

# Technical Publications Query Form

From .....  
.....  
Postcode .....  
Tel. No. ....  
Fax No. ....  
Date .....

Queries on manual content should be stated clearly below, giving Aircraft Type and full manual reference. This form should then be faxed (*preferably*) or mailed to the address below.

Aircraft type/Model ..... Registration .....  
Title of Manual ..... Revision No. ....  
ATA Ref. .... Page ..... Page Date .....

To ensure a quicker reply, provide as much information as possible. Attaching marked - up pages where possible is also helpful.

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

*Fold page top to bottom to Line X-X, staple and post. (If not faxed)*

**T.I.S.**

Contact ..... Tel. Ext. ....

T.I.S. Reply .....

.....  
.....  
.....  
.....  
.....  
.....

X

X

To: Manager,  
Technical Information Services  
G2, TB"A" S.401  
LHR

Fax. (LHR) 23414

# Technical Publications Query Form

From .....  
.....  
Postcode .....  
Tel. No. ....  
Fax No. ....  
Date .....

Queries on manual content should be stated clearly below, giving Aircraft Type and full manual reference. This form should then be faxed (*preferably*) or mailed to the address below.

Aircraft type/Model ..... Registration .....  
Title of Manual ..... Revision No. ....  
ATA Ref. .... Page ..... Page Date .....

To ensure a quicker reply, provide as much information as possible. Attaching marked - up pages where possible is also helpful.

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

*Fold page top to bottom to Line X-X, staple and post. (If not faxed)*

**T.I.S.**

Contact ..... Tel. Ext. ....

T.I.S. Reply .....

.....  
.....  
.....  
.....  
.....

X

To: Manager,  
Technical Information Services  
G2, TB "A" S.401  
LHR

Fax. (LHR) 23414





# OLYMPUS 593 MK 610-14-28 OVERHAUL MANUAL

## ENGINE

Compiled in compliance with TSS No. 0-2  
and the relevant national requirements.

Signed *J. Moore*  
Date 15.9.75

Rolls-Royce (1971) Limited

Signed *J. D. Rapp*  
Date 15.9.75

SNECMA

**TECHNICAL PUBLICATION No. TP.187/1/RR/SN**



1975

This document is the property of Rolls-Royce (1971) Limited and SNECMA  
and may not be copied or communicated to a third party or used for any  
purpose other than that for which it is supplied without the express written  
authority of Rolls-Royce (1971) Limited/SNECMA.

**ROLLS-ROYCE (1971) LIMITED**

BRISTOL ENGINE DIVISION

TECHNICAL PUBLICATIONS DEPARTMENT

P.O. BOX 3, FILTON, BRISTOL, BS12 7QE, ENGLAND

**SNECMA**

DOCUMENTATION TECHNIQUE

BOITE POSTALE 19

91104 CORBEIL-ESSONNES, FRANCE



# OLYMPUS 593 MK 610-14-28 OVERHAUL MANUAL

## ENGINE

Compiled in compliance with TSS No. 0-2  
and the relevant national requirements.

Signed *J. Moore*  
Date 15.9.75  
Rolls-Royce (1971) Limited

Signed *J. D. Remy*  
Date 15.9.75  
SNECMA

**TECHNICAL PUBLICATION No. TP.187/1/RR/SN**



1975

This document is the property of Rolls-Royce (1971) Limited and SNECMA  
and may not be copied or communicated to a third party or used for any  
purpose other than that for which it is supplied without the express written  
authority of Rolls-Royce (1971) Limited/SNECMA.

**ROLLS-ROYCE (1971) LIMITED**  
BRISTOL ENGINE DIVISION

TECHNICAL PUBLICATIONS DEPARTMENT  
P.O. BOX 3, FILTON, BRISTOL, BS12 7QE, ENGLAND

**SNECMA**  
DOCUMENTATION TECHNIQUE

BOITE POSTALE 19  
91104 CORBEIL-ESSONNES, FRANCE

**ALL TECHNICAL MANUALS**

**MANUAL HOLDER'S RESPONSIBILITIES**

The registered holder of this manual is responsible for ensuring:-

That all revisions are correctly incorporated without delay.


That this manual is readily available to the holder's staff and that revisions are brought to their attention.

That any suspected error or omission is reported to Technical Publications.

That Technical Publications is advised of any change in the holder's title and/or address.

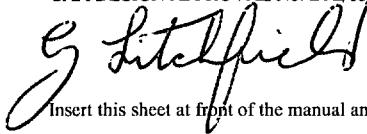
That loss of this manual is reported to Technical Publications.

That when the holder's duties no longer require him to hold this manual that it is returned to Technical Publications.

  
CHIEF ENGINEER

To be inserted in front of the manual frontispiece.

THIS TRANSMITTAL IS ISSUED BY BRITISH AIRWAYS ENGINEERING (TECHNICAL INFORMATION SERVICES, G2, TBA, S401, P. O. BOX 10, HEATHROW AIRPORT, HOUNSLOW, MIDDLESEX TW6 2JA) AND TEMPORARY REVISIONS CONTAINED IN THE MANUAL, AS LISTED BELOW, COMPLY WITH BCAR'S CHAPTER A5-3, B5-3 AND/OR TSS No. 0-2 AS REQUIRED.  
CAA DESIGN APPROVAL No. DA1/8566/78.



For TECHNICAL &amp; QUALITY DIRECTOR

Insert this sheet at front of the manual and destroy previous issue. Complete Revision Record Sheet after revision incorporation.

**ROLLS-ROYCE / SNECMA OLYMPUS 593 ENGINE OVERHAUL MANUAL**

Approved Technical Publication No. E6868

TL No. 107A

**TIS REMINDER-IF ENGINE TIME LIMITS (CHAPTER 5) ARE REVISED UPDATE  
ATP 04701**

1. Check that BA Revision 106A has been incorporated.

2. ACTION :

<u>A.T.A.</u>	<u>Remove</u>	<u>Insert</u>	<u>Reason</u>
VARIOUS 78-13-01 P568		Revision 107 TR 78-537	Mfrs. update.

**NOTE:** For references throughout this manual to ATP Nos. E7496, E7497 and E7592 read ATP No. E6868.

# BRITISH AIRWAYS

ATP E6868 TL No. 107A (Cont'd)

## ACTION (Cont'd)

### BA PAGES

The following list should be read in conjunction with vendor list of effective pages:

<u>Chap/Topic</u>	<u>Page</u>	<u>Date</u>	<u>Chap/Topic</u>	<u>Page</u>	<u>Date</u>
<u>Chapter 72</u>			78-12-01	306	Apr/90 (BA 1)
72-09-00	308	30.8.76		309	Apr/90 (BA 1)
Inspection/ Check			78-13-01	309	Apr/90 (BA 1)
<u>Chapter 78</u>			Twin Sec Nozzle Assy - Removable Parts		
78-11-01	306	Apr/90 (BA 1)	78-31-01	303	Apr/90 (BA 1)
	307	Apr/90 (BA 1)	Bucket Assy -	305	Apr/90 (BA 1)
	308	Apr/90 (BA 1)	Removable Parts		
	312	Apr/90 (BA 1)			
	314	Apr/90 (BA 1)			

### TEMPORARY REVISIONS

This manual contains the following BA TRs:

NOTE: Reference must always be made to the Concorde Manual Supplement - ATP No. E7925.

<u>Chap/Topic</u>	<u>A.T.A.</u>	<u>Page</u>	<u>TR No.</u>	<u>Date</u>
<u>Chapter 71</u>				
Inspection	71-20-00	305	71-505	16.7.79
Assembly	71-00-02	501	71-507	30.9.87
	71-00-03	501	71-506	21.11.79
	71-09-00	518	71-504	14.11.77

# BRITISH AIRWAYS

ATP E6868 TL No. 107A (Cont'd)

ACTION (Cont'd)

TRs (Cont'd)

<u>Chap/Topic</u>	<u>A.T.A.</u>	<u>Page</u>	<u>TR No.</u>	<u>Date</u>
<u>Chapter 72</u>				
Disassembly	72-09-00	105	72-596	15.4.96
Cleaning	72-09-00	201	72-510	1.5.81
		204	72-585	1.8.86
		205	72-586	1.8.86
		210	72-587	1.8.86
		211	72-588	1.8.86
		212	72-589	1.8.86
		213	72-590	1.8.86
		214	72-591	1.8.86
		220	72-592	1.8.86
	72-33-01	204	72-502	1.5.81
	72-65-00	201	72-578	18.1.82
Inspection	72-09-00	321	72-561	23.7.81
		327	72-555	3.7.81
		335	72-562	23.7.81
		336	72-563	23.7.81
		339	72-522	1.5.81
		340	72-564	23.7.81
	72-31-02	302	72-565	23.7.81
	72-33-02	302	72-566	23.7.81
	72-34-00	313	72-551	1.5.81
	72-51-02	305	72-504	1.5.81
	72-51-03	304	72-567	23.7.81
	72-52-02	314	72-568	23.7.81
	72-54-01	303	72-569	23.7.81
Repair	72-09-13	405	72-570	23.7.81
	72-21-01 (R2)	416	72-594	26.8.88
	72-22-01	END	72-533	1.5.81
	72-31-01 (R2)	403	72-514	1.5.81
	72-31-01	END	72-581	9.9.82
	72-31-02 (R1)	403	72-515	1.5.81
	72-31-02	END	72-536	1.5.81
	72-31-03 (R6)	403	72-513	1.5.81
	72-33-01 (R2)	403	72-517	1.5.81

# BRITISH AIRWAYS

ATP E6868 TL No. 107A (Cont'd)

## ACTION (Cont'd)

### TRs (Cont'd)

<u>Chap/Topic</u>	<u>A.T.A.</u>	<u>Page</u>	<u>TR No.</u>	<u>Date</u>
<u>Chapter 72 (Cont'd)</u>				
Repair (Cont'd)	72-33-01	408	72-501	1.5.81
		END	72-526	1.5.81
		END	72-537	1.5.81
	72-33-02 (R6)	403	72-516	1.5.81
	72-33-02	END	72-509	1.5.81
		END	72-535	1.5.81
	72-34-00	END	72-527	1.5.81
		END	72-531	1.5.81
		END	72-547	1.5.81
	72-51-01	END	72-525	1.5.81
		END	72-543	1.5.81
	72-51-02	END	72-511	1.5.81
		END	72-548	1.5.81
	72-52-01	END	72-507	1.5.81
		END	72-508	1.5.81
		END	72-523	1.5.81
		END	72-524	1.5.81
		END	72-544	1.5.81
	72-53-00	END	72-505	1.5.81
		END	72-538	1.5.81
		END	72-549	1.5.81
	72-54-01	404	72-571	23.7.81
	(R6-150B-4)			
	72-61-00 (R1)	404	72-506	1.5.81
	72-61-00	END	72-529	1.5.81
	72-63-02	END	72-595	18.3.92
Assembly	72-00-51	551	72-530	1.5.81
	72-33-00	501	72-518	1.5.81
	72-33-02	528	72-572	23.7.81
	72-52-02	521	72-573	23.7.81
		542	72-540	1.5.81
Fits & Clearances	72-00-00	603	72-582	28.2.83
	72-40-00	603	72-583	28.2.83

# BRITISH AIRWAYS

ATP E6868 TL No. 107A (Cont'd)

## ACTION (Cont'd)

### TRs (Cont'd)

<u>Chap/Topic</u>	<u>A.T.A.</u>	<u>Page</u>	<u>TR No.</u>	<u>Date</u>
<u>Chapter 72 (Cont'd)</u>				
Testing	72-00-25	750	72-574	23.7.81
	72-00-27	717	72-575	23.7.81
		723	72-528	1.5.81
	72-00-28	709	72-576	23.7.81
	72-00-29	703	72-577	23.7.81
		715	72-503	1.5.81
Light/Overhaul	72-31-02	1302	72-519	1.5.81
	72-51-03	1301	72-541	1.5.81
	72-52-02	1301	72-539	1.5.81
		1303	72-520	1.5.81
<u>Chapter 74</u>				
Inspection	74-20-00	304	74-501	1.5.81
Disassembly	74-21-01	101	74-A	11.3.91
<u>Chapter 75</u>				
Repair	75-01-03	203	75-501	1.5.81
	75-01-04	203	75-503	1.5.81
	75-01-05	203	75-504	1.5.81
	75-02-02	203	75-502	1.5.81
<u>Chapter 77</u>				
Repair	77-12-03	306	77-501	1.5.81



# BRITISH AIRWAYS

ATP E6868 TL No. 107A (Cont'd)

ACTION (Cont'd)

TRs (Cont'd)

<u>Chap/Topic</u>	<u>A.T.A.</u>	<u>Page</u>	<u>TR No.</u>	<u>Date</u>
<u>Chapter 78</u>				
Inspection	78-11-01	301	78-523	27.1.89
		313	78-503	5.6.84
		315	78-502	11.4.84
		316	78-529	21.9.93
	78-12-01	301	78-524	27.1.89
		312	78-534	2.12.97
		315	78-530	21.9.93
		301	78-525	27.1.89
	78-31-01	301	78-526	27.1.89
	78-31-01	304	78-535	2.12.97
	BUCKET ASSY - REM. PARTS			
	78-31-01	307	78-531	21.9.93
	BUCKET ASSY - REM. PARTS			
	78-31-01	308	78-532	21.9.93
	BUCKET ASSY - REM. PARTS			
Repair	78-13-01	401	78-501	14.2.84
	78-31-01	401	78-533	21.9.93
	REP. PARTS LIST			
	78-31-01	401	78-510	30.7.87
	REP 1-50-1			
	78-31-01	402	78-527	3.4.92
	REP 1-460-2			
	78-31-01	408	78-528	3.4.92
	REP 1-460-2			
Assembly	78-13-01	568	78-537	12.9.01
Detailed Parts List	78-13-01	1101-0	78-536	26.2.98

**ATP  
TEMPORARY  
REVISION**

**BRITISH AIRWAYS**

TR Page 1 of 3

OLYMPUS 593

12 September, 2001

OVERHAUL MANUAL

ATP: E6868

TEMPORARY REVISION No. 78-537

THIS TEMPORARY REVISION IS ISSUED BY BRITISH AIRWAYS ENGINEERING (TECHNICAL INFORMATION SERVICES, G2, TBA, S401, P. O. BOX 10, HEATHROW AIRPORT, HOUNSLOW, MIDDLESEX TW6 2JA).  
CAA DESIGN APPROVAL No. DAI/8566/78.

Manual Reference 78-13-01 Page 568

**REASON FOR REVISION**

EOC-COM-78G076 - Telescopic tube fail safe ring.

**ACTION**

Paragraph 22. Installation of Bucket Drive Pneumatic Actuators  
(Figure 513).

NOTE: EOC-COM-78G076 (Rolls-Royce/SNECMA SB OL.593-78-28235-47).

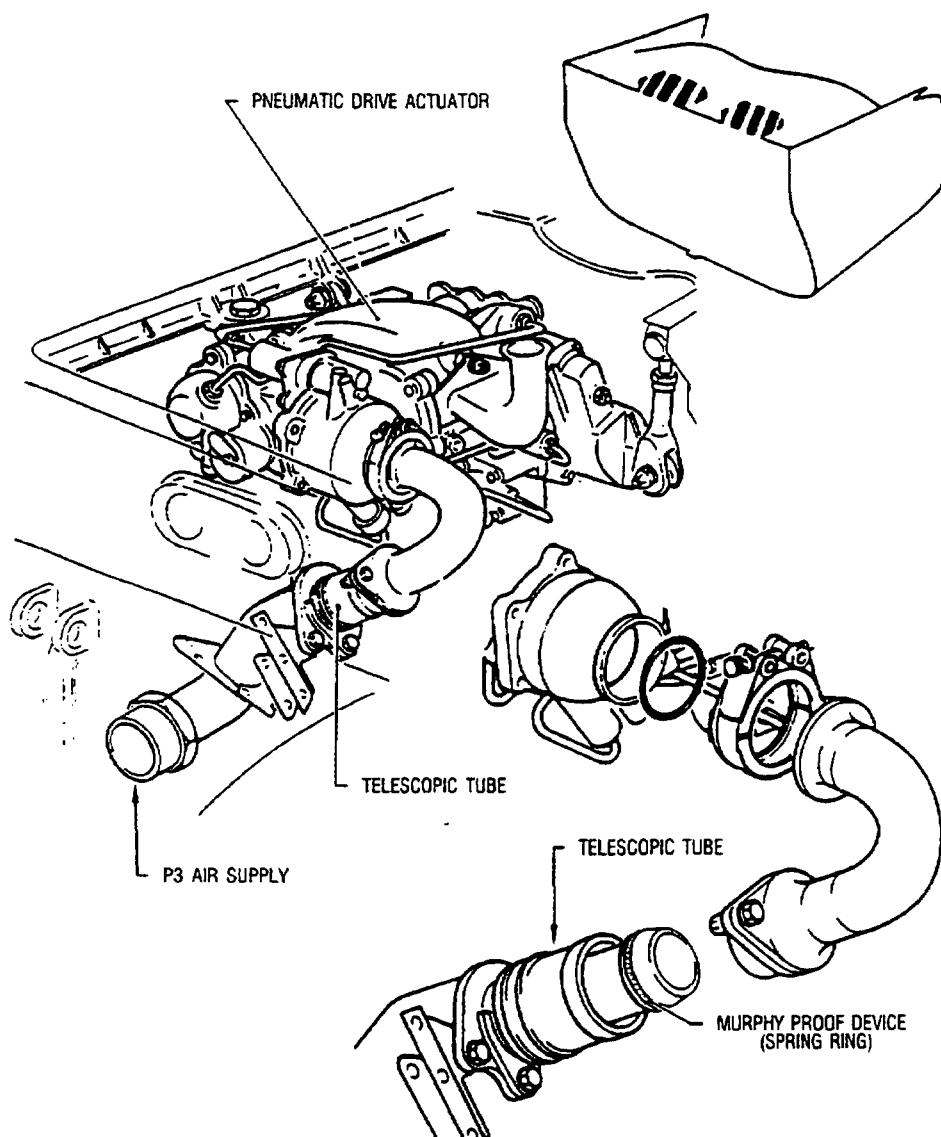
Telescopic tubes (Figure 513, Item 17-10) are used to provide a dynamic link between fixed and variable air ducts in the Concorde thrust reverser system. Several cases of incorrect installation of the telescopic tube have been identified during the service life of the aircraft. EOC-COM-78G076 introduces a spring ring which fits in the groove at one end of the tube, preventing incorrect installation (See TR Figures 1 and 2).

Originator: A.Cope  
Reference: EOC-COM-78G076  
Workbook: GE 78-54

78-13-01  
Page 568

OLYMPUS 593  
OVERHAUL MANUAL  
ATP: E6868

TEMPORARY REVISION No. 78-537 (Cont'd)



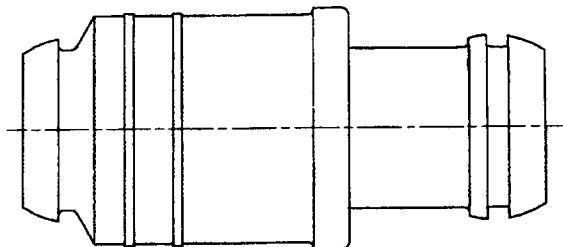
Telescopic Tube  
Location in the Twin Secondary Nozzle  
TR Figure 1

OLYMPUS 593  
OVERHAUL MANUAL  
ATP: E6868

TEMPORARY REVISION No. 78-537 (Cont'd)

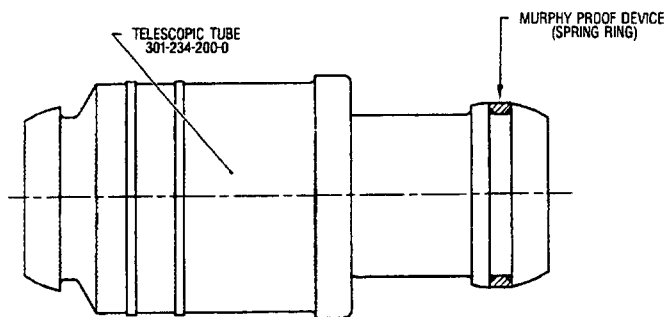
**BEFORE**

301-234-200-0



**AFTER**

301-810-501-0



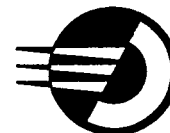
Telescopic Tube Assembly  
Installation of the Spring Ring  
TR Figure 2



P.O.Box 3, Filton, Bristol BS34 7QE, England

Fax: (0117) 979 7234

Telephone: (0117) 979 6060



sneema

APRIL, 2002

OLYMPUS 593 MK.610-14-28  
OVERHAUL MANUAL

Publication Ref. TP.187/1/RR/S

LETTER OF TRANSMITTAL  
FOR  
REVISION NO.107

The contents of this revision is approved by  
ROLLS-ROYCE plc - SNECMA  
in accordance with TSS Standard No.0-2

EMBODIMENT INSTRUCTIONS

Verify that the preceeding revision has been embodied and then insert the accompanying pages of this revision in the correct ATA sequence in accordance with the following instructions.

<u>CHAPTER</u>	<u>REMOVE PAGES</u>	<u>INCORPORATE PAGES</u>
<u>Manual Contents</u> <u>/Introduction</u>		
List of Effective Pages	1	1
Service Bulletin List	7 to 14	7 to 14
<u>71 - Power Plant</u>		
List of Effective Pages	1 to 10	1 to 10
71-00-01 Assembly Stage 2	521 to 524	521 to 524

8800017477/1

Letter of Transmittal Continued

<u>CHAPTER</u>	<u>REMOVE PAGES</u>	<u>INCORPORATE PAGES</u>
<u>71 - Power Plant</u> (Cont'd.)		
71-00-01 Assembly Stage 3	537 to 542	537 to 554
Assembly Stage 4	501/502 507/508 511 to 516 541 to 544	501/502 507/508 511 to 516 541 to 544
Assembly Stage 5	503/504 511 to 514 519/520 543/544	503/504 511 to 514 519/520 543/544
Assembly Stage 6	507/508 519/520 523/524	507/508 519/520 523/524
71-00-03	523/524	523/524
71-09-00	503/504	503/504
<u>72 - Cleaning</u>		
List of Effective Pages	1/2	1/2
72-09-00	235/236	235/236
<u>72 - Inspection</u> <u>/Check</u>		
List of Effective Pages	1 to 4 7 to 10	1 to 4 7 to 10
72-09-03	309/310 318A to 322 330A to 332	309/310 318A to 322 330A to 332

Letter of Transmittal Continued

<u>CHAPTER</u>	<u>REMOVE PAGES</u>	<u>INCORPORATE PAGES</u>
<u>72 - Inspection</u> <u>/Check</u> (Cont'd.)		
72-31-04	310A/310B	310A/310B
72-52-02	301/302 TR.72-306 327/328 TR.72-307	301/302  327/328
<u>72 - Repair</u>		
List of Effective Pages	1/2 5/6 7/8 17/18	1/2 5/6 7/8 17/18
72-09-31	407/408 423/424	407/408 423/424
72-31-03 Repair No.9	401 to 404	401 to 404
72-41-01 Repair No.8	403/404	403/404
<u>72 - Assembly</u> <u>/Sub-Assembly</u>		
List of Effective Pages	1 to 4 9 to 18	1 to 4 9 to 18
72-00-00	523/524 527/528 533/534 547/548 555 to 558 563/564 569/570	523/524 527/528 533/534 547/548 555 to 558 563/564 569/570

Letter of Transmittal Continued

<u>CHAPTER</u>	<u>REMOVE PAGES</u>	<u>INCORPORATE PAGES</u>
<u>72 - Assembly</u> <u>Sub Assembly&amp;</u> <u>(Cont'd.)</u>		
72-00-51 Contents	1/2 521 to 524 527 to 530 535/536 539/540 549/550 571 to 578 581 to 584 597 to 598B 598.3 to 598.6 598.9 to 598.14 598.19/598.20 598.29 to 598.34	1/2 521 to 524 527 to 530 535/536 539/540 549/550 571 to 578 581 to 584 597 to 598B 598.3 to 598.6 598.9 to 598.14 598.19\598.20 598.29 to 598.34
72-09-00	501/502	501/502
72-32-00	502A to 502D 502Q to 504 515/516 523/524 526A to 532 561/562 565 to 568 583 to 590 597 to 598.2 598.5 to 598.8 598.19 to 598.24 598.45 to 598.48	502A to 502D 502Q to 504 515/516 523/524 526A to 532 561/562 565 to 568 583 to 590 597 to 598.2 598.5 to 598.8 598.19 to 598.24 598.45 to 598.48
72-33-00	531/532 548A to 550 553 to 556 563/564 573/574 587/588 598.1/598.2 598.15 to 598.18 598.25/598.26 598.66A to 598.68 598.81 to 598.83	531/532 548A to 550 553 to 556 563/564 573/574 587/588 598.1/598.2 598.15 to 598.18 598.25/598.26 598.66A to 598.68 598.81 to 598.83



Letter of Transmittal Continued

<u>CHAPTER</u>	<u>REMOVE PAGES</u>	<u>INCORPORATE PAGES</u>
<u>72 - Assembly</u> <u>Sub Assembly&amp;</u> (Cont'd.)		
72-33-01	501 to 504 507/508 511/512	501 to 504 507/508 511/512
72-51-03	529 to 532 539/540 557/558 563 to 566 573/574	529 to 532 539/540 557/558 563 to 566 573/574
72-52-01	503/504	503/504
72-52-02	529 to 530B 551 to 554 557/558	529 to 530B 551 to 554 557/558
72-52-03	503/504 509 to 512 515 to 518	503/504 509 to 512 515 to 518
72-53-00	515/516 519 to 526B 533/534 537/538 541/542 545/546 549 to 552 561/562 565/566	515/516 519 to 526B 533/534 537/538 541/542 545/546 549 to 552 561/562 565/566
<u>72 - Testing</u>		
List of Effective Pages	1/2	1/2
72-00-25	713/714	713/714

## Letter of Transmittal Continued

<u>CHAPTER</u>	<u>REMOVE PAGES</u>	<u>INCORPORATE PAGES</u>
<u>72 - Special Tools</u>		
List of Effective Pages	1/2	1/2
Contents	1	1
72-00-25	1001/1002	1001 to 1003
72-09-03	1001 to 1006	1001 to 1006
72-09-04	-	1001 to 1003
<u>73 - Fuel and Control</u>		
List of Effective Pages	1 to 4	1 to 4
73-12-05 Repair Contents	1	1
Repair No.1	401 to 418 TR.73-001	401 to 421
Repair No.2	TR.73-002	401 to 404
<u>76 - Controls</u>		
List of Effective Pages	1/2	1/2
76-13-03 Assembly	503	503
76-21-01 Assembly	507/508	507/508

Letter of Transmittal Continued

<u>CHAPTER</u>	<u>REMOVE PAGES</u>	<u>INCORPORATE PAGES</u>
<u>79 - Oil</u>		
List of Effective Pages	1/2	1/2
79-10-00 Inspection/Check	308A to 312 TR.79-002	308A to 312

Record the incorporation of the revision on the Revision Record Sheet and the removal of the TR's on the Temporary revision record sheet at the front of the manual.

Book No.....  
Held by .....

# OLYMPUS 593 MK.610-14-28 OVERHAUL MANUAL

## HIGHLIGHTS FOR REVISION NO.107

### Chapter/Topic

#### 71 - Power Plant

71-00-01 Assembly Stage 2	Bolt lubricant and torque figures amended in accordance with SB.0L.593-72-9044-436.
71-00-01 Assembly Stage 3	Bolt lubricant and torque figures amended in accordance with SB.0L.593-72-9044-436.
71-00-01 Assembly Stage 4	Bolt lubricant and torque figures amended in accordance with SB.0L.593-72-9044-436.
71-00-01 Assembly Stage 5	Bolt lubricant and torque figures amended in accordance with SB.0L.593-72-9044-436.
71-00-01 Assembly Stage 6	Bolt lubricant and torque figures amended in accordance with SB.0L.593-72-9044-436.
71-00-03 Engine Despatch	Bolt lubricant and torque figures amended in accordance with SB.0L.593-72-9044-436.
71-09-00	Rocol 251T added to list of approved materials.

#### 72 - Cleaning

72-09-00	References to Trichloroethane and associated NOTE deleted.
----------	---

#### 72 - Inspection/ Check

72-09-03	Examination of Stage 1 LP Comp. Rotor Blades and Stator Vanes amended.
72-31-04	LPC Drive Shaft - Sleeve inspection limits removed and replaced with NOTE.
72-52-02	Temporary Revisions 72-306 and 72-307 incorporated.

## HIGHLIGHTS OF REVISION 107 (CONTINUED)

### 72 - Repair

72-09-31	Inspection port location diagram amended.
72-31-03 Repair No.9	Amended to add new part number and revise grinding dimension.
72-41-01 Repair No.8	Amended to revise lubricant reference for vaporiser threads.

### 72 - Assembly/ Sub-Assembly

72-00-00	Bolt lubricant and torque figures amended in accordance with SB.0L.593-72-9044-436. Amendment to procedure when assembling locking tube to LP Drive Shaft.
72-00-51	Bolt lubricant and torque figures amended in accordance with SB.0L.593-72-9044-436. Illustration 527A added - CC0C Blanking Cover Details (SB.72-8605-276).
72-09-00	Rocol 251T added to list of approval materials.
72-32-00	Bolt lubricant and torque figures amended in accordance with SB.0L.593-72-9044-436.
72-33-00	Bolt lubricant and torque figures amended in accordance with SB.0L.593-72-9044-436.
72-33-01	Bolt lubricant and torque figures amended in accordance with SB.0L.593-72-9044-436.
72-51-03	Bolt lubricant and torque figures amended in accordance with SB.0L.593-72-9044-436.
72-52-01	Bolt lubricant and torque figures amended in accordance with SB.0L.593-72-9044-436.
72-52-02	Bolt lubricant and torque figures amended in accordance with SB.0L.593-72-9044-436.
72-52-03	Bolt lubricant and torque figures amended in accordance with SB.0L.593-72-9044-436.
72-53-00	Bolt lubricant and torque figures amended in accordance with SB.0L.593-72-9044-436.

## HIGHLIGHTS OF REVISION 107 (CONTINUED)

### 72 - Testing

72-00-25                      Tool identification number added for Fuel Pressure (Transducer) Adaptor Assembly.

### 72 - Special Tools

72-09-03                      Engine Internal Examination photographic equipment removed from this section.

72-09-04                      New section created for Engine Internal Examination photographic equipment

### 73 - Fuel and Control

73-12-05                      Temporary Revision 73-001 incorporated.  
Temporary Revision 73-002 incorporated.

### 76 - Controls

76-13-03                      Bolt lubricant and torque figures amended in accordance with SB.0L.593-72-9044-436.

76-21-01                      Bolt lubricant and torque figures amended in accordance with SB.0L.593-72-9044-436.

### 79 - Oil

79-10-00                      Temporary Revision 79-002 incorporated.



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



RECORD OF REVISIONS

REV NO.	ISSUE DATE	DATE INSERTED	BY	REV NO.	ISSUE DATE	DATE INSERTED	BY	REV NO.	ISSUE DATE	DATE INSERTED	BY
86	24.2.92	16.4.92	/L	99	05.3.98	06.4.98	KS				
86A	3.4.92	16.4.92	/L	99A	06.4.98	06.4.98	KS				
87	16.7.92	28.10.92	MC	100	15.8.98	22.10.98	KS				
88	29.1.93	14.5.93	AS	100A	20.10.98	22.10.98	KS				
88A	7.5.93	17.5.93	AS	101	12.2.99	7.5.99	CL				
89	30.8.93	4.10.93	CRG	101A	20.4.99	7.5.99	CL				
89A	21.8.93	5.10.93	CRG	102	12.11.99	12.11.99	CL				
90	8.2.94	14.6.94	CRG	102A	12.11.99	12.11.99	CL				
90A	28.4.94	14.6.94	CRG	103	24.4.00	24.4.00	CL				
91	31.8.94	10.1.95	CRG	103A	24.4.00	24.4.00	CL				
92	4.11.94	10.1.95	CRG	104	25.9.00	25.9.00	CL				
92A	14.12.94	10.1.95	CRG	104A	21.9.00	25.9.00	CL				
93	21.1.95	24.3.95	CRG	105	2.5.01	8.5.01	CL				
93A	1.3.95	24.3.95	CRG	105A	2.5.01	8.5.01	CL				
94	30.6.95	23.10.05	AS	106	30.6.01	13.11.01	DA				
94A	10.10.95	23.10.95	AS	106A	6.11.01	13.11.01	DA				
95	27.2.96	19.4.96	AS	107	20.9.02	24.9.02	LS				
95A	15.4.96	19.4.96	AS	107A	20.9.02	24.9.02	LS				
96	15.8.96	15.11.96	AS								
96A	12.11.96	15.11.96	A.S.								
97											
97A											
98	30.8.97	4.12.97	KS								
98A	2.12.97	4.12.97	KS								

P124

RECORD OF REVISIONS

Page 2  
Dec 1/85



OLYMPUS 593

MK.610-14-28

OVERHAUL



## RECORD OF TEMPORARY REVISIONS

TEMPORARY REV. NO.	PAGE NUMBER	ISSUE DATE	BY	DATE REMOVED	BY
72-550	-	-	-	REV. 86.A.	<i>[Signature]</i>
72-051	-	-	-	REV. 86.	<i>[Signature]</i>
72-052	-	-	-	REV. 86.	<i>[Signature]</i>
72-053	-	-	-	REV. 86.	<i>[Signature]</i>
72-054	-	-	-	REV. 86.	<i>[Signature]</i>
72-595	72-63-02 RST 4035	18-3-92	<i>[Signature]</i>		
78-527	78-31-01 REP. 1-460-2 P.402	3-4-92	<i>[Signature]</i>		
78-528	78-31-01 REP. 1-460-2 P.403	3-4-92	<i>[Signature]</i>		
5-021	-	-	-	REV. 88	A.S.
72-070	-	-	-	REV. 88	A.S.
72-088	-	-	-	REV. 88.	A.S.
72-089	-	-	-	REV. 88	A.S.
72-090	-	-	-	REV. 88	A.S.
72-091	-	-	-	REV. 88	A.S.
72-080	-	-	-	REV. 88	A.S.
77-078	-	-	-	REV. 88.	A.S.
72-079	-	-	-	REV. 88	A.S.
72-081	-	-	-	REV. 88	A.S.
72-082	-	-	-	REV. 88	A.S.
72-074	-	-	-	REV. 88	A.S.
72-084	-	-	-	REV. 88	A.S.
72-086	-	-	-	REV. 88	A.S.
72-085	-	-	-	REV. 88	A.S.
72-073	-	-	-	REV. 88	A.S.

P125

RECORD OF TEMPORARY REVISIONS

TR Page 4

Dec 1/91



**OLYMPUS 593**

MK.610-14-28

OVERHAUL

RECORD OF TEMPORARY REVISIONS

TEMPORARY REV. NO.	PAGE NUMBER	ISSUE DATE	BY	DATE REMOVED	BY
72-068	—	—	—	REV. 88	A.S.
72-087	—	—	—	REV. 88	A.S.
72-083	—	—	—	REV. 88	A.S.
72-069	—	—	—	REV. 88	A.S.
72-077	—	—	—	REV. 88	A.S.
72-076	—	—	—	REV. 88	A.S.
72-071	—	—	—	REV. 88	A.S.
72-072	—	—	—	REV. 88	A.S.
72-075	—	—	—	REV. 88	A.S.
72-092	—	—	—	REV. 88	A.S.
72-093	—	—	—	REV. 88	A.S.
75-001	—	—	—	REV. 88	A.S.
5-022	—	—	—	Rev 89	CRC
71-002	—	—	—	Rev 89	CRC
72-107	—	—	—	Rev 89	CRC
72-108	—	—	—	Rev 89	CRC
72-110	—	—	—	Rev 89	CRC
72-104	—	—	—	Rev 89	CRC
72-105	—	—	—	Rev 89	CRC
72-103	—	—	—	Rev 89	CRC
72-101	—	—	—	Rev 89	CRC
72-111	—	—	—	Rev 89	CRC
72-099	—	—	—	Rev 89	CRC
72-106	—	—	—	Rev 89	CRC

P125

RECORD OF TEMPORARY REVISIONS

TR Page 5

Dec 1/91

**OLYMPUS 593**

MK.610-14-28

OVERHAUL

RECORD OF TEMPORARY REVISIONS

TEMPORARY REV. NO.	PAGE NUMBER	ISSUE DATE	BY	DATE REMOVED	BY
72-100	—	—	—	Rev 89	CRC
72-112	—	—	—	Rev 89	CRC
72-094	—	—	—	Rev 89	CRC
72-095	—	—	—	Rev 89	CRC
72-096	—	—	—	Rev 89	CRC
72-097	—	—	—	Rev 89	CRC
72-102	—	—	—	Rev 89	CRC
72-098	—	—	—	Rev 89	CRC
72-109	—	—	—	Rev 89	CRC
75-002	—	—	—	Rev 89	CRC
75-003	—	—	—	Rev 89	CRC
75-004	—	—	—	Rev 89	CRC
75-005	—	—	—	Rev 89	CRC
5-023	—	—	—	Rev 90	CRC
72-113	—	—	—	Rev 90	CRC
72-114	—	—	—	Rev 90	CRC
72-128	—	—	—	Rev 90	CRC
72-120	—	—	—	Rev 90	CRC
72-121	—	—	—	Rev 90	CRC
72-130	—	—	—	Rev 90	CRC
72-131	—	—	—	Rev 90	CRC
72-129	—	—	—	Rev 90	CRC
72-115	—	—	—	Rev 90	CRC
72-116	—	—	—	Rev 90	CRC

P125

RECORD OF TEMPORARY REVISIONS

TR Page 6

Dec 1/91

PRINTED IN ENGLAND



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



RECORD OF TEMPORARY REVISIONS

TEMPORARY REV. NO.	PAGE NUMBER	ISSUE DATE	BY	DATE REMOVED	BY
72-117	—	—	—	Rev 90	CRC
72-118	—	—	—	Rev 90	CRC
72-119	—	—	—	Rev 90	CRC
72-122	—	—	—	Rev 90	CRC
72-123	—	—	—	Rev 90	CRC
72-124	—	—	—	Rev 90	CRC
72-125	—	—	—	Rev 90	CRC
72-126	—	—	—	Rev 90	CRC
72-127	—	—	—	Rev 90	CRC
72-132	—	—	—	Rev 90	CRC
5-024	—	—	—	REV 92	CRC
5-025	—	—	—	REV 92	CRC
71-003	—	—	—	REV 92	CRC
71-004	—	—	—	REV 92	CRC
72-033	—	—	—	REV 92	CRC
72-034	—	—	—	REV 92	CRC
72-035	—	—	—	REV 92	CRC
72-036	—	—	—	REV 92	CRC
72-037	—	—	—	REV 92	CRC
72-038	—	—	—	REV 92	CRC
72-039	—	—	—	REV 92	CRC
72-040	—	—	—	REV 92	CRC
72-041	—	—	—	REV 92	CRC
72-042	—	—	—	REV 92	CRC

P125

RECORD OF TEMPORARY REVISIONS  
TR Page 7  
Jul 31/93

PRINTED IN ENGLAND



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



RECORD OF TEMPORARY REVISIONS

TEMPORARY REV. NO.	PAGE NUMBER	ISSUE DATE	BY	DATE REMOVED	BY
72-043	-	-	-	REV 92	CRC
72-044	-	-	-	REV 92	CRC
72-045	-	-	-	REV 92	CRC
72-046	-	-	-	REV 92	CRC
72-047	-	-	-	REV 92	CRC
72-048	-	-	-	REV 92	CRC
72-049	-	-	-	REV 92	CRC
72-050	-	-	-	REV 92	CRC
72-051	-	-	-	REV 92	CRC
72-052	-	-	-	REV 92	CRC
72-053	-	-	-	REV 92	CRC
72-054	-	-	-	REV 92	CRC
72-055	-	-	-	REV 92	CRC
72-056	-	-	-	REV 92	CRC
72-057	-	-	-	REV 92	CRC
72-058	-	-	-	REV 92	CRC
72-059	-	-	-	REV 92	CRC
72-060	-	-	-	REV 92	CRC
72-061	-	-	-	REV 92	CRC
72-062	-	-	-	REV 92	CRC
72-063	-	-	-	REV 92	CRC
72-064	-	-	-	REV 92	CRC
72-065	-	-	-	REV 92	CRC
5-026	-	-	-	REV 93	CRC

P125



### RECORD OF TEMPORARY REVISIONS

[illegible]

**P125**

RECORD OF TEMPORARY REVISIONS  
TR Page 9  
Jul 31/93

PRINTED IN ENGLAND



## СПЕЦМА

Printed in England



## спекта

Printed in England







**Снежа**

# OLYMPUS 593

**MK.610-14-28**  
**OVERHAUL**



## СРЕМА

### RECORD OF TEMPORARY REVISIONS

[illegible]

P125

### RECORD OF TEMPORARY REVISIONS

TR Page 14

Jun 1/98

Printed in England



### RECORD OF TEMPORARY REVISIONS

[illegible]

**P125**

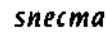
RECORD OF TEMPORARY REVISIONS

TR Page 15

JUN 1/98



## Снежа





### RECORD OF TEMPORARY REVISIONS

[illegible]

**P125**



### RECORD OF TEMPORARY REVISIONS

[illegible]

**P125**



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

## MANUAL CONTENTS/INTRODUCTION

### LIST OF EFFECTIVE PAGES

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
List of Effective Pages	1	Dec 31/01	Introduction	1	Jul 1/76
				2	Dec 1/85
				3	Apr 1/77
				4	Oct 1/76
Service Bulletin List	1	Dec 31/99	Observance of Manual Instructions	1	Mar 1/84
	2	Dec 31/99			
	3	Jun 1/98			
	4	Jun 1/98			
	5	Jun 30/01	Assembly of Parts	1	Jan 4/93
	6	Dec 30/98			
	7	Jun 30/00			
	8	Dec 31/01	Contamination of Engine Components	1	Jun 1/90
	9	Dec 31/01			
	10	Dec 31/01			
	11	Dec 31/01			
	12	Dec 31/99	Hazardous Materials	1	Jun 30/00
	13	Dec 31/01			
	14	Jun 30/01			
	15	Jun 30/01			
	16	Jun 30/01			
	17	Jun 30/00			
	18	Jun 30/01			
Manual Contents	1	Jun 30/00			
	2	Jun 30/00			
	3	Oct 1/76			
	4	Jul 1/76			
	5	Jul 1/76			
	6	Jul 1/79			
	7	Dec 1/81			
	8	Dec 1/81			
	9	Jul 1/81			
	10	Jul 1/81			
	11	Jul 1/81			
	12	Jul 1/81			
	13	Jul 1/81			
	14	Jul 1/81			
	15	Jul 1/81			
	16	Jul 1/81			

MANUAL CONTENTS/INTRODUCTION

LIST OF EFFECTIVE PAGES

Page 1  
Dec 31/01



**OLYMPUS 593**

MK.610-14-28

sneema

OVERHAUL

LIST OF ROLLS-ROYCE/SNECMA SERVICE BULLETINS

The following Service Bulletins have been considered and either incorporated in the manual or found to have no effect. Any S.B. not included has not yet been actioned.

<u>Service Bulletin No.</u>	<u>Rev. No.</u>	<u>Date of incorp.</u>
71-1	1	No effect
71-2	1	Prior to Jul 1/81
71-3	1	No effect
71-4	1	Prior to Jul 1/81
71-5	1	Prior to Jul 1/81
71-6	2	Prior to Jul 1/81
71-7	1	Prior to Jul 1/81
71-8	3	Prior to Jul 1/81
71-9	-	Prior to Jul 1/81
71-10	-	Prior to Jul 1/81
71-11	2	Prior to Jul 1/81
71-12	-	Prior to Jul 1/81
71-13	-	Prior to Jul 1/81
71-14	-	Prior to Jul 1/81
71-15	1	Prior to Jul 1/81
71-16	3	Prior to Jul 1/81
71-17	1	Prior to Jul 1/81
71-18	-	Prior to Jul 1/81
71-19	-	Prior to Jul 1/81
71-8482-20	1	No effect
71-8288-21	-	No effect
71-8502-22	-	No effect
71-8455-23	1	Prior to Jul 1/81
71-8579-24	1	Prior to Jul 1/81
71-8619-25	-	No effect
71-8442-26	-	Prior to Jul 1/81
71-8494-27	1	Jul 1/81
71-8314-28	-	Prior to Jul 1/81
71-8264-29	-	No effect
71-8722-30	-	No effect
71-8885-31	-	Jun 1/88
71-8988-32	3	Jun 1/94
71-9056-33	1	No effect
72-1	-	Prior to Jul 1/81
72-2	-	Prior to Jul 1/81
72-3	-	Prior to Jul 1/81
72-4	-	Prior to Jul 1/81
72-5	1	Jul 1/81
72-6	-	Prior to Jul 1/81
72-7	1	Prior to Jul 1/81
72-8	1	Prior to Jul 1/81
72-9	1	Prior to Jul 1/81

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

SNECMA

Printed in England

<u>Service Bulletin No.</u>	<u>Rev. No.</u>	<u>Date of incorp.</u>
72-10	1	Prior to Jul 1/81
72-11	-	Aug 1/81
72-12	1	Prior to Jul 1/81
72-13	-	No effect
72-14	-	No effect
72-15	1	No effect
72-16	-	No effect
72-17	1	Prior to Jul 1/81
72-18	1	Prior to Jul 1/81
72-19	1	Prior to Jul 1/81
72-20	2	Jul 1/81
72-21	1	Prior to Jul 1/81
72-22	2	No effect
72-23	-	Prior to Jul 1/81
72-24	1	Prior to Jul 1/81
72-25	5	No effect
72-26	2	Prior to Jul 1/81
72-27	1	Prior to Jul 1/81
72-28	-	Prior to Jul 1/81
72-29	2	Prior to Jul 1/81
72-30	1	No effect
72-31	-	Prior to Jul 1/81
72-32	1	Prior to Jul 1/81
72-33	1	No effect
72-34	6	No effect
72-35	1	Prior to Jul 1/81
72-36	1	No effect
72-37	-	Jul 1/81
72-38	-	No effect
72-39	-	Prior to Jul 1/81
72-40	2	No effect
72-41	-	Prior to Jul 1/81
72-42	-	No effect
72-43	-	No effect
72-44	1	Prior to Jul 1/81
72-45	1	No effect
72-46	2	Prior to Jul 1/81
72-47	-	Prior to Jul 1/81
72-48	1	Prior to Jul 1/81
72-49	2	Prior to Jul 1/81

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

Printed in England

<u>Service Bulletin No.</u>	<u>Rev. No.</u>	<u>Date of incorp.</u>
72-50	2	No effect
72-51	2	No effect
72-52	1	Prior to Jul 1/81
72-53	2	No effect
72-54	5	Prior to Jul 1/81
72-55	-	Prior to Jul 1/81
72-56	1	No effect
72-57	1	No effect
72-58	5	Prior to Jul 1/81
72-59	2	No effect
72-60	1	No effect
72-61	1	No effect
72-62	1	No effect
72-63	1	Prior to Jul 1/81
72-64	2	Prior to Jul 1/81
72-65	7	No effect
72-66	-	No effect
72-67	7	No effect
72-68	-	Prior to Jul 1/81
72-69	-	Prior to Jul 1/81
72-70	6	Prior to Jul 1/81
72-71	1	Prior to Jul 1/81
72-8046-72	-	Prior to Jul 1/81
72-73	-	Prior to Jul 1/81
72-74	-	No effect
72-75	1	No effect
72-76	2	No effect
72-77	-	No effect
72-78	1	No effect
72-79	-	No effect
72-80	-	Prior to Jul 1/81
72-81	-	Prior to Jul 1/81
72-82	-	Prior to Jul 1/81
72-83	2	Prior to Jul 1/81
72-84	1	Prior to Jul 1/81
72-85	2	Prior to Jul 1/81
72-86	1	Prior to Jul 1/81
72-87	2	Prior to Jul 1/81
72-88	1	Prior to Jul 1/81
72-89	-	Prior to Jul 1/81
72-90	6	No effect

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

<u>Service Bulletin No.</u>	<u>Rev. No.</u>	<u>Date of incorp.</u>
72-91	1	Prior to Jul 1/81
72-92	9	No effect
72-93	1	Prior to Jul 1/81
72-94	1	Prior to Jul 1/81
72-95	-	No effect
72-96	-	Prior to Jul 1/81
72-97	-	No effect
72-98	-	No effect
72-99	-	No effect
72-100	1	Prior to Jul 1/81
72-101	1	No effect
72-102	2	Prior to Jul 1/81
72-103	1	Prior to Jul 1/81
72-104	1	Prior to Jul 1/81
72-105	2	Prior to Jul 1/81
72-106	2	No effect
72-107	-	No effect
72-108	5	No effect
72-109	-	No effect
72-110	1	Prior to Jul 1/81
72-111	1	No effect
72-112	1	Prior to Jul 1/81
72-113	1	Prior to Jul 1/81
72-114	-	No effect
72-115	1	No effect
72-116	-	Jul 1/81
72-117	-	No effect
72-118	2	Prior to Jul 1/81
72-8712-119	-	Prior to Jul 1/81
72-120	-	Prior to Jul 1/81
72-121	2	No effect
72-122	1	No effect
72-8430-123	1	Prior to Jul 1/81
72-124	1	Prior to Jul 1/81
72-125	-	No effect
72-126	1	No effect
72-127	-	No effect
72-128	-	No effect
72-129	6	Prior to Jul 1/81

SERVICE BULLETIN LIST

Page 4

Jun 1/98

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

Printed in England

<u>Service Bulletin No.</u>	<u>Rev. No.</u>	<u>Date of incorp.</u>
72-130	1	Prior to Jul 1/81
72-131	-	Prior to Jul 1/81
72-132	-	Not issued
72-133	-	No effect
72-134	-	No effect
72-135	-	No effect
72-136	2	No effect
72-137	-	No effect
72-138	2	No effect
72-139	1	Cancelled
72-8434-140	2	No effect
72-141	-	No effect
72-142	-	No effect
72-143	9	No effect
72-8472-144	1	No effect
72-8483-145	5	No effect
72-8562-146	4	Prior to Jul 1/81
72-8517-147	2	No effect
72-8559-148	9	No effect
72-8563-149	7	No effect
72-14040-150	2	
72-8080-151	-	No effect
72-8222-152	-	No effect
72-8259-153	-	May 1/81
72-8305-154	2	May 1/81
72-8566-155	1	Cancelled
72-8496-156	-	No effect
72-8261-157	-	No effect
72-8220-158	-	No effect
72-8513-159	-	No effect
72-8255-160	-	No effect
72-8458-161	-	No effect
72-8267-162	-	No effect
72-8568-163	1	No effect
72-8543-164	-	No effect
72-8368-165	2	No effect
72-7510-166	2	Prior to Jul 1/81
72-8415-167	3	No effect
72-8227-168	-	No effect
72-8456-169	3	No effect
72-8475-170	-	No effect
72-8510-171	-	No effect
72-8446-172	-	May 1/81
72-8262-173	-	May 1/81
72-8319-174	-	No effect
72-8333-175	3	No effect

SERVICE BULLETIN LIST

Page 5

Jun 30/01

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

<u>Service Bulletin No.</u>	<u>Rev. No.</u>	<u>Date of incorp.</u>
72-8300-176	2	No effect
72-8452-177	-	No effect
72-7244-178	-	No effect
72-7856-179	1	Prior to Jul 1/81
72-8302-180	-	Prior to Jul 1/81
72-8038-181	1	Prior to Jul 1/81
72-8599-182	1	No effect
72-8512-183	2	Sep 1/85
72-8531-184	-	No effect
72-8408-185	2	No effect
72-8410-186	1	No effect
72-8260-187	-	Prior to Jul 1/81
72-8525-188	6	No effect
72-8312-189	-	Prior to Jul 1/81
72-8228-190	-	No effect
72-8449-191	1	May 1/81
72-8573-192	-	No effect
72-8600-193	2	Cancelled
72-8440-194	-	Prior to Jul 1/81
72-8532-195	1	No effect
72-8409-196	1	No effect
72-8419-197	-	No effect
72-8310-198	-	No effect
72-8382-199	-	No effect
72-8477-200	2	Prior to Jul 1/81
72-8414-201	-	No effect
72-8506-202	9	No effect
72-8630-203	1	No effect
72-8631-204	-	Cancelled
72-8334-205	-	May 1/81
72-8632-206	5	No effect
72-8540-207	-	No effect
72-8646-208	2	Prior to Jul 1/81
72-8627-209	2	Prior to Jul 1/81
72-8304-210	-	No effect
72-8591-211	-	No effect
72-8610-212	-	Not issued
72-8647-213	-	No effect
72-8470-214	2	No effect
72-8648-215	2	No effect

**OLYMPUS 593**

MK.610-14-28

sneema

OVERHAUL

Printed in England

<u>Service Bulletin No.</u>	<u>Rev. No.</u>	<u>Date of incorp.</u>
72-8495-216	-	No effect
72-3218-217	1	No effect
72-8588-218	5	No effect
72-8284-219	-	No effect
72-8657-220	4	No effect
72-8636-221	-	Prior to Jul 1/81
72-8375-222	1	No effect
72-8615-223	2	No effect
72-8659-224	2	No effect
72-8444-225	-	May 1/81
72-8448-226	-	No effect
72-8639-227	1	No effect
72-8585-228	-	No effect
72-8612-229	-	No effect
72-8625-230	5	No effect
72-8620-231	-	No effect
72-8182-232	-	No effect
72-8660-233	2	Cancelled
72-8404-234	-	May 1/81
72-8441-235	3	No effect
72-8357-236	1	No effect
72-8671-237	-	No effect
72-8142-238	-	No effect
72-8331-239	-	No effect
72-8673-240	4	No effect
72-8668-241	-	No effect
72-8524-242	3	No effect
72-8635-243	-	No effect
72-8592-244	2	No effect
72-8184-245	-	Jul 1/81
72-8651-246	5	Jul 1/81
72-8607-247	-	No effect
72-8677-248	2	Jul 1/81
72-8678-249	-	No effect
72-8682-250	1	No effect
72-8683-251	1	No effect
72-8452-252	5	No effect
72-8576-253	-	Prior to Jul 1/81
72-8684-254	1	Cancelled
72-8685-255	2	Cancelled
72-8629-256	-	Prior to Jul 1/81
72-8564-257	3	No effect
72-8687-258	-	No effect
72-8709-259	1	Cancelled
72-8692-260	1	Jun 1/89
72-8633-261	-	No effect
72-8669-262	-	No effect
72-8713-263	3	No effect



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

<u>Service Bulletin No.</u>	<u>Rev. No.</u>	<u>Date of incorp.</u>
72-8706-264	-	Cancelled
72-8485-265	-	No effect
72-8714-266	1	No effect
72-8490-267	5	No effect
72-8429-268	1	No effect
72-8725-269	-	Jul 1/81
72-8703-270	-	No effect
72-8721-271	-	No effect
72-8689-272	2	Oct 23/81
72-8723-273	1	No effect
72-7433-274	-	No effect
72-8547-275	-	No effect
72-8605-276	-	Prior to Jul 1/81
72-8693-277	-	No effect
72-8574-278	-	No effect
72-8737-279	1	Cancelled
72-8743-280	-	No effect
72-8749-281	-	Cancelled
72-8679-282	2	Prior to Jul 1/81
72-8751-283	-	Jul 1/81
72-8746-284	1	No effect
72-8755-285	-	No effect
72-8697-286	4	No effect
72-8728-287	2	No effect
72-8738-288	1	Cancelled
72-8739-289	-	No effect
72-8731-290	4	Cancelled
72-8766-291	-	Jul 1/81
72-8535-292	-	No effect
72-8763-293	1	No effect
72-8771-294	2	No effect
72-8775-295	-	Dec 1/83
72-8690-296	4	No effect
72-8694-297	3	No effect
72-8730-298	3	No effect
72-8758-299	1	No effect
72-8787-300	2	Sep 1/81
72-8772-301	-	No effect
72-8777-302	1	No effect
72-8756-303	-	No effect
72-8773-304	4	No effect
72-8774-305	2	Oct 1/81
72-8790-306	2	Dec 1/83
72-8784-307	1	Apr 1/82
72-8783-308	1	No effect
72-8794-309	-	No effect
72-8801-310	2	Dec 1/82
72-8800-311	3	Dec 1/85





# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England

<u>Service Bulletin No.</u>	<u>Rev. No.</u>	<u>Date of incorp.</u>
72-8818-312	2	No effect
72-8806-313	2	No effect
72-8825-314	-	No effect
72-8822-315	-	No effect
72-8836-316	2	No effect
72-8828-317	-	No effect
72-8839-318	1	Cancelled
72- -319	-	No effect
72-8493-320	-	No effect
72-8850-321	2	No effect
72-8853-322	1	No effect
72-8843-323	1	No effect
72-8844-324	-	No effect
72-8856-325	-	Sep 1/84
72-8845-326	1	No effect
72-8855-327	-	No effect
72-8848-328	1	Cancelled
72-8857-329	-	No effect
72-8861-330	3	Jun 1/88
72-8863-331	1	No effect
72-8864-332	-	Dec 1/85
72-8870-333	-	No effect
72-8871-334	4	No effect
72-8872-335	-	No effect
72-8873-336	-	No effect
72-8880-337	2	Cancelled
72-8879-338	2	No effect
72-8881-339	-	Cancelled
72-8882-340	1	Cancelled
72-8895-341	3	No effect
72-8893-342	-	No effect
72-8892-343	-	No effect
72-8907-344	3	No effect
72-8883-345	-	Cancelled
72-8909-346	3	No effect
72-8896-347	3	No effect
72-8910-348	3	No effect
72-8911-349	2	Cancelled
72-8908-350	1	No effect
72-8936-351	1	No effect
72-8916-352	4	No effect
72-8917-353	1	No effect
72-8937-354	1	No effect
72-8938-355	1	No effect
72-8934-356	1	No effect
72-8939-357	2	Cancelled
72-8925-358	1	Cancelled



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

<u>Service Bulletin No.</u>	<u>Rev. No.</u>	<u>Date of incorp.</u>
72-8915-359	1	No effect
72-8940-360	-	No effect
72-7519-361	1	No effect
72-8950-362	-	Cancelled
72-8923-363	-	Jun 1/91
72-8951-364	5	No effect
72-8949-365	-	No effect
72-8971-366	3	No effect
72-8973-367	4	No effect
72-8974-368	6	No effect
72-8955-369	-	No effect
72-8952-370	-	No effect
72-8958-371	1	No effect
72-8969-372	1	No effect
72-8977-373	-	No effect
72-8976-374	1	No effect
72-8953-375	-	No effect
72-8954-376	-	Cancelled
72-8935-377	2	No effect
72-8983-378	-	Jan 31/94
72-8979-379	1	No effect
72-8981-380	1	No effect
72-8975-381	2	Jan 31/94
72-8980-382	-	Jan 4/93
72-8990-383	4	Jan 31/94
72-8982-384	5	No effect
72-8987-385	-	No effect
72-8991-386	-	No effect
72-8984-387	-	No effect
72-8985-388	-	No effect
72-8993-389	2	No effect
72-8986-390	2	No effect
72-8999-391	-	Cancelled
72-9000-392	-	No effect
72-8994-393	1	Jun 1/95
72-9002-394	1	No effect
72-9009-395	-	Cancelled
72-9006-396	4	No effect
72-9016-398	-	No effect
72-9011-399	1	Dec 1/95
72-9017-400	1	No effect
72-8995-401	-	Dec 1/95
72-9020-402	1	No effect
72-9023-403	2	Dec 1/95
72-9019-404	2	Dec 1/95
72-8956-405	1	No effect
72-9022-406	-	Dec 1/95
72-9030-407	3	Jun 1/96



# OLYMPUS 593



MK.610-14-28

SNECMA

OVERHAUL

Printed in England

<u>Service Bulletin No.</u>	<u>Rev. No.</u>	<u>Date of incorp.</u>
72-9026-408	3	Jun 1/96
72-9005-409	1	Jun 1/96
72-9012-410	2	Jun 1/96
72-9031-411	-	No effect
72-9008-412	1	Dec 1/96
72-9021-413	-	Jun 1/96
72-9007-414	3	Jun 1/96
72-9015-416	-	No effect
72-9038-417	-	No effect
72-9040-418	-	No effect
72-9036-419	3	Dec 1/96
72-9034-420	-	No effect
72-9041-421	-	No effect
72-9042-422	2	No effect
72-9047-423	3	No effect
72-9048-424	-	No effect
72-9049-425	-	No effect
72-9053-426	1	Jun 1/98
72-9050-427	1	No effect
72-9051-428	-	No effect
72-9054-429	-	No effect
72-9055-430	-	No effect
72-9071-431	1	No effect
72-9072-432	-	No effect
72-9061-434	-	Dec 31/99
72-9068-435	-	Dec 31/99
72-9044-436	-	Dec 31/01
72-9074-437	-	No effect
72-9082-438	2	No effect
72-9066-439	-	Dec 31/00
72-9065-440	-	No effect
72-9086-441	1	No effect
72-9087-442	-	No effect
72-9063-443	-	No effect
72-9089-444	-	No effect
72-9090-445	-	No effect
73-1	-	Prior to Jul 1/81
73-2	-	No effect
73-3	-	No effect
73-4	-	No effect
73-5	-	No effect
73-6	2	No effect
73-7	2	No effect
73-8	3	No effect
73-9	2	No effect
73-10	2	No effect
73-11	1	Cancelled



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

<u>Service Bulletin No.</u>	<u>Rev. No.</u>	<u>Date of incorp.</u>
73-12	-	No effect
73-13	-	No effect
73-14	-	No effect
73-15	-	No effect
73-16	1	No effect
73-17	-	No effect
73-18	-	No effect
73-19	-	No effect
73-20	-	No effect
73-21	1	No effect
73-22	1	No effect
73-23	-	No effect
73-24	-	No effect
73-25	1	No effect
73-26	-	No effect
73-27	2	No effect
73-28	-	No effect
73-29	-	No effect
73-30	-	No effect
73-31	4	No effect
73-32	-	No effect
73-33	1	No effect
73-A34	5	Apr 1/80
73-34	1	Apr 1/80
73-35	-	Not issued
73-36	-	No effect
73-37	1	Prior to Jul 1/81
73-38	1	Apr 1/77
73-39	3	Jan 15/78
73-40	1	No effect
73-41	1	Prior to Jul 1/81
73-42	2	No effect
73-43	1	No effect
73-8361-44	-	No effect
73-45	-	No effect
73-8546-46	-	No effect
73-14050-47	3	No effect
73-8445-48	-	No effect
73-14051-49	2	No effect
73-14053-50	-	No effect
73-8586-51	3	No effect
73-8443-52	-	No effect
73-8500-53	-	No effect
73-8514-54	2	No effect
73-8306-55	1	Cancelled
73-8541-56	1	No effect
73-8614-57	-	No effect
73-8422-58	2	No effect
73-8515-59	-	No effect



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England

<u>Service Bulletin No.</u>	<u>Rev. No.</u>	<u>Date of incorp.</u>
73-8624-60	-	No effect
73-8637-61	1	No effect
73-8311-62	-	Prior to Jul 1/81
73-8257-63	-	No effect
73-8587-64	-	No effect
73-14057-65	-	No effect
73-8634-66	-	Prior to Jul 1/81
73-8626-67	-	No effect
73-8527-68	-	No effect
73-8672-69	1	No effect
73-8654-70	1	No effect
73-14060-71	-	
73-8696-72		
	1	No effect
73-8711-73	1	No effect
73-8704-74		
	1	No effect
73-8724-75	-	No effect
73-8741-76	-	No effect
73-8708-78	-	No effect
73-8718-79	-	No effect
73-8705-80	1	No effect
73-8702-81	1	No effect
73-8754-82	-	No effect
73-8769-83	-	No effect
73-8786-84	-	No effect
73-8776-85	1	No effect
73-8795-86	2	No effect
73-8788-87	-	No effect
73-8789-88	1	No effect
73-8813-89	-	No effect
73-8810-90	-	No effect
73-8816-91	-	No effect
73-8827-92	1	No effect
73-8842-93	1	Jun 1/84
73-8867-94	-	No effect
73-8874-95	-	No effect
73-14074-96	1	
73-8922-97	-	No effect
73-14081-98	2	No effect
73-14097-99	-	No effect
73-9001-100	-	No effect
73-14102-101	-	No effect
73-9057-102	-	Dec 31/99
73-9075-103	-	No effect
73-9070-104	-	No effect
73-9069-105	-	No effect
73-9078-106	-	No effect
73-9079-107	-	No effect
73-9080-108	-	No effect



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

<u>Service Bulletin No.</u>	<u>Rev. No.</u>	<u>Date of incorp.</u>
74-1	1	Prior to Jul 1/81
74-2	-	No effect
74-3	6	Prior to Jul 1/81
74-4	-	No effect
74-5	-	Prior to Jul 1/81
74-6	-	No effect
74-8561-7	2	No effect
74-14048-8	4	No effect
74-14059-9	-	No effect
74-8674-10	-	No effect
74-14061-11	-	
74-8732-12	-	No effect
74-8748-13	-	No effect
74-14070-14	3	No effect
74-9004-15	2	No effect
74-9028-16	1	No effect
74-9059-17	1	No effect
74-9060-18	1	No effect
74-9084-19	-	Dec 31/00
75-1	-	No effect
75-2	2	Prior to Jul 1/81
75-3	-	No effect
75-4	-	Prior to Jul 1/81
75-5	-	Prior to Jul 1/81
75-6	-	No effect
75-7	-	No effect
75-8	-	No effect
75-9	1	No effect
75-10	1	Prior to Jul 1/81
75-11	4	Prior to Jul 1/81
75-12	1	Prior to Jul 1/81
75-13	-	Prior to Jul 1/81
75-14	-	No effect
75-8567-15	1	No effect
75-8557-16	-	No effect
75-8578-17	1	Cancelled
75-8584-18	1	No effect
75-8413-19	-	Prior to Jul 1/81
75-8137-20	1	Prior to Jul 1/81
75-8733-21	-	No effect
75-8765-22	4	No effect
75-8826-23	2	No effect
75-8834-24	-	No effect
75-8862-25	-	No effect
75-8912-26	-	No effect
75-8972-27	-	Jun 1/94
75-9013-28	2	No effect

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

SNECMA

Printed in England

<u>Service Bulletin No.</u>	<u>Rev. No.</u>	<u>Date of incorp.</u>
76-1	-	No effect
76-2	-	Cancelled
76-3	5	Prior to Jul 1/81
76-4	-	No effect
76-5	2	
76-6	-	No effect
76-A7	-	Cancelled
76-8	1	Prior to Jul 1/81
76-9	-	Prior to Jul 1/81
76-10	-	No effect
76-11	-	No effect
76-12	-	No effect
76-13	1	Cancelled
76-14	-	Prior to Jul 1/81
76-15	1	No effect
76-16	1	No effect
76-17	-	Cancelled
76-18	2	No effect
76-19	-	
76-20	1	No effect
76-21	1	
76-22	-	No effect
76-8538-23	1	No effect
76-8518-24	-	Prior to Jul 1/81
76-8523-25	-	Prior to Jul 1/81
76-8570-26	5	No effect
76-8593-27	1	No effect
76-8582-28	-	Prior to Jul 1/81
76-8597-29	-	Cancelled
76-8598-30	1	Cancelled
76-8616-31	-	No effect
76-8534-32	-	No effect
76-8595-33	2	Prior to Jul 1/81
76-7234-34	-	No effect
76-8473-35	-	No effect
76-8606-36	1	Prior to Jul 1/81
76-8628-37	1	Prior to Jul 1/81
76-8649-38	-	No effect
76-7875-39	1	Prior to Jul 1/81
76-8655-40	2	No effect
76-8670-41	-	No effect
76-8656-42	-	No effect
76-8691-43	1	Prior to Jul 1/81
76-8720-44	-	No effect
76-8726-45	3	No effect
76--GSE34-46	-	No effect
76-8745-47	1	No effect
76-8740-48	-	No effect

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

<u>Service Bulletin No.</u>	<u>Rev. No.</u>	<u>Date of incorp.</u>
76-8768-49	1	No effect
76-14067-50	-	No effect
76-14068-51	-	No effect
76-14064-52	1	No effect
76-8779-53	-	No effect
76-8803-54	-	No effect
76-8805-55	1	No effect
76-8796-56	-	No effect
76-8865-57	1	No effect
76-8901-58	-	No effect
76-8897-59	1	No effect
76-8903-60	-	No effect
76-14075-61	-	No effect
76-8913-62	-	No effect
76-8914-63	-	No effect
76-14079-64	-	No effect
76-14093-65	1	No effect
76-9009-66	1	No effect
76-9010-67	-	No effect
76-9029-68	-	No effect
76-9018-69	-	Cancelled
76-9033-70	-	No effect
76-9039-71	-	No effect
76-9043-72	2	Dec 1/96
76-9067-73	-	No effect
77-1	-	No effect
77-2	1	Prior to Jul 1/81
77-3	1	Prior to Jul 1/81
77-4	-	Prior to Jul 1/81
77-5	2	
77-6	1	No effect
77-7	-	Prior to Jul 1/81
77-8	-	Prior to Jul 1/81
77-9	3	Prior to Jul 1/81
77-10	-	Prior to Jul 1/81
77-11	1	Prior to Jul 1/81
77-12	1	No effect
77-13	1	No effect
77-8268-14	-	No effect
77-8602-15	-	No effect
77-8293-16	-	No effect
77-8294-17	-	No effect
77-8295-18	-	No effect
77-8296-19	-	No effect
77-8297-20	-	No effect
77-8298-21	-	No effect
77-8299-22	-	No effect



**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

Printed in England

<u>Service Bulletin No.</u>	<u>Rev. No.</u>	<u>Date of incorp.</u>
77-8356-23	-	No effect
77-8481-24	-	No effect
77-8583-25	-	No effect
77-8611-26	-	Prior to Jul 1/81
77-8303-27	-	No effect
77-8661-28	1	Prior to Jul 1/81
77-8183-29	-	Prior to Jul 1/81
77-8734-30	-	No effect
77-8793-31	4	No effect
77-8876-32	1	No effect
77-14073-33	1	No effect
77-9025-34	-	No effect
77-9045-35	-	No effect
78-1	3	
78-2	1	
78-3	2	
78-4	5	
78-5	3	
78-6	3	
78-7	2	
78-8	3	
78-9	1	
78-10	1	
78-11	3	
78-12	4	
78-13	1	
78-14	1	
78-15	2	
78-28220-16	3	
78-17	4	
78-18	4	
78-19	2	
78-20	3	
78-21	1	
78-22	4	
78-23	-	
78-24	-	
78-25	3	
78-26	2	
78-27	1	
78-28	-	
78-29	1	
78-30	-	
78-31	1	
78-32	4	
78-33	1	
78-34	2	

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

SNECMA

<u>Service Bulletin No.</u>	<u>Rev. No.</u>	<u>Date of incorp.</u>
78-28217-35	2	
78-28218-36	3	
78-14052-37	-	
78-14056-38	-	
78-28222-39	1	
78-28224-40	2	
78-41	-	
78-14066-42	-	
78-14069-43	-	
78-44	-	
78-14089-45	-	
78-28232-46	-	
78-28235-47	-	
78-28236-48	-	
79-1	-	No effect
79-7807-2	-	Prior to Jul 1/81
79-3	1	Prior to Jul 1/81
79-4	1	No effect
79-5	1	No effect
79-6	-	Prior to Jul 1/81
79-7	-	Prior to Jul 1/81
79-8	-	Prior to Jul 1/81
79-9	2	Prior to Jul 1/81
79-8387-10	-	No effect
79-8253-11	-	Prior to Jul 1/81
79-8556-12	-	No effect
79-8658-13	1	No effect
79-8177-14	-	No effect
79-8735-15	-	No effect
79-8759-16	1	No effect
79-8809-17	-	No effect
79-9003-18	-	No effect
79-9081-19	-	No effect
80-1	-	No effect
80-8736-2	-	No effect
80-8715-3	-	No effect
80-8707-4	-	No effect
80-9014-5	-	No effect
80-9027-6	-	No effect



# OLYMPUS 593

MK.61D-14-28  
OVERHAUL



SNECMA

## MANUAL CONTENTS

	CH/SEC/SUB	PAGE	VOL.
TITLE PAGE ... ..	-	-	1
RECORD OF REVISIONS...	-	1	1
RECORD OF TEMPORARY REVISIONS ... ..	-	1	1
SERVICE BULLETIN LIST ... ..	-	1	1
MANUAL CONTENTS ... ..	-	1	1
INTRODUCTION ... ..	-	1	1
OBSERVANCE OF MANUAL INSTRUCTIONS ... ..	-	1	1
ASSEMBLY OF PARTS ... ..	-	1	1
CONTAMINATION OF ENGINE COMPONENTS ... ..	-	1	1
HAZARDOUS MATERIALS... ..	-	1	1
 CHAPTER 5 - TIME LIMITS/MAINTENANCE			
CHECKS ... ..	-	-	1
List of Effective Pages ... ..	5	1	1
Table of Contents ... ..	5	1	1
Flight Profiles and Operational			
Monitoring ... ..	5-10-01	1	1
Lives of Group A Parts ... ..	5-10-03	1	1
 CHAPTER 70 - STANDARD PRACTICES...	-	-	1
Table of Contents ... ..	70	1	1
General... ..	70	1	1
Life Limitations and Storage			
Conditions for Flexible Rings,			
Hoses and Rubber Components ... ..	70-00-01	1	1
 CHAPTER 71 - POWER PLANT ... ..	-	-	1
List of Effective Pages ... ..	71	1	1
Table of Contents ... ..	71	1	1
Table of Approved Repair Schemes ... ..	71	1	1
Tubes and Accessories ... ..	71-00-01	101	1
		501	
		1001	
Electrical Harness, Ignition Leads and			
Vibration Transducer Cable ... ..	71-00-02	101	1A
		501	
		701	
		1001	
Prepare Engine for Despatch ... ..	71-00-03	501	1A
Installation of Engine in Moisture and			
Vapour Proof Bag and Transportation			
Stand... ..	71-00-03	901	1A
Standard Practices ... ..	71-09-00	101	1A
		501	
Engine Mountings ... ..	71-20-00	201	1A
		301	
		401	

MANUAL CONTENTS

Page 1

Jun 30/00



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

Printed in England

	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>VOL.</u>
Engine Heat Shields (Containing SEC/SUB 71-32-01 and 71-32-02) ... ..	71-32-00	301	1A
Combustion Chamber Outer Case ... ..	71-32-01	201	1A
Turbine Exhaust Diffuser Heat Shield ... ..	71-32-02	201	1A
Engine Electrical Cables ... ..	71-51-01	101	1A
		201	
		301	
		401	
		501	
		1001	
Engine Drains (Containing SEC/SUB 71-73-01 to 06, 71-79-01 and 71-79-02) ... ..	71-70-00	301	1A
Engine Drains... ..	71-70-00	701	1A
Drains Tank ... ..	71-73-01	201	1A
Component Connection to Overboard Spill Tubes... ..	71-73-02	201	1A
Second Stage Pump to Drain Tank Tube ... ..	71-73-03	201	1A
First Stage Pump and FCU to Connection at Second Stage Pump Tubes ... ..	71-73-04	201	1A
Distribution and Dump Valve to Drain Tank Tubes ... ..	71-73-05	201	1A
Engine Drain Assembly at Exhaust Diffuser Case ... ..	71-73-06	101	1A
		201	
		501	
CSD to Overboard Spill at Drains Tank Tubes... ..	71-79-01	201	1A
Hydraulic Pump to Overboard Spill Connection Tubes ... ..	71-79-02	201	1A
CHAPTER 72 - DISASSEMBLY ... ..	-	-	2
List of Effective Pages ... ..	72	1	2
Table of Contents ... ..	72	1	2
Engine ... ..	72-00-00	101	2
Turbine Static ... ..	72-00-51	101	2
Standard Practices ... ..	72-09-00	101	2
Air Inlet Section ... ..	72-20-00	101	2
Air Intake Fairing ... ..	72-21-01	101	2
Air Intake Case ... ..	72-22-01	101	2
LP Compressor Rotor Front Bearing Support ... ..	72-23-01	101	2
LP Compressor Assembly ... ..	72-31-00	101	2
LP Compressor Case and Vanes ... ..	72-31-01	101	2
LP Compressor Exit Guide Case and Vanes... ..	72-31-02	101	2



# OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

TN9569

	CH/SEC/SUB	PAGE	VOL.
LP Compressor Rotor...	72-31-03	101	2
LP Compressor Drive Shaft...	72-31-04	101	2
LP Shaft Signal System Generating Mechanism ...	72-31-05	101	2
Compressor Intermediate Case ...	72-32-00	101	2
HP Compressor Assembly ...	72-33-00	101	2
HP Compressor Case and Vanes ...	72-33-01	101	2
HP Compressor Rotor...	72-33-02	101	2
HP Compressor Diffuser Case Assembly ...	72-34-00	101	2
Combustion Section ...	72-40-00	101	2
Combustion Chamber ...	72-41-01	101	2
Combustion Chamber Outer Case ...	72-42-01	101	2
HP Turbine Assembly...	72-51-00	101	2
HP Turbine Bearing Support ...	72-51-01	101	2
HP Turbine Nozzle ...	72-51-02	101	2
HP Turbine Rotor ...	72-51-03	101	2
HP Turbine Rotor, Hub and Labyrinth Assemblies ...	72-51-04	101	2
LP Turbine Nozzle ...	72-52-01	101	2
LP Turbine Rotor ...	72-52-02	101	2
LP Turbine Bearing Support ...	72-52-03	101	2
Turbine Exhaust Diffuser ...	72-53-00	101	2
Spherical Joint Flange ...	72-54-01	101	2
Internal Accessory Drives...	72-61-00	101	2
Left-hand Accessory Gearbox ...	72-62-00	101	2
Left-hand Accessory Gearbox Case Assembly ...	72-62-01	101	2
Left-hand Accessory Gearbox Main Drives ...	72-62-02	101	2
First Stage Fuel Pump Drive and Idler Gear ...	72-62-03	101	2
Fuel Control Unit Drive and Main Oil Pump Drive ...	72-62-04	101	2
Right-hand Accessory Gearbox ...	72-63-00	101	2
Right-hand Accessory Gearbox Case Assembly ...	72-63-01	101	2
Right-hand Accessory Gearbox Main Drives ...	72-63-02	101	2
Air Starter Drive and IDG Drive...	72-63-03	101	2
Scavenge Oil Pump Drive and Idler Shaft ...	72-63-04	101	2
Main and Stand-by Hydraulic Pump Drives ...	72-63-05	101	2
Drain Valve and Magnetic Plug Assemblies ...	72-63-06	101	2
Drive, Pulse Probe and Housing ...	72-64-00	101	2
Main Oil Pump ...	72-65-00	101	2

MANUAL CONTENTS

Page 3

Oct 1/76



# OLYMPUS 593

MK.610-14-28

OVERHAUL



	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>VOL.</u>
CHAPTER 72 - CLEANING ... ..	-	-	2
List of Effective Pages ... ..	72	1	2
Table of Contents ... ..	72	1	2
Oil Tube Filters ... ..	72-01-01	201	2
Oil Feed, Pump to Bearing Tubes... ..	72-01-03	201	2
Oil Scavenge, Bearing to Pump Tubes ... ..	72-01-04	201	2
Standard Practices ... ..	72-09-00	201	2
Air Intake Fairing ... ..	72-21-01	201	2
Air Intake Case ... ..	72-22-01	201	2
LP Compressor Rotor Front Bearing Support ... ..	72-23-01	201	2
LP Compressor Case and Vanes ... ..	72-31-01	201	2
LP Compressor Exit Guide Case and Vanes... ..	72-31-02	201	2
LP Compressor Rotor... ..	72-31-03	201	2
LP Compressor Drive Shaft... ..	72-31-04	201	2
LP Shaft Signal System Mechanism ... ..	72-31-05	201	2
Compressor Intermediate Case Assembly... ..	72-32-00	201	2
HP Compressor Case and Vanes ... ..	72-33-01	201	2
HP Compressor Rotor... ..	72-33-02	201	2
HP Compressor Diffuser Case Assembly ... ..	72-34-00	201	2
Combustion Chamber ... ..	72-41-01	201	2
Combustion Chamber Outer Case ... ..	72-42-01	201	2
HP Turbine Bearing Support ... ..	72-51-01	201	2
HP Turbine Nozzles ... ..	72-51-02	201	2
HP Turbine Rotor ... ..	72-51-03	201	2
HP Turbine Rotor, Hub and Labyrinth Assemblies ... ..	72-51-04	201	2
LP Turbine Nozzles ... ..	72-52-01	201	2
LP Turbine Rotor ... ..	72-52-02	201	2
LP Turbine Bearing Support ... ..	72-52-03	201	2
Turbine Exhaust Diffuser ... ..	72-53-00	201	2
Spherical Joint Flange ... ..	72-54-01	201	2
Internal Accessory Drives... ..	72-61-00	201	2
Left-hand Accessory Gearbox Case Assembly ... ..	72-62-01	201	2
Left-hand Main Drives Accessory Gearbox ... ..	72-62-02	201	2
First Stage Fuel Pump Drive and Idler Gear ... ..	72-62-03	201	2

FN32969



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



CH/SEC/SUB    PAGE    VOL.

Scavenge Oil Pump Drive and Idler			
Gear ... ..	72-62-04	201	2
Right-hand Accessory Gearbox Case			
Assembly ... ..	72-63-01	201	2
Main Drives ... ..	72-63-02	201	2
Air Starter Drive and CSD Drive...	72-63-03	201	2
Scavenge Oil Pump Drive and Idler			
Gear ... ..	72-63-04	201	2
Main and Stand-by Hydraulic Pump			
Drives ... ..	72-63-05	201	2
Drive, Pulse Probe and Housing ...	72-64-00	201	2
Main Oil Pump... ..	72-65-00	201	2
CHAPTER 72 - INSPECTION/CHECK ... ..	-	-	3
List of Effective Pages ... ..	72	1	3
Table of Contents ... ..	72	1	3
Engine Lubrication System... ..	72-01-00	301	3
Engine Lubrication System, Filters	72-01-01	301	3
Tubes - Oil Feed, Pump to Bearings	72-01-03	301	3
Tubes - Oil Scavenge, Bearings to			
Pump ... ..	72-01-04	301	3
Standard Practices ... ..	72-09-00	301	3
Engine Internal Examination ... ..	72-09-03	301	3
Air Inlet Section ... ..	72-20-00	301	3
Air Intake Fairing ... ..	72-21-01	301	3
Air Intake Case ... ..	72-22-01	301	3
LP Compressor Front Bearing Support	72-23-01	301	3
LP Compressor Case and Vanes ... ..	72-31-01	301	3
LP Compressor Exit Guide Case and			
Vanes... ..	72-31-02	301	3
LP Compressor Rotor... ..	72-31-03	301	3
LP Compressor Drive Shaft... ..	72-31-04	301	3
LP Shaft Signal Generating Mechanism	72-31-05	301	3
Compressor Intermediate Case ... ..	72-32-00	301	3
HP Compressor Case and Vanes ... ..	72-33-01	301	3
HP Compressor Rotor... ..	72-33-02	301	3
HP Compressor Diffuser Case Assembly	72-34-00	301	3
Combustion Chamber ... ..	72-41-01	301	3
Combustion Chamber Outer Case ... ..	72-42-01	301	3
HP Turbine Bearing Support ... ..	72-51-01	301	3



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



	CH/SEC/SUB	PAGE	VOL.
HP Turbine Nozzles ... ..	72-51-02	301	3
HP Turbine Rotor ... ..	72-51-03	301	3
HP Turbine Rotor, Hub and Labyrinth Assemblies ... ..	72-51-04	301	3
LP Turbine Nozzles ... ..	72-52-01	301	3
LP Turbine Rotor ... ..	72-52-02	301	3
LP Turbine Bearing Support ... ..	72-52-03	301	3
Turbine Exhaust Diffuser ... ..	72-53-00	301	3
Spherical Joint Flange ... ..	72-54-01	301	3
Internal Accessory Drives... ..	72-61-00	301	3
Left-hand Accessory Gearbox Assembly ... ..	72-62-00	301	3
Left-hand Accessory Gearbox Case Assembly ... ..	72-62-01	301	3
Left-hand Accessory Gearbox Main Drives ... ..	72-62-02	301	3
First Stage Fuel Pump Drive and Idler Gear ... ..	72-62-03	301	3
Fuel Control Unit Drive and Main Oil Pump Drive ... ..	72-62-04	301	3
Right-hand Accessory Gearbox Assembly... ..	72-63-00	301	3
Right-hand Accessory Gearbox Case Assembly ... ..	72-63-01	301	3
Right-hand Accessory Gearbox Main Drives ... ..	72-63-02	301	3
Air Starter Drive and IDG Drive... ..	72-63-03	301	3
Scavenge Oil Pump Drive and Idler Shaft... ..	72-63-04	301	3
Main and Stand-by Hydraulic Pump Drives ... ..	72-63-05	301	3
Drive, Pulse Probe and Housing ... ..	72-64-00	301	3
Main Oil Pump... ..	72-65-00	301	3
CHAPTER 72 - REPAIR... ..	-	-	4
List of Effective Pages ... ..	72	1	4
Table of Contents ... ..	72	1	4
Table of Approved Repair Schemes ... ..	72	1	4
Numerical List of Repair Schemes ... ..	72	1	4
Standard Practices ... ..	72-09-00	401	4
Epoxy Marking Enamel ... ..	72-09-01	401	4
Alocrom 1200 ... ..	72-09-02	401	4
Gold Paint ... ..	72-09-03	401	4
High Heat Resisting Aluminium Enamel ... ..	72-09-04	401	4
Pack Aluminizing ... ..	72-09-05	401	4
Abradable Composite Coatings ... ..	72-09-06	401	4
Chromium Plating ... ..	72-09-07	401	4
Silver Plating ... ..	72-09-08	401	4
Nickel Plating ... ..	72-09-09	401	4
Combustion Spraying... ..	72-09-10	401	4

FN15034





# OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

	CH/SEC/SUB	PAGE	VOL.
Plasma Spraying ... ..	72-09-11	401	4
Plasma Welding ... ..	72-09-12	401	4
Vapour Blasting ... ..	72-09-13	401	4
Etching... ..	72-09-14	401	4
Wet Glass Bead Peening ... ..	72-09-15	401	4
Cold Roll Forming ... ..	72-09-16	401	4
Electroless Nickel Plating ... ..	72-09-17	401	4
Dry Film Lubricant ... ..	72-09-18	401	4
Anodizing of Aluminium Alloys ... ..	72-09-19	401	4
Temporary Protection of Metal Components Against Corrosion ... ..	72-09-20	401	4
Machining of Adjusting Washers, Shims etc. ... ..	72-09-21	401	4
Rectification of Minor Damage ... ..	72-09-22	401	4
Electrical Discharge Machining ... ..	72-09-23	401	4
Dry Abrasive Blasting ... ..	72-09-24	401	4
Air Intake Fairing ... ..	72-21-01	401	4
Air Intake Case ... ..	72-22-01	401	4
LP Compressor Front Bearing Support ... ..	72-23-01	401	4
LP Compressor Case and Vanes ... ..	72-31-01	401	4
LP Compressor Exit Guide Case and Vanes... ..	72-31-02	401	4
LP Compressor Rotor... ..	72-31-03	401	4
LP Compressor Drive Shaft... ..	72-31-04	401	4
Compressor Intermediate Case ... ..	72-32-00	401	4
HP Compressor Case and Vanes ... ..	72-33-01	401	4
HP Compressor Rotor... ..	72-33-02	401	4
HP Compressor Diffuser Case ... ..	72-34-00	401	4
Combustion Chamber ... ..	72-41-01	401	5
HP Turbine Bearing Support ... ..	72-51-01	401	5
HP Turbine Nozzles ... ..	72-51-02	401	5
HP Turbine Rotor ... ..	72-51-03	401	5
HP Turbine Rotor, Hub and Labyrinth Assemblies ... ..	72-51-04	401	5
LP Turbine Rotor ... ..	72-52-02	401	5
LP Turbine Bearing Support ... ..	72-52-03	401	5
Turbine Exhaust Diffuser ... ..	72-53-00	401	5
Spherical Joint Flange ... ..	72-54-01	401	5
Internal Accessory Drives... ..	72-61-00	401	5
RH Gearbox Case ... ..	72-63-01	401	5
CHAPTER 72 - ASSEMBLY/SUB-ASSEMBLY ... ..	-	-	6
List of Effective Pages ... ..	72	1	6
Table of Contents ... ..	72	1	6
Engine ... ..	72-00-00	501	6
Turbine Static ... ..	72-00-51	501	6
Standard Practices ... ..	72-09-00	501	6
Engine Turning ... ..	72-09-01	501	6



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>VOL.</u>
Air Inlet Section ... ..	72-20-00	501	6
Air Intake Fairing ... ..	72-21-01	501	6
Air Intake Case ... ..	72-22-01	501	6
LP Compressor Rotor Front Bearing Support ... ..	72-23-01	501	6
LP Compressor Assembly ... ..	72-31-00	501	6
LP Compressor Case and Vanes ... ..	72-31-01	501	6
LP Compressor Exit Guide Case and Vanes... ..	72-31-02	501	6
LP Compressor Rotor... ..	72-31-03	501	6
LP Compressor drive Shaft... ..	72-31-04	501	6
LP Shaft Signal System Generating Mechanism ... ..	72-31-05	501	6
Compressor Intermediate Case Assembly...	72-32-00	501	6
HP Compressor Assembly ... ..	72-33-00	501	7
HP Compressor Case and Vanes ... ..	72-33-01	501	7
HP Compressor Rotor... ..	72-33-02	501	7
HP Compressor Diffuser Case Assembly ...	72-34-00	501	7
Combustion Section ... ..	72-40-00	501	7
Combustion Chamber ... ..	72-41-01	501	7
Combustion Chamber Outer Case ... ..	72-42-01	501	7
HP Turbine Assembly... ..	72-51-00	501	7
HP Turbine Bearing Support ... ..	72-51-01	501	7
HP Turbine Nozzle ... ..	72-51-02	501	7
HP Turbine Rotor ... ..	72-51-03	501	7
HP Turbine Rotor, Hub and Labyrinth Assemblies ... ..	72-51-04	501	7
LP Turbine Nozzle ... ..	72-52-01	501	7
LP Turbine Rotor ... ..	72-52-02	501	7
LP Turbine Bearing Support ... ..	72-52-03	501	7
Turbine Exhaust Diffuser ... ..	72-53-00	501	7
Spherical Joint Flange ... ..	72-54-01	501	7
Internal Accessory Drives... ..	72-61-00	501	7
Left-hand Accessory Gearbox ... ..	72-62-00	501	7
Left-hand Accessory Gearbox Case Assembly ... ..	72-62-01	501	7
Left-hand Accessory Gearbox Main Drives ... ..	72-62-02	501	7
First Stage Fuel Pump Drive and Idler Gear ... ..	72-62-03	501	7
Fuel Control Unit Drive and Main Oil Pump Drive ... ..	72-62-04	501	7
Right-hand Accessory Gearbox ... ..	72-63-00	501	7
Right-hand Accessory Gearbox Case Assembly ... ..	72-63-01	501	7
Right-hand Accessory Gearbox Main Drives ... ..	72-63-02	501	7
Air Starter Drive and IDG Drive... ..	72-63-03	501	7



OLYMPUS 593

MK.610-14-28  
OVERHAUL

PRINTED IN ENGLAND

TN14894

	CH/SEC/SUB	PAGE	VOL.
Scavenge Oil Pump Drive and Idler			
Shaft... ..	72-63-04	501	7
Main and Stand-by Hydraulic Pump			
Drives ... ..	72-63-05	501	7
Drain Valve and Magnetic Plug			
Assemblies ... ..	72-63-06	501	7
Drive, Pulse Probe and Housing ... ..	72-64-00	501	7
Main Oil Pump... ..	72-65-00	501	7
CHAPTER 72 - FITS AND CLEARANCES	-	-	8
List of Effective Pages ... ..	72	1	8
Table of Contents ... ..	72	1	8
General (Engine Assembly)... ..	72-00-00	601	8
Standard Practices ... ..	72-09-00	601	8
Air Inlet Section ... ..	72-20-00	601	8
LP Compressor Assembly ... ..	72-31-00	601	8
LP Compressor Drive Shaft... ..	72-31-04	601	8
LP Shaft Signal Generating Mechanism ... ..	72-31-05	601	8
Compressor Intermediate Case Assembly... ..	72-32-00	601	8
HP Compressor Assembly ... ..	72-33-00	601	8
Combustion Section ... ..	72-40-00	601	8
HP Turbine Bearing Support ... ..	72-51-01	601	8
HP Turbine Nozzles ... ..	72-51-02	601	8
HP Turbine Rotor ... ..	72-51-03	601	8
LP Turbine Nozzles ... ..	72-52-01	601	8
LP Turbine Rotor ... ..	72-52-02	601	8
LP Turbine Bearing Support ... ..	72-52-03	601	8
Turbine Exhaust Diffuser Assembly ... ..	72-53-00	601	8
Internal Accessory Drives... ..	72-61-00	601	8
Left-hand Accessory Gearbox Assembly ... ..	72-62-00	601	8
Right-hand Accessory Gearbox Assembly... ..	72-63-00	601	8
Main Oil Pump... ..	72-65-00	601	8
CHAPTER 72 - ENGINE TESTING	-	-	8
List of Effective Pages ... ..	72	1	8
Table of Contents ... ..	72	1	8
General... ..	72-00-24	701	8
Equipment and Set-up ... ..	72-00-25	701	8
Procedures and Adjustments ... ..	72-00-26	701	8
Schedule and Checks... ..	72-00-27	701	8
Schedule for Proof Test Procedure After			
Minor Rectification ... ..	72-00-28	701	8
Specification and Analysis ... ..	72-00-29	701	8
CHAPTER 72 - SPECIAL TOOLS, FIXTURES			
AND EQUIPMENT ... ..	-	-	8
List of Effective Pages ... ..	72	1	8
Table of Contents ... ..	72	1	8



# OLYMPUS 593

MK.610-14-28

OVERHAUL



	CH/SEC/SUB	PAGE	VOL.
Engine ... ..	72-00-00	1001	8
Engine Testing - Equipment and Set-up ... ..	72-00-25	1001	8
Engine Testing - Procedures and Adjustments... ..	72-00-26	1001	8
Engine Testing - Schedule and Checks ... ..	72-00-27	1001	8
Turbine Static ... ..	72-00-51	1001	8
Standard Practices ... ..	72-09-00	1001	8
Engine Turning ... ..	72-09-01	1001	8
Engine Internal Examination ... ..	72-09-03	1001	8
Air Inlet Section ... ..	72-20-00	1001	8
LP Compressor Assembly ... ..	72-31-00	1001	8
LP Compressor Case and Vanes ... ..	72-31-01	1001	8
LP Compressor Rotor... ..	72-31-03	1001	8
LP Compressor Drive Shaft... ..	72-31-04	1001	8
Compressor Intermediate Case Assembly... ..	72-32-00	1001	8
HP Compressor Assembly ... ..	72-33-00	1001	8
HP Compressor Case and Vanes ... ..	72-33-01	1001	8
HP Compressor Rotor... ..	72-33-02	1001	8
HP Turbine Rotor ... ..	72-51-03	1001	8
LP Turbine Nozzle ... ..	72-52-01	1001	8
LP Turbine Rotor ... ..	72-52-02	1001	8
LP Turbine Bearing Support ... ..	72-52-03	1001	8
Turbine Exhaust Diffuser ... ..	72-53-00	1001	8
Left-hand Gearbox ... ..	72-62-00	1001	8
Right-hand Accessory Gearbox ... ..	72-63-00	1001	8
Main Oil Pump... ..	72-65-00	1001	8
CHAPTER 72 - LIGHT OVERHAUL	-	-	8
List of Effective Pages ... ..	72	1	8
Table of Contents ... ..	72	1	8
Engine ... ..	72-00-00	1301	8
Air Inlet Section ... ..	72-20-00	1301	8
LP Compressor Case and Vanes ... ..	72-31-01	1301	8
LP Compressor Exit Guide Case and Vanes. ... ..	72-31-02	1301	8
LP Compressor Rotor... ..	72-31-03	1301	8
Compressor Intermediate Case ... ..	72-32-00	1301	8
HP Compressor Case and Vanes ... ..	72-33-01	1301	8
HP Turbine Nozzles ... ..	72-51-02	1301	8
HP Turbine Rotor ... ..	72-51-03	1301	8
LP Turbine Nozzles ... ..	72-52-01	1301	8
LP Turbine Rotor ... ..	72-52-02	1301	8
Turbine Exhaust Diffuser ... ..	72-53-00	1301	8
CHAPTER 73 - ENGINE FUEL AND CONTROL ... ..	-	-	9
List of Effective Pages ... ..	83	1	9
Table of Contents ... ..	73	1	9

TN1912

MANUAL CONTENTS

Page 10  
Jul 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL

CH/SEC/SUB PAGE VOL.

Fuel Distribution System (Containing SEC/SUB 73-11-01 to 03, 73-12-01 to 07, 73-13-01 to 06, 73-13-08 to 13 and 73-14-01 to 05) ... ..	73-10-00	301	9
		501	9
First Stage Fuel Pump ... ..	73-11-01	201	9
Second Stage Fuel Pump ... ..	73-11-02	201	9
Electric Starter Pump ... ..	73-11-03	201	9
Fuel Recirculation Pump ... ..	73-12-01	201	9
Distribution and Dump Valve ... ..	73-12-02	201	9
Fuel Inlet Elbow and Drain Valve ... ..	73-12-03	201	9
Fuel Manifold... ..	73-12-04	201	9
Fuel Nozzles Assembly ... ..	73-12-05	201	9
Reheat Injection System ... ..	73-12-06	201	9
Fuel Pressure Atomizing (Pilot) Nozzle ... ..	73-12-07	201	9
First Stage Pump to Second Stage Pump Tubes ... ..	73-13-01	201	9
Fuel Control Unit Supply to Fuel Manifold Tubes ... ..	73-13-02	201	9
First Stage Pump Supply to Reheat Injection System Tubes ... ..	73-13-03	201	9
Second Stage Pump Inlet to Electric Starter Pump Tubes ... ..	73-13-04	201	9
Electric Starter Pump Supply to Flow Control Unit Tubes ... ..	73-13-05	201	9
Electric Starter Pump Supply to Pilot Nozzle Tubes ... ..	73-13-06	201	9
Reheat Controller and Flow Control Unit Spill to First Stage Pump Inlet Elbow Tubes... ..	73-13-08	201	9
Second Stage Pump Inlet Elbow Return to Recirculation Valve Tubes ... ..	73-13-09	201	9
Distribution and Dump Valve Tubes ... ..	73-13-10	201	9
Drains Tank Return to First Stage Pump/Recirculation Valve Tubes ... ..	73-13-11	201	9
Oil Cooler to Air Bleed Valve Tubes ... ..	73-13-12	201	9
Fuel Heater and Filter Outlet to Reheat Controller Tubes... ..	73-13-13	201	9
Fuel Heater and Filter ... ..	73-14-01	201	9
Fuel Heater Control Valve... ..	73-14-02	201	9
Fuel Heater Control Valve Switch ... ..	73-14-04	201	9
Fuel Heater Control Thermometer... ..	73-14-05	201	9
Fuel System Control (Containing SEC/SUB 73-21-01, 73-22-01, 73-23-01 and 73-24-01) ... ..	73-20-00	301	9
Engine Fuel Control Unit ... ..	73-21-01	201	9
LP Compressor Speed Probe Unit ... ..	73-22-01	201	9
Reheat Fuel Controller ... ..	73-23-01	201	9

PRINTED IN ENGLAND

TN18733

MANUAL CONTENTS

Page 11

Jul 1/81



# OLYMPUS 593

MK.610-14-28

OVERHAUL



	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>VOL.</u>
Reheat Purge Solenoid Valve ...	73-24-01	201	9
Fuel System Indicating (Containing SEC/SUB 73-31-01, 73-32-01, 73-33-01 and 73-33-02) ...	73-30-00	301	9
Fuel Differential Pressure Warning Switch ...	73-31-01	201	9
Fuel Nozzles Inlet Thermometer ...	73-32-01	201	9
Engine Fuel Flowmeter ...	73-33-01	201	9
Reheat Fuel Flowmeter ...	73-33-02	201	9
CHAPTER 74 - IGNITION ...	-	-	9
List of Effective Pages ...	74	1	9
Table of Contents ...	74	1	9
Table of Approved Repair Schemes ...	74	1	9
High Energy Ignition Unit... ..	74-11-01	201	9
		301	9
Ignition Distribution System (Containing SEC/SUB 74-21-01, 74-21-02 and 74-22-01) ...	74-20-00	301	9
High Energy Ignition Lead... ..	74-21-01	101	9
		201	
		501	
Engine Ignition Plugs ...	74-21-02	201	9
Reheat Igniter ...	74-22-01	201	9
CHAPTER 75 - AIR ...	-	-	9
List of Effective Pages ...	75	1	9
Table of Contents ...	75	1	9
Table of Approved Repair Schemes ...	75	1	9
Air Tubes (Containing SEC/SUB 75-01-01 to 05, 75-02-01 to 12, 75-03-01, 75-03-02 and 75-05-01 to 03) ...	75-00-00	301	9
Intermediate Case to Exhaust Diffuser Tubes... ..	75-01-01	201	9
Intermediate Case to HP Turbine Bearing Tube ...	75-01-02	201	9
HP Compressor Case to HP Compressor Diffuser (Upper) Case Tubes ...	75-01-03	201	9
HP Compressor Case to HP Compressor Diffuser (Lower) Case Tubes ...	75-01-04	201	9
Elbow, Air Cooling, HP Turbine Bearing Feed Pipe... ..	75-01-05	201	9
Intermediate Case Adapter to Aircraft Connection Tubes ...	75-02-01	201	9

TN18734

MANUAL CONTENTS

Page 12

Jul 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL

PRINTED IN ENGLAND

TN18739

	CH/SEC/SUB	PAGE	VOL.
Oil Tank to Outlet Seal Plate ... ..	75-02-02	201	9
HP Compressor Diffuser Case and Exhaust Diffuser to Multiple Connection Tubes ... ..	75-02-03	201	9
Exhaust Diffuser to Duct (LH) Tubes ...	75-02-04	201	9
Exhaust Diffuser to Duct (RH) Tubes ...	75-02-05	201	9
HP Compressor Diffuser Case to Aircraft Overboard Cowling (RH) Tubes... ..	75-02-06	201	9
HP Compressor Diffuser Case to Aircraft Overboard Cowling (LH) Tubes... ..	75-02-07	201	9
Air Intake Case Adapter to Connection on Tube (Air Intake Case Adapter to Outlet Seal Plate) Tube... ..	75-02-08	201	9
Air Intake Case Adapter to Outlet Seal Plate (LH) Tube ... ..	75-02-09	201	9
Air Starter to Outlet Seal Plate Tube...	75-02-10	201	9
RPM Probe Drive and Housing to Tube Connection Tube ... ..	75-02-11	201	9
Duct, Air Venting, HP Compressor Diffuser Case Tube to Aircraft Overboard Cowling (LH and RH)... ..	75-02-12	201	9
HP Compressor Diffuser Case to Overboard Cowling Tubes... ..	75-03-01	201	9
Connection on Duct (HP Compressor Case to Diffuser Case Lower) to Spherical Joint Flange Tubes ... ..	75-03-02	201	9
Intermediate Case Elbow Duct to Second Stage Pump Tubes... ..	75-05-01	201	9
Connection on HP Compressor Case to Adapters (Gearbox Seals) Tubes ...	75-05-02	201	9
Connection on Tube (HP Compressor Case to Diffuser Case Lower) to Aircraft Connection Tubes ... ..	75-05-03	201	9
Engine Anti-icing Tubes and Manifold (Containing SEC/SUB 75-11-01, 75-11-02, 75-12-01 and 75-41-01) ... ..	75-10-00	301	9
Engine Anti-icing Manifold ... ..	75-11-01	201	9
Engine Anti-icing Tubes ... ..	75-11-02	201	9



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



	CH/SEC/SUB	PAGE	VOL.
Engine Anti-icing Air Control Valve ...	75-12-01	201	9
Engine Anti-icing Air Pressure Switch...	75-41-01	201	9
		301	9
CHAPTER 76 - ENGINE CONTROLS ... ..	-	-	9
List of Effective Pages ... ..	76	1	9
Table of Contents ... ..	76	1	9
Table of Approved Repair Schemes ...	76	1	9
Engine Controls (Containing SEC/SUB 76-11-01, 76-12-01, 76-12-02, 76-13-03, 76-15-02) ... ..	76-10-00	301	9
Throttle Valve Control Actuator...	76-11-01	201	9
LP Compressor RPM Probe ... ..	76-12-01	201	9
HP Compressor RPM Probe ... ..	76-12-02	201	9
Primary Nozzle Control Signal Pitot ...	76-13-03	201	9
Reheat Flame Detector ... ..	76-15-02	201	9
LP Shaft Signal System - Cylinder Piston Section with Front and Centre Cable Assemblies ... ..	76-21-01	101	9
		201	9
		301	9
		401	9
		501	9
		1001	9
LP Shaft Signal System - Rear Cable Assembly and Pulley ... ..	76-21-02	101	9
		201	9
		301	9
		501	9
CHAPTER 77 - ENGINE INDICATING ... ..	-	-	9
List of Effective Pages ... ..	77	1	9
Table of Contents ... ..	77	1	9
Table of Approved Repair Schemes ...	77	1	9
Engine Power Pitots... ..	77-12-03	201	9
		301	9
Engine Temperature Indication (Contain- ing SEC/SUB 77-21-02, 77-21-03, 77-22-02 to 09 and 77-23-02) ... ..	77-20-00	301	9
Jet Pipe Thermocouples ... ..	77-21-02	201	9
Jet Pipe Thermocouple Lead-outs...	77-21-03	201	9
Thermocouples, Turbine Cooling Air ...	77-22-02	201	9
Thermocouple Leads, Turbine Cooling Air ... ..	77-22-03	201	9
Thermocouple, LP and HP Turbine Bearings Cold Vent ... ..	77-22-04	201	9
Thermocouple, LP Turbine Bearing Hot Vent ... ..	77-22-05	201	9

MANUAL CONTENTS

Page 14  
Jul 1/81

FN18740





# OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

TN19268

	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>VOL.</u>
Thermocouple, Intermediate Case			
Bearings Cold Vents ... ..	77-22-06	201	9
Thermocouple, HP Compressor Rear			
Labyrinth Seal Hot Vents ... ..	77-22-07	201	9
Junction Box, Engine Thermocouple			
Termination... ..	77-22-08	201	9
Thermocouple HP Compressor			
Delivery Air ... ..	77-22-09	201	9
Thermometers, Oil Inlet and Outlet ...	77-23-02	201	9
Engine Vibration Indication (Containing			
SEC/SUB 77-33-01 to 03)... ..	77-30-00	301	9
Engine Vibration Transducer Cable ...	77-33-01	101	9
		201	
		501	
		1001	
Engine Vibration Transducer ... ..	77-33-02	201	9
		701	
Reheat Chamber Vibration Transducer ...	77-33-03	201	9
CHAPTER 79 - OIL ... ..	-	-	9
List of Effective Pages ... ..	79	1	9
Table of Contents ... ..	79	1	9
Oil System Storage (Containing SEC/SUB			
79-11-01 to 03) ... ..	79-10-00	301	9
Main Oil Tank... ..	79-11-01	101	9
		201	
		501	
		1001	
Fill Drain Connection ... ..	79-11-02	201	9
Overflow Drain Coupling ... ..	79-11-03	201	9
Oil System Distribution (Containing			
SEC/SUB 79-21-01, 79-22-01 to 04			
and 79-23-01) ... ..	79-20-00	301	9
Oil Cooler ... ..	79-21-01	201	9
Oil Supply, Tank to Pump and Anti			
Drain Connection Tubes ... ..	79-22-01	201	9
Oil Return, Oil Pump and RH Gearbox,			
to Oil Tank Tubes... ..	79-22-02	201	9
Anti Drain Connection to Connection			
on Tube, Oil Cooler to Oil Tank			
Tube ... ..	79-22-03	201	9



OLYMPUS 593

MK.610-14-28

OVERHAUL



CH/SEC/SUB    PAGE    VOL.

IDG Supply and Return to Oil Cooler			
Tubes... ..	79-22-04	201	9
Drain Valve and Master Magnetic Plug ...	79-23-01	201	9
Oil System Indicating (Containing			
SEC/SUB 79-31-01, 79-32-01,			
79-33-01, 79-33-02, 79-34-01			
and 79-34-02) ... ..	79-30-00	301	9
Oil Tank Contents Transmitter and			
Overfull Switch ... ..	79-31-01	201	9
Engine Oil Inlet Thermocouple ... ..	79-32-01	201	9
Engine Oil Pressure Transmitter... ..	79-33-01	201	9
Engine Oil Pressure Switch ... ..	79-33-02	201	9
RH Gearbox Oil Pressure Transmitter ...	79-34-01	201	9
RH Gearbox Oil Pressure Switch ... ..	79-34-02	201	9

TN4179



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## INTRODUCTION

### 1. General

This manual has been produced to provide overhaul/repair information of the Olympus 593 Mk.610-14-28 engine installed in the Concorde aircraft. Book 1 which is considered here, covers the basic engine and external dressings required to build the engine to a testable standard, and includes coverage of power plant testing. Book 2 covers the engine exhaust system.

### 2. Manual Format

The manual has been produced to the breakdown called for in ATA Specification 100 which provides a three element (six digit) identifying system which sub-divides the book into Chapters, Sections and where necessary, sub-divides the Sections into Subjects in the following manner.

- A. The Chapters are denoted by divider cards and provide the first pair of numbers 71, 72, 73 etc. The chapters deal with the Power Plant (the engine plus its dressings), the bare engine and all its sub-assemblies/modules, the fuel, air and oil systems/components, and the ignition, engine controls and indicating.
- B. Each chapter is in turn sub-divided into Sections which are denoted by the second pair of identifying numbers and which deal with a sub-assembly/module or part of a system.
- C. The sections may be sub-divided into Subjects which are a part of a sub-assembly or a component, and are denoted by the third pair of identifying numbers.
- D. Thus for example, the LP compressor drive shaft is identified by 72-31-04. The 72 number denotes it is contained in the engine, the 31 denotes it is part of the LP compressor section and the 04 shows it is a separate sub-assembly of the LP compressor section.



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



- E. Each page is identified by the full element identification number and, in addition, is identified by a page block number which denotes with what aspect of overhaul it is concerned. A full list of page blocks and the topics they deal with is as follows:

Description and Operation	Page block	1- 100
Disassembly	Page block	101- 200
Cleaning	Page block	201- 300
Inspection/Check	Page block	301- 400
Repair	Page block	401- 500
Assembly or Sub-assembly	Page block	501- 600
Fits and Clearances	Page block	601- 700
Testing	Page block	701- 800
Storage Instruction	Page block	901-1000
Special Tools, Fixtures and Equipment	Page block	1001-1100
Light Overhaul	Page block	1301-1400

- F. Chapter 72-Engine contains page block divider cards, and all the subjects for each aspect of overhaul are contained under their divider cards e.g. the disassembly of all subjects (page block 101-200) is contained under the Disassembly (blue) divider card. The remaining Chapters 71, 73, etc. have no page block divider cards and all subjects are in ATA sequence.

### 3. Item Identification

- A. The identifying system of ATA numbering in Book 1 is (where possible) identical to that in the Illustrated Parts Catalogue (IPC), and with the exception of disassembly, references are contained throughout the text as thought necessary, of the IPC Fig. and Item No. for identifying items. The identifying system used in the IPC cannot always be used in the disassembly/assembly page blocks due to the structure of the engine, which in some instances entails the combination of a number of subjects. An example is the RH Gearbox Assembly which is called out under seven subjects 72-63-00 to 72-63-06 in the IPC, but is disassembled/assembled as an assembly under 72-63-00. Where this occurs, a token page is contained in this book which refers to the Section/Subject number under which the information is contained.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- B. A similar arrangement has been used in the Inspection/Check page block where because of inter-relating items or duplication of checks, a number of subjects in the IPC have been contained under one subject number in this book. In Chapter 72 Engine, token pages have been included which refer to the subject number under which the information is contained. The remaining Chapters 71, 73, 74 etc. do not generally contain token pages, but the Chapter Contents pages of each Chapter denote the subjects contained under each Section/Subject number.

#### 4. Cleaning and Inspection/Check

- A. For identification of items during cleaning and inspection/check topics, the IPC illustrations have been reproduced, with the difference that all consumable (low cost items) have been deleted, and items that normally remain assembled, such as studs, inserts etc. have been shown assembled with the IPC references indicating their position.

#### 5. Service Bulletins

- A. All Service Bulletins quoted in this manual are identified by their chapter No. and issue sequence No. only. The engine identification code OL.593 has been omitted for simplicity.
- B. With the exception of Mandatory bulletins which are basic in the text, all other service bulletins (SB) that entail a different disassembly or assembly procedure, cleaning process or inspection/check etc. are identified in the text as post or pre SB standard. Where a SB entails a direct replacement of an item that does not affect a procedure etc. the SB is not identified in the text.

#### 6. Standard Practices

- A. To prevent duplication of information of a general nature in each subject, standard practices of each topic of overhaul are contained under section 72-09-00 of each topic, or under 71-09-00 for Power Plant information on disassembly and assembly.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## 7. Repair

- A. Information of a general nature dealing with repair are contained in Standard Practices 72-09-00 Repair, while procedures for finishes (painting, plating etc.) are detailed under their own subject number 72-09-01, 02 etc. Additional information of a general nature dealing with where to apply paint, plating etc. and how to dress out damage within the Inspection/Check acceptable limits on an item, are contained under their own Chapter/Section/Subject number.
- B. Information of a specific nature dealing with one aspect of an item or items will be contained in a Repair, and each repair will be identified by a No. and will start on page 401. The Repairs will follow any information of a general nature in each Chapter/Section/Subject as applicable.

TN33418



OLYMPUS 593

MK.610-14-28

OVERHAUL



### OBSERVANCE OF MANUAL INSTRUCTIONS

The instructions for overhaul and repair of the engine contained in this manual, particularly those related to cleaning, inspection, surface protection and repair of major rotating parts and of other "high duty" parts, have been devised to preserve the integrity of the parts during their service lives.

Instructions are written to permit, wherever possible, the use of routine workshop practices in the performance of tasks and to give flexibility where appropriate. However, where instructions are specific as to means and method, it is important that alternatives are not used unless agreed with Rolls-Royce/SNECMA, since even minor deviations from the specified parameters may require careful evaluation in order to avoid abuse, e.g. machining abuse, which may not be detectable by routine inspection.

Where changes to the specified instructions are agreed, Rolls-Royce/SNECMA will consider revising the manual to include the change as an alternative.



OLYMPUS 593

MK.610-14-28

OVERHAUL



## ASSEMBLY OF PARTS

Owing to the physical similarity of components with different part numbers, it is possible to assemble engine parts into the wrong location, and into engine types for which they were not intended. Such incorrect assembly could possibly result in failure. Before fitting components therefore, always check the part number to ensure that it is the correct item.

PRINTED IN ENGLAND

ASSEMBLY OF PARTS

Page 1

Jan 4/93



**OLYMPUS 593**MK.610-14-28  
OVERHAUL

## CONTAMINATION OF ENGINE COMPONENTS

### 1. General

Contamination of a material by a low melting point alloy can, at certain temperatures, lead to intercrystalline penetration and subsequent embrittlement and cracking.

Contamination by chloride based materials of stainless steel tubes can, after a period of time, cause stress cracking and ultimate failure.

### 2. Contamination by Cadmium Plated Tools

It is possible for deposits of cadmium to be transferred from a plated tool to the surface of an engine component. In the case of titanium components this could result in rapid failure of the component under certain running conditions.

The failure is caused by the cadmium reacting, at certain temperatures, with the titanium, resulting in embrittlement and cracking.

In view of this, any tool or item of equipment which is liable to come into contact with titanium must not be cadmium plated.

### 3. Chafe Wrapping of Stainless Steel Tubes

Chloride based materials (e.g. neoprene tubing and glass fibre tape) must not be wrapped on engine air, oil and fuel tubes to prevent chafing. These materials can breakdown under high engine temperatures, resulting in the formation of salts which are highly corrosive to the stainless steel tubes. After a period of time, stress cracking can develop, resulting in failure of the tubes.

All tubes must be installed with the authorised brackets, clips and bushes only, as specified in the Illustrated Parts Catalogue TP.184/BED.

CONTAMINATION OF ENGINE  
COMPONENTS



OLYMPUS 593

MK.610-14-28  
OVERHAUL



SNECMA

HAZARDOUS MATERIALS

All hazardous materials must be handled in an environmentally friendly manner and in accordance with local regulations.

Printed in England

# *Concorde*

## MAINTENANCE MANUAL

## OVERHAUL MANUAL

### FRONT PAGES

CHAPTER 05	TIME LIMITS
CHAPTER 70	STANDARD PRACTICES - ENGINE
CHAPTER 71	POWER PLANT GENERAL
CHAPTER 72	ENGINE
CHAPTER 73	ENGINE FUEL AND CONTROL
CHAPTER 74	IGNITION
CHAPTER 75	AIR
CHAPTER 76	ENGINE CONTROLS
CHAPTER 77	ENGINE INDICATING
CHAPTER 78	EXHAUST
CHAPTER 79	OIL

Select Chapter

Copyright:  
British Aerospace (Operations) Ltd 1999





# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

## CHAPTER 72

### ASSEMBLY/SUB-ASSEMBLY

### LIST OF EFFECTIVE PAGES

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
List of Effective Pages			72-00-00	508	Dec 31/00
			(Cont'd.)	509	Dec 31/00
	1	Dec 31/01		510	Dec 31/00
	2	Dec 31/01		510A	Jun 1/89
	3	Dec 31/01		510B	Dec 31/00
	4	Dec 31/01		511	Jun 1/89
	5	Jun 30/01		512	Jan 19/76
	6	Jun 30/01		513	Aug 1/76
	7	Jun 30/01		514	Aug 1/76
	8	Jun 30/01		515	Jun 1/77
	9	Dec 31/01		516	Jan 19/76
	10	Dec 31/01		517	Jan 4/93
	10A	Jun 1/99		518	Jan 4/93
	10B	Dec 31/01		519	Jan 1/77
	11	Dec 31/01		520	Jun 1/99
	12	Dec 31/01		521	Aug 1/76
	13	Dec 31/01		522	Jun 1/99
	14	Dec 31/99		522A	Jun 1/99
	15	Dec 31/01		522B	Jun 1/99
	16	Dec 31/01		523	Dec 31/01
	17	Dec 31/01		524	Dec 1/97
	18	Dec 31/01		525	Jan 19/76
Table of Contents	19	Dec 31/00		526	Dec 1/97
	20	Dec 31/99		527	Dec 31/01
Contents	21	Jun 30/00		528	Dec 31/01
				528A	Jun 30/95
72-00-00	1	Oct 1/76		528B	Jun 30/95
	2	Apr 1/76		529	Jun 1/99
Contents				530	Jan 19/76
Contents				531	Dec 1/87
Contents				532	Jan 19/76
Contents				533	Jan 19/76
Contents				534	Dec 31/01
Contents				535	Jun 1/92
Contents				536	May 1/81
	501	Dec 31/00		537	Jun 30/95
	502	Jan 19/76		538	Aug 1/76
	503	Dec 31/00		539	Jan 19/76
	504	Jan 19/76		540	Jan 19/76
	505	Dec 31/00		541	Jan 19/76
	506	Jan 19/76		542	Sep 30/94
	507	Dec 31/00		543	Jan 19/76

ASSEMBLY/SUB-ASSEMBLY

LIST OF EFFECTIVE PAGES - 72

Page 1

Dec 31/01



# OLYMPUS 593



MK.610-14-28  
OVERHAUL *sneema*

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
72-00-00	544	Apr 1/82	72-00-00	588	Jul 1/76
(Cont'd.)	545	Jun 1/88	(Cont'd.)	589	Jun 1/94
	546	Jan 19/76		590	Jun 1/99
	547	Dec 31/01		591	Jun 1/99
	548	Jun 1/88		592	Jun 1/99
	548A	Jun 1/88		593	Jun 1/99
	548B	Jun 1/88		594	Jun 1/99
	549	Jul 1/76		595	Jun 1/99
	550	Jun 1/77		596	Jun 1/99
	551	Jul 1/76		597	Jun 1/99
	552	Dec 1/86		598	Jun 1/99
	553	Jul 1/76		598.1	Jun 1/99
	554	Dec 1/86		598.2	Jun 1/99
	555	Jul 1/76		598.3	Jun 1/99
	556	Dec 31/01		598.4	Jun 1/99
	557	Jul 1/76		598.5	Jun 1/99
	558	Dec 31/01		598.6	Jun 1/99
	559	Jul 1/76		598.7	Jun 1/99
	560	Jul 1/76		598.8	Jun 1/99
	561	Jul 1/76		598.9	Jun 1/99
	562	Dec 1/83		598.10	Jun 1/99
	563	Dec 31/01		598.11	Jun 1/99
	564	Jun 1/91		598.12	Jun 1/99
	565	Jul 1/76		598.13	Jun 1/99
	566	Dec 1/96		598.14	Jun 1/99
	567	Jul 1/76	72-00-51		
	568	Dec 1/96	Contents	1	Dec 31/01
	569	Jul 1/76	Contents	2	Jun 1/98
	570	Dec 31/01	Contents	3	Jun 1/98
	571	Jul 1/76	Contents	4	Jun 1/98
	572	Jul 1/76	Contents	5	Jun 1/98
	573	Jul 1/76	Contents	6	Jun 1/98
	574	Oct 1/82	Contents	7	Jun 1/98
	575	Jul 1/76		501	Apr 1/77
	576	Oct 1/82		502	Jun 1/98
	577	Jan 4/93		502A	Jun 1/98
	578	Jul 1/76		502B	Dec 31/00
	579	Jul 1/76		503	Jun 30/95
	580	Jul 1/76		504	Dec 31/00
	581	Dec 31/99		505	Sep 28/75
	582	Sep 30/94		506	Sep 28/75
	582A	Dec 31/99		507	Dec 31/00
	582B	Dec 31/99		508	Mar 1/76
	583	Dec 31/99		509	Jun 1/98
	584	Jul 1/76		510	Sep 28/75
	585	Jul 1/76		511	Jun 1/98
	586	Jul 1/76			
	587	Jul 1/76			

ASSEMBLY/SUB-ASSEMBLY



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
72-00-51	512	Oct 1/82	72-00-51	558	Dec 1/84
(Cont'd.)	513	Oct 1/82	(Cont'd.)	559	Sep 1/85
	514	Oct 1/82		560	Mar 1/76
	515	Dec 1/85		561	Mar 1/76
	516	Dec 1/85		562	Mar 1/76
	517	Apr 1/77		563	Mar 1/76
	518	Mar 1/76		564	Mar 1/76
	519	Oct 1/76		565	Mar 1/76
	520	Mar 1/76		566	Oct 1/82
	521	Dec 31/01		567	Oct 1/82
	522	Mar 1/76		568	Oct 1/82
	523	Dec 31/01		569	Sep 1/85
	524	Mar 1/76		570	Jun 1/98
	525	Mar 1/76		571	Dec 31/01
	526	Mar 1/76		572	Jun 1/98
	527	Jun 1/96		573	Dec 31/01
	528	Dec 31/01		574	Dec 31/01
	529	Dec 31/01		575	Jun 1/98
	530	Feb 1/80		576	Dec 31/01
	531	Oct 1/82		577	Dec 31/01
	532	Feb 1/80		578	Dec 31/01
	533	Mar 1/76		578A	Jun 1/98
	534	Jan 1/77		578B	Jun 1/98
	535	Jan 1/77		578C	Jun 1/98
	536	Dec 31/01		578D	Jun 1/98
	537	Mar 1/76		579	Jun 1/98
	538	Mar 1/76		580	Mar 1/76
	539	Dec 31/01		581	Dec 31/01
	540	Mar 1/76		582	Dec 1/83
	541	Jun 1/98		582A	Dec 31/01
	542	Jun 1/98		582B	Dec 31/01
	543	Dec 31/99		583	Dec 31/01
	544	Jun 1/98		584	Dec 31/01
	545	Dec 1/80		584A	Dec 31/99
	546	Dec 1/80		584B	Jun 1/98
546A	Dec 1/85		585	Dec 31/99	
546B	Jun 1/98		586	Jan 2/80	
547	Dec 1/85		587	Jun 1/98	
548	Oct 1/82		588	Jan 2/80	
549	Dec 31/01		589	Jan 2/80	
550	Dec 1/80		590	Oct 1/82	
551	Oct 1/82		591	Jan 2/80	
552	Dec 1/80		592	Dec 31/00	
553	Dec 1/84		593	Jan 2/80	
554	Dec 1/80		594	Oct 1/82	
555	Dec 1/84		595	Jun 1/99	
556	Mar 1/76		596	Jan 2/80	
557	Mar 1/76		597	Dec 31/01	

ASSEMBLY/SUB-ASSEMBLY

LIST OF EFFECTIVE PAGES - 72  
Page 3  
Dec 31/01



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
72-00-51	598	Jan 2/80	72-09-00	504	Jun 1/96
(Cont'd.)	598A	Dec 31/01	(Cont'd.)	505	Jun 1/99
	598B	Dec 1/96		506	Jun 1/99
	598.1	Jan 2/80		506A	Jun 1/99
	598.2	Jun 1/98		506B	Sep 30/94
	598.3	Dec 31/01		507	Mar 1/76
	598.4	Jan 2/80		508	Nov 1/78
	598.5	Dec 31/01		509	Jun 1/99
	598.6	Jul 1/81		510	Mar 1/76
	598.7	Oct 1/82		511	Dec 31/00
	598.8	Jul 1/81		512	Mar 1/76
	598.9	Jul 1/81		513	Mar 1/76
	598.10	Dec 31/01		514	Jan 2/80
	598.11	Dec 31/01		515	Mar 1/76
	598.12	Dec 31/01		516	Mar 1/76
	598.13	Dec 31/01		517	Jun 1/96
	598.14	Dec 31/01		518	Jun 1/96
	598.15	Feb 1/83		519	Sep 1/80
	598.16	Feb 1/83		520	Dec 1/97
	598.17	Feb 1/83		521	Sep 1/80
	598.18	Feb 1/83		522	Mar 1/76
	598.19	Feb 1/83		523	Dec 31/99
	598.20	Dec 31/01		524	Dec 31/99
	598.21	Jul 1/81		524A	Dec 31/99
	598.22	Dec 1/86		524B	Dec 31/99
	598.23	Jul 1/81		525	Mar 1/76
	598.24	Dec 1/86		526	Jul 1/76
	598.25	Jun 1/98		527	Aug 1/77
	598.26	Jun 1/98		528	Aug 1/77
	598.27	Jul 1/81		529	Nov 1/78
	598.28	Jul 1/81		530	Nov 1/78
	598.29	Dec 31/01		531	Mar 1/80
	598.30	Dec 31/01		532	Mar 1/80
	598.31	Jul 1/81		533	Mar 1/80
	598.32	Dec 31/01	72-09-01		
	598.33	Dec 31/01	Contents	1	Sep 1/80
	598.34	Jul 1/81		501	Sep 1/80
	598.35	Jul 1/81		502	Apr 1/77
	598.36	Jul 1/81		503	Sep 1/80
				504	Sep 1/80
72-09-00			72-20-00		
Contents	1	Feb 1/80	Contents	1	Jul 1/81
Contents	2	Mar 1/80		501	Jun 1/77
	501	Dec 31/00		502	Dec 1/76
	502	Dec 31/01		503	Jun 1/77
	502A	Dec 31/00		504	Jun 1/77
	502B	Dec 31/00		505	Apr 1/76
	503	Jun 30/97		506	Jun 1/77

ASSEMBLY/SUB-ASSEMBLY

LIST OF EFFECTIVE PAGES - **72**

Page 4

Dec 31/01



OLYMPUS 593



MK.610-14-28

SNECMA

OVERHAUL

Printed in England

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
72-20-00	507	Jan 4/93	72-31-00	503	Dec 31/00
(Cont'd.)	508	Jan 4/93	(Cont'd.)	504	Apr 1/77
	508A	Jan 4/93		505	Jun 1/77
	508B	Jan 4/93		506	Jul 1/76
	509	Jan 4/93		507	Jun 1/77
	510	Jan 4/93		508	Dec 31/00
	511	Jan 4/93		509	Jun 1/99
	512	Jan 4/93		510	May 1/79
	513	Jun 1/77		511	Jul 1/76
	514	Dec 1/81		512	Jul 1/76
	515	Jun 1/77		513	May 1/79
	516	Jun 1/77		514	Jul 1/76
	517	Dec 1/81		515	Dec 31/00
	518	Sep 30/94		516	Dec 31/00
	519	Dec 1/81		517	Dec 31/00
	520	Dec 1/81		518	Dec 31/00
	521	Dec 1/81		519	Dec 1/95
	522	Jul 1/81		520	Jun 30/01
	523	Jul 1/81		521	Jul 1/76
	524	Jul 1/81		522	Jul 1/76
	525	Jul 1/81		523	Jul 1/76
	526	Jul 1/81		524	Jul 1/76
	527	Jul 1/81		525	Jul 1/76
	528	Jul 1/81		526	Dec 31/00
	529	Jul 1/81		527	Dec 31/00
	530	Jul 1/81		528	Dec 31/00
	531	Jul 1/81		529	Dec 31/00
	532	Jul 1/81		530	Dec 31/00
	533	Jul 1/81		531	Dec 31/00
	534	Jul 1/81		532	Dec 31/00
				532A	Dec 31/00
72-21-01	501	Jan 1/76		532B	Dec 31/00
				533	Dec 31/00
72-22-01	501	Jan 1/76		534	Dec 31/00
				535	Dec 31/00
72-23-01				536	Jul 1/76
	501	Jan 1/76		537	Jul 1/76
				538	Jul 1/76
72-31-00				539	Jul 1/76
Contents	1	Dec 31/00		540	Feb 1/82
Contents	2	Jul 1/76		541	Jul 1/76
Contents	3	Dec 31/00		542	Dec 31/00
Contents	4	Dec 31/00		543	Dec 31/00
Contents	5	Dec 31/00		544	Dec 31/00
	501	Apr 1/77		545	Jul 1/76
	502	Jul 1/76		546	Jul 1/76

ASSEMBLY/SUB-ASSEMBLY

LIST OF EFFECTIVE PAGES - 72

Page 5

Jun 30/01





OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
72-31-00	547	Jul 1/76	72-31-00	591	Dec 31/00
(Cont'd.)	548	Jul 1/76	(Cont'd.)	592	Dec 31/00
	549	Jul 1/76		593	Dec 31/00
	550	Jul 1/76		594	Dec 31/00
	551	Mar 1/81		595	Dec 31/00
	552	Jul 1/76		596	Dec 31/00
	553	Nov 1/76		597	Dec 31/00
	554	Jul 1/76		598	Dec 31/00
	555	Jul 1/76		598.1	Dec 31/00
	556	Jul 1/76		598.2	Dec 31/00
	557	Feb 1/78		598.3	Dec 31/00
	558	Jul 1/76		598.4	Jul 1/76
	559	Jul 1/76		598.5	Dec 31/00
	560	Jul 1/76		598.6	Jul 1/76
	561	Jun 30/00		598.7	Dec 31/00
	562	Nov 1/76		598.8	Dec 31/00
	563	Feb 1/78		598.9	Dec 31/00
	564	Jul 1/76		598.10	Dec 31/00
	565	Jul 1/76		598.11	Dec 31/00
	566	Jun 30/01		598.12	Dec 31/00
	567	Jul 1/76			
	568	Mar 1/81	72-31-01		
	569	Jul 1/76	Contents	1	Sep 30/94
	570	Feb 1/78		2	Jul 1/81
	571	May 1/79		501	Oct 1/77
	572	May 1/79		502	Aug 14/75
	573	Jun 30/01		503	Feb 1/82
	574	Nov 1/76		504	Sep 30/94
	575	Jul 1/76		505	Sep 30/94
	576	Feb 1/78		506	Dec 31/99
	577	Jul 1/76		506A	Dec 31/99
	578	Jul 1/76		506B	Dec 1/82
	579	May 1/79		507	Dec 1/97
	580	Mar 1/81		508	Oct 1/77
	581	Feb 1/78		509	Feb 1/82
	582	May 1/79		510	Oct 1/77
	583	Jul 1/76		511	Feb 1/82
	584	Jul 1/76		512	Feb 1/82
	585	Jul 1/76		513	Feb 1/82
	586	Jul 1/76		514	Oct 1/77
	587	Jul 1/76		515	Feb 1/82
	588	Nov 1/76		516	Oct 1/77
	589	Jul 1/76		517	Oct 1/77
	590	Jul 1/76		518	Oct 1/77
				519	Jun 1/84
				520	Jul 1/81
				521	Dec 31/99

ASSEMBLY/SUB-ASSEMBLY

LIST OF EFFECTIVE PAGES - 72

Page 6

Jun 30/01



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

Printed in England

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
72-31-01	522	Dec 31/99	72-31-03	524	Dec 1/76
(Cont'd.)	523	Dec 31/99	(Cont'd.)	525	Dec 1/76
	524	Dec 31/99		526	Dec 1/75
	524A	Jun 1/84		527	Dec 1/76
	524B	Dec 1/82		528	Dec 1/76
	525	Dec 31/99		529	Dec 1/76
	526	Dec 31/99		530	Dec 1/75
	527	Dec 31/99		531	Dec 1/76
	528	Dec 31/99		532	Dec 1/76
				533	Dec 1/76
				534	Dec 1/75
72-31-02				535	Jun 1/90
Contents	1	Aug 1/75		536	Dec 1/75
	501	Mar 1/81		537	Jun 1/90
	502	Nov 1/76		538	Dec 1/76
	503	Aug 1/75		539	Dec 1/76
	504	Aug 1/75		540	Dec 1/76
	505	May 1/79		541	Jun 30/01
				542	Dec 1/76
72-31-03				543	Dec 1/76
Contents	1	Dec 1/76		544	Dec 1/76
Contents	2	Dec 1/76		545	Dec 1/76
Contents	3	Dec 1/76		546	Dec 1/76
Contents	4	Dec 1/76		547	Dec 1/76
Contents	5	Dec 1/76		548	Dec 1/76
Contents	6	Dec 1/76		549	Dec 1/76
	501	Mar 1/76		550	Dec 1/76
	502	Dec 1/76		551	Dec 1/76
	503	Dec 1/75		552	Dec 1/76
	504	Dec 1/76		553	Dec 1/76
	505	Dec 1/76		554	Jun 30/01
	506	Dec 1/76		555	Dec 1/76
	507	Dec 1/76		556	Dec 1/76
	508	Dec 1/76		557	Dec 1/76
	509	Dec 1/76		558	Dec 1/76
	510	Dec 1/76		559	Dec 1/76
	511	Dec 1/76		560	Dec 1/76
	512	Dec 1/76		561	Dec 1/76
	513	Feb 1/78		562	Dec 1/76
	514	Dec 1/76		563	Dec 1/76
	515	Dec 1/76		564	Dec 1/76
	516	Dec 1/76		565	Dec 1/76
	517	Dec 1/76		566	Dec 1/76
	518	Dec 1/76		567	Dec 1/76
	519	Dec 1/75		568	Dec 1/76
	520	Dec 1/76			
	521	Dec 1/75			
	522	Jun 30/01			
	523	Dec 1/75			

ASSEMBLY/SUB-ASSEMBLY

LIST OF EFFECTIVE PAGES - 72

Page 7

Jun 30/01



# OLYMPUS 593



MK.610-14-28

sheema

OVERHAUL

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
72-31-03	569	Dec 1/76	72-31-03	598.15	Dec 1/76
(Cont'd.)	570	Dec 1/76	(Cont'd.)	598.16	Dec 1/76
	571	Dec 1/76		598.17	Dec 1/76
	572	Aug 1/78		598.18	Dec 1/76
	573	Dec 1/76		598.19	Dec 1/95
	574	Dec 1/76		598.20	Dec 1/76
	575	Dec 1/76		598.21	Dec 1/76
	576	Dec 1/76		598.22	Jun 30/01
	577	Dec 1/76			
	578	Jun 30/01	72-31-04		
	579	Dec 1/76	Contents	1	Sep 1/81
	580	Dec 1/76		2	Sep 1/81
	581	Dec 1/76		501	Oct 1/76
	582	Dec 1/76		502	Aug 27/75
	583	Dec 1/76		503	Oct 1/82
	584	Dec 1/76		504	Aug 27/75
	585	Dec 1/76		505	Sep 1/81
	586	Dec 1/76		506	Oct 1/76
	587	Dec 1/76		507	Sep 1/81
	588	Dec 1/76		508	Sep 1/81
	589	Dec 1/76		509	Oct 1/82
	590	Dec 1/76		510	Oct 1/82
	591	Jun 30/01		511	Oct 1/82
	592	Dec 1/76		512	Oct 1/76
	593	Dec 1/76		513	Oct 1/76
	594	Dec 1/76		514	Oct 1/76
	595	Dec 1/76		515	Oct 1/76
	596	Dec 1/76		516	Feb 1/78
	597	Dec 1/76		517	Oct 1/76
	598	Dec 1/76		518	Oct 1/76
	598.1	Dec 1/76		519	Oct 1/76
	598.2	Dec 1/76		520	Oct 1/76
	598.3	Dec 1/76		521	Oct 1/76
	598.4	Dec 1/76		522	Oct 1/76
	598.5	Dec 1/76		523	Feb 1/78
	598.6	Dec 1/76		524	Oct 1/76
	598.7	Jan 1/78		525	Oct 1/76
	598.8	Dec 1/76		526	Oct 1/82
	598.9	Dec 1/76		527	Oct 1/82
	598.10	Dec 1/76		528	Oct 1/76
	598.11	Dec 1/76		529	Oct 1/82
	598.12	Feb 1/82		530	Oct 1/76
	598.13	Dec 1/76		531	Oct 1/82
	598.14	Dec 1/76		532	Oct 1/76

ASSEMBLY/SUB-ASSEMBLY

LIST OF EFFECTIVE PAGES - 72

Page 8

Jun 30/01



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
72-31-04	533	Oct 1/76	72-32-00	506	Mar 1/76
(Cont'd.)	534	Oct 1/76	(Cont'd.)	507	Aug 1/78
	535	Oct 1/76		508	Dec 31/99
	536	Oct 1/76		509	Dec 31/99
	537	Oct 1/76		510	Dec 31/99
	538	Oct 1/76		511	Dec 31/99
	539	Oct 1/76		512	Dec 31/99
	540	Oct 1/76		513	Dec 31/99
	541	Oct 1/76		514	Dec 31/99
	542	Oct 1/76		515	Dec 31/01
	543	Apr 1/77		516	Dec 31/99
	544	Oct 1/76		517	Dec 31/99
	545	Oct 1/76		518	Dec 31/99
	546	Oct 1/76		518A	Dec 31/99
	547	Sep 1/81		518B	Dec 31/99
	548	Sep 1/81		519	Jun 1/99
				520	Jul 1/76
72-31-05				521	Oct 1/76
	501	Jan 1/76		522	Jun 1/99
				523	Dec 1/95
72-32-00				524	Dec 31/01
Contents	1	Jun 1/99		525	Jul 1/76
Contents	2	Jun 1/99		526	Dec 31/99
Contents	3	Jun 1/99		526A	Dec 31/01
Contents	4	Jun 1/99		526B	Dec 1/96
Contents	5	Jun 1/99		527	Jul 1/76
Contents	6	Jun 1/99		528	Dec 31/01
	501	Jun 1/99		529	Oct 1/76
	502	Jun 1/99		530	Dec 31/01
	502A	Dec 31/01		531	Dec 31/01
	502B	Dec 31/01		532	Dec 31/01
	502C	Jun 1/99		533	Jun 1/99
	502D	Dec 31/01		534	Jul 1/76
	502E	Jun 1/99		535	Jun 1/77
	502F	Jun 1/99		536	Jul 1/76
	502G	Jun 1/99		537	Jul 1/76
	502H	Jun 1/99		538	Jul 1/76
	502J	Jun 1/99		539	Jun 1/99
	502K	Jun 1/99		540	Jun 1/77
	502L	Jun 1/99		541	Jun 1/99
	502M	Jun 1/99		542	Jul 1/76
	502N	Jun 1/99		543	Jul 1/76
	502P	Jun 1/99		544	Jul 1/76
	502Q	Dec 31/01		545	Jul 1/76
	502R	Jun 1/99		546	Jun 1/99
	503	Jun 1/99		547	Jul 1/76
	504	Dec 31/01		548	Jun 1/99
	505	Mar 1/76		549	Jun 1/77

ASSEMBLY/SUB-ASSEMBLY



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
72-32-00	550	Jul 1/76			
(Cont'd.)	551	Dec 31/99			
	552	Oct 1/76			
	553	Apr 1/82			
	554	Apr 1/82			
	554A	Dec 31/99			
	554B	Apr 1/82			
	555	Jul 1/76			
	556	Dec 31/00			
	557	Jun 30/97			
	558	Apr 1/82			
	558A	Jun 30/97			
	558B	Dec 1/97			
	559	Dec 1/96			
	560	Dec 1/95			
	561	Dec 31/01			

ASSEMBLY/SUB-ASSEMBLY

LIST OF EFFECTIVE PAGES - 72

Page 10  
Dec 31/01

Printed in England



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

THIS PAGE LEFT BLANK INTENTIONALLY

ASSEMBLY/SUBASSEMBLY

LIST OF EFFECTIVE PAGES - **72**  
Page 10A  
Jun 1/99



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sheema

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
72-32-00 (Cont'd.)	562	Jul 1/76	72-32-00 (Cont'd.)	598.8	Dec 31/01
	563	May 1/79		598.9	Jun 1/99
	564	Dec 1/96		598.10	Jun 1/99
	565	Dec 1/96		598.11	Jun 1/99
	566	Dec 31/01		598.12	Jun 1/99
	567	Jul 1/76		598.13	Jun 1/99
	568	Dec 31/01		598.14	Jun 1/99
	569	Jul 1/76		598.15	Jun 1/99
	570	Apr 1/82		598.16	Jun 1/99
	571	Apr 1/82		598.17	Jun 1/99
	572	Jun 1/99		598.18	Jul 1/76
	573	Jul 1/76		598.19	Dec 31/01
	574	Apr 1/82		598.20	Jul 1/76
	575	Apr 1/82		598.21	Dec 31/01
	576	Jun 30/95		598.22	Dec 31/99
	577	Jun 30/95		598.23	Dec 31/01
	578	Apr 1/82		598.24	Jul 1/76
	579	Jul 1/76		598.25	Jul 1/76
	580	Jun 1/99		598.26	Jun 1/98
	581	Jun 1/99		598.27	Dec 31/99
	582	Jun 1/99		598.28	Jun 1/99
	583	Jun 1/99		598.29	Jul 1/76
	584	Dec 31/01		598.30	Jul 1/76
	585	Dec 31/01		598.31	Mar 1/85
	586	Jun 1/99		598.32	Dec 31/99
	587	Dec 31/01		598.33	Jun 30/95
	588	Jun 1/99		598.34	Jul 1/76
	589	Dec 31/01		598.35	Jun 30/95
	590	Jun 1/99		598.36	Jul 1/76
	591	Jun 1/99		598.37	May 1/79
	592	Jun 1/99		598.38	May 1/79
	593	Jun 1/99		598.39	May 1/79
	594	Jun 1/99		598.40	Jul 1/76
	595	Jun 1/99		598.41	Jul 1/76
	596	Jun 1/99		598.42	Jul 1/76
	597	Jun 1/99		598.43	Dec 1/95
	598	Dec 31/01		598.44	Jun 1/99
	598.1	Dec 31/01		598.45	Jan 1/77
	598.2	Dec 31/01		598.46	Dec 31/01
	598.3	Jun 1/99		598.47	Dec 31/01
	598.4	Jun 1/99		598.48	Jun 1/84
	598.5	Dec 31/01		598.49	Jun 1/99
	598.6	Jun 1/99		598.50	Jun 1/77
	598.7	Jun 1/99		598.51	Jun 1/99
				598.52	Oct 1/77

ASSEMBLY/SUB-ASSEMBLY

LIST OF EFFECTIVE PAGES - 72  
Page 10B  
Dec 31/01



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
72-32-00	598.53	Sep 1/84	72-33-00	523	Nov 1/78
(Cont'd.)	598.54	Sep 1/84		524	Apr 1/76
	598.55	Oct 1/77		525	Sep 1/81
	598.56	Sep 1/84		526	Jun 1/98
	598.57	Oct 1/77		527	Apr 1/76
	598.58	Oct 1/77		528	Dec 1/81
	598.59	Oct 1/77		529	Nov 1/76
	598.60	Oct 1/77		530	Apr 1/76
	598.61	Oct 1/77		531	Dec 31/01
	598.62	Sep 1/84		532	Dec 1/97
	598.63	Oct 1/77		532A	Jun 1/99
	598.64	Sep 1/84		532B	Dec 1/97
	598.65	Oct 1/77		533	Dec 1/97
	598.66	Sep 1/84		534	Apr 1/76
				535	Dec 1/85
				536	Dec 1/85
72-33-00				537	Apr 1/76
Contents	1	Nov 1/76		538	Sep 1/81
Contents	2	Apr 1/78		539	Sep 1/81
Contents	3	Jun 1/99		540	Apr 1/82
Contents	4	Jun 1/89		541	Dec 1/97
Contents	5	Apr 1/78		542	Apr 1/76
Contents	6	Jun 1/77		543	Dec 1/97
	501	Jan 1/78		544	Dec 1/97
	502	Aug 27/75		545	Dec 1/97
	503	Jun 1/85		546	Dec 1/97
	504	May 1/81		547	Jun 1/76
	504A	May 1/81		548	Dec 1/97
	504B	Jun 1/92		548A	Dec 1/97
	505	Nov 1/76		548B	Dec 31/01
	506	Aug 27/75		548C	Dec 31/01
	507	Jan 28/75		548D	Dec 1/97
	508	Aug 27/75		549	Dec 31/01
	509	Apr 1/76		550	Apr 1/76
	510	Aug 27/75		551	Apr 1/76
	511	Apr 1/76		552	Sep 1/81
	512	Apr 1/76		553	Apr 1/76
	513	Aug 27/75		554	Dec 31/01
	514	Dec 1/95		555	Apr 1/76
	515	Aug 27/75		556	Dec 31/01
	516	Dec 1/95		557	Nov 1/76
	517	Aug 27/75		558	Nov 1/76
	518	Apr 1/76		559	Jun 1/89
	519	Aug 27/75		560	Jun 1/89
	520	Nov 1/78		561	Jun 1/89
	520A	Dec 1/95		562	Apr 1/76
	520B	Dec 1/95		563	Dec 31/01
	521	Sep 1/81		564	Dec 31/01
	522	Nov 1/78			

ASSEMBLY/SUB-ASSEMBLY

LIST OF EFFECTIVE PAGES - 72  
Page 11  
Dec 31/01





# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
72-33-00	565	Apr 1/76	72-33-00	598.10	Dec 1/83
(Cont'd.)	566	Apr 1/76	(Cont'd.)	598.10A	Sep 1/81
	567	Apr 1/76		598.10B	May 1/81
	568	Apr 1/76		598.11	May 1/81
	569	Nov 1/76		598.12	Apr 1/78
	570	Sep 1/81		598.13	Apr 1/78
	571	Apr 1/76		598.14	Apr 1/78
	572	Jun 1/89		598.15	Dec 31/01
	572A	Jun 1/89		598.16	Apr 1/78
	572B	Jun 1/89		598.17	Apr 1/78
	573	Dec 31/01		598.18	Dec 31/01
	574	Dec 31/01		598.19	Apr 1/78
	575	Apr 1/76		598.20	Apr 1/78
	576	Sep 1/81		598.21	Apr 1/78
	577	Apr 1/76		598.22	Apr 1/78
	578	May 1/81		598.23	Apr 1/78
	579	Apr 1/76		598.24	Apr 1/78
	580	Aug 1/81		598.25	Apr 1/78
	581	Apr 1/76		598.26	Dec 31/01
	582	Nov 1/76		598.27	Apr 1/78
	583	Apr 1/76		598.28	Apr 1/78
	584	Apr 1/76		598.29	Apr 1/78
	585	Apr 1/76		598.30	Apr 1/78
	586	Apr 1/76		598.31	Apr 1/78
	587	Apr 1/76		598.32	Apr 1/78
	588	Dec 31/01		598.33	Jun 1/77
	589	Jun 1/91		598.34	Jun 1/77
	590	Dec 1/83		598.35	Jun 1/77
	590A	Jun 1/91		598.36	Jun 1/77
	590B	May 1/81		598.37	Jan 1/78
	591	Jun 1/77		598.38	Jan 1/78
	592	Apr 1/76		598.39	Jun 1/77
	593	Jun 1/77		598.40	Jun 1/77
	594	Apr 1/76		598.41	Jun 1/77
	595	Jun 1/77		598.42	Jun 1/77
	596	Apr 1/76		598.43	Apr 1/78
	597	Apr 1/76		598.44	Jun 1/77
	598	Jun 1/77		598.45	Sep 1/81
	598.1	Jun 1/77		598.46	Apr 1/78
	598.2	Dec 31/01		598.47	Jun 1/77
	598.3	Apr 1/78		598.48	Jan 1/78
	598.4	Apr 1/78		598.49	Jan 1/78
	598.5	Apr 1/78		598.50	Jun 1/77
	598.6	Apr 1/78		598.51	Jun 1/77
	598.7	Apr 1/78		598.52	Jun 1/77
	598.8	May 1/81		598.53	Jun 1/77
	598.9	Jun 1/77		598.54	Jun 1/77

ASSEMBLY/SUB-ASSEMBLY

LIST OF EFFECTIVE PAGES - 72

Page 12  
Dec 31/01



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
72-33-00	598.55	Dec 1/97	72-33-01		
(Cont'd.)	598.56	Jun 1/77	(Cont'd.)	513	Dec 1/97
	598.57	Jun 1/77		514	Dec 1/97
	598.58	Jun 1/77			
	598.59	Aug 1/81	72-33-02		
	598.60	Dec 1/97	Contents	1	Jun 1/87
	598.61	Jun 1/77	Contents	2	Nov 1/76
	598.62	Jun 1/77	Contents	3	Jun 1/87
	598.63	Jun 1/77	Contents	4	Nov 1/76
	598.64	Jun 1/77	Contents	5	Nov 1/76
	598.65	Jun 1/77	Contents	6	Jun 1/87
	598.66	Jun 1/99	Contents	7	Nov 1/76
	598.66A	Jun 1/99		501	Nov 1/76
	598.66B	Dec 31/01		502	Nov 1/76
	598.67	Jun 1/99		503	Dec 1/75
	598.68	Dec 31/01		504	Nov 1/76
	598.69	Jun 1/77		505	Nov 1/76
	598.70	Jun 1/77		506	Jun 1/77
	598.71	Jun 1/77		507	Dec 1/75
	598.72	Jun 1/77		508	Nov 1/76
	598.73	Jun 1/77		509	Nov 1/76
	598.74	Jun 1/77		510	Dec 1/75
	598.75	Jun 1/77		511	Nov 1/76
	598.76	Jun 1/77		512	Dec 1/75
	598.77	Jun 1/77		513	Jun 1/87
	598.78	Apr 1/82		514	Jun 1/87
	598.79	Jun 1/77		514A	Jun 1/87
	598.80	Apr 1/82		514B	Jun 1/87
	598.81	Dec 31/01		515	Jun 1/87
	598.82	Jun 1/77		516	Dec 1/75
	598.83	Dec 31/01		517	Nov 1/76
				518	Dec 1/75
				519	Jun 1/77
72-33-01				520	Nov 1/76
Contents	1	Dec 1/97		521	Jun 1/87
	501	Dec 1/85		522	Nov 1/76
	502	Dec 31/01		523	Jun 1/87
	503	Dec 1/97		524	Jun 1/87
	504	Dec 31/01		525	Nov 1/76
	505	Jun 1/88		526	Nov 1/76
	506	Dec 1/97		527	Nov 1/76
	506A	Dec 1/97		528	Nov 1/76
	506B	Dec 1/97		529	Nov 1/76
	507	Dec 31/01		530	Nov 1/76
	508	Dec 31/01		531	Nov 1/76
	509	Dec 1/97		532	Nov 1/76
	510	Jun 1/88		533	Nov 1/76
	511	Dec 31/01		534	Jun 1/77
	512	Dec 31/01			

ASSEMBLY/SUB-ASSEMBLY



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
72-33-02	535	Jun 1/90	72-33-02	581	Nov 1/76
(Cont'd.)	536	Jun 1/90	(Cont'd.)	582	Jun 1/87
	537	Jun 1/90		582A	Jun 1/87
	538	Nov 1/76		582B	Jun 1/87
	539	Nov 1/76		583	Nov 1/76
	540	Nov 1/76		584	Aug 1/81
	541	Nov 1/76		585	Nov 1/76
	542	Nov 1/76		586	Jun 1/87
	543	Nov 1/76		587	Nov 1/76
	544	Nov 1/76		588	Jun 1/87
	545	Nov 1/76		589	Nov 1/76
	546	Nov 1/76		590	Nov 1/76
	547	Nov 1/76		591	Nov 1/76
	548	Nov 1/76		592	Nov 1/76
	549	Jun 1/90		593	Jun 1/90
	550	Jun 1/90		594	Jun 1/90
	551	Nov 1/76		595	Nov 1/76
	552	Nov 1/76		596	Jun 1/90
	553	Nov 1/76		597	Nov 1/76
	554	Jun 1/90		598	Nov 1/76
	555	Nov 1/76		598.1	Nov 1/76
	556	Aug 1/78		598.2	Nov 1/76
	557	Nov 1/76		598.3	Nov 1/76
	558	Nov 1/76		598.4	Nov 1/76
	559	Nov 1/76		598.5	Nov 1/76
	560	Jan 1/78		598.6	Nov 1/76
	561	Nov 1/76		598.7	Jun 1/90
	562	Jan 1/78		598.8	Nov 1/76
	563	Nov 1/76		598.9	Nov 1/76
	564	Jan 1/78		598.10	Jun 1/90
	565	Nov 1/76		598.11	Nov 1/76
	566	Nov 1/76		598.12	Nov 1/76
	567	Nov 1/76		598.13	Aug 1/78
	568	Nov 1/76		598.14	Nov 1/76
	569	Nov 1/76		598.15	Nov 1/76
	570	Nov 1/76		598.16	Nov 1/76
	571	Nov 1/76		598.17	Jan 1/78
	572	Nov 1/76		598.18	Jan 1/78
	573	Nov 1/76		598.19	Jan 1/78
	574	Nov 1/76		598.20	Nov 1/76
	575	Nov 1/76		598.21	Jan 1/78
	576	Nov 1/76		598.22	Nov 1/76
	577	Nov 1/76		598.23	Nov 1/76
	578	Nov 1/76		598.24	Nov 1/76
	579	Nov 1/76		598.25	Nov 1/76
	580	Nov 1/76		598.26	Nov 1/76

ASSEMBLY/SUB-ASSEMBLY

LIST OF EFFECTIVE PAGES - 72

Page 14  
Dec 31/99



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

Printed in England

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
72-33-02	598.27	Nov 1/76	72-51-03	513	Dec 1/95
(Cont'd.)	598.28	Nov 1/76	(Cont'd.)	514	Dec 1/95
	598.29	Nov 1/76		514A	Dec 1/95
	598.30	Nov 1/76		514B	Dec 1/95
	598.31	Nov 1/76		515	Nov 1/76
	598.32	Nov 1/76		516	Nov 1/76
	598.33	Jun 1/92		517	Nov 1/76
				518	Nov 1/76
72-34-00				519	Nov 1/76
	501	Jan 1/76		520	Nov 1/76
				521	Jun 1/78
72-40-00				522	Apr 1/83
	501	Jan 1/76		523	Nov 1/76
				524	Nov 1/76
72-41-01				525	Nov 1/76
	501	Jan 1/76		526	Nov 1/76
				527	Nov 1/76
72-42-01				528	Nov 1/76
	501	Jan 1/76		529	Nov 1/76
				530	Dec 31/01
72-51-00				531	Dec 31/01
	501	Jan 1/76		532	Jan 1/78
				533	Jan 1/78
72-51-01				534	Jan 1/78
	501	Jan 1/76		535	Jan 1/78
				536	Jan 1/78
72-51-02				537	Jan 1/78
	501	Jan 1/76		538	Jan 1/78
				539	Dec 31/01
72-51-03				540	Jan 1/78
Contents	1	Jan 1/78		541	Jan 1/78
Contents	2	Jan 1/78		542	Jan 1/78
	501	Jan 1/78		543	Jan 1/78
	502	Aug 14/75		544	Jan 1/78
	503	Jan 1/78		545	Jan 1/78
	504	Aug 14/75		546	Jan 1/78
	505	Jan 1/78		547	Jan 1/78
	506	Jan 1/78		548	Jan 1/78
	507	Jan 1/78		549	Jan 1/78
	508	Aug 14/75		550	Jan 1/78
	509	Jan 1/78		551	Jan 1/78
	510	Aug 14/75		552	Jan 1/78
	511	Jan 1/78		553	Jan 1/78
	512	Nov 1/76		554	Jan 1/78
				555	Jan 1/78
				556	Jan 1/78

ASSEMBLY/SUB-ASSEMBLY



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
72-51-03	557	Jan 1/78	72-52-02		
(Cont'd.)	558	Dec 31/01	Contents	1	Aug 1/79
	559	Jan 1/78	Contents	2	Dec 31/00
	560	Jan 1/78		501	Oct 1/76
	561	Jan 1/78		502	Oct 1/76
	562	Jan 1/78		503	Aug 28/75
	563	Dec 31/01		504	Jun 30/95
	564	Jan 1/78		505	Jun 30/95
	565	Jan 1/78		506	Aug 28/75
	566	Dec 31/01		507	Aug 28/75
	567	Jan 1/78		508	Aug 28/75
	568	Jan 1/78		509	Aug 28/75
	569	Jan 1/78		510	Aug 28/75
	570	Jan 1/78		511	Aug 28/75
	571	Jan 1/78		512	Aug 28/75
	572	Jan 1/78		513	Nov 1/76
	573	Dec 31/01		514	Aug 1/79
	574	Jan 1/78		515	Aug 1/79
	575	Jan 1/78		516	Aug 1/79
	576	Dec 31/00		517	Nov 1/76
				518	Aug 1/79
72-51-04				519	Nov 1/76
	501	Oct 1/76		520	Aug 1/79
				521	Aug 1/79
72-52-01				522	Aug 1/79
Contents	1	Sep 1/80		523	Nov 1/76
	501	Mar 1/76		524	Nov 1/76
	502	Mar 1/76		525	Nov 1/76
	503	Dec 31/01		526	Nov 1/76
	504	Feb 1/78		527	Nov 1/76
	505	Mar 1/76		528	Nov 1/76
	506	Sep 1/80		529	Dec 31/01
	507	Mar 1/76		530	Dec 1/86
	508	Sep 1/80		530A	Dec 31/01
	509	Mar 1/76		530B	Dec 1/86
	510	Sep 1/80		531	Dec 1/86
	511	May 1/76		532	Dec 1/96
	512	Sep 1/80		533	Nov 1/76
	513	Jul 1/81		534	Dec 1/96
	514	Sep 1/80		535	Jul 1/76
				536	Nov 1/76
				537	Jul 1/76
				538	Nov 1/78
				539	Jul 1/76
				540	Jul 1/76

ASSEMBLY/SUB-ASSEMBLY

LIST OF EFFECTIVE PAGES - 72

Page 16

Dec 31/01



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

Printed in England

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
72-52-02 (Cont'd.)	541	Jul 1/76	72-53-00		
	542	Jul 1/76	Contents	1	Dec 1/80
	542	Jul 1/76	Contents	2	Jun 1/98
	543	Jan 4/93	Contents	3	Jun 1/98
	544	Jun 1/77		501	Sep 30/94
	545	Dec 1/96		502	Sep 30/94
	546	Oct 1/77		503	Aug 14/75
	547	Jul 1/76		504	Aug 1/77
	548	Jul 1/76		505	Jun 30/97
	549	Jul 1/76		506	Jun 1/78
	550	Jul 1/76		507	Aug 1/76
	551	Jun 1/91		508	Aug 1/76
	552	Dec 31/01		509	Aug 1/76
	553	Jun 1/78		510	Sep 30/94
	554	Dec 31/01		511	Jan 1/77
	555	Jul 1/76		512	Dec 1/79
	556	Oct 1/77		513	Sep 30/94
	557	Jul 1/76		514	Aug 1/77
	558	Dec 31/01		515	Dec 1/86
	559	Jul 1/76		516	Dec 31/01
72-52-03 Contents	560	Feb 1/78		517	Dec 1/86
	561	Jul 1/76		518	Aug 1/77
				519	Jun 1/99
	1	Oct 1/76		520	Dec 31/01
	501	Aug 1/76		521	Aug 1/76
	502	Jun 1/78		522	Dec 31/01
	503	Aug 28/75		523	Dec 31/01
	504	Dec 31/01		524	Aug 1/76
	505	Aug 28/75		525	Dec 31/01
	506	Aug 1/76		526	Dec 31/01
	507	Aug 28/75		526A	Dec 31/01
	508	Oct 1/76		526B	Dec 1/83
	509	Jun 1/77		527	Dec 1/83
	510	Dec 31/01		528	Dec 1/83
	511	Dec 31/01		529	Jun 1/78
	512	Aug 1/76		530	Aug 1/76
	513	Aug 1/76		531	Aug 1/76
	514	Aug 1/76		532	Aug 1/76
	515	Dec 31/01		533	Jul 1/79
	516	Aug 1/81		534	Dec 31/01
	517	Dec 31/01		535	Aug 1/76
	518	Aug 1/76		536	Aug 1/76
				537	Aug 1/76
				538	Dec 31/01
				539	Aug 1/76
				540	Dec 1/80

ASSEMBLY/SUB-ASSEMBLY

LIST OF EFFECTIVE PAGES - 72

Page 17  
Dec 31/01



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
72-53-00	541	Dec 1/80	72-62-00	510	Dec 31/00
(Cont'd.)	542	Dec 31/01	(Cont'd.)	510A	Dec 1/96
	543	Dec 30/98		510B	Dec 1/96
	544	Aug 1/76		511	Dec 1/96
	545	Dec 31/01		512	Dec 1/96
	546	Dec 31/01		513	Sep 1/75
	547	Aug 1/76		514	Dec 1/76
	548	Dec 1/96		515	Dec 1/80
	549	Dec 31/01		516	Sep 1/75
	550	Dec 1/96		517	Sep 1/75
	551	Dec 31/01		518	Sep 1/75
	552	Dec 31/01		519	Apr 1/76
	553	Sep 30/94		520	Sep 1/75
	554	Aug 1/76		521	Apr 1/76
	555	Sep 30/94		522	Dec 1/80
	556	Aug 1/81		523	Sep 30/94
	557	Aug 1/81		524	Dec 1/80
	558	Aug 1/81		525	Dec 1/79
	559	Aug 1/81		526	Sep 1/75
	560	Aug 1/81		527	Apr 1/76
	561	Dec 31/01		528	Sep 30/94
	562	Dec 31/01		529	Sep 30/94
	563	Aug 1/81		530	Jan 31/94
	564	Dec 30/98		531	Sep 30/94
	565	Dec 31/01		532	Sep 30/94
	566	Dec 31/01		533	Sep 30/94
	567	Jun 1/98		534	Sep 30/94
				534A	Sep 30/94
72-54-01	501	Jan 1/76		534B	Sep 30/94
				535	Jan 31/94
72-61-00	501	Jan 1/76		536	Dec 1/80
				537	Sep 30/94
72-62-00				538	Sep 30/94
Contents	1	Jan 31/94		539	Sep 30/94
Contents	2	Jan 31/94		540	Jan 31/94
Contents	3	Apr 1/76		540A	Sep 30/94
Contents	4	Jan 31/94		540B	Jan 31/94
	501	Dec 1/80		540C	Jan 31/94
	502	Jun 1/77		540D	Jan 31/94
	503	Sep 1/75		541	Jun 30/95
	504	Apr 1/77		542	Aug 1/81
	505	Apr 1/77		543	Oct 1/76
	506	Sep 1/75		544	Sep 1/75
	507	Nov 1/78		545	Jan 31/94
	508	Apr 1/76		546	Sep 30/94
	509	Sep 1/75		546A	Jan 31/94
				546B	Sep 30/94

ASSEMBLY/SUB-ASSEMBLY

LIST OF EFFECTIVE PAGES - 72

Page 18  
Dec 30/01



# OLYMPUS 593



MK.610-14-28

SNECMA

OVERHAUL

Printed in England

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
72-62-00			72-62-00	582	Apr 1/76
(Cont'd.)	547	Jan 31/94	(Cont'd.)	583	Apr 1/76
	548	Jan 31/94		584	Dec 1/82
	549	Sep 30/94		585	Dec 1/82
	550	Jan 31/94		586	Dec 1/82
	550A	Jan 31/94		587	Dec 1/90
	550B	Dec 1/90		588	Jun 1/91
	551	Sep 30/94		589	Dec 1/79
	552	Jan 31/94		590	Sep 1/75
	552A	Jun 30/95		591	Dec 1/79
	552B	Jun 30/95		592	Apr 1/76
	552C	Jun 30/95		593	Apr 1/76
	552D	Jun 30/95		594	Apr 1/76
	553	Jun 30/95		595	Dec 1/82
	554	Sep 1/75		596	Dec 1/82
	555	Aug 1/81		597	Dec 1/82
	556	Apr 1/76		598	Nov 1/78
	557	Aug 1/81			
	558	Jun 1/91	72-62-01	501	Jan 1/76
	559	Sep 1/75			
	560	Apr 1/76	72-62-02	501	Jan 1/76
	561	Apr 1/76			
	562	Sep 1/75	72-62-03	501	Jan 1/76
	563	Sep 1/75			
	564	Dec 31/00	72-62-04	501	Jan 1/76
	565	Sep 1/75			
	566	Dec 31/00	72-63-00		
	567	Dec 31/00	Contents	1	Dec 1/96
	568	Dec 1/95	Contents	2	Dec 1/96
	568A	Dec 31/00	Contents	3	Sep 1/80
	568B	Dec 1/95	Contents	4	Sep 1/80
	569	Dec 1/95		501	Jun 1/77
	570	Sep 1/75		502	Aug 1/81
	571	Sep 1/75		503	Aug 14/75
	572	Sep 1/75		504	Aug 1/81
	573	Apr 1/76		505	Aug 1/81
	574	Aug 1/81		506	Feb 2/76
	575	Sep 1/75		507	Aug 14/75
	576	Dec 1/82		508	Dec 1/79
	577	Sep 1/75		509	Aug 14/75
	578	Dec 1/82		510	Sep 1/80
	579	Dec 1/82		511	Aug 1/81
	580	Dec 1/82		512	Feb 2/76
	580A	Dec 1/82		513	Feb 2/76
	580B	Dec 1/82			
	580C	Dec 1/82			
	580D	Dec 1/82			
	581	Sep 1/75			

ASSEMBLY/SUB-ASSEMBLY

LIST OF EFFECTIVE PAGES - 72

Page 19  
Dec 31/00





OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

Printed in England

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
72-63-00	514	Feb 2/76	72-63-00	554	Feb 2/76
(Cont'd.)	515	Feb 2/76	(Cont'd.)	555	Mar 1/84
	516	Aug 14/75		556	Feb 2/76
	517	Apr 1/77		557	Sep 1/84
	518	Feb 2/76		558	Sep 1/84
	519	Feb 2/76		558A	Sep 1/84
	520	Dec 1/96		558B	Sep 1/84
	521	Aug 14/75		559	Feb 2/76
	522	Dec 1/96		560	Feb 2/76
	523	Dec 1/97		561	Feb 2/76
	524	Dec 1/96		562	Feb 2/76
	524A	Dec 1/96		563	Feb 2/76
	524B	Dec 1/96		564	Feb 2/76
	525	Dec 30/98		565	Feb 2/76
	526	Aug 14/75		566	Feb 2/76
	526A	Dec 30/98		567	Feb 2/76
	526B	Dec 30/98		568	Feb 2/76
	527	Jun 30/95		569	Feb 2/76
	528	Feb 2/76		570	Feb 2/76
	529	Feb 2/76		571	Dec 1/79
	530	Apr 1/77		572	Feb 2/76
	531	Aug 14/75		573	Feb 2/76
	532	Apr 1/77		574	Feb 2/76
	533	Aug 1/81		575	Feb 2/76
	534	Aug 14/75		576	Feb 2/76
	535	Feb 2/76		577	Feb 2/76
	536	Apr 1/77		578	Feb 2/76
	537	Aug 14/75		579	Feb 2/76
	538	Dec 1/88		580	Feb 2/76
	538A	Dec 1/88		581	Feb 2/76
	538B	Dec 1/88		582	Feb 2/76
	539	Dec 1/88		583	Sep 30/94
	540	Apr 1/77		584	Sep 30/94
	541	Apr 1/77		585	Sep 30/94
	542	Aug 1/81		586	Sep 30/94
	543	Feb 2/76		587	Sep 1/80
	544	Jul 1/79		588	Sep 1/80
	545	Feb 2/76		589	Sep 1/80
	546	Dec 1/88		590	Sep 1/80
	547	Dec 1/88		591	Dec 31/99
	548	Feb 2/76		592	Dec 1/95
	549	Feb 2/76		593	Sep 30/94
	550	Dec 1/88		594	Dec 31/99
	550A	Dec 1/88		595	Dec 31/99
	550B	Dec 1/88		596	Dec 31/99
	551	Feb 2/76		597	Dec 31/99
	552	Dec 1/81		598	Sep 1/80
	553	Mar 1/84		598.1	Sep 1/80

ASSEMBLY/SUB-ASSEMBLY

LIST OF EFFECTIVE PAGES - 72

Page 20  
Dec 31/99



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

Printed in England

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
72-63-00	598.2	Dec 31/99	72-65-00	516	Jul 1/75
(Cont'd.)	598.3	Dec 31/99	(Cont'd.)	517	Jul 1/75
	598.4	Sep 1/80		518	Jul 1/75
	598.5	Sep 1/80		519	Aug 1/76
	598.6	Sep 30/94		520	Aug 1/76
	598.7	Sep 1/80		521	Aug 1/76
	598.8	Sep 1/80		522	Jul 1/75
	598.9	Sep 1/80		523	Aug 1/76
72-63-01	501	Jan 1/76		524	Jun 30/00
72-63-02	501	Jan 1/76		525	Dec 30/98
72-63-03	501	Jan 1/76		526	Dec 30/98
72-63-04	501	Jan 1/76		527	Dec 31/99
72-63-05	501	Jan 1/76		528	Dec 31/99
72-63-06	501	Jan 1/76		529	Dec 30/98
72-64-00	501	Jan 1/76		530	Dec 30/98
72-65-00					
Contents	1	Dec 1/96			
Contents	2	Dec 1/96			
	501	Jul 1/75			
	502	Jul 1/75			
	503	Jul 1/75			
	504	Aug 1/81			
	505	Jul 1/75			
	506	Jul 1/75			
	507	Jul 1/75			
	508	Jul 1/75			
	509	Jul 1/75			
	510	Jul 1/75			
	511	Aug 1/76			
	512	Jul 1/75			
	513	Aug 1/76			
	514	Aug 1/76			
	515	Aug 1/76			

ASSEMBLY/SUB-ASSEMBLY

LIST OF EFFECTIVE PAGES - 72

Page 21

Jun 30/00



# OLYMPUS 593

MK.610-14-28

OVERHAUL



## CHAPTER 72

### ASSEMBLY/SUB-ASSEMBLY

### TABLE OF CONTENTS

CH/SEC/SUB

List of Effective Pages	...	...	...	...	...	72
Table of Contents	...	...	...	...	...	72
Engine	...	...	...	...	...	72-00-00
Turbine Static	...	...	...	...	...	72-00-51
Standard Practices	...	...	...	...	...	72-09-00
Engine Turning	...	...	...	...	...	72-09-01
Air Inlet Section	...	...	...	...	...	72-20-00
Air Intake Fairing	...	...	...	...	...	72-21-01
Air Intake Case	...	...	...	...	...	72-22-01
LP Compressor Rotor Front Bearing Support	...	...	...	...	...	72-23-01
LP Compressor Assembly...	...	...	...	...	...	72-31-00
LP Compressor Case and Vanes...	...	...	...	...	...	72-31-01
LP Compressor Exit Guide Case and Vanes	...	...	...	...	...	72-31-02
LP Compressor Rotor	...	...	...	...	...	72-31-03
LP Compressor Drive Shaft	...	...	...	...	...	72-31-04
LP Shaft Signal System Generating Mechanism	...	...	...	...	...	72-31-05
Compressor Intermediate Case Assembly	...	...	...	...	...	72-32-00
HP Compressor Assembly...	...	...	...	...	...	72-33-00
HP Compressor Case and Vanes...	...	...	...	...	...	72-33-01
HP Compressor Rotor	...	...	...	...	...	72-33-02
HP Compressor Diffuser Case Assembly	...	...	...	...	...	72-34-00
Combustion Section	...	...	...	...	...	72-40-00
Combustion Chamber	...	...	...	...	...	72-41-01
Combustion Chamber Outer Case	...	...	...	...	...	72-42-01
HP Turbine Assembly	...	...	...	...	...	72-51-00
HP Turbine Bearing Support	...	...	...	...	...	72-51-01
HP Turbine Nozzle	...	...	...	...	...	72-51-02
HP Turbine Rotor	...	...	...	...	...	72-51-03
HP Turbine Rotor, Hub and Labyrinth Assemblies...	...	...	...	...	...	72-51-04
LP Turbine Nozzle	...	...	...	...	...	72-52-01
LP Turbine Rotor	...	...	...	...	...	72-52-02
LP Turbine Bearing Support	...	...	...	...	...	72-52-03
Turbine Exhaust Diffuser	...	...	...	...	...	72-53-00
Spherical Joint Flange...	...	...	...	...	...	72-54-01
Internal Accessory Drives	...	...	...	...	...	72-61-00
Left-hand Accessory Gearbox	...	...	...	...	...	72-62-00
Left-hand Accessory Gearbox Case Assembly	...	...	...	...	...	72-62-01
Left-hand Accessory Gearbox Main Drives	...	...	...	...	...	72-62-02
First Stage Fuel Pump Drive and Idler Gear	...	...	...	...	...	72-62-03
Fuel Control Unit Drive and Main Oil Pump Drive	...	...	...	...	...	72-62-04
Right-hand Accessory Gearbox...	...	...	...	...	...	72-63-00
Right-hand Accessory Gearbox Case Assembly	...	...	...	...	...	72-63-01

ASSEMBLY/SUB-ASSEMBLY

TABLE OF CONTENTS -

72

Page 1

Oct 1/76

PRINTED IN ENGLAND

TN13627



OLYMPUS 593

MK.610-14-28  
OVERHAUL



CH/SEC/SUB

Right-hand Accessory Gearbox Main Drives	...	...	72-63-02
Air Starter Drive and IDG Drive	...	...	72-63-03
Scavenge Oil Pump Drive and Idler Shaft...	...	...	72-63-04
Main and Stand-by Hydraulic Pump Drives...	...	...	72-63-05
Drain Valve and Magnetic Plug Assemblies	...	...	72-63-06
Drive, Pulse Probe and Housing	...	...	72-64-00
Main Oil Pump	...	...	72-65-00

TN32441

ASSEMBLY/SUB-ASSEMBLY

TABLE OF CONTENTS - **72**

Page 2

Apr 1/76



# OLYMPUS 593



MK.61D-14-28

sneema

OVERHAUL

## ENGINE - ASSEMBLY

### TABLE OF CONTENTS

Para.		Page
1.	General ... ..	501
2.	Assemble Air Inlet Section to Building Base ... ..	503
	A. Prepare Building Base ... ..	503
	B. Assemble the Air Inlet Section... ..	503
3.	Assemble the LP Compressor Assembly to the Air Inlet Section ... ..	503
	A. Prepare the LP Compressor Assembly ... ..	503
	B. Assemble the LP Compressor Assembly ... ..	505
	C. Remove the LP Compressor Rear Bearing Adapter ... ..	507
	D. Remove the Balancing LP Bearing Assembly ... ..	509
4.	Assemble the Adjusting Washer, LP Thrust Bearing Assembly, Bevel Gear and Probe Operating Ring ... ..	511
	A. Prepare LP Bearing Assembly ... ..	511
	B. Assemble the Adjusting Washer, Bevel Gear and Retaining Nut ... ..	513
	C. Assemble the LP Probe Operating Ring... ..	514
5.	Assemble the Brackets to the LP Compressor Case Front Flange ... ..	515
	A. Prepare the Brackets and Bolts... ..	515
	B. Assemble the Brackets ... ..	515
6.	Assemble the Module Plate Mounting Brackets and Identification Plate to the Mounting Brackets ... ..	517
	A. Assemble the Mounting Brackets... ..	517
	B. Assemble the Module Identification Plates ... ..	518
7.	Assemble the HP Compressor/Intermediate Assembly to the LP Compressor Assembly... ..	521
	A. Prepare for Dimensional Check ... ..	521
	B. Assemble the Metaflex Seal ... ..	522A
	C. Remove the HP Compressor/Intermediate Assembly from the Mobile Stand... ..	522A
	D. Determine Thickness of LP Bearing Failure Probe Adjusting Washers ... ..	522B
	E. Lower the HP Compressor/Intermediate Assembly onto the Spacers... ..	523
	F. Lock the Spherical Mounting ... ..	527
	G. Secure the Inner and Outer LP Bearing Housing Baffles to the Intermediate Case ... ..	527
	H. Re-check the Set Dimension ... ..	528
	J. Change the LP Compressor Thrust Bearing Adjusting Washer if Required ... ..	529

ASSEMBLY

# 72-00-00

Contents 1

Dec 31/00



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

Printed in England

Para.		Page
8.	Air Flow and Pressure Check of the LP and HP Compressor Thrust Bearing Failure Warning Probe Circuit ... ..	529
	A. Prepare Test Equipment ... ..	531
	B. Carry Out Air Flow Check... ..	531
9.	Assemble the Exit Guide Vane Cases and Flange Brackets. ... ..	531
	A. Assemble the Cases... ..	531
	B. Assemble Brackets to the LP Compressor Case/ Exit Guide Vane Case Flanges... ..	534
	C. Assemble Brackets to the Exit Guide Vane/ Intermediate Case Flanges ... ..	536
	D. Torque-tighten the Axial Bolts and Flange Bolts ... ..	536
10.	Check HP Compressor Adjusting Washer Setting ... ..	536
	A. Remove Rear Bearing Adapter ... ..	536
	B. Carry Out Dimensional Check ... ..	538
11.	Assemble HP Turbine Bearing Inner Track to HP Drive Shaft... ..	538
	A. Remove HP Turbine Slave Bearing Inner Track ... ..	538
	B. Assemble Bearing Inner Track ... ..	540
12.	Assemble Turbine Static Sub-Assembly to HP Exit Guide Vane Case ... ..	542
	A. Prepare for Assembly ... ..	542
	B. Assemble Sub-Assembly to Engine ... ..	542
13.	Calculate HP and LP Turbine Adjusting Washers Thickness ... ..	547
	A. Determine HP Turbine Adjusting Washer Thickness SB.72-94 ... ..	547
	B. Determine LP Turbine Adjusting Washer Thickness SB.72-94 ... ..	548
	C. Determine HP Turbine Adjusting Washer Thickness Pre-SB.72-94 ... ..	550
14.	Assemble HP Turbine Hub to Drive Shaft ... ..	550
	A. Prepare Turbine Hub for Assembly ... ..	550
	B. Assemble Turbine Hub ... ..	552
	C. Tighten HP Turbine Nut ... ..	552
15.	Assemble HP Turbine Rotor and Labyrinths... ..	554
	A. Assemble Turbine Rotor to Hub ... ..	554
	B. Assemble No.24 and 26 Labyrinth to HP Turbine Disk ... ..	556
	C. HP Turbine Rotor Blades Tip Clearance Check ... ..	558
	D. Adjusting Washer Proving Check... ..	560
	E. HP Turbine Rotor Swash Check ... ..	560
16.	Assemble and Secure the LP Turbine Nozzle Assembly to CCOC ... ..	561
	A. Assemble the Nozzle Assembly ... ..	561
17.	Calculate LP Turbine Adjusting Washer Thickness ... ..	563
	A. Adjusting Washer Checks ... ..	563

ASSEMBLY

## 72-00-00

Contents 2

Jun 1/99



# OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

Printed in England

Para.		Page
18.	Assemble LP Turbine Rotor to Engine ... ..	564
A.	Assemble Turbine Rotor ... ..	564
B.	Assemble Retaining Nuts ... ..	566
C.	Adjusting Washer Proving Check... ..	568
D.	Assemble LP Drive Shaft Centralizing Fixture ... ..	570
19.	Assemble Locking Tube to LP Drive Shaft ... ..	570
A.	Prepare to Assemble Locking Tube ... ..	570
B.	Assemble the Locking Tube ... ..	572
20.	Assemble and Install LP Shaft Signal System Mechanism ... ..	574
A.	Assemble LP Shaft Signal System Mechanism ... ..	574
B.	Lock the LP Shaft Signal System Retaining Nut ... ..	576
C.	Lock the Shaft Signal System Mechanism ... ..	577
21.	Assemble Turbine Exhaust Diffuser to CCOC ... ..	577
A.	Prepare for Assembly ... ..	577
B.	Assemble Turbine Exhaust Diffuser ... ..	579
22.	Assemble Rear Cover Unit to CCOC Heat Insulation Shields ... ..	583
A.	Prepare for Assembly ... ..	583
B.	Install Rear Covers ... ..	585
23.	Assemble Main Oil Tank to Engine ... ..	585
A.	Prepare Oil Tank ... ..	585
B.	Assemble Oil Tank ... ..	585
24.	Assembling Pressurising Air Supply Tubes... ..	587
A.	Assemble Tube A ... ..	587
B.	Assemble Tube B ... ..	589
C.	Secure Tube C ... ..	589
25.	Deleted	
26.	Assemble Right-hand Gearbox to Engine ... ..	590
A.	Prepare Brackets and Pins ... ..	590
B.	Assemble Lifting Equipment to Right-hand Gearbox... ..	593
C.	Assemble Gearbox to Engine ... ..	594
D.	Determine Shim for Front and Rear Mounting Brackets ... ..	595
E.	Finally Assemble Front and Rear Mounting Brackets ... ..	598
F.	Check Rotational Movement of HP Rotating Assembly..	598.1
27.	Deleted	
28.	Assemble Left-hand Gearbox to Engine ... ..	598.2
A.	Prepare Brackets and Pins ... ..	598.2
B.	Assemble Lifting Equipment to Left-hand Gearbox ... ..	598.5
C.	Assemble Gearbox to Engine ... ..	598.5
D.	Determine Shims for Front and Rear Mounting Brackets ... ..	598.6
E.	Finally Secure Gearbox to Engine ... ..	598.8
F.	Check Rotational Movement of HP Rotating Assembly..	598.9

ASSEMBLY

## 72-00-00

Contents 3

Jun 1/99



# OLYMPUS 593



MK.610-14-28

SNECMA

OVERHAUL

Printed in England

Para.		Page
29.	Check Rotational Movement of LP Rotating Assembly ...	598.11
A.	Assemble Hand Turning Equipment to Intermediate Case Sump ...	598.11
B.	Check Rotation of LP Assembly ...	598.11
30.	Assemble LP Pulse Probe, Oil Pressure Transmitter and Switch to Drive Housing ...	598.12
A.	Assemble LP Pulse Probe to Drive Housing ...	598.12
B.	Assemble Oil Pressure Transmitter to Drive Housing ...	598.14
C.	Assemble Oil Pressure Switch to Drive Housing ...	598.14
31.	External Examination of Engine ...	598.14
A.	Examination Procedure ...	598.14

## TABLE OF ILLUSTRATIONS

Fig.No.		Page
501	Building Sequence of the Sub-Assemblies or Modules ...	502
502	Receiving the LP Compressor Assembly on the Mobile Stand ...	504
503	Lowering the LP Compressor onto the Air Inlet Section ...	506
504	Removing the Rear Bearing Adapter ...	508
505	Removing the Balancing Bearing Assembly ...	510
505A	Painted Areas on Rotor Shaft Rear ...	510A
506	Assembling Bearing, Gear and Probe Operating Ring..	512
507	Assembling Brackets to the LP Compressor Case Front Flange ...	516
508	Assembling Module Identification Plates ...	519
509	Measuring the Set Dimension ...	520
510	Lowering the HP Compressor/Intermediate Assembly onto the Spacers... ..	525
511	Checking the Bearing Failure Warning Probe Circuit.	530
512	Assembling the Exit Guide Vane Cases... ..	533
513	Assembling Brackets to the LP Compressor Case/Exit Guide Vane Case Flange ...	535
514	Assembling Brackets to the Exit Guide Vane/Intermediate Case Flanges ...	537
515	Dimensional Check onto Stage 7 Rotor Disk ...	539
516	Assembling HP Turbine Bearing Inner Track ...	541
517	Assembling Turbine Static Sub-Assembly ...	543
518	Bracket Positions HP Compressor Diffuser/HP Compressor Exit Guide Vane Case Flanges ...	545/546
519	HP and LP Turbine Rotor Adjusting Washer Checks ...	549
520	Assembling HP Turbine Hub ...	551
521	Tightening HP Turbine Hub Nut ...	553

ASSEMBLY

# 72-00-00

Contents 4

Dec 31/00





OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

Printed in England

Fig.No.		Page
522	Assembling HP Turbine Rotor ... ..	555
523	Assembling Labyrinth and Tightening HP Turbine Bolts ... ..	557
524	HP Turbine Rotor Blades Tip Clearance and Swash Check ... ..	559
525	Assembling LP Turbine Nozzles ... ..	562
526	Assembling LP Turbine Rotor ... ..	565
527	Tightening LP Turbine Bearing Retaining Nut ...	567
528	LP Turbine Adjusting Washer Proving Checks and Centralising Fixture ... ..	569
529	Preparing to Assemble Locking Tube ... ..	571
530	Assembling LP Drive Shaft Signal System Mechanism..	573
531	Locking LP Drive Shaft Signal System Mechanism Retaining Nut ... ..	575
532	Locking LP Drive Shaft Signal System Mechanism ...	578
533	Application of Jointing Compound to CCOC ... ..	580
534	Assembling Turbine Exhaust Diffuser and Brackets to CCOC... ..	582
535	Assembling Rear Covers to CCOC Heat Shield... ..	584
536	Assembling Main Oil Tank to Engine ... ..	586
537	Assembling Pressurising Air Supply Tubes ... ..	588
538	Preparing to Assemble the Right-hand Gearbox to Determine Adjusting Washers ... ..	591
539	Assembling Right-hand Gearbox Lifting Equipment ...	592
540	Assembling Right-hand Gearbox to Engine (Sheet 1 of 2) ... ..	596
540	Assembling Right-hand Gearbox to Engine (Sheet 2 of 2) ... ..	597
541	Preparing to Assemble the Left-hand Gearbox to Determine Adjusting Shims ... ..	598.3
542	Assembling Left-hand Gearbox to Engine ... ..	598.4
543	Engine Hand Turning Equipment ... ..	598.10
544	Assembling Oil Switches and Pulse Probe ... ..	598.13

LIST OF TABLES

Table No.		Page
501	Bracket Positions HP Compressor Diffuser Case/ Exit Guide Blade Case Flange... ..	544
502	Bracket Positions Turbine Exhaust Diffuser/ CCOC Flange ... ..	581

ASSEMBLY

**72-00-00**

Contents 5

Jun 1/99



# OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

## ENGINE - ASSEMBLY

### 1. General

- A. Prior to commencing assembly, refer to 72-09-00 Assembly for general information.
- B. Throughout the text special tools are quoted by their Ref.No. e.g. (Tool 1234). For a complete list of tooling required for the assembly and for the manufacturer's Part No., refer to Special Tools, Fixtures and Equipment Table 1002.
- C. During the assembly procedure, reference will be made to the Illustrated Parts Catalogue (I.P.C.) to identify the items. To qualify from what sub-assembly or module the item belongs, the breakdown number will be quoted e.g. (72-20-00). In addition, because of the duplication of titles, e.g. nuts, bolts, washers, gears, housings etc., the item will be identified as bolt (72-20-00/1-10), the 1 referring to the I.P.C. Fig.No., and the 10 referring to the Item No.
- D. During the sub-assembly procedure, where the thickness of adjusting washers has to be determined, the words 'select' or 'select from the range' are used. If a range of washers is not available, it may be necessary to machine the washer to achieve the desired thickness. The information for machining washers is given under chapter 72-09-21 Repair. During the assembly procedure, the machining procedure reference will be given immediately after each adjusting washer I.P.C. Ref. No. in the appropriate part of the text e.g. select from the range the correct thickness adjusting washer (3-70) (72-09-21 Repair, Fig.401).
- E. This section details the sequence for assembling together all the sub-assemblies or modules comprising the complete engine. The assembly is carried out vertically, starting with the engine front sub-assembly or module at the bottom, and progressing upwards to the engine rear sub-assembly or module as illustrated in Fig.501.
- F. Prior to accepting for engine assembly a sub-assembly or module, ensure that they have been finalised on their sections, and that the modules have their identification plate attached qualifying that they are complete and ready for engine assembly.

ASSEMBLY

72-00-00

Page 501

Dec 31/00



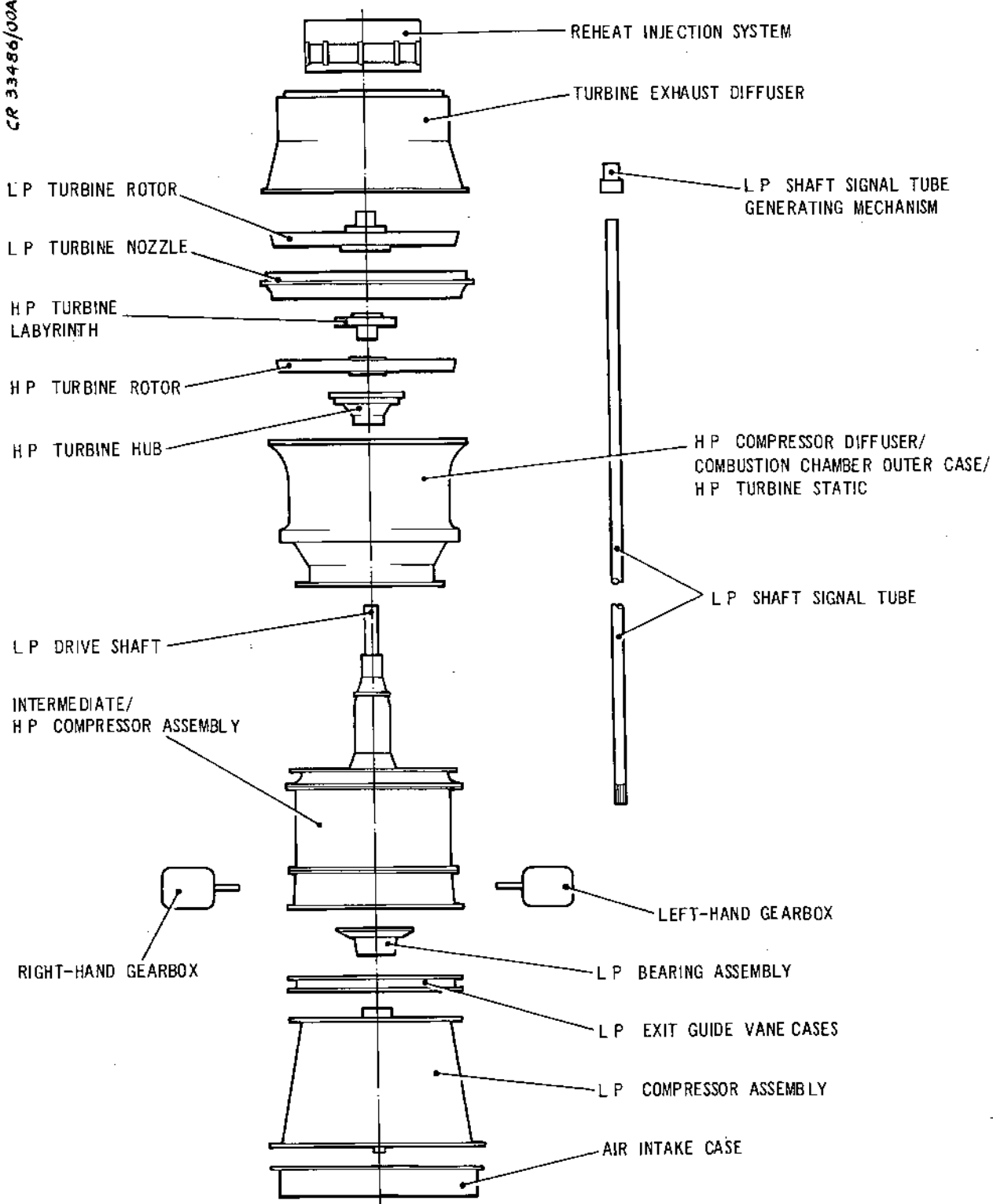
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33486/00A

PRINTED IN ENGLAND



Building Sequences of the Sub-Assemblies or Modules  
Figure 501



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

- G. On completion of the engine assembly, refer to 71-00-01 Assembly for the removal of the engine from the building base to a horizontal stand, and the assembly of all external tubes and accessories, and for the assembly of the electrical harness refer to 71-00-02 Assembly.

## 2. Assemble Air Inlet Section to Building Base

### A. Prepare Building Base.

NOTE: Platforms (Tool 1308 and 967) are to be used at all times during engine build. Platforms not in use are to be stowed in the mobile stand (Tool 85).

- (1) Check for general cleanliness of the building base and ensure that it is securely clamped to the ramp platform, (Ref.Fig.503).
- (2) Check that the jacking fixture in the centre of the building base is in the retracted position, if not, retract the jack by rotating the handwheel located on the side of the building base in a counter-clockwise direction.

### B. Assemble the Air Inlet Section (Ref.Fig.503).

- (1) Ensure that the air inlet section has been cleared for engine assembly.
- (2) Assemble and secure the lifting fixture (Tool 1236) to the intake case. Raise the air inlet section, then remove the protectors from the front and rear of the LP bearing housing. Ensure that the LP bearing outer track and labyrinth seal are undamaged, then apply lubricant 'A' to the rollers of the outer track. Check that protective blanks have been assembled to the following positions:
  - (a) Air tube at vane No.2 outer location.
  - (b) Oil feed tube at vane No.3 outer location.
  - (c) Oil scavenge tube at vane No.4 outer location.
- (3) Lower the air inlet section onto the building base (Tool 1244) aligning the TOP of the intake (vane No.1 position) with the TOP of the building base. Release and remove the lifting fixture.

ASSEMBLY

72-00-00

Page 503

Dec 31/00



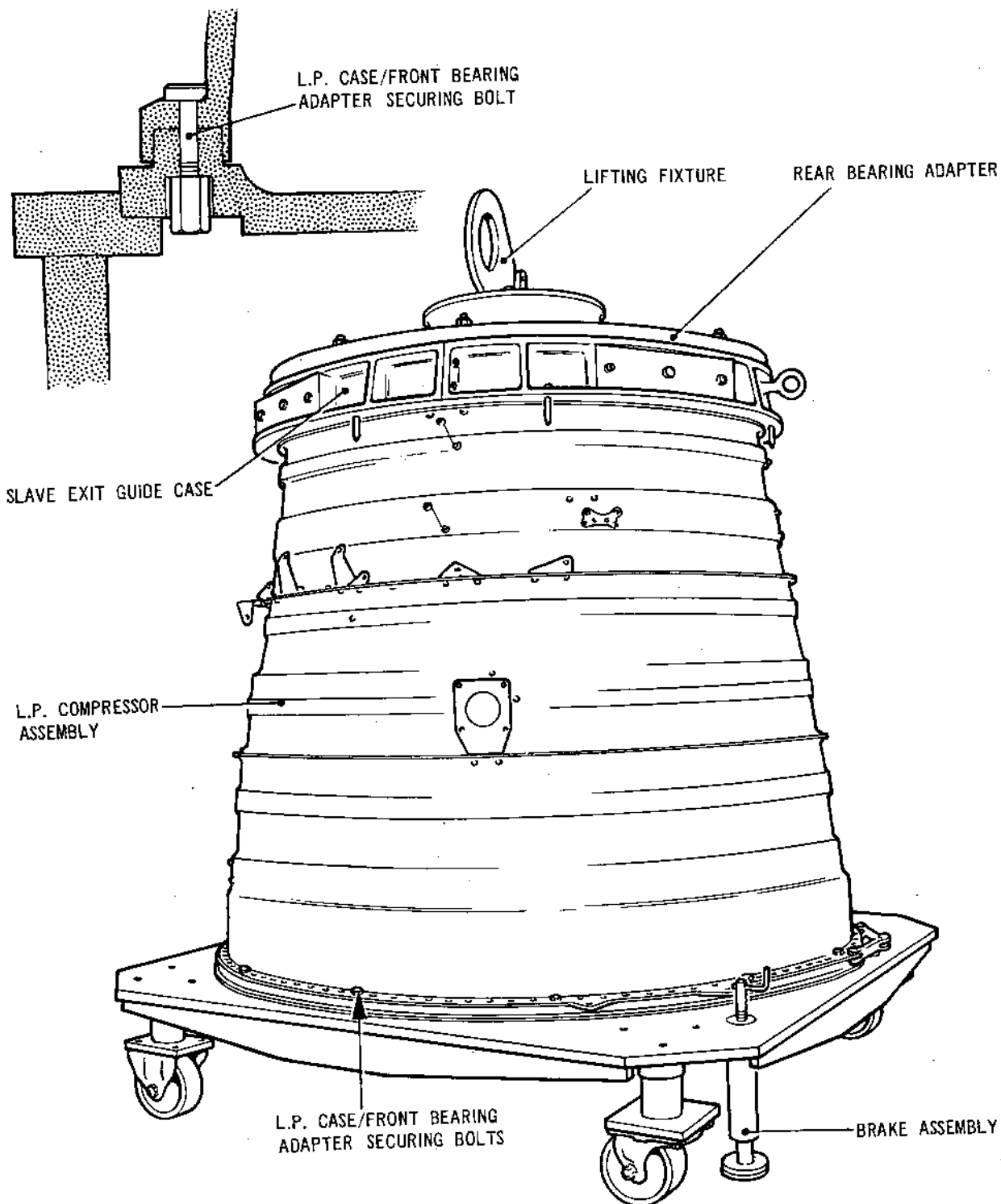
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 31597/00A



Receiving the LP Compressor Assembly on the Mobile Stand  
Figure 502

ASSEMBLY

72-00-00

Page 504

Jan 19/76

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

### 3. Assemble the LP Compressor Assembly to the Air Inlet Section

#### A. Prepare the LP Compressor Assembly.

- (1) Receive the compressor on the mobile stand (Ref.Fig. 502).
- (2) Assemble a lifting fixture (Tool 1096), if not already assembled, to the LP compressor assembly rear bearing adapter and secure with the captive bolts attached to the fixture plate. Attach a hoist to the lifting fixture.
- (3) Remove the slave nuts and bolts retaining the front bearing adapter to the LP case front flange. Place slave nuts and bolts in a container.
- (4) Carefully take the weight of the LP compressor assembly sufficiently to free the assembly from its spigot location in the front bearing adapter, then raise the compressor assembly clear of its stand.
- (5) Check that the pin (72-31-01/6-460) has been assembled to the TOP position (near the engine mounting bracket) of the LP case front flange.
- (6) Assemble an adapter (Tool 319) to the LP rotor shaft centre and retain with the four captive bolts (do not overtighten). Check that the LP roller bearing inner track has been correctly assembled to the LP rotor shaft front, and that it is free from damage, then apply lubricant 'A' to the LP bearing inner track. Check that the balancing weight retaining nuts (72-31-03/1-50) on the rotor shaft front are secure.

#### B. Assemble the LP Compressor Assembly (Ref.Fig.503).

- (1) Centralize the LP compressor assembly over the air inlet section, then adjust the compressor assembly until the location pin assembled to the TOP position of the LP case front flange is aligned with its corresponding pin hole at the TOP position in the intake case rear flange.

ASSEMBLY

**72-00-00**

Page 505

Dec 31/00

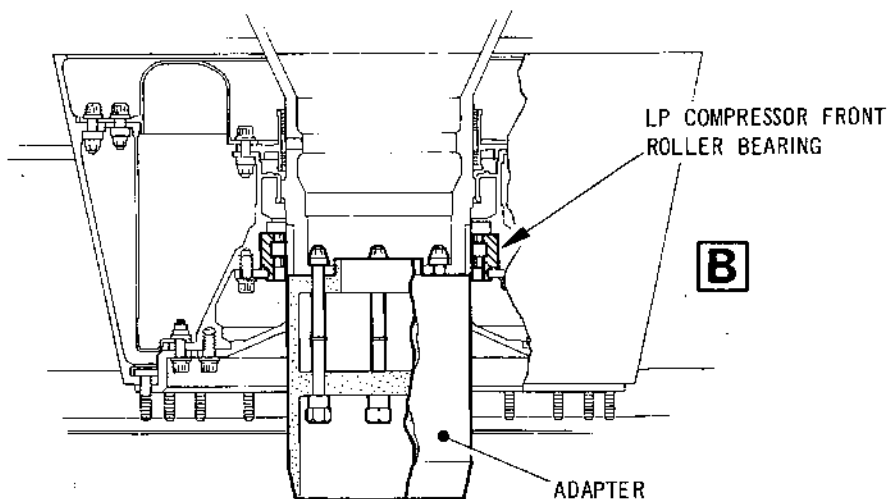
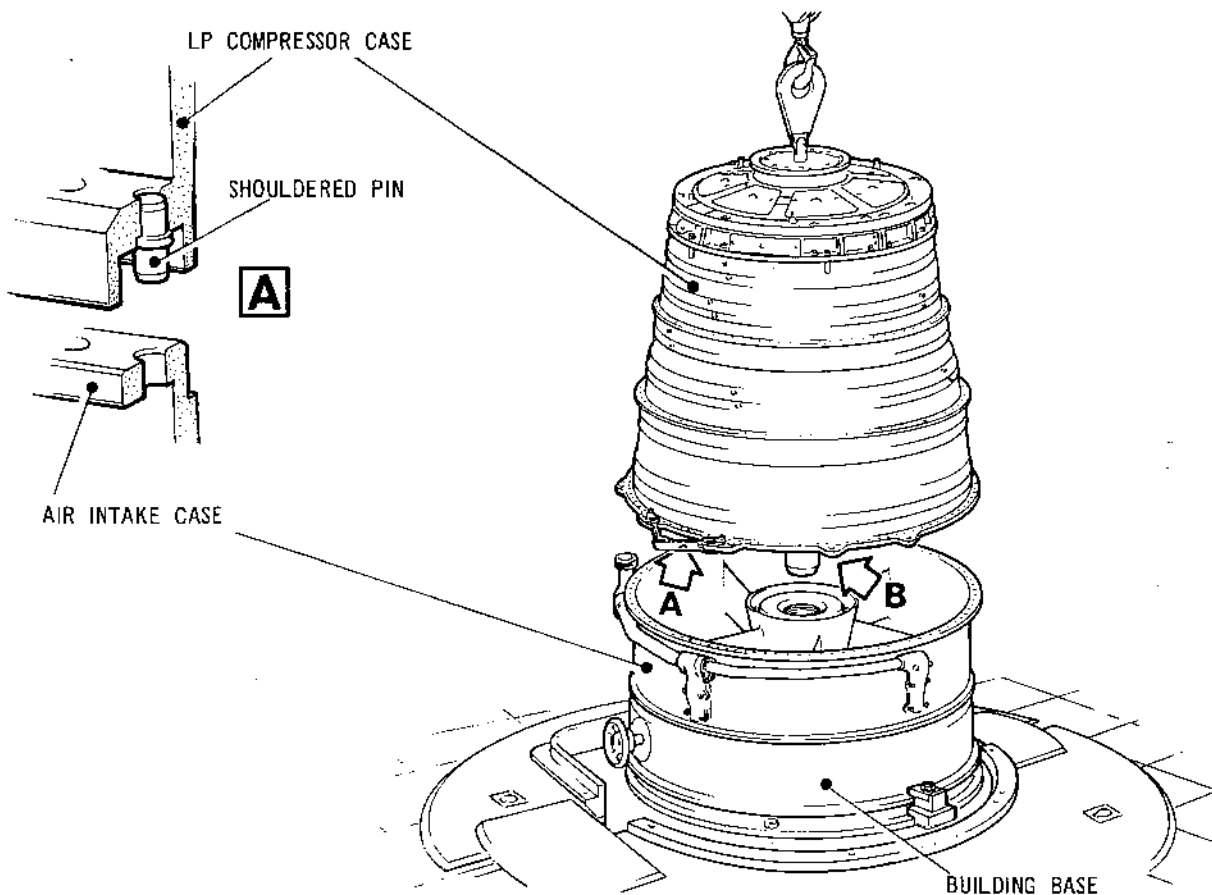
CR 33485/00A



OLYMPUS 593

MK.610-14-28

OVERHAUL



Lowering the LP Compressor onto the Air Inlet Section  
Figure 503



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

**CAUTION:** EXERCISE CARE WHEN LOWERING THE COMPRESSOR ASSEMBLY OVER THE BOLT PROTRUDING FROM HOLE 22 OF THE INTAKE CASE FLANGE.

- (2) Carefully lower the compressor assembly until the jacking adapter (Tool 319) is about to enter the roller bearing. Make a final check to ensure that the adapter enters the bearing centrally without fouling the rollers. Lower the compressor assembly onto the intake case. Temporarily assemble three equi-spaced fitted bolts to the compressor flange to align the compressor case and intake case bolt-holes.
- (3) Remove the hoist, then withdraw the three bolts temporarily assembled to the compressor flange. Apply lubricant 'B' to the flange bolts (72-22-01/4-30), then assemble them (less bracket positions) to the LP compressor/intake flange, boltheads face forward. Retain the bolts in position with self-locking nuts. Torque-tighten the nuts between 170 and 190 lbf in. (19,2 and 21,5 N.m), ensuring that they have a minimum locking (run-down) torque of 6.5 lbf in. (0,73 N.m). Refer to Fig.507 for the bracket positions.
- (4) Turn the handwheel, located on the side of the building base, in a clockwise direction until the jack firmly abuts the adapter assembled to the LP rotor shaft front.
- (5) Apply lubricant 'A' to the slave bearing in the front bearing adapter then assemble the protector (Tool 1369). Return the mobile stand, adapter, slave nuts and bolts to the compressor section.

C. Remove the LP Compressor Rear Bearing Adapter (Ref. Fig.504).

- (1) Unscrew 8 off captive bolts securing the lifting fixture (Tool 1096) to the rear bearing adaptor.
- (2) Remove immobilisers (Tools 3157 and 3158) using spanner (Tool 3164).
- (3) Unscrew the captive bolts securing the rear bearing adapter to the slave bearing assembly. Remove the slave bolts and nuts attaching the slave exit guide cases to the rear of the LP compressor case.

ASSEMBLY

72-00-00

Page 507

Dec 31/00



CR 33328/00B  
BS00029209/1



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

LIFTING FIXTURE SECURING BOLTS

REAR BEARING ADAPTER

SECURING BOLTS

BALANCING BEARING ASSEMBLY

SPACER SLEEVE

SECURING BOLTS

REAR BEARING ADAPTER

LIFTING FIXTURE

LP COMPRESSOR CASE

PLATFORMS

SLAVE EXIT GUIDE VANE CASES

Removing the Rear Bearing Adapter  
Figure 504

ASSEMBLY

72-00-00

Page 508

Dec 31/00



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (4) Re-install lifting fixture (Tool 1096) and assemble the overhead hoist to the ring of the lifting fixture. Take the weight of the bearing adapter and at the same time check that all the captive bolts are free to move rearwards.
- (5) Slowly raise the rear bearing adapter/slave exit guide blade cases clear of the compressor assembly, then position and lower onto a container. Release the hoist from the lifting fixture, then return the adapter/cases together with the slave exit guide blade nuts and bolts to the compressor section.

CAUTION: DO NOT TOUCH THE BUILDING BASE HANDWHEEL AFTER REMOVING THE LP COMPRESSOR REAR BEARING ADAPTER.

- (6) If balancing weights have been assembled to the rim of the stage seven LP rotor disk, ensure that their retaining nuts have been correctly torque-tightened between 85 and 95 lbf in. (9,6 and 10,7 N.m). Temporarily screen off the rear of the compressor assembly with a suitable material prior to removing the slave bearing.

CAUTION: TOOLING ACCIDENTLY DROPPED CAUSING SUFFICIENT DAMAGE TO THE TRAILING EDGES OF STAGE SEVEN ROTOR BLADES WOULD RESULT IN A COMPLETE DISASSEMBLY OF THE COMPRESSOR ASSEMBLY.

D. Remove the Balancing Bearing Assembly (Ref.Fig.505).

- (1) Insert a sleeve (Tool 696) into the rear of the rotor shaft rear, then locate the immobilizer (Tool 280) in the rotor shaft internal splines. Ensure that the spanner (Tool 1594) is bolted to the multiplier (Tool 1022), then assemble the spanner to the nut and the multiplier to the immobilizer. It may be necessary to turn the square in the top of the multiplier to engage the square of the immobilizer.
- (2) Engage the wrench handle (Tool 1651) in the multiplier, then de-torque the bearing retaining nut. Remove the wrench, spanner/multiplier, immobilizer, and sleeve.

NOTE: The bearing retaining nut has a right-hand thread.

ASSEMBLY

72-00-00

Page 509

Dec 31/00



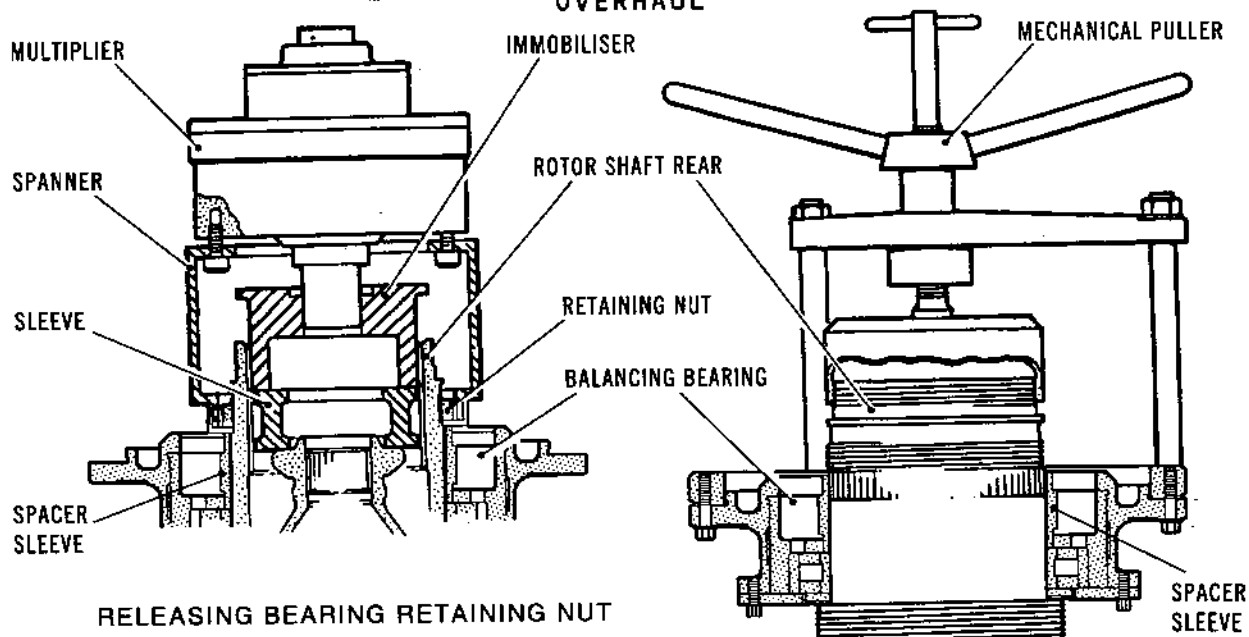
OLYMPUS 593



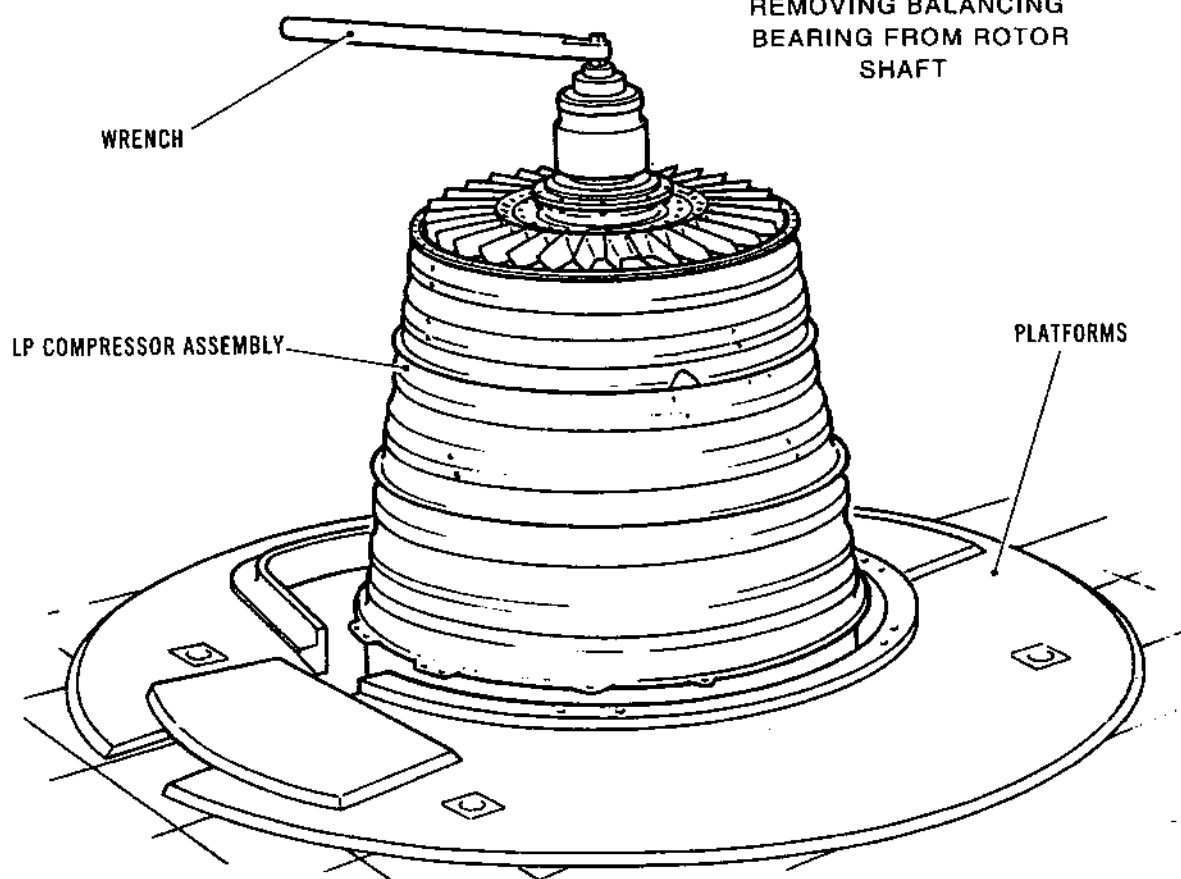
MK.610-14-28  
OVERHAUL

sneema

CR 33329/008  
BS00029210/1



REMOVING BALANCING  
BEARING FROM ROTOR  
SHAFT



Removing the Balancing Bearing Assembly  
Figure 505

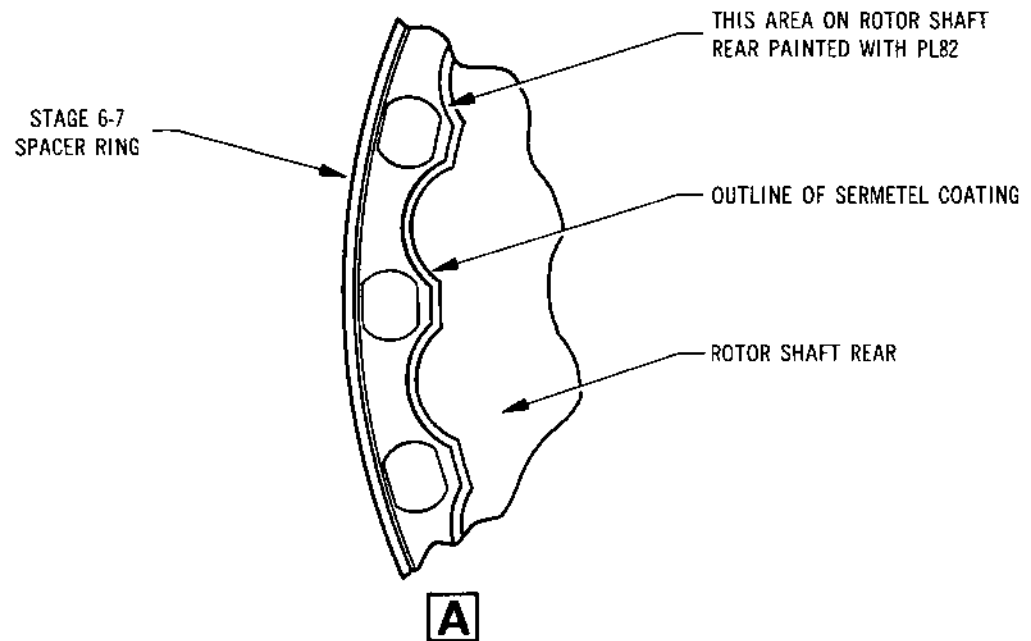
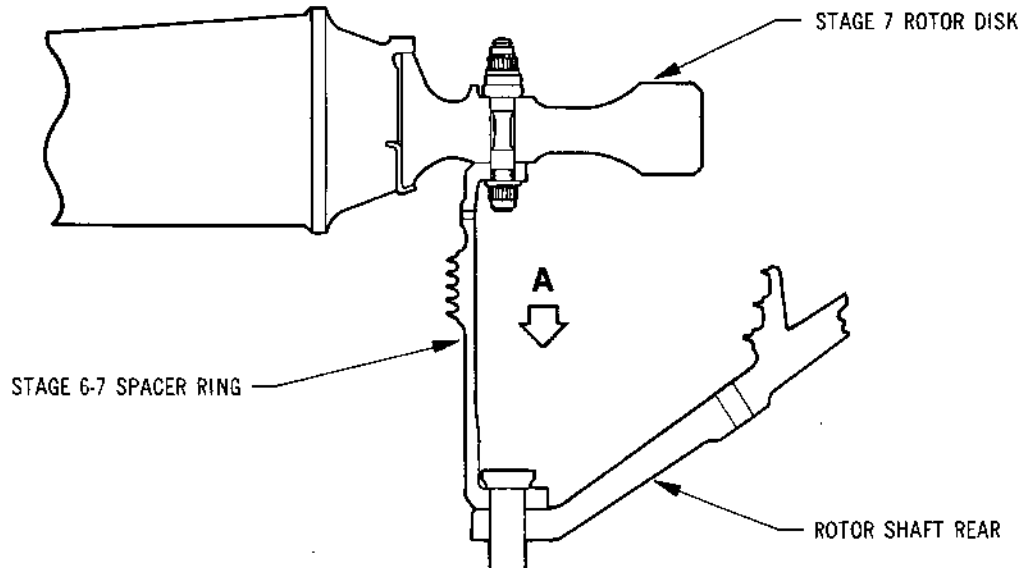


OLYMPUS 593  
MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 36195/00A



SB 72-8896-347 STANDARD

Painted Areas on Rotor Shaft Rear  
Figure 505A

ASSEMBLY  
72-00-00  
Page 510A  
Jun 1/89



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (3) Remove the retaining nut and washer from the rotor shaft rear. Remove spacer sleeve (Tool 3159).
- (4) Assemble the mechanical puller (Tool 283) to the rotor shaft rear.
  - (a) Lower the puller onto the rotor shaft rear and screw the central threaded shroud of the puller onto the rotor shaft rear. Engage sufficient threads of the threaded shroud to operate the puller, but do not overtighten.
  - (b) Lower the outer ring of the puller onto the balancing bearing aligning the captive bolts of the balancing bearing, with the tapped holes in the puller outer ring. Secure the puller to the balancing bearing outer location with the captive bolts.
- (5) Turn the puller T piece in a clockwise direction and remove the balancing bearing assembly. When the bearing becomes free of its interference location, unscrew the puller control shroud from the rotor shaft rear, then lift the puller and bearing assembly clear of the LP compressor assembly. Place the balancing bearing onto a suitable work top, then release and remove the puller from the bearing assembly.
- (6) On engines to pre SB.72-21 standard remove the slave adjusting washer from the LP rotor shaft rear. Return the slave adjusting washer (if applicable), packing piece and balancing bearing assembly to the LP compressor section.
- (7) On engines to SB.72-8896-347 standard, apply heat resisting aluminium touch-up enamel (PL82) to the rotor shaft rear on the area not protected by Sermetel W (Ref. Fig.505A). For procedure, refer to 72-09-04 Repair.

ASSEMBLY

72-00-00

Page 510B

Dec 31/00



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

4. Assemble the Adjusting Washer, LP Thrust Bearing Assembly, Bevel Gear and Probe Operating Ring (Ref.Fig.506).

A. Prepare LP Bearing Assembly.

- (1) Remove the LP bearing assembly from its protective container and place on a clean surface. For pre SB.72-21 standard engines obtain the correct size adjusting washer (72-31-03/3-70-165), previously calculated by the compressor section. Measure the washer to establish that it corresponds with the figure recorded in the record sheets.
- (2) On SB.72-21 standard engines check the actual thickness of the engine adjusting washer assembled to the rotor shaft and make sure that it corresponds with the thickness logged in the relevant record sheet.
- (3) Check that the adjusting washer is free from nicks and burrs, lightly stone if necessary. Ensure that the rotor shaft rear washer abutment flange is free from damage marks. Apply lubricant 'A' to the LP thrust bearing location and adjusting washer, then assemble the adjusting washer to the rotor shaft rear.

Printed in England

ASSEMBLY

72-00-00

Page 511  
Dec 31/00

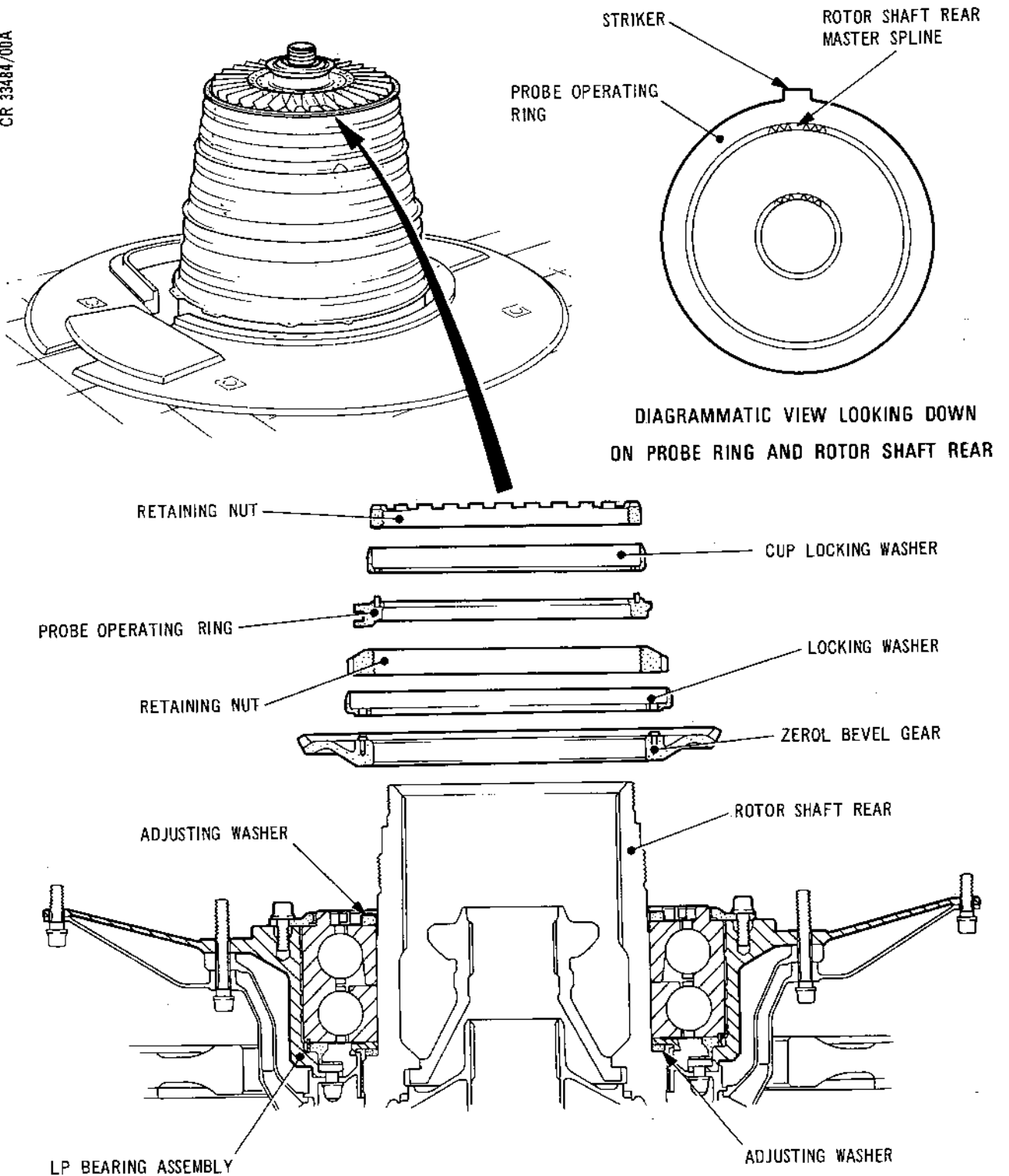


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33484/00A



Assembling Bearing, Gear and Probe Operating Ring  
Figure 506

ASSEMBLY  
**72-00-00**  
Page 512  
Jan 19/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Check that a blank has been assembled to the LP bearing housing transfer feed tube. Adjust the LP thrust bearing inner tracks until the thrust arrows coincide to form a "V". Ensure the LP bearing assembly is clean and free from damage marks.
- (5) With the correct size adjusting washer in position on the rotor shaft rear, assemble the LP thrust bearing assembly over the rotor shaft. Position the bearing assembly so that the thrust markings are in line with the master spline of the rotor shaft rear and that the arrows point forward.
- (6) Ensure that the adapter (Tool 284) is screwed onto the centre thrust plate of the mechanical driver (Tool 1099), then lower the drive onto the rotor shaft rear, and screw the central adapter (Tool 284) onto the shaft ensuring that it is not overtightened. Turn the T handle in a clockwise direction and press the thrust bearing assembly home. Unscrew the adapter, then remove the mechanical driver from the shaft.

B. Assemble the Adjusting Washer Bevel Gear and Retaining Nut.

- (1) Check that the six pins (72-32-00/1-30) assembled to the bevel gear (72-32-00/1-40) (Ref.SB.72-21) are undamaged, then temporarily assemble the locking washer (72-31-03/3-60) to the bevel gear to ensure that none of the six pins protrude above the locking washer abutment face. Remove the locking washer from the bevel gear.
- (2) Obtain the correct size bevel gear adjusting washer (72-32-00/1-50) previously calculated by the intermediate section. Measure the thickness of the washer to verify that it is the dimension logged in the engine record sheet.
- (3) Assemble the adjusting washer to the rotor shaft rear, then assemble the bevel gear (72-32-00/1-40) to the shaft, engaging the splines. Assemble the locking washer (72-31-03/3-60) to the six pins assembled to the bevel gear. Lubricate the retaining nut (72-31-03/3-50) with lubricant 'B', then assemble the nut to the shaft. Run the nut down initially with the hand spanner (Tool 1551).





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Insert a sleeve (Tool 696) into the rear of the rotor shaft rear, then locate the immobilizer (Tool 280) in the rotor shaft internal splines. Ensure that the spanner (Tool 1594) is bolted to the multiplier (Tool 1022), then assemble the spanner to the nut and the multiplier to the immobilizer. It may be necessary to turn the square in the top of the multiplier to engage the square of the immobilizer. Assemble a torque wrench to the multiplier, then torque-tighten the retaining nut between 650 and 700 lbf ft (881 and 949 N.m). Remove the torque wrench, multiplier/spanner, immobilizer and sleeve. Lock the retaining nut by peening the locking washer at three equi-spaced positions.

C. Assemble the LP Probe Operating Ring. (Refer to SB.72-95).

- (1) Temporarily assemble the locking washer (72-31-03/3-20) to the probe ring (72-31-03/3-40) to ensure that the four locating pins assembled to the probe ring do not protrude above the nut abutment face of the locking washer. Remove the locking washer from the probe ring.

NOTE: The two lugs on the probe ring are diametrically opposite, one is a plain lug, whilst the other functions as the rotating member of LP bearing failure warning probe, its static member being attached to the oil distributor in the intermediate case. When assembling the probe ring it is imperative that the probe lug proper aligns the master spline of the LP rotor shaft rear.

- (2) Lower the probe ring (72-31-03/3-40) into the slots machined in the rotor shaft rear, ensuring that the probe lug aligns the master spline. Assemble the locking washer to the four locating pins (72-31-03/3-30) in the probe ring. Lubricate the retaining nut (72-31-03/3-10) with lubricant 'B', then screw the nut by hand onto the rotor shaft rear. Lower the immobilizer (Tool 1330) into the shaft engaging the splines of both items, then lower the spanner (Tool 325) onto the retaining nut. Lower the multiplier (Tool 1333) onto the spanner turning the multiplier drive (if necessary) to enable it to engage its drive in the immobilizer and its capscrews into the holes of the spanner. Assemble a torque wrench to the multiplier, then torque the retaining nut between 300 and 330 lbf ft (407 and 448 N.m). Remove the torque wrench, multiplier, spanner and immobilizer from the rotor shaft rear, then lock the retaining nut by peening the locking washer at three equi-spaced positions.

FN21032

ASSEMBLY  
**72-00-00**

Page 514  
Aug 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (3) Assemble a protector (Tool 1227) to the rear of the LP compressor assembly.

5. Assemble the Brackets to the LP Compressor Case Front Flange

NOTE: The 116 bolts and nuts required for securing the flanges are of the same Part No., therefore the I.P.C. No. for the bolts (72-22-01/4-30, 60, 90, 120, 150, 180, 220, 250 and 300), and the I.P.C. No. for the nuts (72-22-01/4-20, 40, 70, 100, 130, 160, 190, 230, and 280) will not be quoted with each bracket assembled.

- A. Prepare the Brackets and Bolts (Ref.Fig.507).

NOTE: Boltheads are to face forward.

- (1) Starting in a clockwise direction and in numerical sequence looking forward from the TOP position, (No.1 bolt-hole) mark on the case with an approved marker the bracket positions (Ref.Fig.507) 36, 37, 45, 46, 47, 49, 50, 53, 54, 62, 63, 65, 66, 71 and 72.
- (2) Apply lubricant 'B' to the threads of all the bracket securing bolts.

- B. Assemble the Brackets.

- (1) Assemble a bracket (72-22-01/4-50) to position 36 and 37, retain the bracket, with two bolts and two nuts.

NOTE: Before assembling the following bracket (72-22-01/4-80) refer to SB.77-8.

- (2) Assemble a bracket (72-22-01/4-80) to position 45, 46 and 47, retain the bracket with three bolts and three nuts.
- (3) Assemble a bracket (72-22-01/4-110) to position 49 and 50, retain the bracket with two bolts and two nuts.
- (4) Assemble a bracket (72-22-01/4-200) to position 53 and 54, retain the bracket with two bolts and two nuts.
- (5) Assemble a bracket (72-22-01/4-170) to position 55 and 56, retain the bracket with two bolts and two nuts.
- (6) Assemble two brackets (72-22-01/4-210 and 4-140) to position 62 and 63, ensuring that bracket (4-210) is assembled to the flange first with the long leg extending forward, and bracket (4-140) assembled to bracket (4-210) with its leg extending rearward. Retain the brackets with two bolts and two nuts.

PRINTED IN ENGLAND

TN14562

ASSEMBLY

72-00-00

Page 515

Jun 1/77

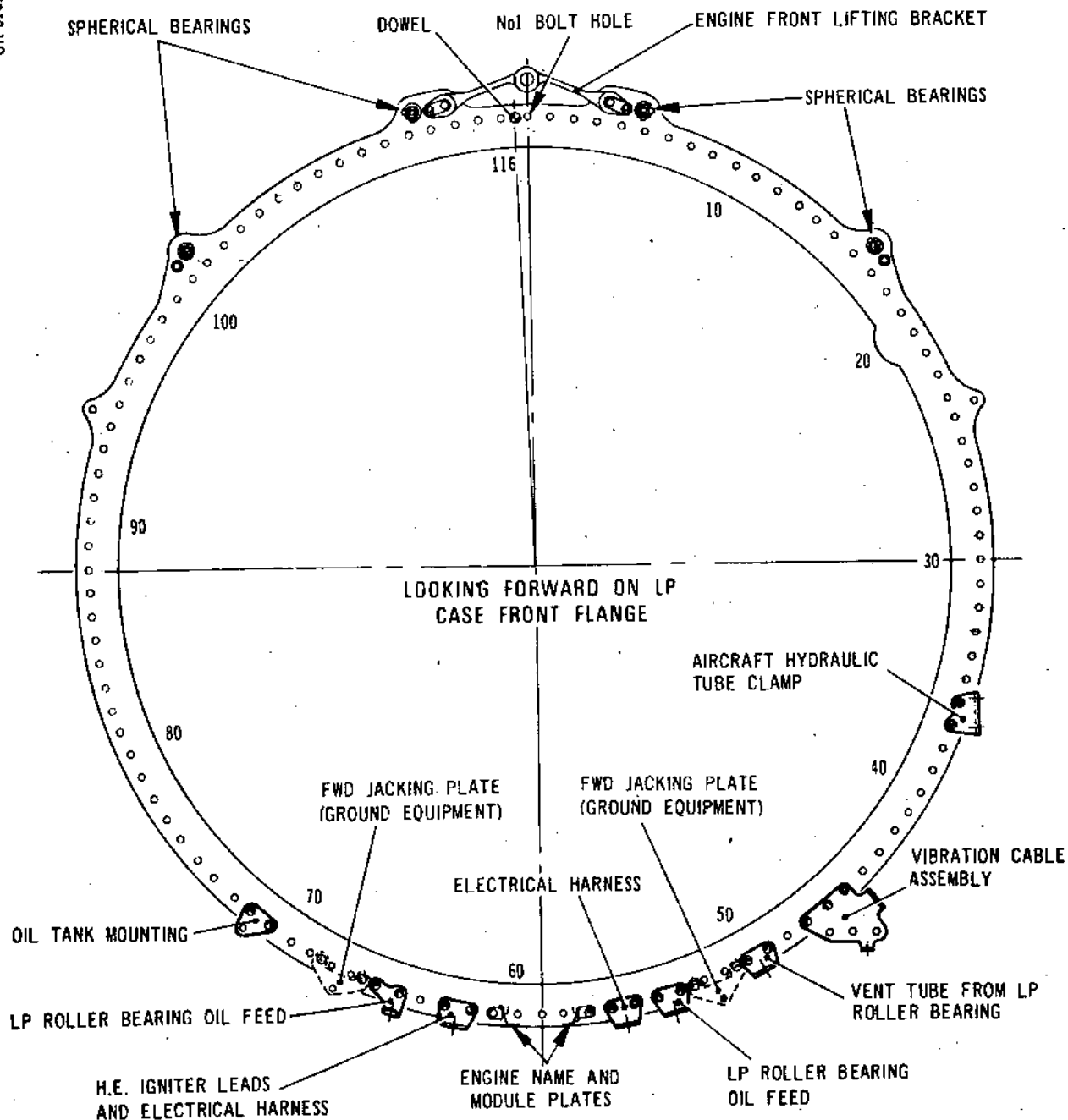


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31615/00A



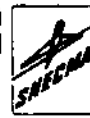
TN14693

Assembling Brackets to the LP Compressor Case Front Flange  
Figure 507

ASSEMBLY  
**72-00-00**  
Page 516  
Jan 19/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

- (7) Assemble a bracket (72-22-01/4-240) to position 65 and 66, retain the bracket with two bolts and two nuts.
- (8) Assemble a pin (72-22-01/4-270) and retaining ring (72-22-01/4-260) to the bracket (72-22-01/4-290), then assemble the bracket to position 71 and 72 and retain with two bolts and two nuts.
- (9) Assemble a bolt (72-22-01/4-30) and nut (72-22-01/4-20) to the remaining vacant positions with the exception of bolt-holes 22, 57 and 61.
- (10) Torque-tighten the assembled LP compressor/air inlet section flange retaining bolts between 170 and 190 lbf in. (19,2 and 21,5 N.m), ensuring that they have a minimum locking (run-down) torque of 6.5 lbf in. (0,73 N.m).

6. Assemble the Module Plate Mounting Brackets and Identification Plates to the Mounting Brackets (Ref.Fig.508)

A. Assemble the Mounting Brackets.

- (1) Remove the two bolts and a spacer from the LP stage 2 bottom bolted vane position. Apply lubricant 'B' to two front flange bolts (72-22-01/4-30), then assemble them to positions 57 and 61 of the LP case front flange, retain the mounting bracket assembly (72-31-01/4-260) at this position with two nuts (72-22-01/4-20).
- (2) Secure the brackets (72-31-01/4-130 and 4-260) with the two bolts and spacer removed from the case in para.(1). The spacer is assembled between the case and the bracket. Torque-tighten the two bolts between 160 and 180 lbf in. (18,1 and 20,3 N.m), then wire-lock the bolts to each other.
- (3) Torque-tighten the two bolts securing the bracket (72-31-01/4-260) to the LP case flange at the bottom position (holes 57 and 61), between 170 and 190 lbf in. (19,2 and 21,5 N.m), ensuring that they have a minimum locking (run-down) torque of 6.5 lbf in. (0,73 N.m).

ASSEMBLY

72-00-00

Page 517

Jan 4/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



B. Assemble the Module Identification Plates (Ref.Fig.508).

NOTE: After the sub-assemblies have been cleared for engine build, each sub-assembly will have attached its own module identification plate which will be checked on receipt to ensure that it bears the correct data. No module identification plate may be assembled to the mounting bracket on the engines LP compressor case until the relevant information has been marked on the identification plate and verified as being correct in accordance with the module interchangeability chart.

- (1) Starting nearest the LP case front flange and working rearwards, assemble the following Module Identification plates and engine nameplate. Apply lubricant 'B' to all the following retaining bolts.
  - (a) Assemble a module identification plate (72-00-06/1-160) to location 1, retain with two washers (72-00-06/1-150) and two bolts (72-00-06/1-140).
  - (b) Assemble a module identification plate (72-00-12/1-90) to location 2, retain with two washers (72-00-12/1-80) and two bolts (72-00-12/1-70).
  - (c) Assemble a module identification plate (72-00-07/1-50) to location 3, retain with two washers (72-00-07/1-40) and two bolts (72-00-07/1-30).
  - (d) Assemble a module identification plate (72-00-04/1-90) to location 4, retain with two washers (72-00-04/1-80) and two bolts (72-00-04/1-70).
  - (e) Assemble a module identification plate (72-00-05/1-90) to location 5, retain with two washers (72-00-05/1-80) and two bolts (72-00-05/1-70).
  - (f) Assemble a module identification plate (72-00-03/1-70) to location 6, retain with two washers (72-00-03/1-60) and two bolts (72-00-03/1-50).
  - (g) Assemble a module identification plate (72-00-02/1-70) to location 7, retain with two washers (72-00-02/1-60) and two bolts (72-00-02/1-50).

ASSEMBLY

72-00-00

Page 518

Jan 4/93



OLYMPUS 593

MK. 610-14-28

OVERHAUL

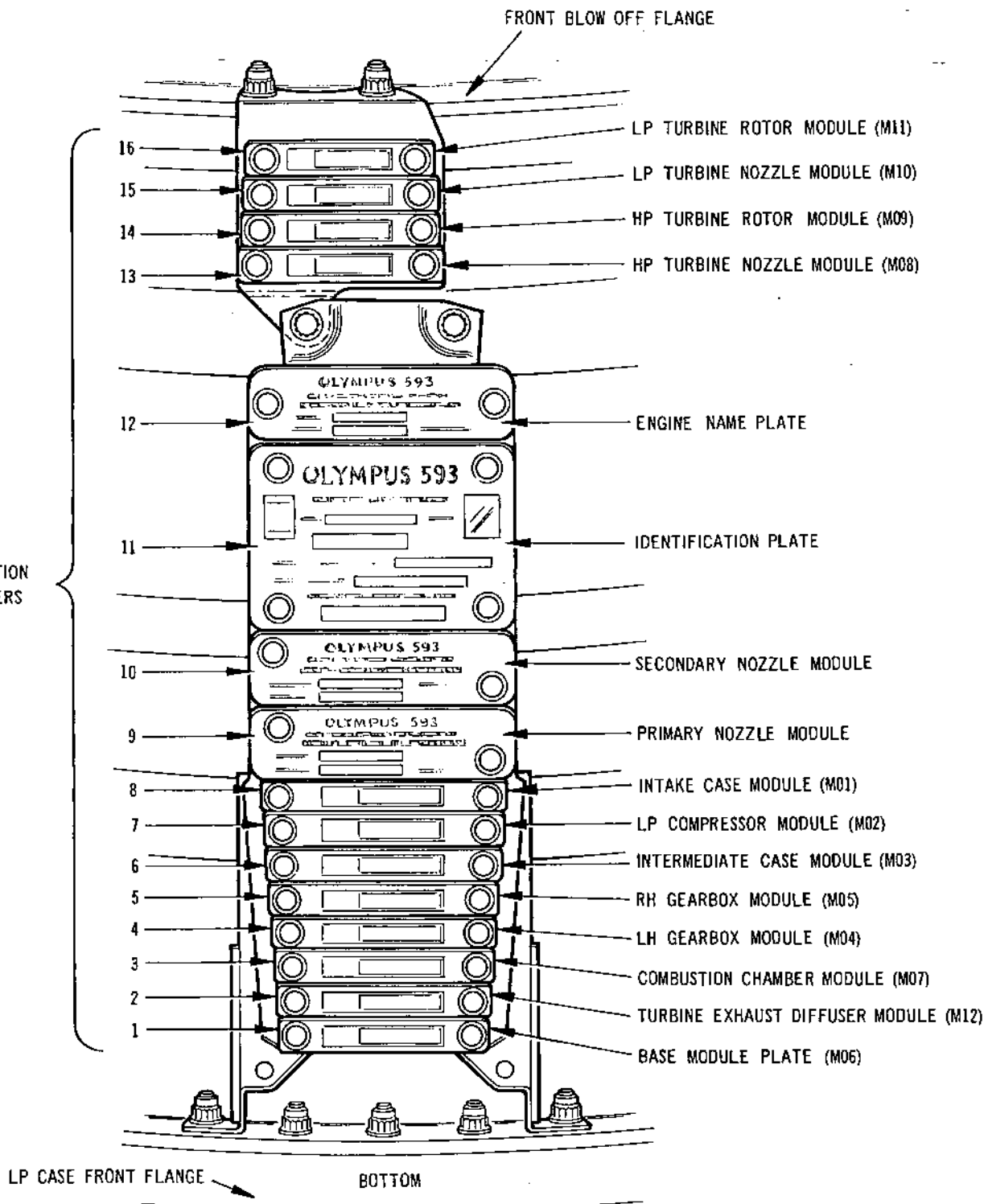


CR 32627/00C

PRINTED IN ENGLAND

TN14694

LOCATION  
NUMBERS



Assembling Module Identification Plates  
Figure 508

ASSEMBLY  
**72-00-00**

Page 519  
Jan 1/77

BS00026285/1

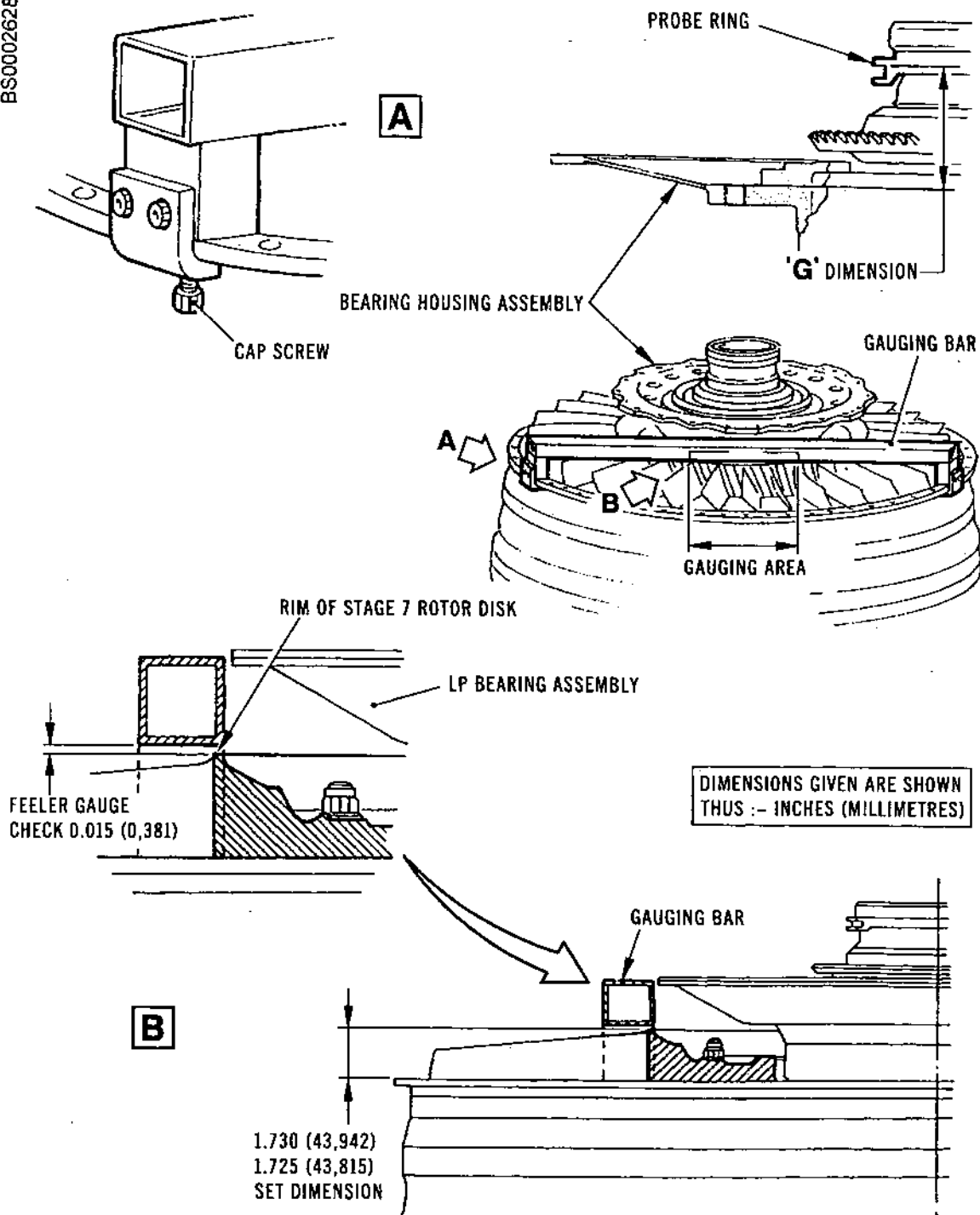


OLYMPUS 593

MK.610-14-28  
OVERHAUL



snecma



Measuring the Set Dimension  
Figure 509

ASSEMBLY

72-00-00

Page 520

Jun 1/99



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (h) Assemble a module identification plate (72-00-01/1-70) to location 8, retain with two washers (72-00-01/1-60) and two bolts (72-00-01/1-50).
- (j) Assemble a module identification plate (72-31-01/4-250) to location 9, retain with two washers (72-31-01/4-240) and two bolts (72-31-01/4-230).
- (k) Assemble a module identification plate (72-31-01/4-220) to location 10, retain with two washers (72-31-01/4-210) and two bolts (72-31-01/4-200).
- (m) Assemble the engine identification plate (72-31-01/4-40) to location 11, then retain with four washers (72-31-01/4-20) and four bolts (72-31-01/4-30).
- (n) Assemble an identification engine nameplate (72-31-01/4-190) to location 12, retain with two washers (72-31-01/4-180) and two bolts (72-31-01/4-170).
- (p) Assemble a module identification plate (72-00-08/1-50) to location 13, retain with two washers (72-00-08/1-40) and two bolts (72-00-08/1-30).
- (q) Assemble a module identification plate (72-00-09/1-50) to location 14, retain with two washers (72-00-09/1-40) and two bolts (72-00-09/1-30).
- (r) Assemble a module identification plate (72-00-10/1-50) to location 15, retain with two washers (72-00-10/1-40) and two bolts (72-00-10/1-30).
- (s) Assemble a module identification plate (72-00-11/1-50) to location 16, retain with two washers (72-00-11/1-40) and two bolts (72-00-11/1-30).
- (t) Torque-tighten all of the module plate retaining bolts between 28 and 32 lbf in. (3,2 and 3,6 N.m).

7. Assemble the HP Compressor/Intermediate Assembly to the LP Compressor Assembly

A. Prepare for Dimensional Check (Ref.Fig.509).

NOTE: On pre SB.72-21 and SB.72-21 standard engines the LP compressor rotor is adjusted by means of the handwheel on the side of the building base, to produce the mean set dimension. This is from the

ASSEMBLY

**72-00-00**

Page 521

Aug 1/76



**OLYMPUS 593**

MK.610-14-28

sneema

OVERHAUL

rear face of the LP compressor rear flange to the rim of the stage 7 rotor disk. The dimension is rechecked on pre SB.72-21 standard engines as a washer proving check, after the HP compressor/intermediate assembly has been assembled to the LP compressor.

- (1) Remove the protective blanking cover from the rear of the LP compressor assembly.
- (2) Assemble the gauging bar (Tool 83) to the rear flange of the compressor case, secure the bar with the capscrews.
- (3) Turn the handle at the side of the building base to adjust the LP rotor until a 0.015 in. (0,381 mm) feeler gauge can be inserted between the gauging area of the bar and the rim of the stage 7 rotor disk.
- (4) Remove the gauging bar and place in a protective container.
- (5) Establish dimension 'G' if not already recorded during build of the LP Compressor Assembly (Ref. Assembly 72-31-00 para.2D).
  - (a) Support the bearing housing during measurement to compensate for bearing end float.
  - (b) Assemble the checking gauge (Tool 43) to the LP bearing housing (72-32-00/1-270) rear inner abutment face.
  - (c) Adjust the gauge so that the arm of the gauge contacts the rear inside face of the probe ring lug, then lock the gauge in this position (Ref. Fig.509).
  - (d) Remove the gauge, then by direct measurement, measure from the top of the arm to the LP bearing/gauge abutment face, record this as dimension 'G'. Place the gauge in its container (Tool 824).

ASSEMBLY

**72-00-00**

Page 522

Jun 1/99



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

## B. Assemble the Metaflex Seal.

**NOTE:** The seal is received as a loose item. It must be new and unused, and have been lapped to produce a 0.003-0.008 nip (0,070-0,200 mm) by the intermediate case section. Refer to 72-32-00 for the lapping procedure.

- (1) Ensure that the seal location in the rear of the LP bearing assembly is clean. Do not apply jointing compound to the seal location.
- (2) Apply a light smear of jointing compound 'D' to both faces of the Metaflex seal (72-32-00/1-320), then assemble it to its location in the LP bearing assembly.

## C. Remove the HP Compressor/Intermediate Assembly from the Mobile Stand.

- (1) Check that the mobile stand has its brake applied, then remove the protector (Tool 210) from the rear (top) of the HP compressor assembly.
- (2) Identify the steady support (Tool 396) on the (bottom) front of the intermediate inner case, then unscrew the jacking wheel and lower the LP drive shaft until it is supported internally. Release and remove the steady support from the inner case.
- (3) Assemble the overhead hoist to the alignment locking tool (Tool 835), then raise the tool above the HP compressor assembly until the tool aligns the LP drive shaft. Slowly lower the alignment locking tool into the LP drive shaft a few inches, then assemble the split guide (Tool 838) into the end of the LP drive shaft and the split sleeve (Tool 836) around the locking tool. Continue to lower the alignment locking tool until the split sleeve engages the split guide, then release the hoist.
- (4) Screw the lifting fixture (Tool 837) onto the HP drive shaft, then attach a hoist to the lifting equipment.
- (5) Release the clamps securing the HP compressor assembly to the mobile stand. Slowly raise the assembly until it is clear of the stand and at a convenient height for inspection of the intermediate case.

ASSEMBLY

72-00-00

Page 522A

Jun 1/99



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- D. Determine thickness of LP bearing failure probe adjusting washers (Ref. Fig.509).

**CAUTION:** THE FRANGIBLE PROBES ARE SUSCEPTIBLE TO DAMAGE DURING THE SETTING PROCEDURE, AND IF KNOCKED WHILST BEING ASSEMBLED THEY SHOULD BE REMOVED AND SUBJECTED TO AN INSPECTION FOR CRACKING AND DISTORTION. IF A PROBE IS FOUND DAMAGED IT SHOULD BE REJECTED.

**NOTE:** If the dimension 'D' and the thickness of the adjusting washers (72-32-00/3-180) were recorded during assembly of the Intermediate Case Assembly to the HP Compressor Assembly (Ref. Assembly 72-33-00 para.11E), proceed to para.(4).

- (1) Measure and record the thickness of the two probe adjusting washers (72-32-00/3-180).
- (2) Assemble the two adjusting washers, the probe and probe retainer (72-32-00/3-170, 160) to the intermediate case and temporarily secure them with bolts (72-32-00/3-150).
- (3) Measure from the front face of the intermediate case (inner) flange to the rear face of the probe and record as dimension 'D'.
- (4) Obtain dimension 'G' recorded during dimensional check (Ref. para.7.A (5)).
- (5) Using the following formula, calculate the required thickness of the LP probe adjusting washers (72-32-00/3-180) to produce the desired clearance between the probe and probe operating ring of between 0.024 and 0.029 in. (0,609 and 0,736 mm) for SB.72-21 standard, or between 0.020 and 0.025 in. (0,508 and 0,635 mm) for pre-SB.72-21 standard engines.
  - (a) The required adjusting washer thickness =  

$$D + (\text{size of washer assembled for check}) + (\text{desired clearance}) - G.$$
- (6) If adjustment is required, select two adjusting washers (72-32-00/3-180) that will produce a clearance between 0.024 and 0.029 in. (0,609 and 0,736 mm) for SB.72-21 standard, or between 0.020 and 0.025 in. (0,508 and 0,635 mm) for pre-SB.72-21 standard engines.

ASSEMBLY

72-00-00

Page 522B

Jun 1/99



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England

- (7) Remove the LP probe and retainer (72-32-00/3-170, -160) from the oil distributor, then remove the two adjusting washers used for the check.
- (8) Reassemble the LP probe, retainer and the two selected adjusting washers (72-32-00/3-180) (72-09-21 Repair, Fig.407) to the oil distributor. Secure the probe with two bolts (72-32-00/3-150) lubricated with lubricant 'A'. Torque-tighten the bolts to 135 lbf in. (15,2 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).

E. Lower the HP Compressor/Intermediate Assembly onto the Spacers (Ref.Fig.510).

CAUTION: THE FRANGIBLE PROBES ARE SUSCEPTIBLE TO DAMAGE DURING ASSEMBLY OF THE ENGINE MODULES, AND IF KNOCKED THEY SHOULD BE REMOVED AND SUBJECTED TO AN INSPECTION FOR CRACKING AND DISTORTION. IF A PROBE IS FOUND DAMAGED IT SHOULD BE REJECTED.

- (1) Ensure that the LP and HP bearing failure warning probes assembled to the inner case are undamaged, and that the inner and outer front flanges of the intermediate case are free from damage.
- (2) Ensure that the oil transfer tube (72-32-00/3-370) has been assembled to the distributor in the intermediate case, and the oil transfer tube (72-32-00/3-340) has been assembled to the rear location on the LP bearing housing.
- (3) Offer up the spherical mounting setting tool (Tool 839) to the rear of the LP rotor shaft. Identify the master spline of the spherical mounting, then observe the master spline through the observation hole in the setting tool. Engage the splines of the setting tool with those of the spherical mounting. Turn the setting tool until the master spline of the LP rotor shaft rear aligns the corresponding master spline in the rear flange of the setting tool, then allow the setting tool to drop fully home into the locking cone. Withdraw the setting tool ensuring it is not turned.

ASSEMBLY

72-00-00

Page 523  
Dec 31/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

**NOTE:** The master spline of the spherical mounting is now set 45 deg relative to the master spline in the locking cone and ready to receive the LP shaft. Do not touch the spherical mounting after setting.

- (4) Assemble three spacers (Tool 804) equi-spaced to the rear face of the LP compressor case. Retain the spacers with thumbscrews.

**NOTE:** The spacers (Tool 804) allow the HP compressor assembly to be temporarily supported, leaving a clearance between the LP drive shaft and spherical mounting, permitting the LP drive shaft to be rotated in a free state allowing accurate alignment with the locking system prior to engagement.

- (5) Observe the master spline of the rotor shaft rear, then using suitable chalk, mark the rotor shaft rear on the outside in line with the spline.

**NOTE:** The chalk mark will assist in lining up the master spline with the LP drive shaft master spline.

- (6) Raise and position the HP compressor assembly above the LP compressor assembly.

**CAUTION:** BEFORE LOWERING THE ASSEMBLY ENSURE THAT THE PROBE LUG OF THE OPERATING RING IS NOT IN LINE WITH THE PROBE ASSEMBLED TO THE OIL DISTRIBUTOR IN THE INTERMEDIATE CASE.

- (7) Align the rotor shaft and LP drive shaft master splines. Check that the TOP of the HP compressor/intermediate case assembly aligns with the TOP of the LP compressor assembly, then lower the assembly, exercising care, onto the spacers. Secure the spacers to the intermediate case front flange with thumbscrews. Release the hoist and lower the lifting fixture onto the rear bearing adapter.

- (8) Assemble the lifting fixture (Tool 981) to the overhead hoist, then lower the lifting fixture over the LP drive shaft. Engage the half clamps into the recess in the rear of the shaft, then lock the half clamps together with the pivoting bolt.

ASSEMBLY

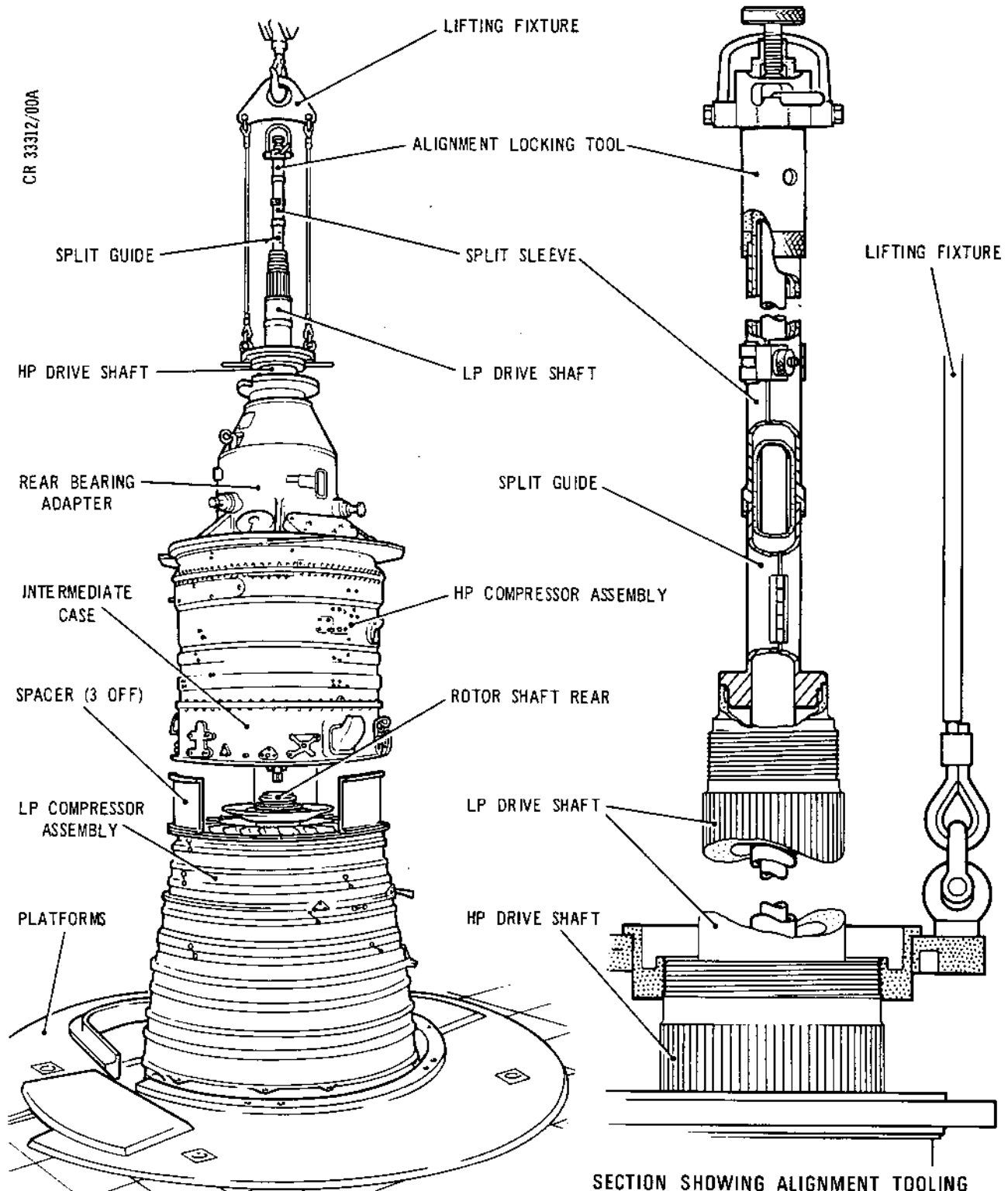
72-00-00

Page 524  
Dec 1/97



OLYMPUS 593

MK.610-14-28  
OVERHAUL



SECTION SHOWING ALIGNMENT TOOLING

Lowering the HP Compressor/Intermediate Assembly  
onto the Spacers  
Figure 510

ASSEMBLY  
72-00-00

Page 525  
Jan 19/76



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (9) Operate the hoist until the weight of the LP drive shaft is taken up allowing the shaft to turn freely.
- (10) Support the alignment/locking tool and withdraw the split sleeve, then allow the tool to move forward to engage with the spherical mounting and locking cone. Slight angular adjustment of the LP drive shaft may be necessary to effect engagement.
- (11) Turn the central part of the alignment/locking tool 45 deg in a clockwise direction to unlock the spherical mounting.
- (12) Attach the lifting fixture already assembled to the HP drive shaft to a hoist. Take the weight of the HP compressor/intermediate assembly, then release and remove the three spacers assembled to the rear flange of the LP compressor case.
- (13) Assemble four packing pieces (Tool 1200) and two packing pieces (Tool 1201) to the rear flange of the LP case, secure with thumbscrews.
- (14) Remove the seven bolts retaining the blanking plate at the LP pulse probe drive location (intermediate case vane No.4), then remove the plate.
- (15) Check that the TOP marked on the LP bearing housing aligns the TOP marked on the intermediate case (vane No.1 position). Observe the six dowels assembled to the front inner flange of the intermediate case, then ensure that they align with their corresponding location holes in the LP bearing housing flange.

**CAUTION:** EXERCISE GREAT CARE WHEN LOWERING  
COMPRESSOR/INTERMEDIATE ASSEMBLY,  
ENSURING THAT LP DRIVEN BEVEL GEAR DOES  
NOT ABUT LP DRIVING GEAR.

- (16) Ensuring that the dowels in the intermediate case engage in the holes in the LP bearing housing flange, slowly lower the HP compressor/intermediate assembly, simultaneously turning the LP pulse probe drive shaft to ensure that the LP pulse probe driven bevel meshes smoothly with the LP gear and the teeth do not abut. When the intermediate case abuts the packing pieces secure the case to the packing pieces with slave bolts and nuts.
- (17) Release the hoist and lower the lifting fixture onto the rear bearing adapter.

ASSEMBLY

## 72-00-00

Page 526  
Dec 1/97



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England

F. Lock the Spherical Mounting.

- (1) Partially lock the spherical mounting by turning the central part of the alignment/locking tool approximately 5 deg in a counter clockwise direction.
- (2) Assemble a Salter 400 lb (181.4 kg) spring balance (Tool 1631) to the overhead hoist, then assemble the spring balance to the LP shaft lifting equipment already in position. Slowly raise the LP shaft until the shaft is suspended by the spring balance, then record the weight registered on the spring balance. Continue to raise the shaft until a slight increase in weight is noted on the dial of the spring balance.

NOTE: The LP drive shaft is now in contact with the partially locked spherical, any further increase in weight is unnecessary.

- (3) Turn the central part of the alignment/locking tool counter clockwise approximately 45 deg to bring the spherical mounting into the fully locked position. A decrease in the weight factor will be observed on the dial of the spring balance.
- (4) Carefully lower the hoist, then remove the spring balance and lifting equipment. Attach the hoist to the alignment/locking tool, then carefully withdraw the tool and split guide from the LP shaft. Place the alignment tool in its container (Tool 803).

G. Secure the Inner and Outer LP Bearing Housing Baffles to the Intermediate Case.

- (1) Apply lubricant 'A' to the 30 externally relieved body bolts (72-32-00/1-20) of the LP bearing housing, then engage the bolts in the tapped holes in the intermediate inner case and screw in until finger tight.

ASSEMBLY

72-00-00

Page 527  
Dec 31/01





OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (2) Calibrate the ratchet wrench (Tool 1542) and torque wrench (Tool 1541) on the torquemeter gauge to a torque of 135 lbf in. (15,2 N.m), then torque-tighten the 30 captive bolts to 135 lbf in. (15,2 N.m), ensuring that they have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).

NOTE: The seals, assembled in the following operation, are located by six equi-spaced dowels, the correct assembly position of the seal is determined by aligning the cut-away in the seal (this is 30 deg relative to the centre location hole in the seal) with the headless pin (72-32-00/6-40) located in the intermediate case. The angular position of the pin is 90 deg relative to the 'TOP' of the intermediate case and falls between vane No.2 and 3.

- (3) Identify the cut-away on the two seals (72-31-02/1-30), then assemble them to the front outer baffle of the LP bearing housing positioning the gaps correctly. Retain the seal rings to the outer baffle with the 24 externally relieved bolts (72-32-00/1-10) lubricated with lubricant 'A'. Calibrate the ratchet wrench (Tool 822) and torque wrench (Tool 821) on the torquemeter gauge to a torque of 135 lbf in. (15,2 N.m). Torque-tighten the 24 retaining bolts to 135 lbf in. (15,2 N.m), ensuring that they have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).

#### H. Re-check the Set Dimension.

NOTE: The dimensional check (para.(2) to (6) inclusive) is applicable to Pre SB.72-21 engines only.

- (1) With the seals correctly positioned and the 54 LP bearing housing/intermediate case bolts torque-tightened, turn the handwheel, located on the side of the building base, in a counter clockwise direction allowing the LP rotor to move forward, now supported by the LP bearing housing/intermediate case.
- (2) Carefully insert the gauging bar (Tool 83) between the intermediate case front flange and the LP compressor case rear flange, then secure the bar to the LP compressor case flange with the capscrews.

ASSEMBLY

72-00-00

Page 528

Dec 31/01



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (3) Using feeler gauges, measure the gap which exists between the gauging bar and the rim of the stage 7 rotor disk. Reposition the gauging bar and repeat the check diametrically opposite.
- (4) Subtract the mean dimension obtained, from the actual dimension marked on the gauging bar.
- (5) The set gap dimension must be between 1.730 and 1.725 in. (43,942 and 43,815 mm).

Example - If the distance measured by the feeler gauges is 0.015 in. (0,381 mm), then subtract this from say 1.742 in. (44,246 mm) marked on the gauging bar, and the resultant dimension would be 1.727 in. (43,865 mm), acceptable as mid tolerance between the desired set gap dimension.

ASSEMBLY

72-00-00

Page 528A

Jun 30/95



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sheema

"This page left blank intentionally"

ASSEMBLY

72-00-00

Page 528B

Jun 30/95



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

- (6) Remove the gauging bar from the LP compressor case flange and place it in a protective container.
- (7) Check the backlash between the LP zero l bevel driving gear and the LP zero l bevel driven gear (LP pulse probe drive) (Ref. Fits and Clearance Schedule (72-32-00) F.C.S.438).

If the LP drive gears backlash check has been carried out on the Intermediate Case Assy. during final assembly (Ref.72-32-00 Sub-Assembly Para.11A), proceed as follows:

Check for backlash by moving the pulse probe bevel gearshaft through the drive housing aperture. Loss of movement indicates fouling of gear teeth.

- (8) Following satisfactory dimensional and backlash checks, reassemble the blank to the LP pulse probe drive position (vane No.4). Apply lubricant 'B' to the seven bolts, then secure the blank. Torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m), ensuring that they have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).
- (9) If for any reason work is to be discontinued at this stage for any period of time, blank off the gap which exists between the LP compressor and intermediate case with blank (Tool 995).

NOTE : If the set dimension is outside the limits, it may be necessary to change the LP thrust bearing adjusting washer. A thicker adjusting washer decreases the set dimension and conversely a thinner washer increases the dimension. Inspection supervision must be consulted before any decision is reached concerning a washer change.

#### J. Change the LP Compressor Thrust Bearing Adjusting Washer if Required.

- (1) Remove the LP thrust bearing assembly and adjusting washer (Ref.72-00-00 Disassembly).
- (2) Assemble the LP bearing adjusting washer (Ref.para.4.A.(2)).
- (3) Reassemble the LP compressor intermediate assembly to the LP compressor assembly (Ref.para.7).

ASSEMBLY

72-00-00

Page 529

Jun 1/99

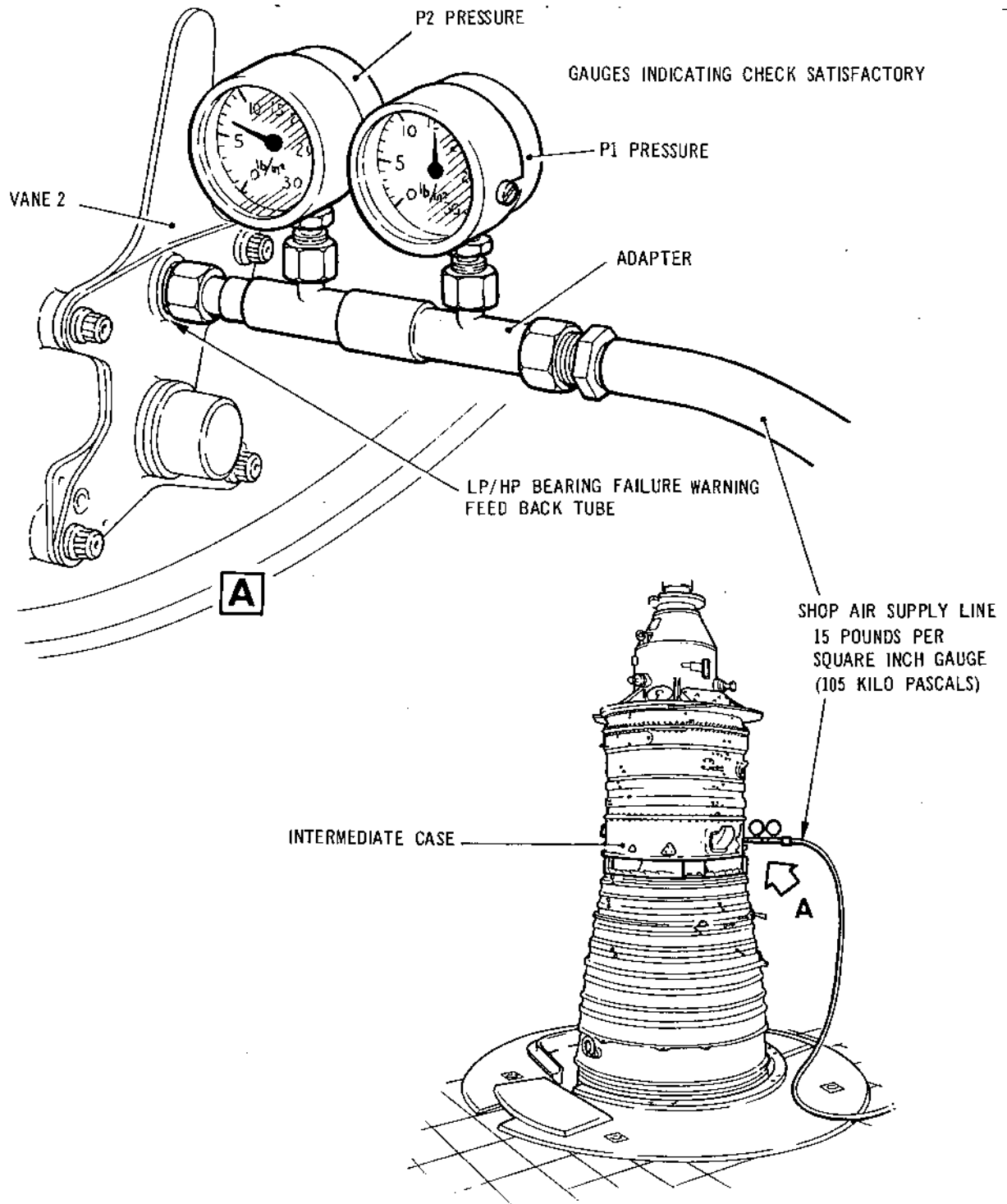


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 33307/00A



Checking the Bearing Failure Warning Probe Circuit  
Figure 511



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



8. Air Flow and Pressure Check of the LP and HP Compressor Thrust Bearing Failure Warning Probe Circuit (Ref.Fig.511)

NOTE : This check will indicate whether or not a bearing failure warning probe has been 'knocked off' during assembly.

A. Prepare Test Equipment.

- (1) Examine the adapter (Tool 802) for cleanliness and serviceability of the two gauges, then remove the protector from the LP/HP bearing failure warning feed back tube at vane No.2 of the intermediate case.
- (2) Assemble the adapter to the feedback tube, then connect a flexible hose between the adapter and a moisture free air supply.

B. Carry Out Air Flow Check.

- (1) Turn on the air supply and regulate the supply until 15 psig (105 Kpa) is registering on the P<sub>1</sub> gauge. With 15 psig (105 Kpa) registering on P<sub>1</sub> gauge, P<sub>2</sub> gauge should register between 6.1 and 7.5 psig (43 and 53 Kpa). If there is a slight variant at P<sub>2</sub>, then check for leaks at the feedback tube connection and repeat the check. If a probe has been 'knocked off', then no pressure, or a very low pressure will be observed on the P<sub>2</sub> gauge.
- (2) If the check is satisfactory, remove the adapter then reassemble the protector to vane No.2. If a probe has been 'knocked off', refer to the following Chapters and use the appropriate text in each Chapter.
  - (a) Engine (72-00-00 Disassembly).
  - (b) Intermediate Case (72-32-00 Assembly).
  - (c) Engine (72-00-00 Assembly Ref.para.7.).
- (3) If no further work is to be carried out immediately, blank off the gap between the LP compressor and intermediate cases with protector (Tool 995).

9. Assemble the Exit Guide Vane Cases and Flange Brackets

A. Assemble the Cases (Ref.Fig.512).

- (1) Check that the exit guide vane (e.g.v.) cases (72-31-02/1-150) are a matched pair and free from damage.

ASSEMBLY

72-00-00

Page 531

Dec 1/87



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (2) Attach the lifting fixture, already assembled to the HP drive shaft, to a hoist. Loosen the nuts securing the six packing pieces to the intermediate case two or three threads. Using extreme care so as not to lift the complete assembly from the build stand, raise the hoist to take the weight of the HP compressor/intermediate case off the packing pieces without loading the bolts attached to the intermediate case.
- (3) Release and remove the three packing pieces assembled to the top half of the LP compressor case and intermediate case flanges.

NOTE: Lubricant 'B' to be applied to all bolt threads in the following operations.

- (4) Identify the top half of the e.g.v. cases, then assemble the case between the LP compressor case and intermediate case flanges aligning the dowel holes of the e.g.v. with the corresponding dowel holes in the LP compressor case rear flange and the intermediate case front flange. Check that the e.g.v. retaining ring (72-31-02/1-60) engages with the seal (72-31-02/1-30) assembled to the front outer labyrinth housing (72-32-00/1-350) of the LP bearing housing. If necessary lightly tap the case with an appropriate mallet to align the bolt holes. Temporarily assemble six bolts (72-31-01/6-160) and nuts (72-31-01/6-150) to equi-spaced positions to align and hold the top and bottom flanges of the top half case in their correct position.
- (5) Remove the slave plates (gearbox mounting bracket positions) from the intermediate case front flange.
- (6) Release and remove the three packing pieces assembled to the bottom half of the LP compressor case and intermediate case flanges. Wipe these flanges clean, then assemble the bottom half of the e.g.v. case to the engine at the same time observing the seal engagement between the e.g.v. retaining ring (72-31-02/1-60) and the front outer labyrinth housing location of the LP bearing housing.
- (7) Temporarily assemble six equi-spaced bolts (72-31-01/6-160) and six nuts (72-31-01/6-150) to the front and rear flanges of the bottom e.g.v. case.

ASSEMBLY

72-00-00

Page 532  
Jan 19/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL

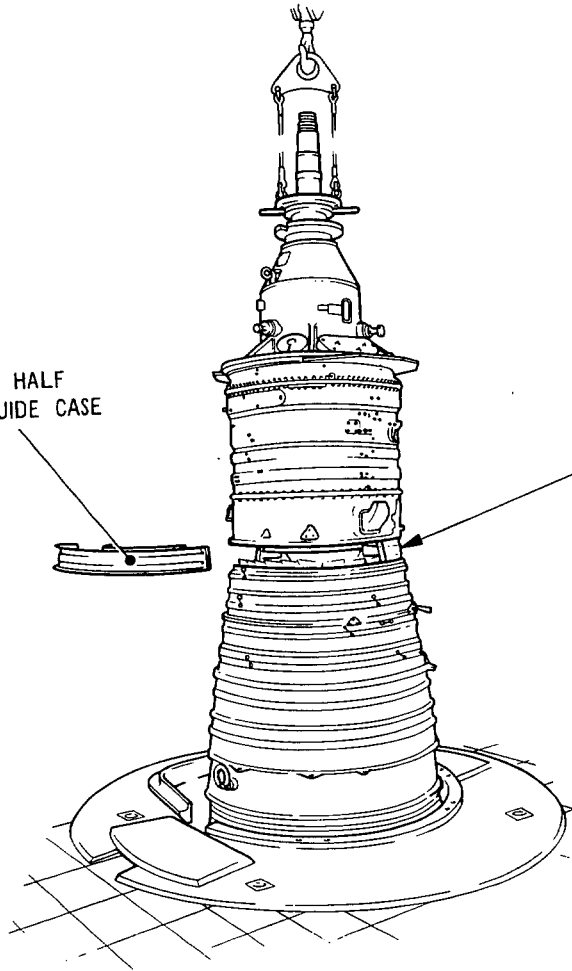


CR 33482/00A

PRINTED IN ENGLAND

BOTTOM HALF  
EXIT GUIDE CASE

TOP HALF  
EXIT GUIDE CASE



INTERMEDIATE CASE

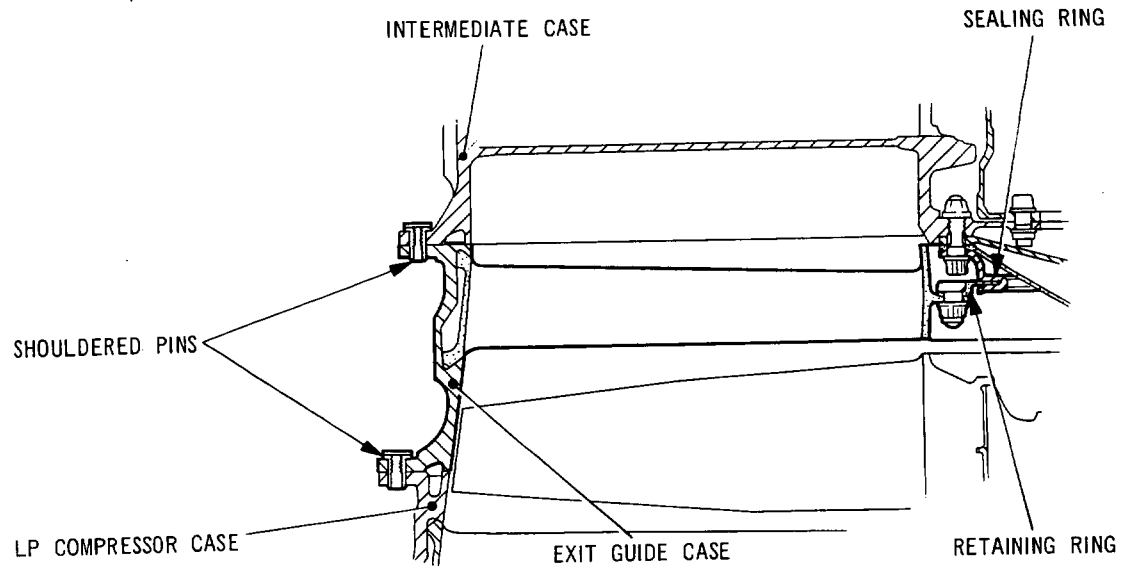
SEALING RING

SHOULDERED PINS

LP COMPRESSOR CASE

EXIT GUIDE CASE

RETAINING RING



Assembling the Exit Guide Vane Cases  
Figure 512

TN20830





# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (8) Assemble a pin (72-32-00/6-20) through the intermediate case front flange and e.g.v. rear flange (flange of pin to rear of engine). Secure the pin with a plate (72-32-00/6-10), then retain the plate with two bolts lubricated with lubricant 'B' and two nuts.
- (9) Assemble a pin (72-31-01/6-130) through the e.g.v. case front flange and LP compressor case rear flange, retain the pin with a retaining plate (72-31-01/6-120), two bolts (72-31-01/6-140) lubricated with lubricant 'B' and two nuts (72-31-01/6-110).
- (10) Apply lubricant 'B' to six bolts (72-31-02/1-20), then assemble them to the axial positions of the exit guide vane cases with the boltheads to the TOP of the engine. Retain the bolts with nuts (72-31-02/1-10).
- (11) Lower the HP compressor/intermediate case onto the exit guide vane cases. Release and remove the lifting fixture from the HP drive shaft and hoist.
- (12) Assemble two hollow pin retainers (72-32-00/7-170) to the rear exit guide flange (left-hand gearbox mounting bracket location), secure the retainers at the inner station with bolts (72-32-00/7-140) lubricated with lubricant 'A', and at the outer station with nuts (72-32-00/7-150) and bolts (72-32-00/7-160) lubricated with lubricant 'A'. Do not tighten at this stage.
- (13) Assemble the retaining plate (72-32-00/8-140) to the rear exit guide flange (right-hand gearbox mounting bracket location), secure the retainer with bolts (72-32-00/8-130) lubricated with lubricant 'A'. Do not tighten the bolts at this stage.

**B. Assemble Brackets to the LP Compressor Case/Exit Guide Vane Case Flanges.**

- (1) Attach suitable tape to the exit guide vane case, then mark off the bracket positions, starting at the No.1 bolt-hole position and numbering clockwise looking forward.

NOTE: Remove any temporarily assembled bolts occupying bracket positions.

- (2) Assemble brackets, bolts and nuts in accordance with Fig.513. Do not tighten the bolts at this stage.

ASSEMBLY

## 72-00-00

Page 534  
Dec 31/01



# OLYMPUS 593

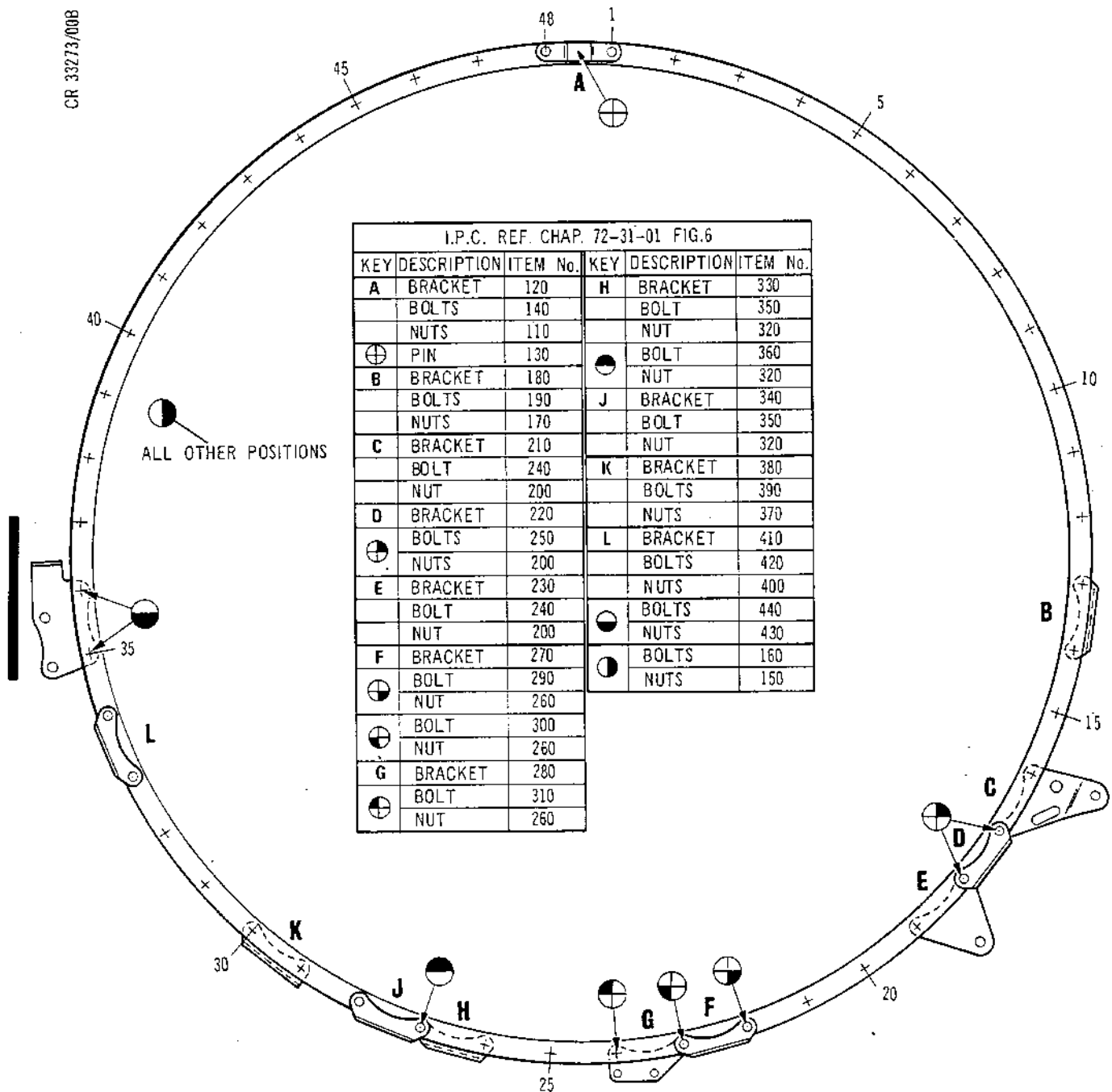
MK.610-14-28

OVERHAUL



CR 33273/00B

PRINTED IN ENGLAND



VIEW LOOKING FORWARD ON  
LP COMPRESSOR/EXIT GUIDE VANE FLANGES

Assembling Brackets to the LP Compressor Case/Exit  
Guide Vane Case Flanges  
Figure 513

ASSEMBLY

## 72-00-00

Page 535

Jun 1/92



OLYMPUS 593

MK.610-14-28  
OVERHAUL



C. Assemble Brackets to the Exit Guide Vane/Intermediate Case Flanges.

- (1) Attach suitable tape to the exit guide case, then mark off the bracket positions starting at the No.1 bolt-hole position and numbering clockwise looking forward.
- (2) Assemble the brackets, bolts and nuts in accordance with Fig.514.

D. Torque-tighten the Axial Bolts and Flange Bolts.

- (1) Using spanner (Tool 1585) and a torque wrench, torque-tighten the axial joint bolts between 170 and 190 lbf in. (19,2 and 21,5 N.m), ensuring that they have a minimum locking (run-down) torque of 6.5 lbf in. (0,73 N.m).
- (2) Torque-tighten the 48 LP compressor case/exit guide vane case flange bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m), ensuring that they have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).
- (3) Torque-tighten the exit guide vane case/intermediate case flange bolts.
  - (a) Torque-tighten the bolts at holes 29, 30, 31, 32, 33 and 34 between 67 and 73 lbf in. (7,57 and 8,25 N.m), ensuring that they have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 2.5 thread pitches beyond nut chamfer, the bolt must be renewed. Failure to obtain this protrusion at positions 31, 32, 33 and 34, refer to SB.72-8404-234.
  - (b) Torque-tighten the remaining bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m), ensuring that they have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).

- (4) Remove the tape from the exit guide vane cases.

10. Check HP Compressor Adjusting Washer Setting

A. Remove Rear Bearing Adapter.

- (1) Attach the overhead hoist to the multiple leg sling (1054), then assemble the sling to the rear bearing adapter and secure with the three thumbscrews.
- (2) Remove the slave nuts and bolts retaining the rear bearing adapter to the HP compressor case rear.
- (3) Slowly raise the bearing adapter until the adapter clears the LP drive shaft, then lower onto a suitable pallet. Place the slave nuts and bolts in a canvas bag and attach to the adapter.

ASSEMBLY

72-00-00

Page 536

May 1/81

TN9067



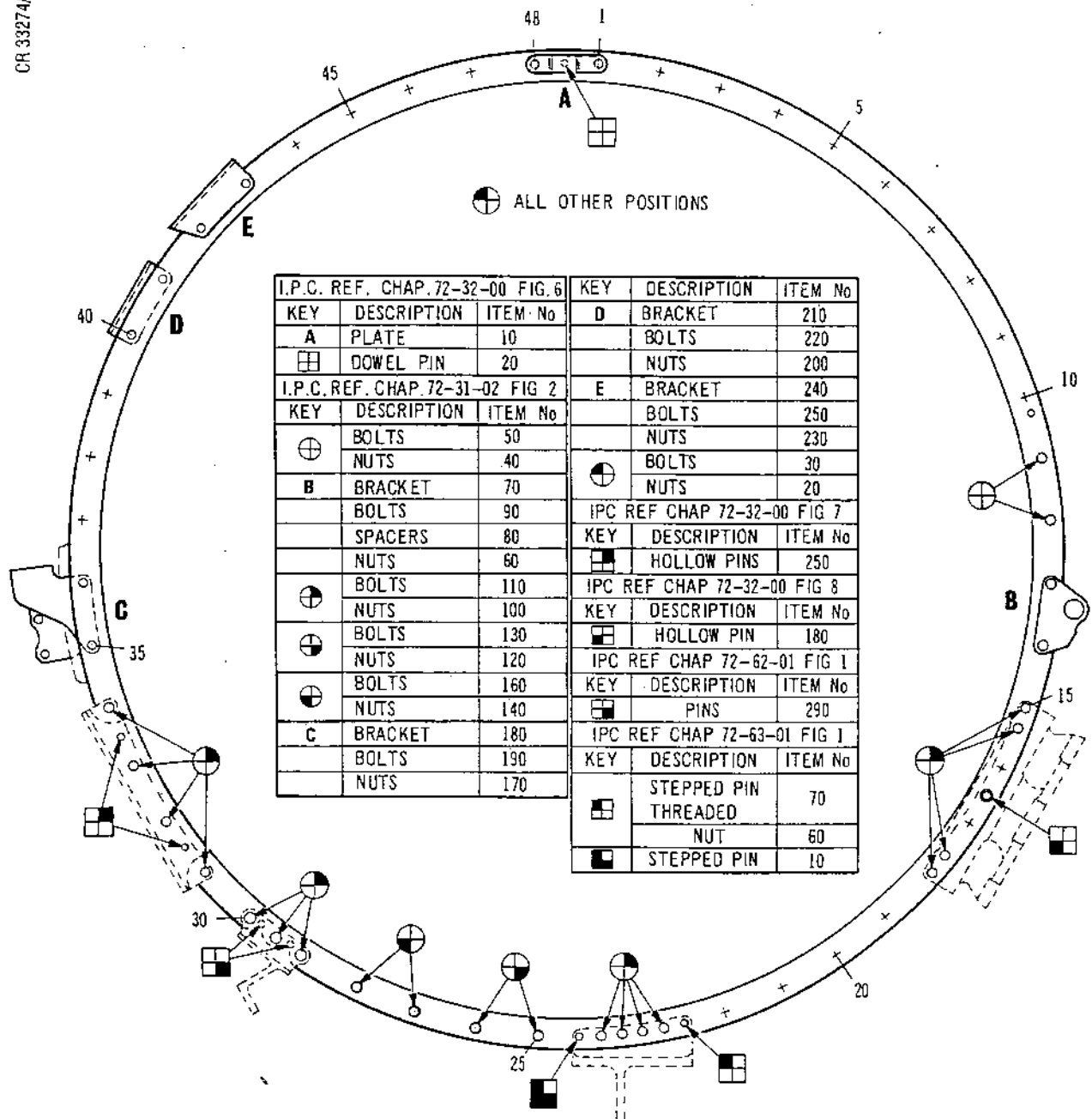
# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

CR 33274/00C

Printed in England



VIEW LOOKING FORWARD ON EXIT GUIDE VANE  
INTERMEDIATE CASE FLANGES

Assembling Brackets to the Exit Guide  
Vane/Intermediate Case Flange  
Figure 514



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Apply lubricant 'A' to the slave bearing assembled to the rear of the adapter, then assemble a protector (Tool 1370) to the adapter to protect the bearing.

B. Carry Out Dimensional Check.

- (1) Place a straight edge across the HP compressor case rear flange, then position the straight edge as near as possible to the HP drive shaft (Ref.Fig.515).
- (2) Using a depth gauge measure from the rear face of the HP case flange to the rim of the stage 7 rotor disk (between the blades not on the blade platform). The distance must be within the dimensions quoted in the Fits and Clearance Schedule (72-00-00) FCS 120. Repeat the check at 90 deg, 180 deg and 270 deg. Add the four sets of figures together then divide by 4 to obtain the mean dimension. Record the dimension.
- (3) If the figure obtained is satisfactory, assemble a protector (Tool 1237) to the rear of the HP compressor assembly.
- (4) If the check is unsatisfactory, consult inspection supervision before carrying out any rectification.
- (5) If the HP adjusting washer has to be changed, refer to the following Chapters and use the appropriate part of the text in each Chapter.
  - (a) Engine (72-00-00 Disassembly).
  - (b) HP Compressor Assembly (72-33-00 Disassembly).
  - (c) HP Compressor Assembly (72-33-00 Assembly).
  - (d) Engine (72-00-00 Assembly).

11. Assemble HP Turbine Bearing Inner Track to HP Drive Shaft

A. Remove HP Turbine Slave Bearing Inner Track (Ref.Fig.516).

- (1) Ensure that the hydraulic cylinder is assembled between the two parts of the mechanical puller (Tool 1019) (Ref.detail A), then unscrew the extraction claws.
- (2) Carefully lower the mechanical puller over the LP drive shaft and screw the end fitting fully onto the HP drive shaft.



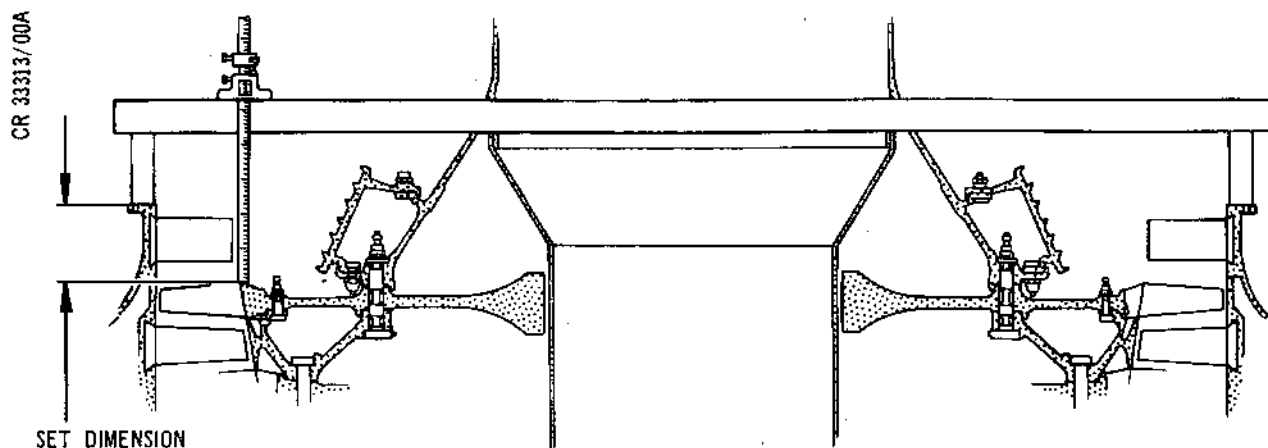
OLYMPUS 593

MK.610-14-28

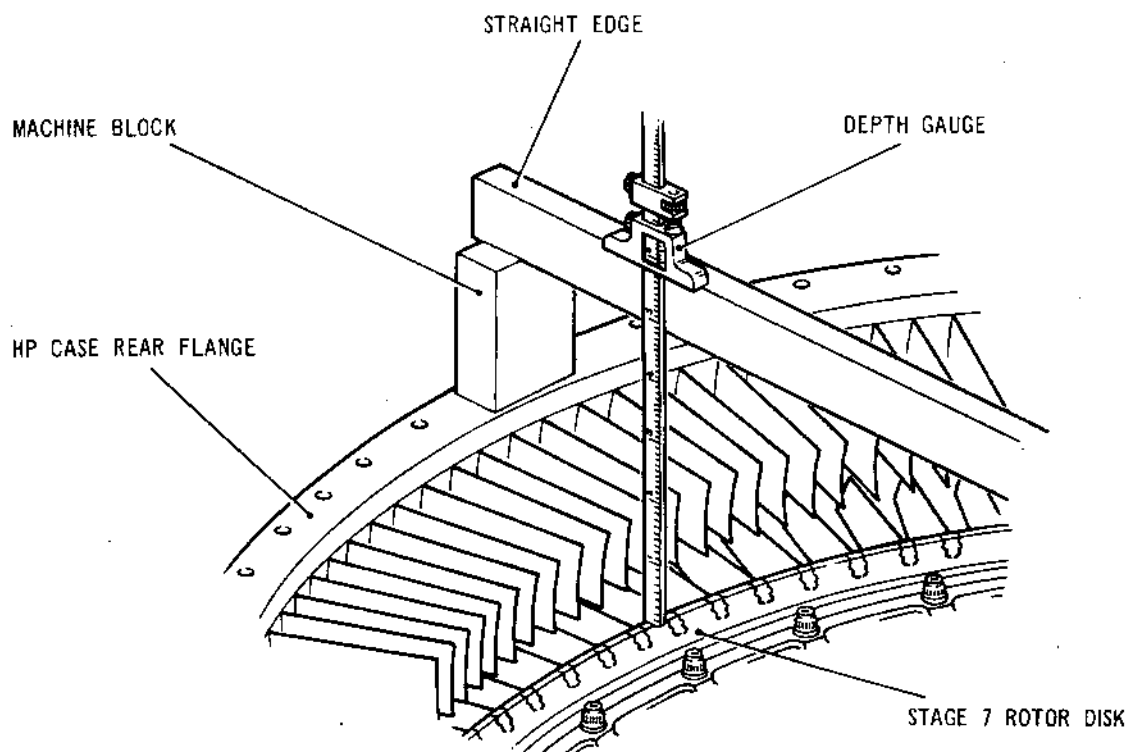
OVERHAUL



PRINTED IN ENGLAND



SECTION THROUGH HP COMPRESSOR



Dimensional Check onto Stage 7 Rotor Disk  
Figure 515

TN9068

ASSEMBLY  
**72-00-00**  
Page 539  
Jan 19/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Screw each extraction claw fully into position in the recesses under the slave bearing inner track, then lock by tightening the small screw located near each knurled nut (Ref.detail B).
- (4) Connect the hand pump hose to the hydraulic cylinder, then apply sufficient pressure through the hand pump to gradually remove the slave bearing. When the slave bearing is released, release and withdraw the extraction claws from under the bearing.

CAUTION: EXERCISE CARE DURING REMOVAL OF SLAVE BEARING TRACK TO PREVENT DAMAGE TO DRIVE SHAFTS.

- (5) Disconnect the hand pump hose from the cylinder, then unscrew the end fitting from the HP drive shaft and remove the mechanical puller from the drive shafts. Withdraw the slave bearing from the drive shafts and place in a container.

B. Assemble Bearing Inner Track (Ref.Fig.516).

- (1) Release and remove the hydraulic cylinder from between the two parts of the mechanical puller (Tool 1019), then assemble the cylinder above the outer part (Ref.detail C).
- (2) Unscrew the extraction claws as far as possible to ensure that they will not be in contact with the bearing track.
- (3) Ensure thorough cleanliness of the shaft and bearing inner track (72-33-02/3-120), then with the identification markings on the track edge uppermost, carefully lower the bearing track into position on the HP drive shaft.
- (4) Carefully lower the mechanical puller over the LP drive shaft and screw the end fitting fully onto the HP drive shaft. Adjust the mechanical puller until the extraction claw mounting flange is correctly located on the bearing track (Ref.detail D).
- (5) Connect the hand pump to the hydraulic cylinder, then operate the pump until the bearing track is pressed fully into position on the HP drive shaft.

TN28392

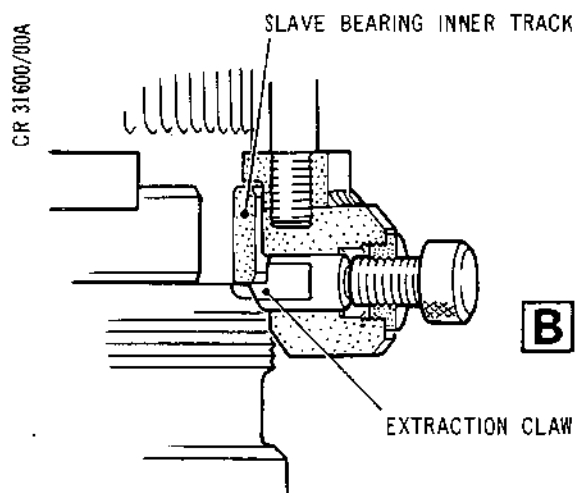


OLYMPUS 593

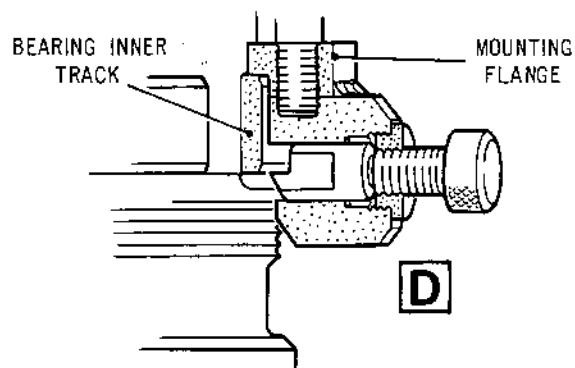
MK.610-14-28  
OVERHAUL



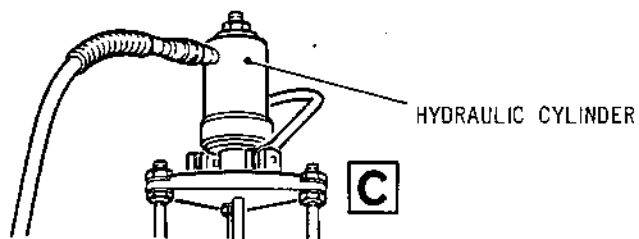
PRINTED IN ENGLAND



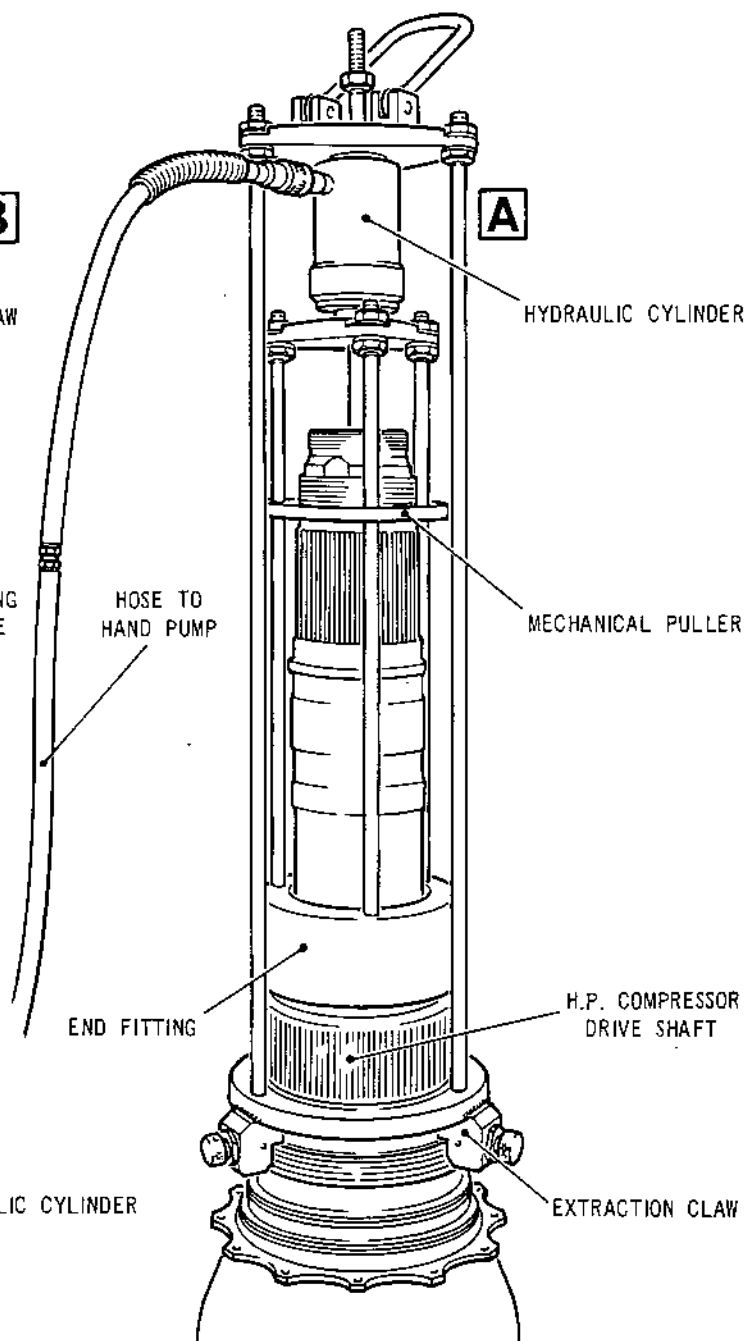
DETAIL OF AN EXTRACTION CLAW  
FULLY ENGAGED WITH SLAVE BEARING  
INNER TRACK



DETAIL OF AN EXTRACTION CLAW  
FULLY WITHDRAWN AND BEARING  
INNER TRACK PRESSED INTO POSITION



HYDRAULIC CYLINDER POSITIONED  
TO INSTALL BEARING INNER TRACK



HYDRAULIC CYLINDER POSITIONED  
TO REMOVE SLAVE BEARING INNER TRACK

Assembling HP Turbine Bearing Inner Track  
Figure 516





OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

(6) Disconnect the hand pump from the cylinder, then unscrew and remove the mechanical puller from the drive shaft.

(7) Ensure that the bearing track is correctly installed.

12. Assemble Turbine Static Sub-assembly to HP Exit Guide Vane Case

A. Prepare for Assembly (Ref.Fig.517).

(1) Check the HP compressor exit guide vanes tip clearance.

(a) Obtain dimension X from the Turbine Static Sub-assembly record (Ref.72-00-51 para.9.B.). Record as dimension A.

(b) Obtain the exit guide vanes diameter from the HP Compressor Case and Vanes Sub-assembly record (Ref.72-33-01 para.2.). Record as dimension B.

(c) Calculation to obtain exit guide vanes tip clearance detailed in Fits and Clearances Schedule (72-34-00) F.C.S.135 =  $B - A$  divided by 2. Record the calculated clearance.

(2) Place the HP drive shaft guide sleeve (Tool 1202) onto the rear end of the HP compressor drive shaft with the chamfer of the sleeve uppermost.

(3) Attach a crane hoist to the lifting fixture attached to the rear of the CCOC, then carefully raise and position the sub-assembly over the HP compressor assembly.

(4) Insert four guide pins (Tool 1304) at equi-spaced positions into the front flange of the HP compressor diffuser case. Note the position of the locating pin at the top position on the HP compressor exit guide blade case flange.

B. Assemble Sub-assembly to Engine.

CAUTION: EXERCISE GREAT CARE TO AVOID DAMAGE TO BEARING AND LABYRINTHS.

(1) Carefully lower the sub-assembly over the LP and HP drive shafts and into position on the HP compressor case aligning the top positions. Withdraw the guide pins.

ASSEMBLY

72-00-00

Page 542  
Sep 30/94

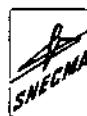
CR 31602/00A



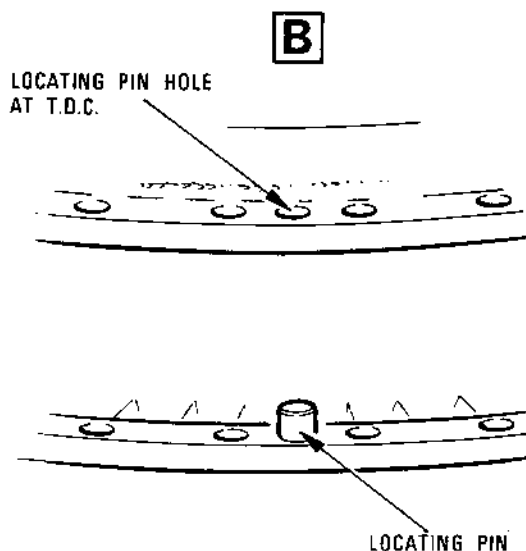
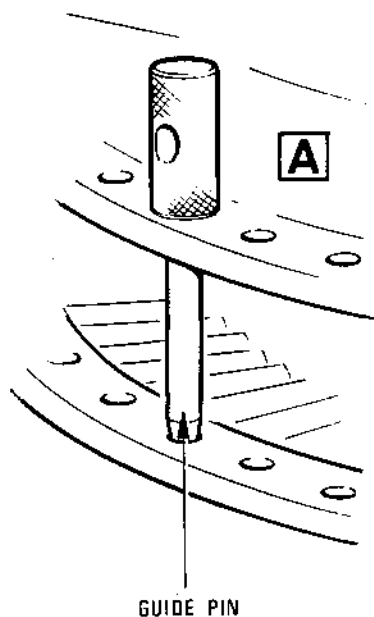
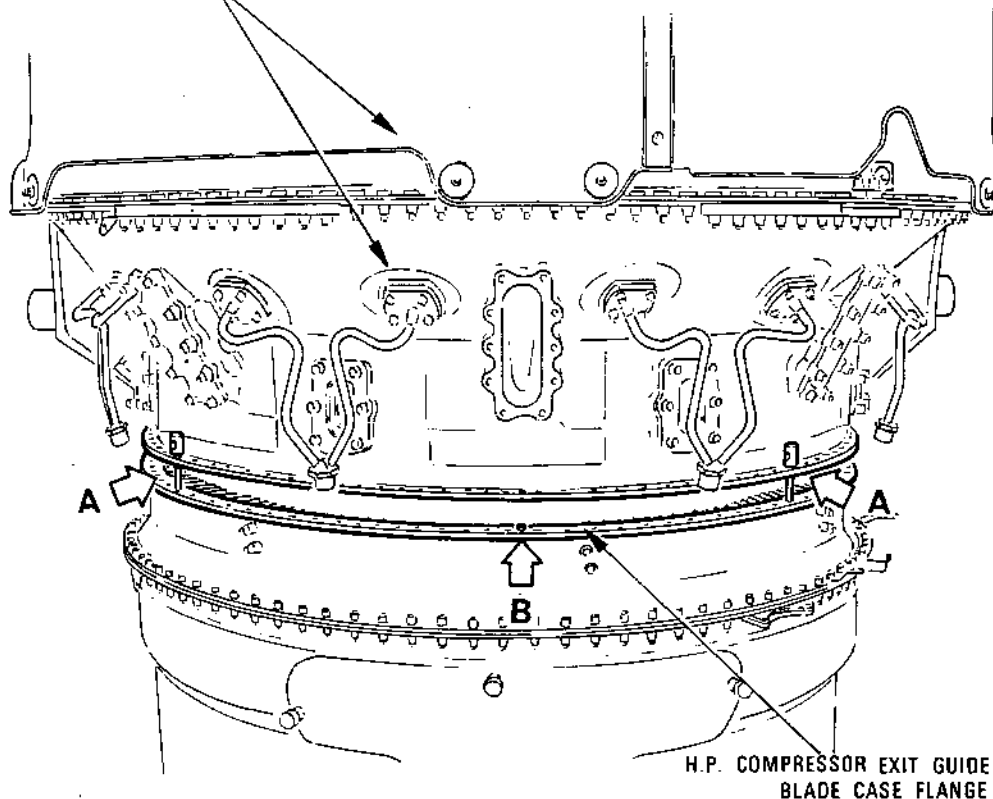
OLYMPUS 593

MK.610-14-28

OVERHAUL



SECTION OF TURBINE  
STATIC SUB-ASSEMBLY



Assembling Turbine Static Sub-Assembly  
Figure 517



# OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Apply lubricant 'A' to the securing bolts. Ensure that the nuts have a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m).
- (3) Assemble the brackets to the HP exit guide blade case/diffuser case flanges (Ref.Fig.518 and Table 501).
  - (a) Assemble the pin (72-33-01/8-40) to the mounting plate (72-33-01/8-30) prior to assembling the plate to the flange (Ref.detail H).

BRACKET		SECURING ITEMS		TORQUE LOADING	
FIG.518	I.P.C.REF.	BOLT I.P.C.	NUT I.P.C.	OF NUTS	
REF.	72-33-01	REF.72-33-01	REF.72-33-01	lbf in.	N.m
A	8-170	8-180	8-160	)	
B	8-200	8-210	8-190	)	
C	7-110	8-230	8-220	)	
E	8-250	8-260	8-240	)	
F	8-280	8-290	8-270	)	
F	8-275	8-300	8-270	)	
G	8-320	8-330	8-310	)	100 11,5
H	8-30	8-20	8-10	)	
J	8-70	8-60	8-50	)	
K	8-350	8-360	8-340	)	
L	8-100	8-90	8-80	)	
M	8-380	8-390	8-370	)	
N	8-410	8-420	8-400	)	

Bracket Positions HP Compressor Diffuser Case/Exit  
Guide Blade Case Flange  
Table 501

- (b) On completion of the installation of the brackets, secure the flange at the remaining positions with bolts, washers and nuts (72-33-01/8-150-140-130).
- (c) Torque-tighten the bolts to 100 lbf in. (11,5 N.m).



# OLYMPUS 593

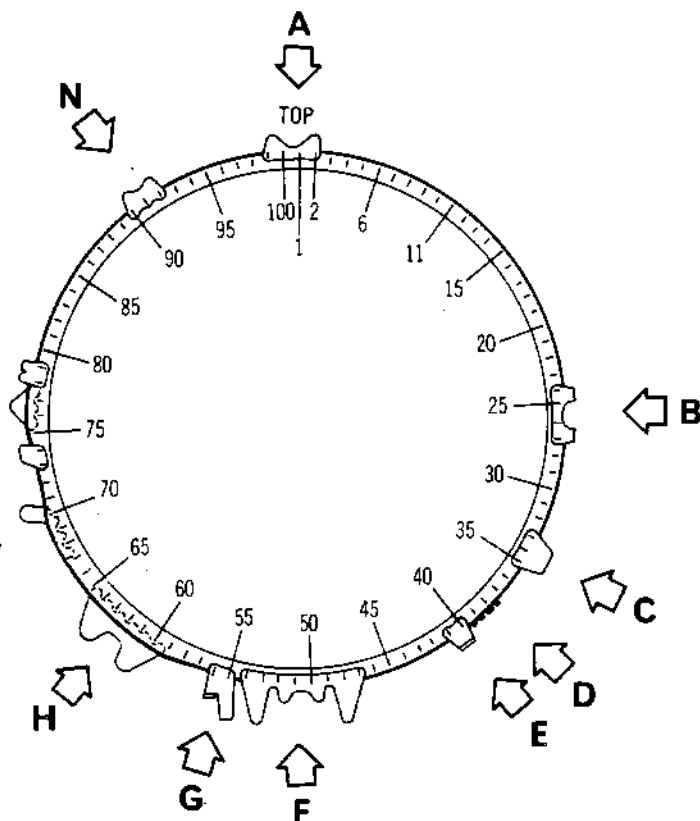
MK.610-14-28  
OVERHAUL



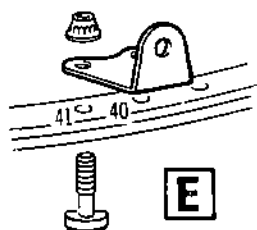
PRINTED IN ENGLAND

CR 31603/00B

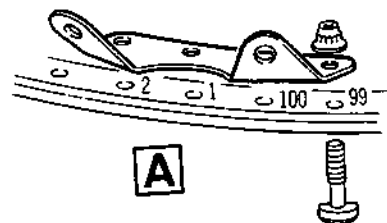
M  
L  
K  
J



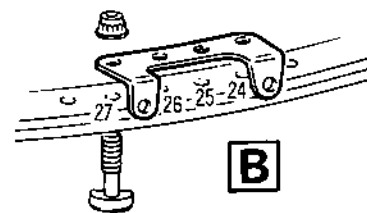
VIEW ON REAR OF TURBINE  
STATIC SUB-ASSEMBLY FRONT FLANGE



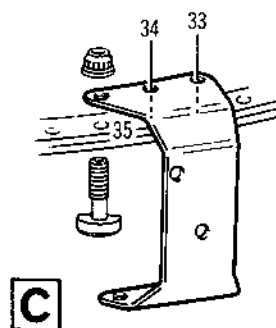
E



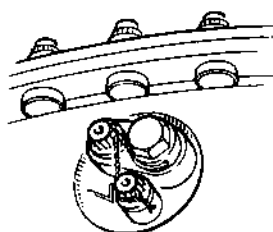
A



B

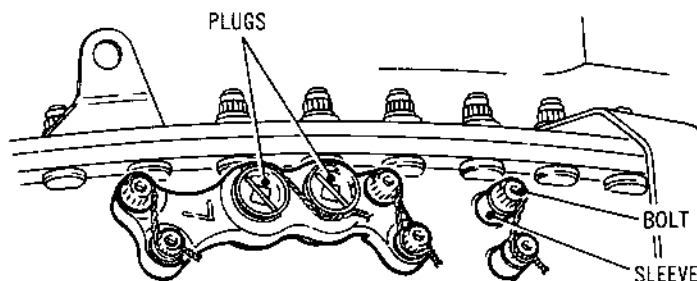


C



SINGLE INSPECTION PORT  
RETAINING PLATE  
(MOD 8039)

D



DOUBLE INSPECTION PORT  
MOUNTING BLOCK

Bracket Positions  
HP Compressor Diffuser/HP Compressor Exit Guide Vane Case Flanges  
Figure 518 (Sheet 1 of 2)

ASSEMBLY  
**72-00-00**  
Page 545  
Jun 1/88

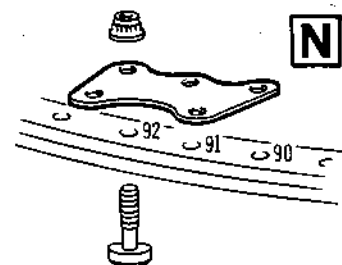
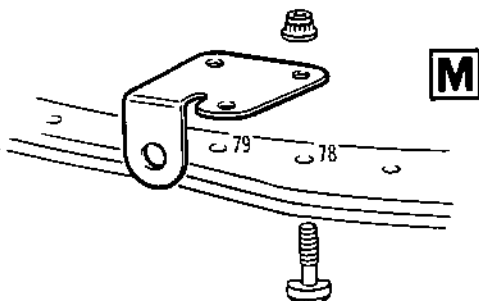
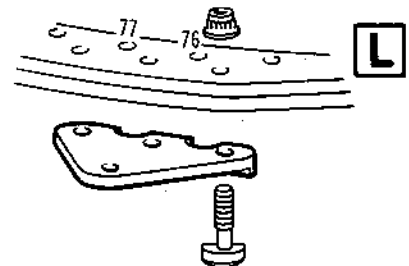
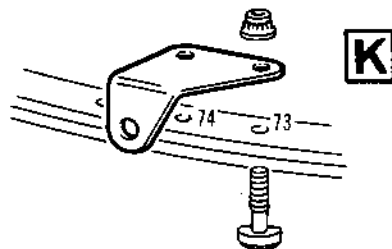
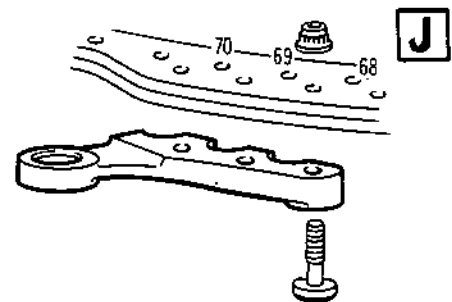
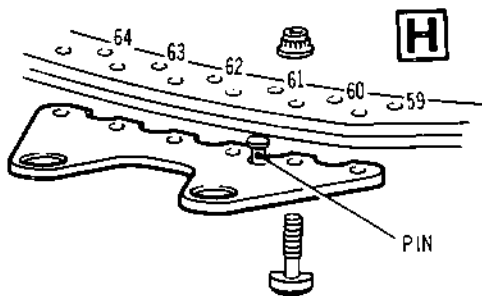
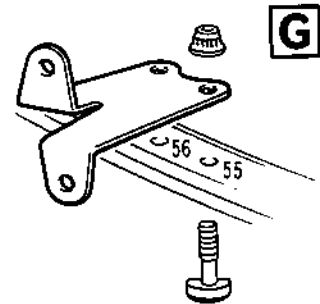
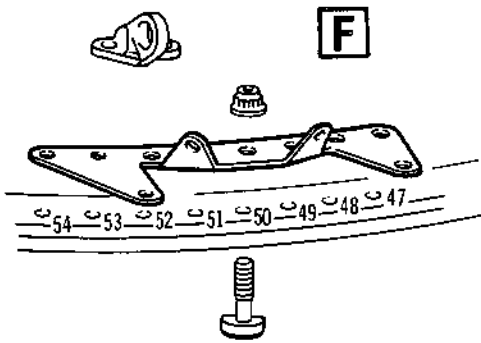


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31604/00A



Bracket Positions  
HP Compressor Diffuser/HP Compressor Exit Guide Vane Case Flanges  
Figure 518 (Sheet 2 of 2)

ASSEMBLY  
**72-00-00**  
Page 546  
Jan 19/76



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (4) On completion of the flange securing procedure, apply lubricant 'C' to the four bolts (72-33-01/3-60), then assemble the bolts and sleeves (72-33-01/3-70) to the HP compressor exit guide vane case (Ref. detail D). Torque-tighten the bolts to 100 lbf in. (11,5 N.m) then wire-lock the bolts.
- (5) Assemble the single inspection port retaining plate to the HP compressor rear case (Ref. detail D) (single inspection port; Mod.8039 cases only).
- (a) Apply lubricant 'C' to the securing bolts (72-33-01/3-60, 74) and lubricant 'A' to the blanking plug (72-33-01/3-73).
- (b) Position the retaining plate (72-33-01/3-75) and secure it with one bolt. Assemble a bolt and a sleeve (72-33-01/3-70) to the retaining plate location. Torque-tighten the bolts to 100 lbf in. (11,5 N.m).
- (c) Screw the blanking plug into the retaining plate, and torque-tighten to 65 lbf in. (7,3 N.m).
- (d) Wire-lock the bolts and the plug together.
- (6) Assemble the double inspection port mounting block to the HP compressor rear case (Ref. detail D) (double inspection port; post Mod.8039 cases only).
- (a) Apply lubricant 'C' to the securing bolts (72-33-01/3-90) and lubricant 'A' to the blanking plugs (72-33-01/3-80).
- (b) Position the mounting block (72-33-01/3-100), and secure it with the bolts. Torque-tighten the bolts to 100 lbf in. (11,5 N.m) and wire-lock.
- (c) Ensure the thorough cleanliness of the spherical sealing surfaces of the blanking plugs, and screw them into the mounting block.
- (d) Torque-tighten each plug in turn in gradual stages until both reach a torque of 70 lbf in. (7,9 Nm). Wire-lock the plugs together.
- (7) Release and remove the lifting equipment from the rear of the CCOC, then withdraw the guide sleeve from the end of the HP drive shaft.

ASSEMBLY

72-00-00

Page 547

Dec 31/01



OLYMPUS 593

MK.610-14-28

OVERHAUL



### 13. Calculate HP and LP Turbine Adjusting Washers Thickness

- A. Determine HP Turbine Adjusting Washer Thickness SB.72-94 (Ref.Fig.519).

NOTE: This procedure conforms to module interchangeability requirement.

- (1) Measure the distance from the rear flange face of the CCOC to the rear face of the previously installed bearing inner track. Record as dimension W.
- (2) Obtain dimension B from the HP Turbine Sub-assembly records (Ref.72-51-03 para.7.B.). Record as dimension X for this calculation.
- (3) Obtain the Set Gap dimension from the Fits and Clearance Schedule 72-00-00 F.C.S.237.
- (4) Using the following formula, calculate the required adjusting washer thickness. Thickness of the washer required =  $W - \text{Set Gap dimension} + X$ . Obtain a washer from the range (72-51-04/1-35 to 115) (72-09-21 Repair, Fig.421).
- (5) Lightly mark the edge of the washer with the base module number. The washer must be retained permanently with the base module.

- B. Determine LP Turbine Adjusting Washer Thickness SB.72-94 (Ref.Fig.519).

NOTE: This procedure conforms to module interchangeability requirement.

- (1) Assemble the split sleeves (Tool 1058) between the HP rotor shaft rear and the LP rotor shaft. Do not tighten the securing screws at this stage.
- (2) In order to ensure that the LP rotor shaft is fully forward check that the jacking fixture on the building base at the front end of the engine is fully retracted. To achieve this, the handwheel on the side of the building base must be turned in a counter-clockwise direction.
- (3) Tighten the split sleeves securing screws.

ASSEMBLY

72-00-00

Page 548

Jun 1/88



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (4) Measure and record the distance from the rear flange face of the CC0C to the LP turbine adjustment washer abutment face on the rotor shaft. Record as dimension Y.
- (5) Obtain the LP drive shaft/rotor rear end-float dimension from the LP compressor drive shaft sub-assembly records (Ref.72-31-04 para.5.B.(4)). Record as dimension Z for this calculation.
- (6) Obtain the Set Gap dimension from the Fits and Clearance Schedule 72-00-00 F.C.S.239.
- (7) Using the following formula, calculate the required adjusting washer thickness. Thickness of washer required = Set Gap dimension - (Y + Z). Obtain a washer from the range (72-31-04/2-25 to 90) (72-09-21 Repair, Fig.402).
- (8) Lightly mark the edge of the washer with the base module number. The washer must be retained permanently with the base module.

PRINTED IN ENGLAND

ASSEMBLY

**72-00-00**

Page 548A

Jun 1/88





OLYMPUS 593

MK.610-14-28  
OVERHAUL



This page left blank intentionally



OLYMPUS 593

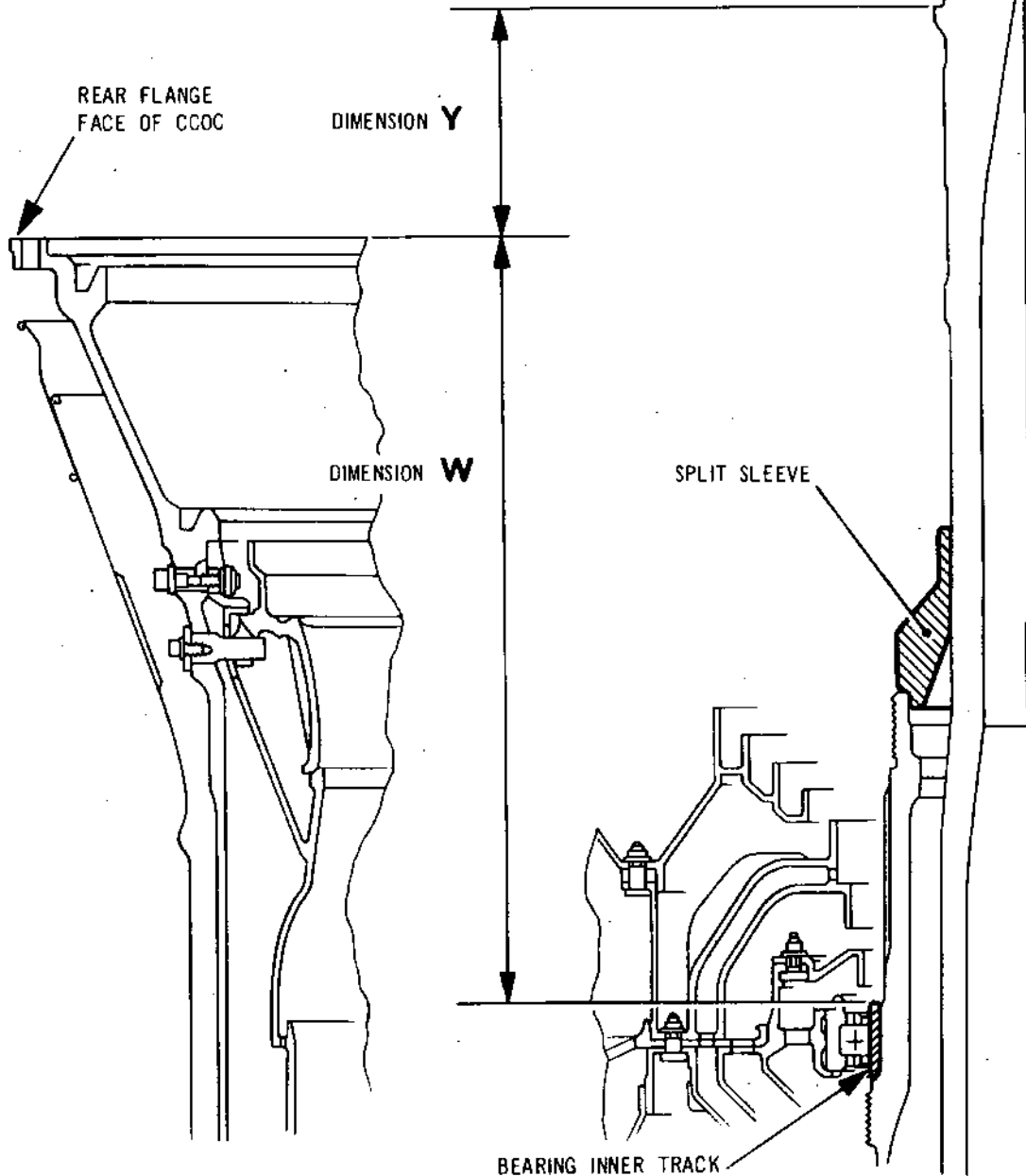
MK. 610-14-28  
OVERHAUL



PRINTED IN ENGLAND

TN29010

CR 33737/00A



HP and LP Turbine Rotor Adjusting Washer Checks  
Figure 519



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. Determine HP Turbine Adjusting Washer Thickness  
Pre-SB.72-94 (Ref.Fig.519).

NOTE: This procedure does not conform to module  
interchangeability requirement.

- (1) Measure the distance from the rear flange face of the CCOC, to the rear face of the previously installed bearing inner track. Record as dimension W.
- (2) Obtain dimension A from the Turbine Static Sub-assembly records (Ref.72-00-51 para.34.B). Record as dimension X for this calculation and the adjusting washer proving check.
- (3) Obtain dimension A from the HP Turbine Sub-assembly records (Ref.72-51-03 para.7.A). Record as dimension Y for this calculation.
- (4) Using the following formula, calculate the required adjusting washer thickness. Thickness of washer required =  $(W) - (X + Y - 1.990 \text{ in.})$ .
- (5) Obtain a washer from the range (72-51-04/1-40 to 110) (72-09-21 Repair, Fig.421) and record the thickness of the washer to be installed.

#### 14. Assemble HP Turbine Hub to Drive Shaft

- A. Prepare Turbine Hub for Assembly (Ref.Fig.520).

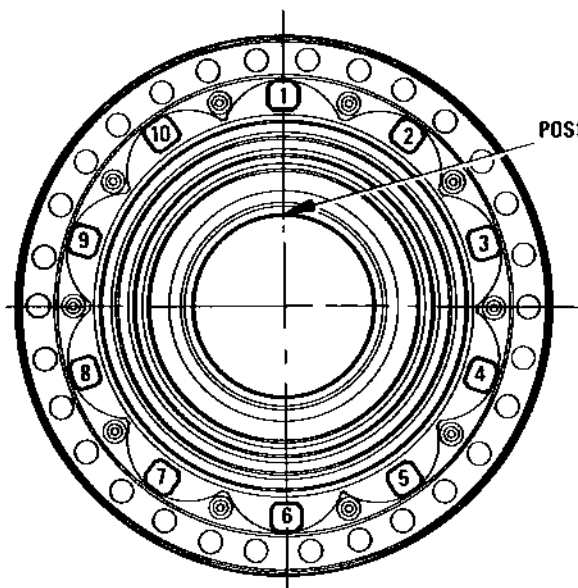
- (1) Lower the adjusting washer of the correct thickness over the LP drive shaft and into position on the HP drive shaft.
- (2) Remove the split sleeves located between the HP and LP drive shafts.
- (3) Assemble the bolts (72-51-04/1-180) numbered 1 to 10 to the turbine hub.
  - (a) Insert No.1 bolt rearward through the hub in line with the master spline in the hub bore. Secure the bolt by assembling a retaining ring (72-51-04/1-170) to the recess in the bolt using the sleeve (Tool 1224).
  - (b) Assemble the remaining bolts and retaining rings in numerical order in a clockwise direction when viewing the hub from the rear.

TN33139



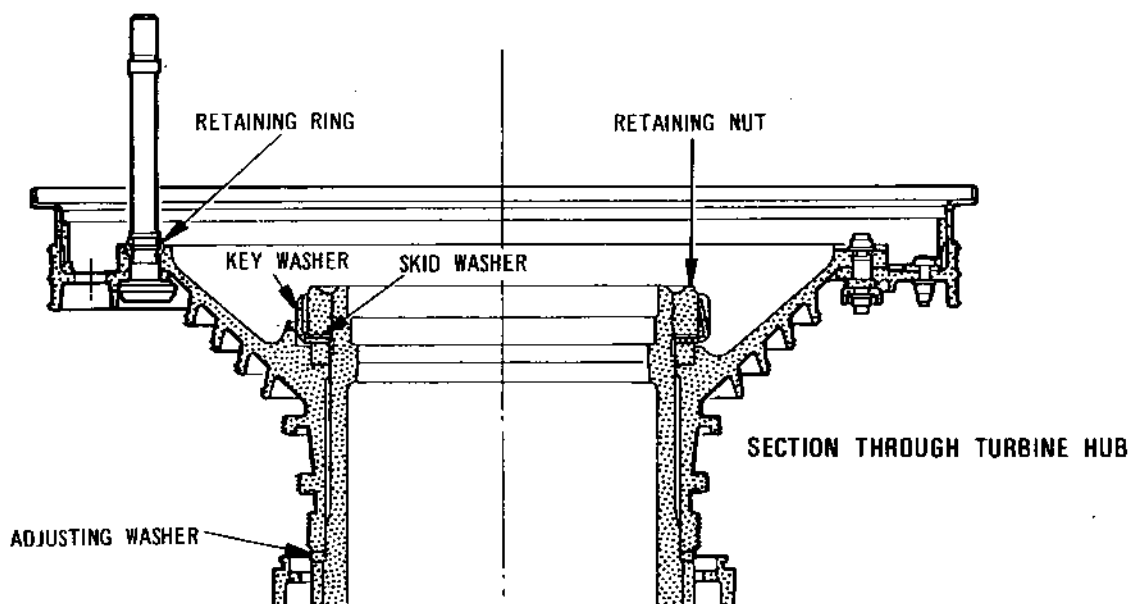
OLYMPUS 593

MK.610-14-28  
OVERHAUL



POSITION OF MASTER SPLINE

VIEW ON REAR OF H.P. TURBINE HUB  
TO SHOW BOLT POSITIONS



Assembling HP Turbine Hub  
Figure 520



**OLYMPUS 593**

MK.610-14-28  
OVERHAUL



**B. Assemble Turbine Hub.**

- (1) Remove the protector from the hub and ensure thorough cleanliness of components. Align the master splines of the shaft and hub and slide the hub fully into position on the shaft.
- (2) Lower the keywasher (72-51-04/1-30) over the shaft and engage the lugs with the locations in the turbine hub, then place the washer (72-51-04/1-20) in the keywasher.
- (3) Apply lubricant 'A' to the shaft thread and retaining nut (plain round nut) (72-51-04/1-10), then screw the nut onto the shaft ensuring that the nut abutment face abuts the skid washer and that the keywasher is correctly engaged with the hub.

**C. Tighten HP Turbine Nut (Ref.Fig.521).**

- (1) Prepare the equipment.
  - (a) Attach the lifting ring (Tool 334) to the spanner (Tool 1085) and secure it with bolts.
  - (b) Assemble the hand torque multiplier (Tool 1022) to the immobilizer (Tool 1343) and secure the assembly with bolts, then assemble the adapter (Tool 1315) to the immobilizer and secure it with bolts.
- (2) Assemble equipment and tighten the hub nut.
  - (a) Using a hoist, carefully lower the spanner (Tool 1085) over the shaft and engage it with the hub nut. Remove the hoist and lifting ring from the spanner.
  - (b) Attach a crane hoist to the immobilizer ring, then carefully lower the immobilizer/multiplier over the spanner and guide the turbine securing bolts through the pillar tubes. Turn the square drive of the multiplier (if necessary) until engagement is achieved with the spanner.

**WARNING:** MAINTAIN SUPPORT OF TOOL ASSEMBLY WITH CRANE TO PREVENT ASSEMBLY FROM DROPPING ON TURBINE HUB.



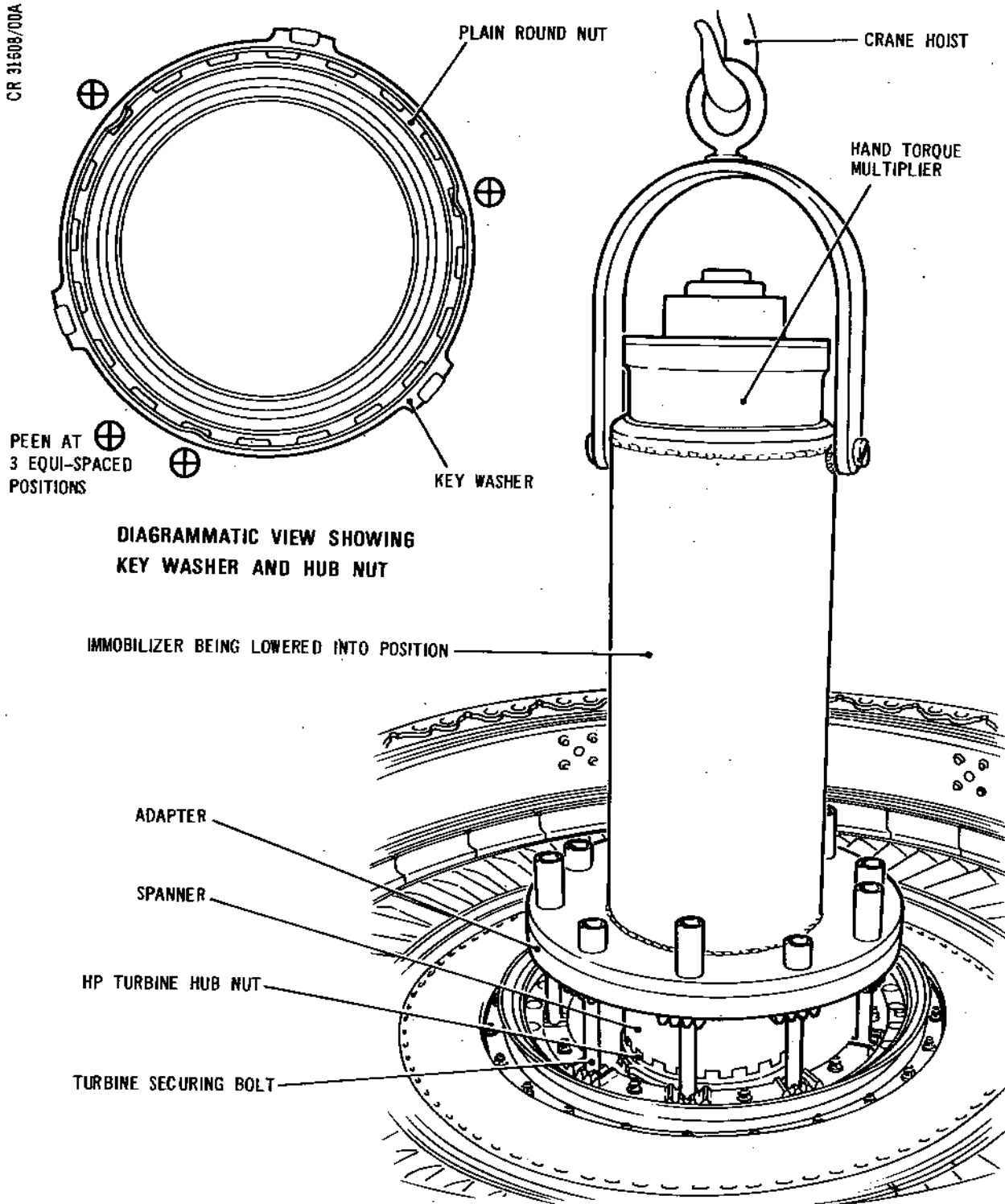
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31508/00A

PRINTED IN ENGLAND



Tightening HP Turbine Hub Nut  
Figure 521



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) When the immobilizer is engaged in the spanner continue lowering the immobilizer assembly onto the turbine hub and ensure that the Hirth serrations engage correctly.
- (d) Secure the tool assembly to the hub bolts with slave nuts and washers evenly tightened, then remove the crane hoist.
- (e) Use a suitable torque wrench and torque-tighten the hub nut between 3400 and 3700 lbf ft (4610,2 and 5016,9 N.m).

NOTE: The torque multiplier has a ratio of 10 to 1, therefore the input torque must be between 340 and 370 lbf ft (461 and 501,7 N.m).

- (3) Remove the equipment and lock the keywasher.
  - (a) Remove the torque wrench, then attach a hoist to the immobilizer ring. Remove the slave nuts and washers from the turbine hub bolts, then carefully remove the tool assembly and lower onto a container. Disconnect the hoist from the immobilizer.
  - (b) Assemble the lifting ring to the hub spanner, then attach a hoist to the ring and carefully remove the spanner from the drive shaft. Disconnect the hoist from the spanner.
  - (c) Using the peening tool (Tool 274), lock the hub nut keywasher at three equally spaced positions.

## 15. Assemble HP Turbine Rotor and Labyrinths

### A. Assemble Turbine Rotor to Hub (Ref.Fig.522).

- (1) Ensure that the Hirth serrations on the disk face downward.
- (2) With the knurled nuts of the lifting fixture (Tool 1120) in the 'UNLOCK' position, carefully lower the lifting fixture into the centre bore of the disk and engage the support feet under the disk by turning the knurled nuts to the 'LOCK' position.

ASSEMBLY

72-00-00

Page 554

Dec 1/86



OLYMPUS 593

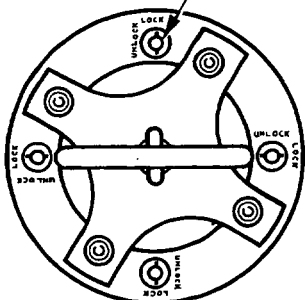
MK. 610-14-28

OVERHAUL



CR 31609 / 00 A

SUPPORT FOOT KNURLED NUT  
IN LOCKED POSITION

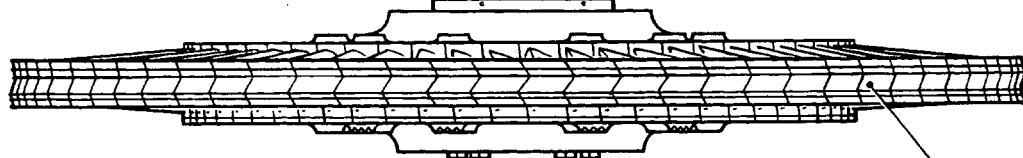


A

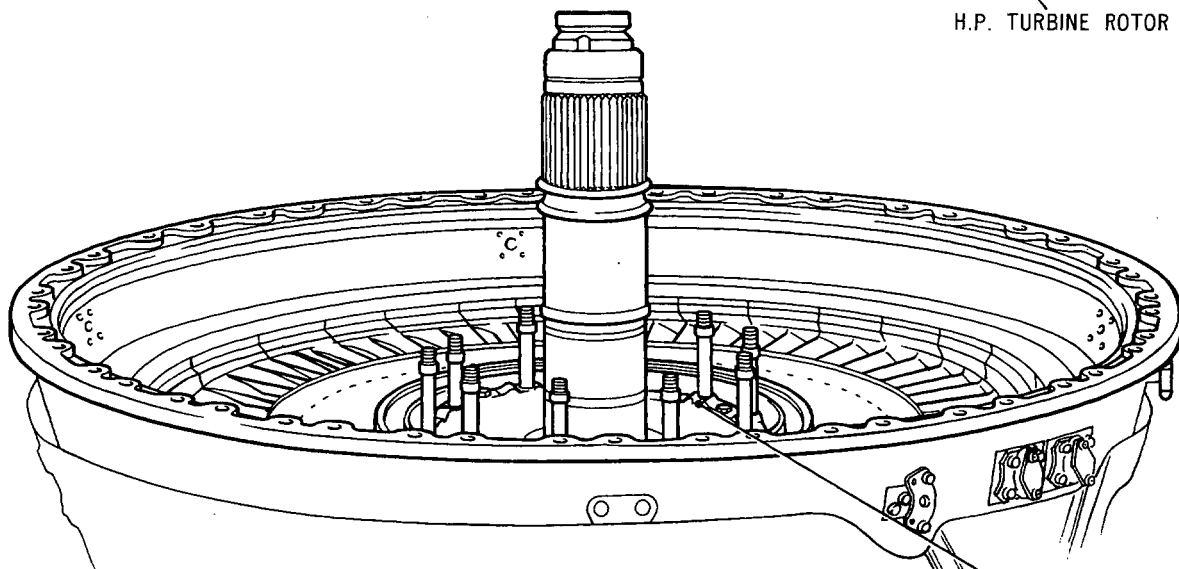


LIFTING FIXTURE

SUPPORT FEET KNURLED NUTS



H.P. TURBINE ROTOR



H.P. TURBINE ROTOR HUB  
SERRATIONS AT EACH LOCATION

Assembling HP Turbine Rotor  
Figure 522

ASSEMBLY  
72-00-00

Page 555

Jul 1/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (3) Attach a crane hoist to the lifting fixture and carefully raise the rotor. Ensure that all components are clean especially the Hirth serrations on the turbine rotor and hub.
  - (4) Carefully lower the turbine rotor over the LP drive shaft. Ensure that the balance datum marks 0 on the turbine disk and hub align, then lower the disk onto the hoist exercising care to prevent damage to the securing bolt threads. Ensure that the Hirth serrations are correctly and fully engaged.
  - (5) Turn the knurled nuts of the lifting fixture to the 'UNLOCK' position, then remove the lifting fixture from the turbine disk and hoist.
- B. Assemble No.24 and 26 Labyrinth to HP Turbine Disk (Ref.Fig.523).
- (1) With balance datum marks 0 aligned, assemble the labyrinth to the turbine disk, exercising care when lowering the labyrinth over the turbine disk securing bolts.
  - (2) Assemble the immobilizer (Tool 1354) to the CC0C flange positioning the immobilizer to allow the restraining pin to engage with a hole between the bolts protruding through the labyrinth. Secure the tool to the CC0C flange with nuts, bolts and washers.
  - (3) Identify the securing bolt positions 1 to 10 for torque sequence purposes. Apply lubricant 'C' to the nuts, bolts and thrust faces of the nuts, then loosely assemble the nuts (72-51-04/1-120) to the bolts.
  - (4) Using a torque wrench, torque-tighten the nuts to the nut run-down torque plus 30 lbf.in. (3,4 Nm) in the following sequence 1, 6, 3, 8, 2, 7, 4, 9, 5 and 10.
  - (5) On completion of the tightening procedure, carry out a torque locking check.
    - (a) Slacken No.1 nut sufficiently to facilitate the torque locking check.

ASSEMBLY

72-00-00

Page 556  
Dec 31/01



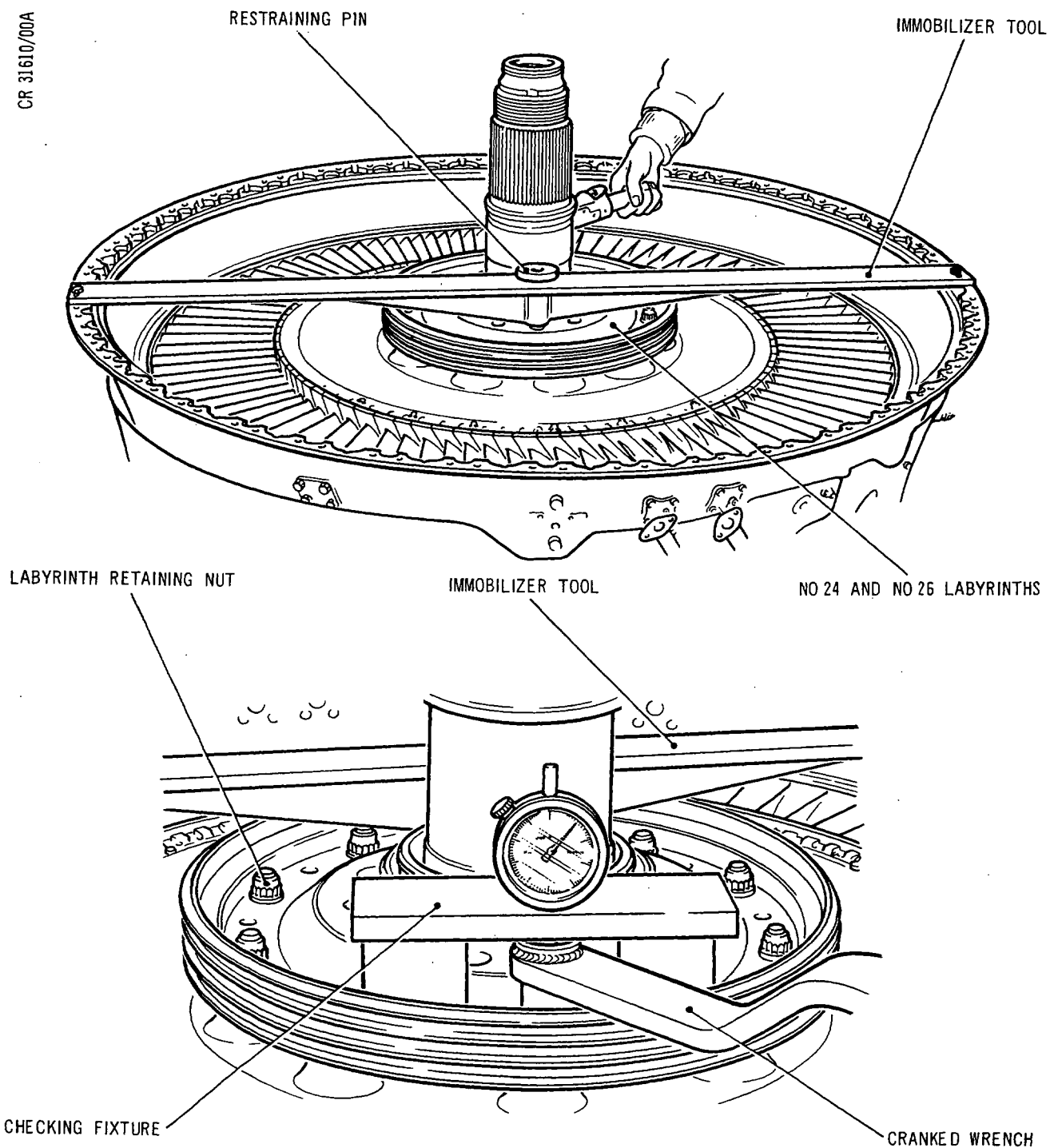
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31610/00A

PRINTED IN ENGLAND



TN31685

Assembling Labyrinth and Tightening HP Turbine Bolts  
Figure 523



# OLYMPUS 593



MK.610-14-28

SNECMA

OVERHAUL

- (b) Tighten the nut and note that the torque resistance is between 24 and 105 lbf in. (2,7 and 11,9 N.m), then torque-tighten to 60 lbf in. (6,8 N.m) in excess of the noted torque to ensure full engagement of the bolt.
  - (c) Repeat the procedure i.e. slacken, then torque check each of the remaining nuts in turn. If any nut is below the minimum torque value, it must be replaced and a torque check carried out to ensure it is within the torque limits.
- (6) On completion of the torque check procedure, tighten and stretch each bolt in the sequence of 1, 6, 3, 8, 2, 7, 4, 9, 5 and 10 in the following manner.
- (a) Place the cranked wrench spanner (Tool 1630) on No.1 nut.
  - (b) Place the checking fixture (Tool 82) in position with the dial indicator stylus located on the end of the bolt. Set the dial indicator to 0.
  - (c) Ensure that the immobilizer is correctly engaged in the disk. Tighten the nut gradually until the dial indicator records a bolt stretch of 0.013 to 0.015 in. (0,33 to 0,36 mm).
  - (d) Repeat the stretching procedure for each bolt in the given sequence.
- (7) Remove the checking fixture and place it into the container. Remove the immobilizer.
- (8) Measure the amount of bolt thread protruding from each nut. To comply with S.B.72-8444-225, thread protrusion must be no less than 0.145 in. (3,683 mm). This is approximately equal to 2.5 threads.
- (a) If the thread protrusion of each bolt is satisfactory remove the immobilizer and proceed with the engine assembly (Ref.para.E.).
  - (b) If the thread protrusion of any bolt is less than the amount detailed remove and replace the deficient bolt(s).
  - (c) Clearly identify the bolt(s) to be replaced.

ASSEMBLY

## 72-00-00

Page 558

Dec 31/01

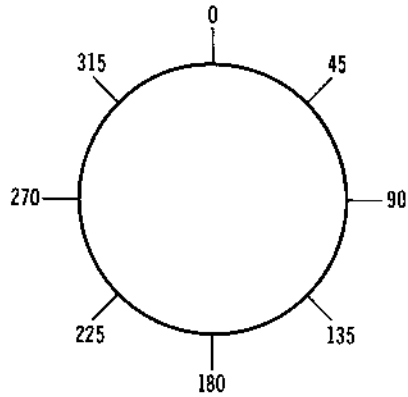


OLYMPUS 593

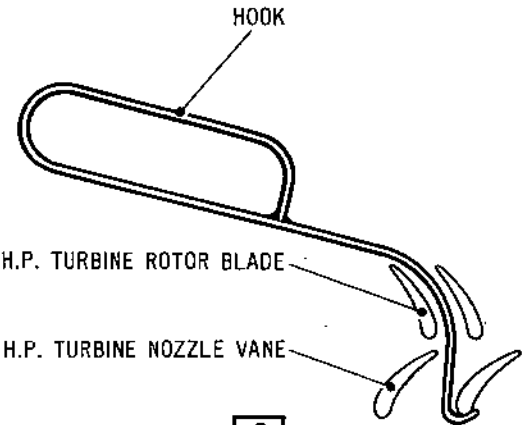
MK. 610-14-28  
OVERHAUL



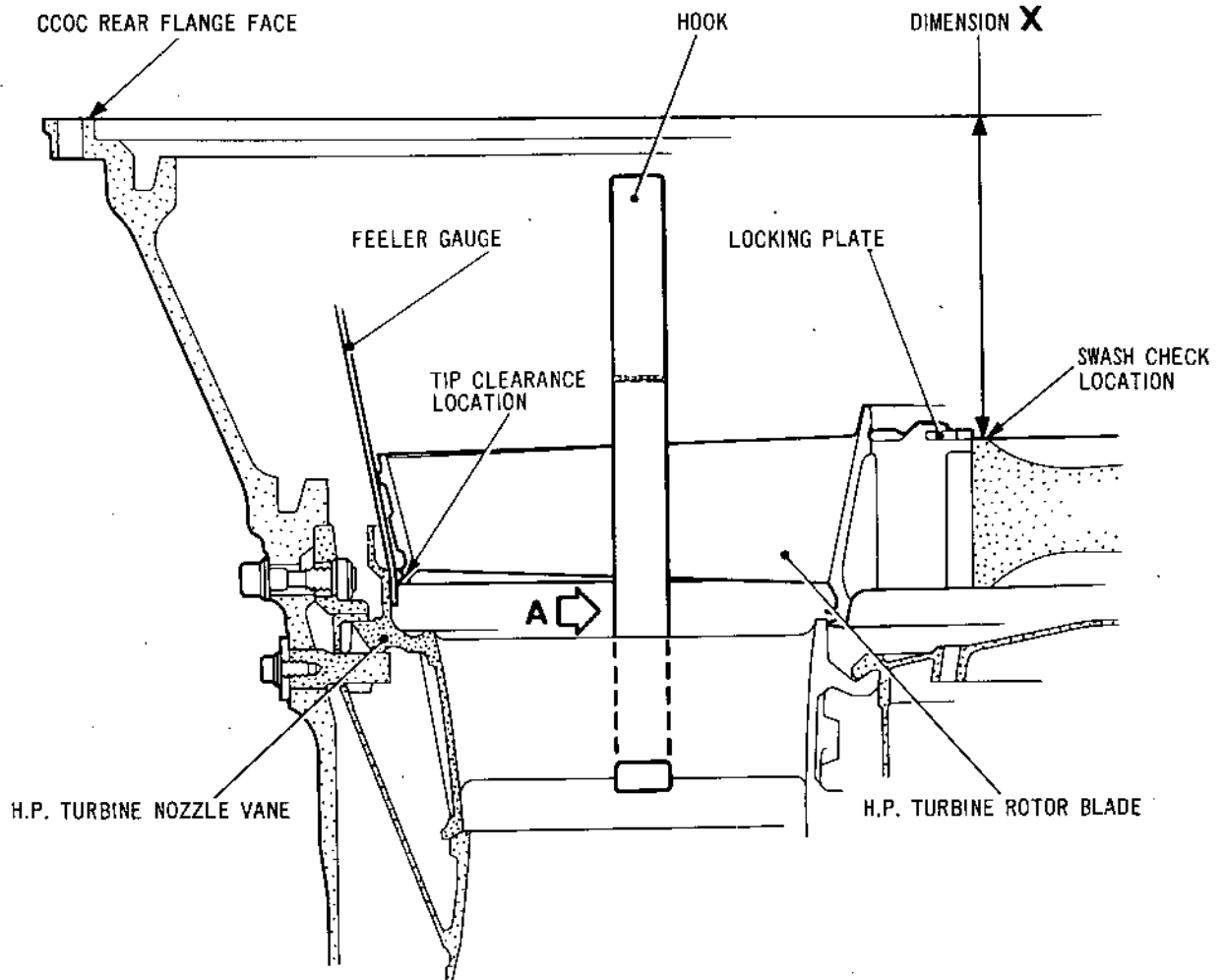
CR 32685/00C



SWASH CHECK POSITIONS ON ROTOR  
IN DEGREES



VIEW ON **A**



HP Turbine Rotor Blades Tip Clearance and Swash Check  
Figure 524



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Hold each segment in position and using a flexible checking gauge or laminated feeler gauge check the gap between the turbine blade edge and the nozzle vane segment. Each gap must be within the dimensions quoted in the Fits and Clearance Schedule (72-00-00) FCS.241.

D. Adjusting Washer Proving Check (Ref.Fig.524).

NOTE: This check does not conform to module interchangeability requirement.

- (1) Obtain dimension (X) from the adjusting washer thickness check (Ref.para.13.C). Record as dimension X for this calculation.
- (2) Measure the distance from the rear flange face of the CCOC to the HP turbine disk at position X. Record as dimension Y for this calculation.
- (3) Prove the adjusting washer thickness and HP turbine set dimension using the following formula.

$$\text{HP turbine set dimension} = X - Y$$

- (4) Acceptance limit for the set dimension must be within the dimensions quoted in the Fits and Clearance Schedule (72-00-00) FCS.237.
- (5) Assemble protector (Tool 1061) to No.24 and 26 labyrinth.

E. HP Turbine Rotor Swash Check (Ref.Fig.524).

NOTE: This check conforms to module interchangeability requirement.

- (1) Check the turbine rotor for swash at dimension X and at 45 deg intervals. Record the total dial indicator reading at each position and note the highest point of variation.
- (2) Obtain the highest point of swash variation from the HP Compressor Sub-assembly records (Ref. 72-33-00 para.6.C).

TN10486



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Compare the highest point of sub-assembly swash variation with the highest point of engine assembly swash variation. The difference must not exceed 0.001 in. (0,0254 mm).

- (4) Investigate and rectify excessive swash variation.

16. Assemble and Secure the LP Turbine Nozzle Assembly to CCOC  
(Ref.Fig.525)

A. Assemble the Nozzle Assembly.

- (1) Ensure that the nozzle assembly multiple leg sling (Tool 1192) is correctly assembled to the nozzle vanes, then attach a hoist to the sling.
- (2) Remove the protector from No.24 and 26 labyrinth and assemble steady (Tool 1013) to the LP drive shaft. Raise and position the nozzle assembly over the LP drive shaft, then align the inspection probe hole in vane No.13 and the thermocouple holes in vanes No.11 and 14 with the ports in the CCOC.
- (3) Lower the nozzle assembly into the recess in the CCOC flange and ensure that it locates correctly.
- (4) Remove the multiple leg sling from the nozzle vane assembly.
  - (a) Unscrew the knurled nut on each retaining hook. Press the hooks downwards, then turn the hooks through 90 deg to disengage them from the vanes.
  - (b) Withdraw each hook as far as possible, then carefully raise the sling from the nozzle vane assembly. Lower the sling onto a suitable container, then disconnect the hoist.
- (5) Attach the multiple leg sling (Tool 1645) to the clamping ring (Tool 1262), then attach a hoist to the sling. Position and lower the clamping ring onto the CCOC rear flange, ensuring that the pin locates correctly. Secure the ring with nuts, bolts and washers.

PRINTED IN ENGLAND

TN34167

ASSEMBLY

72-00-00

Page 561

Jul 1/76



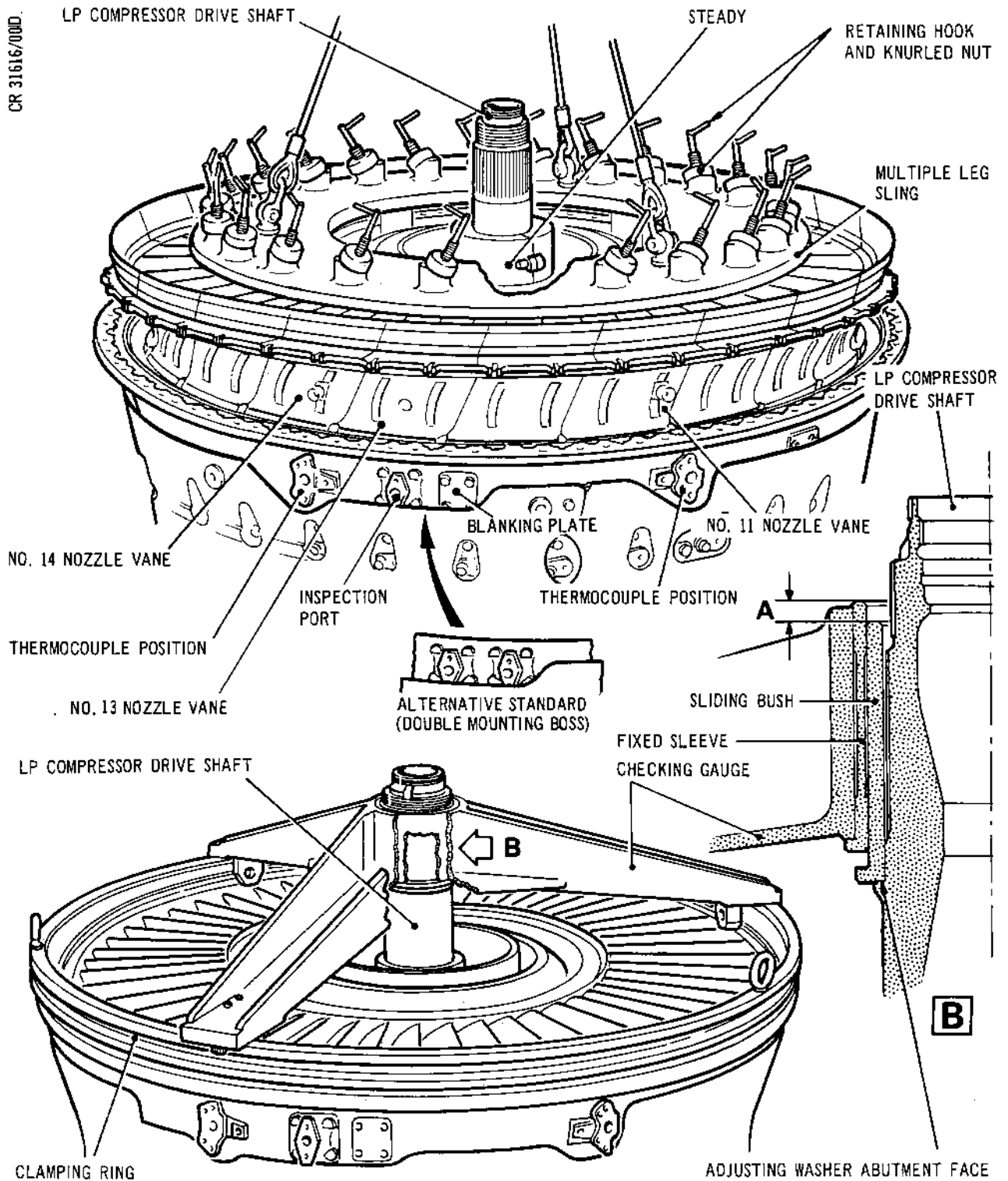
OLYMPUS 593

MK. 610-14-28

OVERHAUL



CR 31616/000



Assembling LP Turbine Nozzles  
Figure 525



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

- (6) Install inspection port flanged sealing bar(s) (72-42-01/2-220).

NOTE: There are two configurations of turbine inspection port access at rear of drains tank position (Ref.Fig.525).

- (a) Apply lubricant 'C' to the securing bolts (72-42-01/2-200).
- (b) Place a gasket (72-42-01/2-225) SB.72-58 over the stem of each flanged sealing bar (72-42-01/2-220).
- (c) Insert the sealing bars into the CCOC, place a cover plate (72-42-01/2-210) on each sealing bar and secure each assembly with two bolts torque-tightened to 100 lbf in. (11,5 N.m). Wire-lock each pair of bolts together.
- (7) Check to ensure that the thermocouple ports are not obstructed.

#### 17. Calculate LP Turbine Adjusting Washer Thickness

NOTE: This procedure is to Pre SB.72-94 standard and does not conform to module interchangeability requirement.

##### A. Adjusting Washer Checks (Ref.Fig.525).

- (1) Lower the checking gauge (Tool 76) into position over the LP drive shaft ensuring that the tool locates correctly on the clamping ring and nozzle vanes.
- (2) Depress the sliding bush in the centre of the tool and ensure that it locates on the adjusting washer abutment face on the LP drive shaft (Ref. detail B).
- (3) Calculate adjusting washer thickness.
- (a) Obtain dimensions D and C ( $D + C = X$ ) from the LP turbine rotor sub-assembly records (Ref. 72-52-02, para.13). Record as dimension X for this calculation.
- (b) Measure the distance from the rear face of the fixed sleeve to the rear face of the sliding bush (Dimension A Fig.525) (4.000 in. (101,600 mm) - Dimension A) = Y. Record dimension Y for this calculation.

ASSEMBLY

72-00-00

Page 563  
Dec 31/01





OLYMPUS 593

MK.610-14-28  
OVERHAUL



(c) Obtain the LP drive shaft/rotor rear end-float dimension from the LP compressor drive shaft sub-assembly records (Ref.72-31-04, para.5.B. (4)). Record as dimension Z for this calculation.

(d) Calculate the required adjustment washer thickness as follows:

Adjustment washer thickness = (X + 0.160 in.  
(4,064 mm)) - (Y + Z).

(3) Select an adjusting washer of the required thickness from the range (72-31-04/2-10 to 105) (72-09-21 Repair, Fig.402) Pre-SB.72-94 and record the thickness of the washer to be installed. Remove the checking gauge and clamping ring from the engine.

#### 18. Assemble LP Turbine Rotor to Engine

##### A. Assemble Turbine Rotor (Ref.Fig.527).

- (1) Place the adjusting washer of the correct calculated size on the LP drive shaft.
- (2) Ensure thorough cleanliness of splines. Apply lubricant 'A' to LP drive shaft splines.
- (3) Ensure that the lifting/extracting fixture (Tool 1142) handle is fully retracted, then carefully screw the cylindrical section of the tool fully onto the LP turbine hub.
- (4) Attach a crane hoist to the lifting fixture, then carefully lift and position the turbine assembly over the LP drive shaft. Align the master splines of the shaft and turbine assembly, then carefully lower the turbine assembly over the shaft.
- (5) Unscrew and remove the lifting/extracting fixture from the turbine assembly, then disconnect the hoist from the fixture.
- (6) Carefully lower the mechanical driver (Tool 1146) over the LP drive shaft, then turn the small handle on the driver and screw the inner part of the driver onto the thread on the end of the LP drive shaft until fully engaged. Screw down on the large handle until the outer part of the driver contacts the LP turbine hub, then tighten the handle until the turbine assembly is pressed fully onto the LP drive shaft and abuts the adjusting washer. Unscrew and remove the mechanical driver from the LP drive shaft.

ASSEMBLY

72-00-00

Page 564  
Jun 1/91

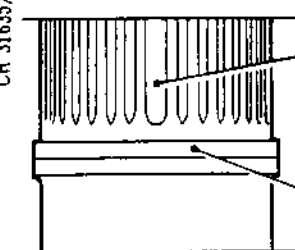


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31635/00A



A

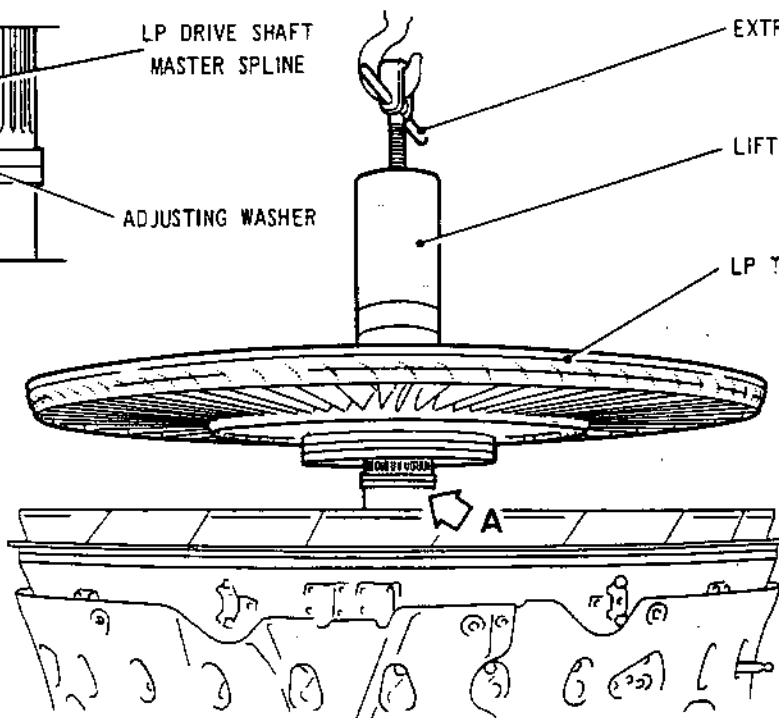
LP DRIVE SHAFT  
MASTER SPLINE

ADJUSTING WASHER

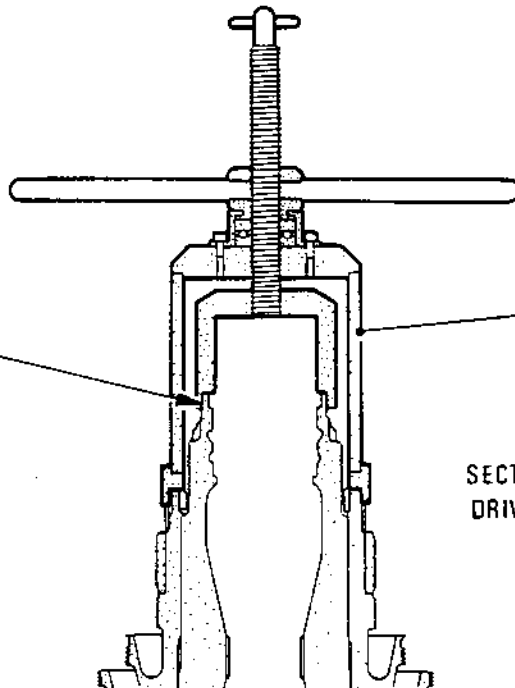
EXTRACTION HOUSING HANDLE

LIFTING/EXTRACTING FIXTURE

LP TURBINE ROTOR ASSEMBLY



ENGAGEMENT OF TOOL WITH  
DRIVE SHAFT THREAD



MECHANICAL DRIVER

SECTION THROUGH MECHANICAL  
DRIVER TO SHOW ENGAGEMENT  
WITH DRIVE SHAFT

Assembling LP Turbine Rotor  
Figure 526



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

## B. Assemble Retaining Nuts (Ref.Fig.527).

- (1) Assemble the bearing inner track retaining nut (72-52-02/1-130) to the drive shaft.
  - (a) Apply lubricant 'A' to the nut, then screw the nut onto the drive shaft as far as possible by hand.
  - (b) Align the splines and lower the immobilizer (Tool 862) into the rear end of the drive shaft until the immobilizer abuts the end of the shaft.
  - (c) Lower the spanner wrench (Tool 1616) over the immobilizer and engage it on the bearing retaining nut.
  - (d) Using a crane hoist, lower the torque multiplier (Tool 1647) and engage it with the splines in the immobilizer and spanner turning the multiplier drive (if necessary) to achieve engagement.
  - (e) Engage a torque wrench in the multiplier drive, then torque-tighten the nut between 690 and 790 lbf ft (935,6 and 1071,2 N.m).

**WARNING:** CRANE HOIST MUST SUPPORT GEARBOX  
DURING TORQUE LOADING PROCEDURE.

- (f) Remove the torque wrench, multiplier, spanner and immobilizer from the nut and drive shaft.
- (2) Lower the cupwasher (72-52-02/2-20) over the drive shaft and engage it in the castellations in the bearing inner track retaining nut.
- (3) Assemble the LP turbine retaining nut (72-52-02/2-10) to the drive shaft.
  - (a) Apply lubricant 'A' to the nut, then screw the nut onto the LP drive shaft, as far as possible by hand.
  - (b) Assemble the immobilizer (Tool 862) to the end of the LP drive shaft, ensuring that the splines engage correctly and the immobilizer plate rests on the end of the shaft.

ASSEMBLY

## 72-00-00

Page 566  
Dec 1/96



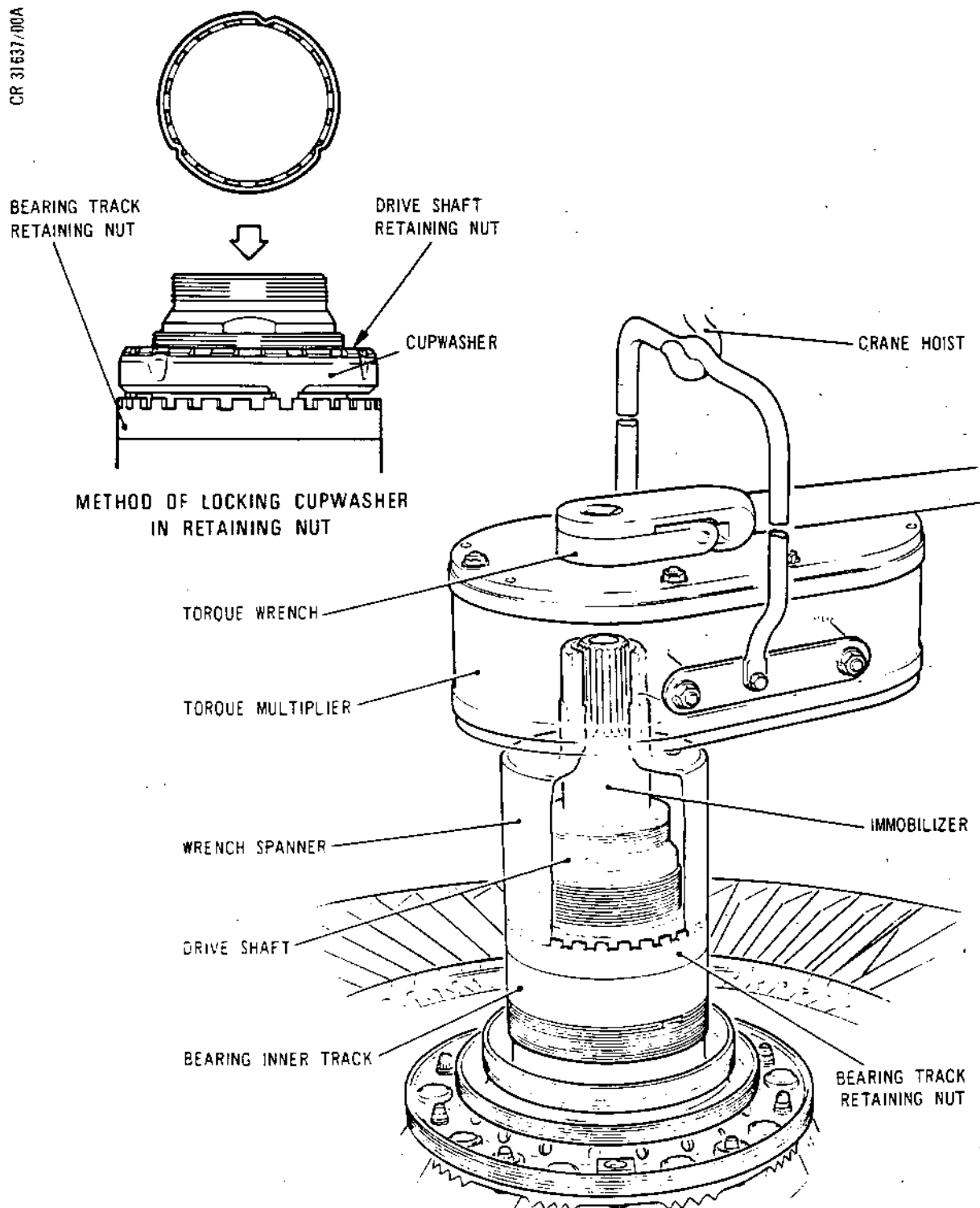
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31537/00A

PRINTED IN ENGLAND



Tightening LP Turbine Bearing Retaining Nut  
Figure 527



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (c) Lower the wrench spanner (Tool 1578) over the immobilizer and engage it with the LP turbine hub retaining nut.
- (d) Use a crane hoist and position the torque multiplier (Tool 1647) over the assembled tools.
- (e) Lower and engage the multiplier with the splines in the immobilizer and spanner.
- (f) Engage a torque wrench in the multiplier and torque-tighten the nut between 1450 and 1550 lbf ft (1965,9 and 2101,5 N.m). Do not lock the cupwasher until a satisfactory adjusting washer proving check is completed.

**WARNING:** CRANE HOIST MUST SUPPORT TORQUE MULTIPLIER DURING TORQUE LOADING PROCEDURE.

- (g) Remove the wrench, multiplier, spanner and immobilizer from the LP drive shaft.

## C. Adjusting Washer Proving Check (Ref.Fig.528).

**NOTE:** This check does not conform to module interchangeability requirement.

- (1) Measure the distance from the rear face of the LP turbine disk to the CCOC rear flange face. Record as dimension W.
- (2) Obtain the LP shaft/rotor shaft rear end-float dimension from the LP compressor drive shaft sub-assembly records (Ref.72-31-04, para.5.B.(4)). Record as dimension X for this calculation.
- (3) Obtain dimension C from the LP turbine rotor sub-assembly records (Ref.72-52-02, para.13). Record as dimension Y for this calculation.
- (4) Obtain dimension A from the turbine static sub-assembly records (Ref.72-00-51, para.44.B). Record as dimension Z for this calculation.
- (5) Calculate the LP turbine set dimension as follows:  
$$\text{LP turbine set dimension} = (W + X) - (Y + Z) = \text{actual}$$
- (6) Acceptance limit for the set dimension must be between 0.155 in. and 0.165 in. (3,937 and 4,191 mm).

ASSEMBLY

## 72-00-00

Page 568

Dec 1/96



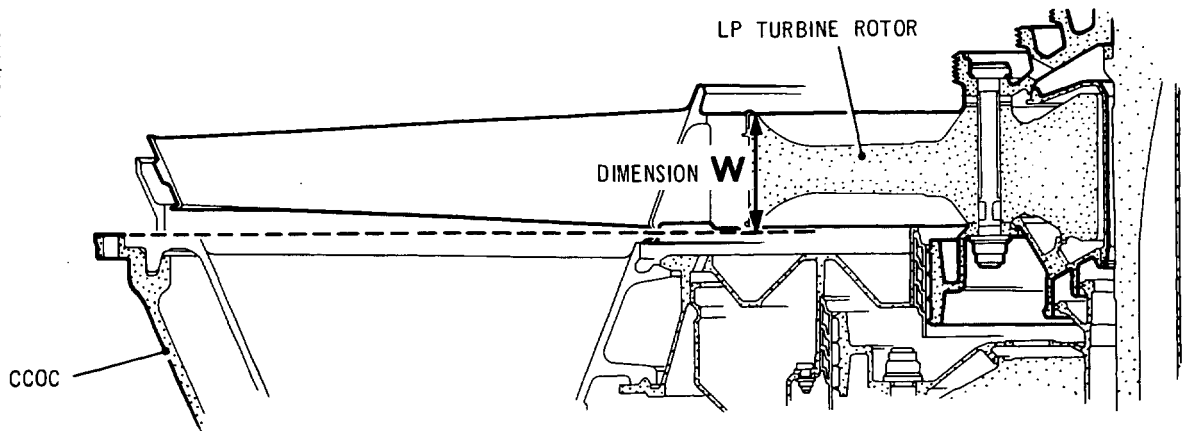
OLYMPUS 593

MK.610-14-28

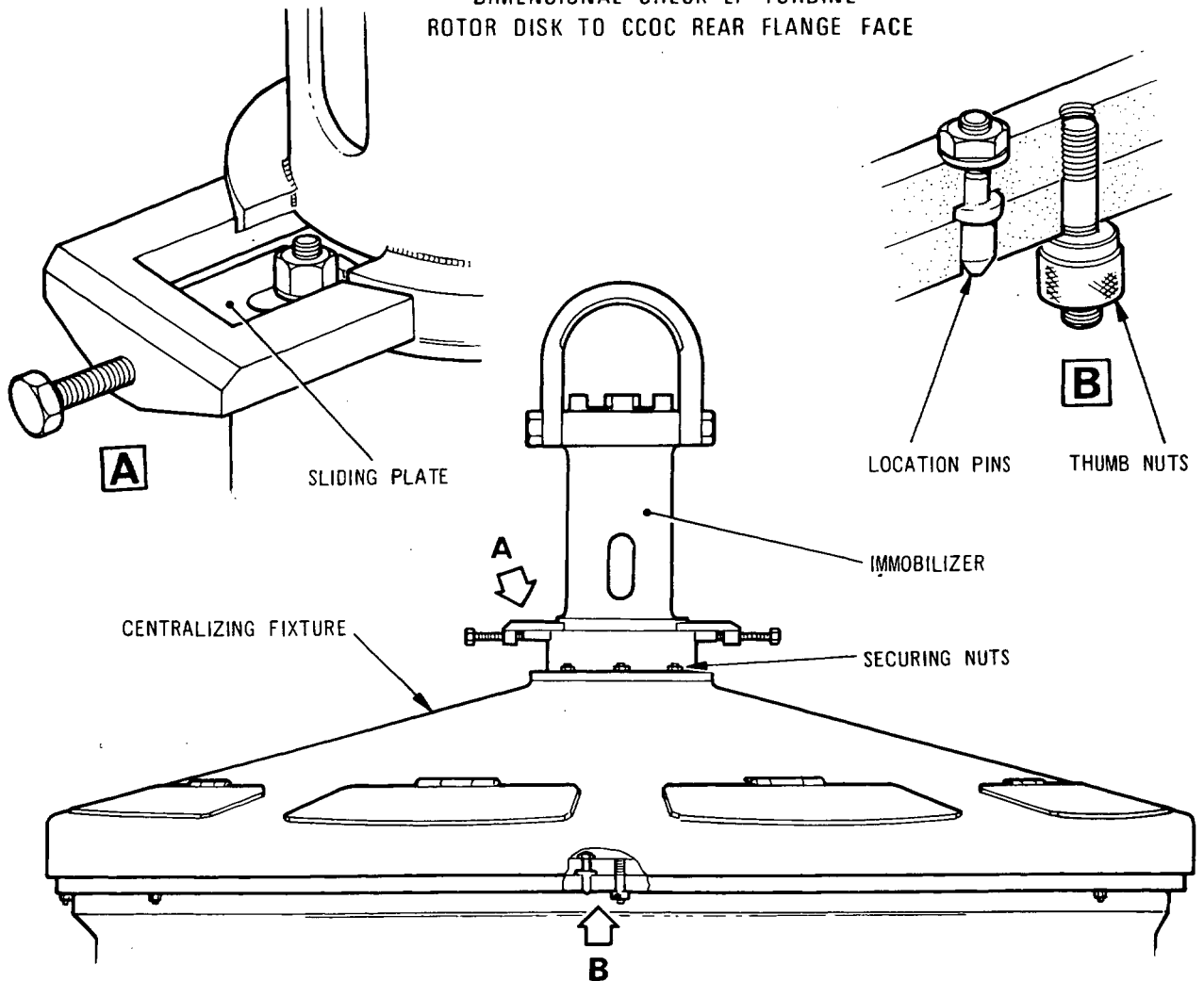
OVERHAUL



CR 31639/00C



DIMENSIONAL CHECK LP TURBINE  
ROTOR DISK TO CCOC REAR FLANGE FACE



LP Turbine Adjusting Washer Proving Checks  
and Centralizing Fixture  
Figure 528

ASSEMBLY

72-00-00

Page 569

Jul 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (7) On completion of a satisfactory adjusting washer proving check, lock the turbine retaining nut cup-washer in three equally spaced positions with peening tool (Tool 274).

D. Assemble LP Drive Shaft Centralizing Fixture (Ref.Fig.528).

- (1) Assemble the immobilizer (Tool 927) to the centralizing fixture (Tool 1261) and secure it with nuts and washers. Ensure that the sliding plates in the immobilizer are fully withdrawn and locked.
- (2) Attach a crane hoist to the immobilizer, then position and carefully lower the assembly over the LP drive shaft and engage the locating pins and studs in the CC0C rear flange. Ensure that the fixture is fully in position on the flange, then secure it with thumbnuts.
- (3) Release and remove the immobilizer from the centralizing fixture, then disconnect the hoist from the immobilizer.

19. Assemble Locking Tube to LP Drive Shaft

A. Prepare to Assemble Locking Tube (Ref.Fig.529).

- (1) Carefully insert the split guide sleeve (Tool 609) into the splined bore of the LP drive shaft.
- (2) Carefully remove the locking tube from the container (Tool 1452) and ensure that it is clean and undamaged.
- (3) Remove the nut, lockwasher, inner guide and washer from the locking tube (if assembled).
- (4) Screw the lifting fixture (Tool 1323) onto the rear end of the locking tube. To assist assembly alignment, note the master spline position at the front end of the tube and identify the rear end accordingly by marking the lifting fixture.
- (5) Ensure that the seal ring assembly is assembled to the rear end of the locking tube, and that the separate sealing ring gaps are not consecutively aligned. Apply lubricant 'A' and ensure that the seal ring assembly is free to move radially in its location groove.

ASSEMBLY

72-00-00

Page 570

Dec 31/01



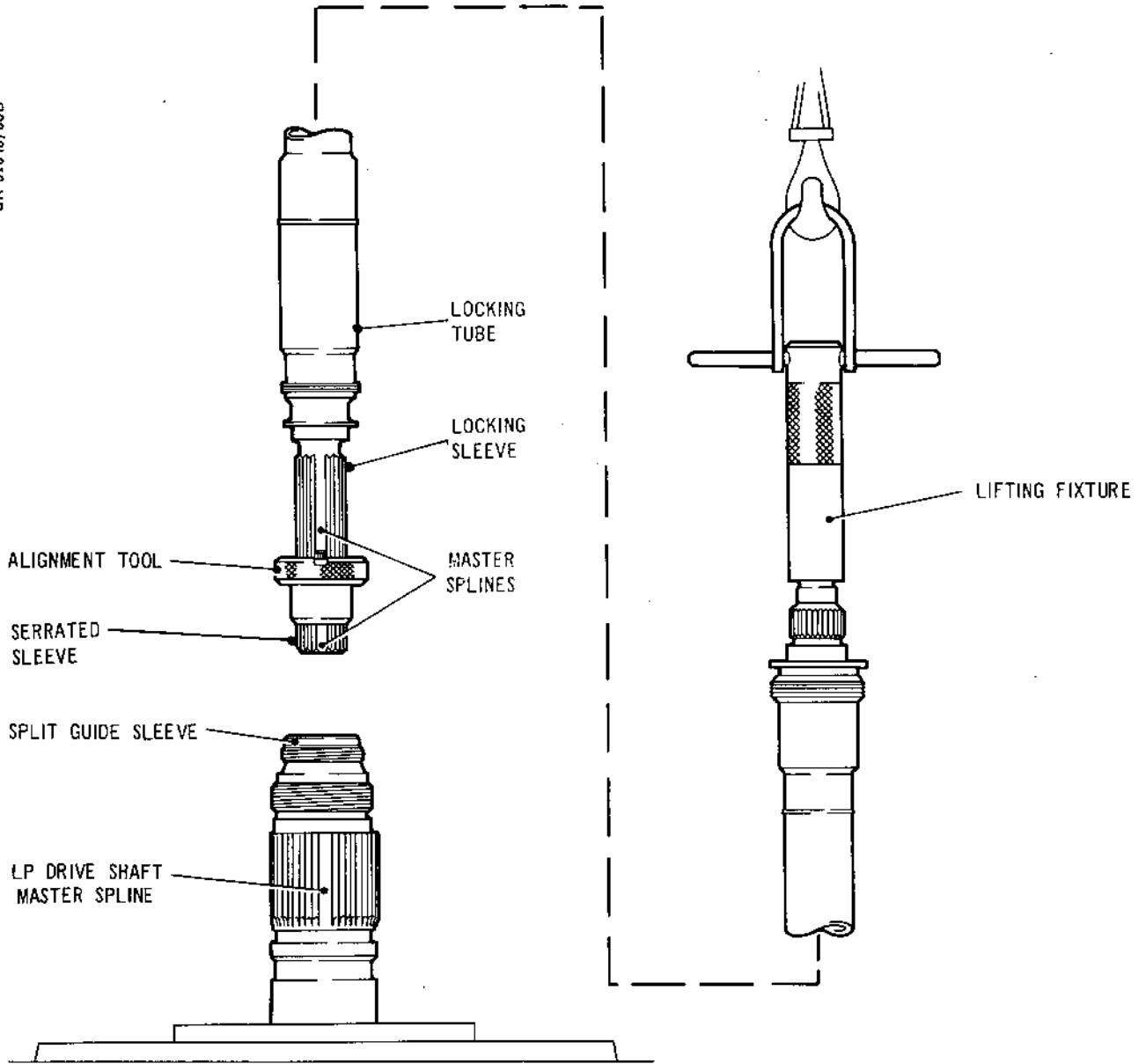
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 31640/00B



TN31690

Preparing to Assemble Locking Tube  
Figure 529

ASSEMBLY  
**72-00-00**  
Page 571  
Jul 1/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (6) Align the master splines of the serrated and locking sleeves at the front end of the locking tube by sliding the alignment tool (Tool 611) over the splines of the serrated sleeve then turning the locking sleeve until the tool can be engaged. Withdraw the tool ensuring that the locking sleeve is not turned.
- (7) Attach a crane hoist to the locking tube lifting fixture, then raise and position the tube over the LP drive shaft.

B. Assemble the Locking Tube.

CAUTION: EXERCISE GREAT CARE WHEN LOWERING LOCKING TUBE INTO DRIVE SHAFT. DAMAGE TO DRIVE SHAFT CARBON SEALS COULD OTHERWISE RESULT.

- (1) Position the locking tube so that the master splines of the sleeves are radially aligned with the master spline on the rear end of the LP drive shaft, then carefully lower the locking tube into the shaft until approximately three quarters of its length is inserted.
- (2) Remove the split guide sleeve from the LP drive shaft.
- (3) Ensure that the master spline identification on the lifting fixture is maintained in line with master spline on the rear end of the LP drive shaft, then continue lowering the locking tube until engagement occurs between the master splines of the tube sleeve and the LP drive shaft. If engagement does not occur, turn the locking tube slightly in one direction, then the other (if necessary) until engagement occurs. When engaged, press the tube into the LP drive shaft until the tube rear flange abuts the internal sleeve in the rear end of the LP drive shaft. If full engagement will not occur, the locking sleeve may have turned. Withdraw the locking tube, align the sleeves and reassemble.
- (4) When the locking tube is fully engaged, unscrew and remove the lifting fixture from the locking tube.

TN22381

ASSEMBLY

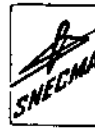
72-00-00

Page. 572

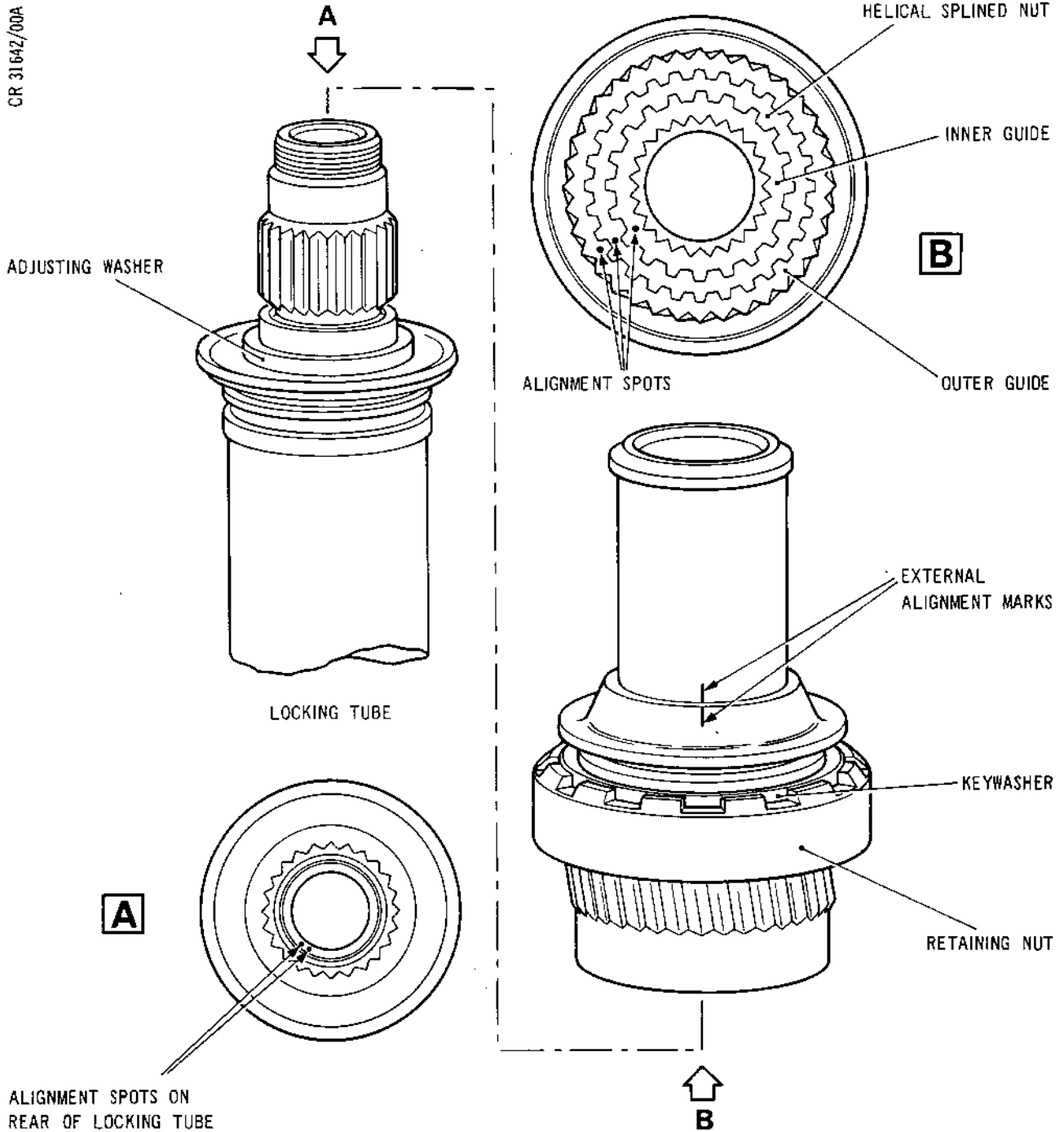
Jul 1/76



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 31642/00A



Assembling LP Drive Shaft Signal System Mechanism  
Figure 530



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



## 20. Assemble and Install LP Shaft Signal System Mechanism

### A. Assemble LP Shaft Signal System Mechanism (Ref.Fig.530).

- (1) Assemble the inner guide (72-31-05/1-60) to the helical splined nut (72-31-05/1-50), and by trial and error, ensure that the alignment spot on the front face of each item are in line, when the front faces are level. Assemble the retaining nut (72-31-05/1-70) and keywasher (72-31-05/1-80) to the helical splined nut, then assemble the outer guide (72-31-05/1-90) to the helical splined nut. By trial and error, align the spot on the front face of the outer guide with the spots on inner guide and helical splined nut when the front faces are level.
- (2) Place the adjusting washer (72-31-05/1-100) supplied with the mechanism (Ref.72-31-04, para.6), on the rear of the locking tube.
- (3) Note the alignment spots on the rear face of the locking tube rear splines, then assemble the signal system mechanism to the locking tube ensuring that the alignment spot on the inner guide aligns with the alignment spots on the tube.
- (4) When fully in position on the locking tube, the alignment marks on the side of the inner guide and helical splined nut must coincide. If this alignment is not achieved, remove the mechanism and investigate for cause of error.
- (5) Apply lubricant 'A' to the retaining nut, then ensuring that the keywasher is correctly located, screw the retaining nut onto the LP drive shaft as far as possible by hand.
- (6) Re-check the external alignment marks as detailed in para.(4).

ASSEMBLY

72-00-00

Page 574

Oct 1/82



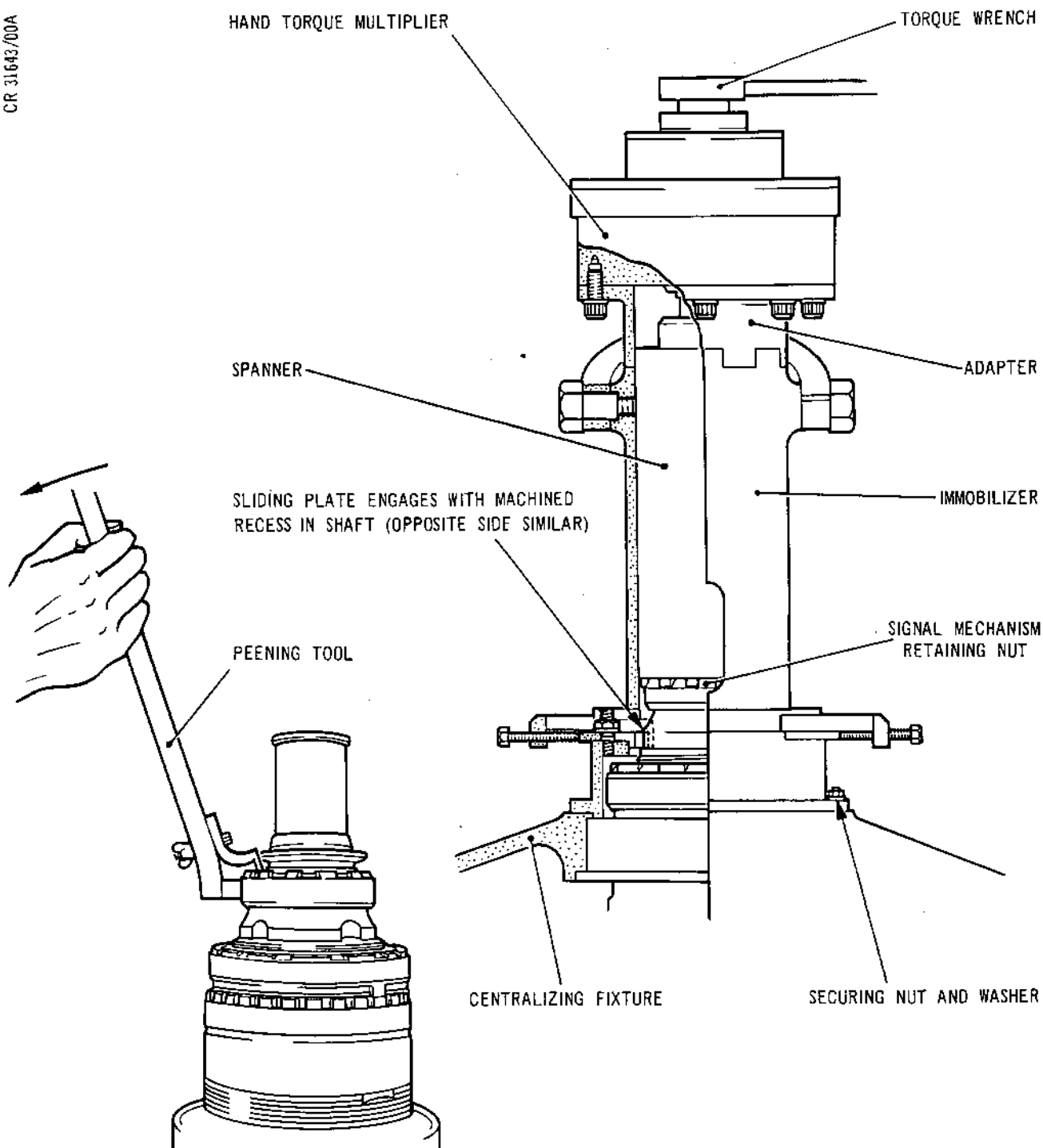
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31643/00A

PRINTED IN ENGLAND



METHOD OF LOCKING SIGNAL SYSTEM  
RETAINING NUT KEYWASHER

Locking LP Drive Shaft Signal System Mechanism Retaining Nut  
Figure 531

ASSEMBLY

72-00-00

Page 575

Jul 1/76

TN31693



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



B. Lock LP Shaft Signal System Retaining Nut (Ref.Fig.531).

- (1) Ensure that the sliding plates on the immobilizer (Tool 927) are fully withdrawn and locked, then assemble the immobilizer to the centralizing fixture and secure it with nuts and washers.
- (2) Lift an access plate on the centralizing fixture and carefully rotate the LP drive shaft until the machined recesses on the shaft are in line with the sliding plates, then engage the plates with the machined recesses and lock the plates firmly in position.
- (3) Carefully insert spanner (Tool 929) down through the centre of the immobilizer and engage it with the signal mechanism retaining nut.
- (4) Assemble adapter (Tool 1300) to the hand torque multiplier (Tool 1022) and secure with eight bolts.
- (5) Lower the adapter/multiplier onto the immobilizer and turning the multiplier drive (if necessary), engage the adapter in the immobilizer and the multiplier in the spanner. Torque-tighten the retaining nut to 286 lbf ft (388 N.m).
- (6) Remove the wrench, adapter/multiplier and spanner, then release and remove the immobilizer (Tool 927). Do not remove the centralizing fixture at this stage.
- (7) Lock the retaining nut with the keywasher at three equally spaced positions with the peening tool (Tool 314).



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

C. Lock the Shaft Signal System Mechanism (Ref.Fig.532).

- (1) Apply lubricant 'A' to the threads of the castellated round nut (72-31-05/1-40), then insert the nut into the shaft signal system mechanism and screw it into the threads on the locking tube (Ref.detail A).
- (2) Torque-tighten the nut to 65 lbf ft (88 N.m) using a torque wrench and spanner (Tool 1617).
- (3) Insert the locking piece (72-31-05/1-30) into the mechanism inner guide engaging the splines and, (by trial and error), engage the lugs on the locking piece with the castellations of the nuts (Ref. detail B). If engagement cannot be achieved, the castellated nut may be turned in increments to a maximum torque-loading of 70 lbf ft (94,9 N.m) until locking piece engagement is achieved.
- (4) Place the keywasher (72-31-05/1-20) in position on the locking piece and ensure that the lugs engage correctly (Ref.detail C).
- (5) Screw the retaining nut (72-31-05/1-10) into position over the keywasher and torque-tighten it to 95 lbf ft (129 N.m) using a torque wrench and spanner (Tool 1513) (Ref.detail D). Lock the retaining nut by peening the keywasher into the nut.

21. Assemble Turbine Exhaust Diffuser to CCOC

A. Prepare for Assembly.

- (1) Remove the centralizing fixture from CCOC.
  - (a) Ensure that the sliding feet of the immobilizer (Tool 927) are fully withdrawn and locked, then assemble the immobilizer to the centralizing fixture and secure it with nuts and washers.

ASSEMBLY

72-00-00

Page 577  
Jan 4/93

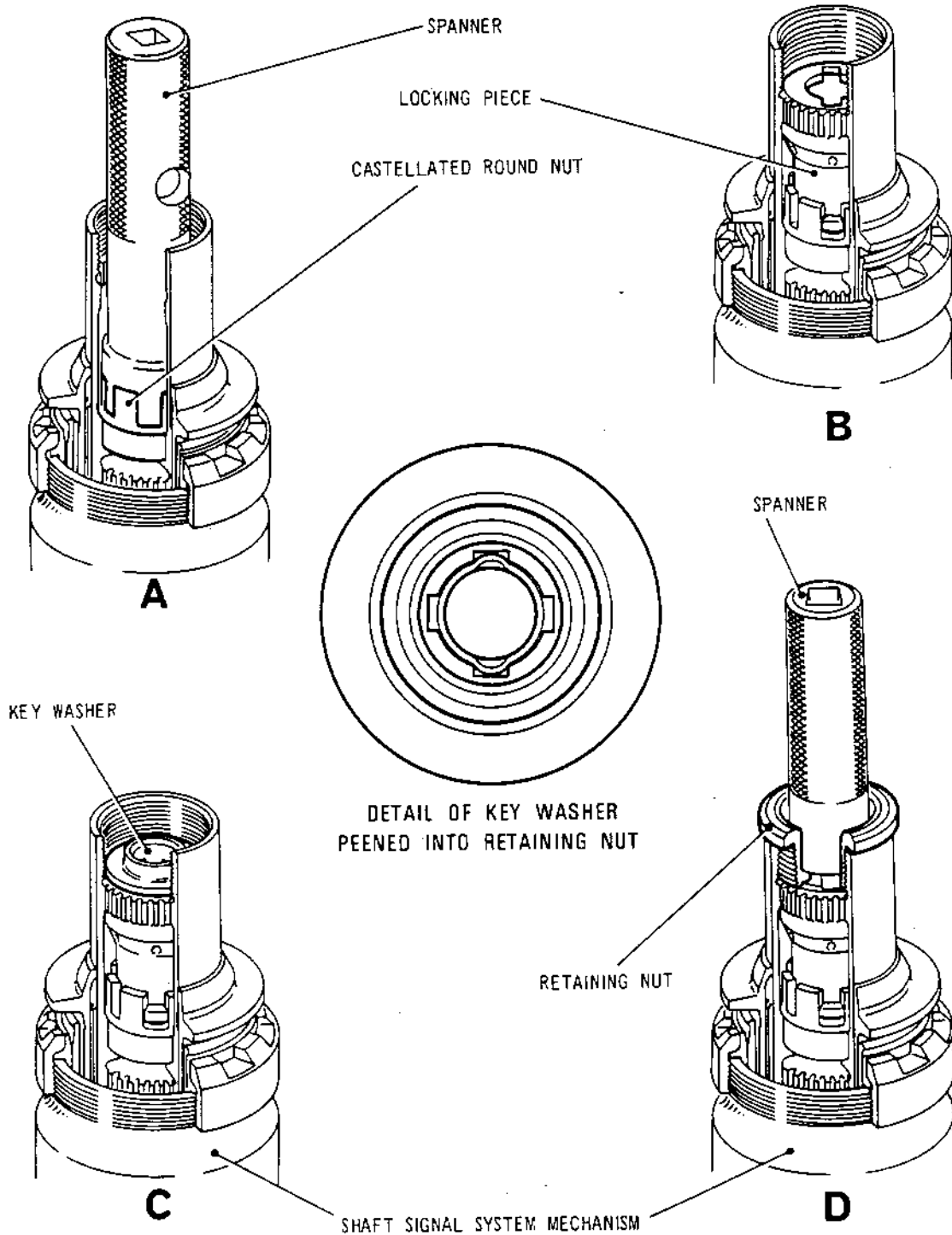


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31644/00A



Locking LP Drive Shaft Signal System Mechanism  
Figure 532

ASSEMBLY  
**72-00-00**  
Page 578  
Jul 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Remove the thumbnuts securing the centralizing fixture to the CCOC. Attach a crane hoist to the immobilizer, then carefully remove the assembly from the engine, lower onto a container and disconnect the hoist. If necessary use protector (Tool 1180) to protect the engine.

B. Assemble Turbine Exhaust Diffuser (Ref.Fig.533-534 and Table 502).

- (1) Assemble the lifting fixture (Tool 305) to the rear centre cone of the turbine exhaust diffuser aligning the captive bolts of the fixture with the anchor nuts of the cone. Secure the fixture by screwing the bolts into the anchor nuts.
- (2) Application of compound (Ref.Fig.533).
  - (a) Ensure thorough cleanliness of all parts. Do not apply jointing compound to bolt threads.
  - (b) Apply a thin coating of jointing compound 'A' to the CCOC and turbine exhaust diffuser abutment flanges and also to the heads and shanks of the retaining bolts held captive in the exhaust diffuser flange.
  - (c) Apply additional jointing compound to the bolts positioned 30 deg each side of the bottom position, and also seal the gaps between the LP turbine nozzle vanes and CCOC flange over the 30 deg areas.
- (3) Attach a crane hoist to the lifting fixture on the exhaust diffuser, then raise and position the assembly over the CCOC.

CAUTION: EXERCISE CARE WHEN LOWERING EXHAUST DIFFUSER. DAMAGE TO LP TURBINE BEARING COULD OTHERWISE RESULT.

- (4) Align the pin hole in the exhaust diffuser flange with the headless pin in the CCOC flange, then carefully lower the exhaust diffuser on to the CCOC guiding the bolts attached to the exhaust diffuser flange into the holes in the CCOC flange.

PRINTED IN ENGLAND

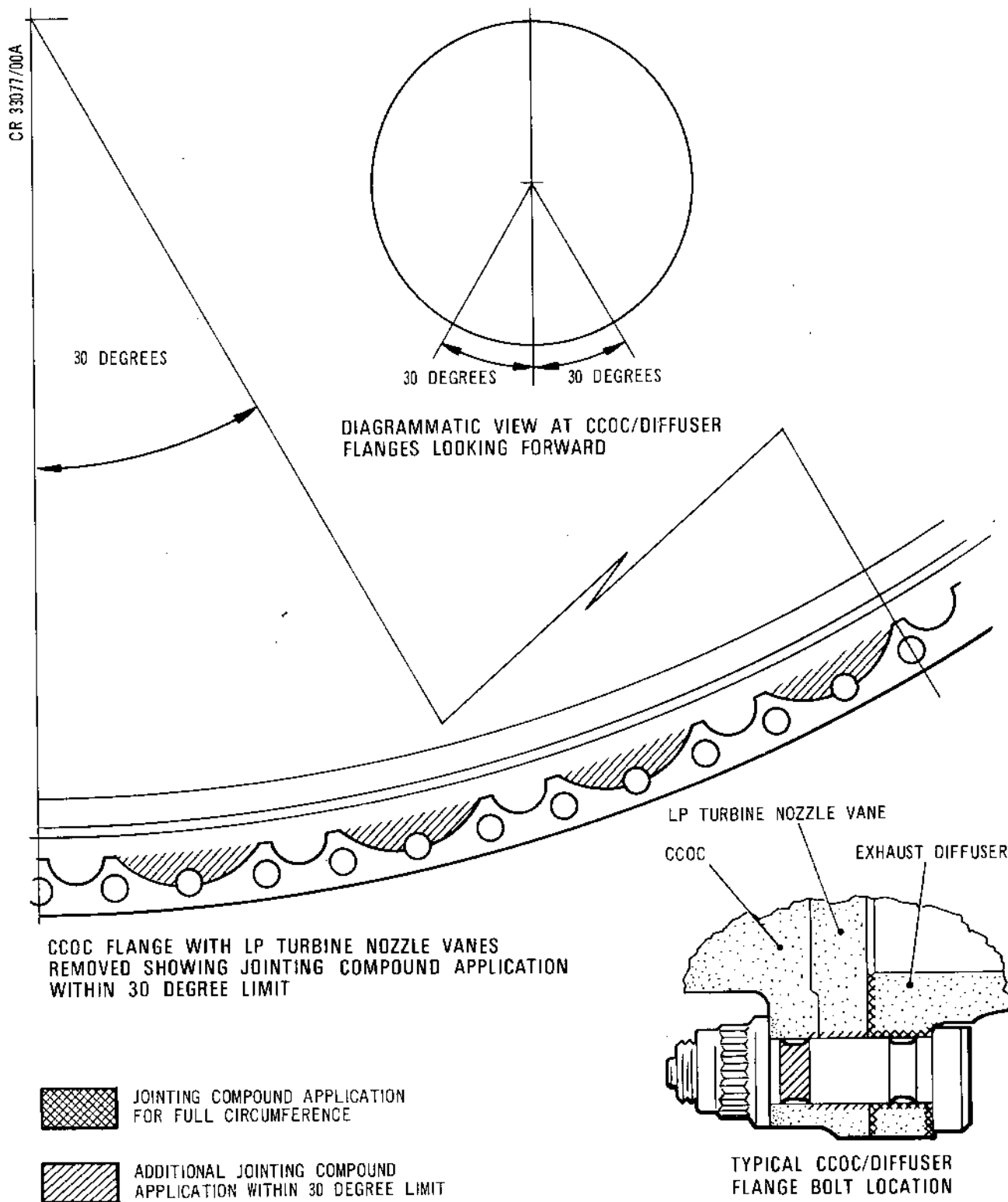
TN10491





OLYMPUS 593

MK. 610-14-28  
OVERHAUL



Application of Jointing Compound to CCOC  
Figure 533



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

## (5) Assemble bolts.

- (a) Ensure that all bolts are fully inserted through the flanges.

**CAUTION:** EXERCISE CARE AND ENSURE D HEAD BOLTS FIT TIGHTLY AGAINST LOCATING SHOULDER TO AVOID DAMAGE.

- (b) Remove any jointing compound that extrudes onto the bolt threads and apply lubricant 'A' to the threads.
- (6) Use an approved non permanent marking agent and mark the flange bolt hole positions 1 to 144 in the clockwise direction when viewing from the rear of the engine.

FIG.534 REF.	I.P.C. REF. 72-53-00	FIG.534 REF.	I.P.C. REF. 72-53-00	FIG.534 REF.	I.P.C. REF. 72-53-00
A	5-90	E	6-30	M	6-250
B	5-50	E	8-140	N	6-260
C	5-130	F	5-250	N	6-440
C	5-320	F	8-110	N	7-80
C	6-90	G	5-280	P	6-280
C	6-290	G	7-310	Q	6-270
C	7-120	G	8-30	R	6-380
C	7-350	G	8-200	S	7-40
C	8-70	J	6-150	T	7-110
C	8-240	K	6-180	U	7-220
D	5-160	L	6-210	V	7-180
E	5-190			W	7-250
				X	7-280

**NOTE:** All brackets with the same Fig. Ref. are identical.

Bracket Positions Turbine Exhaust Diffuser/CCOC Flange  
Table 502

- (7) Secure the brackets and flange bolts with nuts (72-53-00/5-20).
- (a) Place spacers (72-53-00/7-50) between the bracket at position S and the engine flange. Place washers (72-53-00/7-30) under the nuts.

ASSEMBLY

72-00-00

Page 581

Dec 31/99

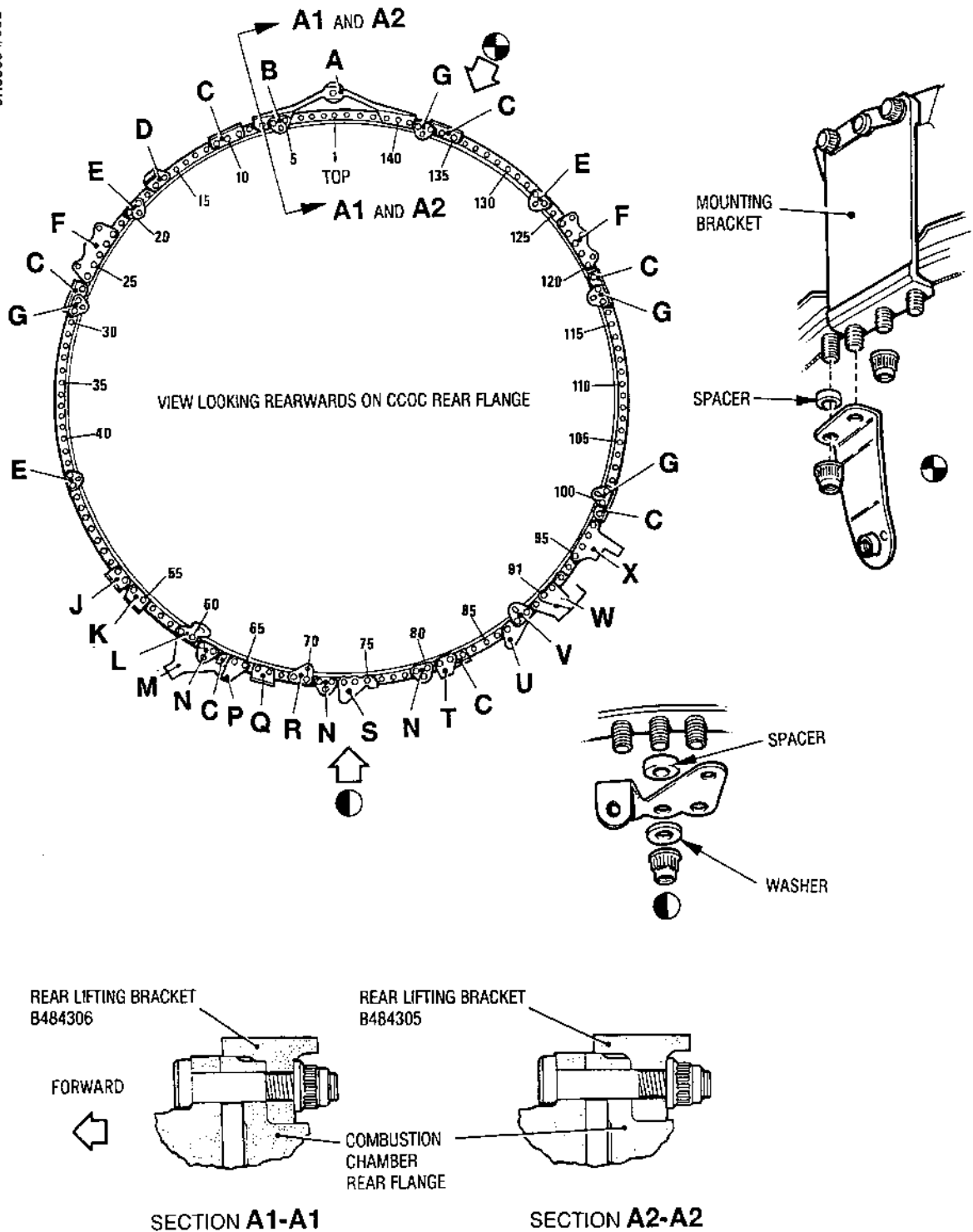


# OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

CR33334/00E



Assembling Turbine Exhaust Diffuser and Brackets to CCOC  
Figure 534

ASSEMBLY

72-00-00

Page 582

Sep 30/94



OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

- (b) Insert the spacer (72-53-00/8-250) between the bracket and the engine flange at positions G bolt-hole 138.
  - (c) Ensure bracket at position A is assembled correctly, dependent on which standard of bracket is being assembled (Refer to Fig.543).
- (8) Secure the containment shield to each mounting bracket at position C.
- (a) Apply lubricant 'A' to securing items, then locate each bracket on the grooved pin in the containment shield and insert each retaining plate (72-53-00/3-10) into the respective pin groove.
  - (b) Use bolts (72-53-00/3-50) to secure the mounting brackets positioned at bolt locations (27-28-29) (117-118-119).
  - (c) Secure the bracket and mounting bracket at bolt location (99-100-101) with bolts (72-53-00/3-40).
  - (d) Secure the remaining mounting brackets to the containment shield with bolts (72-53-00/3-60). Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the bolts to 100 lbf in. (11,5 N.m).

ASSEMBLY

72-00-00

Page 582A

Dec 31/99

Printed in England



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

THIS PAGE LEFT BLANK INTENTIONALLY

ASSEMBLY

72-00-00

Page 582B

Dec 31/99



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (9) Ensure that the nuts have a minimum locking (run-down) torque of 6.5 lbf in. (0,73 N.m). Torque-tighten the engine flange and bracket nuts between 170 and 190 lbf in. (19,2 and 21,5 N.m). Torque the remaining flange nuts and bolts to 210 lbf in. 24 N.m) using the cranked ring wrench (Tool 1508) and adapter (Tool 239).
- (10) Allow a period of ten minutes to elapse after torque tightening the engine flange and bracket nuts then torque check the nuts and ensure that torque-tightness as detailed is maintained.
- (11) Assemble eight protectors (Tool 1350) to the exhaust diffuser vane positions.
- (12) Release and remove the lifting fixture, then assemble the protector (Tool 437) to the rear end of the exhaust diffuser.

22. Assemble Rear Cover Unit to CCOC Heat Insulation Shields  
(Ref.Fig.535)

A. Prepare for Assembly.

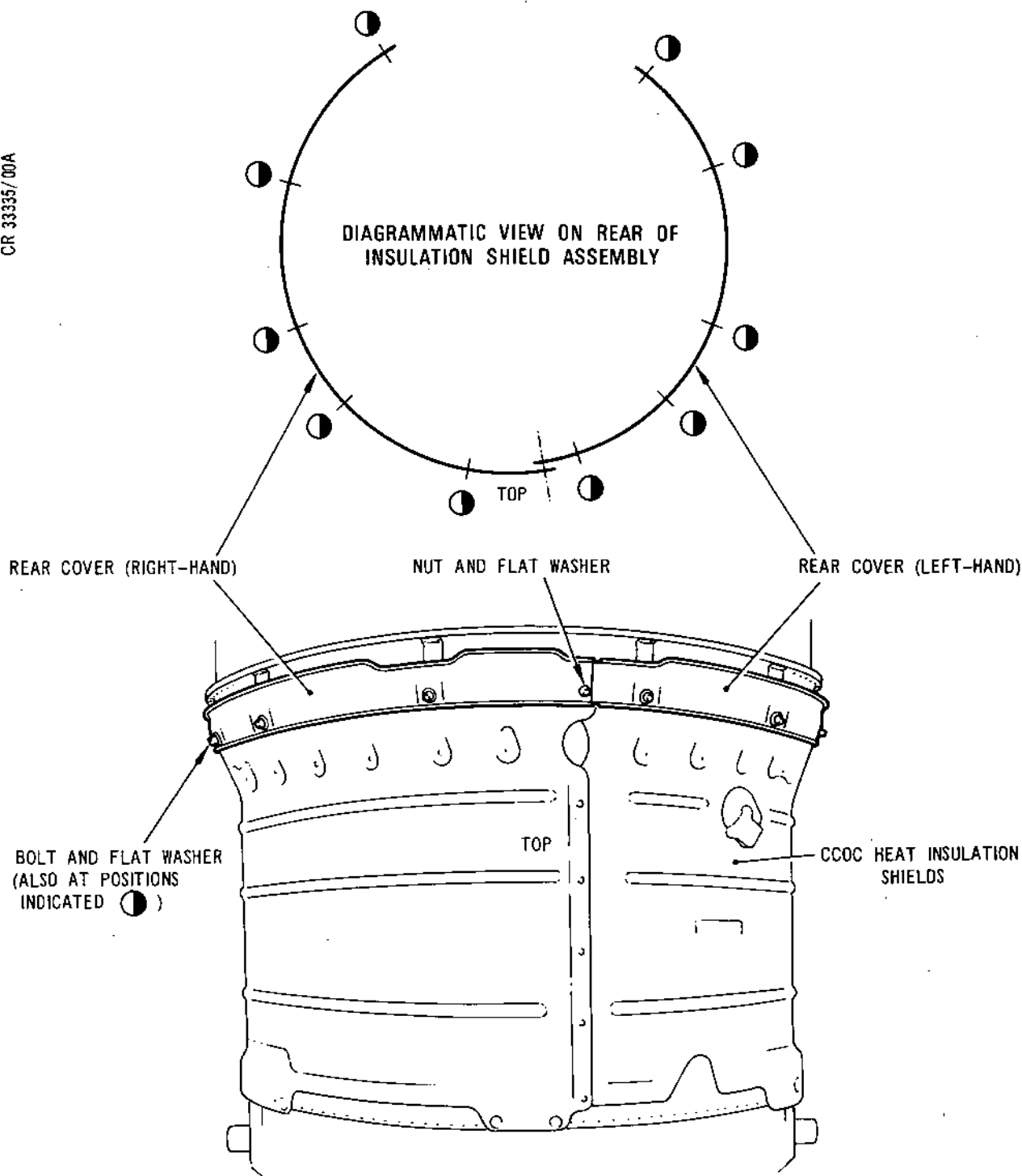
- (1) Remove the nut and washer from the rear position of the CCOC heat shields joint at the top position on the engine.

CR 33335/00A



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Assembling Rear Covers to CCOC Heat Shield  
Figure 535



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Apply lubricant 'B' to the nut and bolts.

B. Install Rear Covers.

- (1) Place each rear cover in the respective left or right-hand position on the rear of the CCOC heat shields and overlap at the top position where the nut has been removed from the main heat shields. Loosely retain the covers with the nut and washer.
- (2) Secure the rear covers at the remaining positions with bolts (71-32-01/2-20-50) and washers (71-32-01/2-30-60). Ensure that the nut and bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the nut and bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m).

23. Assemble Main Oil Tank to Engine (Ref.Fig.536)

A. Prepare Oil Tank.

- (1) Apply lubricant 'B' to the securing bolts.
- (2) Assemble the stiffener plate (79-11-01/2-180) to the front of the LP compressor case bracket flange and secure with two shoulder bolts (79-11-01/2-150) and self-locking nuts (79-11-01/2-140).
- (3) Ensure that the nuts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the nuts between 85 and 95 lbf in. (9,6 and 10,7 N.m).

B. Assemble Oil Tank.

- (1) Position the oil tank on the LP compressor case and locate and secure as follows (Ref.Fig.536).
  - (a) Position bracket A so that it locates on the rear face of the LP compressor bracket flange. Secure the bracket temporarily with a bolt (79-11-01/2-170) and a self-locking nut (79-11-01/2-160). Ensure that the nut has a minimum locking (run-down) torque of 6.5 lbf in. (0,73 N.m).
  - (b) Position bracket B so that it locates on the front face of the LP compressor bracket flange. Ensure that the headless pin is fully inserted in the engine flange. Secure the bracket with two bolts (79-11-01/2-70). Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).

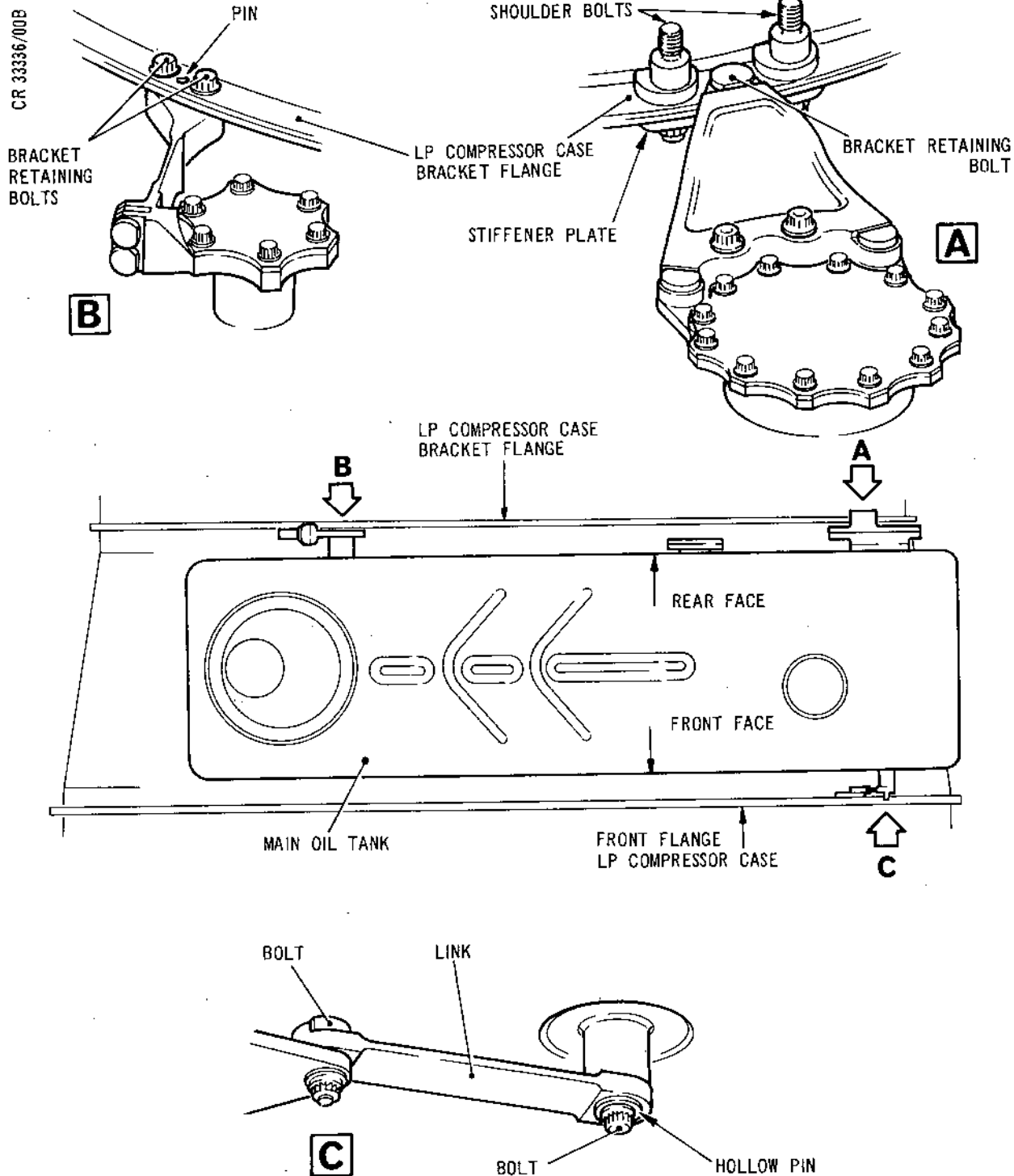
ASSEMBLY

72-00-00

Page 585

Jul 1/76





Assembling Main Oil Tank to Engine  
Figure 536



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (c) Secure the link C positioned on the front face of the tank to the bracket on the front flange of the LP compressor case. Insert bolt (79-11-01/2-30) through the link and secure with a nut (79-11-01/2-20). Ensure that the nut has a minimum locking (run-down) torque of 6.5 lbf in. (0,73 N.m).
- (d) Check that link C is secured to the tank with a hollow pin (79-11-01/2-50) and bolt (79-11-01/2-40). Ensure that the bolt has a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the bolt between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (2) Torque-tighten the oil tank securing bolts.
- (a) Torque-tighten the bolt at position A between 170 and 190 lbf in. (16,9 and 21,5 N.m).
- (b) Torque-tighten the bolts at position B between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (c) Torque-tighten the nut at position C between 170 and 190 lbf in. (15,8 and 18,1 N.m).
- (3) Check that the clearance gap between the oil tank and engine case or projection on the engine case is not less than 0.120 in. (3,048 mm) at any point.

#### 24. Assemble Pressurising Air Supply Tubes

##### A. Assemble Tube A (Ref.Fig.537).

- (1) Remove blanks (if assembled) from the ends of the tube (75-05-02/1-90), then apply lubricant 'A' to the union nuts.
- (2) Remove the blanking caps from the union locations, then position the tube between the connectors at the right-hand gearbox location and HP compressor case and engage the union nuts. Torque-tighten the union nut at the right-hand gearbox location between 90 and 100 lbf in. (10,2 and 11,3 N.m) using the wrench (Tool 1480), then torque-tighten the union nut at the HP compressor case between 140 and 160 lbf in. (15,8 and 18,1 N.m) using the wrench (Tool 1480). Wire-lock the union nuts.

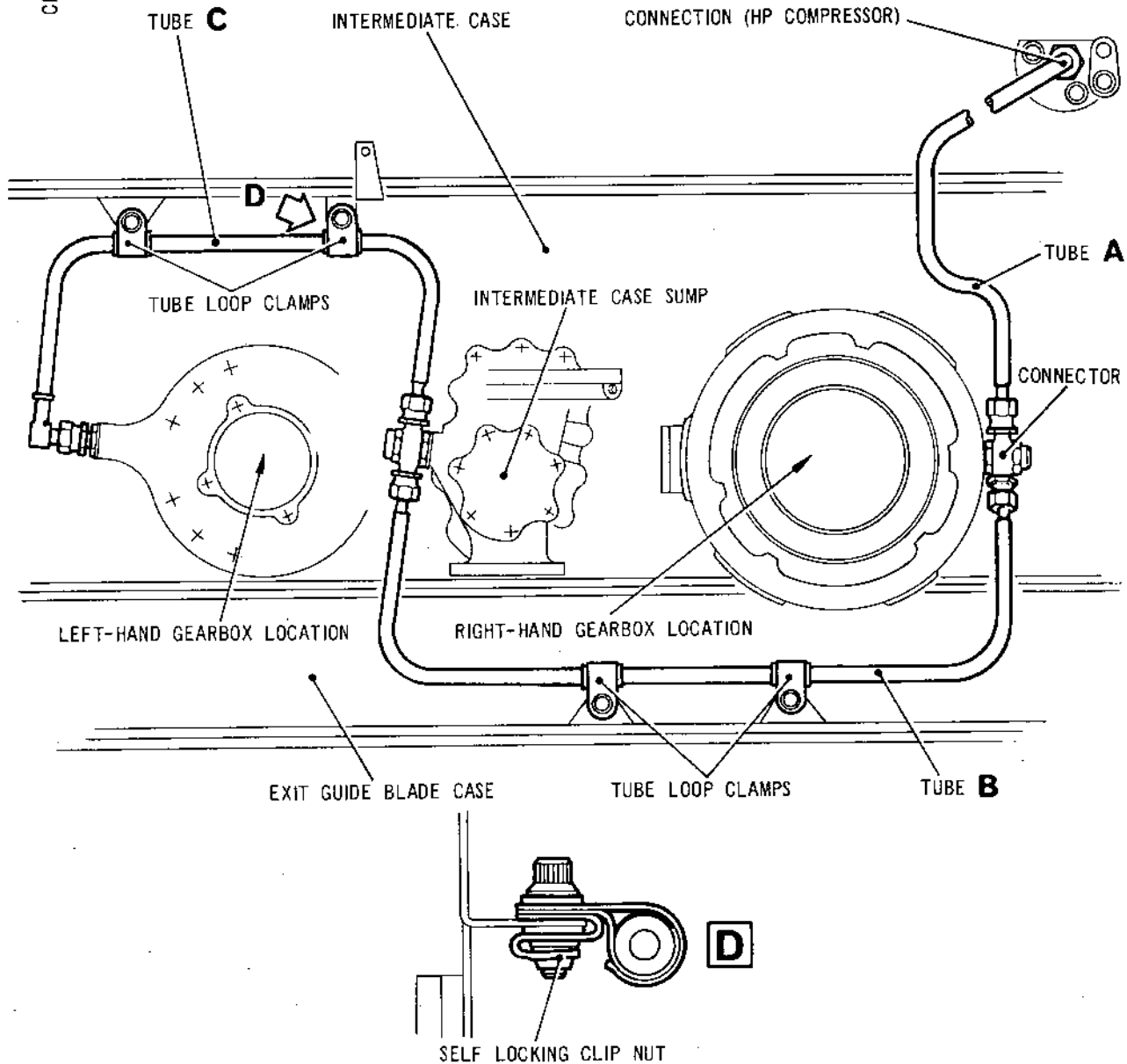


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33337/00A



TN24598

Assembling Pressurizing Air Supply Tubes  
Figure 537

ASSEMBLY  
72-00-00

Page 588

Jul 1/76



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

Printed in England

## B. Assemble Tube B (Ref.Fig.537).

- (1) Remove blanks (if assembled) from the ends of the tube (75-05-02/1-250), then apply lubricant 'A' to the union nuts.
- (2) Remove the blanking caps from the union locations, then position the tube between the connections at the right-hand gearbox location and the intermediate case sump and engage the union nut.
- (3) Assemble the two loop-clamp assemblies (75-05-02/1-180) and the half clamp shells (75-05-02/1-245) (SB.OL.593-75-8972-27 standard) to the tube, then secure the clamps to the two brackets on the exit guide vane case front flange with nuts, bolts and washers (75-05-02/1-190-210-200) having lubricated the nuts with lubricant 'B'. Ensure that the nuts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the nuts between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (4) Torque-tighten both union nuts between 90 and 100 lbf in. (10,2 and 11,3 N.m) using the wrench (Tool 1480), then wire-lock the union nuts.
- (5) Ensure that a minimum clearance of 0.100 in. (2,54 mm) exists between the tube and the right-hand gearbox mounting bracket.

## C. Secure Tube C (Ref.Fig.537).

NOTE: Tube C will have been connected previously (Ref.72-32-00).

- (1) Assemble a self-locking clipnut (75-05-02/1-335) to the bracket nearest the intermediate case sump (Ref.detail D), and lubricate the nut (75-05-02/1-330) with lubricant 'B'. Assemble the two loop-clamp assemblies (75-05-02/1-320) and the half clamp shells (75-05-02/1-385) (SB.OL.593-75-8972-27 standard) to the tube, then secure the clamps to the brackets with bolts and washers (75-05-02/1-350-340), and a nut (75-05-02/1-330) onto the bracket without the clipnut. Ensure that the nut has a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the nut and bolt between 67 and 73 lbf in. (7,6 and 8,2 N.m).

ASSEMBLY

## 72-00-00

Page 589

Jun 1/94

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



SNECMA

25. Deleted

26. Assemble Right-hand Gearbox to Engine

## A. Prepare Brackets and Pins (Ref. Fig.538).

- (1) Locate two nuts (72-31-02/2-100) in the provisioned holes of the nut retainer (72-63-01/1-80). Apply lubricant A to the threads of the stepped threaded pin (72-63-01/1-70), then insert the pin through the end hole of the front mounting bracket (72-63-01/1-110). Position the nut retainer with the previously assembled nuts to its correct position on the front mounting bracket, then secure the retainer with the threaded pin (72-63-01/1-70) and nut (72-63-01/1-60).
- (2) Ensure that the holes in the nut retainer (72-63-01/1-80) align the corresponding holes in the mounting bracket (72-63-01/1-110). Hold the stepped pin (72-63-01/1-70) across the flats, then torque-tighten the pin to 40 lbf in. (4,5 N.m) ensuring that the pin has a minimum run-down (locking torque) of 2 lbf in. (0,23 N.m).
- (3) Using an approved freezing agent, freeze the stepped pin (72-63-01/1-10), then assemble the pin to the front outer flange of the intermediate case at the bottom position, near No.4 vane, ensuring that the smaller diameter of the pin extends towards the rear, and the larger diameter is flush with the front face of the flange.
- (4) Temporarily assemble the front mounting bracket (72-63-01/1-110) to the front flange of the intermediate case and retain it with bolts (72-31-02/2-110) lubricated with lubricant A and nuts (72-31-02/2-100).
- (5) Temporarily assemble the rear mounting bracket (72-63-01/1-240) to the rear flange of the intermediate case and retain it with bolts (72-33-01/6-200) lubricated with lubricant A and nuts (72-33-01/6-190).

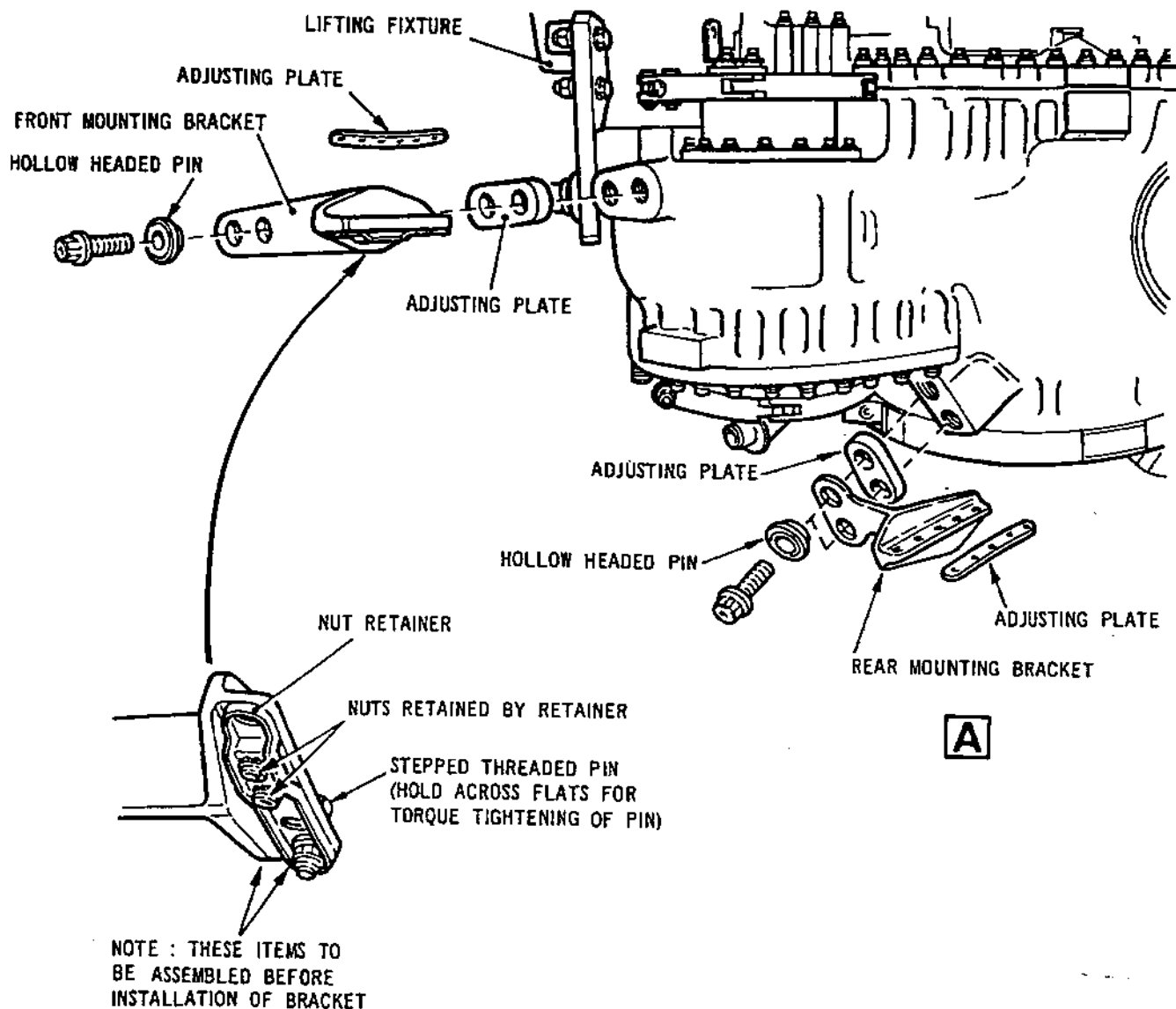
Printed in England

ASSEMBLY

**72-00-00**

Page 590

Jun 1/99



Preparing to Assemble the Right-hand Gearbox  
to Determine Adjusting Washers  
Figure 538

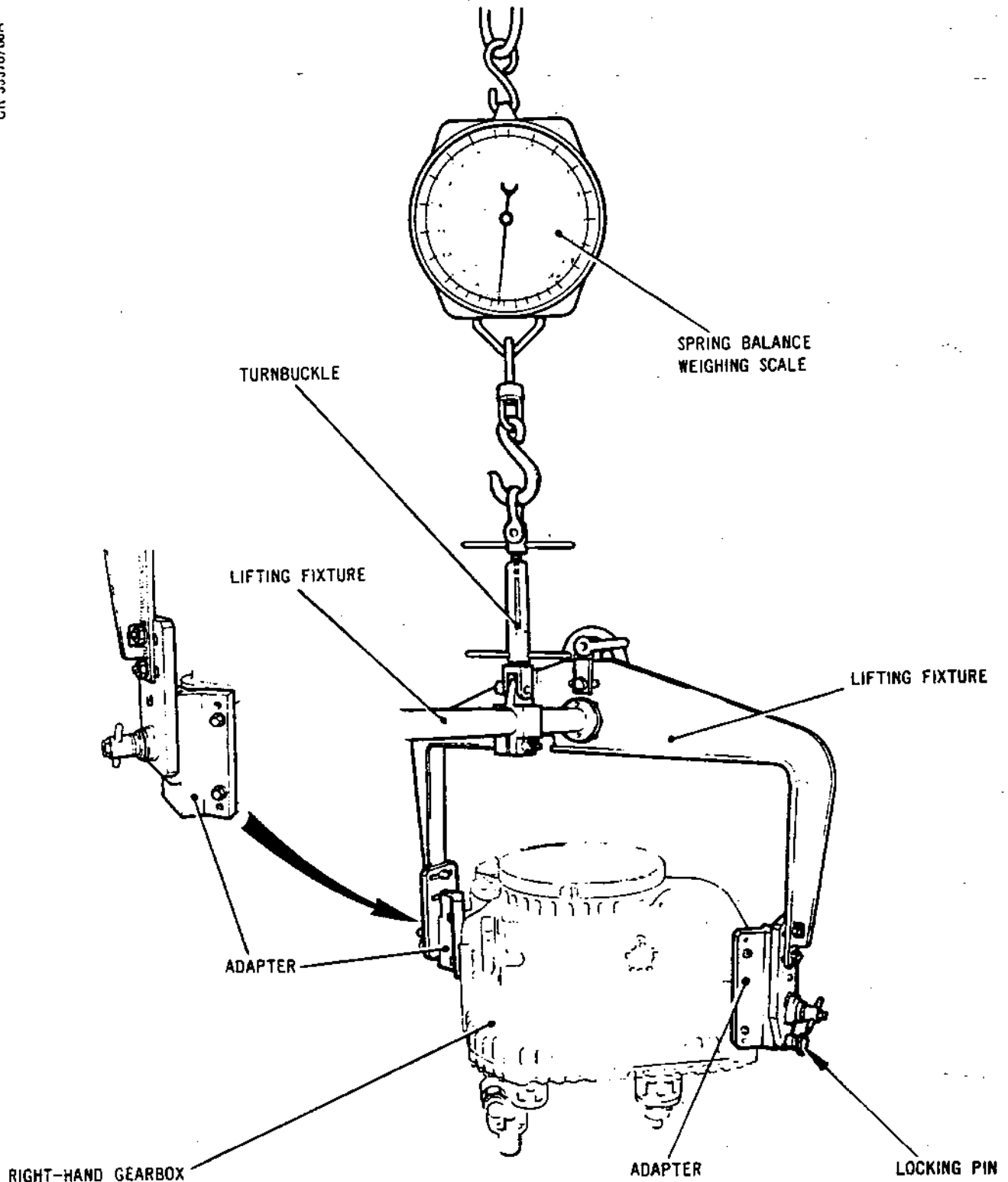


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Assembling Right-hand Gearbox Lifting Equipment  
Figure 539

ASSEMBLY

72-00-00

Page 592

Jun 1/99



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

B. Assemble Lifting Equipment to Right-hand Gearbox  
(Ref.Fig.539).

- (1) Assemble the adapters (Tool 793 and 794) to the lifting fixture (Tool 795) and secure each adapter with two nuts and washers.
- (2) Position the lifting fixture assembly so that an adapter aligns with a lifting point on each side of the gearbox, then secure each adapter with the retaining bolts and ensure that the locking pin in adapter (Tool 793) is fully engaged.
- (3) Assemble the lifting fixture (Tool 798) to the lifting fixture assembly attached to the gearbox.
  - (a) Attach a spring balance weighing scale (400 lb 181,4 kg. dial indicator pattern) to a crane hoist.
  - (b) Attach turnbuckle (Tool 1302) to the weighing scale and carefully attach the turnbuckle to the lifting fixture (Tool 798). Secure it with the knurled pin on the turnbuckle screwed fully into position.
  - (c) Carefully raise the lifting fixture and engage its studs with the slots in the top of the gearbox lifting fixture. Secure the equipment with nuts and washers firmly tightened.
- (4) Remove the bolts and washers securing the engine turning point cover to the gearbox and remove the cover. Carefully remove the blank from the gear shaft on the gearbox.
- (5) Ensure that the six headed pins (72-63-01/1-28) are assembled to the gearbox mounting flange.
- (6) Assemble gasket (72-63-01/10-29) to the gearbox mounting flange. Apply lubricant 'B' to the retaining bolts (72-63-01/10-27).

ASSEMBLY

## 72-00-00

Page 593

Jun 1/99





OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

C. Assemble Gearbox to Engine (Ref.Fig.540).

- (1) Carefully raise the gearbox and note the weight of the assembly.

CAUTION: MAINTAIN NOTED WEIGHT OF GEARBOX DURING ASSEMBLY AS SHAFT MUST BE INSERTED HORIZONTALLY INTO ENGINE. DAMAGE TO SHAFT COULD OTHERWISE RESULT.

WARNING: EXERCISE CARE TO PREVENT HANDS BEING TRAPPED BETWEEN LIFTING FIXTURE AND GEARBOX DURING ROTATION OF GEARBOX.

- (2) Remove the locking pin from the adapter (Tool 793), then carefully rotate the gearbox to allow the gear shaft to move downward and through 180 deg in readiness for entry into the engine. Remove the blank from the gear shaft location on the engine.
- (3) Insert the engine hand turning tool (Tool 613) into the engine turning point on the gearbox and connect a wrench to the tool.
- (4) Position the gearbox to allow the gear shaft to enter vane No.3 using the turnbuckle for fine adjustment. Carefully push the gearbox into position and engage the gearbox gear shaft in the engine bevel gear by turning the wrench/tool. When the gear shaft is engaged, push the gearbox into position until the joint faces are in contact. Ensure that the pins enter into the main mounting bracket. Remove the hand turning equipment and loosely assemble the turning location cover.
- (5) Secure gearbox to the gearbox mounting bracket. Assemble nuts (72-63-01/10-26) to the bolts and torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m). Use the swivel wrench (Tool 3132) to run the nuts down prior to torque-tightening.



# OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

## D. Determine Shims for Front and Rear Mounting Brackets.

**NOTE :** The shims and plates must be a firm sliding fit.

- (1) Select the correct thickness adjusting plate (72-63-01/1-120-205) (72-09-21 Repair, Fig.435) from the range to accommodate the gap which exists between the front mounting bracket and the gearbox. Record the thickness of the selected adjusting plate.
- (2) Select the correct thickness adjusting shim (72-63-01/1-250-295) (72-09-21 Repair, Fig.437) from the range to accommodate the gap which exists between the rear mounting bracket and gearbox. Record the thickness of the selected adjusting shim.
- (3) Unscrew and remove the nuts and bolts temporarily retaining the front (72-63-01/1-110) and rear (72-63-01/1-240) mounting brackets to the intermediate flange then remove the brackets.
- (4) Apply lubricant A to the locating diameter of the two hollow headed pins (72-63-01/1-100) then locate them in the front mounting bracket and the correct thickness adjusting plate (72-63-01/1-120-205) previously selected. Temporarily assemble the bracket and plate to the gearbox. Apply lubricant A to two bolts (72-63-01/1-90) then secure the pins, bracket and plate, torque-tighten the bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m) ensuring a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).
- (5) Apply lubricant A to the locating diameter of the two hollow headed pins (72-63-01/1-230), then locate them in the rear mounting bracket (72-63-01/1-240) and the correct thickness adjusting shim (72-63-01/1-250-295) previously selected. Finally assemble the pins, bracket and shim to the gearbox and secure with two bolts (72-63-01/1-220) lubricated with lubricant A. Torque-tighten the bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m) ensuring a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).

ASSEMBLY

## 72-00-00

Page 595

Jun 1/99

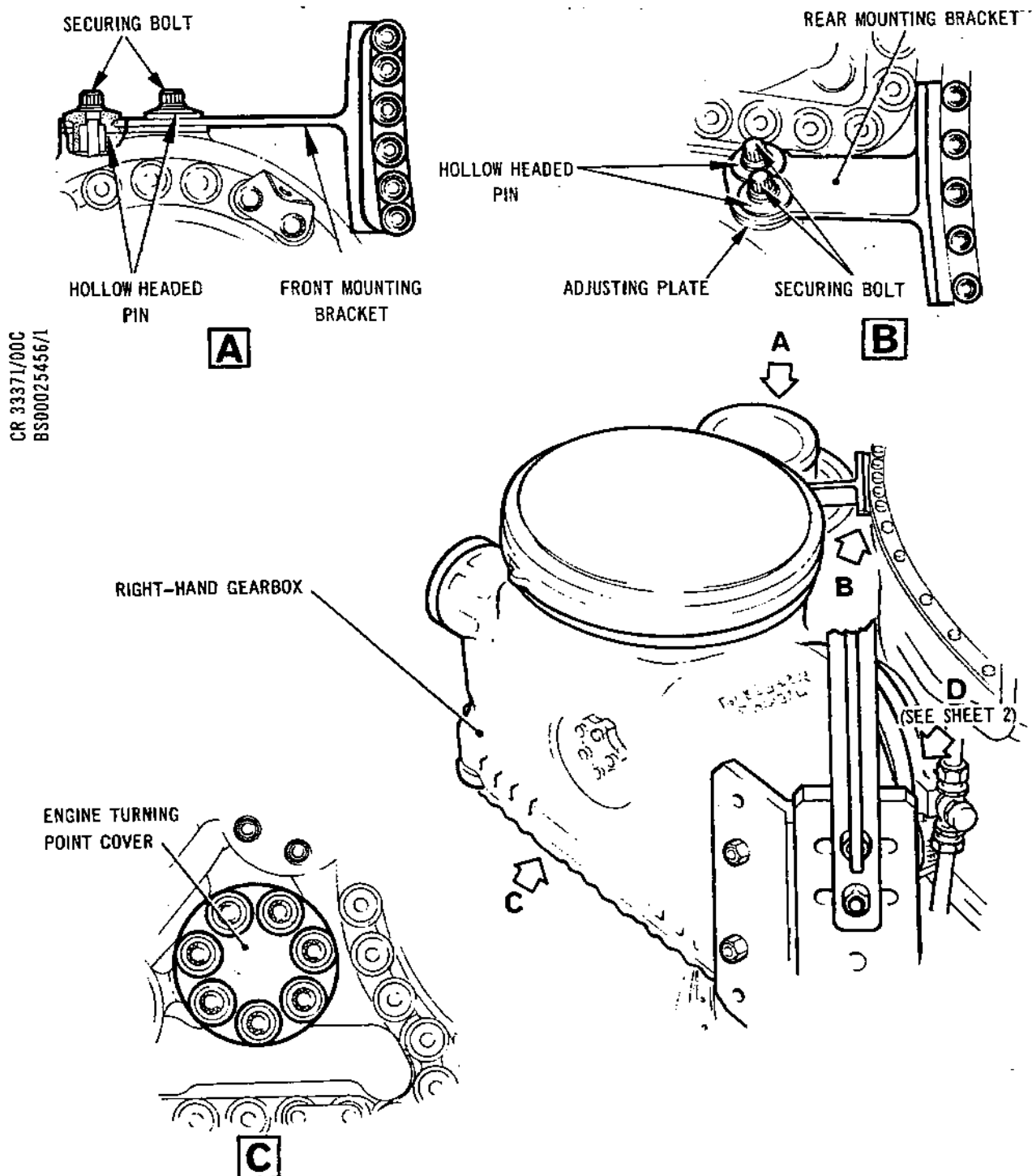


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Assembling Right-hand Gearbox to Engine  
Figure 540 (Sheet 1 of 2)

ASSEMBLY

72-00-00

Page 596

Jun 1/99

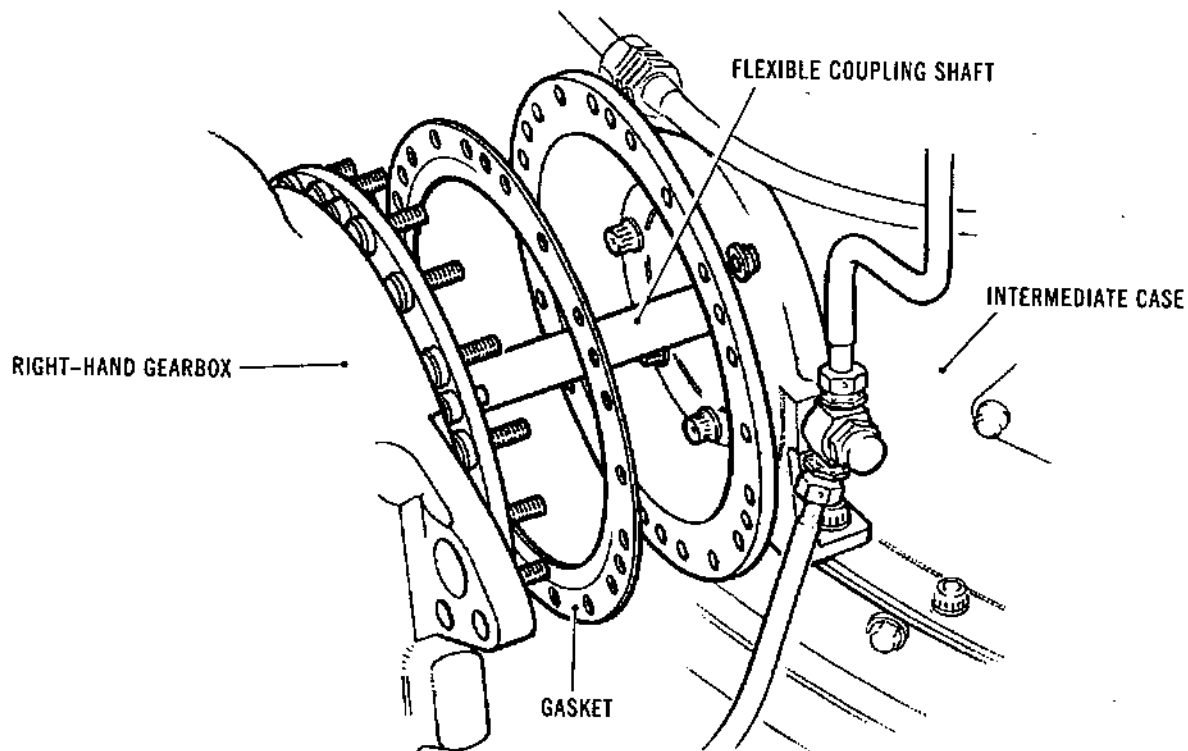


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



**D**

S.B. 72-8689-272

Assembling Right-hand Gearbox to Engine  
Figure 540 (Sheet 2 of 2)



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

- (6) Select the correct thickness adjusting plate (72-63-01/1-20-45) (72-09-21 Repair, Fig.434) from the range to accommodate the gap which exists between the front mounting bracket (72-63-01/1-110) and the intermediate case flange. Record the thickness of the selected adjusting plate.
- (7) Select the correct thickness adjusting plate (72-63-01/1-160-205) (72-09-21 Repair, Fig.436) from the range to accommodate the gap which exists between the rear mounting bracket (72-63-01/1-240) and the intermediate case flange. Record the thickness of the selected adjusting plate.

#### E. Finally Assemble Front and Rear Mounting Brackets.

- (1) Finally assemble the rear mounting bracket (72-63-01/1-240) with the correct thickness adjusting plate (72-63-01/1-160-205) previously selected. Secure the plate and bracket to the intermediate flange with bolts (72-33-01/6-200) lubricated with lubricant A and nuts (72-33-01/6-190). Torque-tighten the bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m) ensuring a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).
- (2) Unscrew and remove the bolts and pins securing the front mounting bracket (72-63-01/1-110) to the gearbox, then finally assemble the bracket with its correct thickness adjusting plate (72-63-01/1-20-45) to the intermediate case flange. Secure the bracket and plate with bolts (72-31-12/2-110) lubricated with lubricant A and nuts (72-31-02/2-100). Torque-tighten the bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m) ensuring a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).
- (3) Finally assemble the front mounting bracket (72-63-01/1-110), two pins (72-63-01/1-100) and the correct thickness adjusting plate (72-63-01/1-120-205) to the gearbox. Retain the pins, bracket and plate with bolts (72-63-01/1-90). Torque-tighten the bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m) ensuring a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).

ASSEMBLY

72-00-00

Page 598

Jun 1/99



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

F. Check Rotational Movement of HP Rotating Assembly (Ref. Fig.543).

- (1) Assemble the universal joint (Tool 1872) and the adapter (Tool 1876) to the turning location on the right-hand gearbox. Ensure that the assembly pin on the adapter flange locates in the gearbox flange. Secure the assembly with three equally spaced bolts, with lubricant 'A' applied, then torque-tighten the bolts between 90 and 100 lbf in (10,2 and 11,3 N.m).
- (2) Insert the extension bar (Tool 1873) through the adapter and engage it with the universal joint.
- (3) Set the torque wrench (Tool 1874) to between 360 and 400 lbf in. (40 and 45 N.m) and assemble it with the torque adapter (Tool 1875) to the extension bar.

CAUTION: DO NOT EXERT FORCE IN EXCESS OF 400 LBF IN. (45 N.M) OR APPLY SHOCK LOAD.  
FRACTURE OF SHEAR NECK SHAFT IN GEARBOX  
COULD RESULT.

- (4) Apply a gradual force to the torque wrench and check the HP compressor assembly for free and even rotation.
- (5) Investigate and rectify restricted or uneven rotational movement.
- (6) On completion of satisfactory rotational check, remove the hand turning equipment. Ensure that the gasket is in position on the gearbox and loosely assemble the cover.
- (7) Remove the gearbox lifting equipment and assemble a suitable protector to the gearbox.

ASSEMBLY

72-00-00

Page 598.1

Jun 1/99



# OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

27. DELETED.

## 28. Assemble Left-hand Gearbox to Engine

### A. Prepare Brackets and Pins (Ref. Fig.541).

- (1) Assemble a hollow pin (72-62-01/8-8B) (SB.72-103) or a solid pin (72-61-01/8-8A) and retaining ring (72-62-01/8-7) (Pre SB.72-103) to the front mounting bracket location on the gearbox. Assemble the front mounting bracket (72-62-01/1-310) over the pin, then temporarily assemble the retaining plate (72-62-01/1-375) (SB.72-103 only) and two bolts (72-62-01/1-300) to align the bracket. Do not screw the bolts fully in, allowing the bracket to be adjusted for the insertion of shims.
- (2) Assemble a hollow pin (72-62-01/8-4B) (SB.72-103) or a solid pin (72-62-01/8-4A) and retaining ring (72-62-01/8-3) (Pre SB.72-103). Assemble the rear mounting bracket (72-62-01/1-130) over the pin, then temporarily retain the bracket with three bolts (72-62-01/1-100, 110 and 120). Do not screw the bolts fully in, allowing the bracket to be adjusted for the insertion of shims.

NOTE: If required, remove the hollow pin (72-62-01/8-8B) using the mechanical puller (Tool 957) and to remove hollow pin (72-62-01/8-4B) use the mechanical puller (Tool 958).

Printed in England

ASSEMBLY

## 72-00-00

Page 598.2

Jun 1/99



OLYMPUS 593

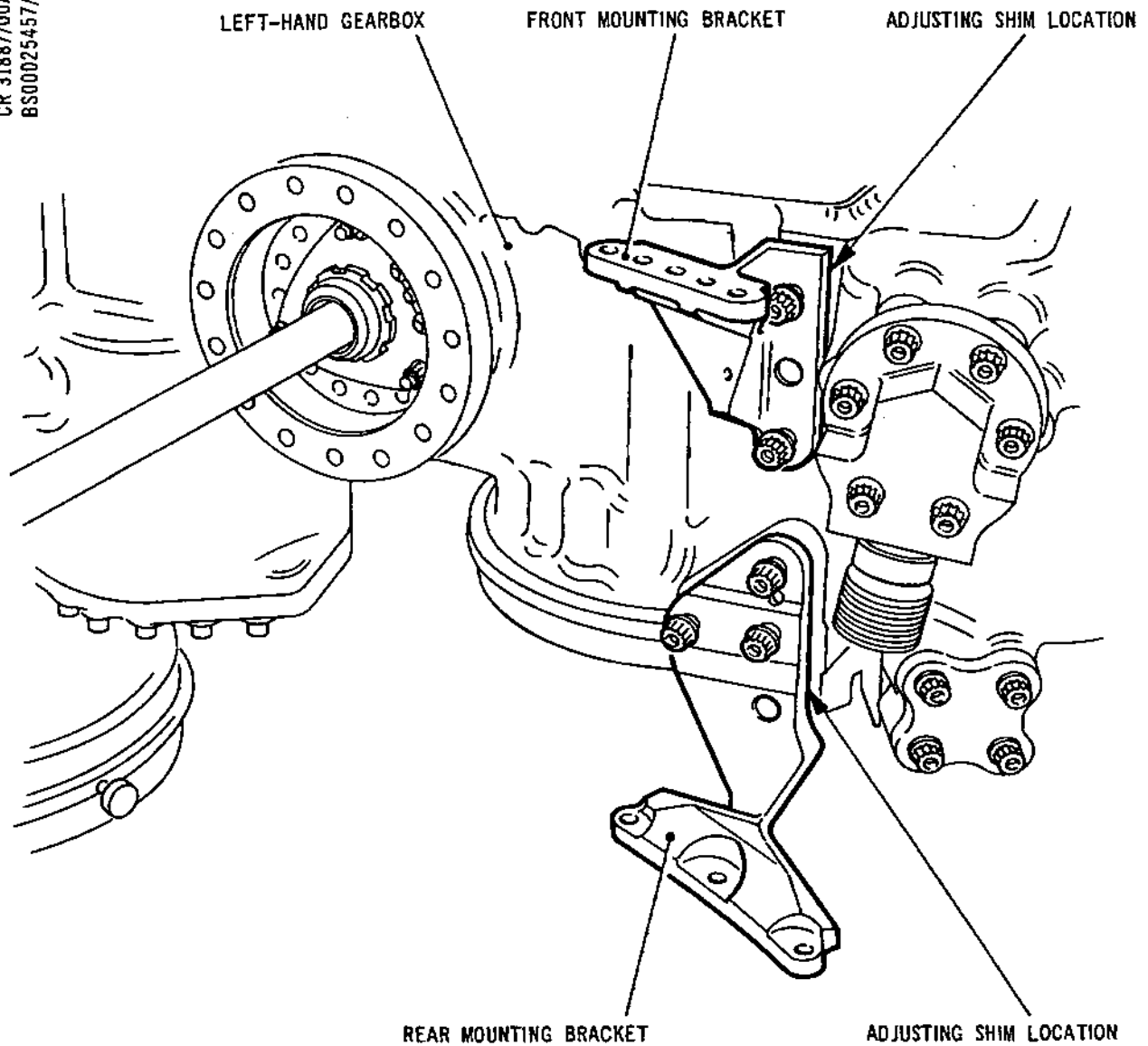
MK.610-14-28  
OVERHAUL



sneema

Printed in England

CR 31887/00A  
BS00025457/1



Preparing to Assemble the Left-hand Gearbox to  
Determine Adjusting Shims  
Figure 541

ASSEMBLY  
**72-00-00**  
Page 598.3  
Jun 1/99





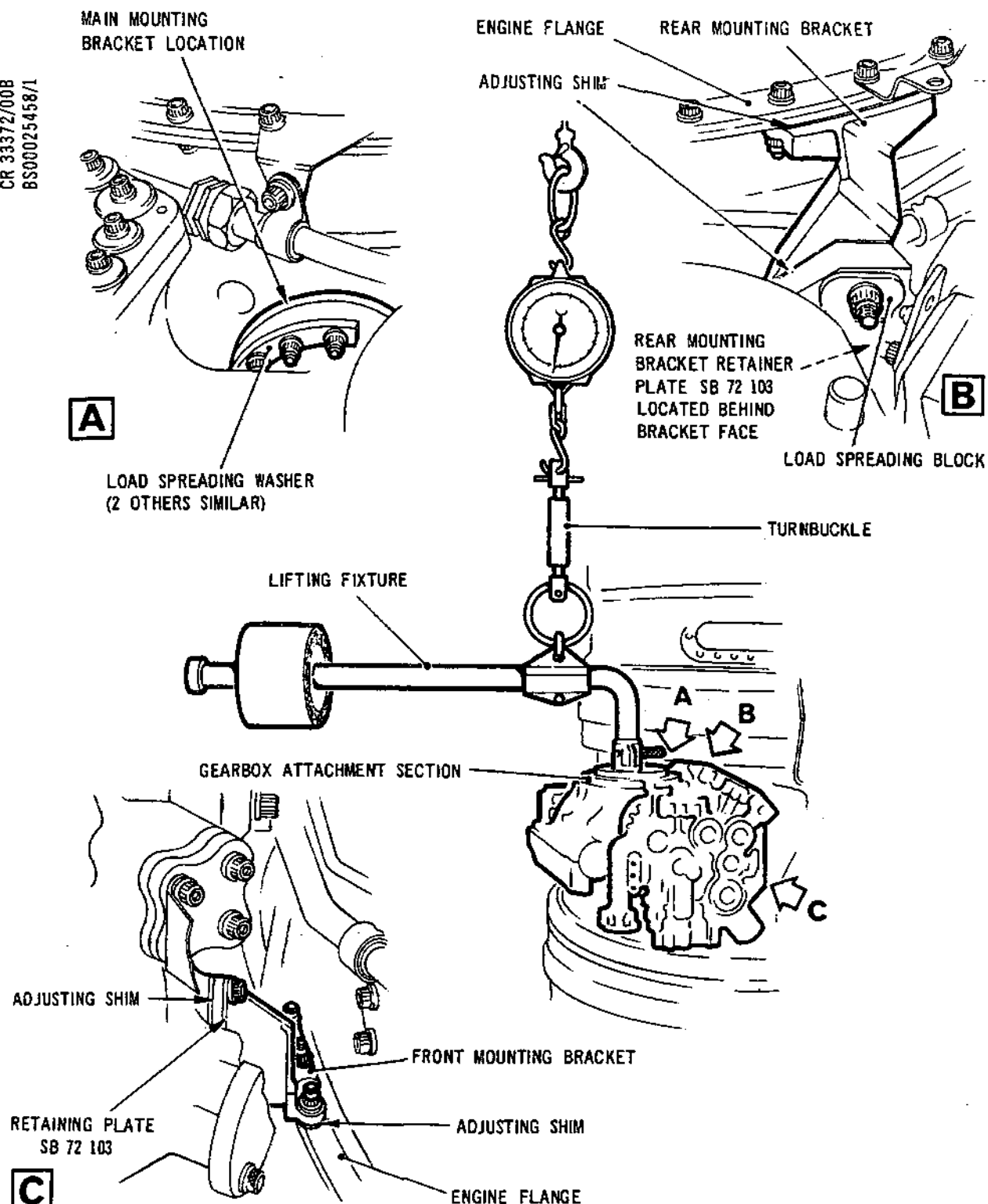
OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

CR 33372/00B  
BS00025458/1



Assembling Left-hand Gearbox to Engine  
Figure 542

ASSEMBLY

72-00-00

Page 598.4

Jun 1/99

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



sneema

**B. Assemble Lifting Equipment to Left-Hand Gearbox (Ref.Fig.542).**

- (1) Attach a spring balance weighing scale (400 lb 881,8 kg. dial indicator pattern) to a crane hoist. Attach turnbuckle (Tool 1302) to the weighing scale, then carefully attach the turnbuckle to the gearbox lifting fixture (Tool 197) and secure it with the knurled pin on the turnbuckle.
- (2) Remove the gearbox attachment from the end of the lifting fixture by unscrewing the pin securing it to the fixture.
- (3) Remove the protection blank from the fuel control unit location on the gearbox, then carefully place the attachment section removed from the lifting fixture in position on the gearbox. Engage the coupling ring on the gearbox with the attachment section ensuring that it is correctly engaged and tight.
- (4) Secure the lifting fixture to the attachment section and secure it with the pin previously removed.

**C. Assemble Gearbox to Engine (Ref.Fig.542).**

- (1) Remove the protection blanks from the shaft location on the gearbox and vane No.5 location on the intermediate case.
- (2) Examine the driving shaft (72-62-02/1-180) for cleanliness and ensure that the retaining ring (72-62-02/1-190) is assembled to it. Apply lubricant A to splines and insert the retaining ring end of the driving shaft into the gearbox. Assemble the gasket (72-32-00/7-130) to the adapter plate (72-31-00/7-270).
- (3) Insert the engine hand turning tool (Tool 613) into the engine turning point on the right-hand gearbox and connect a wrench to the tool.

**CAUTION:** DO NOT APPLY FORCE IN EXCESS OF 400 LBF IN. (45 N.M.). FRACTURE OF SHEAR NECK SHAFT COULD RESULT.

ASSEMBLY

**72-00-00**

Page 598.5

Jun 1/99

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

- (4) Carefully raise the gearbox and note the weight of the assembly.

**CAUTION:** MAINTAIN NOTED WEIGHT OF GEARBOX DURING ASSEMBLY AS SHAFT MUST BE INSERTED HORIZONTALLY INTO ENGINE. DAMAGE TO SHAFT COULD OTHERWISE RESULT.

- (5) Position the gearbox to allow the gear shaft to enter vane No.5 using the turnbuckle for fine adjustment. Carefully push the gearbox into position and engage the gearbox gear shaft in the engine bevel gear by turning the wrench/tool in the right-hand gearbox. When the gear shaft is engaged, push the gearbox into position at the same time ensure that the bolt-holes in the gearbox flange align correctly with, and pass centrally over the 15 bolts protruding from the adapter plate so that the flanges abut squarely.
- (6) Remove the hand turning equipment and loosely assemble the turning point cover.
- (7) Secure the gearbox to the main mounting bracket with load spreading washers (72-32-00/7-20) and nuts (72-32-00/7-10) lubricated with lubricant 'A'. Tighten the nuts but do not torque-tighten at this stage.

**D. Determine Shims for Front and Rear Mounting Brackets**

**NOTE:** The shims must be a firm sliding fit. If working to Pre SB.72-103 standard the gearbox may be withdrawn sufficiently during the procedure, gaining access to facilitate shimming.

- (1) Select the correct thickness adjusting shim (72-62-01/1-220-275) (72-09-21 Repair, Fig.428) from the range to accommodate the gap which exists between the mounting bracket (72-62-01/1-310) and the intermediate case flange. Record the thickness of the selected adjusting shim.
- (2) Select the correct thickness adjusting shim (72-62-01/1-10-65) (72-09-21 Repair, Fig.426) from the range to accommodate the gap which exists between the rear mounting bracket (72-62-01/1-130) and the intermediate case flange. Record the thickness of the selected adjusting shim.

ASSEMBLY

**72-00-00**

Page 598.6

Jun 1/99



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

- (3) Disassemble the bolts and the hollow pin retaining plate from the rear mounting bracket, then withdraw the hollow pin from the gearbox using the mechanical puller (Tool 957).
- (4) Disassemble the bolts and the hollow pin retaining plate from the rear mounting bracket, then withdraw the hollow pin from the gearbox using the mechanical puller (Tool 958). Allow the large diameter bolt to remain located in the bracket for ease of assembly.
- (5) Finally assemble the front mounting bracket (72-62-01/1-310) with the two hollow pins (72-62-01/1-290) and the correct thickness adjusting shim (72-62-01/1-220-275) previously determined to the intermediate case flange. Apply lubricant A to the threads of two bolts (72-31-02/2-110) then secure the bracket and shim with the bolts and nuts (72-31-02/2-100). Torque-tighten the bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m) ensuring a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).
- (6) Finally assemble the rear mounting bracket (72-62-01/1-130) with the correct thickness adjusting shim (72-62-01/1-10-65) to the intermediate case flange. Secure the bracket and shim to the flange with bolts (72-33-01/6-330 and 320) lubricated with lubricant A and nuts (72-33-01/6-290). Torque-tighten the bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m) ensuring a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).
- (7) Select the correct thickness adjusting shim (72-62-01/1-320-355) (72-09-21 Repair, Fig.429) from the range to accommodate the gap which exists between the front mounting bracket (72-62-01/1-310) and the gearbox. Record the thickness of the adjusting shim.
- (8) Select the correct thickness adjusting shim (72-62-01/1-140-185) (72-09-21 Repair, Fig.427) to accommodate the gap which exists between the rear mounting bracket (72-62-01/1-130) and gearbox. Record the thickness of the adjusting shim.

ASSEMBLY

72-00-00

Page 598.7

Jun 1/99



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (9) Finally assemble the correct thickness adjusting shim (72-62-01/1-320-355) between the front mounting bracket (72-62-01/1-310) and the gearbox. Assemble the hollow pin (72-62-01/8-8B) (SB.72-103) through the mounting bracket and adjusting shim to locate in the gearbox. Secure the bracket, shim and hollow pin with a retaining plate (72-62-01/1-375) and two bolts (72-62-01/1-300). Torque-tighten the two bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m) ensuring a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).
- (10) Finally assemble the correct thickness adjusting shim (72-62-01/1-140-185) between the rear mounting bracket (72-62-01/1-130) and the gearbox. Assemble the hollow pin (72-62-01/8-4B) (SB.72-103) through the mounting bracket and adjusting shim to locate in the gearbox. Secure the bracket shim and hollow pin with a retaining plate (72-62-01/1-205) (SB.72-103) and bolts (72-62-01/1-110 and 1-120). Push the large bolt (72-62-01/1-100) fully home then assemble the load spreading block (72-62-01/1-90) to the bolt and secure with the nut (72-62-01/1-80).
- (11) Torque-tighten bolts (72-62-01/1-110 and 120) between 67 and 73 lbf in. (7,6 and 8,2 N.m) ensuring a minimum run-down (locking torque) of 3.5 lbf in. (0,4 N.m). Torque-tighten the larger bolt (72-62-01/1-100) between 240 and 260 lbf in. (27,1 and 29,4 N.m) ensuring that the nut has a minimum locking (run-down) torque of 9.5 lbf in. (1,1 N.m).

#### E. Finally Secure Gearbox to Engine.

- (1) Ensure that the nuts securing the main mounting bracket have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the nuts between 67 and 73 lbf in. (7,6 and 8,2 N.m). Use a torque wrench in conjunction with cranked ring wrench (Tool 1530).

ASSEMBLY

72-00-00

Page 598.8

Jun 1/99



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

F. Check Rotational Movement of HP Rotating Assembly  
(Ref. Fig. 543).

- (1) Assemble the universal joint (Tool 1872) and the adapter (Tool 1876) to the turning location on the right-hand gearbox. Ensure that the assembly pin on the adapter flange locates in the gearbox flange. Secure the assembly with three equally spaced bolts, with lubricant 'A' applied, then torque-tighten the bolts between 90 and 100 lbf in. (10,2 and 11,3 N.m).
- (2) Insert the extension bar (Tool 1873) through the adapter and engage it with the universal joint.
- (3) Set the torque wrench (Tool 1874) to between 360 and 400 lbf in. (40 and 45 N.m) and assemble it with the torque adapter (Tool 1875) to the extension bar.

**CAUTION:** DO NOT EXERT FORCE IN EXCESS OF 400 LBF IN. (45 N.M) OR APPLY SHOCK LOAD. FRACTURE OF SHEAR NECK SHAFT IN GEARBOX COULD RESULT.

- (4) Apply a gradual force to the torque wrench and check the HP compressor assembly for free and even rotation.
- (5) Investigate and rectify restricted or uneven rotational movement.
- (6) On completion of satisfactory rotational check, remove the hand turning equipment.
- (7) Apply lubricant 'A' to the cover bolts. Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Assemble the gasket (72-63-01/4-80) and cover (72-63-01/4-70) to the right-hand gearbox, then secure the cover with seven load spreading washers and seven bolts (72-63-01/4-60 and 50). Torque-tighten the bolts between 90 and 100 lbf in. (10,2 and 11,3 N.m).
- (8) Remove the lifting equipment from the left-hand gearbox and assemble protector (Tool 222) to the gearbox.

ASSEMBLY

72-00-00

Page 598.9

Jun 1/99

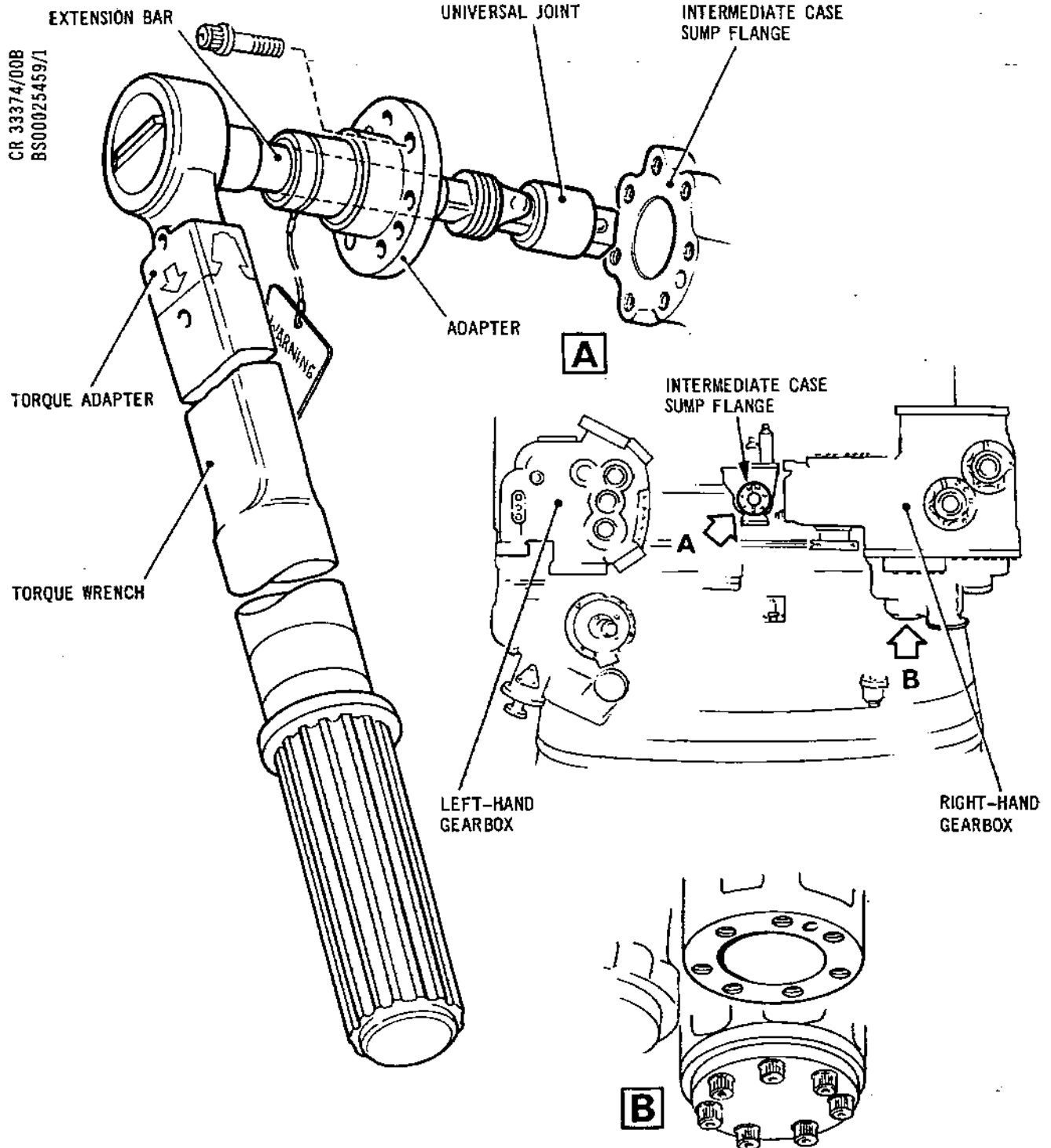


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Engine Hand Turning Equipment  
Figure 543



OLYMPUS 593

MK.610-14-28  
OVERHAUL29. Check Rotational Movement of LP Rotating Assembly

## A. Assemble Hand Turning Equipment to Intermediate Case Sump (Ref.Fig.543).

- (1) Remove the bolts securing the cover to the intermediate case sump (between the gearbox cases) and remove the cover.
- (2) Assemble the universal joint (Tool 1872) and adapter (Tool 1876) to the sump. Ensure that the assembly pin on the adapter flange locates in the sump flange. Secure the assembly with three equally spaced bolts, with lubricant 'A' applied, then torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (3) Insert the extension bar (Tool 1873) through the adapter and engage it with the universal joint.

## B. Check Rotation of LP Assembly.

- (1) Set the torque wrench (Tool 1877) to between 150 and 180 lbf in. (16,9 and 20,3 N.m) and assemble it with the torque adapter (Tool 1875) to the installed extension bar.

CAUTION: DO NOT EXERT FORCE IN EXCESS OF 180 LBF IN. (20,3 N.M) OR APPLY SHOCK LOAD. FRACTURE OF SHEAR NECK SHAFT IN INTERMEDIATE CASE SUMP COULD RESULT.

- (2) Apply a gradual force to the torque wrench and check the LP compressor assembly for free and even rotation.
- (3) Investigate and rectify restricted or uneven rotational movement.
- (4) On completion of satisfactory rotational check, remove the hand turning equipment.
- (5) Assemble cover to the intermediate case sump.

NOTE: This operation may be carried out in conjunction with assembly of the LP pulse probe to the drive housing (Ref. Para.30.A).

ASSEMBLY

72-00-00

Page 598.11

Jun 1/99





- (6) Apply lubricant 'A' to the cover bolts. Assemble and secure the gasket (72-64-00/1-25) and cover (72-64-00/1-20) to the sump with the seven bolts (72-64-00/1-10). Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m).

30. Assemble LP Pulse Probe, Oil Pressure Transmitter and Switch to Drive Housing (Ref. Fig.544)

A. Assemble LP Pulse Probe to Drive Housing (Ref. Fig.544).

NOTE: Before assembling the LP pulse probe, refer to SB.76-9 and SB.76-11.

- (1) Remove the pulse probe (76-12-01/1-10) from its protective container, check that the probe is not damaged. Assemble the probe and Corruplus seal (76-12-01/1-40) to the uppermost face of the drive housing (72-64-00/1-90), then secure the probe with eight bolts (76-12-01/1-20) lubricate with lubricant 'A'. Torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).
- (2) Ensure that the gap between the pulse probe and the splines of the drive shaft is between 0.010 and 0.020 in. (0,254 and 0,508 mm).

NOTE: Before assembling the drive housing cover refer to SB.72-41.

- (3) Assemble the drive housing cover (72-64-00/1-20) and gasket (72-64-00/1-25) to the drive housing and secure with seven bolts (72-64-00/1-10) lubricated with lubricant 'A'. Torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).



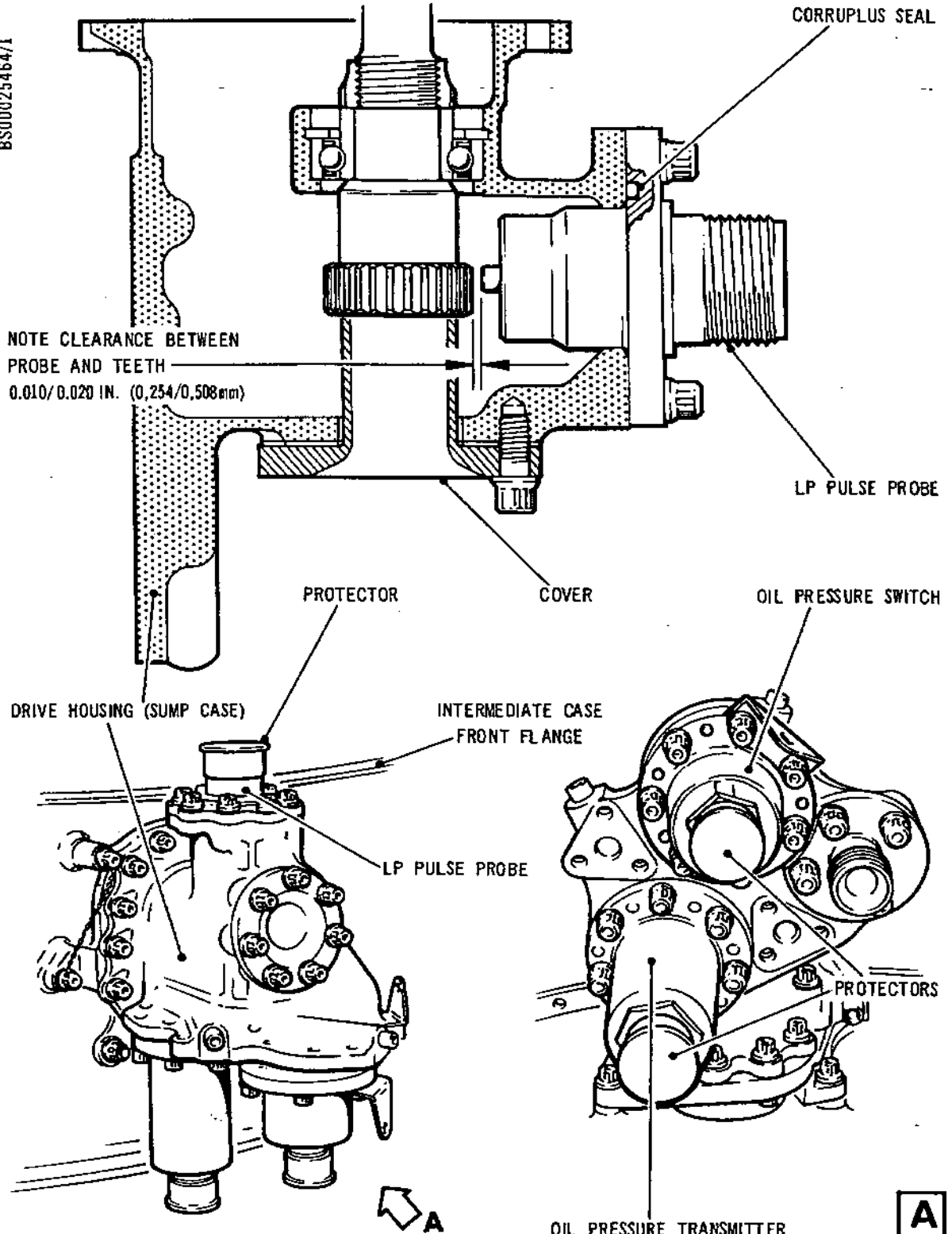
OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

CR 33512/00A  
BS00025464/1



Assembling Oil Switches and Pulse Probe  
Figure 544



OLYMPUS 593

MK.610-14-28  
OVERHAUL

B. Assemble the Oil Pressure Transmitter to Drive Housing (Sump Case) (Ref. Fig.544).

- (1) Ensure that the transmitter flange face is clean and undamaged. Assemble two seals (79-33-01/1-70 and 79-33-01/1-80) to the oil pressure transmitter flange 79-33-01/1-10), then assemble the transmitter to the drive housing. Lubricate seven bolts (79-33-01/1-20) with lubricant 'A', then secure the transmitter with the bolts. Torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).

C. Assemble the Oil Pressure Switch to Drive Housing (Ref. Fig.544).

- (1) Ensure that the flange of the pressure switch 79-33-02/1-10) is clean and free from damage, then assemble two seals (79-33-02/1-70 and 79-33-02/1-80) to the switch flange. Lubricate seven bolts (79-33-02/1-20) with lubricant 'A', then secure the switch, together with a bracket. Torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).

### 31. External Examination of Engine

A. Examination Procedure.

- (1) Ensure that all components assembled to the external surface of the engine are correctly secured. Examine all locking devices for correct locking and security.
- (2) Remove non-permanent identification markings (i.e. bolt position numbers on engine flanges).
- (3) Ensure that all protection blanks are correctly assembled to the engine.
- (4) Verify that all assembly operations and dimensional checks have been completed and recorded where applicable on the appropriate record sheets.
- (5) Ensure that all module identification plates are correctly assembled to the module plate mounting brackets (Ref. Fig.508).

ASSEMBLY

72-00-00

Page 598.14

Jun 1/99

# Technical Publications Query Form

From .....  
.....  
Postcode .....  
Tel. No. ....  
Fax No. ....  
Date .....

Queries on manual content should be stated clearly below, giving Aircraft Type and full manual reference. This form should then be faxed (*preferably*) or mailed to the address below.

Aircraft type/Model ..... Registration .....  
Title of Manual ..... Revision No. ....  
ATA Ref. .... Page ..... Page Date .....

To ensure a quicker reply, provide as much information as possible. Attaching marked – up pages where possible is also helpful.

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

*Fold page top to bottom to Line X-X, staple and post. (If not faxed)*

**T.I.S.** Contact ..... Tel. Ext. ....

**T.I.S. Reply** .....  
.....  
.....  
.....  
.....  
.....

X

X

To: Manager,  
Technical Information Services  
G2, TB"A" S.401  
LHR

Fax. (LHR) 23414



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

## TURBINE STATIC - SUB-ASSEMBLY

### TABLE OF CONTENTS

Para.		Page
1.	General ... ..	501
2.	HP Compressor Diffuser Case Assembly ... ..	502
	A. Assemble Diffuser Case to Assembly Stand ... ..	502
	B. Install Stepped Pins in Fuel Sprayer Pads ... ..	502
	C. Assemble Shoulder Bolts to Diffuser Case ... ..	502A
3.	Prepare the HP Turbine Bearing Support for Assembly ... ..	502B
	A. Assemble Pins and Bolts ... ..	502B
4.	Temporarily Assemble HP Turbine Bearing Unit to Bearing Housing ... ..	504
	A. Prepare to Assemble Bearing ... ..	504
	B. Assemble Bearing to Housing ... ..	507
5.	Assemble Bearing Housing to Bearing Support ... ..	509
	A. Prepare for Assembly ... ..	509
	B. Assemble Bearing Housing... ..	509
6.	Deleted.	
7.	Assemble Front Cover Unit to Bearing Support ... ..	511
	A. Prepare Front Cover Unit... ..	511
	B. Assemble Drain Tube to Screwed Connector ... ..	511
	C. Assemble Screwed Connector to Cover ... ..	512
	D. Assemble Insulation Blanket to Cover Unit ... ..	513
	E. Assemble Front Cover Unit ... ..	513
8.	Assemble Tube Fittings to Front Cover Unit ... ..	514
	A. Assemble Adapter Tube ... ..	514
	B. Seal Ring Gap Checks ... ..	514
	C. Assemble Oil Scavenge Tube End Assembly to Bearing Housing ... ..	514
	D. Assemble Oil Lubricating Nozzle and Tube End Assembly to Bearing Housing ... ..	515
9.	Assemble No.12 Labyrinth Seal to Diffuser Case for Adjusting Ring Checks ... ..	517
	A. Prepare for Checks... ..	517
	B. Calculate Adjusting Ring Thickness ... ..	517
10.	Assemble Air Duct Unit to Diffuser Case ... ..	519
	A. Prepare to Assemble Air Duct ... ..	519
	B. Assemble Air Duct ... ..	519
11.	Assemble Bearing Support to Diffuser Case ... ..	521
	A. Prepare to Assemble Bearing Support ... ..	521
	B. Assemble Bearing Support... ..	521

SUB-ASSEMBLY

# 72-00-51

Contents 1  
Dec 31/01



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

Para.	Page
12. Assemble Coupling Assemblies to Air Duct Unit ...	521
A. Seal Ring Gap Checks ...	521
B. Assemble Couplings to Air Duct Vanes No.1 and 4 ...	523
C. Assemble Couplings to Air Duct Vanes No.3, 5 and 6 ...	523
13. Calculate Thickness of Inner Adjusting Ring No.12 Labyrinth Seal...	525
A. Assemble Labyrinth Seal ...	525
B. Check Adjusting Ring Thickness...	525
C. Remove Labyrinth Seal and Adjusting Ring ...	527
14. Assemble Air Duct Outer to Air Duct ...	527
A. Install Air Duct Outer to S.B.72-8627-209 Standard ...	527
15. Assemble No.12 Labyrinth Seal to Diffuser Case...	527
A. Assemble Adjusting Rings...	527
B. Assemble Labyrinth Seal ...	528
16. Assemble HP Thrust Bearing Air Cooling Components ...	528
A. Prepare Spherical Seal Assembly ...	528
B. Assemble Spherical Seal Insulated Tube and Elbow...	528
17. Secure Coupling to No.5 and 6 Vane Positions ...	529
A. Secure Coupling to No.5 Position ...	529
B. Secure Coupling to No.6 Position ...	531
18. Check Radial Setting of No.12 Labyrinth Seal ...	531
A. Assemble Checking Equipment ...	531
B. Check Labyrinth Seal ...	535
C. Secure Labyrinth Seal ...	536
D. Remove Checking Equipment ...	536
E. Lock Shoulder Bolts on Labyrinth Seal Outer Flange.	539
19. Remove Bearing Centralizing Strip ...	539
A. Remove HP Turbine Bearing ...	539
20. Assemble Squeeze Film Oil Jet and HP Bearing Unit to Bearing Housing ...	541
A. Prepare Jet for Assembly...	541
B. Assemble Jet to Bearing Housing ...	541
C. Assemble Bearing Unit to Bearing Housing ...	541
21. Assemble No.16 Labyrinth Ring to Bearing Housing ...	542
A. Prepare to Assemble Labyrinth Ring ...	542
B. Assemble Labyrinth Ring ...	542
22. Assemble HP Turbine Bearing Oil Feed and Scavenge Tubes to Bearing Housing ...	542
A. Prepare Oil Feed Tube ...	542
B. Procedure for Installing Retaining Clip to S.B.72-8477-200 Standard on Insulation Blanket ...	543
C. Install Oil Feed Tube ...	543
D. Prepare Oil Scavenge Tube ...	544
E. Assemble Oil Scavenge Tube ...	544

SUB-ASSEMBLY

## 72-00-51

Contents 2

Jun 1/98



# OLYMPUS 593



MK.610-14-28

sheema

OVERHAUL

Printed in England

Para.	Page
23. Assemble HP Bearing Vent Tube to Bearing Housing ...	547
A. Prepare Vent Tube ...	547
B. Assemble Vent Tube...	548
24. Assemble Air Duct to Diffuser Case at No.5	
Vane Position ...	548
A. Position Air Duct ...	548
B. Secure Air Duct ...	549
C. Secure Tube Slotted Nuts...	549
25. Assemble HP Bearing Cooling Tubes to Bearing Housing	
Unit and Duct at No.3 Vane...	551
A. Prepare Tubes ...	551
B. Assemble Tubes ...	551
26. Flow and Pressure Test HP Bearing Oil System ...	553
A. Test Equipment Required ...	553
B. Assemble Pressure Test Equipment to Bearing Housing ...	553
C. Prepare Pressure Test/Flow Check Equipment...	554
D. Flow Check Bearing Assembly ...	554
E. Investigate and Rectify Unsatisfactory Oil Flow ...	555
F. Assemble Components After Investigation of Unsatisfactory Oil Flow Test...	556
G. Re-Assemble Pressure Test Blanks to Bearing Housing and Repeat Flow Test ...	559
H. Pressure Test Bearing Assembly ...	559
J. Remove Equipment After Satisfactory Pressure Test...	561
K. Investigate Oil Leakage ...	563
L. Rectify Oil Leakage from Bearing Housing Blanks ...	563
M. Assemble Blanks to Bearing Housing ...	564
N. Rectify Oil Leakage from Tube End Assemblies ...	564
P. Pressure Test After Rectification ...	568
Q. Rectify Oil Leakage from No.16 Labyrinth Ring ...	568
R. Re-Assemble Pressure Test Blanks to Bearing Housing and Repeat Pressure Test ...	570
27. Assemble Engine Mounting Trunnions to Diffuser Case ...	571
A. Prepare to Install Trunnions ...	571
B. Assemble Engine Trunnions ...	571
28. Assemble External Blanks and Ducts to Diffuser Case ...	573
A. Assemble Air Duct Vane Covers ...	573
B. Assemble Air Vent Duct to No.6 Vane ...	573
C. Blank Unused Igniter Ports ...	574
D. Blank Unused Fuel Sprayer Pad Locations ...	574
E. Assemble Blanking Plugs Near Unused Fuel Sprayer Pads...	576
F. Assemble Duct at No.1 Vane Position ...	577
G. Assemble Duct at No.4 Vane Position ...	577

SUB-ASSEMBLY

## 72-00-51

Contents 3

Jun 1/98



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

Para.	Page
29. Assemble fuel Sprayers to Diffuser Case ...	578
A. Assemble Sprayers ...	578
30. Transfer Diffuser Case Assembly to Final Assembly Stand ...	578B
A. Remove Diffuser Case from Assembly Stand ...	578B
B. Assemble the Diffuser Case in Assembly Stand ...	579
31. Assemble Shroud to Bearing Support ...	579
A. Prepare Shroud ...	579
B. Assemble Shroud ...	581
32. Assemble Combustion Chamber Outer Case to Diffuser Case ...	581
A. Prepare CCOC ...	581
B. Assemble Saddle Plates and Igniter Adapters to CCOC ...	584
C. Assemble CCOC ...	584
33. Prepare HP Nozzle Vane Support Cone for Assembly ...	587
A. Assemble Bolts and Pins ...	587
34. Calculate Thickness of HP Nozzle Vane Support Cone Adjusting Washer and 19 to 23 Labyrinth Seal Adjusting Washers ...	590
A. Temporarily Assemble Abutment Segments ...	590
B. Support Cone Adjusting Washer Measuring Procedure..	590
C. Measuring Procedure 19 to 23 Labyrinth Seal Adjusting Washer...	592
35. Assemble HP Turbine Nozzle Vanes to Combustion Chamber ...	592
A. Prepare Combustion Chamber ...	592
B. Pressure Wash Turbine Nozzle Vanes ...	594
C. Separate and Identify Nozzle Vanes ...	594
D. Assemble Nozzle Vanes for Dimensional Checks ...	595
E. Temporarily Assemble HP Nozzle Vane Support Cone to Combustion Chamber ...	597
F. Measure Turbine Entry Duct Gaps ...	597
G. Assemble Complete Nozzle Vane Assembly (Pre-S.B.72-124)...	598.1
H. Assemble Complete Nozzle Vane Assembly and Sealing Strip (S.B.72-124 Standard) ...	598.1
J. Final Assembly of HP Nozzle Vane Support Cone to Combustion Chamber ...	598.3
36. Assemble Combustion Chamber and Nozzle Vane Assembly to CCOC ...	598.3
A. Prepare Assembly ...	598.3
B. Install Assembly ...	598.3
C. Assemble Nozzle Vane Abutment Segments ...	598.5
D. Secure HP Turbine Nozzle Vanes to CCOC ...	598.7

SUB-ASSEMBLY

## 72-00-51

Contents 4  
Jun 1/98





# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

Printed in England

Para.	Page
37. Finally Assemble No.19 to 23 Labyrinth Seal Housing ...	598.13
A. Prepare to Assemble Housing ...	598.13
B. Assemble Housing ...	598.13
38. Deleted.	
39. Assemble Pilot Fuel Sprayers and Engine Igniter	
Plugs to CCOC ...	598.14
A. Prepare to Assemble Pilot Fuel Sprayers ...	598.14
B. Fuel Pressure Atomizing (Pilot) Nozzle Assembly	
Adjusting Washer Thickness Measuring Procedure...	598.14
C. Assemble Fuel Pressure Atomizing (Pilot) Nozzle	
Assembly to CCOC...	598.20
D. Igniter Plugs Spacer Washers Thickness Measuring	
Procedure ...	598.23
E. Assemble Engine Igniter Plugs to CCOC ...	598.24
40. Deleted.	
41. Assemble Heat Insulation Shields to CCOC...	598.27
A. Prepare Heat Shields ...	598.27
B. Assemble Heat Shields ...	598.27
42. Assemble Inspection Port Blanking Covers to CCOC ...	598.29
A. Prepare to Assemble Covers ...	598.29
B. Assemble Covers ...	598.29
43. Assemble Anti-icing Port Cover/Fuel Heater Bracket/	
Optical Pyrometer Ports Covers to CCOC...	598.30
A. Assemble Anti-icing Port Cover...	598.30
B. Assemble Fuel Heater Bracket ...	598.30
C. Assemble Optical Pyrometer Ports Blanking Plates	
and Brackets (Pre SB.72-7856-179 Standard). ...	598.32
D. Assemble Brackets to CCOC (SB.72-7856-179 Standard)	598.32
44. Temporarily Assemble LP Turbine Nozzle Vane Assembly	
to CCOC ...	598.33
A. Assemble LP Turbine Nozzle Vane Assembly ...	598.33
B. Turbine Nozzle Dimensional Check ...	598.35
C. Remove LP Turbine Nozzle Vane Assembly ...	598.36
45. Completion of Assembly...	598.36
A. Final Examination ...	598.36
B. Transport Sub-assembly to Main Engine Assembly	
Area... ...	598.36

## TABLE OF ILLUSTRATIONS

Fig.No.	Page
501 HP Compressor Diffuser Case in Assembly Stand ...	503
502 Assembling Bolts and Pins to Bearing Support ...	505
503 Temporarily Assembling HP Turbine Bearing to	
Bearing Support ...	506

SUB-ASSEMBLY

# 72-00-51

Contents 5

Jun 1/98



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

Fig.No.		Page
504	Assembling Bearing Housing to Bearing Support ...	508
505	Assembling No.16 Labyrinth Seal and Front Cover to Bearing Support ...	510
506	Assembling Tube Fittings to Front Cover Unit ...	516
507	Installing No.12 Labyrinth Seal and Checking Outer Adjusting Ring Thickness ...	518
508	Assembling Air Duct to Diffuser Case... ..	520
509	Assembling Bearing Support to Diffuser Case ...	522
510	Assembling Air Duct Couplings ... ..	524
510	No.12 Labyrinth Seal Inner Adjusting Ring Checks...	526
512	Installing HP Turbine Bearing Air Cooling Components and Tube Brackets... ..	530
513	Radial Check No.12 Labyrinth Seal ... ..	534
514	Assembling Eccentric Locking Items to Shoulder Bolts ... ..	538
515	Installing Squeeze Film Oil Jet ... ..	540
516	Insulation Blanket Retaining Clip Installation Detail ... ..	545
517	Installing HP Turbine Bearing Oil Feed - Scavenge and Vent Tubes ... ..	546
518	Installing HP Turbine Bearing Cooling Tubes ...	550
519	Installing HP Turbine Bearing pressure Test Equipment ... ..	552
520	Deleted	
521	Removing Squeeze Film Oil Jet ... ..	557
522	Wire-Locking Tube Fittings ... ..	562
523	Installing Engine Mounting Trunnions... ..	572
524	Installing External Components to Diffuser Case (Sheet 1 of 2) ... ..	575
524	Installing External Components to Diffuser Case (Sheet 2 of 2) ... ..	578A
525	Transferring Diffuser Case to Final Assembly Stand ... ..	578C
526	Assembling Shroud and Insulation Blanket to Bearing Support ... ..	580
527	Assembling CCOC to Diffuser Case ... ..	582
528	Assembling Attachment Items CCOC/Diffuser Case Flange (Sheet 1 of 2) ... ..	588
528	Assembling Attachment Item CCOC/Diffuser Case Flange (Sheet 2 of 2) ... ..	589
529	Adjusting Washers Measuring Procedure ... ..	591
530	Assembling Multiple Leg Sling to Combustion Chamber ... ..	593
531	HP Turbine Nozzle Vanes Pressure Washing Equipment ... ..	593

SUB-ASSEMBLY

## 72-00-51

Contents 6

Jun 1/98

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

Fig.No.		Page
532	Assembling HP Turbine Nozzle Vanes to Combustion Chamber ... ..	596
533	Assembling Support Cone to Combustion Chamber ...	598
534	Installing HP Nozzle Vane/Combustion Chamber Assembly ... ..	598.4
535	Installing HP Turbine Nozzle Vane Pins and Abutment Segments ... ..	598.6
536	Installation of Bolt and Locking Pin Retention Brackets ... ..	598.8
537	Assembling Pilot Nozzles and Igniter Plugs to CCOC ... ..	598.15
538	Deleted.	
539	Assembling Heat Insulation Shields to CCOC...	598.39
540	Assembling Inspection Port Covers to CCOC ...	598.31
541	Temporarily Assembling LP Turbine Nozzle Vane Assembly to CCOC... ..	598.34

#### LIST OF TABLES

Table No.		Page
501	Bracket Positions CCOC/Diffuser Case Flange ...	586
502	HP Turbine Nozzle Vane Assemblies Identification ... ..	595
503	Identification of HP Turbine Nozzle Vane Pins ...	598.9

SUB-ASSEMBLY

**72-00-51**Contents 7  
Jun 1/98

**OLYMPUS 593**

MK.610-14-28

OVERHAUL

**TURBINE STATIC - SUB-ASSEMBLY****1. General**

- A. Prior to commencing assembly, refer to 72-09-00, Assembly for general information.
- B. Throughout the text special tools are quoted by their Ref. No. e.g. (Tool 1234). For a complete list of tooling required for the assembly, and for the manufacturer's Part No., refer to Special Tools, Fixtures and Equipment Table 1002.
- C. During the sub-assembly procedure reference will be made to the Illustrated Parts Catalogue (IPC) to identify those items where the nomenclature does not positively identify them, due to duplication of the title e.g. nuts, bolts, washers, bearings, gears, housings, tubes, etc. Where the item is a part of the text concerned, the item will be identified as e.g. bolt (1-10), the 1 referring to the IPC Fig.No. and the 10 referring to the Item No. Where items from a different breakdown are introduced, then the breakdown number will be quoted in addition e.g. bolt (72-32-01/1-10).
- D. During the sub-assembly procedure, where the thickness of adjusting washers has to be determined, the words 'select' or 'select from the range' are used. If a range of washers is not available, it may be necessary to machine the washer to achieve the desired thickness. The information for machining washers is given under chapter 72-09-21 Repair. During the assembly procedure, the machining procedure reference will be given immediately after each adjusting washer I.P.C. Ref. No. in the appropriate part of the text e.g. select from the range the correct thickness adjusting washer (3-70) (72-09-21 Repair, Fig.401).
- E. The turbine static sub-assembly is basically composed of the HP compressor diffuser case and combustion chamber outer case (CCOC) assembled together by means of a bolted flange. Each case contains a series of components most of which are installed before the cases are assembled together. Two assembly stands are used with other tools and equipment. Assembled internally to the diffuser case is the HP turbine bearing support, roller bearing assembly (less inner track) and associated lubrication, venting and air cooling components. Externally the main fuel sprayers are secured to the case. The combustion chamber and HP turbine nozzle vanes are assembled together and installed as a unit in the CCOC. Externally the pilot

SUB-ASSEMBLY

**72-00-51**

Page 501

Apr 1/77

**OLYMPUS 593**

MK.610-14-28

sneema

OVERHAUL

fuel sprayers and engine igniter plugs are secured to the case. Heat insulation shields are assembled externally to the CCOC in the final stages of assembly. Housed within the complete sub-assembly are labyrinth seals No.12 to 23, No.12 being located within the diffuser case. On completion of assembly the sub-assembly is conveyed on a pallet to the engine assembly area.

NOTE: Rationalisation of operator build sequence for the HP Compressor Diffuser Case and the CCOC sometimes results in a build sequence which may vary from the Overhaul Manual sequence. In all such cases, the overriding requirement on completion of assembly must be compliance with Para.45A Final Examination.

## 2. HP Compressor Diffuser Case Assembly

### A. Assemble Diffuser Case to Assembly Stand (Ref.Fig.501).

- (1) Adjust the assembly stand (Tool 1160) to position the mounting plate (Tool 99) at its lowest point in the horizontal position. Ensure that the lever clamps on the mounting plate are retracted clear of the machined recess.
- (2) Assemble the multiple leg sling (Tool 1191) to the diffuser case and attach to the overhead crane. Manipulate the diffuser case into position on the adapter ensuring that the diffuser case flange is correctly located into the adapter recess. Secure the diffuser case to the adapter by operating the lever clamps. Detach the crane from the sling and remove the sling from the diffuser case.

### B. Install Stepped Pins in Fuel Sprayer Pads (Ref.Fig.501).

- (1) Ensure that the pin locations are undamaged. Freeze shrink the pins (72-34-00/3-10) using a suitable freezing substance. Insert the pins into the sprayer pads.

SUB-ASSEMBLY

**72-00-51**

Page 502

Jun 1/98



OLYMPUS 593



MK.610-14-28

snecma

OVERHAUL

- (2) Assemble sprayer bosses if previously removed (applicable to case Pt. Nos. B925231 and B934987 with bolt-on sprayer bosses only).
  - (a) Identify the sprayer boss (matched part) with its position on the case.
  - (b) Apply lubricant A to threads of the countersunk screws.
  - (c) Apply jointing compound A between the sprayer boss and the case, and under the heads of the countersunk screws.
  - (d) Assemble the sprayer boss to its location on the case and secure with two countersunk screws and nut plate. Tighten the two countersunk screws and ensure that the screwheads do not protrude above the surface of the boss. Peen the heads of the two countersunk screws using a centre-punch.
  - (e) Ensure the pin locations are undamaged. Freeze shrink the stepped pins (72-34-00/3-10) using a suitable freezing substance. Insert the stepped pins into the sprayer bosses.

C. Assemble Shoulder Bolts to Diffuser Case (Ref.Fig.501).

- (1) Insert four shoulder bolts (72-34-00/2-360) through the outer of the two flanges located in the centre area of the diffuser case, ensuring that boltheads are positioned on the bottom face of the flange. Each bolt-hole is identified by two countersunk holes in the top face of the flange.
  - (a) Ensure that the boltheads are fully in contact with the bottom face of the flange, no gap is permissible at any point between the faces.

SUB-ASSEMBLY

**72-00-51**

Page 502A

Jun 1/98



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (2) Apply lubricant A to the screws. Secure each bolt with a countersunk screw (72-34-00/2-350) and self-locking nut (72-34-00/2-340), using the special screwdriver (Tool 1626) to tighten the screws. Blank the unused countersunk hole near each shouldered bolt with a countersunk screw and self-locking nut.
- (3) Ensure that the countersunk screws do not protrude above the surface of the flange.
- (4) Ensure that the nuts have a minimum locking (run-down) torque of 6 lbf in. (0,68 N.m). Torque-tighten the nuts to 26 lbf in. (2,9 N.m). Recheck for absence of gap between boltheads and bottom face of flange.

### 3. Prepare the HP Turbine Bearing Support For Assembly

#### A. Assemble Pins and Bolts (Ref.Fig.502).

- (1) Place the bearing support into its support stand (Tool 95).
- (2) Assemble the 58 bolts (72-51-01/5-70) to the rear outer flange section of the bearing support ensuring that the bolts protrude rearward through the flange. Using the sleeve (Tool 1663), assemble a retaining ring (72-51-01/5-60) to each bolt.
- (3) Assemble the pins to the bearing support.
  - (a) Shrink the pins by freezing. Insert the six shouldered pins (72-51-01/5-35) into the rear outer flange of the bearing support.
  - (b) Insert the four locating pins (72-51-01/4-420) into the rear inner flange of the bearing support.
  - (c) Insert a pin (72-51-01/5-30) into the front flange of the bearing support.

SUB-ASSEMBLY

**72-00-51**

Page 502B

Dec 31/00



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

NO GAP PERMISSIBLE  
BETWEEN THESE FACES

CR 30424/000

FLANGE

BOLTHEAD

SHOULDER BOLT

VANE NO. 2

VANE NO. 3

VANE NO. 4

TOP  
VANE NO. 1

VANE NO. 8

VANE NO. 7

VANE NO. 6

VANE NO. 5

SHOULDER BOLT

MULTIPLE LEG SLING

SHOULDER BOLT

MOUNTING PLATE

LEVER CLAMP  
(LOCKED)

FUEL SPRAYER PAD

ASSEMBLY STAND

COUNTERSUNK  
SCREWS

NUTPLATE

STEPPED PINS

CASE

BOLTED ON SPRAYER BOSS  
(CASE PART NOS. B925231  
AND B934987)

CAST SPRAYER BOSS  
(ALL OTHER PART NOS.)

HP Compressor Diffuser Case in Assembly Stand  
Figure 501

SUB-ASSEMBLY

72-00-51

Page 503

Jun 30/95





OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

#### 4. Temporarily Assemble HP Turbine Bearing Unit to Bearing Housing (Ref.Fig.503)

##### A. Prepare to Assemble Bearing.

- (1) Place the bearing housing on a clean flat surface with the oil connections facing downward.
- (2) If the roller bearing (72-33-02/3-120) is new, remove the protective wrapping and protective grease from the bearing (Ref.72-09-00 Assembly).

NOTE: On engines to SB.0L.593-72-9066-439, the bearing outer race cage and roller (72-33-02/3-121/3-123) and the bearing inner race (72-33-02/3-122/3-124) are separate spareable items. Therefore a mixed new/not new assembly maybe used.

- (3) If the bearing (72-33-02/3-120) is not new assemble the rollers cage and outer track.

NOTE 1: The following procedure should be done in an approved clean room.

NOTE 2: On engines to SB.0L.593-72-9066-439, the bearing outer race cage and roller (72-33-02/3-121/3-123) and the bearing inner race (72-33-02/3-122/3-124) are separate spareable items. Therefore a mixed new/not new assembly maybe used.

- (a) Position the cage in the outer track, then using finger pressure carefully insert each roller into the cage. Check the rollers for free rotation.
- (4) Place a 0.002 or 0.003 in. (0,050 or 0,076 mm) feeler gauge strip around the outer diameter of the roller bearing assembly. The feeler gauge strip must be no wider than the roller bearings and is used to centralize the bearing assembly in the bearing housing.

NOTE: An alternative method of centralizing the bearing is to temporarily insert four 0.002 - 0.003 in. (0,050 - 0,076 mm) feeler gauges, equi-spaced around the outer diameter of the roller bearing assembly.

SUB-ASSEMBLY

72-00-51

Page 504

Dec 31/00

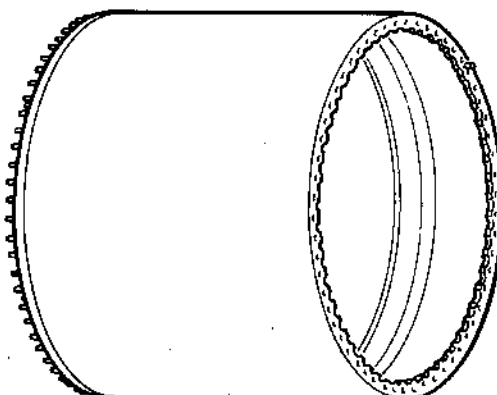
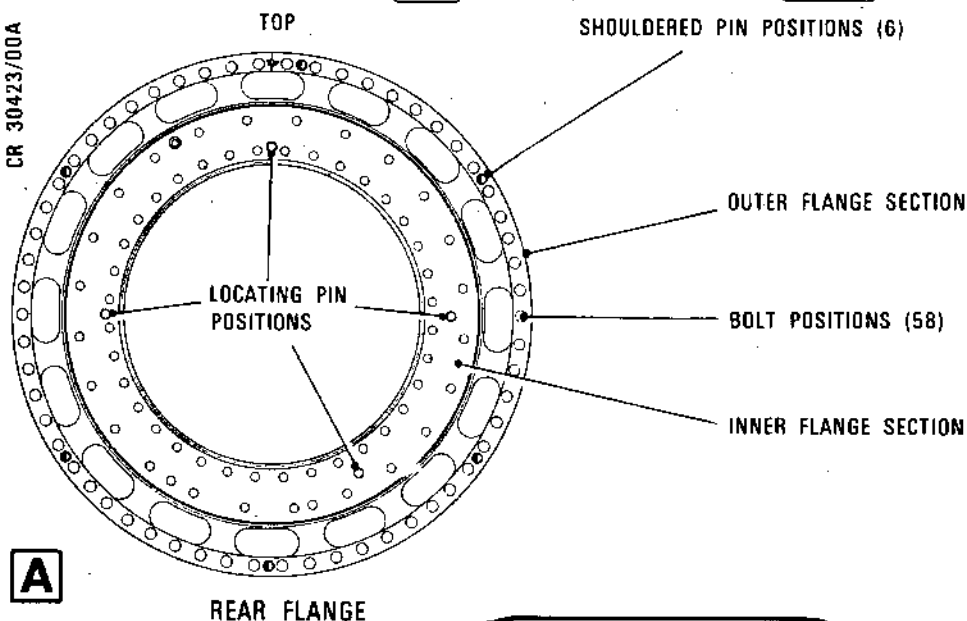


OLYMPUS 593

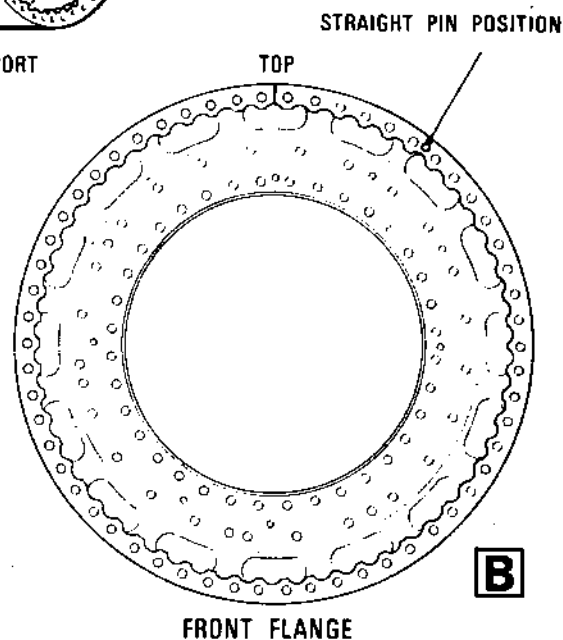
MK.610-14-28  
OVERHAUL



CR 30423/00A



H.P. TURBINE BEARING SUPPORT



Assembling Bolts and Pins to Bearing Support  
Figure 502

SUB-ASSEMBLY  
**72-00-51**

Page. 505  
Sep 28/75



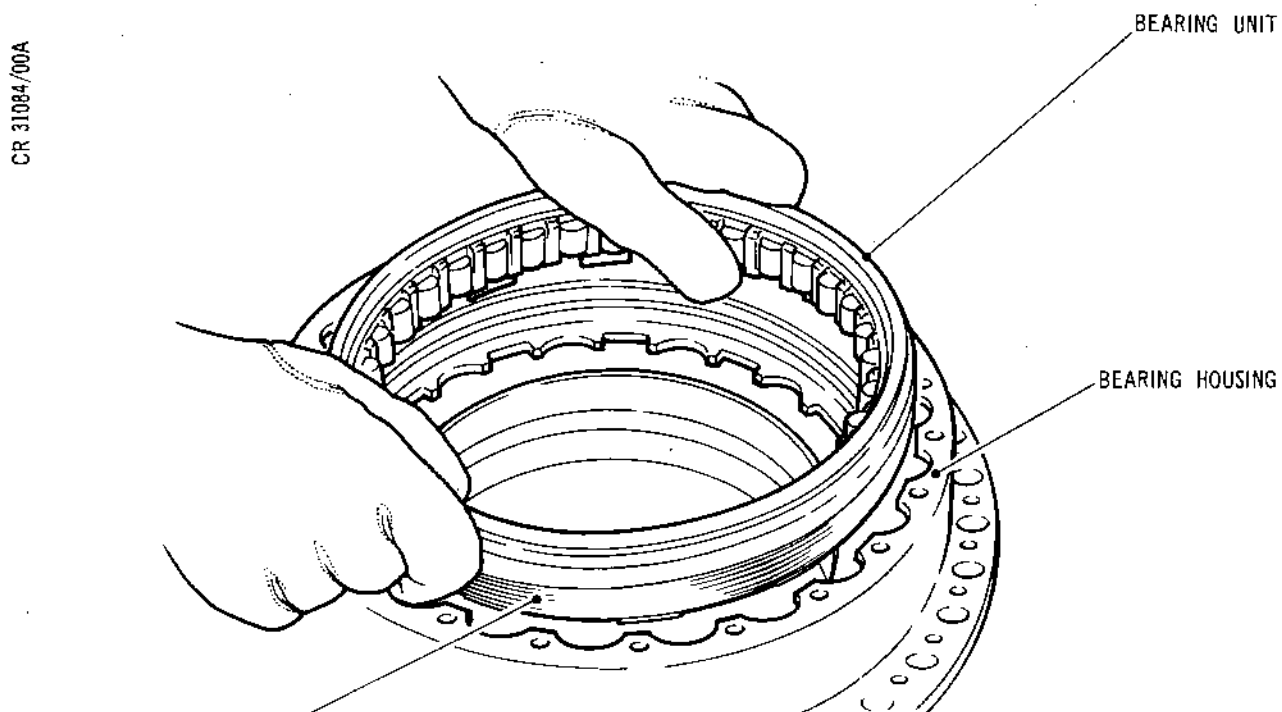
OLYMPUS 593

MK.610-14-28

OVERHAUL

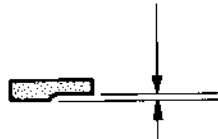


CR 31084/00A

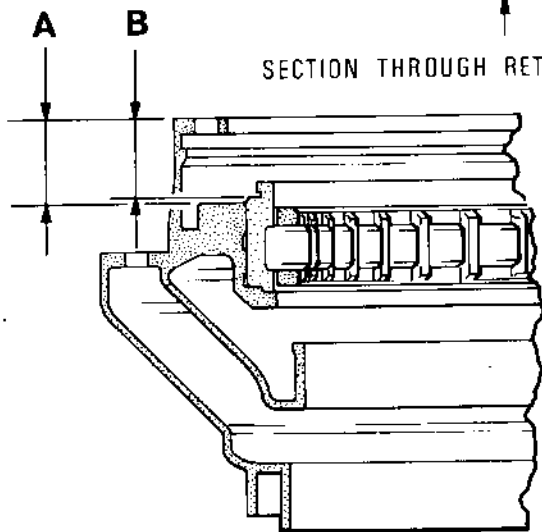


CENTRALISING STRIP

DIMENSION C

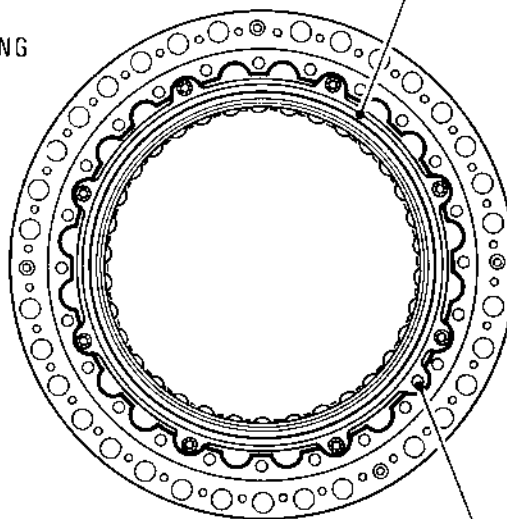


SECTION THROUGH RETAINING RING



SECTION THROUGH BEARING HOUSING

BEARING RETAINING RING



OIL JET HOLE

Temporarily Assembling the HP Turbine Bearing to  
Bearing Support  
Figure 503

SUB-ASSEMBLY  
**72-00-51**

Page 506  
Sep 28/75

TN30075



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

## B. Assemble Bearing to Housing.

NOTE: Dimensional check is not necessary if the bearing housing (72-51-01/4-300 to 330), retaining ring (72-51-01/4-340 to 370) and bearing (72-33-02/3-120B) are supplied as matched components through SB.72-17. Ensure that these components are retained as matched items.

- (1) Slide the bearing and centralizing strip into the housing ensuring that the castellations engage fully.

NOTE: It is permissible to temporarily insert four equally disposed feeler gauges in lieu of the centralizing strip. Refer para.4A(4) note.

- (2) On engines to Pre SB.72-17 standard carry out the dimensional checks to determine the retaining ring thickness (Ref.Fig.503).
  - (a) Measure and record dimension A.
  - (b) Measure and record dimension B.
  - (c) The required retaining ring thickness dimension  $C = (A - B) + 0.001 \text{ in. (0,025 mm)}$ .



OLYMPUS 593

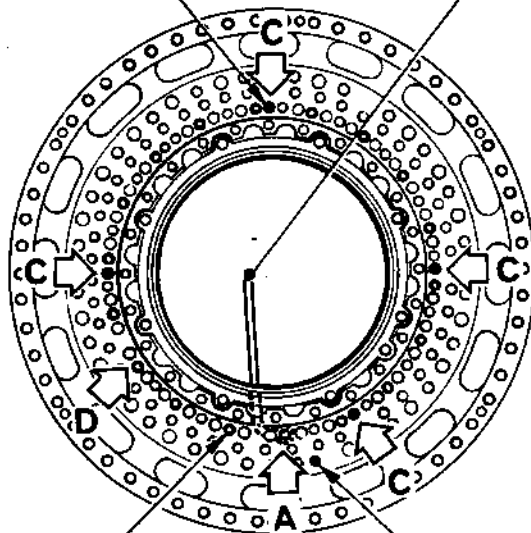
MK.610-14-28  
OVERHAUL



CR 31085/00B

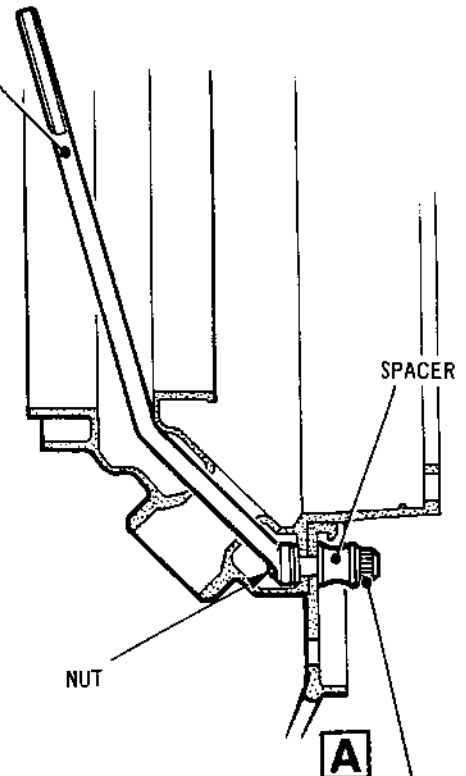
LOCATING PINS AT  
POSITIONS MARKED **C**

LEFT HAND IMMOBILISER  
RIGHT HAND SIMILAR

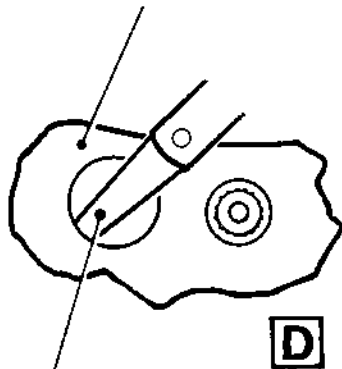


BEARING HOUSING  
RETAINING BOLT

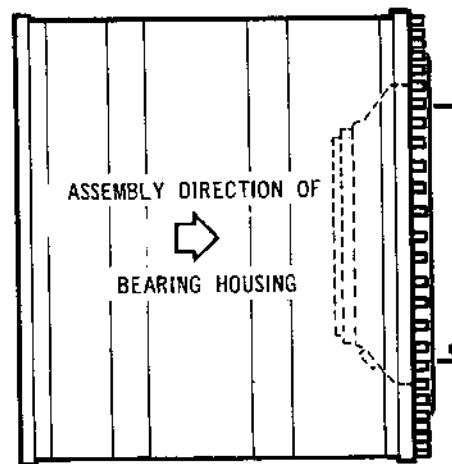
OIL JET HOLE



SECTION OF BEARING SUPPORT



FEELER  
GAUGE



BEARING HOUSING  
RETAINING BOLT

**B**

BEARING HOUSING

Assembling Bearing Housing to Bearing Support  
Figure 504

SUB-ASSEMBLY  
**72-00-51**

Page 508  
Mar 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL *sneema*

- (3) On engines to Pre SB.72-17 standard select a retaining ring from the range (72-51-01/4-340 to 370) (72-09-21 Repair, Fig.416) to suit the dimension C requirement. On engines to SB.72-17 standard ensure that the retaining ring and housing are retained as matched components.
- (4) Apply lubricant 'A' to the eight bolts(72-51-01/4-240). Place the retaining ring in position on the bearing assembly ensuring that the oil jet hole in the retaining ring aligns with the hole in the bearing housing. Secure the retaining ring with the eight bolts.

## 5. Assemble Bearing Housing to Bearing Support (Ref.Fig.504)

### A. Prepare for Assembly.

- (1) Place the bearing support into an oven and heat to a temperature of 120 deg C.
- (2) Place the support stand (Tool 95) in an accessible position in the vicinity of the oven. On completion of the given heating time, remove the bearing support from the oven and carefully place it in the support stand. Wear suitable protective gloves when handling the heated component.

### B. Assemble Bearing Housing.

- (1) Assemble the bearing housing unit to the rear flange of the bearing support. Press the unit fully into position ensuring that the pins engage correctly.
- (2) Apply lubricant A to the bolts (72-51-01/4-290) and spacers (72-51-01/4-280). Insert the bolts through the bearing support flange and bearing housing and screw the nuts (72-51-01/4-270) onto the bolts.

NOTE: Lubricant must be applied to bolt threads also under the boltheads and to the ends of spacers.

- (3) Using the immobilizers (Tool 841 and Tool 842) to hold the nuts, ensure that the bolts have a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m) then torque-tighten the bolts to 100 lbf in. (11,5 N.m).
- (4) Ensure that the bearing housing is fully in position in the bearing support. Use a 0.001 in. (0,025 mm) feeler gauge to check the assembly.

SUB-ASSEMBLY

72-00-51

Page 509

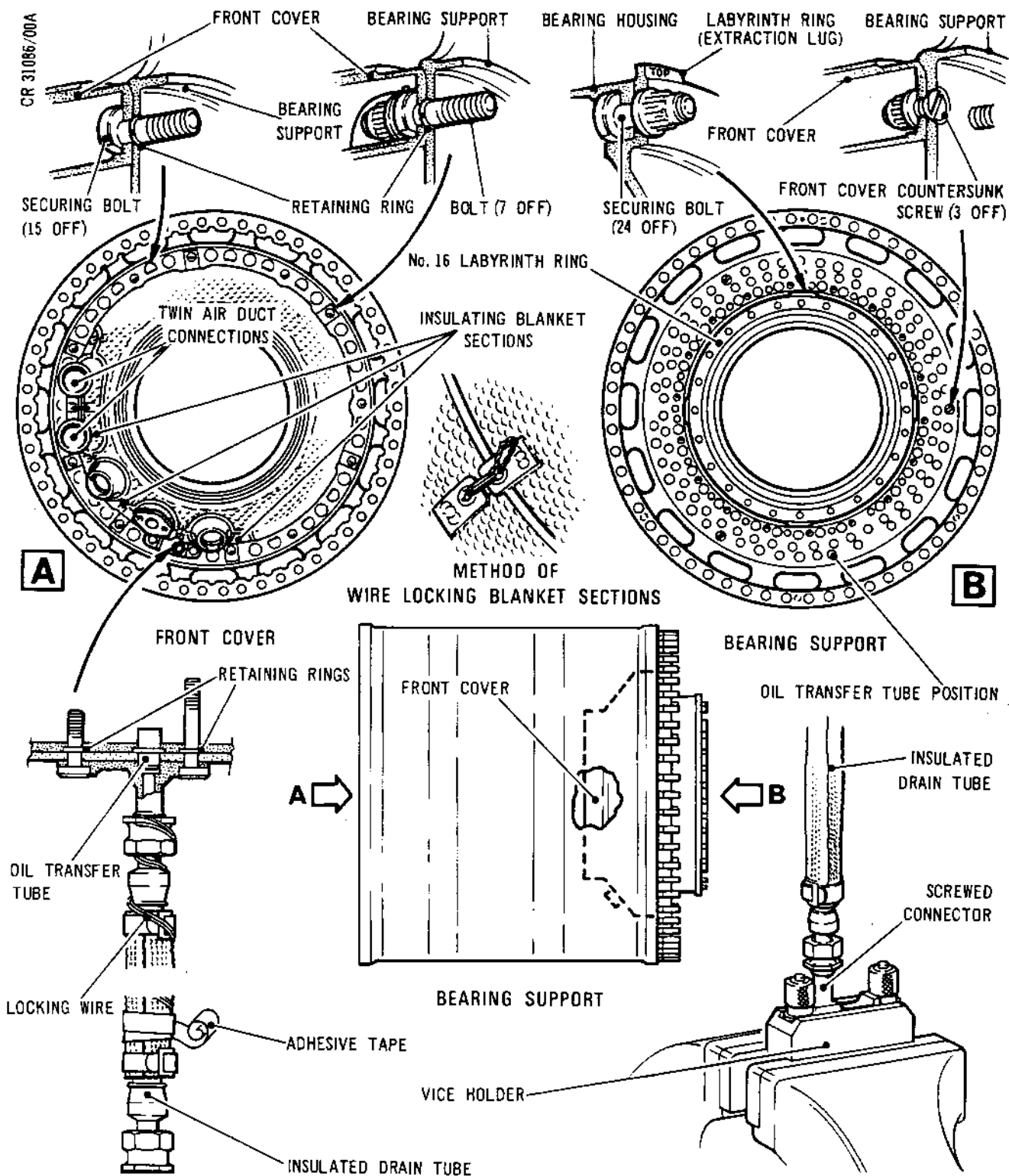
Jun 1/98



# OLYMPUS 593

MK.610-14-28

OVERHAUL



Assembling No.16 Labyrinth Seal and Front Cover  
to Bearing Support  
Figure 505

SUB-ASSEMBLY  
**72-00-51**

Page 510  
Sep 28/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

6. Deleted

7. Assemble Front Cover Unit to Bearing Support (Ref.Fig.505)

A. Prepare Front Cover Unit.

- (1) Place the insulation blanket sections (72-51-01/4-10A-20A) Pre-SB.72-20 or (72-51-01/4-20B) SB.72-20 in position on the front cover and note the hole positions for the seven D-head bolts (72-51-01/4-60 (Ref.Fig.505 view A).
- (2) Remove the insulation blanket sections and insert the seven bolts into position on the front cover flange. Ensure that the flat section of each bolt is correctly positioned and that the retaining ring groove of each bolt is located on the rear face of the front cover (Ref.Fig.505 view A).
- (3) Secure each bolt with a retaining ring (72-51-01/4-50) assembled by using assembly sleeve (Tool 1321).

B. Assemble Drain Tube to Screwed Connector (Ref.SB.72-84) (Ref.Fig.505).

- (1) Assemble the screwed connector (72-51-01/4-150) to the vice holder (Tool 968) and secure with the special washers and thumbnuts.
- (2) Clamp the vice holder in a bench vice.

Printed in England





OLYMPUS 593

MK.610-14-28

OVERHAUL



- (3) Apply lubricant 'A' to the threads and engage the drain tube union nut (72-34-00/1-420) with the screwed connector.
- (4) Using spanner (Tool 1181) torque-tighten the drain tube union to 125 lbf in. (14 N.m).
- (5) Assemble the insulation top and bottom halves (72-34-00/1-440-450) to the drain tube and secure with clips (72-34-00/1-430).
- (6) Remove the assembly from the vice holder. Secure the special washers and thumbnuts to the vice holder and remove from the bench vice.

C. Assemble Screwed Connector to Cover (Ref.Fig.505).

- (1) Place the screwed connector drain tube assembly flange in position on the front of the cover unit flange.
- (2) Insert bolt (72-51-01/4-120) and bolt (72-51-01/4-130 or 140) through the screwed connector flange and cover unit flange ensuring that the flat edge of each bolt abuts with the raised sections of the screwed connector flange.

NOTE: For conditions attached to the alternative use of bolt (72-51-01/4-130 or 140) refer to the IPC.

- (3) Secure each bolt with a retaining ring (72-51-01/4-110) assembled by assembly sleeve (Tool 1321).
- (4) Select a section of locking wire approximately 18.0 in. (457,2 mm) long.
- (5) Thread half of the locking wire length through the locking hole in the screwed connector, and carefully wind the doubled wire strand around the drains tube in readiness for use at a later stage.
- (6) Using adhesive tape, lightly secure the ends of the locking wire to the drains tube.

D. Assemble Insulation Blanket to Cover Unit (Ref.Fig.505).

- (1) Insert fifteen bolts (72-51-01/4-90) through the remaining holes in the front cover unit flange (Ref. Fig.505 view A). Secure each bolt with a retaining ring (72-51-01/4-80) assembled by using assembly sleeve (Tool 1321).
- (2) Assemble the small and large section of the insulating blanket (72-51-01/4-10 and 20A) Pre-SB.72-20 or (72-51-01/4-20B) SB.72-20 to the front cover unit.
- (3) Apply lubricant 'A' to bolt threads and secure the blanket assembly to the front cover with seven nuts (72-51-01/4-30). Ensure that the nuts have a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m). Torque-tighten the nuts to 100 lbf in. (11,5 N.m).
- (4) Wire-lock the front cover insulation blanket sections together.
- (5) Assemble the insulation blanket sections to the twin air duct connections on the front cover. Wire-lock the sections together.

E. Assemble Front Cover Unit (Ref.Fig.505).

- (1) Insert the oil transfer tube (72-51-01/4-200) into the hole in the front cover unit flange located at the screwed connector position. Note the position of the transfer tube hole in the rear flange of the bearing support located near the bottom position.
- (2) Position the front cover inside the bearing support and over the bearing housing. Engage the transfer tube with the hole in bearing support flange.
- (3) Apply lubricant 'A' to the threads of countersunk screws (72-51-01/4-170).
- (4) Secure the front cover unit to the bearing support with three countersunk screws and self-locking nuts (72-51-01/4-160) inserting the screws through the rear face of the bearing support flange (Ref.Fig.505 view B).
- (5) Ensure that the nuts have a minimum locking (run-down) torque of 6 lbf in. (0,68 N.m). Torque-tighten the nuts to 26 lbf in. (2,9 N.m).

SUB-ASSEMBLY

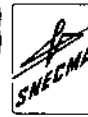
**72-00-51**

Page 513

Oct 1/82



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



8. Assemble Tube Fittings to Front Cover Unit (Ref.Fig.506)

A. Assemble Adapter Tube.

- (1) Assemble the adapter tube (72-51-01/3-240) to the raised flange positioned near the drains tube and secure it with two bolts (72-51-01/3-230) lubricated with lubricant 'A'.
- (2) Torque-tighten the bolts to 100 lbf in. (11,5 N.m), then wire-lock the bolts together.

B. Seal Ring Gap Checks.

- (1) Ensure thorough cleanliness of all components.
- (2) Select two seal ring assemblies (72-51-01/3-200-250). Carefully insert each ring (72-51-01/3-200) separately into the oil feed bore in the bearing housing. Ensure that the seal ring is installed evenly.
- (3) Measure and record the gap between the seal ring ends of each ring and check that the clearances obtained are within the limits quoted in Fits and Clearances Schedule (72-51-01 F.C.S.244).
- (4) Identify the ring assembly in preparation for assembly to the oil feed tube end assembly.
- (5) Carefully insert each ring (75-51-01/3-250) separately into the oil scavenge bore in the bearing housing. Ensure that the seal ring is installed evenly.
- (6) Repeat the seal ring gap check and check that the clearances obtained are within the limits quoted in Fits and Clearances Schedule (72-51-01 F.C.S.244).
- (7) Identify the ring assembly in preparation for assembly to the oil scavenge tube end assembly.

C. Assemble Oil Scavenge Tube End Assembly to Bearing Housing.

- (1) Ensure that the spherical joint of the tube end assembly (72-51-01/3-260) is damage free. Assemble the seal ring assembly (72-51-01/3-250) to the grooved recess in the castellated union nut. The small diameter sealing ring is assembled between the two larger rings.



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Ensure that the open section of each ring is not aligned with the open section of an adjacent ring. Apply lubricant 'A' to the union nut thread and screw the tube end assembly union into position near the bottom location of the bearing housing. Using spanner (Tool 1598) lightly tighten union nut.

D. Assemble Oil Lubricating Nozzle and Tube End Assembly to the Bearing Housing.

- (1) Ensure that the spherical joint of the tube end assembly (72-51-01/3-210) is damage free. Assemble the seal ring assembly (72-51-01/3-200) to the grooved recess in the castellated union nut. The small diameter seal ring is assembled between the two larger rings.
- (2) Ensure that the open section of each ring is not aligned with the open section of an adjacent ring.
- (3) On engines to SB.72-1 or SB.72-39 standard apply lubricant 'A' to the oil lubricating nozzle (72-51-01/3-220A or 220B). Assemble the nozzle to the tube end assembly (72-51-01/3-210B) SB.72-1 and torque-tighten the nozzle to 50 lbf in. maximum (5,6 N.m) maximum.
- (4) On engines to Pre-SB.72-1 or SB.72-8800-311 standard insert the filter assembly (72-51-01/3-215A or 215B) into the tube end assembly (72-51-01/3-210A or 210C). Apply lubricant 'A' to the tube end assembly union nut thread. Ensure that the filter is in position then screw the tube end assembly into the front cover. Lightly tighten the union nut with spanner (Tool 1598).
- (5) On engines to SB.72-1 or SB.72-39 standard calculate the clearance gap between the face of the oil lubricating nozzle and face of the bore in the front cover (Ref.Fig.506).

NOTE: Dimension A and B are checked before the tube end assembly is installed.

- (a) Check and record dimension A.
- (b) Ensure that the union nut is in contact with the flange on the spherical joint. Check and record dimension B.
- (c) Apply lubricant 'A' to the tube end assembly union nut then screw the tube end assembly into the front cover. Using torque wrench (Tool 694) and adapter (Tool 695) torque-tighten the castellated union nut to 460 lbf in. (52 N.m).

SUB-ASSEMBLY

**72-00-51**

Page 515

Dec 1/85



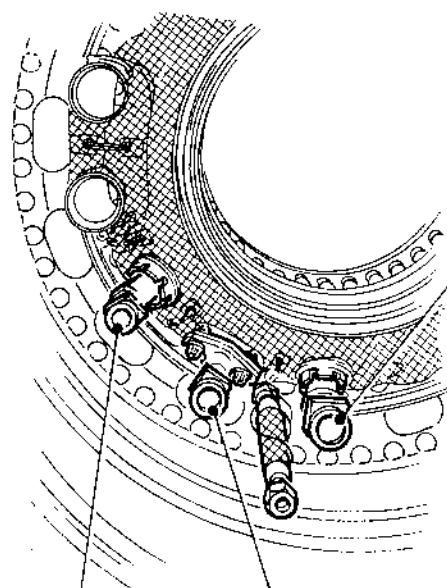
# OLYMPUS 593

MK.610-14-28

OVERHAUL



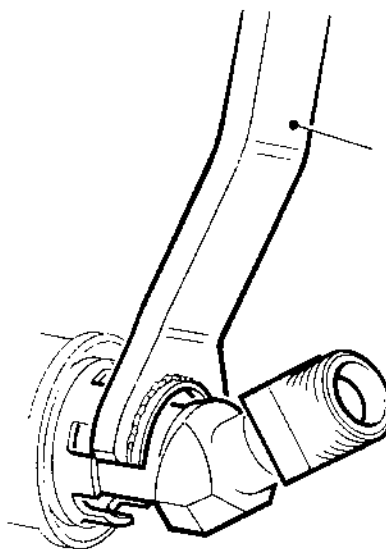
CR 31087/000



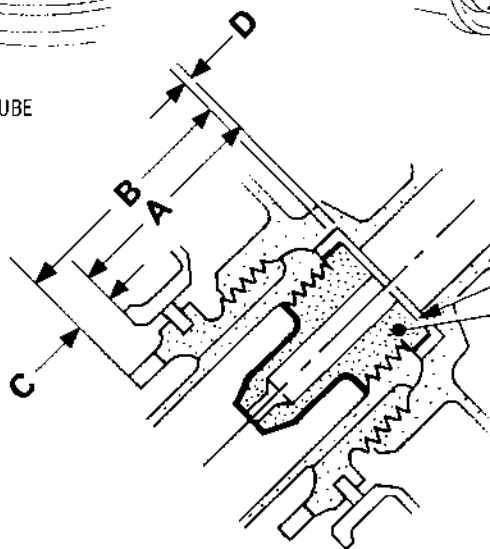
OIL FEED TUBE  
END ASSEMBLY

ADAPTER TUBE

OIL SCAVENGE TUBE  
END ASSEMBLY



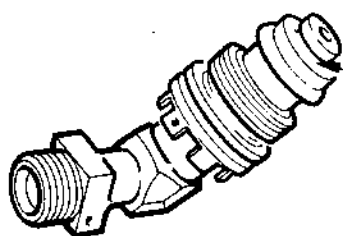
SPANNER



SECTION VIEW OF INSTALLED  
OIL FEED TUBE END ASSEMBLY

LOCATING BORE

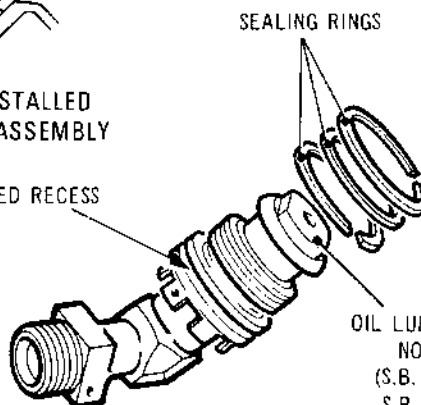
OIL LUBRICATING NOZZLE  
(S.B. 72-39)



OIL FILTER  
(PRE S.B. 72-1  
OR S.B. 72-8800-311)

OIL FEED TUBE END ASSEMBLY  
(PRE S.B. 72-1 OR S.B. 72-8800-311)

GROOVED RECESS



SEALING RINGS

OIL LUBRICATING  
NOZZLE  
(S.B. 72-1 OR  
S.B. 72-39)

OIL FEED TUBE END ASSEMBLY  
(S.B. 72-1 OR S.B. 72-39)

Assembling Tube Fittings to Front Cover Unit  
Figure 506

SUB-ASSEMBLY

## 72-00-51

Page 516

Dec 1/85



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (d) Check and record dimension C.
- (e) Calculate clearance gap D as follows:  
 $(A + C) - B = \text{clearance gap D.}$  This dimension must not be less than 0.020 in. (0,508 mm).
- (f) On completion of the dimensional check, slacken the tube end assembly union nut. Final torque-tightening is detailed later during assembly of tubes.

9. Assemble No.12 Labyrinth Seal to Diffuser Case for Adjusting Ring Checks

A. Prepare for Checks (Ref.Fig.507).

- (1) Select any adjusting ring from the range (72-34-00/2-120-210) (72-09-21 Repair, Fig.414) and measure and note the thickness of the ring.
- (2) Align the holes in the ring with the holes in the flange and place the ring over the shoulder bolts assembled to the flange.
- (3) Place the labyrinth seal (72-34-00/2-110) in position over the adjusting ring.
  - (a) Align the bolt-holes in the labyrinth seal flange with the adjusting ring holes. The shouldered bolt-holes in the labyrinth seal outer flange are identified by the recessed machined sections in the flange.
  - (b) Place the labyrinth seal in position on the adjusting ring. Temporarily secure the labyrinth seal with eight bolts (72-34-00/2-70) and four locking plates (72-34-00/2-80), assembling the bolts in pairs to the equally spaced locking plates. Tighten the bolts but do not lock the locking plates.

B. Calculate Adjusting Ring Thickness (Ref.Fig.507).

- (1) Measure the distance from the front outer joint flange of the diffuser case to the forward flange edge. Record as dimension C.
- (2) Measure the distance from the forward flange edge to the front edge of the labyrinth seal. Record as dimension D.

SUB-ASSEMBLY

**72-00-51**

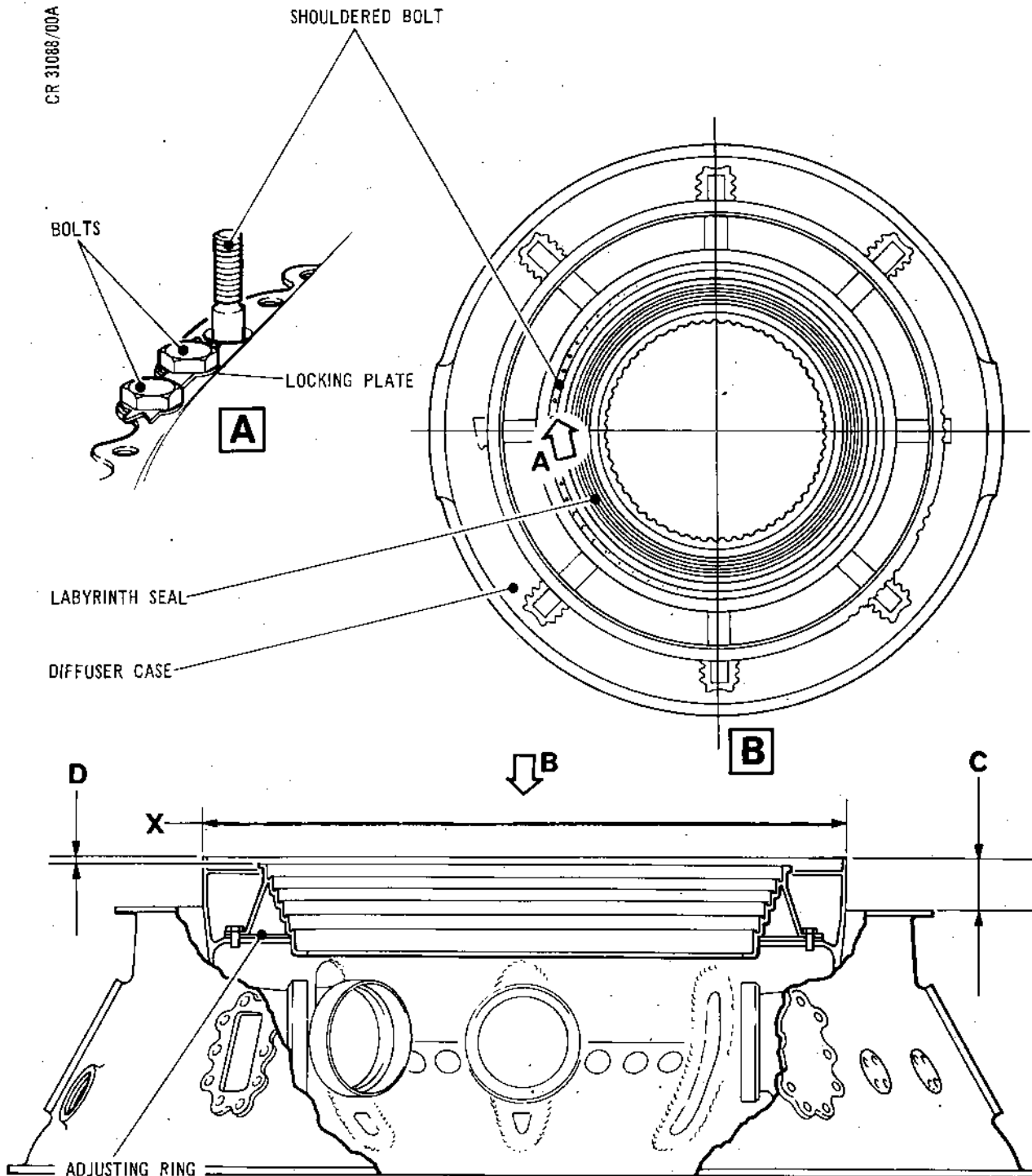
Page 517  
Apr 1/77



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 31088/00A



IN30078

Installing No.12 Labyrinth Seal and Checking Outer  
Adjusting Ring Thickness  
Figure 507

SUB-ASSEMBLY  
**72-00-51**  
Page 518  
Mar 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (3) Obtain dimension G from the HP compressor rotor sub-assembly record (Ref.72-33-00 para.2.A.). Record as dimension E for this calculation.
- (4) Calculate the required adjusting thickness as follows:

$$(2.590 \text{ in. (65,756 mm)} - E) - (C + 0.510 \text{ in. (12,954 mm)} - D)$$

NOTE: If the calculated thickness is a plus (+) dimension, it must be added to the thickness of the installed adjusting ring. If the calculated thickness is a minus (-) dimension it must be subtracted from the thickness of the installed adjusting ring.

- (5) Select an adjusting ring of the calculated thickness from the range (72-34-00/2-120-210). Clearly identify the adjusting ring for assembly reference.
- (6) Measure the seal diameter at X. Record the dimension for main engine assembly reference. This dimension is part of Fits and Clearances Schedule (72-33-00 F.C.S.135).
- (7) Remove the bolts, locking plates, labyrinth seal and adjusting ring from the diffuser case.

#### 10. Assemble Air Duct Unit to Diffuser Case (Ref.Fig.508)

##### A. Prepare to Assemble Air Duct (72-51-01/2-60).

- (1) Install the bolts at vane flanges No.1 and 4.
  - (a) Insert six bolts (72-51-01/2-40) through each of the vane flanges with the threaded sections of bolts protruding towards the centre of the air duct.
  - (b) Use the assembly sleeve (Tool 1663) and secure each bolt in position with a retaining ring (72-51-01/2-30).

##### B. Assemble Air Duct.

- (1) Position the air duct (72-51-01/2-60) inside the diffuser case ensuring that the flange to which the nuts are attached is positioned uppermost.

SUB-ASSEMBLY

**72-00-51**

Page 519

Oct 1/76



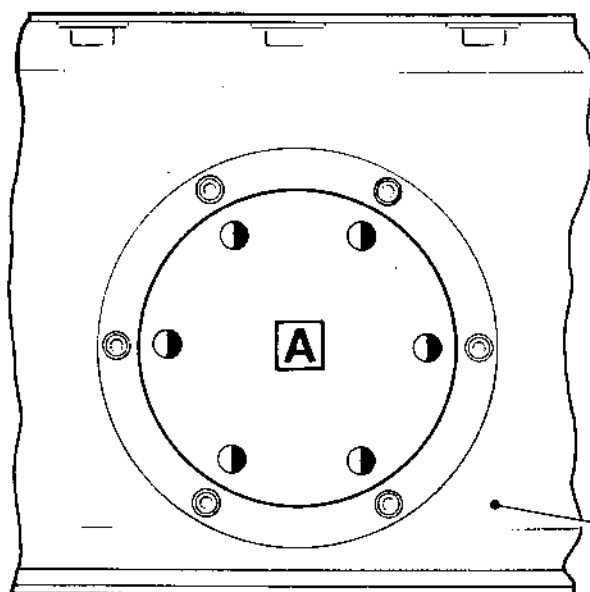
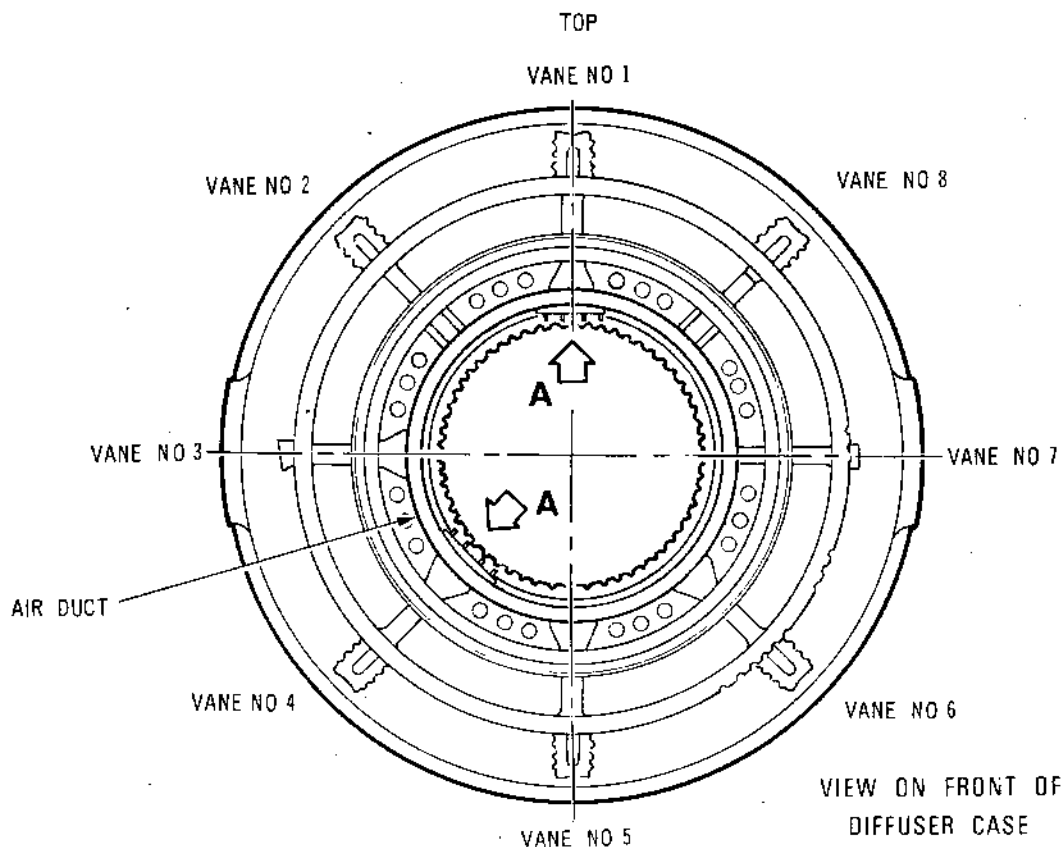


OLYMPUS 593

MK.610-14-28  
OVERHAUL

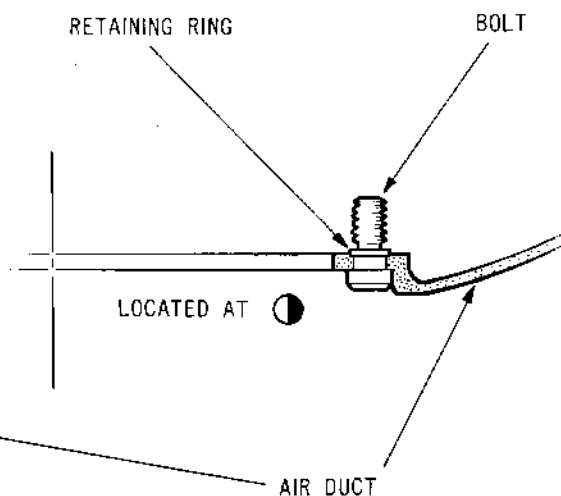


CR 31089/00A



SECTION OF AIR DUCT AT A  
VANE NOS 1 AND 4

Assembling Air Duct to Diffuser Case  
Figure 508



FN30079

SUB-ASSEMBLY  
**72-00-51**  
Page 520  
Mar 1/76



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (2) Rotate the air duct to align the ports with vanes No.1,3,4,5 and 6 in the diffuser case, and the bolt-holes in the flange with the diffuser case flange holes.

## 11. Assemble Bearing Support To Diffuser Case (Ref.Fig.509)

### A. Prepare to Assemble Bearing Support.

- (1) Prepare a suitable flat surface beneath the diffuser case upon which the bearing support will be positioned.
- (2) With the front flange uppermost, carefully position the bearing support under the diffuser case.
- (3) Align the top position on the bearing support with the top position on the diffuser case.

### B. Assemble Bearing Support.

- (1) Apply lubricant 'C' to the bolts (72-51-01/5-90), previously assembled to the bearing support.
- (2) Gently raise the bearing support into position ensuring that the pin on the bearing support flange enters the hole in the diffuser case flange. Maintain support of the unit until sufficient bolts and nuts are assembled to retain it.
- (3) Secure the bearing support and air duct together with four bolts inserted through the bearing support flange and equally spaced. Ensure that the flat edge section of each bolt locates correctly. Secure each bolt with a self-locking nut (72-51-01/5-80).
- (4) Assemble bolts and nuts to the remaining positions and ensure that the nuts have a minimum locking (run-down) torque of 20 lbf in. (2,3 N.m). Torque-tighten the nuts to 210 lbf in. (24 N.m).

## 12. Assemble Coupling Assemblies to Air Duct Unit (Ref.Fig.510)

### A. Seal Ring Gap Checks.

- (1) Ensure thorough cleanliness of all components.

SUB-ASSEMBLY

72-00-51

Page 521

Dec 31/01

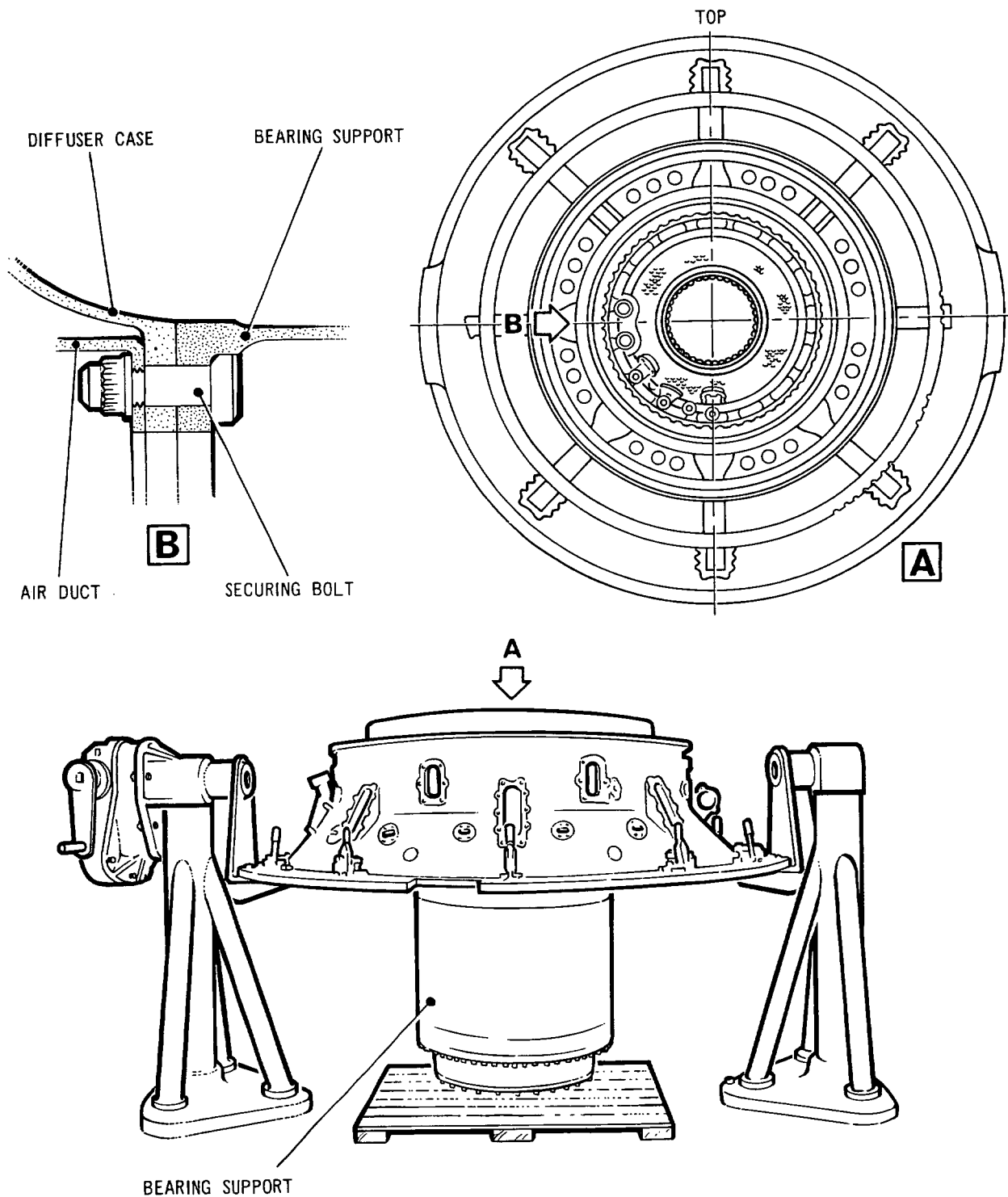


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31419/00A



Assembling Bearing Support to Diffuser Case  
Figure 509

SUB-ASSEMBLY  
**72-00-51**  
Page 522  
Mar 1/76



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

Printed in England

- (2) Select two seal rings (72-51-01/2-10). Carefully insert one ring into No.1 vane location and the other into No.4 vane location. Ensure that both seal rings are installed evenly.
- (3) Measure and record the gap between the seal ring ends of each component and check that the clearance figures obtained are within the limits quoted in the Fits and Clearances Schedule (72-51-01 F.C.S.181).
- (4) Remove each ring and identify in preparation for assembly to the couplings.
- (5) Select three seal rings (72-51-01/1-30-100-200) also (72-51-01/1-40-110-210). Carefully insert the seal rings into No.3-5-6 vane locations. Measure and record the gap between the seal ring ends of each component and check that the clearance figures obtained are within the limits quoted in Fits and Clearances Schedule (72-51-01 F.C.S.183-185-187-189).
- (6) Remove each ring and identify in preparation for assembly to the couplings.

**B. Assemble Couplings to Air Duct Vanes No.1 and 4.**

- (1) Assemble a seal ring assembly (72-51-01/2-10) to the grooved recess in each coupling (72-51-01/2-50).
- (2) Apply lubricant 'C' to the bolt threads.
- (3) Insert the coupling assemblies in No.1 and 4 vane locations. Secure each coupling with six nuts (72-51-01/2-20) ensuring that the nuts have a locking (run-down) torque of 10 lbf in. (1,1 N.m). Torque-tighten the nuts to 100 lbf in. (11,5 N.m).

**C. Assemble Couplings to Air Duct Vanes No.3,5 and 6.**

- (1) Assemble the two seal ring assemblies to the grooved recesses of the couplings. Position the larger diameter ring assembly nearest the coupling flange.
  - (a) Assemble the seal ring assembly (72-51-01/1-210) followed by seal ring assembly (72-51-01/1-200) to the coupling assembly (72-51-01/1-220).

SUB-ASSEMBLY

## 72-00-51

Page 523  
Dec 31/01

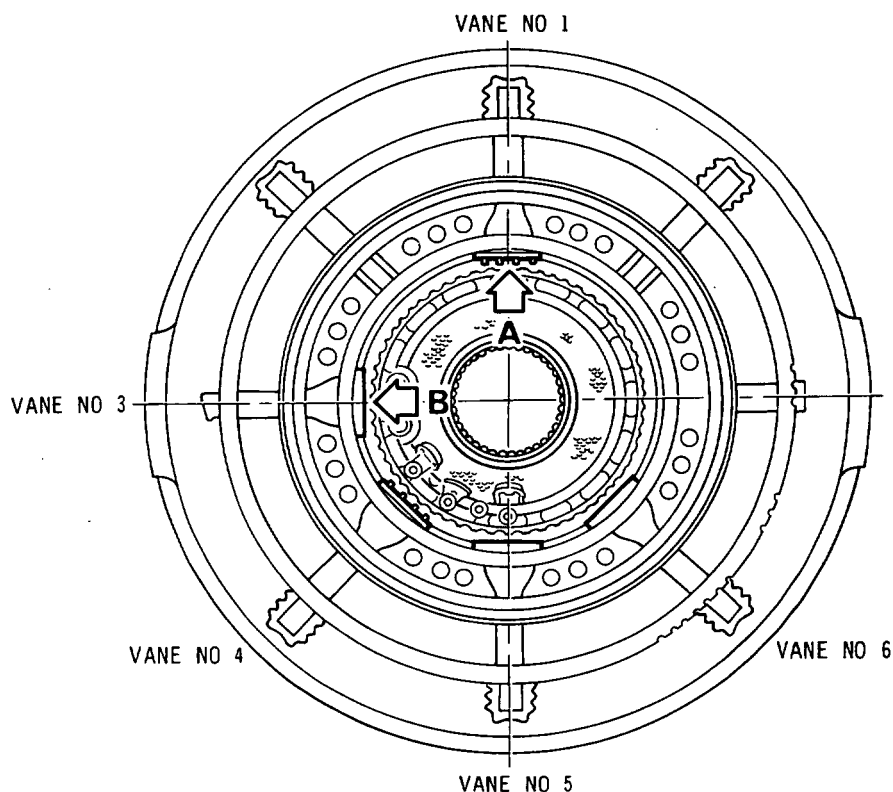


OLYMPUS 593

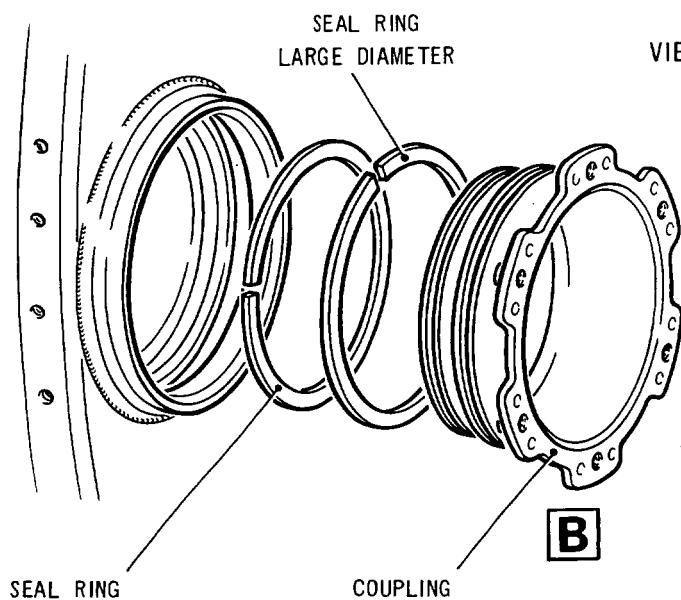
MK.610-14-28  
OVERHAUL



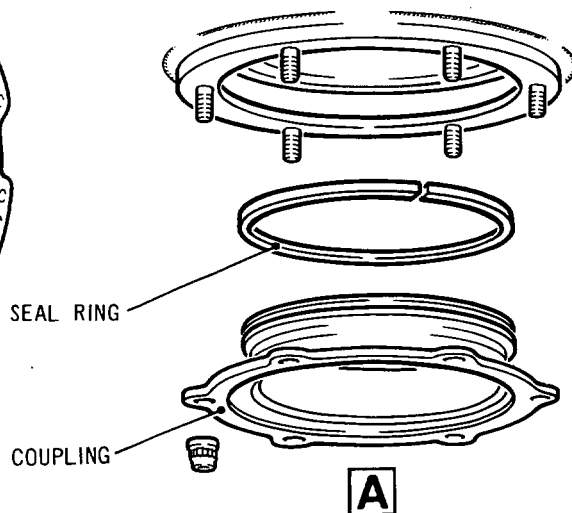
CR 31091/00A



VIEW ON FRONT OF DIFFUSER CASE



LOCATED AT VANE NOS 3, 5, AND 6



LOCATED AT VANE NOS 1 AND 4

Assembling Air Duct Couplings  
Figure 510

SUB-ASSEMBLY  
**72-00-51**  
Page 524  
Mar 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Insert the coupling assembly into No.3 vane location.
- (c) Assemble the seal ring assembly (72-51-01/1-110) followed by seal ring assembly (72-51-01/1-100) to the coupling assembly (72-51-01/1-130).
- (d) Insert the coupling assembly into No.5 vane location.
- (e) Assemble the seal ring assembly (72-51-01/1-40) followed by seal ring assembly (72-51-01/1-30) to coupling assembly (72-51-01/1-50).
- (f) Insert the coupling assembly into No.6 vane location.

13. Calculate Thickness of Inner Adjusting Ring No.12 Labyrinth Seal

A. Assemble Labyrinth Seal.

- (1) Place the adjusting ring of previously calculated thickness in position on the diffuser case.
- (2) Place the labyrinth seal in position over the adjusting ring.
- (3) Temporarily secure the labyrinth seal with eight bolts (72-34-00/2-70) and four locking plates (72-34-00/2-80), assembling the bolts in pairs to the equally spaced locking plates.
- (4) Tighten the bolts but do not lock the locking plates.

B. Check Adjusting Ring Thickness (Ref.Fig.511).

- (1) Measure the gap between the rear flange face of the labyrinth seal and the front flange face of the air duct unit. Record as dimension AA.
- (2) Measure the thickness of the scalloped section of the bolt flange of the outer air duct. Record as dimension BB.
- (3) Deduct dimension BB from dimension AA and record as dimension CC.

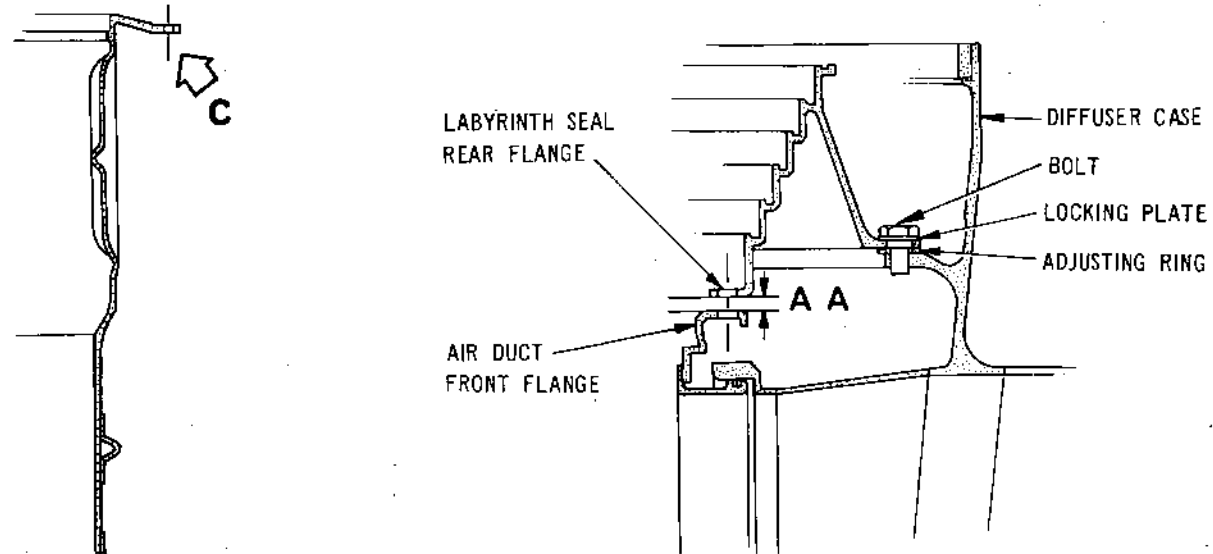


OLYMPUS 593

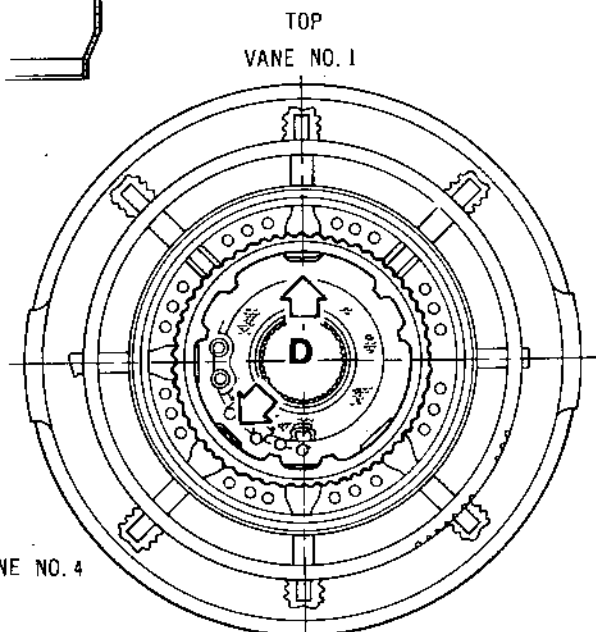
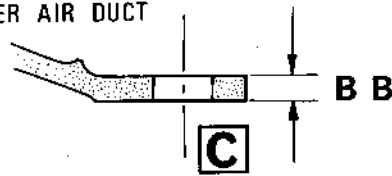
MK.610-14-28  
OVERHAUL



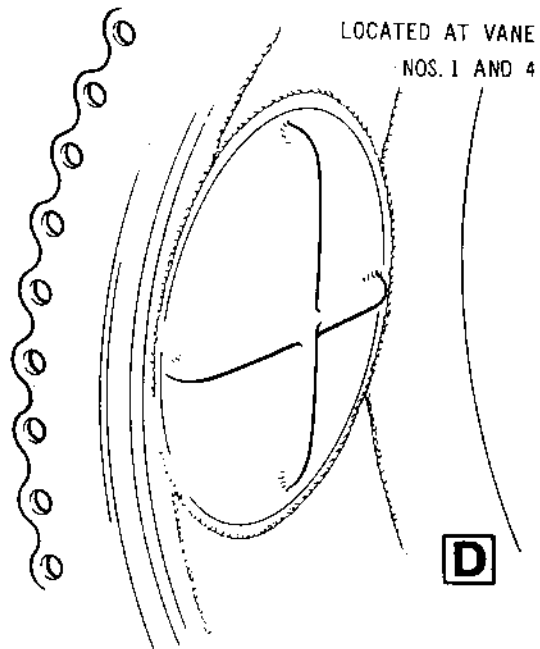
CR 31092/00A



SECTION OF  
OUTER AIR DUCT



VIEW ON FRONT OF DIFFUSER CASE



VIEW OF OUTER AIR DUCT  
AT BLANKED PORTS

No.12 Labyrinth Seal Inner Adjusting Ring Checks  
Figure 511

SUB-ASSEMBLY  
**72-00-51**

Page 526  
Mar 1/76

TN13449



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

(4) Select an adjusting ring of dimension CC thickness from the range (72-34-00/2-220 to 330) (72-09-21 Repair, Fig.415).

(5) Clearly identify the adjusting ring for assembly reference.

C. Remove Labyrinth Seal and Adjusting Ring.

(1) Remove the bolts and locking plates securing the labyrinth seal.

(2) Carefully remove the labyrinth seal and adjusting ring.

14. Assemble Air Duct Outer to Air Duct

A. Install Air Duct Outer to S.B.72-8627-209 Standard (Ref.Fig.511).

(1) Alternative outer air duct assembly (72-51-01/1A-270H,K). Apply lubricant 'A' to two off bolts (72-51-01/1-286A) and assemble to two off shank nut locations in outer air duct. Ensure that the bolts have a locking (run-down) torque of 10 lbf in. (1,1 Nm) then torque-tighten to 100 lbf in. (11,5 Nm).

(2) Slide the air duct outer (72-51-01/1A-270G,H,J,K) inside the bearing support.

(3) Align the bolt-holes in the air duct outer flange with holes in the air duct flange. Ensure that the air duct outer ports are radially aligned with those in the air duct.

(4) Press the air duct outer into position. The lower end of the unit will slide over the bearing front cover spigot.

15. Assemble No.12 Labyrinth Seal to Diffuser Case

A. Assemble Adjusting Rings.

(1) Place the inner adjusting ring of previously calculated thickness, on the air duct outer flange ensuring that the bolt-holes are correctly aligned.

SUB-ASSEMBLY

72-00-51

Page 527

Jun 1/96





OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

(2) Place the outer adjusting ring of previously calculated thickness in position on the outer flange.

(a) Align the holes in the ring with the holes in the flange and place the ring in position over the shoulder bolts in the flange.

**B. Assemble Labyrinth Seal.**

(1) Place the labyrinth seal in position over the adjusting rings.

(a) Press the labyrinth seal fully into position.

(b) Apply lubricant 'A' to the bolts and temporarily secure the labyrinth seal outer flange with the eight bolts and locking plates. Tighten the bolts but do not lock the locking plates.

(c) Apply lubricant 'C' to bolts (72-34-00/2-100). Temporarily secure the labyrinth flange inner with the eight bolts equally spaced.

**16. Assemble HP Thrust Bearing Air Cooling Components (Ref.Fig.512)**

**A. Prepare Spherical Seal Assembly.**

(1) Insert the spherical seal (72-51-01/3-170) through the flanged end of the spherical housing (72-51-01/3-190) and engage the seal with the two slots in the housing. Manipulate the spherical seal to obtain alignment of the bolt-holes.

(2) Apply lubricant 'A' to the securing bolt. Secure the seal to the housing with the location bolt (72-51-01/3-150) and keywasher (72-51-01/3-160). Torque-tighten the bolt to 40 lbf in. (4,5 N.m), then lock the keywasher.

**B. Assemble Spherical Seal, Insulated Tube and Elbow. (Ref. Fig.512 detail A).**

(1) Assemble the spherical housing and seal to No.3 vane duct.

(a) Apply lubricant 'A' to bolts.

(b) Insert the housing and seal into No.3 vane duct and secure the housing with four bolts (72-51-01/3-180) torque-tightened to 100 lbf in. (11,5 N.m).

SUB-ASSEMBLY

**72-00-51**

Page 528

Dec 31/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (c) Retain the coupling at the two remaining locations with bolts (72-51-01/1A-230). Ensure that the bolts have a locking (run-down) torque of 10 lbf in. (1,1 N.m) then torque-tighten to 100 lbf in. (11,5 N.m).
- (2) Assemble the insulated tube assembly to No.3 vane.
- (a) Assemble the insulation top half (75-01-05/1-50) and bottom half (75-01-05/1-60) to the tube (75-01-05/1-40) and secure with three clips (75-01-05/1-70).
- (b) Insert the insulated tube into No.3 vane and ensure engagement with the spherical seal.
- (3) Secure the elbow (75-01-05/1-20) to the diffuser case.
- (a) Apply lubricant 'C' to the securing bolts (75-01-05/1-10).
- (b) Place the gasket (75-01-05/1-30) in position over the insulated tube flange on the diffuser case. Place the elbow over the gasket and secure it with four bolts (75-01-05/1-10). Torque-tighten the bolts to 135 lbf in. (15,2 N.m). Wire-lock the bolts together.

17. Secure Coupling to No.5 and 6 Vane Positions (Ref.Fig.512)

A. Secure Coupling to No.5 Position.

NOTE: Bolts finally torque-tightened to 100 lbf in. (11,5 N.m) must have a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m).



OLYMPUS 593

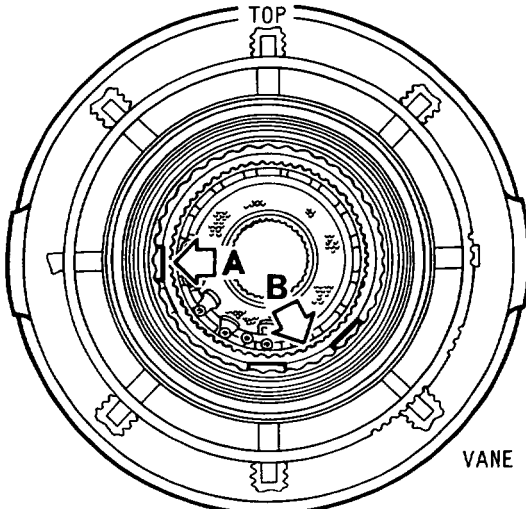
MK.610-14-28

OVERHAUL



CR 31094/00D

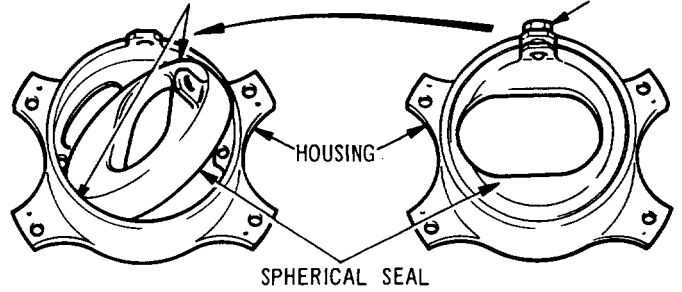
VANE  
No. 3



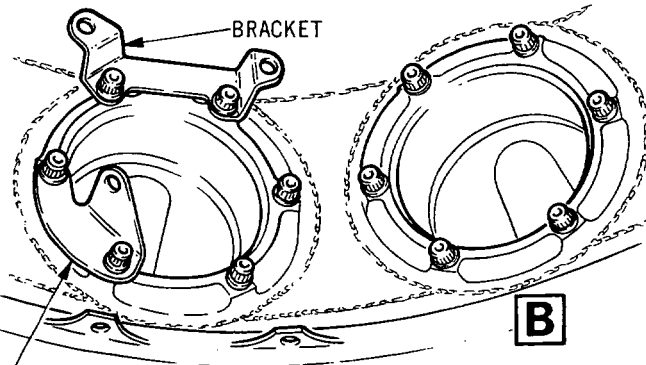
VIEW ON FRONT OF DIFFUSER CASE

POSITION OF SLOTS IN HOUSING

BOLT AND KEY WASHER

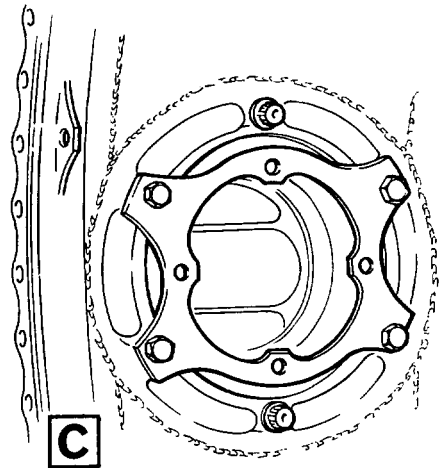


ASSEMBLY OF SPHERICAL SEAL TO HOUSING

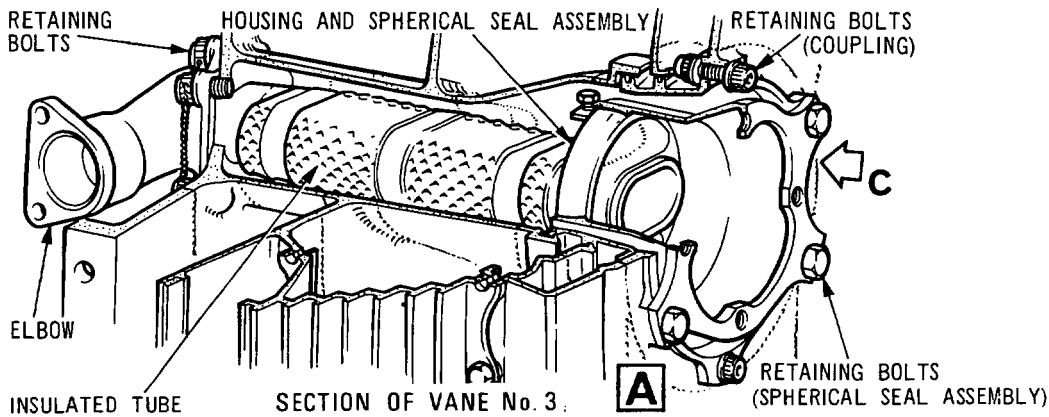


BRACKET

COUPLINGS AT VANES Nos. 5 AND 6



COUPLING AT VANE No. 3



Installing HP Turbine Bearing Air Cooling Components and Tube Brackets

Figure 512

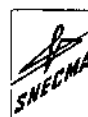
SUB-ASSEMBLY  
**72-00-51**

Page 530  
Feb 1/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

- (1) Align the bolt-holes in the coupling with the holes in the air duct outer. Apply lubricant 'A' to the securing bolts.
- (2) Place the bracket (72-51-01/1-190) (Ref.SB.72-114) in position and retain it with two bolts (72-51-01/1-140A).
- (3) Place the bracket (72-51-01/1-180) in position and retain it with two bolts (72-51-01/1-140).
- (4) Assemble two bolts (72-51-01/1-140) into the remaining locations.
- (5) Torque-tighten all the bracket/coupling bolts to 100 lbf in. (11,5 N.m).

B. Secure Coupling to No.6 Position.

- (1) Align the bolt-holes in the coupling with the holes in the air duct outer.
- (2) Apply lubricant 'A' to bolts (72-51-01/1-60).
- (3) Secure the coupling with six bolts torque-tightened to 100 lbf in. (11,5 N.m).

18. Check Radial Setting of No.12 Labyrinth Seal

A. Assemble Checking Equipment (Ref.Fig.513).

- (1) Assemble the lifting support (Tool 100) to the rear end of the bearing support. Ensure thorough cleanliness of the shaft section. Retain the support with nuts securely tightened.

SUB-ASSEMBLY

72-00-51

Page 531

Oct 1/82



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



This page left blank intentionally



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Assemble the support piece (Tool 101) to the front flange of the diffuser case, and retain with nuts and bolts securely tightened. The tool is stored in container (Tool 1188).
- (3) Slide the support bars (Tool 102) into the locating bores in the spacing ring, allowing sufficient clearance for the concentricity column to pass through the centre of the spacing ring. The tool is stored in container (Tool 1188).
- (4) Attach the lifting sling (Tool 1573) and crane hoist to the concentricity column (Tool 103) and carefully raise it to a vertical position. The concentricity column is stored in container (Tool 1189).
- (5) Ensure thorough cleanliness of the machined end sections and the bore in the lower end of the concentricity column.
- (6) Raise the concentricity column and position it concentrically above the spacing ring.
- (7) Carefully lower the column into the diffuser case assembly until engagement with the lifting support shaft is effected. Do not lower the column into the bearing at this stage.
- (8) Carefully adjust the support bars to centralize the column. Gently lower the concentricity column finally into position. Remove the lifting sling and crane hoist from the column.
- (9) Attach the multiple leg sling (Tool 1645) and crane hoist to the locating cone (Tool 1186).
- (10) Ensure thorough cleanliness of the bore in the locating cone. Raise the locating cone and remove the nuts and washers from the retaining bolts in the flange. Position the locating cone centrally over the spacing ring.
- (11) Carefully lower the locating cone in position on the spacing ring ensuring that the concentricity column enters freely into the bore and that the bolts enter freely into the spacing ring flange.

SUB-ASSEMBLY

72-00-51

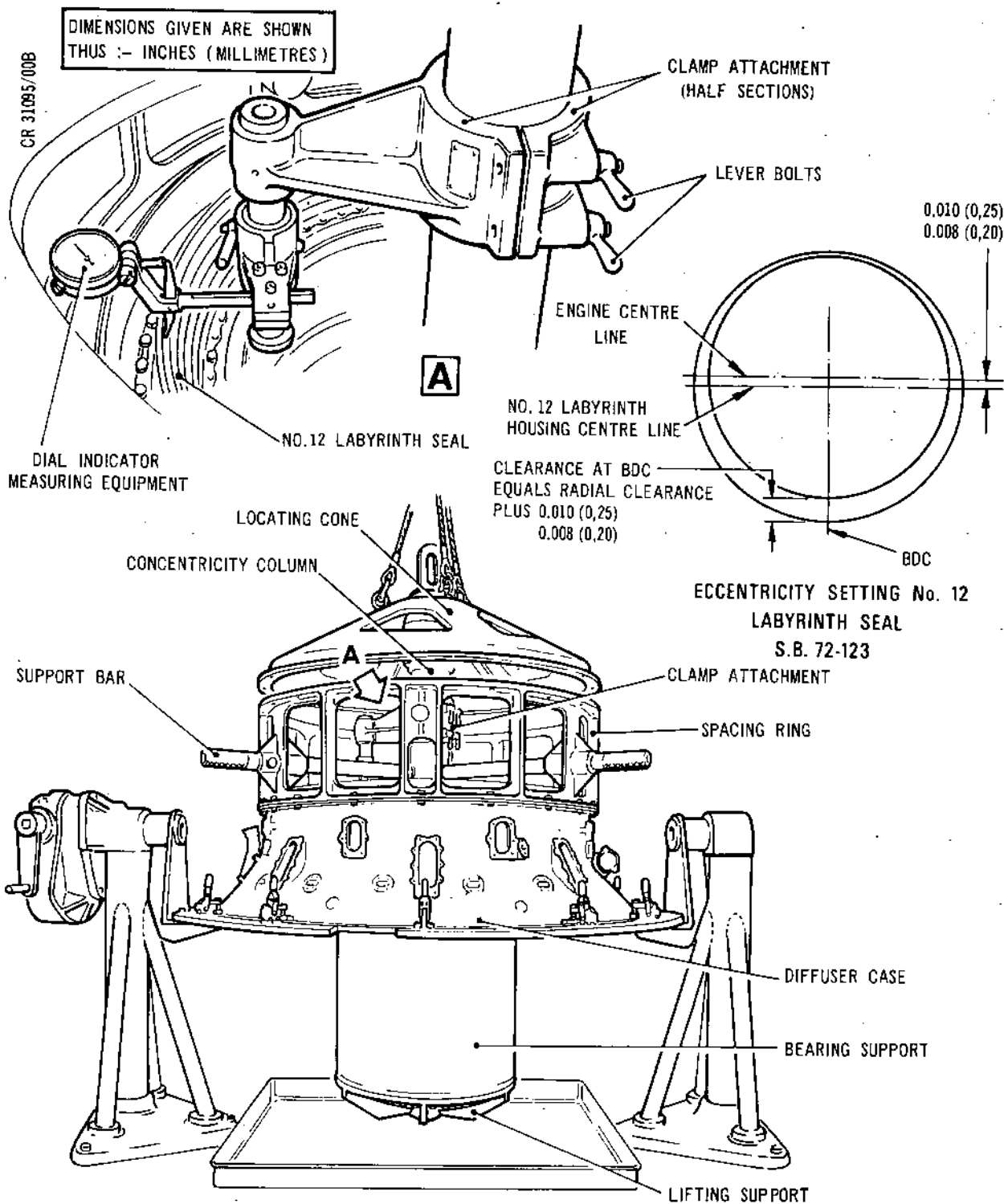
Page 533

Mar 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Radial Check of No.12 Labyrinth Seal  
Figure 513

SUB-ASSEMBLY  
**72-00-51**  
Page 534  
Jan 1/77

TN29787



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (12) Secure the locating cone to the spacing ring with nuts and flat washers.
- (13) Withdraw the support bars sufficiently to permit the concentricity column to rotate.
- (14) Check the column by hand for free rotation, if satisfactory, remove the support bars from the spacing ring.

CAUTION: SUPPORT BARS MUST ALWAYS BE IN POSITION AND RESTRAINING CONCENTRICITY COLUMN DURING AND AFTER REMOVAL OF LOCATING CONE. DAMAGE TO BEARING ASSEMBLY COULD OTHERWISE RESULT.

- (15) Assemble the clamp attachment (Tool 104) to the concentricity column. The clamp attachment is stored in container (Tool 1188).
  - (a) Separate the half sections of the clamp attachment by unscrewing the four lever type bolts.
  - (b) Ensure cleanliness of the clamp half sections, then assemble the sections to the machined area of the concentricity column located near the top of the fixture.
  - (c) Secure the clamp half sections together with four lever type bolts securely hand tightened.
  - (d) Assemble a 0.050 in. (1,270 mm) total reading dial indicator and clock adapter (Tool 1187) to the clamp attachment. The tool is stored in container (Tool 1188).

B. Check Labyrinth Seal (Ref.Fig.513).

- (1) Adjust the equipment to establish contact between the stylus of the dial indicator and the large diameter labyrinth seal (Ref.Fig.513 detail A). Set the dial indicator to '0' position.
- (2) On engines to Pre S.B.72-123 standard slowly rotate the concentricity column and note any variation in the dial indicator readings. Total dial indicator variation must not exceed 0.010 in. (0,254 mm).
  - (a) If the labyrinth seal is not centralized, slacken the bolts securing the seal, adjust the position of the seal to centralize it, then tighten the bolts.

SUB-ASSEMBLY

**72-00-51**

Page 535

Jan 1/77





OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

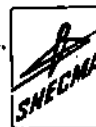
- (b) Re-check the labyrinth seal concentricity setting to ensure it is within the limits.
- (3) On engine to S.B.72-123 standard slowly rotate the concentricity column and note any variation in the indicator readings. Set the labyrinth seal to achieve an eccentricity of 0.008 in. to 0.010 in. (0,203 mm to 0,254 mm) toward bottom dead centre.
  - (a) If the labyrinth seal is not correctly positioned, slacken the bolts securing the seal, adjust the position of the seal, then tighten the bolts.
  - (b) Re-check the labyrinth seal eccentricity setting to ensure it is within the limits.
- C. Secure Labyrinth Seal.
  - (1) Apply lubricant 'C' to the securing bolts (72-34-00/2-70).
  - (2) Secure the labyrinth with the bolts and locking plates (72-34-00/2-80-90) assembled to the outer flange. Torque-tighten the bolts to 210 lbf in. (24 N.m). Ensure that the bolts installed temporarily are also finally torque-tightened.
  - (3) Secure the labyrinth seal inner flange with bolts (72-34-00/2-100) lubricated with lubricant 'C'. Ensure that the bolts have a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m). Torque-tighten the bolts to 100 lbf in. (11,5 N.m).
  - (4) Finally check the concentricity of the labyrinth.
- D. Remove Checking Equipment.
  - (1) Remove the dial indicator measuring equipment from the clamp attachment, and place it in container (Tool 1188).



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Remove the clamp attachment half sections from the concentricity column by unscrewing the lever type bolts. Place the clamp attachment into the container (Tool 1188).
- (3) Slide the support bars into position in the spacing ring. Ensure that each bar is in contact with the column and locked in position.
- (4) Attach the multiple leg sling (Tool 1645) and crane hoist to the locating cone.
- (5) Remove the nuts and washers securing the locating cone to the spacing ring.
- (6) Carefully remove the locating cone from the spacing ring and concentricity column. Ensure that the column does not move out of position during this operation.
- (7) Screw the nuts and flat washers on to the locating cone retaining bolts.
- (8) Remove the sling and crane hoist from the locating cone.
- (9) Attach the lifting sling (Tool 1573) and crane hoist to the column. Ensure that the lifting force will be applied vertically.
- (10) Carefully apply sufficient lifting force to minimise the movement of the column when the support bars are withdrawn. Do not remove the column at this stage.
- (11) Withdraw the support bars from the spacing ring.
- (12) Carefully lift the column clear of the diffuser case, lower it into the container (Tool 1189), then remove the lifting sling and crane hoist.
- (13) Remove the nuts and bolts securing the spacing ring to the diffuser case flange.
- (14) Remove the spacing ring from the diffuser case. Secure the nuts and bolts to the flange.
- (15) Remove the lifting support from the rear end of the bearing support.

SUB-ASSEMBLY

72-00-51

Page 537

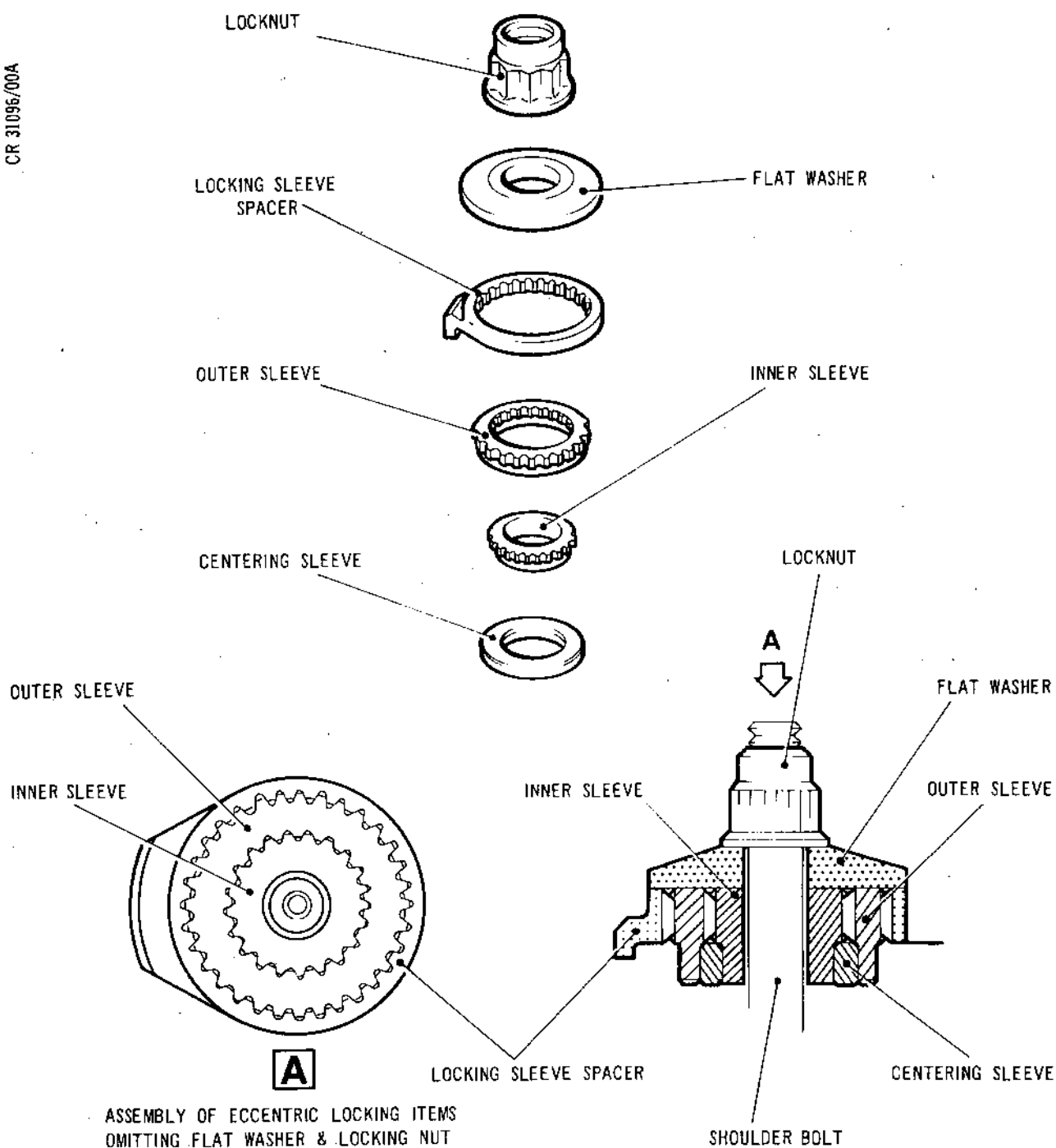
Mar 1/76



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 31095/00A



TN13457

Assembling Eccentric Locking Items to Shoulder Bolts  
Figure 514

SUB-ASSEMBLY  
**72-00-51**  
Page 538  
Mar 1/76



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

E. Lock Shoulder Bolts on Labyrinth Seal Outer Flange  
(Ref.Fig.514).

- (1) Assemble the eccentric locking items.

NOTE: The inner sleeve and centering sleeve must be rotated and inter adjusted until the outer sleeve will engage with the inner sleeve and simultaneously be fully inserted in the machined recess hole in the flange. The locking assembly will then be positive.

- (a) Place the centering sleeve (72-34-00/2-50) over the shoulder bolt.
- (b) Place the inner sleeve (72-34-00/2-60) over the centering sleeve.
- (c) Place the outer sleeve (72-34-00/2-40) over the inner sleeve.
- (d) Assemble the locking sleeve spacer (72-34-00/2-30) to the outer sleeve.
- (e) Apply lubricant 'C' to the shoulder bolt, place the flat washer (72-34-00/2-20) over the bolt and retain with a locknut (72-34-00/2-10).
- (f) Ensure that the locknuts have a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m). Torque-tighten the locknut to 100 lbf in. (11,5 N.m).

19. Remove Bearing Centralizing Strip

A. Remove HP Turbine Bearing.

- (1) Remove the bolts securing the retaining ring to the bearing housing.
- (2) Withdraw the retaining ring and clearly identify it for assembly reference.

SUB-ASSEMBLY

72-00-51

Page 539  
Dec 31/01



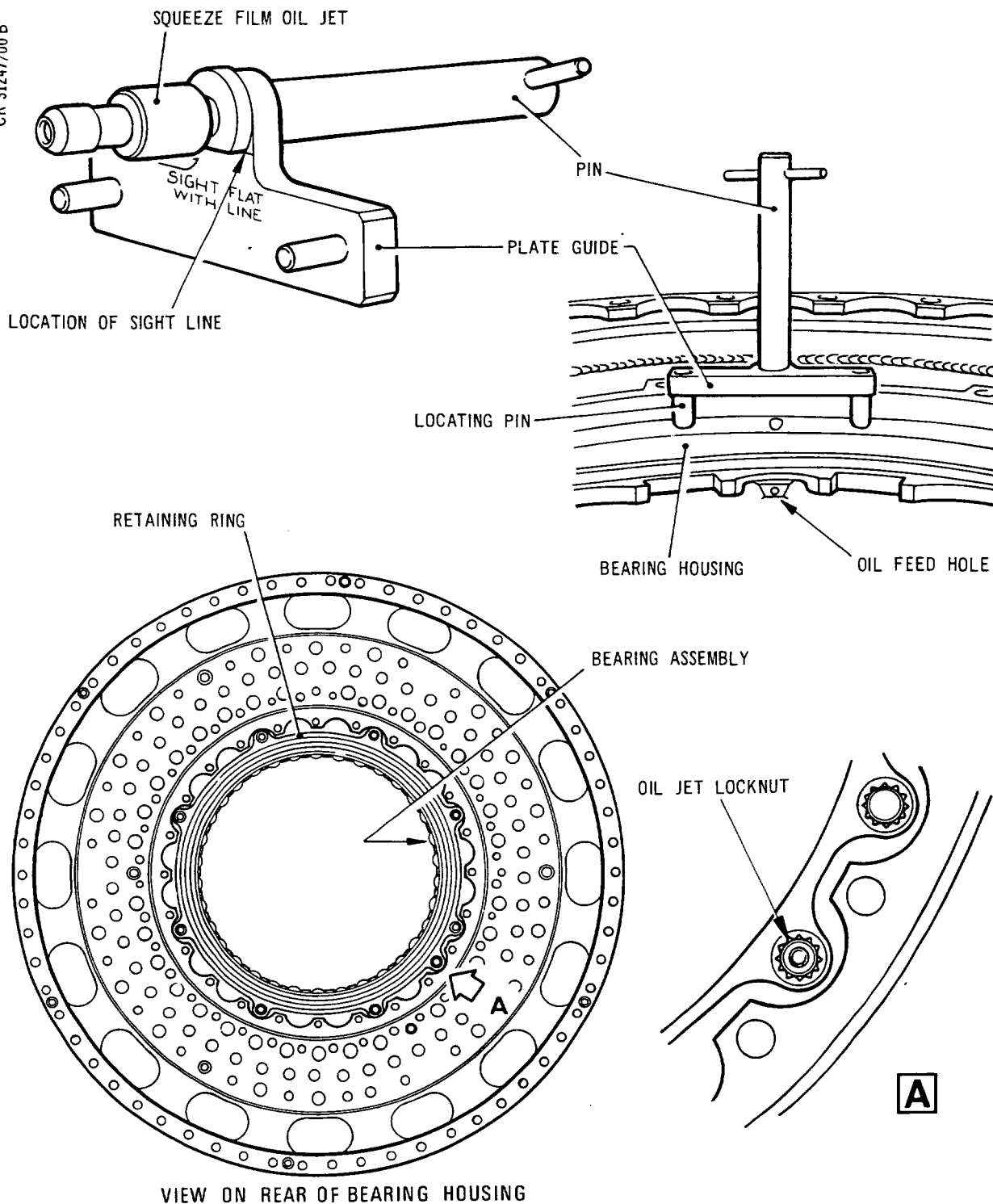
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 31247/00 B



Installing Squeeze Film Oil Jet  
Figure 515



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

(3) Withdraw the bearing unit and centralizing strip (or four feeler gauges if fitted in lieu of centralizing strip) from the bearing housing. Place the bearing unit in a suitable container clearly identified for assembly reference.

(4) Remove the centralizing strip from the bearing.

20. Assemble Squeeze Film Oil Jet and HP Bearing Unit to Bearing Housing (Ref.Fig.515)

A. Prepare Jet for Assembly.

- (1) Ensure thorough cleanliness of components and tools.
- (2) Insert the jet into the plate guide (Tool 585) ensuring that the flat edge of the jet flange is parallel with the sight line on the tool.
- (3) Retain the jet in position with the pin (Tool 586) assembled to the threaded section of the jet.
- (4) Freeze the jet and assembly tool using a suitable freezing agent. Protective gloves must be worn when handling frozen components.

B. Assemble Jet to Bearing Housing.

- (1) On completion of the freezing procedure, carry out the following procedure with minimum delay. Do not remove the assembly tools from the jet at this stage.
- (2) Align the jet with the hole in the bearing housing. The locating pins on the plate guide will engage with the recess in the bearing housing.
- (3) Ensure that the oil feed hole in the jet will align with the hole in the bearing housing.
- (4) Press the jet fully into position and do not disturb it until the temperature of the components is equalised.
- (5) Remove the assembly tools from the jet.

SUB-ASSEMBLY

72-00-51

Page 541  
Jun 1/98



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

C. Assemble Bearing Unit to Bearing Housing.

- (1) Assemble the bearing to the bearing housing ensuring that the castellations fully engage. Place the retaining ring of the previously calculated thickness into position on the bearing assembly ensuring that the oil jet hole locates correctly over the oil jet. Apply lubricant 'A' to securing items.
- (2) Secure the retaining ring with eight bolts (72-51-01/4-240) and assemble the locknut (72-51-01/4-250) to the oil jet thread. Ensure that the nut and bolts have a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m). Torque-tighten the nut and bolts to 100 lbf in. (11,5 N.m).

21. Assemble No.16 Labyrinth Ring to Bearing Housing (Ref. Fig.505)

A. Prepare to Assemble Labyrinth Ring.

- (1) Assemble 24 bolts (72-51-01/4-220) to the rear flange of the bearing housing. Ensure that the flat section of each bolthead is correctly positioned in the flange recess (Ref. Fig.505 View B).
- (2) Apply lubricant 'A' to the bolt threads.
- (3) Apply a light smear of jointing compound 'D' to the labyrinth ring at the bearing housing location.

B. Assemble Labyrinth Ring.

- (1) Position the labyrinth ring on the bearing housing, ensuring that the top extraction lug is correctly positioned.

NOTE: When assembling a new labyrinth ring, the word 'TOP' may not be vibro-etched on one of the extraction lugs. The assembly procedure in this case is to position the labyrinth ring on the bearing housing with an extraction lug at the top position. The top position is identifiable by reference to the marking on the bearing support. Lightly vibro-etch 'TOP' on the extraction lug in the top position following assembly.

SUB-ASSEMBLY

72-00-51

Page 542  
Jun 1/98



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (2) Secure the labyrinth ring to the bearing housing with 24 locknuts (72-51-01/4-210). Ensure that the locknuts have a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m). Torque-tighten the nuts to 100 lbf in. (11,5 N.m).

- (3) Re-check the bolts for correct assembly to the bearing housing.

22. Assemble HP Turbine Bearing Oil Feed and Scavenge Tubes to Bearing Housing (Ref.Fig.516, 517)

**CAUTION:** ENSURE THAT INSULATION BLANKETS AND CLIPS ARE COMPATIBLE WITH THE TUBE TO WHICH THEY ARE TO BE ASSEMBLED.

A. Prepare Oil Feed Tube.

- (1) Assemble the thermal insulation blankets (72-34-00/1-100-110-120-130) to the oil feed tube (72-34-00/1-80).
- (2) On engines to pre S.B.72-8477-200 standard, secure the blankets with clips (72-34-00/1-90A).
- (3) On engines to S.B.72-8477-200 standard, secure the blankets with retaining clip straps and sleeves (72-34-00/1-90B, 95A) as detailed in paragraph B.

B. Procedure for Installing Retaining Clip to S.B.72-8477-200 Standard on Insulation Blanket (Ref.Fig.516).

- (1) Assemble the retaining slip sleeve over the long portion of the retaining clip strap then slide the sleeve to the hooked end of the strap (Detail A).
- (2) Hold the hooked end of the strap against the insulation blanket joint line in the clip recess, then wrap the strap around the blanket and thread the end of the strap through the sleeve (Detail B).
- (3) Insert a length of 0,80 mm diameter locking wire under the strap in line with the hole in the strap end.
- (4) Tighten retaining clip strap (Detail C).
  - (a) Position the tensioning tool (Tool 3127) as shown and insert the tensioning tool tightening pin through the hole in the clip strap.

SUB-ASSEMBLY

72-00-51

Page 543  
Dec 31/99





OLYMPUS 593

MK.610-14-28

OVERHAUL



snecma

- (b) Unscrew the tensioning tool puller until the blanket halves are tight and secure on the tube.
  - (c) Manoeuvre the tensioning tool so that the clip strap is folded as far as possible over clip sleeve.
- (5) Remove the tensioning tool.
  - (6) Wire-lock retaining clip strap (Detail E).
    - (a) Thread the locking wire through the hole in the end of the clip strap.
    - (b) Press the end of clip strap against the section of clip strap securing the insulation blanket.
    - (c) Wire-lock together the sections of the clip strap.
- C. Install Oil Feed Tube.
- (1) Position the oil feed tube inside the air duct outer.
  - (2) Align the tube union nut with the tube end assembly located near the twin air duct connections on the bearing front cover.
  - (3) Insert the tube end through No.5 vane.
  - (4) Assemble the tube bush and clip assembly (72-34-00/1-50-60-70) to the tube and attach it to the small bracket positioned on No.5 vane duct.
    - (a) Apply lubricant 'A' to the bolt threads.
    - (b) Ensure that the nut has a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m). Torque-tighten the nut to 100 lbf in. (11,5 N.m).
  - (5) Apply lubricant 'A' to the tube union nut and screw it on to the tube end assembly hand-tight.
  - (6) Torque-tighten the castellated nut securing the tube end assembly to the bearing housing to 460 lbf in. (51,9 N.m) using the wrench spanner (Tool 6940 and adapter (Tool 695).

SUB-ASSEMBLY

72-00-51

Page 544

Jun 1/98

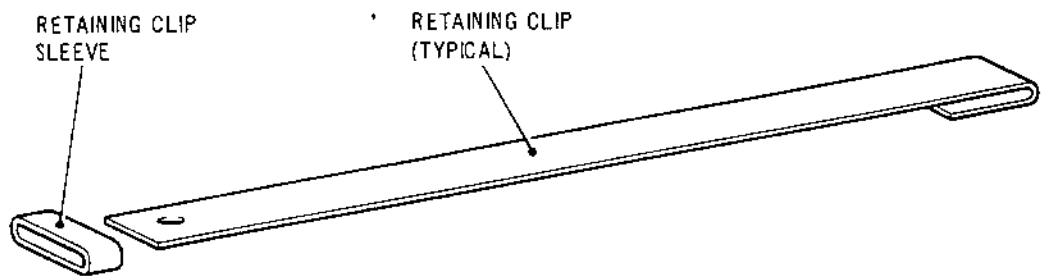


OLYMPUS 593

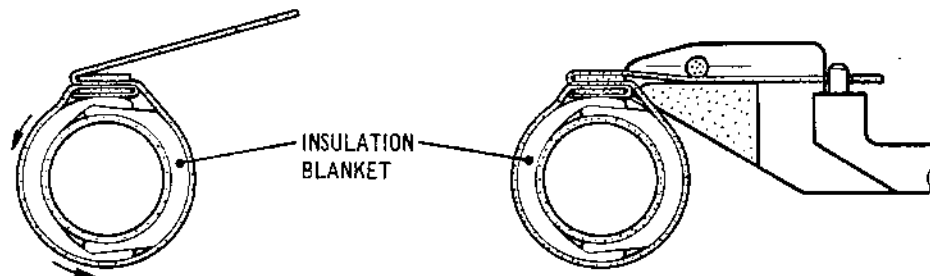
MK. 610-14-28  
OVERHAUL



CR 35689/00A

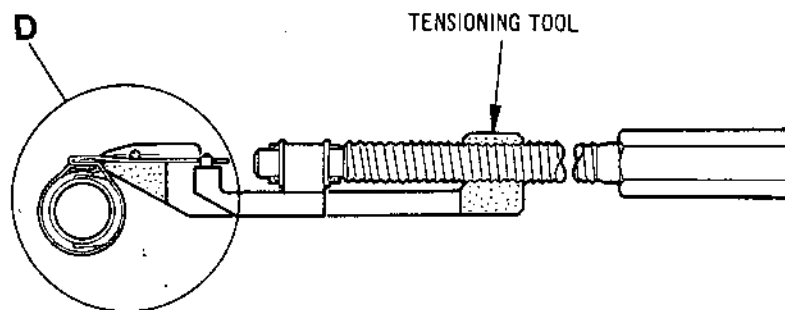


DETAIL A

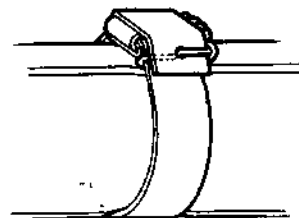


DETAIL B

ENLARGED SECTION AT D



DETAIL C



DETAIL E SHOWING METHOD OF WIRE LOCKING

Insulation Blanket Retaining Clip Installation Detail  
Figure 516

SUB-ASSEMBLY  
**72-00-51**

Page 545  
Dec 1/80



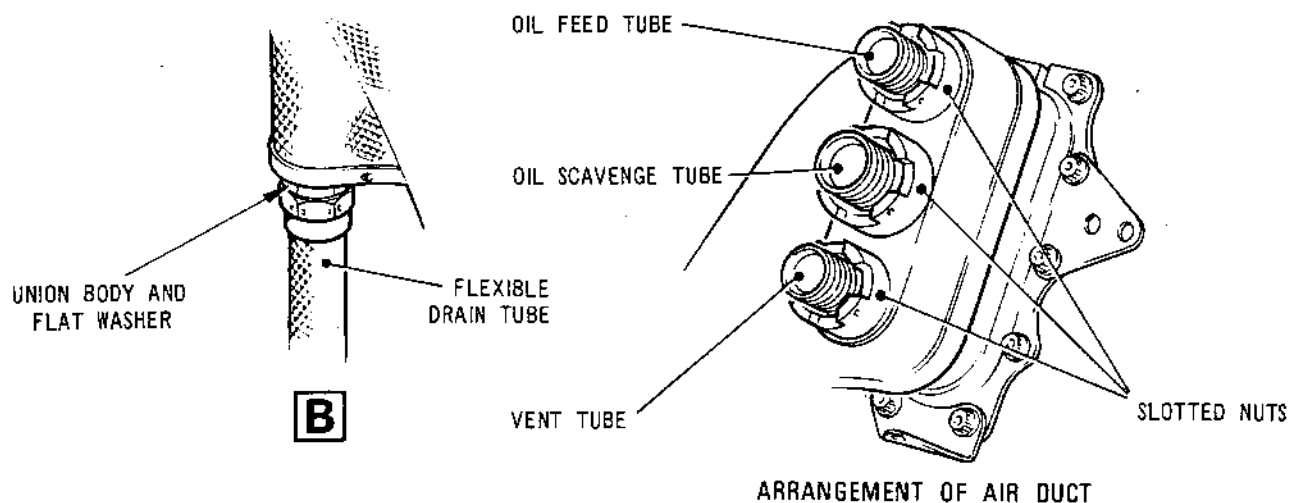
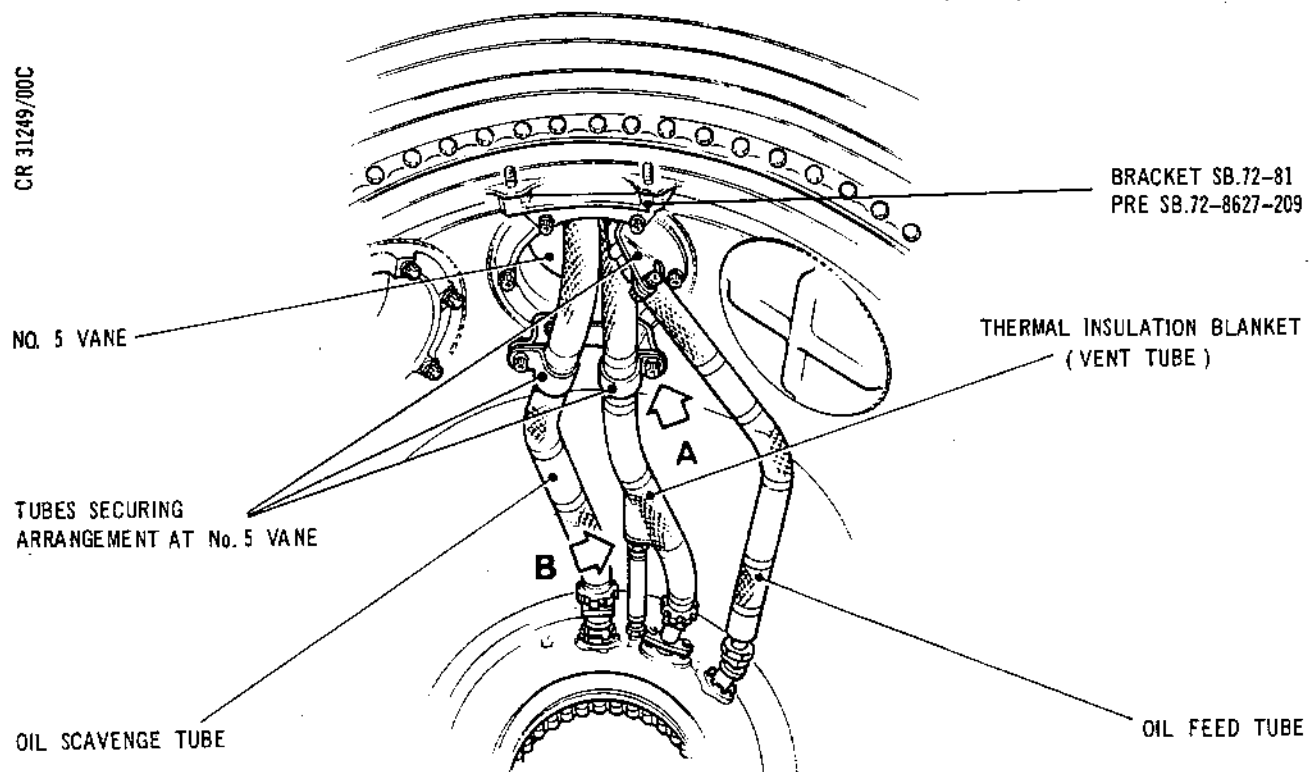
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 31249/00C



Installing HP Turbine Bearing Oil Feed, Scavenge and Vent Tubes  
Figure 517

SUB-ASSEMBLY  
**72-00-51**  
Page 546  
Dec 1/80

TN28604

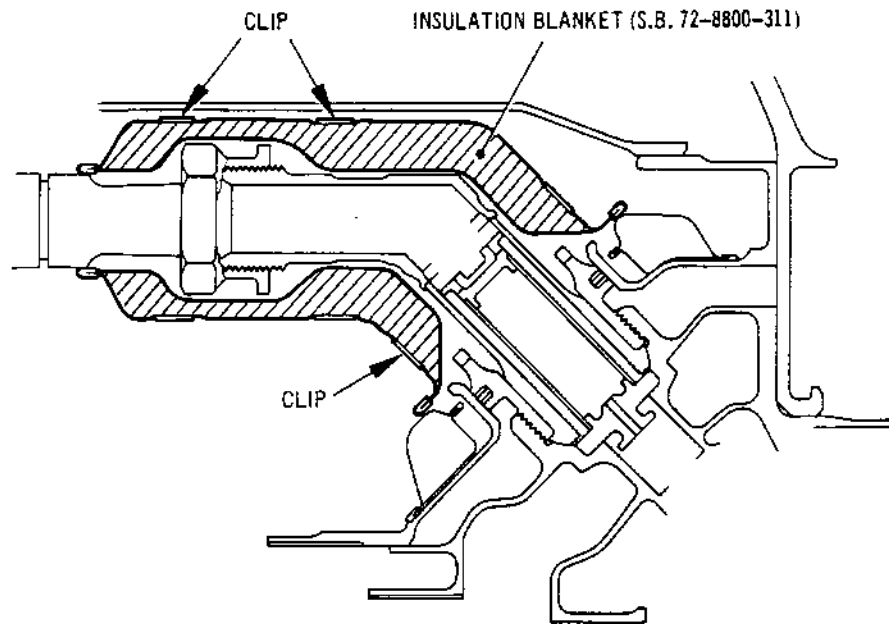
CR 36045/00A



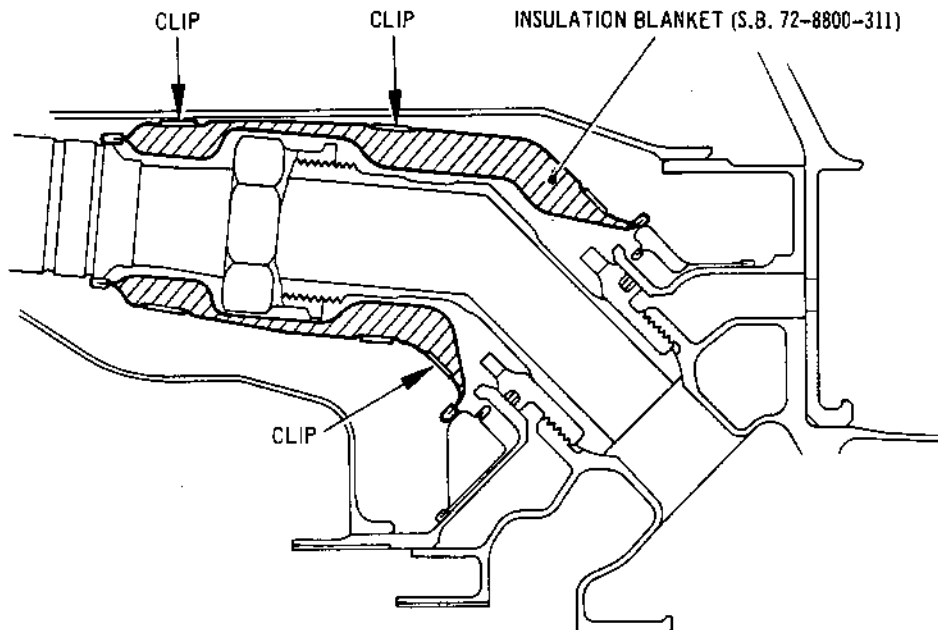
**OLYMPUS 593**

MK. 610-14-28

OVERHAUL



**OIL FEED TUBE INSTALLATION**



**OIL SCAVENGE TUBE INSTALLATION**

Insulation Blankets and Clipping Details  
Figure 517A



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (7) Torque-tighten the tube union nut to 295 lbf in. (33 N.m) using the cranked wrench spanner (Tool 1552).

D. Prepare Oil Scavenge Tube.

- (1) Assemble the thermal insulation blankets (72-34-00/1-230-240-250-260) to the oil scavenge tube (72-34-00/1-210).
- (a) On engines to pre S.B.72-8477-200 standard, secure the blankets with clips (72-34-00/1-220A or 220B).
- (b) On engines to S.B.72-8477-200 standard, secure the blankets with clip straps and sleeves (72-34-00/1-220C, 225A) as detailed in paragraph B.

E. Assemble Oil Scavenge Tube.

- (1) Position the tube inside the air duct outer. Align the tube union nut with the tube end assembly located at the bottom position on the bearing housing.
- (2) Insert the tube end through No.5 vane. Assemble the tube bush and clip assembly (72-34-00/1-180-190-200) to the tube and attach it to the bracket on No.5 vane duct with a nut, bolt and washer (72-34-00/1-150-170-160).
- (a) Apply lubricant 'A' to the bolt threads. Ensure that the nut has a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m). Torque-tighten the nut to 100 lbf in. (11,5 N.m).

SUB-ASSEMBLY

72-00-51

Page 546B

Jun 1/98



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Apply lubricant 'A' to the union nut and screw it on to the tube end assembly hand-tight.
- (4) Torque-tighten the castellated nut securing the tube end assembly to the bearing housing to 460 lbf in. (52 N.m) using wrench spanner (Tool 694) and adapter (Tool 695).
- (5) Torque-tighten the tube union nut to 420 lbf in. (47 N.m) using the cranked wrench spanner (Tool 1546).

F. On engines to SB.72-8800-311 Standard, Assemble Insulation Blankets. (Ref.Fig.516, 517A)

- (1) Assemble the thermal insulation blankets (72-51-01/3-193) to the oil feed tube end, and secure with clips (72-51-01/3-195-197).
- (2) Assemble the thermal insulation blankets (72-51-01/3-243) to the oil scavenge tube end, and secure with clips (72-51-01/3-245-246-247).

23. Assemble HP Bearing Vent Tube to Bearing Housing (Ref.Fig.517)

CAUTION: ENSURE THAT INSULATION BLANKETS AND CLIPS ARE COMPATIBLE WITH THE TUBE TO WHICH THEY ARE TO BE ASSEMBLED.

A. Prepare Vent Tube.

- (1) Assemble the thermal insulation blankets (72-34-00/1-360-370-380-390) to the vent tube (72-34-00/1-340).
  - (a) On engines to pre S.B.72-8477-200 standard, secure the blankets with clips (72-34-00/1-350A or 350B).
  - (b) On engines to S.B.72-8477-200 standard, secure the blankets with clip straps and sleeves (72-34-00/1-350C, 355B, 358A) in accordance with the procedure detailed previously for oil tubes installation. Position the longer clip strap (355B) in the forward recess of the blankets located on the tube junction block.
- (2) Apply lubricant 'A' to the thread of the union body (72-34-00/1-400).
- (3) Assemble the following items to the branch tapping in the vent tube.

SUB-ASSEMBLY  
**72-00-51**

Page 547  
Dec 1/85



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (a) Union body (72-34-00/1-400A) and one flat washer (72-34-00/1-410A) Pre-SB.72-82, two flat washers (72-34-00/1-410A) with the union body (72-34-00/1-400A) SB.72-82 Part 2, or union body (72-34-00/1-400B) and flat washer (72-34-00/1-410B) SB.72-82, Part 1.

- (4) Torque-tighten the union body to 125 lbf in. (14 N.m). Wire-lock the union body to the nearby hole.

B. Assemble Vent Tube.

- (1) Position the vent tube inside the air duct outer. Align the tube ends with the flexible drains tube and adapter.

- (2) Insert the outlet end of the tube through No.5 vane. Assemble the tube bush and clip assembly (72-34-00/1-310-320-330) with a nut, bolt and washer (72-34-00/1-280-300-290) to the remaining location on the bracket attached to No.5 vane duct.

- (a) Apply lubricant 'A' to the bolt threads. Ensure that the nut has a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m). Torque-tighten the nut to 100 lbf in. (11,5 N.m).

- (3) Apply lubricant 'A' to the tube union connections.

- (4) Screw the flexible drain tube union nut on to the tube union body and torque-tighten it to 125 lbf in. (14 N.m), using spanner (Tool 1181).

- (5) Screw the tube union nut on to the adapter and torque-tighten it to 325 lbf in. (37 N.m), using spanner (Tool 1545).

24. Assemble Air Duct to Diffuser Case at No.5 Vane Position

A. Position Air Duct (75-02-12/1-50) (Ref.Fig.517).

- (1) Position the air duct over the three tubes protruding through No.5 vane.
- (2) Place the Locating plate (75-02-12/1-110) over the three tube ends protruding through the air duct.
- (3) Apply lubricant 'A' to the tube end threads.

SUB-ASSEMBLY  
**72-00-51**

Page 548  
Oct 1/82



OLYMPUS 593

MK.610-14-28  
OVERHAUL



SNECMA

(4) Screw the slotted nuts on to the tube ends as follows:

- (a) Oil feed tube slotted nut (75-02-12/1-120).
- (b) Oil scavenge tube slotted nut (75-02-12/1-130).
- (c) Vent tube slotted nut (75-02-12/1-140).

B. Secure Air Duct.

- (1) Assemble the two stiffener plates (75-02-12/1-80) to the air duct bolt flange.
  - (a) Apply lubricant 'C' to the retaining bolts (75-02-12/1-60-70).
  - (b) Place the stiffener plates in position on the air duct flange.
  - (c) Assemble the bracket (75-02-12/1-90) to the rear of the stiffener plates and secure with two bolts (75-02-12/1-70).
  - (d) Assemble the bracket (75-02-12/1-100) to the right-hand stiffener plate and secure with two bolts (75-02-12/1-70).
  - (e) Secure the stiffener plates at the remaining locations with bolts (75-02-12/1-60). Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the bolts to 100 lbf in. (11,5 N.m) using cranked spanner (Tool 1583).

C. Secure Tube Slotted Nuts.

- (1) Torque-tighten the oil feed tube between 280 and 310 lbf in. (31,6 and 35,0 N.m) using wrench (Tool 1533).
- (2) Torque-tighten the oil scavenge tube between 400 and 440 lbf in. (45,2 and 49,7 N.m) using wrench (Tool 1540).
- (3) Torque-tighten the vent tube between 310 and 340 lbf in. (35,0 and 38,4 N.m) using wrench (Tool 1540).





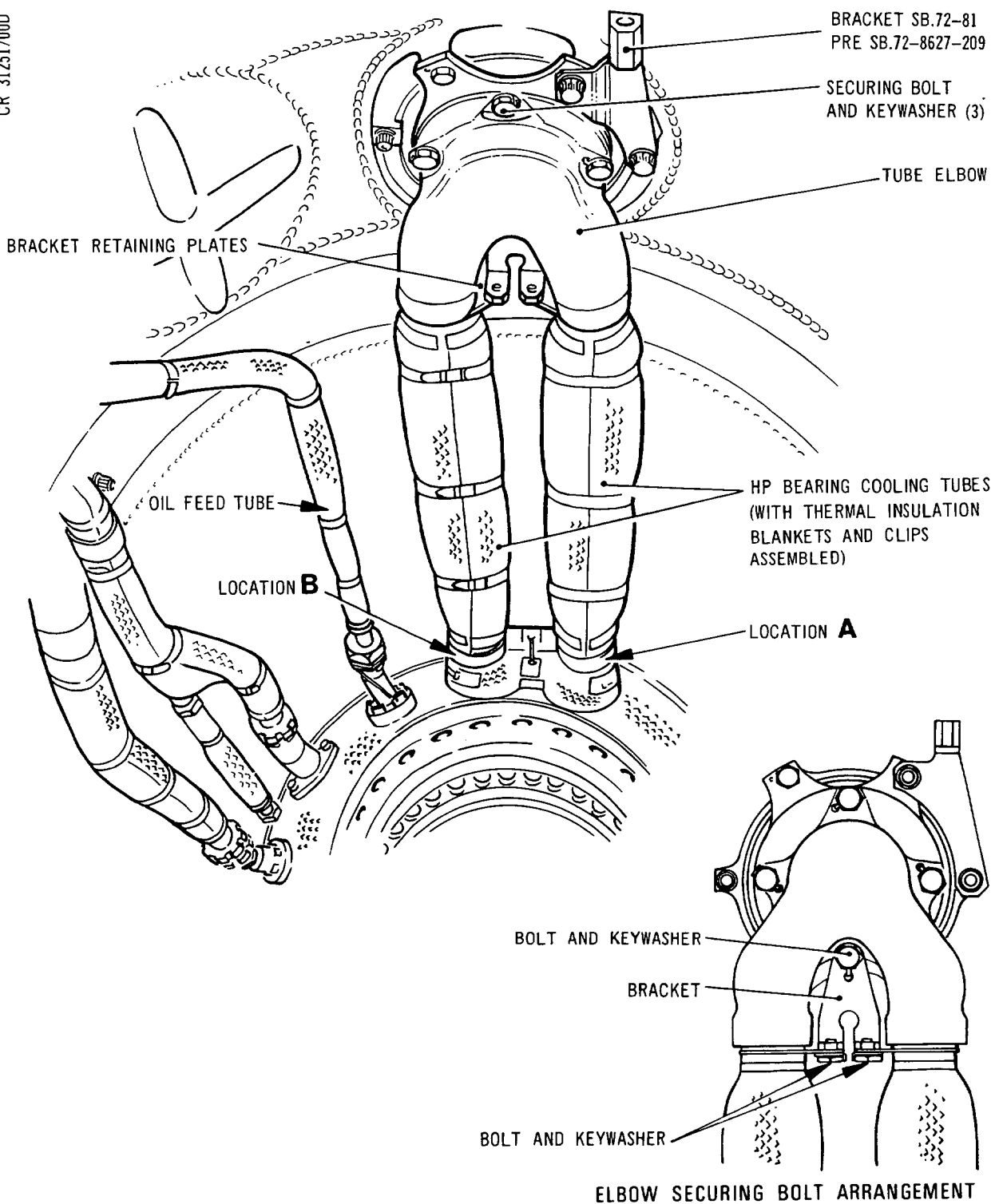
# OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

CR 31251/00D



Installing HP Turbine Bearing Cooling Tubes  
Figure 518

SUB-ASSEMBLY

## 72-00-51

Page 550

Dec 1/80

# British airways

CONCORDE

## OLYMPUS 593 OVERHAUL MANUAL

Temporary Revision 72-530  
Insert in 72-00-51 before page 551

### REASON FOR ISSUE

With the deletion of the inner air duct introduced by S.B.72-8627-209 it has been found possible to fit the No.4 bearing cooling air tubes incorrectly such that a rub could occur between the tubes and the adjacent rotating H.P. compressor rear shaft. (MRA 97)

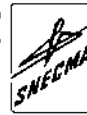
### ACTION

Add a CAUTION to Para. 25 (B) (1) to read:-

CAUTION: THESE TUBES ARE 'HANDED' AND IT IS IMPORTANT THAT TUBE 72-51-01/3-30 IS FITTED IN THE RIGHT HAND POSITION AS VIEWED IN FIGURE 517 AND TUBE 72-51-01/3-70 FITTED IN THE LEFT HAND POSITION. WHEN CORRECTLY FITTED THE CRANKED END OF THE TUBES AT THE REAR LOCATION IN THE NO. 4 BEARING HOUSING IS TOWARDS THE OUTSIDE OF THE C.C.O.C. GIVING THE MAXIMUM CLEARANCE OF THE TUBE TO THE H.P. COMPRESSOR SHAFT.



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



SEE TR

25. Assemble HP Bearing Cooling Tubes to Bearing Housing Unit and Duct at No.3 Vane (Ref.Fig.518)

A. Prepare Tubes.

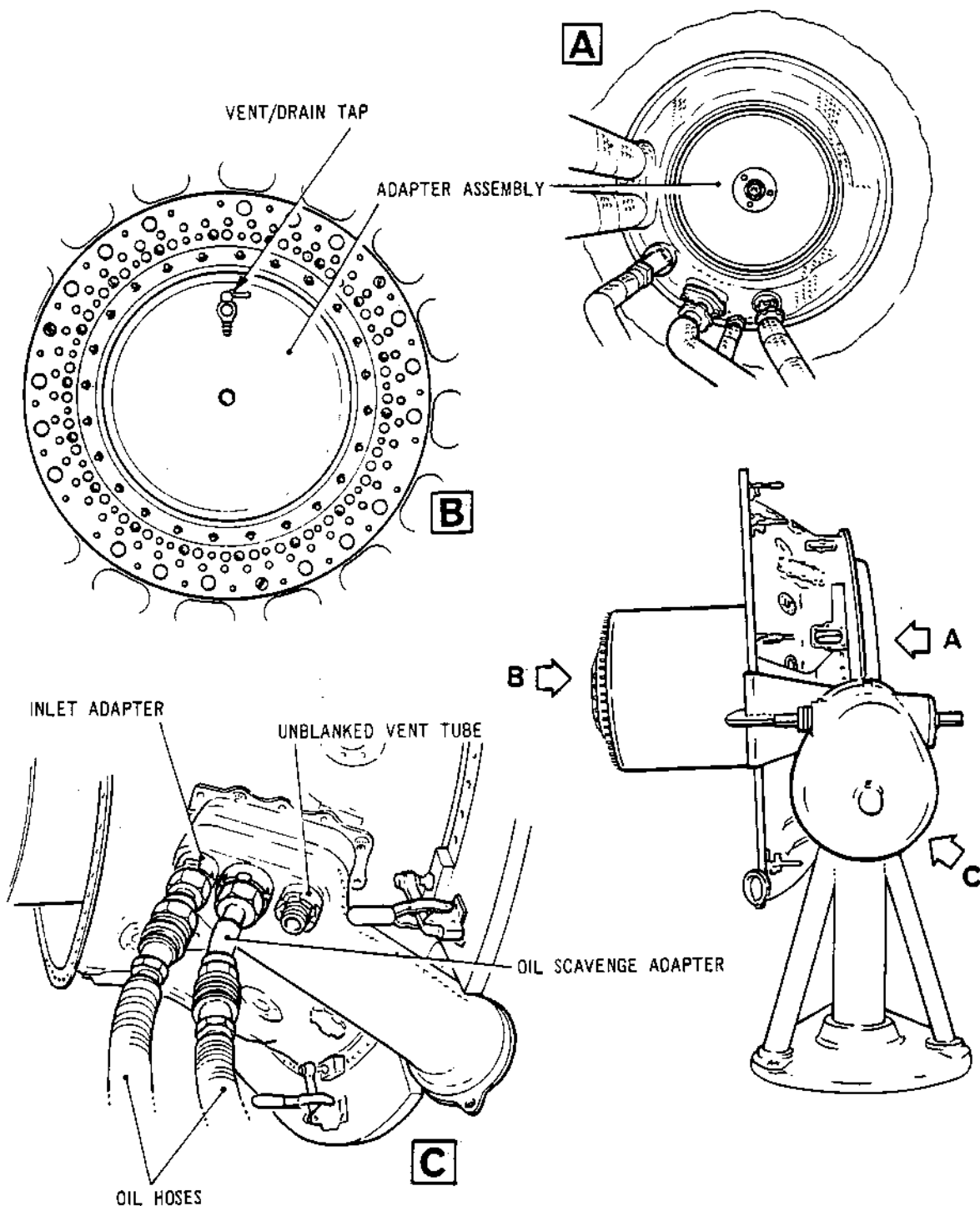
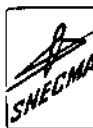
- (1) Assemble the thermal insulation blanket top and bottom (72-51-01/3-50-60) to the tube assembly (72-51-01/3-30).
- (2) Secure the blankets with clips (72-51-01/3-80).
- (3) Assemble the thermal insulation blanket top and bottom (72-51-01/3-90-100) to the tube assembly (72-51-01/3-70).
- (4) Secure the blankets with clips 972-51-01/3-80).

B. Assemble Tubes.

- (1) Insert tube (72-51-01/3-30) in the port at location A, fig.518 and tube (72-51-01/3-70) in the port at location B of the bearing cover unit.
  - (a) Position each tube so that the bracket retaining plates face each other and are located near the No.3 vane duct.
  - (b) Assemble the tube elbow (72-51-01/3-140) to the tubes in readiness for assembly to No.3 vane duct.
  - (c) Apply lubricant 'A' to the securing bolts.
  - (d) Align the tube elbow flange bolt-holes with the holes in No.3 vane duct.
  - (e) Loosely retain the tube elbow to the vane duct with three bolts (72-51-01/3-110) and keywashers (72-51-01/3-120) leaving the bottom hole open.
  - (f) Position the bracket (72-51-01/3-130) on the cooling tubes retaining plates and bottom hole in the tube elbow flange.
  - (g) Secure the bracket to the tube elbow with a bolt and keywasher.



**OLYMPUS 593**  
MK. 610-14-28  
OVERHAUL

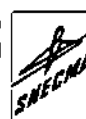


Installing HP Turbine Bearing Pressure Test Equipment  
Figure 519



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (h) Secure the bracket to the cooling tubes retaining plates with two bolts 972-51-01/3-100 and key-washers (72-51-01/3-20).
- (j) Torque-tighten the bolts securing the tube elbow to the vane duct to 100 lbf in. (11,5 N.m). Lock the keywashers.
- (k) Torque-tighten the bolts securing the bracket to the cooling tubes to 100 lbf in. (11,5 N.m). Lock the keywashers.

## 26. Flow and Pressure Test HP Bearing Oil System

### A. Test Equipment Required.

- (1) An oil pressure test rig capable of a flow rate up to 100 gal/h (Imp.) (454.6 litres/hour) of oil at a temperature of 120 deg C with a delivery pressure up to 50 psi (345 Kpa) to the oil jet (Tool 1926).
- (2) Oil specification: Lubricant 'A'.

### B. Assemble Pressure Test Equipment to Bearing Housing (Ref.Fig.519).

- (1) Rotate the build stand to facilitate assembly of the adapter (Tool 992) front and rear blanks to the bearing housing.
  - (a) Assemble the rear blank to the rear bore of the bearing housing. Position the vent/drain tap at the top position for air venting purposes.
  - (b) Assemble the front blank to the front bore of the bearing housing and secure the blanks together with the captive nut on the front blank. Tighten the captive nut securely.
- (2) Assemble the oil inlet feed adapter (Tool 812) and oil scavenge adapter (Tool 813) to the tubes at No.5 vane.
  - (a) Screw the adapter union on to the appropriate tube end and tighten.

SUB-ASSEMBLY

**72-00-51**

Page 553

Dec 1/84



OLYMPUS 593

MK.610-14-28  
OVERHAUL



C. Prepare Pressure Test/Flow Check Equipment.

- (1) Ensure that the correct amount of oil is contained in the pressure test equipment. Suitable protective clothing must be worn to minimise personal contact with the oil.
- (2) Connect the flowmeter electrical plug and instrumentation plug to the respective locations on the mobile pressure test equipment. Place the flowmeter in a convenient but safe position.
- (3) Connect the feed and scavenge hoses to the feed and scavenge adapters on No.5 vane. Ensure that the connections are tight.
- (4) Ensure that the vent tap on the rear blank of the bearing housing is closed.
- (5) Connect the pressure test equipment to an earthed electricity supply of 30 A 600 V a.c. Ensure that the circulating pump is switched OFF.
- (6) Open the return stop valve on the pressure test equipment.

D. Flow Check Bearing Assembly.

- (1) Switch ON the circulating pump and adjust the pressure controller to give a delivery oil pressure of 10 psig (69 Kpa) for circulating and venting purposes. Ensure that the flowmeter is functioning.
- (2) Carefully open the vent tap on the rear blank to release the trapped air. Catch residual oil in a suitable container.
- (3) Close the vent tap when the trapped air has been expelled.
- (4) Check the oil connections and blanks for oil leakage. Rectify leaks as necessary (Ref. para.K.L.Q).
- (5) Switch ON the oil heater to raise the oil temperature to 120 deg C.

WARNING: ADEQUATE VENTILATION IS ESSENTIAL. HEAT AND OIL RESISTANT CLOTHING MUST BE WORN DURING OPERATIONS INVOLVING CONTACT WITH HEATED OIL AND COMPONENTS.



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (6) When the oil temperature is at 120 deg C switch OFF the circulating pump and carefully open the rear blank vent tap to finally release trapped air.
- (7) CLOSE the vent tap and switch ON the circulating pump.
- (8) Adjust the oil pressure to achieve a differential of 48 psig (330 Kpa) between the oil feed and scavenge. Circulate the oil at the given pressure and temperature for a period of fifteen minutes to equalise the temperature of components.
- (9) On completion of the oil circulation, time check to ensure that the oil flow pressure rate is maintained. Observe and record the oil flow rate indication on the flowmeter.
- (10) Acceptable flow rates are as follows:

(a) Engines pre	38 to 43 gal/h (Imp.)
SB72-8800-311	(172,75 to 195,48 litres/h)
(b) Engines to	55 to 75 gal/h (Imp.)
SB72-8800-311	(250,03 to 340,95 litres/h)
- (11) On completion of a satisfactory flow test, switch OFF the oil heater and circulating pump. Switch off the electricity supply to the equipment and disconnect the oil flowmeter. Ensure that the flowmeter is safely stored.

E. Investigate and Rectify Unsatisfactory Oil Flow.

NOTE : Before commencing disassembly of engine components for examination of the oil jet, examine the mobile pressure test equipment and associated items for possible malfunction.

- (1) Remove adapter blanks (front) and (rear).
  - (a) Switch OFF oil heater.
  - (b) Switch OFF the electricity supply to the pressure test equipment.
  - (c) Rotate the assembly stand to assist oil drainage from the bearing housing rear blank.
  - (d) Open the drain tap on the rear blank, and drain oil into a clean container.

SUB-ASSEMBLY

**72-00-51**

Page 555

Dec 1/84



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (e) Support the bearing housing rear blank and unscrew the captive nut on the front blank.
- (f) Remove the rear and front blanks.
- (2) Remove the bearing assembly from the bearing housing (Ref.Fig.521).
  - (a) Remove the nuts securing the No.16 labyrinth ring to the bearing housing. Carefully remove the labyrinth ring.
  - (b) Remove the eight bolts securing the bearing retaining ring to the bearing housing. Remove the oil jet locknut from the retaining ring.
  - (c) Carefully remove the retaining ring and ensure that it is clearly identified for assembly reference.
  - (d) Carefully withdraw the bearing assembly from the housing. Clearly identify the bearing, and place it in a clean sealed container.
- (3) Examine the oilways and ports for possible cause of low oil flow.
- (4) If necessary remove the squeeze film oil jet for investigation (Ref.Fig.521).
  - (a) Assemble the mechanical puller (Tool 587) to the oil jet.
  - (b) Carefully extract the oil jet.
- F. Assemble Components after Investigation of Unsatisfactory Oil Flow Test.
  - (1) Prepare the squeeze film oil jet for assembly.
    - (a) Ensure thorough cleanliness of components and tools.
    - (b) Insert the jet into assembly plate guide (Tool 585) ensuring that the flat edge of the flange is parallel with the sight line on the tool (Ref.Fig.515).

SUB-ASSEMBLY

72-00-51

Page 556

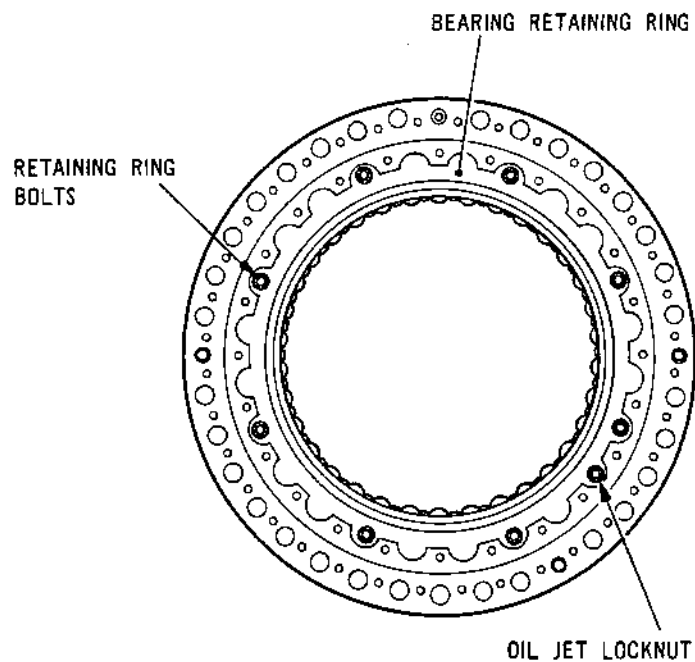
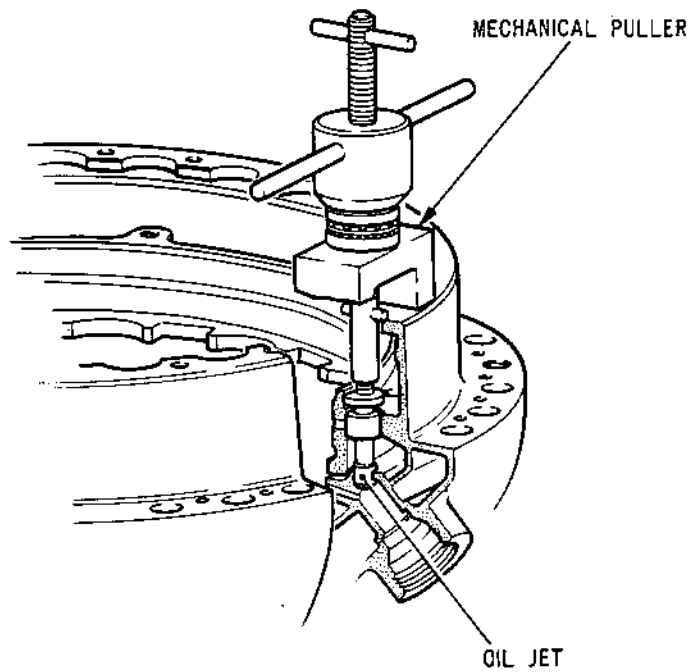
Mar 1/76





OLYMPUS 593

MK. 610-14-28  
OVERHAUL



Removing Squeeze Film Oil Jet  
Figure 521



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (c) Retain the jet in position with the pin (Tool 586) assembled to the threaded section of the jet.
  - (d) Freeze the jet and assembly tool, using a suitable freezing agent. Protective gloves must be worn when handling frozen components.
- (2) Assemble the jet to the bearing housing.
- (a) On completion of the freezing procedure carry out the following procedure with the minimum delay. Do not remove the assembly tools from the jet at this stage.
  - (b) Align the jet with the hole in the bearing housing also align the locating pins on the plate guide with the recess in the bearing housing.
  - (c) Ensure that the oil feed hole in the jet will align with the hole in the bearing housing.
  - (d) Press the jet fully into position and do not disturb it until the temperature of the components is equalised.
  - (e) Remove the assembly tools from the jet.
- (3) Assemble the bearing unit to the bearing housing.
- (a) Assemble the bearing to the bearing housing ensuring that the castellations fully engage.
  - (b) Place the identified retaining ring in position on the bearing assembly, ensuring that the oil jet hole locates correctly over the oil jet. Apply lubricant 'A' to securing items.
  - (c) Secure the retaining ring with eight bolts (72-51-01/4-240) and assemble the locknut (72-51-01/4-250) to the oil jet thread. Ensure that the nut and bolts have a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m). Torque-tighten the nut and bolts to 100 lbf in. (11,5 N.m).
  - (d) Check that the correct bearing end-float (0.0015/ 0.0005 in. (0,0381/0,0127 mm)) is present, using feeler gauges. If necessary, replace the retaining ring to obtain the correct bearing end-float.

SUB-ASSEMBLY

**72-00-51**

Page 558  
Dec 1/84



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Assemble the No.16 labyrinth ring to the bearing housing.
  - (a) Check and ensure that the bolts on the rear flange of the bearing housing are correctly positioned with the flat sections of the bolt-heads located in the flanged recess.
  - (b) Apply lubricant 'A' to the bolt threads.
  - (c) Apply a light smear of jointing compound 'D' to the labyrinth ring at the bearing housing location.
  - (d) Position the labyrinth ring on the bearing housing, ensuring that the top extraction lug is correctly positioned.
  - (e) Secure the labyrinth ring to the bearing housing with locknuts (72-51-01/4-210). Ensure that the locknuts have a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m). Torque-tighten the nuts to 100 lbf in. (11,5 N.m).
  - (f) Re-check the bolts for correct assembly to the bearing housing.
- G. Re-Assemble Pressure Test Blanks to Bearing Housing and Repeat Flow Test.
  - (1) Rotate the assembly stand to facilitate the assembly of the blanks to the bearing housing.
  - (2) Assemble the rear blank to the rear bore of the bearing housing. Position the vent/drain tap at the top position for air venting purposes.
  - (3) Assemble the front blank to the front bore of the bearing housing and secure the blanks together with the captive nut on the front blank. Tighten the captive nut securely.
  - (4) Repeat the flow test procedure (Ref.para.D).
- H. Pressure Test Bearing Assembly (Ref.Fig.519).
  - (1) Ensure that the vent/drain tap on the bearing housing rear blank is closed and that the return stop valve on the pressure test equipment is OPEN.

SUB-ASSEMBLY

**72-00-51**

Page 559

Sep 1/85



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Rotate the assembly stand in order to position No.5 vane on the underside of the sub-assembly during pressure test. This is necessary to allow the oil leakage to drain from the vent tube installed through No.5 vane. The vent tube must remain un-blanked throughout the pressure test procedure.
- (3) Switch ON the circulating pump and adjust the delivery oil pressure to 10 psi (69 Kpa) for circulating and venting purposes.
- (4) Carefully open the vent tap on the rear blank to release the trapped air. Catch the residual oil in a suitable container.
- (5) Close the vent tap when the trapped air has been expelled.
- (6) Switch ON the oil heater to raise the oil temperature to 120 deg C. Switch OFF the heater when the given temperature is achieved.
- (7) When the oil temperature is at 120 deg C, switch OFF the circulating pump and carefully open the rear blank vent tap to finally release trapped air.
- (8) Close the vent tap and switch ON the circulating pump.
- (9) CLOSE the return stop valve and adjust the oil pressure controller to give a pressure of 10 psig (69 Kpa) on the oil scavenge pressure gauge.
- (10) OPEN the return stop valve periodically and switch on the oil heater as necessary to maintain minimum oil temperature of 80 deg C evenly in the system. Ensure that the given pressure is resumed after circulation.
- (11) Check the assembly for oil leakage or seepage.

NOTE: A 30 minute pressure test period is necessary to allow oil leaks to accumulate and become evident in the cold vent tube on No.5 vane, or under the bearing housing front cover insulation blankets.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (12) Oil leakage is unacceptable, but slight seepage of oil can be accepted.

NOTE: An oil leak is considered as drops or globules of oil forming within the specified time and conditions of the pressure test and a seepage is considered as oil dampness which may spread but does not form a droplet or globule within the specified time and conditions of the pressure test.

- (13) Any disturbance of oil carrying components after pressure test will necessitate complete re-pressure test.

J. Remove Equipment After Satisfactory Pressure Test.

- (1) Switch off the circulating pump and oil heater.
- (2) Disconnect the pressure test equipment electrical plug from the mains supply.
- (3) Open the return stop valve.
- (4) Rotate the build stand to assist oil drainage from the bearing housing rear blank.
- (5) Open the drain tap on the rear blank and drain the oil into a clean container.
- (6) Support the bearing housing rear blank.
- (7) Unscrew the captive nut attached to the front blank.
- (8) Remove the rear and front blanks.
- (9) Disconnect the oil feed and scavenge hoses from the adapters at No.5 vane.
- (10) Disconnect the adapters from the oil feed and scavenge tubes at No.5 vane. Assemble suitable protectors to the tube ends.
- (11) Wire-lock the tube fittings positioned internally, and the slotted nuts located at No.5 vane (Ref.Fig.522).

SUB-ASSEMBLY

72-00-51

Page 561

Mar 1/76



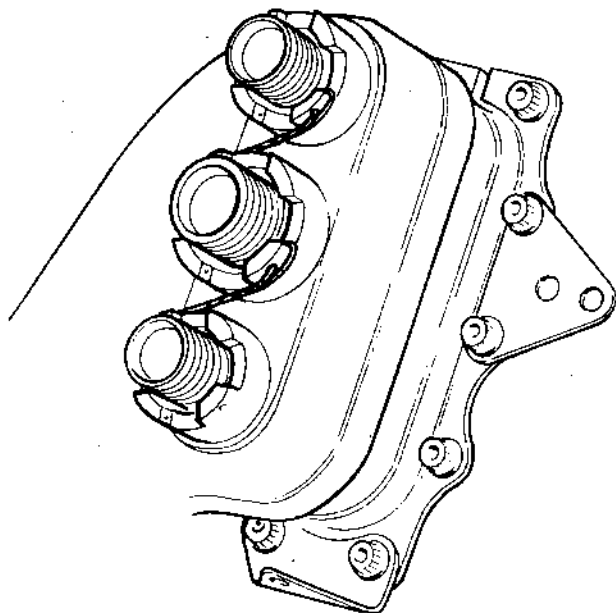
OLYMPUS 593

MK.610-14-28

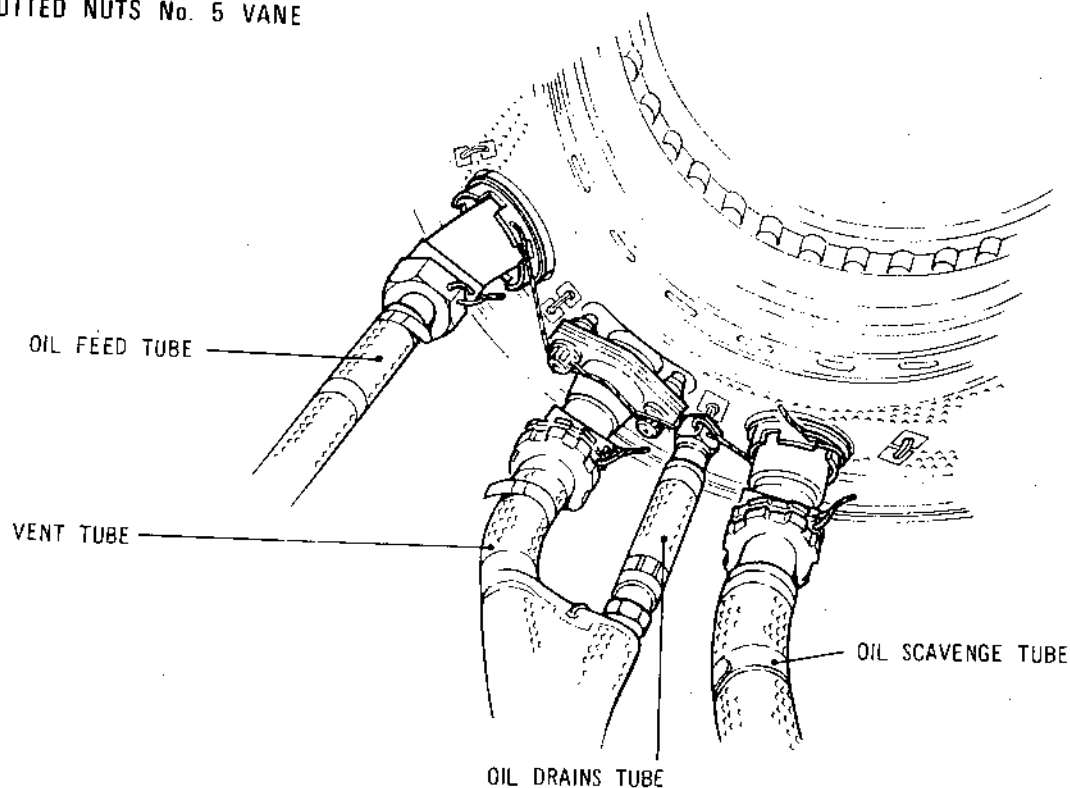
OVERHAUL



CR 31294/00A



WIRE LOCKING ARRANGEMENT  
OF SLOTTED NUTS No. 5 VANE



Wire-Locking Tube Fittings  
Figure 522

SUB-ASSEMBLY  
**72-00-51**  
Page 562  
Mar 1/76

TN39296



OLYMPUS 593

MK.610-14-28  
OVERHAUL



K. Investigate Oil Leakage.

- (1) Leakage from bearing housing blanks is easily detected.
- (2) Leakage from oil feed or scavenge tube end assemblies spherical seals can be detected by the emergence of oil from the following positions.
  - (a) Under the bearing housing front cover insulation blanket.
  - (b) Vent/drain tube protruding through No.5 vane.
- (3) Leakage from No.16 labyrinth ring joint is easily detected.

L. Rectify Oil Leakage from Bearing Housing Blanks.

- (1) Check the tightness of the captive nut on the bearing housing front blank.
- (2) If leakage continues after captive nut has been fully tightened, remove the bearing housing blanks for examination of the seals.
  - (a) Switch OFF the circulating pump and oil heater.
  - (b) Disconnect the pressure test equipment electrical plug from the mains supply.
  - (c) Open the return stop valve.
  - (d) Rotate the assembly stand to assist oil drainage from the bearing housing rear blank.
  - (e) Open the drain tap on the rear blank and drain the oil into a clean container.
  - (f) Support the bearing housing rear blank.
  - (g) Unscrew the captive nut attached to the front blank.
  - (h) Remove the rear and front blanks.
  - (j) Check blanks and locations for cleanliness.
  - (k) Change blank seals if necessary.

SUB-ASSEMBLY

72-00-51

Page 563

Mar 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



M. Assemble Blanks to Bearing Housing.

- (1) Assemble the rear blank to the rear bore of the bearing housing. Position the vent/drain tap at the top position for air venting purposes.
- (2) Assemble the front blank to the front bore of the bearing housing and secure the blanks together with the captive nut attached to the front blank. Tighten the captive nut securely.
- (3) Pressure test the bearing assembly (Ref. para.H).
- (4) Remove the pressure test equipment and wire-lock the tubes (Ref. para.J).

N. Rectify Oil Leakage from Tube End Assemblies.

- (1) Check the oil feed and oil scavenge tube end assemblies for evidence of leakage.
  - (a) Examine each tube end assembly in the vicinity of castellated nut for evidence of oil leakage through the sealing rings. If no oil is evident, it will be necessary to remove both tube end assemblies for examination of the spherical sealing joints.
- (2) Switch OFF the circulating pump and oil heater.
- (3) Disconnect the pressure test equipment electrical plug from the mains supply.
- (4) OPEN the return stop valve.
- (5) Rotate the assembly stand to assist oil drainage from the bearing housing rear blank.
- (6) Open the drain tap on the rear blank and drain the oil into a clean container.
- (7) Remove the oil feed or oil scavenge tube end assemblies for examination.
  - (a) Unscrew the oil feed or scavenge adapter from the appropriate tube at No.5 vane.

TN14489

SUB-ASSEMBLY  
**72-00-51**  
Page 564  
Mar 1/76





OLYMPUS 593

MK.610-14-28  
overhaul



- (b) Remove the slotted nut securing the oil feed or scavenge tube to the external duct on No.5 vane. Use the wrench spanner (Tool 1540) for the oil feed nut, and wrench (Tool 1533) for the scavenge nut.
- (c) Detach the oil feed or scavenge tube bush and clip assembly from the bracket on No.5 vane internal duct. Note the positions of the items removed.
- (d) Unscrew the tube union nut from the tube end assembly on the bearing housing. Use the cranked wrench spanner (Tool 1552) for the oil feed nut and wrench (Tool 1546) for the scavenge nut.
- (e) Carefully manipulate each tube away from the respective tube end assembly.
- (8) Remove the tube end assembly.
- (a) Unscrew the tube end assembly castellated nut. Use the cranked wrench spanner (Tool 1598) for the feed and scavenge.
- (b) Carefully withdraw the tube end assembly from the bearing housing.
- (c) Check the sealing surfaces for cleanliness.
- (d) Examine the sealing surfaces for damage.
- (e) Examine the threads for damage.
- (f) Correct minor damage if possible.
- (9) Assemble the appropriate oil feed or scavenge tube end unit to the bearing housing.

NOTE: The preparation procedure for a replacement oil feed tube end assembly is detailed after this procedure.

SUB-ASSEMBLY

**72-00-51**

Page 565

Mar 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (a) If a replacement scavenge tube end unit (72-51-01/3-260) is to be installed, transfer the seal ring assembly (72-51-01/3-250) (if serviceable) from the rejected tube end assembly to the replacement unit. The small diameter seal ring is assembled between the two larger rings.
  - (b) Ensure that the open section of each ring is not aligned with the open section of an adjacent ring.
  - (c) Apply lubricant 'A' to the union nut thread.
  - (d) Screw the tube end assembly into position in the bearing housing. The scavenge unit is located at bottom position.
- (10) Prepare to install a replacement oil feed tube end assembly (72-51-01/3-210).
- (a) Carefully remove the lubricating nozzle from the unserviceable tube end assembly, and remove the seal ring assembly if serviceable.
  - (b) Assemble the seal ring assembly (72-51-01/3-200) to the replacement tube end assembly. The small diameter seal ring is assembled between the two larger rings.
  - (c) Ensure that the open section of each ring is not aligned with the open section of an adjacent ring.
  - (d) Apply lubricant 'A' to the oil lubricating nozzle and assemble it to the tube end assembly. Torque-tighten the nozzle to 50 lbf in. maximum (5,6 N.m) maximum.
  - (e) Ensure that a minimum clearance gap of 0.020 in. (0,508 mm) will be maintained between the face of the lubricating nozzle and the bottom of the locating bore in the front cover after tightening.
- (11) Install the oil feed tube end assembly.
- (a) Apply lubricant 'A' to the tube end assembly union nut thread. Screw the unit into position in the bearing housing.

SUB-ASSEMBLY

72-00-51

Page 566

Oct 1/82



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (12) Connect the insulated tube assembly to the oil feed or scavenge tube end assembly.
- (a) Apply lubricant 'A' to the tube union nut thread and screw it on to the appropriate tube end assembly, hand-tight.
  - (b) Assemble the tube bush and clip assembly to the appropriate tube. Attach the feed tube to the small bracket on No.5 vane duct. Attach the scavenge tube to the large bracket on No.5 vane duct.
  - (c) Ensure that the nuts have a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m). Apply lubricant 'A' to the bolt threads and torque-tighten the nuts to 100 lbf in. (11,5 N.m).
  - (d) Torque-tighten the oil feed castellated nut to 460 lbf in. (52 N.m) using the wrench spanner (Tool 694) and adapter (Tool 695).
  - (e) Torque-tighten the oil feed tube union nut to 295 lbf in. (33 N.m) using the cranked wrench spanner (Tool 1552).
  - (f) Torque-tighten the oil scavenge castellated nut to 460 lbf in. (52 N.m) using wrench spanner (Tool 694) and adapter (Tool 695).
  - (g) Torque-tighten the oil scavenge tube union nut to 420 lbf in. (47 N.m) using the cranked wrench spanner (Tool 1546).
- (13) Assemble the slotted nut to the oil feed or scavenge tube protruding through No.5 vane.
- (a) Apply lubricant 'A' to the tube threads.
  - (b) Screw the slotted nut on to the tube end. Torque-tighten the oil feed tube nut between 280 and 310 lbf in. (31,6 and 35,0 N.m) using the spanner (Tool 1533).
  - (c) Torque-tighten the oil scavenge tube nut between 400 and 440 lbf in. (45,2 and 49,7 N.m) using the spanner (Tool 1540).

SUB-ASSEMBLY

72-00-51

Page 567  
Oct 1/82



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



(14) Secure the oil feed or oil scavenge tube to the appropriate bracket at No.5 vane duct.

- (a) Assemble the securing items in the order noted during removal. Ensure that the nuts have a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m). Torque-tighten the nuts to 100 lbf in. (11,5 N.m).

P. Pressure Test After Rectification.

- (1) Connect the oil feed and scavenge hose adapter to the appropriate connection at No.5 vane.
- (2) Ensure that all traces of oil are removed from the vent tube and insulation blankets.
- (3) Pressure test the bearing housing assembly (Ref. para.H).
- (4) Remove the pressure test equipment and wire-lock the tubes (Ref. para.J).

Q. Rectify Oil Leakage From No.16 Labyrinth Ring.

- (1) Check the tightness of the nuts securing No.16 labyrinth ring to the bearing housing. Torque required is 100 lbf in. (11,5 N.m).
- (2) If leakage continues after the tightness check, remove the bearing housing blanks.
- (a) Switch OFF the circulating pump and oil heater.
- (b) Disconnect the pressure test equipment electrical plug from the mains supply.
- (c) OPEN the return stop valve.
- (d) Rotate the assembly stand to assist oil drainage from the bearing housing rear blank.
- (e) Open the drain tap on the rear blank and drain the oil into a clean container.
- (f) Support the bearing housing rear blank.

SUB-ASSEMBLY

**72-00-51**

Page 568

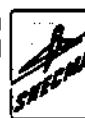
Oct 1/82



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (g) Unscrew the captive nut attached to the front blank.
- (h) Remove the rear and front blanks.
- (3) Remove the labyrinth ring for examination.
  - (a) Remove the nuts securing the labyrinth ring to the bearing housing.
  - (b) Remove the labyrinth ring.
  - (c) Examine the labyrinth ring and bearing housing for the cause of the leakage.
  - (d) Correct any minor damage if possible.
  - (e) Ensure thorough cleanliness of parts.
- (4) Install labyrinth ring.
  - (a) Check and ensure that the bolts on the bearing housing rear flange are correctly positioned with the flat sections of the boltheads located in the flanged recess.
  - (b) Apply lubricant 'A' to the bolt threads.
  - (c) Apply a light smear of jointing compound 'D' to the labyrinth ring at the bearing housing location.
  - (d) Position the labyrinth ring on the bearing housing, ensuring that the top extraction lug is correctly positioned.
  - (e) Ensure that the locknuts have a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m). Secure the labyrinth ring to the bearing housing with locknuts, torque-tightened to 100 lbf in. (11,5 N.m).
  - (f) Re-check the bolts for correct assembly to the bearing housing.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

R. Re-Assemble Pressure Test Blanks to Bearing Housing and Repeat Pressure Test.

- (1) Assemble the rear blank to the rear bore of the bearing housing. Position the vent/drain tap at the top position for air venting purposes.
- (2) Assemble the front blank to the front bore of the bearing housing and secure the blanks together with the captive nut attached to the front blank. Tighten the captive nut securely.
- (3) Pressure test the bearing assembly (Ref. para.H).
- (4) Remove pressure test equipment and wire-lock the tubes (Ref. para.J.).

This space left blank intentionally



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

27. Assemble Engine Mounting Trunnions to Diffuser Case  
(Ref.Fig.523)

A. Prepare to Install Trunnions.

- (1) Install the plug (72-34-00/3-280) and sealing washer (72-34-00/3-290) in the tapping at vane No.7 trunnion location.
  - (a) Apply lubricant 'A' to the plug thread, assemble the washer to the plug and screw the plug into position in the diffuser case. Torque-tighten the plug to 355 lbf in. (40 N.m).
- (2) Assemble the elbow (72-34-00/3-300) to the location at No.7 vane.
  - (a) Apply lubricant 'C' to the securing bolts (72-34-00/3-310-320). Ensure that the bolts have a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m).
  - (b) Place the elbow in position on the diffuser case. The elbow outlet faces toward the bottom dead centre of the diffuser case.
  - (c) Retain the elbow with the securing bolts torque-tightened to 100 lbf in. (11,5 N.m).
  - (d) Temporarily assemble the keep plate (75-03-01/3-280) to the elbow with a bolt (75-03-01/3-270).
  - (e) Secure the hollow pin (75-03-01/3-260) to the keep plate and elbow with bolt (75-03-01/3-250).

B. Assemble Engine Trunnions.

NOTE: It is permissible to perform this operation following assembly of the CC0C to the diffuser case (Refer para.32.C.(7)).

- (1) Apply lubricant 'A' to bolts (71-20-00/1-40).



OLYMPUS 593

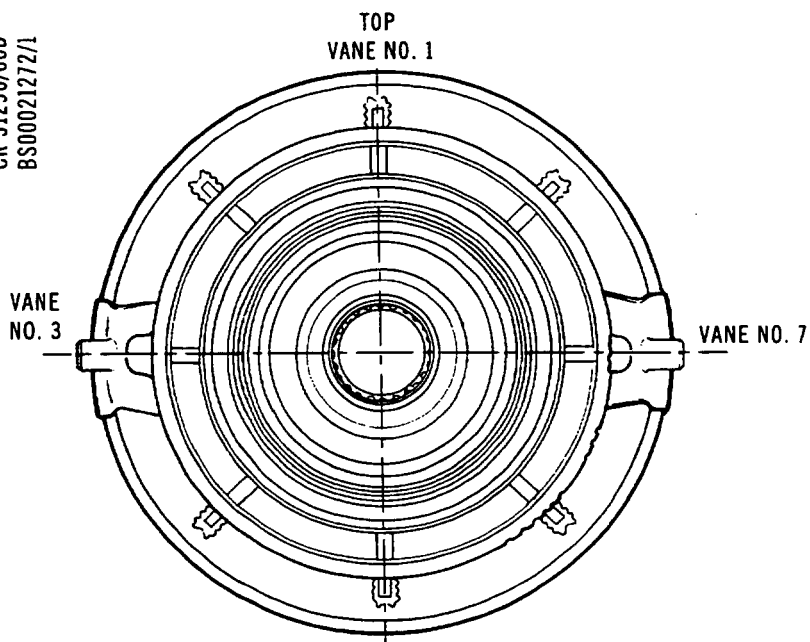
MK.610-14-28

OVERHAUL

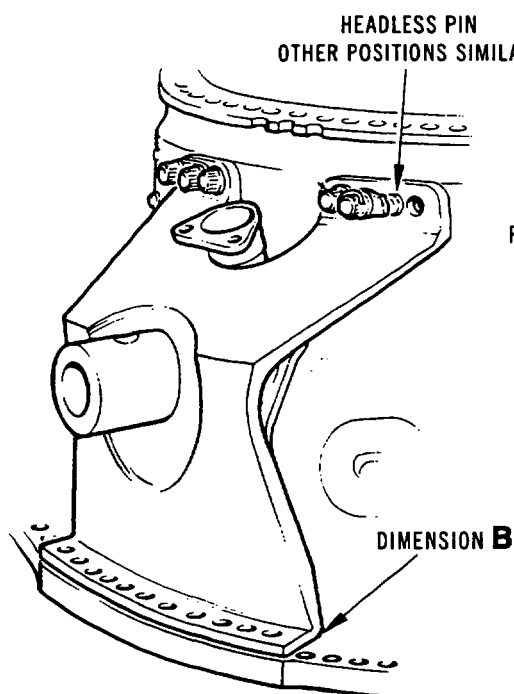


SNECMA

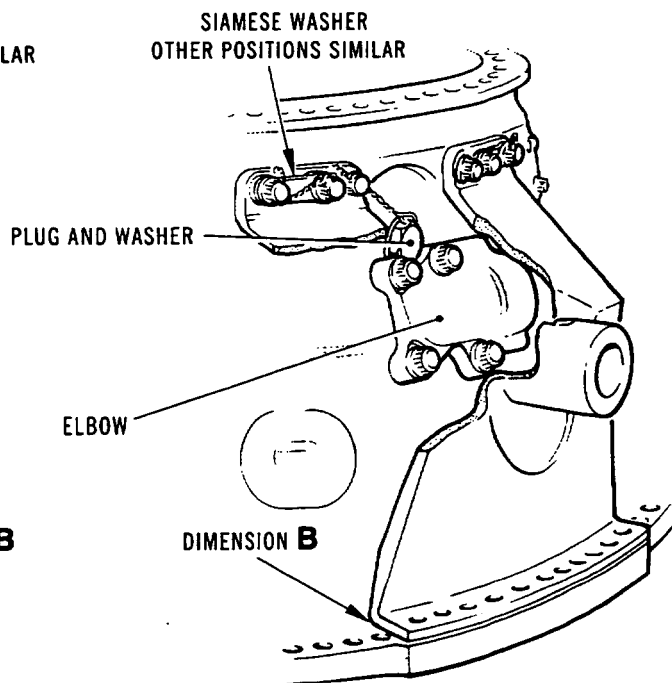
CR 31296/000  
BS00021272/1



VIEW ON FRONT OF DIFFUSER CASE



MOUNTING TRUNNION AT VANE NO. 3



MOUNTING TRUNNION AT VANE NO. 7

Installing Engine Mounting Trunnions  
Figure 523





OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

- (2) Insert the headless pins (71-20-00/1-70) in position in the diffuser case.
- (3) Assemble the mounting trunnions to the diffuser case ensuring that the headless pins locate freely.
- (4) Secure each headless pin in position with a siamese washer (71-20-00/1-50) retained by a bolt (71-20-00/1-40) positioned at each side of the pin location.
- (5) Screw the remaining bolts into position and torque-tighten all the bolts to 500 lbf in. (56,6 N.m).
- (6) Measure dimension B between the mounting trunnion and radius section of the diffuser case wall near the flange. A minimum gap greater than 0.008 in. (0,203 mm) must be maintained throughout this area.
- (7) Wire-lock the plug assembled under the left-hand trunnion location to the nearest trunnion securing bolt.
- (8) On engines to SB.71-8885-31 standard, apply heat resisting aluminium touch-up enamel (PL82) to the bolted flanges on the areas not protected by Sermetel W. Refer to Chapter 72-09-04 for procedure (Local Touch-Up).

28. Assemble External Blanks and Ducts to Diffuser Case  
(Ref.Fig.524 Sheet 1 of 2)

A. Assemble Air Duct Vane Covers.

- (1) Apply lubricant 'C' to bolts (72-34-00/3-230).
- (2) Place a cover (72-34-00/3-250) in position on No.2 and 8 air duct vane flanges and secure with bolts (72-34-00/3-230) and cup-lockwashers (72-34-00/3-240).
- (3) Torque-tighten the bolts to 100 lbf in. (11,5 N.m). Do not lock the washers at this stage.

B. Assemble Air Vent Duct to No.6 Vane.

- (1) Place the air duct (75-02-12/1-10B) SB.75-2 or (75-02-12/1-10A) Pre-SB.75-2 in position on No.6 vane.

SUB-ASSEMBLY

72-00-51

Page 573

Dec 31/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (2) Apply lubricant 'C' to securing bolts (75-02-12/1-20). Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).
- (3) Place the brackets (75-02-12/1-30-40) in position on the air duct flange and secure with two bolts.
- (4) Assemble the securing bolts to the remaining holes in the air duct. Torque-tighten the bolts to 100 lbf in. (11,5 N.m) and wire-lock the bolts together in pairs.
- (5) Pre-SB.75-2. Apply lubricant 'A' to the threads of the union body situated on the duct (75-02-12/1-10A). Assemble the nut assembly (75-02-12/1-45A) to the union body and torque-tighten the nut between 140 and 160 lbf in. (15,8 and 18,1 N.m). Wire-lock the nut to the union body.

C. Blank Unused Igniter Ports.

- (1) Apply lubricant 'A' to the threads of blanking plugs (72-34-00/3-260).
- (2) Assemble a flat washer (72-34-00/3-270) to each blanking plug. Screw each plug into the diffuser case and torque-tighten to 505 lbf in. (57 N.m). Wire-lock each plug.

D. Blank Unused Fuel Sprayer Pad Locations.

NOTE: Refer to the IPC for details of alternative bolts and blanking covers.

- (1) Assemble blanking covers without brackets attached.
  - (a) Apply lubricant 'C' to bolts. Assemble a sealing washer (72-34-00/3-110) and blanking cover (72-34-00/3-90) to positions 9, 10, 11, 14, 15 and 16. Retain the blanks with bolts (72-34-00/3-60) torque-tightened to 210 lbf in. (24 N.m). Wire-lock the bolts together.

SUB-ASSEMBLY

72-00-51

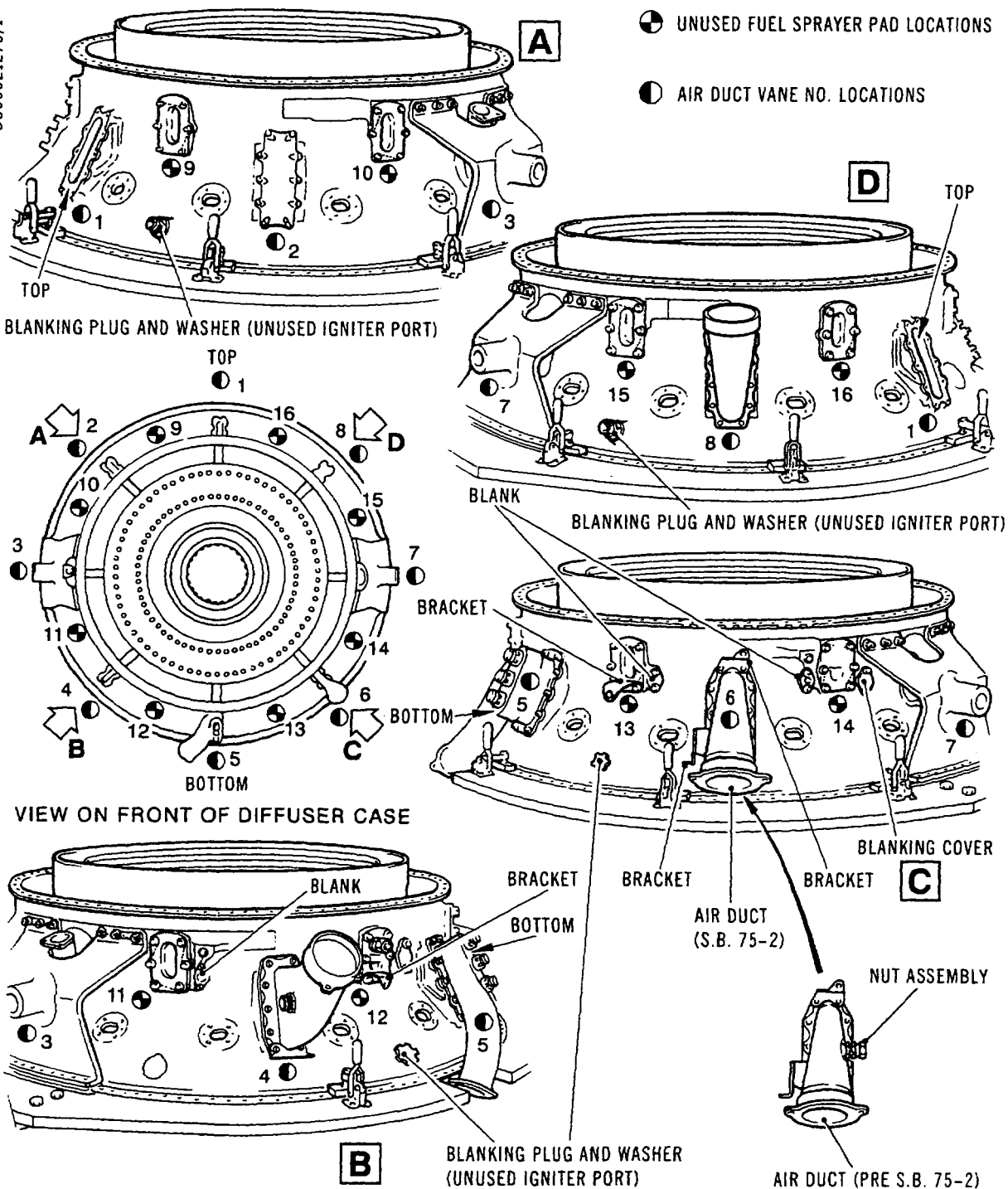
Page 574  
Dec 31/01

CR 31297/00E  
BS00021273/1



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Installing External Components to Diffuser Case  
Figure 524 (Sheet 1 of 2)

SUB-ASSEMBLY

72-00-51

Page 575  
Jun 1/98



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

(2) Assemble components to position 12.

- (a) Apply lubricant 'C' to bolts. Assemble a sealing washer (72-34-00/3-110) with the blank cover/thermocouple housing (72-34-00/3-100). Position the bracket (72-34-00/3-85) on the blank cover and secure the assembly to the diffuser case with bolts (72-34-00/3-80). Torque-tighten the bolts to 210 lbf in. (24 N.m). Wire-lock the bolts together in pairs.
- (b) Assemble the union nut/blank ferrule assembly (72-34-00/3-170-180-190-200) to the blank cover. Apply lubricant 'A' to the threads. Torque-tighten the union nut to 240 lbf in. (27 N.m). Wire-lock the union nut to a cover bolt.
- (c) Insert the blanking cover (72-34-00/3-220) into the hole next to the installed cover. Apply lubricant 'C' to the securing bolts (72-34-00/3-210).
- (d) Ensure that the bolts have a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m). Secure the blanking cover with the bolts torque-tightened to 100 lbf in. (11,5 N.m). Wire-lock the bolts together.

(3) Assemble components to position 13.

- (a) Apply lubricant 'C' to bolts. Assemble a sealing washer (72-34-00/3-110) blanking cover (72-34-00/3-90) and bracket (72-34-00/3-40) to position 13. Retain the bracket with bolts (72-34-00/3-35 or 20). Secure the blanking cover at the remaining bolt positions with bolts (72-34-00/3-60 or 70). Torque-tighten the bolts to 210 lbf in. (24 N.m). Wire-lock the bolts together.

E. Assemble Blanking Plugs near Unused Fuel Sprayer Pads.

- (1) Apply lubricant 'C' to bolts. Ensure that the bolts have a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m).



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

Printed in England

- (2) Install the blanking plugs (72-34-00/3-150) near the unused sprayer pad positions 11, 13 and 14.
- (3) Secure each blanking plug at position 11 and 14 with two bolts (72-34-00/3-140) torque-tightened to 100 lbf in. (11,5 N.m).
- (4) Wire-lock each pair of bolts together.
- (5) Secure the blanking plug at position 13 with two bolts (72-34-00/3-120) and cupwashers (72-34-00/3-130).
- (6) Torque-tighten the bolts to 100 lbf in. (11,5 N.m).
- (7) Peen the cupwashers to lock the bolts.

F. Assemble duct at No.1 vane position.

- (1) Apply lubricant 'C' to bolts.
- (2) Position the duct (75-01-03/1-60) on the diffuser case and secure with 10 bolts (75-01-03/1-70B) (SB.75-2) or bolts and key washers (75-01-03/1-70A-80A) (Pre-SB.75-2). Torque-tighten the bolts to 100 lbf in. (11,5 Nm.).
- (3) Wire lock the bolts (SB.75-2) together in pairs. Lock the keywashers and bolts (Pre-SB.75-2).

G. Assemble duct at No.4 vane position.

- (1) Apply lubricant 'C' to bolts.
- (2) Position the duct (75-01-04/1-200) on the diffuser case.
- (3) Position the bracket (75-01-04/1-220) on the rear end of the duct flange and secure with bolts (75-01-04/1-210).
- (4) Secure the duct to the diffuser case with bolts (75-01-04/1-210). Torque-tighten the 10 bolts to 100 lbf in. (11,5 Nm.).
- (5) Wire lock the bolts together in pairs.

SUB-ASSEMBLY

72-00-51

Page 577

Dec 31/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

29. Assemble Fuel Sprayers to Diffuser Case  
(Ref.Fig.524 Sheet 2 of 2)

A. Assemble Sprayers.

CAUTION: EXERCISE GREAT CARE WHEN ASSEMBLING SPRAYERS.  
DO NOT APPLY FORCE TO TUBE SECTIONS, DAMAGE  
TO TUBES COULD OTHERWISE RESULT.

- (1) Ensure that all sprayers have been functionally tested and certified satisfactory. Remove the protectors from the fuel outlet ends of the sprayers, then ensure thorough cleanliness and absence of damage.
- (2) Apply lubricant 'C' to the sprayer securing bolts (73-12-05/1-20, 1-30, 1-40) and jointing compound 'A' to the sealing joints on the fuel sprayers and CCOC. Insert sprayers into the position A, B and C (Ref.Fig.538), and assemble brackets and securing bolts as follows.
  - (a) Assemble a bracket (73-12-05/1-60) to the sprayer flange at position A and secure it with two bolts (73-12-05/1-20).
  - (b) Assemble a bracket (73-12-05/1-50) to the sprayer flange at position B and secure it with two bolts (73-12-05/1-30).
  - (c) Assemble a bracket (73-12-05/1-70) to the sprayer flange at position C and secure it with two bolts (73-12-05/1-40).
- (3) Insert sprayers into the remaining locations and secure with bolts (73-12-05/1-20).
- (4) Torque-tighten all the fuel sprayer securing bolts to 100 lbf in. (11,5 N.m), then wire-lock the bolts together in pairs. Ensure that protectors are assembled to the thread sections of the sprayers.

SUB-ASSEMBLY

72-00-51

Page 578

Dec 31/01



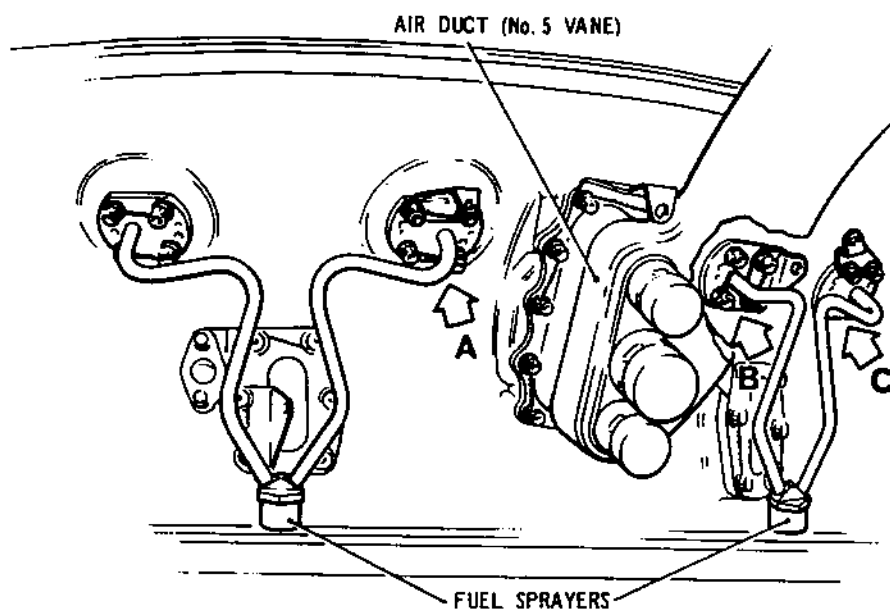
OLYMPUS 593

MK.610-14-28

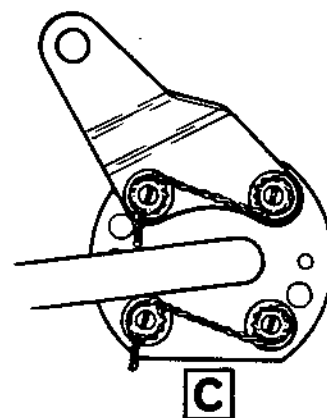
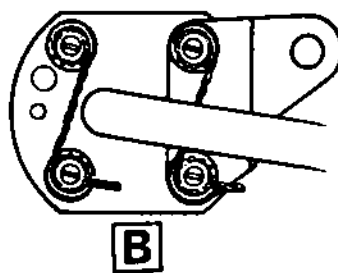
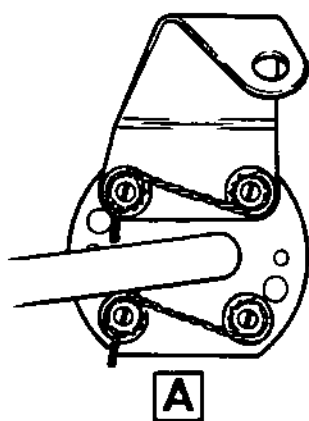
OVERHAUL



sneema



VIEW ON BOTTOM OF DIFFUSER CASE



Installing External Components to Diffuser Case  
Figure 524 (Sheet 2 of 2)



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

30. Transfer Diffuser Case Assembly to Final Assembly Stand

A. Remove Diffuser Case from Assembly Stand (Ref.Fig.525).

- (1) Rotate the assembly stand (Tool 1160) until the bearing support is uppermost and vertically positioned.
- (2) Assemble the lifting fixture (Tool 1659) to the bearing support.
  - (a) Align the top position of the lifting fixture flange with the top of the bearing support.
  - (b) Carefully place the lifting fixture on the bearing support flange ensuring that the bolts and dowels engage freely.
  - (c) Secure the lifting fixture with nuts.
  - (d) Attach a crane hoist to the lifting fixture and carefully apply sufficient lifting force to support the diffuser case when it is released from the assembly stand.
- (3) Remove the diffuser case from the assembly stand.
  - (a) Prepare a suitable flat surface beneath the assembly stand to accept the diffuser case.

SUB-ASSEMBLY

**72-00-51**

Page 578B

Jun 1/98





OLYMPUS 593

MK.610-14-28  
OVERHAUL



SNECMA

To be issued later

Transferring Diffuser Case to Final Assembly Stand  
Figure 525

SUB-ASSEMBLY

72-00-51

Page 578C  
Jun 1/98



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

This Page Left Blank Intentionally



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (b) Release the lever clamps securing the diffuser case to the assembly stand ensuring that the clamps are fully retracted.
- (c) Carefully lower the diffuser case on to the prepared flat surface then remove the crane hoist.
- (d) Rotate the assembly stand away from the diffuser case. Attach the crane hoist to the lifting fixture.
- (e) Carefully raise the diffuser case in readiness for transfer to the assembly stand.

B. Assemble the Diffuser Case in Assembly Stand.

- (1) Align the engine mounting trunnions with the assembly stand supports. Lower the diffuser case on to the stand.
- (2) Secure the diffuser case flange to the assembly stand.
- (3) Remove the crane hoist and lifting fixture from the bearing support.

31. Assemble Shroud to Bearing Support (Ref.Fig.526)

A. Prepare Shroud.

- (1) Assemble 24 bolts (72-51-02/1-240) to the outer flange of the shroud (72-51-01/5-20), ensuring that the bolts protrude rearward and the flat sections of boltheads locate on the machined section at the base of the bolt flange.
- (2) Using the assembly sleeve (Tool 1322) secure each bolt with a retaining ring (72-51-02/1-231).
- (3) Freeze theoulderer pin (72-51-02/1-330) using a suitable freezing agent.
- (4) Fully insert the pin into the rear flange of the shroud. Protective gloves must be worn when handling frozen components.

SUB-ASSEMBLY

72-00-51

Page 579

Jun 1/98



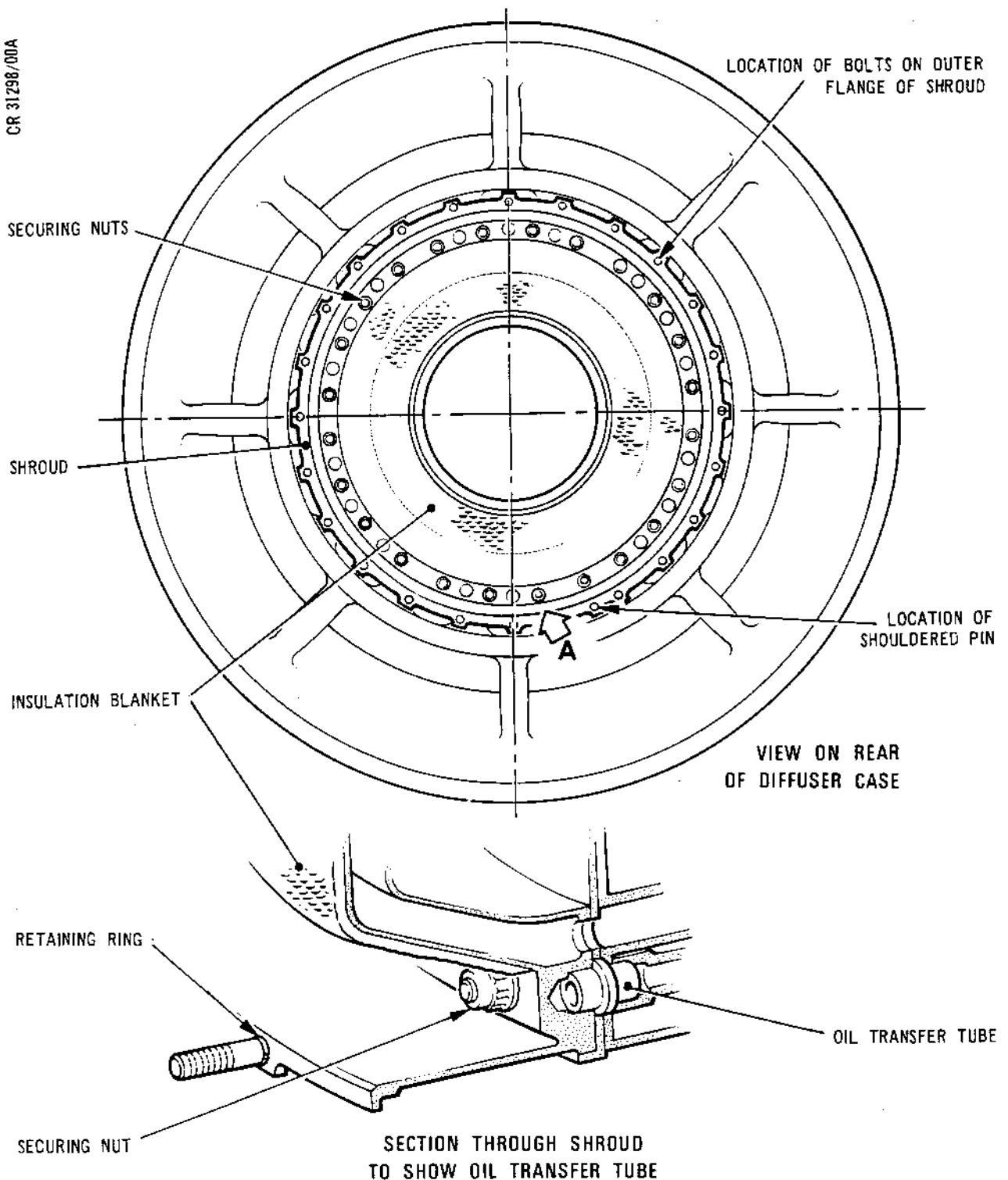
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 31298/00A



Assembling Shroud and Insulation Blanket to Bearing Support  
Figure 526

SUB-ASSEMBLY  
**72-00-51**  
Page 580  
Mar 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

B. Assemble Shroud.

- (1) Place the shroud in position on the bearing support ensuring that the oil transfer tube in the bearing support flange engages correctly with the location in the shroud. Place the insulation blanket (72-51-01/5-10) over the shroud and locate it on the seven bolts protruding from the bearing support.
- (2) Apply lubricant 'C' to the bolt threads. Ensure that the bolts have a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m).
- (3) Secure the shroud and insulation blanket with self-locking nuts (72-51-01/4-40 and 70). Torque-tighten the nuts to 100 lbf in. (11,5 N.m).
- (4) Secure the bolts each side of the oil transfer tube/flexible drains tube position with two nuts (72-51-01/4-100). Torque-tighten the nuts to 100 lbf in. (11,5 N.m).

32. Assemble Combustion Chamber Outer Case to Diffuser Case

A. Prepare CCOC (Ref.Fig.527 and 527A).

- (1) On engines to Pre-S.B.72-75 standard, install pins and blanking plates.
  - (a) Shrink the locating pin and the straight headless pin (72-42-01/2-360-370) in a freezing agent.
  - (b) Install the locating pin (2-360) in the top of the CCOC front flange.
  - (c) Install the headless pin (2-370) in the top of the CCOC rear flange.
  - (d) Install blanking plates.
    - (i) Apply jointing compound 'A' to abutment surfaces of the blanking plates (72-42-01/2-400).
    - (ii) Assemble the blanking plates to the redundant thermocouple locations and retain them with bolts and nuts (72-42-01/

SUB-ASSEMBLY

72-00-51

Page 581  
Dec 31/01

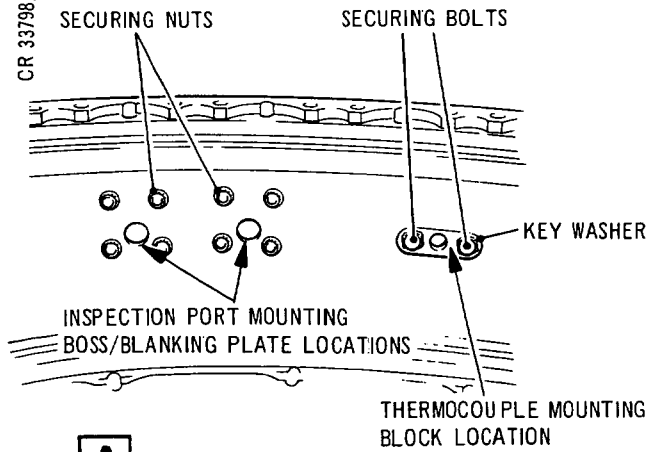


# OLYMPUS 593

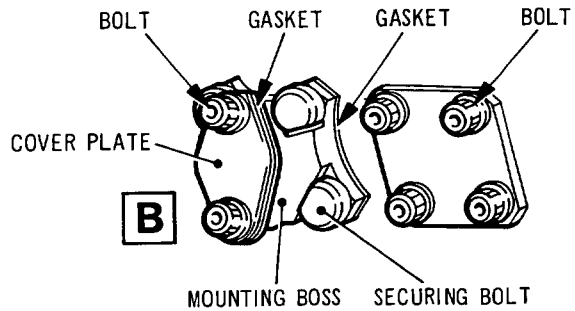
MK.610-14-28  
OVERHAUL



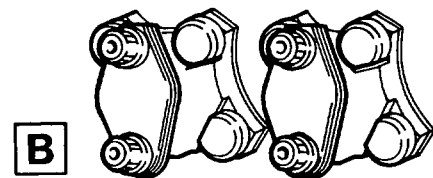
CR 33798/000



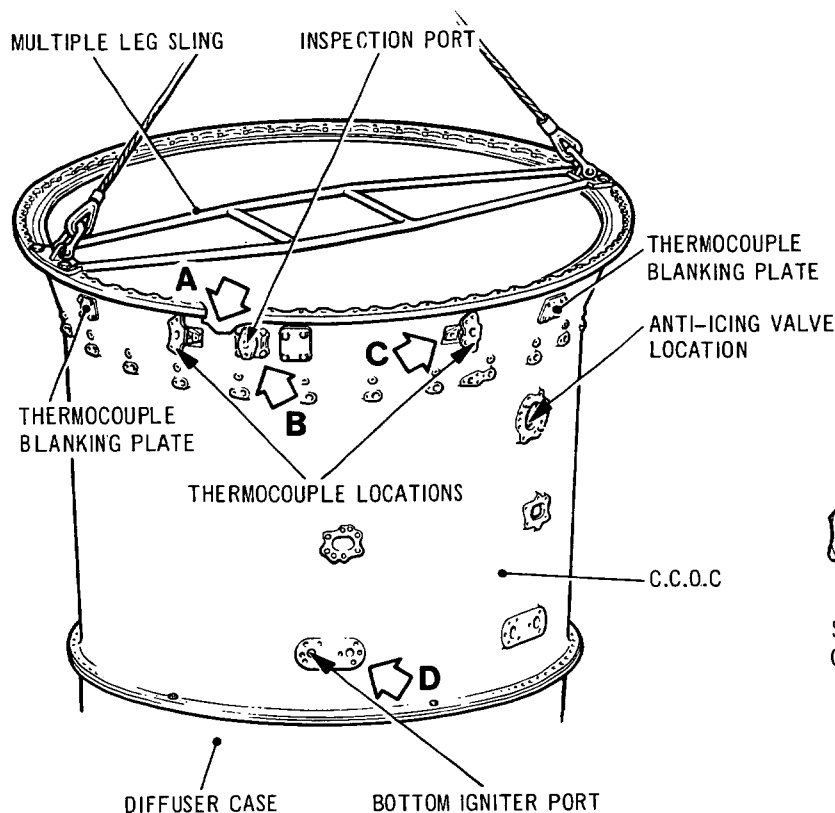
**A** VIEW INSIDE C.C.O.C.



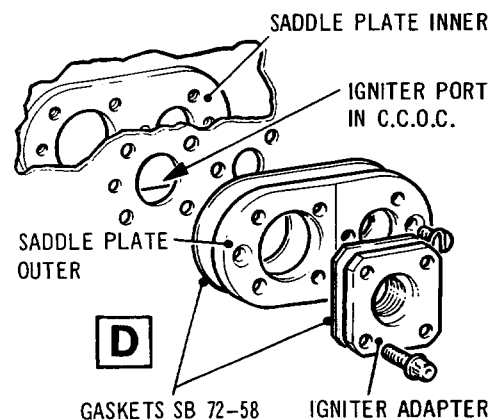
**B** INSPECTION PORT AND BLANKING PLATE



ALTERNATIVE STANDARD  
(DOUBLE MOUNTING BOSS)



THERMOCOUPLE MOUNTING  
BLOCK  
(OPPOSITE HAND SIMILAR)



Assembling CCOC to Diffuser Case  
Figure 527

BS00001567/1  
CR 35473/00A

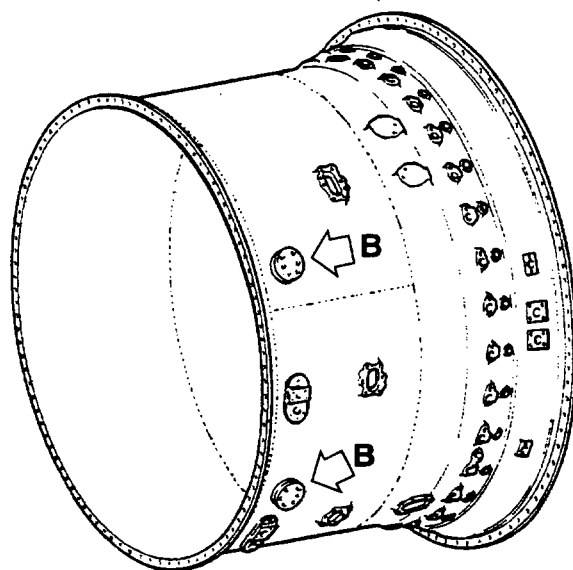
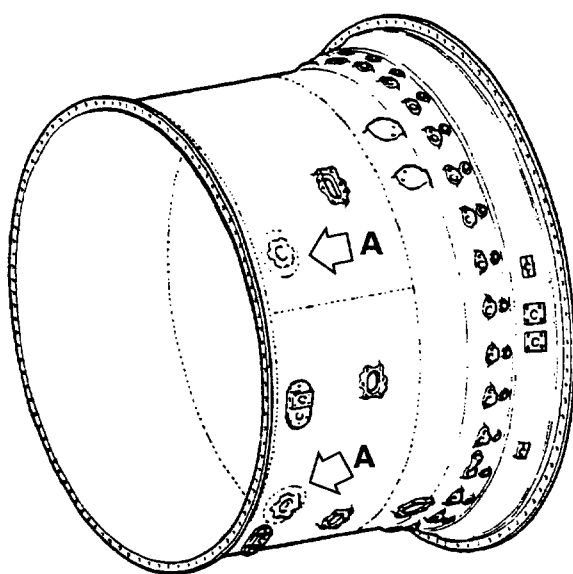


OLYMPUS 593

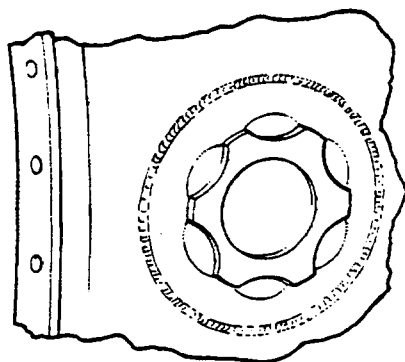
MK.610-14-28  
OVERHAUL



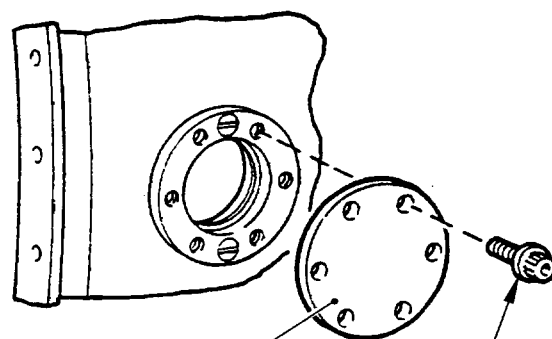
snecma



VIEW ON UNDERSIDE OF CASE



**A**



BLANKING COVER

BOLT

**B**

CC0C Blanking Cover Details (SB.72-8605-276)  
Figure 527A

SUB-ASSEMBLY

**72-00-51**

Page 582A  
Dec 31/01



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

2-390-380) with lubricant 'C' applied. Ensure that the nuts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m), then torque-tighten to 100 lbf in. (11,5 N.m).

- (2) Install pins (72-42-01/2-80) to the anti-icing valve location in the side of the CCOC. Use a suitable freezing agent to shrink the pins, then insert the pins into the anti-icing valve mounting location.
- (3) Install mounting bosses (72-42-01/2-250) or blanking plate (72-42-01/2-110) at inspection port locations.

NOTE: If vane 13 is of the single inspection port type, install blanking plate in lieu of lower mounting boss.

- (a) Install mounting boss (72-42-01/2-250) at both inspection port locations.
  - (i) Apply jointing compound 'A' to abutment surfaces of the boss/CCOC and gasket SB.72-58 (72-42-01/2-255). Apply lubricant 'C' to bolts.
  - (ii) Place the mounting boss and gasket in position and retain with four bolts and nuts (72-42-01/2-240-230). Ensure that the nuts have a locking (run-down) torque of 10 lbf in. (1,1 N.m) then torque-tighten to 100 lbf in. (11,5 N.m).
  - (iii) Temporarily assemble the cover plate (72-42-01/2-210), gasket SB.72-58 (72-42-01/2-225) and bolts (72-42-01/2-200) to the mounting boss. Attach the flanged sealing bar externally to the mounting boss in readiness for later use.
- (b) Install blanking plate (72-42-01/2-110) in lieu of lower mounting boss.
  - (i) Apply lubricant 'C' to bolts (Ref.70-00-01, Servicing and Storage of Materials).





OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (ii) Position the plate over the inspection port and retain with four bolts and nuts (72-42-01/2-100-90). Ensure that the nuts have a locking (run-down) torque of 10 lbf in. (1,1 N.m) then torque-tighten to 100 lbf in. (11,5 N.m).
- (4) Install mounting blocks (72-42-01/2-30) at both thermocouple locations.
  - (a) Apply jointing compound 'A' to abutment surfaces. Place the mounting block in position on the CC0C and place keywasher (72-42-01/2-20) inside the CC0C in line with the mounting block bolt-holes.
  - (b) Apply lubricant 'A' to the bolts (72-42-01/2-10), then insert the bolts through the keywasher and screw into the mounting block. Ensure that the keywasher does not obstruct the thermocouple hole.
  - (c) Torque-tighten the bolts to 100 lbf in. (11,5 N.m), then lock the keywashers.
- (5) On engines to SB.72-8605-276 standard, install the two blanking covers (72-42-01/2A-892) on the CC0C.
  - (a) Apply lubricant C to the bolts (72-42-01/2A-891) and secure the blanking covers.
  - (b) Torque-tighten the bolts (72-42-01/2A-891) to 100 lbf in. (11,5 N.m).
  - (c) Wire-lock the bolts together in pairs.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

B. Assemble Saddle Plates and Igniter Adapters to CCOC  
(Ref.Fig.527).

- (1) Ensure thorough cleanliness of all components.  
Apply lubricant 'A' to securing screws and  
lubricant 'C' to bolts.

NOTE: This procedure applies only to engines with CCOC  
incorporating bolted on igniters and pilot fuel  
sprayer mountings.

- (2) Position the saddle plates inner (72-42-01/2A-860)  
on the inner surface of the CCOC.
- (3) On engines to Pre-SB.72-58 standard apply jointing  
compound 'A' to abutment surfaces of saddle plates  
outer (72-42-01/2A-840) and CCOC.
- (4) On engines to SB.72-58 standard interpose a gasket  
(72-42-01/2A-850) between each saddle plate outer  
and CCOC.
- (5) Position the saddle plates outer on the CCOC and  
secure to the saddle plates inner with screws  
(72-42-01/2A-830) fully tightened. Peen the screws  
to lock (Ref. Standard Practices 72-09-00).



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (6) Assemble igniter adapters to saddle plates.
  - (a) On engines to Pre-SB.72-58 standard apply jointing compound 'A' to abutment surfaces of adapters (72-42-01/2A-810) and saddle plates outer.
  - (b) On engines to SB.72-58 standard interpose a gasket (72-42-01/2A-820) between each adapter and saddle plate outer.
  - (c) Secure the adapters with bolts (72-42-01/2A-800) torque tightened to 100 lbf in. (11,5 N.m). Wire-lock the bolts together in pairs.

C. Assemble CCOC to HP Compressor Diffuser Case (Ref.Fig.528).

- (1) Secure the multiple leg sling (Tool 1190) to the rear flange of the CCOC, then attach the crane hoist and position the unit in readiness for assembly to the diffuser case.
- (2) Apply jointing compound A to the abutment surfaces of the diffuser case and CCOC flange.
- (3) Align the TOP mark on the CCOC with the TOP mark on the diffuser case. Align the bolt-holes in the flanges and the pin in the CCOC with the hole near the top position in the diffuser flange.
- (4) Lower the CCOC into position on the diffuser case flange.
- (5) Apply lubricant 'A' to the flange retaining bolts.
- (6) Assemble brackets to the joint flanges.

NOTE: Boltheads are to be positioned on the CCOC flange side of the assembly.

CAUTION: EXERCISE CARE AND ENSURE D HEAD BOLTS FIT TIGHTLY AGAINST LOCATING SHOULDER TO AVOID DAMAGE.

- (a) Refer to Fig.528 and, in conjunction with Table 501, assemble and retain the brackets to the flanges.

SUB-ASSEMBLY

72-00-51

Page 584A

Dec 31/99



OLYMPUS 593



MK.610-14-28  
OVERHAUL

snecma

(7) Assemble Engine Trunnions (Ref. Fig.523)

NOTE: If the engine trunnions are already assembled to the diffuser case (Ref. para 27A and 27B), proceed to para.(8).

- (a) Ensure the plug and sealing ring (72-34-00/3-280-290) and the elbow and retaining bolts (72-34-00/3-310-320) are assembled at vane No.7 trunnion location (Ref. para.27A(1) and (2)).
- (b) Apply lubricant 'A' to bolts (71-20-00/1-40).
- (c) Insert the headless pins (71-20-00/1-70) in position in the diffuser case.
- (d) Assemble the mounting trunnions to the diffuser case ensuring that the headless pins locate freely.
- (e) Secure each headless pin in position with a siamese washer (71-20-00/1-50) retained by a bolt (71-20-00/1-40) positioned at each side of the pin location.
- (f) Screw the remaining bolts (71-20-00/1-40) into position and torque tighten all the bolts to 500 lbf in. (56,6 Nm.).
- (g) Measure dimension B between the mounting trunnion and the radius section of the diffuser case wall near the flange. A minimum gap greater than 0.008 in. (0,203 mm) must be maintained throughout this area.
- (h) Wire-lock the plug assembled under the left-hand trunnion location to the nearest trunnion securing bolt.
- (j) On engines to SB.71-8885-31 standard, apply heat resisting aluminium touch-up enamel (PL82) to the bolted flanges on the areas not protected by Sermetel W. Refer to Chapter 72-09-04 for procedure (Local Touch-up).

SUB-ASSEMBLY

72-00-51

Page 584B

Jun 1/98



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (8) Assemble bolts and nuts at engine mounting trunnion rear flange positions.

**CAUTION:** EXERCISE CARE AND ENSURE D HEAD BOLTS FIT TIGHTLY AGAINST LOCATING SHOULDER TO AVOID DAMAGE.

- (a) Ensure that the nuts have minimum locking (run-down) torque of 20 lbf in. (2,3 N.m).
- (b) Assemble bolts and nuts (72-42-01/3-260-250) at the right-hand engine mounting trunnion position (hole numbers 32 to 42 inclusive).
- (c) Assemble bolts and nuts (72-42-01/5-90-80) at the left-hand engine mounting trunnion position (hole numbers 104 to 114 inclusive).

- (9) Assemble bolts to remaining locations in the flanges.

**CAUTION:** EXERCISE CARE AND ENSURE D HEAD BOLTS FIT TIGHTLY AGAINST LOCATING SHOULDER TO AVOID DAMAGE.

- (a) Ensure that the nuts have a minimum locking (run-down torque of 10 lbf in. (1,1 N.m).
- (b) Assemble the bolt and nut (72-42-01/3-450-20) to hole No.60.
- (c) Assemble the bolts and nuts (72-42-01/4-150-140) to holes No.79 and 80.
- (d) Assemble the bolts and nuts (72-42-01/3-30-20) to the remaining positions.

- (10) Torque-tighten flange nuts.

- (a) Torque-tighten the nuts at the mounting trunnion positions (hole numbers 32 to 42 inclusive and 104 to 114 inclusive) to 250 lbf in. (28 N.m).
- (b) Torque-tighten the nuts at all other positions to 120 bf in. (13,6 N.m).
- (c) Allow a period of ten minutes to elapse after torque-tightening the complete assembly, then torque check all nuts and ensure that torque tightness as detailed is maintained.

SUB-ASSEMBLY

72-00-51

Page 585

Dec 31/99



OLYMPUS 593



BRACKET IPC NO.	FLANGE HOLE NO.	DESCRIPTION	SECURING ITEMS IPC NO.
72-42-01/3-50	3,4	Bolt, Nut	72-42-01/3-90-40
71-20-00/1-30	8,9,10,11,12,13	Bolt, Washer, Nut	72-42-01/3-120- 110-100
72-42-01/3-170 )	14,15,16, 17,18	Bolt, Washer, Nut	72-42-01/3-180- 160-150
72-42-01/3-140 )		Bolt, Nut	72-42-01/3-180- 130
72-42-01/3-50 )		Bolt, Nut	72-42-01/3-90- 40
72-42-01/3-200	29	Bolt, Nut	72-42-01/3-210- 190
72-42-01/3-280	44,45	Bolt, Nut	72-42-01/3-320- 270
72-42-01/3-230	48,49	Bolt, Nut	72-42-01/3-240- 220
72-42-01/3-340	52,53	Bolt, Nut	72-42-01/3-410- 330
72-42-01/3-350	54,55	Bolt, Nut	72-42-01/3-410- 330
72-42-01/3-360	56,57	Bolt, Nut	72-42-01/3-410- 330
72-42-01/3-400	58,59	Bolts, Nut	72-42-01/3-420- 440-430
72-42-01/3-470	61,62	Bolt, Nut	72-42-01/3-480- 460
72-42-01/3-500	63,64	Bolt, Nut	72-42-01/3-510- 490
72-42-01/3-530	66,67	Bolt, Nut	72-42-01/3-540- 520
72-42-01/4-30	72	Bolt, Nut	72-42-01/4-80-20
72-42-01/4-30 )	73	Bolt, Nut	72-42-01/4-90-20
72-42-01/4-70 )	74,75,76 77,78	Bolt, Nut	72-42-01/4-100-20
72-42-01/4-70		Bolt, Nut	72-42-01/4-130- 110-150-140
72-42-01/4-120			72-42-01/4-180- 160
72-42-01/4-170	82	Bolt, Nut	72-42-01/4-260- 200-190
72-42-01/4-210 )	83,84	Bolt, Washer, Nut	
72-42-01/4-220 )			

Bracket Positions CCOC/Diffuser Case Flange  
Table 501 (Continued)

SUB-ASSEMBLY

72-00-51

Page 586

Jan 2/80

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

Printed in England

BRACKET IPC NO.	FLANGE HOLE NO.	DESCRIPTION	SECURING ITEMS IPC NO.
72-42-01/4-280	86,87,88	Bolt, Nut	72-42-01/4-290-270
72-42-01/4-310	90,91,92	Bolt, Nut	72-42-01/4-320-300
72-42-01/4-360	96,97	Bolt, Nut	72-42-01/4-340-380-350
72-42-01/4-370	97,98,99,100	Bolt, Nut	72-42-01/4-380-350
72-42-01/5-30	101,102	Bolt, Nut	72-42-01/5-70-20
72-42-01/5-110	115,116	Bolt, Nut	72-42-01/5-150-100
72-42-01/5-170	117	Bolt, Nut	72-42-01/5-180-160
72-42-01/5-230	128,129,132	Bolt, Washer, Nut	72-42-01/5-240-220-210
72-42-01/5-200	130,131	Nut, Shouldered Stud Washer, Nut	72-42-01/5-190-250-210-210
71-20-00/1-20	133,134,135,136,137,138	Bolt, Washer, Nut	72-42-01/5-280-270-260
72-42-01/5-300	142,143	Bolt, Nut	72-42-01/5-340-290

Bracket Positions CCOC/Diffuser Case Flange  
Table 501 (Concluded)

(11) On engines with mounting trunnions to SB.71-8885-31 standard, apply heat resisting aluminium touch-up enamel (PL82) to the bolted flanges on the areas not protected by Sermetel W. Refer to Chapter 72-09-04 for procedure (Local Touch-up).

(12) Remove the sling from the CCOC rear flange.



OLYMPUS 593

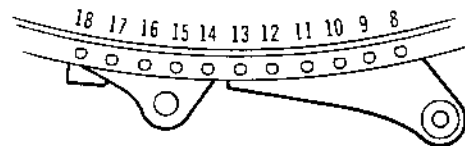
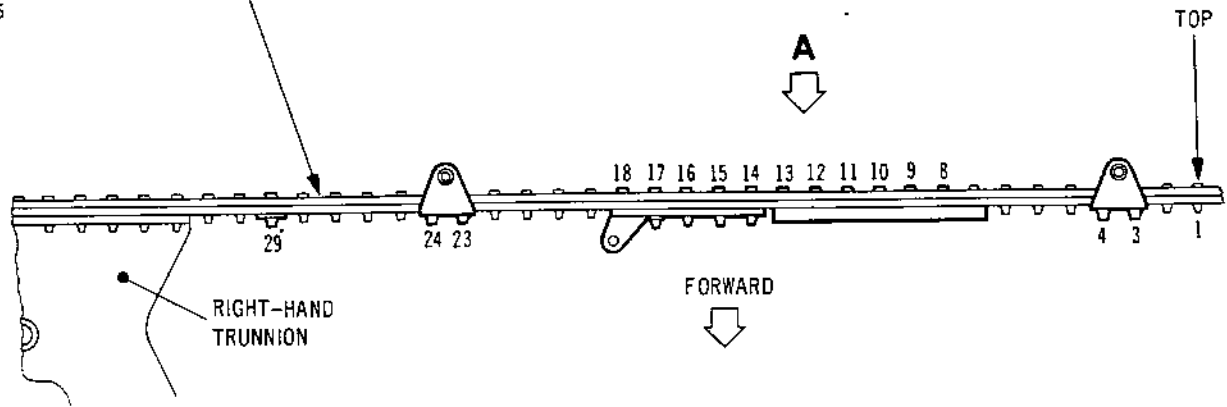
MK. 610-14-28

OVERHAUL

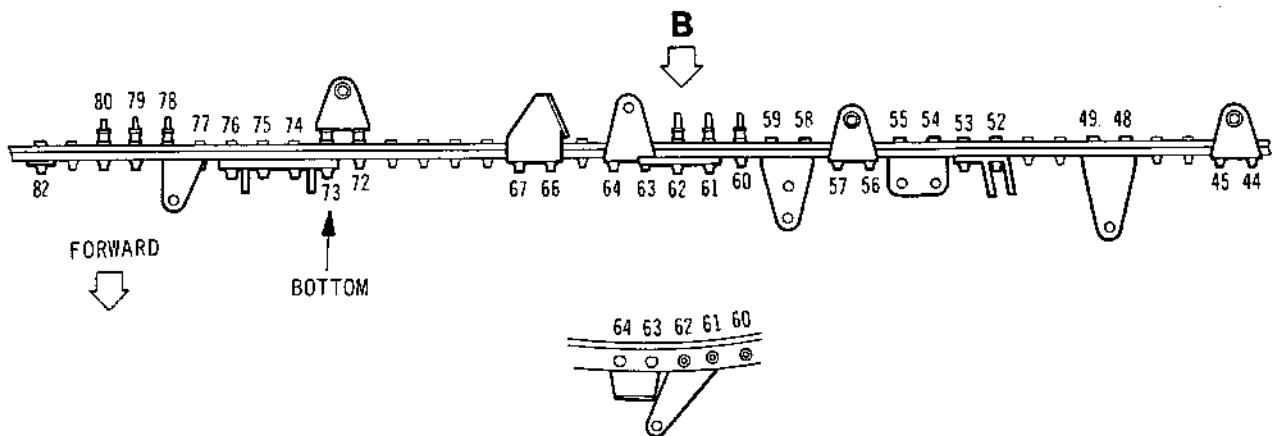


CR 31312/00B

COMBUSTION CHAMBER OUTER  
CASING FLANGE (CCOC)



VIEW IN DIRECTION OF ARROW **A**



VIEW IN DIRECTION OF ARROW **B**

Assembling Attachment Items CCOC/Diffuser Case Flange  
Figure 528 (Sheet 1 of 2)

SUB-ASSEMBLY  
**72-00-51**

Page 588  
Jan 2/80





OLYMPUS 593

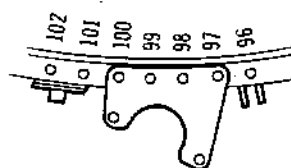
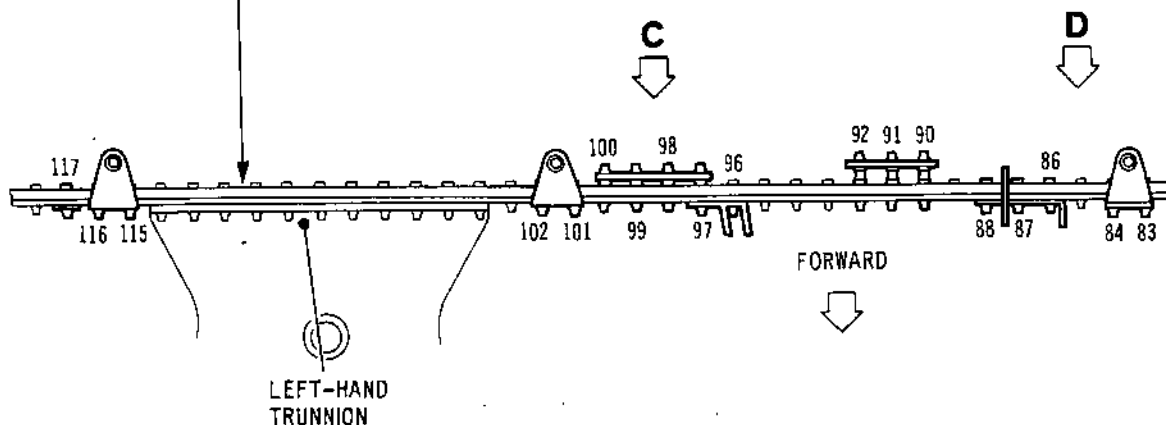
MK.610-14-28

OVERHAUL

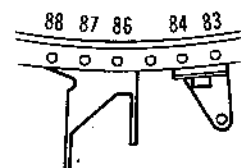


CR 32549/00A

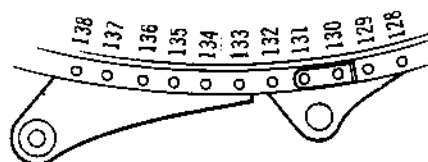
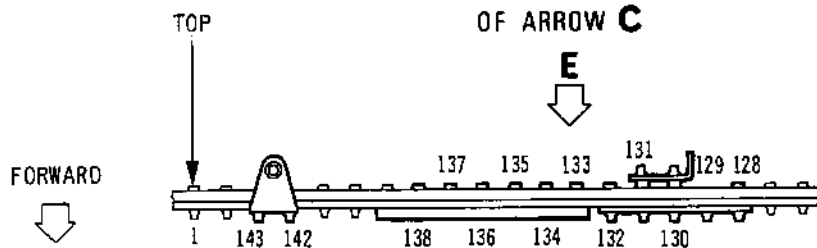
COMBUSTION CHAMBER OUTER  
CASING FLANGE (CCOC)



VIEW IN DIRECTION  
OF ARROW C



VIEW IN DIRECTION  
OF ARROW D



VIEW IN DIRECTION OF ARROW E

Assembling Attachment Items CCOC/Diffuser Case Flange  
Figure 528 (Sheet 2 of 2)

SUB-ASSEMBLY  
**72-00-51**

Page 589  
Jan 2/80

PRINTED IN ENGLAND

TN39256



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



33. Prepare HP Nozzle Vane Support Cone for Assembly

A. Assemble Bolts and Pins (Ref.Fig.529).

- (1) Install the 24 bolts (72-51-02/1-190) in to the rear flange of the support cone. Ensuring that the flat edge section of each bolthead locates correctly and the bolts protrude rearwards through the flange.
- (2) Use the assembly sleeve (Tool 1321) to assemble the retaining rings (72-51-02/1-180) to the bolts.
- (3) Using protective gloves and a suitable freezing agent, freeze the 12 shoulder pins (72-51-02/1-70), then assemble them to the front flange outer of the support cone.

34. Calculate Thickness of HP Nozzle Vane Support Cone Adjusting Washer and 19 to 23 Labyrinth Seal Adjusting Washer

A. Temporarily Assemble Abutment Segments (Ref.Fig.529).

- (1) Assemble four abutment segments (72-42-01/6-190A) Pre-SB.72-7856-179 or (72-42-01/6-190B) SB.72-7856-179 at equally spaced positions in the CCOC internal machined recess.
  - (a) Position each segment with the right angled flanged section facing downward. Secure each segment with two bolts (72-42-01/6-180) inserted from the outside of the CCOC. Retain each bolt with a special nut (72-42-01/6-170).
  - (b) Check the gap between the top edge of each segment and the recessed section in the CCOC to ensure that the segments are evenly located.

B. Support Cone Adjusting Washer Measuring Procedure (Ref. Fig.529).

**NOTE:** Ensure that the adjusting washer range is 0.004 in. (0.101 mm) thickness increments SB.72-86.

- (1) Check and record the following dimensions.
  - (a) CCOC flange face to the underside of each abutment segment. Dimensions must be within 0.002 in. (0.051 mm) variation. Record as dimension A.
  - (b) CCOC flange to the adjusting washer locating face on the bearing support. Record as dimension B.

SUB-ASSEMBLY

**72-00-51**

Page 590  
Oct 1/82



OLYMPUS 593

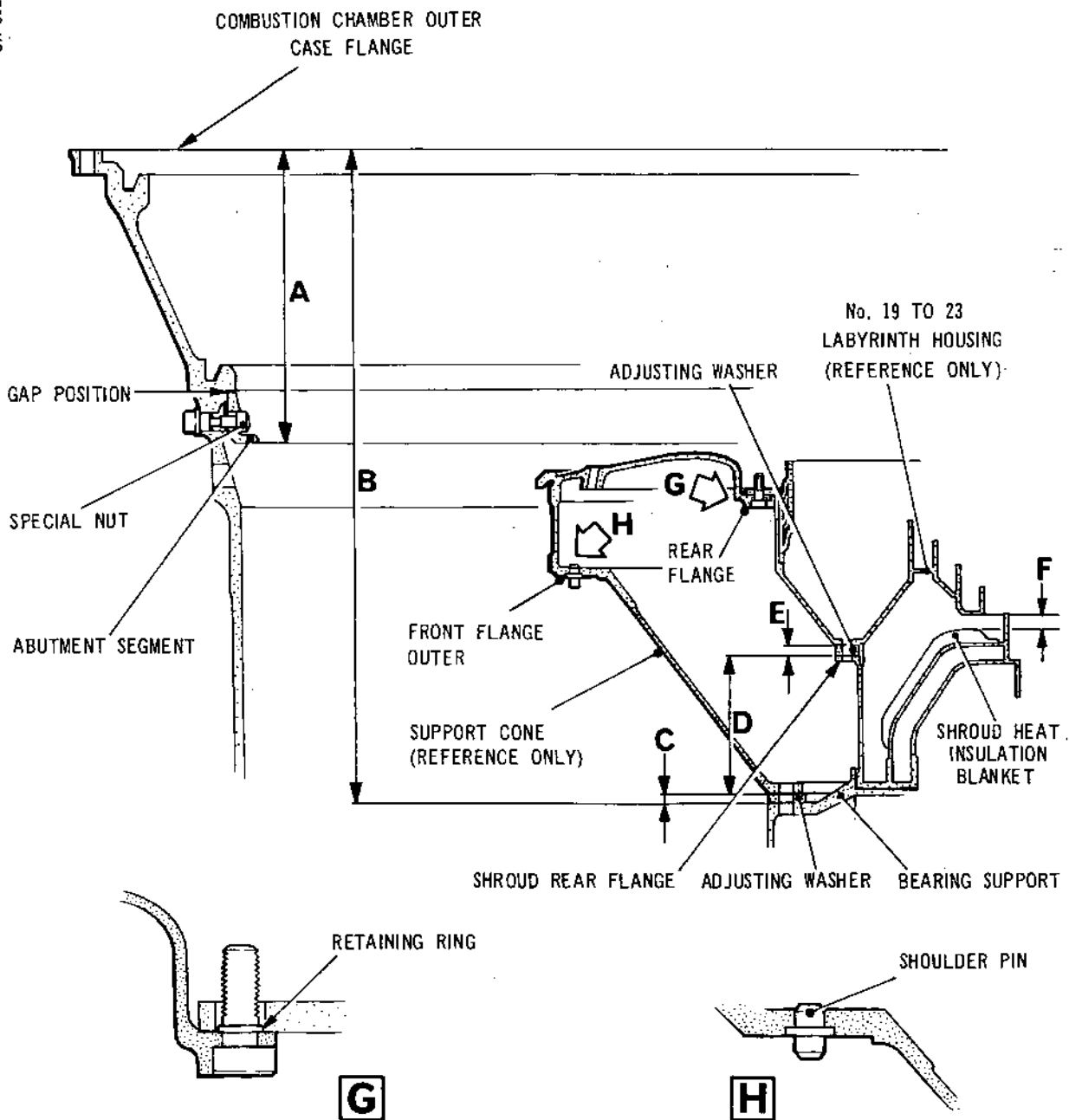
MK.610-14-28

OVERHAUL



CR 31206/00C

PRINTED IN ENGLAND



TN8307

Adjusting Washers Measuring Procedure  
Figure 529

SUB-ASSEMBLY  
**72-00-51**  
Page 591  
Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

- (2) Obtain the Set Gap dimension from the Fits and Clearance Schedule 72-51-02 F.C.S.236.
  - (3) Using the following formula, calculate the required adjusting washer thickness. Thickness of washer C =  $B - (A + \text{Set Gap dimension})$ . Record the washer thickness.
  - (4) Select an adjusting washer of calculated thickness C from the range (72-51-01/5-100 to 185 SB.72-86 standard) (72-09-21 Repair, Fig.417) and place it in position on the bearing support.
  - (5) Remove the four abutment segments.
- C. Measuring Procedure 19 to 23 Labyrinth Seal Adjusting Washer (Ref.Fig.529).
- NOTE: If SB.72-86 is incorporated, the thickness of the adjusting washers is in 0.004 in. (0,101 mm) increments.
- (1) Ensure that the previously calculated support cone adjusting washer is in position on the bearing support.
  - (2) Measure and record the dimension from the rear face of the support cone adjusting washer, to the rear face of the shroud. Record as dimension D.
  - (3) Obtain the Set Gap dimension from the Fits and Clearance Schedule 72-51-01 F.C.S.262.
  - (4) Using the following formula, calculate the required adjusting washer thickness. Thickness of washer E =  $\text{Set Gap dimension} - D$ . Record the washer thickness.
  - (5) Select an adjusting washer of calculated thickness E from the range (72-51-01/5-200 to 310 SB.72-86 standard) (72-09-21 Repair, Fig.418) and place it in position on the shroud.

### 35. Assemble HP Turbine Nozzle Vanes to Combustion Chamber

#### A. Prepare Combustion Chamber (Ref.Fig.530).

- (1) Attach the multiple leg sling (Tool 903) to the combustion chamber, raise the assembly and assemble the protector (Tool 3131) to the front end of the combustion chamber.

SUB-ASSEMBLY

72-00-51

Page 592

Dec 31/00



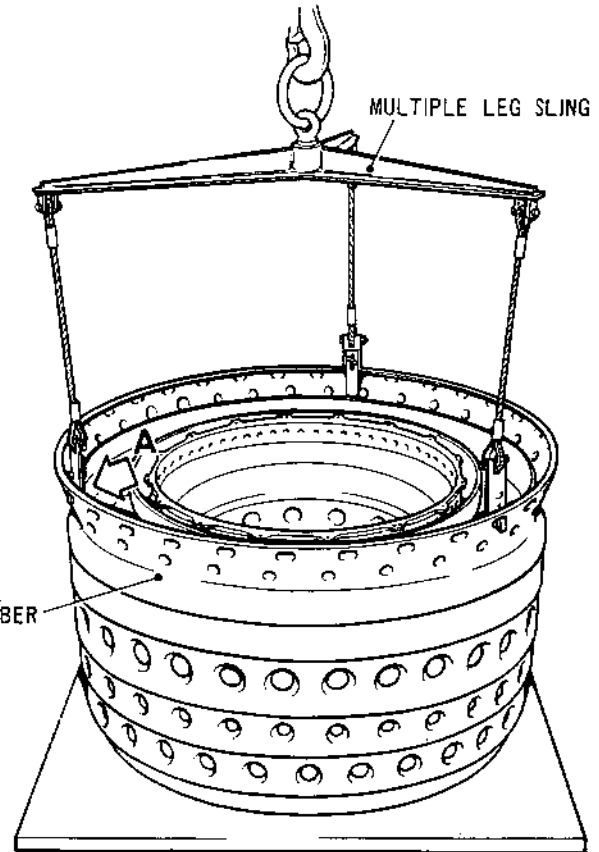
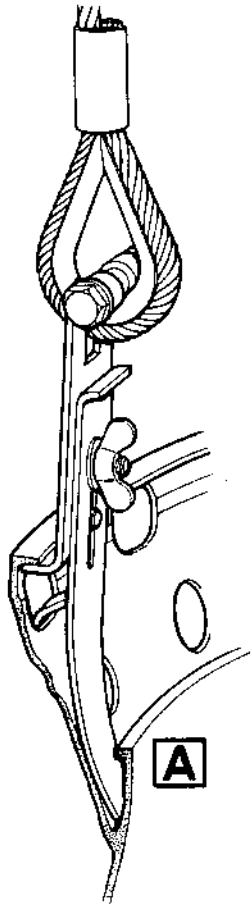
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 31239/00A

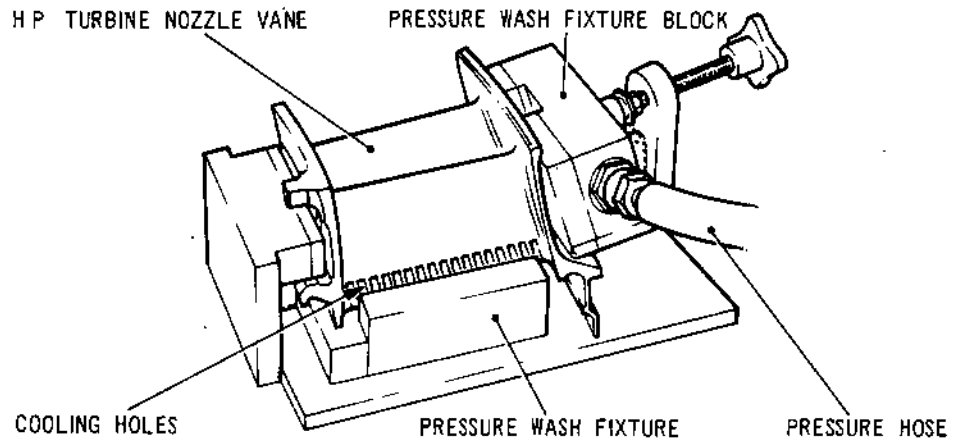


COMBUSTION CHAMBER

MULTIPLE LEG SLING

Assembling Multiple Leg Sling to Combustion Chamber  
Figure 530

CR 31209/00A



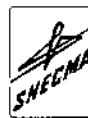
HP Turbine Nozzle Vanes Pressure Washing Equipment  
Figure 531

SUB-ASSEMBLY  
**72-00-51**

Page 593  
Jan 2/80



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (2) Lift the assembly onto a prepared surface or pallet (Tool 1014) then remove the lifting equipment.

B. Pressure Wash Turbine Nozzle Vanes (Ref.Fig.531).

NOTE: The following procedure is a non-calibrated witness check requiring equipment capable of delivering a low pressure flow of filtered paraffin through an outlet hose capable of connecting to the pressure wash fixture block (Tool 246).

- (1) Assemble each vane in turn to the pressure wash fixture (Tool 245).
- (2) Place the pressure wash fixture block (Tool 246) in position to seal the nozzle vane. Hand-tighten the screw clamp to hold the block and vane firmly in position.
- (3) Connect the pressure wash equipment hose union to the union on the fixture block and securely tighten.
- (4) Place a suitable oil splash protection screen around the nozzle vane pressure wash fixture assembly.
- (5) Operate the pressure wash equipment and adjust to a flow pressure setting of 5 psi approximately. Thoroughly flush out each nozzle vane and ensure that oil flows freely through each cooling hole.
- (6) Investigate cooling hole obstruction and rectify or reject the nozzle vane.
- (7) Switch off the pressure wash equipment and remove the nozzle vane.
- (8) Place each nozzle vane into its container (Tool 1372).

C. Separate and Identify Nozzle Vanes.

- (1) Separate the nozzle vanes (Ref.Table 502).
  - (a) If replacement units are to be installed, lightly vibro-etch the appropriate assembly position identification number on the outer section of each unit between the vane ends.

SUB-ASSEMBLY

**72-00-51**

Page 594

Oct 1/82

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

Printed in England

IPC No.	Quantity	Assembly Position Ident. No.
72-51-02/1-40	30	1,2,3,4,5,6,7,8,9,10,11,12, 13,16,17,18,19,20,21,22,23, 24,25,26,27,28,29,30,31,32
72-51-02/1-50	1	15
72-51-02/1-60	1	14

HP Turbine Nozzle Vane Assemblies Identification  
Table 502

- (2) Mark the nozzle vane positions on the combustion chamber (Ref.Fig.532).
- (a) Note the TOP position on the combustion chamber as this is the position for No.1 nozzle vane.
  - (b) Commencing at No.1 position, numerically identify the vane positions on the combustion chamber in a clockwise order. Use an approved non-permanent marking agent.
- D. Assemble Nozzle Vanes for Dimensional Checks (Ref.Fig.532).
- (1) Assemble the retaining ring support rods (Tool 1946) to the combustion chamber.
- (a) Position each support rod on the inner surface of the combustion chamber. Insert the rod section through a cooling hole near the rear end of the combustion chamber, press the tapered plug section of the support rod into a cooling hole and lock the cap screw.
- (2) Assemble the retaining ring (72-51-02/1-10) to the combustion chamber.

**NOTE:** Prior to assembly, ascertain that the retaining ring is compatible with the standard of HP nozzle vane support cone to be fitted (72-51-02/1-10, -150).

SUB-ASSEMBLY

**72-00-51**

Page 595

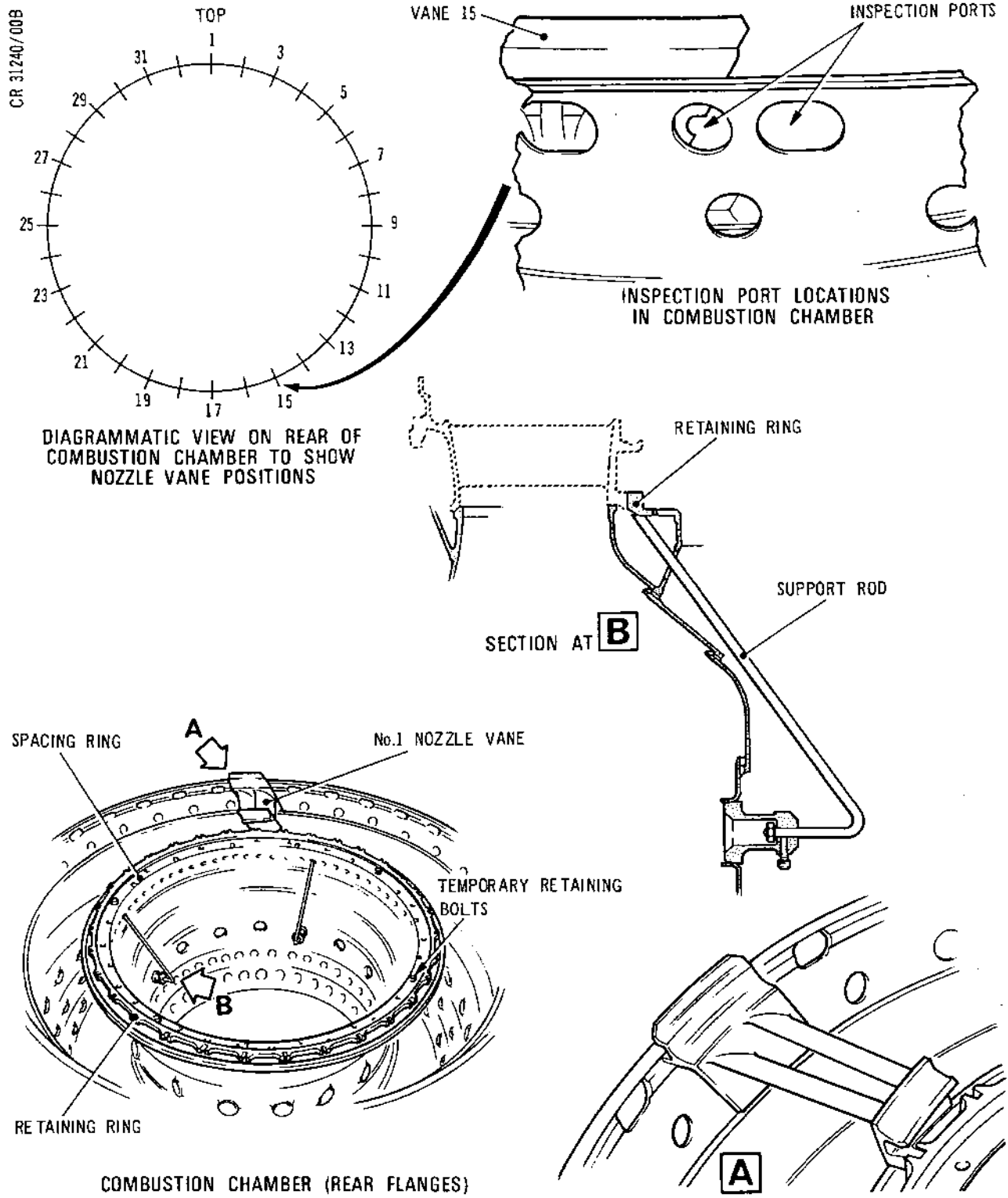
Jun 1/99



OLYMPUS 593

MK. 610-14-28

OVERHAUL



Assembling HP Turbine Nozzle Vanes to Combustion Chamber  
Figure 532

SUB-ASSEMBLY  
**72-00-51**  
Page 596  
Jan 2/80





OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (a) Place the retaining ring in position on the combustion chamber and support rods.

NOTE: On retaining rings that incorporate captive securing nuts, ensure the ring is positioned with the captive nuts facing downwards.

CAUTION: MAINTAIN NOZZLE VANES IN COMPLETE SETS AND TO THE SAME S.B. STANDARD.

- (3) Commencing at No.1 position assemble the odd numbered vanes only to the combustion chamber. Insert the vane lugs into the retaining ring slots. Ensure that each vane moves freely when in position and that vane No.15 is installed at an inspection port location.

E. Temporarily Assemble HP Nozzle Vane Support Cone to Combustion Chamber (Ref. Fig.533).

- (1) Install the support cone.

- (a) Press each nozzle vane fully toward the centre of the assembly to ensure engagement with the support cone.
- (b) Attach the multiple leg sling (Tool 1155) and crane hoist to the support cone. Carefully lower the support cone evenly into position on the combustion chamber ensuring that the locating pins fully engage and that the nozzle vanes engage correctly with the support cone flange.
- (c) Remove the multiple leg sling and crane hoist. Apply lubricant 'C' to new bolts (72-51-02/1-20 and 160). Screw the bolts into the holes inside the support cone to engage with the retaining ring.

NOTE: The new bolts assembled at this stage can be used for the final assembly of the support cone, Ref. Para. 35.J.

SUB-ASSEMBLY

72-00-51

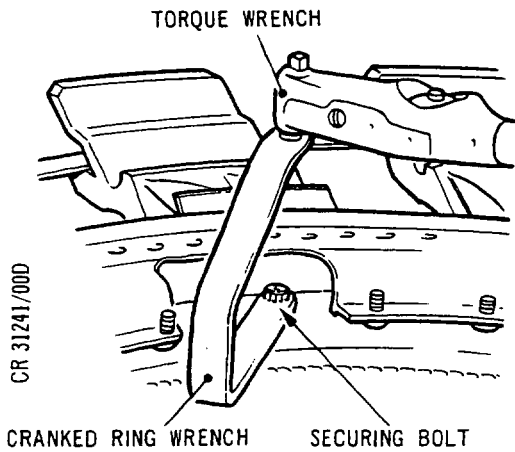
Page 597

Dec 31/01

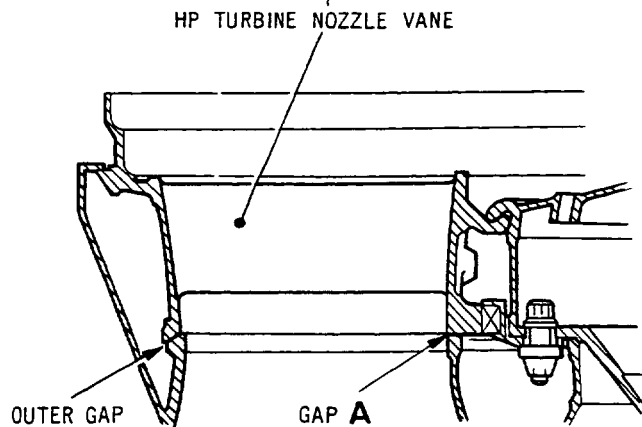
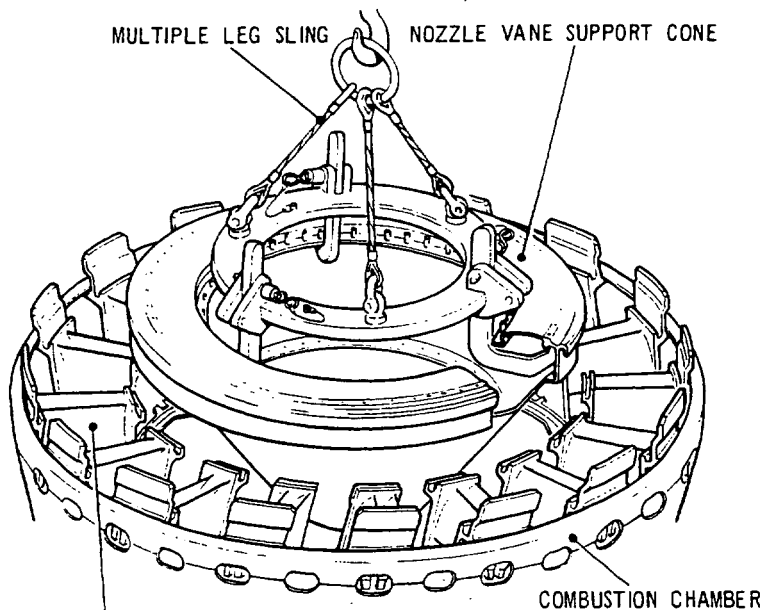


OLYMPUS 593

MK.610-14-28  
OVERHAUL



LOCATION OF CRANKED RING  
WRENCH IN SUPPORT CONE



TURBINE ENTRY DUCT GAPS

Assembling Support Cone to Combustion Chamber  
Figure 533

SUB-ASSEMBLY  
**72-00-51**

Page 598  
Jan 2/80



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (d) Ensure that the bolts have a minimum locking (run-down) torque of 6.5 lbf in. (0,73 N.m). Torque-tighten the bolts to 210 lbf in. (24,0 N.m) using the cranked ring wrench (Tool 1556). On completion of torque-tightening ensure that the nozzle vanes move freely in position.

F. Measure Turbine Entry Duct Gaps (Ref. Fig.533).

- (1) Measure the gap of each nozzle vane.
  - (a) Press the nozzle vane as far as possible toward the centre of the assembly and at the same time lift the vane as far rearwards as possible. Firmly hold the vane in the described position and measure the gap formed at position A. When measuring the gap ensure that the outer gap has clearance. Record the gap measured for each vane.
  - (b) Check that the clearances obtained are within the limits quoted in Fits and Clearances Schedule (72-40-00 F.C.S.175).



OLYMPUS 593

MK.610-14-28  
OVERHAUL



*sneema*

This Page Left Blank Intentionally

SUB-ASSEMBLY

**72-00-51**

Page 598B

Dec 1/96



OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

G. Assemble Complete Nozzle Vane Assembly (Pre-S.B.72-124).

- (1) Use the cranked ring wrench (Tool 1556) to remove the bolts securing the support cone.
- (2) Assemble the multiple leg sling (Tool 1155) to the cone and carefully remove the cone from the combustion chamber. Do not remove the installed nozzle vanes.
- (3) Commencing at No.2 position assemble the even numbered vanes to the combustion chamber. Insert the vane lugs into the retaining ring slots. Ensure that each vane moves freely when in position and that vane No.14 is installed at an inspection port location.

H. Assemble Complete Nozzle Vane Assembly and Sealing Strips (S.B.72-124 Standard).

- (1) Using the cranked ring wrench (Tool 1556) remove the bolts securing the support cone. Assemble the multiple leg sling (Tool 1155) to the cone and carefully remove the cone from the combustion chamber.
- (2) Ensure that the retaining ring top position is in line with top position on the combustion chamber, support rods must remain in position.
- (3) Assemble sealing strips to nozzle vanes.

CAUTION: EXERCISE CARE TO PREVENT SEALING STRIPS FROM FALLING INTO COMBUSTION CHAMBER.

- (a) Assemble a sealing strip (72-51-02/1A-55) to the outer location of the inspection port nozzle vane (No.14) (72-51-02/1A-60C). The sealing strip is assembled to the inspection port edge of the nozzle vane. Assemble a sealing strip (72-51-02/1A-57) to the inner location of the vane. This strip is assembled in line with the previous strip.
- (b) Carefully place the nozzle vane in position on the combustion chamber at the inspection port location. Ensure that the nozzle vane lug is engaged with the retaining ring. Carefully engage nozzle vane (No.15) (72-51-02/1A-50C) with (No.14) nozzle vane sealing strips. Ensure that the sealing strips are fully inserted in the vanes and that both vanes are assembled to the retaining ring and combustion chamber.

SUB-ASSEMBLY

**72-00-51**

Page 598.1

Jan 2/80



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (c) Assemble a sealing strip (72-51-02/1A-45) to the outer location of the installed nozzle vane (No. 15) and a sealing strip (72-51-02/1A-47) to the inner location. Engage nozzle vane (No.16) (72-51-02/1A-40) with the assembled nozzle vane sealing strips and simultaneously assemble it to the retaining ring and combustion chamber.
- (d) Continue the sealing strip and nozzle vane assembly procedure in numerical order in a clockwise direction until a complete assembly is achieved. Ensure that sealing strips are assembled to the last position between vanes 13 and 14. If the last vane is difficult to install the following procedure will assist.
  - (i) Remove the retaining ring support rods.
  - (ii) Carefully press the retaining ring downward evenly to disengage it from the nozzle vanes lugs, ensure that the sealing strips are not dislodged. The retaining ring will drop slightly into the combustion chamber.
  - (iii) Close the gaps between each vane to allow maximum space for the last nozzle vane. Install the remaining sealing strips and carefully manipulate the last vane into position.
  - (iv) Ensure that the inspection port vanes are in line with the inspection ports in the combustion chamber, also that the retaining ring and combustion chamber top positions align.
  - (v) Evenly raise the retaining ring and engage it with the nozzle vanes lugs.

**NOTE:** The retaining ring securing bolts provide an effective lifting facility.
  - (vi) When the retaining ring and nozzle vane lugs are fully engaged, assemble the retaining ring support rods (Tool 1946) to the combustion chamber.
- (d) Examine each nozzle vane to ascertain that the complete set of sealing strips is correctly installed.

SUB-ASSEMBLY

72-00-51

Page 598.2

Jun 1/98



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

Printed in England

J. Final Assembly of HP Nozzle Vane Support Cone to Combustion Chamber.

(1) Install the support cone.

- (a) Press each nozzle vane fully toward the centre of the assembly to ensure engagement with the support cone.
- (b) Attach the multiple leg sling (Tool 1155) and crane hoist to the support cone. Carefully lower the support cone evenly into position on the combustion chamber, ensuring that the locating pins fully engage and that the nozzle vanes engage correctly with the support cone flange. Remove the multiple leg sling and crane hoist.
- (c) Ensure that the bolts (72-51-02/1-20 and 1-60) are new (Ref. Service Bulletin OL.593-72-8825-314), and apply lubricant 'C' to the bolts. Screw the bolts into the holes inside the support cone to engage with the retaining ring. Ensure that the bolts have a minimum locking (run-down) torque of 6.5 lbf in. (0,73 N.m). Torque-tighten the bolts to 210 lbf in. (24,0 N.m) using the cranked ring wrench (Tool 1556).
- (d) On completion of the torque-tightening, ensure that all nozzle vanes move freely in position.

36. Assemble Combustion Chamber and Nozzle Vane Assembly to CCOC  
(Ref.Fig.534).

A. Prepare Assembly.

- (1) Assemble the multiple leg sling (Tool 1155) to the nozzle vanes support cone. Ensure that the tool is correctly installed (Ref.Fig.533). Remove the protector from the front end of the combustion chamber.
- (2) Ensure that the adjusting washer of the previously calculated thickness is on the bearing support.

B. Install Assembly.

- (1) Align the top of the combustion chamber with the TOP of the CCOC, also align the bottom igniter hole in the combustion chamber with the bottom hole in the CCOC. Carefully mark the top position inside the combustion chamber.

SUB-ASSEMBLY

72-00-51

Page 598.3

Dec 31/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



COMBUSTION CHAMBER

MULTIPLE LEG SLING

INSPECTION PROBE  
PORTS

CR 31242/00A

NOZZLE VANE  
PINS POSITIONS

INSPECTION PROBE  
PORTS

THERMOCOUPLE  
LOCATIONS

C.C.O.C.

MARK BOLT HOLE POSITIONS  
AROUND THIS CIRCUMFERENCE

BOLT No. 104

BOLT No. 42

DIFFUSER CASE

ENGINE MOUNTING  
TRUNNION (LEFT-HAND)

BOTTOM IGNITER PORT

ENGINE MOUNTING  
TRUNNION (RIGHT-HAND)

Installing HP Nozzle Vane/Combustion Chamber Assembly  
Figure 534

SUB-ASSEMBLY  
**72-00-51**

Page 598.4  
Jan 2/80





OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (2) Gently lower the combustion chamber into the CCOC until the support cone is almost in contact with the bearing support bolts. Ensure that the bearing support bolts and pins are aligned with the holes in the support cone flange. Lower the combustion chamber assembly into position. Check the alignment of the igniter ports through the CCOC also check the alignment of the inspection probe ports through the CCOC. Remove the multiple leg sling.
  - (3) Ensure that protectors (Tools 1002-1003) are in position on the bearing support to prevent nuts from falling into the bearing support. Secure the support cone to the bearing support with self-locking nuts (72-51-01/5-50). Apply lubricant 'C' to the nuts. Do not fully tighten the nuts at this stage.
- C. Install Nozzle Vane Abutment Segments (Ref.Fig.535).
- (1) On engines to Pre S.B.72-7856-179 standard, assemble abutment segments to CCOC.
    - (a) Assemble two segments (72-42-01/6-190A-195) to CCOC with their abutting edges positioned at approximately bottom dead centre of the case.
    - (b) Assemble a half segment (72-42-01/6-160A-165) to the CCOC to abut the segment installed to the left of the centre line.
    - (c) Assemble a half segment to the CCOC to abut the segment installed to the right of the centre line.
    - (d) Assemble abutment segments (72-42-01/6-190A-195) to the CCOC at remaining locations.
  - (2) On engines to SB.72-7856-179 standard, assemble abutment segments to CCOC.
    - (a) Assemble the two half segments (72-42-01/6-160B) to their locations the 8 o'clock position.

SUB-ASSEMBLY

72-00-51

Page 598.5

Dec 31/01



# OLYMPUS 593

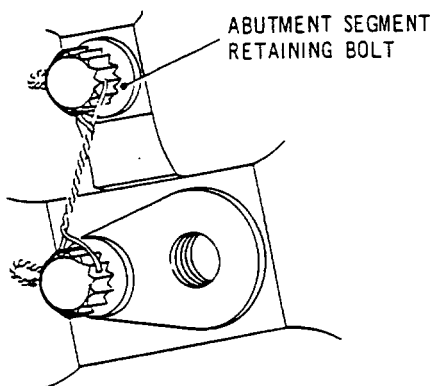


MK.610-14-28

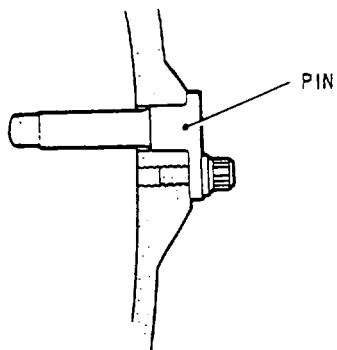
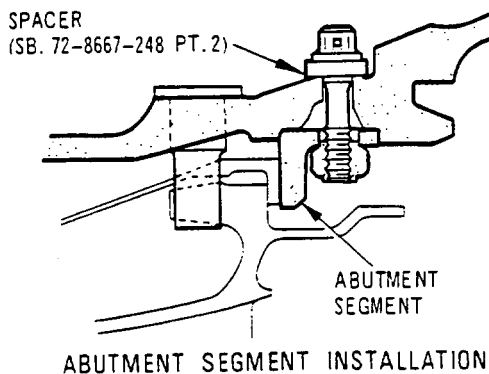
sneema

OVERHAUL

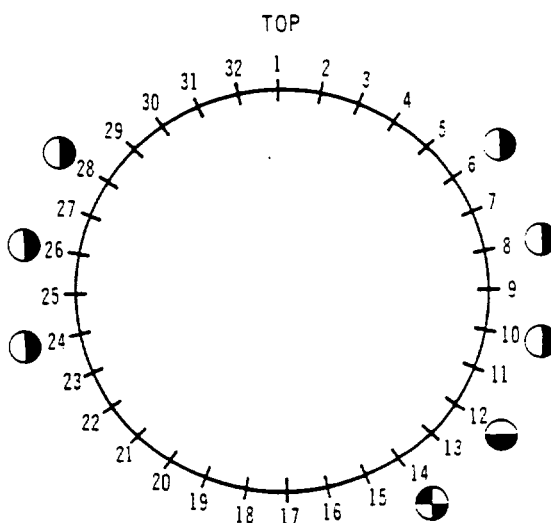
CR 31244/008



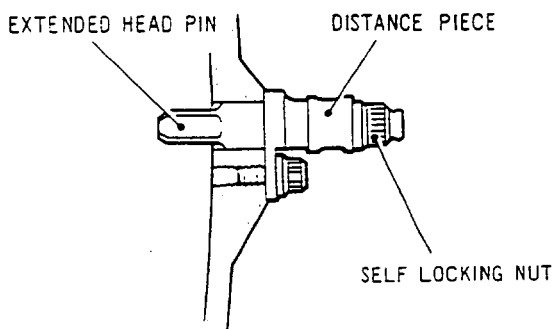
DETAIL AT OTHER POSITIONS  
(EXCLUDING 1 TO 5 AND 29 TO 32)



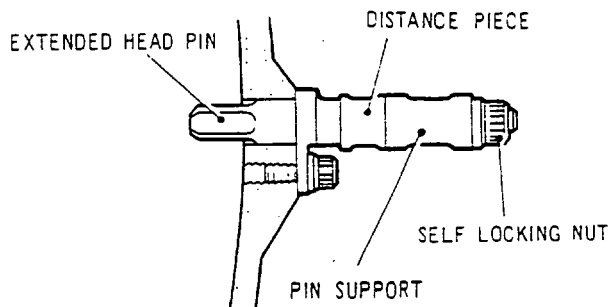
DETAIL AT POSITION 30



DIAGRAMMATIC VIEW ON REAR OF  
COMBUSTION CHAMBER OUTER CASE  
(HP NOZZLE VANE PIN POSITIONS)



DETAIL AT POSITIONS 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32



DETAIL AT POSITION 30

Installing HP Turbine Nozzle Vane Pins and Abutment Segments  
Figure 535

SUB-ASSEMBLY  
**72-00-51**  
Page 598.6  
Jul 1/81



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



(b) Assemble abutment segments (72-42-01/6-190B) to the CCOC at remaining locations.

(3) Secure abutment segments to CCOC.

NOTE: There are several S.B. standards applicable to the securing of abutment segments to the CCOC. The following details apply to the preferred standard (S.B.72-8743-280).

(a) Apply lubricant 'A' to the bolts (72-42-01/6-180).

(b) Retain abutment segments, except those aligned with nozzle vane locking pins at positions 1 to 5 and 29 to 32 (Ref.Fig.535) with the bolts and nuts (72-42-01/6-140-145-170-175) or, the bolts, spacers (72-42-01/6-157-197) and nuts. Lightly tighten the bolts.

(c) Torque-tighten each bolt to 100 lbf in. (11,5 N.m).

NOTE: Segments at positions 1 to 5 and 29 to 32 are secured later in the procedure.

(4) Check the gap between the top of each segment and the recessed section in the CCOC to ensure that the segments are evenly located.

D. Install and Secure HP Turbine Nozzle Vanes to CCOC (Ref. Fig.534, 535 and 536).

(1) Identify Nozzle Vane Pin Positions.

(a) Use an approved non-permanent marking substance. Identify the nozzle vane securing pin positions 1 to 32 in a clockwise direction commencing at the top position as viewed from the rear of the CCOC.

SUB-ASSEMBLY

**72-00-51**

Page 598.7

Oct 1/82



OLYMPUS 593

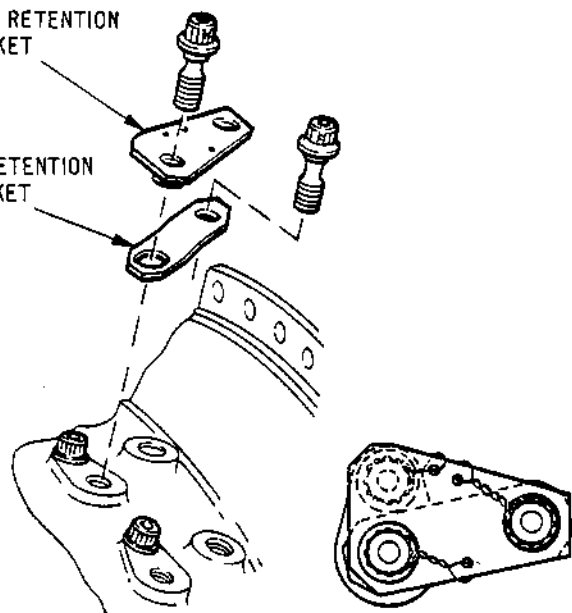
MK.610-14-28  
OVERHAUL



BOLT RETENTION  
BRACKET

PIN RETENTION  
BRACKET

CR 35799/00A

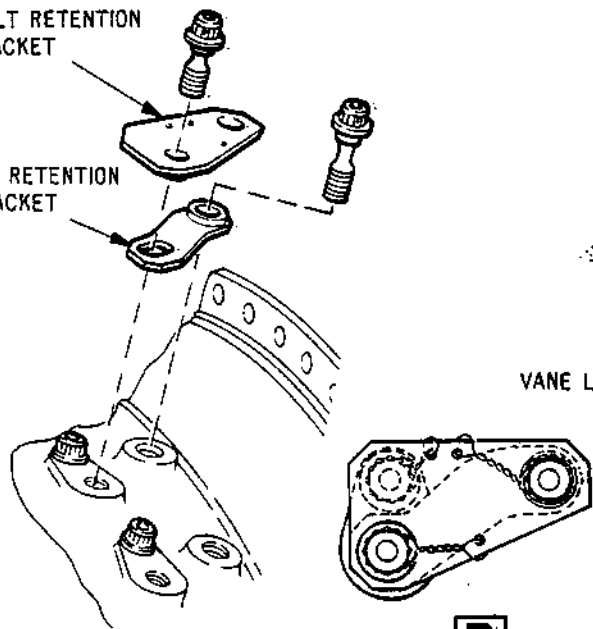


A

S.B. 72-8751-283 PART 1 STANDARD

BOLT RETENTION  
BRACKET

PIN RETENTION  
BRACKET



B

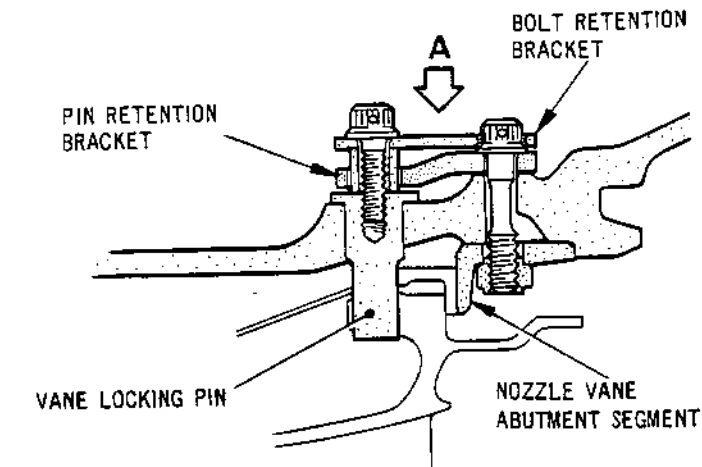
S.B. 72-8751-283 PART 2 STANDARD

PIN RETENTION  
BRACKET

BOLT RETENTION  
BRACKET

VANE LOCKING PIN

NOZZLE VANE  
ABUTMENT SEGMENT

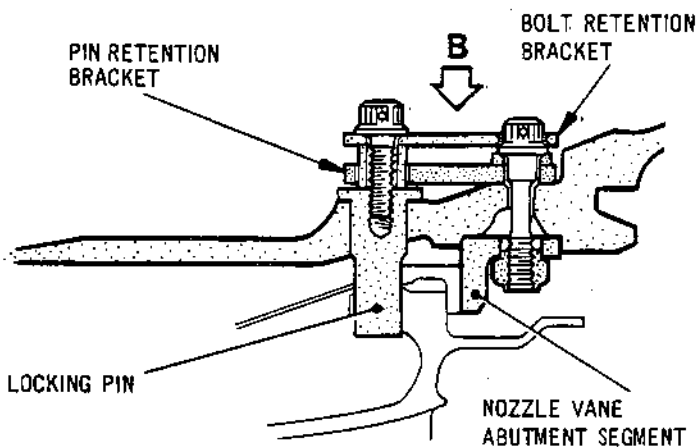


PIN RETENTION  
BRACKET

BOLT RETENTION  
BRACKET

VANE LOCKING PIN

NOZZLE VANE  
ABUTMENT SEGMENT



Installation of Bolt and Locking Pin Retention Brackets  
Figure 536

SUB-ASSEMBLY  
**72-00-51**

Page 598.8  
Jul 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(2) Install Nozzle Vane Pins.

- (a) Insert the pins through the CCOC to secure the nozzle vanes (Ref.Table 503). Ensure that the pins abut the CCOC before and during the bolt assembly.

NOTE: To assist this operation it may be necessary to slightly raise the nozzle vanes support cone assembly (Ref. para.(b) and (c)).

IPC NO.	QUANTITY	ASSEMBLY POSITION IDENT NO.
72-42-01/6-20	24	1,2,3,4,5,7,9,11,13,15, 16,17,18, 19,20,21,22,23,25,27,29,30,31,32
72-42-01/6-80	6	6,8,10,24,26,28
72-42-01/6-130	1	12
72-42-01/6-40	1	14

Identification of HP Turbine Nozzle Vane Pins  
Table 503

- (b) Ensure that the nuts securing the support cone to the bearing support are sufficiently slack to allow slight movement of the support cone assembly.
- (c) Assemble the multiple leg sling (Tool 1155) to the support cone. Ensure that the tool is correctly installed (Ref.Fig.533). Attach a crane hoist to the multiple leg sling and carefully apply sufficient force only to assist installation of the nozzle vane pins.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

(3) Secure nozzle locking pins to CC0C.

(a) Ensure that the bolts (72-42-01/6-10-30-70-120) are new (Ref. SB.72-8648-215), then apply lubricant 'C' to the bolts. Secure each pin with a bolt torque-tightened to 100 lbf in. (11,5 N.m).

(4) Assemble retention brackets to nozzle vane locking pins and abutment segment retaining bolts (Ref. Fig.536).

NOTE: There are various S.B. standards applicable to the securing of nozzle vane locking pins and abutment segments at the top nine locations of the CC0C. The details for securing the segments and pins given subsequently, apply to the preferred standard.

(a) The following procedure applies to each of nine locations (i.e. vane locking pin positions 1 to 5 and 29 to 32) at the top of the combustion chamber outer case on engines to S.B.72-8571-283 standard.

(i) Establish whether Part 1 or Part 2 of the S.B. is to be incorporated.

(ii) Apply lubricant 'A' to retaining bolts (72-42-01/6-181).

(iii) Hold the pin retention bracket (72-42-01/6-225 or 235) in the position shown with the elongated hole aligned with the threaded hole in the vane locking pin.

(iv) Locate the bolt (72-42-01/6-181) through the smaller hole of the bracket and the abutment segment, engage the nut (72-42-01/6-140-145-175) and lightly tighten the bolt.

SUB-ASSEMBLY

72-00-51

Page 598.10

Dec 31/01



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (v) To maintain alignment of bolt locations while torque-tightening the abutment segment retaining bolt, engage the bolt retention bracket (72-42-01/6-220 or 230) with the pin retention bracket, then position the bolt retention bracket clear of the abutment segment retaining bolt. Attach both brackets to the locking pin with the bolt (6-200) lightly tightened with lubricant 'C' applied to threads.
  - (vi) Torque-tighten the abutment segment retaining bolt to 100 lbf in. (11,5 N.m).
  - (vii) Slacken the bolt attaching both brackets to the locking pin, reposition the bolt retention bracket to engage the head of the abutment segment retaining bolt, then secure both brackets to the locking pin with the bolt (6-200) torque-tightened to 100 lbf in. (11,5 N.m).
- (5) Assemble the following items to the nozzle vane pins.
- (a) Apply lubricant 'A' to the nuts (72-41-01/6-50-90).
  - (b) At positions 6,8,10,24,26 and 28 place a distance piece (72-42-01/6-60) over the projecting thread of each pin and secure it with a nut (72-42-01/6-50).
  - (c) Ensure that the nuts have a minimum locking (run-down) torque of 20 lbf in. (2,3 N.m). Torque-tighten the nuts to 250 lbf in. (28 N.m).
  - (d) At position 12, assemble a distance piece (72-42-01/6-110) over the thread of the pin, then, with lubricant 'A' applied, screw the pin support (72-42-01/6-100) onto the pin and torque-tighten to 210 bf in. (24 N.m).
  - (e) Attach the nut (72-42-01/6-90) to the pin support for use later in the procedure.

SUB-ASSEMBLY

## 72-00-51

Page 598.11

Dec 31/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (6) Visually check alignment of the following ports:
  - (a) Thermocouples.
  - (b) Engine igniters.
  - (c) Fuel sprayers.
- (7) Install flanged sealing bar (72-42-01/2-140).
  - (a) Apply jointing compound 'A' to abutment surfaces and lubricant 'C' to securing bolts.
  - (b) Insert the flanged sealing bar into the inspection port between nozzle vanes 14 and 15.
  - (c) Secure the cover plate (72-42-01/2-130) to the flanged sealing bar with two bolts (72-42-01/2-120).
  - (d) Torque-tighten the bolts to 100 lbf in. (11,5 N.m) and wire-lock the bolts together.
- (8) On satisfactory completion of alignment checks, wire-lock the bolts securing abutment segments and nozzle vanes.
  - (a) At nozzle locking pin locations 1 to 5 and 29 to 32 wire-lock the bolts to the brackets as shown (Ref.Fig.536).
  - (b) At location 12 wire-lock together, the pin support, the nozzle locking pin retaining bolt and the abutment segment retaining bolt.
  - (c) At remaining locations wire-lock the nozzle locking pin retaining bolt to the abutment segment retaining bolt as shown (Ref.Fig.535).

SUB-ASSEMBLY

**72-00-51**

Page 598.12

Dec 31/01





OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

- (9) Ensure that a complete set of locknuts (72-51-01/5-50) secures the support cone to the bearing support.

- (a) Ensure that the locknuts have a minimum locking (run-down) torque of 20 lbf in. (2,3 N.m). Torque-tighten the locknuts to 210 lbf in. (24 N.m). Remove the protectors from the bearing support.

### 37. Finally Assemble No.19 to 23 Labyrinth Seal Housing

#### A. Prepare to Assemble Housing.

- (1) Ensure that the adjusting washer of the previously calculated thickness is in position on the shroud. Ensure that the extraction holes in the washer align with the corresponding sections on the shroud flange.
- (2) Apply lubricant 'C' to the bolt threads. Ensure that the locknuts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).

#### B. Assemble Housing.

- (1) Place the labyrinth seal housing in position and ensure that it locates fully on the adjusting washer and support cone.
- (2) Measure and record the minimum clearance between No.19 labyrinth seal and the shroud insulation blanket, which must not be less than 0.390 in. (9,906 mm). Dimension F (Fig.529).
- (3) Secure the labyrinth seal housing to the shroud with locknuts (72-51-02/1-220). Torque-tighten the nuts to 100 lbf in. (11,5 N.m).



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (4) Assemble the retaining plate (72-51-02/1-200) to the labyrinth seal housing at the nozzle vane support cone location. Secure the retaining plate with locknuts (72-51-02/1-170) with lubricant 'C' applied. Torque-tightened to 100 lbf in. (11,5 N.m).
- (5) Place the protector (Tool 913) over the labyrinth housing and nozzle vanes.

38. Deleted

39. Assemble Pilot Fuel Sprayers and Engine Igniter Plugs to CC0C

A. Prepare to Assemble Pilot Fuel Sprayers (Ref.Fig.537).

- (1) Examine all components for cleanliness and absence of damage. Ensure that all the sprayers have been functionally tested and certified satisfactory.
- (2) Apply lubricant 'C' to securing bolts (73-12-07/1-20 or 1-21).
- (3) Assemble the fuel transfer tube (73-12-07/1-50) to each sprayer (73-12-07/1-10). Assemble a protector to the threaded section of the sprayer to prevent the transfer tube from becoming dislodged and to exclude foreign matter.

B. Fuel Pressure Atomizing (Pilot) Nozzle Assembly Adjusting Washer Thickness Measuring Procedure (Ref.Fig.537).

NOTE: Pilot nozzle assemblies to Pre and S.B.73-12 and Pre and S.B.73-13 are all installed similarly.

NOTE: Correct penetration of the pilot nozzle is normally achieved by the use of an adjusting washer, but failure to obtain sufficient nozzle penetration will necessitate compliance with S.B. 73-8527-68. Where the procedures are affected by the Service Bulletin standard, the differences are detailed.



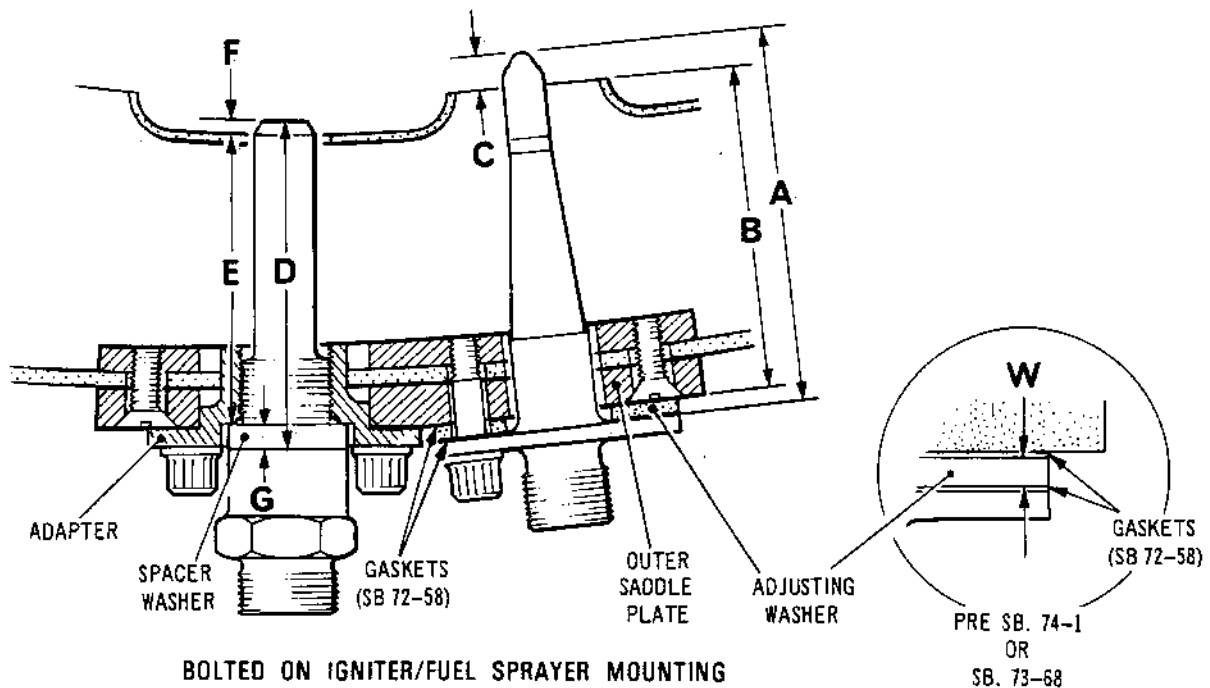
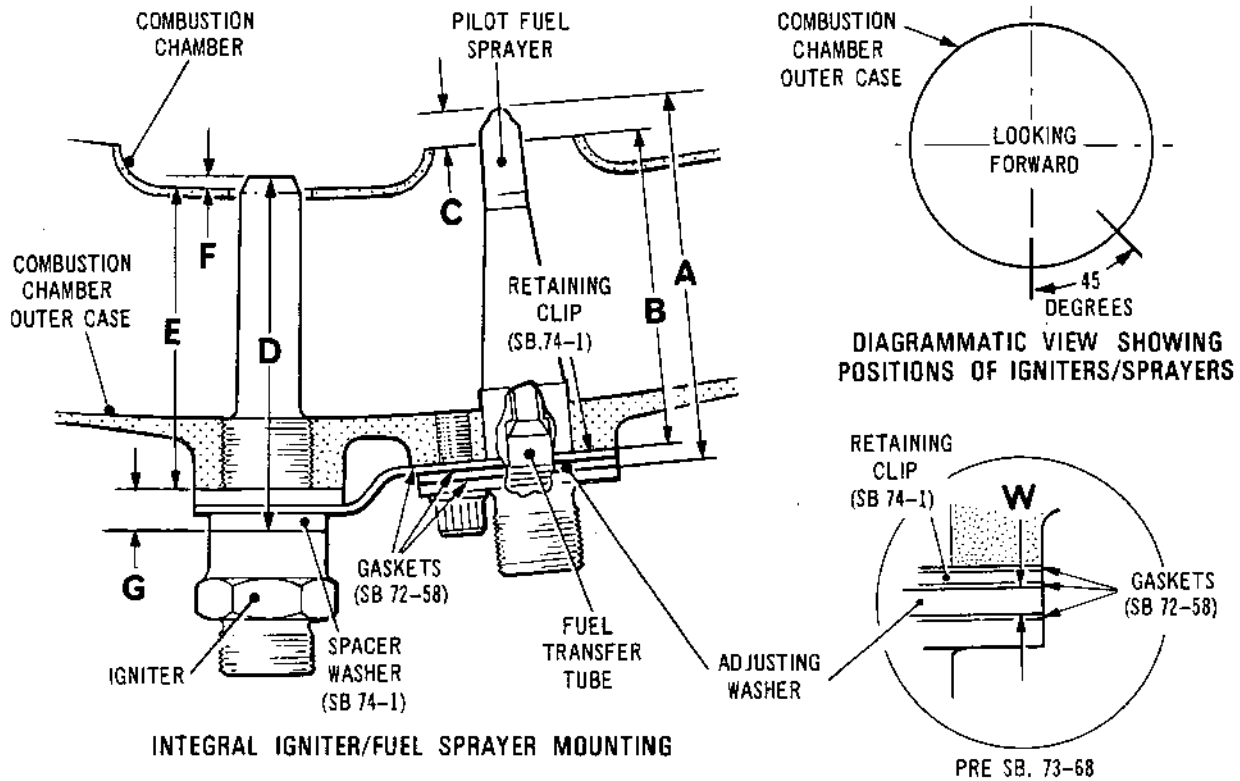
# OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31315/000

PRINTED IN ENGLAND



Assembling Pilot Nozzles and Igniter Plugs to CCOC  
Figure 537

SUB-ASSEMBLY  
**72-00-51**  
Page 598.15  
Feb 1/83



OLYMPUS 593

MK.610-14-28

OVERHAUL



**NOTE:** Service Bulletins affecting the assembly are S.B. 74-1 which introduced a retaining clip and S.B.72-58 Part 2 which introduced gaskets and Part 1 a substitute clip for S.B.74-1.

- (1) Measure the distance from the pilot nozzle mounting flange abutment face to the top of the nozzle and note as dimension A.

**NOTE:** The centre of the fuel outlet orifice is the effective nozzle penetration but measurement of length to the tip of the nozzle permits direct calculation in determining adjusting washer thickness.

- (2) Measure the distance between the mounting boss abutment face on the CCOC and the inner edge of the combustion chamber outer flame tube and note as dimension B.

**NOTE:** On engines with CCOC incorporating bolted on igniter and pilot nozzle mountings, dimension B is measured from the pilot nozzle adjusting washer abutment surface on the saddle plate outer.

- (3) On engines to SB.74-1 standard, measure the thickness of the retaining clip (73-12-07/1-40), and record as dimension T.
- (4) On engines to SB.72-58 standard, measure the thickness of each new gasket (73-12-07/1-25) separately on the undeformed area, add the measurements together and record as dimension K.

SUB-ASSEMBLY

**72-00-51**

Page 598.16

Feb 1/83



OLYMPUS 593

MK.610-14-28

OVERHAUL



(5) Pilot nozzle penetration (dimension C) is as follows:

(a) On engines pre SB.73-12 standard,

$C = 0.216/0.140$  in. (5,49/3,56 mm)

(b) On engines to SB.73-12 standard,

$C = 0.250/0.140$  in. (6,35/3,56 mm)

Refer to Fits and Clearances 72-40-00/177.

(6) Calculate adjusting washer thickness W as follows:

$$W = A - B - T - K - C$$

Ignore dimensions T and K if not applicable.

NOTE: It is recommended that the maximum value of dimension C should be aimed for (Ref. para.(5)) by varying W to suit.

(7) If dimension W is a very small or negative value, carry out one of the following alternatives:

(a) Incorporate SB.73-8527-68, deleting the clip and its associated gasket. Re-calculate dimension K (Ref. para.(4)) and delete dimension T in the formula in para.(6). Ensure that the necessary documentation is completed.

(b) Delete the adjusting washer and its gasket. This is acceptable provided that nozzle penetration is within the limits stated in paragraph (5).

NOTE: Do not use more than one gasket between any two mating faces.

SUB-ASSEMBLY

**72-00-51**

Page 598.17

Feb 1/83



OLYMPUS 593

MK.610-14-28  
OVERHAUL



This page left blank intentionally



OLYMPUS 593

MK. 610-14-28  
OVERHAUL



PRINTED IN ENGLAND

This page left blank intentionally

SUB-ASSEMBLY

**72-00-51**

Page 598.19

Feb 1/83



# OLYMPUS 593

MK.610-14-28  
OVERHAULL



snecma

- (6) Machine the adjusting washer (73-12-07/1-30) (if required), to the calculated thickness (plus 0.000, minus 0.002 in. (plus 0,00, minus 0,05 mm)). Refer to 72-09-21 Repair, Fig.450 for the procedure.

**CAUTION:** ADJUSTING WASHERS, RETAINING CLIPS AND GASKETS MUST NOT BE INTERCHANGED UNLESS RE-MATCHED BY DIMENSIONAL CALCULATION. ENSURE THAT COMPONENTS ARE ASSEMBLED TO MATCHING PILOT NOZZLE LOCATIONS.

C. Assemble Fuel Pressure Atomizing (Pilot) Nozzle Assembly to CC0C (Ref.Fig.537).

- (1) Refer to the Illustrated Parts Catalogue for the pilot nozzle securing bolts (73-12-07/1-20 or 1-21) relative to the CC0C standard, then apply lubricant 'C' to the bolts.
- (2) On engines to Pre S.B.72-58 and S.B.74-1 or to S.B. 73-8527-68 standard (no gaskets or retaining clip).
- (a) Apply jointing compound 'A' to abutment surface of the pilot nozzle, adjusting washer (73-12-07/1-130) and CC0C. Assemble the washer to the nozzle, then insert the nozzle into the same CC0C location that was used to calculate its penetration.
- (b) Align the attachment holes and secure the nozzle with the bolts (73-12-07/1-20 or 1-21) torque-tightened to 100 lbf in. (11,5 N.m) using the procedure specified for jointing compound application (Ref.72-09-00 Assembly).

SUB-ASSEMBLY

## 72-00-51

Page 598.20

Dec 31/01





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) On engines to Pre S.B.72-58 and S.B.74-1 or to S.B. 73-8527-68 standard (no gaskets but retaining clip interposed).

NOTE: As the pilot nozzle attachment bolts secure the retaining clip, which also locates around the igniter plug, the bolts cannot be tightened until the igniter plug is assembled. As the bolts must be tightened using the procedure specified for jointing compound application (Ref.72-09-00 Assembly), carry out the igniter plug measuring procedure before assembling the pilot nozzle, so that the plug can be assembled with the pilot nozzle to enable the torque-tightening of the bolts to be carried out correctly.

- (a) Apply jointing compound 'A' to abutment surface of the pilot nozzle, adjusting washer (73-12-07/1-30), retaining clip (73-12-07/1-40A) and CCOC.

NOTE: Do not apply jointing compound to the igniter spacer washer location on the retaining clip.

- (b) Assemble the washer and clip to the nozzle, then insert the nozzle into the same CCOC location that was used to calculate its penetration.
- (c) Align the attachment holes and secure the nozzle with bolts (73-12-07/20A or 21A). Do not tighten the bolts at this stage (Ref.para.E.(2)).
- (4) On engines to S.B.72-58 and Pre S.B.74-1 or to S.B. 73-8527-68 standard (gaskets interposed but no retaining clip).
- (a) Assemble the specified adjusting washer (73-12-07/1-30) with a gasket (73-12-07/1-25) on each side, to the nozzle, then insert the nozzle into the same CCOC location that was used to calculate its penetration.

SUB-ASSEMBLY

**72-00-51**

Page 598.21

Jul 1/81



**OLYMPUS 593**

MK.610-14-18  
OVERHAUL



- (b) Align the attachment holes and secure the nozzle with bolts (73-12-07/20A or 21A) torque-tightened to 100 lbf in. (11,5 N.m). Wire-lock the bolts together.
- (5) On engines to S.B.72-58 and S.B.74-1 and to pre S.B. 73-8527-68 standard (with gaskets and retaining clip interposed).
- (a) Assemble the specified adjusting washer (73-12-07/1-30) with a gasket (73-12-07/1-25) on each side, to the nozzle, followed by the retaining clip (73-12-07/1-40B) and third gasket. Insert the nozzle into the same CCOC location that was used to calculate its penetration.
  - (b) Align the attachment holes and secure the nozzle with bolts (73-12-07/20A or 21A). Do not tighten the bolts at this stage (Ref.para.E.(2)).
- (6) On engines to S.B.73-8527-68 standard (with or without adjusting washer and/or retaining clip).
- (a) With the retaining clip removed, proceed as detailed in para.(4).
  - (b) With the adjusting washer removed, proceed as follows:
    - (i) Assemble the retaining clip (73-12-07/1-40B) with a gasket (73-12-07/1-25) on each side, to the nozzle, then insert the nozzle into the same CCOC location that was used to calculate its penetration.
    - (ii) Align the attachment holes and secure the nozzle with bolts (73-12-07/20A or 21A). Do not tighten the bolts at this stage (Ref.para.E.(2)).

SUB-ASSEMBLY

**72-00-51**

Page 598.22

Dec 1/86



OLYMPUS 593

MK.610-14-28  
OVERHAUL



D. Igniter Plugs Spacer Washers Thickness Measuring Procedure.

(1) With reference to Fig.537, obtain the following dimensions required for setting the igniter penetration in the combustion chamber.

- (a) Igniter plug tip to spacer washer abutment face on igniter plug (Dimension D).
- (b) Igniter plug spacer washer locating face on CCOC to inner surface of combustion chamber (Dimension E).

NOTE: On engines with CCOC incorporating bolted on igniter and pilot fuel sprayer mountings, dimension E is measured from the bottom of the spacer washer location in the igniter adapter to the inner surface of the CCOC.

(c) The required igniter plug penetration in the combustion chamber Dimension F is detailed in Fits and Clearances Schedule (72-40-00 F.C.S.176).

(d) Required spacer washer thickness (Dimension G).

(2) Determine the spacer washer thickness using the formula  $G = D - (E + F)$ .

(a) Select a spacer washer from the range (74-21-02/1-20A to 45A) (72-09-21 Repair, Fig.451 Sheet 1) Pre-SB.74-1 or (74-21-02/1-20B to 45B-50A-55A) (72-09-21 Repair, Fig.451 Sheet 2) S.B.74-1.

CAUTION: ENGINE IGNITER PLUGS AND SPACER WASHERS MUST NOT BE INTERCHANGED UNLESS RE-MATCHED BY DIMENSIONAL CALCULATION. ENSURE THAT COMPONENTS ARE ASSEMBLED TO MATCHING IGNITER LOCATIONS.

SUB-ASSEMBLY  
**72-00-51**

Page 598.23

Jul 1/81



**OLYMPUS 593**

MK.610-14-28  
OVERHAUL



**E. Assemble Engine Igniter Plugs to CC0C (Ref.Fig.537).**

- (1) Ensure cleanliness of all components. The igniter plug is installed without lubricant.
  - (a) On engines to pre S.B.74-1 place the spacer selected from the range (74-21-02/1-20A to 45A) (72-09-21 Repair, Fig.451 Sheet 1) on the igniter plug. Screw the plug into the CC0C and torque-tighten to 42 lbf ft (57,0 N.m). Check that the igniter is screwed fully into position.
  - (b) On engines embodying S.B.74-1 place the spacer selected from the range (74-21-02/1-20B to 45B-50A-55A) (72-09-21 Repair, Fig.451 Sheet 2) over the igniter hole in the CC0C. Ensure that the retaining clip (73-12-07/1-40) previously assembled to the pilot nozzle location holds the spacer in position. Screw the igniter plug into the CC0C and ensure that the retaining clip and spacer are correctly positioned. Torque-tighten the igniter plug to 42 lbf ft (57,0 N.m). Check that the igniter is screwed fully into position.
- (2) On engines embodying S.B.74-1 ensure that the retaining clip is correctly positioned on the igniter spacer washer. Torque-tighten the pilot nozzle retaining bolts to 100 lbf in. (11,5 N.m), then wire-lock the bolts together.

**NOTE:** On engines to pre S.B.72-58 (no gaskets assembled to pilot nozzle), torque-tighten the bolts using the procedure specified for jointing compound application (Ref.72-09-00 Assembly).

- (3) Assemble protectors to the ends of the igniters.



OLYMPUS 593

MK.610-14-28



sneema

40. Deleted.

Printed in England

SUB-ASSEMBLY

72-00-51

Page 598.25

Jun 1/98



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

This Page Left Blank Intentionally

SUB-ASSEMBLY

72-00-51

Page 598.26

Jun 1/98



OLYMPUS 593

MK.610-14-28  
OVERHAUL



41. Assemble Heat Insulation Shields to CCOC (Ref.Fig.539)

A. Prepare Heat Shields.

- (1) Apply lubricant 'G' to the heat shield panel joints and knitmesh cushion damper abutment surfaces. Apply lubricant 'B' to securing bolts.

B. Assemble Heat Shields.

- (1) Position the heat shield panel (71-32-01/1-40) on the left-hand side of the CCOC and panel (71-32-01/1-240) on the right-hand side. Ensure that the panel joints overlap correctly on the captive bolts. Temporarily secure the panels together at the following positions.
  - (a) Assemble bolts and flat washers (71-32-01/1-30-20) at positions A.
  - (b) Assemble locknuts and flat washers (71-32-01/1-10-20) at positions B.
- (2) Secure each panel to the brackets on the CCOC flange as follows (Ref.Fig.539).
  - (a) Secure the knitmesh damper assembly with bolt (71-32-01/1-70) to position C near the upper side of the left-hand trunnion.
  - (b) Secure the knitmesh damper assembly with bolt (71-32-01/1-50) to position D near the lower side of the left-hand trunnion.
  - (c) Secure the remaining knitmesh damper assemblies with bolts (71-32-01/1-60-250).
- (3) Ensure that the nuts and bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Use the torque wrench (Tool 1664) and torque-tighten all the nuts and bolts between 67 and 73 lbf in. (7,5 and 8,2 N.m).

NOTE: The heat insulation shield assembly is not secured to the rear of the CCOC at this stage.

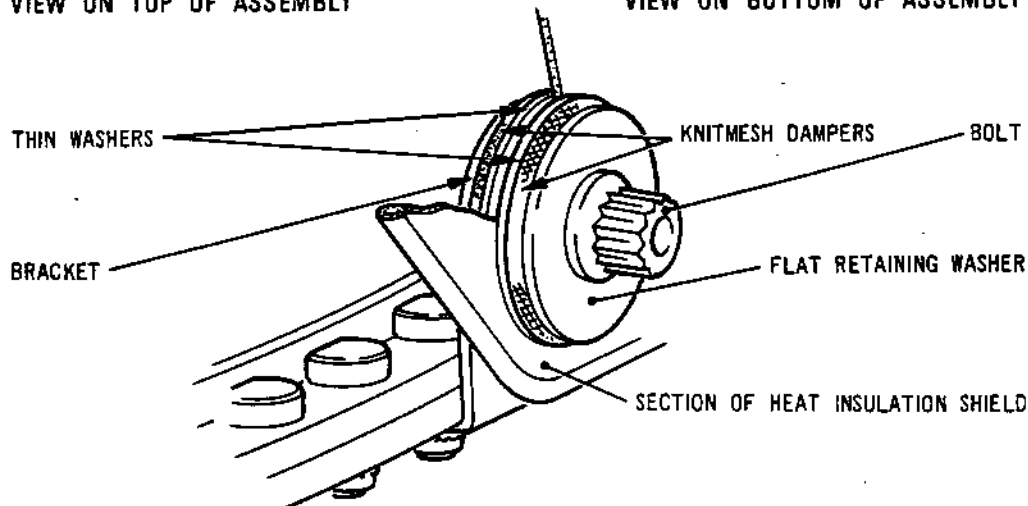
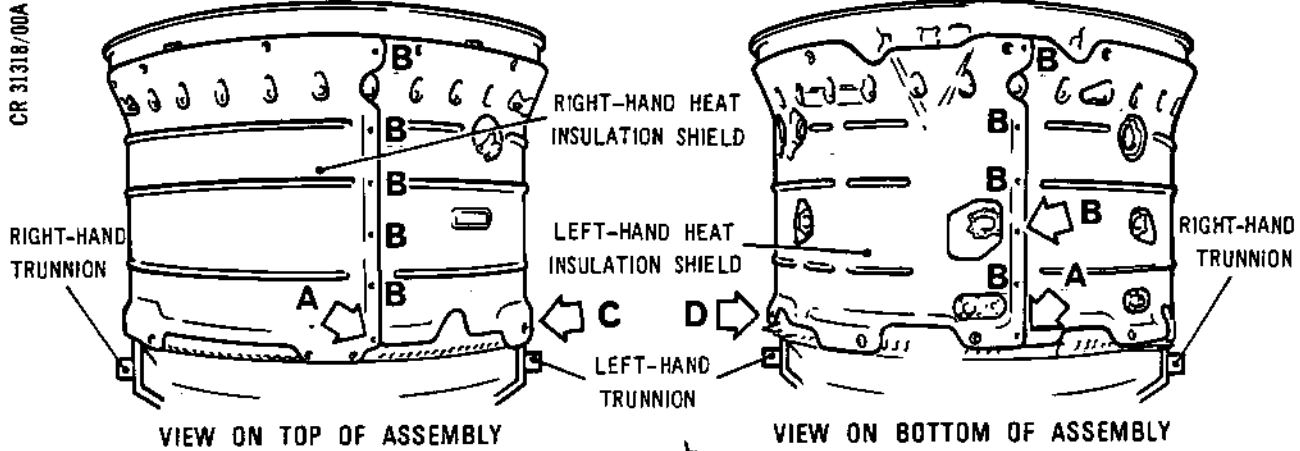
PRINTED IN ENGLAND

TN39263

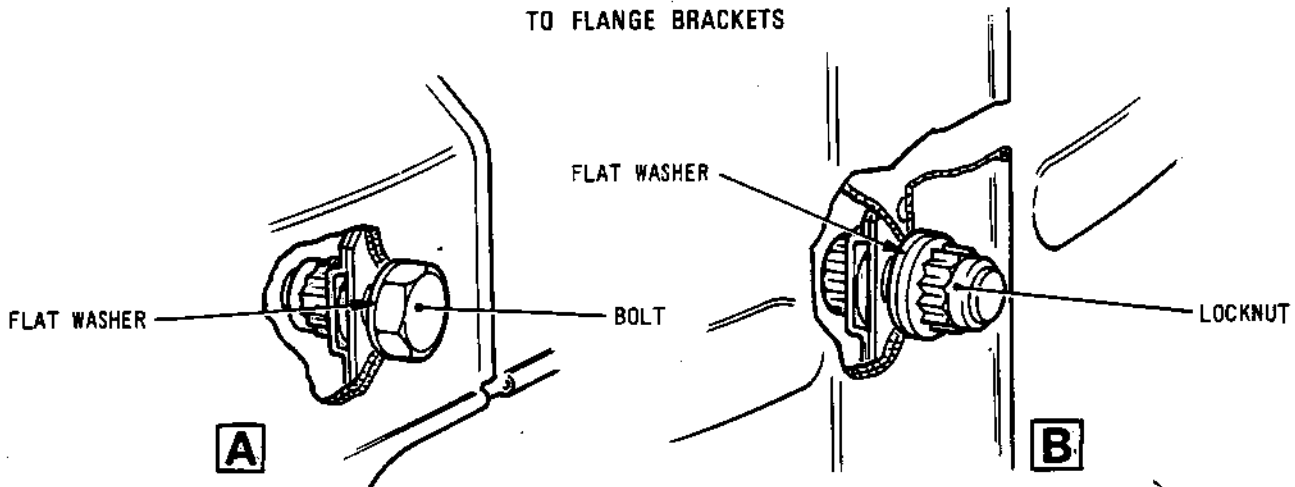


OLYMPUS 593

MK.610-14-28  
OVERHAUL



TYPICAL METHOD OF SECURING HEAT INSULATION SHIELD TO FLANGE BRACKETS



METHOD OF SECURING HEAT INSULATION SHIELD JOINTS

Assembling Heat Insulation Shields to CCOC  
Figure 539

SUB-ASSEMBLY  
**72-00-51**

Page 598.28  
Jul 1/81

TN39264





OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

42. Assemble Inspection Port Blanking Covers to CC0C (Ref.Fig.540)

A. Assemble Covers at Bottom, Left and Right-Hand Positions.

(1) Install the cover at bottom position.

(a) Assemble the bracket to CC0C.

(i) Insert a gasket (72-42-01/2-195) between the bracket 972-42-01/2-190B).

(ii) Secure the bracket to the CC0C with screws (72-42-01/2-180). Tighten the screws and ensure that the screw heads do not protrude above the surface of the bracket.

(b) Assemble the blanking cover to CC0C.

(i) Insert a gasket (72-42-01/2-175) between the blanking cover (72-42-01/2-170B) and bracket.

(ii) Secure the blanking cover with bolts (72-42-01/2-160) with lubricant 'C' applied, then torque-tighten to 100 lbf in. (11,5 N.m). Wire-lock the bolts together with single strand wire. Do not twist the wire.

(2) Install the cover at the left-hand position.

(a) Place the bracket (76-21-01/2-110) in position on the inspection port flange. Retain the bracket in position with two screws (76-21-01/2-100). Tighten the screws and ensure that the screw heads do not protrude above the surface of the bracket.

SUB-ASSEMBLY

72-00-51

Page 598.29

Dec 31/01



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (b) Place the blanking cover (76-21-01/2-80) in position and retain with bolts (76-21-01/2-70) with lubricant 'C' applied. Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m) then torque-tighten the bolts to 100 lbf in. (11,5 N.m). Wire-lock the bolts together. Do not twist the wire, lock the bolts with single strand only.

- (3) Install the cover at the right-hand position.

- (a) Locate the blanking cover (72-42-01/2-50) on the port together with the spacer plate (72-42-01/2-45) on engines to SB.72-8629-256 standard. Retain in position with bolts (72-42-01/2-40) with lubricant 'C' applied, then torque-tighten to 100 lbf in. (11,5 N.m). Wire-lock the bolts together with single strand only.

#### 43. Assemble Anti-icing Port Cover/Fuel Heater Bracket/Optical Pyrometer Ports Blanking Plates to CCOC (Ref.Fig.540)

##### A. Assemble Anti-icing Port Cover.

- (1) Place the blanking cover (72-42-01/2-70) in position and secure it to the CCOC with bolts (72-42-01/2-60), torque-tightened to 100 lbf in. (11,5 N.m) with lubricant 'C' applied.

NOTE: The anti-icing valve is installed during the main engine assembly procedure.

##### B. Assemble Fuel Heater Bracket.

- (1) Apply lubricant 'B' to the securing bolts (75-03-01/3-160).
- (2) Place the bracket (75-03-01/3-180) in position on the CCOC and secure it with three bolts. Assemble a bolt and flat washer (75-03-01/3-170) to the location near the bracket.
- (3) Torque-tighten the bracket securing bolts between 67 and 73 lbf in. (7,6 and 8,3 N.m). Wire-lock the bolts together.

NOTE: When the bracket is not assembled to the engine assemble three bolts (72-42-01/2-350) with lubricant 'C' applied to the bracket location. Torque-tighten the bolts to 100 lbf in. (11,5 N.m) and wire-lock.

SUB-ASSEMBLY  
**72-00-51**

Page 598.30  
Dec 31/01

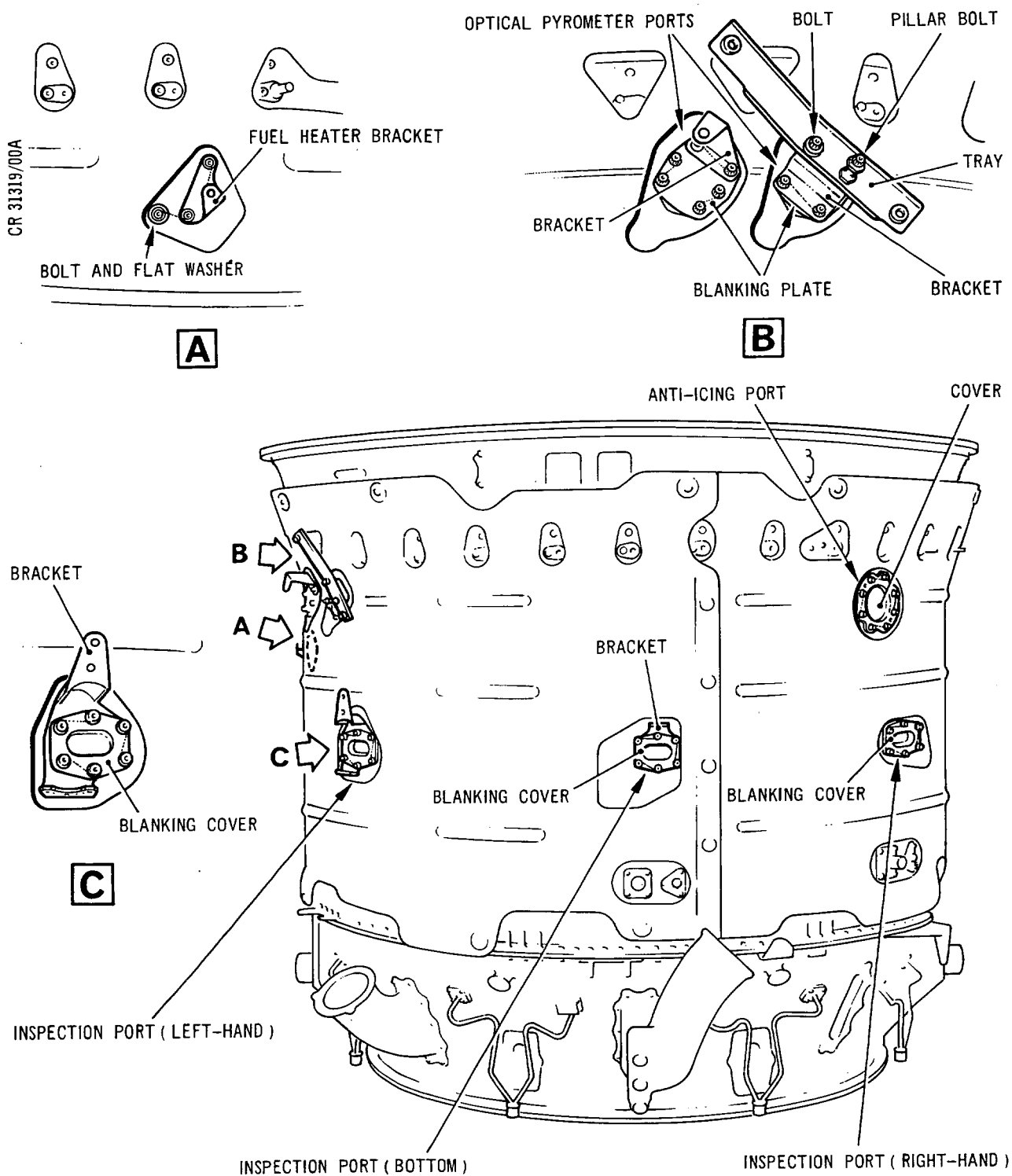


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



Assembling Inspection Port Covers to CCOC  
Figure 540

SUB-ASSEMBLY  
**72-00-51**

Page 598.31  
Jul 1/81

TN8463



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

C. Assemble Optical Pyrometer Ports Blanking Plates and Brackets (Pre SB.72-7856-179 Standard).

- (1) Apply jointing compound 'A' to the abutment surfaces of blanking plates (72-42-01/2-340). Apply lubricant 'B' to the bolt threads (72-42-01/2-270). Apply lubricant 'C' to the bolt threads (72-42-01/2-260). Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).
- (2) Assemble blanking plates to CC0C.
  - (a) Place the blanking plates in position on the optical pyrometer ports. Some blanking plates have an additional unwanted hole. Plates of this type must be installed with the unwanted hole at the rear (Ref. SB.72-88).
  - (b) Temporarily retain the blanking plates with bolts (72-42-01/2-260) but do not assemble bolts to bracket locations at this stage.
- (3) Assemble brackets to blanking plates.
  - (a) Position a bracket (72-42-01/2-300A) on the blanking plate which is in line with the left hand inspection port. Secure the bracket with two bolts (72-42-01/2-260).
  - (b) Position a bracket (72-42-01/2-280A) on the remaining blanking plate. Secure the bracket with two bolts (72-42-01/2-270).
  - (c) Torque-tighten bolts (72-42-01/2-270) to between 60 and 75 lbf in. (6,8 and 8,5 N.m). Torque-tighten bolts (72-42-01/2-260) to 100 lbf in. (11,5 N.m). Wire-lock the bolts together at each blank position.

SUB-ASSEMBLY

72-00-51

Page 598.32

Dec 31/01



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England

D. Assemble Brackets to CCOC (SB.72-7856-179 Standard).

(1) Assemble the bracket (72-42-01/2-300B) and tray (71-51-01/7-290).

- (a) Place the bracket on the location in line with the left-hand inspection port cover. Secure the bracket with two bolts (72-42-01/2-290), torque-tightened to 100 lbf in. (11,5 N.m) with lubricant 'C' applied. Wire-lock the bolts together.
- (b) Assemble the tray (71-51-01/7-290) to the previously installed bracket. Secure the tray with pillar bolt (71-51-01/7-280) and bolt (71-51-01/7-250) with lubricant 'B' applied. Do not fully tighten the bolt but torque-tighten the pillar bolt between 67 and 73 lbf in. (7,6 and 8,2 N.m). Loosely assemble the locknut (71-51-01/7-270) to the pillar bolt.

(2) Assemble the bracket (72-42-01/2-280B).

- (a) Place the bracket on the location near the previously assembled tray. Secure the bracket with two bolts (72-42-01/2-270B) torque-tightened to 100 lbf in. (11,5 N.m) with lubricant 'C' applied. Wire-lock the bolts together.

44. Temporarily Assemble LP Turbine Nozzle Vane Assembly to CCOC (Ref.Fig.541)

A. Assemble LP Turbine Nozzle Vane Assembly.

- (1) Ensure that the lifting equipment is correctly assembled to the nozzle vane assembly.

NOTE: The LP turbine nozzle vane assembly is a separate sub-assembly (Ref.72-52-01) complete with lifting equipment.

- (2) Assemble the multiple leg sling (Tool 1645) to the nozzle vanes lifting equipment and attach a crane hoist to the sling.

SUB-ASSEMBLY

72-00-51

Page 598.33

Dec 31/01

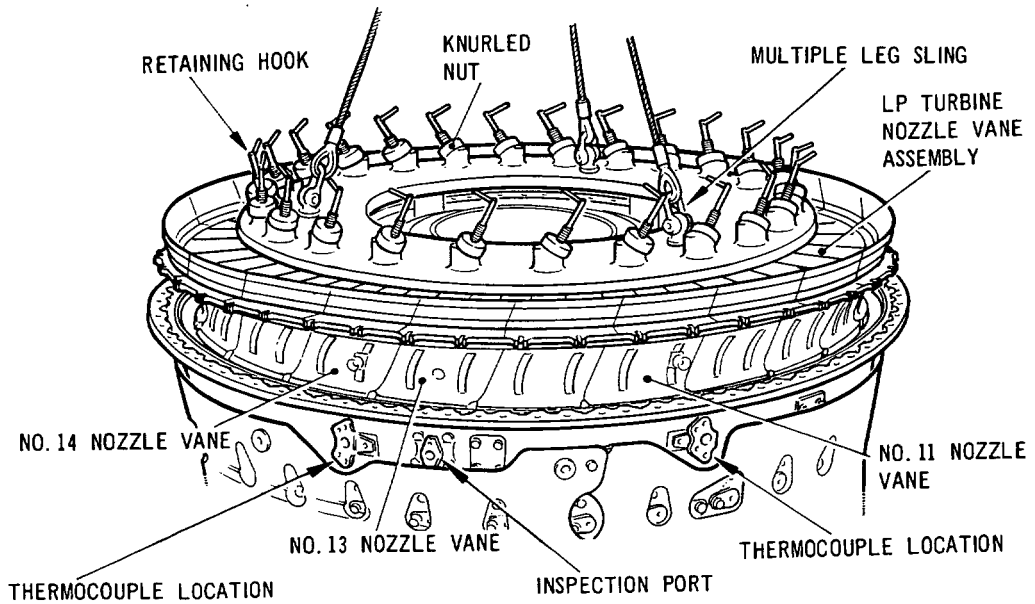


# OLYMPUS 593

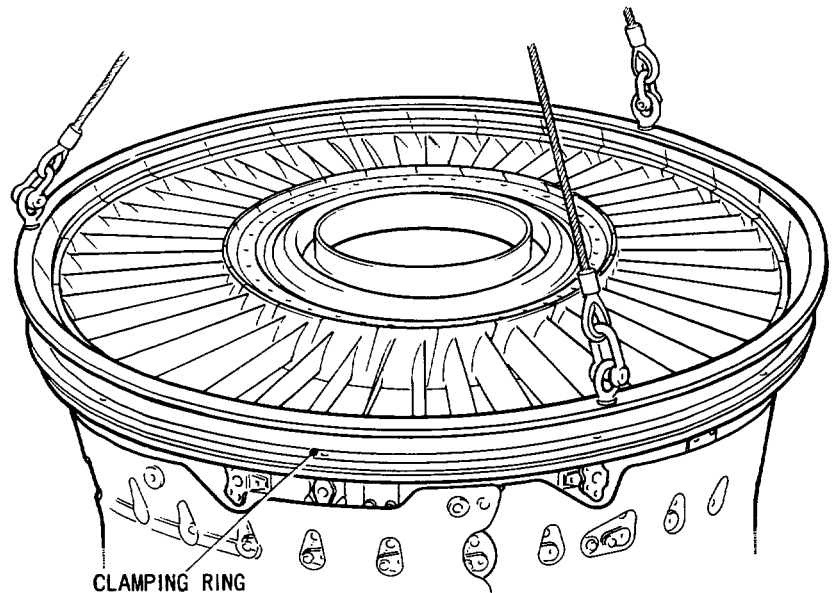
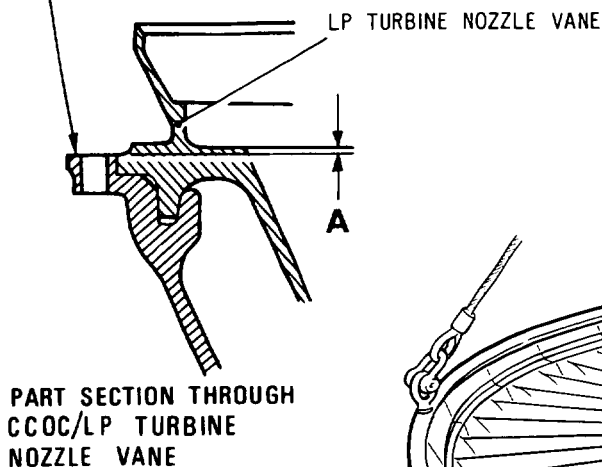
MK.610-14-28  
OVERHAUL



CR 32624/00C



CCOC REAR FLANGE SURFACE



Temporarily Assembling LP Turbine Nozzle Vane Assembly to CCOC  
Figure 541

SUB-ASSEMBLY  
**72-00-51**

Page 598.34  
Jul 1/81



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



- (3) Ensure the cleanliness of the CCOC rear flange and LP turbine nozzle vanes. Carefully lower the assembly into position on the CCOC flange. Ensure that the inspection port in the CCOC aligns with the hole in No.13 nozzle vane and that No.11 and 14 vanes align with the thermocouple locations in the CCOC.
- (4) When the nozzle vane assembly is fully in position, carefully slacken the knurled nuts securing the retaining hooks to the nozzle vanes.

NOTE: Slacken the hooks sufficiently to allow the nozzle vanes to assume unrestrained positions. Do not disengage the retaining hooks from the nozzle vanes.

- (5) Align the clearance bolt-holes in the nozzle vanes with the bolt-holes in the CCOC flange.
- (6) Attach the multiple leg sling (Tool 1645) to the clamping ring (Tool 1262). Carefully lower the clamping ring into position on the CCOC flange and nozzle vane assembly.
- (7) Secure the clamping ring to the CCOC with nuts evenly tightened.
- (8) Ensure that the thermocouple probes will penetrate fully and freely.

B. Turbine Nozzle Dimensional Check.

- (1) Carefully remove the clamping ring from the CCOC flange. Ensure that the nozzle vane assembly is not disturbed.
- (2) At four equally spaced positions measure the step A from the nozzle vane to the rear flange surface of the CCOC (Ref.Fig.541). The dimension must be within the limits of 0.025 in. and 0.035 in. (0,635 and 0,889 mm). Record the actual dimension for engine assembly reference.

PRINTED IN ENGLAND

TN8470



OLYMPUS 593

MK.610-14-28  
OVERHAUL



C. Remove LP Turbine Nozzle Vane Assembly.

- (1) Ensure that the nozzle vanes retaining hooks are correctly in position and that the knurled nuts are fully tightened.
- (2) Carefully remove the LP turbine nozzle vane assembly from the CCOC and return it to the appropriate area.

45. Completion of Assembly

A. Final Examination.

- (1) Ensure that all operations have been completed satisfactorily and inspected where necessary.
- (2) Ensure that all locking arrangements are correctly secured and open ports correctly blanked.
- (3) Remove the protector from the HP turbine nozzle vane assembly. Examine the sub-assembly internally for cleanliness.

B. Transport Sub-assembly to Main Engine Assembly Area.

CAUTION: EXERCISE CARE TO PREVENT DAMAGE TO FUEL SPRAYERS DURING TRANSPORTATION.

- (1) Assemble the lifting fixture (Tool 1310) to the rear flange of the CCOC.
- (2) Prepare a pallet (Tool 1014) to accept the sub-assembly. Remove the bolts securing the sub-assembly to the assembly stand.
- (3) Release the sub-assembly, then carefully raise the assembly from the stand and transfer it to the prepared pallet in preparation for transportation to the main engine assembly area (72-00-00 Assembly).

NOTE: If SB.72-64 or 72-86 are incorporated, module interchangeability will be affected. Check to ensure that the module identification plate is in accordance with the interchangeability chart.

TN33201

SUB-ASSEMBLY

**72-00-51**

Page 598.36

Jul 1/81





# OLYMPUS 593

MK.610-14-28

OVERHAUL



## STANDARD PRACTICES - ASSEMBLY

### TABLE OF CONTENTS

Para.		Page
1.	General ... ..	501
2.	Application of Lubricants, Jointing Compounds and Locking Compounds ... ..	502
	A. General ... ..	502
	B. Thread Lubricants ... ..	503
	C. Jointing Compounds... ..	503
	D. Application of Locking Compound ... ..	504
3.	Torque-tightening ... ..	505
	A. General ... ..	505
	B. Using Adapters with Torque Wrenches ... ..	505
	C. Locking (Run-down) Torque Check of Components with Friction Type Locking Features ... ..	506
	D. Components with Locking Features Requiring Alignment ... ..	508
4.	Locking ... ..	510
	A. Cupwashers ... ..	510
	B. Peening ... ..	510
	C. Keywashers ... ..	510
	D. Split Cotter Pins ... ..	514
	E. Wire-locking... ..	514
5.	Rim Clenching Clamp Assemblies ... ..	517
	A. Assemble the Clamp... ..	517
	B. Install the Clamp ... ..	517
6.	Quick Attach/Detach (QAD) Couplings ... ..	518
	A. Prepare the Components ... ..	518
	B. Assemble the Components ... ..	520
	C. Tighten the Coupling Ring ... ..	520
7.	Ball and Roller Bearings ... ..	521
	A. Prepare the Bearing ... ..	521
	B. Install the Bearing ... ..	522
8.	Tubes ... ..	522
	A. Rigid Tubes ... ..	522
	B. Flexible Tubes ... ..	523
9.	Toroidal Sealing Rings... ..	523
10.	Tri-wing Fasteners ... ..	524
11.	Temporary Markings ... ..	524
12.	Identification of Components ... ..	526
	A. General ... ..	526
	B. Material Batch/Code Number ... ..	526
	C. Locational Code/Serial Number ... ..	526
	D. Part Number ... ..	527
	E. Salvage Number ... ..	527
	F. Miscellaneous Numbers ... ..	527
13.	LP and HP Compressor Rotor Blade Identification ... ..	528
	A. General ... ..	528
	B. Application of Paint ... ..	528

ASSEMBLY

# 72-09-00

Contents 1

Feb 1/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Para.	Page
14. Bolt and Nut Tightening Sequences ... ..	530
A. General ... ..	530
B. Circular Flanges ... ..	530
C. Half Casing Flanges ... ..	530
15. Component Life Marking ... ..	531
A. General ... ..	531
B. System of Coding Used by Iberia Overhaul Facility ...	531
C. System of Coding Used by BEOL Overhaul Facility ...	532

#### TABLE OF ILLUSTRATIONS

Fig.No.	Page
501 Using Adapters with Torque Wrenches ... ..	507
502 Locking Cupwashers ... ..	509
503 Peening Threaded Components and Pins ... ..	511
504 Wire-locking ... ..	515
505 Assembling Rim Clenching Clamp Assemblies ... ..	516
506 Assembling QAD Couplings ... ..	519
507 Installing Tri-wing Fasteners ... ..	525
508 Flange Bolt and Nut Tightening Sequences ... ..	529

#### LIST OF TABLES

Table No.	Page
501 Lubricants, Jointing Compounds and Locking Compounds ... ..	502
502 Iberia Overhaul Facility Coding System... ..	531
503 BEOL Overhaul Facility Coding System ... ..	532



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

STANDARD PRACTICES - ASSEMBLY

1. General

- A. Before commencing assembly, check the inspection records/ reports to ensure that all components are cleared for assembly, having had any repairs or modifications called for embodied.
- B. Prior to assembly, examine all components to ensure that they have not been damaged during storage or transit, and that they are clean.
- C. When installing or connecting items or units during the assembly sequence, ensure that joint faces and sealing ring grooves are clean and free from damage.
- D. During assembly, all blanks and covers shall be left in position until the assembly sequence necessitates their removal, in order to protect protruding items and joint faces and to prevent the ingress of foreign matter. The appropriate engine blanks and covers shall be installed at the completion of each stage during engine final assembly.
- E. Throughout the assembly, reference is made to the Modification (Mod) No. or Service Bulletin (S.B.) No. to accommodate engines of varying standards brought about by the introduction of modifications. Where direct replacement occurs unaffected the assembly sequence, the S.B. or Mod. will not be quoted, but the Illustrated Parts Catalogue (I.P.C.) reference will denote the S.B. or Mod., enabling the engine to be built to the standard required. For information on the relationship of Mod. and S.B., refer to the Service Bulletin Index, and for embodiment information (if applicable), refer to the Service Bulletin folder.
- F. During assembly, all vital dimensions that must be obtained are referenced in the text to the appropriate section and Ref.No. of the Fits and Clearances Schedule (F.C.S.).
- G. All self-locking nuts, captive nuts and inserts that have passed the Inspection/Check examination are reusable providing that they satisfy the locking (run-down) torque specified in para.3.

Printed in England

ASSEMBLY

72-09-00

Page 501  
Dec 31/00

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

MATERIAL	SPECIFICATION	APPROVED BRANDS
<u>Lubricant</u>		
A	D.E.R.D.2497 Iss.3	Esso ETO 25 Mobil RM.193A-3 Shell ASTO 555 (Shell ASTO 555 USA blended must be marked D.E.R.D.2497 on the container) Royco Turbine Oil 555 Castrol 599
B	D.T.D.806B OMat 405B	AeroShell Grease 8 Rocol Aerospec 350
C	MSRR 4008	Rocol 251T
E	- MSRR 9295 (OMat 1069A)	Dentoil 900 Turbo 10
F	D ENG RD 2490 or AIR 3515/B	-
G	D.T.D.900/4980	Rocol G576 (Formerly Foliac G576) Polybutylcuprysil Grease
H	MSRR 9276 (OMat 4/44)	PL 239
S	AIR 4247 (D.T.D.900/392B)	AeroShell Compound 08 Total 4247 Nycogard GA47
T	-	Guardian Chain Lubricant 1
<u>Jointing Compound</u>		
A	D.T.D.900/4344 (OMat 423)	Silkolene 762
B	-	Wellseal
C	D.T.D.900/4134B	Hermetite 1310
D	MSRR 9251	RAS Pipesseal PTFE paste

Overhaul Materials Specifications  
Table 501 (Continued)ASSEMBLY  
**72-09-00**  
Page 502  
Dec 31/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

MATERIAL	SPECIFICATION	APPROVED BRANDS
<u>Locking Compound</u>		
A	D.T.D.900/4588B (OMat 852) OMat 8/68B	Loctite E Loctite 241
B	-	Loctite 640
C	OMat 8/69	Loctite 270
<u>Consumable Materials</u>		
Lockwire A 0,8 mm	Nimonic 90(MSRR.7015) Inconel 600(AMS 5687)	-
Lockwire B 0,5 mm diameter or 0.022 in. diameter	D.T.D.189A (OMAT 2/97) D.T.D.198A	
<u>Solvents</u>		
1	OMat No.1/257 OMat No.1/257A OMat No.1/257B OMat No.1/257C OMat No.1/257D OMat No.1/257E OMat No.1/257F OMat No.1/257G OMat No.1/257H Odourless Kerosine - OMat No.1/260 OMat No.102A OMat No.102B OMat No.1/270 OMat No.1/270A OMat No.1/267	Desoclean 45 (PD680 Type 1) Desoclean 20 Applied 8-300 Applied 8-000 Ardrox 5548 MS 38 MS 56 Lotoxane Lotoxane Fast  Stoddards Solvent (PD-680 Type 1) Safranor Turco 6646 Ardrox 161-K Lemsolv
2	OMat No.150	Acetone

Overhaul Materials Specifications  
Table 501 (Continued)

ASSEMBLY

72-09-00

Page 502A

Dec 31/00

**OLYMPUS 593**

MK.610-14-28

sneema

OVERHAUL

Printed in England

MATERIAL	SPECIFICATION	APPROVED BRANDS
3	OMat No.1/257J	Primaclean 3650
4	Isopropyl alcohol - OMat No.1/140A Methylated spirits - OMat No.155A	
5	Methylene chloride - OMat No.169	

Overhaul Materials Specifications  
Table 501 (Concluded)

- H. All ball and roller bearings should be received for assembly in matched sets protected by a temporary corrosion protection solution and contained in PVC or polythene bags. Bearings can be assembled with the protection solution applied but the thickness must be minimal. If necessary remove excess with a lint free cloth.
- J. Nuts and bolts supplied with corrosion preventative coatings must be thoroughly cleaned to remove all traces of preservatives. Ensure that all surfaces are clean and dry before the application of the prescribed lubricant.

ASSEMBLY

**72-09-00**

Page 502B

Dec 31/00



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

## 2. Application of Lubricants and Compounds

### A. General.

**CAUTION:** EXTREME CARE MUST BE TAKEN TO ENSURE THAT MOLYBDENUM DISULPHIDE LUBRICANT IS NOT USED IN AREAS WHERE IT IS NOT SPECIFIED. MOLYBDENUM DISULPHIDE LUBRICANTS BREAK DOWN ABOVE 300 DEG C. RELEASING SULPHUR WHICH CAN INDUCE STRESS CORROSION AND PREMATURE FAILURE OF ENGINE PARTS SO LUBRICATED.

- (1) Where the application of a lubricant, jointing compound or locking compound is necessary during assembly, it is specified by means of a letter, e.g. apply lubricant 'B'. Refer to Table 501 for specifications and approved brands for these materials.

### B. Thread Lubricants.

- (1) Apply the recommended lubricant (Ref. appropriate Sub-assembly Chapter) immediately prior to assembly.

- (a) Ensure that all traces of preservatives are removed and that the surfaces to be lubricated are clean and dry.
- (b) Using a suitable small brush (if the viscosity of the lubricant permits), apply just sufficient lubricant to cover the following surfaces:

Nut to bolt or stud	...	Abutment face of nut and threads of bolt or stud
Setbolt	... ..	Abutment face of bolthead and threads of bolt
Retaining nut to shaft	...	Abutment face of nut and threads of shaft
Tube end fittings	...	Union body threads and ferrule groove or abutment face mating with thrust wire or nut respectively

- (2) Ensure that lubricant contamination on any other surface is removed immediately.

### C. Jointing Compounds.

- (1) Ensure that the joint faces are smooth and free from burrs.

ASSEMBLY

72-09-00

Page 503

Jun 30/97



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

- (2) Clean the joint faces using a clean, lint free cloth moistened with a group 2 or 4 solvent (Refer to Table 501).
- (3) Apply a thin even coating of jointing compound to both faces using a clean stiff bristle brush or a small flexible knife; leave a clear border (0.050 in. (1,27 mm) maximum width) around the inner edges of the joint thus preventing internal exuding.  
  
NOTE: Sufficient compound should be applied to allow a slight exuding from the outer edges of the joint when it has been made.
- (4) A minimum of 10 minutes air drying time must be allowed before the joint is assembled.
- (5) Check the torque loading of joint securing nuts or bolts after a wait of at least 10 minutes after torque-tightening and, if necessary, restore to required value. Compound can slowly exude under pressure resulting in a considerable reduction of nut or bolt torque loading.
- (6) Remove surplus compound using a clean, lint free cloth moistened with a group 2 or 5 solvent (Refer to Table 501) before complete hardening occurs.

D. Application of Locking Compound.

- (1) Clean surfaces to receive the compound using a clean, lint free cloth moistened with a group 2, 3 or 4 solvent (Refer to Table 501).

WARNING: USE PRIMERS ONLY IN WELL VENTILATED AREAS. PRIMERS CONTAIN CHLORINATED SOLVENTS AND ARE HIGHLY VOLATILE.

WARNING: DO NOT ALLOW PRIMERS OR COMPOUND TO CONTAMINATE THE SKIN. IF ACCIDENTAL CONTAMINATION OCCURS, WASH OFF WITH SOAP AND WATER.

CAUTION: DO NOT PRIME TITANIUM ALLOYS.

- (2) If required, apply primer in accordance with the recommendation of the manufacturer.

ASSEMBLY

72-09-00

Page 504

Jun 1/96





OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (3) Apply a thin coat of compound to one of the mating surfaces, either directly from the bottle through the dispenser nozzle, or by dipping in the compound contained in a shallow polythene dish.

NOTE: The compound used for dipping shall be discarded after use, not returned to the bottle.

- (4) In blind hole applications, apply the compound to the hole and assemble the components with a twisting motion to ensure joint coverage (indicated by a small fillet of compound around the joint line).

- (5) Assemble the components and allow to cure at room temperature.

NOTE: Bonded parts may be handled after 15 minutes. The adhesive attains full strength in 5 hours.

### 3. Torque-tightening

#### A. General.

- CAUTIONS:
1. EXTREME CARE MUST BE TAKEN TO ENSURE THAT MOLYBDENUM DISULPHIDE LUBRICANT IS NOT USED IN AREAS WHERE IT IS NOT SPECIFIED. MOLYBDENUM DISULPHIDE LUBRICANTS BREAK DOWN ABOVE 300 DEG C. RELEASING SULPHUR WHICH CAN INDUCE STRESS CORROSION AND PREMATURE FAILURE OF ENGINE PARTS SO LUBRICATED.
  2. IT IS OF THE UTMOST IMPORTANCE TO ENSURE THAT ALL FEED/SCAVENGE FILTERS AND MAGNETIC PLUG ASSEMBLIES ARE FULLY TORQUE-TIGHTENED ON ASSEMBLY. FAILURE TO DO THIS CAN RESULT IN OIL LEAKAGE IN FLIGHT WHICH MAY NOT BE APPARENT DURING GROUND CHECKS/ /RUNNING.
  3. WRENCHES USED FOR TORQUE-TIGHTENING MUST BE CALIBRATED AT REGULAR INTERVALS AGAINST A CERTIFIED CHECKING RIG. TORQUE WRENCH ACCURACY SHALL BE WITHIN  $\pm 5$  PER CENT.

- (1) A specific torque loading is applied when tightening threaded components to ensure optimum security and to prevent overstressing which could result in subsequent failure.

ASSEMBLY

72-09-00

Page 505

Jun 1/99



OLYMPUS 593

MK.610-14-28

OVERHAUL



SNECMA

- (2) The torque loadings are specified in the relevant Sub-assembly Chapters, together with the applicable locking (run-down) torques where the component concerned has a friction type locking device.
- (3) Never exceed the stated maximum torque loading, nor loosen an item when torque-tightened to obtain alignment of a locking device.
- (4) To ensure that the specified torque loading is achieved, the components must be lubricated as specified in para.2.A. and B.

#### B. Using Adapters with Torque Wrenches.

NOTE: In certain instances a special adapter is specified to enable a torque wrench/adapter assembly to be calibrated on the checking rig, rendering the following calculations unnecessary.

- (1) When an adapter which alters the leverage is used with a torque wrench it is necessary to compensate the indicated torque reading accordingly.
- (2) If the adapter increases the effective leverage (Ref.Fig.501, detail A), the following formula must be used to determine the compensated wrench setting:

$$S = \frac{L \times T}{L + E}$$

where S = compensated wrench setting  
 L = effective length of wrench  
 E = effective length of adapter  
 and T = required torque loading

NOTE: When using this and similar formulae, all quantities must be expressed in similar units, i.e. wrench length in feet if required, torque is in lbf ft.

ASSEMBLY

72-09-00

Page 506

Jun 1/99



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

- (3) For example, to find the compensated wrench settings -- when using a 10 in. wrench and 5 in. adapter to torque-tighten a nut to between 67 and 73 lbf in.:

$$S = \frac{10 \times 67}{10 + 5} = 44.7 \text{ lbf in. (lower limit)}$$

and

$$S = \frac{10 \times 73}{10 + 5} = 48.7 \text{ lbf in. (upper limit)}$$

therefore the wrench settings are 45 and 49 lbf in. (corrected to the nearest lbf in.).

- (4) If the adapter decreases the effective leverage of the wrench (Ref. detail B) the formula must be altered to subtract the adapter length from the wrench length:

$$S = \frac{L \times T}{L - E}$$

- (5) No compensation of the wrench setting is required if the adapter does not alter the effective leverage of the wrench (Ref. detail C).
- (6) When the adapter axis is not parallel to the wrench axis, the effective length of the adapter must be measured in a plane parallel to the wrench axis (Ref. detail D).

C. Locking (Run-down) Torque Check of Components with Friction Type Locking Features.

- (1) Lubricate the item as specified in para.2.B.

ASSEMBLY

72-09-00

Page 506A

Jun 1/99



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sheema

This page left blank intentionally

ASSEMBLY

**72-09-00**

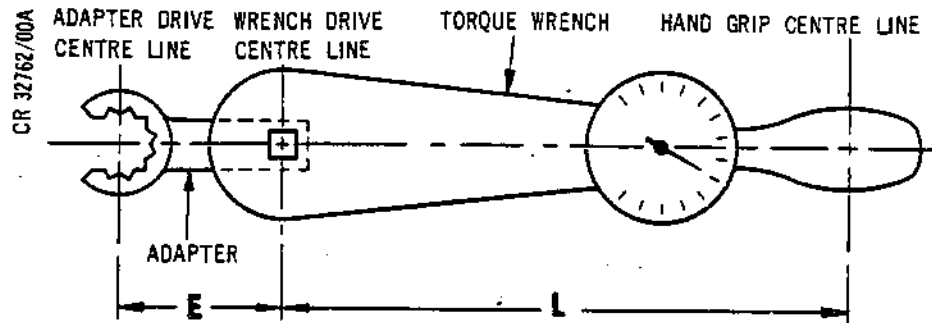
Page 506B  
Sep 30/94



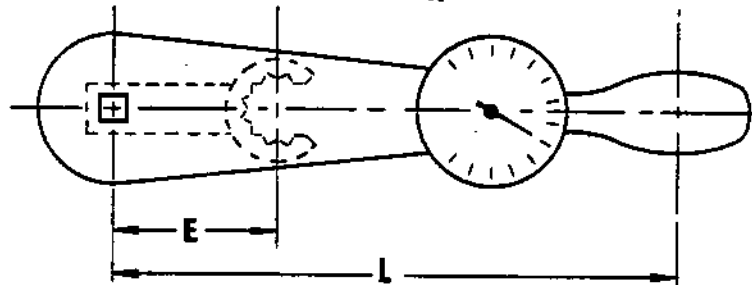
OLYMPUS 593

MK. 610-14-28

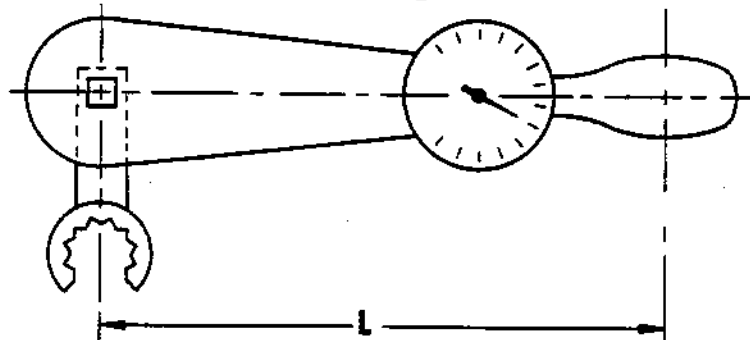
OVERHAUL



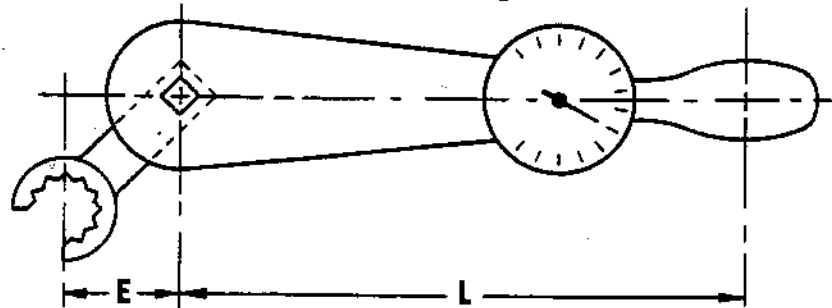
DETAIL A



DETAIL B



DETAIL C



DETAIL D

Using Adapter with Torque Wrenches  
Figure 501

ASSEMBLY

72-09-00

Page 507

Mar 1/76

PRINTED IN ENGLAND

TN14328



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Run down the nut or bolt until the locking element is fully engaged, with the load faces out of contact.

NOTE: A self-locking nut is fully engaged when the end of the bolt is flush with, or slightly protruding from the end of the nut.

- (3) Using a direct reading torque wrench, measure the torque required to turn the nut or bolt. This locking (run-down) torque must be within the limits specified in the relevant Sub-assembly Chapter, or if not quoted, as specified in 72-09-00 Inspection/Check, Table 318.
- (4) If the nut or bolt fails to meet the locking torque requirements, use selective assembly or, if this fails, renew the nut or bolt and recheck the locking torque until satisfactory.
- (5) Torque-tighten the nut or bolt to the figure specified in the relevant Sub-assembly Chapter.

NOTE: Unless otherwise stated, the torque-tightening figure is inclusive of the locking torque, i.e. the locking torque shall not be added to the torque-tightening figure.

- (6) After torque-tightening the nut ensure that a minimum of one and a half threads is protruding beyond the outer face of the nut.
- (7) Reject and destroy any nut where it is obvious that it will not give a satisfactory locking torque on any bolt. Do not attempt to restore locking properties.

D. Components with Locking Features Requiring Alignment.

- (1) Lubricate the assembly as specified in the relevant Chapter.
- (2) Run down the nut or bolt by hand.
- (3) Torque-tighten the nut or bolt to the lower figure specified.

CAUTION: NEVER SLACKEN OFF TORQUE-TIGHTENED NUT OR BOLT TO ACHIEVE ALIGNMENT OF LOCKING FEATURE.

- (4) Continue tightening slowly within the upper torque limit until alignment of the locking feature is achieved.

TN14329



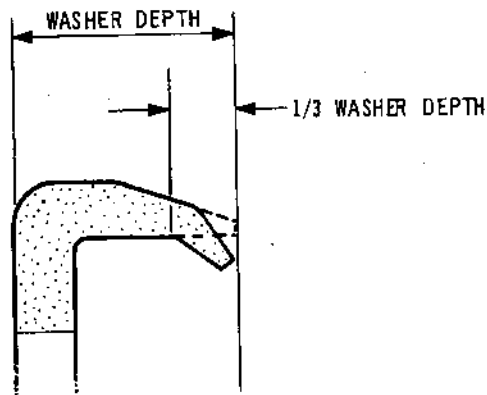
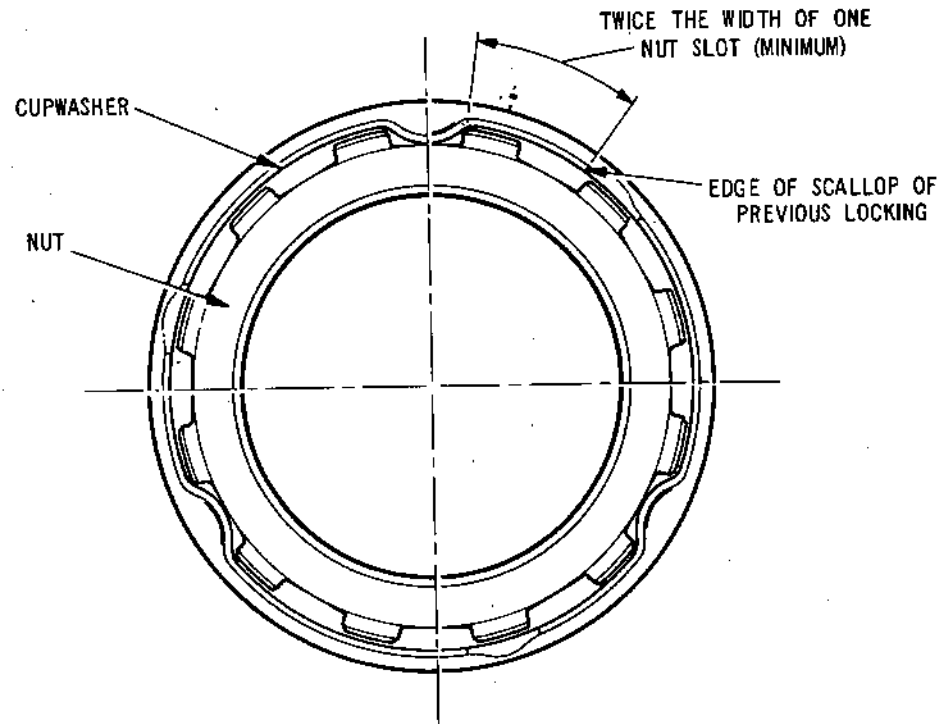
OLYMPUS 593

MK.610-14-28  
OVERHAUL

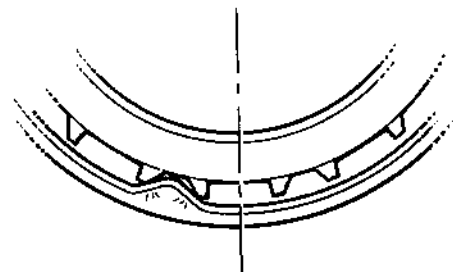


PRINTED IN ENGLAND

CR 31638/00A



ENLARGED SECTION THROUGH  
LOCKING POSITION



PART VIEW SHOWING LOCKING WHEN  
SPECIAL LOCKING SLOTS ARE PROVIDED

Locking Cupwashers  
Figure 502

TN14330



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (5) If alignment cannot be achieved within the torque-tightening limits, slacken the nut or bolt right off, then repeat the torque-tightening procedure. If alignment still cannot be achieved, renew the nut or bolt.

#### 4. Locking

##### A. Cupwashers (Ref.Fig.502).

- (1) Before locking a reconditioned cupwasher, check that the new locking positions are not less than twice the width of one nut slot away from any previous locking positions. If this condition cannot be satisfied, install a new cupwasher.
- (2) Using the special punch (if specified), lock the cupwasher.
  - (a) In one location on double-hexagon bolts.
  - (b) In two locations on nuts with four slots.
  - (c) In three locations on nuts with six or more slots.

NOTE: Locking locations shall be as near equispaced as possible.

##### B. Peening (Ref.Fig.503).

- (1) When locking of threaded components or pins by means of peening is specified, use the appropriate method shown in the illustration.

##### C. Keywashers.

CAUTION: DO NOT PRE-SET TABS OF KEYWASHERS BEFORE INSTALLATION. FAILURE MAY RESULT.

- (1) Place the keywasher in position, ensuring that the "snugged" limb is correctly located.
- (2) Lubricate, install and torque-tighten the nut or bolt.
- (3) Check that the "snugged" limb has not sheared due to turning with the nut or bolt.

TNI4331

ASSEMBLY  
**72-09-00**  
Page 510  
Mar 1/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

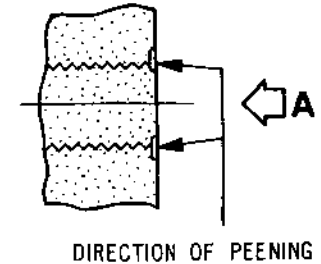
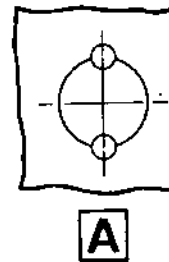
CR 32771/00A

## APPLICATION AND METHOD

## DIAGRAM

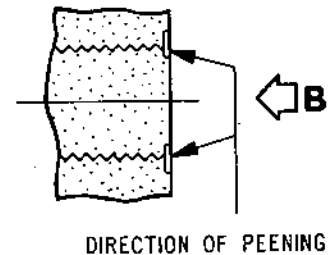
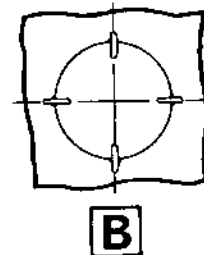
SCREWED PLUGS UP TO AND INCLUDING  
0.500 IN DIA (WHERE PEENING SLOTS ARE  
NOT PROVIDED)

PEEN END OF STUD OR BOLT LIGHTLY OVER  
SURROUNDING SURFACE AT TWO OPPOSITE  
POINTS



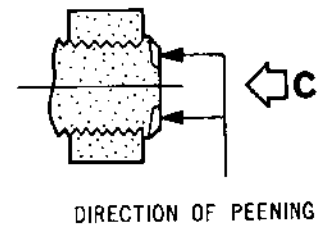
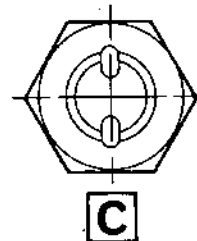
SCREWED PLUGS OVER 0.500 IN DIA (WHERE  
PEENING SLOTS ARE NOT PROVIDED)

PEEN EDGE OF PLUG LIGHTLY INTO  
SURROUNDING SURFACE AT FOUR POINTS



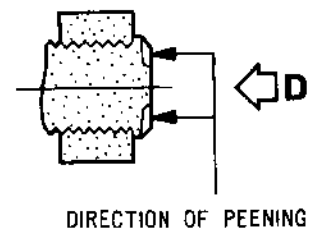
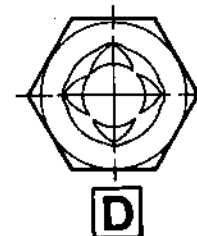
STUDS BOLTS ETC WITHOUT RECESS IN END

PEEN END OF STUD OR BOLT LIGHTLY  
OVER SURROUNDING SURFACE AT TWO  
OPPOSITE POINTS



STUDS BOLTS ETC NO 10 UNF TO 3/8 IN UNF  
(INCLUSIVE) WITHOUT RECESS IN END  
(ALTERNATIVE TO PREVIOUS METHOD)

PEEN END OF STUD OR BOLT LIGHTLY OVER  
SURROUNDING SURFACE AT FOUR POINTS



Peening Threaded Components and Pins  
Figure 503 (Sheet 1 of 3)

TN14332



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL

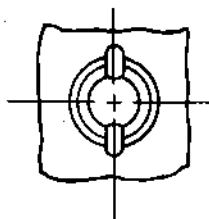


## APPLICATION AND METHOD

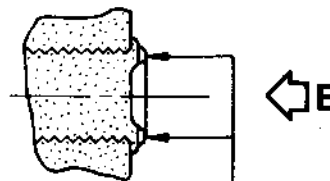
## DIAGRAM

STUDS BOLTS ETC UP TO AND INCLUDING  
NO 10 UNF WITH RECESS IN END

PEEN EDGE OF PLUG LIGHTLY INTO  
SURROUNDING SURFACE AT TWO OPPOSITE  
POINTS



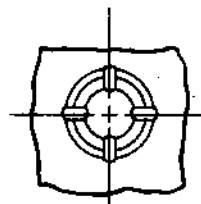
E



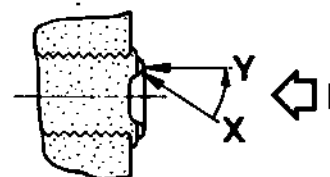
DIRECTION OF PEENING

STUDS BOLTS ETC OVER NO 10 UNF  
WITH RECESS IN END

PEEN END OF STUD OR BOLT LIGHTLY  
OVER SURROUNDING SURFACE AT  
FOUR POINTS. PEEN FIRST IN  
DIRECTION OF ARROW X THEN IN  
DIRECTION OF ARROW Y

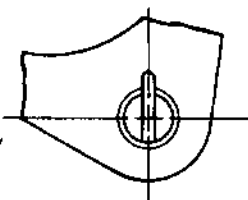


F

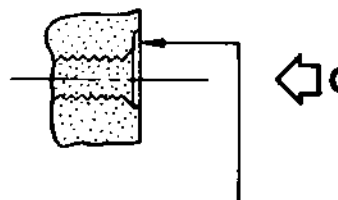


COUNTERSUNK AND CHEESEHEAD  
SCREWS

PEEN SURROUNDING SURFACE LIGHTLY  
INTO ONE END OF SCREW DRIVER  
SLOT PEEN FROM WIDEST SECTION



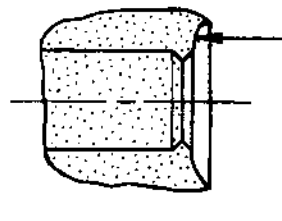
G



DIRECTION OF PEENING

PINS

DRIVE PIN BELOW SURFACE AND  
PEEN SURROUNDING SURFACE LIGHTLY  
OVER ALL ROUND TOP OF PIN



DIRECTION OF PEENING

Peening Threaded Components and Pins  
Figure 503 (Sheet 2 of 3)

ASSEMBLY  
72-09-00  
Page 512  
Mar 1/76

TN14333



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



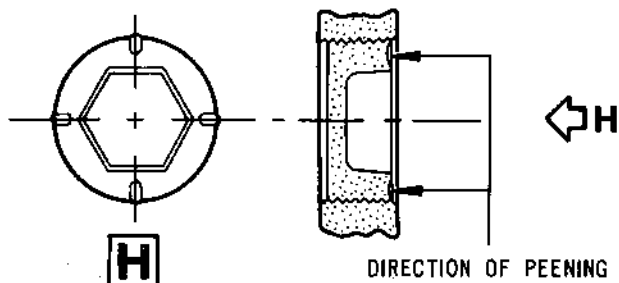
CR 32773/00A

# APPLICATION AND METHOD

## CORE PLUGS

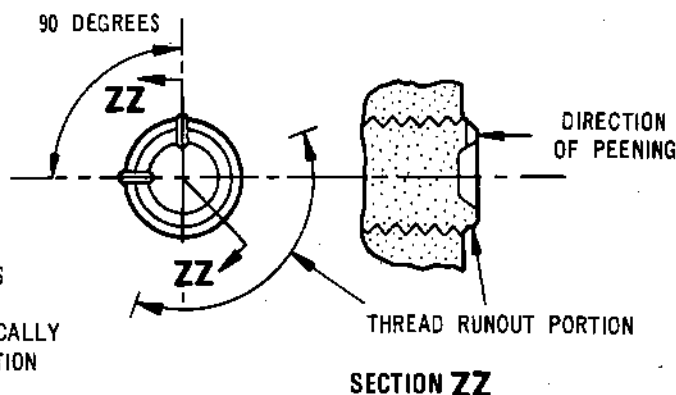
PEEN FACE OF PLUG LIGHTLY INTO SURROUNDING METAL AT FOUR POINTS FACE OF PLUG MUST BE FLUSH WITH OR BELOW SURFACE

## DIAGRAM



STUDS BOLTS ETC OVER NO 10 UNF WITH RECESS IN END AND PEENED INTO HARDENED COMPONENTS

PEEN END OF STUD OR BOLT LIGHTLY AT TWO POINTS 90 DEGREES APART AND POSITIONED WITHIN THE PORTION OF FULL THREAD DIAMETRICALLY OPPOSITE THE THREAD RUNOUT PORTION



Peening Threaded Components and Pins  
Figure 503 (Sheet 3 of 3)



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (4) Turn up the tabs of the keywasher against the flat(s) of the nut or bolt. Refer to para.3.D. if alignment of the tabs with the flat(s) cannot be achieved.
- (5) Check that the tabs have not cracked at the base where they are turned up.
- (6) Inspect to ensure that the nut or bolt is effectively prevented from turning by the tabs.

D. Split Cotter Pins.

- (1) Ensure that the slots of the nut are correctly aligned with the hole in the bolt (if applicable). Refer to para.3.D. if out of alignment.

CAUTION: DO NOT REDUCE SPLIT END OF PIN IN SIZE TO FACILITATE INSERTION.

- (2) Insert the split pin fully and part the legs.
- (3) On nuts, position one leg to closely abut the face of the nut, and the other leg to closely abut the free end of the bolt and not extending further than the centre of the bolt.
- (4) On shouldered pins, position the legs around and closely abutting the pin.

E. Wire-locking (Ref.Fig.504).

- (1) Unless otherwise stated, use the approved locking wire given in Table 501, for all wire-locking applications.
- (2) Ensure that the locking wire is adequately tensioned to resist rotation of the locked component. Also ensure that there are no untwisted lengths of wire in excess of  $\frac{1}{4}$  in. (10 mm) and no unsupported lengths in excess of 3 in. (76 mm).
- (3) Refer to the illustration for typical acceptable locking configurations.
- (4) Ensure that cut off pieces of wire are retrieved and are not allowed to become lost in or around the engine.
- (5) Tuck the free end of the locking wire away so that it cannot catch either skin or clothing.

FN14340

ASSEMBLY

72-09-00

Page 514  
Jan 2/80



OLYMPUS 593

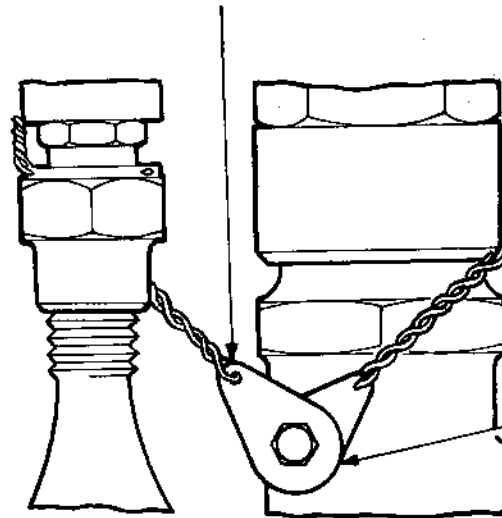
MK. 610-14-28  
OVERHAUL



CR 32778/008

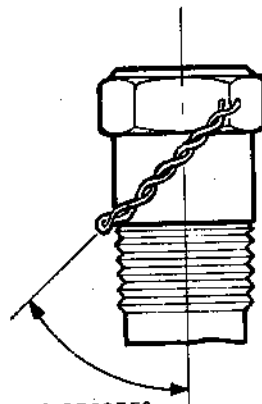
PRINTED IN ENGLAND

CLOSED END OF WIRE AT TAG

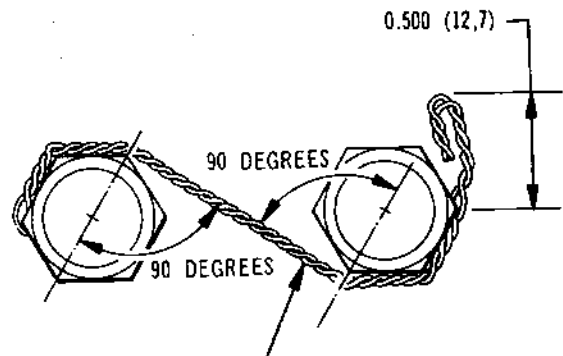


LOCKING TAGS IN LINE  
WITH LOCKING WIRE

CORRECT USE OF LOCKING TAGS



NOT LESS THAN 45 DEGREES  
NOT MORE THAN 90 DEGREES



TANGENTIAL APPROACH LINE WHEN TWO OR  
MORE COMPONENTS ARE LOCKED TOGETHER

CORRECT LOCKING OF NUTS AND BOLTS

NOTE:- EXAMPLES SHOWN ARE RIGHT-HAND  
THREADS. REVERSE CONFIGURATION  
OF WIRE FOR LEFT-HAND THREADS.

DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)

Wire-Locking  
Figure 504

ASSEMBLY  
**72-09-00**

Page 515  
Mar 1/76

TN14335

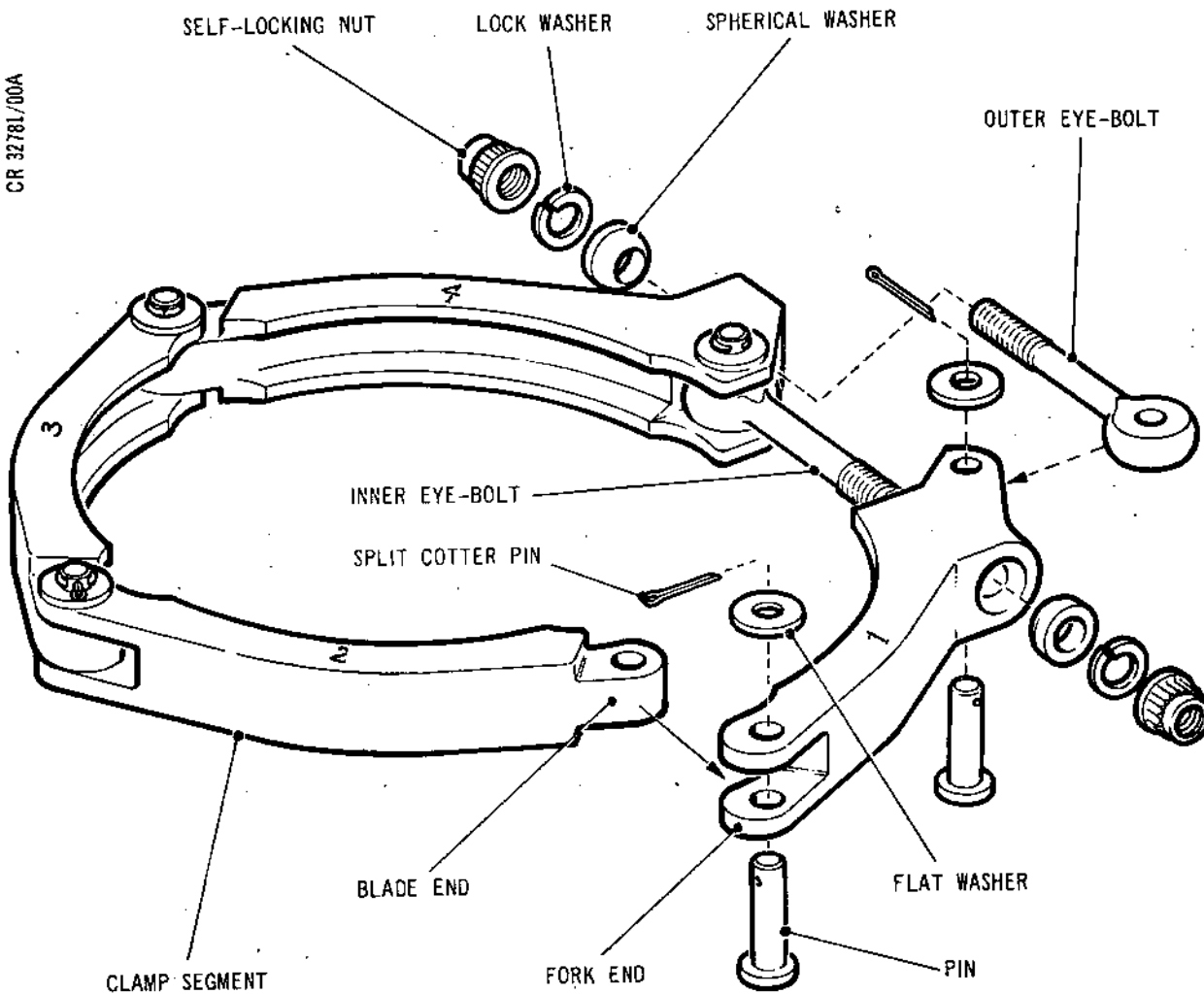


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32781/00A



TN14336

Assembling Rim Clenching Clamp Assemblies  
Figure 505

ASSEMBLY  
**72-09-00**  
Page 516  
Mar 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



SNECMA

## 5. Rim Clenching Clamp Assemblies

### A. Assemble the Clamp (Ref.Fig.505).

- (1) Examine the clamp segments to ensure that they are all marked with the same identification symbol.

NOTE: Together with the identification symbol, each segment is marked with the number 1, 2, 3 or 4 to ensure that they are reassembled in the correct order.

- (2) Arrange the segments in numerical order with the ends aligned blade to fork and with the grooves facing the same way.
- (3) Install the pins, washers and split cotter pins to secure the segments together.
- (4) Install the eye-bolts and secure with the pins, washers and split cotter pins.
- (5) Submit the assembled clamp for a bedding check (Ref.72-09-00 Inspection/Check).

### B. Install the Clamp.

- (1) Check the surfaces of the joint flanges to ensure freedom from defects, e.g. burrs, on the abutment faces, sealing surfaces, taper surfaces and outside diameter. If necessary, clean these surfaces using a clean, lint free cloth moistened with a group 1 or 3 solvent (Refer to Table 501).
- (2) Apply a thin coating of lubricant 'A' to the taper surfaces.
- (3) Check the surfaces of the clamp assembly to ensure freedom from defects, e.g. burrs, on the taper surfaces, threads, abutment faces of nuts and washers and spherical seatings of the trunnions. If necessary, clean these surfaces using a clean, lint free cloth moistened with a group 1 or 3 solvent (Refer to Table 501).
- (4) Apply a thin coating of lubricant 'A' to the taper surfaces, threads, abutment faces of nuts and washers and spherical seatings of the trunnions.
- (5) Assemble the components, ensuring that the joint flanges are concentric, parallel and with no appreciable gap between them.

ASSEMBLY

72-09-00

Page 517

Jun 1/96



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

- (6) Install the clamp and install the spherical washer, lockwasher and self-locking nut on the inner eye-bolt only.
- (7) Check the locking (run-down) torque of the nut is within the limit specified for the component.
- (8) Torque-tighten the nut to the limit specified for the component.
- (9) Tap each clamp segment in turn using a soft-faced mallet or fibre drift.
- (10) Again torque-tighten the nut.
- (11) Repeat tapping of each clamp segment in turn.
- (12) Finally torque-tighten the nut.
- (13) Install the spherical washer, lockwasher and self-locking nut on the outer eye-bolt.
- (14) Check the locking (run-down) torque of the nut.

NOTE: The torque-tightening of the outer eye-bolt nut will reduce the torque loading on the inner eye-bolt nut.

CAUTION: DO NOT ATTEMPT TO CHECK TORQUE LOADING OR RE-TIGHTEN INNER EYE-BOLT NUT AFTER TORQUE-TIGHTENING OUTER EYE-BOLT NUT.

- (15) Torque-tighten the nut.

#### 6. Quick Attach/Detach (QAD) Couplings (Ref.Fig.506)

##### A. Engage, Tighten and Lock QAD Couplings.

- (1) Prepare coupling for tightening before unit installation.

CAUTION: EXAMINE THE THREAD SURFACES AND ABUTMENT FACES OF THE RING AND FLANGE FACES TO ENSURE ALL SURFACES ARE FREE OF ANY DEFECTS OR DAMAGE MARKS.

- (a) Clean the surfaces of the coupling ring and flange thread segments, and the abutment faces of the spherical washer and bolt, using a clean, lint free cloth moistened with a group 1 or 3 solvent (Refer to Table 501).

ASSEMBLY

72-09-00

Page 518

Jun 1/96

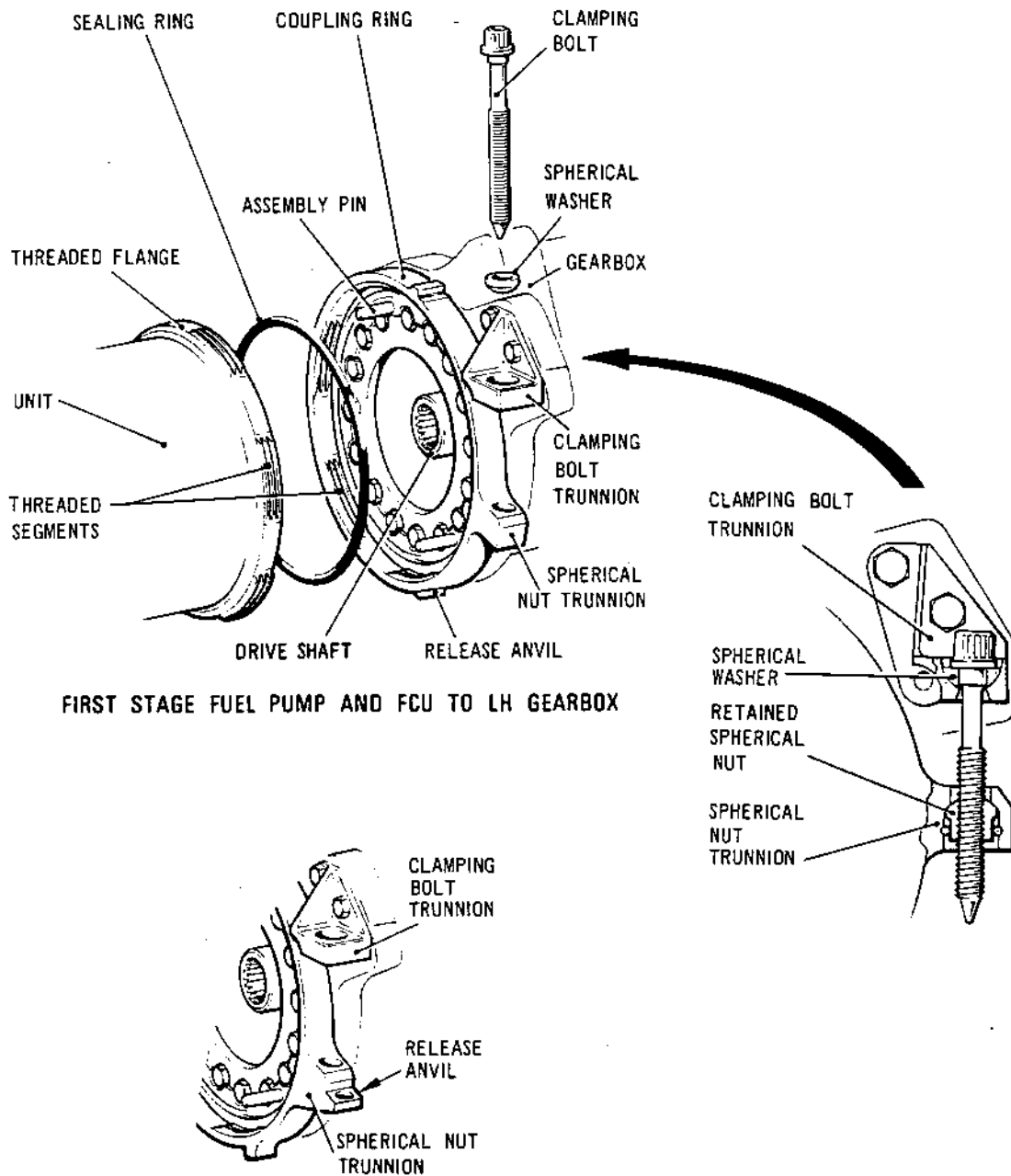




**OLYMPUS 593**  
MK.610-14-28  
OVERHAUL



CR 34358/00B



FIRST STAGE FUEL PUMP AND FCU TO LH GEARBOX

AIR STARTER AND IDG TO RH GEARBOX

Assembling QAD Couplings  
Figure 506



OLYMPUS 593

MK.610-14-28  
OVERHAUL



SNECMA

(b) Apply a thin coating of lubricant 'A' to the thread surfaces, bolt threads and abutment face, and the spherical washer abutment faces.

(c) Apply lubricant (70-00-03, Sealing Devices) to the toroidal sealing ring before installation.

**B. Engage Coupling Ring.**

- (1) Align the unit to the mounting face and turn the coupling ring so that its thread segments align with the threaded flange slots and the spherical nut trunnion is positioned so that it can be tightened to the clamping bolt trunnion when the segmented threads are engaged.
- (2) Locate the unit on the mounting face as detailed in the relevant chapter. Ensure that the sealing ring is in position, assembly pins and drive shaft splines are engaged and that the mating faces are squarely in abutment.
- (3) Turn the coupling ring in the direction to bring the trunnions together by hand and engage the segmented threads as far as possible.

**C. Tighten the Coupling Ring.**

**CAUTION:** ENSURE THAT THREADS HAVE CORRECTLY ENGAGED BEFORE ATTEMPTING TO TIGHTEN COUPLING RING.

DO NOT USE THIS PROCEDURE TO TIGHTEN RIGHT-HAND GEARBOX TO INTERMEDIATE CASE COUPLING RING. REFER TO 72-00-00, ASSEMBLY.

- (1) Insert clamping bolt, together with spherical washer through fixed locking trunnion and screw into spherical nut of coupling ring trunnion by hand.
- (2) Measure the locking (run-down) torque of the bolt.
  - (a) Screw bolt in until load faces are just out of contact.
  - (b) Measure torque necessary to turn bolt and ensure that it is within the specified limits given in the relevant component chapter.

ASSEMBLY

**72-09-00**

Page 520

Dec 1/97



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (3) Tighten the locking bolt with wrench (Ref.72-00-00, Special Tools, Tool 419) using one hand only.

NOTE: The amount of turn given to the bolt by use of this wrench gives an action that results in a positive full run-down to near the final tightening position without exceeding the torque-loading limit.

- (4) Torque-tighten the locking bolt to the value specified for the unit.
- (5) Tap radially around the periphery of a coupling ring, where accessible, using a hide faced hammer or an 8 ounce hammer and aluminium drift and ensure equal disposition of the ring.
- (6) Measure the torque-loading remaining on the locking bolt.
- (7) Repeat operations (4), (5) and (6) until the following conditions are met.
  - (a) There is less than 18 lbf in. (2 N.m) difference between the specified torque-loading (4) and the torque-loading remaining (6).
  - (b) The bolt is tightened to within the specified torque-loading limits.

## 7. Ball and Roller Bearings

### A. Prepare the Bearing.

NOTE: Preparation is not required if the bearing has been temporarily protected as detailed in 72-09-00 Inspection/Check.

CAUTION: DO NOT REMOVE PROTECTIVE COATINGS FROM BEARINGS UNTIL IMMEDIATELY PRIOR TO INSTALLATION.

- (1) If the bearing has been temporarily protected with petroleum jelly, remove the bearing from its bag and wipe off the surplus jelly using a clean, lint free cloth.
- (2) If the bearing is a new one which has been protected using Protective PX11, clean the bearing.
  - (a) Remove the bearing from its protective wrapping.

ASSEMBLY

72-09-00

Page 521

Sep 1/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Immerse the bearing in a bath comprising 70 per cent (by volume) aviation kerosine and 30 per cent oil to D.Eng.R.D.2490 or the recommended engine oil, maintained at a temperature of between 75 and 85 deg C. Keep the bearing in the bath until it attains the bath temperature and all the protective has melted off.
- (c) Remove the bearing from the bath and allow to drain.
- (d) Rewash the bearing in a fresh bath prepared and operated as detailed previously.
- (e) Remove the bearing from the bath and allow to drain.

**B. Install the Bearing.**

- (1) Immediately prior to installation, lubricate the bearing with the recommended engine oil.
- (2) Unless otherwise stated, install the bearing so that the Part No., Serial No. and/or other identification symbols remain visible.
- (3) Use only the recommended tools and equipment to install the bearing.

**8. Tubes**

**CAUTION:** DO NOT ATTEMPT TO RECTIFY LEAKAGE FROM TUBE END FITTINGS BY FURTHER TIGHTENING. REMOVE TUBE, INSTALL NEW SEALING DEVICES AND/OR RECTIFY DEFECT, THEN REINSTALL TUBE AND RECHECK FOR LEAKAGE.

**A. Rigid Tubes.**

**CAUTION:** DO NOT STRAIN RIGID TUBE TO ALIGN END FITTINGS AND/OR SUPPORT CLIPS. IF TUBE WILL NOT ALIGN WITHOUT STRAIN, REMOVE IT AND INVESTIGATE CAUSE.

- (1) Lubricate and install new sealing rings (if applicable).
- (2) Lubricate the tube end fittings as specified in the relevant Chapter (if applicable).
- (3) Position the tube and ensure that the end fittings align with their locations.



OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

- (4) Connect the end fittings and tighten as far as possible by hand.
- (5) Ensure that the tube support clips will align without straining the tube.
- (6) Using a suitable spanner to prevent turning of the tube and/or union adapter (if applicable), torque-tighten each union nut in turn to the figure specified in the relevant Chapter. Wire-lock the nuts.
- (7) Install the tube support clips.

#### B. Flexible Tubes.

- (1) Lubricate the tube end fittings as specified in the relevant Chapter.
- (2) Position the tube, connect the end fittings and tighten as far as possible by hand.
- (3) Ensure that the tube is not twisted, distorted or kinked.
- (4) Using a suitable spanner to prevent turning of the tube and union adapter, torque-tighten each union nut in turn to the figure specified in the relevant Chapter. Wire-lock the nuts.
- (5) Install the tube support clips.

### 9. Sealing Rings

#### A. Toroidal Sealing Rings.

- (1) Lubricate the sealing ring before installation.
  - (a) In the fuel system, apply lubricant 'F'.
  - (b) In other locations, apply lubricant 'A'.
- (2) Install the sealing ring in its groove, ensuring that it is not twisted or kinked.
- (3) Assemble the components carefully and ensure that sealing rings are not displaced or damaged.

ASSEMBLY

72-09-00

Page 523

Dec 31/99



OLYMPUS 593

MK.610-14-28  
OVERHAUL



SNECMA

Printed in England

B. Metallic Sealing Rings.

- (1) Leave metallic sealing rings in their protective packages until immediately prior to use.
- (2) Retain Corruplus sealing rings in their grooves with lubricant 'E' used sparingly, and ensure seals are not displaced or damaged during assembly of component.

10. Tri-wing Fasteners (Ref.Fig.507)

- A. The size of the recess in the head of a tri-wing fastener is indicated by means of a number in a circle.
- B. It is essential when installing a tri-wing fastener that a driver bit carrying the same number as the fastener is used. The size number of the driver bit is marked on the shank, either contained within a circle or as a suffix to the part number.

11. Temporary Markings

- A. During the assembly of the sub-assemblies and the engine, it is necessary to apply temporary markings to assist in the balancing, aligning and positioning of items. The type of temporary marking and their particular application are recommended as follows.
  - (1) Small adhesive labels. Used during the mass moment weighing of compressor and turbine blades, and the subsequent balancing of the bladed disks.
  - (2) Tailors chalk or rapid drying ink applied by felt point pen. Used to indicate datum holes or positions of compressor disks and spacers during assembly, when the permanent markings are obscured during the assembly.

ASSEMBLY

72-09-00

Page 524  
Dec 31/99



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (3) Adhesive tape. Used to indicate bracket or bolt positions on abutment flanges of sub-assemblies during the assembly.

CAUTION: DO NOT USE LEAD PENCIL OR METALLIC PENCIL OR ANY MARKING MEDIUM THAT LEAVES A DEPOSIT OF CARBON, ZINC, COPPER OR LEAD. THESE DEPOSITS MAY CAUSE CEMENTATION OR INTERGRANULAR ATTACK AT HIGH TEMPERATURE AND RESULT IN STRENGTH LOSS AND SUBSEQUENT FAILURE. IF SURFACES ARE ACCIDENTALLY CONTAMINATED WITH THESE DEPOSITS, CAREFULLY REMOVE THE DEPOSIT USING A METHOD APPROPRIATE TO THE TYPE OF DEPOSIT AND THE COMPONENT MATERIAL.

- B. When the temporary marking is no longer required, ensure that the ink or chalk mark is removed with a suitable solvent, or the adhesive tape or label is removed and the residue adhesive removed from the engine item with a suitable solvent.

Printed in England

ASSEMBLY

72-09-00

Page 524A  
Dec 31/99

Printed in England



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

THIS PAGE LEFT BLANK INTENTIONALLY

ASSEMBLY

**72-09-00**

Page 524B

Dec 31/99



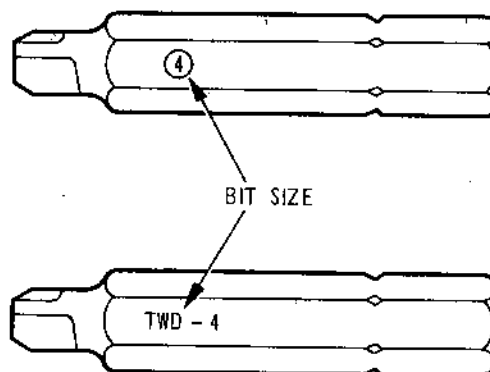
PRINTED IN ENGLAND

CR 33090/00A

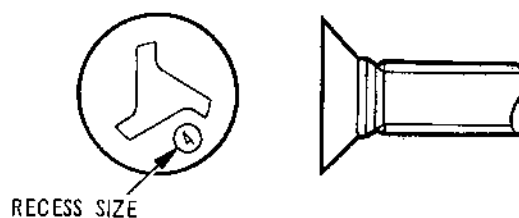


OLYMPUS 593

MK.610-14-28  
OVERHAUL



DRIVER BIT



FASTENER

TN25740

Installing Tri-wing Fasteners  
Figure 507

ASSEMBLY  
**72-09-00**  
Page 525  
Mar 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL




## 12. Identification of Components

### A. General.

- (1) With the exception of small items, each component will be identified by series of alpha- numerics, the numbers off, position and form of markings will vary, depending on the components size, shape and material. The various alpha- numerics that may be found and what they represent are detailed as follows.

### B. Material Batch/Code Number.

- (1) The batch/code number is the manufacturers identification of where and when the component was produced and is recorded on the data recording/retrieval inspection records. It is identified by a , followed by letters denoting the contractor, and numbers denoting when the batch was produced. The symbol may point towards, or be above the batch/code numbers as space dictates. A letter C preceding the symbol denotes the component is subject to Customs and Excise control.

Examples



BAA99




RAZ80



C AZA66

- (2) The batch/code number will not exceed five digits, but an oblique stroke followed by additional code letters and/or numbers will refer to a heat treatment that has been carried out on the item. The heat treatment identification will not be recorded on the data recording/retrieval inspection records.

### C. Locational Code/Serial Number.

- (1) The code/serial number is the manufacturers identification of where the component is produced and is recorded on the data recording/retrieval inspection records. Each single piece component or a fabricated component with two or more pieces of material that are permanently joined will be identified by a , while an assembly will be identified by an O. In each instance the symbol will be followed by a location serial number.

Examples



RBC23



BAB60



CE567



WB432

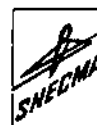
TN7604



OLYMPUS 593

MK.610-14-28

OVERHAUL



D. Part Number.

- (1) The part number is the manufacturers identification of a component. Each component or a fabricated component that is permanently joined will be identified by a letter B followed by six numbers. The part number is the reference used in the Illustrated Parts Catalogue for ordering spares or replacing components.
- (2) If the component is without a B identification, it will be a National Standards Part component and may be identified by A, SP, AGS, AS, AN, MS, NAS, FBS, FB, UBS or U.

E. Salvage Number.

- (1) The salvage number (e.g. SAL. B.478086) or alternatively an abbreviated Repair No. (e.g. R.1), will only be found on components that have had a repair carried out. A letter following the repair number (e.g. R.1A, R.1B etc.) identifies the number of a composite numbered repair, while a letter 'X' after the number or letter, denotes each additional application of the repair following the first application.
- (2) During manufacture minor defects, corrections, faults etc. may have been accepted by minor concessions, with possible minor salvage which will be identified by an MC or CON.

F. Miscellaneous Numbers.

- (1) Bevel gears will have a mounting distance MD number which is a dimension used in the manufacture of the gears and will be required during the setting up of the gears to their correct position during assembly. Other markings found on gears may be SET and TV.
- (2) Components may have a laboratory identification L followed by numbers, which will refer to a manufacture heat treatment, or some other process.
- (3) Depending on the component and whether it has had numerous forms of machining, or is fabricated, inspection checks denoted by a BA may have been applied. The BA and a number may be contained in a circle.

ASSEMBLY

72-09-00

Page 527

Aug 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



### 13. LP and HP Compressor Rotor Blade Identification

#### A. General.

- (1) To achieve rapid identification of the rotor disk datum blades in both the LP and HP compressors when carrying out intrascope inspection, a Potassium Silicate high temperature paint may be applied to the tip of the datum blades. The recommended paint is MSRR.9041 and is available from:

Rolls-Royce Limited,  
Aero Division,  
P.O. Box 31,  
Moor Lane,  
DERBY.

- (2) Although available in a variety of colours, it is recommended in order to achieve contrast between blade material and paint, and to obviate the need for stoving, that the following colour is used:

Yellow - Code PL 168A ... Used in conjunction with  
Potassium Silicate  
Solution No.66 grade and  
Thinners SV16/R1.

NOTE: Other colours in the range require stoving.

- (3) The shelf life of paints to MSRR.9041 is six months in temperate climates and three months in tropical climates. Paints exceeding the recommended shelf life should be laboratory tested before use.

#### B. Application of Paint.

- (1) Observe the safety precautions instructed by the paint manufacturer.
- (2) Degrease the area to be painted using a clean lint-free cloth moistened with white spirit.
- (3) Apply one coat of Potassium Silicate solution No.66 grade by brushing and allow to air dry for ten minutes.
- (4) Apply one coat of paint (PL 168A) by brushing and allow to air dry for at least one hour. The minimum temperature for applying the paint is 16 deg C.

TN20871

ASSEMBLY  
**72-09-00**  
Page 528  
Aug 1/77

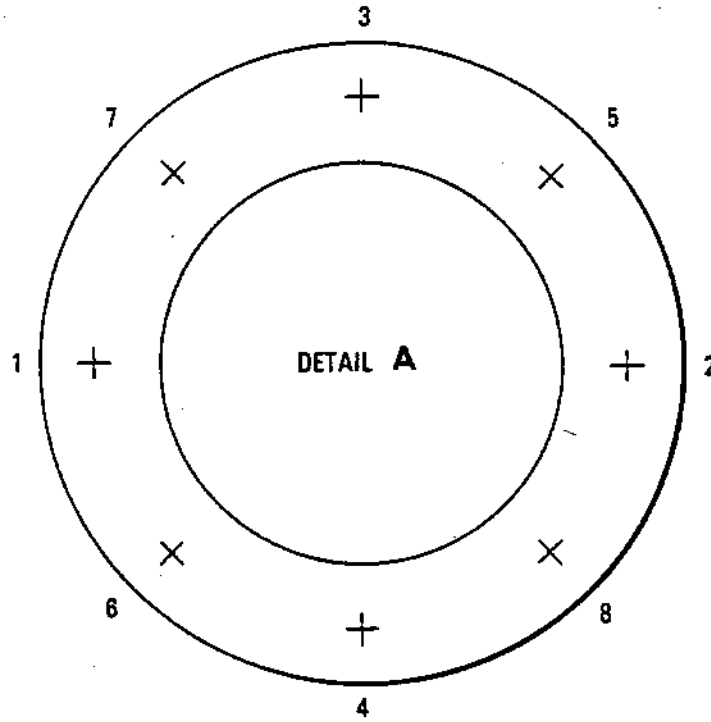


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 32634/ D0A



+ 7	+ 3	+ 1	+ 5	+ 9
+ 8	+ 4	+ 2	+ 6	+ 10

DETAIL B

Flange Bolt and Nut Tightening Sequences  
Figure 508

ASSEMBLY

72-09-00

Page 529

Nov 1/78



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



#### 14. Bolt and Nut Tightening Sequences

##### A. General.

- (1) In areas where high density bolting occurs, tightening is carried out in a symmetrical pattern to ensure that strain is not induced in the structure.

##### B. Circular Flanges.

- (1) Tighten nuts/bolts at circular flanges in a sequence similar to that shown in Fig.508, detail A.
  - (a) Lightly tighten two nuts/bolts approximately opposite to each other and then lightly tighten another pair approximately at 90 degrees to the first pair. Bisect the resulting angles and proceed as before.
  - (b) With the joint flanges in contact torque-tighten the nuts/bolts in sequence, as detailed in (a), to the specified torque value.
  - (c) As a precaution, check each nut/bolt sequentially in a clockwise direction for tightness to ensure that no nut/bolt has been omitted in the torque-tightening sequence.

##### C. Half Casing Flanges.

- (1) Tighten nuts/bolts at half casing flanges in a sequence similar to that shown in Fig.508, detail B.
  - (a) Lightly tighten the two mid-section positioned nuts/bolts first and then lightly tighten the remaining nuts/bolts working outwards from the centre.
  - (b) With the joint flanges in contact torque-tighten the nuts/bolts in sequence, as detailed in (a), to the specified torque value.
  - (c) As a precaution, check each nut/bolt progressively from one end to the other for tightness to ensure that no nut/bolt has been omitted in the torque-tightening sequence.

TN35953

ASSEMBLY  
**72-09-00**  
Page 530  
Nov 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## 15. Component Life Marking

### A. General.

There are two separate systems of coding used to represent the number of running hours on engine components. One system is used by the Iberia overhaul facility and is described in paragraph B. The other system, described in paragraph C, is used by the BEOL overhaul facility.

### B. System of Coding Used by Iberia Overhaul Facility.

#### (1) Identification of running hours.

- (a) Components with zero running hours are marked with the letter 'N'.
- (b) Components with accrued running hours are marked with the letter 'U', followed by the code number/letter which is established in accordance with the following:
  - (i) Running hours are rounded to the nearest 50, e.g. 1217 becomes 1200 and 1232 becomes 1250.
  - (ii) After rounding, the number is allocated a code as detailed in Table 502.

Code	Running Hours (Rounded)
A	50
1	100
1A	150
2	200
2A	250
etc. to	
10	1000
10A	1050
11	1100
11A	1150
etc. to	
99	9900
99A	9950

Iberia Overhaul Facility Coding System  
Table 502

ASSEMBLY

72-09-00

Page 531  
Mar 1/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(iii) The code number is obtained by disregarding the last two digits of the number of running hours (rounded). When the last two digits are 50, the letter 'A' is added to the code number.

(b) Successive code markings on a component are separated by an oblique stroke / and each code mark represents the running time since the previous mark. Total running time is obtained by adding all code markings together.

#### C. System of Coding Used by BEOL Overhaul Facility.

##### (1) Identification of running hours.

(a) This system of coding relates running hours to an identification letter as shown in Table 503.

NOTE: The letter I is not used.

---

Code	Running Hours
A	1 to 100
B	101 to 200
C	201 to 300
D	301 to 400
E	401 to 500
F	501 to 600
G	601 to 700
H	701 to 800
J	801 to 900
	etc. to
Z	2401 to 2500

---

Refer to para.(b) for symbols to denote multiples of 2500

---

BEOL Overhaul Facility Coding System  
Table 503

TN8424



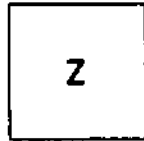


OLYMPUS 593

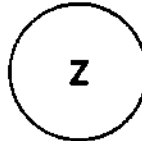
MK.610-14-28  
OVERHAUL



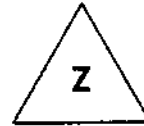
- (b) In addition to the coding given in Table 503, the following symbols are used to denote multiples of 2500.



5000



10000



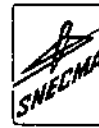
15000



OLYMPUS 593

MK.610-14-28

OVERHAUL



ENGINE TURNING - SUB-ASSEMBLY

TABLE OF CONTENTS

Para.	Page
1. General ... ..	501
2. Hand Turning Equipment... ..	501
A. Install the LP Turning Equipment ... ..	501
B. Install the HP Turning Equipment ... ..	503
C. Remove the LP Turning Equipment ... ..	503
D. Remove the HP Turning Equipment ... ..	504

TABLE OF ILLUSTRATIONS

Fig.No.	Page
501 General Hand Turning Equipment - LP and HP Rotating Assemblies ... ..	502

SUB-ASSEMBLY

**72-09-01**

Contents 1

Sep 1/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



## ENGINE TURNING

### 1. General

Provision is made for turning the HP and LP rotating assemblies using hand turning equipment. The HP assembly is turned through a drive in the right-hand gearbox, while the LP assembly is turned through a drive in the pulse probe drive and housing.

CAUTION: THESE PROCEDURES APPLY TO ENGINES THAT ARE STANDING IN THE VERTICAL POSITION FOLLOWING ENGINE BUILD OR ENGINES IN THE HORIZONTAL POSITION WHERE LUBRICATION HAS BEEN MADE EFFECTIVE BY AN ENGINE RUN. LABYRINTH RUB AND EXCESSIVE RESISTANCE TO ROTATION OCCURS WHEN BEARINGS HAVE NO OIL SQUEEZE FILM.

The lubricant quoted in these procedures is stated in 72-09-00 Standard Practices.

### 2. Hand Turning Equipment

NOTE: Select the appropriate procedures dependent on which rotating assembly requires turning.

#### A. Install the LP Turning Equipment (Ref.Fig.501, Detail A).

- (1) Remove the bolts securing the cover to the pulse probe drive and housing flange then withdraw the cover.
- (2) Assemble the universal joint (Tool 1872) and adapter (Tool 1876) to the flange ensuring that the assembly pin on the adapter flange locates in the housing flange. Secure the assembly with three equally spaced bolts lubricated with lubricant 'A' and torque-tightened between 85 and 95 lbf in. (9,6 and 10,8 N.m).
- (3) Engage the extension bar (Tool 1873) square drive in the universal joint and assemble the torque adapter (Tool 1875) to the extension bar.
- (4) Pre-set a torque wrench (Tool 1877) between 150 and 180 lbf in. (16,9 and 20,3 N.m) and assemble to the torque adapter.

NOTE: The torque wrench is pre-set to prevent excessive loading should a sudden force be applied to the torque wrench.

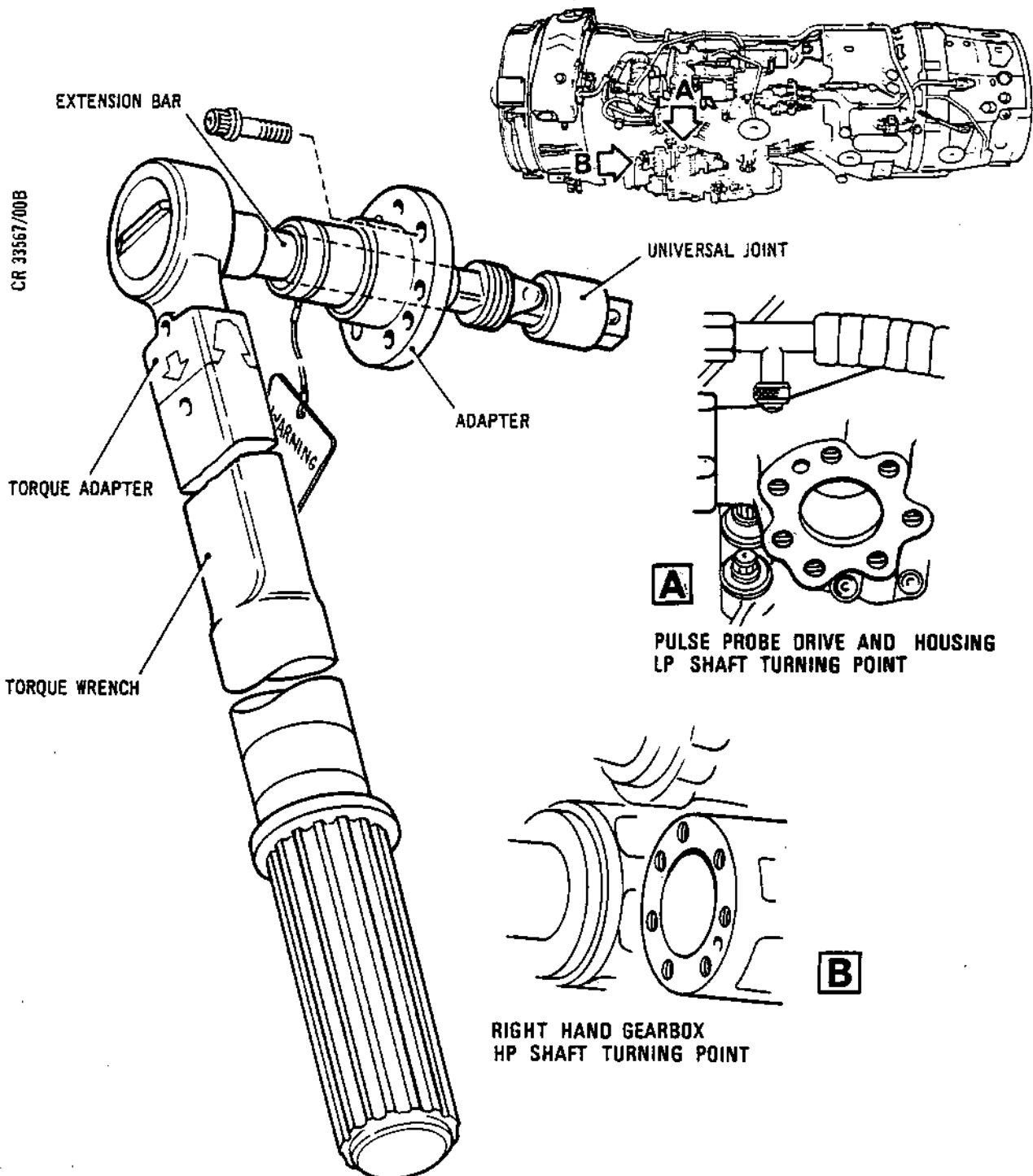
SUB-ASSEMBLY  
**72-09-01**

Page 501  
Sep 1/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



General Hand Turning Equipment -  
LP and HP Rotating Assemblies  
Figure 501

SUB-ASSEMBLY  
**72-09-01**  
Page 502  
Apr 1/77

TN21901



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (5) Apply a gradual force at the torque wrench to turn the LP rotating assembly.

B. Install the HP Turning Equipment (Ref.Fig.501, Detail B).

- (1) Remove the bolts and washers securing the cover blank to the engine right-hand gearbox cover flange, then withdraw the cover.
- (2) Locate the universal joint (Tool 1872) and adapter (Tool 1876) in position on the cover flange ensuring that the assembly pin on the adapter flange locates in the gearbox cover flange. Secure the assembly with three equally spaced bolts lubricated with lubricant 'A' and torque-tighten between 90 and 100 lbf in. (10,2 and 11,3 N.m).
- (3) Engage the extension bar (Tool 1873) square drive in the universal joint and assemble the torque adapter (Tool 1875) to the extension bar.
- (4) Pre-set a torque wrench (Tool 1874) between 360 and 400 lbf in. (40 and 45 N.m) and assemble to the torque adapter.

NOTE: The torque wrench is pre-set to prevent excessive loading should a sudden force be applied to the torque wrench.

- (5) Apply a gradual force at the torque wrench to turn the HP rotating assembly.

C. Remove the LP Turning Equipment.

- (1) Remove the torque wrench (Tool 1877), then withdraw the torque adapter (Tool 1875) and extension bar (Tool 1873).
- (2) Remove the bolts securing the adapter (Tool 1876) and universal joint (Tool 1872) to the flange and withdraw the adapter and universal joint.

SUB-ASSEMBLY

72-09-01

Page 503

Sep 1/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (3) Assemble the cover (72-64-00/1-20) and a new gasket (72-64-00/1-25) to the flange and secure with seven bolts (72-64-00/1-10) lubricated with lubricant 'A' and torque-tightened between 85 and 95 lbf in. (9,6 and 10,8 N.m)

D. Remove the HP Turning Equipment.

- (1) Remove the torque wrench (Tool 1874), then withdraw the torque adapter (Tool 1875) and extension bar (Tool 1873).
- (2) Remove the bolts securing the adapter (Tool 1876) and universal joint (Tool 1872) to the gearbox cover flange, then withdraw the adapter and universal joint.
- (3) Assemble the cover blank (72-63-01/4-70) and a new gasket (72-63-01/4-80) to gearbox cover flange and secure with seven bolts (72-63-01/4-50) and washers (72-63-01/4-60) ensuring that the bolts are lubricated with lubricant 'A'. Torque-tighten the bolts between 90 and 100 lbf in. (10,2 and 11,3 N.m).

IN43732

SUB-ASSEMBLY

**72-09-01**

Page 504

Sep 1/80



# OLYMPUS 593

MK.610-14-28

OVERHAUL



## AIR INLET SECTION - SUB-ASSEMBLY

### TABLE OF CONTENTS

Para.		Page
1.	General ... ..	501
2.	Assemble the LP Compressor Front Bearing Support ...	501
	A. Assemble the Pins to the Bearing Housing... ..	501
	B. Assemble the Bearing to the Bearing Housing ...	503
3.	Assemble the Air Intake Case to the Build Stand ...	506
	A. Assemble the Holding Fixture to the Build Stand ... ..	506
	B. Assemble the Air Intake Case to the Holding Fixture ... ..	506
4.	Assemble the Air Intake Case ... ..	508
	A. Assemble the Anti-icing Manifold to the Case ...	508
	B. Assemble the Electrical Tube to the Case... ..	512
	C. Assemble the Flange to the Front of the Case ...	512
	D. Assemble the Bearing Housing and Baffle to the Flange ... ..	514
	E. Assemble the Oil Tubes to the Case... ..	514
	F. Check for Leakage from the Oil Tube/Anti-icing Space Seals ... ..	522
	G. Assemble the Flange and Filter to the Feed Tube..	525
	H. Assemble the Flange to the Scavenge Tube... ..	525
5.	Pressure Test the Bearing Housing and Oil Tubes ...	526
	A. Assemble the Pressure Test Equipment to the Case.	526
	B. Pressure Test and Flow Check... ..	528
	C. Rectification of Leakage ... ..	529
	D. Flow Check Outside Limits ... ..	529
	E. Remove the Pressure Test Equipment from the Case.	531
6.	Final Assembly of the Air Intake Case ... ..	531
	A. Assemble the Labyrinth Housing and Baffle to the Case ... ..	531
	B. Remove the Air Inlet Section from the Build Stand	532
7.	Machine the LP Compressor Front Bearing Retaining Plate ... ..	534
	A. Prepare and Machine the Retaining Plate ... ..	534

### TABLE OF ILLUSTRATIONS

Fig.No.		Page
501	Assembling Front Bearing Support ... ..	502
502	Assembling Air Intake Case to Stand ... ..	505
503	Assembling Anti-icing Manifold ... ..	507
504	Assembling Items to Air Intake Inner Case.. ...	513
505	Assembling Seals to Baffle and Arrangement of Electrical Tubes ... ..	515
506	Assembling Oil Tubes to Air Intake Case ... ..	516
507	Method for Correcting Oil Tube Malalignment ...	523
508	Assembling Pressure Test Equipment... ..	527

SUB-ASSEMBLY

# 72-20-00

Contents 1

Jul 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



AIR INLET SECTION - SUB-ASSEMBLY

1. General

- A. Before commencing this assembly refer to 72-09-00 Assembly, for general information.
- B. Throughout the text, special tools are quoted by their reference number; e.g. Tool 1324. For a complete list of the tooling required for assembly and for the Manufacturer's Part Number, refer to Special Tools, Fixtures and Equipment, Table 1002.
- C. During the sub-assembly procedure, reference will be made to the Illustrated Parts Catalogue (I.P.C.) to identify those items where the nomenclature does not positively identify them, due to the duplication of the title e.g. nuts, bolts, washers, bearings, gears, housings, tubes etc. When the item is a part of the breakdown of the text concerned, the item will be identified as bolt (1-10), the 1 referring to the I.P.C. Fig.No., and the 10 referring to the Item No. Where items from a different breakdown are introduced, then the breakdown number will be quoted in addition e.g. bolt (72-32-01/1-10).
- D. The five vanes between inner and outer casing are identified by numbering them counter-clockwise when viewed from the front, starting with No.1 vane at the top.

2. Assemble the LP Compressor Front Bearing Support

- A. Assemble the Pins to the Bearing Housing (Ref. SB.72-46 and SB.72-76).

NOTE: Para.2.A. is only applicable if new items are being assembled.

NOTE: The following Fig. and Item numbers after the names of the parts in para.2 refer to Section 72-23-01 in the I.P.C.

- (1) Place the four shouldered pins (1-70) into a freezing agent Cardice for (approx) 20 minutes or liquid nitrogen for (approx) 2 to 3 minutes.

SUB-ASSEMBLY

**72-20-00**

Page 501

Jun 1/77

PRINTED IN ENGLAND

TN19928



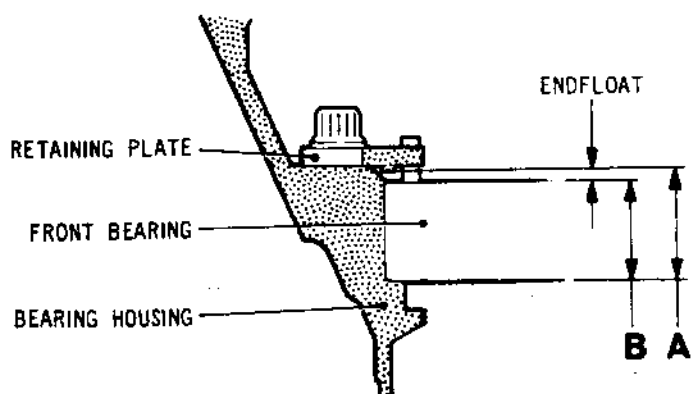
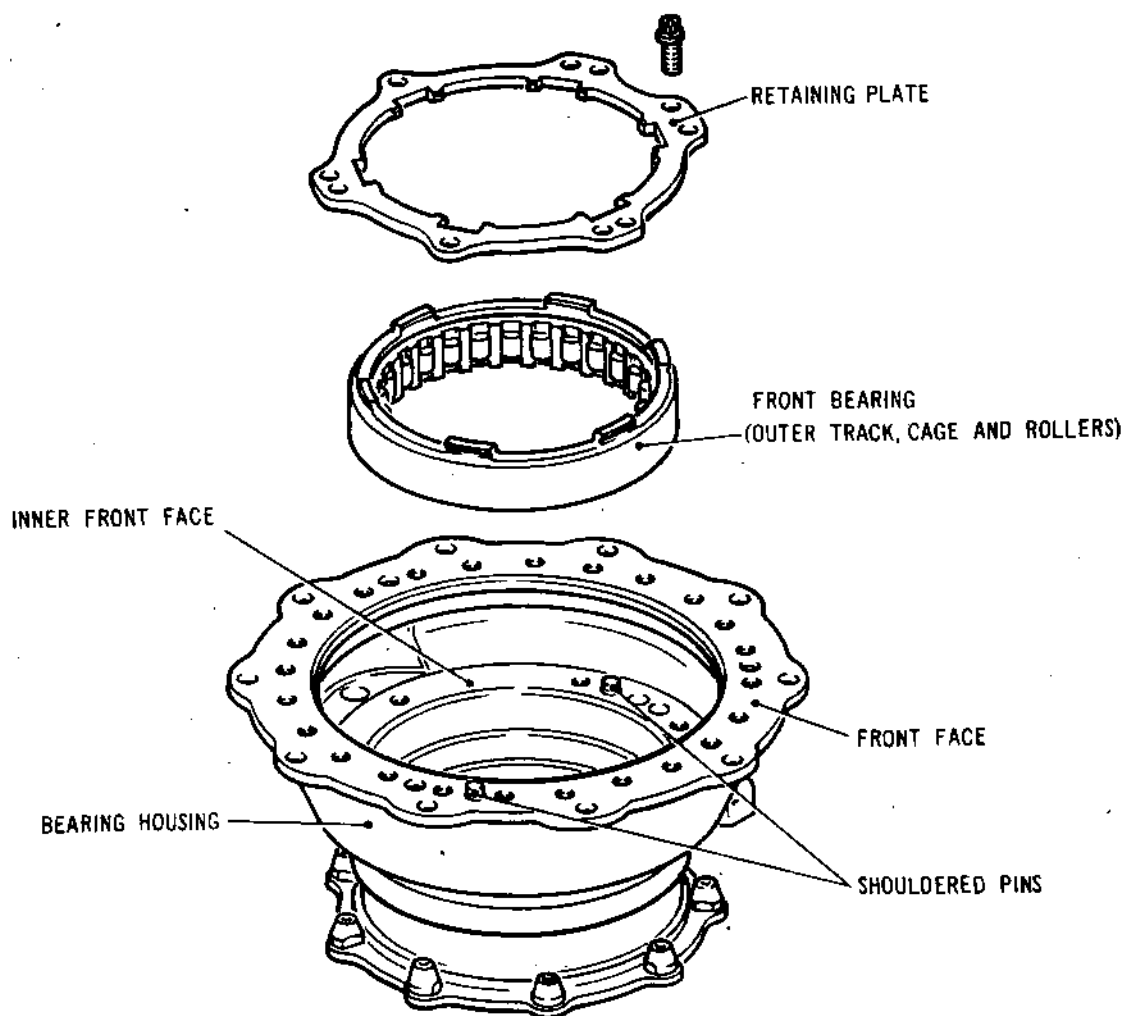


OLYMPUS 593

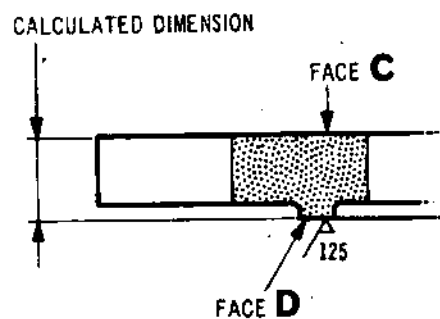
MK.610-14-28  
OVERHAUL



CR 32106/00 D



CHECKING THE ENDFLOAT



ENLARGED SECTION  
THROUGH RETAINING PLATE

Assembling Front Bearing Support  
Figure 501

SUB-ASSEMBLY  
**72-20-00**  
Page 502  
Dec 1/76

TN21172



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Place the bearing housing on the bench, then remove the pins from the freezing agent and tap one pin into the location in the front flange face, and three pins into the locations in the front inner face (Ref.Fig.501).

B. Assemble the Bearing to the Bearing Housing (Ref.Fig.501).

- (1) If the roller bearing (1-80) is a new item, remove the protective wrapping and grease (Ref.72-09-00 Assembly). If the roller bearing is the original item, assemble the cage and rollers to the outer track.

NOTE: The procedure should be carried out in an approved 'clean' room.

- (a) Position the cage inside the outer track, then press the rollers by hand into the cage.
  - (b) Ensure that the cage and rollers rotate freely. Apply temporary protection if required (Ref. 72-09-00 Inspection/Check para.4).
- (2) On pre-SB.72-17 engines, determine the thickness of retaining plate required to give the correct end-float between the bearing outer track and the shroud on the retaining plate.

NOTE: SB.72-17 Part 1 introduced bearing housings and retaining plates as matched sets, obviating the need for machining the retaining plate to size.

- (a) Insert the bearing outer track and rollers into the bearing housing, then assemble the retaining plate (1-100) with the raised shoulder towards the bearing, and engage the slots of the plate with the dogs of the bearing outer track. Lubricate the seven bolts (1-60) with lubricant 'A', then torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m).

PRINTED IN ENGLAND

TN9313



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Measure the end-float between the bearing outer track and the shoulder on the retaining plate using feeler gauges.
- (c) If the end-float is less than 0.003 in. (0,076 mm), the retaining plate and bearing must be released and removed, and the shoulder of the retaining plate ground sufficiently to give the required clearance (Ref.para.7). If, however, the end-float is more than 0.004 in. (0,102 mm), a new retaining plate must be assembled and the amount to be machined calculated as follows.
- (i) Remove the bearing and measure the width of the outer track 'B' (Ref.Fig.501).
- (ii) Assemble and secure the retaining plate to the bearing housing, without the bearing, and measure the gap 'A' between the shoulder of the retaining plate and the shoulder of the bearing housing, using slip gauges.
- (iii) Calculate the amount to be removed from the retaining plate shoulder to produce the correct end-float by first adding 0.0035 in. (0,089 mm) to dimension 'B' and then subtracting dimension 'A' from the total i.e.  $B + 0.0035 - A$ .
- (iv) Release and remove the retaining plate and despatch it to the machining area for the shoulder to be ground to reduce the plate thickness by the calculated amount (Ref. para.7).
- (3) On engines to SB.72-17 standard or engines to Pre. SB.72-17 when the end-float has been checked and found to be within limits (Ref.para.(2)), assemble the bearing and retaining plate to the bearing housing, then apply lubricant 'A' to the seven retaining bolts and assemble the bolts to secure the retaining plate. Check that the run-down torque is not less than 3.5 lbf in. (0,4 N.m), then torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m).

TN9314

SUB-ASSEMBLY

**72-20-00**

Page 504

Jun 1/77

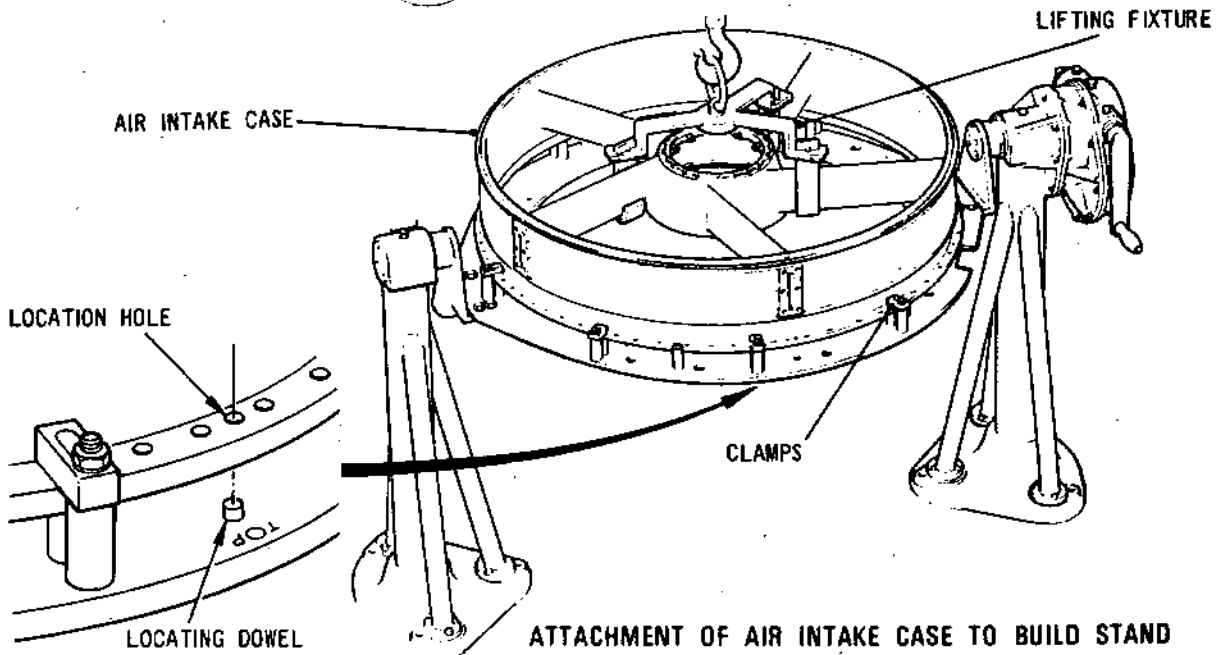
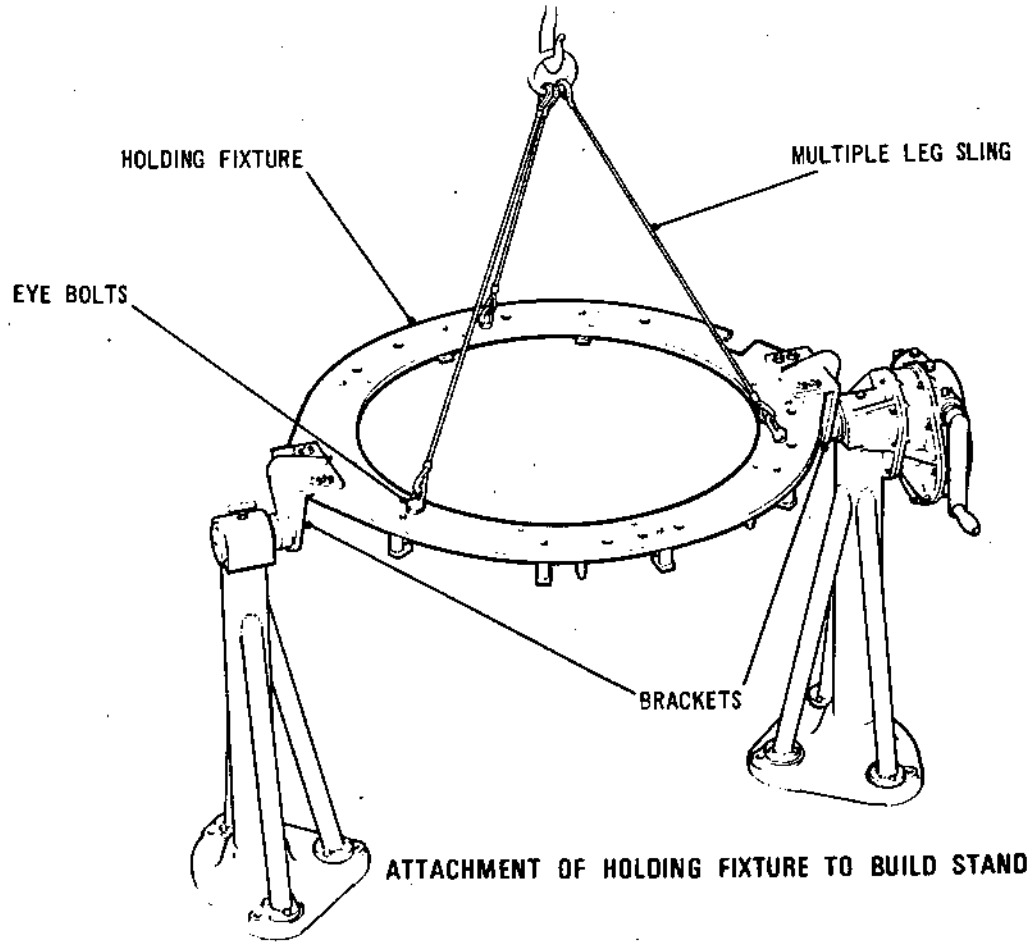
CR 31668/00B



OLYMPUS 593

MK.610-14-28

OVERHAUL



Assembling Air Intake Case to Stand  
Figure 502



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Place the assembled bearing housing in a clean polythene or P.V.C. bag until required for assembly to the air intake case.

3. Assemble the Air Intake Case to the Build Stand (Ref.Fig.502)

A. Assemble the Holding Fixture (Tool 1254) to the Build Stand (Tool 1320).

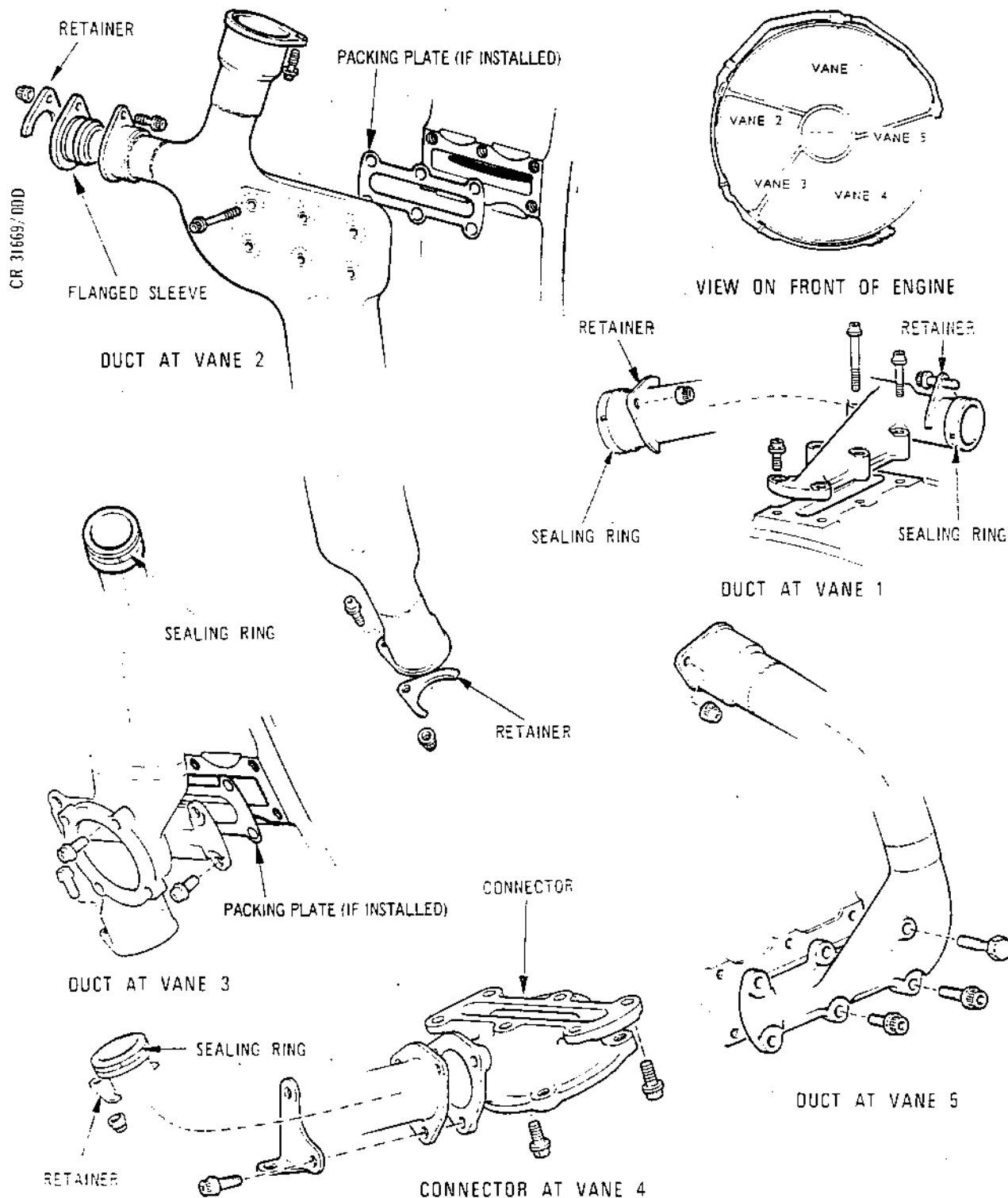
- (1) Assemble the three shackles of the sling (Tool 1255) to the three eye-bolts of the holding fixture and raise the fixture on a hoist.
- (2) Turn the brackets on the stand so that they point upwards, then traverse the holding fixture beneath the brackets. Raise the fixture to locate it to the bottom surface of the brackets, then secure it with eight slave bolts and nuts.
- (3) Release the shackles from the eye-bolts, then remove the sling from the hoist and invert the fixture so that the eye-bolts are on the bottom.

B. Assemble the Air Intake Case to the Holding Fixture.

- (1) Position the air intake case front (smaller inner diameter) uppermost. Attach a hoist to the lifting ring of the lifting fixture (Tool 894), then raise the lifting fixture and position it over the centre of the case.
- (2) Position the three hooks of the lifting fixture under three of the five vanes then lift and position the case over the stand.

NOTE: A location hole which identifies the vane nearest to it as vane No.1 is to be found between two of the bolt holes in the case rear flange.

TN19929



Assembling Anti-icing Manifold  
Figure 503 (Sheet 1 of 2)



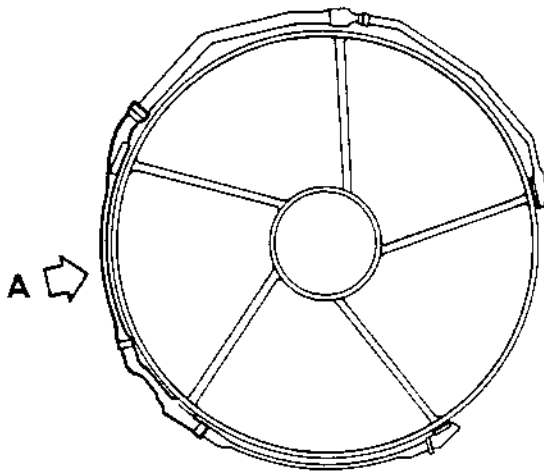
OLYMPUS 593

MK.610-14-28

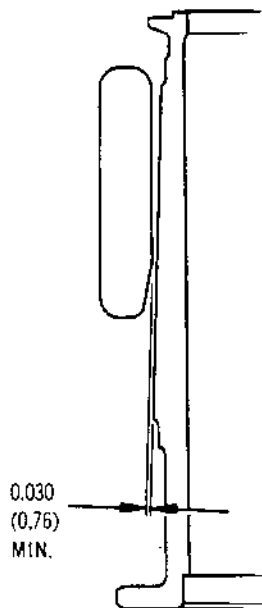
OVERHAUL



CR 36380/00A

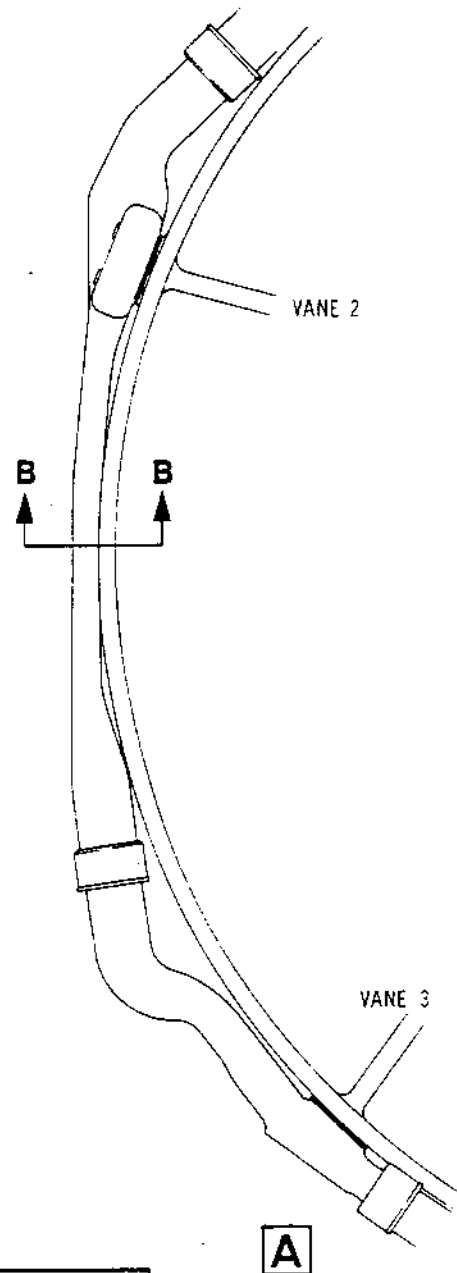


VIEW ON FRONT OF ENGINE



SECTION B-B

DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)



Assembling Anti-icing Manifold  
Figure 503 (Sheet 2 of 2)

SUB-ASSEMBLY  
**72-20-00**  
Page 508  
Jan 4/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (3) Bring the location hole into alignment with the locating pin next to the word TOP on the holding fixture. Turn the clamps of the holding fixture so that they do not obstruct the rear flange of the case and slowly lower the case onto the fixture. Screw the captive bolts fully into the tapped holes in the rear flange and then swing the clamps onto the flange and tighten the clamp nuts. Remove the lifting fixture from the case and the hoist.

#### 4. Assemble the Air Intake Case

- A. Assemble the Anti-icing Manifold to the Case (Ref.Fig.503).

NOTE: The Figure and Item numbers following the names of parts of the anti-icing manifold relate to Section 75-11-01 of the I.P.C.

- (1) Assemble the duct (2-70) to the case at vane No.3 position.
- (a) Assemble the seal ring (2-140) to the duct, in readiness for assembly to the duct at vane No.2.
- (b) Apply lubricant 'B' to the six bolts (2-80, -90). Assemble the four longer bolts through the external holes of the duct and the two shorter bolts through the holes inside the duct and assemble the six bolts and duct to the case, at vane No.3, with the longer portion of the duct towards vane No.2. Check that the run-down torque is not less than 3.5 lbf in. (0,4 N.m), then torque-tighten the bolts between 80 and 90 lbf in. (9,0 and 10,2 N.m).
- (c) Assemble a protector (Tool 879) to the outer joint face of the duct (oil feed flange location) and secure the protector using the two captive bolts.
- (2) To the shorter portion of the duct at vane No.3 assemble the duct (2-150) leading to the connector at vane No.4.





OLYMPUS 593

MK.610-14-28

OVERHAUL



- (a) Install the seal ring (2-190) on the duct (2-150).
- (b) Insert duct and seal into the duct at vane No.3 and assemble the retainer (2-120), apply lubricant 'B' to the securing bolt (2-110) and install the bolt with the self-locking nut (2-100), check that the run-down torque is not less than 3.5 lbf in. (0,4 N.m) then temporarily tighten.
- (3) Assemble the connector (2-200) to the case at vane No.4 position.
  - (a) Apply lubricant 'B' to the bolts (2-210, -220), then install the four longer bolts to the outer holes and the two shorter bolts to the inner holes of the connector and assemble with the flange towards vane No.3. Check that the run-down torque is not less than 3.5 lbf in. (0,4 N.m), then torque-tighten the bolts between 80 and 90 lbf in. (9,0 and 10,2 N.m).
  - (b) Assemble a protector (Tool 879) to the outer joint face of the connector using the two captive bolts.
- (4) Assemble the duct (2-150) and bracket to the connector at vane No.4 and complete the security of the seal retainer assembled to the duct at vane No.3.
  - (a) Align the holes in the flange of the duct (2-150) to the holes (thread inserts) in the flange of the connector. Apply lubricant 'B' to the three bolts (2-170). Align the bracket (2-180) with the flange (Ref.Fig.503) and assemble the bolts, bracket and duct to the connector. Check that the run-down torque is not less than 3.5 lbf in. (0,4 N.m), then torque-tighten the bolts between 80 and 90 lbf in. (9,0 and 10,2 N.m).

SUB-ASSEMBLY

72-20-00

Page 508B

Jan 4/93



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (b) Check that the run-down torque is not less than 3.5 lbf in. (0,4 N.m), then torque-tighten the nut and bolt securing the retainer to the duct at vane No.3 between 85 and 95 lbf in. (9,5 and 10,7 N.m).
- (5) In the rear outer flange of the case install a bolt (72-22-01/1-30), position No.22 (unable to be done after completed assembly).
- NOTE: The bolts are installed from the front and then as viewed from the rear are identified by numbering them in a clockwise direction starting with No.1 bolt at the top.
- (6) Assemble the duct (2-10) to the duct at vane No.3 and to the case at vane No.2 position.
- (a) Check that the seal ring is fitted to the free end of the duct at vane No.3, then assemble the duct (2-10) over the seal ring and position the duct to align with the tapped holes in the case at vane No.2. Apply lubricant 'B' to the six bolts (2-20) and assemble the bolts to secure the duct. Check that the run-down torque is not less than 3.5 lbf in. (0,4 N.m), then torque-tighten the bolts between 80 and 90 lbf in. (9,0 and 10,2 N.m).
- (b) Apply lubricant 'B' to the bolt (2-40), then assemble the retainer (2-50), bolt and self-locking nut (2-30) to the duct (2-10) retaining the seal between the ducts. Check that the run-down torque is not less than 3.5 lbf in. (0,4 N.m), then torque-tighten the nut between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (c) Assemble and temporarily secure the flanged sleeve (2-60) and the protector (Tool 885) to the air inlet, using the retainer, bolt and self-locking nut (75-11-02/2-140, 2-130 and 2-120).

SUB-ASSEMBLY

72-20-00

Page 509

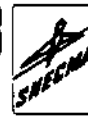
Jan 4/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (7) Assemble the duct (1-80) to the duct at vane No.2 and to the case at vane No.1 position.
- (a) Assemble the seal ring (1-160) to the duct (1-80), then insert the duct and seal into the free end of the duct at vane No.2. Position the duct so that the bolt-holes line up with the tapped holes at vane No.1.
- (b) Apply lubricant 'B' to the six bolts (1-90, 100 and 110), then assemble the bolts to secure the duct to the case at vane No.1. Check that the run-down torque is not less than 3.5 lbf in. (0,4 N.m), then torque-tighten the bolts between 80 and 90 lbf in. (9,0 and 10,2 N.m).
- (c) Apply lubricant 'B' to the bolt (1-130), then assemble the retainer (1-140), bolt and self-locking nut (1-120) to the duct (2-10) retaining the seal between the ducts. Check that the run-down torque is not less than 3.5 lbf in. (0,4 N.m), then torque-tighten the nut between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (8) Assemble the duct (1-10) to the case at vane No.5 position.
- (a) Assemble the seal ring (1-150) to the free end of the duct at vane No.1 then assemble the duct (1-10) over the seal ring and position the duct so that the bolt holes line up with the tapped holes in the case at vane No.5.
- (b) Apply lubricant 'B' to the six bolts (1-20, 30, and 40) then install the bolts to secure the duct. Check that the run-down torque is not less than 3.5 lbf in. (0,4 N.m), then torque-tighten the bolts to between 80 and 90 lbf in. (9,0 and 10,2 N.m).

NOTE: Bolt (1-40) to Mod.8095 has a hexagon head.

SUB-ASSEMBLY

72-20-00

Page 510

Jan 4/93



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

- (c) Apply lubricant 'B' to the bolt (1-60), then assemble the retainer (1-70), bolt, and nut (1-50) to duct (1-10) retaining the seal between the ducts. Check that the run-down torque is not less than 3.5 lbf in. (0,4 N.m) then torque-tighten the nut between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (9) Ensure sufficient clearance between casing and manifold.
- (a) Using feeler gauges, check the clearance between the casing and manifold, between the vane 2 and 3 positions (Ref.Fig.503). If insufficient clearance install packing plates to achieve desired clearance.
- CAUTION: ENSURE PACKING PLATES INSTALLED CORRECTLY. THE PACKING PLATE APERTURE IS DISPLACED AXIALLY WITH RESPECT TO THE SYMMETRICAL BOLT HOLES. INCORRECT FITTING IS OBVIOUS SINCE THE PLATE AND MANIFOLD END FITTINGS WILL NOT MATCH.
- (b) Remove manifold using procedure detailed in 72-20-00 Disassembly to a point where packing plate(s) (2-15A/2-75A) can be installed to obtain desired clearance.
- (c) Install packing plate(s).
- (d) Re-install manifold repeating procedure previously detailed.
- (e) Re-check clearance between casing and manifold.

B. Assemble the Electrical Tube to the Case.

NOTE: The following Fig. and Item numbers after the names of parts refer to Section 72-22-01 in the I.P.C. unless otherwise quoted.

- (1) To prevent possible damage to the insulation of the cable which will be fed through, ensure that the entry to the electrical tube and the flared exit from the tube are free internally from sharp edges, and that the weld is smooth on the inside of the tube. Ensure also that the rear edge of the forward internal web of No.3 vane has an adequate radius. See Fig.505 (Ref.SB.77-6).

SUB-ASSEMBLY

72-20-00

Page 511  
Jan 4/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Position the tube assembly (2-180), to abut inside the front flange of the case and enter the inner end of vane No.3 (Ref.Fig.506).
- (3) Apply lubricant 'B' to the two countersunk head bolts (2-170), then assemble the bolts through the flange of the case into the thread inserts in the tube body (2-180A). Check that the run-down torque is not less than 3.5 lbf in. (0,4 N.m) and torque-tighten between 45 and 50 lbf in. (5,1 and 5,6 N.m). Check that the boltheads are below the surface of the joint face.

C. Assemble the Flange to the Front of the Case (Ref.Fig.504).

- (1) Install the 20 bolts (1-30) from the rear through the holes in the front flange of the case, then turn the bolts so that their D-heads are trapped in the groove of the case.

SUB-ASSEMBLY

72-20-00

Page 512

Jan 4/93



OLYMPUS 593

MK.610-14-28

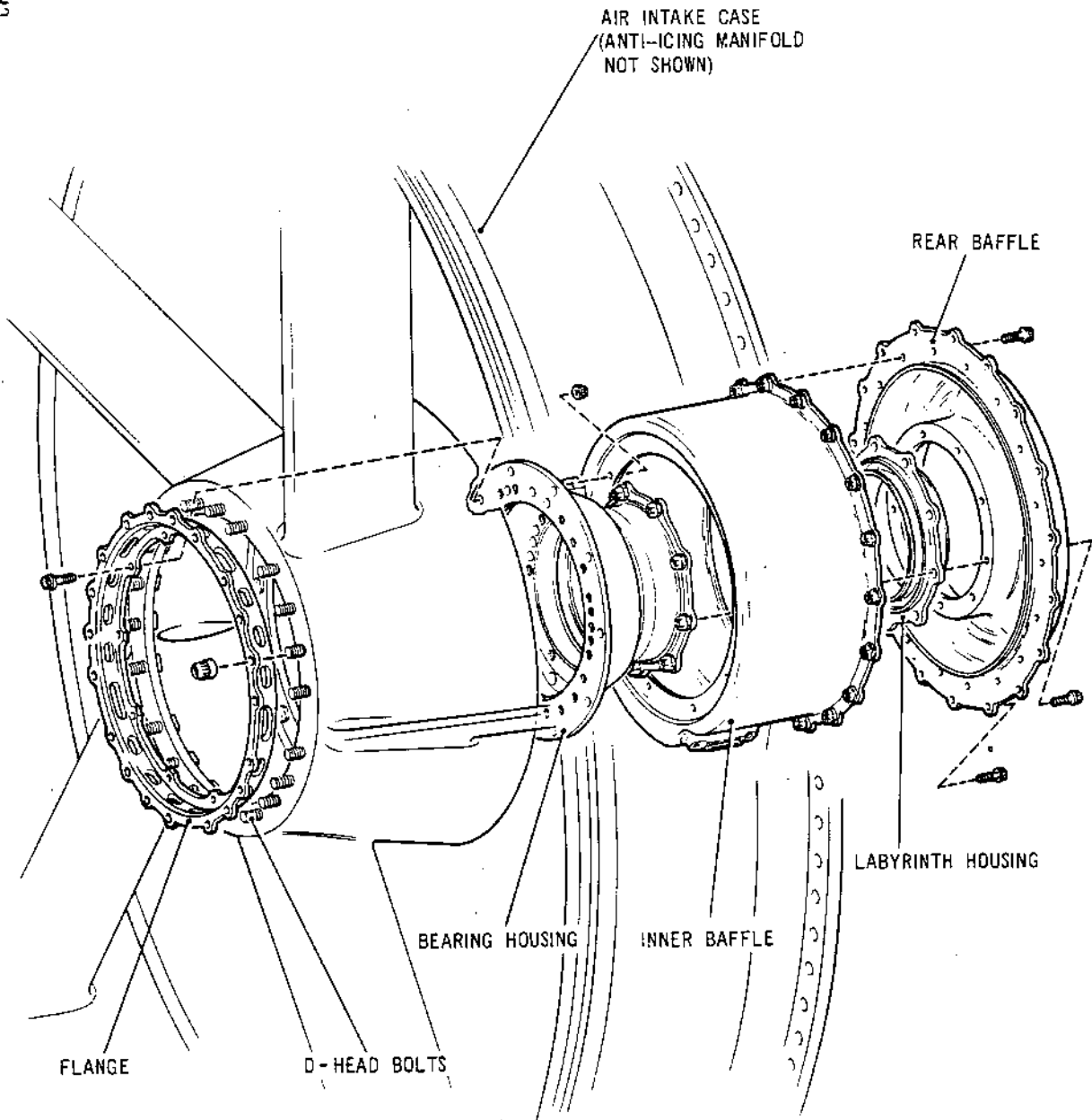
OVERHAUL



CR 33164/00A

PRINTED IN ENGLAND

TN11100



Assembling Items to Air Intake Inner Case  
Figure 504

SUB-ASSEMBLY

**72-20-00**

Page 513

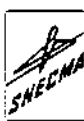
Jun 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Assemble the flange (1-40) to the bolts and the case so that the outside diameter of the flange locates the D-headed bolts and prevents them from turning.
- (3) Secure the flange with 20 slave nuts and temporarily tighten.

NOTE: The installed bolts will be used to retain the air intake fairing at a later stage of the assembly.

D. Assemble the Bearing Housing and Baffle to the Flange (Ref.Fig.504).

- (1) Rotate the build stand to invert the case, then assemble the flange of the bearing housing (72-23-01/1-110) to the inside of the flange (1-40), so that the threaded orifice for the oil feed tube location is next to vane No.2, and the threaded orifice for the oil scavenge tube location is between vanes No.3 and 4.
- (2) Assemble the (inner) baffle (1-60) over the bearing housing so that the oil tube locations in the baffle are next to vanes No.3 and 4.
- (3) Apply lubricant '8' to the ten bolts (1-20). Install the bolts through the front of the flange, bearing housing and baffle and assemble the self-locking nuts (1-10). Check that the run-down torque is not less than 3.5 lbf in. (0,4 N.m), then screw down the nuts until they contact the baffle. Release the nuts not more than 1/4 turn and check that there is a slight radial movement of the baffle. The nuts are torque-tightened in sub-para.E.(3).

E. Assemble the Oil Tubes to the Case (Ref.Fig.505 and 506).

- (1) Assemble the seals to the baffles.
  - (a) Hand dress the two seals (2-80) around their inner surface, to suit the tube to be assembled at vane No.4. Dress the ends of the seals to obtain a gap between 0.002 and 0.010 in. (0,051 and 0,254 mm), at each end as assembled round the tube. Chamfer the seals to suit the radius in the baffle.

SUB-ASSEMBLY

**72-20-00**

Page 514

Dec 1/81



OLYMPUS 593

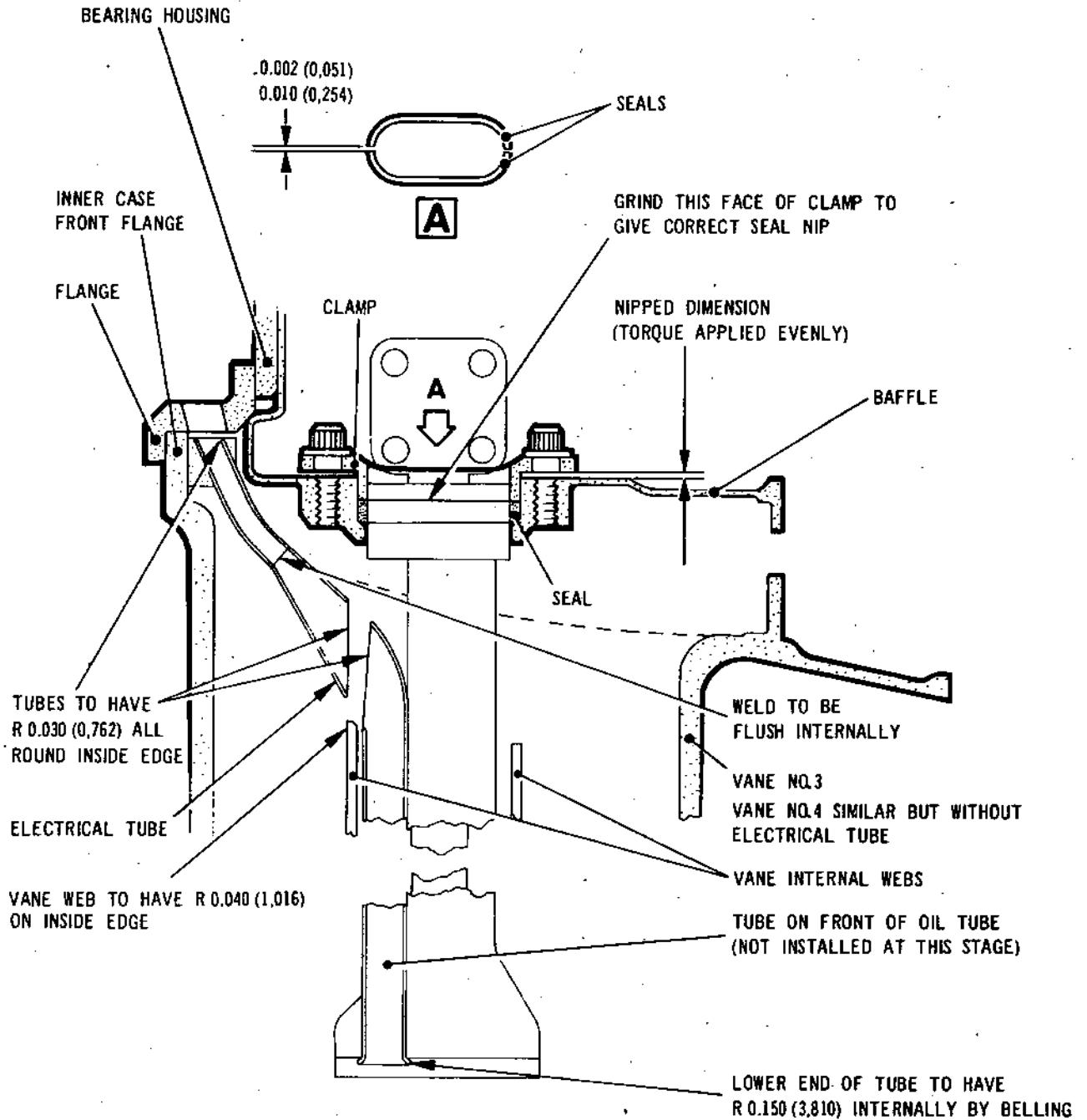
MK. 610-14-28  
OVERHAUL



CR 32617/00B

PRINTED IN ENGLAND

TN21175



Assembling Seals to Baffle and Arrangement of Electrical Tubes  
Figure 505

SUB-ASSEMBLY

72-20-00

Page 515

Jun 1/77





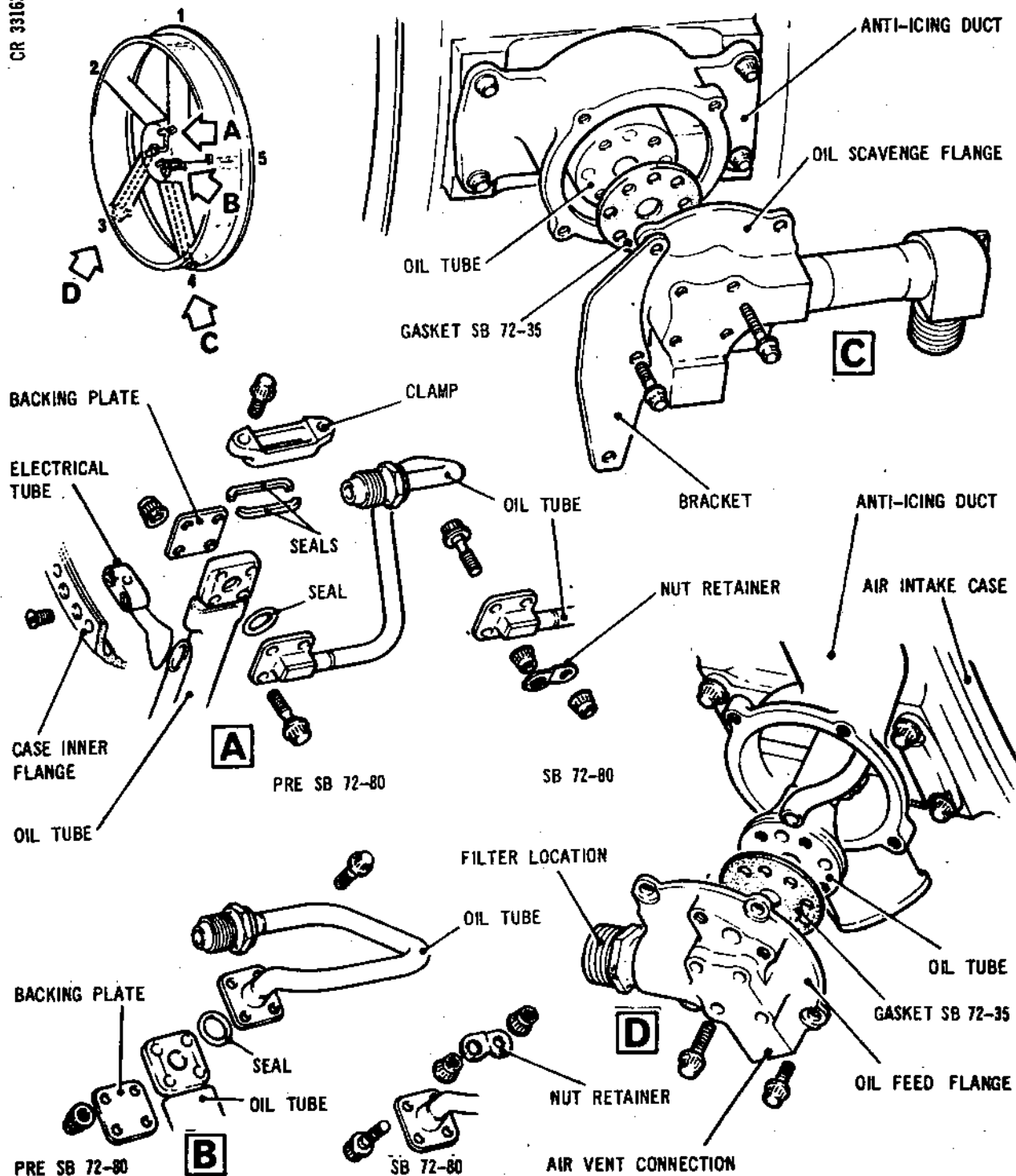
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 33163/00C



Assembling Oil Tubes to Air Intake Case  
Figure 506

SUB-ASSEMBLY  
**72-20-00**  
Page 516  
Jun 1/77

111101



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Position the two seals into the baffle, at vane No.4, then place the seal clamp (2-70) over the seals. Apply lubricant 'A' to the two bolts (2-60), then insert and lightly tighten the bolts and clamp to centralise the seats, without engaging the bolt threads in the locking portion of the inserts. Slacken the bolts, then torque-tighten them to 10 lbf in. (1,1 N.m) maintaining an even gap between faces at both ends of the clamp.
- (c) Measure the nip between the clamp and baffle. If the gap (nipped) is more than 0.010 in. (0,254 mm), machine the sealing face of the clamp (Ref.Fig.505) to obtain a nip between 0.008 and 0.010 in. (0,203 and 0,254 mm). If the nip is less than 0.008 in. (0,203 mm), then a new seal clamp must be used and the procedure repeated.
- (d) Assemble the seals and seal clamp to the baffle at vane No.3, in the same manner as detailed in para.(a) to (c).
- (e) Check that the run-down torque after engaging the bolt threads in the locking portion of the inserts is a minimum of 3.5 lbf in. (0,4 N.m).
- (2) Assemble the oil scavenge and feed tubes (2-50) to vanes No.3 and 4 (Ref.Fig.506).
  - (a) Scavenge tube (No.4 vane position).
    - (i) Assemble the alignment tool (Tool 878) to the oil scavenge tube using the four captive bolts.
    - (ii) Remove the protector from the connector at the end of vane No.4. Insert the tube through vane No.4 with the electrical tube towards the front.

**NOTE:** The tube has a joggle for anti-rattle purposes and therefore may be a tight fit in the vane. If so, the tube may be lightly tapped through the vane, or if it is excessively tight, interchanged with the tube at vane No.3.



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

(iii) Secure the alignment tool to the connector with four captive bolts.

(iv) Using the adapter (Tool 1662), check the torque loading of the cranked ring wrench (Tool 1606), then using the wrench, torque tighten the two bolts retaining the seal clamp to 100 lbf in. (11,5 N.m).

NOTE: Ensure that the clamp pulls down onto the face of the baffle.

(b) Feed tube (No.3 vane position).

(i) Ensure that the tube on the front of the oil feed tube has adequate internal radii at both ends to prevent damage to the insulation of the cable to be fed through it. (Ref.SB.77-6) (Ref.Fig.505).

(ii) Assemble the alignment tool (Tool 878) to the outer end of the oil feed/cold vent tube (2-50) using the four captive bolts.

(iii) Remove the protector from the duct at vane No.3 and insert the tube through vane No.3 with the electrical tube towards the front.

(iv) Secure the alignment tool to the duct with four captive bolts.

(v) Using the adapter (Tool 1662), check the torque loading of the cranked ring wrench (Tool 1607), then using the wrench torque-tighten the two bolts retaining the seal clamp to 100 lbf in. (11,5 N.m).

NOTE: Ensure that the clamp pulls down onto the face of the baffle.

(3) Torque-tighten inner baffle nuts.

(a) Torque-tighten the inner baffle securing nuts (1-10) to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

SUB-ASSEMBLY

72-20-00

Page 518

Sep 30/94

(4) Assemble the oil scavenge tube (2-190).

- (a) Apply lubricant 'A' to the loading face and threads of the union of the tube assembly (2-190), then assemble the tube assembly without the seal, between the tube at vane No.4 and the bearing housing.
- (b) Tighten the union nut sufficiently to bring the nipple of the tube into full contact with the bearing housing while maintaining freedom of movement of the tube within the union nut, then lightly press the mating faces of the flanges of the two tubes (2-50, 190) together checking with a 0.002 in. (0,05 mm) feeler gauge at the first point of contact for squareness. To be acceptable, the faces should be squarely aligned and parallel to within 0.005 in. (0,127 mm) and the securing bolts should enter their locations without obstruction. If the mating faces of the flanges do not meet these requirements, ascertain the degree of malalignment and carry out the correcting procedure detailed in paragraph (4).
- (c) Slacken the union, then assemble the Corruplus seal (2-120) between the mating faces of the tubes. Assemble the backing plate (2-130), then apply lubricant 'B' to the four bolts (2-90A) pre-SB.72-80, or to the upper inner bolt (2-90C) and three (longer) bolts (2-95A) (SB.72-80). Enter the two upper bolts from the right-hand side as viewed, and the two lower bolts from the left-hand side, and assemble the bolts with slave nuts to secure the two tubes. Tighten the four nuts using the wrenches (Tools 1604 and 1605), then, using the cranked wrench (Tool 880) torque-tighten the union nut between 280 and 310 lbf in. (31,6 and 35,0 N.m). Wire-lock the union nut.
- (d) Slacken the four bolts, then ensure that a gap of between 0.002 and 0.010 in. (0,051 and 0,254 mm) exists between the flanges of the tubes, and that the flanges are within 0.005 in. (0,127 mm) square. Assemble new nuts (2-110) to the flange securing bolts. On engines embodying SB.72-80, to assemble the nuts partly withdraw the upper inner bolt, then, holding the upper inner nut in



OLYMPUS 593

MK.610-14-28

OVERHAUL



the twelve point recess in the retainer (2-100) assemble the retainer to the upper outer bolt, with the held nut in position over the inner bolt and assemble the outer nut to secure the retainer. Torque- tighten the nuts using the ring wrenches (Tools 1604 and 1605) to between 85 and 95 lbf in. (9,6 and 10,7 N.m) ensuring for SB.72-80 that the nut securing the retainer is tightened first permitting the torque-tightening of the trapped nut.

- (e) Remove the alignment tool from the outer end of the tube and replace the protector (Tool 879).

(5) Assemble the oil feed tube (2-150).

- (a) Apply lubricant 'A' to the loading face and threads of the union of the tube (2-150), then assemble the tube, without the seal, between the tube at vane No.3 and the bearing housing.
- (b) Tighten the union nut sufficiently to bring the nipple of the tube into full contact with the bearing housing while maintaining freedom of movement of the tube within the union nut, then lightly press the mating faces of the two tubes together checking with a 0.002 in. (0,05 mm) feeler gauge at the first point of contact for squareness. To be acceptable, the faces should be squarely aligned and parallel to within 0.005 in. (0,127 mm) and the securing bolts should enter their locations without obstruction. If the mating faces of the flanges do not meet these requirements, ascertain the degree of malalignment and carry out the correcting procedure detailed in paragraph (4).
- (c) Slacken the union, then assemble the Corruplus seal (2-120) between the mating faces of the tubes. Assemble the backing plate (2-130), then apply lubricant 'B' to the four bolts (2-90A) (pre-SB.72-80), or to the inner upper bolt (2-90C) and three (longer) bolts (2-95A) (SB.72-80). Enter the two upper bolts from the right-hand side as viewed, and the two lower bolts from the left-hand side then assemble the bolts with slave nuts to secure the two tubes. Tighten the four nuts using the wrenches (Tools 1604 and 1605), then using the cranked wrench (Tool 881) torque-tighten the union nut between 220 and 240 lbf in. (24,8 and 27,1 N.m). Wire-lock the union nut.

SUB-ASSEMBLY

**72-20-00**

Page 520

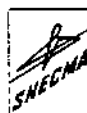
Dec 1/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (d) Slacken the four flange bolts, then ensure that a gap of between 0.002 and 0.010 in. (0,051 and 0,254 mm) exists between the flanges of the tubes and that the flanges are within 0.005 in. (0,127 mm) square. Assemble new nuts (2-110) to the flange securing bolts. On engines embodying SB.72-80, to assemble the nuts partly withdraw the upper inner bolt, then, holding the upper inner nut in the twelve point recess in the retainer (2-100) assemble the retainer to the upper outer bolt with the held nut in position over the inner bolt and assemble the outer nut to secure the retainer to the backing plate. Torque-tighten the nuts using the ring wrenches (Tools 1604 and 1605) between 85 and 95 lbf in. (9,6 and 10,7 N.m) ensuring for SB.72-80 that the nut securing the retainer is tightened first permitting the torque-tightening of the trapped nut.
- (e) Remove the alignment tool from the outer end of the tube and replace the protector (Tool 879).
- (6) Procedure for correcting malalignment of oil feed and scavenge tubes (Ref Fig 507)
  - (a) Ascertain the degree of malalignment and if necessary draw sketches to indicate the directions in which correction is required.
  - (b) Clamp the setting block assembly of the tool kit (Tool 3131) firmly in a vice.
  - (c) Remove the oil feed and/or scavenge tube (2-190,2-150) to be corrected, from the air intake case.
  - (d) Secure the flange of the oil tube to the setting block with the clamp plates, bolts, washers and nuts from the tool kit, as shown.
  - (e) Insert the correct size setting pin in the setting block location that is aligned with the tube end. The pin can be used as a datum for establishing the amount of movement obtained on the tube when applying the correcting force.

SUB-ASSEMBLY

**72-20-00**

Page 521

Dec 1/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (f) Hold the appropriate setting tool on a straight section of the tube and carefully apply the correcting force in the required direction. Check the amount of movement obtained by using the setting pin as a datum point.

NOTE: It is recommended that alignment of bolt holes is achieved prior to correcting parallelism and that movement of the tube is obtained in several small increments. Constant trial checking of the tube in the air intake case is advised.

- (g) When malalignment has satisfactorily been corrected, subject the tube to the crack detection procedure recommended in 72-20-00, Inspection/Check.
- (h) Continue with the assembly procedure of paragraphs (2) or (3) as applicable.

F. Check for Leakage from the Oil Tube/Anti-icing Space Seals.

CAUTION: IT IS IMPORTANT TO LIMIT THE AMOUNT OF LEAKAGE ACROSS THESE SEALS. IDEALLY, NO LEAKAGE SHOULD OCCUR, BECAUSE ANY OIL WHICH REACHES THE ANTI-ICING AIR SPACE HAS DIRECT ACCESS THROUGH THE COMPRESSOR TO CABIN AIR.

- (1) Position the air intake case so that it is horizontal with the rear flange uppermost.
- (2) Place a suitable oil tray on the floor beneath the centre of the case, then ensure that protectors (Tool 889) are assembled to the connectors at the outer end of vanes No.3 and No.4.

TN5093

SUB-ASSEMBLY

72-20-00

Page 522

Jul 1/81



OLYMPUS 593

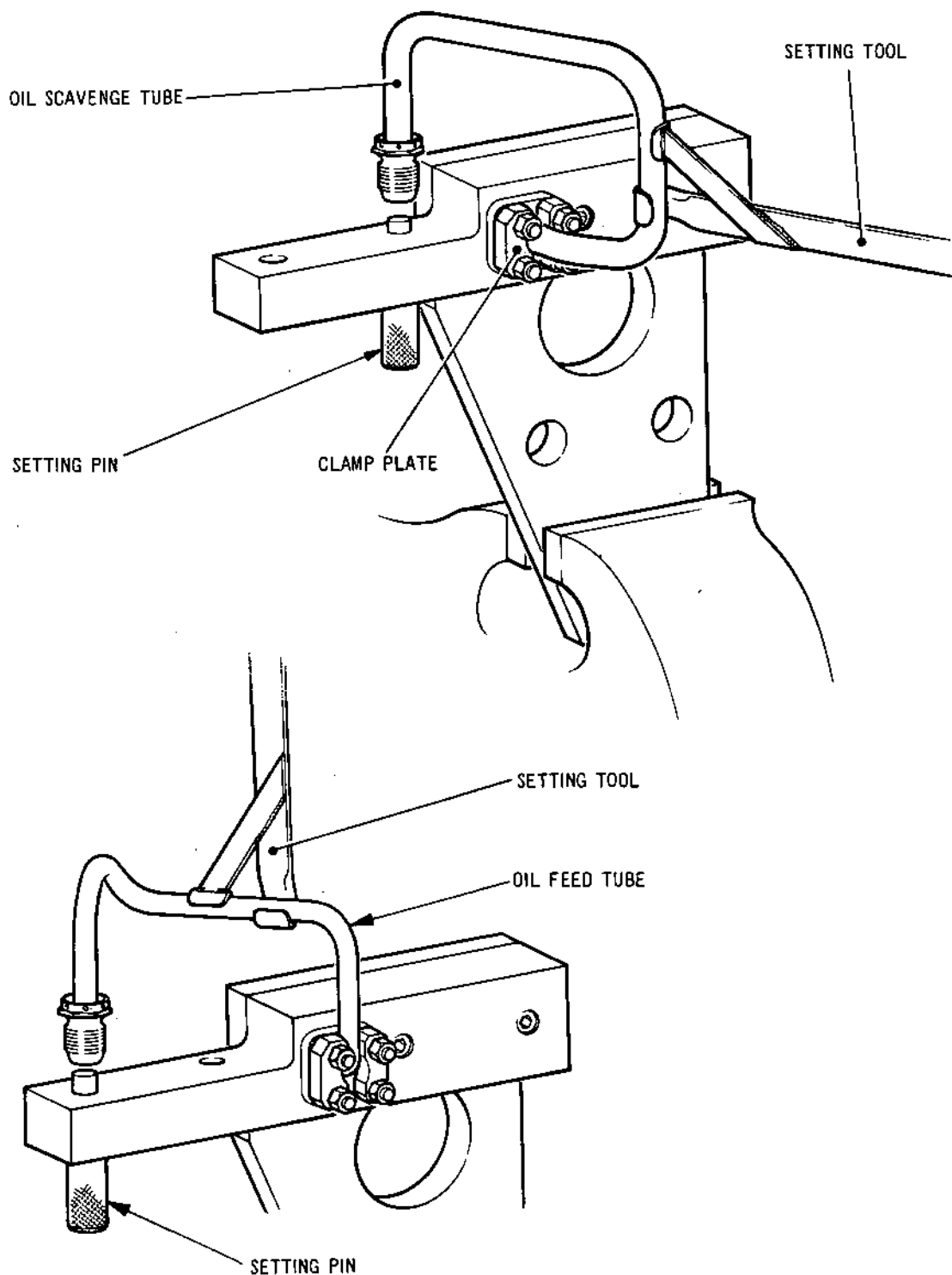
MK.610-14-28

OVERHAUL



CR 35797/00A

PRINTED IN ENGLAND



Method for Correcting Oil Tube Malalignment  
Figure 507

SUB-ASSEMBLY  
**72-20-00**  
Page 523  
Jul 1/81

TN12843





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Fill the space between the bearing housing and the baffle with engine oil within 1.25 in. (32 mm) of the top, then measure and record the amount of oil which leaks from the front inner flange. The leak must not be greater than 5 drops per minute.
- (4) Drain the oil from the air intake case by slowly tilting the case in the stand. Collect the oil in a suitable container.
- (5) In the event of leakage in excess of 5 drops/min carry out remedial action; remove the oil tubes and form and assemble new seal halves.
  - (a) Inspect the area surrounding the sealed joints, between the baffle and tubes in the anti-icing space external to the baffle to determine, if possible, which of the seals is leaking. Slacken the two bolts of the seal clamp, using the cranked ring wrench (Tool 1606 or 1607).
  - (b) Remove the protector from the manifold at the outer end of the vane and install the alignment tool (Tool 878) to the end of the oil tube and to the manifold, using the eight captive bolts.
  - (c) At the bearing housing and using wrench (Tool 880 or 881), release the union of the tube assembly and, using wrenches (Tool 1604 and 1605), unscrew the four bolts to disassemble the tube assembly, sealing ring and backing plate from the tube at the vane. For SB.72-80 the nut securing the retainer must be released last.
  - (d) Disassemble the alignment tool from the manifold by unscrewing the outer four captive bolts, then withdraw the oil tube from the clamp, seal and vane. If withdrawal is difficult, replace the alignment tool with adapter (Tool 519) and impact puller (Tool 1690).

SUB-ASSEMBLY

**72-20-00**

Page 524

Jul 1/81

TN19936



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (e) Unscrew the two bolts using wrench (Tool 1606 for scavenge or 1607 for feed) and remove the clamp from the seal. Inspect, remove and reform the two halves of the seal, or form new seals to the tube and baffle, following the procedure detailed in para.E. Assemble the oil tubes as detailed in para.E., then recheck the leakage (Ref.para.F.) ensuring that the rate of leakage does not exceed 5 drops/min.

G. Assemble the Flange and Filter to the Feed Tube.

- (1) Remove the protector and assemble the flange (2-10) and gasket (2-140) if SB.72-35 is embodied, to the oil feed tube with the filter location towards the rear (Ref.Fig.506). Apply lubricant 'B' to the four bolts (2-30) and assemble the bolts to secure the flange to the tube. Torque-tighten the bolts between 67 and 73 lbf in. (7,5 and 8,2 N.m), then wire-lock them in two pairs.
- (2) Apply lubricant 'B' to the four bolts (2-20), then install the bolts to secure the flange to the anti-icing duct. Check that the run-down torque is a minimum of 3.5 lbf in. (0,4 N.m), then torque-tighten them between 67 and 73 lbf in. (7,5 and 8,2 N.m).
- (3) Check that the filter (72-01-01/1-10) is to Mod.8082, then insert the filter into its location in the flange and retain it by screwing the protector (Tool 886) onto the flange connection.
- (4) Assemble the protector (Tool 887) to the air vent location on the flange.

H. Assemble the Flange to the Scavenge Tube.

- (1) Remove the protector and assemble the flange (72-01-04/1-260) and gasket (2-140) if SB.72-35 is embodied, to the oil scavenge tube with the outlet elbow to the rear (Ref.Fig.506). Apply lubricant 'B' to the four bolts (72-01-04/1-290) and assemble the bolts to secure the flange to the tube. Torque-tighten the bolts between 67 and 73 lbf in. (7,5 and 8,2 N.m), then wire-lock them in two pairs.

SUB-ASSEMBLY

**72-20-00**

Page 525

Jul 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Apply lubricant 'B' to the two bolts (72-01-04/1-280), then assemble with bracket (72-01-04/1-300) to the flange as shown in Fig.506. Apply lubricant 'B' to the two bolts (72-01-04/1-270) and assemble to the flange. Check that the run-down torque is a minimum of 3.5 lbf in. (0,4 N.m), then torque-tighten the four bolts between 67 and 73 lbf in. (7,5 and 8,2 N.m).
- (3) Assemble a suitable protector onto the flange connection, then assemble the blank (Tool 887) onto the air vent location.

## 5. Pressure Test the Bearing Housing and Oil Tubes

- A. Assemble the Pressure Test Equipment to the Case (Ref.Fig.508).

NOTE: An oil pressure test rig (Tool 583 or similar) is required. The rig must contain an oil heater, a temperature gauge and a pressure control valve. The rig must be capable of flowing 50 gal/h and of pressurizing the unit to 40 psig by use of a shut-off valve in the return system. The oil to be used in the rig is lubricant 'A'.

- (1) Remove the nut, fibre washer and end plate from the blank (Tool 884), then assemble the blank into the rear of the bearing housing. Assemble the end plate to the blank from the front of the housing in the case of early blanks (locating the offset hole over the pin in the bearing housing front face), then reassemble the fibre washer and the nut to retain the end plate.
- (2) Install the 12 slave bolts to secure the end plate (of early blanks only) to the front face of the bearing housing then tighten the centre nut.

CAUTION: TWO TOROIDAL SEALS (AS.12801-261 LARGE AND AS.12801-243 SMALLER) MUST BE USED WITH THE PRESSURE TEST BLANK AND MUST BE RENEWED IF DAMAGED.

TN19938



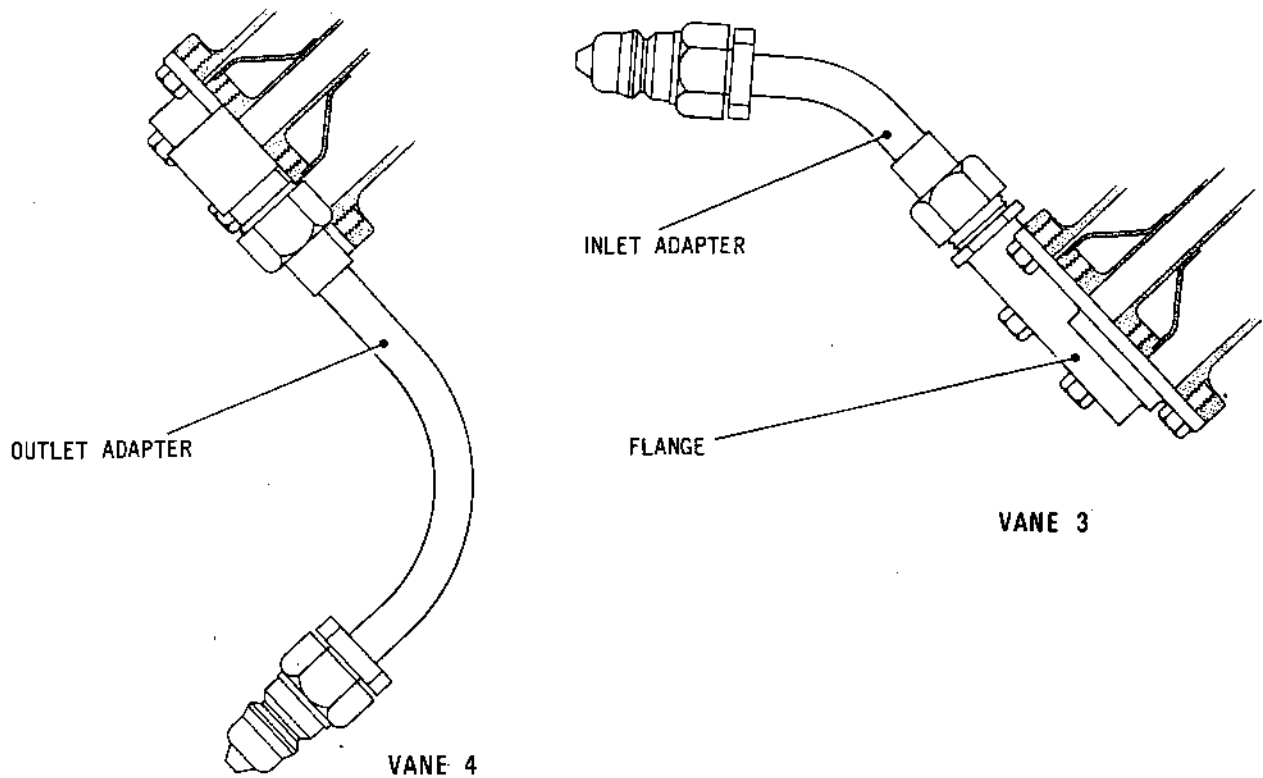
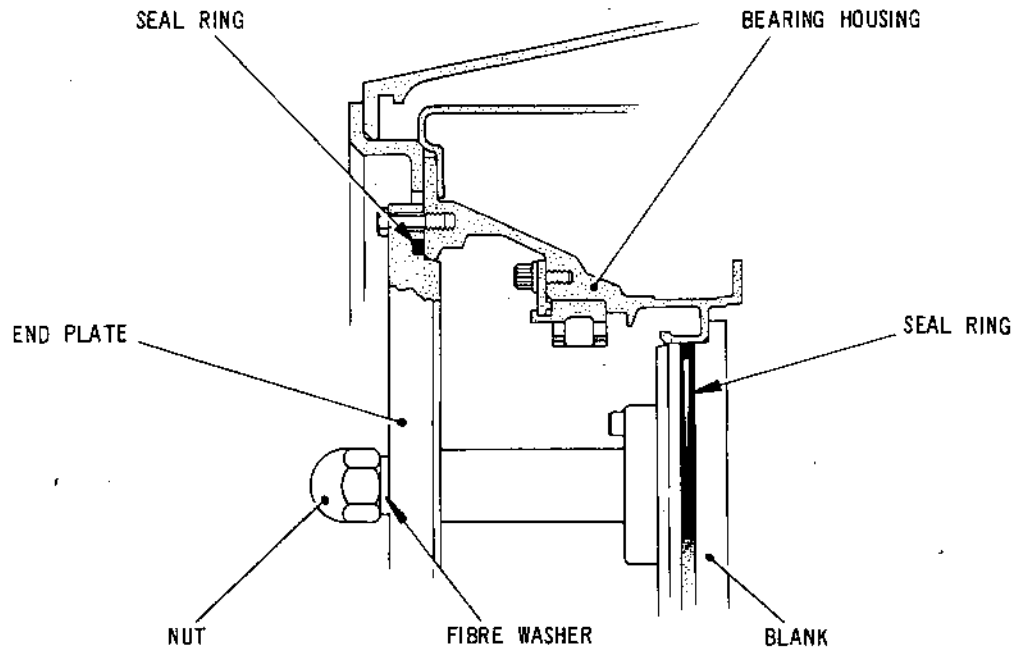
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32619/00B

PRINTED IN ENGLAND



Assembling Pressure Test Equipment  
Figure 508

SUB-ASSEMBLY  
**72-20-00**

Page 527  
Jul 1/81

TN7074



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) At the outer end of vane No.4, remove the blank from the oil connector, screw on the oil outlet adapter (Tool 1871) and tighten.
- (4) At the outer end of vane No.3, remove the blank from the oil connector, screw on the oil inlet adapter (Tool 1001) and tighten.
- (5) Couple the feed pipe from the pressure test rig to the inlet adapter at vane No.3 and couple the return pipe to the outlet adapter at vane No.4.
- (6) Erect the screens (Tool 829) around the build stand.

B. Pressure Test and Flow Check.

WARNING: THE OIL IS USED FOR TESTING THE SYSTEM AT A TEMPERATURE OF 120 DEG C (AND AT 32 AND 40 PSIG). CARE MUST BE TAKEN IN ENSURING THAT SEALS ARE IN GOOD CONDITION, CONNECTIONS SECURELY MADE AND THE SCREENS PLACED IN POSITION. PROTECTIVE CLOTHING MUST BE WORN WHILE CARRYING OUT THE PRESSURE TEST AND FLOW CHECK PROCEDURE.

- (1) With the rig and equipment connected as detailed in para.A., flow oil at  $120 \pm 5$  deg C and 40 psig through the system for 10 minutes to allow component metal temperatures to stabilize.
- (2) Close the shut-off valve in the return feed line and maintain 40 psig for 30 minutes in the oil tubes and housing while observing for leaks.
- (3) Open the shut-off valve and flow test the tubes and housing at  $120 \pm 5$  deg C, with a pressure differential set between gauges on feed and scavenge pipes of 32 psig, and record the total oil flow through the system. The total oil flow must be between 20.5 and 25 litres per hour (4.5 and 5.5 gallons per hour).

IN39945



OLYMPUS 593

MK.610-14-28

OVERHAUL



C. Rectification of Leakage.

- (1) If leakage occurs from either of the unions at the bearing housing, proceed as follows, as appropriate, observing the different torque loadings for the two unions (Ref.Fig.506).
  - (a) At the feed tube union slacken and then torque-tighten the union between 220 and 240 lbf in. (24,8 and 27,1 N.m), using the cranked wrench (Tool 881).
  - (b) At the scavenge tube union slacken and then torque-tighten the union between 280 and 310 lbf in. (31,6 and 35,0 N.m) using cranked wrench (Tool 880).
- (2) If leakage occurs at a joint between the tubes at the inner end of the vanes No.3 and 4, disassemble the tube assembly at the bearing housing and at the inner end of the vane and remove the tube assembly. Inspect the condition of the sealing ring and renew if necessary. Inspect the surface finish of the mating faces for signs of scratching or other damage. If the condition appears satisfactory, repeat the assembly procedure and the pressure test procedure.

NOTE: No leakage, other than a surface wetness which does not form a drop within 30 minutes is acceptable.

D. Flow Check Outside Limits.

- (1) If the total oil flow is not within the defined limits the most likely cause is the filter assembly (72-01-01/1-10). The following checks should be made.
  - (a) Compare the flow check results again with the acceptance standards.
  - (b) Check that the filter element is not blocked.

SUB-ASSEMBLY

**72-20-00**

Page 529

Jul 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) If available repeat the flow check with another filter assembly.
- (2) If the filter assembly is not the cause, the fault may be displaced seals or gaskets, or foreign matter in the oil pipes, flanges or bearing housing. Systematic disassembly and examination will be necessary as follows:
- (a) Remove pressure test adapters from flanges at vane No.3 and vane No.4.
  - (b) Remove flanges and check that gaskets are not covering oil holes, and that the oilways are free of obstructions.
  - (c) Install alignment tool (Tool 878), disassemble inner oil tubes (Ref.4.F.(5)(b) and (c)) and check that seals are not deformed and oil tubes are clear of obstructions.
  - (d) Slacken the bolts of the seal clamps, disassemble the alignment tool from the manifolds and withdraw the outer oil tubes (Ref.4.F.(5)(a) and (d)).
  - (e) Remove the 10 bolts and nuts securing the bearing housing to the intake front flange and remove the bearing housing and inner baffle (Ref.4.D.).
  - (f) Remove the seven bolts from the bearing retainer and remove the retainer and bearing from the bearing housing. Examine the oilways in the bearing housing.
- (3) Thoroughly clean all components and reassemble following the procedures in the appropriate parts of this chapter. The oil leakage test (Ref.4.F.) and the pressure and flow tests (Ref.5.A. and B.) must be repeated.

FN22010

SUB-ASSEMBLY

**72-20-00**

Page 530  
Jul 1/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



E. Remove the Pressure Test Equipment from the Case.

- (1) Uncouple the feed pipe from the adapter at vane No.3, then unscrew the adapter from the flange. Screw the puller (Tool 888) into the filter and remove the filter from the flange. Wash the filter in clean white spirit, then re-assemble it to the flange and retain it with the protector (Tool 886).
- (2) Uncouple the return pipe from the outlet adapter at vane No.4, then unscrew the adapter from the flange, and assemble a suitable protector/blank.
- (3) Remove the twelve bolts securing the pressure test blank to the front face of the bearing housing (if fitted), then remove the centre nut and fibre washer. Remove the end plate and blank from the bearing housing.
- (4) Replace the pressure test equipment in the container (Tool 896).

## 6. Final Assembly of the Air Intake Case

A. Assemble the Labyrinth Housing and Baffle to the Case (Ref.Fig.504).

- (1) Assemble the labyrinth housing (72-23-01/1-140) to the rear of the bearing housing ensuring that they are to the correct standard (Ref.SB.72-46).

NOTE: It may be necessary to shrink the labyrinth housing in a freezing agent (Cardice for (approx.) 20 minutes or liquid nitrogen for (approx.) 2 to 3 minutes), prior to assembly in order to locate the spigot in the bearing housing bore.

- (2) Assemble the rear baffle (1-110) over the labyrinth housing to the rear faces of the inner baffle and air intake case.

SUB-ASSEMBLY

**72-20-00**

Page 531

Jul 1/81





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Apply lubricant 'B' to the 45 retaining bolts (1-50, 90 and 100), then install the bolts to secure the baffle to the bearing housing/labyrinth, to the inner baffle and to the air intake case. Torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m), starting with the nine inner bolts.
- (4) Loosen the thumbnuts of the protector (Tool 882), then assemble the protector to the labyrinth housing. Locate the legs of the protector behind the labyrinth housing, then tighten the thumbnuts.
- (5) Assemble the protector (Tool 904) to the front inner flange of the air intake case and secure it with slave nuts.

B. Remove the Air Inlet Section from the Build Stand.

NOTE: Three methods are given for removing the air intake case from the build stand (Ref. para.(1), (2) and (3)). In general the method under para.(1) should be carried out prior to vertical engine assembly, but the alternative methods may be carried out as and when necessary.

- (1) Remove the air inlet section from the build stand and store the case on its front face.
  - (a) Invert the build stand so that the bottom face of the holding fixture is uppermost, then secure the shackles of the multiple leg sling (Tool 1255) to the eye-bolts of the fixture.
  - (b) Support the weight of the holding fixture with the lifting equipment, then release and remove the eight nuts and bolts securing the holding fixture to the build stand.
  - (c) Lower the air intake case and holding fixture onto a pallet, then release the swing clamps and securing bolts and remove the holding fixture from the air intake case.

FN32171

SUB-ASSEMBLY

**72-20-00**

Page 532

Jul 1/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (d) If required, the holding fixture may be re-assembled to the build stand and secured with eight bolts and nuts.
- (2) Remove the air inlet section from the build stand and store the case on its rear face.
- (a) Position the air intake case in the build stand with its front face uppermost, then attach the hook of the lifting equipment to the ring of the lifting fixture (Tool 894).
- (b) Position the lifting fixture over the centre of the case, then locate the hooks of the fixture under three of the vanes of the case.
- (c) Release the swing clamps and bolts securing the case to the holding fixture, then lift the case away from the fixture and lower it onto the pallet (Tool 905).
- (d) Remove the lifting fixture from the air intake case and from the hoist.
- (3) Remove the air inlet section from the build stand for direct assembly to the engine in a horizontal position.
- (a) Turn the holding fixture on the stand until the flange faces of the air intake case are vertical with vane No.1 uppermost, then assemble the lifting fixture (Tool 890) to the top of the front flange. Position the retainer behind the front flange, then tighten the securing nut.
- (b) Attach the hook of the lifting equipment to the lifting ring of the fixture, then apply sufficient force to the lifting equipment to take the weight of the air intake case. Release the clamps and bolts securing the air intake case to the holding fixture.

SUB-ASSEMBLY

72-20-00

Page 533

Jul 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) Adjust the sliding lifting ring until the flange faces of the case are vertical, then position and attach the air inlet section to the LP compressor.

7. Machine the LP Compressor Front Bearing Retaining Plate

A. Prepare and Machine the Retaining Plate.

NOTE: The following operation may be required to prepare the retaining plate (72-23-01/1-100) (Ref.Fig.501) to suit assembly dimensions.

- (1) Locate face C of the retaining plate to a magnetic table.
- (2) Finish grind face D to achieve the dimension calculated for assembly.
- (3) Subject the plate to magnetic particle crack detection (Ref.72-23-01, Inspection/Check).
- (4) Ensure all burrs and sharp edges have been removed and that the surface finish is correct (Ref.72-09-00, Inspection/Check).

TN3153

SUB-ASSEMBLY

**72-20-00**

Page 534

Jul 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



AIR INTAKE FAIRING - SUB-ASSEMBLY

PRINTED IN ENGLAND

For information on the assembly of the Air  
Intake Fairing, refer to 71-00-01 Assembly.

TN38

SUB-ASSEMBLY

**72-21-01**

Page 501

Jan 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



AIR INTAKE CASE - SUB-ASSEMBLY

PRINTED IN ENGLAND

For information on the assembly of the Air  
Intake Case, refer to 72-20-00 Assembly.

TN25105

SUB-ASSEMBLY

**72-22-01**

Page 501

Jan 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



LP COMPRESSOR ROTOR FRONT BEARING SUPPORT - SUB-ASSEMBLY

PRINTED IN ENGLAND

For information on the assembly of the LP Compressor  
Rotor Front Bearing Support, refer to 72-20-00 Assembly.

TN29602

SUB-ASSEMBLY

**72-23-01**

Page 501

Jan 1/76



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

LP COMPRESSOR ASSEMBLY - SUB-ASSEMBLYTABLE OF CONTENTS

Para.		Page
1.	General ... ..	501
2.	Determine Engine and Slave Washer Sizes and Dimension 'G'... ..	503
A.	Assemble the Setting Gauge to the Rotor Shaft Rear (SB.72-21 Standard) ... ..	504
B.	Mock Up Rotor Shaft Rear, Stage 6-7 Spacer Ring Stage 7 Rotor Disk and Gauge to Determine LP Bearing Adjusting Washer (Pre-SB.72-21 Standard)	505
C.	Assemble the Adjusting Washer and LP Bearing Assembly to Rotor Shaft Rear ... ..	509
D.	Measure Dimension 'G' (Post and Pre-SB.72-21 Standard)... ..	514
E.	Disassemble Items from Rotor Shaft Rear ... ..	514
F.	Mock Up Balancing Bearing Adapter/Balancing Bearing Assembly and Slave Exit Guide Vane Cases to Determine Slave Adjusting Washer ... ..	515
3.	Assemble the Stage 7 Rotor Disk and the Stage 6-7 Spacer Ring to the Rotor Shaft Rear ... ..	518
A.	Prepare the Disk, Spacer Ring, Rotor Shaft Rear and Bolts ... ..	518
B.	Assemble the Stage 7 Rotor Disk and 6-7 Spacer Ring... ..	519
C.	Assemble the Rotor Shaft Rear to the Spacer Ring/Rotor Disk Assembly ... ..	520
4.	Assemble the Rotor Shaft Rear/Spacer Ring/Disk Assembly to the Turnover Stand ... ..	523
A.	Assemble the Mounting Plate to Rotor Shaft Rear...	523
B.	Secure the Assembly to the Turnover Stand ... ..	523
5.	Assemble the Balancing Bearing Assembly and the Rear Bearing Adapter (Part of Tool 3163) ... ..	527
A.	Assemble the Balancing Bearing Assembly ... ..	527
B.	Torque-tighten the Balancing Bearing Retaining Nut ... ..	531
C.	Assemble the Rear Bearing Adapter (Tool 3163) ... ..	531
6.	Assemble the Rear Bearing Adapter and Rotor Shaft Assembly to the Build Stand ... ..	532
A.	Remove the Assembly from the Turnover Stand ... ..	532
B.	Check the Swash of the Rear Bearing Adapter ... ..	535

SUB-ASSEMBLY

**72-31-00**

Contents 1

Dec 31/00



# OLYMPUS 593

MK.610-14-28

OVERHAUL



Para.		Page
7.	Check the Stage 7 Rotor Blade Tip Clearances ...	535
A.	Assemble the Exit Guide Vane Cases ...	535
8.	Assemble the Slave Exit Guide Vane Cases to the Rear Bearing Adapter ...	536
A.	Assemble the Cases to the Build Stand ...	540
B.	Assemble Supports to the Rear Bearing Adapter ...	540
C.	Remove the Mounting Plate from the Rotor Shaft Rear ...	540
9.	Assemble the LP Compressor Case to the Slave Exit Guide Vane Cases ...	540
A.	Prepare the LP Compressor Case ...	540
B.	Assemble the LP Compressor Case ...	542
10.	Assemble Stages 6 to 1 Rotor Disks, Spacer Rings and Labyrinth Seals ...	544
A.	Assemble the Stage 6 Rotor Disk and Stage 5-6 Spacer Ring ...	544
B.	Assemble the Stage 5 Stator Vanes and Vane Fixing Ring to the LP Compressor Case ...	551
C.	Assemble the Stage 5 Support Plug Assemblies and the Vane Retaining Bolts ...	556
D.	Assemble the Stage 5 Rotor Disk and the Stage 4-5 Spacer Ring ...	557
E.	Assemble the Stage 4 Stator Vanes to the LP Compressor Case ...	561
F.	Assemble the Stage 4 Support Plug Assemblies and the Stator Vane Retaining Bolts ...	562
G.	Assemble the Stage 4 Rotor Disk and the Stage 3-4 Spacer Ring ...	564
H.	Assemble the Stage 3 Stator Vanes to the LP Compressor Case ...	568
J.	Assemble the Stage 3 Support Plug Assemblies and the Stator Vane Retaining Bolts ...	569
K.	Assemble the Stage 3 Rotor Disk and the Stage 2-3 Spacer Ring ...	571
L.	Assemble the Stage 2 Stator Vanes to the LP Compressor Case ...	573
M.	Assemble the Stage 2 Support Plug Assembly and the Stator Vane Retaining Bolts ...	576
N.	Assemble the Stage 2 Rotor Disk and the Stage 1-2 Spacer Ring ...	577
P.	Assemble the Stage 1 Stator Vanes to the LP Compressor Case ...	579

PRINTED IN ENGLAND

SUB-ASSEMBLY

## 72-31-00

Contents 2

Jul 1/76





# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England

Para.	Page
Q. Assemble the Stage 1 Support Plug Assembly and the Stator Vane Retaining Bolts ... ..	581
R. Assemble the Stage 1 Rotor Disk ... ..	582
S. Assemble the Rotor Shaft Front to the Stage 1 Rotor Disk ... ..	588
T. Assemble the Roller Bearing Inner Track to Rotor Shaft Front ... ..	588
11. Assemble the Front Bearing Adapter and Prepare LP Compressor Assembly for Concentricity Checks ...	590
A. Assemble the Guide Adapter to the Rotor Shaft Front and Prepare the Bearing Adapter ...	590
B. Assemble the Front Bearing Adapter to the LP Compressor Case... ..	591
C. Raise the LP Compressor Assembly from the Build Stand and Locate in the Extension Stand ...	591
12. Carry Out Concentricity and Swash Checks of LP Compressor Assembly... ..	597
A. Check the Roller Bearing, the Stage 1 and Stage 7 Rotor Disks ... ..	597
13. Carry Out Dynamic Balance of the LP Compressor Assembly ... ..	598.1
A. Assemble the LP Compressor Assembly to the Balancing Machine (Avery Type 72 N56) ...	598.1
B. Dynamically Balance the LP Compressor Assembly ...	598.5
14. Prepare the LP Compressor Assembly for Final Engine Build ... ..	598.9
A. Remove the Compressor Assembly from the Balancing Machine ... ..	598.9
B. Assemble the LP Compressor Assembly to the Mobile Stand ... ..	598.10
C. Attach the Module Identification Plate to the LP Compressor Case ... ..	598.12

## TABLE OF ILLUSTRATIONS

Fig.No.	Page
501 Determining the LP Thrust Bearing Adjusting Washer Size ... ..	502
502 Measuring X Dimension (Pre-SB.72-21 Standard) ...	506
503 Measuring the 'G' Dimension ... ..	511
504 Assembling the Stage 7 Rotor Disk to the Support..	512

SUB-ASSEMBLY

# 72-31-00

Contents 3

Dec 31/00



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

Printed in England

Fig.No.		Page
505	Measuring K Dimension (Pre-SB.72-21 Standard) ...	516
506	Assembling Bolts and Assembly Pins to Stage 6-7 Spacer Ring ... ..	521
507	Assembling Rotor Shaft Rear to Stage 6-7 Spacer Ring ... ..	522
508	Assembling the Mounting Plate to Stage 6-7 Spacer Ring ... ..	524
509	Assembling Rotor Shaft Rear and Disk Assembly to the Turnover Build Stand ... ..	525
510	Assembling the Balancing LP Thrust Bearing Assembly to the Rotor Shaft Rear ... ..	526
511	Pressing the Balancing LP Thrust Bearing Assembly onto the Rotor Shaft Rear ... ..	528
512	Torque-tightening the LP Bearing Retaining Nut ...	529
513	Assembling the Rear Bearing Adapter to the Balancing LP Thrust Bearing Assembly ... ..	530
513A	Assembling the Immobilisers ... ..	532A
514	Assembling the Rear Bearing Adapter and Rotor Shaft Assembly to the Build Stand... ..	533
515	Assembling the Exit Guide Vane Cases ... ..	537
516	Checking the Swash on the Exit Guide Vane Cases...	538
517	Checking the Stage 7 Rotor Blade Tip Clearances...	539
518	Assembling the LP Compressor Case to the Slave Exit Guide Vane Cases ... ..	541
519	Assembling a Rotor Disk to the Compressor Assembly ... ..	543
520	Assembling Alignment Rods Through the Rotor Disk Bolt-Holes into the Assembly Pins... ..	545
521	Alignment Rods and Assembly Pins Protruding from the Rotor Disk ... ..	546
522	Assembling and Securing Bolts in Rotor Disk ...	548
523	Spacer Ring Assembled to the Rotor Disk ... ..	550
524	Assembling the Vane Fixing Ring ... ..	552
525	Assembling the Stator Vanes ... ..	554
526	Stage 5 Probe and Bolted Vane Positions ... ..	555
527	Stage 4 Probe and Bolted Vane Positions ... ..	560
528	Stage 3 Probe and Bolted Vane Positions ... ..	567
529	Stage 1 and 2 Probe and Bolted Vane Positions ...	575
530	Assembling the Stage 1 Rotor Disk Securing Bolts ... ..	583
531	Assembling the Multiple Leg Sling to the Stage 1 Rotor Blades ... ..	584

SUB-ASSEMBLY

## 72-31-00

Contents 4

Dec 31/00



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

Fig.No.

Page

532	Assembling the Stage 1 Rotor Disk ... ..	586
533	Assembling the Rotor Shaft Front ... ..	587
534	Securing Rotor Shaft Front and Assembling Bearing Inner Track ... ..	589
535	Lowering the Front Bearing Adapter onto the LP Compressor Case... ..	592
536	Lowering the Compressor Assembly onto the Extension Stand... ..	593
537	Turning the Compressor Assembly to the Horizontal Position ... ..	595
538	Preparing for Horizontal Lift of Compressor Assembly ... ..	596
539	Carrying out Swash and Concentricity Checks of Compressor Assembly ... ..	598
540	Preparing Compressor Assembly for Dynamic Balance ... ..	598.2
541	Balancing Washer Positions for Dynamic Balance Correction ... ..	598.4
542	Preparing to Raise the Compressor Assembly into the Vertical Position ... ..	598.6
543	Preparing for Horizontal Lift of Compressor Assembly and Raising the Compressor Assembly into the Vertical Position with Rear Bearing Adapter Uppermost ... ..	598.7
544	Assembling the Compressor Assembly onto the Mobile Stand ... ..	598.11

Printed in England

SUB-ASSEMBLY

## 72-31-00

Contents 5

Dec 31/00



OLYMPUS 593

MK.610-14-28  
OVERHAUL



LP COMPRESSOR ASSEMBLY - SUB-ASSEMBLY

1. General

- A. Prior to commencing the sub-assembly, refer to 72-09-00 Assembly for general information.
- B. Throughout the text special tools are quoted by their Ref. No. e.g. (Tool 1234). For a complete list of tooling required for the assembly and balance, and for the manufacturers Part No., refer to the Special Tools, Fixtures and Equipment Table 1002.
- C. During the sub-assembly procedure, reference will be made to the Illustrated Parts Catalogue (I.P.C.) to identify those items where the nomenclature does not positively identify them, due to the duplication of the title e.g., nuts, bolts, washers, bearings, gears, housings etc. When an item is a part of the breakdown of the text concerned, the item will be identified e.g., bolt (1-10), the one referring to the I.P.C. Fig. No., and the 10 referring to the item No. To distinguish between the LP compressor case items, which are under breakdown 72-31-01, and the rotor items, under 72-31-03, the case items will be identified by their Fig. and Item No. only, but the rotor items will be prefixed by 03/ before their Fig. and Item No., e.g. (03/1-10).
- D. During the sub-assembly procedure, where the thickness of adjusting washers has to be determined, the words 'select' or 'select from the range' are used. If a range of washers is not available, it may be necessary to machine the washer to achieve the desired thickness. The information for machining washers is given under chapter 72-09-21 Repair. During the assembly procedure, the machining procedure reference will be given immediately after each adjusting washer I.P.C. Ref. No. in the appropriate part of the text e.g. select from the range the correct thickness adjusting washer (3-70) (72-09-21 Repair, Fig.401).
- E. This chapter details the work necessary for preparing the LP compressor assembly ready for engine final build. The assembly comprises the LP compressor case and vanes and the LP rotor, but in addition the LP thrust bearing assembly, which is allocated to the intermediate case section (72-32-00) is temporarily assembled to the LP rotor shaft rear for dimensional checks. After the check the LP bearing assembly is then returned to the intermediate section.

SUB-ASSEMBLY

**72-31-00**

Page 501  
Apr 1/77

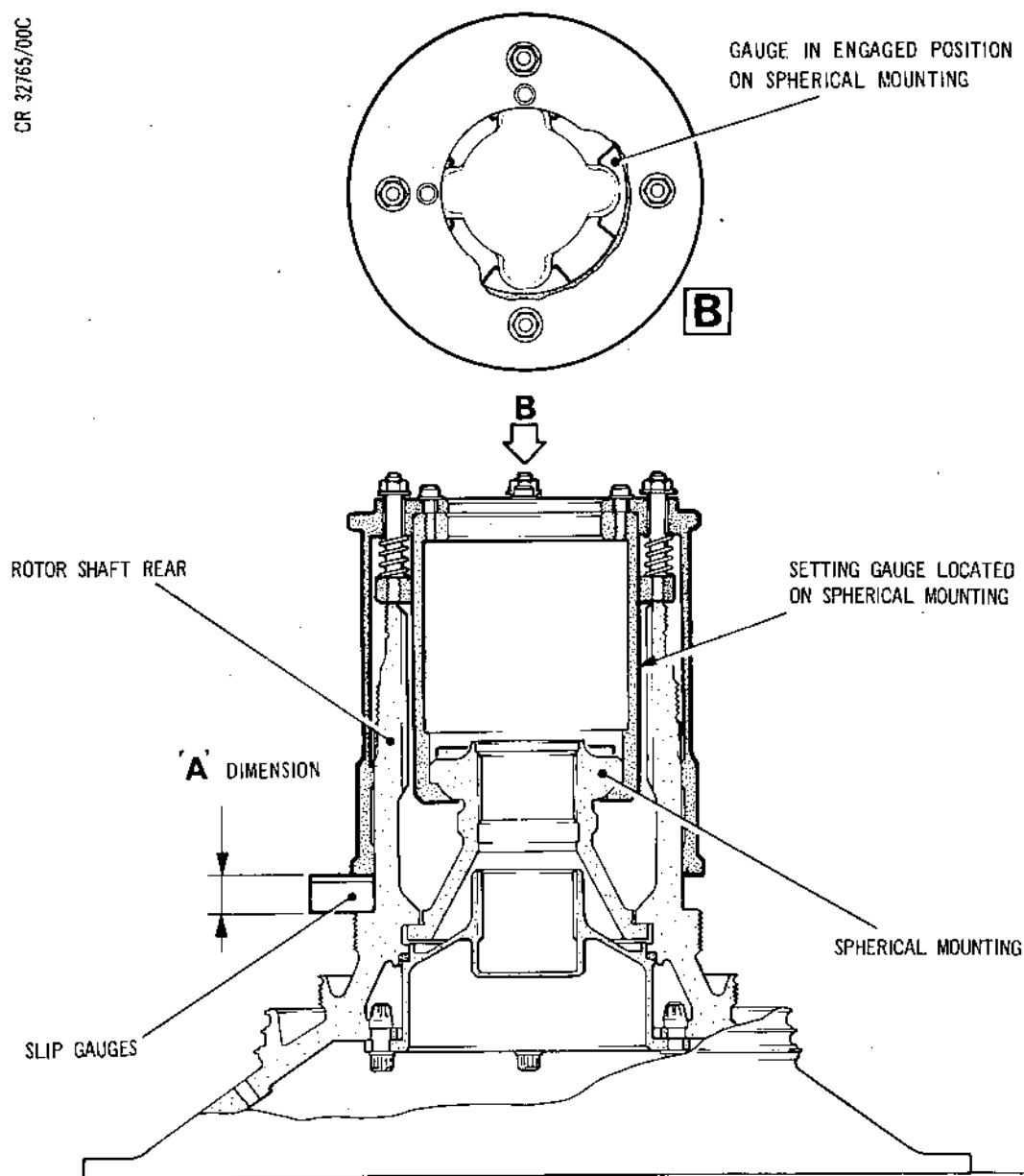


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32765/00C



FN20411

Determining the LP Thrust Bearing Adjusting Washer Size  
(SB.72-21 Standard)  
Figure 501

SUB-ASSEMBLY  
**72-31-00**  
Page 502  
Jul 1/76



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- F. The LP compressor case and vanes will be received from 72-31-01 Assembly, with the stage 6 vanes assembled and any necessary plugs and blanks assembled. The LP exit guide case with its vanes, plugs and blanks assembled will be received from 72-31-02 Assembly.
- G. The LP compressor rotor will be received from 72-31-03 Assembly, ready for assembly into the LP case. The blades will have been mass moment weighed, the bladed compressor disks balanced, the blades numbered for position and locked (as appropriate), and the datum points marked. Prior to the assembly of the bladed compressor disks to the casings, the No.1 datum blade of each stage may be painted to assist identification of blade positions when internal examinations of the LP compressor are carried out during the operation of the engine. Refer to Standard Practices 72-09-00 Assembly.
- H. Throughout the compressor build the assembly is supported on a slave bearing assembly, the work commencing with the stage 7 rotor disk and progressing forward.
- J. After completion of the build the compressor assembly is raised from its build stand then turned through 90 deg by means of supporting its rear end in a support stand and lowering to the horizontal position.
- K. Install compressor assembly to balancing machine and carry out swash and concentricity checks.
- L. On completion of satisfactory swash and concentricity checks, the compressor assembly will be dynamically balanced, removed from the machine then turned through 90 deg, rear bearing adapter uppermost. From this position the assembly is released from the front support stand then lowered into the mobile stand and transferred to the final build area. The front and rear balancing bearing adapters will be removed during the engine final build sequences.

## 2. Determine Engine and Slave Washer Sizes and Dimension 'G'

NOTE: On Pre-SB.72-21 standard engines, the LP compressor assembly is built with a slave adjusting washer of additional thickness, and the balancing bearing assembly will not have the oil thrower assembled. For Pre-SB.72-21 standard engines refer to para.B for adjusting washer procedure.

SUB-ASSEMBLY

72-31-00

Page 503

Dec 31/00



OLYMPUS 593

MK.610-14-28  
OVERHAUL



A. Assemble the Setting Gauge to the Rotor Shaft Rear  
(SB.72-21 Standard) (Ref.Fig.501).

- (1) Before proceeding with dimensional checks, ensure that items 03/3-180, 190, 200, 210 and 220 have been assembled to the rotor shaft rear (03/3-230).
- (2) Check that both the rotor shaft rear (03/3-230) and gauge (Tool 275) contact areas are clean and free from nicks or burrs, lightly stone if necessary.
- (3) Apply lubricant 'A' to the bearing area of the LP rotor shaft rear, then assemble the gauge (Tool 275) over the shaft. Push the gauge fully forward then turn 45 deg. in either direction and release so that the gauge engages under the lands of the spherical mounting.
- (4) Using slip gauges determine the distance between the front face of the gauge and the adjusting washer abutment face. Record this measurement as Dimension A. The adjusting washer required =

Dimension A - 0.5 in. (12,7 mm)

NOTE: The size of the adjusting washer is controlled by the part number and is raised by increments of 0.004 in. (0,101 mm) through the range, the last figure of the part number being raised by one for every 0.004 in. (0,101 mm) increment.

- (5) Remove the gauge and place in its container (Tool 698). Select the correct size adjusting washer (03/3-70) (72-09-21 Repair, Fig.401) from the range. Label the washer with the engine number and place to one side. Record the final thickness of the adjusting washer on the appropriate record sheet.

SUB-ASSEMBLY

**72-31-00**

Page 504

Apr 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



- B. Mock Up Rotor Shaft Rear, Stage 6-7 Spacer Ring, Stage 7 Rotor Disk and Gauge to Determine LP Bearing Adjusting Washer (Pre-SB.72-21 Standard) (Ref.Fig.502).

NOTE: During the mock up of the assembly refer to Fig.503, 505 to 509 for guidance.

- (1) Place the support (Tool 1095) on the worktop, then assemble the stage 7 rotor disk (03/3-340) to the support with the leading edge of the blades uppermost.
- (2) Assemble the stage 6-7 spacer ring (03/3-270) to the rotor disk aligning the smaller holes of the spacer with those of the rotor disk. Temporarily secure the spacer with six equi-spaced bolts (03/3-310) and nuts (03/3-260).
- (3) Insert six equi-spaced bolts (03/3-250) through the rear of the spacer (bolts to extend forward), then screw an assembly pin (Tool 1067) onto each of the six bolts.
- (4) Assemble the lifting fixture (Tool 1017) to the rotor shaft rear (03/3-230), then attach the overhead hoist to the fixture.
- (5) Assemble the rotor shaft rear to the stage 6-7 spacer ring, then pull the six bolts through the spacer and shaft and retain with the spring clips (Tool 1038). Remove the hoist then remove the lifting fixture.
- (6) Turn the turnover stand (Tool 697) so that the ring of the lifting plate is uppermost. Attach a hoist to the mounting plate (part of tool 697), then release the mounting plate from the turnover stand and transfer it to the mock up. Lower the plate over the six bolts; then assemble six slave nuts (not self-locking) to the bolts, remove the retaining clips then tighten the bolts.

PRINTED IN ENGLAND

TN20412

SUB-ASSEMBLY

**72-31-00**

Page 505

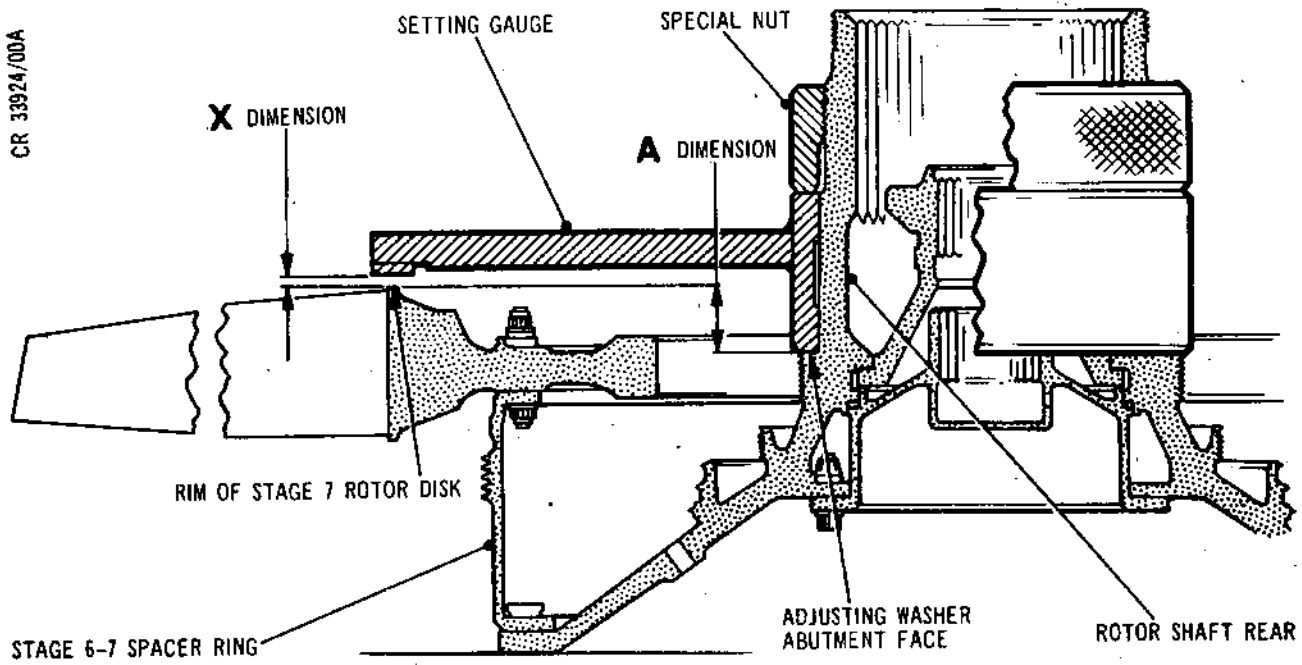
Jun 1/77





OLYMPUS 593

MK.610-14-28  
OVERHAUL



TN17995

Measuring X Dimension (Pre-SB.72-21 Standard)  
Figure 502

SUB-ASSEMBLY  
**72-31-00**  
Page 506  
Jul 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (7) Attach the overhead hoist to the ring of the lifting plate, then raise the lifting plate/rotor shaft assembly and transfer it to the turnover stand.
- (8) Centralise the assembly over the turnover stand, then lower the assembly to locate it on the locating pegs of the stand. Finally secure the mounting plate to the stand with the four pivoting bolts and nuts (Ref.Fig.509).

NOTE: Although Fig.509 represents a final build sequence, it may be referred to for the 'mock up' as a guide for assembling the 'mock up' to the build stand.

- (9) With the 'mock up' assembly secure in the build stand, release the hook of the hoist from the lifting ring of the mounting plate, then using the turnover stands cranked handle, turn the assembly until the rotor shaft rear is uppermost.
- (10) Ensure that the adjusting washer abutment face on the rotor shaft rear is clean, then apply lubricant 'A' to the bearing location.
- (11) Assemble the setting gauge (Tool 72) (Ref.Fig.502) to the rotor shaft so that the leg on the outer extremity of the gauge extends towards the rim of the stage 7 rotor disk. Screw the special nut (Tool 143) onto shaft to secure the gauge.
- (12) Using slip gauges, measure the distance between the rim of the stage 7 rotor disk and the setting gauge, then record the measurement as Dimension X (Ref.Fig.502).

NOTE: It is important that the dimension is taken from the rim of the disk and not the rear of the stage 7 rotor blade platform.



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (13) Calculate and record dimension A, which is the distance from the washer abutment face to the rim of the stage 7 rotor disk.

$$\text{Dimension A} = 1.250 \text{ in. (31,750 mm)} - X$$

Where 1.250 in. (31,750 mm) is the setting gauge (Tool 72) working dimension and X is the dimension obtained in para.(12).

NOTE: Dimension A is required to calculate the LP bearing adjusting washer and the balancing bearing adjusting washer.

CAUTION: THE ENGINE WASHER AND SLAVE WASHER ON PRE-SB.72-21 STANDARD ENGINES CANNOT BE USED IN LIEU OF EACH OTHER SINCE THEIR DIMENSIONS WILL NOT BE THE SAME.

- (14) Obtain and record from 72-32-00 Assembly the B dimension which is the distance from the front face of the LP exit guide case flange (with the cases assembled to the intermediate case), to the front face of the LP oil thrower with the thrust loaded fully forward.
- (15) Calculate and record the thickness of the LP bearing adjusting washer (03/3-70).
- $$\text{Washer thickness} = B - (1.727 \text{ in. (43,865 mm)} - A)$$
- Where 1.727 in. (43,865 mm) is the mean engine setting dimension, A is the dimension obtained in para.(13) and B obtained from para.(14).
- (16) Select the correct thickness adjusting washer (03/3-70) (72-09-21 Repair, Fig.401) from the range, log its actual thickness on the appropriate record sheet then suitably identify the washer and place to one side.
- (17) Unscrew and remove the special nut from the rotor shaft rear, then remove the gauge and place both items in a container.

SUB-ASSEMBLY

72-31-00

Page 508

Dec 31/00



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (18) Ensure that the assembly is secure in the turnover stand, then using the cranked handle, turn the stand until the lifting/mounting plate is uppermost.
  - (19) Attach the overhead hoist to the ring of the lifting plate, then release the four bolts retaining the lifting plate. Carefully raise the lifting plate/rotor shaft rear assembly from the build stand, then transfer the assembly to the support (Tool 1095) and release the hook of the hoist.
  - (20) Disassemble the 'mock up' components using the lifting fixture (Tool 1017) to lift out the rotor shaft rear, then remove the lifting fixture. Place the rotor shaft rear stage 7 rotor disk and 6-7 spacer ring in their respective containers.
- C. Assemble the Adjusting Washer and LP Bearing Assembly to Rotor Shaft Rear (Ref.Fig.503).

NOTE: The items in this operation are temporarily assembled for the purpose of the dimensional check to assist the intermediate case build personnel in calculating the LP probe adjusting washers. The operator may choose to carry out the dimensional check during engine assembly (Ref. Assembly 72-00-00 para.7A), in which case ignore the following and paragraphs 2D and 2E and proceed to para.2F.

- (1) If not already in position assemble the mounting plate (Tool 1294) to the turnover build stand (Tool 697), then turn the build stand (if necessary) so that the mounting plate abutment face is uppermost.
- (2) Assemble and secure the lifting fixture (Tool 806) to the rotor shaft rear (03/3-230).
- (3) Using the overhead hoist, transfer the rotor shaft rear to the mounting plate assembled to the build stand, then secure the shaft with slave bolts and nuts. Release and remove the lifting fixture (Tool 806).
- (4) Assemble the previously calculated adjusting washer (03/3-70) (Ref.para.A.(4) or para.B.(15) for Pre-SB.72-21 standard) to the rotor shaft rear.

SUB-ASSEMBLY

72-31-00

Page 509

Jun 1/99



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

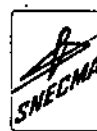
- (5) Remove the LP thrust bearing assembly from its protective container then check the following:
  - (a) The LP bearing housing (72-32-00/1-270) engine symbol.
  - (b) The correct size oil thrower (72-32-00/1-200) has been assembled.
  - (c) The thrust arrows on the bearing (72-32-00/1-190) inner tracks when aligned, point towards the oil thrower.
  - (d) The bearing retaining plate (72-32-00/1-170) is seating correctly.
- (6) Apply a small quantity of lubricant 'A' to the bearing area of the rotor shaft rear. Raise the LP bearing assembly, then position the assembly so that the bearing rests squarely on the rotor shaft rear.
- (7) Ensure that the adapter (Tool 284) is screwed onto the centre thrust plate of the mechanical driver (Tool 1099), then lower the driver onto the rotor shaft and screw the adapter onto the shaft ensuring that it is not overtightened. Turn the 'T' handle in a clockwise direction and press the bearing home. Unscrew and remove the mechanical driver.

NOTE: If Tool 1100 is not available, then items 72-32-00/1-40 and 1-50 may be used in its place.
- (8) Ensure the probe operating ring (03/3-40) is to SB.72-95 standard.



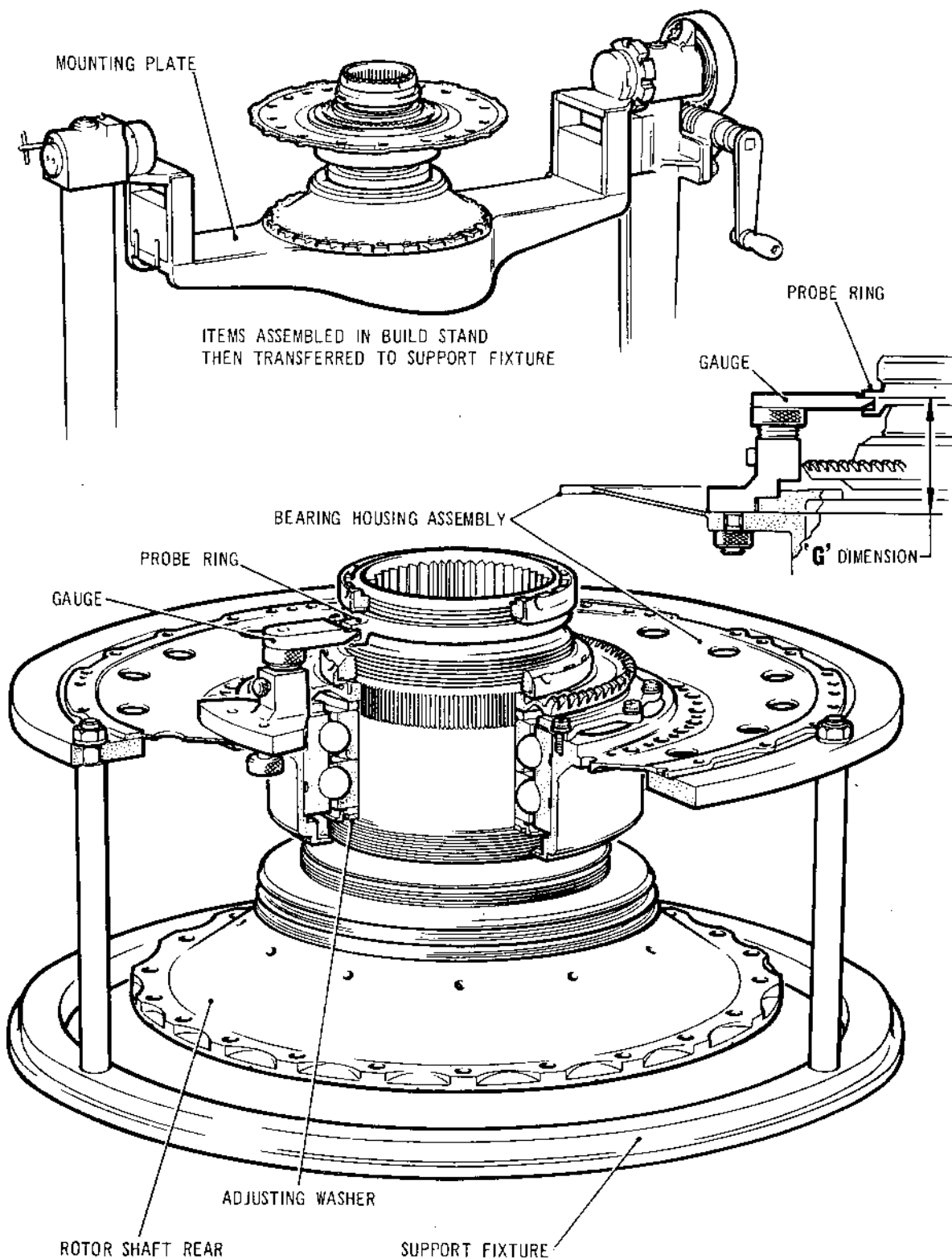
OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 32766/00A

PRINTED IN ENGLAND



Measuring the 'G' Dimension  
Figure 503

TN20413

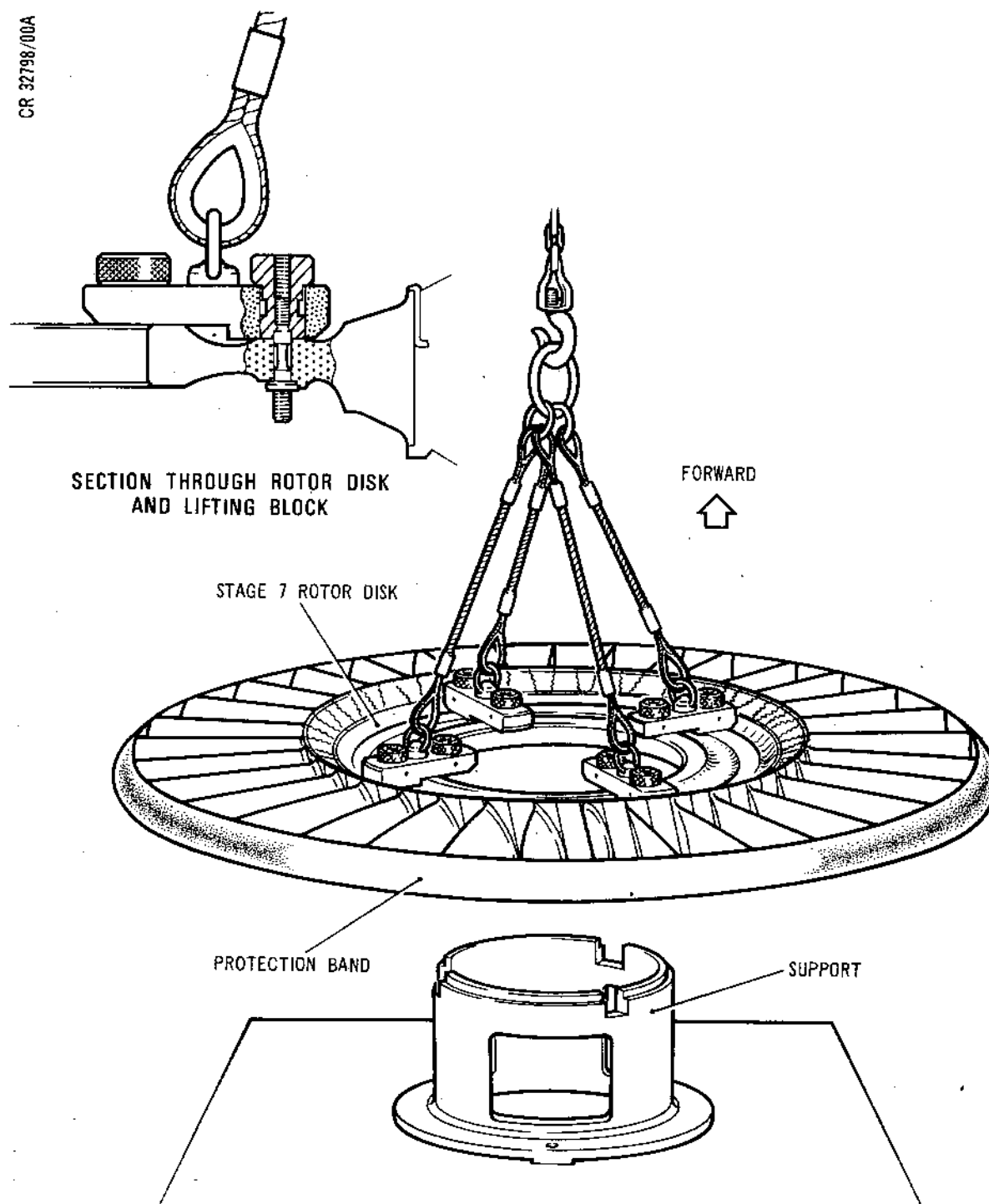


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32798/00A



Assembling the Stage 7 Rotor Disk to the Support  
Figure 504

SUB-ASSEMBLY

72-31-00

Page 512

Jul 1/76

TN20415



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (9) Assemble a slave packing piece (Tool 1100) to the rotor shaft rear, this takes the place of the LP bevel gear and washer, then assemble the locking washer (03/3-60). Apply lubricant 'B' to the threads of the plain round nut (03/3-50), then assemble the nut to the shaft and tighten with a hand wrench (Tool 1551).
- (10) Ensure four pins (03/3-30) have been assembled to the probe ring then assemble the probe ring (03/3-40) and locking washer (03/3-20) to their correct position on the rotor shaft rear. Apply lubricant 'B' to the threads of the retaining nut (03/3-10), then assemble the nut to the shaft.
- (11) Insert the sleeve (Tool 696) into the rotor shaft rear, then locate the immobilizer (Tool 1330) in the rotor shaft internal splines. Assemble the wrench (Tool 325) to the retaining nut, then lower the multiplier (Tool 1333) onto the wrench engaging the drive in the immobilizer and the spigots in the wrench. It may be necessary to turn the multiplier drive to engage it in the immobilizer.
- CAUTION: CHECK THE INPUT OUTPUT RATIO ON THE MULTIPLIER.
- (12) Using a torquemeter wrench, torque-tighten the probe ring retaining nut between 300 and 330 lbf ft (407 and 448 N.m). Remove the multiplier, wrench, immobilizer and sleeve from the rotor shaft rear.
- (13) Assemble and secure the lifting fixture (Tool 806) to the rotor shaft rear then attach a hoist to the fixture. Release and remove the slave nuts and bolts securing the rotor shaft rear to the mounting plate, then operate the hoist and position and lower the shaft onto the support (Tool 805). Release and move the hoist and lifting fixture.

PRINTED IN ENGLAND

TN18794

SUB-ASSEMBLY

72-31-00

Page 513

May 1/79





OLYMPUS 593

MK.610-14-28  
OVERHAUL



D. Measure Dimension 'G' (Post and Pre-SB.72-21 Standard)  
(Ref.Fig.503).

- (1) Assemble the checking gauge (Tool 43) to the LP bearing housing (72-32-00/1-270) rear inner abutment face.
- (2) Adjust the gauge so that the arm of the gauge contacts the rear inside face of the probe ring lug, then lock the gauge in this position.
- (3) Remove the gauge, then by direct measurement, measure from the top of the arm to the LP bearing/gauge abutment face, record this as dimension G. Place the gauge in its container (Tool 824).

E. Disassemble Items from Rotor Shaft Rear.

- (1) Assemble the lifting fixture (Tool 806) to the rotor shaft rear, then using the overhead hoist, transfer the shaft and LP bearing assembly to the turnover stand (Tool 697) mounting plate. Secure the shaft to the mounting plate with bolts and nuts. Remove the lifting fixture.
- (2) Insert the sleeve (Tool 696) into the rotor shaft rear, then locate the immobilizer (Tool 1330) in the rotor shaft internal splines. Assemble the wrench (Tool 325) to the retaining nut, then lower the multiplier (Tool 1333) onto the wrench engaging the drive in the immobilizer and the spigots in the wrench. It may be necessary to turn the multiplier drive to engage it in the immobilizer.
- (3) Using a wrench, de-torque the probe ring retaining nut. Remove the multiplier, wrench, immobilizer and sleeve. Remove the retaining nut and probe.

TN11428

SUB-ASSEMBLY

**72-31-00**

Page 514

Jul 1/76



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (4) Using the hand wrench (Tool 1551), unscrew and remove the LP thrust bearing plain round nut (03/3-50), then remove the packing piece (Tool 1100) or bevel gear and washer.
- (5) Lift the mechanical puller (Tool 283) onto the shaft, then screw the central adapter onto the shaft threads (do not overtighten). Retain the puller at the outer location to the bearing housing.
- (6) Turn the 'T' piece of the puller clockwise to remove the bearing assembly, then place the bearing assembly in a protective container. On engines to Pre-SB.72-21 standard ensure that the engine washer is removed, labelled and placed in a container.
- (7) Assemble and secure the lifting fixture (Tool 806) to the rotor shaft rear, then attach a hoist to the fixture. Release and remove the slave nuts and bolts securing the shaft to the mounting plate, then using the hoist, transfer the rotor shaft rear to a worktop. Release and remove the hoist and lifting fixture. If work is not to be continued immediately, assemble protectors to the rotor shaft rear.

**F. Mock Up Balancing Bearing Adapter/Balancing Bearing Assembly and Slave Exit Guide Vane Cases to Determine Slave Adjusting Washer (Ref.Fig.505).**

- (1) Ensure the bearing adapter abutment face on the build stand (Tool 1093) is clean and also the corresponding abutment face on the rear bearing adapter (Tool 344).
- (2) Using suitable lifting equipment, attach it to the rear bearing adapter, then using the overhead hoist position the adapter so that the front face of the adapter is uppermost. Release the lifting equipment.

SUB-ASSEMBLY

**72-31-00**

Page 515

Dec 31/00



OLYMPUS 593

MK.610-14-28

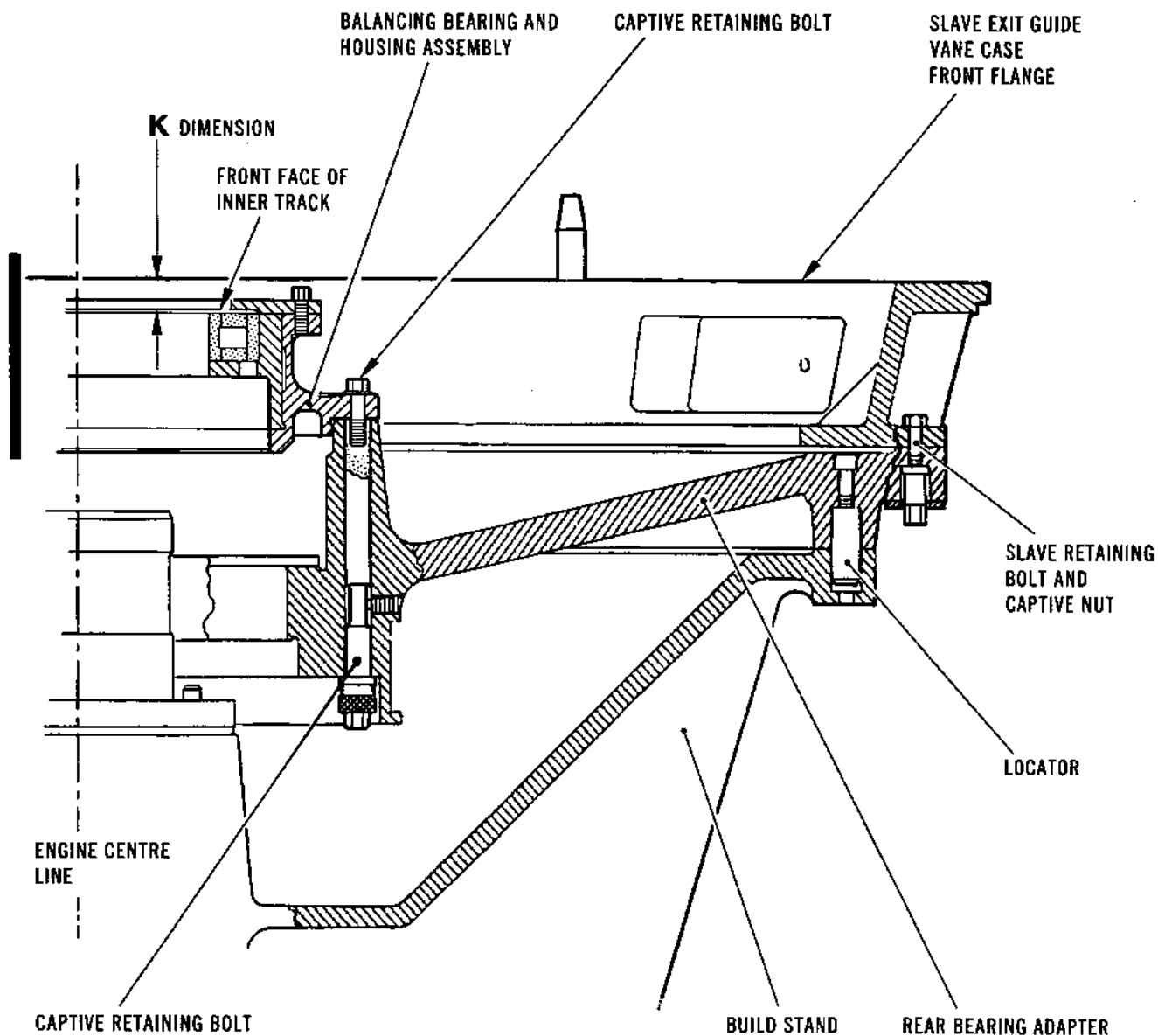
OVERHAUL



sneema

Printed in England

CR 33943/008  
BS00029211/1



Measuring K Dimension (Pre-SB.72-21 Standard)  
Figure 505

SUB-ASSEMBLY  
**72-31-00**  
Page 516  
Dec 31/00



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (3) Using suitable lifting equipment, attach it to the front of the rear bearing adapter, then using the overhead hoist raise the adapter and position it square above the build stand (Tool 1093). Lower the rear bearing adapter onto the build stand positioning the locators correctly. Remove the lifting equipment.
- (4) Clean the balancing bearing outer (Tool 3163) rear flange and the corresponding front inner flange of the bearing adapter, then assemble the balancing bearing assembly to the rear bearing adapter. Temporarily retain the balancing bearing assembly with the captive bolts.
- (5) Obtain the slave exit guide vane (e.g.v.) cases (Tool 398) ensuring they are a matched set, then assemble them to the front face of the rear bearing adapter and temporarily retain them with slave bolts and nuts.
- (6) Clean the front flange of the slave e.g.v. cases, then place two machine blocks diametrically opposite each other on the flange. Position a straight edge across the blocks.
- (7) Measure from the front face of the e.g.v. case flange to the front face of the inner track of the slave bearing, then record the dimension. Repeat the measuring on the opposite side of the inner track. Reposition the block and straight edge 90 deg then obtain two more measurements. Obtain the mean dimension from the four results and record as dimension K.
- (8) Determine the end-float of the balancing bearing, then subtract the end-float dimension from dimension K (Ref.para.(7)) and record the resultant dimension as M.

SUB-ASSEMBLY

72-31-00

Page 517

Dec 31/00



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

- (9) Calculate and record the required balancing bearing adjusting washer (Tool 345) thickness.

$$\text{Washer thickness} = M - (1.727 \text{ in. (43,865 mm)}) - A$$

Where 1.727 in. (43,865 mm) is the mean engine setting dimension, M is the dimension obtained in para.(8) and A is the dimension obtained in para.B.(13).

- (10) Remove the straight edge, machine blocks and place in a container.
- (11) Disassemble the slave e.g.v. case and place them as a matched set on a pallet.
- (12) Remove the balancing bearing assembly from the rear bearing adapter, then place the bearing assembly in a protective container.
- (13) Using the lifting equipment, remove the rear bearing adapter from the build stand and place on a pallet.
- (14) Proceed with the build (Ref.para.3) observing the Pre-SB.72-21 references.

### 3. Assemble the Stage 7 Rotor Disk and the Stage 6-7 Spacer Ring to the Rotor Shaft Rear

- A. Prepare the Disk, Spacer Ring, Rotor Shaft Rear and Bolts.

NOTE: Where no specific instruction has been given to remove protectors from components, it is assumed that the protector will be removed prior to the assembly of the component.

- (1) If not already in position, assemble a protection/retaining band (Tool 1129) to the rotor blades. Check that the front and rear abutment faces of the disk (03/3-340) and spacer ring (03/3-270) are clean and free from damage marks, lightly stone if necessary. Lightly stone the disk abutment face of the rotor shaft rear (03/3-230). Check that the labyrinth seal on the spacer ring is undamaged.

SUB-ASSEMBLY

72-31-00

Page 518

Dec 31/00



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

B. Assemble the Stage 7 Rotor Disk and 6-7 Spacer Ring.

**CAUTION:** PREVIOUSLY USED BOLTS (03/3-310) MUST BE  
DISCARDED AND REPLACED WITH 24 NEW ITEMS.

- (1) Apply lubricant 'B' to 24 bolts (03/3-310), then place a support (Tool 1095) onto a worktop. Assemble the multiple leg sling (Tool 1217) to the front face of the stage 7 rotor disk (03/3-340) with the leading edge of the rotor blades uppermost and secure the sling to the disk with four slave bolts (Tool 1164). Attach a hoist to the sling, then position and lower the rotor disk onto the support (Ref.Fig.504). Release and remove the hoist and sling.
- (2) Release and remove the protector (Tool 1170) from the stage 6-7 spacer ring, then assemble the spacer ring to the stage 7 rotor disk with the front face of the ring uppermost, identified by aligning the smaller holes with the corresponding small holes in the rotor disk. Ensure that the datum markings on the spacer ring correlate with the datum markings on the rotor disk.

**NOTE:** All datums coincide with the No.1 rotor blade, and No.1 bolt-hole, and all true datums throughout the rotating assembly are defined by two circles with an arrow each side pointing towards the circles → 00 ←. It is most important to check all datum positions before and after every build sequence.

- (3) With the stage 6-7 spacer ring correctly assembled, insert a bolt (03/3-310) through the rear of the disk into the 6-7 spacer ring, retain the bolt in position with a locking nut (03/3-260). Proceed in a clockwise direction with the remaining 23 bolts and nuts. Run each nut down the bolt threads until the nuts 'nip' the spacer ring flange. Check that the bolt platforms are correctly located in the rear of the stage 7 rotor disk.

SUB-ASSEMBLY

72-31-00

Page 519

Dec 1/95

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

**CAUTION:** IT IS OF THE UTMOST IMPORTANCE THAT THE SPECIFIED TORQUE VALUES FOR BOLTS (03/3-310) ARE ADHERED TO.

- (4) Using a torque wrench (Tool 1612) tighten the 24 bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m) in the following sequence: 1, 13, 7, 19, 4, 16, 10, 22, 2, 14, 8, 20, 5, 17, 11, 23, 3, 15, 9, 21, 6, 18, 12 and 24. Locking (run-down) torque 3.5 lbf in. (0,4 N.m).
  - (5) After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 1.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref.SB.72-8449-191).
  - (6) Insert a bolt (03/3-250) into a bolt-hole in the front flange of the stage 6-7 spacer with the bolt head facing to the rear. Screw an assembly pin (Tool 1067) onto the bolt, then allow the bolt to move rearward and rest on the nuts securing the 6-7 spacer ring and stage 7 disk. Continue in a clockwise direction with the remaining 23 bolts (Ref.Fig.506).
- C. Assemble the Rotor Shaft Rear to the Spacer Ring/Rotor Disk Assembly (Ref.Fig.507).
- (1) Slacken the thumbnut on the lifting fixture (Tool 1017) sufficiently to disengage the sliding arm, then assemble the lifting fixture to the larger diameter of the rotor shaft rear. Engage the sliding arm into one of the slots in the locking cone, then lock the arm with the thumbnut. Attach the overhead hoist to the lifting fixture, then raise the rotor shaft rear (03/3-230) above the assembled 6-7 spacer ring and stage 7 rotor disk. Align the datum symbols marked on the 6-7 spacer ring with the datum marks on the periphery of the rotor shaft rear, which will line up with the No.1 blade slot (Ref.Fig.507).
  - (2) Carefully lower the rotor shaft over the assembly pins until the rotor shaft abutment face contacts the spacer ring. Check that the datum symbols on the stage 7 rotor disk, 6-7 spacer ring and the rotor shaft are in line. Remove the hoist and lifting fixture.
  - (3) Pull an assembly pin through the rotor shaft rear until the bolthead abuts its location in the spacer ring, then assemble a spring retaining clip (Tool 1038) ensuring the "L" shape tang faces outward. Pull the remaining 23 bolts through into position assembling a retaining clip to each bolt.

SUB-ASSEMBLY

**72-31-00**

Page 520

Jun 30/01



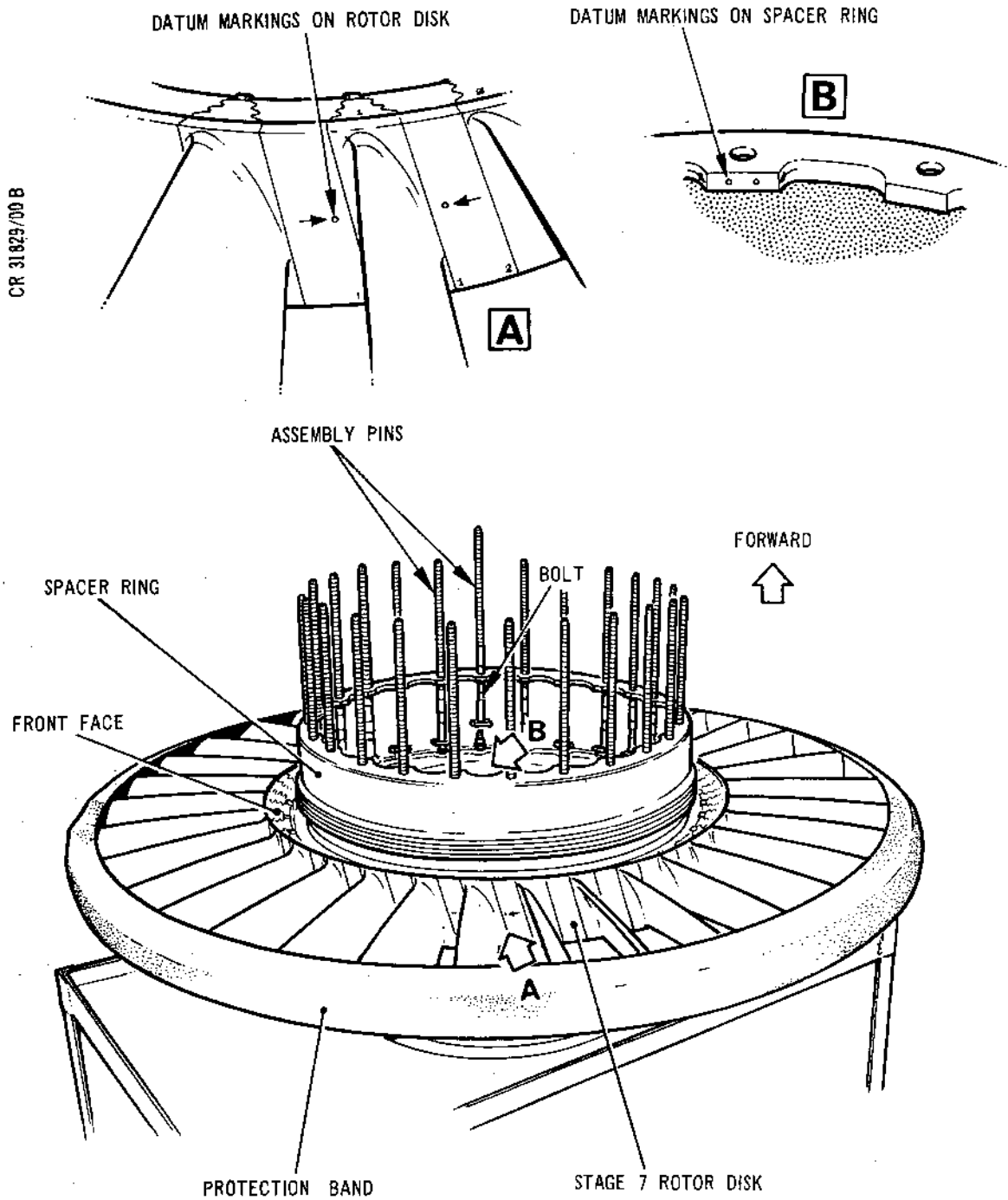
OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND



Assembling Bolts and Assembly Pins to Stage 6-7 Spacer Ring  
Figure 506

SUB-ASSEMBLY

72-31-00

Page 521

Jul 1/76

TN20417



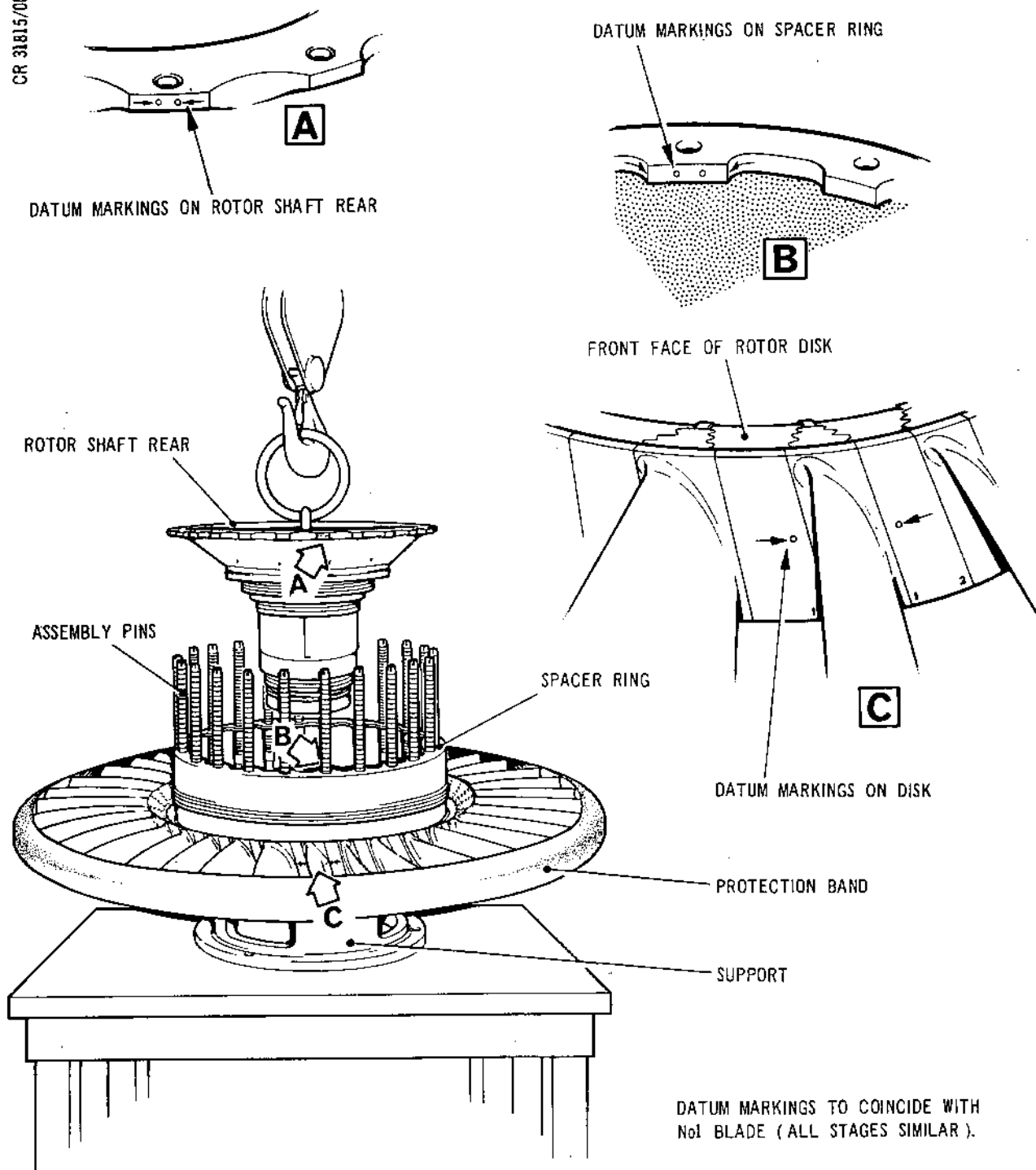


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31815/00B



TN20418

Assembling Rotor Shaft Rear to Stage 6-7 Spacer Ring  
Figure 507

SUB-ASSEMBLY  
**72-31-00**  
Page 522  
Jul 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



4. Assemble the Rotor Shaft Rear Spacer Ring/Disk Assembly to the Turnover Stand

A. Assemble the Mounting Plate to Rotor Shaft Rear  
(Ref.Fig.508).

- (1) Turn the turnover stand (Tool 697) until the mounting plate is uppermost. Attach the overhead hoist to the lifting ring of the mounting plate, then unscrew the nuts securing the mounting plate to the turnover stand. Raise the mounting plate clear of the turnover stand.
- (2) Transfer the mounting plate to the rotor shaft/spacer ring/disk assembly. Raise the mounting plate above the assembly, align the assembly pins with the mounting plate bolt-holes, then lower the plate onto the rotor shaft abutment face. Slight adjustment of the retaining clips may be necessary so that they locate freely in the accommodating slots machined in the rear face of the mounting plate.
- (3) Assemble slave nuts to four bolts at four equi-spaced positions. Remove the spring retaining clips at these positions, then tighten the four slave nuts.

B. Secure the Assembly to the Turnover Stand (Ref.Fig.509).

- (1) Raise the assembly from the worktop, then transfer it to the turnover stand (Tool 697).
- (2) Depress the pedal controlling the lock on the trunnion arm, then turn the cranked handle of the turnover stand to bring the moveable arm into its uppermost position.
- (3) Release the locking pin securing the trunnion arm, then reposition the arm to its uppermost position. Lock the arm. Lower the rotor shaft/spacer ring/disk assembly onto the trunnion arms (Ref.Fig.509) taking care not to damage the stage 7 blades against the stand. Secure the assembly to the trunnion arms with slave nuts and washers. Disconnect the hoist.

PRINTED IN ENGLAND

TN45885

SUB-ASSEMBLY

72-31-00

Page 523

Jul 1/76

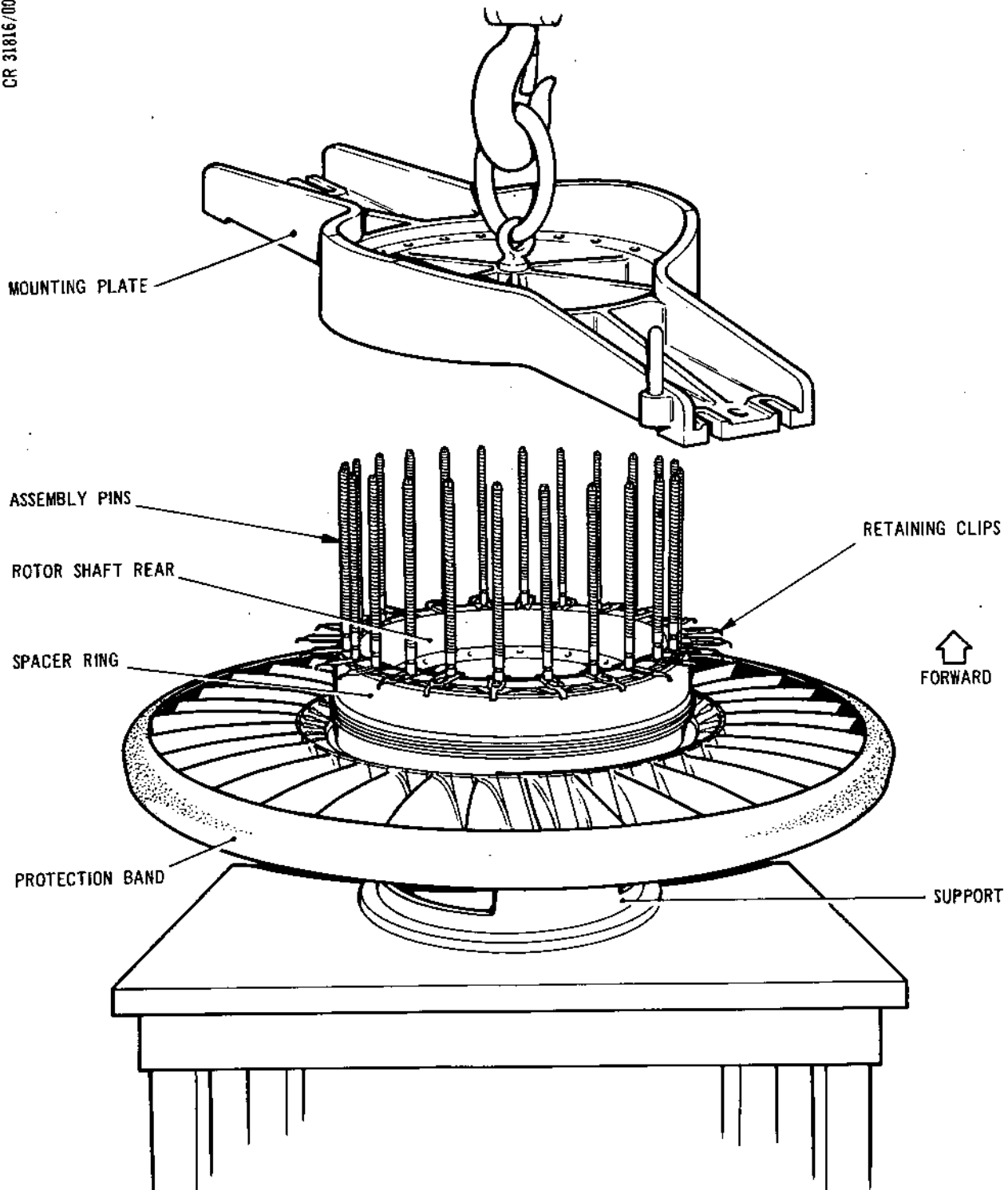


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 31816/00 B



TN20419

Assembling the Mounting Plate to Stage 6-7 Spacer Ring  
Figure 50g

SUB-ASSEMBLY  
**72-31-00**  
Page 524  
Jul 1/76



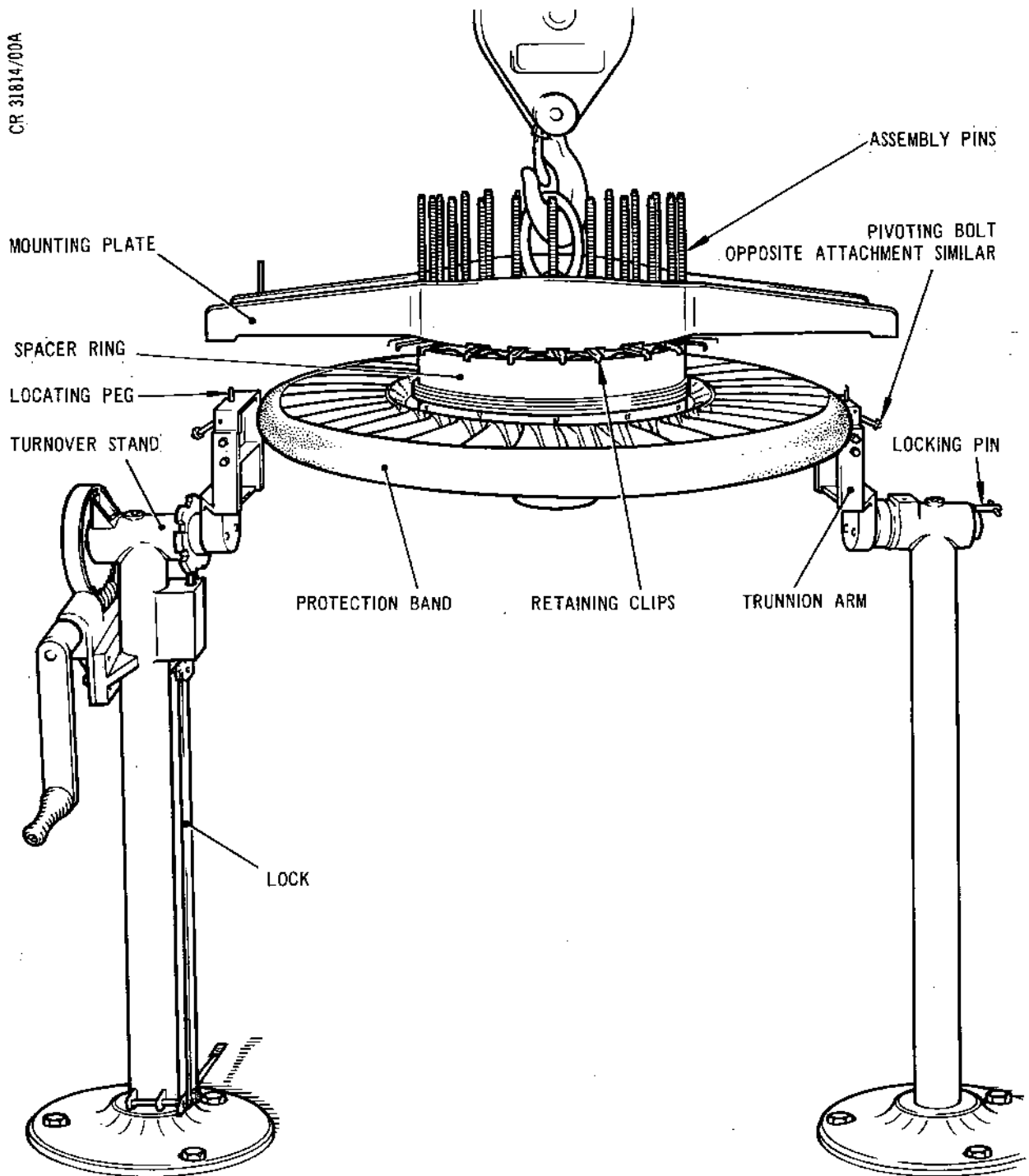
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31814/00A

PRINTED IN ENGLAND



TN24544

Assembling Rotor Shaft Rear and Disk Assembly  
to the Turnover Build Stand  
Figure 509

SUB-ASSEMBLY  
**72-31-00**  
Page 525  
Jul 1/76



# OLYMPUS 593

MK.610-14-28

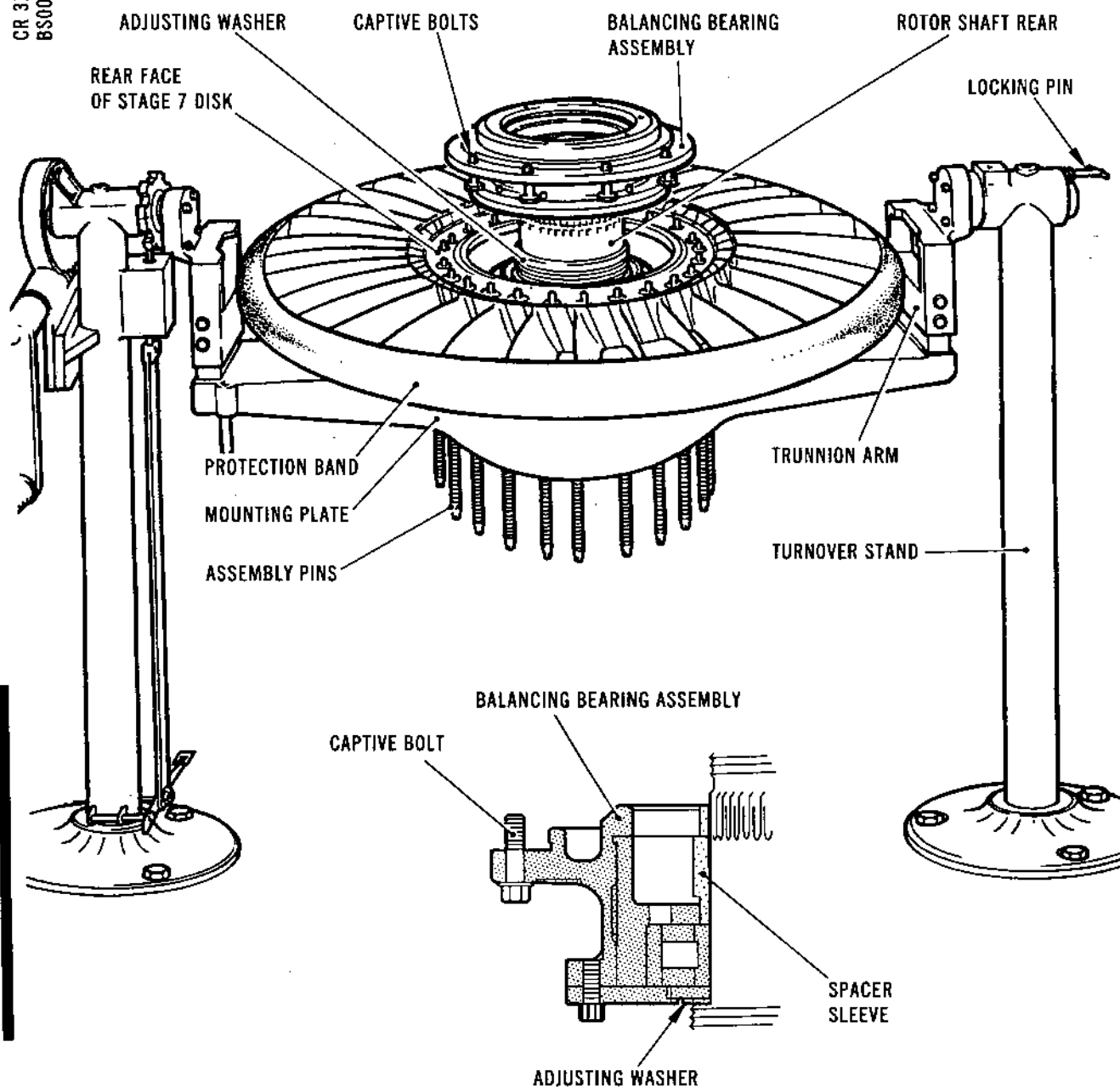
OVERHAUL



sneema

Printed in England

CR 31819/00C  
BS00029212/1



Assembling the Balancing LP Thrust Bearing Assembly  
to the Rotor Shaft Rear  
Figure 510

SUB-ASSEMBLY

## 72-31-00

Page 526  
Dec 31/00



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (4) Pull the locking pin to release the trunnion arm, turn the thumbscrew on the pin to retain the pin in the unlocked position. Depress the pedal controlling the lock on the opposite trunnion arm, then turn the stand through 180 deg so that the rotor disk is uppermost. Lock the trunnion arms by operating the foot pedal in conjunction with the locking pin.

5. Assemble the Balancing Bearing Assembly and the Rear Bearing Adapter (Part of Tool 3163)

NOTE: Remove protector assemblies (Tools 3161 and 3162) before proceeding.

A. Assemble the Balancing Bearing Assembly (Ref.Fig.510).

- (1) Apply lubricant 'A' to the bearing surface of the rotor shaft rear.
- (2) On engines to SB.72-21 standard, assemble the correct size adjusting washer (03/3-70) previously determined in para.2.A.(4) to the rotor shaft rear. On engines to Pre-SB.72-21 standard assemble the slave adjusting washer (Tool 345) previously calculated in para.2.F.(8) to the rotor shaft rear.

NOTE: If an adjusting washer (03/3-70) of the size required is not available, then a slave washer of the same size may be used providing that the washer is clearly marked 'slave' and marked with red paint on its periphery. The correct size engine washer must be assembled during 72-00-00, Assembly.

- (3) Offer the balancing bearing assembly part of Tool 3163 on engines to SB.72-21 standard or Tool 346 on engines to Pre-SB.72-21 standard, to the rotor shaft rear, positioning the bearing so that it rests square with the shaft (Ref.Fig.510). Screw the mechanical driver (Tool 1099) clockwise onto the shaft threads ensuring it is not overtightened. Turn the 'T' handle in a clockwise direction, and press the balancing bearing onto the adjusting washer abutment face (Ref.Fig.511). Unscrew and remove the driver.

SUB-ASSEMBLY

72-31-00

Page 527

Dec 31/00

CR 31820/00C  
BS00029213/1

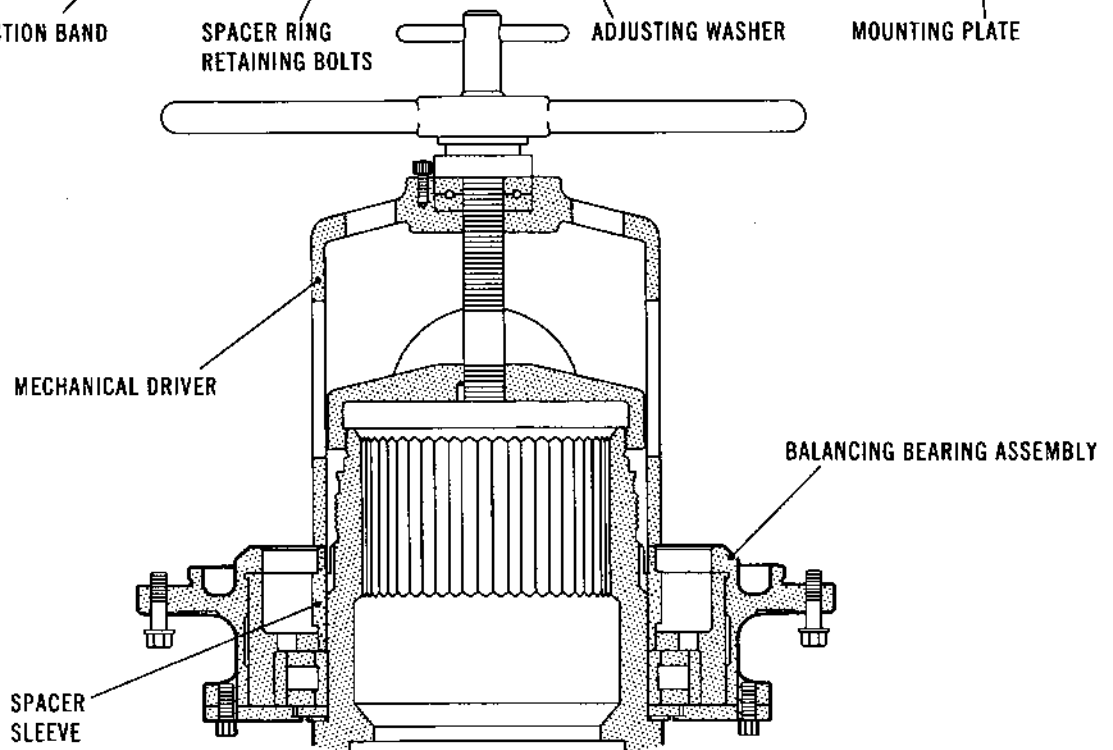
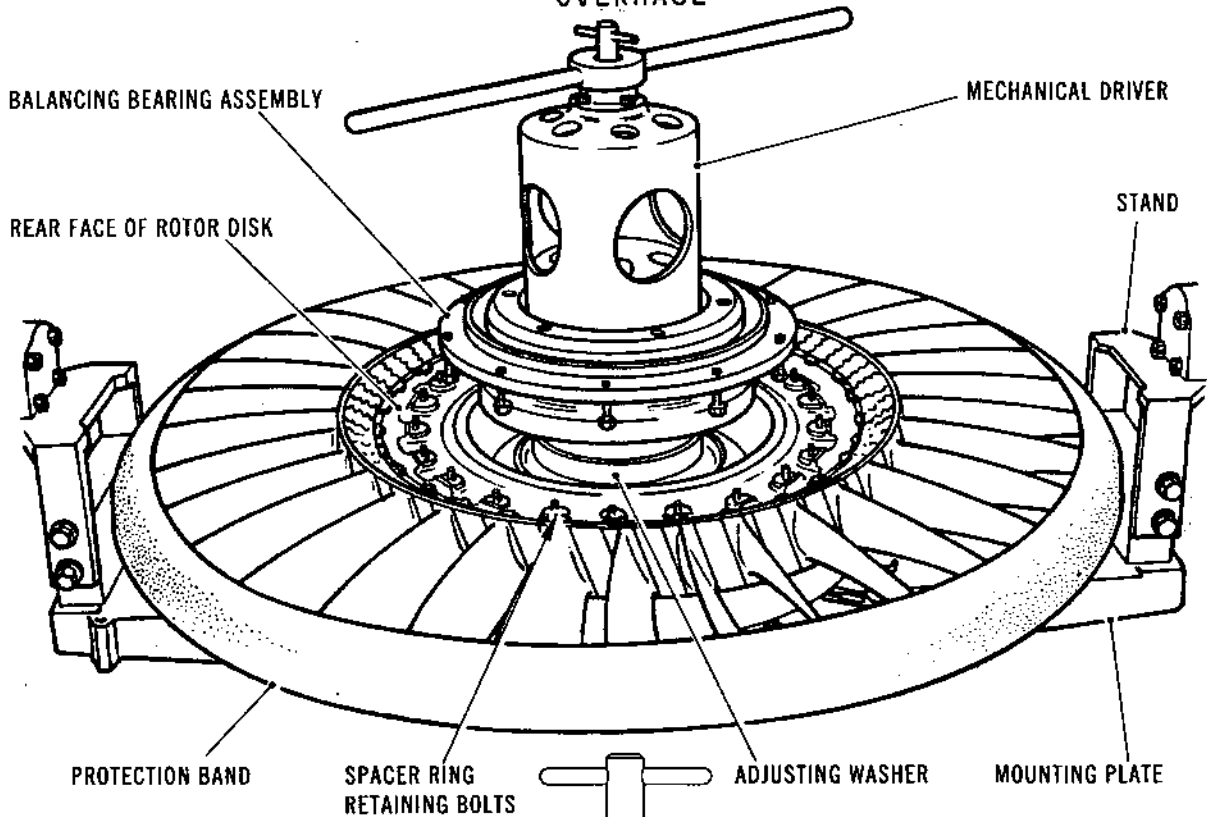


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



SECTION THROUGH MECHANICAL DRIVER  
Pressing the Balancing LP Thrust Bearing Assembly  
onto the Rotor Shaft Rear  
Figure 511

CR 31817/00D  
BS00029214/1

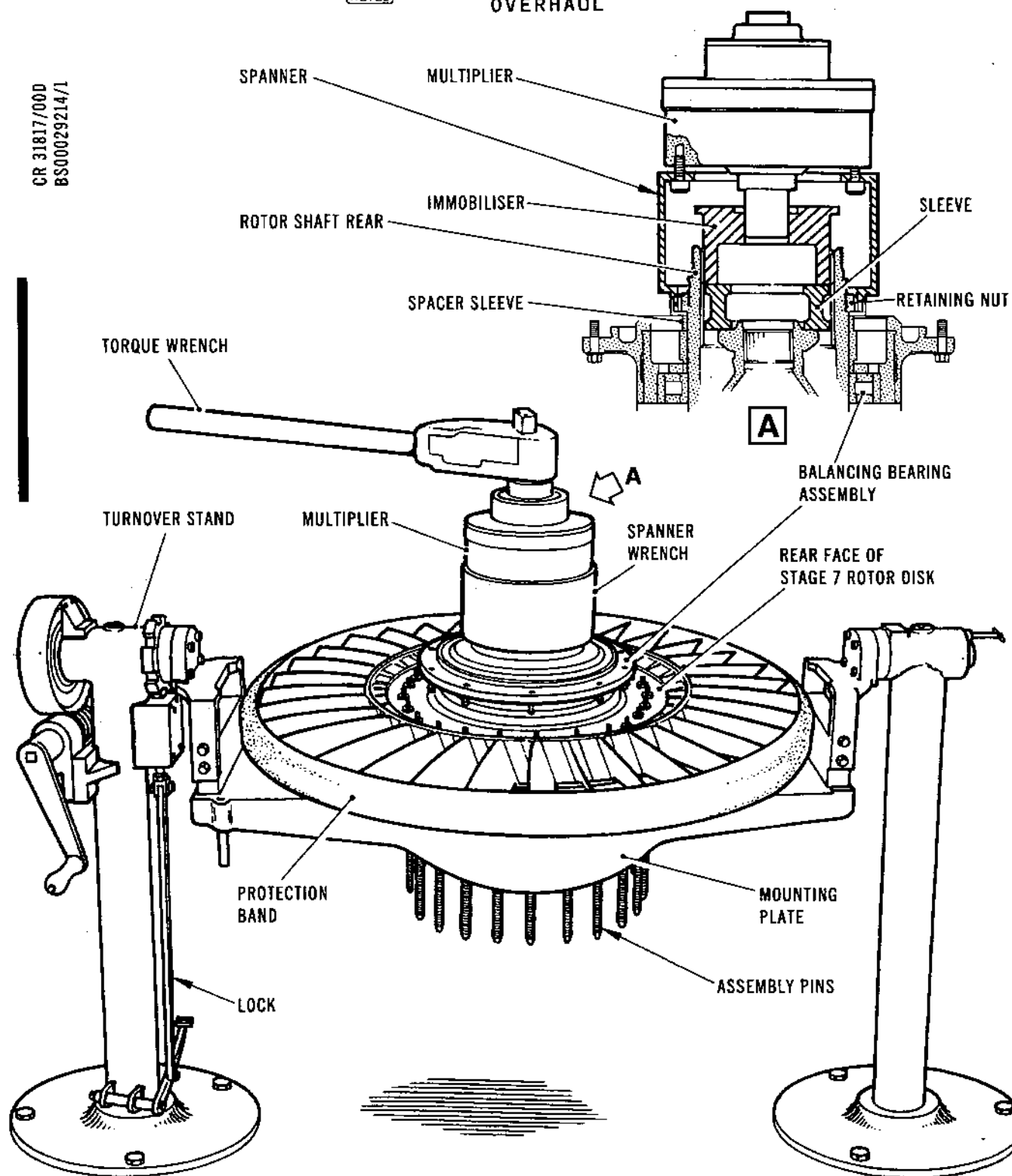


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Torque-tightening the LP Bearing Retaining Nut  
Figure 512

SUB-ASSEMBLY  
**72-31-00**

Page 529  
Dec 31/00



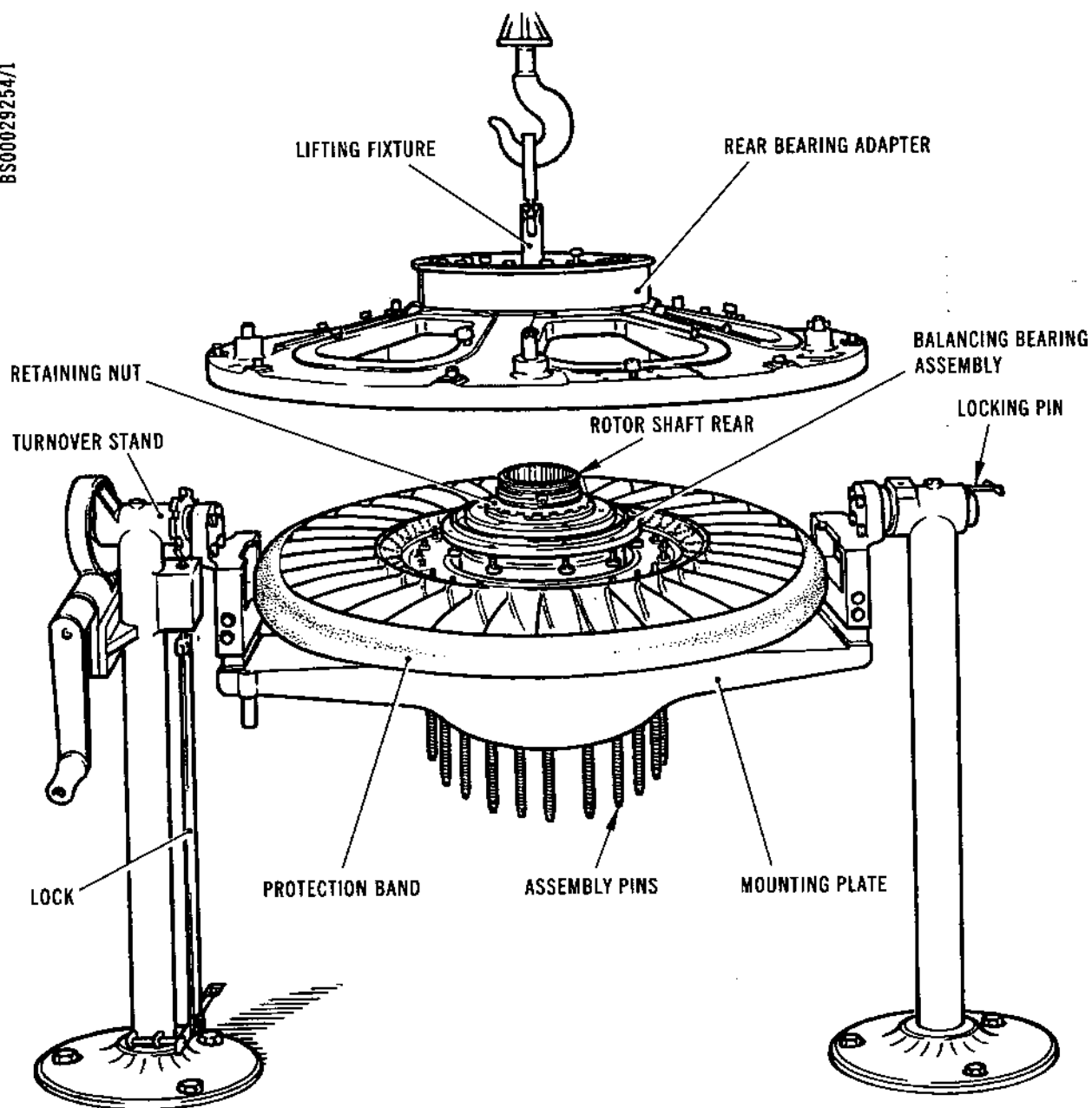


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Assembling the Rear Bearing Adapter to the Balancing  
LP Thrust Bearing Assembly  
Figure 513

SUB-ASSEMBLY

72-31-00

Page 530

Dec 31/00



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (4) Assemble spacer sleeve (Tool 3159) to the rotor shaft rear. Assemble mechanical driver (Tool 1099). Turn the 'T' handle in a clockwise direction and press the spacer sleeve (Tool 3159) onto the balancing bearing (Part of Tool 3163). Unscrew and remove the driver.
- (5) Assemble locking washer (03/3-60) to the rotor shaft rear. Lubricate the bearing retaining nut (03/3-50) with lubricant 'B', then assemble the nut to the shaft and tighten with the hand spanner (Tool 1551).

- B. Torque-Tighten the Balancing Bearing Retaining Nut (Ref.Fig.512).

CAUTION: BEFORE USE CHECK THE INPUT AND OUTPUT TORQUE RATIO MARKED ON MULTIPLIERS.

- (1) Insert a sleeve (Tool 696) into the rear of the rotor shaft rear, then locate the immobilizer (Tool 280) in the rotor shaft internal splines. Ensure that the spanner (Tool 1594) is bolted to the multiplier (Tool 1022), then assemble the spanner to the nut and the multiplier to the immobilizer. It may be necessary to turn the square in the top of the multiplier to engage the square of the immobilizer. Assemble a torque wrench to the multiplier, then torque-tighten the retaining nut between 650 and 700 lbf ft (881 and 949 N.m). Remove the torque wrench, multiplier/spanner, immobilizer and sleeve. Do not lock the locking washer.

- C. Assemble the Rear Bearing Adapter (Tool 3163) (Ref.Fig.513).

NOTE: The following operation is carried out to avoid the possibility of discovering a tight location sleeve at a later stage.

- (1) Assemble a location sleeve (Tool 628) to the rotor shaft rear ensuring that the sleeve engages without difficulty. If however the sleeve is tight, then the sleeve must be removed from the rotor shaft and an alternative sleeve trial assembled. After a successful trial assembly, assemble the sleeve to the build stand (Tool 1093).

SUB-ASSEMBLY

72-31-00

Page 531

Dec 31/00



OLYMPUS 593



MK.610-14-28

SNECMA

OVERHAUL

- (2) Assemble the lifting fixture (Tool 1096) to the rear bearing adapter (Tool 1011 on engines to SB.72-21 standard, or Tool 344 on engines to Pre-SB.72-21 standard), retain the lifting plate with four captive bolts. Attach the overhead hoist to the lifting fixture, then raise the adapter and position it above the rotor shaft assembly in the turnover stand.
- (3) Lower the bearing adapter sufficiently to allow the retaining bolts to be correctly aligned. After aligning the bolts, carefully lower the bearing adapter to within 0.5 in. (12,7 mm) of its abutment, then engage the 10 captive bolts of the balancing bearing in the pillar nuts of the rear bearing adapter. Lower the bearing adapter onto the balancing bearing abutment flange and tighten the 10 captive bolts. Remove the lifting fixture from the adapter.
- (4) Assemble immobilisers (Tools 3157 and 3158). Relocate the lifting fixture (Ref.Fig.513A).

6. Assemble the Rear Bearing Adapter and Rotor Shaft Assembly to the Build Stand

A. Remove the Assembly from the Turnover Stand.

- (1) Unlock the trunnion arms and turn the stand (Tool 697) through 180 deg until the mounting plate is uppermost then lock the trunnion arms.

CAUTION: EXERCISE CARE WHEN TAKING UP WEIGHT OF ASSEMBLY WHEN MOUNTING PLATE IS BOLTED TO STAND.

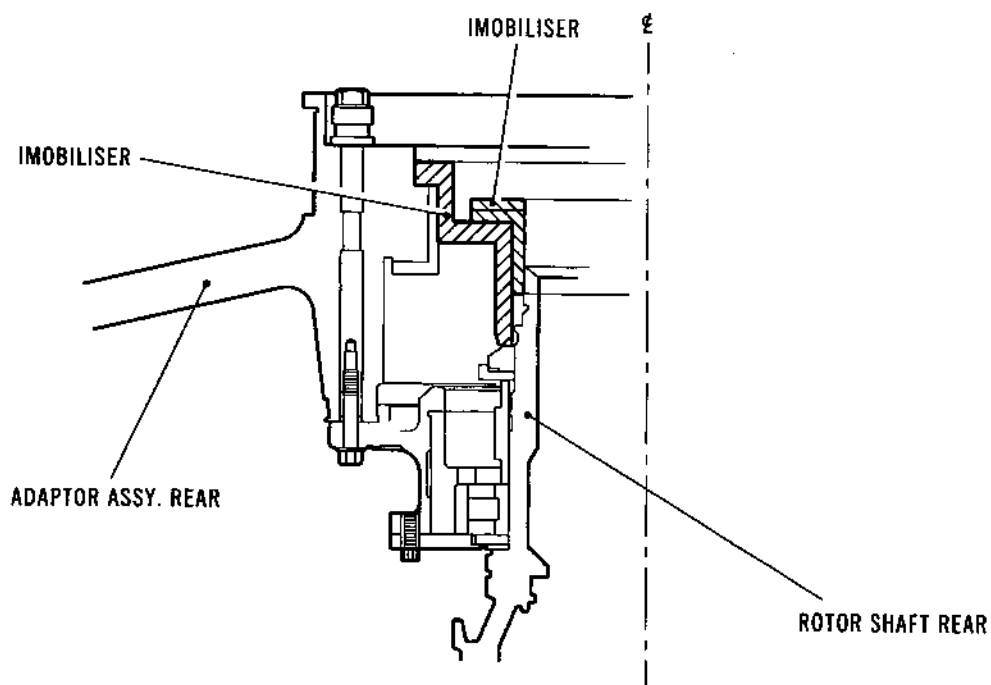


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Assembling the Immobilisers  
Figure 513A

Printed in England



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

This page is left blank intentionally



OLYMPUS 593

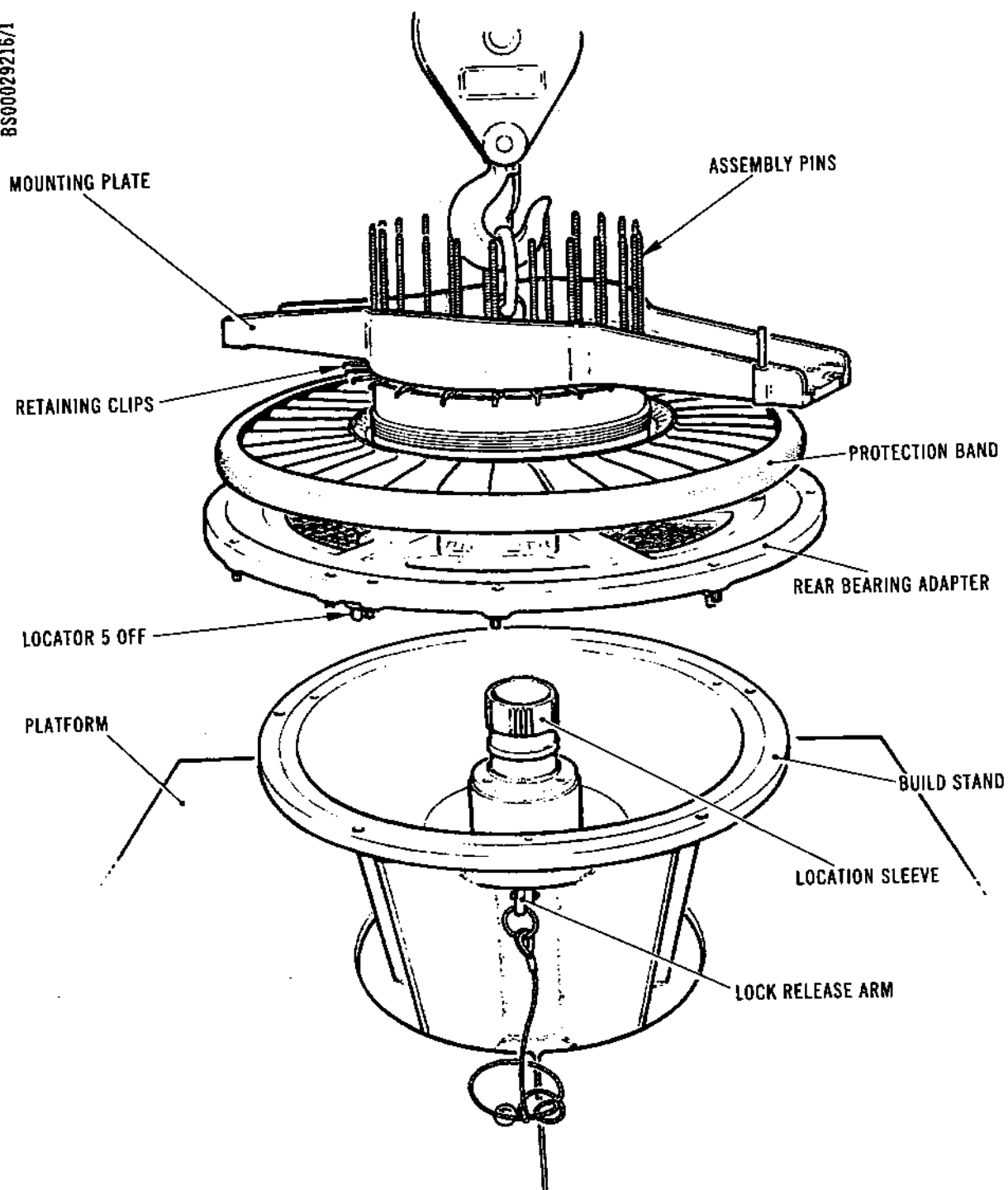
MK.610-14-28

OVERHAUL



sneema

CR 31818/008  
BS00029216/1



Assembling the Rear Bearing Adapter and Rotor Shaft  
Assembly to the Build Stand  
Figure 514

SUB-ASSEMBLY  
**72-31-00**

Page 533  
Dec 31/00



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (2) Attach the overhead hoist to the lifting ring of the mounting plate, then raise the hoist sufficiently to take up the weight of the rotor shaft and rear bearing adapter assembly.
- (3) Release the nuts securing the mounting plate, then allow the bolts to pivot outwards releasing the plate. Carefully raise the assembly sufficiently to clear the trunnion arms, then traverse the hoist to clear the stand taking care not to damage the stage 7 rotor blades.
- (4) Operate the hoist and transfer the assembly to the compressor build stand (Tool 1093). Wipe the build stand outer flange clean and lightly stone if necessary, then clean the corresponding abutment face on the rear bearing adapter. Check that the location sleeve (Tool 628) has been assembled to the centre of the build stand (Tool 1093) (Ref.para.5.C.(1)).
- (5) Position the assembly over the build stand, turn the assembly so that the master spline in the rotor shaft rear falls in line with one of the four cut outs machined on the outside of the location sleeve (Tool 628).

NOTE: During the lowering of the assembly onto the build stand it will not be possible to observe the master spline, providing the assembly is not turned again the No.1 blade can be used as a guide as this lines up with the master spline (Ref.Fig.514).

CAUTION: DO NOT REMOVE THE MOUNTING PLATE (TOOL 1294) AS IT SUPPORTS THE STAGE 7 ROTOR DISK/SPACER RING ASSEMBLY AT THIS STAGE.

- (6) Lower the assembly engaging the internal splines of the rotor shaft rear with those of the location sleeve. Align the dowels in the rear face of the rear bearing adapter with the corresponding dowel holes machined through the build stand outer flange, then lower the assembly onto the build stand. Secure the assembly with the slave captive nuts and bolts assembled to the rear bearing adapter and build stand. Use a 0.002 in. (0,050 mm) feeler gauge and check that no gap exists between the build stand and the rear

SUB-ASSEMBLY

72-31-00

Page 534

Dec 31/00



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

bearing adapter abutment flanges. If a gap exists between the flanges, release the slave retaining bolts and raise the assembly sufficiently to rectify. Lower the assembly, secure with the slave captive nuts and bolts, then recheck the gap. Remove the hoist and the protection band from the stage 7 rotor blades.

B. Check the Swash of the Rear Bearing Adapter.

- (1) Attach a clock indicator to the pillar at one end of the mounting plate and adjust the indicator to contact the rear bearing adapter, then set the dial to read zero. Unlock the rotor shaft by lifting the lever assembled to the build stand.
- (2) Turn the rotor shaft assembly clockwise and plot the readings at 8 equi-spaced positions. The maximum swash reading obtained must not exceed 0.006 in. (0,152 mm). Move the clock indicator clear of the adapter to allow assembly of exit guide vane cases. If the swash is excessive, investigate the cause and rectify, then recheck the swash.

7. Check the Stage 7 Rotor Blade Tip Clearances

A. Assemble the Exit Guide Vane Cases.

- (1) Check the serial No. of both halves of the exit guide vane cases (72-31-02/1-150) with the engine record sheets. Wipe clean the front and rear flanges of the top half case. Remove the protection/retaining band (Tool 1129) from the stage 7 rotor blade tips.

NOTE: The top half case is identified by the two dowel location holes in the front and rear flanges at the 'TOP' position.





OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

- (2) Insert the top half of the exit guide vane case (1-150) between the rear bearing adapter and stage 7 rotor, with the convex surface of its stator vanes uppermost. Slide the case around the rear bearing adapter until the 'TOP' of the case aligns the 'TOP' of the rear bearing adapter. Retain the case with slave bolts and nuts. Ensure that the abutment faces are clean at the exit guides four axial flanges, then assemble the bottom half exit guide vane case (1-150) to the rear bearing adapter. Retain in position with slave bolts and nuts (Tool 559) at the two axial positions and rear exit guide flange/adapter plate location (Ref.Fig.515).
- (3) Reposition the clock indicator to engage it with the exit guide vane case flange (Ref.Fig.516), then check the swash at eight equi-spaced positions. The swash should not exceed the rear bearing adapter swash of 0.006 in. (0,152 mm). Remove the clock indicator.
- (4) Using feeler gauges check the tip clearance between the stage 7 rotor blades and the exit guide cases (Ref.Fig.517). Find the longest and shortest blades, then check the max. and min. tip clearance at eight equi-spaced positions. From the check determine the average max. and min. tip clearance. Refer to the Fits and Clearances Schedule (72-30-00) FCS 31.
- (5) Release and remove the two exit guide cases from the rear bearing adapter and place on a suitable pallet. Identify the cases with their respective engine No.

8. Assemble the Slave Exit Guide Vane Cases to the Rear Bearing Adapter

NOTE: The rear bearing adapter and the slave exit guide vane cases are a matched set, and must be retained as a set, and assembled together in the positions marked on the items.

SUB-ASSEMBLY

**72-31-00**

Page 536

Jul 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (2) Insert the top half of the exit guide vane case (1-150) between the rear bearing adapter and stage 7 rotor, with the convex surface of its stator vanes uppermost. Slide the case around the rear bearing adapter until the 'TOP' of the case aligns the 'TOP' of the rear bearing adapter. Retain the case with slave bolts and nuts. Ensure that the abutment faces are clean at the exit guides four axial flanges, then assemble the bottom half exit guide vane case (1-150) to the rear bearing adapter. Retain in position with slave bolts and nuts (Tool 559) at the two axial positions and rear exit guide flange/adapter plate location (Ref.Fig.515).
- (3) Reposition the clock indicator to engage it with the exit guide vane case flange (Ref.Fig.516), then check the swash at eight equi-spaced positions. The swash should not exceed the rear bearing adapter swash of 0.006 in. (0,152 mm). Remove the clock indicator.
- (4) Using feeler gauges check the tip clearance between the stage 7 rotor blades and the exit guide cases (Ref.Fig.517). Find the longest and shortest blades, then check the max. and min. tip clearance at eight equi-spaced positions. From the check determine the average max. and min. tip clearance. Refer to the Fits and Clearances Schedule (72-30-00) FCS 31.
- (5) Release and remove the two exit guide cases from the rear bearing adapter and place on a suitable pallet. Identify the cases with their respective engine No.

8. Assemble the Slave Exit Guide Vane Cases to the Rear Bearing Adapter

NOTE: The rear bearing adapter and the slave exit guide vane cases are a matched set, and must be retained as a set, and assembled together in the positions marked on the items.

TN34415

SUB-ASSEMBLY

**72-31-00**

Page 536

Jul 1/76



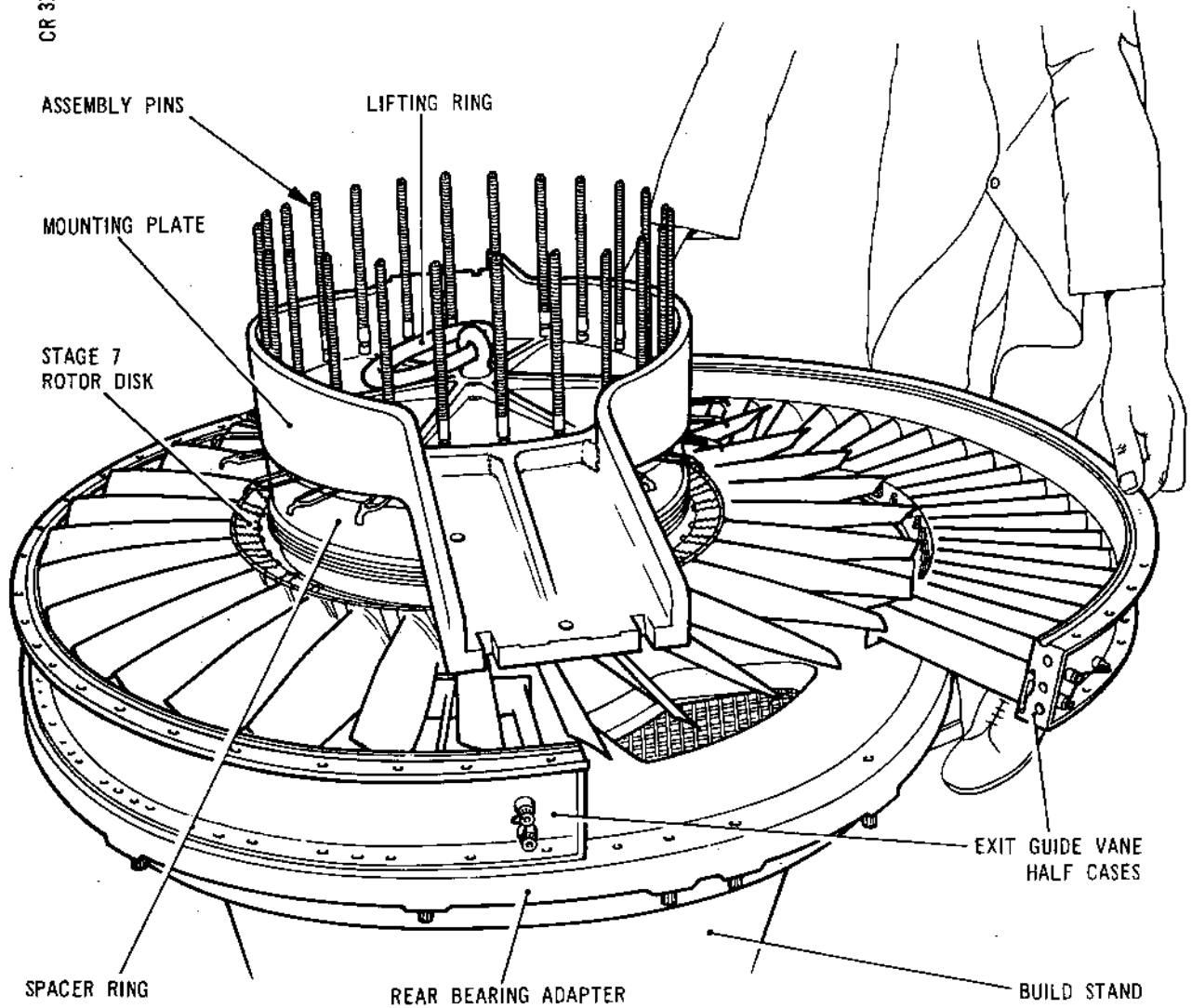
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 31823/00A



TN11445

Assembling the Exit Guide Vane Cases  
Figure 515

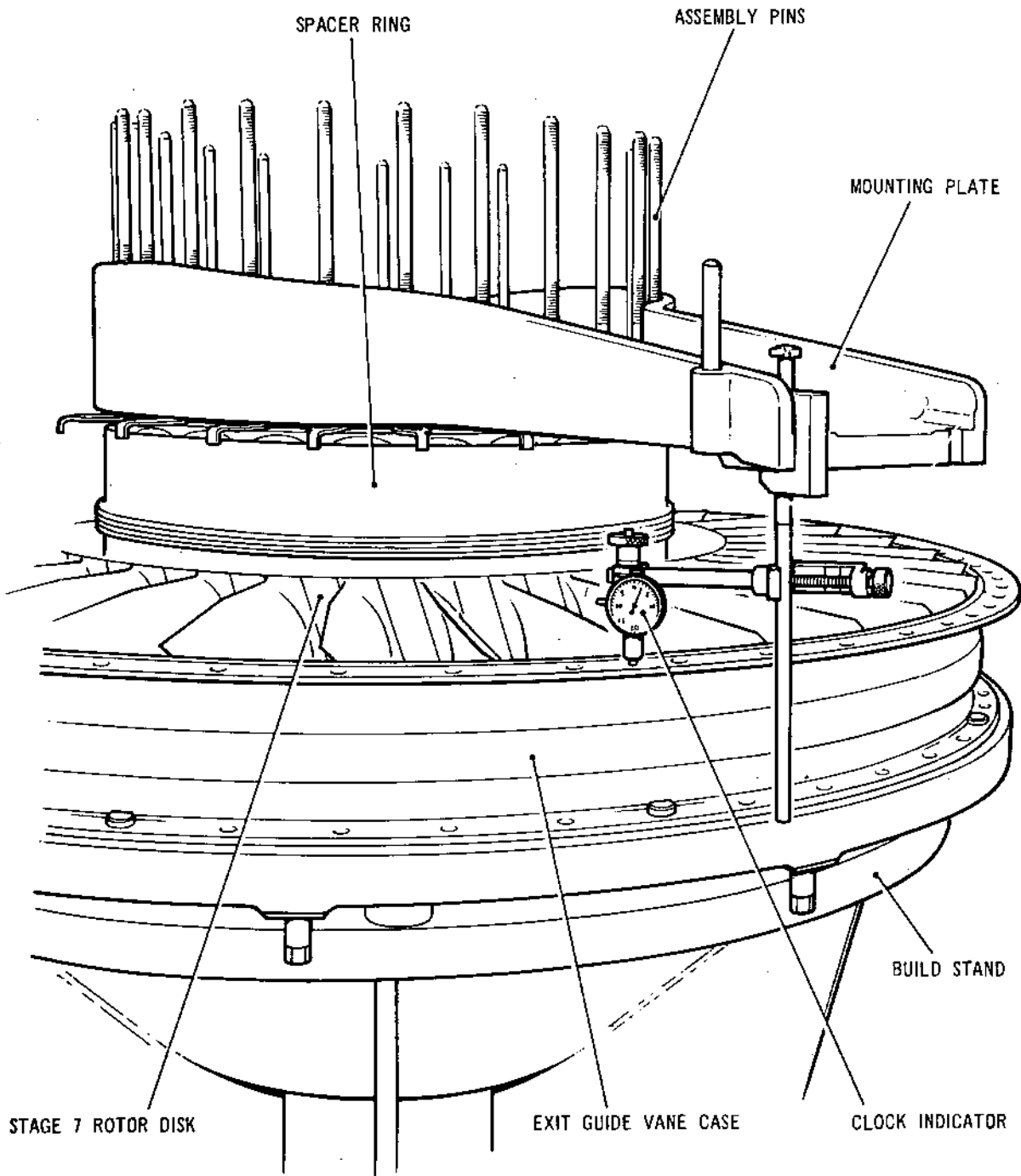
SUB-ASSEMBLY  
**72-31-00**  
Page 537  
Jul 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 31825/00A



7N24551

Checking the Swash on the Exit Guide Vane Cases  
Figure 516

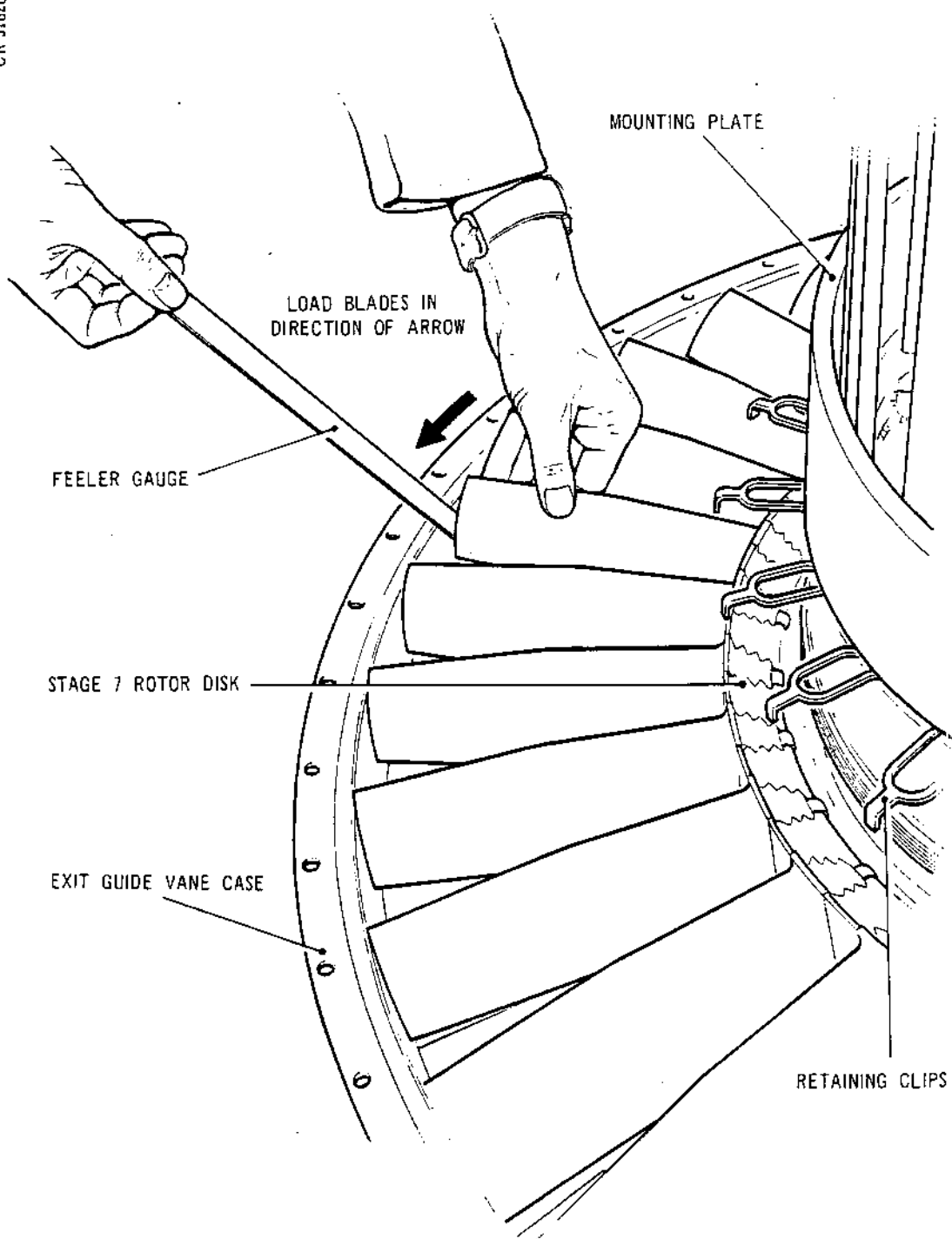
SUB-ASSEMBLY  
**72-31-00**  
Page 538  
Jul 1/76

CR 31828/008



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Checking the Stage 7 Rotor Blade Tip Clearances  
Figure 517



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



A. Assemble the Cases to the Build Stand.

- (1) Insert the two halves of the slave exit guide vane cases (Tool 398) between the rear bearing adapter and stage 7 rotor, aligning the assembly marks and bolt-holes. Secure the items together with the slave bolts and nuts (Tool 559).

B. Assemble Supports to the Rear Bearing Adapter (Ref.Fig.518).

- (1) Remove three equi-spaced blanking plates from the slave exit guide vane cases, then insert three supports (Tool 1006) through the apertures and rest them on the raised machined platforms within the rear bearing adapter (Ref.Fig.518).
- (2) Position each support so that they will abut the rim, (not the blade platform), of the stage 7 rotor disk when the mounting plate is removed.

C. Remove the Mounting Plate from the Rotor Shaft Rear.

- (1) Unscrew and remove the slave nuts securing the mounting plate to the rotor shaft rear and place the nuts in a container.
- (2) Attach the overhead hoist to the ring of the mounting plate, then slowly raise the plate, taking care not to foul the assembly pins. Transfer the mounting plate to the turnover stand (Tool 697) and secure the plate to the stand, then remove the hoist.

9. Assemble the LP Compressor Case to the Slave Exit Guide Vane Cases (Ref.Fig.518)

A. Prepare the LP Compressor Case.

- (1) Check that all work has been completed on the LP compressor case at the sub-assembly stage, and that the case has the appropriate inspection clearance certificate attached.

SUB-ASSEMBLY

72-31-00

Page 540

Feb 1/82



OLYMPUS 593

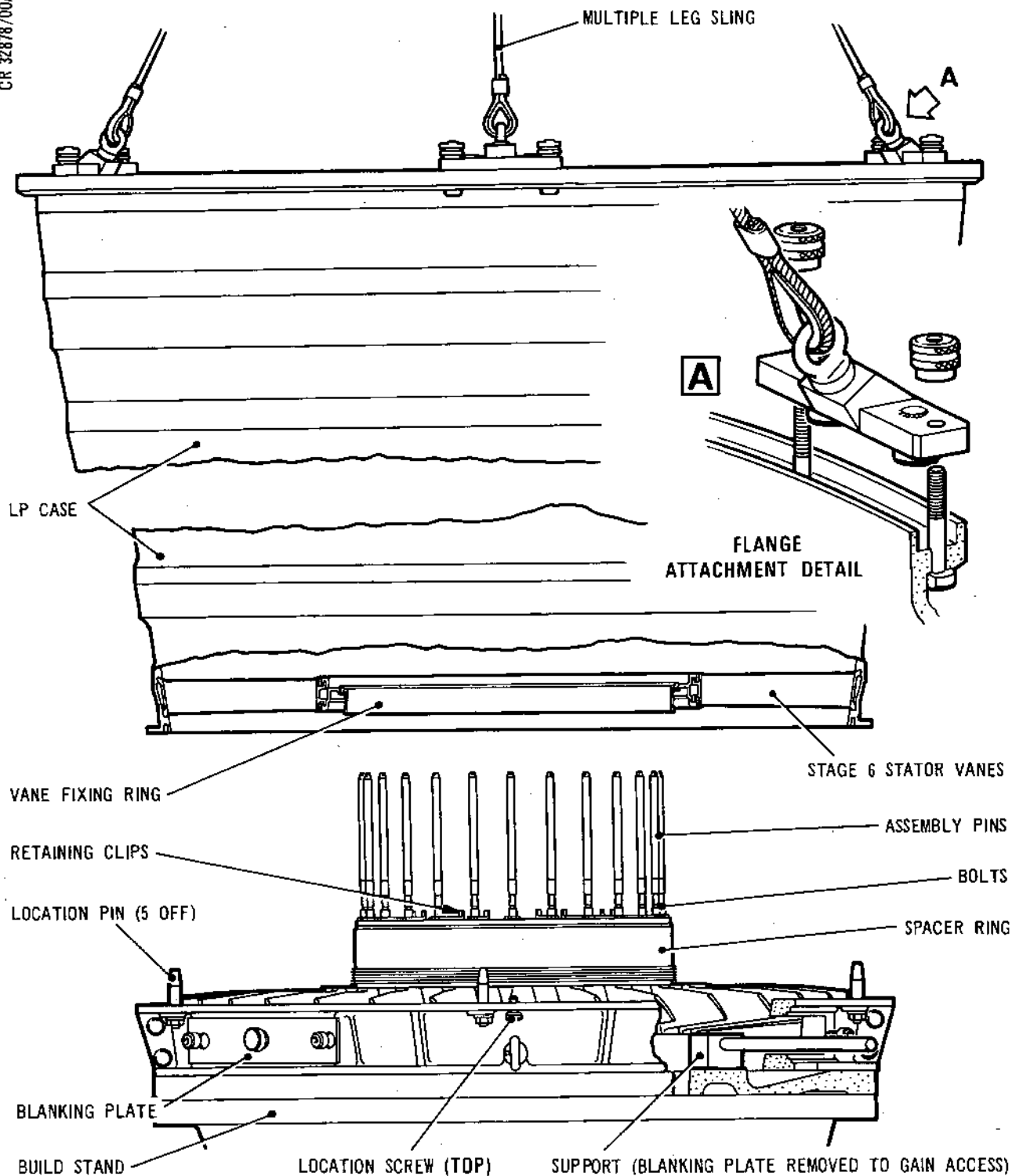
MK.610-14-28

OVERHAUL



CR 32878 /00A

PRINTED IN ENGLAND



Assembling the LP Compressor Case to the Slave Exit  
Guide Vane Cases  
Figure 518

SUB-ASSEMBLY

72-31-00

Page -541

Jul 1/76

TN24557



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

- (2) Assemble the three blocks of the multiple leg sling (Tool 1101) (Ref.Fig.518) to the front face of the LP compressor case, ensuring the blocks are evenly spaced. Attach a hoist to ring of the sling. Raise the LP case to a convenient height, then wipe clean the rear flange and inspect for damage. Lightly stone any nicks or burrs. Wipe clean the front face of the slave exit guide vane cases assembled to the rear bearing adapter.
- (3) Observe the datum markings on the periphery of the rotor shaft rear, then suitably mark the inside of the shaft at the datum position so that the datum position can be easily identified when the case is in position.

B. Assemble the LP Compressor Case.

CAUTION: EXERCISE CARE WHEN LOWERING CASE AND STAGE 6 STATOR VANE ASSEMBLY OVER STAGE 6-7 SPACER RING TO AVOID DAMAGE TO THE SPACER RING LABYRINTH.

- (1) Position the LP compressor case (6-100) over the build stand (Tool 1093). Align the dowel hole in the case rear (bottom) flange with the pin in the slave exit guide vane case, then lower the case engaging the pin and aligning the attachment holes. Secure the case to the slave exit guide case with slave bolts and nuts. Release and remove the sling from the hoist and compressor case.
- (2) Operate the control governing the raising and lowering of the ramp and lower the ramp so that the stage 6 rotor disk can be worked on in a favourable position. Ensure that brackets assembled to the case do not foul the build platform boards when raising or lowering the ramp.

SUB-ASSEMBLY

72-31-00

Page 542

Dec 31/00



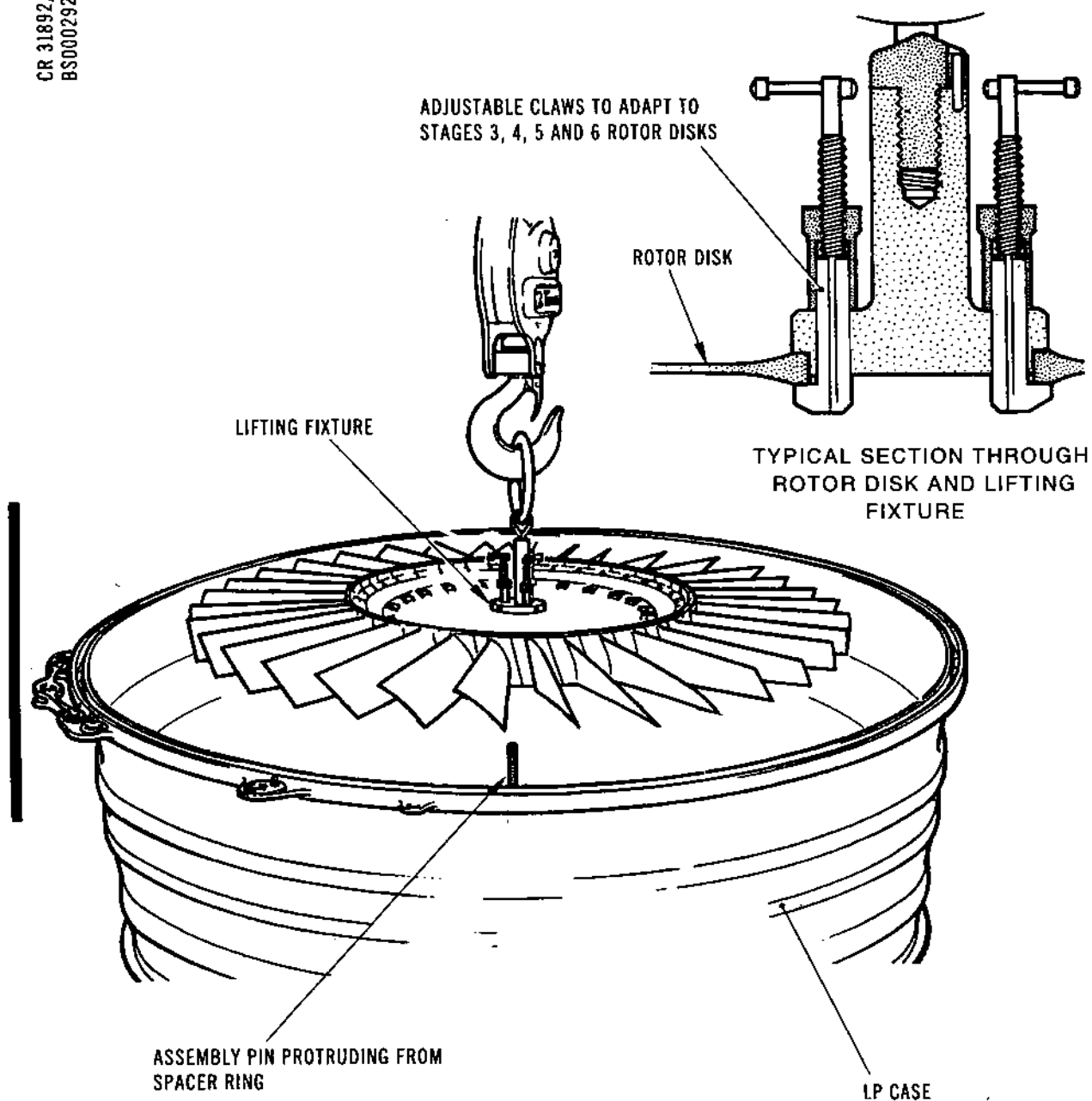


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Assembling a Rotor Disk to the Compressor Assembly  
Figure 519

SUB-ASSEMBLY

72-31-00

Page 543

Dec 31/00



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (3) Using two sets of feeler gauges, check the clearance between the stage 6-7 spacer ring labyrinth and the stage 6 vane fixing ring. Carry out this check by inserting 0.025 in. (0,635 mm) feelers between the labyrinth and ring, then insert the required amount of feelers to measure the remaining clearance between the labyrinth and ring at a point diametrically opposite the first set of feeler gauges. Take the total of the two sets of feelers as the clearance. Carry out the check at three more equi-spaced positions, then take the average of the four readings. The clearance must be within the dimensions quoted in the Fits and Clearances Schedule (72-30-00) FCS 41.
- (4) If the assembly is not to be continued immediately, place the protector/blank (Tool 1684) over the stator vanes.

#### 10. Assemble Stages 6 to 1 Rotor Disks, Spacer Rings and Labyrinth Seals

##### A. Assemble the Stage 6 Rotor Disk and Stage 5-6 Spacer Ring.

- (1) Identify the datum position in the rotor shaft rear, then mark the assembly pin in that hole so that the datum hole is readily identified. Adjust the assembly pins so that they remain in a vertical position.

NOTE: Although disks and spacer rings will assemble in alternative positions, any accidental deviation from the datum during build will result in disassembly of the compressor.

- (2) Assemble the lifting fixture (Tool 1161) (Ref.Fig.519) to the front face of the stage 6 rotor disk (03/2-180) by guiding the three claws of the fixture through the centre hole of the disk, then turn the claws outward to lock and locate on the rear face of the disk. Screw down the three thumbnuts to secure the claws in the locked position.

SUB-ASSEMBLY

72-31-00

Page 544

Dec 31/00



OLYMPUS 593

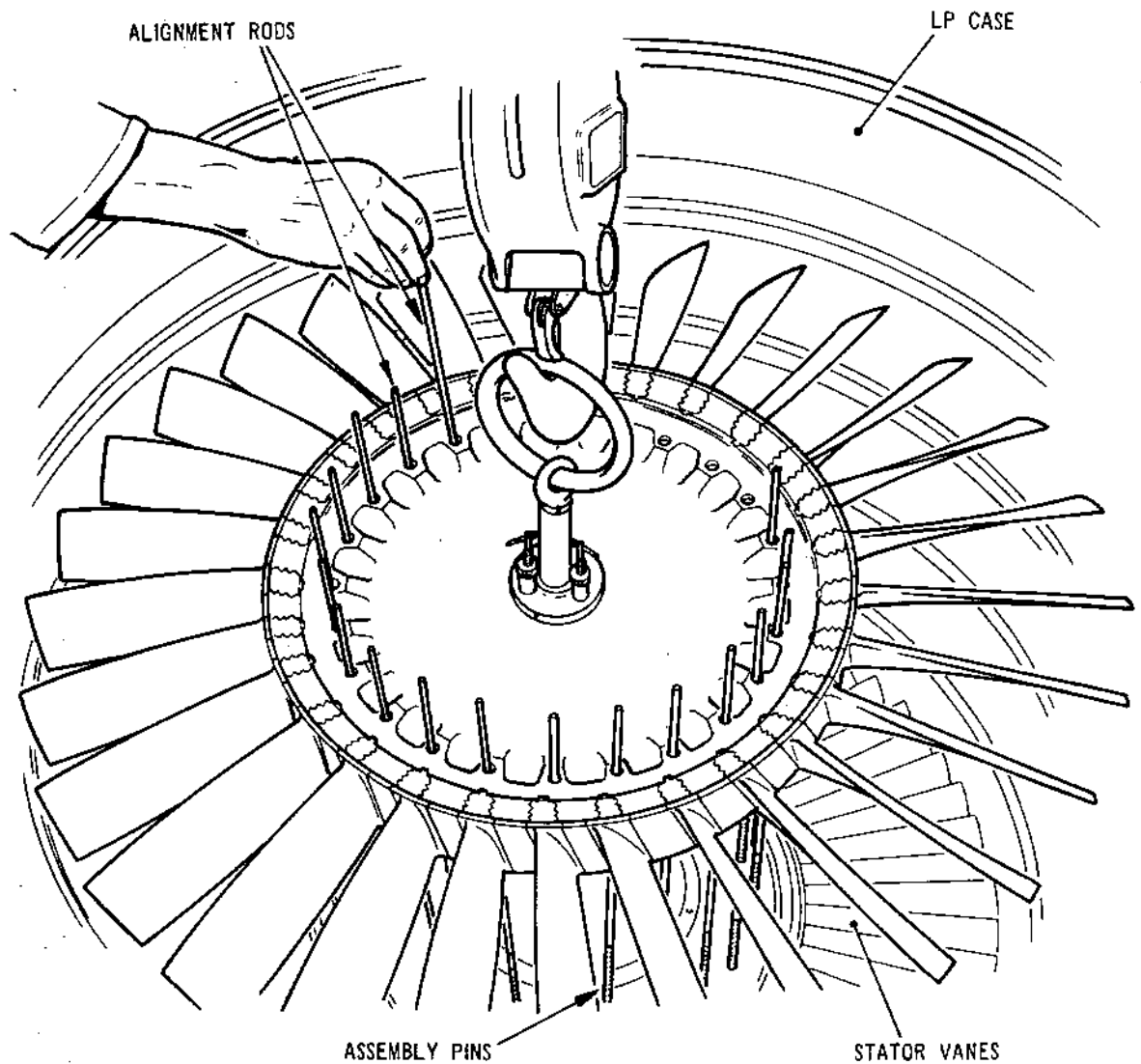
MK.610-14-28  
OVERHAUL



CR 31821/00A

PRINTED IN ENGLAND

TN24559



Assembling Alignment Rods Through the Rotor Disk  
Bolt Holes into the Assembly Pins  
Figure 520

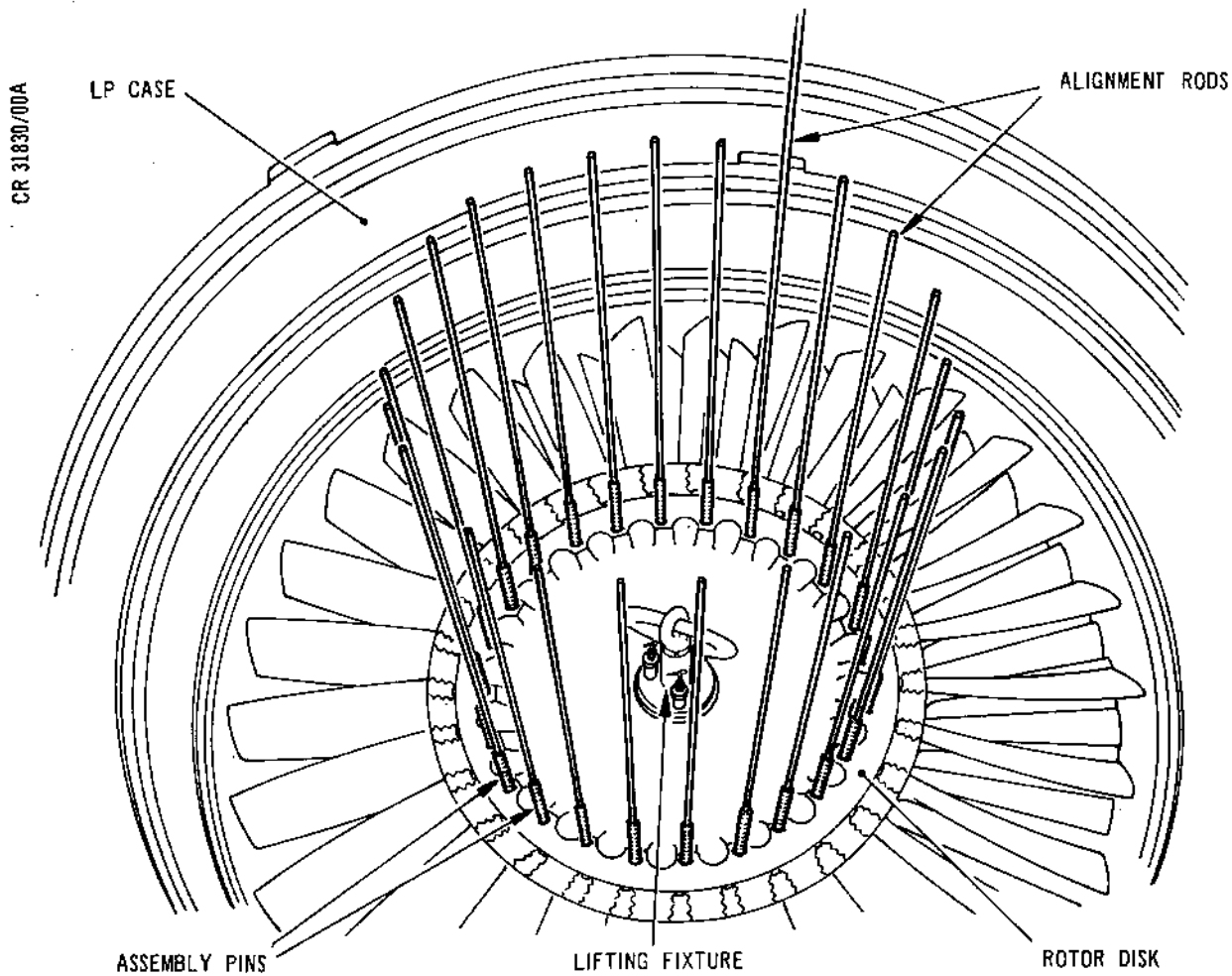
SUB-ASSEMBLY  
**72-31-00**

Page 545  
Jul 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TN24560

Alignment Rods and Assembly Pins Protruding  
From the Rotor Disk  
Figure 521

SUB-ASSEMBLY  
**72-31-00**  
Page 546  
Jul 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Remove the protection band (Tool 1128) from the tips of the rotor blades, and if assembled, the protector/blank (Tool 1684) from the stator vanes. Attach the overhead hoist to the lifting fixture, then raise the hoist positioning the rotor disk over the case (Ref.Fig.519). Mark the datum position on the front face of the disk in line with No.1 bolt-hole with suitable chalk.
- (4) Insert an alignment rod (Tool 380) into the datum position assembly pin (Tool 1067), then align the datum position of the stage 6 rotor disk with the rod (Ref.Fig.519). Lower the stage 6 rotor disk until the rod passes through its datum hole and protrudes a few inches. Centralize the rotor disk with the case, then insert rods through the remaining 23 bolt-holes to locate in the assembly pins assembled to the bolts below (Ref.Fig.520). Carefully lower the disk guiding it onto the assembly pins (Ref.Fig.521) until it abuts the rotor shaft. Withdraw the alignment rods from the assembly pins and place the rods in a container. Place a protector/blank (Tool 1684) over the blades of the rotor.
- (5) Remove the hoist but leave the lifting fixture in the rotor disk bore to act as a blank.
- (6) Turn the assembly pins (if necessary) so that the flat on the bolthead is in line with the wall of the spacer ring, pull on each assembly pin until all of the thread and waisted portion of each bolt is visible, then clip the retaining clips (Tool 1038) into the waisted portion of the bolt, with the clips pointing towards the centre of the disk (Ref.Fig.522). Unscrew and remove the assembly pins from the bolts. If any of the bolts are too tight to pull up with their assembly pins, screw the mechanical driver (Tool 1064) (Ref.Fig.522) onto an assembly pin, then insert the locating key (Tool 1079) into the assembly pin locating the key into the slot in the bolt. Lock the locating tool by screwing the thumbnut onto the assembly pin, then turn the locating tool handle until it points to the centre of the rotor. This aligns

PRINTED IN ENGLAND

TN11448

SUB-ASSEMBLY

**72-31-00**

Page 547

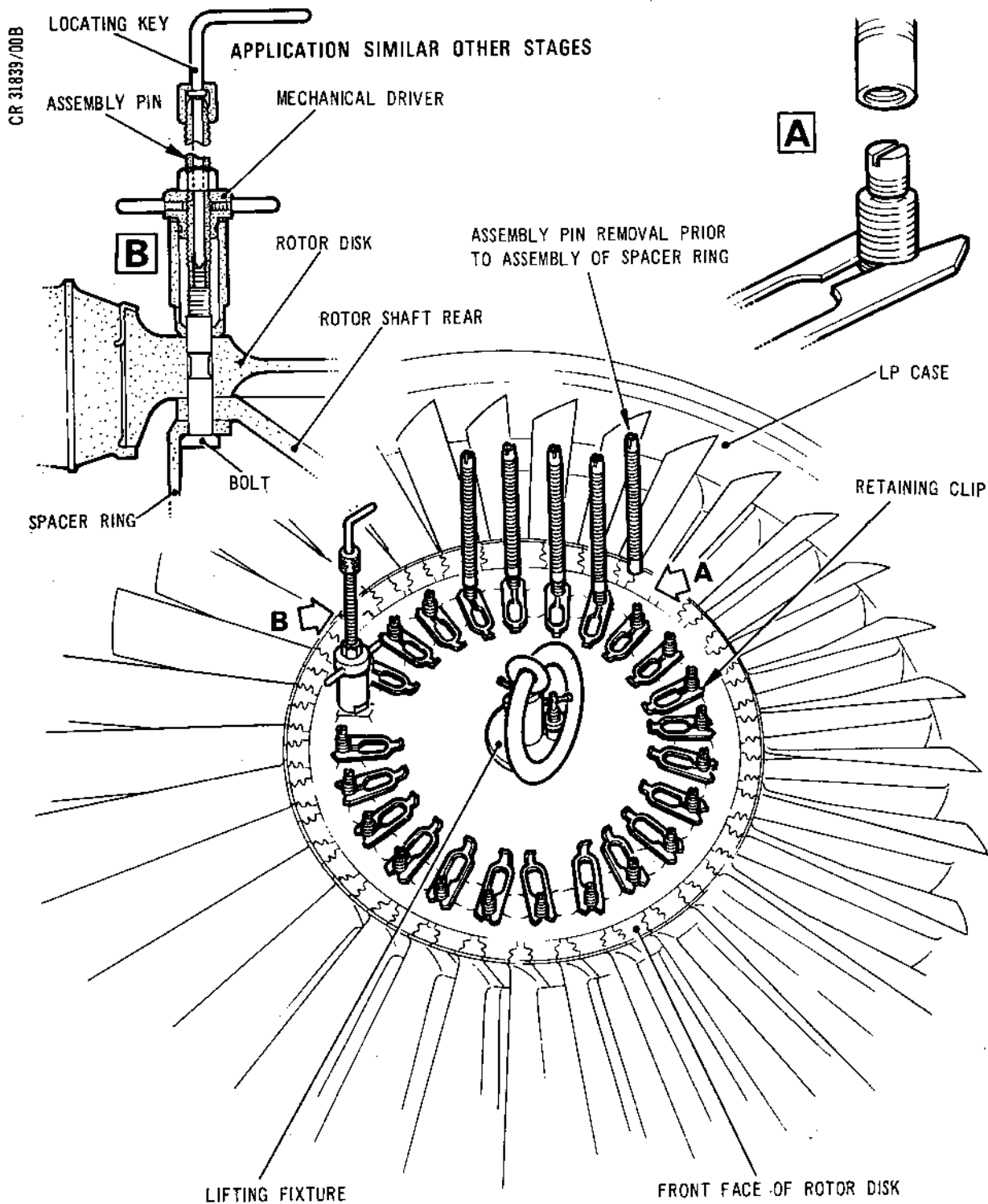
Jul 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



Assembling and Securing Bolts in Rotor Disk  
Figure 522

SUB-ASSEMBLY  
**72-31-00**  
Page 548  
Jul 1/76

TN24561



OLYMPUS 593

MK.610-14-28

OVERHAUL



the flat on the bolthead with the wall of the spacer ring. Screw down on the driver tommy bars and draw the bolt up until it abuts the spacer ring front flange. Release and remove the locating key and mechanical driver, then clip a retaining clip (Tool 1038) onto the waisted portion of the bolt. Remove the assembly pin. Repeat the procedure on any tight bolts.

- (7) Release and remove the protector (Tool 1169) from the stage 5-6 spacer ring (03/2-150), then turn the spacer ring so that the labyrinth on its circumference is nearer the rotor disk. Establish the datum hole in the bottom flange, align the datum holes of the spacer ring and disk (by a chalk mark on the disk), then lower the spacer ring over the bolts until it rests on the retaining clips.
- (8) Apply lubricant 'B' to the 24 nuts (03/2-140), then screw the nuts onto the bolts, but do not tighten. Pull the retaining clips off the bolts and remove (Ref.Fig.523). Remove the lifting fixture (Tool 1161) from the disk by releasing the thumbnuts, pushing the claws down, then turn the tommy bars around 180 deg until a ball catch locates in a slot in each leg. Lift the fixture from the disk.

NOTE: It is recommended that on removing the lifting fixture a suitable size disk (of cardboard or another suitable material) is rested on the disk and marked 1 to 24 in numerical sequence, each number in line and representing a bolt. This is only a convenience to aid the torque-tightening sequence which follows in para.(9). Since the bolts themselves are not numbered the sequence can commence on any bolt.

PRINTED IN ENGLAND

TN11449

SUB-ASSEMBLY

72-31-00

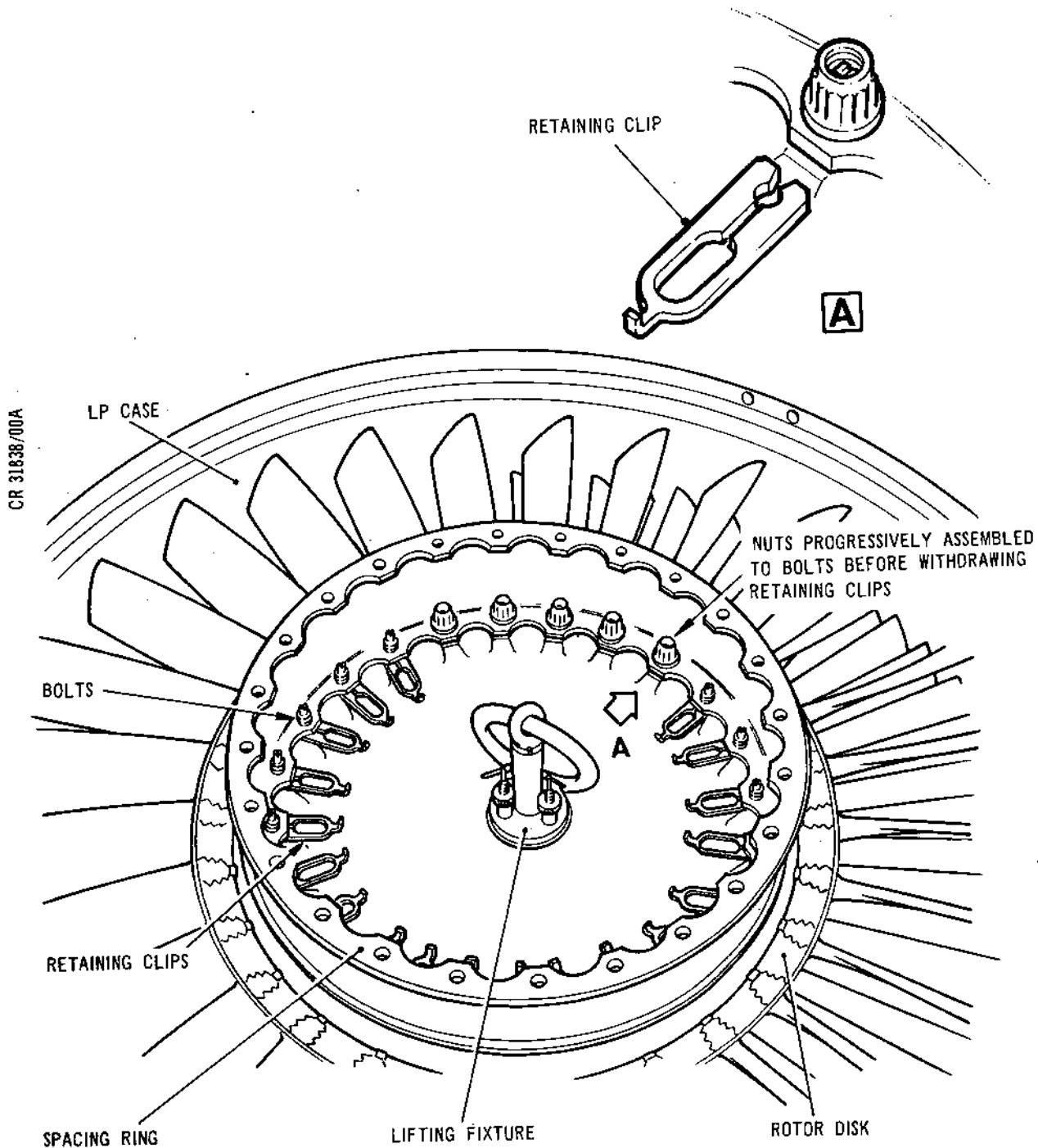
Page 549

Jul 1/76



OLYMPUS 593

MK. 610-14-28  
OVERHAUL



TN14425

Spacer Ring Assembled to the Rotor Disk  
Figure 523

SUB-ASSEMBLY  
**72-31-00**  
Page 550  
Jul 1/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (9) Using a torque wrench, run the nuts down to 'nip' the spacer ring, then using wrenches (Tool 1557 and 627) and a torque wrench, tighten the nuts in increments of 90 lbf in. (10,2 N.m) to a final torque of between 300 and 330 lbf in. (33,9 and 37,3 N.m) in the following sequence: 1, 13, 7, 19, 4, 16, 10, 22, 2, 14, 8, 20, 5, 17, 11, 23, 3, 15, 9, 21, 6, 18, 12 and 24. Locking (run-down) torque 9.1 lbf in. (1,1 N.m).
- (10) Withdraw the three supports (Tool 1006) through the access apertures in the slave exit guide vane cases. Reassemble the blanking plates to the cases.
- (11) Remove the protector/blank (Tool 1684) from the rotor blades, then using feeler gauges, check the tip clearance between the stage 6 rotor blades and the compressor case. Find the longest and shortest blades, check the max. and min. tip clearance at eight equi-spaced points, then find the average max. and min. tip clearance. Refer to the Fits and Clearances Schedule (72-30-00) FCS 30. Replace the protector/blank (Tool 1684) if the assembly is not to be continued immediately.

B. Assemble the Stage 5 Stator Vanes and Vane Fixing Ring to the LP Compressor Case (Ref.SB.72-19).

NOTE: The labyrinth ring (3-200) will already have been assembled to the vane fixing ring as a unit and will not be referred to as a separate item, the vane fixing ring only will be referenced at each stage of build.

- (1) Remove the protector/blank (Tool 1684) (if assembled) from the stage 6 rotor blades, and the torque-tightening cardboard disk (if used) from the disk.
- (2) Apply lubricant 'A' to the stage 5 stator vane grooves in the case, and to the vane grooves in the stage 5 vane fixing ring (3-190).

SUB-ASSEMBLY

**72-31-00**

Page 551

Mar 1/81

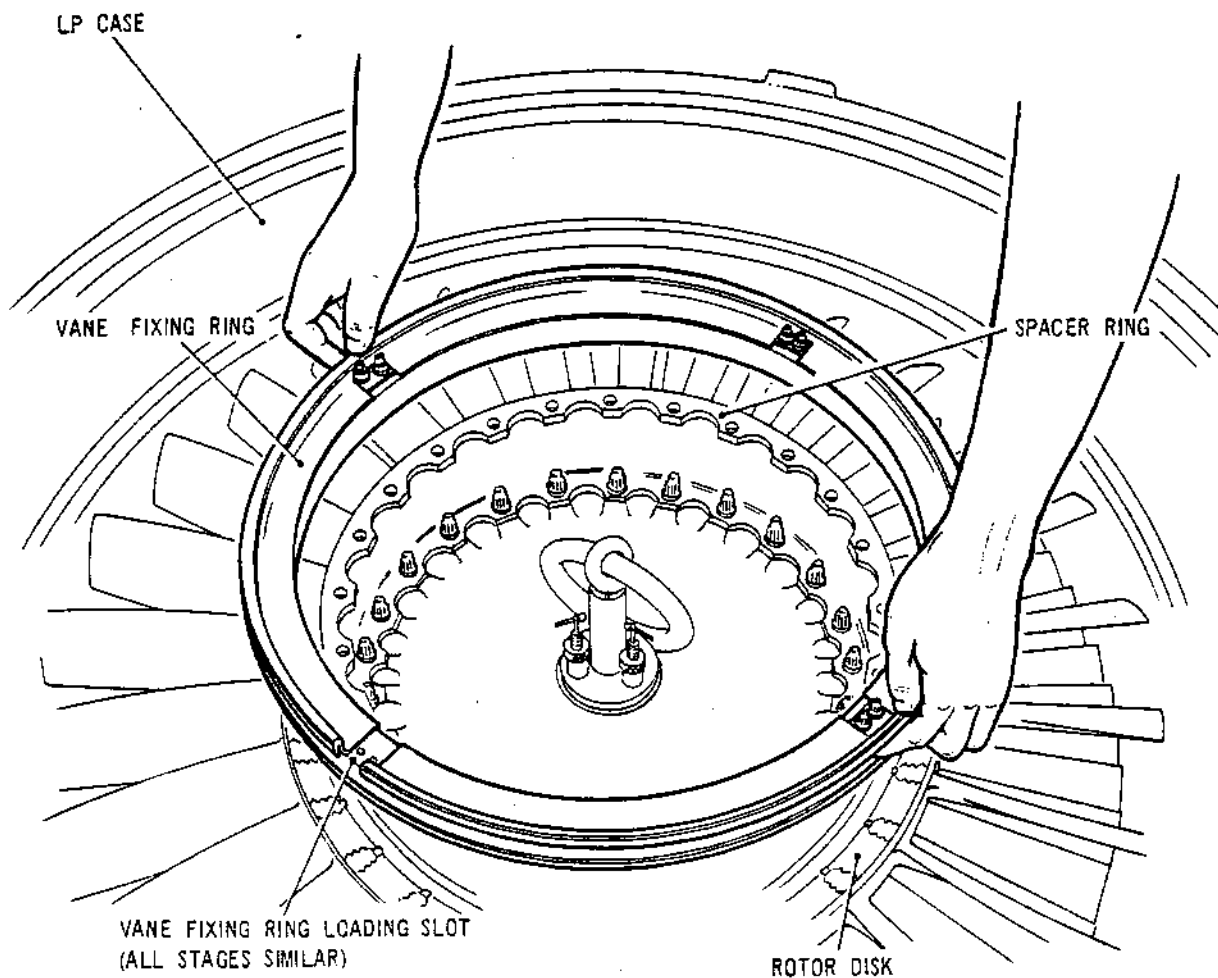


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31831/00B



TN14424

Assembling the Vane Fixing Ring  
Figure 524

SUB-ASSEMBLY  
**72-31-00**

Page 552  
Jul 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Turn the vane fixing ring (3-190) so that the loading slot cut-away is uppermost, then lower the fixing ring over the spacer ring, positioning the cut-away so that it aligns with the vane loading slot in the case.

NOTE: Although none of the stator vanes are numbered for position, the bolted vanes are identified by the tapped threads in the vane platform, and the probe vanes identified by the cut-away sections in the vane outer (larger) platform. The holes will line up with corresponding holes in the compressor case. For clarification, a diagrammatic layout for each stage of stator vanes has been included in the text showing their exact location when assembled to the LP case.

- (4) Identify the probe and bolted vanes, then separate them from the 59 standard vanes (3-100).
- (5) Check that all stage 5 stator vanes are free from damage, giving particular attention to the leading and trailing edges.

NOTE: Ensure that any repaired vanes are evenly distributed around the case and that the aggregate depth of blending does not exceed 1.800 in. (45,72 mm) (Ref.72-31-01 Repair No.2).

- (6) Assemble the vanes to the case, passing each vane through the loading slot in the vane fixing ring and moving the vanes clockwise or counter-clockwise as necessary to take up their correct position in the case (Ref.Fig.526). During assembly of the vanes, ensure that the loading slot of the vane fixing ring aligns the loading slot of the case (Ref.Fig.525).
- (7) Ensure that the bolted vanes align with the bolt-holes in the case, and that the probe vanes are correctly positioned by inserting the checking gauge (Tool 289) through the outside of the case at the probe vane positions, ensuring that adequate clearance exists between the gauge and the probe vanes.

NOTE: This check is to ensure that inspection probes can be assembled to the case at a later date.

PRINTED IN ENGLAND

TN11461

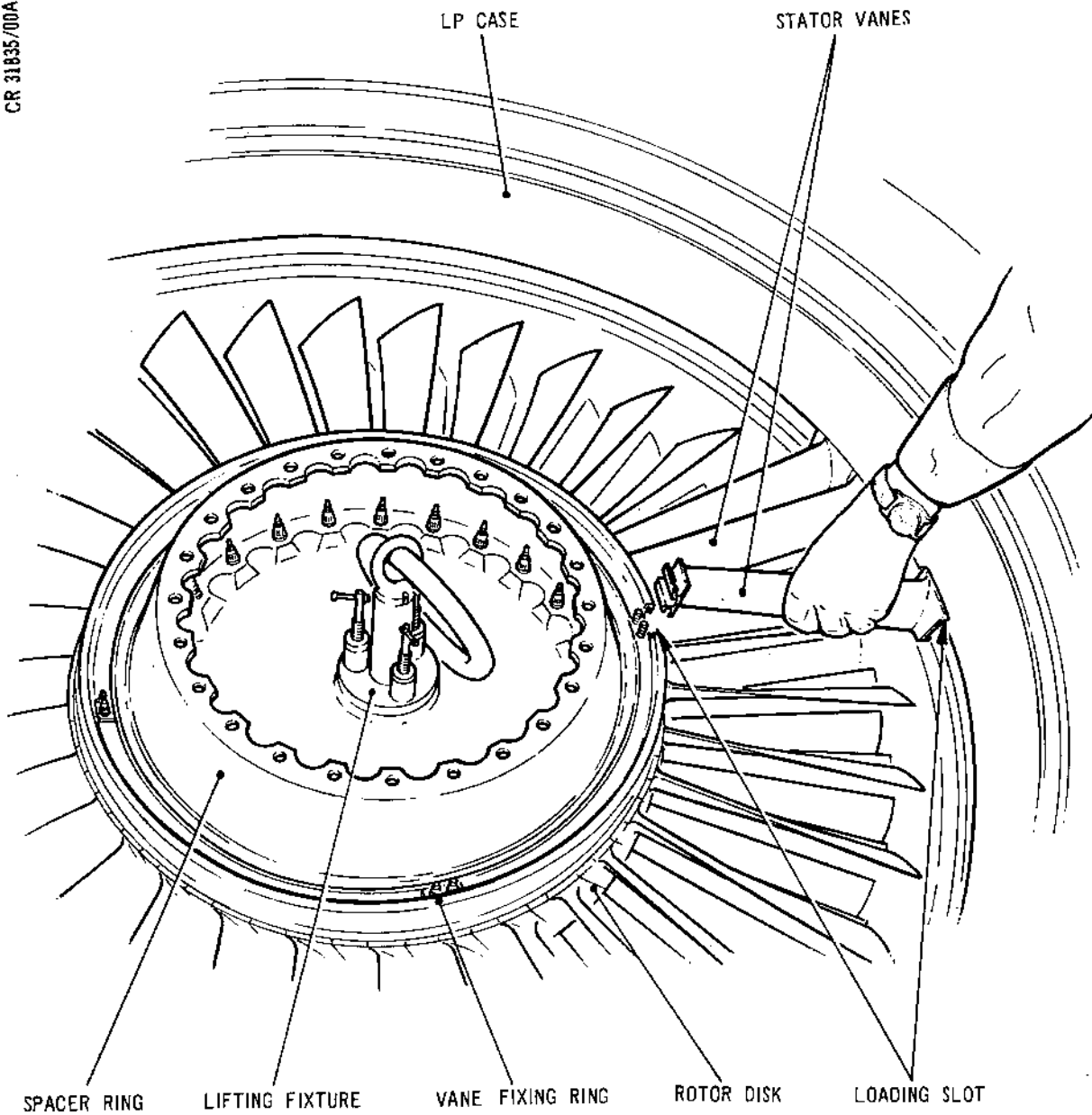


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 31835/00A



TN14426

Assembling the Stator Vanes  
Figure 525

SUB-ASSEMBLY  
**72-31-00**

Page 554  
Jul 1/76

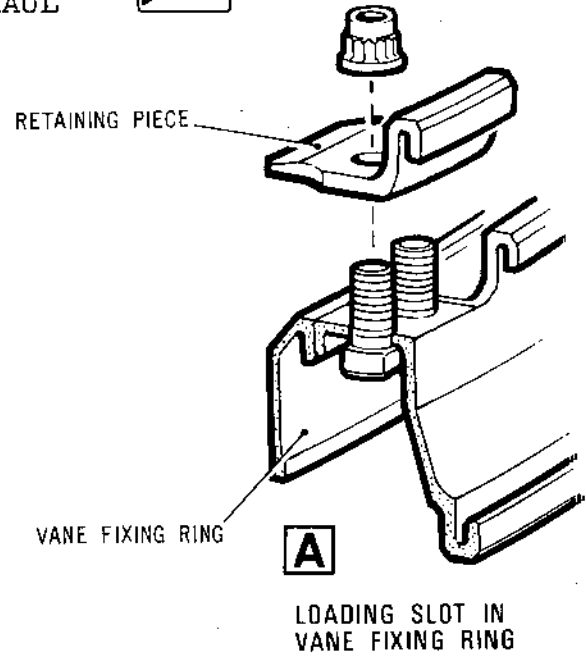
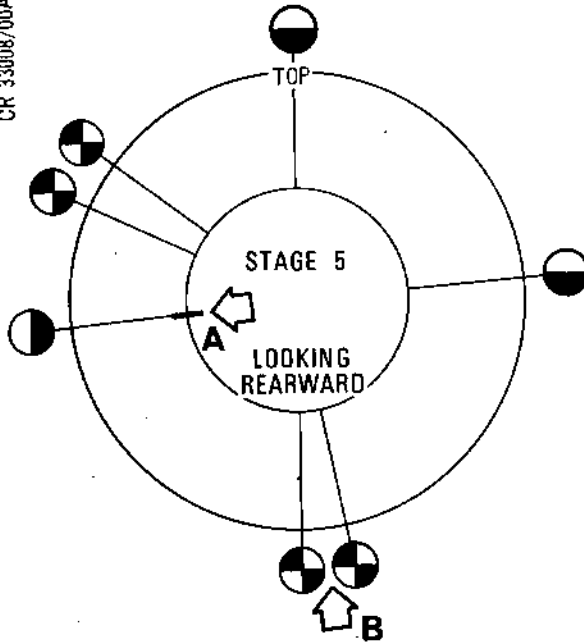


OLYMPUS 593

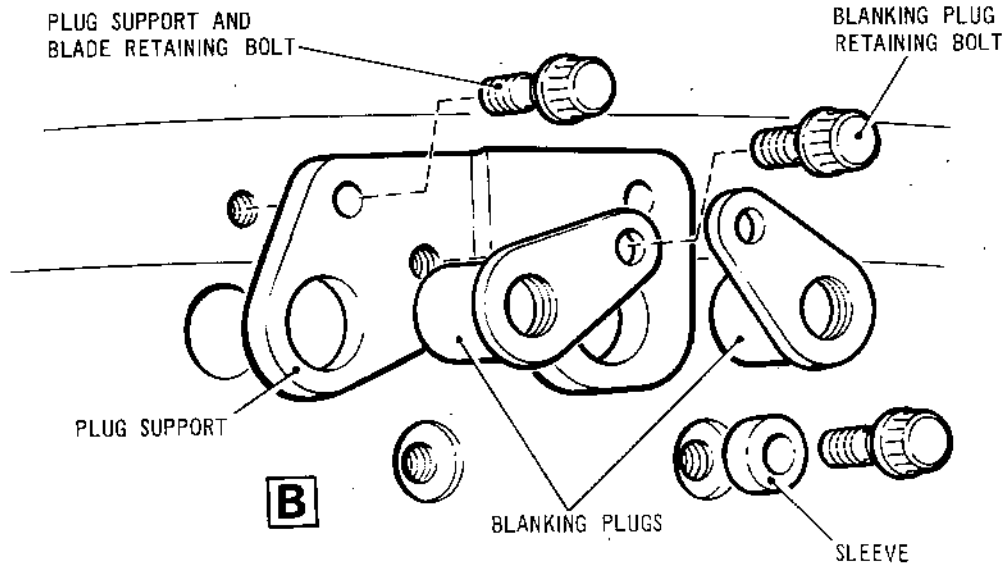
MK.610-14-28  
OVERHAUL



CR 33008/00A



POSITION	IPC REF	No. OFF
ALL OTHER VANES	3-100	59
	3-110	2
	3-120	1
	3-130	4



Stage 5 Probe and Bolted Vane Positions  
Figure 526



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (8) Assemble a retaining piece (3-90) over the two bolts retained in the vane fixing ring, then apply lubricant 'B' to the bolt threads and secure the retaining piece with two nuts (3-80). Do not tighten nuts at this stage.

C. Assemble the Stage 5 Support Plug Assemblies and the Vane Retaining Bolts (Ref.Fig.526).

- (1) Apply lubricant 'B' to two bolts (3-10), then assemble a sleeve (3-20) to each bolt. Insert the bolts into the case at the position shown (Ref.Fig.526), then screw them into the platform of the bolted stator vane, leaving the bolts finger tight at this stage.
- (2) Assemble a support plug assembly (3-50) to the case and secure with two bolts (3-60) lubricated with lubricant 'B'. Insert two blanking plugs (3-40) into the support plug and case and retain with two bolts (3-30) lubricated with lubricant 'B'. Assemble two sleeves (3-20) to the two bolts (3-10), apply lubricant 'B' to their threads, then insert the bolts into the case immediately rearward (above) the support and screw them into the vane platform, nip the bolts but do not tighten at this stage.
- (3) Assemble two sleeves (3-20) to the two bolts (3-10), apply lubricant 'B' to the bolt threads, then insert the bolts into the case and screw them into the stator vane platform.
- (4) Assemble two sleeves (3-20) to the two bolts (3-10), apply lubricant 'B' to the bolt threads, then insert the bolts into the case and screw them into the stator vane platform.
- (5) Assemble a support plug assembly (3-50) to the case at the position shown (Ref.Fig.526) and secure with two bolts (3-60) lubricated with lubricant 'B'. Insert two blanking plugs (3-40) into the support plug assembly and case and retain with two bolts (3-30) lubricated with lubricant 'B'.

IN34416

SUB-ASSEMBLY

72-31-00

Page 556

Jul 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (6) Torque-tighten all the blanking plug retaining bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m), the support plug assembly (3-50) retaining bolts between 80 and 90 lbf in. (9,0 and 10,2 N.m), and the fixed blade retaining bolts between 80 and 90 lbf in. (9,0 and 10,2 N.m).
- (7) Torque-tighten the nuts securing the retaining piece (3-90) at the vane fixing ring position between 85 and 95 lbf in. (9,6 and 10,7 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).
- (8) Wire-lock all the retaining bolts.
- (9) Using two sets of feeler gauges, check the clearance between the stage 5-6 spacer ring labyrinth and the stage 5 vane fixing ring. Carry out this check by inserting 0.025 in. (0,635 mm) feelers between the labyrinth and ring, then insert the required amount of feelers to measure the remaining clearance between the labyrinth and ring at a point diametrically opposite the first set of feeler gauges. Take the total of the two sets of feelers as the clearance. Carry out the check at three more equi-spaced positions, then take the average of the four readings. The clearance must be within the dimension quoted in the Fits and Clearances Schedule (72-30-00) FCS 36.
- (10) If the assembly is not to be worked on immediately, place the protector/blank (Tool 1683) over the stator vanes.

D. Assemble the Stage 5 Rotor Disk and the Stage 4-5 Spacer Ring.

NOTE: The procedure for building the remaining stages of rotor disks, spacer rings, vane fixing rings and stator vanes is similar throughout the build, so that figures shown earlier in the text may be referred to generally. Specific differences will be covered by the appropriate figure.

SUB-ASSEMBLY

**72-31-00**

Page 557

Feb 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (1) Lay out 24 bolts (03/2-130) on the worktop, then lubricate the threads of each bolt with lubricant 'B'.
- (2) Insert a bolt (03/2-130) into the datum hole of the front (upper) flange of the stage 5-6 spacer ring (03/2-150) so that it extends upwards, then screw an assembly pin (Tool 1065) into the bolt. Insert the remainder of the bolts and screw assembly pins onto the bolts. Ensure the pins are upright and mark the top of the datum hole pin so that it is readily identified. The procedure is similar to that shown in Fig.506.
- (3) Assemble the lifting fixture (Tool 1161) (Ref.Fig.519) to the front face of the stage 5 rotor disk (03/2-120), identified by the blade keys. Insert the claws through the centre hole, then turn the three tommy bars around 180 deg. until a ball catch locates in the slot in each leg. Screw down on the three thumb-nuts to lock the claws.
- (4) Remove the protector/blank (Tool 1683) from the stator vanes (if assembled), then clean the stator vanes and disk of any chalk marks and remove the numbered (card-board) disk (if assembled) from the stage 6 rotor disk. Remove the protection band (Tool 1127) from the stage 5 rotor blades.
- (5) Attach a hoist to the lifting fixture, then raise and position the rotor disk over the compressor case. Insert an alignment rod (Tool 380) into the datum position assembly pin (Tool 1065), then align the datum position of the stage 6 rotor disk with the rod (Ref.Fig.519). Lower the rotor disk until the rod passes through the disk datum hole and protrudes a few inches through the disk. Centralize the rotor disk with the case, then insert rods through the 23 vacant holes in the rotor disk to locate in the assembly pins assembled to the bolts below (Ref.Fig.520). Carefully lower the rotor disk guiding it over the assembly pins to abut the spacer ring (Ref.Fig.521). Remove the alignment rods and place them in a container. Remove the hoist, leaving the lifting fixture assembled to act as a blank. Place the protector/blank (Tool 1683) on top of the rotor blades.

TN7781

SUB-ASSEMBLY

72-31-00

Page 558

Jul 1/76





OLYMPUS 593

MK.610-14-28

OVERHAUL



- (6) Turning the assembly pins as required to align the flat on the bolthead with the wall of the spacer ring, pull up on the pins until all the thread and a waisted portion of the bolts are visible, then clip retaining clips (Tool 1038) onto the waisted portions of the bolts, with the clips extending towards the centre of the disk (Ref.Fig.522). Indicate the rotor datum hole by a chalk mark on the disk, then remove the assembly pins from the bolts. If any of the bolts are too tight to pull up with the assembly pins, screw the mechanical driver (Tool 1064) (Ref.Fig.522) onto a pin, then insert the locating key (Tool 1066) into the assembly pin locating the key into the slot in the bolt. Lock the locating key by screwing the thumbnut onto the assembly pin, then turn the locating key handle until it points towards the centre of the rotor. This aligns the flat on the bolthead with the spacer ring. Screw down on the driver tommy bars and draw the bolt up until it abuts the spacer ring front flange. Release and remove the locating key, mechanical driver, then clip a retaining clip (Tool 1038) onto the waisted portion of the bolt. Remove the assembly pin.
- (7) Release and remove the protector (Tool 1169) from the stage 4-5 spacer ring (03/2-90), then turn the spacer ring so that the labyrinth on its circumference is nearer to the disk. Establish the datum hole in the bottom flange, align the datum holes of the spacer ring and disk (by a chalk mark on the disk), then offer the spacer ring over the rotor bolts until it rests on the retaining clips.
- (8) Apply lubricant 'B' to the nuts (03/2-80), then screw the nuts onto the rotor bolts, but do not tighten. Pull the retaining clips off the bolts and remove.
- (9) Remove the lifting fixture (Tool 1161) from the rotor by releasing the thumbnuts, pushing the claws down, then turning the tommy bars around 180 deg until a ball catch locates in a slot in each leg. Lift the fixture away.

PRINTED IN ENGLAND

TN7782

SUB-ASSEMBLY

72-31-00

Page 559

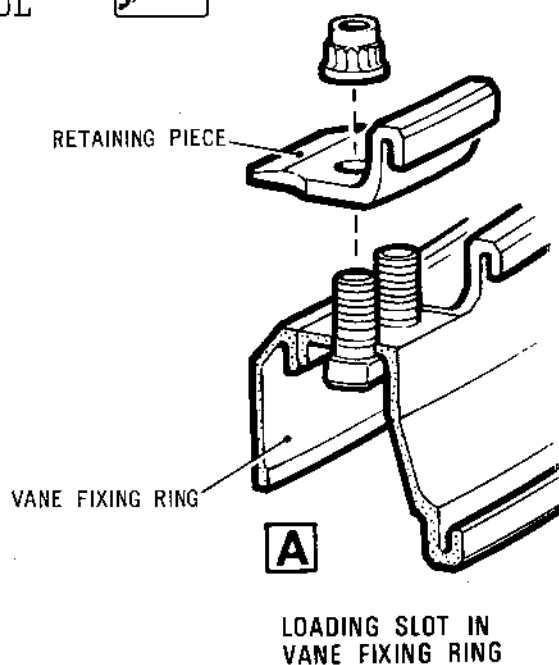
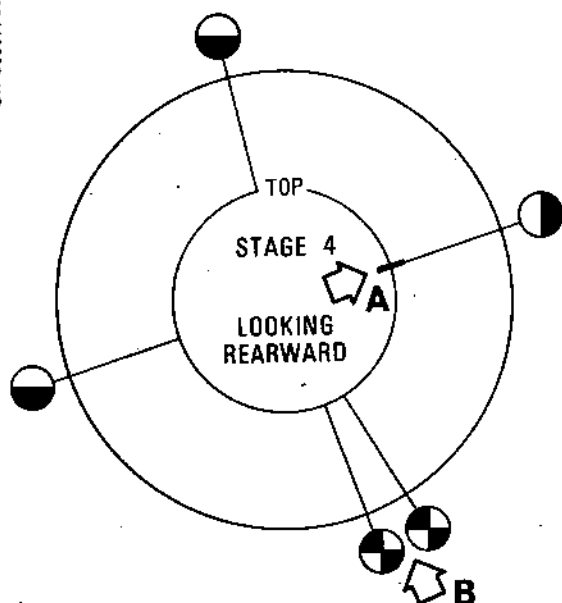
Jul 1/76

CR 33007/00A

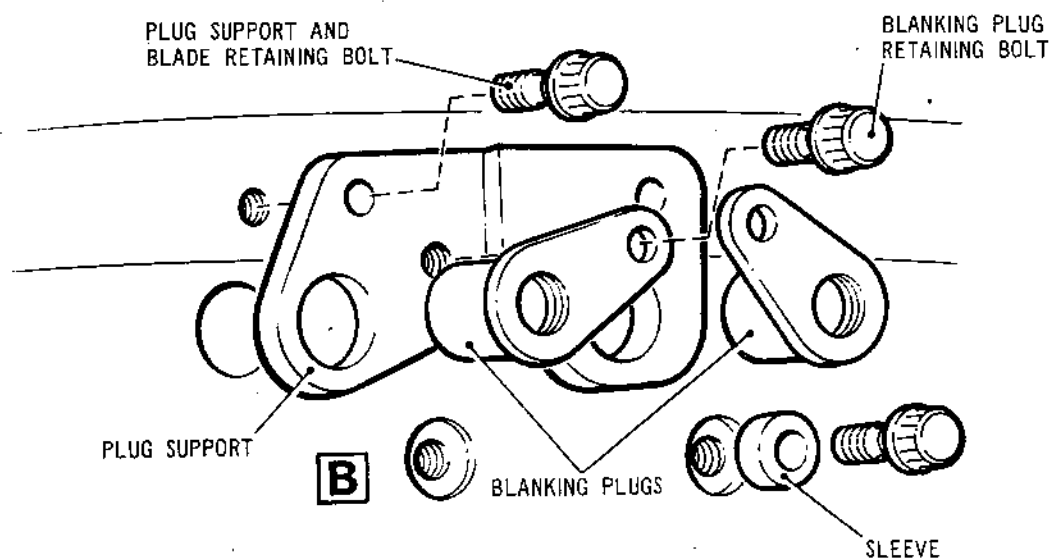


OLYMPUS 593

MK.610-14-28  
OVERHAUL



POSITION	IPC REF	No. OFF
ALL OTHER VANES	2-300	49
	2-310	2
	2-320	1
	2-330	2



Stage 4 Probe and Bolted Vane Positions  
Figure 527

SUB-ASSEMBLY  
**72-31-00**  
Page 560  
Jul 1/76

TN14428



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (10) Using the wrenches (Tool 1557 and 627) and a torque wrench, tighten the nuts in increments of 90 lbf in. to a final torque between 300 and 330 lbf in. (33,9 and 37,3 N.m) in the following sequence - 1, 13, 7, 19, 4, 16, 10, 22, 2, 14, 8, 20, 5, 17, 11, 23, 3, 15, 9, 21, 6, 18, 12 and 24. Locking (run-down) torque 9.5 lbf in. (1,1 N.m).
- (11) After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 1.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref.SB.72-8449-191).
- (12) Remove the protector/blank (Tool 1683) from the rotor blades, then using feeler gauges, check the tip clearance between the stage 5 rotor blades and the compressor case. Find the longest and shortest blades and check the max. and min. tip clearance at eight equi-spaced points then find the average max. and min. tip clearance. Refer to the Fits and Clearances Schedule (72-30-00) FCS 29. Replace the protector/blank if the assembly is not to be continued immediately.

E. Assemble the Stage 4 Stator Vanes to the LP Compressor Case (Ref.Fig.527).

NOTE: Before commencing assembly refer to SB.72-19 and SB.72-54.

- (1) Remove the protector/blank (Tool 1683) (if assembled) from the stage 5 rotor blades.
- (2) Apply lubricant 'A' to the stage 4 stator vane grooves in the case and to the vane grooves in the stage 4 vane fixing ring (2-390).
- (3) Turn the vane fixing ring (2-390) so that the two loading slot bolts extend upwards, then lower the fixing ring over the spacer ring, positioning the loading slot to align with the vane loading slot in the case.
- (4) Identify the probe and bolted vanes, then separate them from the standard vanes.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (5) Check that all stage 4 stator vanes are free from damage giving particular attention to the leading and trailing edges.

NOTE: Ensure that any repaired vanes are evenly distributed around the case and that the aggregate depth of blending does not exceed 1.800 in. (45,72 mm) (Ref.72-31-01 Repair No.2).

- (6) Assemble the vanes to the case (Ref.Fig.526), passing each vane through the loading slot in the vane fixing ring and moving the vanes clockwise or counter-clockwise as necessary allowing the vanes to take up their correct position in the case. During the assembly of the vanes ensure that the loading slot of the vane fixing ring aligns the loading slot of the case (Ref.Fig.525).
- (7) Ensure that the bolted vanes align with the bolt-holes in the case, and that the probe vanes are correctly positioned by inserting the checking gauge (Tool 289) through the outside of the case at the probe vane positions, ensuring that adequate clearance exists between the gauge and the probe vanes.

NOTE: This check is to ensure that inspection probes can be assembled to the case at a later date.

- (8) Assemble a retaining piece (2-290) over the two bolts retained in the vane fixing ring, then apply lubricant 'B' to the bolt threads and assemble two nuts (2-280) to the bolts. Do not tighten nuts at this stage.

F. Assemble the Stage 4 Support Plug Assemblies and the Stator Vane Retaining Bolts (Ref.Fig.527).

- (1) Assemble two sleeves (2-220) to two bolts (2-210), apply lubricant 'B' to the bolt threads, then insert the bolts into the case at the loading slot position (Ref.Fig.527) and screw them into the blade platform.
- (2) Adopting the same procedure, and using lubricant 'B' on the bolts, assemble sleeves (2-220) to the four bolts (2-210), then assemble them to the remaining two positions.

SUB-ASSEMBLY

72-31-00

Page 562

Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Apply lubricant 'B' to two bolts (2-260), then assemble a support plug assembly (2-250) to the case (Ref.Fig.527) and secure it to the case with the two bolts. Assemble two plugs (2-240) to the support plug assembly and retain the plugs with two bolts (2-230) lubricated with lubricant 'B'. Assemble two sleeves (2-220) to two bolts (2-210), apply lubricant 'B' to the threads of the two bolts, then assemble the sleeves and bolts to the two positions immediately to the rear of the support plug assembly.
- (4) Commencing at the loading slot position torque-tighten the two nuts (2-280) at the vane fixing ring position between 85 and 95 lbf in. (9,6 and 10,7 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m). Torque-tighten the two bolts at the outer platform (outside the case) between 80 and 90 lbf in. (9,0 and 10,2 N.m), then wire-lock these bolts together.
- (5) Torque-tighten the remaining sleeved bolts between 80 and 90 lbf in. (9,0 and 10,2 N.m), then wire-lock each pair of bolts together.
- (6) Torque-tighten the two bolts retaining the support plug assembly to the case between 80 and 90 lbf in. (9,0 and 10,2 N.m), then wire-lock the two bolts together. Torque-tighten the two bolts retaining the two plugs to the support plug assembly between 85 and 95 lbf in. (9,6 and 10,7 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m). Torque-tighten the two bolts (with the sleeves) between 80 and 90 lbf in. (9,0 and 10,2 N.m), then wire-lock the two bolts together.
- (7) Using two sets of feeler gauges, check the clearance between the stage 4-5 spacer ring labyrinth and the stage 4 vane fixing ring. Carry out this check by inserting 0.025 in. (0,635 mm) feelers between the labyrinth and ring, then insert the required amount of feelers to measure the remaining clearance between the labyrinth and ring at a point diametrically opposite the first set of feeler gauges. Take the total of the two sets of feelers as the clearance. Carry out the check at three more equi-spaced positions,

SUB-ASSEMBLY

72-31-00

Page 563

Feb 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



then take the average of the four readings. The clearance must be within the dimension quoted in the Fits and Clearances Schedule (72-30-00) FCS 32.

- (8) If the assembly is not to be continued immediately place the protector/blank (Tool 1683) over the stator vanes.

G. Assemble the Stage 4 Rotor Disk and the Stage 3-4 Spacer Ring.

- (1) Lay out 24 bolts (03/2-70) on a clean worktop, then apply lubricant 'B' to the threads of each bolt.
- (2) Insert a bolt (03/2-70) into the upper (front) flange of the stage 4-5 spacer ring (03/2-90) so that it extends upwards, then screw an assembly pin (Tool 1065) onto the bolt (Ref.Fig.506). Insert the remainder of the bolts and screw assembly pins onto the bolts. Ensure the pins are upright. Mark the top of the datum hole pin so that it is readily identified.
- (3) Assemble the lifting fixture (Tool 1161) (Ref.Fig.519) to the front face of the stage 4 rotor disk (03/2-60) identified by the locking tangs. Guide the three claws of the fixture through the centre hole of the disk, then turn the claws outward to lock and locate on the rear face of the disk. Screw down the three thumbnuts to secure the claws in the locked position. Mark the datum position on the front face of the rotor disk with suitable chalk.
- (4) Remove the protection/retaining band (Tool 1126) from the tips of the rotor blades and, if assembled, the protector/blank (Tool 1683) from the stator vanes. Attach the overhead hoist to the lifting fixture, then raise the hoist and position the rotor disk over the case. Mark the datum hole position on the front face of the disk with suitable chalk.

TN25304

SUB-ASSEMBLY

**72-31-00**

Page 564

Jul 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (5) Insert an alignment rod (Tool 380) into the datum position assembly pin (Tool 1065), then align the datum position of the stage 4 rotor disk with the rod. Lower the stage 4 rotor disk until the rod passes through the disk datum hole and protrudes a few inches. Centralize the rotor disk with the case, then insert rods through the remaining 23 bolt-holes in the rotor disk to locate in the assembly pins assembled to the bolts below. Carefully lower the disk guiding it over the assembly pins until it abuts the spacer ring. Withdraw the alignment rods from the assembly pins and place the rods in a container. Place a protector/blank (Tool 1682) over the blades of the rotor. Remove the hoist leaving the lifting fixture assembled to act as a blank.
- (6) Turning the assembly pins as required to align the flat on the bolthead with the wall of the spacer ring, pull up on the pins until all the thread and a waisted portion of the bolts are visible, then clip the retaining clips (Tool 1038) onto the waisted portions of the bolts, with the clips extending towards the centre of the disk (Ref.Fig.522). Remove the assembly pins from the bolts. If any of the bolts are too tight to pull up with the assembly pins, screw the mechanical puller (Tool 1064) (Ref.Fig.522) onto a pin, then insert the locating key (Tool 1066) into the assembly pin locating the key into the slot in the bolt. Lock the locating key by screwing the thumbnut onto the assembly pin, then turn the locating key handle until it points towards the centre of the rotor. This aligns the flat on the bolthead with the spacer ring. Screw down on the puller tommy bars and draw the bolt up until it abuts the spacer ring front flange. Release and remove the locating key and mechanical puller, then clip a retaining clip (Tool 1038) to the waisted portion of the bolt. Remove the assembly pin.

SUB-ASSEMBLY

72-31-00

Page 565

Jul 1/76



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (7) Remove the protector (Tool 1168) from the stage 3-4 spacer ring labyrinth (03/2-30), then turn the spacer ring so that the labyrinth on its circumference is nearer the bottom, with the taper on the spacer uppermost. Establish the datum hole in the bottom flange, then align the datum holes of the spacer ring and disk (by the chalk mark on the disk), and offer the spacer over the rotor bolts until it rests on the retaining clips.
- (8) Screw 24 nuts (03/2-20) onto the rotor bolts, but do not tighten. Pull the retaining clips off the bolts and remove.
- (9) Remove the lifting fixture (Tool 1161) from the rotor by releasing the thumbnuts, pushing the claws down, then turning the tommy bars around 180 deg until a ball catch locates in a slot in each leg. Lift the fixture away.
- (10) Using wrenches (Tool 1557 and Tool 627) and a torque wrench, tighten the nuts in the following sequence - 1, 13, 7, 19, 4, 16, 10, 22, 2, 14, 8, 20, 5, 17, 11, 23, 3, 15, 9, 21, 6, 18, 12 and 24. Torque-tighten the nuts in increments of 100 lbf in. (11,3 N.m) to a final torque of between 300 and 330 lbf in. (33,9 and 37,3 N.m). Locking (run-down) torque 9.5 lbf in. (1,1 N.m).
- (11) After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 1.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref.SB.72-8449-191).
- (12) Remove the protector/blank (Tool 1682) from the rotor blades, then using feeler gauges, check the tip clearance between the stage 4 rotor blades and the compressor case. Find the longest and shortest blades then check the max. and min. tip clearance at eight equi-spaced points, then find the average tip clearance. Refer to the Fits and Clearances Schedule (72-30-00) FCS 28. Replace if the assembly is not to be continued immediately.

SUB-ASSEMBLY

72-31-00

Page 566

Jun 30/01





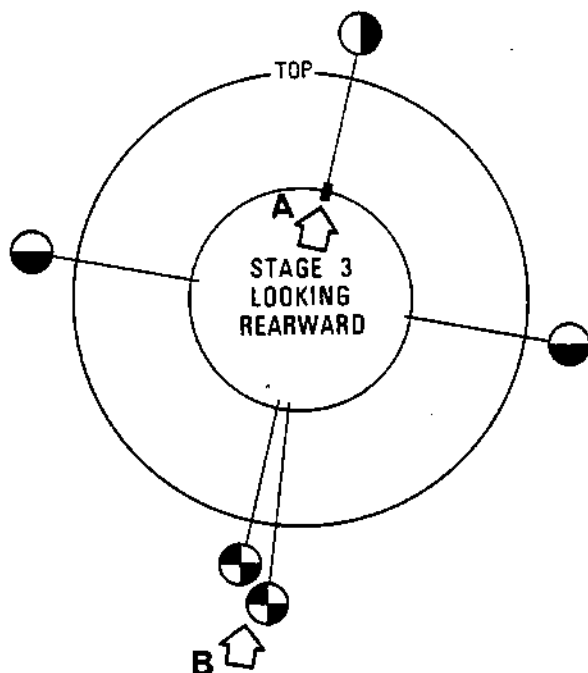
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 33006/00A



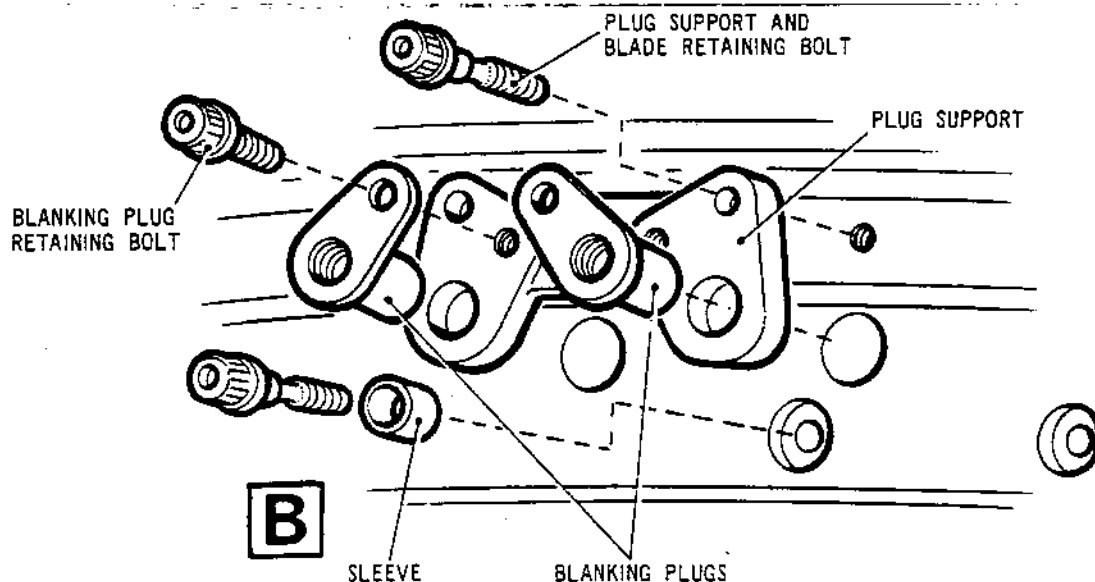
RETAINING PIECE

VANE FIXING RING

A

LOADING SLOT IN  
VANE FIXING RING

POSITION	IPC REF	No. OFF
ALL OTHER VANES	2-100	49
	2-110	2
	2-120	1
	2-130	2



Stage 3 Probe and Bolted Vane Positions  
Figure 528

SUB-ASSEMBLY

72-31-00

Page 567  
Jul 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



H. Assemble the Stage 3 Stator Vanes to the LP Compressor Case (Ref.Fig.528).

NOTE: Before commencing assembly refer to SB.72-19.

- (1) Remove the protector/blank (Tool 1682) (if assembled) from the stage 4 rotor blades.
- (2) Apply lubricant 'A' to the stage 3 stator vane grooves in the case, and to the vane grooves in the stage 3 vane fixing ring unit (2-190).
- (3) Turn the vane fixing ring (2-190) so that the two loading slot bolts extend upwards, then lower the fixing ring over the spacer ring, positioning the loading slot to align with the vane loading slot in the case.
- (4) Identify the probe and bolted vanes, then separate them from the 49 standard vanes.
- (5) Check that all stage 3 stator vanes are free from damage, paying particular attention to the leading and trailing edges.

NOTE: Ensure that any repaired vanes are evenly distributed around the case and that the aggregate depth of blending does not exceed 1.500 in. (38,10 mm) (Ref.72-31-01 Repair No.2).

- (6) Assemble the vanes to the case (Ref.Fig.528), passing each vane through the loading slot in the vane fixing ring and moving the vanes clockwise or counter-clockwise as necessary allowing the vanes to take up their correct position in the case. During the assembly of the vanes ensure that the loading slot of the vane fixing ring aligns the loading slot of the case (Ref.Fig.525).
- (7) Ensure that the bolted vanes align with the bolt-holes in the case, and that the probe vanes are correctly positioned by inserting the checking gauge (Tool 289) through the outside of the case at the probe vane positions ensuring that adequate clearance exists between the gauge and the probe vanes.

NOTE: This check is to ensure that inspection probes can be assembled to the case at a later date.

7N25308

SUB-ASSEMBLY  
**72-31-00**

Page 568  
Mar 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (8) Assemble a retaining piece (2-90) over the two bolts retained in the vane fixing ring, then apply lubricant 'B' to the bolt threads and assemble two nuts (2-80) to the bolts. Do not tighten nuts at this stage.

J. Assemble the Stage 3 Support Plug Assemblies and the Stator Vane Retaining Bolts (Ref.Fig.528).

- (1) Commencing at the loading slot position assemble two sleeves (2-20) to two bolts (2-10), apply lubricant 'B' to the bolt threads, then assemble the bolts and sleeves to the case to retain the bolted vane. Assemble a retaining piece (2-90) to the two bolts protruding through the bolted vane platform inner end, then lubricate two nuts (2-80) with lubricant 'B'. Screw the nuts onto the bolts to secure the retaining plate.
- (2) Assemble two sleeves (2-20) to two bolts (2-10), apply lubricant 'B' to their threads, then assemble the bolts to the case (Ref.Fig.528).
- (3) Assemble a support plug assembly (2-50) to the case, then secure the assembly with two bolts (2-60) lubricated with lubricant 'B'. Assemble two plugs (2-40) to the support plug assembly, then secure the plugs with two bolts (2-30) lubricated with lubricant 'B'. Assemble two sleeves (2-20) to two bolts (2-10), lubricate the bolt threads with lubricant 'B', then assemble the bolts to the case immediately to the rear of the plug assemblies.
- (4) Secure the mounting bracket (4-70), already assembled to the front blow-off flange, with two sleeves (2-20) and two bolts (2-10) lubricated with lubricant 'B'. Torque-tighten the bolts between 80 and 90 lbf in. (9,0 and 10,2 N.m). Wire-lock each bolt (2-10) to the bracket (4-70).

SUB-ASSEMBLY

72-31-00

Page 569  
Jul 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (5) Commencing at the loading slot position, torque-tighten the two nuts (2-80) at the inner fixing ring/stator vane position (Ref.Fig.528) between 85 and 95 lbf in. (9,6 and 10,7 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m). Torque-tighten the two bolts at the outer platform (outside the case) between 80 and 90 lbf in. (9,0 and 10,2 N.m), then wire-lock these bolts together.
- (6) Torque-tighten the sleeved bolts (Ref.Fig.528) between 80 and 90 lbf in. (9,0 and 10,2 N.m), then wire-lock each pair of bolts together.
- (7) Torque-tighten the two bolts retaining the support plug assembly to the case (Ref.Fig.528) between 80 and 90 lbf in. (9,0 and 10,2 N.m), then wire-lock the two bolts together. Torque-tighten the two bolts retaining the two plugs to the support plug assembly between 85 and 95 lbf in. (9,0 and 10,2 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m). Torque-tighten the two bolts (with the sleeves) between 80 and 90 lbf in. (9,0 and 10,2 N.m), then wire-lock the two bolts together.
- (8) Using two sets of feeler gauges, check the clearance between the stage 3-4 spacer ring labyrinth and the stage 3 vane fixing ring. Carry out this check by inserting 0.030 in. (0,762 mm) feelers between the labyrinth and ring, then insert the required amount of feelers to measure the remaining clearance between the labyrinth and ring at a point diametrically opposite the first set of feeler gauges. Take the total of the two sets of feelers as the clearance. Carry out this check at three more equi-spaced positions, then take the average of the four readings. The clearance must be within the dimension quoted in the Fits and Clearances Schedule (72-30-00) FCS 21.
- (9) If the assembly is not to be continued immediately assemble a protector/blank (Tool 1682) to the stator vanes.

FN15476

SUB-ASSEMBLY

**72-31-00**

Page 570

Feb 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



K. Assemble the Stage 3 Rotor Disk and the Stage 2-3 Spacer Ring.

- (1) Lay out 24 bolts (03/2-10) on a clean worktop, then apply lubricant 'B' to the threads of each bolt.
- (2) Insert a bolt (03/2-10) into the datum hole of the upper (front) flange of the stage 3-4 spacer ring so that it extends upwards, then screw an assembly pin (Tool 1065) onto the bolt (Ref.Fig.506). Insert the remainder of the bolts and screw assembly pins onto the bolts. Ensure the pins are upright, mark the top of the datum hole pin so that it is readily identified.
- (3) Assemble the lifting fixture (Tool 1161) (Ref.Fig.519) to the front face of the stage 3 rotor disk (03/1-360), identified by the locking tangs. Guide the three claws through the centre hole, then turn the claws outward to lock and locate on the rear face of the disk. Screw down the three thumbnuts to secure the claws in the locked position.
- (4) Remove the protection/retaining band (Tool 1125) from the tips of the rotor blades and, if assembled, the protector/blank (Tool 1682) from the stator vanes. Attach the overhead hoist to the lifting fixture, then raise the hoist and position the rotor disk over the compressor case. Mark the datum hole position on the front face of the disk with suitable chalk.
- (5) Insert an alignment rod (Tool 380) into the datum position assembly pin (Tool 1065), then align the datum position of the stage 3 rotor disk with the rod. Lower the stage 3 rotor disk until the rod passes through its datum hole and protrudes a few inches. Centralize the rotor disk with the case, then insert rods through the remaining 23 bolt-holes in the rotor disk to locate in the assembly pins assembled to the bolts below (Ref.Fig.520). Carefully lower the disk guiding it over the assembly pins until it abuts the spacer ring (Ref.Fig.521). Withdraw the alignment

PRINTED IN ENGLAND

TN25310



OLYMPUS 593

MK.610-14-28  
OVERHAUL



rods (Tool 380) from the assembly pins and place the pins in a container. Place a protector/blank (Tool 1681) over the blades of the rotor. Remove the hoist leaving the lifting fixture assembled to act as a blank.

- (6) Turning the assembly pins as required to align the flat on the bolthead with the wall of the spacer ring, pull up on the pins until all the thread and a waisted portion of the bolts are visible, then clip retaining clips (Tool 1038) onto the waisted portions of the bolts with the clips extending towards the centre of the disk (Ref.Fig.522). Indicate the rotor datum hole by a chalk mark on the disk, then remove the assembly pins from the bolts. If any of the bolts are too tight to pull up with the assembly pins, screw the mechanical driver (Tool 1064) (Ref.Fig.522) onto a pin, then insert the locating key (Tool 1066) into the assembly pin locating the key to the side of the step in the bolthead with the step face on the bolt facing the case. Lock the locating key by screwing the thumb-nut onto the assembly pin, then turn the locating key handle until it points towards the centre of the rotor, this aligns the flat on the bolthead with the spacer ring. Screw down on the mechanical puller tommy bars and draw the bolt up until it abuts the spacer ring front flange. Release and remove the locating key and mechanical puller, then clip a retaining clip (Tool 1038) onto the waisted portion of the bolt and remove the assembly pins. Repeat this procedure on any bolts that are tight.
- (7) Remove the protector (Tool 443) from the stage 2-3 spacer ring (03/1-280), then turn the spacer ring so that the taper on the spacer ring is uppermost. Establish the datum hole in the bottom flange, align the datum holes of the spacer ring and disk (by the chalk mark on the disk), then lower the spacer ring over the rotor bolts until it rests on the retaining clips.
- (8) Screw 24 nuts (03/1-270) onto the rotor bolts, but do not tighten. Pull the retaining clips off the bolts and place them in a container.

FN25311

SUB-ASSEMBLY

**72-31-00**

Page 572

May 1/79



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (9) Remove the lifting fixture (Tool 1161) from the rotor by releasing the thumbnuts, pushing the claws down, then turning the tommy bars around 180 deg until a ball catch locates in a slot in each leg. Lift the fixture away.
  - (10) Using wrenches (Tool 1557 and Tool 1591) and a torque wrench, tighten the nuts in the following sequence - 1, 13, 7, 19, 4, 16, 10, 22, 2, 14, 8, 20, 5, 17, 11, 23, 3, 15, 9, 21, 6, 18, 12 and 24. Torque-tighten the bolts in increments of 100 lbf in. (11,3 N.m) to a final torque of between 300 and 330 lbf in. (33,9 and 37,3 N.m). Locking (run-down) torque 9.5 lbf in. (1,1 N.m).
  - (11) After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 1.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref.SB.72-8449-191).
  - (12) Remove the protector/blank (Tool 1681) from the rotor blades, then using feeler gauges, check the tip clearance between the stage 3 rotor blades and the compressor case. Find the longest and shortest blades and check the max. and min. tip clearance at eight equi-spaced points, then find the average max. and min. tip clearance. Refer to the Fits and Clearances Schedule (72-30-00) FCS 27. Replace the protector/blank (Tool 1681) if the assembly is not to be continued immediately.
- L. Assemble the Stage 2 Stator Vanes to the LP Compressor Case (Ref.Fig.529).

NOTE: Before commencing assembly refer to SB.72-19.

- (1) Remove the protector/blank (Tool 1681) (if assembled) from the stage 3 rotor blades.
- (2) Apply lubricant 'A' to the second stage stator vane grooves in the case, and to the vane grooves in the stage 2 vane fixing ring unit (1-370).



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Turn the vane fixing ring (1-370) so that the two loading slot bolts extend upwards, then lower the fixing ring over the spacer ring, positioning the loading slot to align the vane loading slot in the case.
- (4) Identify the probe and bolted vanes, then separate them from the 38 standard vanes.
- (5) Check that all stage 2 stator vanes are free from damage, paying particular attention to the leading and trailing edges.

NOTE: Ensure that any repaired vanes are evenly distributed around the case and that the aggregate depth of blending does not exceed 2.000 in. (50,80 mm) (Ref.72-31-01 Repair No.2).

- (6) Assemble the vanes to the case (Ref.Fig.529), passing each vane through the loading slot in the vane fixing ring, moving the vanes clockwise or counter-clockwise as necessary allowing the vanes to take up their correct position in the case. During the assembly of the vanes ensure that the loading slot of the vane fixing ring aligns the loading slot of the case (Ref.Fig.525).
- (7) Ensure that all the bolted vanes align with their respective holes in the case. Insert the checking gauge (Tool 289) through the outside of the case at the probe vane position ensuring that adequate clearance exists between the gauge and probe vanes.

NOTE: This check is to ensure that inspection probes can be assembled to the case at a later date.

- (8) Assemble a retaining piece (1-280) over the two bolts retained in the vane fixing ring, then apply lubricant 'B' to their threads and assemble two nuts (1-270) to the bolts. Do not tighten nuts at this stage.





# OLYMPUS 593

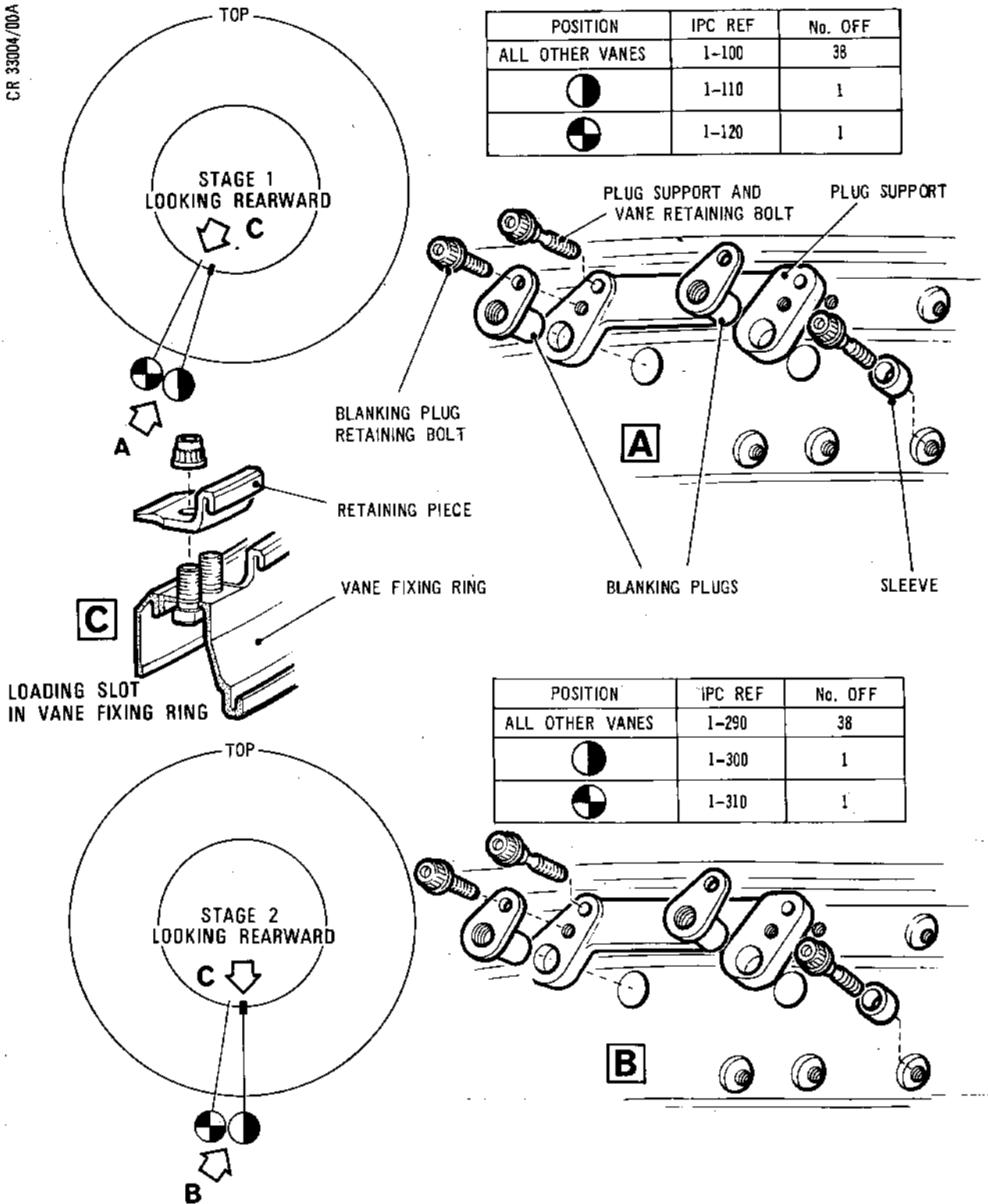
MK.610-14-28  
OVERHAUL



CR 33004/00A

PRINTED IN ENGLAND

POSITION	IPC REF	No. OFF
ALL OTHER VANES	1-100	38
	1-110	1
	1-120	1



POSITION	IPC REF	No. OFF
ALL OTHER VANES	1-290	38
	1-300	1
	1-310	1

Stage 1 and 2 Probe and Bolted Vane Positions  
Figure 529

TN14429



OLYMPUS 593

MK.610-14-28  
OVERHAUL



M. Assemble the Stage 2 Support Plug Assembly and the Stator Vane Retaining Bolts (Ref.Fig.529).

- (1) Assemble a support plug assembly (1-240) to the case and secure it with two bolts (1-250) lubricated with lubricant 'B'. Assemble two blanking plugs (1-230) to the support plug assembly, then retain the plugs with two bolts (1-220) lubricated with lubricant 'B'. Assemble four sleeves (1-210) to four bolts (1-200), apply lubricant 'B' to the bolt threads, then secure the bolted vane and probe vane with the bolts.
- (2) Torque-tighten the nuts securing the retaining piece (1-280) to the bolted vane and inner fixing ring between 170 and 190 lbf in. (19,2 and 21,5 N.m). Locking (run-down) torque 6.5 lbf in. (0,73 N.m).
- (3) Torque-tighten the two bolts retaining the blanking plugs to the support plug assembly between 85 and 95 lbf in. (9,6 and 10,7 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).
- (4) Torque-tighten the four sleeved bolts (1-200) between 160 and 180 lbf in. (18,1 and 20,3 N.m), then wire-lock these bolts in pairs. Torque-tighten the two bolts (1-250) between 160 and 180 lbf in. (18,1 and 20,3 N.m), wire-lock the two bolts together.
- (5) Using two sets of feeler gauges, check the clearance between the stage 2-3 spacer ring labyrinth and the stage 2 vane fixing ring. Carry out this check by inserting 0.025 in. (0,635 mm) feelers between the labyrinth and ring, then insert the required amount of feelers to measure the remaining clearance between the labyrinth and ring at a point diametrically opposite the first set of feeler gauges. Take the total of the two sets of feelers as the clearance. Carry out the check at three more equi-spaced positions, then take the average of the four readings. The clearance must be within the dimension quoted in the Fits and Clearances Schedule (72-30-00) FCS 17.

FN15462

SUB-ASSEMBLY

**72-31-00**

Page 576

Feb 1/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (6) If the assembly is not to be continued immediately, assemble a protector/blank (Tool 1681) to the stator vanes.

N. Assemble the Stage 2 Rotor Disk and the Stage 1-2 Spacer Ring.

- (1) Lay out 20 bolts (03/1-260) on a suitable worktop, lubricate the threads of each bolt with lubricant 'B'.
- (2) Insert a bolt (1-260) into the datum hole of the upper (front) flange of the stage 2-3 spacer ring so that it extends upwards, then screw an assembly pin (Tool 1067) onto the bolt ensuring the step face on the bolt end faces the spacer wall. Insert the remainder of the bolts and screw assembly pins onto the bolts. Ensure the pins are upright, and mark the top of datum hole pin so that it is readily identified.
- (3) Ensure that a retaining band (Tool 1166) is assembled to each pair of blades of the stage 2 rotor disk (03/1-250), and that the bands are towards the tip of the blades with the band fasteners uppermost. The blade tangs are to the rear of the disk.
- (4) Assemble the multiple leg sling (Tool 1102), to the rotor blades (Ref.Fig.531).
  - (a) Attach a hoist to the sling lifting ring, then position the hoist over the rotor disk.
  - (b) Ensure that the tommy bars of the legs are pointed to 'FREE', then lower the hoist guiding the legs in between the rotor blades. When the three pads of the equipment rest on the blade roots, turn the tommy bars to 'LIFT'.
- (5) Remove the protector/blank (Tool 1681) (if assembled) from the stator vanes, then clean the stator vanes and disk of any chalk marks. Remove the padding ring (Tool 1108) from the compressor case front (top) flange, then remove the protective band (Tool 1124) from the stage 2 rotor blades.

PRINTED IN ENGLAND

TN12088

SUB-ASSEMBLY

72-31-00

Page 577

Jul 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (6) Raise the hoist/rotor and position it over the compressor case. Establish the datum hole of the rotor and align it with the marked assembly pin, then steadily lower the rotor taking care it does not swing causing damage to the blades or case. When the rotor is just touching the assembly pins, stop lowering the rotor and ensure that all the pins are aligned with, and entering into the rotor securing holes, and that the marked pin is aligned with the rotor datum hole. Steadily lower the rotor ensuring all the pins are located in the rotor. When the rotor abuts the spacer, turn the tommy bars of the sling to 'FREE', then raise the hoist, guiding the legs out from between the blades. Remove the sling from the hoist. Remove the retaining bands (Tool 1166) from the rotor blades.
- (7) Place a protector/blank (Tool 1680) on top of the rotor blades, and a convenient size disk over the centre hole in the rotor disk. Reassemble the padding ring (Tool 1108) to the front (top) flange of the case locating the ring's tapped pins in the flange bolt-holes.
- (8) Turning the assembly pins as required to align the flat on the bolthead with the wall of the spacer ring, pull up on the pins until all the thread and a waisted portion of the bolts are visible, then clip retaining clips (Tool 1038) onto the waisted portions of the bolts, with the clips extending towards the centre of the disk (Ref.Fig.522). Remove the assembly pins from the bolts. If any of the bolts are too tight to pull up with the assembly pins, screw the mechanical puller (Tool 1064) (Ref.Fig.522) onto a pin, then insert the locating key (Tool 987) into the assembly pin locating the key to the side of the step in the bolthead with the step face on the bolt facing the case. Lock the locating key by screwing the thumbnut onto the assembly pin, then turn the locating key handle until it points towards the centre of the rotor, this aligns the flat on the bolthead with the case. Screw down on the puller tommy bars and draw the bolt up until it abuts the spacer ring

TN12089

SUB-ASSEMBLY

72-31-00

Page 578

Jul 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



front flange. Release and remove the locating key and mechanical puller, then clip a retaining clip (Tool 1038) to the waisted portion of the bolt. Repeat this procedure on any bolts that are tight. Remove the assembly pins.

- (9) Release and remove the protector (Tool 443) from the stage 1-2 spacer ring (03/1-190), then turn the spacer ring so that the smaller diameter is uppermost. Establish the datum hole in the bottom flange, align the datum holes of the disk and spacer ring, then lower the spacer ring over the rotor bolts until it rests on the retaining clips.
- (10) Apply lubricant 'B' to the nut threads, then screw the nuts onto the rotor bolts, but do not tighten. Pull the retaining clips off the bolts and remove.
- (11) Using wrench (Tool 1627) and a torque wrench, tighten the nuts in the following sequence - 1, 11, 7, 17, 4, 14, 9, 19, 3, 13, 6, 16, 10, 20, 5, 15, 2, 12, 8, and 18, in increments of 13 lbf ft (16,2 N.m), to a final torque of between 38 and 42 lbf ft (51,5 and 56,9 N.m). Locking (run-down) torque 14 lbf in. (1,6 N.m).
- (12) Remove the protector/blank (Tool 1680) from the rotor blades, then using feeler gauges, check the tip clearance between the stage 2 rotor blades and the compressor case. Find the longest and shortest blades and check the max. and min. tip clearance at eight equi-spaced points, then find the average max. and min. tip clearance. Refer to the Fits and Clearances Schedule (72-30-00) FCS 26. Replace the protector/blank (Tool 1680) if the assembly is not to be worked on immediately.

P. Assemble the Stage 1 Stator Vanes to the LP Compressor Case (Ref.Fig.529).

NOTE: Before commencing work refer to SB.72-19.

SUB-ASSEMBLY

72-31-00

Page 579

May 1/79



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (1) Remove the protector/blank (Tool 1680) (if assembled) from the stage 2 rotor blades.
- (2) Apply lubricant 'A' to the stage 1 stator vane grooves in the case, and to the vane grooves in the stage 1 vane fixing ring unit (1-180).
- (3) Turn the vane fixing ring (1-180) so that the two loading slot bolts extend upwards, then assemble the fixing ring over the spacer ring, positioning the loading slot to align the vane loading slot in the case.
- (4) Identify the probe and bolted vanes, then separate them from the 38 standard vanes.
- (5) Check that all stage 1 stator vanes are free from damage, paying particular attention to the leading and trailing edges.

NOTE: Ensure that any repaired vanes are evenly distributed around the case and that the aggregate depth of blending does not exceed 2.000 in. (50,80 mm) (Ref.72-31-01 Repair No.2).

- (6) Assemble the vanes to the case (Ref.Fig.529) passing each vane through the loading slot in the vane fixing ring, moving the vanes clockwise or counter-clockwise as necessary allowing the vanes to take up their correct position in the case. During the assembly of the vanes ensure that the loading slot of the vane fixing ring aligns the loading slot of the case.
- (7) Ensure that the bolted vanes align with the bolt-holes in the case, and that the probe vanes are correctly positioned by inserting the checking gauge (Tool 289) through the outside of the case at the probe vane position ensuring that adequate clearance exists between the gauge and the probe vanes.

NOTE: This check is to ensure that inspection probes can be assembled to the case at a later date.

- (8) Assemble a retaining piece (1-90) over the two bolts retained in the fixing ring, apply lubricant 'B' to the bolt threads and assemble two nuts (1-80) to the bolts. Do not tighten nuts at this stage.

TN12097

SUB-ASSEMBLY

72-31-00

Page 580

Mar 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Q. Assemble the Stage 1 Support Plug Assembly and the Stator Vane Retaining Bolts (Ref.Fig.529).

- (1) Assemble a support plug assembly (1-50) to the probe position in the stage 1 location. Retain the assembly with two bolts (1-60) lubricated with lubricant 'B'. Assemble two blanking plugs (1-40) to the support plug assembly, then retain the two plugs with two bolts (1-30) lubricated with lubricant 'B' (Ref. Fig.529). Assemble four sleeves (1-20) to four bolts (1-10) apply lubricant 'B' to the bolt threads then secure the bolted vane and probe vane with the bolts.
- (2) Torque-tighten the nuts securing the retaining piece (1-90) to the bolted vane and inner fixing ring between 170 and 190 lbf in. (19,2 and 21,5 N.m). Locking (run-down) torque 6.5 lbf in. (0,73 N.m).
- (3) Torque-tighten the two bolts (1-30) retaining the blanking plugs to the support plug assembly between 85 and 95 lbf in. (9,6 and 10,7 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).
- (4) Torque-tighten the four sleeved bolts (1-10) between 160 and 180 lbf in. (18,1 and 20,3 N.m), then wire-lock the bolts in pairs. Torque-tighten the two bolts (1-60) between 160 and 180 lbf in. (18,1 and 20,3 N.m), wire-lock the two bolts together.
- (5) Using two sets of feeler gauges, check the clearance between the stage 1-2 spacer ring labyrinth and the stage 1 vane fixing ring. Carry out this check by inserting 0.025 in. (0,635 mm) feelers between the labyrinth and ring, then insert the required amount of feelers to measure the remaining clearance between the labyrinth and ring at a point diametrically opposite the first set of feeler gauges. Take the total of the two sets of feelers as the clearance. Carry out the check at three more equi-spaced positions, then take the average of the four readings. The clearance must be within the dimension quoted in the Fits and Clearances Schedule (72-30-00) FCS 13.

PRINTED IN ENGLAND

TN30815

SUB-ASSEMBLY

**72-31-00**

Page 581

Feb 1/78



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



- (6) If the assembly is not to be continued immediately, place a protector/blank (Tool 1680) over the stage 1 stator vanes.

R. Assemble the Stage 1 Rotor Disk.

- (1) Lay out 14 bolts (03/1-170) on a suitable worktop, then lubricate the threads of each bolt with lubricant 'B'.
- (2) Insert a bolt (03/1-170) into the datum hole of the upper (front) flange of the first stage spacer ring (03/1-190) so that it extends upwards, then screw an assembly pin (Tool 1067) onto the bolt (Ref.Fig.530). Insert the remainder of the bolts and screw assembly pins onto the bolts ensuring the step face on each bolt faces the wall of the spacer ring. Ensure the pins are upright, then mark the top of datum hole pin so that it is readily identified.
- (3) Ensure that a retaining band (Tool 1166) is assembled to each pair of blades of the stage 1 rotor disk (03/1-160), and that the bands are towards the tips of the blades with the band fasteners uppermost. The blade locking tangs are to the rear of the disk.
- (4) Assemble the multiple leg sling (Tool 1103) to the rotor blades (Ref.Fig.531).
  - (a) Attach a hoist to the sling lifting ring, then position the hoist over the rotor disk.
  - (b) Ensure that the tommy bars of the legs are pointed to 'FREE', then lower the hoist guiding the legs in between the rotor blades. When the three pads of the sling rest on the blade roots, turn the tommy bars to 'LIFT'.

FN42792





OLYMPUS 593

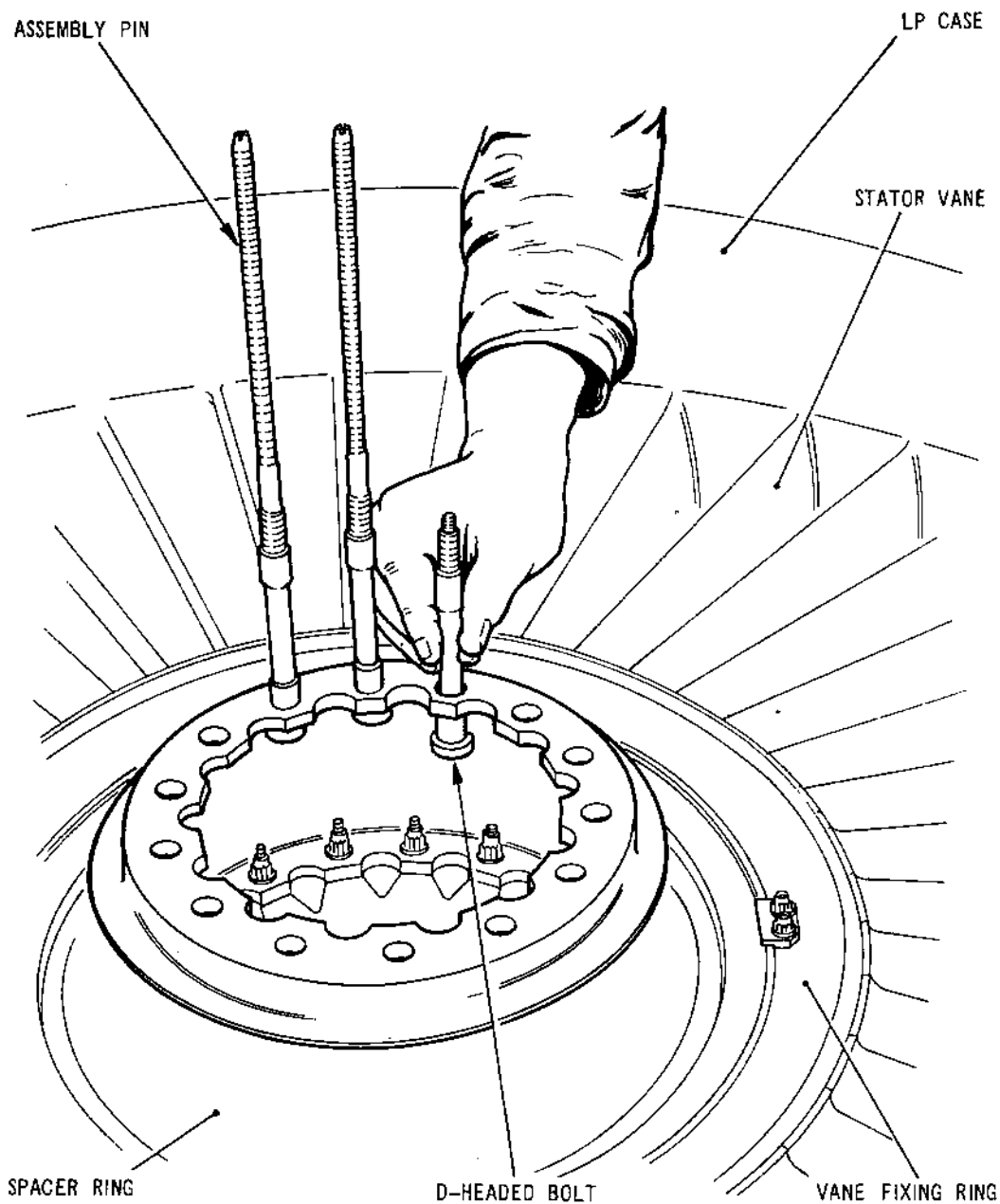
MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

CR 31824/00A



TN14430

Assembling the Stage 1 Rotor Disk Securing Bolts  
Figure 530

SUB-ASSEMBLY  
**72-31-00**

Page 583  
Jul 1/76

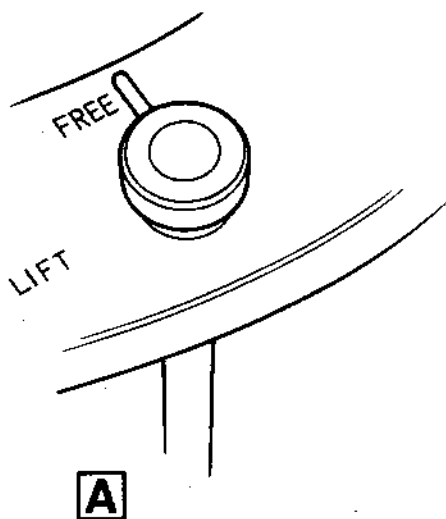


OLYMPUS 593

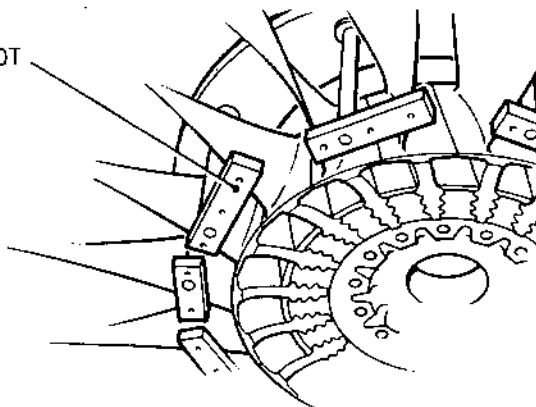
MK.610-14-28  
OVERHAUL



CR 3182Z/00A



FOOT



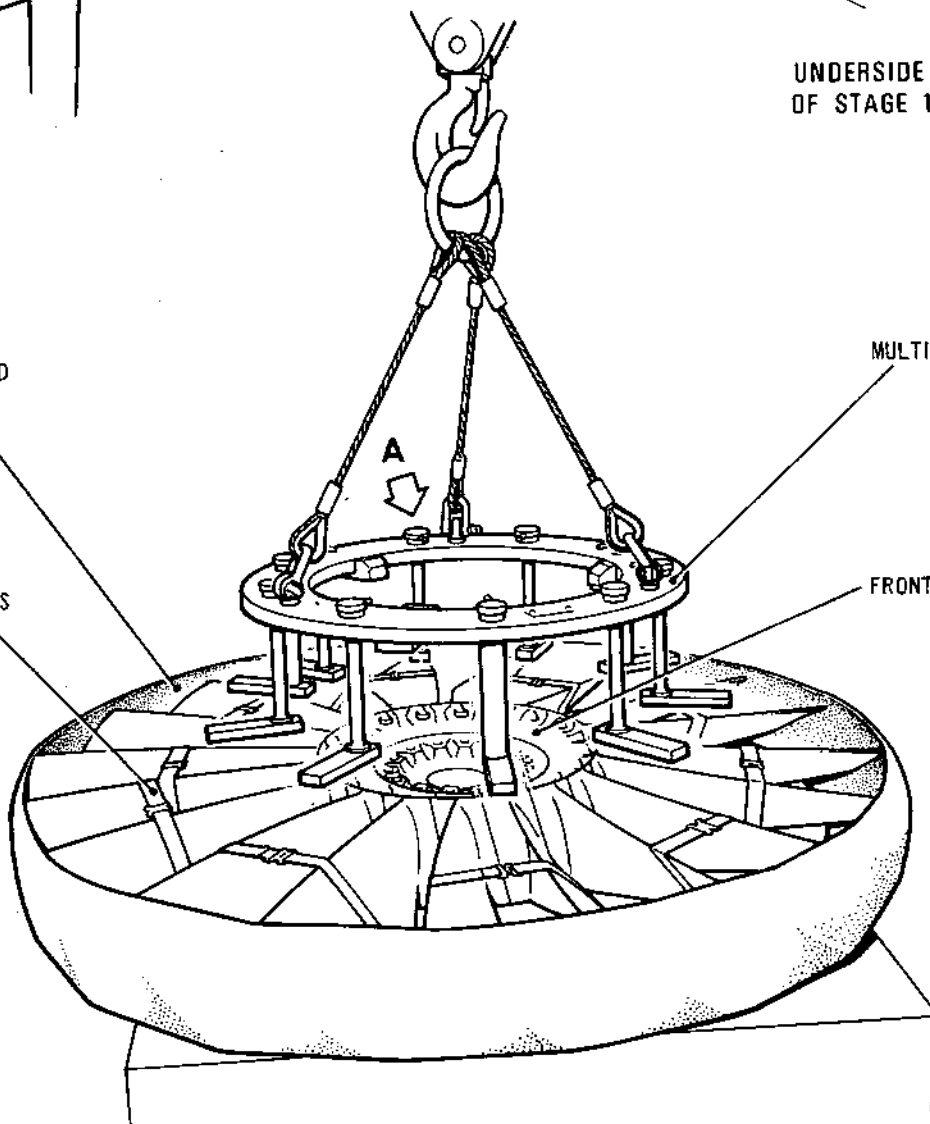
UNDERSIDE VIEW  
OF STAGE 1 DISK

PROTECTION BAND

RETAINING BANDS

MULTIPLE LEG SLING

FRONT FACE OF DISK



Assembling the Multiple Leg Sling to the Stage 1 Rotor Blades  
Figure 531

SUB-ASSEMBLY  
**72-31-00**

Page 584  
Jul 1/76

FN14431



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (5) Remove the protector/blank (Tool 1680) (if assembled) from the stator vanes, then clean the stator vanes and disk of any chalk marks and remove the numbered (cardboard) disk (if assembled) from the second stage rotor disk. Remove the padding ring (Tool 1108) from the compressor case front flange, then remove the protection/retaining band (Tool 1123) from the blades of the stage 1 rotor.
- (6) Raise the hoist/rotor and position it over the compressor case (Ref.Fig.532). Establish the datum hole of the rotor and align it with the marked assembly pin, then steadily lower the rotor taking care it does not swing causing damage to the blades or case. When the rotor is just touching the assembly pins, stop lowering the rotor and ensure that all the pins are aligned with, and entering into the rotor securing holes, and that the marked pin is aligned with the rotor datum hole. Steadily lower the rotor ensuring all the pins are located in the rotor. When the rotor abuts the spacer ring, turn the tommy bars of the sling to 'FREE', then raise the hoist, guiding the legs out from between the blades. Remove the sling from the hoist. Remove the retaining bands (Tool 1166) from the rotor blades.
- (7) Place a protector/blank (Tool 1349) on top of the rotor blades, and a convenient size disk over the centre hole in the rotor disk.
- (8) Turn the assembly pins as required to align the flat on the bolthead with the wall of the spacer ring, pull up on the pins until all the thread and a waisted portion of the bolt is visible. If any of the bolts are too tight to pull up with the assembly pins, screw the mechanical puller (Tool 1064) onto a pin, then insert the locating key (Tool 987) into the assembly pin locating the key to the side of the step in the bolthead with the step face on the bolt facing the case. Lock the locating key by screwing the thumbnut onto the assembly pin, then turn the locating handle until it points towards the centre of the rotor, this aligns the flat on the bolthead with the case. Screw

PRINTED IN ENGLAND

TN12098

SUB-ASSEMBLY

72-31-00

Page 585

Jul 1/76

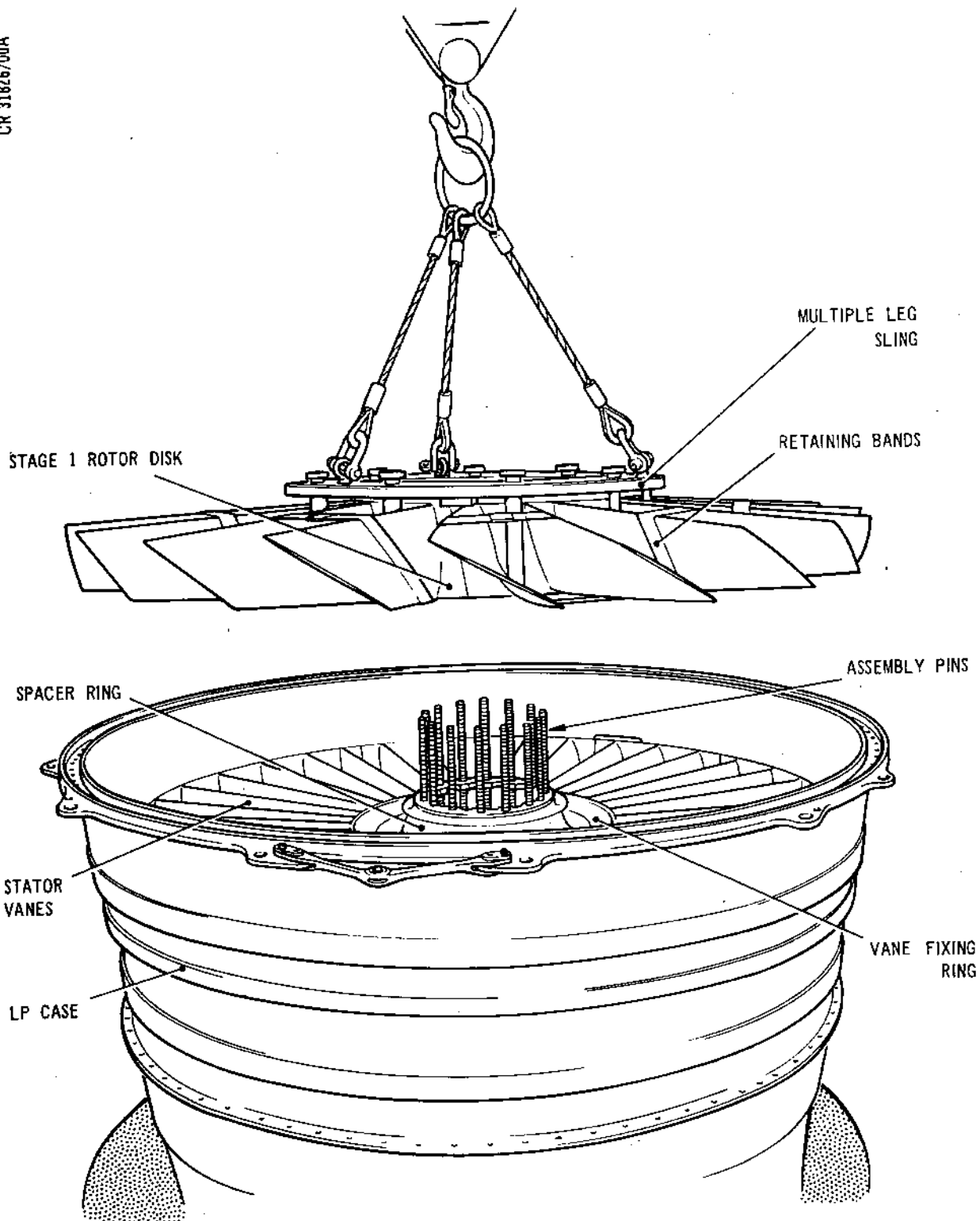


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 31826/00A



TN14432

Assembling the Stage 1 Rotor Disk  
Figure 532



OLYMPUS 593

MK.610-14-28

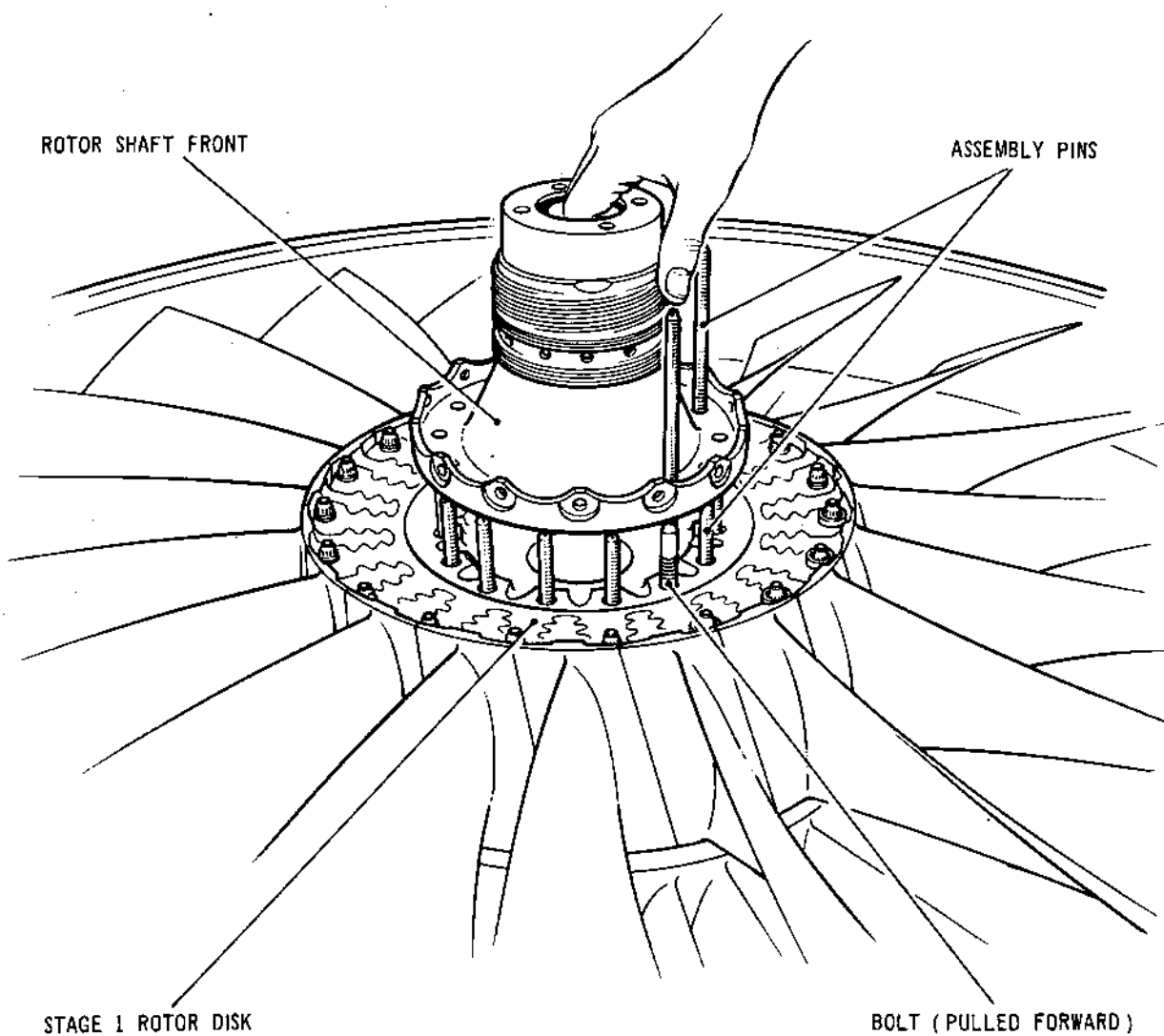
OVERHAUL



CR 31827/ODA

PRINTED IN ENGLAND

TN14433



Assembling the Rotor Shaft Front  
Figure 533

SUB-ASSEMBLY  
**72-31-00**  
Page 587  
Jul 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



down on the puller tommy bars and draw the bolt up until it abuts the spacer ring front flange. Release and remove the locating key and assembly tool. Repeat this procedure on any bolts that are tight.

S. Assemble the Rotor Shaft Front to the Stage 1 Rotor Disk (Ref.Fig.533).

NOTE: Before assembling the rotor shaft front (03/1-90) refer to SB.72-30 and SB.72-79.

- (1) Remove the disk covering the centre hole in the stage 1 rotor disk. Establish the datum hole in the rotor shaft front (03/1-90), then align the datum holes of the rotor shaft and rotor disk and lower the rotor shaft over the assembly pins/rotor bolts to abut the stage 1 rotor disk.
- (2) Apply lubricant 'B' to the nut threads, then pass the nuts over the assembly pins and screw the nuts onto the rotor bolts, but do not tighten. Remove the assembly pins (Ref.Fig.534).
- (3) Using a torque wrench and socket, tighten the nuts in the following sequence - 1, 8, 4, 11, 6, 13, 3, 10, 5, 12, 2, 9, 7 and 14, in increments of 20 lbf ft (27,1 N.m), to a final torque of between 57 and 63 lbf ft (77,3 and 85,4 N.m). Locking (run-down) torque 18 lbf in. (2,0 N.m).
- (4) Recheck the datum alignment marks between the stage 1 rotor disk and the rotor shaft front.

T. Assemble the Roller Bearing Inner Track to Rotor Shaft Front.

- (1) Place the roller bearing inner track (03/1-30) in the oven and allow the track to heat up to 120 deg for 15 minutes.

NOTE: Since the inner track will lose its heat quite rapidly after being removed from the oven, it will be an advantage to prepare the mechanical driver before removing the track from the oven.

TN12099

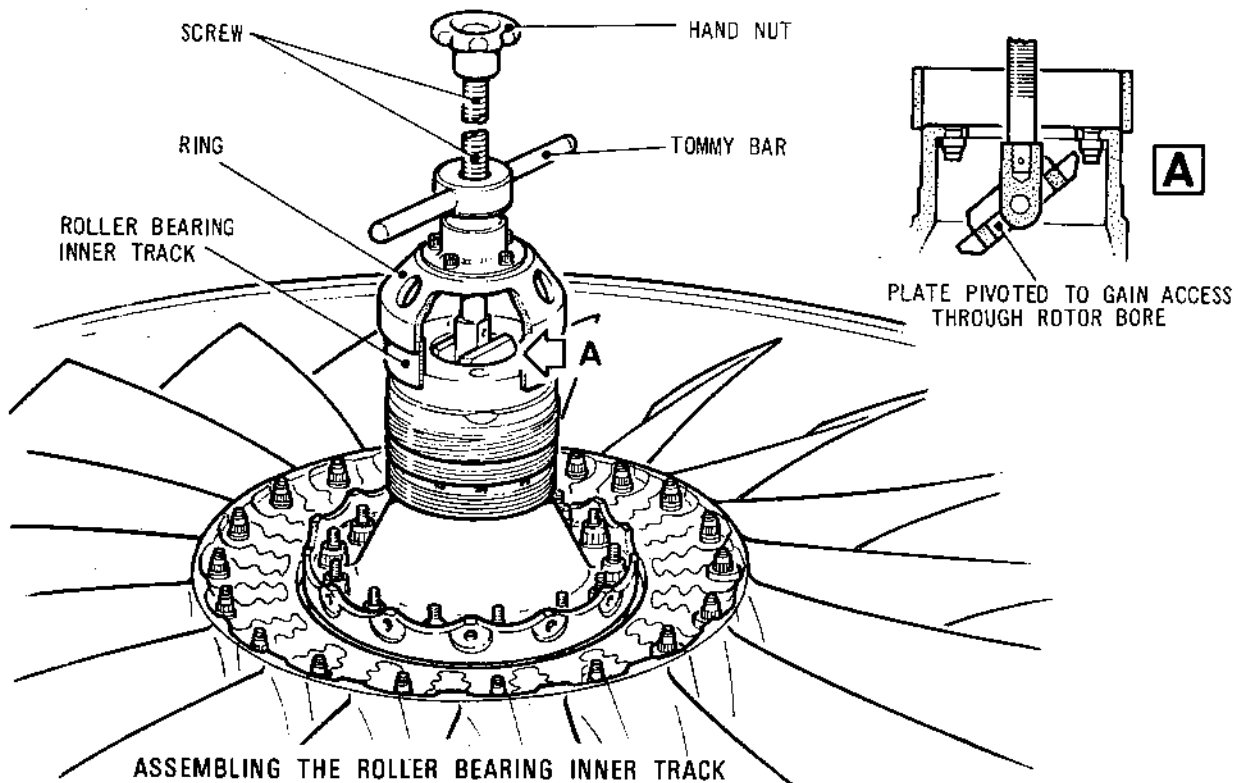
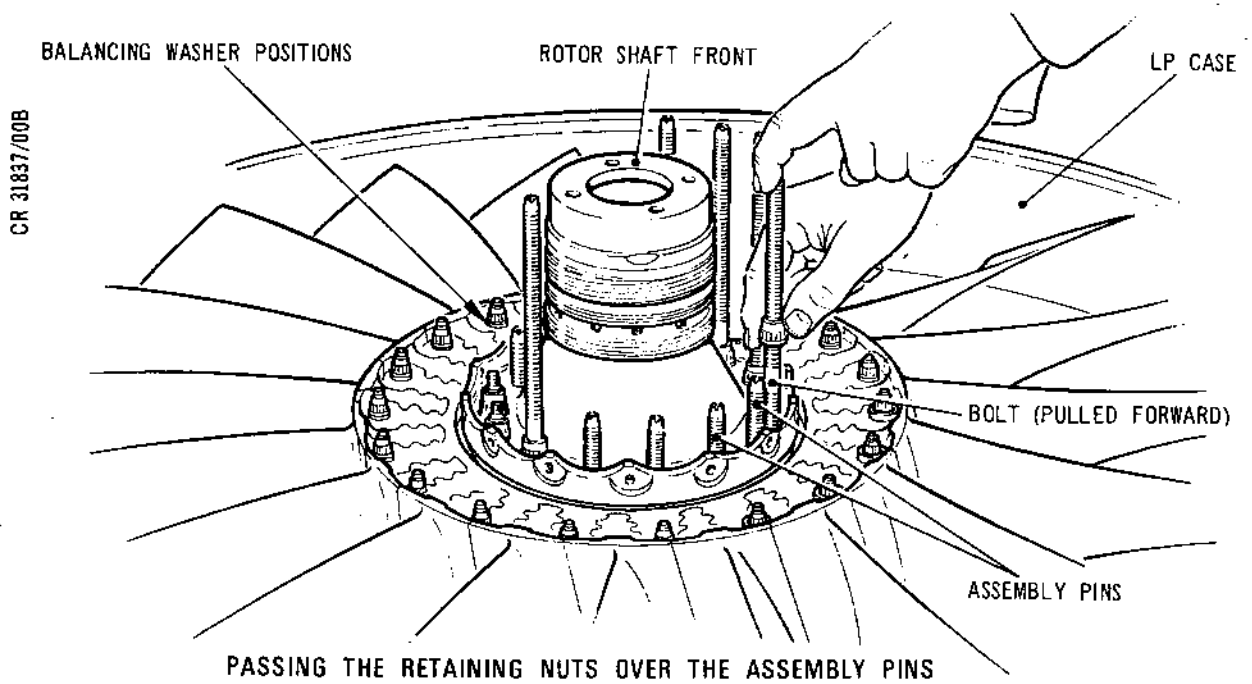
SUB-ASSEMBLY  
**72-31-00**

Page 588  
Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Securing Rotor Shaft Front and Assembling Bearing Inner Track  
Figure 534

SUB-ASSEMBLY

72-31-00

Page 589  
Jul 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (2) Turn the tommy bar of the mechanical driver (Tool 634) to extend the screw and pivoting plate in the forward position (Ref.Fig.534).
- (3) Wearing protective gloves, remove the inner track from the oven and with the part number marked on the inner track uppermost, place it on top of the rotor shaft front.
- (4) Lift the mechanical driver (Tool 634) over the shaft and inner track, then manipulate the pivoting plate through the rotor shaft bore, aligning the cut-outs in the plate with the self-locking nuts inside the rotor shaft.
- (5) Supporting the mechanical driver with the hand nut, screw the tommy bar down so that the ring locates on the inner track correctly, then operate the tommy bar and press the track onto the shaft.
- (6) Check with a feeler gauge to ensure the inner track abuts the step on the rotor shaft front. Release and remove the mechanical driver.
- (7) Remove the protector/blank (Tool 1349), then using feeler gauges, check the tip clearance between the stage 1 rotor blades and the compressor case. Find the longest and shortest blades and check the max. and min. tip clearance at eight equi-spaced points, then find the average max. and min. tip clearance. Refer to the Fits and Clearances Schedule (72-30-00) FCS 25. Replace the protector/blank (Tool 1349) if the assembly is not to be worked on immediately.

11. Assemble the Front Bearing Adapter and Prepare LP Compressor Assembly for Concentricity Checks

A. Assemble the Guide Adapter to the Rotor Shaft Front and Prepare the Bearing Adapter.

- (1) Assemble the guide adapter (Tool 582) to the rotor shaft front.

SUB-ASSEMBLY

**72-31-00**

Page 590

Jul 1/76





# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

Printed in England

- (2) Check that a balancing bearing is in position in the front bearing adapter and secured by its retaining plate. Lubricate the balancing bearing with lubricant 'A', also apply lubricant 'A' to the bearing inner track assembled to the rotor shaft front.

B. Assemble the Front Bearing Adapter to the LP Compressor Case (Ref.Fig.535).

NOTE: If assembled, remove Stop End (Tool 3160).

- (1) Offer the lifting fixture (Tool 1096) to the front bearing adapter (Tool 588) aligning the offset bolt, then screw in and fully tighten the bolts.
- (2) Attach a hoist to the lifting fixture, then raise the hoist and position it over the LP compressor case. Remove the protector/blank (Tool 1349) (if assembled) from the rotor blades. Steadily lower the hoist engaging the front bearing adapter over the guide adapter, and aligning the lifting eye on the adapter with the lifting eye on the slave exit guide blade case, and the bolt-holes in the adapter flange with the bolt-holes in the LP compressor case flange. Secure the adapter to the case with slave nuts and bolts. Disconnect the hoist then release and remove the lifting fixture. Withdraw the guide adapter from the rotor shaft front.

C. Raise the LP Compressor Assembly from the Build Stand and Locate in the Extension Stand.

NOTE: When lifting the compressor assembly with Tool 1096 ensure that the plate has eight captive bolts.

- (1) Locate the lifting fixture (Tool 1096), observing the offset bolt, onto the bearing adapter, then fully tighten the eight bolts.
- (2) Attach a hoist to the lifting fixture, remove the five knurled nuts securing the rear adapter to the build stand, then steadily raise the hoist until well clear of the stand (Ref.Fig.536).

SUB-ASSEMBLY

72-31-00

Page 591

Dec 31/00



# OLYMPUS 593

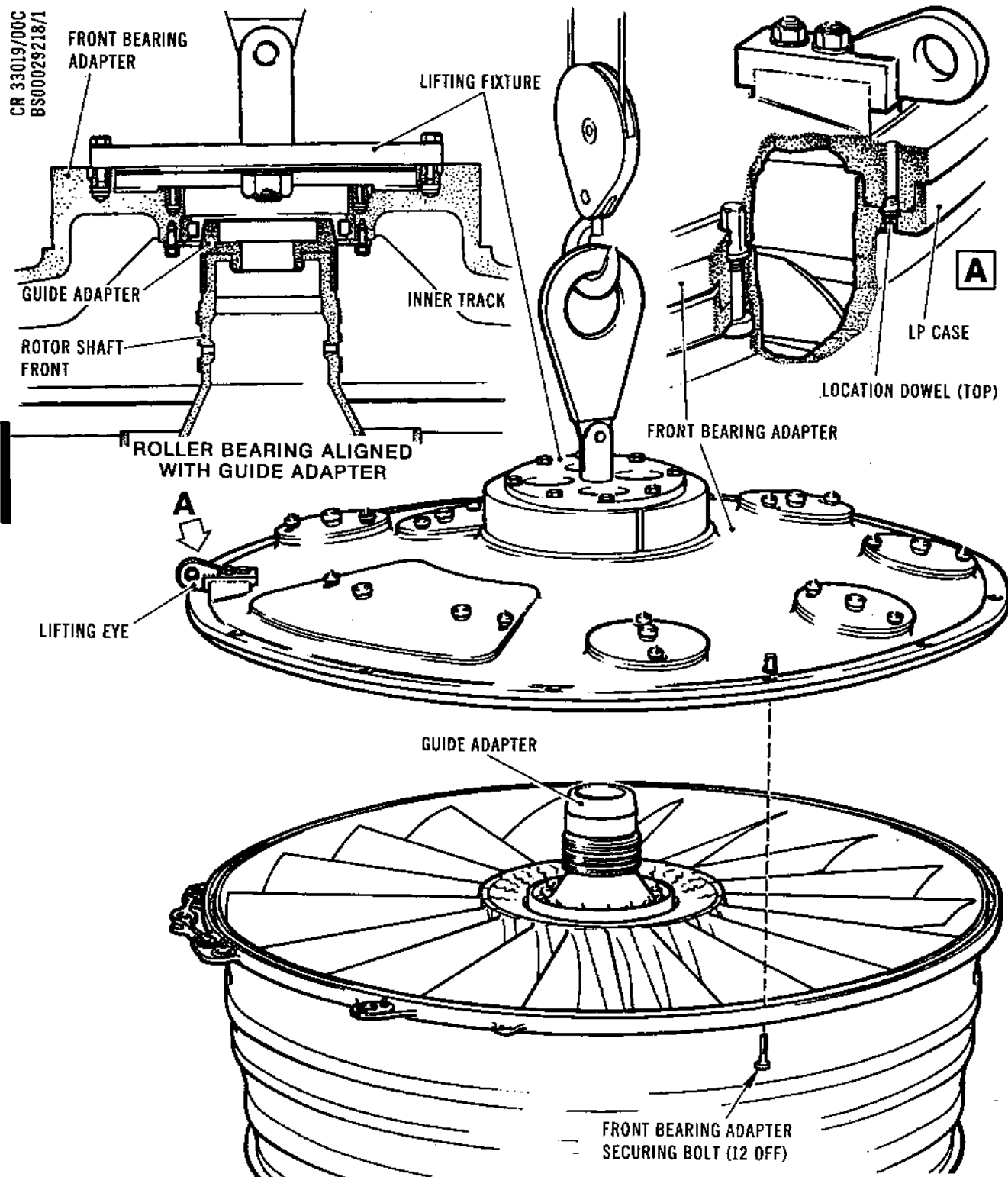
MK.610-14-28

OVERHAUL



sneema

Printed in England



Lowering the Front Bearing Adapter onto the LP Compressor Case  
Figure 535

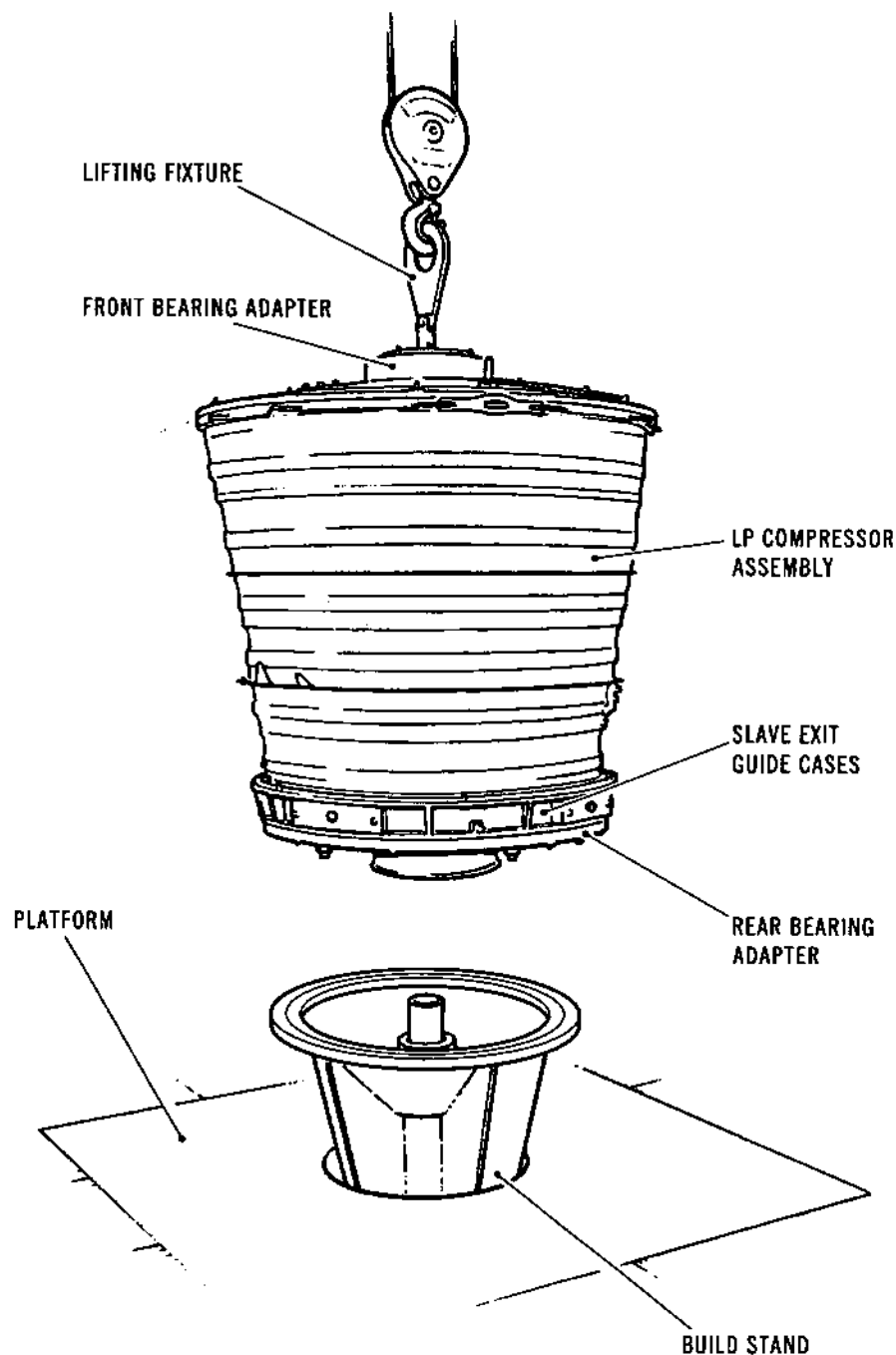
SUB-ASSEMBLY  
**72-31-00**

Page 592  
Dec 31/00



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Lowering the Compressor Assembly onto the Extension Stand  
Figure 536



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (3) Offer the trunnion adapter (Tool 1097) to the balancing bearing assembly. Ensure that the trunnion bar is at right angles to the lifting eye on the slave exit guide blade case, then secure with 7 off retaining bolts.

CAUTION: ENSURE THE SUPPORT STAND (TOOL 1076) LATCHES ARE FULLY ENGAGED BEFORE ATTEMPTING TO LIFT/PIVOT THE ASSEMBLY.

- (4) Position the hoist over the support stand (Tool 1076) (Ref.Fig.537). Disengage the two latches on the stand, then steadily lower the assembly engaging the trunnion adapter (Tool 1097) bar into the two recesses in the stand. Secure the trunnion adapter bar with the two latches of the stand.

CAUTION: ENSURE THAT THE LIFTING FIXTURE EYE PLATE PIVOTS AS THE ASSEMBLY IS LOWERED.

- (5) Moving the hoist as necessary and ensuring the adapter lifting eyes are on top, lower the front end of the assembly pivoting about the trunnion adapter, and rest the front adapter on the support (Tool 1306), moving the support as required to align it with the channel in the adapter (Ref.Fig.537).
- (6) Disconnect the hoist from the lifting fixture, then attach the lifting beam (Tool 1056) to the hoist. Position the beam over the top of the assembly with the lifting bar position handle at the front end of the compressor case. Secure the beam to the lifting eye on the front adapter and the slave exit guide blade case with shackles (Ref.Fig.538).
- (7) Remove the lifting fixture (Tool 1096) from the front bearing adapter and compressor rotor (Ref.Fig.536).

SUB-ASSEMBLY

72-31-00

Page 594

Dec 31/00

CR 33046/00C  
BS00029220/1

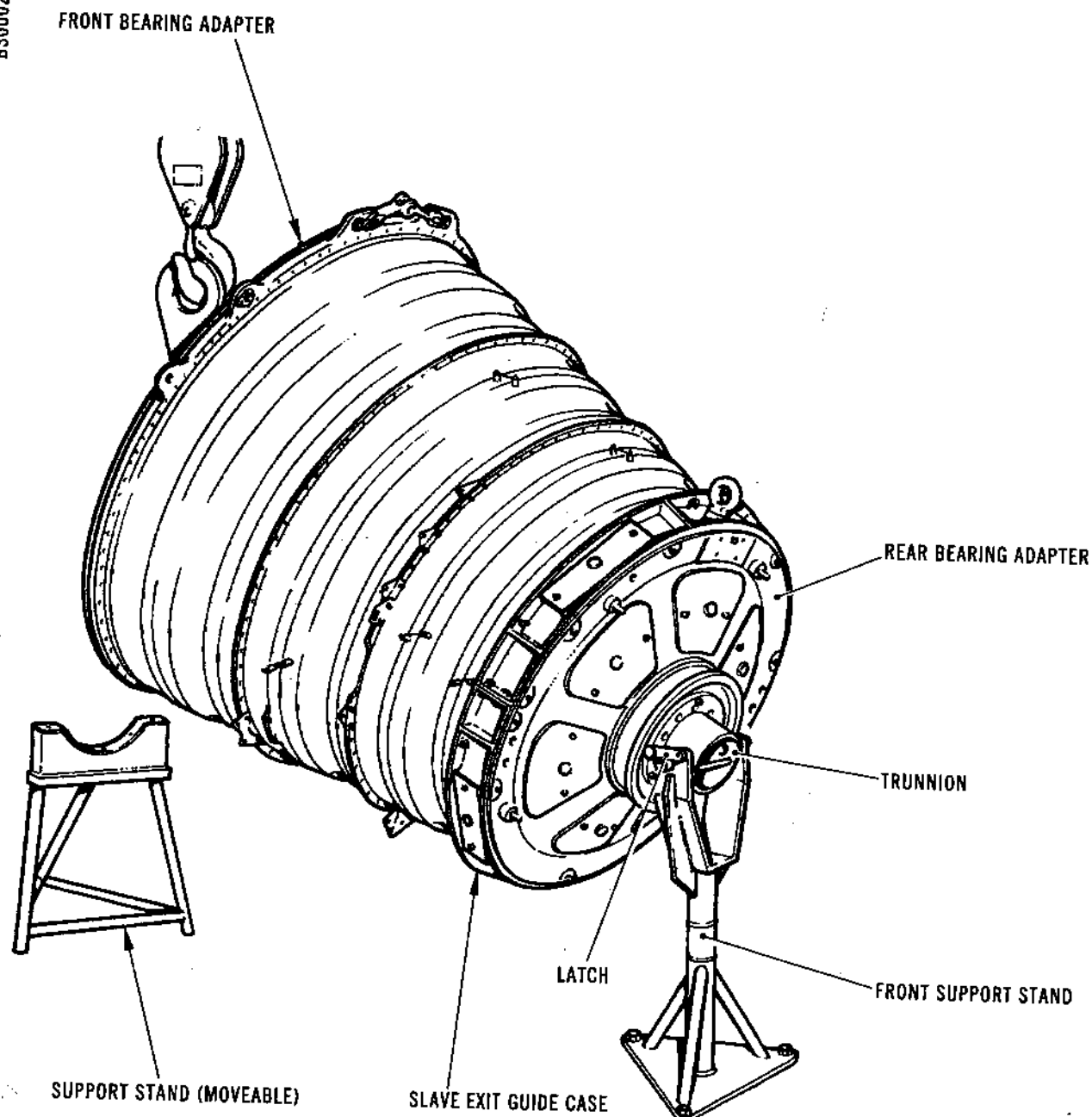


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Turning the Compressor Assembly to the  
Horizontal Position  
Figure 537

BS00029221/1



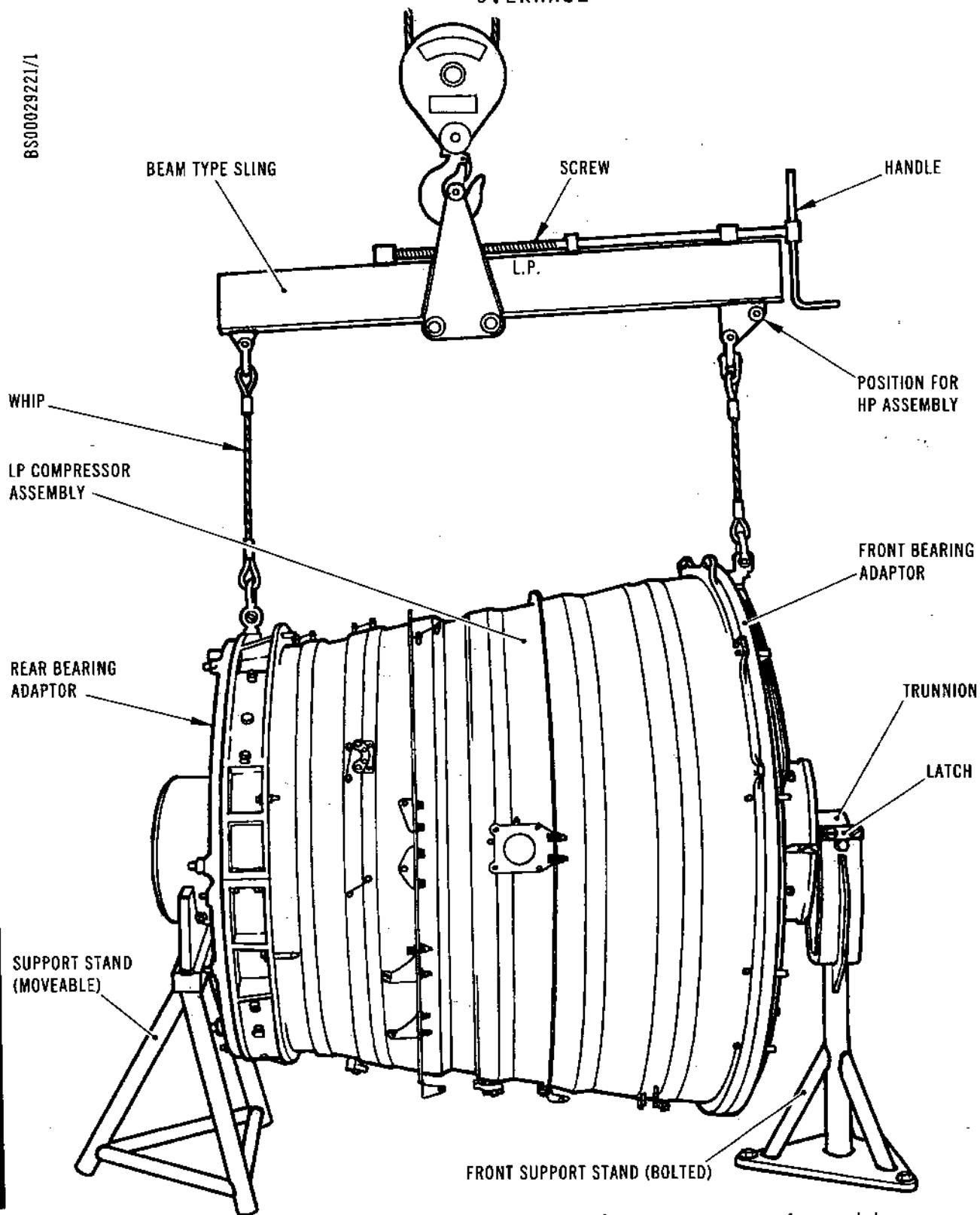
OLYMPUS 593

MK.610-14-28

OVERHAUL



SNECMA



Preparing for Horizontal Lift of Compressor Assembly  
Figure 538

SUB-ASSEMBLY  
72-31-00

Page 596  
Dec 31/00



OLYMPUS 593

MK.610-14-28  
OVERHAUL

snecma

- (8) Release the latches of the stand (Tool 1076), then steadily raise the hoist adjusting the lifting beam (if required) to support the compressor assembly in the horizontal position. Ensure that supports (Tool 1073) with their respective spacers (Tool 1074 and Tool 1075) are assembled to the surface table (Ref.Fig.539). Spacer (1075) locates in the front bearing adapter channel, and spacer (1074) locates in the rear bearing adapter channel. Position the hoist over the two supports (Tool 1073) assembled to the surface table. Release and adjust the supports (if required) so that the channel section in the front and rear adapters aligns with the supports, then fully tighten the clamping bolts of the supports. Steadily lower the hoist and locate the adapter channels on the supports. Assemble and secure clamp plates to the supports.
- (9) Unbolt and remove the trunnion adapter (Tool 1097) from the balancing bearing assembly.

12. Carry out Concentricity and Swash Checks of LP Compressor Assembly

NOTE: All readings are to be taken at eight equi-spaced positions.

A. Check the Roller Bearing, the Stage 1 and Stage 7 Rotor Disks (Ref.Fig.539).

- (1) Check the swash of the front bearing inner race. It must not exceed 0.001 in. (0,0254 mm).
- (2) Check the concentricity of the front bearing inner race. It must not exceed 0.001 in. (0,0254 mm).

SUB-ASSEMBLY

72-31-00

Page 597

Dec 31/00

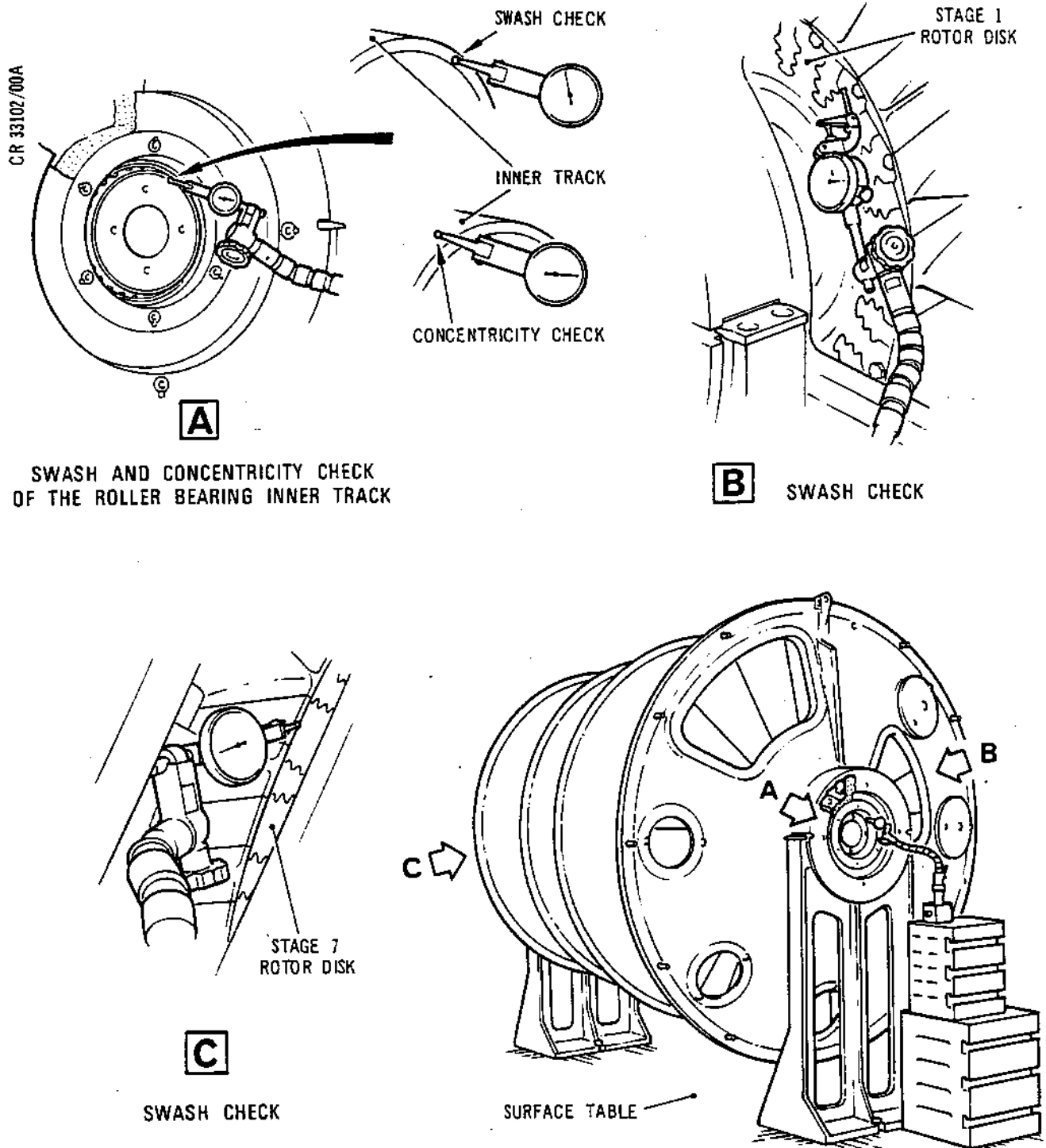


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Carrying Out Swash and Concentricity Checks of Compressor Assembly  
Figure 539

SUB-ASSEMBLY  
72-31-00

Page 598  
Dec 31/00





OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

- (3) Check the swash of the stage 1 rotor disk ensuring that the check is taken at the largest diameter possible, just inboard of the balancing bolts on the disk and not on the blade roots. The swash must not exceed 0.004 in. (0,101 mm).
- (4) Check the swash of the stage 1 rotor disk, ensuring that the check is taken on the disk and not on the blade roots. The swash must not exceed 0.004 in. (0,101 mm).

### 13. Carry Out Dynamic Balance of the LP Compressor Assembly

#### A. Assemble the LP Compressor Assembly to the Balancing Machine.

- (1) Remove the three Allen screws (if assembled) from the splined driving adapter (Tool 603) end face, and ensure the end face has a zero mark in line with the master spline, then assemble the distance piece (Tool 660) to the adapter. Aligning the master splines of the rotor shaft rear and the splined driving adapter, offer the adapter into the rotor shaft, until the distance piece abuts the end of the rotor shaft. Offer the driving adapter retaining ring over the adapter and screw it into the rotor shaft using wrench (Tool 662) to tighten the ring.
- (2) Offer the driving pulley (Tool 661) to the end face of the driving adapter, aligning the master spline zero mark on the adapter with the degree zero mark on the pulley, then assemble the three Allen screws to the pulley and screw them into the adapter. Fully tighten the screws using wrench (Tool 1572).

CAUTION: ENSURE BALANCING MACHINE IS SWITCHED OFF.

- (3) With the lifting beam Tool 1056) and hoist still assembled to the LP compressor assembly, release and remove the clamp plates from the pedestals on the surface table, then steadily raise the hoist disengaging the adapters from the pedestals.
- (4) Position the compressor assembly over the balancing machine.
- (5) Adjust the front and rear pedestals to accommodate the compressor assembly correctly in the balancing machine.

SUB-ASSEMBLY

72-31-00

Page 598.1

Dec 31/00



# OLYMPUS 593

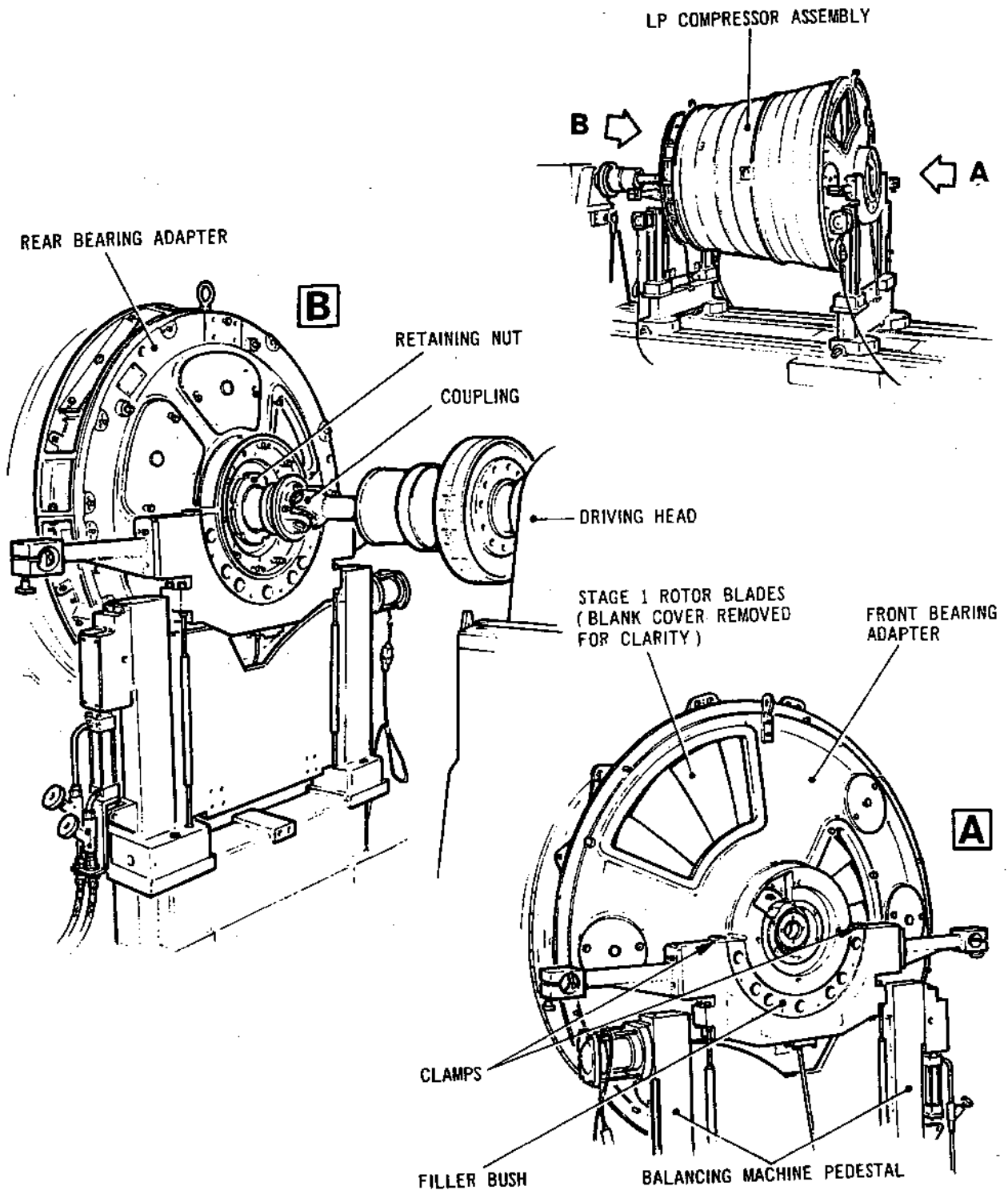
MK.610-14-28  
OVERHAUL



SNECMA

CR 31810/00A

Printed in England



Preparing Compressor Assembly for Dynamic Balance  
Figure 540 (Sheet 1 of 2)

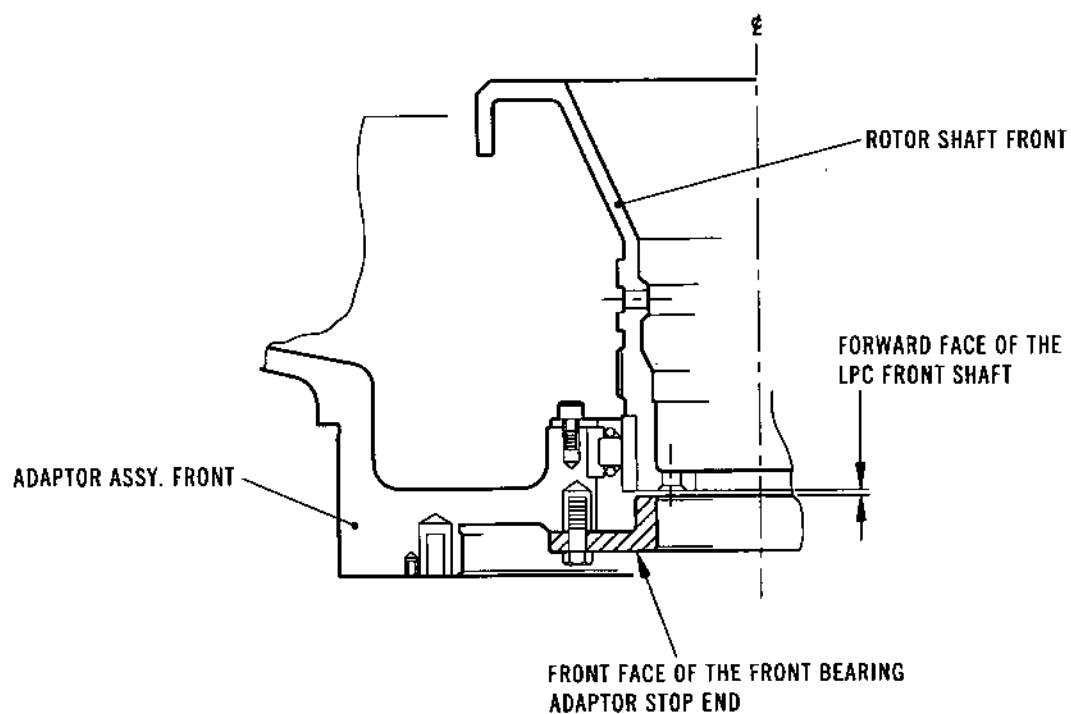
SUB-ASSEMBLY  
**72-31-00**  
Page 598.2  
Dec 31/00

BS00029223/1

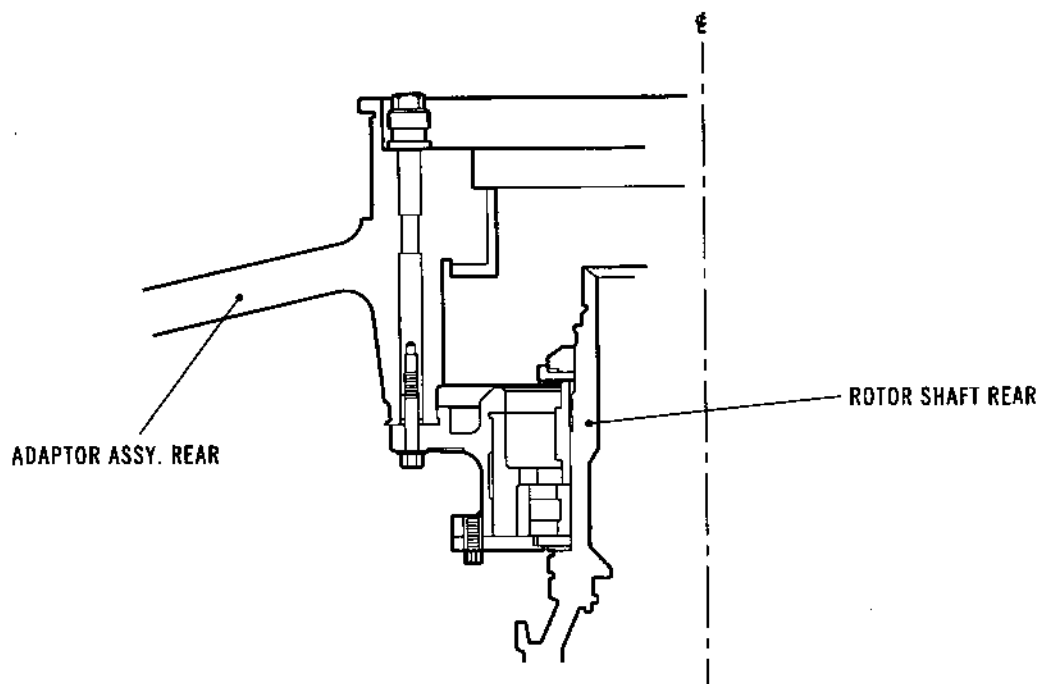


OLYMPUS 593

MK.610-14-28  
OVERHAUL



FRONT BALANCING ADAPTOR P3C 1089083



Preparing Compressor Assembly for Dynamic Balance  
Figure 540 (Sheet 2 of 2)



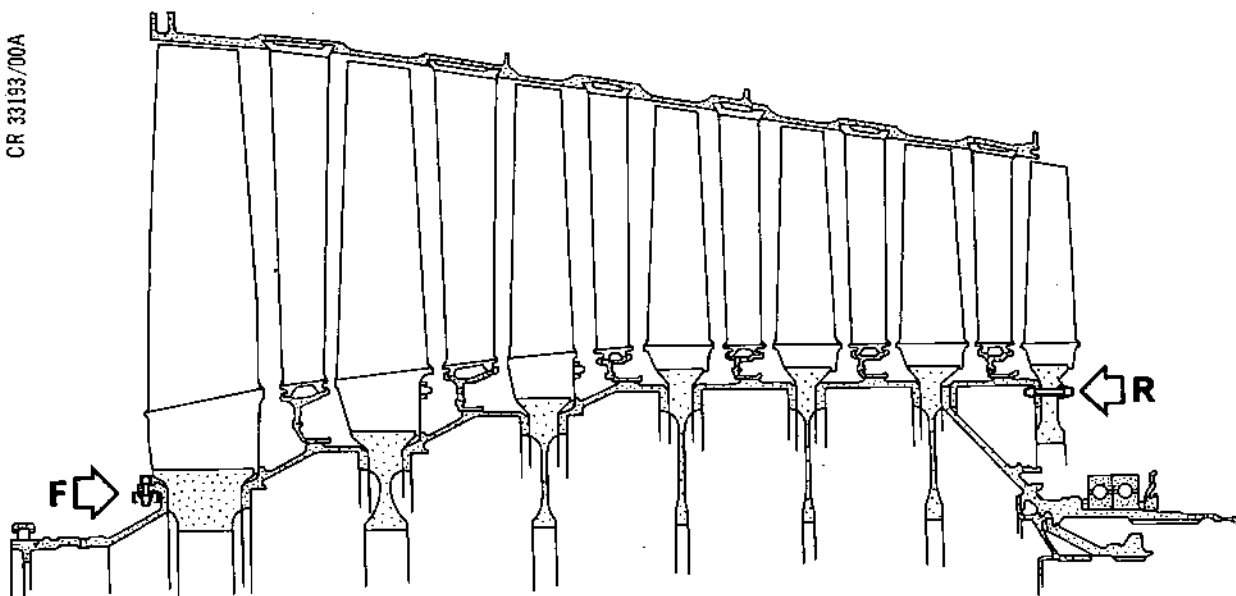
OLYMPUS 593

MK.610-14-28

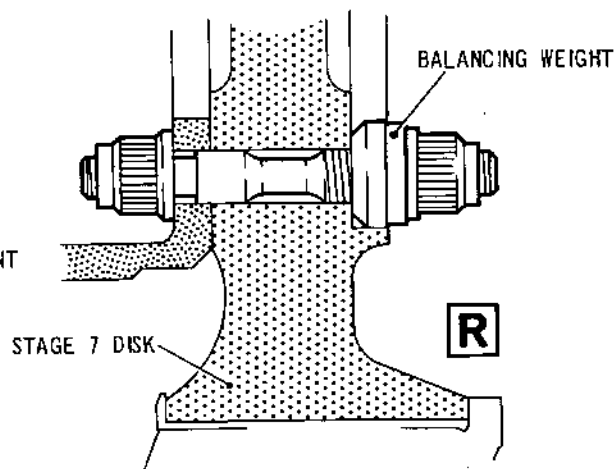
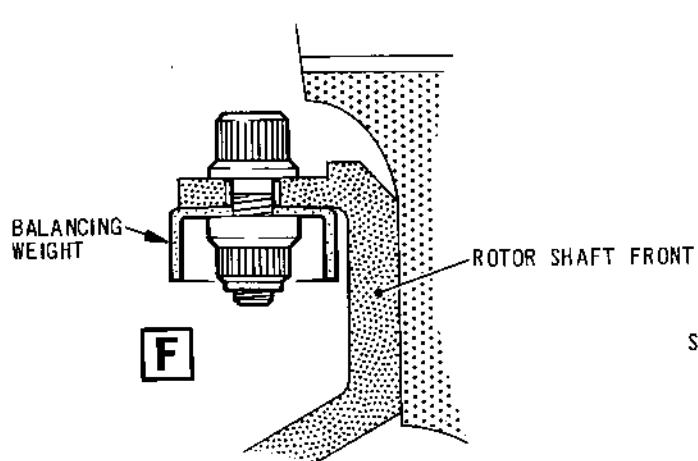
OVERHAUL



CR 33193/00A



TYPICAL SECTION THROUGH LP COMPRESSOR ASSEMBLY



BALANCE WEIGHTS AT POSITION F	IPC REF 72-31-03
6 OFF MAXIMUM	1-60
3 OFF MAXIMUM	1-65
3 OFF MAXIMUM	1-70
BOLTS AS REQUIRED	1-80
NUTS AS REQUIRED	1-50

SELECT

BALANCE WEIGHTS AT POSITION R	IPC REF 72-31-03
4 OFF MAXIMUM	3-290
4 OFF MAXIMUM	3-295
NUTS AS REQUIRED	3-280

SELECT

Balance Washer Positions for Dynamic Balance Correction  
Figure 541



OLYMPUS 593



MK.610-14-28

SNECMA

OVERHAUL

- (6) Lock the front and rear pedestals.
- (7) Lower the hoist and guide the adapter channels onto the balancing machine pedestal adapters (Ref.Fig.540). Assemble and secure clamp plate to the pedestals.
- (8) Release the shackles, then remove the lifting beam from the LP compressor assembly and lower it onto a suitable container. Disconnect the hoist from the beam.
- (9) Secure the drive coupling to the balancing adapter in the rear of the LP compressor with the four nuts.

B. Dynamically Balance the LP Compressor Assembly.

NOTE: For balancing bolts, weights and nuts refer to the IPC 72-31-03, Fig.1 and 3.

- (1) Remove the immobilisers (Tools 3157 and 3158). Fit the Stop End (Tool 3160), to the front bearing adaptor (Ref.Fig.540).
- (2) Set the axial position of the rotor by moving the rotor shaft fully forwards. Measure the distance from the front face of the front bearing adaptor stop end (Tool 3160) to the forward face of the LP Compressor Front Shaft, record the dimension (min.). Move the rotor fully rearwards away from the adaptor plate, record the dimension (max.). Position the rotor mid-way between the min. - max. positions. Lock the drive shaft and recheck the setting dimension (Ref.Fig.540).
- (3) Start the balancing machine and ensure correct rotation of the rotor.

NOTE: Rotation to be set reverse to normal engine rotation i.e. CCW from the front.

- (4) Set the balancing machine speed to 600 RPM. Run the rotor for a minimum of 10 minutes to allow for temperature stabilisation throughout the rotor.
- (5) Index the rotor.

SUB-ASSEMBLY

**72-31-00**

Page 598.5

Dec 31/00

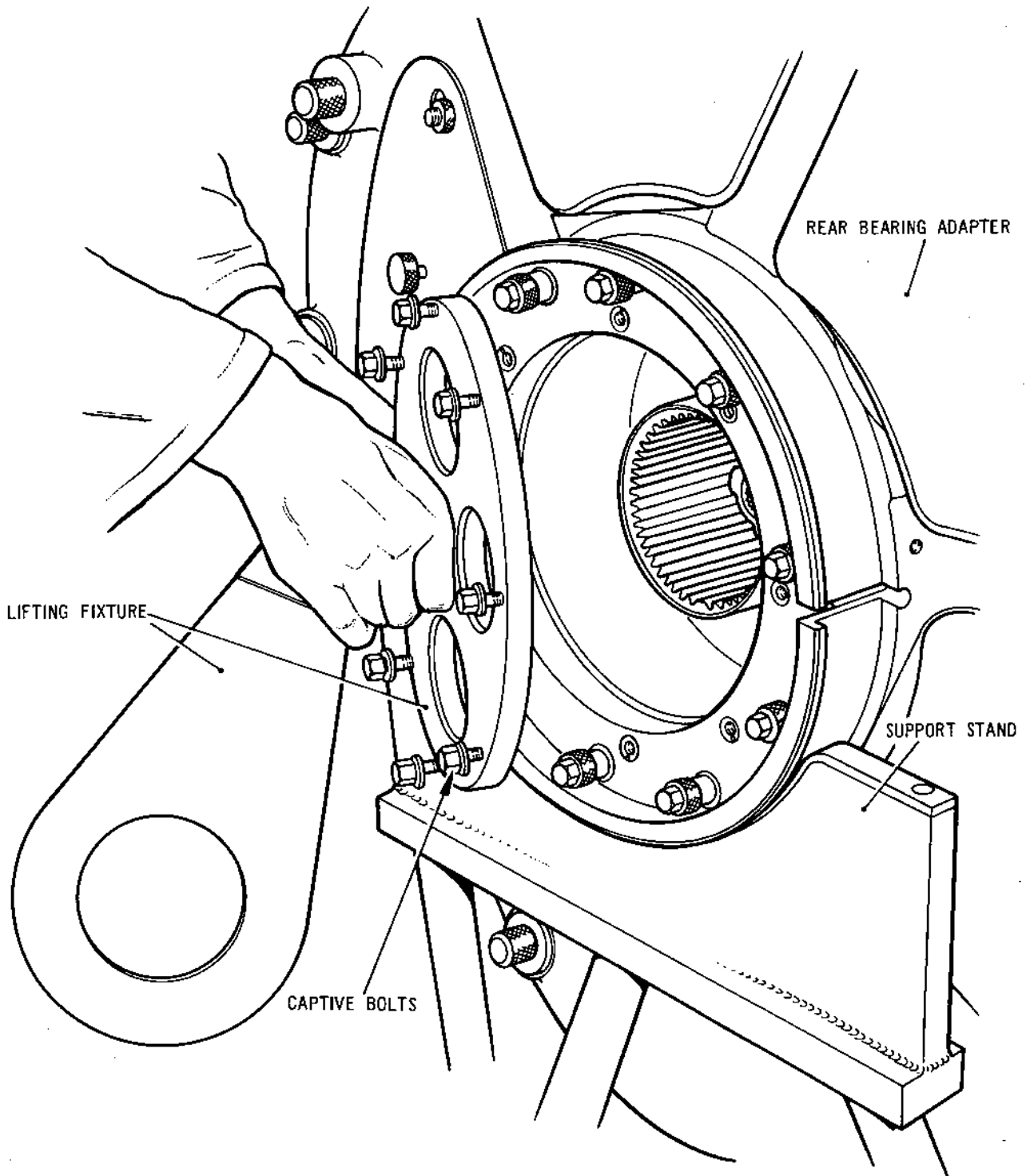


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31811/00A



Preparing to Lift the Compressor Assembly into the  
Vertical Position  
Figure 542

SUB-ASSEMBLY

**72-31-00**

Page 598.6

Jul 1/76



# OLYMPUS 593

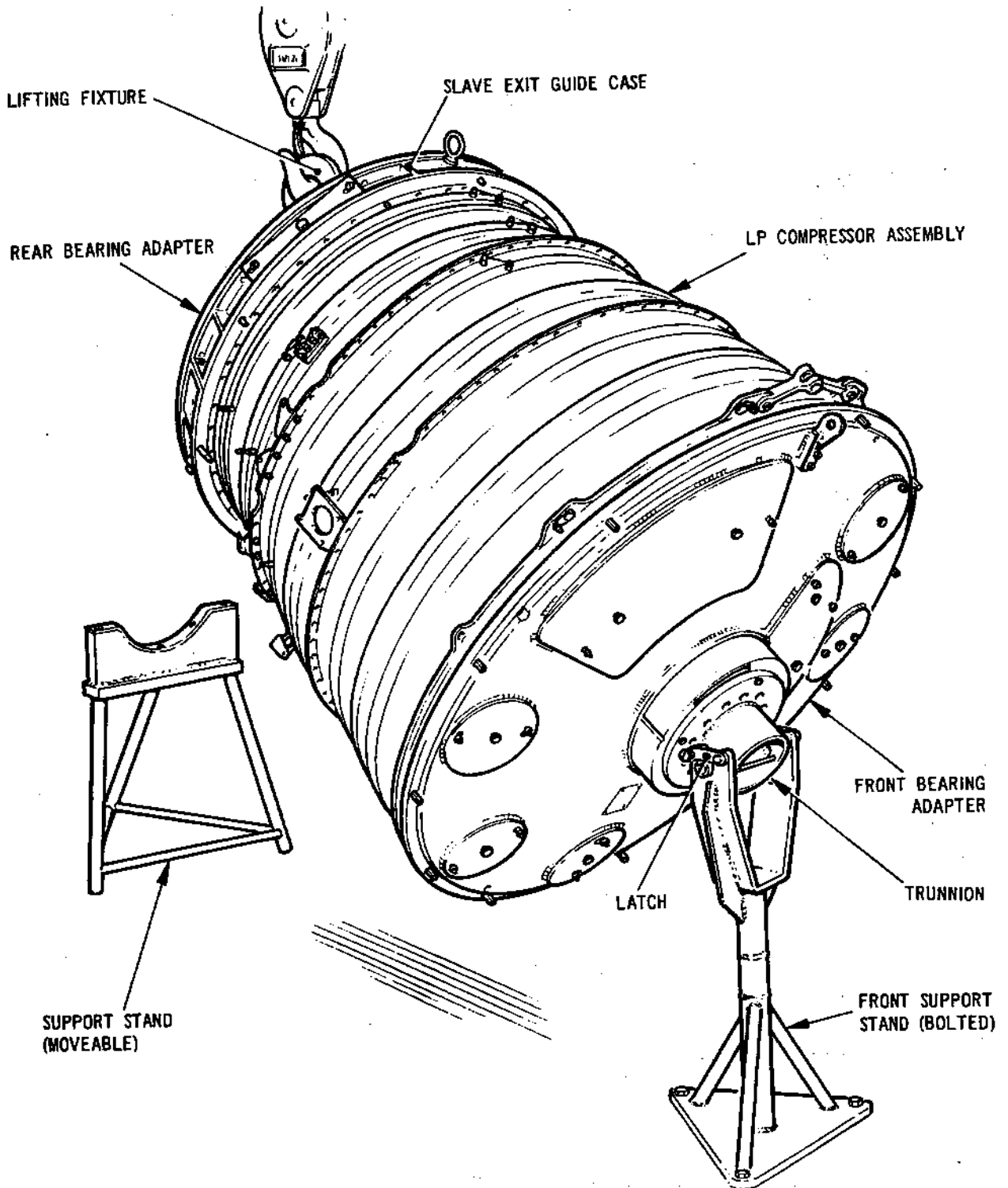
MK.610-14-28  
OVERHAUL



sneema

CR 31812/00A

Printed in England



Preparing for Horizontal Lift of Compressor Assembly and  
Raising the Compressor Assembly into the Vertical  
Position with Rear Bearing Adapter Uppermost  
Figure 543 (Sheet 1 of 2)

SUB-ASSEMBLY  
**72-31-00**  
Page 598.7  
Dec 31/00



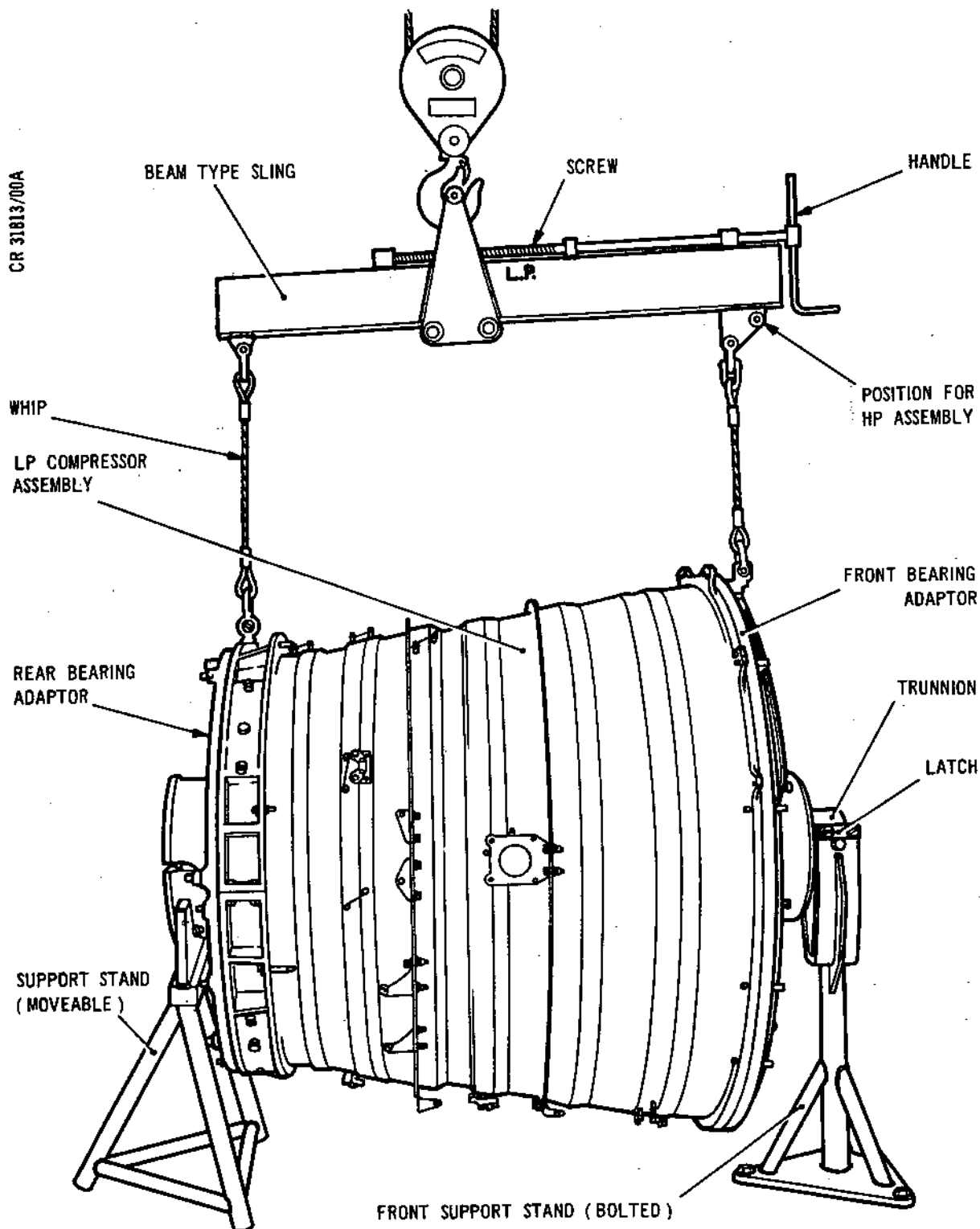
OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL



Preparing for Horizontal Lift of Compressor Assembly and  
Raising the Compressor Assembly into the Vertical  
Position with Rear Bearing Adapter Uppermost  
Figure 543 (Sheet 2 of 2)

SUB-ASSEMBLY

72-31-00

Page 598.8

Dec 31/00





OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (6) Run the rotor a minimum of 3 times to check for repeatability of unbalance indication. At each full stop, record the results obtained.
- (7) Once acceptable repeatability has been demonstrated record the rotor initial unbalance figures at 600 RPM.
- (8) Check the calibration of the machine by fitting a known weight at a known angle to the rotor, run the machine and check for correct indication. If the calibration is acceptable, remove the calibration weight.
- (9) Balance the rotor using weights as required. Prior to recording the final unbalance results for the rotor, ensure repeatability of indications by running the rotor to speed over a minimum of 3 runs at 600 RPM. Record the results.
- (10) Re-assemble immobilisers (Tools 3157 and 3158).
- (11) Remove the rotor from the balancing machine.

#### 14. Prepare the LP Compressor Assembly for Final Engine Build

##### A. Remove the LP Compressor Assembly from the Balancing Machine (Ref.Fig.543).

- (1) Attach a hoist to the lifting beam (Tool 1056), then position the hoist over the balancing machine with the lifting bar position handle at the front end of the LP compressor case. Secure the beam to the lifting eyes on the front and rear adapters with shackles.
- (2) Release and remove the clamp plates from the balancing machine pedestals, then steadily raise the hoist and position the compressor over the two supports (Tool 1306 and 1076). Lower the hoist and guide the rear adapter channel section onto the stands.
- (3) Identify the offset bolt-hole position in the adapter, then assemble the trunnion adapter (Tool 1097) to the front bearing adapter. Screw in and fully tighten the bolts.

SUB-ASSEMBLY

**72-31-00**

Page 598.9

Dec 31/00



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

- (4) Ensure the two latches of the support (Tool 1076) are released. Raise the hoist and position the assembly so that the trunnion adapter aligns with the support stand (Tool 1076), and the channel in the rear bearing adapter aligns with the (moveable) support (Tool 1306), then lower the assembly onto the supports. Secure the trunnion adapter bar with the two latches of the support.
- B. Assemble the LP Compressor Assembly to the Mobile Stand.
- (1) Release the shackles, then remove the lifting beam (Tool 1056) from the compressor assembly and the beam from the hoist.
  - (2) Using wrench (Tool 1572), release the Allen screws and remove the drive pulley from the driving adapter in the rotor shaft rear, then using wrench (Tool 662) release and remove the driving adapter retaining ring and withdraw the driving adapter from the rotor shaft.
  - (3) Assemble the lifting fixture (Tool 1096) to the front bearing adapter and compressor rotor (Ref.Fig.542).
    - (a) Locate the lifting fixture, observing the offset bolt, onto the bearing adapter, then fully tighten the eight bolts.
  - (4) Attach a hoist to the lifting fixture then moving the hoist as necessary, raise the rear end of the compressor assembly and pivot about the trunnion adapter until the assembly is vertical (Ref.Fig. 543). Release the two latches of the stand and raise the hoist. Position the hoist over the mobile stand (Tool 1105) (Ref.Fig.544) aligning the front bearing adapter lifting eye with the slot in the mobile stand, then lower the assembly onto the stand. Locate the stand clamps on the compressor casing front flange and tighten the knurled nuts. Release and remove the hoist from the lifting equipment.

SUB-ASSEMBLY

72-31-00

Page 598.10

Dec 31/00



OLYMPUS 593

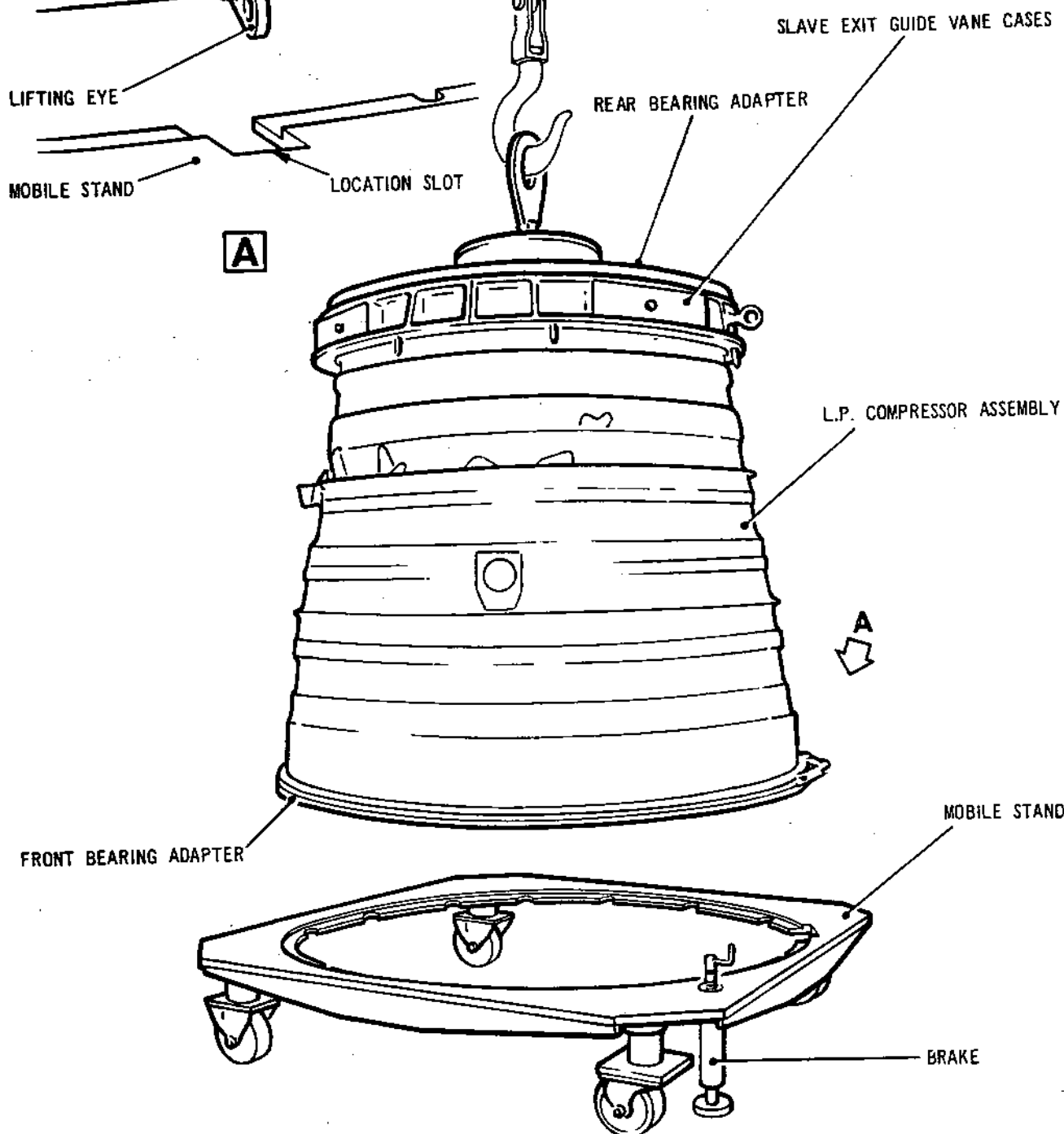
MK.610-14-28  
OVERHAUL



SNECMA

CR 33066/008

Printed in England



Assembling the Compressor Assembly onto the  
Mobile Stand  
Figure 544



OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

C. Attach the Module Identification Plate to the LP Compressor Case.

- (1) Ensure that the module identification plate (72-00-02/1-70) bears the correct data.
- (2) On Pre-SB.72-21 standard engines, ensure that an identification label bearing the sub-assembly/module data and washer thickness is attached to the LP thrust bearing adjusting washer, and passed to engine final build (72-00-00, Assembly).
- (3) Place the module identification plate in a canvas bag, then temporarily attach it to one of the blow-off flanges as a 'loose item'.

NOTE: If the LP compressor assembly is to be stored the module identification plate must not be removed.

- (4) Check that an identification tally has been affixed to the LP compressor exit guide vane cases. The LP compressor assembly together with the exit guide vane cases are now ready for engine final build (72-00-00 Assembly).

SUB-ASSEMBLY

**72-31-00**

Page 598.12

Dec 31/00



OLYMPUS 593

MK.610-14-28 snecma  
OVERHAULLP COMPRESSOR CASE AND VANES - SUB-ASSEMBLYTABLE OF CONTENTS

Para.		Page
1.	General ... ..	501
2.	Assemble the LP Compressor Case to the Build Stand ...	503
	A. Prepare the LP Case ... ..	503
	B. Assemble Case to Stand (With Case on its Front Face) ... ..	503
	C. Assemble Case to Stand (With Case on its Rear Face)... ..	503
3.	Assemble the Stage 6 Stator Vanes and Inner Fixing Ring to the Compressor Case ... ..	504
	A. Assemble Items to Stage 6 Rings ... ..	504
	B. Check Torque-tightening of Labyrinth Retaining Plate Bolts ... ..	505
	C. Prepare to Assemble Stator Vanes and Inner Fixing Ring ... ..	505
	D. Assemble the Vanes ... ..	507
4.	Assemble Brackets, Blanking Plate or Pulse Probe and Bolts to the LP Case ... ..	511
	A. Assemble Brackets and Bolts to the Rear Blow-off Flange ... ..	511
	B. Assemble Blanking Plate or Pulse Probe ... ..	513
	C. Assemble Brackets and Bolts to the Front Blow-off Flange ... ..	513
5.	Assemble Spherical Bearings, Bushes, Pins and Mounting Bracket ... ..	516
	A. Remove the LP Case from the Build Stand ... ..	516
	B. Shrink Pins to Front Flange ... ..	516
	C. Assemble Spherical Bearings and Bushes ... ..	518
	D. Assemble Pins and Mounting Bracket ... ..	519
6.	Assemble Items to Inner Fixing Rings ... ..	519
	A. General ... ..	519
	B. Labyrinth Retaining Plate Installation ... ..	519
	C. Assemble Items to Stage 1 Rings ... ..	521
	D. Assemble Items to Stage 2 Rings ... ..	522
	E. Assemble Items to Stage 3 Rings ... ..	522
	F. Assemble Items to Stage 4 Rings ... ..	523
	G. Assemble Items to Stage 5 Rings ... ..	524
7.	Check Torque-tightening of Labyrinth Retaining Plate Bolts ... ..	525
8.	Transfer the LP Case to the Sub-assembly Final Build ... ..	525

Printed in England

SUB-ASSEMBLY

72-31-01

Contents 1

Sep 30/94



OLYMPUS 593

MK.610-14-28

OVERHAUL



TABLE OF ILLUSTRATIONS

Fig.No.		Page
501	Assembling the LP Case to the Build Stand...	502
502	Assembling the Stage 6 Vanes and Vane Fixing Ring	506
503	Stage 6 Probe and Bolted Vane Positions	508
504	Assembling Brackets to Rear Blow-off Flange	510
505	Assembling Brackets to Front Blow-off Flange	514
506	Assembling Pins, Bushes, Spherical Bearings and Mounting Bracket...	517
507	Labyrinth Retainings Plate Installation Details	520

SUB-ASSEMBLY

**72-31-01**

Contents 2

Jul 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



LP COMPRESSOR CASE AND VANES - SUB-ASSEMBLY

1. General

- A. Prior to commencing work on the LP case, refer to 72-09-00 Assembly for general information on assembly.
- B. During the sub-assembly procedure, reference will be made to the Illustrated Parts Catalogue (I.P.C.) to identify those items where the nomenclature does not positively identify them, due to the duplication of the title e.g. nuts, bolts, washers, bearings, gears, housings, tubes etc. When the item is part of the breakdown of the text concerned, the item will be identified as bolt (1-10), the 1 referring to the I.P.C. Fig.1, and the 10 referring to the Item No. Where items from a different breakdown are introduced, then the breakdown Number will be quoted in addition, e.g. bolt (72-32-01/1-10).
- C. Throughout the text special tools are quoted by their Ref.No. e.g. (Tool 1234). For a complete list of tooling required for the assembly and for the Manufacturers Part No., refer to Special Tools, Fixtures and Equipment Table 1002.
- D. The LP case will be assembled to its turnover build stand where the stage 6 stator vanes will be finally assembled. All necessary brackets will be bolted to their respective flanges. The case will then be removed from the stand and placed front flange uppermost onto a pallet where the spherical bushes, spherical bearings, pins and front mounting bracket will be assembled.
- E. After completion of work on the LP case, items as necessary will be assembled to stages 1 to 5 labyrinth rings/fixing rings in preparation for final build of the compressor. The LP case and labyrinth rings/fixing rings will then be transferred to the final sub-assembly build area, with any loose items, for the final build of the remaining stages of stator vanes and rotor disks.

SUB-ASSEMBLY

**72-31-01**

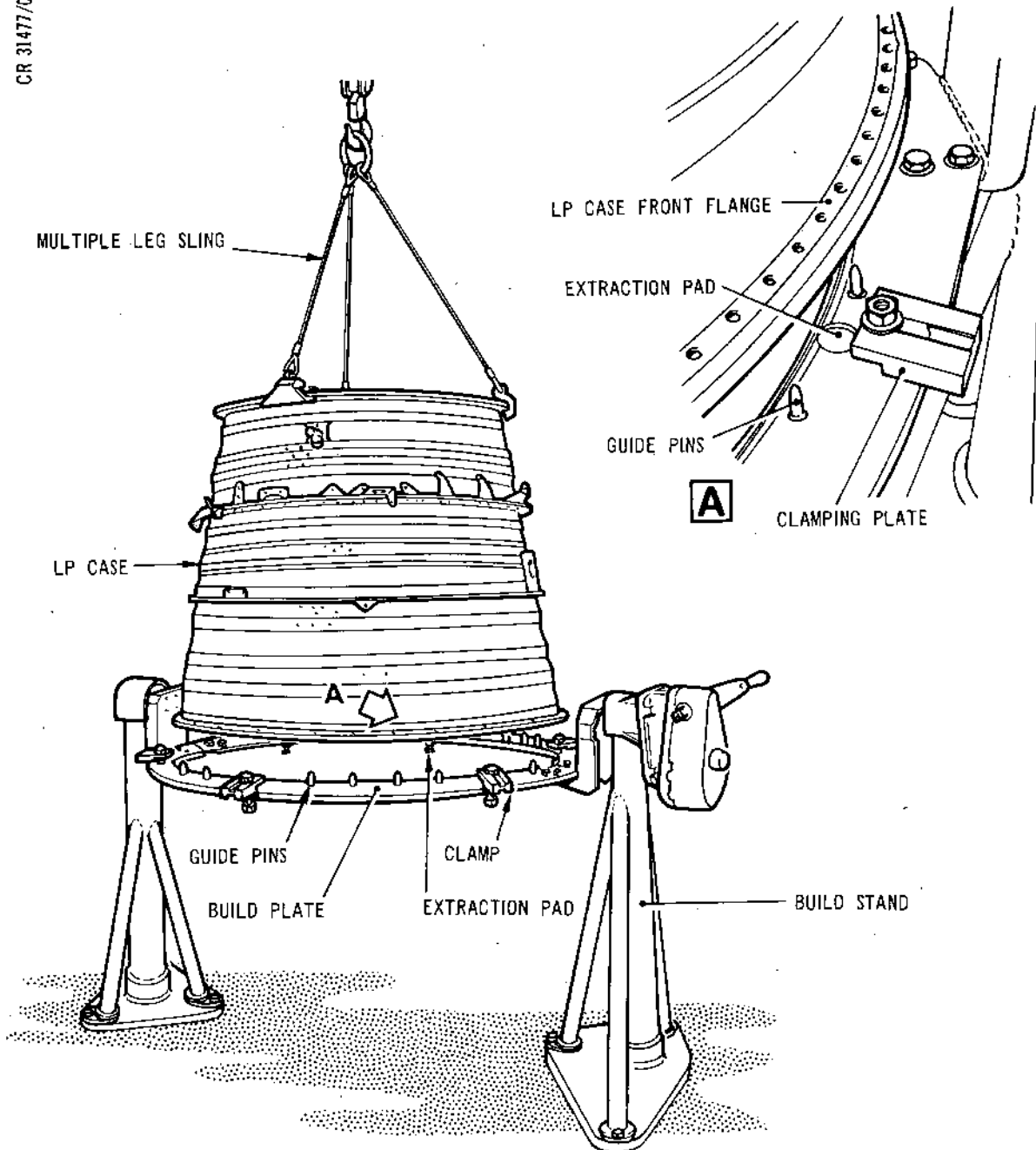
Page 501  
Oct 1/77



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 31477/00A



TN8429

Assembling the LP Case to the Build Stand  
Figure 501

SUB-ASSEMBLY  
**72-31-01**  
Page 502  
Aug 14/75





OLYMPUS 593

MK.610-14-28

OVERHAUL



## 2. Assemble the LP Compressor Case to the Build Stand

### A. Prepare the LP Case.

NOTE: Before commencing work refer to SB.72-19, SB.72-45, SB.72-37 and SB.72-54.

- (1) Check that the case (6-100) is clean and free from damage marks.

NOTE: Adopt the operations given in para.B. or C. depending on whether the LP case is resting on its front or rear face.

### B. Assemble Case to Stand (With Case on its Front Face).

- (1) Assemble the multiple leg sling (Tool 1178) to the rear flange of the LP case at three equally spaced positions, then secure the sling with the six thumbnuts. Turn the build stand (Tool 1317) until the build plate is uppermost.
- (2) Raise the case above the build stand (Ref.Fig.501). Slacken the clamping plate retaining nuts, then slide the plates back so that they do not obstruct the case when lowering. Turn the case until the 'TOP' of the case aligns with the 'TOP' of the build stand plate.
- (3) Check that the extraction pads on the underside of the build plate do not protrude to foul the case flange.
- (4) Carefully lower the case over the guide pins. Slide the clamp assemblies onto the case flange, then secure in position by tightening the retaining nut. Release and remove the sling.

### C. Assemble Case to Stand (With Case on its Rear Face).

- (1) Locate the arms of a small fork lift beneath the pallet then raise the pallet and case sufficiently to clear the floor.
- (2) Turn the build plate until its front face is facing down. Check that the clamping plates are slackened off and pushed outwards to clear the case.



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (3) With the LP case centrally disposed on the pallet, move the pallet and case beneath the build plate so that the 'TOP' of the case aligns the 'TOP' position of the build stand. Manipulate the fork lift to align the case front flange holes with the build plate guide pins. Raise the fork lift until the case front flange fully abuts the build plate.
- (4) Slide the clamping plates home over the case front flange, then secure the plates to the flange by tightening each of the retaining nuts.
- (5) Check that all clamps are securely clamped to the front flange of the case.
- (6) Lower the fork lift then remove the pallet clear of the build stand.

3. Assemble the Stage 6 Stator Vanes and Inner Fixing Ring to the Compressor Case

A. Assemble Items to Stage 6 Rings.

- (1) Remove the assembled labyrinth ring/fixing ring (3-400/390) from its container and place on the worktop with the labyrinth ring (3-400) uppermost.
- (2) Identify the loading slot in the fixing ring (3-390), then insert two new bolts (3-350) through the two holes at this position, the heads of the bolts are to locate the rear of the fixing ring. Using the assembly sleeve (Tool 1507) and driver (Tool 302) assemble a retaining ring (3-340) to each bolt. Ensure that the retaining rings locate correctly in the bolt grooves.
- (3) Install labyrinth retaining plates (Ref.Fig.507).

CAUTION: FAILURE TO INSTALL LABYRINTH RETAINING PLATES IN THE CONFIGURATION APPROPRIATE TO THE DESIGN STANDARD OF THE LABYRINTH RING WILL RESULT IN DAMAGE TO ENGINE.

SUB-ASSEMBLY

72-31-01

Page 504

Sep 30/94



# OLYMPUS 593



MK.610-14-28 *sneema*

OVERHAUL

Printed in England

- (a) The installed configuration for labyrinth retaining plates is dependent upon the design standard of the labyrinth ring. There are two design standards of labyrinth ring in use.
  - (i) The retaining plate location on early labyrinth rings is flush with the vane fixing ring and the retaining plate is installed with its recessed face toward the retaining nut (Detail A).
  - (ii) The retaining plate location on later labyrinth rings has a lipped edge which projects forward of the vane fixing ring and the retaining plate is installed with its recessed face toward the lipped edge (Detail B).
- (b) Before proceeding to install labyrinth retaining plates, establish from the design standard of the labyrinth, which installed configuration is applicable.
- (c) Insert six new bolts (3-370) through the rear of the fixing ring into the remaining three pairs of equi-spaced holes. Secure the three pairs of bolts (3-370) with retaining plates (3-380) and nuts (3-360) lubricated with lubricant 'B'. Ensure that the retaining plates locate the labyrinth ring (3-400) correctly.
- (4) Immobilize each of the six bolts (3-370) with the holding tool (Tool 926), then torque-tighten the six bolts (3-370) between 85 and 95 lbf in. (9,6 and 10,7 N.m) ensuring a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 2.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref.SB.72-8259-153).

SUB-ASSEMBLY

## 72-31-01

Page 505

Sep 30/94

CR 35932/00A  
BS00002010/2



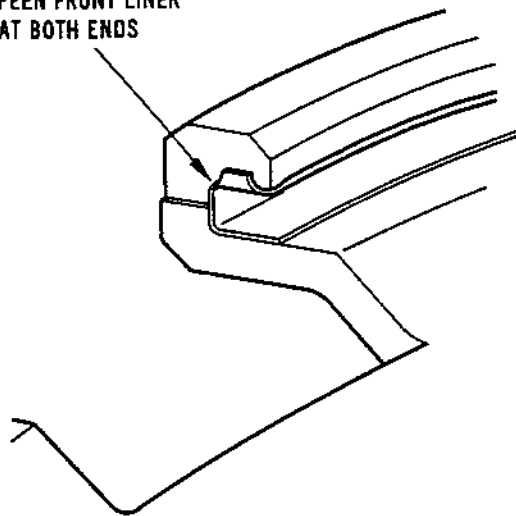
OLYMPUS 593

MK.610-14-28  
OVERHAUL

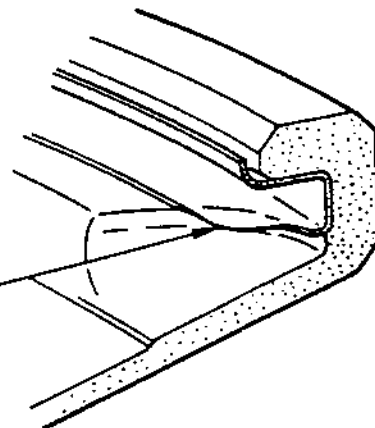


sneema

PEEN FRONT LINER  
AT BOTH ENDS



PEEN REAR LINER INTO  
RECESS IN RING AT BOTH ENDS



Inner Fixing Ring  
Anti-Fret Liner Assembly  
Figure 501A



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (5) On engines to SB.72-8730-298 or SB.72-9061-434 standard, install anti-fret liners (Ref.Fig.501A).

NOTE: If at refurbishment of an engine to SB.72-8730-298 standard, the front liner (3-410) needs replacement, liners to the standard of SB.72-8730-298 should be offered up. If insufficient tang extension exists to allow the tang to overhang the fixing ring 0.050 in (1,27 mm) prior to peening, then an SB.72-9061-434 standard liner must be used. As a consequence the fixing Ring Assy. of must be re-part numbered as detailed in SB.72-9061-434. Any excess tang must be dressed to remove.

- (a) Assemble the front and rear liners (3-410 and 3-420) to the inner fixing ring, and clamp in position for peening using two restraining tools (Tool 3134).
  - (b) Peen the ends of the liners with a soft metal drift, radiused at the end, then assemble the retaining protector (Tool 3140) to the fixing ring.
- (6) Return the labyrinth ring/fixing ring to its protective container.

B. Deleted.

SUB-ASSEMBLY

72-31-01

Page 506A

Dec 31/99

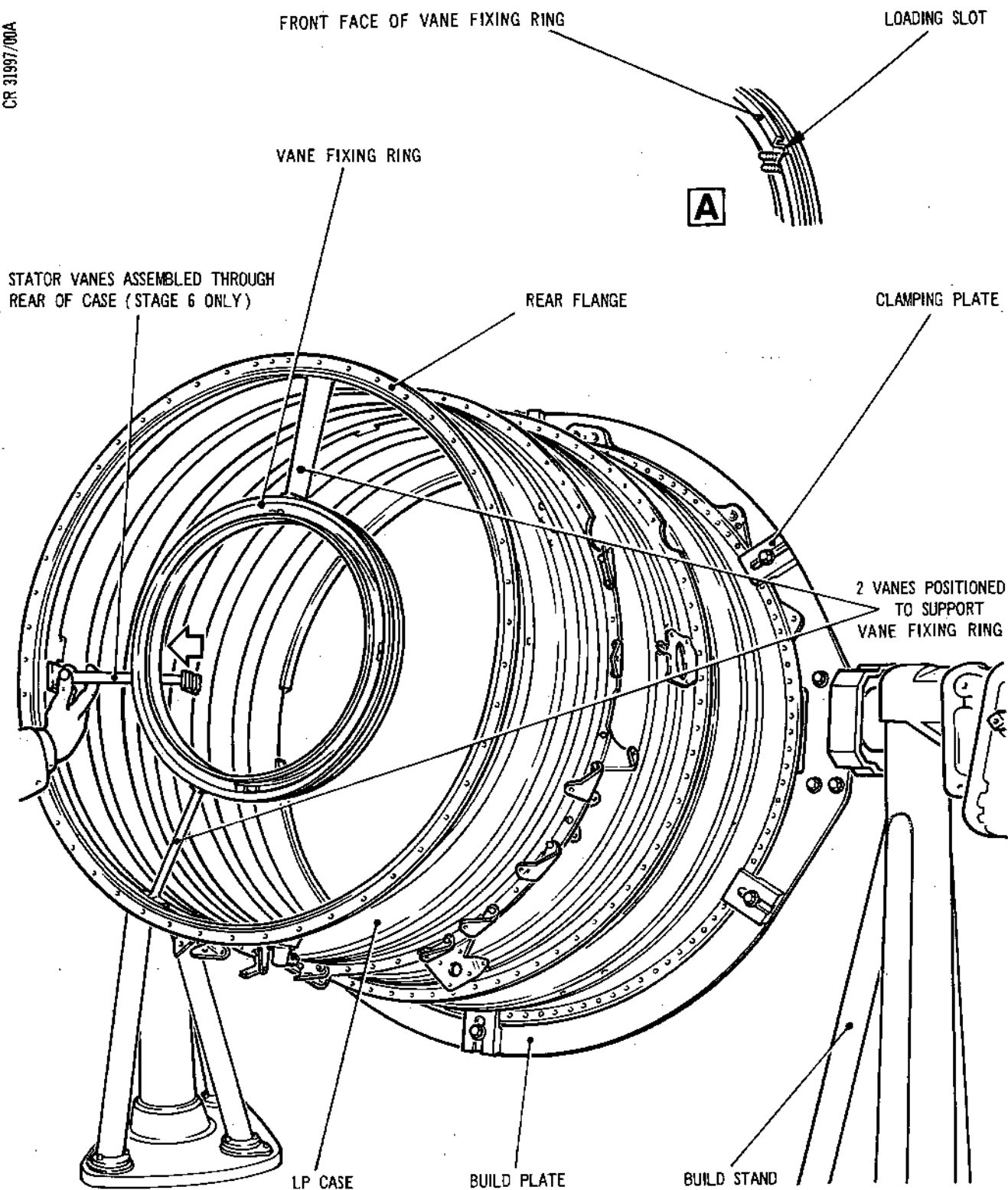


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31997/00A



Assembling the Stage 6 Vanes and Vane Fixing Ring  
Figure 502

SUB-ASSEMBLY

72-31-01

Page 506B

Dec 1/82



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

Printed in England

C. Prepare to Assemble Stator Vanes and Inner Fixing Ring.

- (1) Using the build stand's cranked handle, turn the build stand (Tool 1317) until the case is horizontal.
- (2) Remove the stage 6 vanes (3-300, 3-310, 3-320 and 3-330) and the vane fixing ring (3-390) from their protective containers and place on a suitable worktop.

NOTE: Ensure that any repaired vanes are evenly distributed around the case and that the aggregate depth of blending does not exceed 1.800 in. (45,72 mm) (Ref.72-31-01 Repair No.2).

- (3) Lubricate the vane fixing ring and the stage 6 stator vane grooves in the LP case with lubricant 'A'.

D. Assemble the Vanes (Ref.Figs.502 and 503).

- (1) Assemble a bolted stator vane (3-310) to the loading slot of the vane fixing ring, then slide the vane to a position opposite the loading slot (Ref.Fig.502).

NOTE: For easy identification purposes, note that the heads of the bolts in the fixing ring face the rear.

- (2) Offer up the vane fixing ring and assembled bolted vane to the rear of the LP case, then slot the vane into the stage 6 grooves. Carefully supporting the fixing ring, slide the stator vane around the case simultaneously rotating the fixing ring until its loading slot is in line with the case loading slot opposite. If necessary adjust the bolted vane to align the bolt holes in the case.

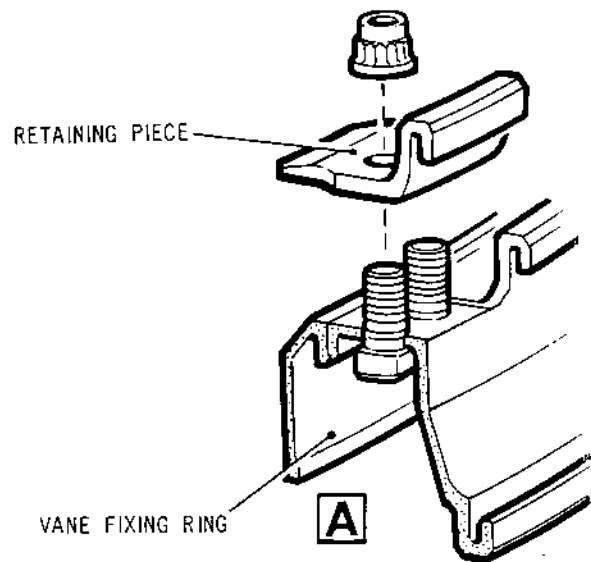
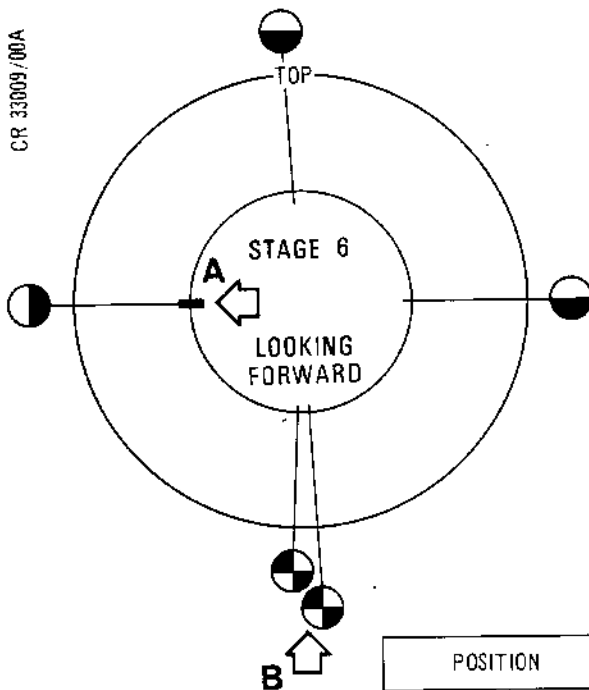


# OLYMPUS 593

MK.610-14-28  
OVERHAUL

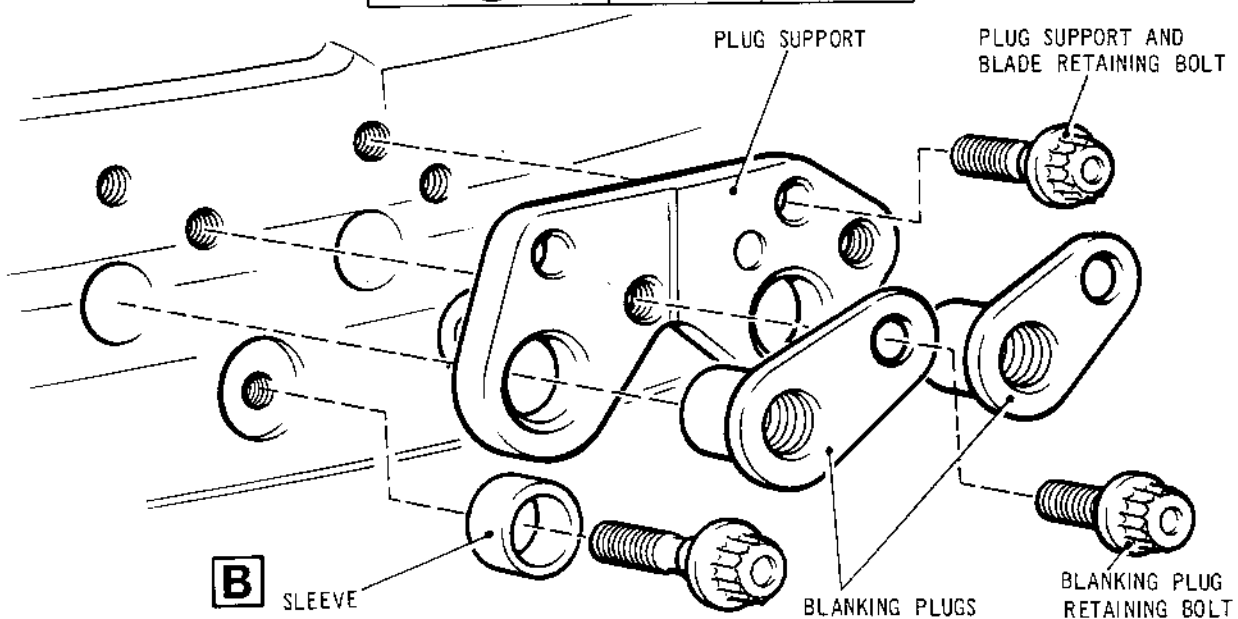


CR 33009/00A



LOADING SLOT IN  
VANE FIXING RING

POSITION	IPC REF	No. OFF
ALL OTHER VANES	3-300	61
	3-310	2
	3-320	1
	3-330	2



Stage 6 Probe and Bolted Vane Positions  
Figure 503

SUB-ASSEMBLY  
**72-31-01**  
Page 508  
Oct 1/77





OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

- (3) Assemble two sleeves (3-220) and two bolts (3-210), lubricated with lubricant 'B', from outside the case to locate the bolted vane. Do not tighten the bolts at this stage.
- (4) Assemble a vane (3-300) to the case and vane fixing ring, slide the vane to within approx. one inch of the loading slot to act as a support to help centralize the inner fixing ring.  
  
Assemble a vane (3-300) so that it abuts the first bolted vane assembled, then assemble subsequent vanes (3-300) in a counter-clockwise direction looking forward until the probe holes in the bottom of the case are left exposed.
- (5) Assemble two probe vanes (3-330) and position at the bottom of the case. Check that the probe holes in the case and corresponding holes in the vanes line up.
- (6) Assemble a plug support (3-250) to the outside of the LP case at the two probe positions. Lubricate two bolts with lubricant 'B', then secure the plug support (finger tight) to the case and probe vanes. Assemble two blanking plugs (3-240) to the plug support, then secure the blanking plugs to the plug support with two bolts (3-230) lubricated with lubricant 'B'. Ensure that the two bolts (3-230) have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m), do not tighten the bolts at this stage.
- (7) Assemble a vane (3-300) to the case so that it abuts the probe vane, continue to assemble vanes (3-300) until the loading slot is reached.
- (8) Progress with vanes (3-300) in the remaining half of the case up to the next bolted vane position, then assemble a bolted vane (3-310) and secure to the outside of the case with two bolts (3-210) lubricated with lubricant 'B' and two sleeves (3-220). Do not tighten the bolts at this stage. With the bolted vane in position assemble the remaining vanes (3-300).
- (9) Finally assemble a bolted vane (3-320) to the case and inner fixing ring. Secure the vane at the outer position with two bolts (3-210) lubricated with lubricant 'B' and two sleeves (3-220). Check that the two retaining rings (3-340) at the inner fixing ring loading position are correctly assembled to their

SUB-ASSEMBLY

**72-31-01**

Page 509

Feb 1/82

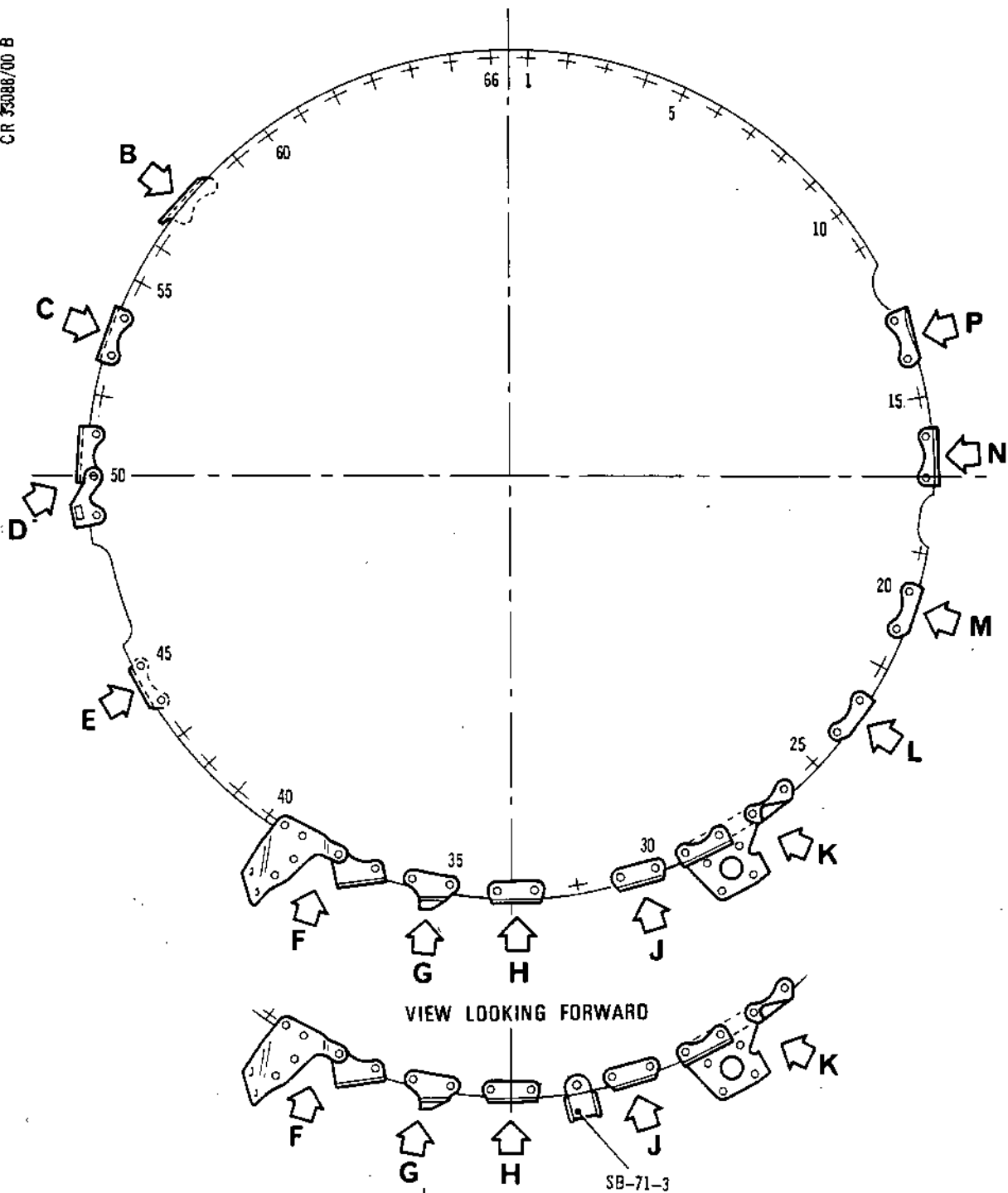


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 35088/00 B



TN17005

Assembling Brackets to Rear Blow-off Flange  
Figure 504

SUB-ASSEMBLY  
**72-31-01**

Page 510  
Oct 1/77



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



grooves, then assemble a retaining piece (3-290) over the two bolts (3-350). Lubricate the two nuts (3-280) with lubricant 'B' then secure the retaining piece using the immobilizer (Tool 926) to secure the bolts.

- (10) Check that all the bolted vanes have been correctly assembled and that all the vanes between the bolted vanes have acceptable lateral movement.
- (11) Torque-tighten the following bolts and nuts:
- (a) TOP outer case position (bolted vane) between 80 and 90 lbf in. (9,0 and 10,2 N.m).
  - (b) The right-hand bolted vane (outer case position) between 80 and 90 lbf in. (9,0 and 10,2 N.m).
  - (c) The bottom two probe vanes (outer case position) and plug support retaining bolts (3-230) between 80 and 90 lbf in. (9,0 and 10,2 N.m).
  - (d) The left-hand bolted vane at the outer case position between 80 and 90 lbf in. (9,0 and 10,2 N.m).
  - (e) The left-hand bolted vane at the inner fixing ring position between 85 and 95 lbf in. (9,6 and 10,7 N.m). After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 2.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref.SB.72-8259-153).
- (12) Check that the probe blades are correctly positioned by inserting the probe pin gauge (Tool 289) through the case and the holes in the vanes.
- (13) Wire-lock the bolts at the bolted vane positions in pairs.

4. Assemble Brackets, Blanking Plate or Pulse Probe and Bolts to the LP Case

- A. Assemble Brackets and Bolts to the Rear Blow-off Flange (Ref.Fig.504).

NOTE: All the bracket retaining bolt threads will be lubricated with lubricant 'B' and unless qualified in the text the bolt heads are to face the front and the brackets to abut the rear face of the flange. Unless stated otherwise the self-locking nuts and inserts will have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).

SUB-ASSEMBLY

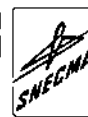
**72-31-01**

Page 511

Feb 1/82



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (1) Turn the stand so that the LP case is vertical (rear flange uppermost).
- (2) Assemble a bracket (5-30) to location P. Secure the bracket with two bolts (5-20) and two nuts (5-10).
- (3) Assemble a bracket (5-60) and two bolts (5-50) to location N, retain the bracket with two nuts (5-40).
- (4) Assemble a bracket (5-110) and bolts (5-80) and (5-100) to location M, retain the brackets with nuts (5-70) and (5-90).
- (5) Assemble a bracket (5-140) and two bolts (5-130) to location L, retain the brackets with nuts (5-120).
- (6) Assemble a bracket (5-180) to location K (holes 26, 27). Assemble a bolt (5-160) and nut (5-150) to hole 26. Do not tighten the bolt at this stage. Assemble the bracket (5-190) underneath the flange to holes 27, 28 and 29, then assemble a bracket (5-200) on top of the flange to holes 28, 29. Secure the brackets at hole 27 with bolt (5-160) and nuts (5-150) and holes 28 and 29 with bolts (5-160) and (5-170) and nuts (5-150).
- (7) Assemble a bracket (5-230) to location J and secure with two bolts (5-220) and nuts (5-210).
- (8) Assemble a bracket (5-270) with the leg of the bracket extended rearward, to location H. Secure the bracket with two bolts (5-260), two washers (5-250) and two nuts (5-240). The washers are to be assembled between the nut and the bracket.
- (9) Assemble the bracket (5-360) to the front face of the flange at location G so that the bracket extends forward, then assemble the bracket (5-300) to the rear face of the flange to extend rearwards; secure the brackets with two bolts (5-290) and nuts (5-280).
- (10) Assemble the bracket (5-410) to the flange at location F with the bracket extending rearwards; retain the bracket with an attachment plate assembly (5-430) on the front face of the flange then assemble the bracket (5-420) to the flange, the leg of this bracket will locate one hole (38) of bracket (5-410). Secure the brackets at the attachment plate position with bolt (5-380) outer location of bracket (5-420) with bolt (5-400) and its inner location with bolt (5-390) and four nuts (5-370).

SUB-ASSEMBLY

**72-31-01**

Page 512  
Feb 1/82



- (11) Assemble a bracket (5-460) to the front face of the flange at location E with the bracket extending forward; retain the bracket with two bolts (5-450) and nuts (5-440).
- (12) Assemble a bracket (5-490) to the rear face of the flange at location D, then assemble the bracket (5-500) to the front face of the flange with the bracket extending forward. Retain both brackets with two bolts (5-480) and two nuts (5-470).
- (13) Assemble a bracket (5-530) to the flange at location C, the bracket extends forward. Retain the bracket with two bolts (5-520) and two nuts (5-510).
- (14) Assemble a bracket (5-560) to location B with the bracket extending forward. Retain the bracket with two bolts (5-550) and two nuts (5-540).
- (15) Torque-tighten the bolt at location F (half pitch between holes 39 and 40) between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (16) Torque-tighten the remainder of the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m).

#### B. Assemble Blanking Plate or Pulse Probe.

- (1) If SB.71-8314-28 is embodied, assemble a blanking plate (6-98) together with a bracket (6-96) to the left-hand bottom position of the LP case (LP probe location). Secure the bracket and blanking plate with two bolts (6-93) and one bolt (6-92). Torque-tighten the three bolts between 80 and 90 lbf in. (9,0 and 10,2 N.m), ensuring a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).
- (2) If the engine is to Pre SB.71-8314-28 standard, assemble the pulse probe (73-22-01/1-10) and bracket (73-22-01/1-40) to the left-hand bottom position of the LP case. Retain the bracket and pulse probe with two bolts (73-22-01/1-30) and one bolt (73-22-01/1-20) lubricated with lubricant 'B'. Torque-tighten the three bolts between 80 and 90 lbf in. (9,0 and 10,2 N.m), ensuring a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Assemble a protector to the pulse probe.

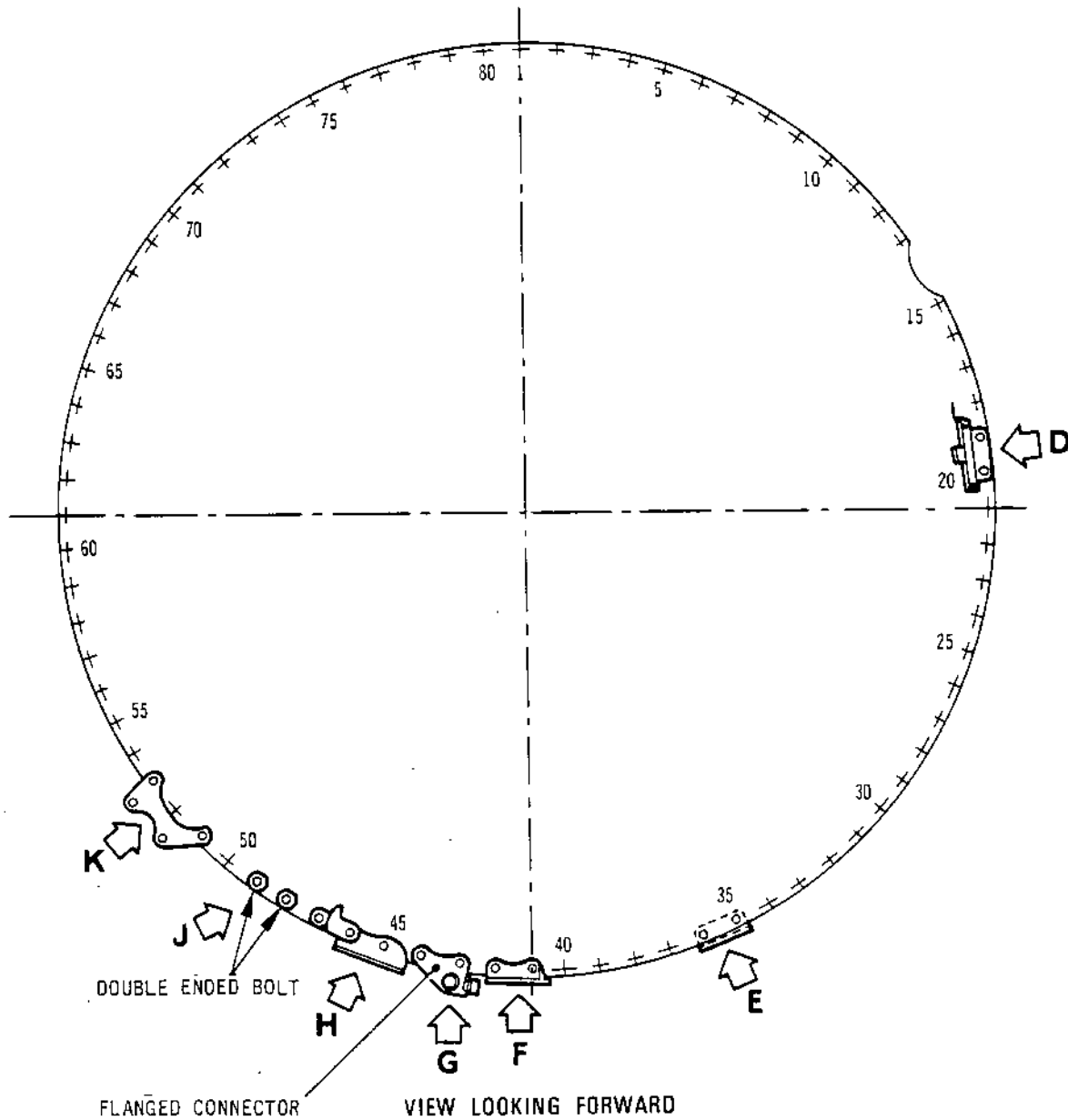


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33087/00A



TN3035

Assembling Brackets to Front Blow-off Flange  
Figure 505

SUB-ASSEMBLY  
**72-31-01**  
Page 514  
Oct 1/77

C. Assemble Brackets and Bolts to the Front Blow-off Flange (Ref.Fig.505).

- (1) Assemble a mounting bracket (4-70) to location D, with its longest section extending rearward. Secure the bracket with two bolts (4-60) (boltheads to face the rear), and two nuts (4-50). Torque tighten the two nuts until the 'shear neck' parts, then discard the severed hexagons.

NOTE: The rear of the bracket will be finally secured during the LP compressor assembly build (Ref. 72-31-00 Assembly).

- (2) Assemble a bracket (4-100) and two bolts (4-90) and nuts (4-80) to location E. The bracket abuts the rear of the flange with the one hole extended forward. Retain the bracket with two nuts (4-80).
- (3) Assemble bracket (4-130) and bracket (4-125) to the flange at location F. The bracket (4-130) is assembled first on the rear of the flange with longest section of the bracket extended forward, the smaller bracket locates on the first bracket extending rearwards. Secure the two brackets with two bolts (4-120) and nuts (4-110).
- (4) Assemble the flanged connector (4-320) to location G and secure with two bolts (4-310) and two nuts (4-300). Assemble three protective blanks to the electrical outlets on the connector.
- (5) Assemble bracket (4-430) and lug support (4-440) to location H. Retain the bracket (4-430) at hole 45 with a bolt (4-410) and locknut (4-400), and support (4-440) at holes 46, 47 with two bolts (4-420).
- (6) Assemble two special flange bolts (4-460) to location J. Secure the special bolts with two lock-nuts (4-450) onto the front face of the flange.
- (7) Assemble a bracket (4-490) and two bolts (4-480) to location K, secure the bracket with two nuts (4-470).
- (8) Torque-tighten the bolts at location H, bolt holes 46, 47 between 80 and 90 lbf in. (9,0 and 10,2 N.m). Wire-lock these two bolts to each other.
- (9) Torque-tighten the remainder of the bracket retaining bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m).



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (10) Assemble a bracket (5A-590) to the bottom left-hand location (looking forward) of the LP case, the bracket is attached to a small separate flange just behind the front blow off flange, close to bolt hole 54. Lubricate two bolts (5A-580) with lubricant 'B' then secure the bracket with the bolts (the boltheads to face the rear) and two nuts (5A-570). Torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m).

5. Assemble Spherical Bearings, Bushes, Pins and Mounting Bracket

A. Remove the LP Case from the Build Stand.

- (1) Check that the LP case is securely clamped to the build stand, then turn the stand until the rear flange (small diameter) is towards the floor.
- (2) Locate the support arms of a small fork lift beneath a pallet, then transfer the pallet beneath the rear flange of the LP compressor case. Raise the fork lift to abut the compressor case rear flange and take the weight of the compressor case sufficiently to take the downward load from the clamping plates.
- (3) Slacken the clamping plate retaining nuts then slide the plates clear of the compressor case flange. Adjust the hydraulic release on the fork lift to allow the LP case to ease down. Check that the build stand mounting plate is level, then continue to lower the compressor case until clear of the mounting plate. Withdraw the pallet with the compressor clear of the build stand, then lower the pallet onto the floor.

B. Shrink Pins to Front Flange (Ref.Fig.506).

- (1) Using a suitable freezing agent, freeze a shouldered pin (6-460), then assemble it to the TOP front face of the flange at location D. Ensure that the shoulder of the pin is flush or slightly below the air intake abutment face of the flange.

TN25728

SUB-ASSEMBLY

72-31-01

Page 516

Oct 1/77





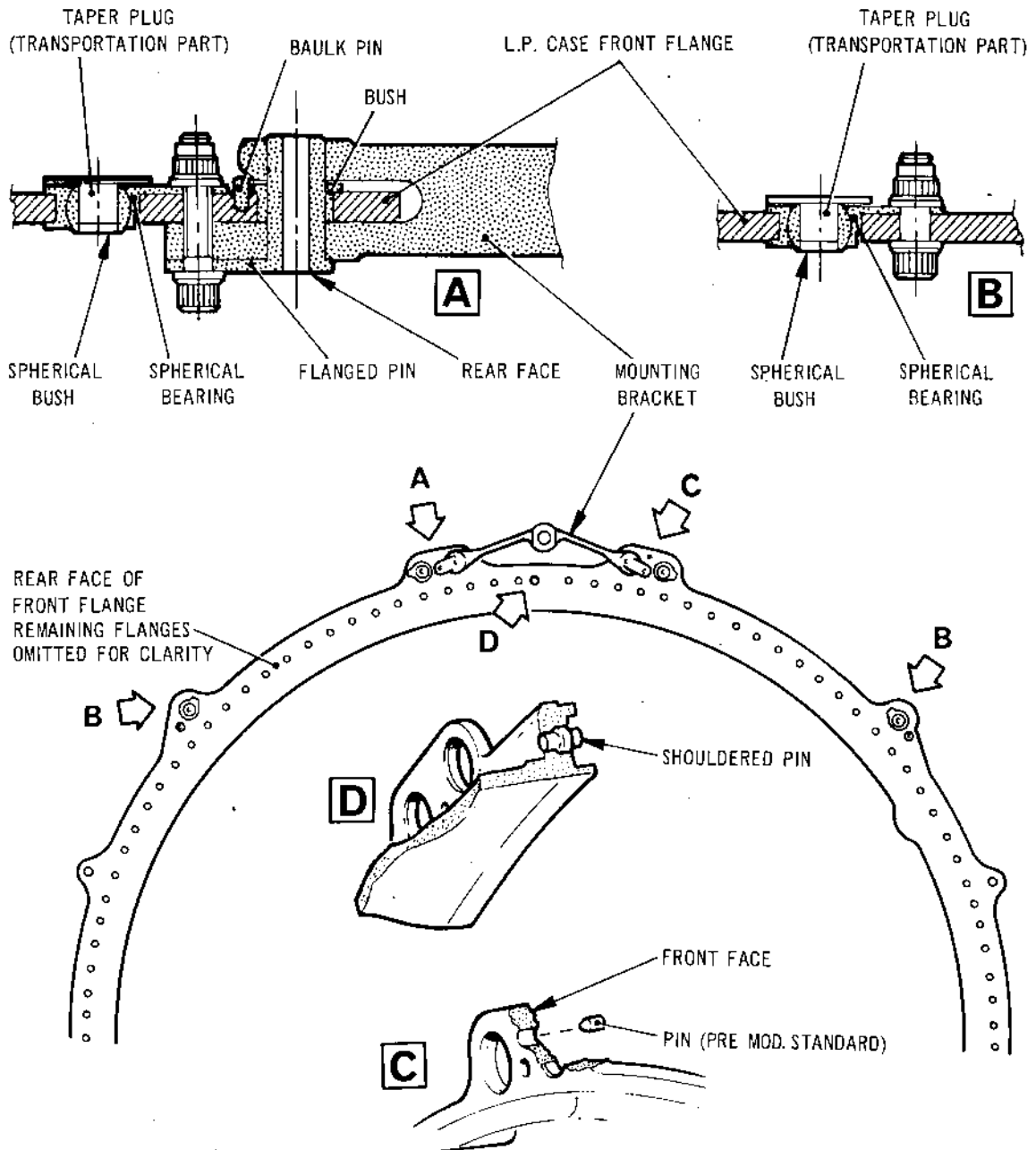
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33110/008

PRINTED IN ENGLAND



TN9721

Assembling Pins, Bushes, Spherical Bearings and Mounting Bracket  
Figure 506

SUB-ASSEMBLY  
**72-31-01**  
Page 517  
Oct 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



NOTE: Depending on the standard of case, assemble either pin (6-470A) or pin (6-470B). The smaller diameter baulk pin is to the later standard.

- (2) Freeze pin (6-470), then assemble it to location C. (Ref.Fig.506).

C. Assemble Spherical Bearings and Bushes.

- (1) Ensure two bushes (6-50) are clean and free from damage and their corresponding locations clean (Ref.Fig.506).

NOTE: The flange of each bush (6-50) is to abut the front face of the flange.

- (2) Using a suitable freezing agent shrink the two bushes (6-50) then assemble them to the front face of the front flange of the LP case.

NOTE: The two bushes (6-50) locate the two flanged pins (6-30) for the mounting bracket.

- (3) Assemble four spherical bushes (6-90) to their locations (two at B and similar each side of the mounting bracket) in the LP case front flange (Ref.Fig.506) the lug of each bush is to locate the rear face of the flange. Adjust the bushes to align the bolt holes, then, retain the two bushes at B with two bolts (6-80), lubricated with lubricant 'B' (bolt-heads to face the rear), and two nuts (6-70). Torque-tighten the bolts between 80 and 90 lbf in. (9,0 and 10,2 N.m) ensuring that they have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).
- (4) Assemble four spherical bearings (6-60) to the four bushes (6-90). Temporarily retain the spherical bearings with locking wire.

IN9722

SUB-ASSEMBLY

**72-31-01**

Page 518

Oct 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



D. Assemble Pins and Mounting Bracket.

NOTE: The pin (6-470) at position C (Ref.Fig.506) permits the mounting bracket to be assembled one way only, boltheads to face the rear.

- (1) Assemble the mounting bracket (6-40) to the 'TOP' position on the LP case front flange (Ref.Fig.506). Assemble the two pins (6-30) to the bracket so that the flange of the pin abuts the rear of the bracket, then retain the bracket, two spherical bushes (6-90) and pins with two bolts (6-20) lubricated with lubricant 'B' and two nuts (6-10). Torque-tighten the bolts (6-20) between 80 and 90 lbf in. (9,0 and 10,2 N.m) ensuring that they have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).

6. Assemble Items to Inner Fixing Rings

A. Deleted.

B. Labyrinth Retaining Plate Installation (Ref.Fig.507).

CAUTION: FAILURE TO INSTALL LABYRINTH RETAINING PLATES IN THE CONFIGURATION APPROPRIATE TO THE DESIGN STANDARD OF THE LABYRINTH RING WILL RESULT IN DAMAGE TO ENGINE.

- (1) The installed configuration for labyrinth retaining plates is dependent upon the design standard of the labyrinth ring. There are two design standards of labyrinth ring in use.
  - (a) The retaining plate location on early labyrinth rings is flush with the vane fixing ring and the retaining plate is installed with its recessed face toward the retaining nut (Detail A).
  - (b) The retaining plate location on later labyrinth rings has a lipped edge which projects forward of the vane fixing ring and the retaining plate is installed with its recessed face toward the lipped edge (Detail B).

SUB-ASSEMBLY

**72-31-01**

Page 519

Jun 1/84



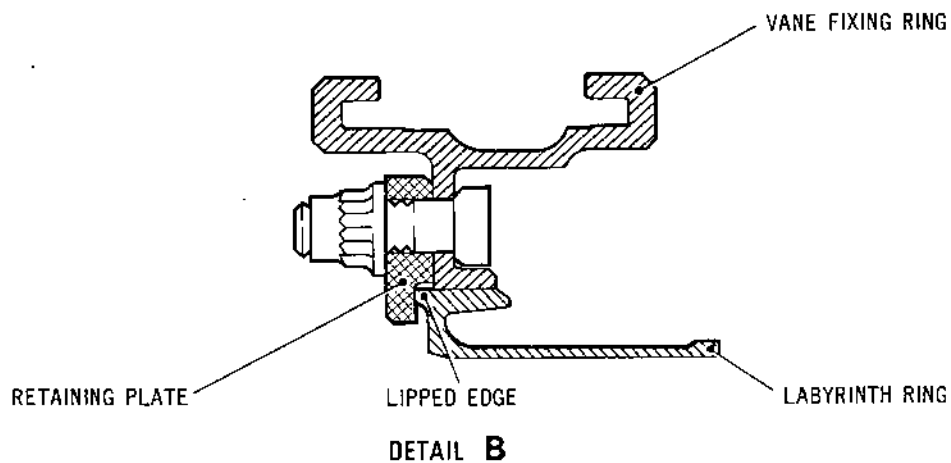
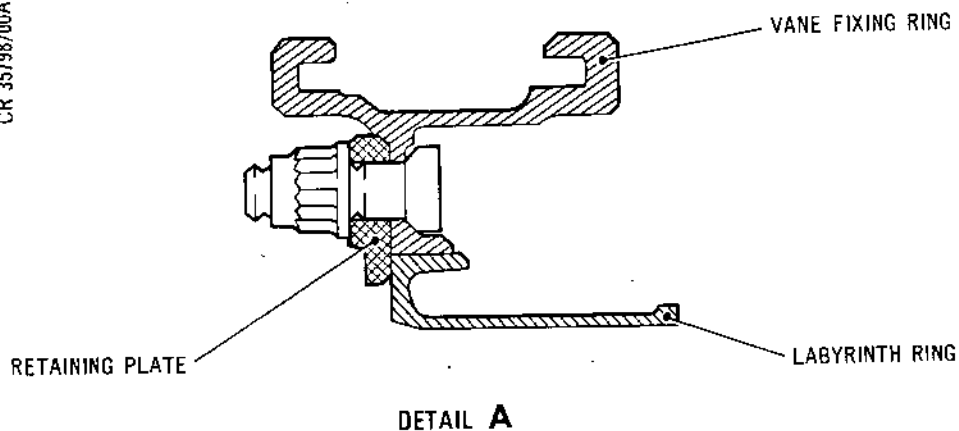
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 35798/00A



Labyrinth Retaining Plate Installation Details  
Figure 507

SUB-ASSEMBLY  
**72-31-01**

Page 520  
Jul 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (2) Before proceeding to install labyrinth retaining plates at stages 1 to 5, establish from the design standard of the labyrinth, which installed configuration is applicable.

C. Assemble Items to Stage 1 Rings.

- (1) Remove the assembled labyrinth ring/fixing ring (1-190/180) from its container and place on the worktop with the labyrinth ring (1-190) uppermost.
- (2) Identify the vane loading slot in the fixing ring (1-180), then insert two new bolts (1-140) through the two holes at this position, the heads of the bolts are to locate the rear of the fixing ring. Using the assembly sleeve (Tool 1506) and driver (Tool 301), assemble a retaining ring (1-130) to each bolt. Ensure that the retaining rings locate correctly in the bolt grooves.
- (3) Insert six new bolts (1-160) through the rear of the fixing ring into the remaining three pairs of equispaced holes. Secure the three pairs of bolts (1-160) with retaining plates (1-170) and nuts (1-150) lubricated with lubricant 'B'. Ensure that the retaining plates locate the labyrinth ring (1-190) correctly.
- (4) Immobilize each of the six bolts (1-160) with the holding tool (Tool 926), then torque-tighten the six nuts (1-150) between 85 and 95 lbf in. (9,6 and 10,7 N.m), ensuring a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 2.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref. SB.72-8259-153).

SUB-ASSEMBLY

72-31-01

Page 521

Dec 31/99



OLYMPUS 593

MK.510-14-28  
OVERHAUL

sneema

- (5) On engines to SB.72-8690-296 or SB.72-9061-434 standard, install anti-fret liners (Ref.Fig.501A).

NOTE: If at refurbishment of an engine to SB.72-8690-296 standard, the front liner (1-94) needs replacement, liners to the standard of SB.72-8690-296 should be offered up. If insufficient tang extension exists to allow the tang to overhang the fixing ring 0.050 in (1,27 mm) prior to peening, then an SB.72-9061-434 standard liner must be used. As a consequence the fixing Ring Assy. of must be re-part numbered as detailed in SB.72-9061-434. Any excess tang must be dressed to remove.

- (a) Assemble the front and rear anti-fret liners (1-194 and 1-196) to the inner fixing ring and clamp in position for peening using two restraining tools (Tool 3134).
- (b) Peen the ends of the liners with a soft metal drift, radiused at the end, then assemble the retaining protector (Tool 3137) to the fixing ring.
- (6) Return the labyrinth ring/fixing ring assembly to its protective container.

#### D. Assemble Items to Stage 2 Rings.

- (1) Remove the assembled labyrinth ring/fixing ring (1-380/370) from its container and place on the worktop with the labyrinth ring (1-380) uppermost.
- (2) Identify the vane loading slot in the fixing ring (1-370), then insert two new bolts (1-330) through the two holes at this position, the heads of the bolts are to locate the rear of the fixing ring. Using the assembly sleeve (Tool 1506) and driver (Tool 301) assemble a retaining ring (1-320) to each bolt. Ensure that the retaining rings locate correctly in the bolt grooves.

SUB-ASSEMBLY

72-31-01

Page 522

Dec 31/99

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

- (3) Insert six new bolts (1-350) through the rear of the fixing ring into the remaining three pairs of equi-spaced holes. Secure the three pairs of bolts (1-350) with retaining plates (1-360) and nuts (1-340) lubricated with lubricant 'B'. Ensure that the retaining plates locate the labyrinth ring (1-380) correctly.
- (4) Immobilize each of the six bolts (1-350) with the holding tool (Tool 926), then torque-tighten the six nuts (1-340) between 85 and 95 lbf in. (9,6 and 10,7 N.m) ensuring a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 2.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref. SB.72-8259-153).
- (5) On engines to SB.72-8730-298 or SB.72-9061-434 standard, install anti-fret liners (Ref.Fig.501A).

**NOTE:** If at refurbishment of an engine to SB.72-8730-298 standard, the front liner (1-390) needs replacement, liners to the standard of SB.72-8730-298 should be offered up. If insufficient tang extension exists to allow the tang to overhang the fixing ring 0.050 in (1,27 mm) prior to peening, then an SB.72-9061-434 standard liner must be used. As a consequence the fixing Ring Assy. of must be re-part numbered as detailed in SB.72-9061-434. Any excess tang must be dressed to remove.

- (a) Assemble the front and rear anti-fret liners (1-390 and 1-400) to the inner fixing ring and clamp in position for peening using two restraining tools (Tool 3134).
- (b) Peen the ends of the liners with a soft metal drift, radiused at the end, then assemble the retaining protector (Tool 3138) to the fixing ring.
- (6) Return the labyrinth ring/fixing ring assembly its protective container.

SUB-ASSEMBLY

**72-31-01**

Page 523

Dec 31/99



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

## E. Assemble Items to Stage 3 Rings.

- (1) Remove the assembled labyrinth ring/fixing ring (2-200/190) from its container and place on the worktop with the labyrinth ring (2-200) uppermost.
- (2) Identify the vane loading slot in the fixing ring (2-190), then insert two new bolts (2-150) through the two holes at this position, the heads of the bolts are to locate the rear of the fixing ring. Using the assembly sleeve (Tool 1507) and driver (Tool 302), assemble a retaining ring (2-140) to each bolt. Ensure that the retaining rings locate correctly in the bolt grooves.
- (3) Insert six new bolts (2-170) through the rear of the fixing ring into the remaining three pairs of equi-spaced holes. Secure the three pairs of bolts (2-170) with retaining plates (2-180) and nuts (2-160) lubricated with lubricant 'B'. Ensure that the retaining plates locate the labyrinth ring (2-200) correctly.
- (4) Immobilize each of the six bolts (2-170) with the holding tool (Tool 926), then torque-tighten the six nuts (2-160) between 85 and 95 lbf in. (9,6 and 10,7 N.m), ensuring a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 2.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref. SB.72-8259-153).
- (5) On engines to SB.72-8730-298 or SB.72-9061-434 standard, install anti-fret liners (Ref.Fig.501A).

NOTE: If at refurbishment of an engine to SB.72-8730-298 standard, the front liner (2-204) needs replacement, liners to the standard of SB.72-8730-298 should be offered up. If insufficient tang extension exists to allow the tang to overhang the fixing ring 0.050 in (1,27 mm) prior to peening, then an SB.72-9061-434 standard liner must be used. As a consequence the fixing Ring Assy. of must be re-part numbered as detailed in SB.72-9061-434. Any excess tang must be dressed to remove.





OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (a) Assemble the front and rear anti-fret liners (2-204 and 2-206) to the inner fixing ring and clamp in position for peening using two restraining tools (Tool 3134).
- (b) Peen the ends of the liners with a soft metal drift, radiused at the end, then assemble the retaining protector (Tool 3139) to the fixing ring.
- (6) Return the labyrinth ring/fixing ring assembly to its protective container.
- F. Assemble Items to Stage 4 Rings.
- (1) Remove the assembled labyrinth ring/fixing ring (2-400/390) from its container and place on the worktop with the labyrinth ring (2-400) uppermost.
- (2) Identify the vane loading slot in the fixing ring (2-390), then insert two new bolts (2-350) at this position, the heads of the bolts are to locate the rear of the fixing ring. Using the assembly sleeve (Tool 1507) and driver (Tool 302), assemble a retaining ring (2-340) to each bolt. Ensure that the retaining rings locate correctly in the bolt grooves.
- (3) Insert six new bolts (2-370) through the rear of the fixing ring into the remaining three pairs of equi-spaced holes. Secure the three pairs of bolts with retaining plates (2-380) and nuts (2-360) lubricated with lubricant 'B'. Ensure that the retaining plates locate the labyrinth ring (2-400) correctly.
- (4) Immobilize each of the six bolts (2-370) with the holding tool (Tool 926), then torque-tighten the six nuts (2-360) between 85 and 95 lbf in. (9,6 and 10,7 N.m) ensuring a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 2.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref. SB.72-8259-153).

SUB-ASSEMBLY

**72-31-01**

Page 525  
Dec 31/99



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (5) On engines to SB.72-8730-298 or SB.72-9061-434 standard, install anti-fret liners (Ref.Fig.501A).

**NOTE:** If at refurbishment of an engine to SB.72-8730-298 standard, the front liner (2-410) needs replacement, liners to the standard of SB.72-8730-298 should be offered up. If insufficient tang extension exists to allow the tang to overhang the fixing ring 0.050 in (1,27 mm) prior to peening, then an SB.72-9061-434 standard liner must be used. As a consequence the fixing Ring Assy. of must be re-part numbered as detailed in SB.72-9061-434. Any excess tang must be dressed to remove.

- (a) Assemble the front and rear anti-fret liners (2-410 and 2-420) to the inner fixing ring and clamp in position for peening using two restraining tools (Tool 3134).
- (b) Peen the ends of the liners with a soft metal drift, radiused at the end, then assemble the retaining protector (Tool 3140) to the fixing ring.
- (6) Return the labyrinth ring/fixing ring assembly to its protective container.

#### G. Assemble Items to Stage 5 Rings.

- (1) Remove the assembled labyrinth ring/fixing ring (3-200/190) from its container and place on the worktop with the labyrinth ring (3-200) uppermost.
- (2) Identify the vane loading slot in the fixing ring (3-190), then insert two new bolts (3-150) at this position, the heads of the bolts are to locate the rear of the fixing ring (3-190). Using the assembly sleeve (Tool 1507) and driver (Tool 302), assemble a retaining ring (3-140) to each bolt. Ensure that the retaining rings locate correctly in the bolt grooves.
- (3) Insert six new bolts (3-170) through the rear of the fixing ring into the remaining three pairs of equi-spaced holes. Secure the three pairs of bolts with retaining plates (3-180) and nuts (3-160) lubricated with lubricant 'B'. Ensure that the retaining plates locate the labyrinth ring (3-200) correctly.

SUB-ASSEMBLY

**72-31-01**

Page 526  
Dec 31/99



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (4) Immobilize each of the six bolts (3-170) with the holding tool (Tool 926), then torque-tighten the six nuts (3-160) between 85 and 95 lbf in. (9,6 and 10,7 N.m) ensuring a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 2.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref. SB.72-8259-153).

- (5) On engines to SB.72-8690-298 or SB.72-9061-434 standard, install anti-fret liners (Ref.Fig.501A).

NOTE: If at refurbishment of an engine to SB.72-8730-298 standard, the front liner (3-204) needs replacement, liners to the standard of SB.72-8730-298 should be offered up. If insufficient tang extension exists to allow the tang to overhang the fixing ring 0.050 in (1,27 mm) prior to peening, then an SB.72-9061-434 standard liner must be used. As a consequence the fixing Ring Assy. of must be re-part numbered as detailed in SB.72-9061-434. Any excess tang must be dressed to remove.

- (a) Assemble the front and rear anti-fret liners (3-204 and 3-206) to the inner fixing ring and clamp in position for peening using two restraining tools (Tool 3134).
- (b) Peen the ends of the liners with a soft metal drift, radiused at the end, then assemble the retaining protector (Tool 3140) to the fixing ring.
- (6) Return the labyrinth ring/fixing ring assembly to its protective container.

SUB-ASSEMBLY

72-31-01

Page 527

Dec 31/99



OLYMPUS 593



MK.610-14-28  
OVERHAUL

snecma

7. Deleted.

8. Transfer the LP Case to the Sub-assembly Final Build

A. Prepare the Case.

- (1) Ensure all flange attachment items have been correctly assembled and bolts torque-tightened.
- (2) Check that stages 1 to 5 (inclusive) labyrinth rings/fixing rings have been placed in the appropriate part of the container.
- (3) Check that the LP case is clean, then transfer the case and labyrinth rings/fixing rings with any loose items to the LP Compressor Assembly (Ref.72-31-00 Assembly).

Printed in England

SUB-ASSEMBLY

**72-31-01**

Page 528

Dec 31/99



OLYMPUS 593

MK.610-14-28  
OVERHAUL



LP COMPRESSOR EXIT GUIDE CASE AND VANES - SUB-ASSEMBLY

TABLE OF CONTENTS

Para.	Page
1. General ... ..	501
2. Assemble the Exit Guide Vanes and Retaining Rings to the Exit Guide Cases ... ..	501
A. Prepare the Top and Bottom Exit Guide Cases ...	501
B. Assemble the Exit Guide Vanes to the Top Half Case ... ..	502
C. Assemble the Exit Guide Vanes to the Bottom Half Case ... ..	502
D. Bolt the Half Cases Together and Assemble the Retaining Rings to the Vanes ... ..	504
E. Torque-tighten Bolts and Blanking Plugs ... ..	505
F. Separate the Top and Bottom Exit Guide Vane Cases ... ..	505

TABLE OF ILLUSTRATIONS

Fig.No.	Page
501	Assembling the Vanes to the Exit Guide Cases ... 503

PRINTED IN ENGLAND

TN44994



OLYMPUS 593

MK.610-14-28

OVERHAUL



LP COMPRESSOR EXIT GUIDE CASE AND VANES - SUB-ASSEMBLY

1. General

- A. Prior to commencing the assembly, refer to 72-09-00 Assembly for general information.
- B. During the sub-assembly procedure, reference will be made to the Illustrated Parts Catalogue (I.P.C.) to identify those items where the nomenclature does not positively identify them, due to duplication of the titles e.g. nuts, bolts, sleeves, blades etc. The item will be identified e.g. bolt (1-10), the 1 referring to the I.P.C. Fig.No., and the 10 referring to the Item No.
- C. The LP exit guide cases take up their position between the LP compressor case rear flange and the intermediate case front flange. The retaining rings assembled to the exit guide vane inner platforms, and retained to the vanes by 54 bolts, slide into corresponding sealing rings assembled to the LP compressor bearing housing assembly when the two half cases are assembled between the LP compressor/intermediate case on final engine build.
- D. The exit guide cases are manufactured as a matched pair and though the top and bottom cases have different part numbers, the cases carry the unit number and a matching symbol (which is usually the engine number). As the cases are matched, it is not recommended that either half case be interchanged with other cases in the event of defects.

2. Assemble the Exit Guide Vanes and Retaining Rings to the Exit Guide Cases (Ref.Fig.501)

- A. Prepare the Top and Bottom Exit Guide Cases.

NOTE: Before commencing work, refer to S.B.72-37 and S.B.72-110.

- (1) Check that the top and bottom exit guide cases are a matched pair.

NOTE: The front of the exit guide cases can be easily recognized by the vane groove position, the groove is machined nearer the rear flange.

- (2) Place the two cases (1-150) on a clean worktop, front flange uppermost. Apply lubricant 'A' to the grooves in the two half cases.

SUB-ASSEMBLY

**72-31-02**

Page 501

Mar 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



B. Assemble the Exit Guide Vanes to the Top Half Case.

NOTE: The exit guide vanes will be assembled to the top and bottom half cases with the convex curve of the vanes uppermost (facing towards the case front flange).

NOTE: Ensure that any repaired vanes are evenly distributed around the case and that the aggregate depth of blending does not exceed 0.200 in. (5,08 mm) (Ref.72-31-02 Repair No.1).

- (1) Insert 23 vanes (1-120) into the lubricated grooves of the top half exit guide case. Position the vanes in the case so that the bolt holes and probe holes at each end of the case are left uncovered.
- (2) Assemble two probe vanes (1-110) to the top half case ensuring that the holes in the vanes align the two large probe holes in the case, then assemble a bolted vane (1-100) so that it abuts the probe vane and does not protrude beyond the axial flange. Insert a bolted vane (1-90) in the other end of the case. Check that the two probe holes and the four bolt holes correlate with their respective vanes.
- (3) Apply lubricant 'B' to two blanking plugs (1-130) then assemble a washer (1-140) to each plug, screw the plugs into the probe holes in the top half case.
- (4) Assemble four sleeves (1-80) to four bolts (1-70), apply lubricant 'B' to the bolt threads then assemble the bolts to the two bolted vanes at either end of the case. Do not tighten at this stage.

C. Assemble the Exit Guide Vanes to the Bottom Half Case.

- (1) Insert 23 vanes (1-120) into the lubricated grooves of the bottom half exit guide case. Position the vanes in the case so that the bolt holes and probe holes at each end of the case are left uncovered.
- (2) Assemble two probe vanes (1-110) to the case ensuring that the holes in the vanes align the two large probe holes in the case, then assemble a bolted vane (1-100) to abut the probe vane. Check that the vane platform does not protrude beyond the axial joint flange. Insert a bolted vane (1-100) in the other end of the case. Check that the two probe holes and the four bolt holes in the case align their respective vanes.

TN44996

SUB-ASSEMBLY

72-31-02

Page 502

Nov 1/76



OLYMPUS 593

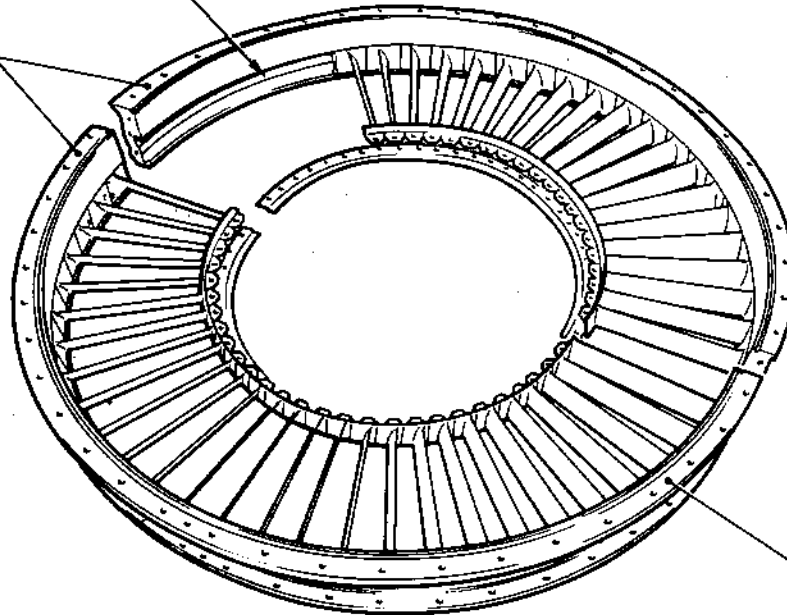
MK. 610-14-28  
OVERHAUL



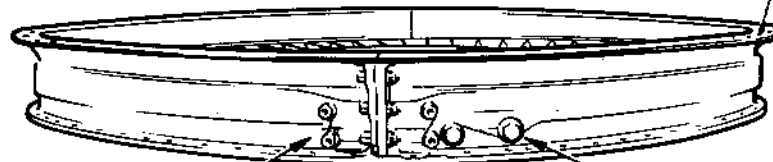
CR 32764/00A

VANES REMOVED TO SHOW GROOVE

EXIT GUIDE  
VANE CASES

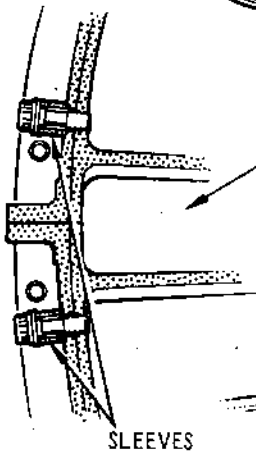


FRONT FACE



BOLTED VANES

BLANKING PLUGS  
(PROBE POSITIONS)

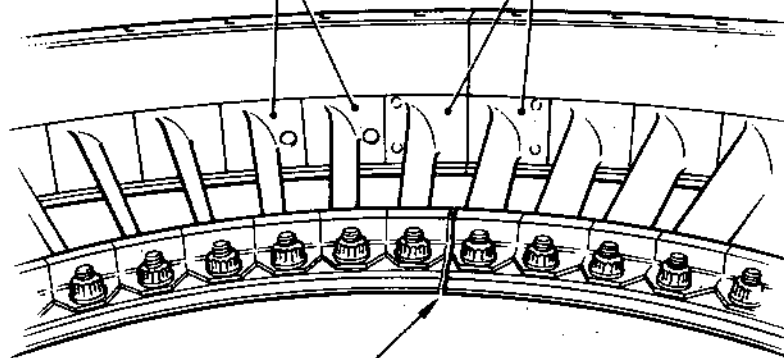


SLEEVES

PROBE VANES

BOLTED VANES

WASHERS



RETAINING RING GAP

TYPICAL SECTION  
THROUGH  
RETAINING RING  
AND VANE

Assembling the Vanes to the Exit Guide Cases  
Figure 501

SUB-ASSEMBLY  
**72-31-02**

Page 503  
Aug 1/75





OLYMPUS 593

MK.610-14-28

OVERHAUL



D. Bolt the Half Cases Together and Assemble the Retaining Rings to the Vanes.

- (1) Clean the four axial joint flanges of the two exit guide cases, ensure that both cases are positioned front flange uppermost, then bring the two cases together to abut the axial joint flange.
- (2) Apply lubricant B to six bolts (1-20) then assemble three bolts to the left-hand axial flange and three bolts to the right-hand axial flange. Assemble six slave nuts to the bolts, then tighten them sufficiently to produce a reasonable nip on the flanges.

NOTE: The top and bottom exit guide cases are temporarily bolted together for two specific reasons.

- (a) To facilitate the correct assembly of the two retaining rings and produce a clearance at their axial positions, this is influenced by the bolted vanes when they are finally secured.
  - (b) To obviate the possibility of bolted vane platform protrusion at the axial joint.
- (3) Position a retaining ring (1-60) on the underside of the vanes (top half case) so that the end holes in the retaining ring align the holes in the two bolted vanes. Ensure that the 'L' shaped section of the retaining ring is positioned rearward of the vane inner platform, looking rearwards. Secure the ring with two bolts (1-50) and nuts (1-40) lubricated with lubricant 'B'. Do not tighten at this stage.

NOTE: The flats on the special D-headed bolts are to face inwards (towards the centre) and the bolt heads to face the rear.

- - 
  - 
  - (4) Assemble bolts and nuts lubricated with lubricant 'B' to the remaining 25 positions in the top half retaining ring, nip the nuts but do not tighten at this stage.
- (5) Position a retaining ring (1-60) on the underside of the vane platforms (bottom half case), align the two end holes of the ring with those of the two end bolted vanes, temporarily secure the ring with two bolts (1-50) and two nuts (1-40) lubricated with lubricant 'B'.

TN44997

SUB-ASSEMBLY

**72-31-02**

Page 504  
Aug 1/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (6) Assemble bolts (1-50) and nuts (1-40) lubricated with lubricant 'B' to the remaining 25 positions in the bottom half retaining ring, nip the nuts but do not tighten at this stage.
- (7) Apply lubricant 'B' to the threads of two blanking plugs (1-130) assemble two washers (1-140) to the plugs, then screw the plugs into the provisioned tappings in the bottom half exit guide case.
- (8) Assemble four sleeves (1-80) to four bolts (1-70), apply lubricant 'B' to the bolt threads then assemble the bolts to the two bolted vanes at either end of the bottom half case.
- (9) With the bolted vane retaining bolts loosely assembled, adjust the four bolted vanes to effect a clearance of equal amount between the end faces of the top and bottom retaining rings. When the clearance is obtained tighten the eight bolted vane retaining bolts.

E. Torque-tighten Bolts and Blanking Plugs.

- (1) Torque-tighten the eight bolted vane retaining bolts (1-70) between 160 and 180 lbf in. (18,1 and 20,3 N.m). Wire-lock the bolts to each other.
- (2) Torque-tighten the four blanking plugs (1-130) between 160 and 180 lbf in. (18,1 and 20,3 N.m). Wire-lock the plugs to each other.
- (3) Torque-tighten the 54 retaining ring/vane securing bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m) ensuring that they have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).

F. Separate the Top and Bottom Exit Guide Vane Cases.

- (1) Unscrew and remove the nuts retaining the six temporarily assembled axial bolts (1-20), remove the bolts and place in a container. Separate the two half cases, tie an identification label to the cases, then place on a pallet. Place a protective disk over the exit guide vanes then transfer the cases to the engine final build area.

PRINTED IN ENGLAND

TN44998

SUB-ASSEMBLY

72-31-02

Page 505

May 1/79



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



LP COMPRESSOR ROTOR - SUB-ASSEMBLY

TABLE OF CONTENTS

Para.	Page
1. General	501
2. Mass Moment Weigh the Stages 1 to 3 of the LP Compressor Rotor Blades	502
A. Prepare the Balancing Machine (Schenk ZE.40) for Mass Moment Weigh of Rotor Blades	502
B. Calibrate the Machine	505
C. Carry Out Mass Moment Weigh of Rotor Blades	506
3. Mass Moment Weigh the Stages 4 to 7 of the LP Compressor Rotor Blades	506
A. Prepare the (Avery 62N5) Scales for Mass Moment Weigh of Rotor Blades	506
B. Carry Out Mass Moment Weigh of Rotor Blades	508
4. Datum Alignment Check of Rotor Disks and Spacer Rings.	509
A. Check Original and New Rotor Disks and Spacer Rings	509
5. Check Balance of Balancing Mandrels used for Horizontal Balance	509
A. General	509
B. Prepare the Balancing Machine	511
C. Assemble a Balancing Mandrel to the Balancing Machine	515
D. Balance the Balancing Mandrel	515
E. Remove the Balance Mandrel from the Balancing Machine	517
6. Balance the Stage 1 Rotor	518
A. Assemble the Blades to Stage 1 Disk	518
B. Assemble the Stage 1 Bladed Disk to the Balancing Machine	524
C. Balance the Stage 1 Bladed Disk	527
D. Remove the Bladed Disk from the Balancing Machine and Number the Blades	528
E. Remove the Bladed Disk from the Balancing Mandrel.	531
F. Check the Stage 1 Blade Tang Clearances	532
7. Balance the Stage 2 Rotor and Stage 1-2 Spacer Ring	533
A. Assemble the Stage 1-2 Spacer Ring to the Stage 2 Disk	533
B. Assemble the Stage 2 Disk/Spacer Ring to the Balancing Mandrel	535
C. Assemble the Blades to Stage 2 Disk	537
D. Assemble the Stage 2 Bladed Disk/Spacer Ring to the Balancing Machine	539
E. Balance the Stage 2 Bladed Disk/Spacer Ring	540
F. Remove the Bladed Disk/Spacer Ring from the Balancing Machine and Number the Blades	541

SUB-ASSEMBLY

**72-31-03**

Contents 1

Dec 1/76

PRINTED IN ENGLAND

TN18550



OLYMPUS 593

MK.610-14-28

OVERHAUL



Para.	Page
G. Remove the Stage 1-2 Spacer Ring from the Stage 2 Disk ... ..	543
H. Check the Stage 2 Blade Tang Clearances ... ..	544
8. Balance the Stage 3 Rotor and Stage 2-3 Spacer Ring...	545
A. Assemble the Stage 2-3 Spacer Ring to the Stage 3 Disk ... ..	545
B. Assemble the Stage 3 Disk/Spacer Ring to the Balancing Mandrel ... ..	546
C. Assemble the Blades to Stage 3 Disk... ..	549
D. Assemble the Stage 3 Bladed Disk/Spacer Ring to the Balancing Machine ... ..	551
E. Balance the Stage 3 Bladed Disk/Spacer Ring ... ..	553
F. Remove the Bladed Disk/Spacer Ring from the Balancing Machine ... ..	554
G. Remove the Spacer Ring from the Disk and Secure the Blades... ..	557
9. Balance the Stage 4 Rotor and Stage 3-4 Spacer Ring...	562
A. Assemble the Stage 3-4 Spacer Ring to the Stage 4 Disk ... ..	562
B. Assemble the Stage 4 Disk/Spacer Ring to the Balancing Mandrel ... ..	562
C. Assemble the Blades to Stage 4 Disk... ..	563
D. Assemble the Stage 4 Bladed Disk/Spacer Ring to the Balancing Machine ... ..	563
E. Balance the Stage 4 Bladed Disk/Spacer Ring ... ..	563
F. Remove the Bladed Disk/Spacer Ring from the Balancing Machine ... ..	563
G. Remove the Spacer Ring from the Disk and Secure the Blades ... ..	565
10. Balance the Stage 5 Rotor and Stage 4-5 Spacer Ring...	565
A. Assemble the Stage 4-5 Spacer Ring to the Stage 5 Disk ... ..	565
B. Assemble the Stage 5 Disk/Spacer Ring to the Balancing Mandrel ... ..	566
C. Assemble the Blades to Stage 5 Disk... ..	568
D. Assemble the Stage 5 Bladed Disk/Spacer Ring to the Balancing Machine ... ..	568
E. Balance the Stage 5 Bladed Disk/Spacer Ring ... ..	568
F. Remove the Bladed Disk/Spacer Ring from the Balancing Machine ... ..	568
G. Remove the Spacer Ring from the Disk and Secure the Blades ... ..	569
11. Balance the Stage 6 Rotor and Stage 5-6 Spacer Ring...	569
A. Assemble the Stage 5-6 Spacer Ring to the Stage 6 Disk ... ..	570
B. Assemble the Stage 6 Disk/Spacer Ring to the Balancing Mandrel ... ..	570
C. Assemble the Blades to Stage 6 Disk ... ..	571

SUB-ASSEMBLY

72-31-03

Contents 2

Dec 1/76

TN18551



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



Para.	Page
D. Assemble the Stage 6 Bladed Disk/Spacer Ring to the Balancing Machine ... ..	571
E. Balance the Stage 6 Bladed Disk/Spacer Ring ...	571
F. Remove the Bladed Disk/Spacer Ring from the Balancing Machine ... ..	571
G. Remove the Spacer Ring from the Disk and Secure the Blades ... ..	572
12. Balance the Stage 7 Rotor and Stage 6-7 Spacer Ring...	572
A. Assemble the Stage 6-7 Spacer Ring to the Stage 7 Disk ... ..	572
B. Assemble the Stage 7 Disk/Spacer Ring to the Balancing Mandrel ... ..	573
C. Assemble the Blades to Stage 7 Disk... ..	573
D. Assemble the Stage 7 Bladed Disk/Spacer Ring to the Balancing Machine ... ..	574
E. Balance the Stage 7 Bladed Disk/Spacer Ring ...	574
F. Remove the Bladed Disk/Spacer Ring from the Balancing Machine ... ..	574
G. Remove the Spacer Ring from the Disk and Secure the Blades ... ..	575
13. Balance the Stage 1 Rotor ... ..	575
A. Assemble the Blades to Stage 1 Disk... ..	575
B. Assemble the Stage 1 Bladed Disk/Adapter to the Balancing Machine ... ..	580
C. Balance the Stage 1 Bladed Disk ... ..	580
D. Remove the Bladed Disk/Adapter from the Balancing Machine and Number the Blades ... ..	582
E. Remove the Bladed Disk from the Balancing Adapter. ...	583
F. Check the Stage 1 Blade Tang Clearance ... ..	584
14. Balance the Stage 2 Rotor and Stage 1-2 Spacer Ring...	585
A. Assemble the Stage 1-2 Spacer Ring to the Stage 2 Disk... ..	585
B. Assemble the Blades to Stage 2 Disk... ..	586
C. Assemble the Balancing Adapter and Hub to the Balancing Machine ... ..	587
D. Assemble the Bladed Disk/Spacer Ring to the Balancing Machine ... ..	587
E. Balance the Stage 2 Bladed Disk/Spacer Ring ...	589
F. Remove the Bladed Disk/Spacer Ring from the Balancing Machine ... ..	592
G. Remove the Spacer Ring from the Disk and Number the Blades... ..	592
H. Check the Stage 2 Blade Tang Clearance ... ..	593
15. Balance the Stage 3 Rotor and Stage 2-3 Spacer Ring...	594
A. Assemble the Stage 2-3 Spacer Ring to the Stage 3 Disk... ..	594
B. Assemble the Blades to Stage 3 Disk... ..	595

SUB-ASSEMBLY

## 72-31-03

Contents 3

Dec 1/76

PRINTED IN ENGLAND

TN18552



# OLYMPUS 593

MK.610-14-28

OVERHAUL



Para.	Page
C. Assemble the Balancing Adapter to the Balancing Machine ...	596
D. Assemble the Bladed Disk/Spacer Ring to the Balancing Machine ...	596
E. Balance the Stage 3 Bladed Disk/Spacer Ring ...	598
F. Remove the Bladed Disk/Spacer Ring from the Balancing Machine ...	598.2
G. Remove the Stage 2-3 Spacer Ring from the Stage 4 Disk, Number and Secure the Blades... ..	598.3
16. Balance the Stage 4 Rotor and Stage 3-4 Spacer Ring...	598.4
A. Assemble the Stage 3-4 Spacer Ring to the Stage 4 Disk... ..	598.4
B. Assemble the Blades to Stage 4 Disk... ..	598.6
C. Assemble the Balancing Adapter and Hub to the Balancing Machine ... ..	598.7
D. Assemble the Bladed Disk/Spacer Ring to the Balancing Machine ... ..	598.9
E. Balance the Stage 4 Bladed Disk/Spacer Ring ...	598.10
F. Remove the Bladed Disk/Spacer Ring from the Balancing Machine ... ..	598.10
G. Remove the Stage 3-4 Spacer Ring from the Stage 4 Disk, Number and Secure the Blades... ..	598.12
17. Balance the Stage 5 Rotor and Stage 4-5 Spacer Ring...	598.13
A. Assemble the Stage 4-5 Spacer Ring to the Stage 5 Disk... ..	598.13
B. Assemble the Blades to Stage 5 Disk... ..	598.15
C. Assemble the Balancing Adapter and Hub to the Balancing Machine ... ..	598.15
D. Assemble the Bladed Disk/Spacer Ring to the Balancing Machine ... ..	598.15
E. Balance the Stage 5 Bladed Disk/Spacer Ring ...	598.16
F. Remove the Bladed Disk/Spacer Ring from the Balancing Machine ... ..	598.16
G. Remove the Stage 4-5 Spacer Ring from the Stage 5 Disk, Number and Secure the Blades... ..	598.16
18. Balance the Stage 6 Rotor and Stage 5-6 Spacer Ring...	598.17
A. Assemble the Stage 5-6 Spacer Ring to the Stage 6 Disk... ..	598.17
B. Assemble the Blades to Stage 6 Disk... ..	598.17
C. Assemble the Balancing Adapter and Hub to the Balancing Machine ... ..	598.17
D. Assemble the Bladed Disk/Spacer Ring to the Balancing Machine ... ..	598.18
E. Balance the Stage 6 Bladed Disk/Spacer Ring ...	598.18
F. Remove the Bladed Disk/Spacer Ring from the Balancing Machine ... ..	598.18
G. Remove the Stage 5-6 Spacer Ring from the Stage 6 Disk, Number and Secure the Blades... ..	598.18

SUB-ASSEMBLY

## 72-31-03

Contents 4

Dec 1/76

TN44234



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



Para.		Page
19.	Balance the Stage 7 Rotor and Stage 6-7 Spacer Ring...	598.18
A.	Assemble the Stage 6-7 Spacer Ring to the Stage 7 Disk...	598.20
B.	Assemble the Blades to Stage 7 Disk...	598.20
C.	Assemble the Balancing Adapter to the Balancing Machine	598.20
D.	Assemble the Bladed Disk/Spacer Ring to the Balancing Machine	598.20
E.	Balance the Stage 7 Bladed Disk/Spacer Ring	598.20
F.	Remove the Bladed Disk/Spacer Ring from the Balancing Machine	598.21
G.	Remove the Stage 6-7 Spacer Ring from the Stage 7 Disk, Number and Secure the Blades...	598.21
20.	Assemble the Spherical Mounting and Sleeve Housing to the Rotor Shaft Rear	598.21
A.	Prepare the Rotor Shaft Rear	598.21
B.	Assemble Items to the Rotor Shaft Rear	598.22

## TABLE OF ILLUSTRATIONS

Fig.No.		Page
501	Mass Moment Weighing Stage 1 to 3 Rotor Blades	503
502	Mass Moment Weighing Stage 4 to 7 Rotor Blades	507
503	Identification of Datum Holes, Blade Slots and Numbering	510
504	Preparing Balancing Machines	512
505	Setting the Adjustable Bearing	514
506	Assembling Balancing Mandrel to Balancing Machine.	516
507	Assembling Balancing Mandrel to Mounting Plate	519
508	Assembling Stage 1 Disk to Balancing Mandrel	521
509	Assembling Blades to Stage 1 Disk	523
510	Assembling Bladed Disk/Mandrel to Mobile Stand	526
511	Removing Bladed Disk from Balancing Mandrel	530
512	Assembling Stage 2 Disk/Stage 1-2 Spacer Ring to Balancing Mandrel	534
513	Assembling Blades to Stage 2 Disk	536
514	Assembling Stage 3 Disk/Stage 2-3 Spacer Ring to Balancing Mandrel	548
515	Assembling Blades/Keys to Stage 3 Disk	550
516	Assembling Stage 3 Bladed Disk to Slave Mandrel...	561
517	Assembling Lifting Equipment to Stage 3-4 Spacer Ring...	564
518	Assembling Multiple Leg Sling to Stage 4-5 Spacer Ring...	567
519	Assembling Lifting Fixture to Stage 1 Disk	576
520	Assembling Blades to Stage 1 Disk	577

SUB-ASSEMBLY

# 72-31-03

Contents 5  
Dec 1/76

PRINTED IN ENGLAND

TN25561

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

## Fig.No.

## Page

521	Assembly of Adapter/Disk to the Balancing Machine ... ..	581
522	Assembly of Lifting Fixture to Stage 2 Disk/Stage 1-2 Spacer Ring ... ..	588
523	Assembly of Adapter, Stage 2 Disk and Spacer Ring to the Balancing Machine ... ..	590
524	Assembling Lifting Fixture to Stage 3 Disk/Stage 2-3 Spacer Ring ... ..	597
525	Assembly of Adapter, Stage 3 Disk and Spacer Ring to the Balancing Machine ... ..	598.1
526	Securing Blades to Stage 3 Disk ... ..	598.5
527	Assembly of Balancing Adapter to Balancing Machine ... ..	598.8
528	Assembly of Lifting Fixture to Stage 3-4 Spacer Ring... ..	598.11
529	Assembling Multiple Leg Sling to Stage 4-5 Spacer Ring... ..	598.14
530	Assembling Items to LP Rotor Shaft Rear ... ..	598.19

LIST OF TABLES

## Table No.

## Page

501	Tooling for Blade Weighing Stages 1 to 3 ... ..	502
502	Disk Balancing Mandrels... ..	511
503	Balancing Machines and Tooling for Stages of Bladed Disks ... ..	511

TN25562

SUB-ASSEMBLY  
**72-31-03**  
Contents 6  
Dec 1/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



LP COMPRESSOR ROTOR - SUB-ASSEMBLY

1. General

- A. Prior to commencing the balancing, refer to 72-09-00 Assembly for general information on assembly.
- B. Two methods of balancing are described within this chapter, paras 6 to 12 detail the procedure necessary for horizontal balancing using Avery equipment (72N 17) and paras 13 to 19 detail the procedure necessary for vertical balance using Schenck equipment (ZE.40).
- C. During the balancing procedures, reference will be made to the Illustrated Parts Catalogue (I.P.C.) to identify those items where the nomenclature does not positively identify them, due to the duplication of the titles e.g. blades, disks, spacer rings etc. When an item is part of the breakdown of the text concerned, the item will be identified e.g. as blade (1-180), the 1 referring to the I.P.C. Fig. No., and the 180 referring to the Item No. Where items from a different breakdown are introduced, the breakdown numbers will be quoted in addition e.g. blade (72-33-00/1-180).
- D. Throughout the text special tools are quoted by their Ref. No. e.g. (Tool 1234). For a complete list of tooling required for the mass moment weighing of blades, horizontal and vertical balancing procedures, and for the Manufacturers Part No., refer to Special Tools, Fixtures and Equipment Table 1002, 1003 and 1004 respectively.
- E. This chapter details the work necessary to static balance the individual stages of the rotor to a degree of balance, that will enable the complete LP rotor assembly to be dynamically balanced within the required limits.
- F. All stages of the disks are balanced with the blades assembled, and except for stage 1, the spacer rings are assembled for balancing. The spacer rings are allied to the disk attached to their rear face i.e. stage 1-2 spacer ring to stage 2 disk, stage 2-3 spacer ring to stage 3 disk etc.
- G. The balance of all stages of disks is achieved by the interchange of blades, but in addition, balancing washers can be used on stages 1 to 3 because of the size/weight of the blades. Depending on the condition of the blades, mass moment weighing of the blades may be required.

SUB-ASSEMBLY

**72-31-03**

Page 501  
Mar 1/76

OLYMPUS 593 MK 610-14-28 OVERHAUL  
MANUAL

H. On completion of the balancing, all spacer rings will have been removed from their respective disks, adhesive labels and adhesive residue removed, with a suitable solvent, from the blades. All stages of disks will have their blades assembled, though stages 1 and 2 will not be locked in position. When the balancing is completed the disks/blades and spacer rings must be despatched to the LP compressor assembly (72-31-00 Assembly) for inclusion in the assembly.

2. Mass Moment Weigh the stages 1 to 3 of the LP Compressor Rotor Blades

NOTE: The following procedure need not be carried out on the blades of any stage if all the original blades are undamaged and are to be assembled to the original disk of stage 1 or the original disk/spacer assembly of stages 2 and 3.

BEOL NOTE: To avoid re-etching, note on a blade card the original position number (as etched on the blade root) against the position assembled to in the disc after balancing. This will enable the reassembly of the blades to their correct positions should they come out of the disc after balancing. Applicable to L.P. stage 1-7 rotor assemblies.

A. Prepare the Balancing Machine (Schenck ZE.40) for Mass Moment Weigh of Rotor Blades.

- (1) Assemble the moment weighing adapter for the stage of blades to be weighed (Ref. Table 501) to the drive shaft of the machine (Ref. Fig. 501).

STAGE OF BLADE	1	2	3
MOMENT WEIGHING ADAPTER TOOL NO.	12	13	14
BALANCING MACHINE ADAPTER	1863	1863	1863
COUNTERBALANCE WEIGHT TOOL NO.	24	25	26

Tooling for Blade Weighing Stages 1 to 3  
Table 501



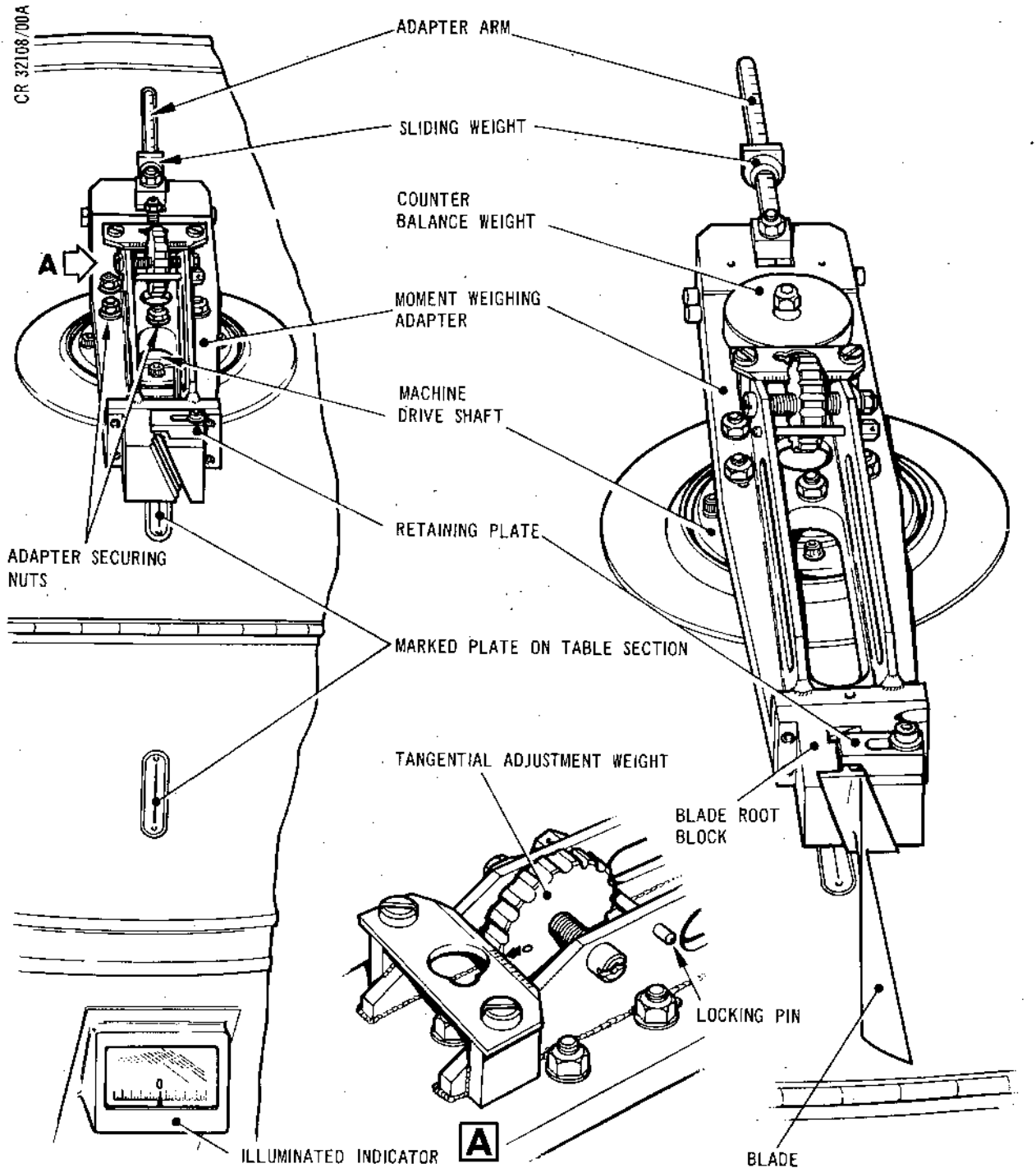
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

TN12545



ATTACHMENT OF ADAPTER TO MACHINE

ATTACHMENT OF BLADE TO ADAPTER

Mass Moment Weighing Stage 1 to 3 Rotor Blades  
Figure 501

SUB-ASSEMBLY  
**72-31-03**

Page 503  
Dec 1/75

OLYMPUS 593 MK 610-14-28 OVERHAUL MANUAL

BLADE CONDITION	MASS MOMENT WEIGHING NOT REQUIRED	MASS MOMENT WEIGHT SALVAGED AND NEW BLADES	MASS MOMENT WEIGHT ALL ORIGINAL AND NEW BLADES
-----------------	---	--	---

BEOL NOTE: To avoid re-etching, note on a blade card the original position number (as etched on the blade root) against the position assembled to in the disc after balancing. This will enable the reassembly of the blades to their correct positions should they come out of the disc after balancing. Applicable to L.P. Stage 1-7 rotor assemblies.

All original undamaged blades Assemble blades to original positions

All original blades with up to salvaged blades Assemble blades to original positions

All original blades with between and up to % of blades salvaged If salvaged blades are in arc of 180 deg, lay-out and reposition all blades as for new blades. If salvage blades are throughout 360 deg, match salvage blades in mass moment weight with blades diametrically opposite

Original undamaged blades with up to new blades If new blades can be matched successfully in mass moment weight with blades diametrically opposite, original blades may stay in original positions. If new blades cannot be matched in mass moment weight, layout and position all blades as for new blades

Original blades (any number) with salvaged blades (up to %) and new blades any number)	Layout and reposition all blades as for new blades
--	--

Mass Moment Weighing, Positioning of Blades and Balancing  
of Bladed Disks  
Table 502

SUB-ASSEMBLY  
72-31-03

BA Page 504  
30 August 1976

OLYMPUS 593 MK 610-14-28 OVERHAUL MANUAL

BLADE CONDITION	MASS MOMENT	MASS MOMENT	MASS MOMENT
	WEIGHING NOT REQUIRED	WEIGHT SALVAGED AND NEW BLADES	WEIGHT ALL ORIGINAL AND NEW BLADES
	Static balancing of blade disk not required	Static balancing of blade disk required	Static bal- ancing of blade disk required

Mass Moment Weighing, Positioning of Blades and Balancing  
of Bladed Disks

Table 502

SUB-ASSEMBLY  
72-31-03

BA Page 504A

30 August 1976



OLYMPUS 593

MK.610-14-28  
OVERHAUL



B. Calibrate the Machine.

- (1) Assemble to the blade root block of the adapter a blade of the stage to be weighed, and secure it with the retaining plate and bolt.
- (2) Assemble to the pillar of the adapter the counter-balance weight applicable to the stage of blades to be weighed, and secure the weight with a nut.
- (3) Balance out the tangential component of the mass moment by means of the tangential adjustment weight on the adapter, as follows:
  - (a) Unscrew and remove from the adapter the locking pin for the tangential adjustment weight.
  - (b) Correct the out-of-balance shown on the graticule, by turning the tangential adjustment weight to the left or right as required.
  - (c) On completion of the adjustment, re-insert and fully tighten the locking pin.
  - (d) Operate the machine in a counter-clockwise direction (viewed from above) to check the adjustment. If necessary, repeat the repositioning of the weight until a zero horizontal reading is obtained on the graticule.
- (4) Operate the machine and compensate electrically for the out-of-balance, by adjustment of the vertical and horizontal zeroing potentiometers to give a zero reading of the light spot.
- (5) Move the sliding weight on the adapter arm to the 2 oz in. position and use the calibration potentiometer to obtain a 2 oz in. reading.
- (6) Check the settings of the adapter arm.
  - (a) Position the adapter arm sliding weight at several other oz in. graduations in turn and operate the machine to confirm that the correct readings are shown on the graticule.

SUB-ASSEMBLY

**72-31-03**

Page 505

Dec 1/76

OLYMPUS 593 MK 610-14-28 OVERHAUL  
MANUAL

- (b) In the event of incorrect readings, check that the adapter and arm are secure and that no item is loose and affecting the readings. Check that the spring of the sliding weight is holding the weight in position. If a defect is found, rectify it, then recheck the horizontal and vertical settings and adjust as necessary. Recheck the settings of the adapter arm. If no defects are found, check the balancing machine for malfunction.

C. Carry out Mass Moment Weigh of Rotor Blades.

- (1) Assemble to the blade root block of the adapter a blade of the stage for which the machine has been calibrated, and secure the blade with the retaining plate and bolt.
- (2) Operate the machine and adjust the sliding weight of the adapter arm to give a reading on the graticule when the sensitivity step switch is at its No.1 position.
- (3) Note the oz in. reading on the graticule. Calculate the mass moment weight of the blade to the nearest oz in. by adding (or subtracting) the graticule reading to (or from) the sum of the counterbalance weight and the weight indicated by the position of the sliding weight on the adapter arm. Record the weight of the blade on an adhesive label and attach the label to the (tip) end of the blade.

3. Mass Moment Weigh the Stages 4 to 7 of the LP Compressor Rotor Blades

NOTE: The following procedure need not be carried out on the blades of any stage if all the original blades are undamaged and are to be assembled to the original disk/spacer assembly of stages 4 to 7.

BEOL NOTE: To avoid re-etching, note on a blade card the original position number (as etched on the blade root) against the position assembled to in the disc after balancing. This will enable the reassembly of the blades to their correct positions should they come out of the disc after balancing. Applicable to L.P. Stage 1-7 rotor assemblies.

A. Prepare the (Avery 62N5) Scales for Mass Moment Weigh of Rotor Blades (Ref.Fig.502).

- (1) Ensure that the scale is level.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

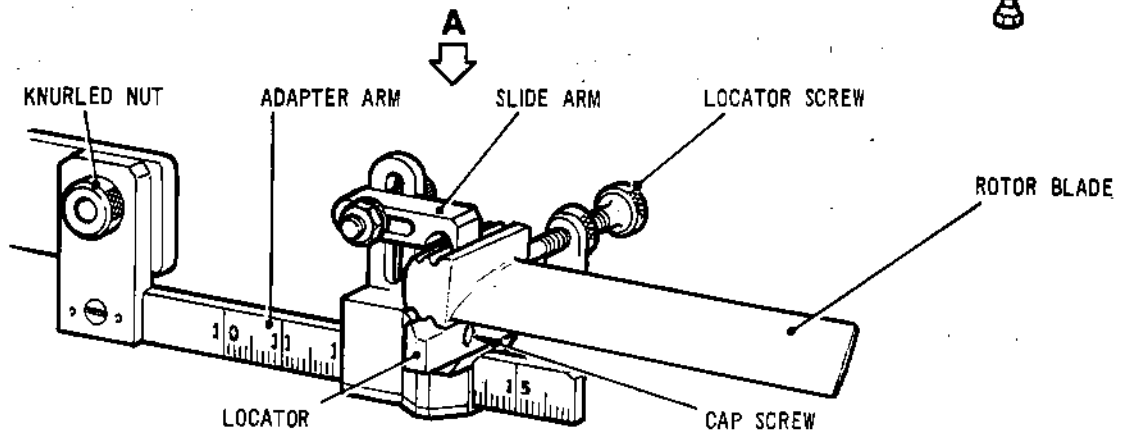
WEIGHTS IN TOP SCALE PAN  
TO BALANCE LOCATOR AND  
ADAPTER ARM

CR 32109/00A

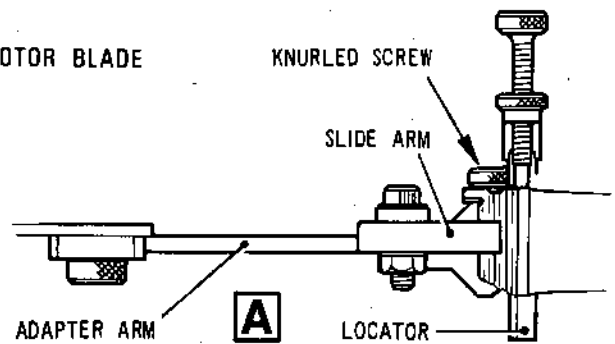
BOTTOM SCALE PAN

AVERY SCALE

SCREWED ADJUSTMENT WEIGHTS  
(LOCKED BY ABUTMENT)



ATTACHMENT AND POSITIONING OF ROTOR BLADE



Mass Moment Weighing of Stage 4 to 7 Rotor Blades  
Figure 502

SUB-ASSEMBLY  
**72-31-03**  
Page 507  
Dec 1/76

TN12546





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Position the locator (Tool 1273) on the end of the adapter arm (Tool 1272) slide, align the holes, then insert the two adapter arm cap screws into the holes in the locator and screw them into the slide.
- (3) Position the adapter arm on the right-hand end of the scale arm and secure with the knurled nut of the scale.
- (4) Release the knurled screw of the slide, position the left-hand edge of the slide at the 10 in. (254 mm) mark. All blades of each stage are to be mass moment weighed with the slide set at this position.

NOTE: Fig.502 does not illustrate the slide in its correct position.

- (5) Select a blade from the stage to be weighed, then position the blade root fir-tree on the locator and adjust on the slide arm to engage on the top of the blade root with the bottom edge of the blade parallel with the (scale) arm. Secure the slide arm, then adjust the locator screw to form a stop for the blade when it is centrally positioned over the scale arm. Secure the locator screw with its thumbnut, then remove the blade.
- (6) Balance out the weight of the adapter arm/locator so that the scale reads zero, by placing weight(s) on the (top) scale pan, and adjusting the position of the screwed balancing weights of the scale.
- (7) Select a (known) weight to counter-balance the weight of the blade and place the weight on the (bottom) scale pan.

B. Carry Out Mass Moment Weigh of Rotor Blades.

- (1) Assemble a blade (of the stage to be weighed) to the locator/arm.

TN45009



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Calculate the mass moment weight of the blade to the nearest tenth oz in. (72 grm mm) by adding the weight indicated on the scale dial to the (known) weight on the (bottom) scale pan.
- (3) Record the weight of the blade on an adhesive label, remove the blade from the locator/arm and attach the label to the (tip) end of the blade. Mass moment weigh each blade in turn in the same manner.
4. Datum Alignment Check of Rotor Disks and Spacer Rings
- A. Check Original and New Rotor Disks and Spacer Rings.
- (1) Examine the edge of each disk and ensure that the datum hole of each disk is marked, and is in correct relationship with the No.1 blade slot (Ref.Fig.503).
- (2) Examine the edge of the front and rear flange of each spacer ring, and ensure that the datum hole in each flange is correctly marked (Ref.Fig.503).
- (3) Trace through the datum holes from the stage 7 disk, stage 6-7 spacer ring, etc. to the stage 1 disk and ensure that the No.1 blades of the disks are in line.
5. Check Balance of Balancing Mandrels Used for Horizontal Balance
- A. General.
- (1) The tolerances of the manufacture of the balancing mandrels are such that concentricity checks etc. are not required on the mandrels, but each mandrel must be dynamically balanced to within 1 dram in. prior to being used as a balancing mandrel. On the first occasion, and on any subsequent occasion it is deemed necessary, the mandrels listed in Table 502 must be balanced in accordance with the following procedure.

PRINTED IN ENGLAND

TN45010

SUB-ASSEMBLY

72-31-03

Page 509

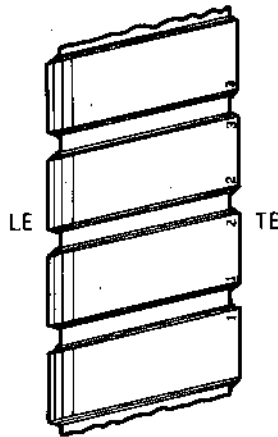
Dec 1/76



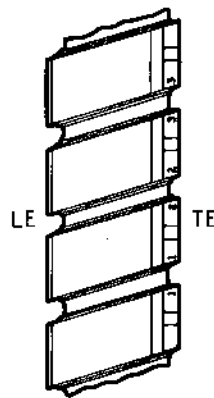
**OLYMPUS 593**  
MK.610-14-28  
OVERHAUL



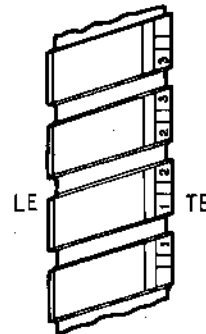
CR 32110/00B



STAGE 1 DISK



STAGE 2 DISK



**OLYMPUS 593**MK.610-14-28  
OVERHAUL

STAGE OF DISK	1	2	3	4	5	6	7
TOOL REF.NO. OF BALANCING MANDREL	1025	600	379	361	362	602	1026

Disk Balancing Mandrels  
Table 502

- (2) Due to the size/weight variation of the disks/blades/spacer rings, not all balancing machines can be used for all stages. Reference must be made to Table 503 for the balancing machine and the appropriate protection guard, slave or adjustable bearings etc. recommended for the various stages of disks.

BALANCING MACHINE	STAGE OF DISK TO BE BALANCED	CRADLE TOOL REF. NO.	DISK PROTECTION GUARD TOOL REF. NO.
Avery 72N 17	1 to 7	1154	1303
Avery 7210	3 to 7	No tooling req'd.	1500

Balancing Machines and Tooling for Stages of Bladed Disks  
Table 503**B. Prepare the Balancing Machine (Ref.Fig.504).**

- (1) Position the left or right-hand edges of the bearings in the machine cradles (approx.) 18 in. (457 mm) apart by adjusting the position of the cradles then lock the cradles.

SUB-ASSEMBLY

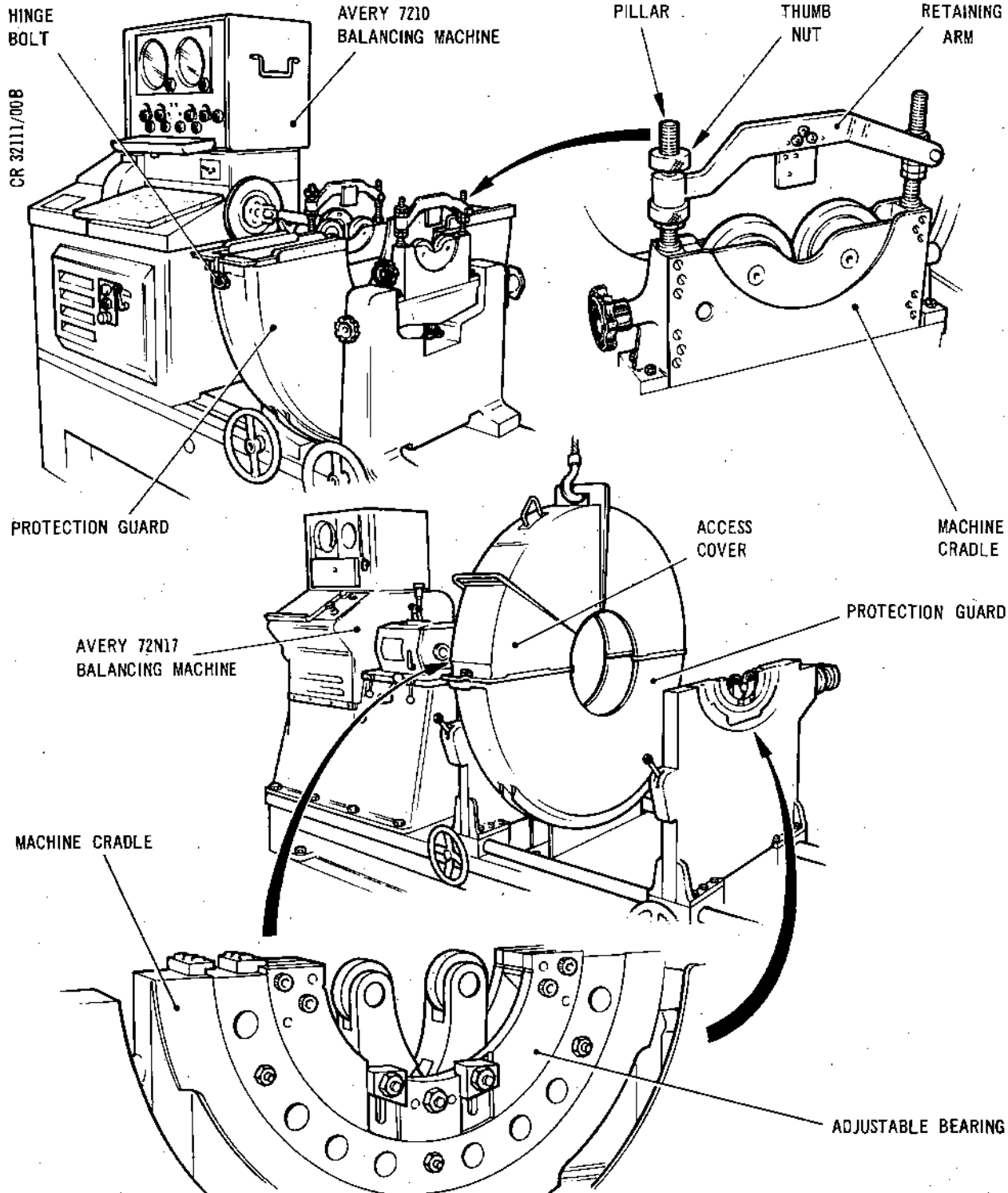
**72-31-03**

Page 511

Dec 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



Preparing Balancing Machines  
Figure 504

SUB-ASSEMBLY  
**72-31-03**  
Page 512  
Dec 1/76

7N12548



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Position the bottom half of the protection guard for the balancing machine in use (Ref. Table 503) in between the cradles so that the left-hand side of the guard is approx. 0.5 in. (12 mm) from the left-hand cradle. Secure the guard to the bed of the balancing machine.
- (3) Assemble bearings to the cradles of the Avery 72N 17 machine.
- (a) Assemble the adjustable bearings (Tool 1154) to the left-hand and right-hand cradles and secure the bearings with keep plates bolted to the cradles.
  - (b) Set the position of the adjustable bearing rollers (if necessary) using the setting gauge (Tool 1641).
    - (i) Set the setting gauge caliper to the bearing journal dia. of the balancing mandrel (Ref.Fig.505) and lock the caliper.
    - (ii) Offer the gauge to the top of the bearing block and ensure that the gauge seats correctly, if necessary, releasing the nuts securing the roller support arms.
    - (iii) Check that the roller contacts the gauge arm, or reposition the roller to contact the arm, then secure the roller support arms.
    - (iv) Reverse the setting gauge in the bearing block and check that the remaining roller contacts the gauge arm, or reposition the roller to contact the arm, then secure the roller support arms. Remove the gauge from the bearing block.

PRINTED IN ENGLAND

TN28192

SUB-ASSEMBLY

**72-31-03**

Page 513

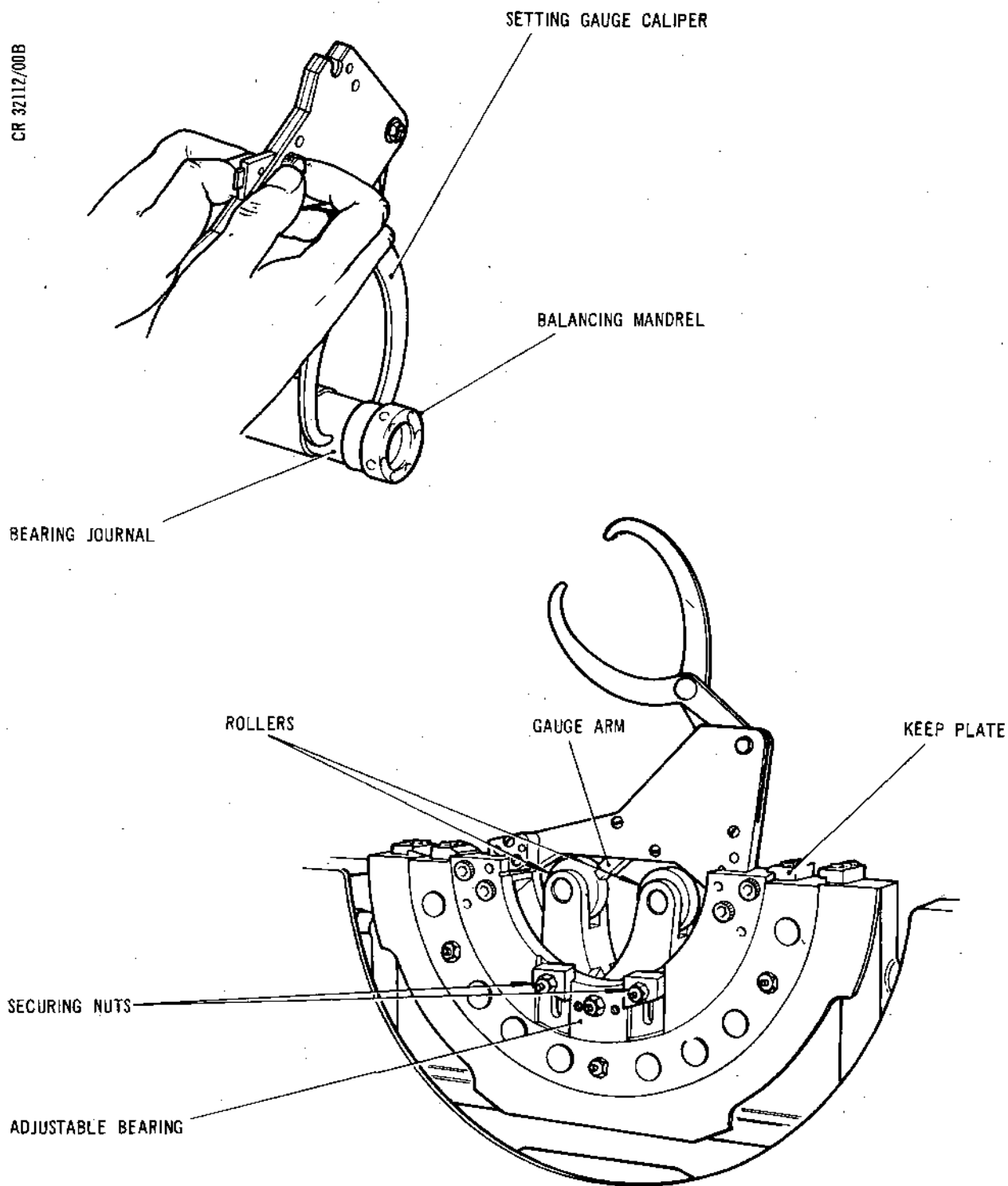
Feb 1/78



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 32112/00B



TN36628

Setting the Adjustable Bearing  
Figure 505

SUB-ASSEMBLY  
**72-31-03**  
Page 514  
Dec 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (v) Screw in on the large tommy bar and engage the plate in the shaft, then continue screwing, holding the knurled ring steady, until the spacer is released.
- (vi) Withdraw the puller and spacer from the shaft. Screw in on the small tommy bar to retract the claws, then withdraw the spacer from the puller.
- (5) Using fine emery cloth, remove the aluminium paint from the rotor shaft at the balancing positions 'A' and 'G' (Ref.Fig.508). Ensure that no paint remains on the shaft at the balancing positions.
- (6) Slide the protector (Tool 408) onto the end of the drive shaft rear, and assemble the (split) protector (Tool 999) to the drive shaft front to protect the splines and labyrinth. Secure the protector with its thumbnut.
3. Carry Out Concentricity and Balancing Checks on the LP Compressor Drive Shaft

- A. Carry Out Concentricity Checks on the Drive Shaft (Ref.Fig.508 and 509).

NOTE: Depending on the availability of equipment, the concentricity checks may be carried out on the balancing machine (prior to balancing) in lieu of the surface table and equipment.

- (1) Prepare the equipment for checking the concentricity.
- (a) Position two supports (Tool 1073) on the surface table.
- (b) Assemble a spacer (Tool 1074) to each of the supports, then assemble clamp plates to each support to secure the spacers.





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) Assemble the adjustable bearing (Tool 1154) (with the attached arm Tool 1153) to one of the spacers so that the arm is towards the other support. Assemble clamp plates to the spacer to secure the bearing.
- (d) Assemble the other adjustable bearing (Tool 1154) to the remaining spacer then assemble clamp plates to the spacer to secure the bearing.
- (e) Set the position of the adjustable bearing rollers (if necessary) using the setting gauge (Tool 1641) (Ref.Fig.506).
  - (i) Set the setting gauge caliper to the 'A' dia. of the shaft (Ref.Fig.508) and lock the caliper.
  - (ii) Offer the gauge to the top of the bearing block and ensure that the gauge seats correctly, if necessary, releasing the nuts securing the rollers support arms.
  - (iii) Check that the roller contacts the gauge arm, or reposition the roller to contact the arm, then secure the roller support arms.
  - (iv) Reverse the setting gauge in the bearing block and check that the remaining roller contacts the gauge arm, or reposition the roller to contact the arm, then secure the roller support arms. Remove the gauge from the bearing block.
  - (v) Repeat operation (i) to (iv) for diameter 'G' of the shaft.

IN7448

SUB-ASSEMBLY

**72-31-04**

Page 516

Feb 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Carry out a dynamic balancing of the mandrel, operating the balancing machine in accordance with the manufacturers instructions. The mandrel should be rotated at (approx.) 450 rpm and run for approx. 2-3 min for the temperature to stabilise. The balance of the mandrel must be within 1 dram in. If the balance of the mandrel is outside the limits, balance out the right-hand end of the mandrel by slackening the axial grub screws in the end face of the mandrel and removing and/or re-positioning the radial grub screws in the right-hand flange (Ref.Fig.506C),. Re-secure the locking screws after adjustment, balance out the left-hand end by adding plugs ( $\frac{1}{4}$  UNF 28 T.P.I.  $\frac{1}{4}$  in. long) and lockwashers to the studded plate at the left-hand end of the mandrel (Ref.Fig.506).

NOTE: If a new mandrel is seriously out of balance, it may be necessary to correct its static balance first, by grinding the bore of one or more of the lightening holes in the web of the mandrel.

E. Remove the Balance Mandrel from the Balancing Machine.

- (1) If the balancing machine in use is an Avery 7210 release the retaining arm of each cradle and pivot the arms out of the way. With both types of Avery machine release and pivot down the swing bolts securing the top half of the guard, then using a hoist, raise the guard until clear of the mandrel and lower onto a suitable surface. Remove the hoist from the guard.
- (2) Attach a hoist to the lifting fixture (Tool 1162), then position and lower the hoist over the mandrel and engage the two hooks of the fixture around the mandrel. Remove the nuts and washers securing the mandrel to the balancing machine drive. Raise the hoist and guide the mandrel out of the guard, and when possible, disengage the drive from the mandrel studs and lower the drive.

SUB-ASSEMBLY

**72-31-03**

Page 517

Dec 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Position and lower the mandrel into its storage stand, then remove the fixture from the mandrel and the hoist.

#### 6. Balance the Stage 1 Rotor

NOTE: The stage 1 blades should be received in the container (Tool 1395). Do not remove the blades until they are required for assembly.

##### A. Assemble Blades to Stage 1 Disk (Ref.Fig.507).

- (1) Ensure that a Hydraclamp (Tool 1673) is bolted to the pedestal (Tool 1674), then position the mounting plate (Tool 1163) on the Hydraclamp and secure with its slave bolts. Position the mounting plate so that its axis is horizontal, then lock the Hydraclamp.
- (2) Connect a hoist to the lifting eye of the lifting fixture (Tool 1162), then position the hoist over the static balance mandrel (Tool 1025) and assemble the mandrel to the lifting fixture.
- (3) Position the hoist alongside the mounting plate, then traverse the hoist and engage the balancing mandrel over the mounting plate shaft ensuring that the mandrel studs locate in the holes in the mounting plate. Assemble washers and nuts to the mandrel studs and fully tighten the nuts.
- (4) Position and adjust the support stand (Tool 1667) to support the end of the balancing mandrel. Disconnect the lifting fixture from the mandrel and the fixture from the hoist. Insert the retaining bolt (Tool 1184) into the end of the mandrel and when it contacts the mounting plate, screw it into the plate. Attach a hoist to the shackle of the bolt, then release the Hydraclamp and raise/traverse the hoist to bring the mandrel to the vertical position. Lock the Hydraclamp and release the hoist.
- (5) Assemble the lifting fixture (Tool 401) to the stage 1 disk (Ref.Fig.508).

NOTE: The disk (1-160) should be received in its container (Tool 1409).

TN11545



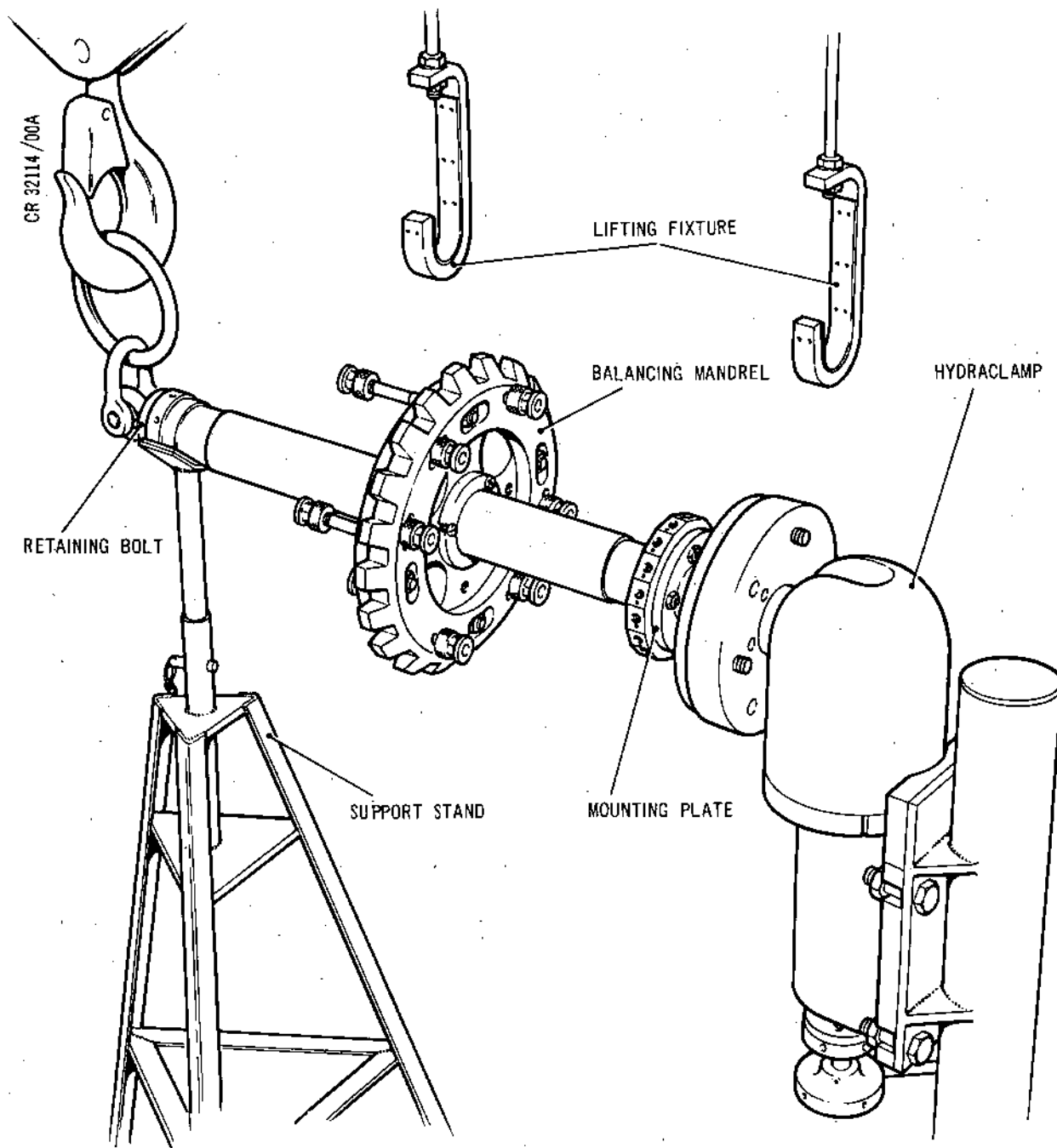
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

TN12549



Assembling Balancing Mandrel to Mounting Plate  
Figure 507

SUB-ASSEMBLY  
**72-31-03**  
Page 519  
Dec 1/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (5) Assemble the lifting fixture (Tool 401) to the stage 1 disk (Ref.Fig.508).

NOTE: The disk (1-160) should be received in its container (Tool 1409).

- (a) Attach a hoist to the lifting fixture plate of the lifting fixture, then position the hoist over the disk (1-160).
- (b) Unscrew and remove the knurled nut and clamp plate from the disk container.
- (c) Ensure that the pins of the hand knobs are located in the holes at the 'FREE' position, then lower the hoist and engage the end plate of the fixture in the disk. Withdraw the pins of the hand knobs from the 'FREE' position locating holes, turn the knobs to the 'LOCK' position engaging the lugs under the disk, and ensure that the pins locate in the locating holes.
- (6) Assemble the stage 1 disk to the balancing mandrel (Ref.Fig.508).
- (a) Raise the hoist and position the disk over the balancing mandrel.
- (b) Correctly position the disk relative to the mandrel locating/securing studs, then lower the disk over the studs, ensuring that it is lowered squarely and does not get jammed. Lightly tap with a suitable (soft-faced) mallet (if necessary). When the disk abuts the mandrel, screw the special nuts onto the studs and fully tighten the nuts.
- (c) Withdraw the pins of the hand knobs from the 'LOCK' position locating holes, turn the knobs to the 'FREE' position, and ensure that the pins locate in the locating holes. Raise the fixture from the disk and lower the fixture onto a suitable surface, then release the hoist.
- (7) Attach a hoist to the shackle of the retaining bolt, then release the Hydraclamp and lower the mandrel to the horizontal position. Position the support stand (Tool 1667) under the end of the mandrel to take the weight, then remove the hoist and unscrew and remove the retaining bolt.

IN11545

SUB-ASSEMBLY

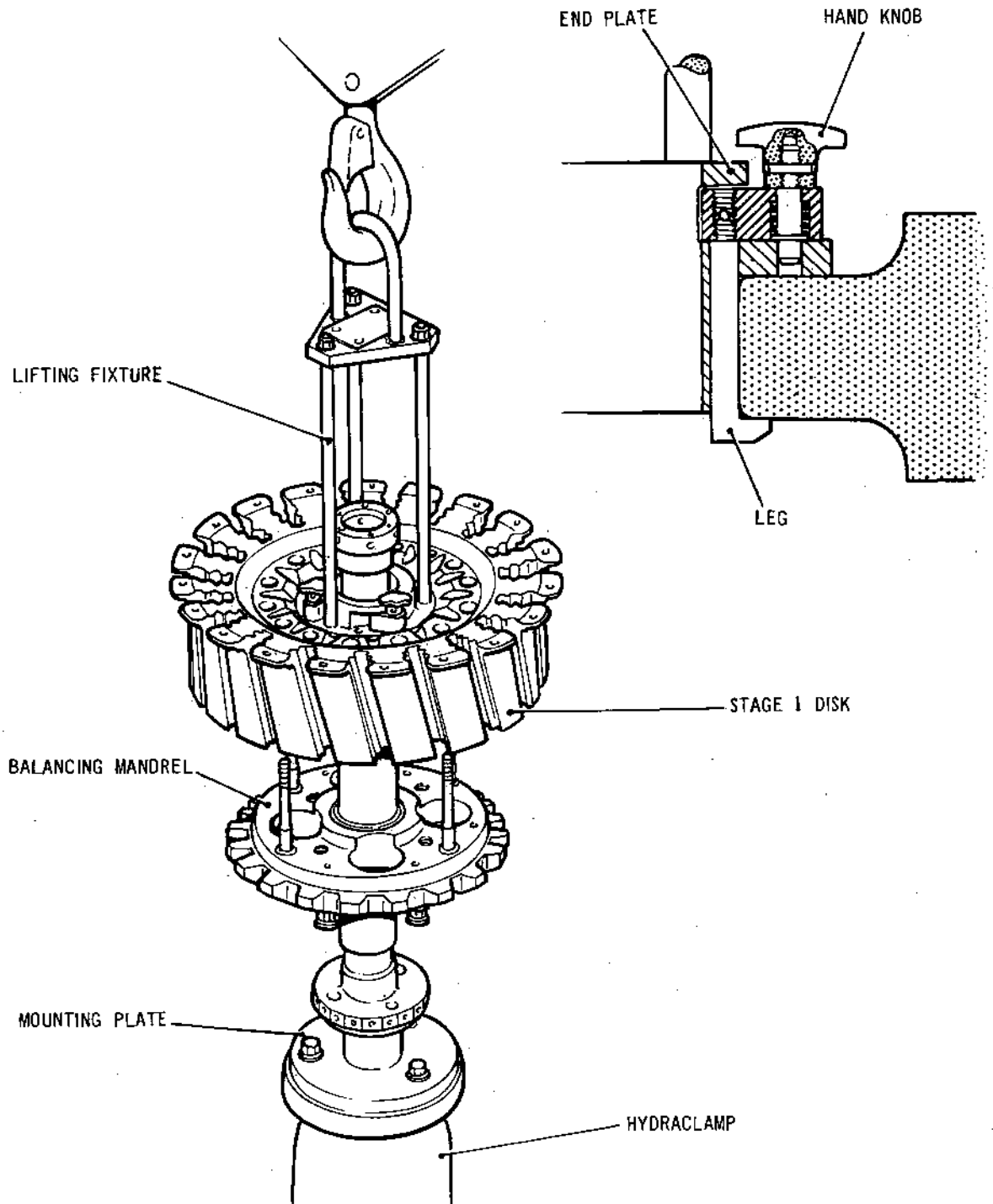
72-31-03

Page 520

Dec 1/75



**OLYMPUS 593**  
MK. 610-14-28  
OVERHAUL



Assembling Stage 1 Disk to Balancing Mandrel  
Figure 508



OLYMPUS 593

MK.610-14-28  
OVERHAUL



SNECMA

- (8) Assemble balancing weights to the stage 1 disk (Ref.Fig.509).
- (a) Apply lubricant 'B' to bolts (1-140), then insert the bolts into the outer ring of holes in the disk, and assemble a balancing weight (1-120) and nut (1-110) to each bolt. Ensure that each nut has a minimum locking (run down) torque of 3.5 lbf in. (0,4 N.m), then torque-tighten the nuts between 85 and 95 lbf in. (9,6 and 10,7 N.m).
  - (b) After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 1.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref.SB.72-8449-191).
- (9) Assemble the blades to the stage 1 disk (Ref.Fig.509).
- NOTE: Ensure the complete set of blades used are to the standard of SB.72-8787-300.
- NOTE: If all the original blades are available and undamaged then assemble the blades as detailed in para.(a). If the blades include 3 repaired and/or new blades, then the blades must be assembled as detailed in para.(b). If the blades include more than 3 repaired and/or new blades then the blades must be assembled as detailed in para.(c). Ensure that the aggregate blending depth of repaired blades does not exceed 3.600 in. (91,44 mm) (Ref. 72-31-03 Repair No.6).
- (a) Identify the stage 1 blades (1-150), then examine the blade roots for their positional No. (Ref. Fig.503) and lay the blades out in numerical sequence. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades. Ensure that the special nuts securing the mandrel retaining plate are loose, and the plate is positioned to allow the blades to be assembled. Insert the blades in numerical sequence into the rear of the disk starting at No.1 position and working in a clockwise direction when viewing the mandrel (rear) side of the disk. When the blades are assembled, turn the mandrel retaining plate to secure the blades, then tighten the plate special nuts.

SUB-ASSEMBLY

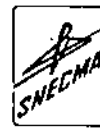
72-31-03

Page 522

Jun 30/01



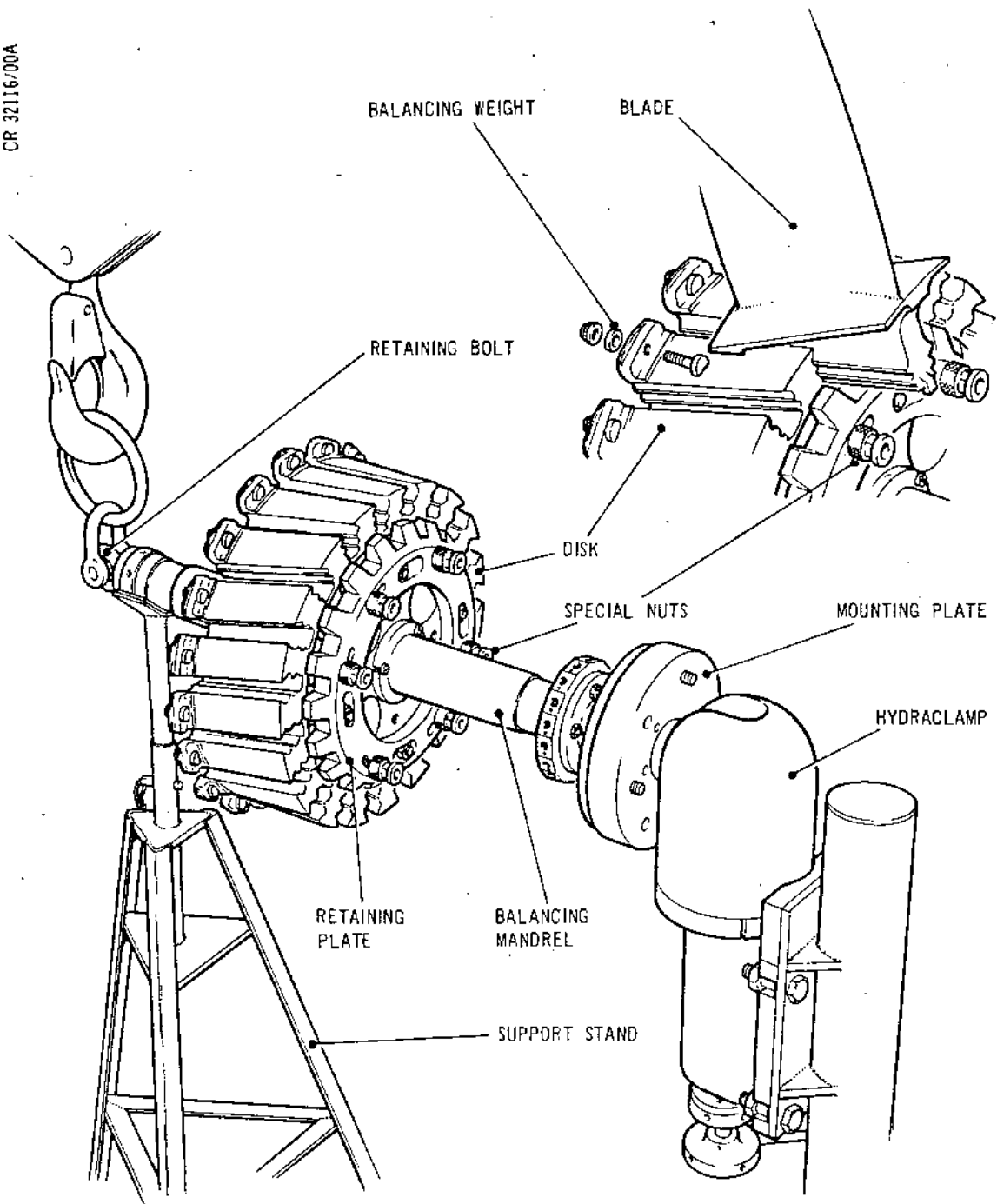
OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 32116/00A

PRINTED IN ENGLAND

TN12551



Assembling Blades to Stage 1 Disk  
Figure 509

SUB-ASSEMBLY  
**72-31-03**  
Page 523  
Dec 1/75





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Identify the stage 1 blades (1-150) then examine the roots of the original blades for their positional No. (Ref.Fig.503) and lay the blades out in numerical sequence, leaving spaces where the new blades are to be positioned. Noting the mass moment weight of the new blades, place the lightest new blades in vacant positions next to the heaviest original blades and position the heaviest new blades in vacant positions next to the lightest original blades. Assemble the blades to the disk as detailed in para.(a).
- (c) Identify the stage 1 blades (1-150), then according to the mass moment weight of the blades (quoted on the labels), lay the blades out in sequence of weight, starting with the heaviest blade at one end and ending with the lightest blade at the other end. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades (Ref.Fig.503). Ensure that the special nuts securing the mandrel retaining plate are loose, and the plate is positioned to allow the blades to be assembled. Assemble the blades to the rear of the disk positioning the heaviest blade at No.1 position and the next heaviest blade diametrically opposite, then assemble the two lightest blades diametrically opposite each other and next to the heaviest blades. Assemble the remainder of the blades to the disk in sequence of weight, assembling alternate pairs of heavy and light blades and where possible, positioning equal weight blades opposite each other. When the blades are assembled, turn the mandrel retaining plate to secure the blades, then tighten the plate special nuts.

B. Assemble the Stage 1 Bladed Disk to the Balancing Machine.

- (1) Prepare the balancing machine (Avery 72 N 17 (Ref. Fig.504)).

TN11548



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (a) Ensure that the adjustable bearings (Tool 1154) are assembled and secured with keep plates to left-hand and right-hand cradles of the balancing machine, and that the bearings are correctly set (Ref. para. 5.B. (3) (c)).
- (b) Ensure that the protection guard (Tool 1303) is bolted to the bed of the machine.
- (2) Attach a hoist to the lifting eye of the lifting fixture (Tool 1162), then position the hoist over the balance mandrel and engage the two hooks of the fixture around the mandrel.
- (3) Remove the nuts and washers securing the mandrel to the mounting plate, then remove the support stand and traverse the hoist to disengage the mandrel from the mounting plate. If the mandrel/disk cannot be assembled direct to the balancing machine, lower it into the mobile stand (Tool 1165) engaging the mandrel journals in the stand support brackets (Ref. Fig. 510). Disconnect the lifting fixture, then position the stand near the balancing machine. With the lifting fixture (Tool 1162) attached to a hoist, position the hooks of the fixture around the mandrel and raise it out of the stand.
- (4) Position the hoist over the balancing machine with the studded end of the mandrel towards the balancing machine drive. Lower the disk into the bottom half of the protection guard, then lift the balancing machine drive and engage the mandrel studs in it. Adjust the position of the cradles (if necessary) to align with the bearing journals of the mandrel, with the mandrel correctly engaged with the drive. Adjust the position of the guard (if necessary) to give running clearance for the mandrel/bladed disk, then secure the cradles and guard (if required). Lower the mandrel onto the cradles, then disengage the lifting fixture from the mandrel and the hoist.
- (5) Assemble washers and nuts to the mandrel studs and fully tighten the nuts.

SUB-ASSEMBLY

**72-31-03**

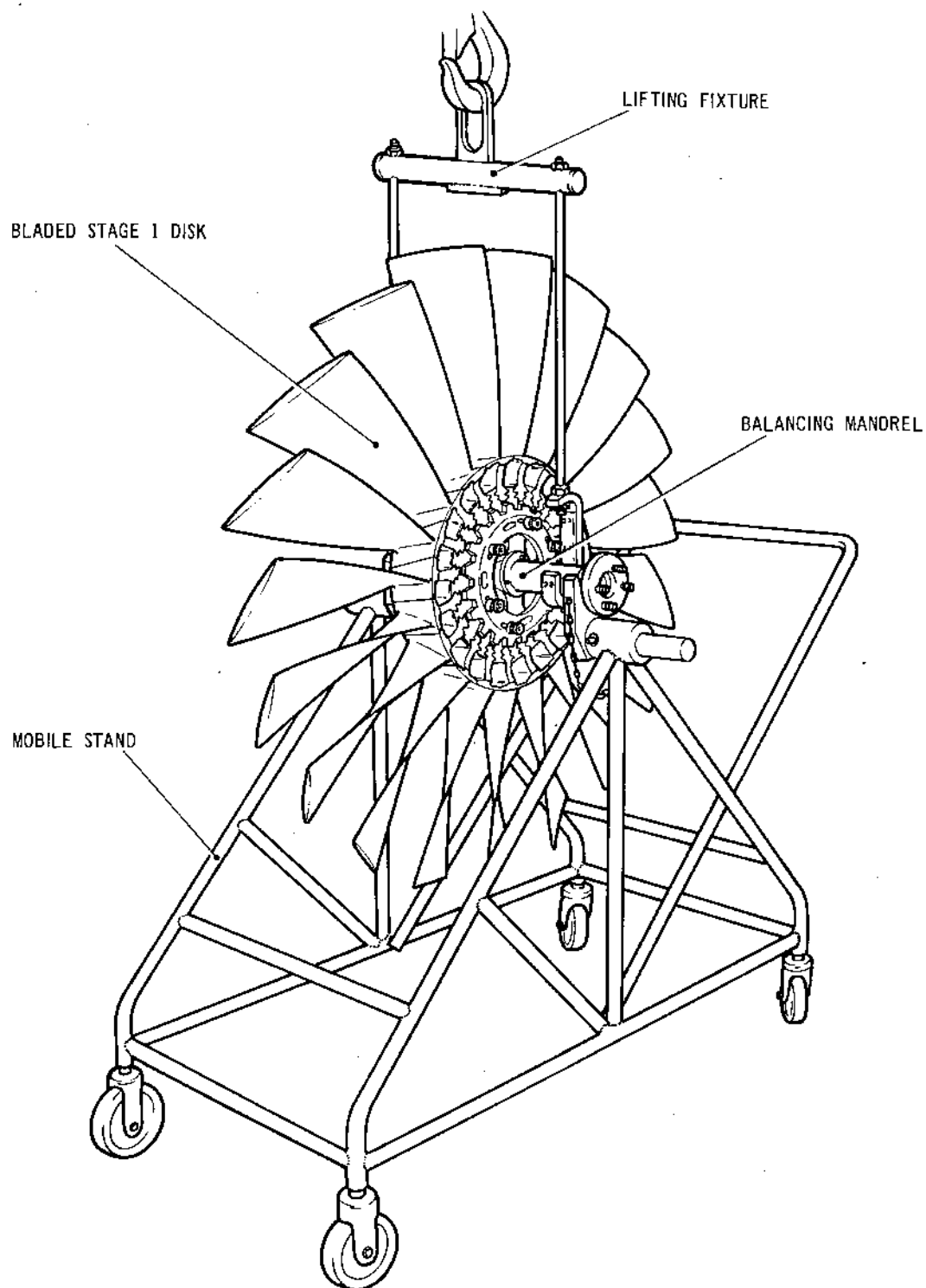
Page 525  
Dec 1/76



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 32117/00A



FN12552

Assembling Bladed Disk/Mandrel to Mobile Stand  
Figure 510

SUB-ASSEMBLY  
**72-31-03**  
Page 526  
Dec 1/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (6) Using a hoist, lower the top half of the guard onto the bottom half ensuring that the access cover of the guard is towards the balancing machine operator. Pivot the bottom guard securing bolts into the top guard and secure with the thumbnuts.

C. Balance the Stage 1 Bladed Disk.

- (1) Apply lubricant 'A' to the spindle of the adjustable bearings and the journals of the mandrel, and ensure that they remain well lubricated throughout the balancing operation.
- (2) Carry out a static balance of the bladed disk, operating the balancing machine in accordance with the manufacturers instructions. The disk should be rotated at (approx.) 450 rpm and run for (approx.) 2 to 3 minutes for the temperature to stabilise. The balance of the disk must be within 4 drmm in. (180 grm mm). If the balance of the disk is outside the limit, rectify by the interchange of heavy and light-weight blades (Ref.para.(3)), and the interchange of heavy and light-weight balancing weights (Ref.para.(4)) from the out of balance angular position, until the disk is within limits.
- (3) Gain access to the blades by either hinging open the access cover, or releasing and removing the top half of the guard using a hoist. Release the special nuts securing the mandrel retaining plate, then turn the plate to allow the removal of the blades. Withdraw a heavy blade from as near the out of balance position as possible, and exchange it for a light blade from as near diametrically opposite as possible. Turn the mandrel retaining plate to secure the blades, then tighten the special nuts to lock the plate. Hinge close the guard access cover, or replace and secure the top of the guard.

NOTE: If the blades are the original and labels stating the mass moment weight are not attached to the blades, two or three of the blades, from the out of balance position, must be removed (noting their positions) and weighed (Ref.para.2.), as must blades

PRINTED IN ENGLAND

TN11971

SUB-ASSEMBLY

**72-31-03**

Page 527

Dec 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL'



from the diametrically opposite position. The suitable weight blades must be exchanged, and the remainder replaced in their original positions. A note of the weight and position of the removed blades should be kept for possible further exchange of blades.

- (4) If, after exchanges of blades, it is found that the balance cannot be brought within the limits (due to the size/weight of the blades), the balancing weights must be changed. Hinge open the guard access cover, release and remove a (light-weight) balancing weight (1-120) from the front of the disk at the out-of-balance position, then assemble a (heavier weight) balancing weight, (either 1-125 or 1-130) to the bolt. Lubricate the nut (1-110) with lubricant 'B', then screw it onto the bolt, ensure that it has a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m) and torque-tighten the nut between 85 and 95 lbf in. (9,6 and 10,7 N.m). The max number of heavy balancing weights that can be used is 4 off (1-125) and 6 off (1-130).

D. Remove the Bladed Disk from the Balancing Machine and Number the Blades.

- (1) Release and pivot down the swing bolts securing the top half of the guard, then using a hoist, raise the guard until clear of the disk and lower onto a suitable surface. Remove the hoist from the guard.
- (2) Attach a hoist to the lifting fixture (Tool 1162), then position and lower the hoist over the disk and engage the two hooks of the fixture around the mandrel. Remove the nuts and washers securing the mandrel to the balancing machine drive. Raise the hoist and guide the disk out of the machine, and when possible, disengage the drive from the mandrel studs and lower the drive.

TN11975



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (3) If the mandrel/disk cannot be assembled direct to the Hydraclamp, lower it into the mobile stand (Tool 1165) engaging the mandrel journals in the stand support brackets (Ref.Fig.510). Disconnect the lifting fixture, then position the stand by the Hydraclamp. With the lifting fixture (Tool 1162) attached to a hoist, position the hooks of the fixture around the mandrel and raise it out of the stand.
- (4) Place a protection/retaining band (Tool 1123) around the Hydraclamp pedestal. Position the hoist alongside the Hydraclamp, then engage the mandrel over the mounting plate shaft and insert the studs through the plate. Assemble the washers and nuts to the studs and fully tighten the nuts.
- (5) Position the support stand (Tool 1667) under the end of the mandrel, then disconnect the lifting fixture from the mandrel and the fixture from the hoist. Insert the retaining bolt (Tool 1184) into the end of the mandrel and screw it into the mounting plate.
- (6) Release the special nuts securing the mandrel retaining plate, then turn the plate to allow the removal of the blades. Examine the edge of the disk for the No.1 blade datum mark  $\rightarrow 0$ , then examine the blade roots for their numbering (Ref.Fig.503). Ensure that all the blades are numbered correctly in numerical sequence in a clockwise direction as viewed from the mandrel (rear) side of the disk, with No.1 blade in the datum slot. Etch all new blades with their position No., and renumber any blades that have been re-positioned, ensuring that all old position No. are obliterated. Turn the retaining plate to secure the blades, then tighten the retaining plate special nuts. Assemble the protection/retaining band (Tool 1123) to the blade tips.

SUB-ASSEMBLY

**72-31-03**

Page 529

Dec 1/76

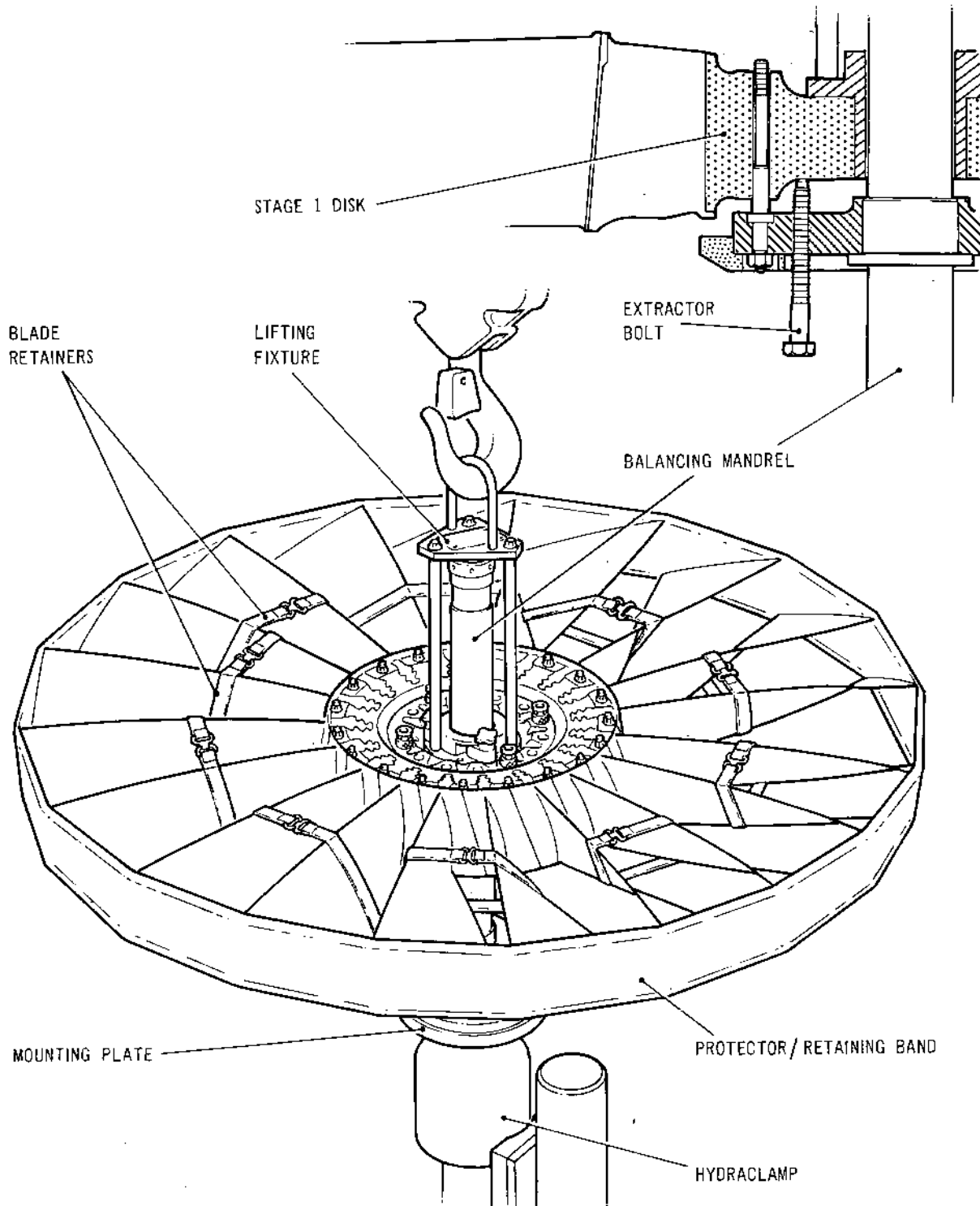


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32118/00A



TN12553

Removing Bladed Disk from Balancing Mandrel  
Figure 511

SUB-ASSEMBLY  
**72-31-03**  
Page 530  
Dec 1/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



E. Remove the Bladed Disk from the Balancing Mandrel (Ref.Fig.511).

- (1) Attach a hoist to the ring of the retaining bolt, then release the Hydraclamp and raise/traverse the hoist to position the mandrel vertically. Lock the Hydraclamp, then release the hoist.
- (2) Assemble the lifting fixture (Tool 401) to the stage 1 disk (Ref.Fig.508).
  - (a) Attach a hoist to the lifting plate of the lifting fixture, then position the hoist over the disk.
  - (b) Ensure that the pins of the hand knobs are located in the holes at the 'FREE' position, then lower the hoist and engage the end plate of the fixture in the disk. Withdraw the pins of the hand knobs from the 'FREE' position locating holes, turn the knobs to the 'LOCK' position, and ensure that the pins locate in the locating holes.
- (3) Release and remove the mandrel special nuts securing the disk. Screw the four extractor bolts (Tool 1185) into the tapped holes in the balancing mandrel plate (from underneath) until they contact the disk, then screw the bolts in, in equal progressive increments until the disk is released from the mandrel locating/securing studs. If there is any evidence that the blades are slipping or may slip out of the disk, assemble blade retainers (Tool 1166) to each pair of blades and pull the retainers towards the tips of the blades. Raise the hoist, then position and lower the disk onto a suitable clean flat surface.
- (4) Withdraw the pins of the hand knobs from the 'LOCK' position locating holes, turn the knobs to the 'FREE' position, and ensure that the pins locate in the locating holes. Raise the fixture from the disk and lower the fixture onto a suitable surface, then release the hoist.

PRINTED IN ENGLAND

TN11978





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (5) Remove the balancing mandrel from the mounting plate (Ref.Fig.507).
  - (a) Attach a hoist to the ring of the retaining bolt, release the Hydraclamp, then lower the mandrel onto the support stand. Release the hoist then remove the retaining bolt. Remove the extractor bolts from the mandrel plate.
  - (b) Attach a hoist to the lifting eye of the lifting fixture (Tool 1162), then position the hoist over the balancing mandrel and engage the two hooks around the mandrel.
  - (c) Remove the nuts and washers securing the mandrel to the mounting plate, then remove the support stand and traverse the hoist to disengage the mandrel from the mounting plate. Position and lower the mandrel into its storage stand, then remove the lifting fixture from the mandrel and the hoist. Assemble the washers and nuts to the mandrel studs, and the special nuts to the mandrel locating/securing studs.

F. Check the Stage 1 Blade Tang Clearances.

- (1) Invert the disk so that its rear face is uppermost, and rest the disk on the centre support (Tool 1326). Remove the protection/retaining band from the blade tips, and the blade retainers (if assembled).
- (2) Examine the edge of the disk and identify the datum hole by the datum mark  $\rightarrow 0$ , then examine the stage 1-2 spacer ring (1-190) and identify the datum hole by the datum mark  $\rightarrow 0$  on the edge of the flange (Ref.Fig.503). Release and remove the protector (Tool 443) (if assembled) from the spacer ring, then place the spacer ring on the disk aligning the datum holes, and ensure that the spacer abuts the disk.
- (3) Using feeler gauges, check that there is a clearance between each blade tang and the spacer ring of between 0.002 and 0.008 in. (0,05 and 0,20 mm).

TN17440



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Remove the spacer ring from the disk, assemble the protector (Tool 443) to the spacer, then stow the spacer on the top shelf of the container (Tool 1410). Place the protection/retaining band (Tool 1123) around the tips of the blade, then invert the disk and place on a pallet. Use the lifting fixture (Tool 401) (if required) to place it on the pallet.

NOTE: The stage 1 bladed disk is now ready to be passed to the LP Compressor Assembly (72-31-00 Assembly).

#### 7. Balance the Stage 2 Rotor and Stage 1-2 Spacer Ring

NOTE: The stage 2 blades should be received in the container (Tool 1396). Do not remove the blades until they are required for assembly.

##### A. Assemble the Stage 1-2 Spacer Ring to the Stage 2 Disk.

NOTE: The disk (1-250) should be received in its container (Tool 1407).

- (1) Unscrew and remove the knurled nut and clamp plate from the disk container.
- (2) Attach the multiple leg sling (Tool 1285) to a hoist and position the hoist above the disk.
- (3) Unscrew and remove the three nuts and washers from the waisted bolts of the sling then pass the bolts through holes in the disk. Reassemble the washers and nuts to the bolts to secure the disk to the sling.
- (4) Raise the hoist and position the disk on suitable blocks or support (Tool 1326), the front face of the disk should now be uppermost.
- (5) Unscrew the nuts from the waisted bolts of the sling, raise the hoist and remove the sling from the disk.
- (6) Examine the front face of the disk at the blade root position, and identify the datum hole by the datum mark  $\rightarrow 0$  to each side of No.1 blade slot. Remove the spacer ring (1-190) from the container (Tool 1410) (top shelf), examine the spacer ring and identify the datum hole by the datum mark  $\rightarrow 00 \leftarrow$  on the edge of the flange (Ref.Fig.503). Place the spacer ring on the disk aligning the datum holes.

PRINTED IN ENGLAND

TN11772

SUB-ASSEMBLY

**72-31-03**

Page 533

Dec 1/76

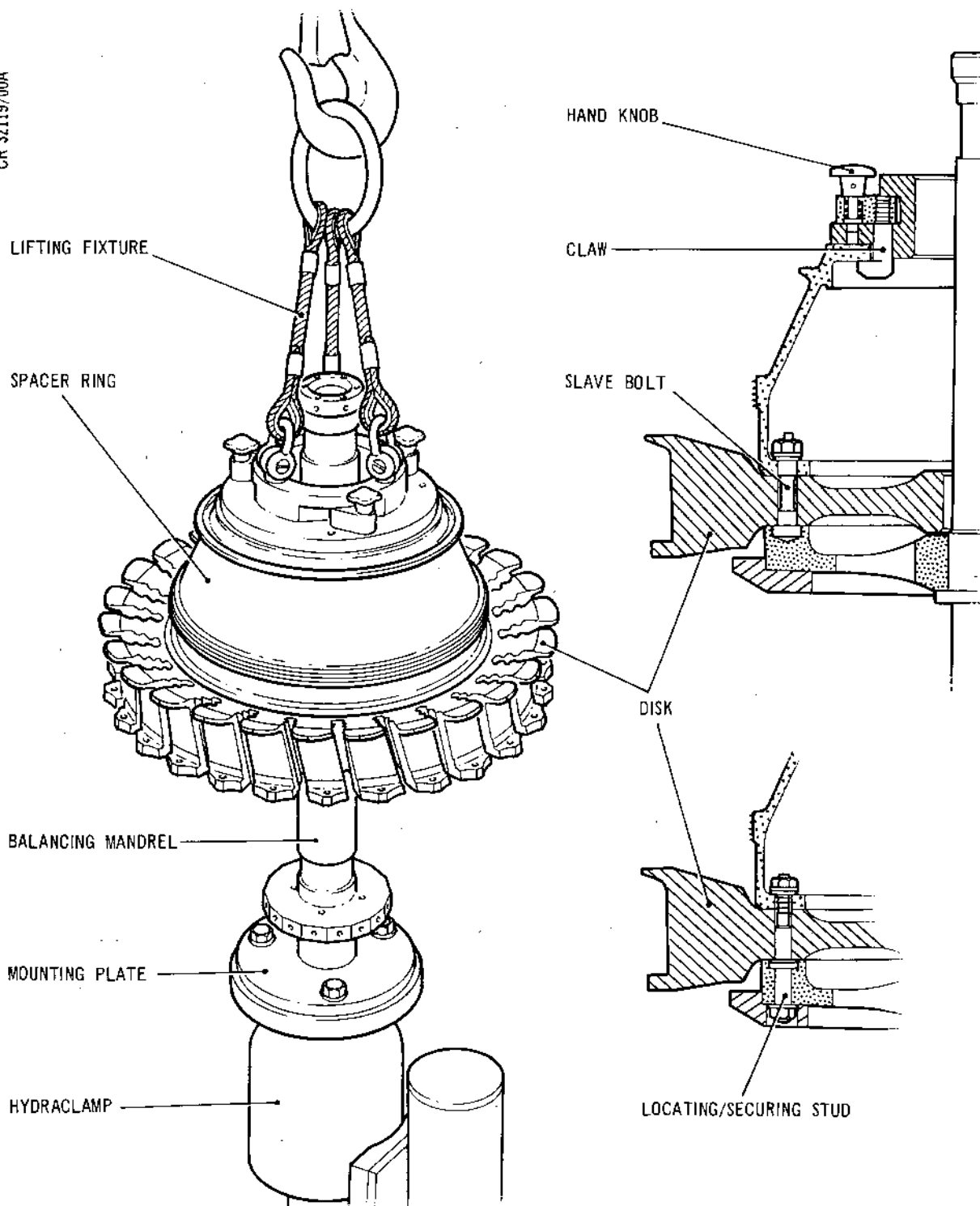


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32119/00A



Assembling Stage 2 Disk/Stage 1-2 Spacer Ring to  
Balancing Mandrel  
Figure 512

TN27708



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (7) Insert the four slave bolts (Tool 366) into the bolt holes from underneath the disk, ensuring that they are evenly spaced, then assemble a slave washer and nut to each bolt (Ref.Fig.512). Fully tighten the nuts.

B. Assemble the Stage 2 Disk/Spacer Ring to the Balancing Mandrel.

- (1) Ensure that the Hydraclamp (Tool 1673) is bolted to the pedestal (Tool 1674) and the mounting plate (Tool 1163) is bolted to the Hydraclamp. Position the mounting plate so that its axis is horizontal, then lock the Hydraclamp.
- (2) Assemble the balancing mandrel to the mounting plate (Ref.Fig.507).
  - (a) Attach a hoist to the lifting eye of the Lifting fixture (Tool 1162), then position the fixture over the balancing mandrel (Tool 600) and engage the two hooks of the fixture around the mandrel.
  - (b) Position the hoist alongside the mounting plate, then traverse the hoist and engage the balancing mandrel over the mounting plate shaft ensuring that the mandrel studs locate in the holes in the mounting plate. Assemble washers and nuts to the mandrel studs and fully tighten the nuts.
  - (c) Position and adjust the support stand (Tool 1667) to support the end of the mandrel. Disconnect the lifting fixture from the mandrel and the hoist. Insert the retaining bolt (Tool 1184) into the end of the mandrel and screw it into the mounting plate.
  - (d) Attach a hoist to the shackle of the retaining bolt, then release the Hydraclamp and raise/traverse the hoist to bring the mandrel to the vertical position. Lock the Hydraclamp and release the hoist.
- (3) Assemble the lifting fixture (Tool 364) to the stage 1-2 spacer ring (Ref.Fig.512).
  - (a) Attach a hoist to the lifting ring of the lifting fixture, then position the hoist over the spacer.

SUB-ASSEMBLY  
**72-31-03**  
Page 536  
Dec 1/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



(b) Ensure that the pins of the hand knobs are located in the holes at the 'FREE' position, then lower the hoist and engage the locating plate of the fixture in the spacer. Withdraw the pins of the hand knobs from the 'FREE' position locating holes, turn the knobs to the 'LOCK' position engaging the claws under the spacer flange, and ensure that the pins locate in the locating holes.

- (4) Position the disk over the balancing mandrel and align the four slave bolts in the disk with the recesses in the mandrel plate. Lower the disk/spacer over the mandrel locating/securing studs, ensuring that it is lowered squarely and does not get jammed. Lightly tap with a suitable (soft faced) mallet (if necessary). When the disk abuts the mandrel, screw the special nuts onto the studs and fully tighten the nuts.
- (5) Withdraw the pins of the hand knobs from the 'LOCK' position locating holes, turn the knobs to the 'FREE' position, and ensure that the pins locate in the locating holes. Raise the fixture from the spacer ring and lower the fixture onto a suitable surface, then release the hoist.
- (6) Attach a hoist to the shackle of the retaining bolt, then release the Hydraclamp and lower the mandrel to the horizontal position. Position the support stand (Tool 1667) under the end of the mandrel to take the weight, then remove the hoist and unscrew and remove the retaining bolt.

C. Assemble the Blades to Stage 2 Disk (Ref.Fig.513).

NOTE: If all the original blades are available and undamaged then assemble the blades as detailed in para.(1). If the blades include 4 repaired and/or new blades, then the blades must be assembled as detailed in para.(2). If the blades include more than 4 repaired and/or new blades then the blades must be assembled as detailed in para.(3). Ensure that the aggregate blending depth of repaired blades does not exceed 3.600 in. (91,44 mm) (Ref. 72-31-03 Repair No.6).

NOTE: Blades with undercut roots (SB 72-8934-356 standard) must be assembled in stage sets.



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (1) Identify the stage 2 blades (1-240), then examine the blade roots for their positional No. (Ref.Fig.503) and lay the blades out in numerical sequence. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades. Ensure that the special nuts securing the mandrel retaining plate are loose, and the plate is positioned to allow the blades to be assembled. Insert the blades in numerical sequence into the rear of the disk starting at No.1 position, and working in a clockwise direction when viewing the mandrel (rear) side of the disk. When the blades are assembled, turn the mandrel retaining plate to secure the blades, then tighten the plate special nuts.
- (2) Identify the stage 2 blades (1-240) then examine the roots of the original blades for their positional No. (Ref.Fig.503) and lay the blades out in numerical sequence, leaving spaces where new blades are to be positioned. Noting the mass moment weight of the new blades, place the lightest new blades in vacant positions next to the heaviest original blades and position the heaviest new blades in vacant positions next to the lightest original blades. Assemble the blades to the disk as detailed in para.(1).
- (3) Identify the stage 2 blades (1-240), then according to the mass moment weight of the blades (quoted on the labels), lay the blades out in sequence of weight, starting with the heaviest blade at one end and ending with the lightest blade at the other end. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades. Ensure that the special nuts securing the mandrel retaining plate are loose, and the plate is positioned to allow the blades to be assembled. Assemble the blades to the rear of the disk positioning the heaviest blade at No.1 position and the next heaviest blade diametrically opposite, then assemble the two lightest blades diametrically opposite each other and next to the heaviest blades. Assemble the remainder of the blades to the disk in sequence of weight, assembling alternate pairs of heavy and light blades and where possible, positioning equal weight blades diametrically opposite each other. When the blades are assembled, turn the mandrel retaining plate to secure the blades, then tighten the plate special nuts.

SUB-ASSEMBLY

**72-31-03**

Page 538

Dec 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



D. Assemble the Stage 2 Bladed Disk/Spacer Ring to the Balancing Machine (Avery 72 N 17).

- (1) Prepare the balancing machine (Avery 72 N 17) (Ref. Fig.504).
  - (a) Ensure that the adjustable bearings (Tool 1154) are assembled and secured with keep plates to the left-hand and the right-hand cradles of the balancing machine, and that the bearings are correctly set (Ref. para.5.B.(3)(c)).
  - (b) Ensure that the protection guard (Tool 1303) is bolted to the bed of the machine.
- (2) Attach a hoist to the lifting eye of the lifting fixture (Tool 1162), then position the hoist over the balancing mandrel and engage the two hooks of the fixture around the mandrel.
- (3) Remove the nuts securing the mandrel to the mounting plate, then remove the support stand and traverse the hoist to disengage the mandrel from the mounting plate. If the mandrel/disk cannot be assembled direct to the balancing machine, lower it into the mobile stand (Tool 1165) engaging the mandrel journals in the stand support brackets. Disconnect the lifting fixture, then position the stand near the balancing machine. With the lifting fixture (Tool 1162) attached to a hoist, position the hooks of the fixture around the mandrel and raise it out of the stand.
- (4) Position the hoist over the balancing machine with the studded end of the mandrel towards the balancing machine drive. Lower the disk into the bottom half of the protection guard, lift the balancing machine drive and engage the mandrel studs in it. Adjust the position of the cradles (if necessary) to align with the bearing journals of the mandrel, with the mandrel correctly engaged with the drive. Adjust the guard position (if necessary) to give running clearance of the mandrel/bladed disk, then secure the cradles and guard (if required). Lower the mandrel onto the cradles, then disengage the lifting fixture from the mandrel and the hoist.

PRINTED IN ENGLAND

TN1775

SUB-ASSEMBLY

**72-31-03**

Page 539

Dec 1/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (5) Assemble washers and nuts to the mandrel studs and fully tighten the nuts.
- (6) Using a hoist, lower the top half of the guard onto the bottom half ensuring that the access cover of the guard is towards the balancing machine operator. Pivot the bottom guard swing bolts into the top guard and secure with the thumbnuts.

E. Balance the Stage 2 Bladed Disk/Spacer Ring.

- (1) Apply lubricant 'A' to the spindles of the adjustable bearings and the journals of the mandrel, and ensure that they remain well lubricated throughout the balancing operation.
- (2) Carry out a static balance of the bladed disk, operating the balancing machine in accordance with the manufacturers instructions. The disk should be rotated at (approx.) 450 rpm and run for (approx.) two to three min. for the temperature to stabilise. The balance of the disk must be within 4 drn in. (180 grm mm). If the balance of the disk is outside the limits, rectify by the interchange of heavy and light-weight blades (Ref.para.(3)) and (if necessary) by the addition of balancing weights (Ref.para.(4)) to the out of balance angular position, until the disk is within limits.
- (3) Gain access to the blades by either hinging open the access cover, or releasing and removing the top half of the guard using a hoist. Release the special nuts securing the mandrel retaining plate, then turn the plate to allow the removal of the blades. Withdraw a heavy blade from as near the out of balance position as possible, and exchange it for a light blade from as near diametrically opposite as possible. Turn the mandrel retaining plate to secure the blades, then tighten the special nuts to lock the plate. Hinge close the guard access cover, or replace and secure the top of the guard, then recheck the balance.

NOTE: If the blades are the original and labels stating the mass moment weight are not attached to

TN28259



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

the blades, two or three of the blades, from the out of balance position must be removed (noting their positions) and weighed (Ref. para. 2), as must blades from the diametrically opposite position. The suitable weight blades must be exchanged, and the remainder replaced in their original positions. A note of the weight and position of the removed blades should be kept for possible further exchange of blades.

- (4) If after exchanges of blades, it is found that the balance cannot be brought within the limits (due to the size/weight of the blades), balancing weights must be added. Hinge open the guard access cover. Apply lubricant 'B' to the bolt (1-230), then insert the bolt into the bolt hole in the disk at the out of balance position and assemble a balance weight, (1-210, 1-215 or 1-220) and a nut (1-200) to the bolt. Ensure that the nut has a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m), then torque-tighten the nut between 85 and 95 lbf in. (9,6 and 10,7 N.m). After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 1.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref. SB.72-8449-191). Hinge close the access cover, then recheck the balance. Exchange or add balancing weights until the balance is within four drn. in. The max. number of balancing weights, of any one weight or combination of weights that can be assembled to the disk is four.

F. Remove the Bladed Disk/Spacer Ring from the Balancing Machine and Number the Blades.

- (1) Release and pivot down the swing bolts securing the top half of the guard, then using a hoist, raise the guard until clear of the disk and lower onto a suitable surface. Remove the hoist from the guard.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Attach a hoist to the lifting fixture (Tool 1162), then position and lower the hoist over the disk and engage the two hooks of the fixture around the mandrel. Remove the nuts and washers securing the mandrel to the balancing machine drive. Raise the hoist and guide the disk out of the machine, and when possible, disengage the drive from the mandrel studs and lower the drive.
- (3) If the mandrel/disk cannot be assembled direct to the Hydraclamp, lower it into the mobile stand (Tool 1165) engaging the mandrel journals in the stand support brackets. Disconnect the lifting fixture, then position the stand by the Hydraclamp. With the lifting fixture (Tool 1162) attached to a hoist, position the hooks of the fixture around the mandrel and raise it out of the stand.
- (4) Position the hoist alongside the Hydraclamp, then engage the mandrel over the mounting plate and insert the studs through the plate. Assemble the mandrel washers and nuts to the studs and fully tighten the nuts.
- (5) Position the support stand (Tool 1667) under the end of the mandrel, then disconnect the lifting fixture from the mandrel and the fixture from the hoist. Insert the retaining bolt (Tool 1184) into the end of the mandrel and screw it into the mounting plate.
- (6) Release the special nuts securing the mandrel retaining plate, then turn the plate to allow the removal of the blades. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades then examine the blade roots for their numbering (Ref.Fig.503). Ensure that all the blades are numbered correctly in numerical sequence in a clockwise direction as viewed from the mandrel (rear) side of the disk, with No.1 blade in the datum slot. Etch all new blades with their position No., and renumber any blades that have been re-positioned, ensuring that all old position No. are obliterated. Turn the mandrel retaining plate to secure the blades.

SUB-ASSEMBLY

**72-31-03**

Page 542

Dec 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



G. Remove the Stage 1-2 Spacer Ring from the Stage 2 Disk.

- (1) Attach a hoist to the shackle of the retaining bolt, then release the Hydraclamp and raise/traverse the hoist to position the mandrel vertically. Lock the Hydraclamp, then release the hoist.
- (2) Assemble the protection/retaining band (Tool 1124) around the blade tips. Assemble the two halves of the protector (Tool 443) around the labyrinth of the spacer ring, then secure the two halves together with the clamp screws. Remove the special nuts securing the disk/spacer to the balancing mandrel.
- (3) Assemble the lifting fixture (Tool 364) to the stage 1-2 spacer ring (Ref.Fig.512).
  - (a) Attach a hoist to the lifting ring of the lifting fixture, then position the hoist over the spacer.
  - (b) Ensure that the pins of the hand knobs are located in the holes at the 'FREE' position, then lower the hoist and engage the locating plate of the fixture in the spacer. Withdraw the pins of the hand knobs from the 'FREE' position locating holes, turn the knobs to the 'LOCK' position engaging the claws under the spacer flange, and ensure that the pins locate in the locating holes.
- (4) Screw the four extractor bolts (Tool 1185) into the tapped holes in the balancing mandrel plate (from underneath) until they contact the disk. Screw the extractor bolts in in equal progressive increments until the disk is released from the mandrel locating/securing studs. If there is any evidence that the blades are slipping or may do so, assemble the blade retainers (Tool 1166) to each pair of blades and pull the retainers towards the tips of the blades. Raise the hoist, then position and lower the disk onto a suitable clean flat surface.

PRINTED IN ENGLAND

TN40351

SUB-ASSEMBLY

**72-31-03**

Page 543

Dec 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (5) Withdraw the pins of the hand knobs from the 'LOCK' position locating holes, turn the knobs to the 'FREE' position, and ensure that the pins locate in the locating holes. Raise the fixture from the spacer and lower onto a suitable surface, then release the hoist.
  - (6) Remove the slave nuts, then remove the spacer ring from the disk and stow the spacer on the top shelf of the container (Tool 1410).
  - (7) Remove the balancing mandrel from the mounting plate (Ref.Fig.507).
    - (a) Attach a hoist to the shackle of the retaining bolt, release the Hydraclamp, then lower the mandrel onto the support stand (Tool 1667). Release the hoist then remove the retaining bolt. Remove the extractor bolts from the plate of the mandrel.
    - (b) Attach a hoist to the lifting eye of the lifting fixture (Tool 1162) then position the hoist over the balancing mandrel and engage the two hooks of the fixture around the mandrel.
    - (c) Remove the nuts and washers securing the mandrel to the mounting plate, then remove the support stand and traverse the hoist to disengage the mandrel from the mounting plate. Position and lower the mandrel onto its storage stand, then remove the lifting fixture from the hoist and the mandrel. Assemble the washers and nuts to the mandrel studs, and the special nuts to the mandrel locating/securing studs.
- H. Check the Stage 2 Blade Tang Clearances.
- (1) Invert the disk so that its rear face is uppermost, and rest the disk on the centre support (Tool 1326). Remove the protection/retaining band from the blade tips, and the blade retainers (if assembled).

IN11782



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

- (2) Examine the front face of the disk at the blade root position, and identify the datum hole by the datum mark  $\rightarrow 00 \leftarrow$  to each side of No.1 blade slot, then examine the stage 2-3 spacer ring (1-280) and identify the datum hole by the datum mark  $\rightarrow 00 \leftarrow$  on the edge of the flange (Ref.Fig.503). Release and remove the protector (Tool 1167) (if assembled) from the spacer ring, then place the spacer ring on the disk aligning the datum holes, and ensure that the spacer abuts the disk.
- (3) Using feeler gauges, check that there is a clearance between each blade tang and the spacer ring between 0.002 and 0.008 in. (0.05 and 0.20 mm).
- (4) Remove the spacer ring from the disk, assemble the protector (Tool 1167) to the spacer, then stow the spacer on the middle shelf of the container (Tool 1410). Place the protection/retaining band (Tool 1124) around the tips of the blades, then invert the disk and place on a pallet. Use the multiple leg sling (Tool 1285) (if required) to place it on the pallet.

NOTE: The stage 2 bladed disk and stage 1-2 spacer ring are now ready to be passed to the LP Compressor Assembly (72-31-00 Assembly).

#### 8. Balance the Stage 3 Rotor and Stage 2-3 Spacer Ring

NOTE: The stage 3 blades should be received in the container (Tool 1397). Do not remove the blades until they are required for assembly.

##### A. Assemble the Stage 2-3 Spacer Ring to the Stage 3 Disk.

NOTE: The disk (1-360) should be received in the container (Tool 1408).

- (1) Unscrew and remove the knurled nut and clamp plate from the disk container.
- (2) Attach the multiple leg sling (Tool 1217) to a hoist and position the hoist above the disk.
- (3) Assemble the four slave bolts (Tool 367) to the disk, the bolts, inserted from the rear face, should be equi-spaced with one assembled to the datum hole marked  $\rightarrow 00 \leftarrow$ .

TN11783



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Lower the sling to the disk and screw the larger thumbnuts on to the slave bolts.
  - (5) Raise the hoist and place the disk on suitable blocks or support (Tool 1326) with the front of the disk uppermost, unscrew the thumbnuts then raise the hoist to remove the sling.
  - (6) Examine the front face of the disk at the blade root position, and identify the datum hole by the datum marks  $\rightarrow 00 \leftarrow$  to each side of No.1 blade slot. Remove the spacer ring (1-280) from the container (Tool 1410) and identify the datum hole by the datum mark  $\rightarrow 00 \leftarrow$  on the edge of the flange (Ref.Fig.503). Place the spacer ring on the disk aligning the datum holes.
  - (7) Assemble a slave washer and nut to each of the slave bolts (Ref.Fig.514) and fully tighten the nuts.
- B. Assemble the Stage 3 Disk/Spacer Ring to the Balancing Mandrel.
- (1) Ensure that the Hydraclamp (Tool 1673) is bolted to the pedestal (Tool 1674) and the mounting plate (Tool 1163) is bolted to the Hydraclamp. Position the mounting plate with its axis horizontal, then lock the Hydraclamp.
  - (2) Assemble the balancing mandrel (Tool 379) to the mounting plate (Ref.Fig.507).
    - (a) Attach a hoist to the lifting eye of the lifting fixture (Tool 1162), then position the fixture over the balancing mandrel and engage the two hooks of the fixture around the mandrel.
    - (b) Position the hoist alongside the mounting plate, then traverse the hoist and engage the balancing mandrel over the mounting plate shaft, ensuring that the mandrel studs locate in the holes in the mounting plate. Assemble washers and nuts to the mandrel studs and fully tighten the nuts.

TN11784

SUB-ASSEMBLY  
**72-31-03**

Page 546  
Dec 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) Position and adjust the support stand (Tool 1667) to support the end of the mandrel. Disconnect the lifting fixture from the mandrel and the hoist. Insert the retaining bolt (Tool 1184) into the end of the mandrel and screw it into the mounting plate. Attach a hoist to the shackle of the bolt, then release the Hydraclamp and raise/traverse the hoist to bring the mandrel to the vertical position. Lock the Hydraclamp, then release the hoist.
- (3) Assemble the lifting fixture (Tool 365) to the stage 2-3 spacer ring (Ref.Fig.514).
- (a) Attach a hoist to the lifting ring of the lifting fixture, then position the hoist over the spacer.
- (b) Ensure that the pins of the hand knobs are located in the holes at the 'FREE' position, then lower the hoist and engage the locating plate of the fixture in the spacer. Withdraw the pins of the hand knobs from the 'FREE' position locating holes, turn the knobs to the 'LOCK' position engaging the claws under the spacer flange, and ensure that the pins locate in the locating holes.
- (4) Position the disk over the balancing mandrel and align the four slave bolts in the disk with the recesses in the mandrel plate. Lower the disk/spacer over the mandrel locating/securing studs, ensuring that it is lowered squarely and does not get jammed. Lightly tap with a suitable (soft faced) mallet (if required). When the disk abuts the mandrel, screw the special nuts onto the studs and fully tighten the nuts.

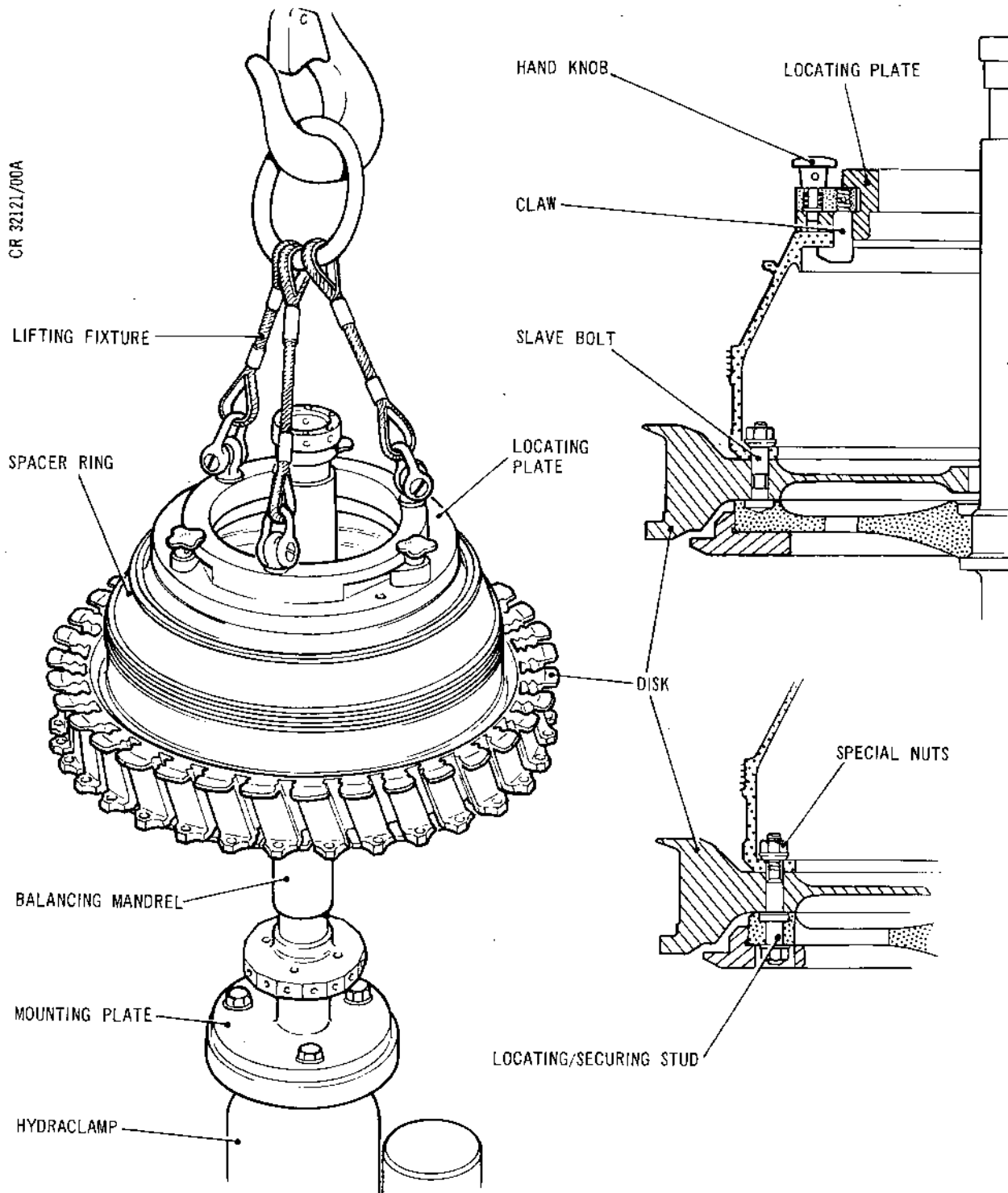
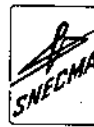
PRINTED IN ENGLAND

TN11785





OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



Assembling Stage 3 Disk/Stage 2-3 Spacer Ring to  
Balancing Mandrel  
Figure 514

SUB-ASSEMBLY  
**72-31-03**  
Page 548  
Dec 1/76

TN12554



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (5) Withdraw the pins of the hand knobs from the 'LOCK' position locating holes, turn the knobs to the 'FREE' position, and ensure that the pins locate in the locating holes. Raise the fixture from the spacer ring and lower the fixture onto a suitable surface, then release the hoist.
- (6) Attach a hoist to the shackle of the retaining bolt, then release the Hydraclamp and lower the mandrel to the horizontal position. Position the support stand (Tool 1667) under the end of the mandrel to take the weight, then remove the hoist and unscrew and remove the retaining bolt.

C. Assemble the Blades to Stage 3 Disk (Ref.Fig.515).

NOTE: If all the original blades are available and undamaged then assemble the blades as detailed in para.(1). If the blades include 4 repaired and/or new blades, then the blades must be assembled as detailed in para.(2). If the blades include more than 4 repaired and/or new blades then the blades must be assembled as detailed in para.(3). Ensure that the aggregate blending depth of repaired blades does not exceed 3.200 in. (81,28 mm) (Ref.72-31-03 Repair No.6).

NOTE: The preceding information regarding repaired or new blades also applies to stage 4 and 5.

- (1) Identify the stage 3 blades (1-330), then examine the blade roots for their positional No. (Ref.Fig.503) and lay the blades out in numerical sequence. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades. Ensure that the special nuts securing the mandrel retaining plate are loose, and the plate is positioned to allow the blades to be assembled. Insert the blades in numerical sequence into the rear of the disk starting at No.1 position, and working in a clockwise direction when viewing the mandrel (rear) side of the disk. When the blades are assembled, turn the mandrel retaining plate to secure the blades, then tighten the plate special nuts.

PRINTED IN ENGLAND

TN11786



OLYMPUS 593

MK.610-14-28

OVERHAUL

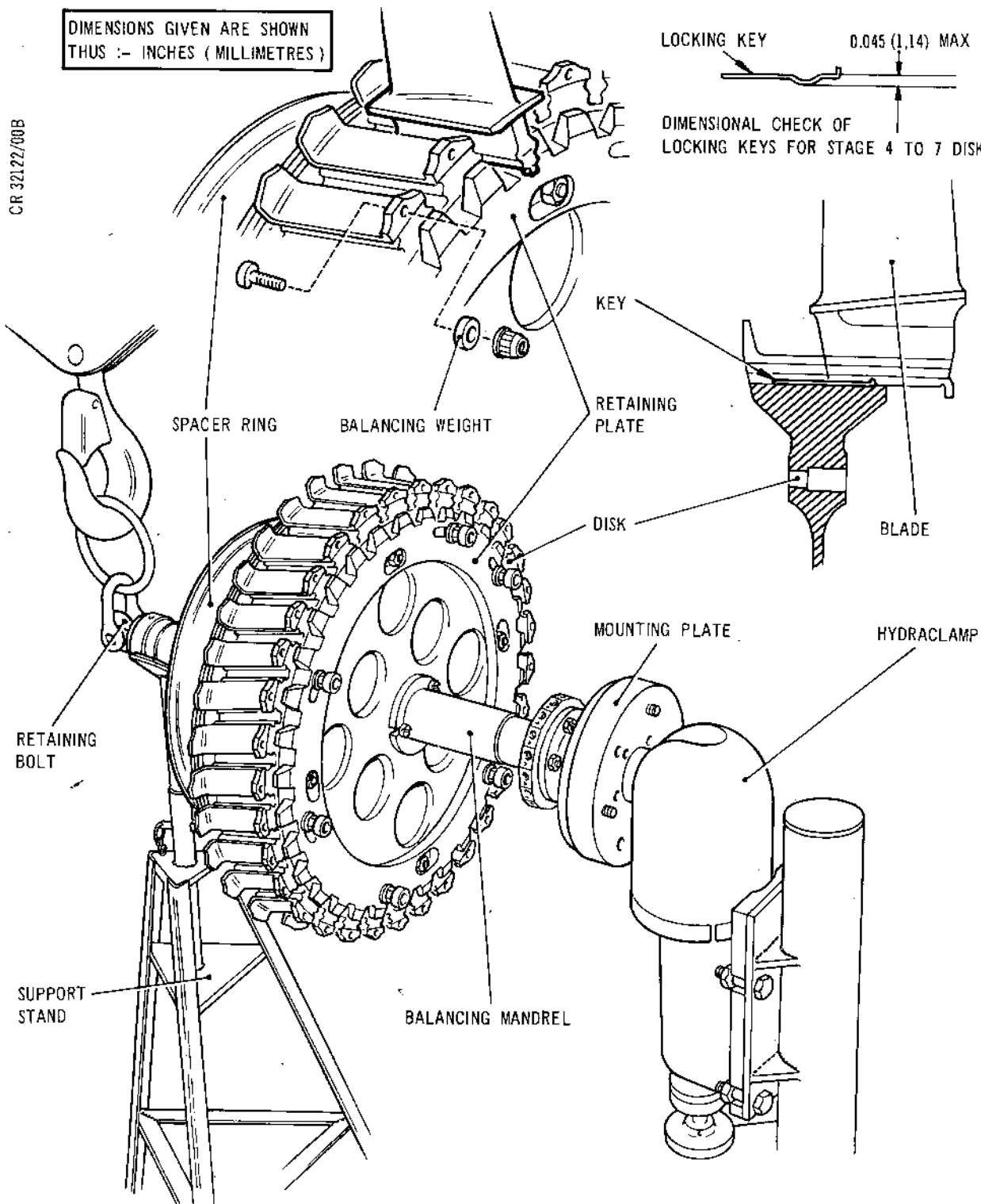


DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)

LOCKING KEY 0.045 (1.14) MAX

DIMENSIONAL CHECK OF  
LOCKING KEYS FOR STAGE 4 TO 7 DISKS

CR 32122/00B



Assembling Blades/Keys to Stage 3 Disk  
Figure 515

TN44229

SUB-ASSEMBLY  
**72-31-03**  
Page 550  
Dec 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Identify the stage 3 blades (1-330) then examine the roots of the original blades for their positional No. (Ref.Fig.503) and lay the blades out in numerical sequence, leaving spaces where new blades are to be positioned. Noting the mass moment weight of the new blades, place the lightest new blades in vacant positions next to the heaviest original blades, and position the heaviest new blades in vacant positions next to the lightest original blades. Assemble the blades to the disk as detailed in para.(1).
- (3) Identify the stage 3 blades (1-330), then according to the mass moment weight of the blades (quoted on the labels), lay the blades out in sequence of weight, starting with the heaviest blade at one end and ending with the lightest blade at the other end. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades. Ensure that the special nuts securing the mandrel retaining plate are loose, and the plate is positioned to allow the blades to be assembled. Assemble the blades to the rear of the disk, positioning the heaviest blade at No.1 position and the next heaviest blade diametrically opposite, then assemble the two lightest blades diametrically opposite each other and next to the heaviest blades. Assemble the remainder of the blades to the disk in sequence of weight, assembling alternate pairs of heavy and light blades and where possible, positioning equal weight blades opposite each other. When the blades are assembled, turn the mandrel retaining plate to secure the blades, then tighten the plate special nuts.

D. Assemble the Stage 3 Bladed Disk/Spacer Ring to the Balancing Machine.

- (1) Prepare the balancing machine (Avery 72 N 17 or 7210) (Ref.Fig.504).

PRINTED IN ENGLAND

TN40352



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (a) Ensure that the adjustable bearings (Tool 1154) are assembled and secured with keep plates to the left-hand and right-hand cradles of the balancing machine, and that the bearings are correctly set (Ref. para. 5.B.(3)(c)).
- (b) Ensure that the protection guard (Tool 1303 for Avery 72 N 17 or Tool 1500 for Avery 7210) is bolted to the bed of the machine.
- (2) Attach a hoist to the lifting eye of the lifting fixture (Tool 1162), then position the hoist over the balance mandrel and engage the two hooks of the fixture around the mandrel.
- (3) Remove the nuts and washers securing the mandrel to the mounting plate, then remove the support stand and traverse the hoist to disengage the mandrel from the mounting plate. If the mandrel/disk cannot be assembled direct to the balancing machine, lower it into the mobile stand (Tool 1165) engaging the mandrel journals in the stand support brackets. Disconnect the lifting fixture, then position the stand near the balancing machine. With the lifting fixture (Tool 1162) attached to the hoist, position the hooks of the fixture around the mandrel and raise it out of the stand.
- (4) Position the hoist over the balancing machine with the studded end of the mandrel towards the balancing machine drive. Lower the disk into the bottom half of the protection guard, lift the balancing machine drive and engage the mandrel studs in it, then adjust the position of the cradles (if necessary) to align with the bearing journals of the mandrel, with the mandrel correctly engaged with the drive. Adjust the position of the guard (if necessary), to give running clearance for the mandrel/bladed disk, then secure the cradles and guard (if required). Lower the mandrel onto the cradles, then disengage the lifting fixture from the mandrel and the hoist. Assemble washers and nuts to the mandrel studs and fully tighten the nuts.
- (5) If the balancing machine is an Avery 7210 secure the balancing mandrel in the machine cradles. Pivot the retaining arms of the cradles over the mandrel and engage them around the pillars, then secure them with thumbnuts.

TN11787

SUB-ASSEMBLY

**72-31-03**

Page 552  
Dec 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (6) Using a hoist lower the top half of the guard onto the bottom half, ensuring that the access cover of the guard is towards the balancing machine operator. Pivot the bottom guard swing bolts into the top guard and secure with the thumbnuts.

E. Balance the Stage 3 Bladed Disk/Spacer Ring.

- (1) Apply lubricant 'A' to the spindles of the adjustable bearings and the journals of the mandrel, and ensure that they remain well lubricated throughout the balancing operation.
- (2) Carry out a static balance of the bladed disk, operating the balancing machine in accordance with the manufacturers instructions. The disk should be rotated at (approx.) 450 rpm and run for (approx.) 2 to 3 minutes for the temperature to stabilise. The balance of the disk/spacer must be within 4 drn. in. (180 grm mm). If the balance of the disk/spacer is outside the limit, rectify by the interchange of heavy and light-weight blades (Ref. para. (3)) and (if necessary), by the addition of balancing weights (Ref. para.(4)) to the out of balance position, until the disk/spacer is within limits.
- (3) Gain access to the blades by either hinging open the access cover, or releasing and removing the top half of the guard using a hoist. Release the special nuts securing the mandrel retaining plate, then turn the plate to allow the removal of the blades. Withdraw a heavy blade from as near the out of balance position as possible, and exchange it for a light blade from as near diametrically opposite as possible. Turn the mandrel retaining plate to secure the blades, then tighten the special nuts to lock the plate. Hinge close the guard access cover, or replace and secure the top of the guard, then recheck the balance.

NOTE: If the blades are the original and labels stating the mass moment weight are not attached to the blades, two or three of the blades, from the out of balance position, must be removed (noting their positions) and weighed (Ref. para.2), as must blades from the diametrically

SUB-ASSEMBLY

**72-31-03**

Page 553

Dec 1/76

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

opposite position. The suitable weight blades must be exchanged, and the remainder replaced in their original positions. A note of the weight and position of the removed blades should be kept for possible further exchange of blades.

- (4) If, after exchanges of blades, it is found that the balance cannot be brought within the limits (due to the size/weight of the blades), balancing weights must be added. Hinge open the guard access cover. Apply lubricant 'B' to a bolt (1-320), then insert the bolt into the bolt hole in the disk at the out of balance position and assemble a balance weight, (1-300, 1-305 or 1-310) and a nut (1-290) to the bolt. Ensure that the nut has a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m), then torque-tighten the nut between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (5) After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 1.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref.SB.72-8449-191). Hinge close the access cover, then recheck the balance. Exchange or add balancing weights until the balance is with 4 drn. in. (180 grm mm). The max. number of balancing weights that can be assembled to the disk is four, and the maximum number of weights of each weight that can be used is four off (1-300), 2 off (1-305) and 2 off (1-310).

**F. Remove the Bladed Disk/Spacer Ring from the Balancing Machine.**

- (1) Release the retaining arm of each cradle and pivot the arms out of the way if the balancing machine is an Avery 7210. With both types of Avery machines release and pivot down the swing bolts securing the top half of the guard, then using a hoist, raise the guard clear of the disk and lower onto a suitable surface. Remove the hoist from the guard.
- (2) Attach a hoist to the lifting fixture (Tool 1162), then position and lower the hoist over the disk and engage the two hooks of the fixture around the mandrel. Remove the nuts and washers securing the mandrel to the balancing machine drive. Raise the hoist and guide the disk out of the machine, and when possible, disengage the drive from the mandrel studs and lower the drive.

SUB-ASSEMBLY

**72-31-03**

Page 554

Jun 30/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) If the mandrel/disk cannot be assembled direct to the mounting plate, lower it into the mobile stand (Tool 1165) engaging the mandrel journals in the stand support brackets. Disconnect the lifting fixture, then position the stand by the mounting plate. With the lifting fixture (Tool 1162) attached to a hoist, position the hooks of the fixture around the mandrel and raise it out of the stand.
- (4) Position the hoist alongside the Hydraclamp, then engage the mandrel over the mounting plate shaft and insert the studs through the plate. Assemble the washers and nuts to the studs and fully tighten the nuts.
- (5) Position the support stand (Tool 1667) under the end of the mandrel, then disconnect the lifting fixture from the mandrel and the hoist. Insert the retaining bolt (Tool 1184) into the end of the mandrel and screw it into the mounting plate.

NOTE: The blade numbering and assembling of the blade keys to the blades (Ref. para. (6) and (7)) may be left at this stage, and carried out with the disk assembled to the slave mandrel (Ref. para. G).

- (6) Release the special nuts securing the mandrel retaining plate, then turn the plate to allow the removal of the blades.
- (7) Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades, then examine the blade roots for their numbering (Ref. Fig. 503). Ensure that all the blades are numbered correctly in numerical sequence in a clockwise direction as viewed from the mandrel (rear) side of the disk, with No.1 blade in the datum slot. Etch all new blades with their position No., and renumber any blades that have been re-positioned, ensuring that all old position No. are obliterated. On completion of the numbering, remove each blade in turn, assemble a blade key (1-340 or 1-350) to the groove in the end face of the blade, then assemble the blade/key to the disk. Turn the mandrel retaining plate to secure the blades.

NOTE: Ensure that the dimension from the face of the key to the top of the dimple does not exceed 0.045 in. (1.14 mm) (Ref. Fig. 515).

SUB-ASSEMBLY  
**72-31-03**

Page 555  
Dec 1/76





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (8) Attach a hoist to the shackle of the retaining bolt, then release the Hydraclamp (if locked) and raise/traverse the hoist to position the mandrel vertically. Lock the Hydraclamp, then release the hoist.
- (9) Assemble the protector/retaining band (Tool 1125) around the blade tips. Assemble the two halves of the protector (Tool 1167) around the labyrinth of the spacer ring, then secure the two halves together with the clamp screws. Remove the special nuts securing the disk/spacer to the balancing mandrel.
- (10) Assemble the lifting fixture (Tool 365) to the stage 2-3 spacer ring (Ref.Fig.514).
  - (a) Attach a hoist to the lifting ring of the lifting fixture, then position the hoist over the spacer.
  - (b) Ensure that the pins of the hand knobs are located in the holes at the 'FREE' position, then lower the hoist and engage the locating plate of the fixture in the spacer. Withdraw the pins of the hand knobs from the 'FREE' position locating holes, turn the knobs to the 'LOCK' position, and ensure that the pins locate in the locating holes.
- (11) Screw the four extractor bolts (Tool 1185) into the tapped holes in the balancing mandrel plate (from underneath) until they contact the disk, then screw the bolts in, in equal progressive increments until the disk is released from the mandrel locating/securing studs. Position and lower the disk onto support (Tool 1326), suitable support blocks or a suitable flat smooth surface.
- (12) Withdraw the pins of the hand knobs from the 'LOCK' position locating holes, turn the knobs to the 'FREE' position, and ensure that the pins locate in the locating holes. Raise the fixture from the spacer and lower onto a suitable surface, then release the hoist.
- (13) Remove the balancing mandrel from the mounting plate (Ref.Fig.507).
  - (a) Attach a hoist to the shackle of the retaining bolt, release the Hydraclamp, then lower the mandrel onto the support stand (Tool 1667).

TN18526

SUB-ASSEMBLY

**72-31-03**

Page 556  
Dec 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



Release the hoist then remove the retaining bolt. Remove the extractor bolts from the plate of the balancing mandrel.

- (b) Attach a hoist to the lifting eye of the lifting fixture (Tool 1162), then position the hoist over the balancing mandrel and engage the two hooks of the fixture around the mandrel.
- (c) Remove the nuts and washers securing the mandrel to the mounting plate, then remove the support stand and traverse the hoist to disengage the mandrel from the mounting plate. Position and lower the mandrel into its storage stand, then remove the lifting fixture from the mandrel and the hoist. Assemble the washers and nuts to the mandrel studs, and the special nuts to the mandrel locating/securing studs.

G. Remove the Spacer Ring from the Disk and Secure the Blades.

- (1) Remove the slave nuts, then remove the spacer ring from the disk.

NOTE: With the disk resting on a flat surface or support(s), lock the blade keys as detailed in para.(7), or if preferred, assemble the disk to a slave mandrel for locking the blades (Ref. Fig.516), and if not carried out previously, the blade numbering and assembling of the blade keys as detailed in para.(2) to (11).

- (2) Assemble the slave mandrel (Tool 1215) to the mounting plate.

NOTE: The slave mandrel may be assembled by hand as detailed in para.(a) or by lifting fixture as detailed in para.(b) to (d).

- (a) Position the mounting plate with its axis vertical, then lock the Hydraclamp. Lower the slave mandrel over the mounting plate shaft with the mandrel retaining nut uppermost. Lower the retaining bolt (Tool 874) into the mandrel and screw it into the mounting plate.
- (b) Connect a hoist to the lifting eye of the lifting fixture (Tool 1162) then position the fixture over the slave mandrel and assemble the mandrel to the fixture.

SUB-ASSEMBLY

**72-31-03**

Page 557

Dec 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) Position the mounting plate with its axis horizontal, then lock the Hydraclamp. Position the hoist alongside the mounting plate, then traverse the hoist and engage the slave mandrel over the mounting plate shaft ensuring that the mandrel retaining nut can be removed from the shaft. Insert the retaining bolt (Tool 874) into the mandrel and screw it into the mounting plate.
  - (d) Position and adjust the support stand (Tool 1667) to support the end of the mandrel. Disconnect the lifting fixture from the mandrel and the hoist. Lift the mandrel to the vertical position by hand, or attach a hoist to the shackle of the retaining bolt, then traverse/raise the hoist to bring the mandrel to the vertical position. Lock the Hydraclamp and release the hoist if used.
- (3) Assemble the multiple leg sling (Tool 1217) to the disk.
- (a) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk.
  - (b) If the four slave bolts (Tool 367) are not assembled, insert the bolts (evenly spaced) into the bolt holes from the rear of the disk so that they protrude above the disk. If the disk is not supported on suitable blocks or support (Tool 1326), assemble the disk to them if required.
  - (c) Lower the sling onto the disk, locate the sling blocks over the slave bolts and screw the thumb-nuts onto the bolts.
- (4) Assemble the stage 3 disk to the slave mandrel.
- (a) Raise the hoist and position the disk over the slave mandrel.
  - (b) Remove the retaining nut from the mandrel, then lower the disk over the mandrel until it abuts the shoulder. Replace and fully tighten the mandrel retaining nut.
  - (c) Unscrew the thumbnuts of the sling and remove the slave bolts. Remove the sling from the hoist.

TN18528

SUB-ASSEMBLY  
**72-31-03**

Page 558  
Dec 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (5) Attach a hoist to the shackle of the retaining bolt, then release the Hydraclamp and lower the mandrel to the horizontal position. Position the support stand (Tool 1667) under the end of the mandrel to take the weight, then remove the hoist.
- (6) If not already carried out, number the blades and assemble the blade keys as detailed in para.F.(7).
- (7) Ensure that a blade is square in the disk slot and not loaded to one side or the other by the action of the protection/retaining band, and that the blade tang abuts the disk and is held against it, then using the hammer (Tool 1655), bend the protruding end of the key against the disk. Ensure that the key is bent over the edge of the disk, but care must be taken that the bend of the key is not too acute causing a fracture of the key. Lock the remainder of the blades in the same manner. Using a feeler gauge, check each blade and ensure that the maximum end-float of the blade root in the disk does not exceed 0.015 in. (0,38 mm).
- (8) Assemble a hoist to the shackle of the retaining bolt, then raise/traverse the hoist to bring the mandrel to the vertical position. Lock the Hydraclamp, then release the hoist.
- (9) Assemble the multiple leg sling (Tool 1217) to the disk.
- (a) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk.
- (b) Insert four slave bolts (Tool 367) (evenly spaced) into the bolt holes from underneath, locate the sling blocks over the slave bolts and screw the thumbnuts onto the bolts.

PRINTED IN ENGLAND

TN18529

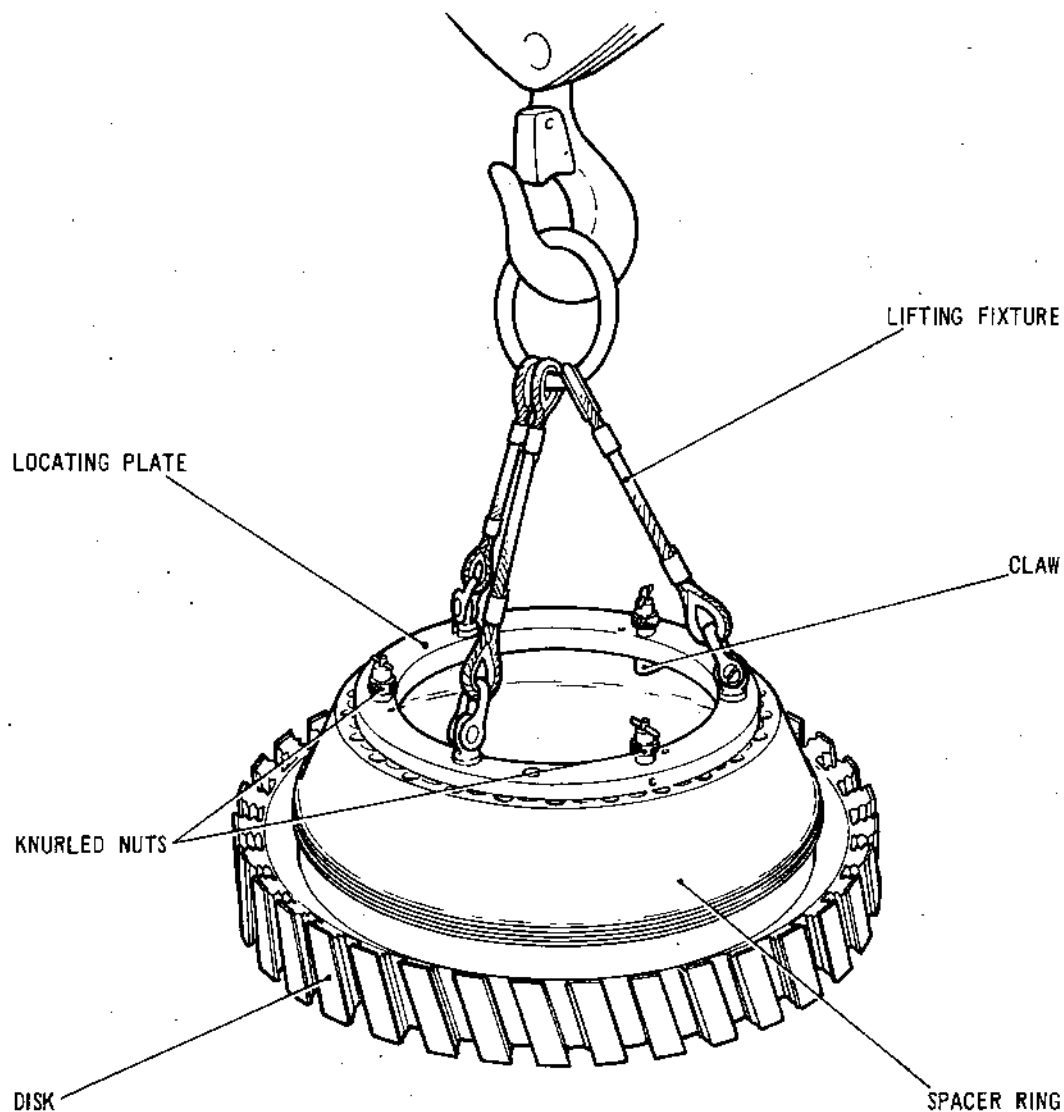


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32124/00A



TN44231

Assembling Lifting Equipment to Stage 3-4 Spacer Ring  
Figure 517

SUB-ASSEMBLY  
**72-31-03**  
Page 560  
Dec 1/75



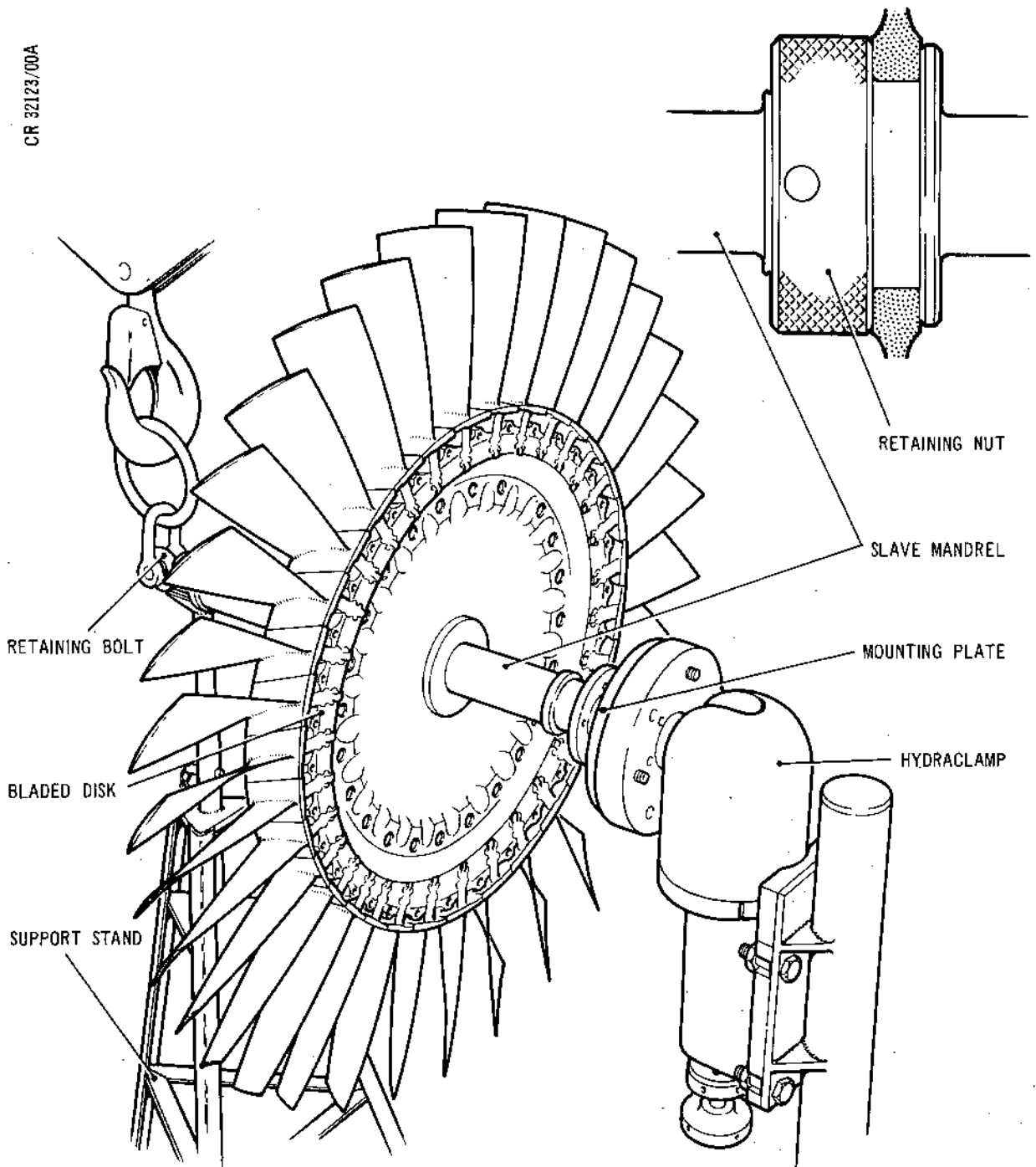
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32123/00A

PRINTED IN ENGLAND



TN44230

Assembling Stage 3 Bladed Disk to Slave Mandrel  
Figure 516

SUB-ASSEMBLY  
**72-31-03**  
Page 561  
Dec 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



9. Balance the Stage 4 Rotor and Stage 3-4 Spacer Ring

NOTE: The stage 4 blades should be received in the container (Tool 1398). Do not remove the blades until they are required for assembly.

A. Assemble the Stage 3-4 Spacer Ring to the Stage 4 Disk.

NOTE: The disk (2-60) should be received in the container (Tool 1407) and the spacer ring (2-30) in the container (Tool 1411).

- (1) Assemble the spacer ring (2-30) to the disk (2-60) as detailed in para.8.A. with the difference that the disk datum hole marks  $\rightarrow 0$  are on the edge of the disk not on the face, and the slave bolt (Tool 426) must be used instead of (Tool 367) (Ref. para.(3)).

B. Assemble the Stage 4 Disk/Spacer Ring to the Balancing Mandrel.

- (1) Assemble the disk/spacer to the balancing mandrel as detailed in para.8.B. with the difference that the balance mandrel (Tool 361) must be used instead of (Tool 379) (Ref. para.(2)), and para.(3) and (5) to read as follows:
  - (3) Assemble the lifting fixture (Tool 444) to the stage 3-4 spacer ring (Ref.Fig.517).
    - (a) Attach a hoist to the lifting ring of the lifting fixture, then position the hoist over the spacer.
    - (b) Ensure that the knurled nuts are unscrewed and the claws turned to align them with the plate, then lower the hoist and engage the locating plate of the fixture in the spacer. Turn the claws outwards to engage them under the spacer flange, then tighten the knurled nuts to lock the claws in position.
  - (5) Release the knurled nuts of the fixture, turn the claws sideways, then raise the fixture from the spacer ring and remove the fixture from the hoist.

TN18531

SUB-ASSEMBLY

**72-31-03**

Page 562  
Dec 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



C. Assemble the Blades to Stage 4 Disk.

- (1) Assemble the stage 4 blades (2-40) to the disk as detailed in para.8.C.

NOTE: If all the original blades are available and undamaged and are to be assembled to the original disk/spacer the bladed disk does not require balancing, but the blades must be assembled to the disk with serviceable blade keys (2-50) as detailed in para.8.F.(7).

D. Assemble the Stage 4 Bladed Disk/Spacer Ring to the Balancing Machine.

- (1) Assemble the bladed disk/spacer ring to the balancing machine as detailed in para.8.D.

E. Balance the Stage 4 Bladed Disk/Spacer Ring.

- (1) Balance the bladed disk/spacer ring as detailed in para.8.E. to within 4 drn in. (180 grm mm) by the interchange of blades only. Ignore the reference to balancing weights in para.(2) and ignore para.(4), and mass moment weigh the blades (if necessary) as detailed in para.3.

F. Remove the Bladed Disk/Spacer Ring from the Balancing Machine.

- (1) Remove the bladed disk/spacer ring from the balancing machine and assemble the blade keys as detailed in para.8.F. with the following differences.
  - (a) Use blade keys (2-50) instead of (1-340 or 1-350) (Ref.para.(7)). The protection/retaining band (Tool 1126) must be used instead of (Tool 1125), and the spacer ring labyrinth protector (Tool 1168) must be used instead of (Tool 1167) (Ref.para.(9)).

PRINTED IN ENGLAND

TN40345

SUB-ASSEMBLY

**72-31-03**

Page 563  
Dec 1/76



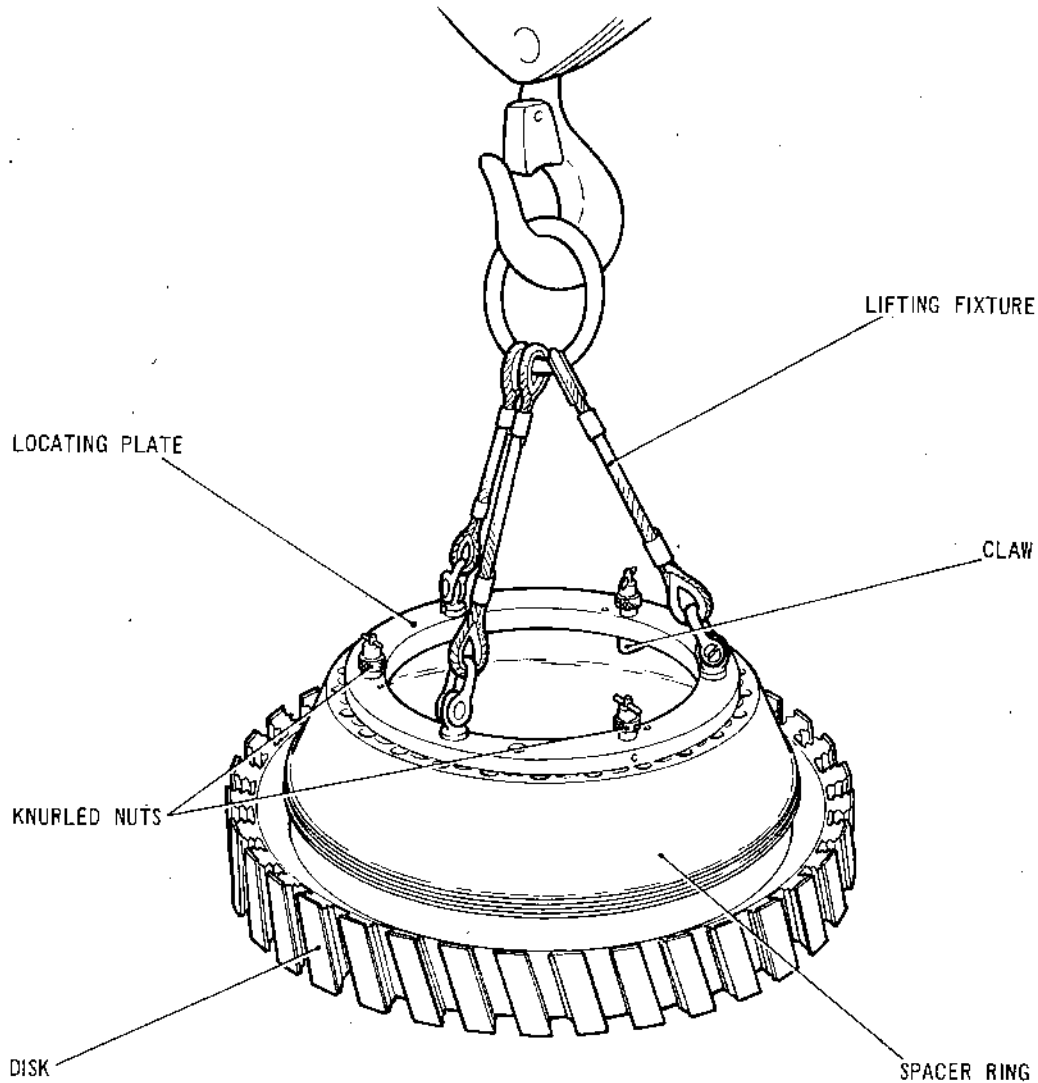


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32124/00A



TN44231

Assembling Lifting Equipment to Stage 3-4 Spacer Ring  
Figure 517

SUB-ASSEMBLY

**72-31-03**

Page 564

Dec 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(b) Amend para. (10) and (12) to read as follows:

(10) Assemble the lifting fixture (Tool 444) to the stage 3-4 spacer ring.

- (a) Attach a hoist to the lifting ring of the lifting fixture, then position the hoist over the spacer.
- (b) Ensure that the knurled nuts are unscrewed and the claws turned to align them with the plate, then lower the hoist and engage the locating plate of the fixture in the spacer. Turn the claws outwards to engage them under the spacer flange, then tighten the knurled nuts to lock the claws in position.

(12) Release the knurled nuts of the fixture, turn the claws sideways, then raise the fixture from the spacer ring and remove the fixture from the hoist.

G. Remove the Spacer Ring from the Disk and Secure the Blades.

- (1) Remove the spacer ring from the disk and secure the blades as detailed in para.8.G. with the difference that the slave bolt (Tool 426) must be used instead of (Tool 367) (Ref. para.(3)(b) and (9)(b)).

10. Balance the Stage 5 Rotor and Stage 4-5 Spacer Ring

NOTE: The stage 5 blades should be received in the container (Tool 1399). Do not remove the blades until required for assembly.

A. Assemble the Stage 4-5 Spacer Ring to the Stage 5 Disk.

NOTE: The disk (2-120) should be received in the container (Tool 1407) and the spacer ring in the container (Tool 1411).

SUB-ASSEMBLY

**72-31-03**

Page 565  
Dec 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (1) Assemble the spacer ring (2-90) to the disk (2-120) as detailed in para.8.A. with the difference that the disk datum hole marks  $\rightarrow 0$  are on the edge of the disk not on the face, and the slave bolts (Tool 426) must be used instead of (Tool 367) (Ref. para.(3)).
- B. Assemble the Stage 5 Disk/Spacer Ring to the Balancing Mandrel.
- (1) Assemble the disk/spacer to the balancing mandrel as detailed in para.8.B. with the difference that the balancing mandrel (Tool 362) must be used instead of (Tool 379) (Ref. para.(2)), and para.(3) and (5) to read as follows:
    - (3) Assemble the multiple leg sling (Tool 321) to the stage 4-5 spacer ring (Ref.Fig.518).
      - (a) Attach a hoist to the lifting ring of the sling, then position the sling over the spacer.
      - (b) Ensure that the hand knobs are loose and located at the 'UNLOCK' position, then lower the hoist and locate the sling plates in the spacer. Slide the hand knobs to the 'LOCK' position, engaging the clamp plates under the spacer flange, then tighten the hand knobs.
    - (5) Release the hand knobs and slide them to the 'UNLOCK' position. Raise the sling from the spacer ring and remove the sling from the hoist.

TN18533

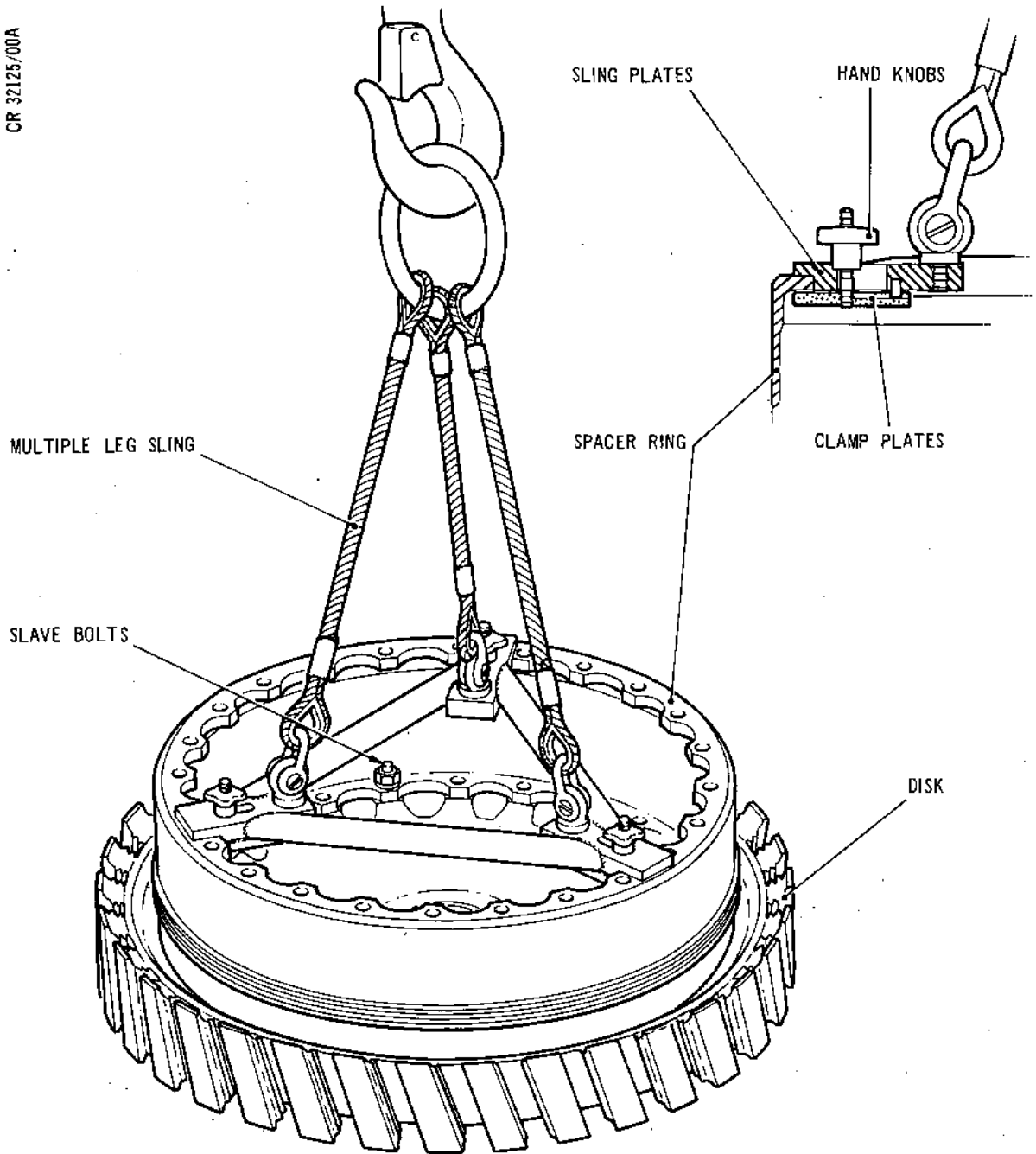


OLYMPUS 593  
MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32125/00A



TN44232

Assembling Multiple Leg Sling to Stage 4-5 Spacer Ring  
Figure 518

SUB-ASSEMBLY  
**72-31-03**  
Page 567  
Dec 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



C. Assemble the Blades to Stage 5 Disk.

- (1) Assemble the stage 5 blades (2-100) to the disk as detailed in para.8.C.

NOTE: If all the original blades are available and undamaged and are to be assembled to the original disk/spacer the bladed disk does not require balancing, but the blades must be assembled to the disk with serviceable blade keys (2-110) as detailed in para.8.F.(7).

D. Assemble the Stage 5 Bladed Disk/Spacer Ring to the Balancing Machine.

- (1) Assemble the bladed disk/spacer ring to the balancing machine as detailed in para.8.D.

E. Balance the Stage 5 Bladed Disk/Spacer Ring.

- (1) Balance the bladed disk/spacer ring as detailed in para.8.E. to within 4 drmm in. (180 grm mm) by the interchange of blades only. Ignore the reference to balancing weights in para.(2) and ignore para.(4), and mass moment weigh the blades (if necessary) as detailed in para.3.

F. Remove the Bladed Disk/Spacer Ring from the Balancing Machine.

- (1) Remove the bladed disk/spacer ring from the balancing machine and assemble the blade keys as detailed in para.8.F. with the following differences.
  - (a) Use blade keys (2-110) instead of (1-340 or 1-350) (Ref. para.(7)). The protection/retaining band (Tool 1127) must be used instead of (Tool 1125) and the spacer ring labyrinth protector (Tool 1169) must be used instead of (Tool 1167) (Ref. para.(9)).

TN18535

SUB-ASSEMBLY  
**72-31-03**

Page 568  
Dec 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(b) Amend para.(10) and (12) to read as follows:

(10) Assemble the multiple leg sling (Tool 321) to the stage 4-5 spacer ring.

(a) Attach the hoist to the ring of the sling, then position the sling over the spacer.

(b) Ensure that the hand knobs are loose and located at the 'UNLOCK' position, then lower the hoist and locate the sling plates in the spacer. Slide the hand knobs to the 'LOCK' position, engaging the clamp plates under the spacer flange, then tighten the hand knobs.

(12) Release the hand knobs and slide them to the 'UNLOCK' position. Raise the sling from the spacer ring and remove the sling from the hoist.

G. Remove the Spacer Ring from the Disk and Secure the Blades.

(1) Remove the spacer ring from the disk and secure the blades as detailed in para.8.G. with the difference that the slave bolt (Tool 426) must be used instead of (Tool 367) (Ref. para.(3)(b) and (9)(b)).

11. Balance the Stage 6 Rotor and Stage 5-6 Spacer Ring

NOTE: The stage 6 blades should be received in the container (Tool 1464). Do not remove the blades until they are required for assembly.



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



A. Assemble the Stage 5-6 Spacer Ring to the Stage 6 Disk.

NOTE: The disk (2-180) should be received in the container (Tool 1407) and the spacer ring (2-150) in the container (Tool 1411).

- (1) Assemble the spacer ring (2-150) to the disk (2-180) as detailed in para.8.A. with the difference that the disk datum hole marks  $\rightarrow 0$  are on the edge of the disk, not on the face, and the slave bolt (Tool 368) must be used instead of (Tool 367) (Ref. para.(3)).

B. Assemble the Stage 6 Disk/Spacer Ring to the Balancing Mandrel.

- (1) Assemble the disk/spacer to the balancing mandrel as detailed in para.8.B. with the difference that the balancing mandrel (Tool 602) with attached blade retaining plate (Tool 1275), must be used instead of (Tool 379) (Ref. para.(2)), and para.(3) and (5) to read as follows:
  - (3) Assemble the multiple leg sling (Tool 321) to the stage 5-6 spacer ring.
    - (a) Attach a hoist to the lifting ring of the sling, then position the sling over the spacer.
    - (b) Ensure that the hand knobs are loose and located at the 'UNLOCK' position, then lower the hoist and locate the sling plates in the spacer. Slide the hand knobs to the 'LOCK' position, engaging the clamp plates under the spacer flange, then tighten the hand knobs.
  - (5) Release the hand knobs and slide them to the 'UNLOCK' position. Raise the sling from the spacer ring and remove the sling from the hoist.

TN18536



OLYMPUS 593

MK.610-14-28  
OVERHAUL



C. Assemble the Blades to Stage 6 Disk.

- (1) Assemble the stage 6 blades (2-160) to the disk as detailed in para.8.C.

NOTE: Ensure that the aggregate blending depth of repaired blades does not exceed 2.000 in. (50,8 mm) (Ref.72-31-03, Repair No.6).

NOTE: If all the original blades are available and undamaged and are to be assembled to the original disk/spacer the bladed disk does not require balancing but the blades must be assembled to the disk with serviceable blade keys (2-170) as detailed in para.8.F.(7).

D. Assemble the Stage 6 Bladed Disk/Spacer Ring to the Balancing Machine.

- (1) Assemble the bladed disk/spacer ring to the balancing machine as detailed in para.8.D.

E. Balance the Stage 6 Bladed Disk/Spacer Ring.

- (1) Balance the bladed disk/spacer ring as detailed in para.8.E. to within 4 grm in. (180 grm mm) by the interchange of blades only. Ignore the reference to balancing weights in para.(2) and ignore para.(4), and mass moment weigh the blades (if necessary) as detailed in para.(3).

F. Remove the Bladed Disk/Spacer Ring from the Balancing Machine.

- (1) Remove the bladed disk/spacer ring from the balancing machine and assemble the blade keys as detailed in para.8.F. with the following differences.
  - (a) Use blade keys (2-170) instead of (1-340 or 1-350) (Ref.para.(7)). The protection/retaining band (Tool 1128) must be used instead of (Tool 1125) (Ref. para.(9)).

PRINTED IN ENGLAND

TN18537

SUB-ASSEMBLY

72-31-03

Page 571

Dec 1/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



(b) Amend para.(10) and (12) to read as follows:

(10) Assemble the multiple leg sling (Tool 321) to the stage 5-6 spacer ring.

(a) Attach the hoist to the ring of the sling, then position the sling over the spacer.

(b) Ensure that the hand knobs are loose and located at the 'UNLOCK' position, then lower the hoist and locate the sling plates in the spacer. Slide the hand knobs to the 'LOCK' position, engaging the clamp plates under the spacer flange, then tighten the hand knobs.

(12) Release the hand knobs and slide them to the 'UNLOCK' position. Raise the sling from the spacer ring and remove the sling from the hoist.

G. Remove the Spacer Ring from the Disk and Secure the Blades.

(1) Remove the spacer ring from the disk and secure the blades as detailed in para.8.G. with the difference that the slave bolts (Tool 368) must be used instead of (Tool 367) (Ref. para.(3)(b) and (9)(b)).

## 12. Balance the Stage 7 Rotor and Stage 6-7 Spacer Ring

NOTE: The stage 7 disk blades should be received in the container (Tool 1465). Do not remove the blades until they are required for assembly.

A. Assemble the Stage 6-7 Spacer Ring to the Stage 7 Disk.

NOTE: The disk (3-340) should be received in the container (Tool 1406) and the spacer ring (3-270) in the container (Tool 1410).

(1) Assemble the spacer ring (3-270) to the disk (3-340) as detailed in para.8.A. with the difference that the disk datum hole marks  $\rightarrow 0$  are on the edge of the disk, not on the face, and the slave bolt (Tool 1164) must be used instead of (Tool 367) (Ref. para.(3)).

TN18547



OLYMPUS 593

MK.610-14-28  
OVERHAUL



B. Assemble the Stage 7 Disk/Spacer Ring to the Balancing Mandrel.

- (1) Assemble the disk/spacer to the balancing mandrel as detailed in para.8.B. with the difference that the balancing mandrel (Tool 1026) must be used instead of (Tool 379) (Ref. para.(2)), and para.(3) and (5) to read as follows:
  - (3) Assemble the multiple leg sling (Tool 321) to the stage 6-7 spacer ring.
    - (a) Attach a hoist to the lifting ring of the sling, then position the sling over the spacer.
    - (b) Ensure that the hand knobs are loose and located at the 'UNLOCK' position, then lower the hoist and locate the sling plates in the spacer. Slide the hand knobs to the 'LOCK' position, engaging the clamp plates under the spacer flange, then tighten the hand knobs.
  - (5) Release the hand knobs and slide them to the 'UNLOCK' position. Raise the sling from the spacer ring and remove the sling from the hoist.

C. Assemble the Blades to Stage 7 Disk.

- (1) Assemble the stage 7 blades (3-320) to the disk as detailed in para.8.C.

NOTE: Ensure that the aggregate blending depth of repaired blades does not exceed 2.000 in. (50,8 mm) (Ref.72-31-03, Repair No.6).

NOTE: If all the original blades are available and undamaged and are to be assembled to the original disk/spacer the bladed disk does not require balancing but the blades must be assembled to the disk with serviceable blade keys (3-330) as detailed in para.8.F.(7).



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- D. Assemble the Stage 7 Bladed Disk/Spacer Ring to the Balancing Machine.
- (1) Assemble the bladed disk/spacer ring to the balancing machine as detailed in para.8.D.
- E. Balance the Stage 7 Bladed Disk/Spacer Ring.
- (1) Balance the bladed disk/spacer ring as detailed in para.8.E. to within 4 drmm in. (180 grm mm) by the interchange of blades only. Ignore the reference to balancing weights in para.(2) and ignore para.(4), and mass moment weigh the blades (if necessary) as detailed in para.(3).
- F. Remove the Bladed Disk/Spacer Ring from the Balancing Machine.
- (1) Remove the bladed disk/spacer ring from the balancing machine and assemble the blade keys (3-330) (Ref. para.(7)) as detailed in para.8.F. with the following differences.
- (a) The protection/retaining band (Tool 1129) must be used instead of (Tool 1125) and the spacer ring labyrinth protector (Tool 1170) must be used instead of (Tool 1167) (Ref. para.(9)).
- (b) Amend para.(10) and (12) to read as follows:
- (10) Assemble the multiple leg sling (Tool 321) to the stage 6-7 spacer ring.
- (a) Attach a hoist to the ring of the sling, then position the sling over the spacer.
- (b) Ensure that the hand knobs are loose and located at the 'UNLOCK' position, then lower the hoist and locate the sling plates in the spacer. Slide the hand knobs to the 'LOCK' position, engaging the clamp plates under the spacer flange, then tighten the hand knobs.

TN18548

SUB-ASSEMBLY

**72-31-03**

Page 574

Dec 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (12) Release the hand knobs and slide them to the 'UNLOCK' position. Raise the sling from the spacer ring and remove the sling from the hoist.

G. Remove the Spacer Ring from the Disk and Secure the Blades.

- (1) Remove the spacer ring from the disk and secure the blades as detailed in para.8.G. with the difference that the slave bolts (Tool 1164) must be used instead of (Tool 367) (Ref. para.(3)(b) and (9)(b)).

### 13. Balance the Stage 1 Rotor

NOTE: The stage 1 blades should be received in the container (Tool 1395). Do not remove the blades until required for assembly.

A. Assemble the Blades to Stage 1 Disk (Ref.Fig.520).

- (1) Position the balancing adapter (Tool 1845) on a work surface then unscrew and remove the collar nut and retaining plate from the adapter. Unscrew and remove the seven nuts and washers from the adapter location pins (Ref.Fig.521).
- (2) Assemble the lifting fixture (Tool 401) to the stage 1 disk (1-160) (Ref.Fig.519).

NOTE: The disk should be received in the container (Tool 1409).

NOTE: The lifting fixture should be assembled to the rear face of the disk, denoted by the smaller outside diameter.

- (a) Attach a hoist to the lifting fixture, then position the hoist over the disk.

PRINTED IN ENGLAND

TN40346

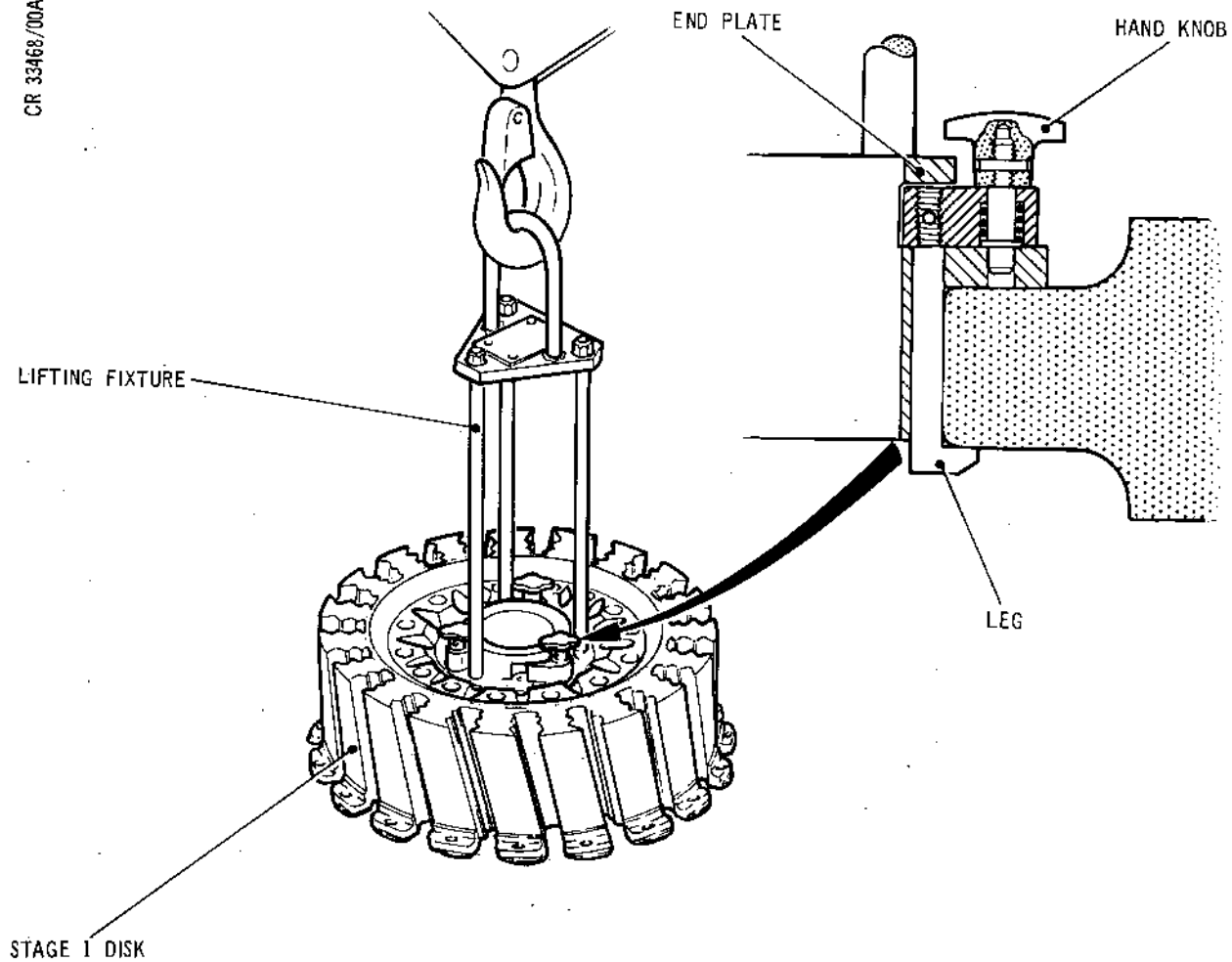


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33468/00A



TN17072

Assembling Lifting Fixture to Stage 1 Disk  
Figure 519

SUB-ASSEMBLY  
**72-31-03**  
Page 576  
Dec 1/76

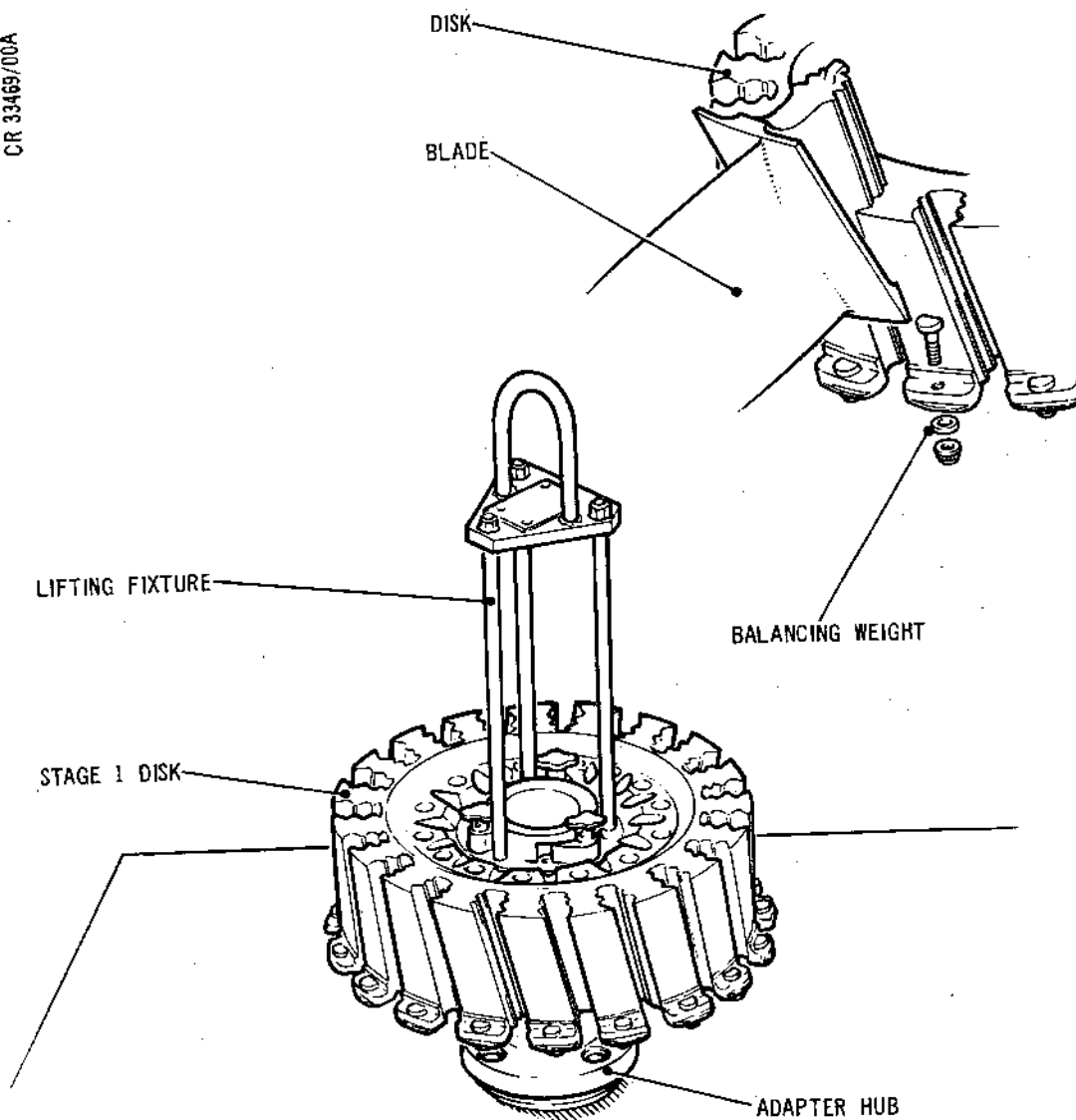


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 33469/00A



Assembling Blades to Stage 1 Disk  
Figure 520.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (b) Unscrew and remove the knurled nut and clamp plate from the disk container.
  - (c) Ensure that the lifting fixture hand knobs are located at the 'FREE' position, then lower the hoist and engage the end plate of the fixture in the disk. Withdraw the hand knobs from the 'FREE' position and turn the knobs to the 'LOCK' position, engaging the lugs under the disk, depress the hand knobs and ensure that the pins locate in the locking holes.
- (3) Raise the hoist and position the disk above the adapter. Align the holes in the disk with the seven location pins then lower the disk on to the adapter. Secure the disk to the adapter by reassembling the washers and nuts to the location pins.
- (4) Disengage the hoist from the lifting fixture and remove the hoist.
- (5) Assemble balancing weights to the stage 1 disk (Ref.Fig.520).
- (a) Apply lubricant 'B' to the 19 bolts (1-140), then insert the bolts, from the rear of the disk, into the outer ring of holes in the disk, and assemble a balancing weight (1-120) and nut (1-110) to each bolt. Ensure that each nut has a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m), then torque-tighten the nuts between 85 and 95 lbf in. (9,6 and 10,7 N.m).
  - (b) After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 1.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref.SB.72-8449-191).
- (6) Assemble the blades to the stage 1 disk (Ref.Fig.520).

NOTE: If all the original blades are available and undamaged then assemble the blades as detailed in para.(a). If the blades include 3 repaired and/or new blades, then the blades must be assembled as detailed in para.(b). If the blades include more than 3 repaired and/or new blades then the blades must be assembled as detailed in para.(c). Ensure that the aggregate blending depth of repaired blades does not exceed 3.600 in. (91,44 mm) (Ref. 72-31-03 Repair No.6).

SUB-ASSEMBLY

**72-31-03**

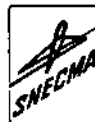
Page 578

Jun 30/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (a) Identify the stage 1 blades (1-150), then examine the blade roots for their positional No. (Ref.Fig.503) and lay the blades out in numerical sequence. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades. Insert the blades, in numerical sequence, from the rear of the disk starting at No.1 position and working in a clockwise direction.
- (b) Identify the stage 1 blades (1-150) then examine the roots of the original blades for their positional No. (Ref.Fig.503) and lay the blades out in numerical sequence, leaving spaces where new blades are to be positioned. Noting the mass moment weight of the new blades, place the lightest new blades in vacant positions next to the heaviest original blades, and position the heaviest new blades in vacant positions next to the lightest original blades. Assemble the blades to the disk as detailed in para.(a).
- (c) Identify the stage 1 blades (1-150), then according to the mass moment weight of the blades (quoted on the labels), lay the blades out in sequence of weight, starting with the heaviest blade and ending with the lightest. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades (Ref.Fig.503). Assemble the blades from the rear of the disk positioning the heaviest blade at No.1 position and the next heaviest blade diametrically opposite, then assemble the two lightest blades dimetrically opposite each other and next to the heaviest blades. Assemble the remainder of the blades to the disk in sequence of weight, assembling alternate pairs of heavy and light blades and where possible, positioning equal weight blades opposite each other.

PRINTED IN ENGLAND

TN17075





OLYMPUS 593

MK.610-14-28  
OVERHAUL



B. Assemble the Stage 1 Bladed Disk/Adapter to the Balancing Machine.

- (1) Attach a hoist to the lifting fixture assembled to the disk. Raise the hoist and position the disk/adapter above the balancing machine.
- (2) Align the holes in the adapter hub with the spindle head of the machine, then lower the adapter on to the machine and secure with the six retaining screws (Tool 1826) (Ref.Fig.521).
- (3) Raise the lifting fixture hand knobs and move them to the 'FREE' position, depress the knobs to engage the locking holes, then raise the hoist and remove the fixture.
- (4) Pass the blade retaining plate spigot over the central bolt in the adapter and secure the plate with the collar nut.

C. Balance the Stage 1 Bladed Disk.

- (1) Carry out a static balance of the bladed disk, operating the balancing machine in accordance with the manufacturers instructions. The disk should be rotated as for engine rotation (counter-clockwise viewed from the rear). The balance of the disk must be within 4 drms in. (180 grms mm). If the balance of the disk is outside the limit, rectify by the interchange of heavy and light weight blades (Ref.para. (2)), and the interchange of heavy and light weight balancing weights (ref.para.(3)) from the out of balance angular position, until the disk is within limits. Before any blades or weights are interchanged check the out of balance readings by rotating the disk 180 degrees relative to the adapter and retaining plate and repeating the balancing procedure.

IN17081

SUB-ASSEMBLY

**72-31-03**

Page 580

Dec 1/76

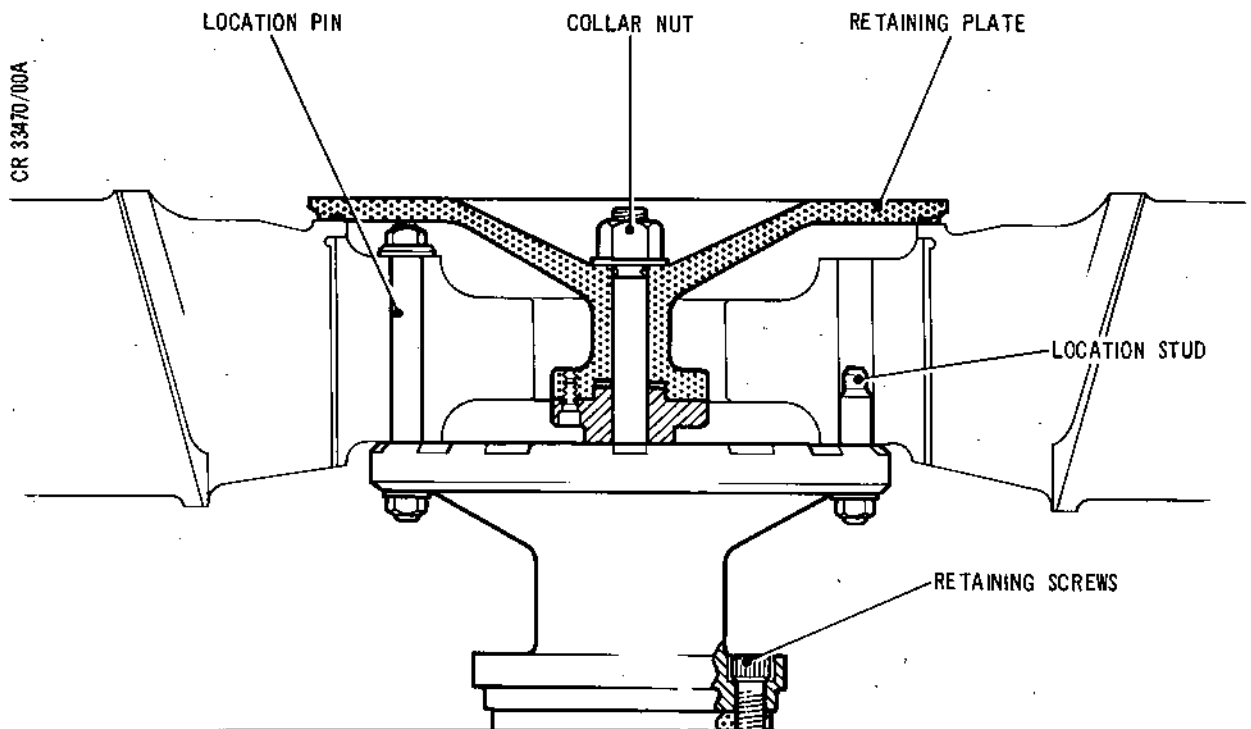


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



TN17082

Assembly of Adapter/Disk to the Balancing Machine  
Figure 521

SUB-ASSEMBLY  
**72-31-03**  
Page 581  
Dec 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Gain access to the blades by unscrewing and removing the collar nut and removing the blade retaining plate. Withdraw a heavy blade from as near the out of balance position as possible, and exchange it for a light blade from as near diametrically opposite as possible then reassemble the retaining plate and collar nut.

NOTE: If the blades are the original and labels stating the mass moment weight are not attached to the blades, two or three of the blades, from the out of balance position, must be removed (noting their positions) and weighed (Ref. para. 2.), as must blades from the diametrically opposite position. The suitable weight blades must be exchanged, and the remainder replaced in their original positions. Record the weight and position of the blades removed for possible further exchange of blades.

- (3) If, after exchanges of blades, it is found that the balance cannot be brought within the limits (due to the size/weight of the blades), the balancing weights must be changed. Release and remove a (light-weight) balancing weight (1-120) from the front of the disk at the out of balance position, (Ref. Fig. 520) assemble a (heavier weight) balancing weight, (either 1-125 or 1-130) to the bolt. Lubricate the nut (1-110) with lubricant 'B', then screw it onto the bolt, ensure that it has a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m) and torque-tighten between 85 and 95 lbf in. (9,6 and 10,7 N.m). The max number of heavy balancing weights that can be used is 4 off (1-125) and 6 off (1-130).

D. Remove the Bladed Disk/Adapter from the Balancing Machine and Number the Blades.

- (1) Unscrew and remove the collar nut and retaining plate from the balancing adapter.

TNI 7083

SUB-ASSEMBLY

**72-31-03**

Page 582

Dec 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Assemble the blade protection/retaining band (Tool 1123) to the blade tips.
- (3) Assemble the lifting fixture (Tool 401) to the disk/adapter.
  - (a) Attach a hoist to the lifting fixture and position the fixture above the balancing machine.
  - (b) Ensure the fixture hand knobs are in the 'FREE' position then lower the fixture and engage the plate in the disk.
  - (c) Raise the fixture hand knobs and move them to the LOCK position, this engages the claws beneath the disk, depress the knobs to engage their locking holes.
- (4) Unscrew and remove the six retaining screws which secure the adapter to the balancing machine then raise the hoist and position the disk/adapter on a work surface; disengage the hoist from the lifting fixture then remove the hoist.
- (5) Examine the edge of the disk for the No.1 blade datum marks  $\rightarrow 0$ , then examine the blade roots for their numbering (Ref.Fig.503). Ensure that all the blades are numbered correctly in numerical sequence in a clockwise direction, viewed from the rear side of the disk, with No.1 blade in the datum slot. Etch all new blades with their position No. and renumber any blades that have been re-positioned, ensure that all old position No. are obliterated.

E. Remove the Bladed Disk from the Balancing Adapter.

- (1) Unscrew and remove the seven nuts and washers which secure the disk to the balancing adapter then attach a hoist to the lifting fixture.

SUB-ASSEMBLY

**72-31-03**

Page 583

Dec 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (2) Position the centre support (Tool 1326) on a work surface then raise the hoist to remove the disk from the adapter and position the disk on the support.
- (3) Raise the lifting fixture hand knobs and move them to the 'FREE' position, depress the knobs to engage the locking holes then raise the hoist and remove the fixture.

F. Check the Stage 1 Blade Tang Clearances.

- (1) Remove the protection/retaining band from the blade tips (if assembled).
- (2) Examine the edge of the disk and identify the datum hole by the datum mark  $\rightarrow 0$ . Remove the stage 1-2 spacer ring (1-190) from its container (Tool 1410), examine the spacer and identify the datum hole by the datum mark  $\rightarrow 0$  on the edge of the flange (Ref.Fig.503). Release and remove the protector (Tool 443) (if assembled) from the spacer ring, then place the spacer on the disk, align the datum holes, and ensure that the spacer abuts the disk.
- (3) Using feeler gauges, check that there is a clearance between each blade tang and the spacer ring of between 0.002 and 0.008 in. (0,05 and 0,20 mm).
- (4) Remove the spacer ring from the disk, assemble the protector (Tool 443) to the spacer, then stow the spacer on the top shelf of the container (Tool 1410). Place the protection/retaining band (Tool 1123) around the tips of the blades, then place the disk on a pallet, use the lifting fixture (Tool 401) (Ref.para.A.(2)) if required.

NOTE: The stage 1 bladed disk is now ready to be passed to the LP Compressor Assembly (72-31-00 Assembly).

FN17085



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



14. Balance the Stage 2 Rotor and Stage 1-2 Spacer Ring

NOTE: The stage 2 blades should be received in the container (Tool 1396). Do not remove the blades until required for assembly.

A. Assemble the Stage 1-2 Spacer Ring to the Stage 2 Disk.

NOTE: The disk (1-250) should be received in the container (Tool 1407).

- (1) Unscrew and remove the knurled nut and clamp plate from the disk container. Ensure the disk has its front face, denoted by the plain lobes, uppermost.
- (2) Attach the multiple leg sling (Tool 1285) to a hoist and position the hoist above the disk.
- (3) Unscrew and remove the three nuts and washers from the waisted bolts of the sling then pass the bolts through the holes in the disk. Reassemble the washers and nuts to the bolts to secure the disk to the sling.
- (4) Raise the hoist and position the disk on suitable blocks or support (Tool 1326).
- (5) Unscrew the nuts from the waisted bolts of the sling, raise the hoist and remove the sling from the disk.
- (6) Examine the front face of the disk at the blade root position, and identify the datum hole by the datum mark  $\rightarrow 0$  to each side of No.1 blade slot. Remove the spacer (1-190) from the container (Tool 1410) (top shelf), then examine the spacer ring and identify the datum hole by the datum mark  $\rightarrow 00 \leftarrow$  on the edge of the flange (Ref.Fig.503). Place the spacer ring on the disk aligning the datum holes.
- (7) Insert the four slave bolts (Tool 366) into the bolt holes from underneath the disk, ensure that they are evenly spaced, then assemble a slave washer and nut to each bolt (Ref.Fig.522). Fully tighten the nuts then invert the assembly and reposition on the support.

PRINTED IN ENGLAND

TN17092

SUB-ASSEMBLY

**72-31-03**

Page 585

Dec 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



B. Assemble the Blades to Stage 2 Disk.

NOTE: If all the original blades are available and undamaged then assemble the blades as detailed in para.(1). If the blades include 4 repaired and/or new blades, then the blades must be assembled as detailed in para.(2). If the blades include more than 4 repaired and/or new blades then the blades must be assembled as detailed in para.(3). Ensure that the aggregate blending depth of repaired blades does not exceed 3.600 in. (91,44 mm) (Ref. 72-31-03 Repair No.6).

- (1) Identify the stage 2 blades (1-240), then examine the blade roots for their positional No. (Ref.Fig.503) and lay the blades out in numerical sequence. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades. Insert the blades in numerical sequence, starting at No.1 position and working in a clockwise direction.
- (2) Identify the stage 2 blades (1-240) then examine the roots of the original blades for their positional No. (Ref.Fig.503) and lay the blades out in numerical sequence, leaving spaces where new blades are to be positioned. Noting the mass moment weight of the new blades, place the lightest new blades in vacant positions next to the heaviest original blades, and position the heaviest new blades in vacant positions next to the lightest original blades. Assemble the blades to the disk as detailed in para. (1).
- (3) Identify the stage 2 blades (1-240), then according to the mass moment weight of the blades (quoted on the labels), lay the blades out in sequence of weight, starting with the heaviest blade and ending with the lightest. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades. Assemble the blades to the disk positioning the heaviest blade at No.1 position and the next heaviest blade diametrically opposite. Assemble the two lightest blades diametrically opposite each other and next to the heaviest blades.

IN40347



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Assemble the remainder of the blades to the disk in sequence of weight, assembling alternate pairs of heavy and light blades and where possible, positioning equal weight blades diametrically opposite each other.

- (4) Assemble the blade protection/retaining band (Tool 1124) to the blade tips then invert the assembly and reposition on the support.

C. Assemble the Balancing Adapter and Hub to the Balancing Machine.

NOTE: Ensure the blade retaining plate, attached to the underside of the adapter, is secure.

- (1) Assemble the adapter (Tool 1846) to the hub (Tool 1850) and secure with the six retaining screws, ensure the four location pins (Tool 1849) and four location studs are assembled to the adapter (Ref.Fig.523).
- (2) Assemble and secure the adapter/hub to the spindle head of the balancing machine with the six retaining screws (Tool 1826).
- (3) Unscrew and remove the nuts and washers from the adapter location pins.

NOTE: After use the hub may be left attached to the adapter.

D. Assemble the Bladed Disk/Spacer Ring to the Balancing Machine.

- (1) Assemble the lifting fixture (Tool 364) to the stage 1-2 spacer ring (Ref.Fig.522).
  - (a) Attach a hoist to the lifting ring of the lifting fixture, then position the hoist over the spacer/disk.

PRINTED IN ENGLAND

TN17093

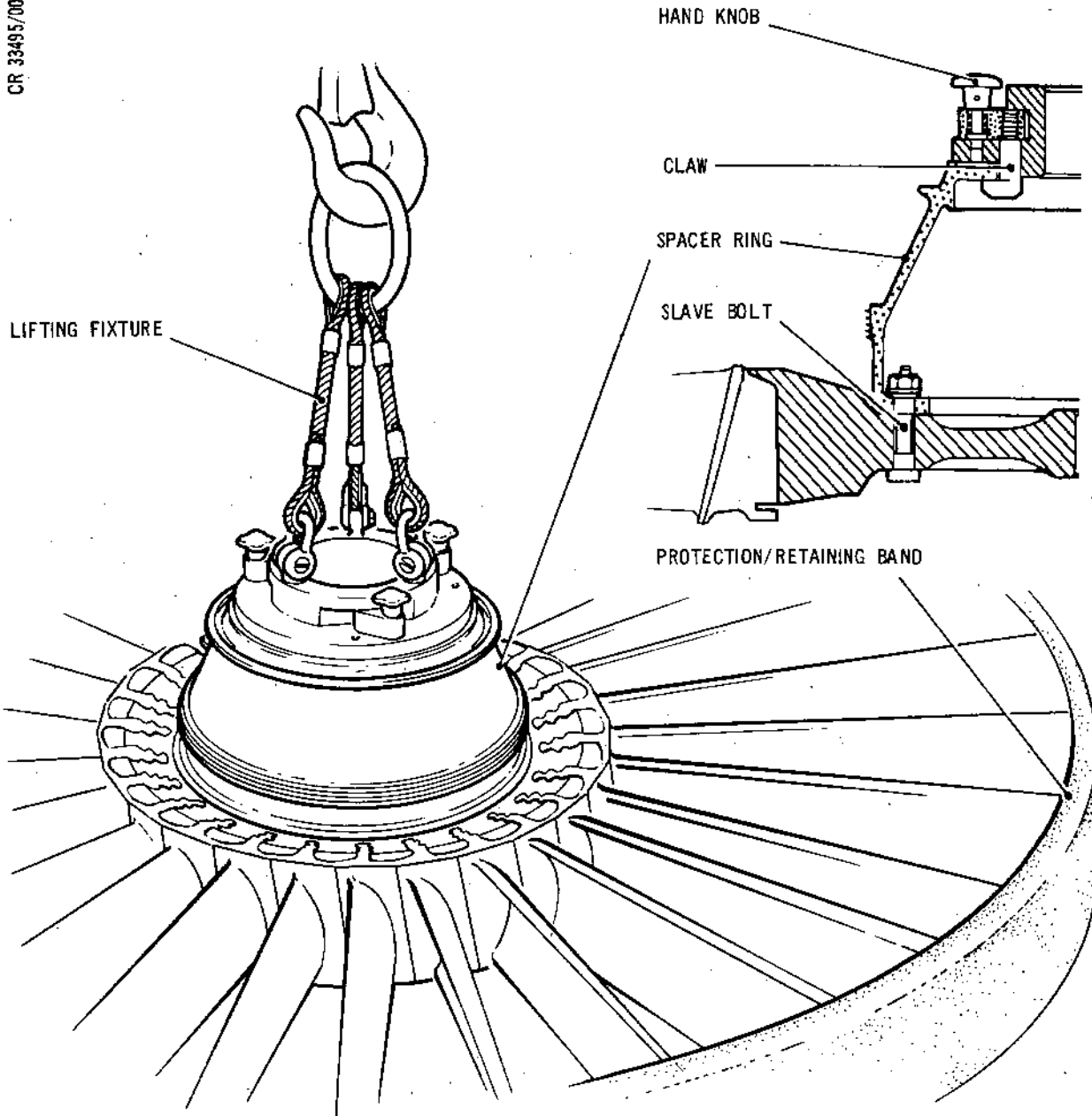




OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 33495/00A



TN17091

Assembling Lifting Fixture to Stage 2 Disk/Stage 1-2 Spacer Ring  
Figure 522

SUB-ASSEMBLY  
**72-31-03**  
Page 588  
Dec 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Ensure that the lifting fixture hand knobs are located at the 'FREE' position, then lower the hoist and engage the locating plate of the fixture in the spacer. Withdraw the hand knobs and turn to the 'LOCK' position, engaging the claws under the spacer flange, depress the knobs to engage the locking holes.
- (2) Raise the hoist and position the disk over the balancing machine, align the holes in the disk with the pins in the adapter. Lower the disk/spacer over the adapter locating/securing pins, ensure that it is lowered squarely until the disk abuts the adapter.
- (3) Withdraw the lifting fixture hand knobs from the 'LOCK' position and turn the knobs to the 'FREE' position, depress the knobs to engage the locking holes. Raise the fixture from the spacer ring and lower the fixture onto a suitable surface, then release the hoist.
- (4) Screw the special nuts and washers on to the location pins (Ref.Fig.523) and fully tighten the nuts. Adjust the blade retaining plate setting screws to ensure the blades are fully forward in the disk. Remove the blade protection/retaining band from the blade tips and, if assembled, the labyrinth protector from the spacer ring.

E. Balance the Stage 2 Bladed Disk/Spacer Ring.

- (1) Carry out a static balance of the bladed disk, operating the balancing machine in accordance with the manufacturers instructions. The disk should be rotated as for engine rotation, (counter-clockwise viewed from the rear). The balance of the disk must be within 4 drmm in. (180 grmm mm) and is achieved by the interchange of heavy and light blades (Ref.para.(2)) and the addition, if necessary, of balancing weights (Ref.para.(3)). Before any blades are interchanged or weights added, check the out of balance readings by rotating the disk/spacer 180 degrees, relative to the adapter, before this operation fit the blade protection/retaining band (Tool 1124), and repeat the balancing procedure.

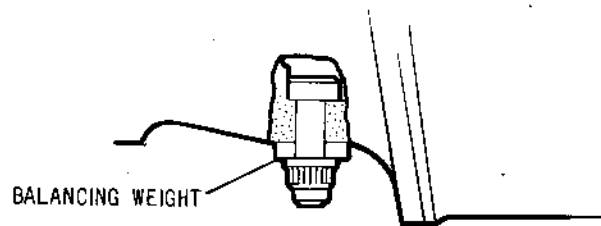
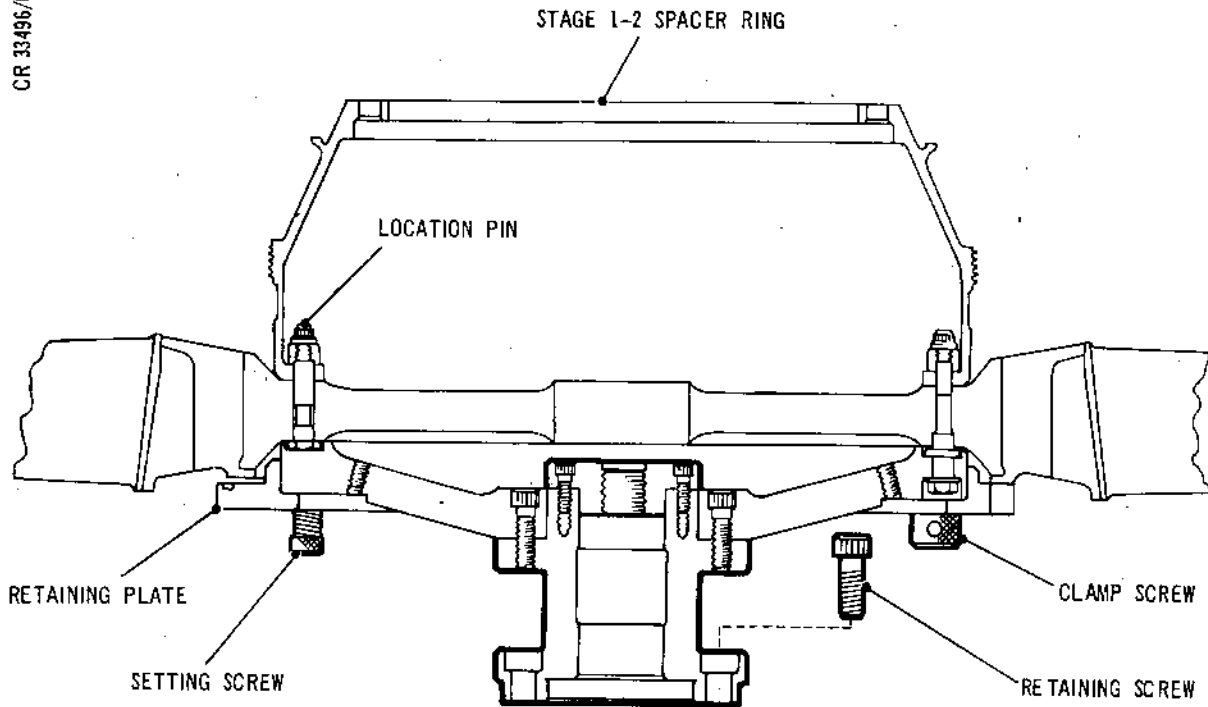


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33496/00A



SECTION THROUGH BALANCING WEIGHT

Assembly of Adapter, Stage 2 Disk and  
Spacer Ring to the Balancing Machine  
Figure 523

SUB-ASSEMBLY  
**72-31-03**  
Page 590  
Dec 1/76

TN2415



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (2) To remove a blade from the disk unscrew the retaining plate setting screws, to relieve the pressure on the blades, then unscrew the clamp screws sufficient to allow the retaining plate to rotate. Turn the plate, to line up one of the cut-outs in the plate with the blade to be removed. Withdraw a heavy blade from as near the out of balance position as possible, and exchange it for a light blade diametrically opposite. Turn the retaining plate to secure the blades, then tighten the clamp screws to secure the plate. Adjust the plate setting screws to ensure the blades are fully forward, then recheck the balance.

NOTE: If the blades are the original and labels stating the mass moment weight are not attached to the blades, two or three of the blades, from the out of balance position must be removed (noting their positions) and weighed (Ref. para.2), as must blades from the diametrically opposite position. The suitable weight blades must be exchanged, and the remainder replaced in their original positions. A note of the weight and position of the removed blades should be kept for possible further exchange of blades.

- (3) If after exchange of blades, it is found that the balance cannot be brought within the limits, balancing weights must be added. Apply lubricant 'B' to the threads of the bolt (1-230), then assemble the bolt to the disk at the out of balance position, assemble a balance weight, (1-210, 1-215 or 1-220) and a nut (1-200) to the bolt (Ref. Fig. 523). Ensure that the nut has a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m), then torque-tighten the nut between 85 and 95 lbf in. (9,6 and 10,7 N.m). After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 1.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref. SB.72-8449-191). The max number of balancing weights of any one weight or combination of weights that can be assembled to the disk is four.

SUB-ASSEMBLY

72-31-03

Page 591

Jun 30/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



F. Remove the Bladed Disk/Spacer Ring from the Balancing Machine.

- (1) Assemble the blade protection/retaining band (Tool 1124) to the blade tips.
- (2) Unscrew and remove the four nuts which secure the spacer/disk to the adapter location pins.
- (3) Assemble the lifting fixture (Tool 364) to the stage 1-2 spacer ring (Ref.Fig.522).
  - (a) Attach a hoist to the lifting ring of the lifting fixture, then position hoist over the spacer/disk.
  - (b) Ensure that the lifting fixture hand knobs are located at the 'FREE' position then lower the hoist and engage the locating plate of the fixture in the spacer. Withdraw the hand knobs and move to the 'LOCK' position, engaging the claws under the spacer flange, depress the knobs to engage the locking holes.
- (4) Raise the hoist and position the spacer/disk on the support (Tool 1326).

G. Remove the Spacer Ring from the Disk and Number the Blades.

- (1) Assemble the two halves of the protector (Tool 443) around the labyrinth of the spacer ring and secure the halves together with the clamp screws.
- (2) Unscrew and remove the slave nuts and bolts which secure the spacer to the disk. Raise the hoist to remove the spacer from the disk.
- (3) Remove the lifting fixture from the spacer (Ref.para.D.(3)) then stow the spacer on the top shelf of the container (Tool 1410).



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades then examine the blade roots for their numbering (Ref.Fig.503). Ensure that all the blades are numbered correctly in numerical sequence in a clockwise direction as viewed from the rear of the disk, with No.1 blade in the datum slot. Etch all new blades with their position No., and renumber any blades that have been re-positioned, ensure that all old position No. are obliterated.

H. Check the Stage 2 Blade Tang Clearances.

- (1) Examine the front face of the disk at the blade root position, and identify the datum hole by the datum mark  $\rightarrow 00 \leftarrow$  on each side of No.1 blade slot. Invert the disk, its rear face is now uppermost, and reposition the disk on the centre support (Tool 1326), then remove the protection/retaining band from the blade tips. Examine the stage 2-3 spacer ring (1-280) and identify the datum hole by the datum mark  $\rightarrow 00 \leftarrow$  on the edge of the flange (Ref.Fig.503). Release and remove the protector (Tool 1167) (if assembled) from the spacer ring, then place the spacer ring on the disk aligning the datum holes, ensure that the spacer abuts the disk.
- (3) Using feeler gauges, check that there is a clearance between each blade tang and the spacer ring between 0.002 and 0.008 in. (0.05 and 0.20 mm).
- (4) Remove the spacer ring from the disk, assemble the protector (Tool 1167) to the spacer, then stow the spacer on the middle shelf of the container (Tool 1410). Place the protection/retaining band (Tool 1124) around the tips of the blades, and place the disk on a pallet. Use the multiple leg sling (Tool 1285) (if required) to place it on the pallet.

NOTE: The stage 2 bladed disk and stage 1-2 spacer ring are now ready to be passed to the LP Compressor Assembly (72-31-00 Assembly).



OLYMPUS 593

MK.610-14-28  
OVERHAUL



15. Balance the Stage 3 Rotor and Stage 2-3 Spacer Ring

NOTE: The stage 3 blades should be received in the container (Tool 1397). Do not remove the blades until required for assembly.

A. Assemble the Stage 2-3 Spacer Ring to the Stage 3 Disk.

NOTE: The disk (1-360) should be received in the container (Tool 1408).

- (1) Unscrew and remove the knurled nut and clamp plate from the disk container. Ensure the disk is front face, denoted by the smaller outside diameter, uppermost.
- (2) Attach the multiple leg sling (Tool 1217) to a hoist and position the hoist above the disk. Lower the sling so that the four blocks of the sling rest on the disk.
- (3) Assemble to the disk, from the rear face, four slave bolts (Tool 367) and engage each bolt in the larger knurled nuts of the sling blocks.
- (4) Fully tighten the knurled nuts then raise the hoist and position the disk on suitable blocks or support (Tool 1326). Unscrew the large knurled nuts, raise the hoist and remove the sling.
- (5) Examine the front face of the disk at the blade root position, and identify the datum hole by the datum marks  $\rightarrow 00 \leftarrow$  to each side of No.1 blade slot. Remove the spacer ring (1-280) from the container (Tool 1410) and identify the datum hole by the datum mark  $\rightarrow 00 \leftarrow$  on the edge of the flange (Ref.Fig.503). Place the spacer ring on the disk aligning the datum holes.
- (6) Assemble a slave washer and nut to each of the slave bolts in the disk (Ref.Fig.524). Fully tighten the nuts then invert the disk/spacer and reposition on the support.

TN40348

SUB-ASSEMBLY

**72-31-03**

Page 594  
Dec 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



B. Assemble the Blades to Stage 3 Disk.

NOTE: If all the original blades are available and undamaged then assemble the blades as detailed in para.(1). If the blades include 4 repaired and/or new blades, then the blades must be assembled as detailed in para.(2). If the blades include more than 4 repaired and/or new blades then the blades must be assembled as detailed in para.(3). Ensure that the aggregate blending depth of repaired blades does not exceed 3.200 in. (81,28 mm) (Ref.72-31-03 Repair No.6).

- (1) Identify the stage 3 blades (1-330), then examine the blade roots for their positional No. (Ref.Fig.503) and lay the blades out in numerical sequence. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades. Insert the blades in numerical sequence from the rear of the disk starting at No.1 position, and working in a clockwise direction.
- (2) Identify the stage 3 blades (1-330) then examine the roots of the original blades for their positional No. (Ref.Fig.503) and lay the blades out in numerical sequence, leaving spaces where new blades are to be positioned. Noting the mass moment weight of the new blades, place the lightest new blades in vacant positions next to the heaviest original blades and position the heaviest new blades in vacant positions next to the lightest original blades. Assemble the blades to the disk as detailed in para.(1).
- (3) Identify the stage 3 blades (1-330), then according to the mass moment weight of the blades (quoted on the labels), lay the blades out in sequence of weight, starting with the heaviest blade and ending with the lightest. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades. Assemble the blades from the rear of the disk. Position the heaviest blade at No.1 position and the next heaviest blade diametrically opposite, then assemble the two lightest blades diametrically opposite each other and next to the heaviest blades. Assemble the remainder of the blades to the disk in sequence of weight, assembling alternate pairs of heavy and light blades and where possible, positioning equal weight blades opposite each other.





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Assemble the protection/retaining band (Tool 1125) to the blade tips then invert the disk/spacer and reposition on the support.

C. Assemble the Balancing Adapter to the Balancing Machine.

NOTE: Ensure the blade retaining plate, attached to the underside of the adapter, is secure.

- (1) Screw a lifting eye ( $\frac{7}{8}$  in. WHIT.) into the hub of the adapter (Tool 1847).
- (2) Attach a hoist to the lifting eye then raise the hoist and position the adapter above the balancing machine. Align the holes in the adapter hub and machine spindle head then lower the adapter on to the machine, secure the adapter to the machine with the six retaining screws (Tool 1826) (Ref.Fig.525). Unscrew and remove the nuts and washers from the adapter location pins.

D. Assemble the Bladed Disk/Spacer Ring to the Balancing Machine.

- (1) Assemble the lifting fixture (Tool 365) to the stage 2-3 spacer ring (Ref.Fig.524).
  - (a) Attach a hoist to the lifting fixture and position the hoist over the spacer.
  - (b) Ensure the lifting fixture hand knobs are in the 'FREE' position then lower the hoist and engage the locating plate in the spacer. Raise the hand knobs and move them to the 'LOCK' position then depress the knobs to engage their locking holes.
- (2) Raise the hoist and position the spacer/disk above the balancing machine. Align the holes in the disk, with the location pins in the adapter then lower the assembly on to the adapter (Ref.Fig.525).

TN13952

SUB-ASSEMBLY

**72-31-03**

Page 596

Dec 1/76



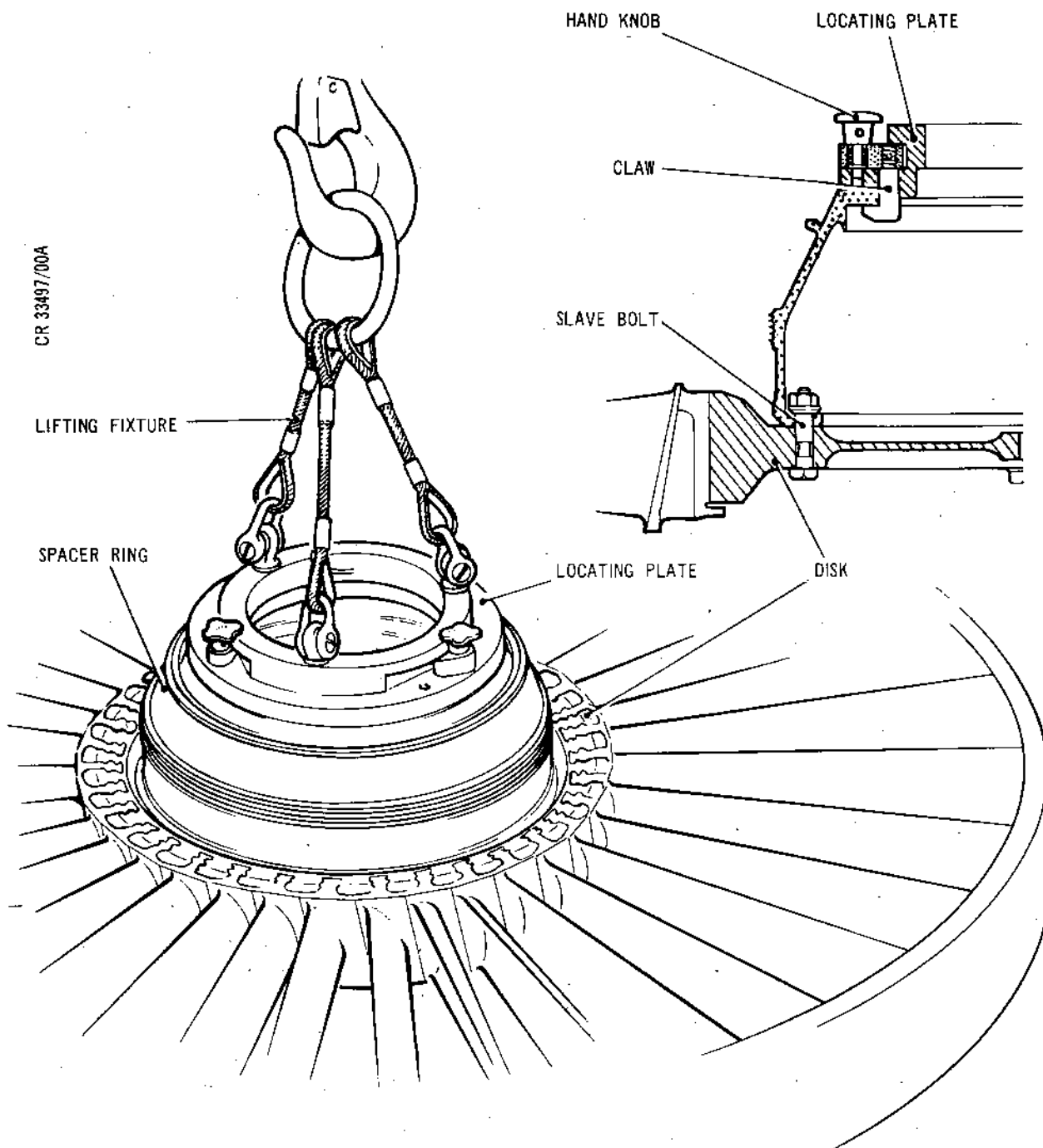
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 33497/00A



TN15817

Assembling Lifting Fixture to Stage 3 Disk/Stage 2-3  
Spacer Ring  
Figure 524

SUB-ASSEMBLY  
**72-31-03**  
Page 597  
Dec 1/76



OLYMPUS 598

MK.610-14-28  
OVERHAUL



- (3) Raise the lifting fixture hand knobs, move them to the 'FREE' position then depress the knobs to engage their locking holes. Raise the hoist and remove the lifting fixture.
- (4) Reassemble the six special washers and nuts to the location pins and fully tighten the nuts. Remove the blade protection/retaining band from the blade tips and, if assembled, remove the labyrinth protector from the spacer ring.

E. Balance the Stage 3 Bladed Disk/Spacer Ring.

- (1) Carry out a static balance of the bladed disk, operating the balancing machine in accordance with the manufacturers instructions. The disk should be rotated as for engine rotation, counter-clockwise viewed from the rear. The balance of the disk/spacer must be within 4 grm in. (180 grm mm). If the balance of the disk/spacer is outside the limit, rectify by the interchange of heavy and light-weight blades (Ref. para.(3)) and (if necessary), by the addition of balancing weights (Ref. para.(4)) to the out of balance position, until the disk/spacer is within limits. Before any blades are interchanged or weights added, check the out of balance readings by rotating the disk/spacer 180 deg, relative to the adapter, before this operation assemble the blade protection/retaining band, and repeat the balancing procedure.
- (3) To remove a blade from the disk unscrew the clamp screws, on the underside of the adapter, sufficient to allow the retaining plate to rotate. Turn the plate, to line up one of the cut-outs with the blade to be removed, then slide the blade down out of the disk. Withdraw a heavy blade from as near the out of balance position as possible, and exchange it for a light blade diametrically opposite. Turn the retaining plate to secure the blades and tighten the clamp screws to lock the plate, then recheck the balance.

NOTE: If the blades are the original and labels stating the mass moment weight are not attached to the blades, two or three of the blades, from

TN13953

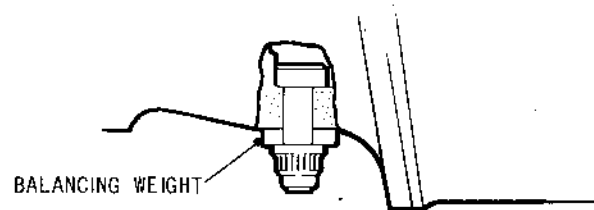
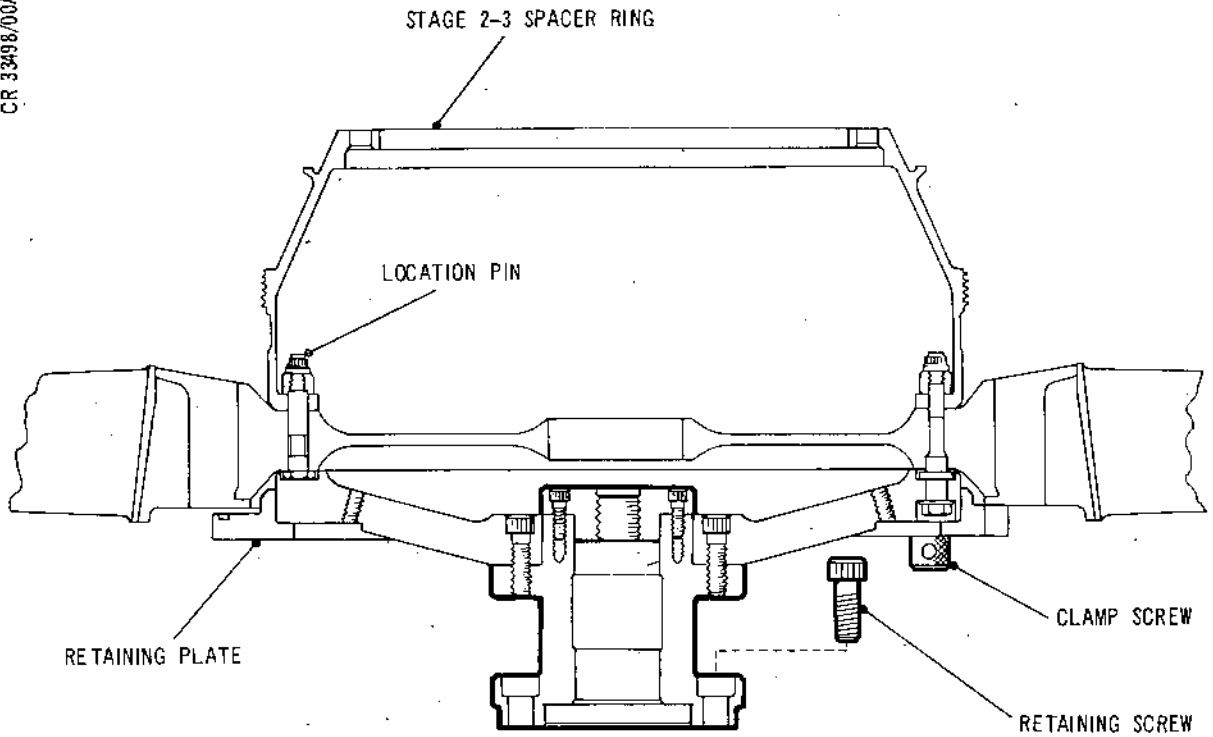


OLYMPUS 593  
MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 33498/00A



SECTION THROUGH BALANCING WEIGHT

Assembly of Adapter, Stage 3 Disk and  
Spacer Ring to the Balancing Machine  
Figure 525

SUB-ASSEMBLY  
**72-31-03**  
Page-598.1  
Dec 1/76

TN2418



OLYMPUS 593

MK.610-14-28  
OVERHAUL



the out of balance position, must be removed (noting their positions) and weighed (Ref. para.2), as must blades from the diametrically opposite position. The suitable weight blades must be exchanged, and the remainder replaced in their original positions. A note of the weight and position of the removed blades should be kept for possible further exchange of blades.

- (4) If the balance of the disk is not within limits after the exchange of blades, balancing weights must be added. Apply lubricant 'B' to a bolt (1-320), then assemble the bolt to the disk at the out of balance position (Ref.Fig.525), then assemble a balance weight (1-300, 1-305 or 1-310) and a nut (1-290) to the bolt. Ensure that the nut has a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m), then torque-tighten the nut between 85 and 95 lbf in. (9,6 and 10,7 N.m). Exchange or add balancing weights until the balance is within 4 drmm in. (180 grm mm). The max. number of balancing weights that can be assembled to the disk is four, maximum numbers of each weight that can be used is four off (1-300), 2 off (1-305) and 2 off (1-310).

F. Remove the Bladed Disk/Spacer Ring from the Balancing Machine.

- (1) Assemble the blade protection/retaining band (Tool 1125) to the blade tips then unscrew and remove the six nuts and washers from the adapter location pins.
- (2) Assemble the lifting fixture (Tool 365) to the spacer as detailed in para.D.1.
- (3) Raise the hoist and position the spacer/disk on to the support (Tool 1326).

IN13954

SUB-ASSEMBLY

**72-31-03**

Page 598.2

Dec 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



G. Remove the Stage 2-3 Spacer Ring from the Stage 3 Disk, Number and Secure the Blades.

- (1) Assemble the two halves of the protector (Tool 1167) around the labyrinth of the spacer ring and secure the halves together with the clamp screws.
- (2) Unscrew and remove the slave nuts and bolts which secure the spacer to the disk.
- (3) Raise the hoist and remove the spacer from the disk. Place the spacer on a suitable work surface or pallet.
- (4) Raise the lifting fixture hand knobs, move the knobs to the 'FREE' position, depress the knobs to engage the locking holes. Raise the fixture from the spacer and lower onto a suitable surface, then release the hoist. Place the spacer in the container (Tool 1410).
- (5) Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades, then examine the blade roots for their numbering (Ref. Fig.503). Ensure that all the blades are numbered correctly in numerical sequence in a clockwise direction viewed from the rear of the disk, with No.1 blade in the datum slot. Etch all new blades with their position No., and renumber any blades that have been re-positioned, ensure that all old position No. are obliterated. On completion of the numbering, remove each blade in turn, assemble a blade key (1-340 or 1-350) to the groove in the end face of the blade, then assemble the blade/key to the disk (Ref.Fig.526).

NOTE: Ensure that the dimension from the face of the key to the peak of the ridge does not exceed 0.045 in. (1,14 mm).

PRINTED IN ENGLAND

TN40349

SUB-ASSEMBLY

**72-31-03**

Page 598.3

Dec 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (6) Ensure that each blade is square in the disk slot, not loaded to one side or the other by the action of the protection/retaining band, and that the blade tang abuts the disk. Using the hammer (Tool 1655), bend the protruding end of each key inward, across the face of the disk. Care must be taken that the bend of the key is not too acute causing a fracture of the key. Using a feeler gauge, check each blade and ensure that the maximum end-float of the blade root in the disk does not exceed 0.015 in. (0,38 mm) (Ref.Fig.526).
- (7) Assemble the multiple leg sling (Tool 1217) to the disk.
  - (a) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk.
  - (b) Insert four slave bolts (Tool 367) (evenly spaced) into the disk bolt holes, from underneath. Locate the sling blocks over the bolts and screw the larger thumbnuts on to the bolts.
- (8) Raise the hoist and position the disk on to a pallet then release and remove the sling and slave bolts from the disk and the sling from the hoist.

NOTE: The stage 3 bladed disk and stage 2-3 spacer ring are now ready to be passed to the LP Compressor Assembly (72-31-00, Assembly).

#### 16. Balance the Stage 4 Rotor and Stage 3-4 Spacer Ring

NOTE: The stage 4 blades should be received in the container (Tool 1398). Do not remove the blades until required for assembly.

##### A. Assemble the Stage 3-4 Spacer Ring to the Stage 4 Disk.

NOTE: The disk (2-60) should be received in the container (Tool 1407) and the spacer ring (2-30) in the container (Tool 1411).

- (1) Assemble the spacer ring (2-30) to the disk (2-60) as detailed in para.15.A. with the difference that the disk datum holes marks → 0 are on the edge of the disk not on the face, use the slave bolts (Tool 426) instead of bolts (Tool 367) (Ref.para.(3)).

TN16158

PRINTED IN ENGLAND

TN16201

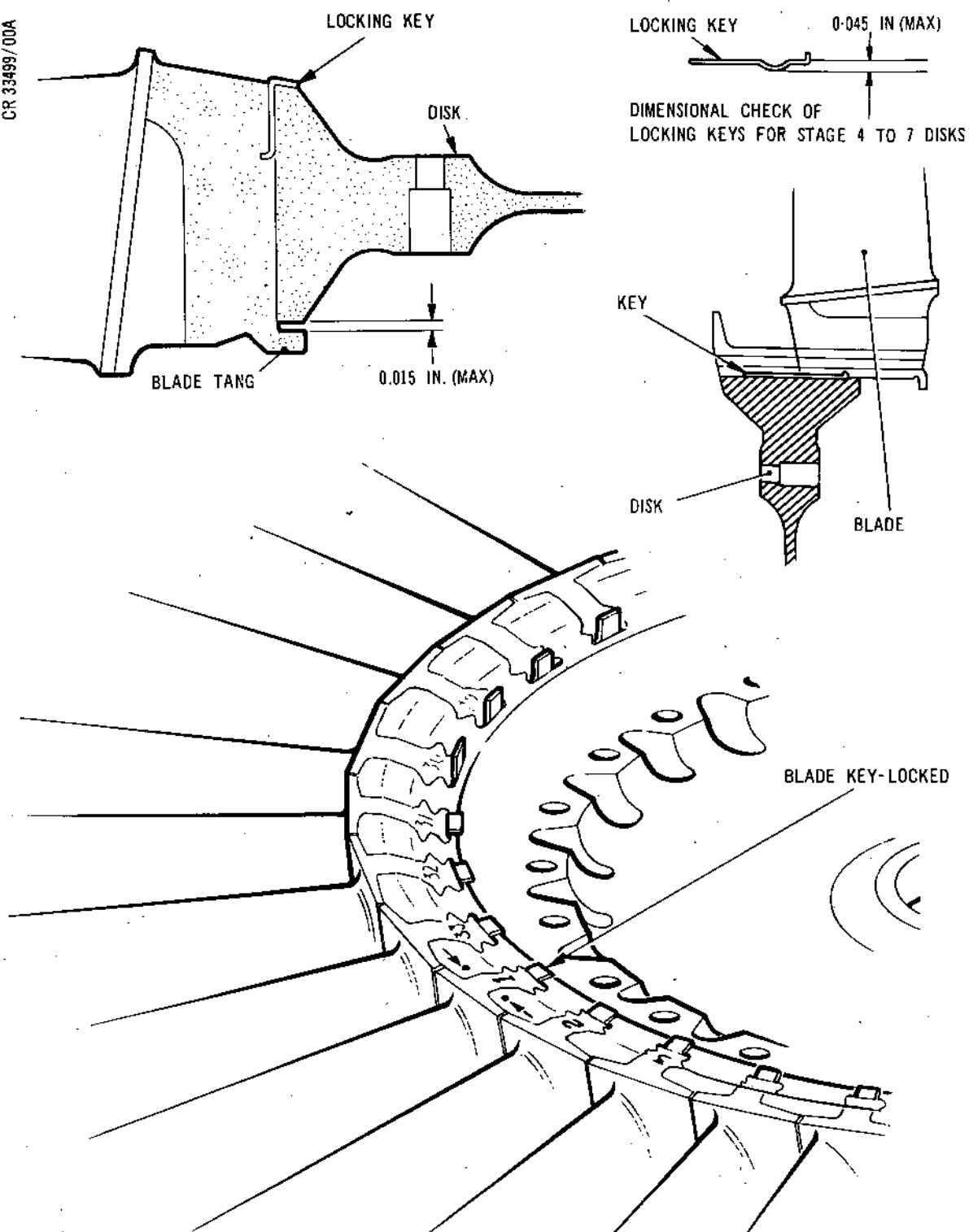


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33499/00A



Securing Blades to Stage 3 Disk  
Figure 526

SUB-ASSEMBLY

**72-31-03**

Page 598.5  
Dec 1/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



B. Assemble the Blades to Stage 4 Disk.

NOTE: If all the original blades are available and undamaged then assemble the blades as detailed in para.(1). If the blades include 4 repaired and/or new blades, then the blades must be assembled as detailed in para.(2). If the blades include more than 4 repaired and/or new blades then the blades must be assembled as detailed in para.(3). Ensure that the aggregate blending depth of repaired blades does not exceed 3.200 in. (81,28 mm) (Ref.72-31-03 Repair No.6).

NOTE: The preceding information regarding repaired or new blades also applies to stage 5.

NOTE: If all the original blades are available and undamaged and are to be assembled to the original disk/spacer the bladed disk does not require balancing but the blades must be assembled to the disk with serviceable blade keys (2-50) as detailed in para.(1).

- (1) Identify the stage 4 blades (2-40), then examine the blade roots for their positional No. (Ref.Fig.503) and lay the blades out in numerical sequence. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades. Assemble to each blade root a slave locking key (2-50) then insert the blades, in numerical sequence, into the disk, working in a clockwise direction.
- (2) Identify the stage 4 blades (2-40) then examine the roots of the original blades for their positional No. (Ref.Fig.503) and lay the blade out in numerical sequence leaving spaces where new blades are to be positioned. Noting the mass moment weight of the new blades, place the lightest new blades in vacant positions next to the heaviest original blades and position the heaviest new blades in vacant positions next to the lightest original blades. Assemble the blades to the disk as detailed in para.(1).

TN865

SUB-ASSEMBLY  
**72-31-03**

Page 598.6  
Dec 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

- (3) Identify the stage 4 blades (2-40), then according to the mass moment weight of the blades (quoted on the labels), lay the blades out in sequence of weight, starting with the heaviest blade and ending with the lightest. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades. Assemble to each blade a slave locking key (2-50) then assemble the blades to the disk. Position the heaviest blade at No.1 position and the next heaviest blade diametrically opposite, then assemble the two lightest blades diametrically opposite each other and next to the heaviest blades. Assemble the remainder of the blades to the disk in sequence of weight, assembling alternate pairs of heavy and light blades and where possible, positioning equal weight blades opposite each other.
- (4) Assemble the protection/retaining band (Tool 1126) to the blade tips then invert the disk/spacer and reposition on the support. Bend each blade key inward across the face of the disk sufficient to retain the blades in the disk.

C. Assemble the Balancing Adapter and Hub to the Balancing Machine.

NOTE: The adapter and hub are used to balance stages 4-6 of the LP Compressor and may be left attached to the balancing machine after balancing stage 4.

- (1) Assemble the hub (Tool 209) to the adapter (Tool 1852) and secure with the six capscrews (Ref.Fig.527).
- (2) Assemble the six location pins (Tool 1860) to the appropriate holes in the adapter and secure with washers and nuts.

TN18077

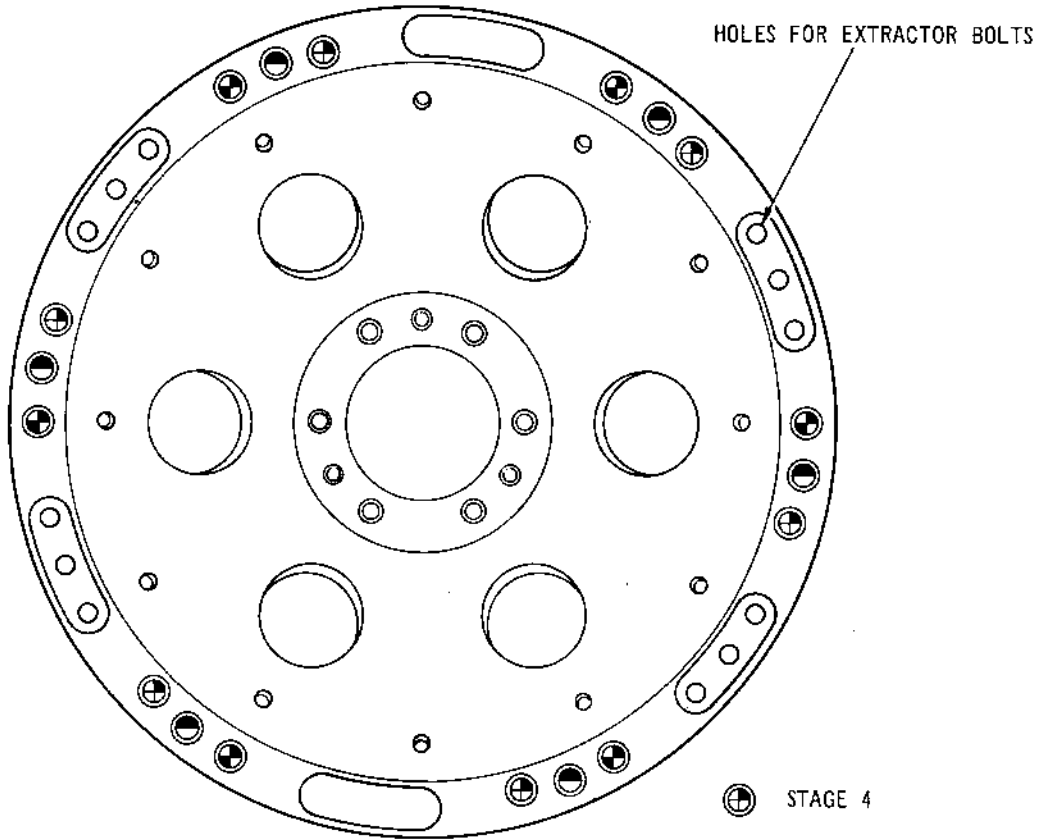


OLYMPUS 593

MK.610-14-28  
OVERHAUL



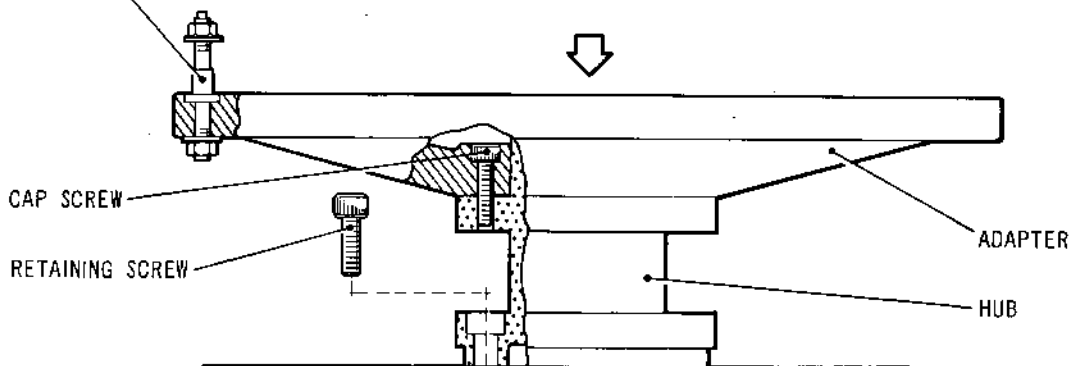
CR 33479/00A



- ⊕ STAGE 4
- ⊗ STAGE 5
- ⊙ STAGE 6

VIEW IN DIRECTION OF ARROW SHOWING  
LOCATION PIN POSITIONS FOR STAGES 4-5-6

LOCATION PIN



TN47

Assembly of Balancing Adapter to Balancing Machine  
Figure 527

SUB-ASSEMBLY  
**72-31-03**

Page 8  
Dec 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (3) Screw a lifting eye ( $\frac{1}{2}$  in. WHIT) into the adapter hub. Attach a hoist to the lifting eye, raise the hoist and position the adapter above the balancing machine and align the holes in the hub with the spindle head of the machine. Lower the adapter on to the machine and secure the adapter with the six retaining screws (Tool 1826) then unscrew and remove the lifting eye and the washers and nuts from the adapter location pins.

D. Assemble the Bladed Disk/Spacer Ring to the Balancing Machine.

- (1) Assemble the lifting fixture (Tool 444) to the stage 3-4 spacer ring (Ref.Fig.528).
  - (a) Attach a hoist to the lifting ring of the lifting fixture, then position the hoist over the spacer.
  - (b) Ensure that the knurled nuts of the lifting fixture are unscrewed and the claws turned to align with the plate, lower the hoist and engage the locating plate of the fixture in the spacer. Turn the claws outwards to engage them under the spacer flange, then tighten the knurled nuts to lock the claws in position.
- (2) Raise the hoist and position the spacer/disk above the balancing adapter attached to the balancing machine. Align the holes in the disk with the adapter location pins then lower the spacer/disk on to the adapter.
- (3) Unscrew the knurled nuts of the lifting fixture and turn the claws inward to align with the plate. Tighten the nuts to lock the claws in position then raise the hoist and remove the lifting fixture.
- (4) Reassemble the washers and nuts to the adapter location pins to secure the disk/spacer to the adapter then remove the protection/retaining band from the blade tips.

PRINTED IN ENGLAND

TN23000



OLYMPUS 593

MK.610-14-28  
OVERHAUL



E. Balance the Stage 4 Bladed Disk/Spacer Ring.

- (1) Carry out a static balance of the bladed disk, operating the balancing machine in accordance with the manufacturers instructions. The disk should be rotated as for engine rotation, counter-clockwise viewed from the rear. The balance of the disk/spacer must be within 8 drmm in. (360 grmm mm). Should the balance of the disk/spacer be outside the limit, rectify by the interchange of heavy and lightweight blades.

NOTE: If the blades are the original and labels stating the mass moment weight are not attached to the blades, two or three of the blades, from the out of balance position must be removed (noting their positions) and weighed (Ref. para.3) as must blades from the diametrically opposite position. The suitable weight blades must be exchanged, and the remainder replaced in their original positions. A note of the weight and position of the removed blades should be kept for possible further exchange of blades.

F. Remove the Bladed Disk/Spacer Ring from the Balancing Machine.

- (1) Assemble the blade protection/retaining band (Tool 1126) to the blade tips then unscrew and remove the six nuts and washers from the adapter location pins.
- (2) Assemble the lifting fixture (Tool 444) to the spacer as detailed in para.D.(1).
- (3) Raise the hoist and remove the spacer/disk from the adapter. Should it be found difficult to remove the spacer/disk from the location pins, screw four extractor bolts (5/16 UNC) into the adapter from the underside. Screw in the bolts in equal increments until the spacer/disk is released. Position the spacer/disk on the support (Tool 1326).

TN28220

SUB-ASSEMBLY

**72-31-03**

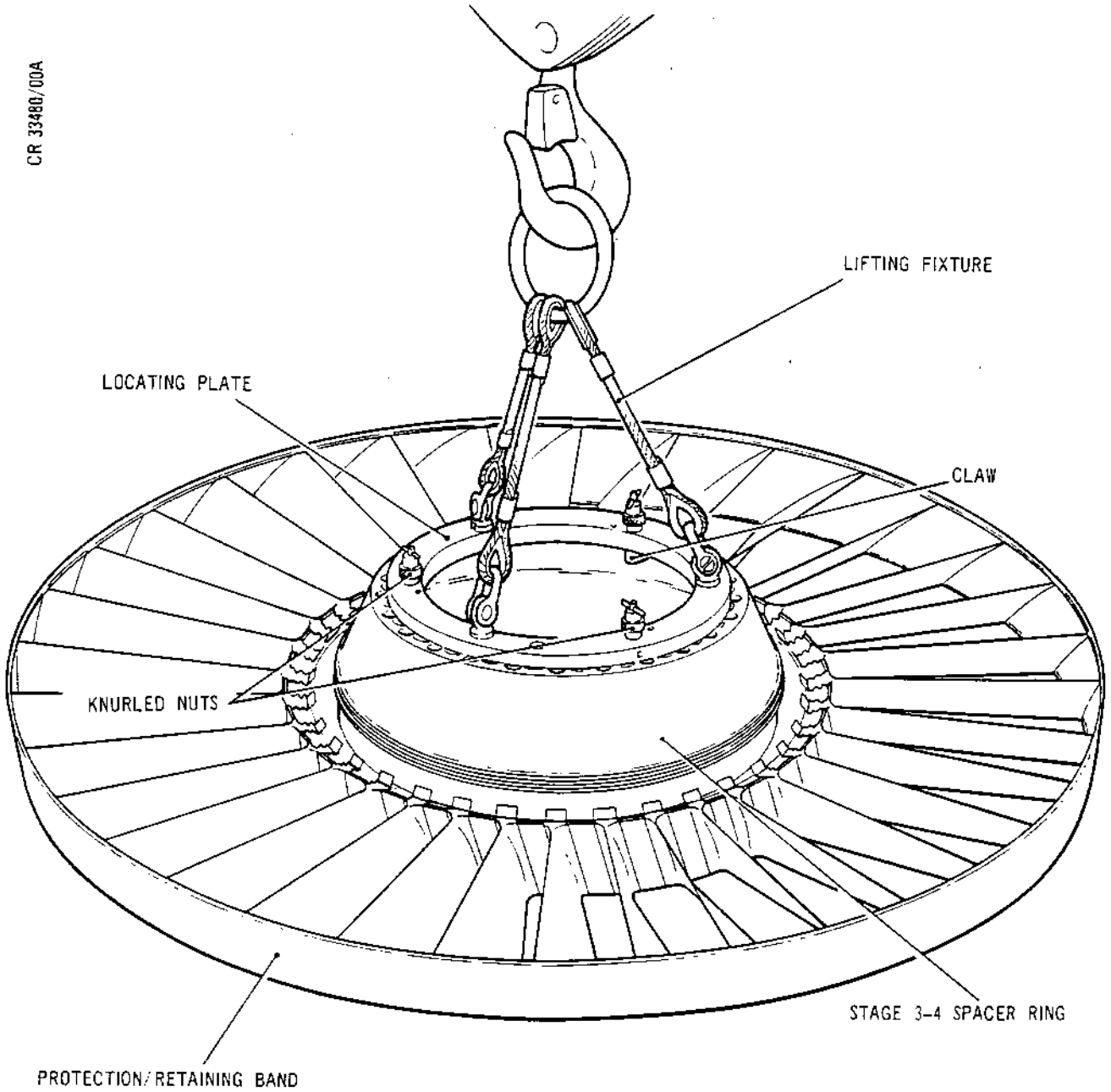
Page 598.10

Dec 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



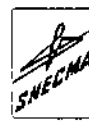
Assembling Lifting Fixture to Stage 3-4 Spacer Ring  
Figure 528

SUB-ASSEMBLY  
**72-31-03**

Page 598.11  
Dec 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



G. Remove the Stage 3-4 Spacer Ring from the Stage 4 Disk, Number and Secure the Blades.

- (1) Assemble the two halves of the protector (Tool 1168) around the labyrinth of the spacer ring and secure the halves together with the clamp screws.
- (2) Unscrew and remove the slave nuts and bolts which secure the spacer to the disk.
- (3) Raise the hoist and remove the spacer from the disk. Position the spacer on a suitable pallet then unscrew the lifting fixture knurled nuts and turn the claws inward to align with the plate. Tighten the nuts to lock the claws in position then raise the hoist and remove the fixture. Place the spacer in its container (Tool 1411).
- (4) Examine the edge of the disk at the blade root position and identify the position of the No.1, 2 and 3 blades, then examine the blade roots for their numbering (Ref.Fig.503). Ensure that all the blades are numbered correctly in numerical sequence in a counter-clockwise direction, viewed from the front face, with No.1 blade in the datum slot. Etch all new blades with their position No., and renumber any blades that have been repositioned, ensure that all old position Nos. are obliterated. Remove the protection/retaining band from the blade tips.
- (5) Bend the slave retaining keys upward away from the face of the disk and slide the blades down out of the disk. Remove each slave key and assemble a serviceable key blade (2-50). Reassemble the blade to the disk then using the hammer (Tool 1655) bend the protruding end of each key inward, across the face of the disk (Ref.Fig.526). Care must be taken that the bend is not too acute causing a fracture of the key. Using a feeler gauge, check each blade and ensure that the maximum end-float of the blade root in the disk does not exceed 0.015 in. (0,38 mm) then assemble the blade protection/retaining band (Tool 1126) to the blade tips.

SUB-ASSEMBLY

**72-31-03**

Page 598.12

Feb 1/82



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (6) Assemble the multiple leg sling (Tool 1217) to the disk.
- (a) Attach a hoist to the lifting ring of the sling then position the hoist over the disk.
  - (b) Insert four slave bolts (Tool 426) (evenly spaced) into the disk bolt-holes, from underneath. Locate the sling blocks over the bolts and screw the larger thumbnuts on to the bolts.
- (7) Raise the hoist and position the disk on to a pallet then release and remove the sling and slave bolts from the disk and the sling from the hoist.

NOTE: The stage 4 bladed disk and stage 3-4 spacer ring are now ready to be passed to the LP Compressor Assembly (72-31-00 Assembly).

17. Balance the Stage 5 Rotor and Stage 4-5 Spacer Ring

NOTE: The stage 5 blades should be received in the container (Tool 1399). Do not remove the blades until required for assembly.

- A. Assemble the Stage 4-5 Spacer Ring to the Stage 5 Disk.

NOTE: The disk (2-120) should be received in the container (Tool 1407) and the spacer ring in the container (Tool 1411).

- (1) Assemble the spacer ring (2-90) to the disk (2-120) as detailed in para.15.A. with the difference that the disk datum hole marks  $\rightarrow 0$  are on the edge of the disk, not on the face, and use slave bolts (Tool 426) instead of bolts (Tool 367) (Ref. para. (3)).

PRINTED IN ENGLAND

TN50



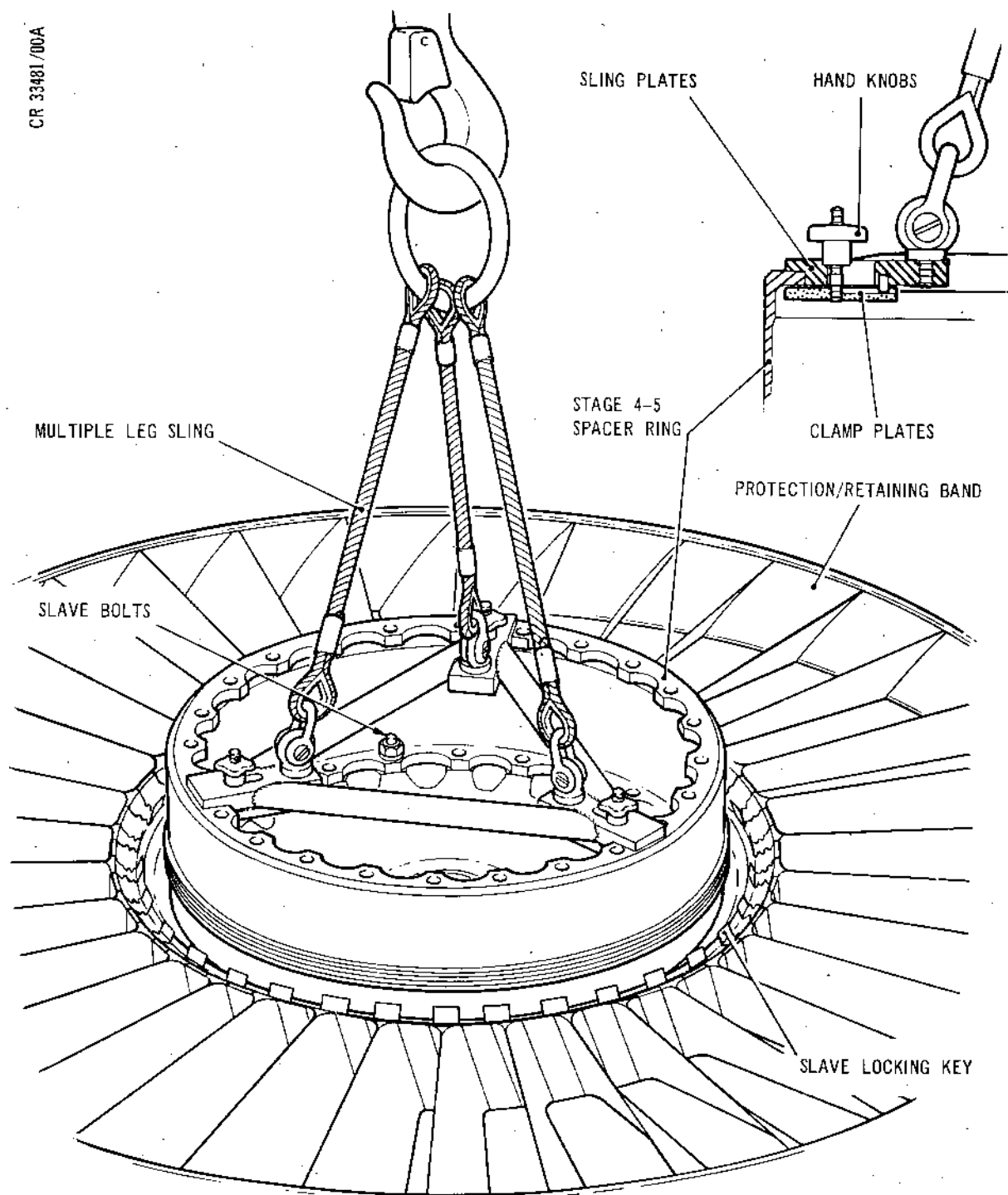


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33481/00A



TN52

Assembling Multiple Leg Sling to Stage 4-5 Spacer Ring  
Figure 529

SUB-ASSEMBLY

**72-31-03**

Page 598.14  
Dec 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



B. Assemble the Blades to Stage 5 Disk.

- (1) Assemble the stage 5 blades (2-100) to the disk as detailed in para.16.B. Use blade locking keys (2-110) instead of (2-50) and the protection/retaining band (Tool 1127) instead of (Tool 1126) (Ref. para. (4)).

C. Assemble the Balancing Adapter and Hub to the Balancing Adapter.

- (1) Assemble the balancing adapter and hub as detailed in para.16.C. (1) and (3).
- (2) Assemble or reposition the six location pins (Tool 1860) to the appropriate holes in the adapter and secure with washers and nuts (Ref. Fig. 527).

D. Assemble the Bladed Disk/Spacer Ring to the Balancing Machine.

- (1) Assemble the multiple leg sling (Tool 321) to the stage 4-5 spacer ring (Ref. Fig. 529).
  - (a) Attach a hoist to the lifting ring of the sling, then position the sling over the spacer.
  - (b) Ensure that the sling handknobs are loose and located at the 'UNLOCK' position, then lower the hoist and locate the sling plates in the spacer. Slide the handknobs to the 'LOCK' position, engaging the clamp plates under the spacer flange, then tighten the handknobs.
- (2) Raise the hoist and position the spacer/disk above the adapter attached to the balancing machine. Align the holes in the disk with the adapter location pins then lower the disk on to the adapter.
- (3) Release the handknobs and slide them to the 'UNLOCK' position. Raise the sling from the spacer ring and remove the sling from the hoist.
- (4) Reassemble the nuts and washers to the adapter location pins to secure the disk/spacer to the adapter.

SUB-ASSEMBLY

**72-31-03**

Page 598.15

Dec 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



E. Balance the Stage 5 Bladed Disk/Spacer Ring.

- (1) Balance the bladed disk/spacer ring as detailed in para.16.E. to within 8 grm in. (360 grm mm).

F. Remove the Bladed Disk/Spacer Ring from the Balancing Machine.

- (1) Assemble the blade protection/retaining band (Tool 1127) to the blade tips then unscrew and remove the six nuts and washers from the adapter location pins.
- (2) Assemble the multiple leg sling (Tool 321) to the stage 4-5 spacer ring as detailed in para.D.(1).
- (3) Raise the hoist and position the spacer/disk on to the support (Tool 1326).

G. Remove the Stage 4-5 Spacer Ring from the Stage 5 Disk, Number and Secure the Blades.

- (1) Assemble the two halves of the protector (Tool 1169) around the labyrinth of the spacer ring and secure the halves together with the clamp screws.
- (2) Unscrew and remove the slave nuts and bolts which secure the spacer to the disk.
- (3) Raise the hoist and remove the spacer from the disk. Position the spacer on a suitable pallet then unscrew the handknobs and slide them to the 'UNLOCK' position. Raise the sling from the spacer ring and remove the sling from the hoist. Place the spacer in the container (Tool 1411).
- (4) Number the blades as detailed in para.16.G.(4).
- (5) Secure the blades as detailed in para.16.G.(5) use blade keys (2-110) instead of (2-50) and the blade protection/retaining band (Tool 1127) instead of (Tool 1126).

IN25330

SUB-ASSEMBLY

**72-31-03**

Page 598.16

Dec 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (6) Assemble the multiple leg sling (Tool 1217) as detailed in para.16.G.(6).
- (7) Raise the hoist and position the disk on to a pallet then release and remove and remove the sling and slave bolts from the disk and the sling from the hoist.

NOTE: The stage 5 bladed disk and stage 4-5 spacer ring are now ready to be passed to the LP Compressor Assembly (72-31-00 Assembly).

#### 18. Balance the Stage 6 Rotor and Stage 5-6 Spacer Ring

NOTE: The stage 6 blades should be received in the container (Tool 1464). Do not remove the blades until required for assembly.

##### A. Assemble the Stage 5-6 Spacer Ring to the Stage 6 Disk.

NOTE: The disk (2-180) should be received in the container (Tool 1407) and the spacer ring (2-150) in the container (Tool 1411).

- (1) Assemble the spacer ring (2-150) to the disk (2-180) as detailed in para.15.A. with the difference that the disk datum holes marks O are on the edge of the disk, not on the face, use the slave bolts (Tool 368) instead of bolts (Tool 367) (Ref.para.(3)).

##### B. Assemble the Blades to Stage 6 Disk.

- (1) Assemble the stage 6 blades (2-160) to the disk as detailed in para.16.B. Use blade locking keys (2-170) instead of (2-50) and the protection/retaining band (Tool 1128) instead of (Tool 1126) (Ref.para.(4)).

NOTE: Ensure that the aggregate blending depth of repaired blades does not exceed 2.000 in. (50,8 mm) (Ref.72-31-03 Repair No.6).

##### C. Assemble the Balancing Adapter and Hub to the Balancing Machine.

- (1) Assemble the balancing adapter and hub as detailed in para.16.C. Use location pins (Tool 1859) instead of (Tool 1860) (Ref.Fig.527).



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- D. Assemble the Bladed Disk/Spacer Ring to the Balancing Machine.
- (1) Assemble the bladed disk/spacer ring to the balancing machine as detailed in para.17.D.
- E. Balance the Stage 6 Bladed Disk/Spacer Ring.
- (1) Balance the bladed disk/spacer ring as detailed in para.16.E. to within 8 drn in. (360 grm mm).
- F. Remove the Bladed Disk/Spacer Ring from the Balancing Machine.
- (1) Remove the bladed disk/spacer ring from the balancing machine as detailed in para.17.F. Use the blade protection/retaining band (Tool 1128) instead of (Tool 1127).
- G. Remove the Stage 5-6 Spacer Ring from the Stage 6 Disk, Number and Secure the Blades.
- (1) Remove the spacer from the disk as detailed in para.17.G. (1) to (3) use the protector (Tool 1169). Number and secure the blades as detailed in para.16.G. (5) to (7) use blade keys (2-170) instead of (2-50) and slave bolts (Tool 368) instead of (Tool 426) (Ref.para.(6)).

NOTE: The stage 6 bladed disk and stage 5-6 spacer ring are now ready to be passed to the LP Compressor Assembly (72-31-00 Assembly).

19. Balance the Stage 7 Rotor and Stage 6-7 Spacer Ring

NOTE: The stage 7 blades should be received in the container (Tool 1465). Do not remove the blades until required for assembly.

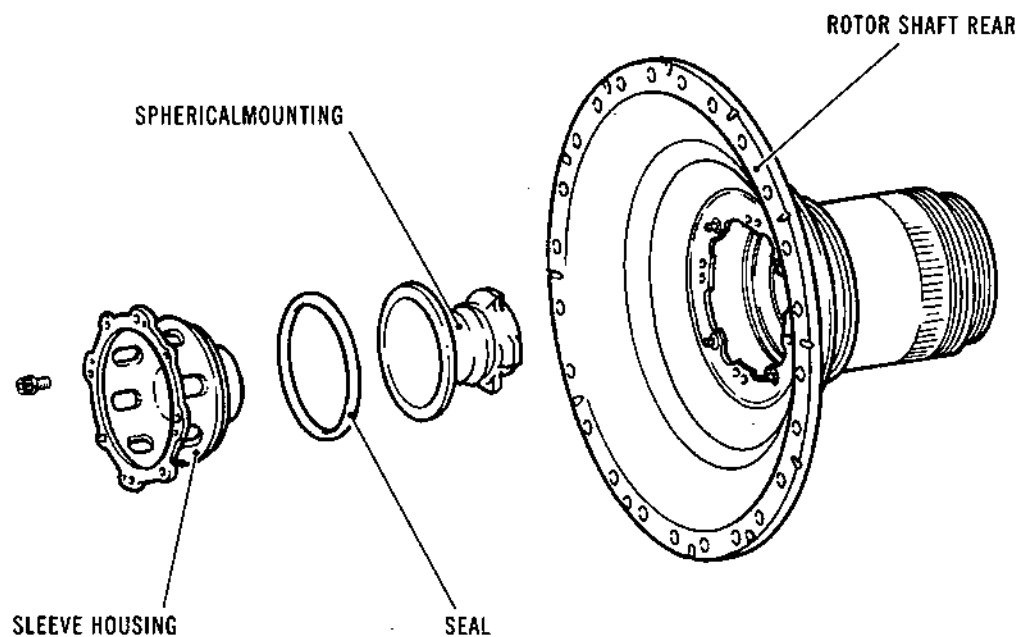
TN14421



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL



Assembling Items to LP Rotor Shaft Rear  
Figure 530



OLYMPUS 593

MK.610-14-28  
OVERHAUL



A. Assemble the Stage 6-7 Spacer Ring to the Stage 7 Disk.

NOTE: The disk (3-340) should be received in the container (Tool 1406) and the spacer ring (3-270) in the container (Tool 1410).

- (1) Assemble the spacer ring (3-270) to the disk (3-340) as detailed in para.15.A. with the difference that the disk datum marks O are on the edge of the disk, not on the face. Use the slave bolts (Tool 1164) instead of bolts (Tool 367).

B. Assemble the Blades to Stage 7 Disk.

- (1) Assemble the stage 7 blades (3-320) to the disk as detailed in para.16.B. Use blade locking keys (3-330) instead of keys (2-50) and the protection/retaining band (Tool 1129) (Ref. para. (4)).

NOTE: Ensure that the aggregate blending depth of repaired blades does not exceed 2.000 in. (50,8 mm) (Ref.72-31-03 Repair No.6).

C. Assemble the Balancing Adapter to the Balancing Machine.

- (1) Align the holes of the adapter hub (Tool 1856) with those of the spindle head of the machine. Lower the adapter on to the machine then secure the adapter with the six retaining screws (Tool 1826).
- (2) Unscrew and remove the six washers and nuts from adapter location pins.

D. Assemble the Bladed Disk/Spacer Ring to the Balancing Machine.

- (1) Assemble the bladed disk/spacer ring to the balancing machine as detailed in para.17.D.

E. Balance the Stage 7 Bladed Disk/Spacer Ring.

- (1) Balance the bladed disk/spacer ring as detailed in para.16.E. to within 4 drn in. (180 grm mm).



OLYMPUS 593

MK.610-14-28  
OVERHAUL



F. Remove the Bladed Disk/Spacer Ring from the Balancing Machine.

- (1) Remove the bladed disk/spacer ring from the balancing machine as detailed in para.17.F. Use the blade protection/retaining band (Tool 1129) instead of (Tool 1127).

G. Remove the Stage 6-7 Spacer Ring from the Stage 7 Disk, Number and Secure the Blades.

- (1) Remove the spacer from the disk, number and secure the blades as detailed in para.16.G. Use labyrinth protector (Tool 1170) instead of (Tool 1168). Use blade keys (3-330) instead of (Tool 2-50) and slave bolts (Tool 1164) instead of (Tool 426).

NOTE: The stage 7 bladed disk and stage 6-7 spacer ring are now ready to be passed to the LP Compressor Assembly (72-31-00).

20. Assemble the Spherical Mounting and Sleeve Housing to the Rotor Shaft Rear (Ref.Fig.530)

A. Prepare the Rotor Shaft Rear.

- (1) Rest the rear end (smaller threaded diameter) of the rotor shaft on a clean, flat surface. Examine the inner internal flange to ensure that the four shouldered locating pins (3-200) are assembled to the flange and the shoulders are below the surface of the flange. If the pins are not assembled, place the pins in Cardice for (approx.) 20 minutes or liquid Nitrogen for (approx.) 2-3 minutes. On completion of the cooling period, remove the pins from the freezing agent and assemble them to the internal flange, ensuring that the shoulders are below the surface of the flange.

SUB-ASSEMBLY

**72-31-03**

Page 598.21

Dec 1/76





# OLYMPUS 593

MK.610-14-28  
OVERHAUL



SNECMA

## B. Assemble Items to the Rotor Shaft Rear.

- (1) Lower the spherical mounting (3-220) into the bore of the rotor shaft, so that the flange of the mounting is uppermost and rests on a step in the shaft.
- (2) Identify the offset pin in the rotor shaft and the offset pin hole in the sleeve housing, then assemble the seal (3-210) to the shoulder on the sleeve housing.
- (3) Assemble the sleeve housing/seal to the rotor shaft, ensuring that the seal remains on the housing, and taking care to ease the seal into the recess in the shaft and align the offset locating pin and hole. Ensure that the sleeve housing is correctly assembled to the pins and abuts the shaft.
- (4) Apply lubricant 'B' to the bolts (3-180), then insert the bolts into the sleeve mounting and screw them into the rotor shaft, ensuring that the bolts have a locking (run-down) torque between 3 and 10 lbf in. (0,3 and 1,1 N.m). Torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m). After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 1.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref.SB.72-8449-191).
- (5) Turn the rotor shaft onto its front face, then check that the spherical mounting rotates freely. Using a suitable depth gauge or dial indicator, check that the spherical mounting has end-float of at least 0.002 in. (0,05 mm).

NOTE: The rotor shaft rear assembly is now ready to be passed to the LP Compressor Drive Shaft (Ref. 72-31-04, Assembly) for dimensional checks, prior to being assembled to the LP Compressor Assembly (72-31-00, Assembly).



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



LP COMPRESSOR DRIVE SHAFT - SUB-ASSEMBLY

TABLE OF CONTENTS

Para.	Page
1. General ... ..	501
2. Assemble the LP Compressor Drive Shaft ... ..	503
A. Assemble the Stiffening Disk Assembly to the Drive Shaft Front ... ..	503
B. Assemble the Drive Shaft Rear to the Drive Shaft Front ... ..	509
C. Assemble the Sealing Ring Outer and Spacer to the Drive Shaft ... ..	510
3. Carry Out Concentricity and Balancing Checks on the LP Compressor Drive Shaft ... ..	515
A. Carry Out Concentricity Checks on the Drive Shaft..	515
B. Dynamically Balance the Drive Shaft ... ..	521
4. Assemble the LP Signal Shaft Tube ... ..	530
A. Assemble the Seal Ring Pack to the Signal Shaft Tube ... ..	530
B. Assemble the Locking and Serrated Sleeves to the Signal Shaft Tube ... ..	531
5. Trial Assembly and Dimensional Checks of the Rotor Shaft Rear/Spherical Mounting, the LP Compressor Drive Shaft and the LP Signal Shaft Tube ... ..	532
A. Assemble and Lock the Rotor Shaft Rear to the Drive Shaft ... ..	532
B. Carry Out Dimensional Checks on the Rotor Shaft Rear, LP Drive Shaft and Signal Shaft Tube ... ..	536
6. Assemble and Check the Signal System Items ... ..	538
A. Assemble the Signal System Items to the Drive Shaft and Signal Tube ... ..	538
B. Carry Out Dimensional Check to Determine the Adjusting Washer Thickness ... ..	542
C. Remove the Rotor Shaft Rear/Spherical Mounting from the Drive Shaft ... ..	546
7. Assemble Carbon Bearings to the Stiffening Disk ... ..	548
A. Prepare to Assemble Bearings ... ..	548
B. Assemble Carbon Bearings... ..	548
C. Finish Machine Carbon Bearings... ..	548

TABLE OF ILLUSTRATIONS

Fig.No.	Page
501 Positioning Stiffener Disks and Heating Coils ... ..	502
502 Assembling LP Drive Shaft Front to Stand ... ..	504

SUB-ASSEMBLY  
**72-31-04**  
Contents 1  
Sep 1/81

PRINTED IN ENGLAND

TN7457



OLYMPUS 593

MK.610-14-28

OVERHAUL



Fig.No.		Page
503	Mobile Stand for Oven Heating LP Drive Shaft Front.	506
504	Assembling Lifting Fixture to LP Drive Shaft Front.	512
505	Removing Sleeve from LP Drive Shaft Rear ... ..	514
506	Setting the Adjustable Bearing for Balancing/ Concentricity ... ..	517
507	LP Drive Shaft Mobile Stand and Lifting Fixture ...	519
508	Balancing/Concentricity Positions on LP Drive Shaft ... ..	520
509	Assembling LP Drive Shaft to Balancing Machine ...	522
510	Effect on Balance of Exchanging Washers on Rear Flange ... ..	528
511	Assembling and Locking LP Rotor Shaft Rear to LP Drive Shaft ... ..	533
512	Dimensional Check of Signal Shaft Tube and LP Drive Shaft ... ..	537
513	Assembling Signal System Items to LP Drive Shaft and Signal Shaft Tube ... ..	539
514	Stiffening Disk Assembly Details ... ..	547

LIST OF TABLES

Table No.		Page
501	Balance Weights for Shaft Front End ... ..	527

SUB-ASSEMBLY  
**72-31-04**  
Contents 2  
Sep 1/81

TN42695



OLYMPUS 593

MK.610-14-28

OVERHAUL



LP COMPRESSOR DRIVE SHAFT - SUB-ASSEMBLY

1. General

- A. Prior to commencing assembly, refer to 72-09-00 Assembly for general information.
- B. During the sub-assembly procedure, reference will be made to the Illustrated Parts Catalogue (I.P.C.) to identify those items where the nomenclature does not positively identify them, due to duplication of the title e.g. nuts, bolts, washers, bearings, gears, housings, tubes etc. When the item is a part of the breakdown of the text concerned, the item will be identified e.g. bolt (1-10), the 1 referring to the I.P.C. Fig. No., and the 10 referring to the Item No. Where items from a different breakdown are introduced, then the breakdown number will be quoted in addition e.g., bolt (72-32-01/1-10).
- C. Throughout the text special tools are quoted by their Ref. No. e.g., (Tool 1234). For a complete list of tooling required for the assembly and balance procedures, and for the Manufacturers Part No., refer to the Special Tools, Fixtures and Equipment Tables 1002, 1003 and 1004.
- D. This chapter deals with the assembly and balancing of the LP compressor drive shaft, and the assembly of the LP signal shaft tube. In addition, certain dimensional checks must be carried out which entail the use of the LP compressor rotor shaft rear. To enable the checks to be carried out, the rotor shaft rear must be borrowed from the LP compressor assembly during its assembly (Ref.72-31-00 Assembly) and assembled and locked to the drive shaft. Certain dimensional checks are carried out between the rotor shaft and the rotor shaft rear, followed by additional dimensional checks and setting up, for determining the adjusting washer thickness for setting up the engine signal system. The signal system items are from 72-31-05.

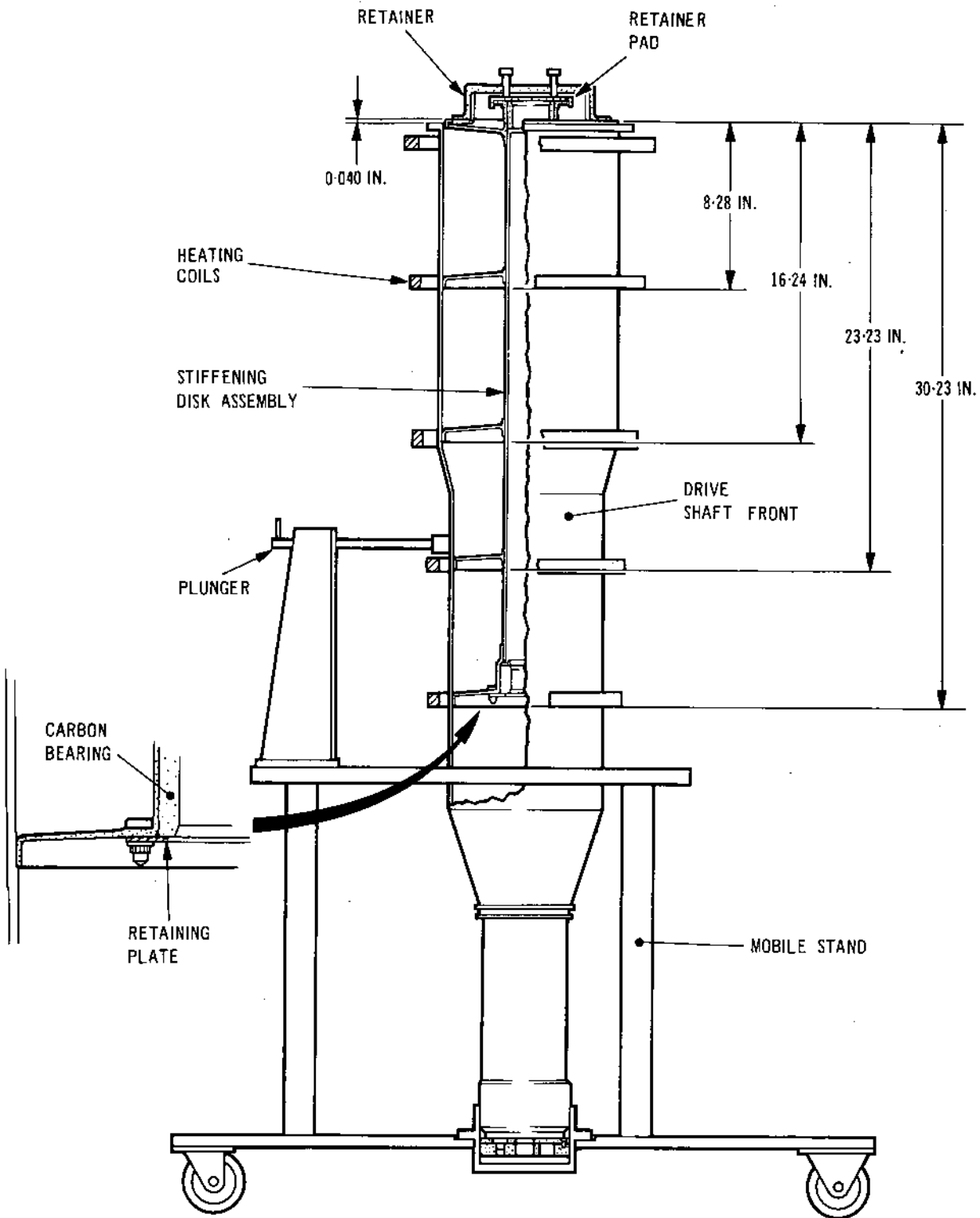
PRINTED IN ENGLAND

TN7434

CR 30495/00A



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



FN11230

Positioning Stiffener Disks and Heating Coils  
Figure 501

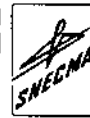
SUB-ASSEMBLY  
**72-31-04**

Page 502  
Aug 27/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- E. On completion of the checks, the LP compressor rotor shaft rear must be returned to the LP compressor assembly, and the signal system items (that were used), returned to the remainder of the system items ready for engine build. The LP signal shaft tube is ready for engine build, and the LP compressor drive shaft is ready for assembling to the HP compressor assembly during its assembly (Ref.72-33-00 Assembly).

2. Assemble the LP Compressor Drive Shaft

A. Assemble the Stiffening Disk Assembly to the Drive Shaft Front.

- (1) If the carbon bearings (1-200) were removed for stiffening disk cleaning procedures install as detailed in para.7.
- (2) Apply lubricant 'A' to bolts (1-170), then assemble the bolts to the rear face of the front (smaller) disk of the stiffening disk assembly (Ref.Fig.501). Position the carbon bearing retaining plate (1-180) on the front face of the disk and locate on the bolts. Secure retaining plate with nuts (1-160), check that the run-down torque is not less than 10 lbf in. (1,1 N.m), then torque-tighten nuts to 100 lbf in. (11,5 N.m).
- (3) Rest the retainer pad (Tool 89) (Ref.Fig.501) on the centre of the upper disk of the disk assembly. Ensure that the three bolts of the disk retainer (Tool 88) are unscrewed, then position the retainer on top of the disk, turn the retainer to engage its three arms behind the lugs on the disk, then screw in the three bolts finger-tight onto the retainer pad.

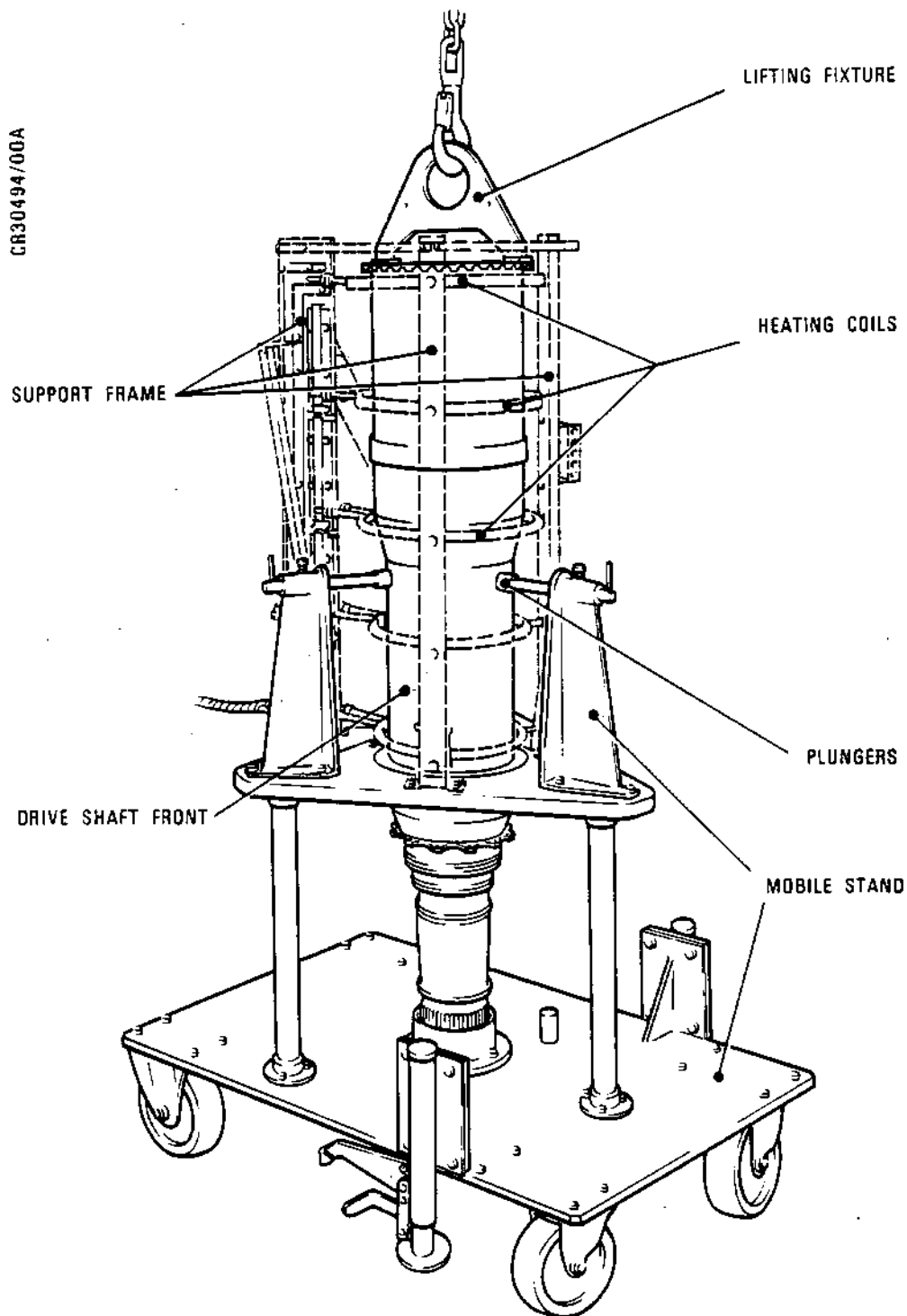
NOTE: The disk retainer and pad prevent the upper disk from dishing, after assembly to the shaft front, and, by acting against its flange, lifting the other disks from their locations.

- (4) Locate the lifting fixture (Tool 1109) on the rear flange of the drive shaft and secure the fixture to the shaft with slave bolts (Tool 328) and nuts.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Assembling LP Drive Shaft Front to Stand  
Figure 502

SUB-ASSEMBLY  
**72-31-04**

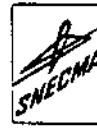
Page 504  
Aug 27/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (5) Employ one of the two methods of heating the drive shaft to attain a temperature of between 300 - 320 deg C.

METHOD 1. Local heating of the areas where the disks locate. The procedure requires special equipment and temperature monitoring to ensure that the shaft is not over-temperatured. This is a Controlled Manufacturing Technique (C.M.T.) procedure and must be followed without deviation.

METHOD 2. Complete heating in a thermostatically controlled oven. This procedure poses a handling problem in ensuring that the stiffening disk assembly is fully inserted before the temperature difference between the shaft and disk assembly is lost.

- (6) Prepare and heat the shaft method 1.

- (a) Attach a hoist to the lifting fixture then raise the drive shaft and lower into the build stand (Tool 1110).
- (b) At the five positions where heat will be applied (Ref.Fig.501) ensure that the shaft surface is adequately degreased then apply, by brushing, a thin coat of Thermindex temperature sensitive paint ref. O/E 106 in bands 0.5 to 1 in. (12,7 to 25,4 mm) wide. Allow the paint to dry at room temperature for 2 hours.

NOTE: It may be necessary to raise the shaft a few inches on the hoist to expose the second band from the lower end for painting.

- (c) Lift the shaft clear of the build stand and position it over the mobile stand (Tool 1253) (Ref.Fig.502). Lower the shaft into the mobile stand, guiding it through the top bush and locating the bottom (front) of the shaft in the lower bush. Release the hoist, then release and remove the lifting fixture. Engage and lock the three plungers against the shaft.

SUB-ASSEMBLY

**72-31-04**

Page 505

Sep 1/81



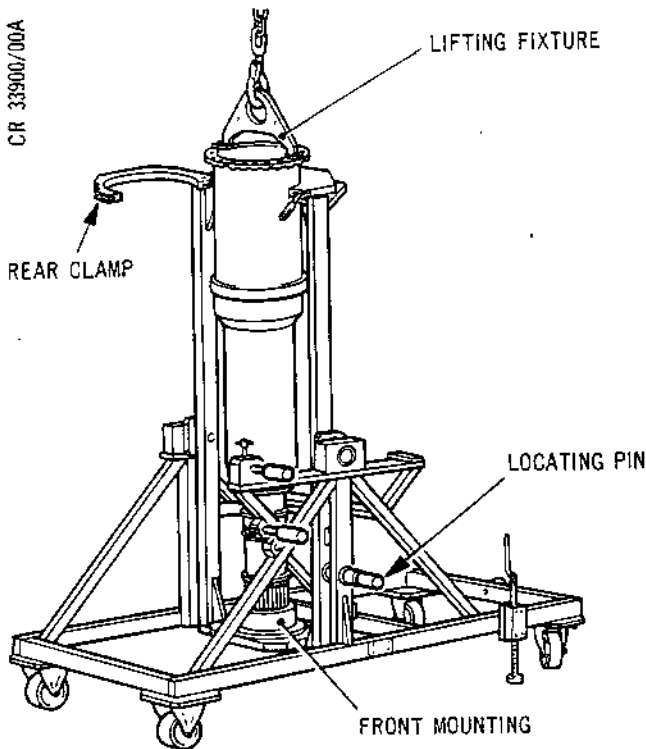


OLYMPUS 593

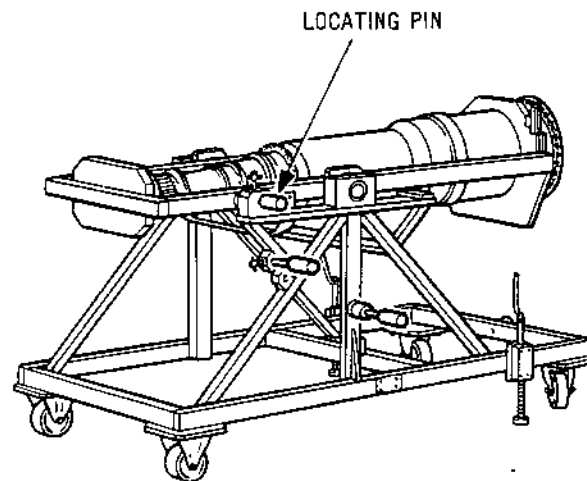
MK. 610-14-28  
OVERHAUL



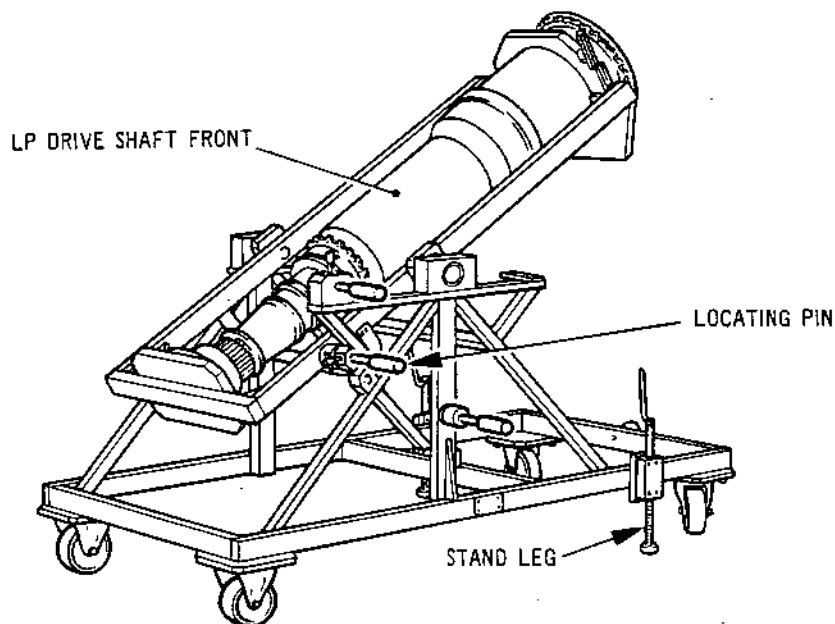
CR 33900/00A



STAND - VERTICAL POSITION



STAND - HORIZONTAL POSITION



STAND - INTERMEDIATE POSITION

Mobile Stand for Oven-Heating LP Drive Shaft Front  
Figure 503

SUB-ASSEMBLY  
**72-31-04**  
Page 506  
Oct 1/76

TN27451



OLYMPUS 593

MK.610-14-28  
OVERHAUL



**WARNING:** DURING THE OPERATION OF THE DELAPENA EQUIPMENT THE HEATING COILS AND LP DRIVE SHAFT MUST NOT BE TOUCHED.

- (d) Position the induction heating coils of a Delapena type 6 30/50 in a supporting frame at the positions shown in Fig.501 and secure the frame to the mobile stand (Ref. Fig.502). Operate the equipment in accordance with the manufacturers instructions, and for the time and at the power quoted as follows:
- (i) With the equipment connected to the main electrical supply, switch the mains supply on and check that the 'MAINS ON' bulb lights up.
  - (ii) With the equipment connected to a mains water supply, turn on the water supply and check that the 'WATER ON' bulb lights up.
  - (iii) When the 'MAINS ON' bulb brightens, the equipment is ready to operate. Operate the starter switch on the control box and check the reading on the ANODE CURRENT dial, then operate the stop switch. The current required is 4 amps and adjustment must be made by moving the handle of the 'POWER CONTROL' until 4 amps is registering when the starter switch is operated.
  - (iv) When the current is correct, set the timer switch to 82 seconds.
  - (v) Operate the starter switch and check that the 'HEAT ON' bulb lights up and the seconds light flashes each second. After 82 seconds the heating operation will automatically stop, the 'HEAT ON' bulb will go out and the seconds light will cease to flash. Operate the stop switch, then turn off the mains supply. The stiffener may now be assembled to the LP drive shaft front, (Ref.para.(8)), and any delay must be avoided.

SUB-ASSEMBLY  
**72-31-04**

Page 507  
Sep 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(vi) If the loss of temperature difference prevents the disks from locating correctly on their lands the disk assembly must be extracted as detailed in 72-31-04 Disassembly and the assembly procedure restarted. The shaft must be permitted to cool to room temperature before the heating process is repeated to prevent oven temperature.

(7) METHOD 2 - Prepare and heat the shaft.

(a) With the mobile stand (Tool 590) (Ref.Fig.503) set in the vertical position and with the rear clamp open, use a hoist on the lifting fixture to position the shaft with its forward end in the front (bottom) mounting of the stand, then close and fasten the rear clamp around the shaft. Remove the hoist, release and remove the lifting fixture, then with the stand set horizontally wheel the stand into an oven set between 300-320 deg C, and heat for 1 hour. Using protective gloves, remove the stand from the oven, elevate the stand to the intermediate position, lower the stand legs, then assemble the stiffening disk assembly (Ref.para.(8)). If the oven will not accommodate the stand, the shaft will have to be transferred to and from the oven on a hoist, taking care to minimise the cooling period before assembling the stiffening disk assembly (Ref.para.(8)).

WARNING: THE SHAFT AND STAND REMAIN HOT FOR ABOUT 2 HOURS AFTER REMOVAL FROM THE OVEN. PRECAUTIONS MUST BE TAKEN TO PREVENT ACCIDENTAL HANDLING DURING THIS PERIOD.

(b) If the loss of temperature difference prevents the disks from locating correctly on their lands the disk assembly must be extracted as detailed in 72-31-04 Disassembly and the assembly procedure restarted.

TN33556

SUB-ASSEMBLY

**72-31-04**

Page 508

Sep 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (8) Lower the stiffening disk assembly into the drive shaft front until the disks abut the steps inside the shaft, then ensure that the stiffening disk is correctly assembled by checking that the protrusion of the upper (rear) disk is not more than approx. 0.040 in. (1 mm) (Ref.Fig.501).
- (9) If the shaft was heated locally, check that the temperature paint has changed colour to black, and has not undergone a further change to an off white colour. If the off white colour appears anywhere on the temperature paint the shaft must be rejected and referred for metallurgical examination.
- (10) When the drive shaft has cooled to the workshop temperature, release and remove the disk retainer and pad. Attach the lifting fixture (Tool 1109) to the shaft with slave bolts (Tool 328), and with a hoist, remove the shaft from the mobile stand and lower it into the build stand (Tool 1110).
- (11) Release and remove the hoist and lifting fixture. Remove the temperature paint (if used) by wiping with a lint-free cloth soaked in cellosolve acetate, then touch up the aluminium paint where necessary (Ref. 72-09-00 Repair).
- (12) Apply lubricant 'A' to bolts (1-90), then position the carbon bearing retaining plate (1-100) on the rear disk extension and assemble the bolts from the front face of the extension through the plate and secure with nuts (1-80). Check that the run-down torque is not less than 10 lbf in. (1,1 N.m), then torque-tighten the nuts to 100 lbf in. (11,5 N.m).

B. Assemble the Drive Shaft Rear to the Drive Shaft Front.

**NOTE:** Stiffened drive shaft front and rear to SB.72-98 are separately interchangeable with front and rear shafts pre SB.72-98.

SUB-ASSEMBLY

**72-31-04**

Page 509

Oct 1/82



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (1) Screw the lifting fixture (Tool 1055) onto the rear end of the drive shaft rear. Attach a hoist to the lifting fixture, then position the shaft over the drive shaft front. Examine the flanges of the drive shaft front and rear for etched datum marks 00 on the flange faces alongside one mating pair of bolt-holes, and/or 0 on their peripheries. If the datum marks are not evident, align the external master spline at the end of each shaft with one another. Lower the drive shaft rear onto the drive shaft front aligning the bolt-holes, and ensuring the datum marks and/or the master splines are aligned.
  - (2) Apply lubricant 'A' to bolts (1-150) then assemble the bolts through the flange of the drive shaft front (from underneath), position the balancing washers (1-130 and 1-140) on the bolts with heavy washers and light washers alternating, and secure with nuts (1-120). Release the hoist from the lifting fixture. Taking the bolt in line with the datum marks and/or master splines as No.1 bolt, and viewing from the rear (above), tighten the nuts in the following sequence 1, 19, 10, 28, 4, 22, 13, 31, 16, 34, 7, 25, 12, 30, 3, 21, 27, 9, 18, 36, 5, 23, 15, 33, 11, 29, 2, 20, 8, 26, 35, 17, 6, 24, 14 and 32, checking that that the nuts have a run-down torque of not less than 9.5 lbf in. (1,1 N.m). Torque-tighten the nuts in 50 lbf in. (5,6 N.m) increments to a final torque of 450 lbf in. (51 N.m). If datum marks were not present on the shaft(s), etch datum marks 00 on the flange faces and 0 on the peripheries of the flanges in line with an existing datum mark, or with the master splines at each end of the shafts.
- C. Assemble the Sealing Ring Outer and Spacer to the Drive Shaft.
- (1) Attach a hoist to the lifting fixture, then steadily raise the hoist and guide the drive shaft out of the stand. Assemble the lifting fixture (Tool 1068) (Ref.Fig.504) to the front end of the drive shaft front as follows:

SUB-ASSEMBLY

**72-31-04**

Page 510

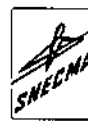
Oct 1/82



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (a) Unscrew the locknut and withdraw the keep plate from the four body pins and towards the lifting plate.
- (b) Offer the fixture to the drive shaft and slide the four lobes of the body through the four cut-aways in the shaft, then turn the body so that the lobes locate behind the lands in the shaft. Push the keep plate towards the shaft locating the two lobes in two of the cut-aways in the shaft and over the four pins of the body. Screw on the locknut and tighten it against the keep plate.
- (2) Attach a hoist to the lifting fixture on the drive shaft front, then raise the shaft to the horizontal position. Position the mobile stand (Tool 1332) (Ref.Fig.507) or (Tool 589) under the drive shaft with the locking end of the stand at the front end of the drive shaft assembly. With the stand hinge bushes open, lower the drive shaft onto the stand bushes. Hinge the bushes closed and secure them with the knurled nuts. Release the hoists from the lifting fixtures, then unscrew and remove the lifting fixture from the drive shaft rear. Remove the lifting fixture from the drive shaft front by releasing the locknut, withdrawing the keep plate, then turning the body until its lobes align with the cut-aways in the shaft, withdraw the body.
- (3) Offer the sealing ring outer over the front of the drive shaft front, and assemble to the shaft flange (Ref.Fig.508). Align the bolt-holes of the two items by temporarily inserting two of the balancing bolts (1-50) in diametrically opposite holes. Lubricate bolts (1-60) with lubricant 'A', then assemble bolts to the front of the sealing ring and secure with nuts (1-10). Remove the two balancing bolts and assemble the correct bolts (1-60) and nuts (1-10). Check that the run-down torque is not less than 10 lbf in. (1,1 N.m), then torque-tighten nuts to 100 lbf in. (11,5 N.m).

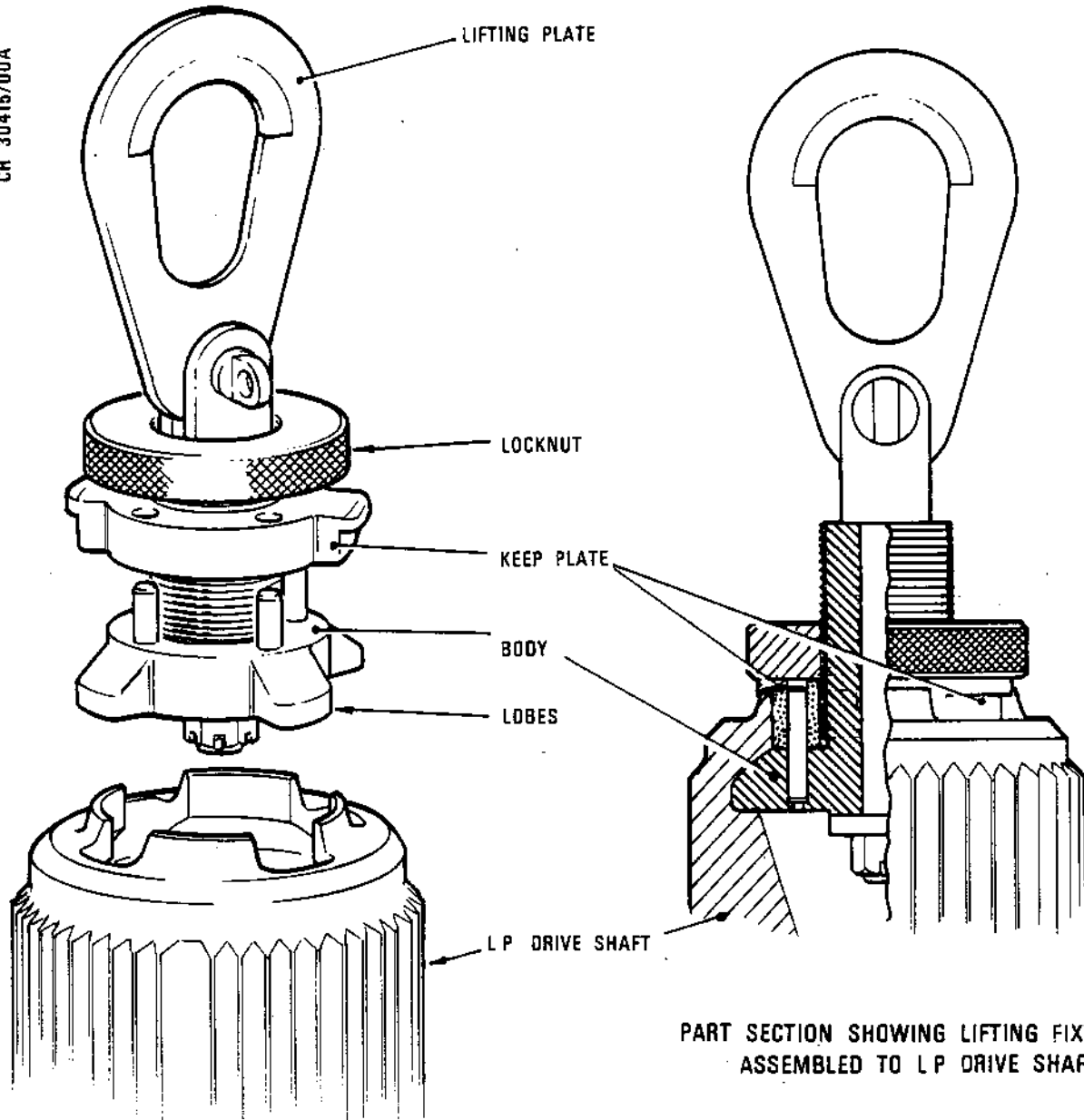
SUB-ASSEMBLY

**72-31-04**

Page 511

Oct 1/82

CR 30415/00A



TN27452

Assembling Lifting Fixture to LP Drive Shaft Front  
Figure 504

SUB-ASSEMBLY  
**72-31-04**

Page 512  
Oct 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (4) Assemble the sleeve to the drive shaft.
- (a) Check that the sealing rings (2-180) will assemble into the sleeve (2-170) and then remove them.
  - (b) Place the sleeve in a freezing agent Cardice for approx. 20 min, or liquid Nitrogen for approx. 2 to 3 min.
  - (c) Remove the sleeve from the freezing agent and assemble the sleeve to the bore of the drive shaft rear, ensuring the smaller diameter end of the sleeve enters first. Using a suitable light alloy drift, ensure the sleeve abuts the step in the shaft.
  - (d) If it becomes necessary to remove the sleeve due to incorrect assembly or accidental damage, extract the sleeve from the shaft using mechanical puller (Tool 1305) (Ref.Fig.505) as follows:
    - (i) Screw in on the small tommy bar until the cone is out of engagement with the three claws, allowing them to retract under the action of the springs.
    - (ii) Unscrew the large tommy bar to move the claw assembly away from the handle.
    - (iii) Slide the claw assembly into the drive shaft rear until the flange on the claw cover plate abuts the spacer.
    - (iv) Hold the knurled ring and screw out on the small tommy bar causing the cone to extend the claws behind the sleeve.

PRINTED IN ENGLAND

TN15182

SUB-ASSEMBLY

**72-31-04**

Page 513

Oct 1/76



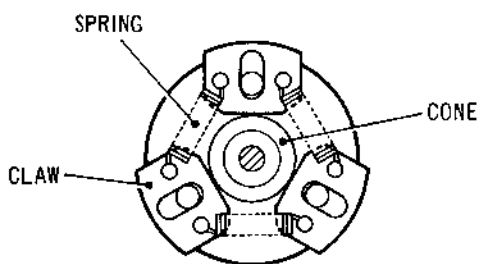
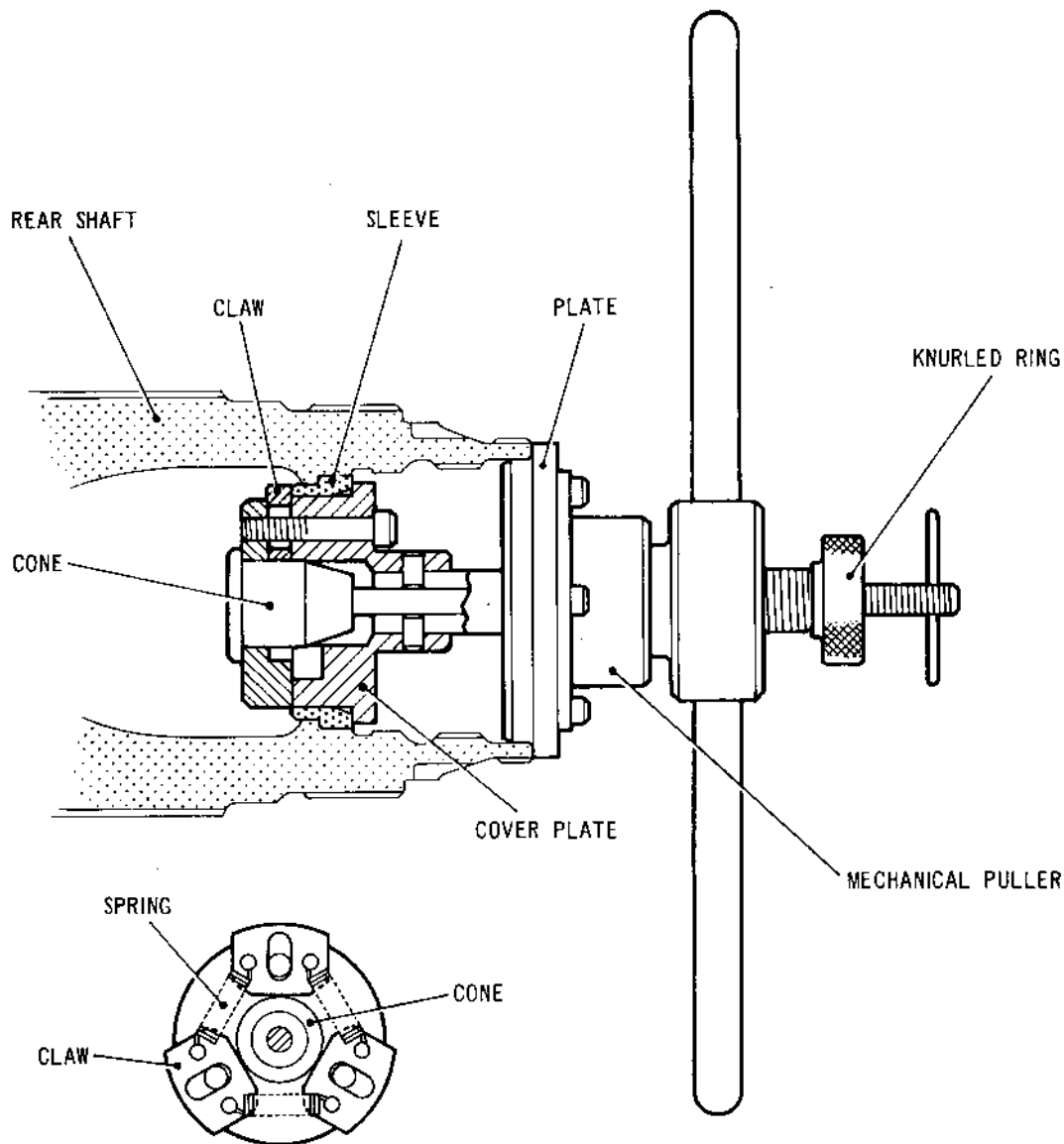


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32166/00A



VIEW SHOWING  
CLAW ARRANGEMENT

Removing Sleeve from LP Drive Shaft Rear  
Figure 505

SUB-ASSEMBLY  
**72-31-04**

Page 514  
Oct 1/76

TN43249



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (v) Screw in on the large tommy bar and engage the plate in the shaft, then continue screwing, holding the knurled ring steady, until the spacer is released.
- (vi) Withdraw the puller and spacer from the shaft. Screw in on the small tommy bar to retract the claws, then withdraw the spacer from the puller.
- (5) Using fine emery cloth, remove the aluminium paint from the rotor shaft at the balancing positions 'A' and 'G' (Ref.Fig.508). Ensure that no paint remains on the shaft at the balancing positions.
- (6) Slide the protector (Tool 408) onto the end of the drive shaft rear, and assemble the (split) protector (Tool 999) to the drive shaft front to protect the splines and labyrinth. Secure the protector with its thumbnut.
3. Carry Out Concentricity and Balancing Checks on the LP Compressor Drive Shaft
- A. Carry Out Concentricity Checks on the Drive Shaft (Ref.Fig.508 and 509).
- NOTE: Depending on the availability of equipment, the concentricity checks may be carried out on the balancing machine (prior to balancing) in lieu of the surface table and equipment.
- (1) Prepare the equipment for checking the concentricity.
- (a) Position two supports (Tool 1073) on the surface table.
- (b) Assemble a spacer (Tool 1074) to each of the supports, then assemble clamp plates to each support to secure the spacers.

PRINTED IN ENGLAND

TN7447

SUB-ASSEMBLY

72-31-04

Page 515

Oct 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) Assemble the adjustable bearing (Tool 1154) (with the attached arm Tool 1153) to one of the spacers so that the arm is towards the other support. Assemble clamp plates to the spacer to secure the bearing.
- (d) Assemble the other adjustable bearing (Tool 1154) to the remaining spacer then assemble clamp plates to the spacer to secure the bearing.
- (e) Set the position of the adjustable bearing rollers (if necessary) using the setting gauge (Tool 1639) (Ref.Fig.506).
  - (i) Set the setting gauge caliper to the 'A' dia. of the shaft (Ref.Fig.508) and lock the caliper.
  - (ii) Offer the gauge to the top of the bearing block and ensure that the gauge seats correctly, if necessary, releasing the nuts securing the rollers support arms.
  - (iii) Check that the roller contacts the gauge arm, or reposition the roller to contact the arm, then secure the roller support arms.
  - (iv) Reverse the setting gauge in the bearing block and check that the remaining roller contacts the gauge arm, or reposition the roller to contact the arm, then secure the roller support arms. Remove the gauge from the bearing block.
  - (v) Repeat operation (i) to (iv) for diameter 'G' of the shaft.

TN7448

SUB-ASSEMBLY

**72-31-04**

Page 516

Oct 1/76



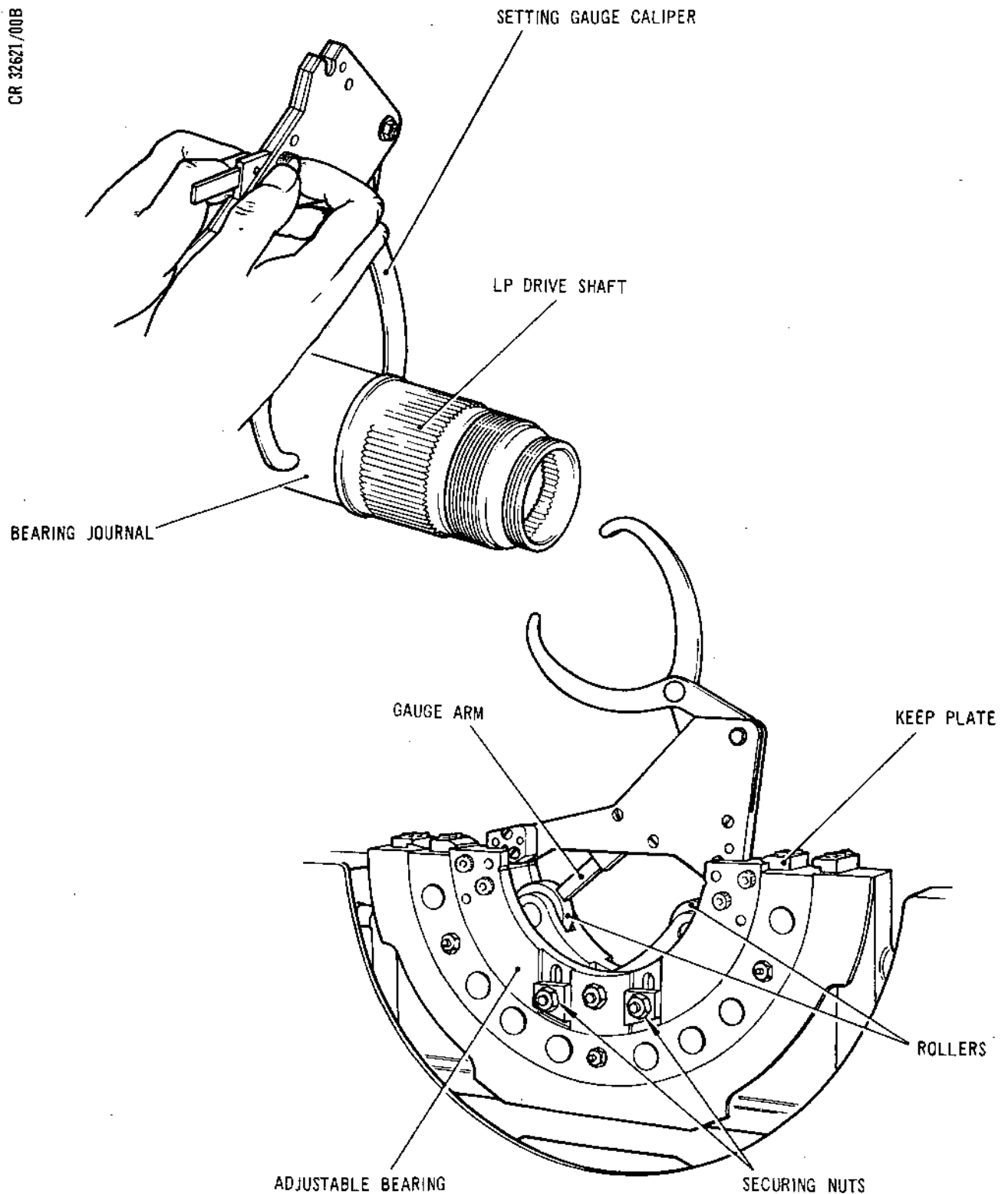
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32621/008

PRINTED IN ENGLAND



TN27218

Setting the Adjustable Bearing for Balancing/Concentricity  
Figure 506

SUB-ASSEMBLY  
**72-31-04**

Page 517  
Oct 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Assemble the lifting equipment to the drive shaft (Ref.Fig.507).
- (a) Release and open the front adapter (Tool 1143), then assemble the adapter to the drive shaft front ensuring that the taper in the bushes abuts the increased dia. taper on the shaft. Close the adapter and secure with the knurled pin.
  - (b) Release and open the rear adapter (Tool 1144), then assemble the adapter to the drive shaft rear ensuring that the taper on the bushes abuts the increased dia. taper on the shaft. Close the adapter and secure with the knurled pin.
  - (c) Attach a hoist to the (beam type) sling (Tool 1145) centre shackle, then position the sling over the drive shaft aligning the connecting points with the correct adapters as quoted on the sling. Secure the sling to the adapters with quick release pins.
- (3) Assemble the drive shaft to the surface table equipment.
- (a) Release the knurled nuts and hinge the mobile stand bushes open.
  - (b) Raise the hoist and position the drive shaft over the supports on the surface table, positioning the drive shaft front over the adjustable bearing fitted with the locating arm. Position the supports to align with location 'A' on the drive shaft front (Ref.Fig.508), and location 'G' on drive shaft rear (Ref.Fig.508). Secure the supports to the surface table.
  - (c) Lower the drive shaft, locating the lip on the drive shaft front in the recess in the locating arm of the front adjustable bearing, and resting the shaft on the two bearings.

IN7449



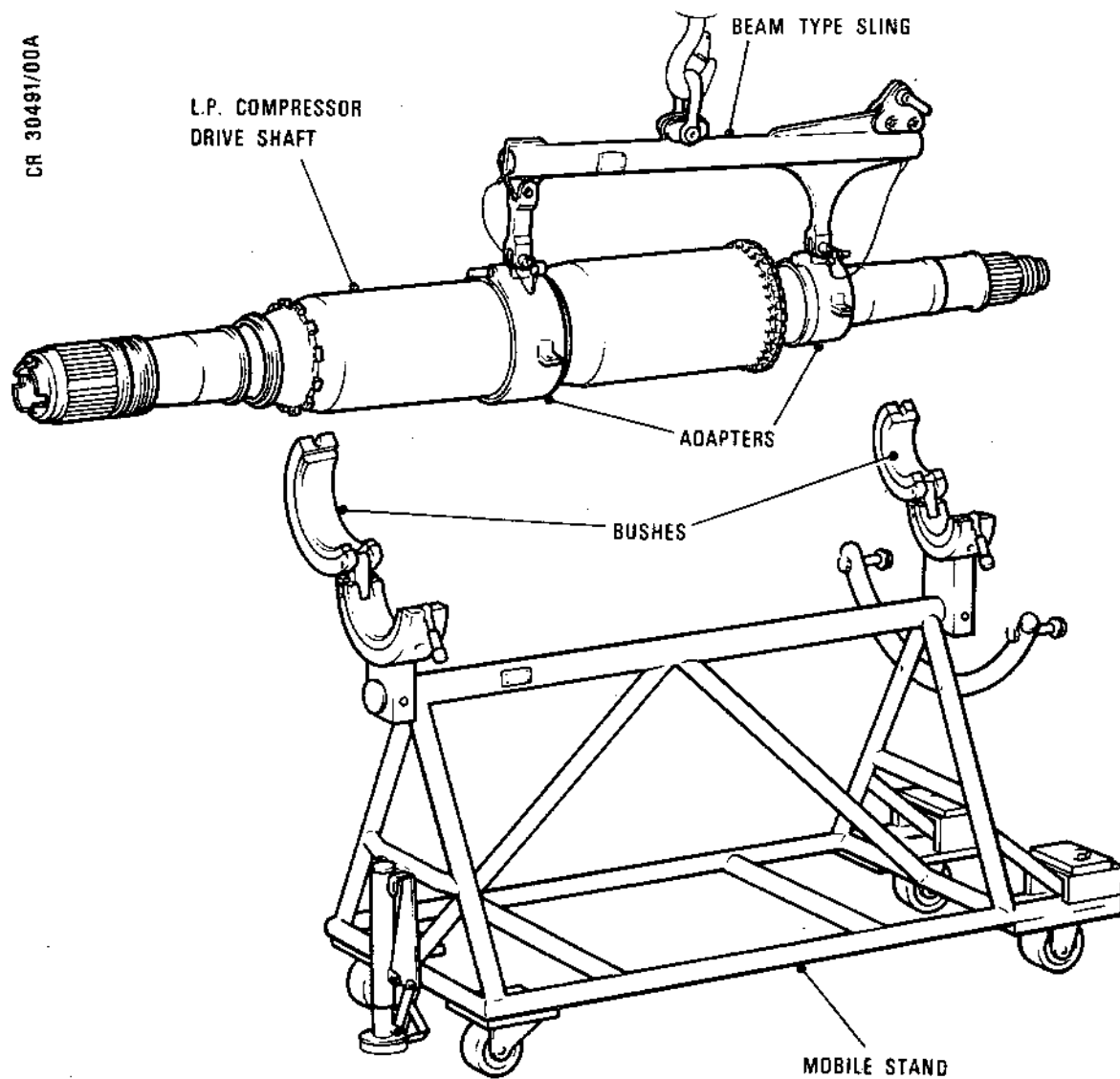
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 30491/00A



TN27215

LP Drive Shaft Mobile Stand and Lifting Fixture  
Figure 507

SUB-ASSEMBLY  
**72-31-04**  
Page 519  
Oct 1/76

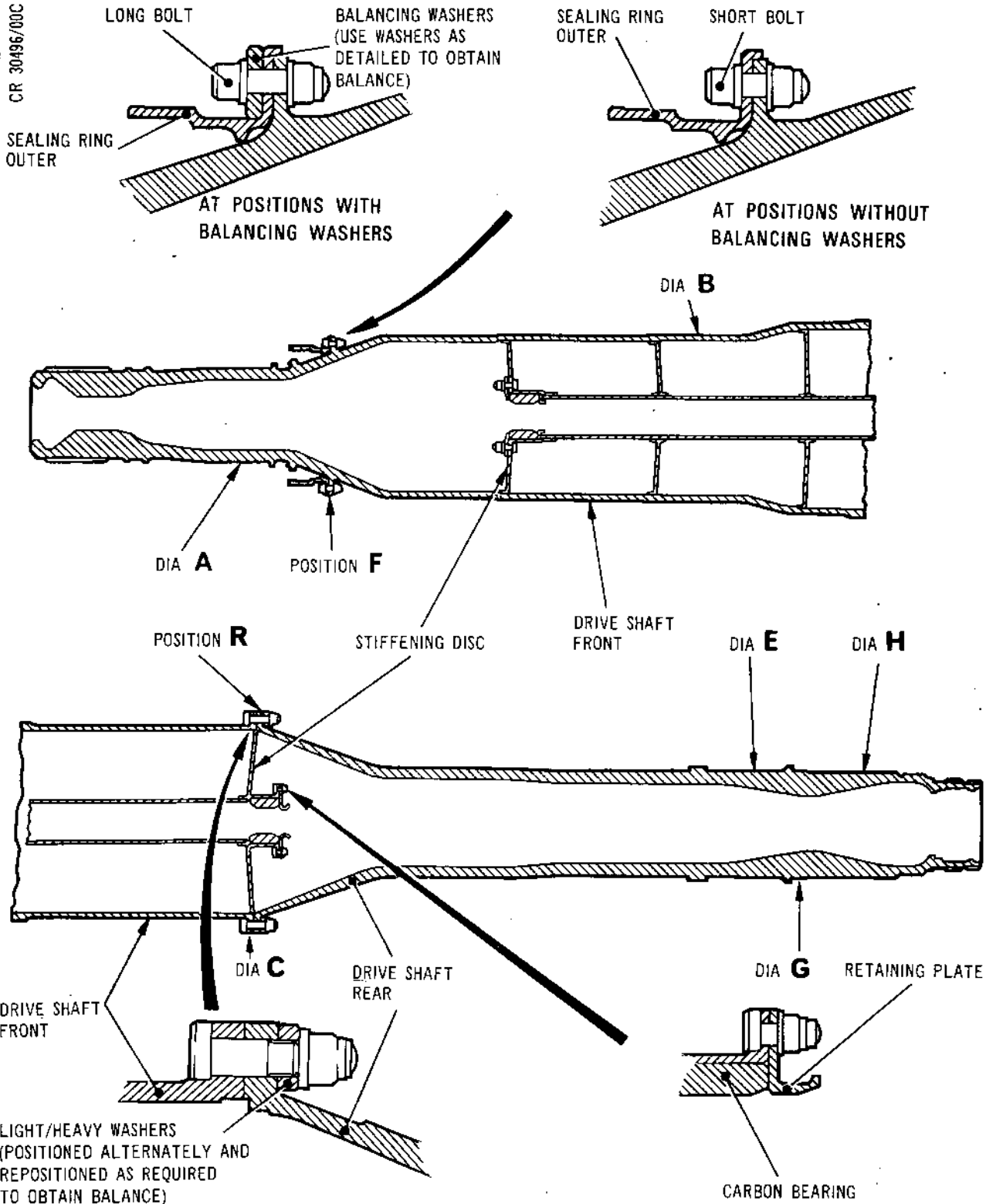


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 30496/00C



Balancing/Concentricity Positions on LP Drive Shaft  
Figure 508

SUB-ASSEMBLY  
**72-31-04**

Page 520  
Oct 1/76

TN27216



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (d) Release the knurled pins securing the adapters to the drive shaft, then remove the sling and adapters from the shaft. Withdraw the protector from the end of the drive shaft rear.
- (4) Check and record the concentricity at eight equi-spaced points at positions 'E', 'C' and 'H' using a suitable dial gauge and stand. The amount of eccentricity must be within a total indicator reading of 0.001 in. (0,025 mm) at positions 'E' and 'H', and 0.005 in. (0,127 mm) at 'C'.

NOTE: Use the datum marks on the drive shaft front and rear as the common angular datum line for the concentricity checks.

- (5) Slide the protector (Tool 408) onto the end of the drive shaft rear. Position the hoist with attached (beam type) sling (Tool 1145) and adapters over the drive shaft, then assemble the rear adapter (Tool 1144) to the drive shaft rear, and the front adapter (Tool 1143) to the drive shaft front. Secure each adapter with its knurled pin.
- (6) If the surface table is required for other use, or the supports and adjustable bearings are required for balancing, hoist the drive shaft from the surface table and position and lower the drive shaft into the mobile stand (Tool 1332 or 589) or transporter (Tool 1092). If required, release the keep plates and remove the bearings and spacers from the supports, then release and remove the supports from the surface table.

B. Dynamically Balance the Drive Shaft.

- (1) Prepare the balancing machine (Avery 72N56) (Ref. Fig.509).
- (a) Assemble a spacer (Tool 1074) to each of the machine cradles, then assemble clamp plates to each cradle to secure the spacers.

SUB-ASSEMBLY

72-31-04

Page 521

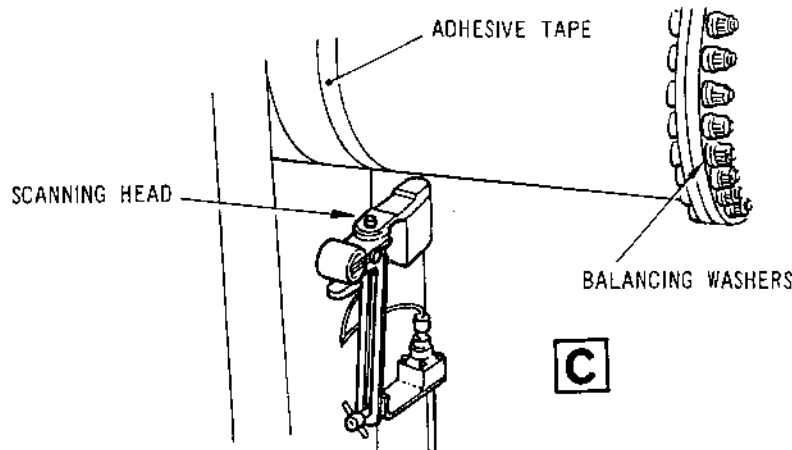
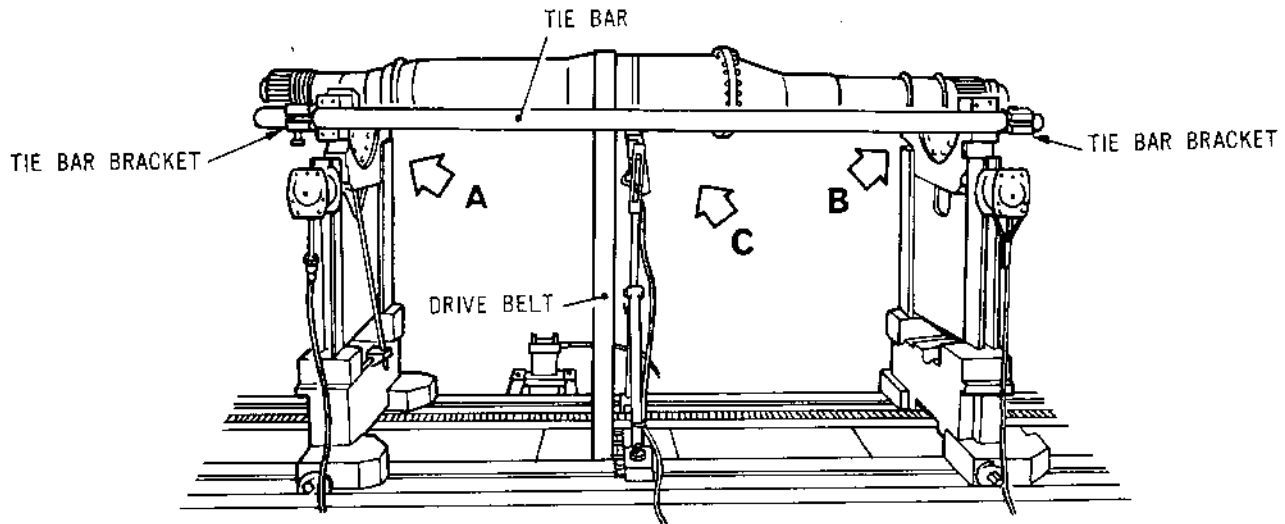
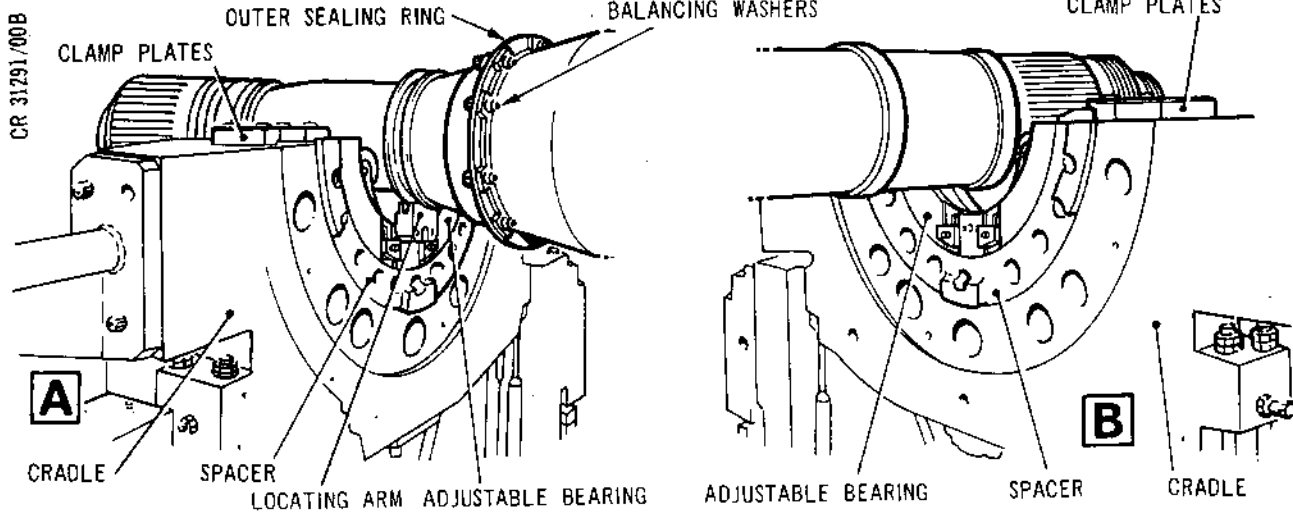
Oct 1/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



Assembling LP Drive Shaft to Balancing Machine  
Figure 509

SUB-ASSEMBLY  
**72-31-04**

Page 522  
Oct 1/76

TN27133



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Assemble the adjustable bearing (Tool 1154) (with the attached arm Tool 1153), to the spacer in the cradle nearer the head of the machine, with the arm towards the other cradle. Assemble clamp plates to the spacer to secure the bearing.
- (c) Assemble the other adjustable bearing (Tool 1154) to the remaining spacer, then assemble clamp plates to the spacer to secure the bearing.
- (d) Set the position of the adjustable bearing rollers (if necessary) using the setting gauge (Tool 1641).
- (i) Set the gauge caliper to the 'G' dia. of the shaft (Ref.Fig.506) and lock the caliper.
- (ii) Offer the gauge to the top of the bearing block and ensure that the gauge seats correctly, if necessary, releasing the nuts securing the roller support arms.
- (iii) Check that the roller contacts the gauge arm, or reposition the roller to contact the arm, then secure the roller support arm.
- (iv) Reverse the setting gauge in the bearing block and check that the remaining roller contacts the gauge arm, or reposition the roller to contact the arm, then secure the roller support arms. Remove the gauge from the bearing block.
- (v) Repeat operations (i) to (iv) for dia. 'A' of the shaft.
- (e) Place a belt (2.5 in. x 120 in.) (63,5 mm x 3048 mm) over one of the cradles.

PRINTED IN ENGLAND

TN7450



OLYMPUS 598

MK.610-14-28  
OVERHAUL



- (f) Assemble a tie bar bracket (Tool 109) to the top position on the front and rear faces of each cradle (Ref.Fig.509) and secure each bracket with four bolts or Allen screws. Ensure the hand-nuts on the brackets are loose, then slide a tie bar (Tool 212) into each pair of front and rear brackets. Do not lock the tie bars at this stage.
- (2) Assemble the drive shaft to the balancing machine.
- (a) With the (beam type) sling (Tool 1145) and adapters assembled to the drive shaft, and a hoist connected to the sling, raise the drive shaft from the surface table supports or the mobile/transporter stand and position the drive shaft over the balancing machine. Align the 'A' location on the drive shaft front (Ref. Fig.508) with the adjustable bearing fitted with the locating arm, then position and secure the cradle(s) to align the 'G' location on the drive shaft rear (Ref.Fig.508) with the other adjustable bearing. Lower the drive shaft locating the lip on the drive shaft front in the recess in the locating arm of the front adjustable bearing and resting the shaft on the two bearings.
- (b) Release the knurled pins securing the adapters to the drive shaft, then remove the sling and adapters from the shaft. Lower the sling onto a suitable surface, then release the hoist.
- (c) Position the tie bars evenly in the brackets, then secure the bars with the bracket handnuts.
- (d) Move the belt from around the cradle and position it on the shaft at diameter 'B' (Ref.Fig.508). Align the motor and rollers with the belt, assemble the belt to the motor/rollers and adjust as necessary to operate correctly, then secure the motor/rollers.

TN7451

SUB-ASSEMBLY

**72-31-04**

Page 524

Oct 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (e) Attach a strip of black adhesive tape around the drive shaft at a suitable position for the scanning head. Starting in line with the datum marks on the attachment flange of the shafts attach a tape of contrasting colour (e.g. white or yellow) over the black tape for 180° of the shaft travel to act as a datum for balancing.
- (f) Release and remove the protector from the front of the drive shaft front, and withdraw the protector from the drive shaft rear.
- (3) Prepare the machine for balancing in accordance with the manufacturers instructions, setting up the pick-ups, nodal bar, pick-up wires and scanning head etc.
- (4) Balance the drive shaft (Ref.Fig.508).

NOTE: If the concentricity checks have not been carried out previously, carry out the checks at this stage (prior to balancing) by mounting the dial gauge holder on the cradle and the bed, and checking that the amounts of eccentricity are within the dimensions quoted in para.A.(4).

- (a) Apply lubricant 'A' to the spindles of the roller bearings and to the shaft journals, and ensure that the bearings/shaft are well lubricated, and remain so throughout the balancing operation.
- (b) Operate the balancing machine to give a shaft speed of 600 rpm (approx.) and run for 3 to 5 min to allow the temperature to stabilise. Calibrate the balancing machine in accordance with manufacturers instructions, then check the initial unbalance. If the initial unbalance exceeds 30 drmm in. (1350 g mm) in plane 'F' or 50 drmm in. (2250 g mm) in plane 'R' the cause must be determined and rectified before balancing may proceed.

SUB-ASSEMBLY

**72-31-04**

Page 525

Oct 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (i) Ensure that no malalignment exists between the supports, bearings and cradles, and that the adjustable bearing rollers have been set correctly.
  - (ii) Ensure that the tie bars are correctly positioned in their brackets.
  - (iii) Ensure that no protective finish has been left on the drive shaft, which would cause picking up and/or overheating.
  - (iv) Ensure that the bearings are well lubricated.
  - (v) If the preceding (i) to (iv) are satisfactory, remove the drive shaft from the balancing machine, separate the rear shaft from the front, assemble an alternative rear shaft, then recheck the initial balance. As an alternative, or in addition to exchanging the rear shaft, the stiffening disk in the shaft front may be removed and replaced at a different angular orientation. When a shaft is assembled with acceptable initial balance, etch new datum marks on the rear shaft and cancel the original datum marks (if necessary) (ref. para.B.(4)).
- (c) With the initial unbalance within limits, balance the LP drive shaft at a shaft speed of 600 rpm (approx.) ensuring that the temperature has stabilised by running for 3-5 min before taking readings.
- (i) Balance the front end of the shaft to within 2 drn in. (90 g mm) using balance weights (Ref. Table 501) secured to the flange with the longer bolts (1-50) and nuts with lubricant 'A' applied. Torque-tighten to 100 lbf in. (11,5 N.m) checking that the run-down torque is not less than 10 lbf in. (1,1 N.m).

SUB-ASSEMBLY

**72-31-04**

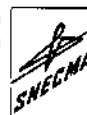
Page 526

Oct 1/82



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



ITEM	IPC REF.	WEIGHT
Balance weight	1-20	6 drn
Balance weight	1-25	6.5 drn
Balance weight	1-30	7 drn
Balance weight	1-35	7.5 drn
Balance weight	1-40 (SB.72-100)	2 drn
Balance weight	1-45 (SB.72-100)	4 drn
Bolt	1-50	1 drn (1,77 g) more than bolt (1-60)

Balance Weights for Shaft Front End  
Table 301

- (ii) Balance the rear end of the shaft to within 2 drn in. (90 g mm) by interchanging light and heavy washers. The difference in weight between one heavy and one light washer is 1 drn (1,77 g) and the radius approx. 5 in. A range of adjustment is thus available by the exchange of pairs of light washers with pairs of heavy washers (Ref.Fig.510). The effect on the balance of exchanging pairs of washers at various positions in relation to the diameter joining light and heavy positions is given for guidance in Fig.510. Torque-tighten the securing nuts affected to 450 lbf in. (51 N.m) checking that the run-down torque is not less than 9.5 lbf in. (1,1 N.m).
- (iii) Check that the balance at the front of the shaft is still within 2 drn in. (90 g mm) and rectify if necessary (Ref. para.(1)).

SUB-ASSEMBLY

## 72-31-04

Page 527

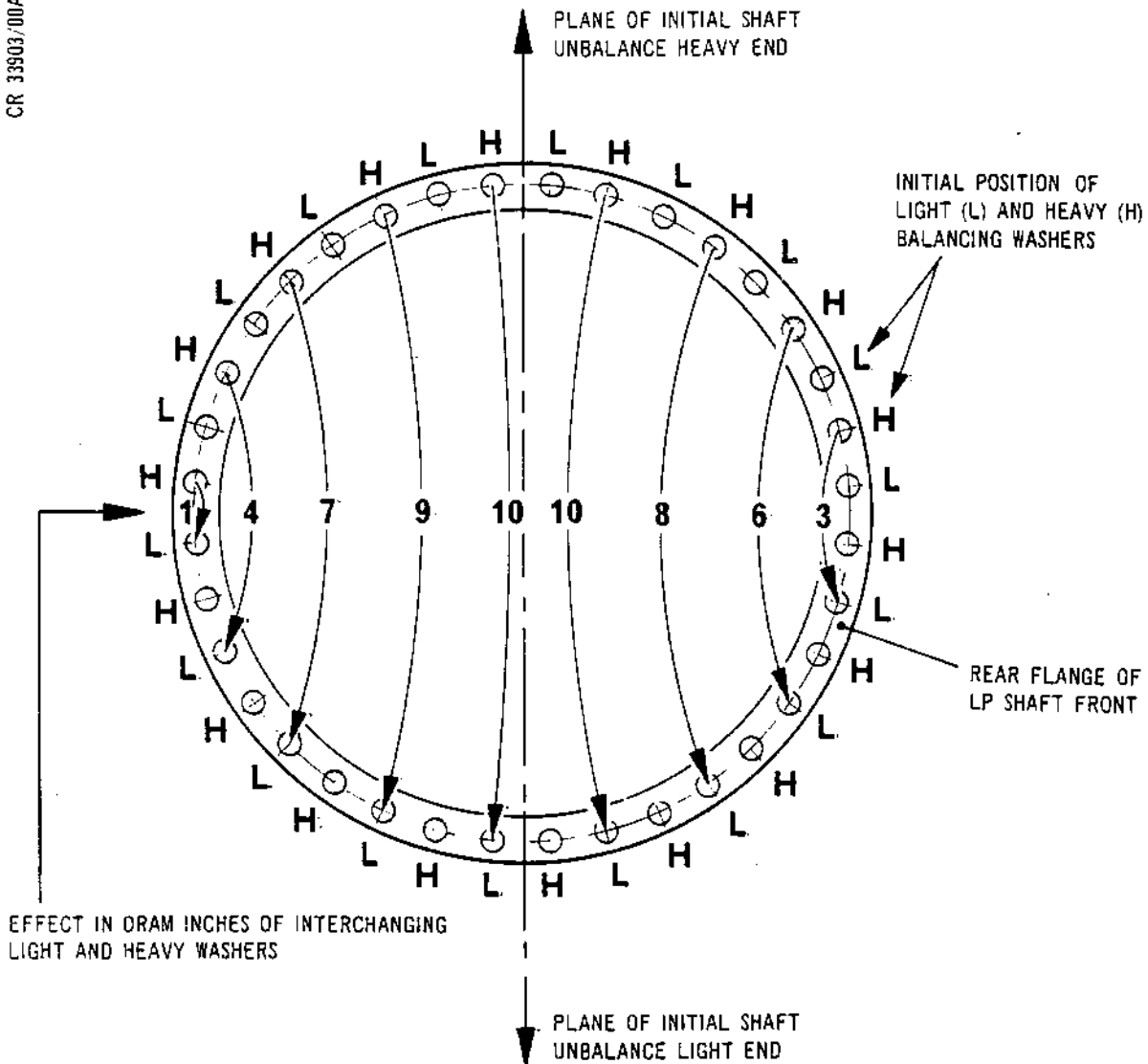
Oct 1/82



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 33903/00A



Effect on Balance of Exchanging Washers  
on Rear Flange  
Figure 510



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (iv) Check that the balance at the rear of the shaft is still within 2 drn in. (90 g mm) if rectification was necessary in para.(iii), and correct if necessary (Ref. para.(ii)). Continue checking alternate ends until both are within 2 drn in. without rectification.
- (v) Ensure that the nuts on the rear end bolts (securing the shaft front to rear) are torque-tightened to 450 lbf in. (51 N.m) and that the front end bolts are torque-tightened to 100 lbf in. (11,5 N.m) and that the curvature of the larger balance weights aligns with the curvature of the sealing ring outer.
- (vi) Record the angle and amount of unbalance at the front and rear ends of the shaft, reading the angles in a clockwise direction from the rear with the datum marks as zero.
- (5) On completion of the balancing, remove the drive shaft from the balancing machine.
- (a) Release the belt and place over a cradle.
- (b) Slide the protector (Tool 408) onto the end of the drive shaft rear, then assemble the (split) protection (Tool 999) to the drive shaft front (to protect the splines and labyrinth), and secure the protector with its thumbnut.
- (c) Attach a hoist to the (beam type) sling (Tool 1145) (with attached adapters Ref.Fig.507) and position over the drive shaft, then assemble the rear adapter (Tool 1144) to the drive shaft rear, and front adapter (Tool 1143) to the drive shaft front. Secure each adapter (around the shafts) with its knurled pin.

SUB-ASSEMBLY

72-31-04

Page 529

Oct 1/82





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (d) Raise the hoist and position the drive shaft over the mobile stand (Tool 1332) (Ref.Fig.507) or (Tool 589) with the locking end of the stand at the front end of the drive shaft assembly. With the stand hinge bushes open, lower the drive shaft onto the stand bushes. Hinge the bushes closed and secure them with the knurled nuts.
  - (e) Release the knurled pins securing the adapters to the drive shaft, then remove the sling and adapters from the shaft. Release and remove the adapters from the sling, then remove the equipment from the hoist.
  - (f) Carry out a 'touch-up' procedure for high temperature aluminium paint as detailed in 72-09-00 Repair to the areas on the drive shaft cleaned of paint to provide the bearing journals for balancing.
- (6) Remove the balancing equipment from the balancing machine.

NOTE: The equipment need only be removed if the balancing machine is required for a different assembly, or the bearings/spacers are required for another function.

- (a) Release the keep plates and remove the adjustable bearings and spacers from the two cradles.
- (b) Remove the belt from around the cradle.

#### 4. Assemble the LP Signal Shaft Tube

##### A. Assemble the Seal Ring Pack to the Signal Shaft Tube.

- (1) Ensure that the seven rings of the seal ring pack (2-180) are serviceable and clean, then ensure that the three inward acting (smaller diameter) rings are interposed between the four outward acting (larger diameter) rings.

SUB-ASSEMBLY

**72-31-04**

Page 530

Oct 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Offer the rings (in sequence) over the front end of the signal shaft (2-190), then slide them to the rear end, locating them in the recess next to the flange.
- (3) Ensure that the rings are not intertwined, that they can be turned, and the gaps in the rings are disposed around the shaft and do not align with one another.
- B. Assemble the Locking and Serrated Sleeves to the Signal Shaft Tube (Ref.Fig.511).
- (1) Slide the locking sleeve (2-160) over the front end of the signal shaft, then slide the serrated sleeve (2-150) on the shaft aligning the master splines of the serrated sleeve and shaft.
- (2) Assemble the locking washer (2-140) to the inside of the serrated sleeve, then apply lubricant 'A' to the threads of the screwed plug (2-130) and screw the plug into the shaft.
- (3) Locate the vice holder (Tool 1301) in a hand vice and secure the holder, then insert the serrated sleeve into the holder. Using spanner (Tool 1614), torque-tighten the screwed plug to 530 lbf in. (60 N.m). Remove the spanner, then lock the locking washer. Remove the serrated sleeve from the holder and the holder from the vice.
- (4) Using feeler gauges, check that the end-float between the locking sleeve and serrated sleeve is between 0.001 and 0.006 in. (0,025 and 0,152 mm). Record the end-float.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



5. Trial Assembly and Dimensional Checks of the Rotor Shaft Rear/  
Spherical Mounting, the LP Compressor Drive Shaft and the  
LP Signal Shaft Tube

NOTE: To carry out this check the rotor shaft rear must be removed from its build station (Ref.72-31-00 Assembly) before it is built into the LP compressor assembly final build, but after it has had the spherical mounting and sleeve housing assembled to it.

A. Assemble and Lock the Rotor Shaft Rear to the Drive Shaft (Ref.Fig.511).

(1) Correctly position the spherical mounting in relation to the rotor shaft rear, ready for engagement with the LP compressor drive shaft.

(a) Insert the alignment tool (Tool 610) into the rear end of the rotor shaft rear, view through the sight hole in the tool and align the master splines in the end of the tool with the spherical mounting, then push the tool into the mounting.

(b) Turning the tool as necessary, align the master spline in the tool with the master spline in the rotor shaft rear, then engage the tool splines in the rotor splines.

(c) Withdraw the setting tool ensuring it is not turned. The master splines in the spherical mounting and rotor shaft rear will now be offset by 45 deg.

NOTE: To assist in aligning the master splines of the rotor shaft rear and the signal tube, mark (with chalk) on the outside diameter of the rotor shaft rear, the position of its master spline.

SUB-ASSEMBLY

**72-31-04**

Page 532

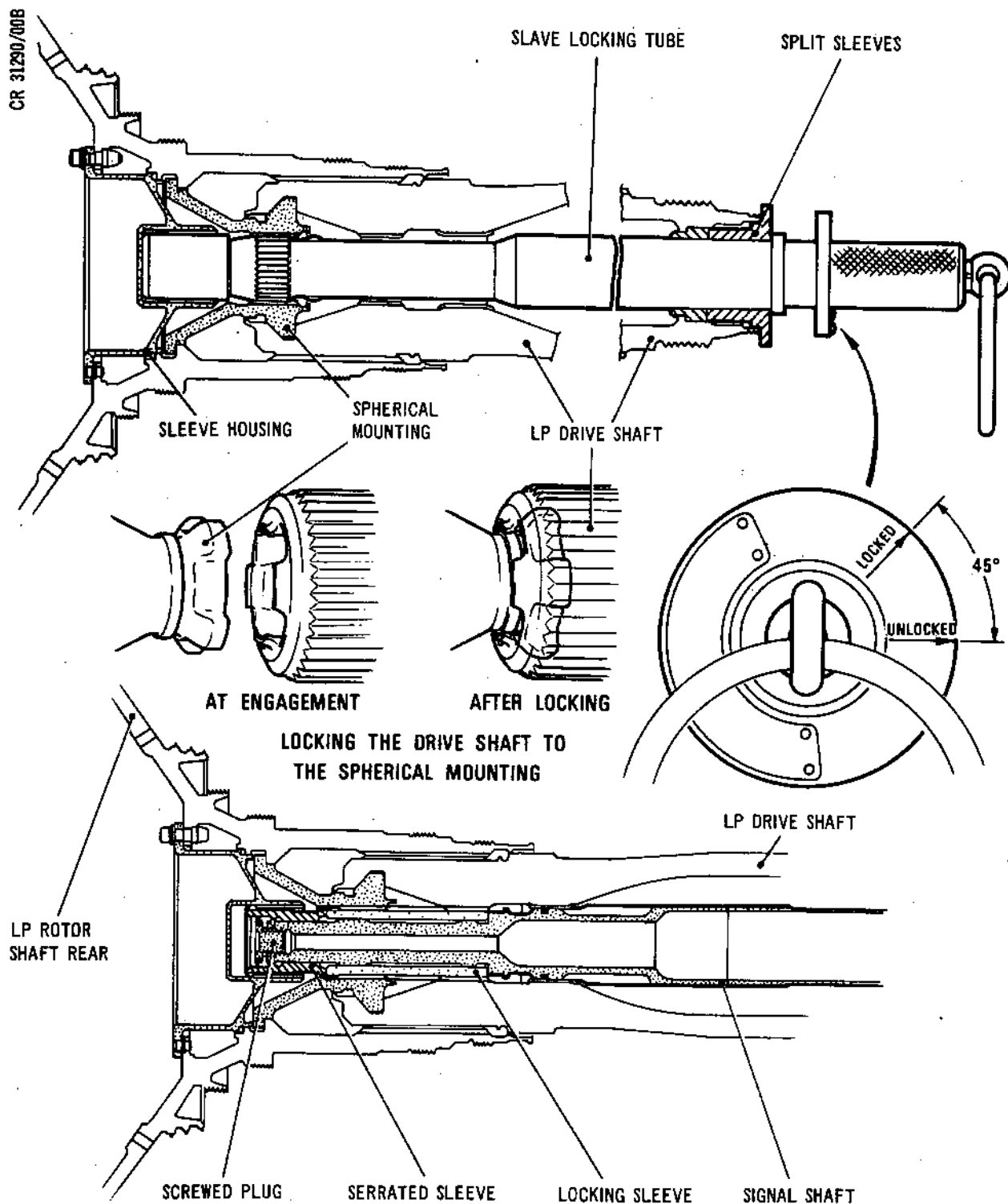
Oct 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



Assembling and Locking of LP Rotor Shaft Rear to  
LP Drive Shaft  
Figure 511



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Withdraw the protector from the rear end of the drive shaft, then release and remove the protector from the front end of the shaft. Ascertain the positions of the master splines in the rotor shaft rear and the external splines on the front end of the drive shaft, then offer the rotor shaft to the drive shaft and engage the master splines. Push the rotor shaft on to the drive shaft until the spherical mounting abuts a shoulder inside the drive shaft. Withdraw the rotor shaft approx. 0.430 in. (10,9 mm).

NOTE: To lock the rotor shaft rear to the drive shaft, the spherical mounting must be turned to engage its dogs with those on the shaft. In this position the master splines on the spherical joint, the drive shaft and the sleeve housing are aligned to turn the spherical mounting. A slave locking tube (Tool 579) is used. Having locked the drive shaft to the rotor shaft rear, the slave tube is removed and the engine signal tube assembled for the dimensional checks. If the slave locking tube is not available, the engine signal tube may be used as detailed for the slave tube, with the exception that the split guide sleeves must be removed before the tube is pushed fully in, and having turned the spherical mounting, the tube must be aligned with the sleeve housing master splines and the tube pushed fully into the housing.

- (3) Assemble the split sleeves (Tool 609) into the rear end of the drive shaft. Remove the slave locking tube (Tool 579) from its container (Tool 580) and locate in the split sleeves, then slide the tube into the drive shaft, taking care not to damage the carbon bearings inside the drive shaft. With the flange of the slave tube approx. 6 in. (150 mm) from the end of the drive shaft, align the 'LOCKED' mark on the slave tube flange with the master spline on the drive shaft and/or rotor shaft rear.

NOTE: The master spline on the slave locking tube is in line with the 'LOCKED' mark on the flange.

TN35021

SUB-ASSEMBLY

**72-31-04**

Page 534

Oct 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (4) Ease the slave tube into the drive shaft until the slave tube splines abut the internal splines in the drive shaft, then turn the tube slightly each way until the master splines align. Engage the splines, then ease the tube forward until the splines disengage with the drive shaft splines. Watching the tube flange, turn the tube 45 deg counter-clockwise (as viewed from the rear), to align the 'UNLOCKED' mark with the master splines on the drive shaft and rotor shaft rear.
- (5) Ease the tube forward and engage its master splines with the master spline of the spherical mounting, then push the tube forward and abut the tube end stop against the sleeve housing. Turn the tube 45 deg clockwise (realigning the master spline with the drive shaft master spline) and aligning the 'LOCKED' mark with the master splines. If the tube will not turn, the dogs on the mounting are out of alignment with the recesses in the drive shaft, and the rotor shaft rear must be eased (slightly) on/off the drive shaft until the tube/spherical mounting can be turned (45 deg clockwise).
- (6) Withdraw the tube drawing the splined end of the tube through the drive shaft splines. Remove the tube from the drive shaft.
- (7) Screw the lifting fixture (Tool 1323) on to the rear end of the signal tube. Align the alignment tool (Tool 611) master spline with the serrated sleeve (2-150) master spline, then slide the tool onto the sleeve. Turn the locking sleeve (2-160) to align the master spline with the tool, then withdraw the tool from the signal tube.

NOTE: Ensure that the locking sleeve is not moved out of alignment with the serrated sleeve, otherwise difficulty will be found engaging the signal tube in the drive shaft.

SUB-ASSEMBLY

**72-31-04**

Page 535

Oct 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (8) With the split sleeves assembled, locate the signal tube in the sleeves. Taking note of the master spline in the rotor shaft rear and aligning the signal tube master spline with it, slide the tube into the drive shaft taking care not to damage the carbon bearings inside the drive shaft. When the serrated sleeve of the signal tube abuts the internal splines in the drive shaft, turn the tube until the master splines align, then ease the tube into engagement. Remove the split sleeves, then ease the tube forward, sliding the serrated sleeve through the splines of the drive shaft and spherical mounting and into the sleeve housing, until the signal tube flange abuts the internal sleeve in the (rear end) of the drive shaft. If difficulty is found engaging the signal tube serrated sleeve in the spherical mounting, note the position of the tube, then turn the tube to engage the sleeve in the mounting. When engaged, turn the tube back to its original position to align the serrated sleeve/ spherical mounting with the locking sleeve, (which cannot be turned as it is engaged in the drive shaft splines), then push the tube in, engaging the serrated sleeve in the sleeve housing, and the locking sleeve in the spherical mounting.

B. Carry Out Dimensional Checks on the Rotor Shaft Rear, LP Drive Shaft and Signal Shaft Tube.

- (1) Ensure that the signal tube is in its fully forward position, then unscrew and remove the lifting fixture from the signal tube. Using a depth gauge, measure the dimension from the rear face of the drive shaft to the rear face of the flange on the signal tube (Ref.Fig.512). The dimension will be between 1.705 in. (43,31 mm) and 1.717 in. (43,61 mm). Record as dimension 'A'.

NOTE: An incorrect dimension 'A' may mean that the sleeve (2-170) was not correctly assembled (Ref. para.2.C.(4)).

TN35022

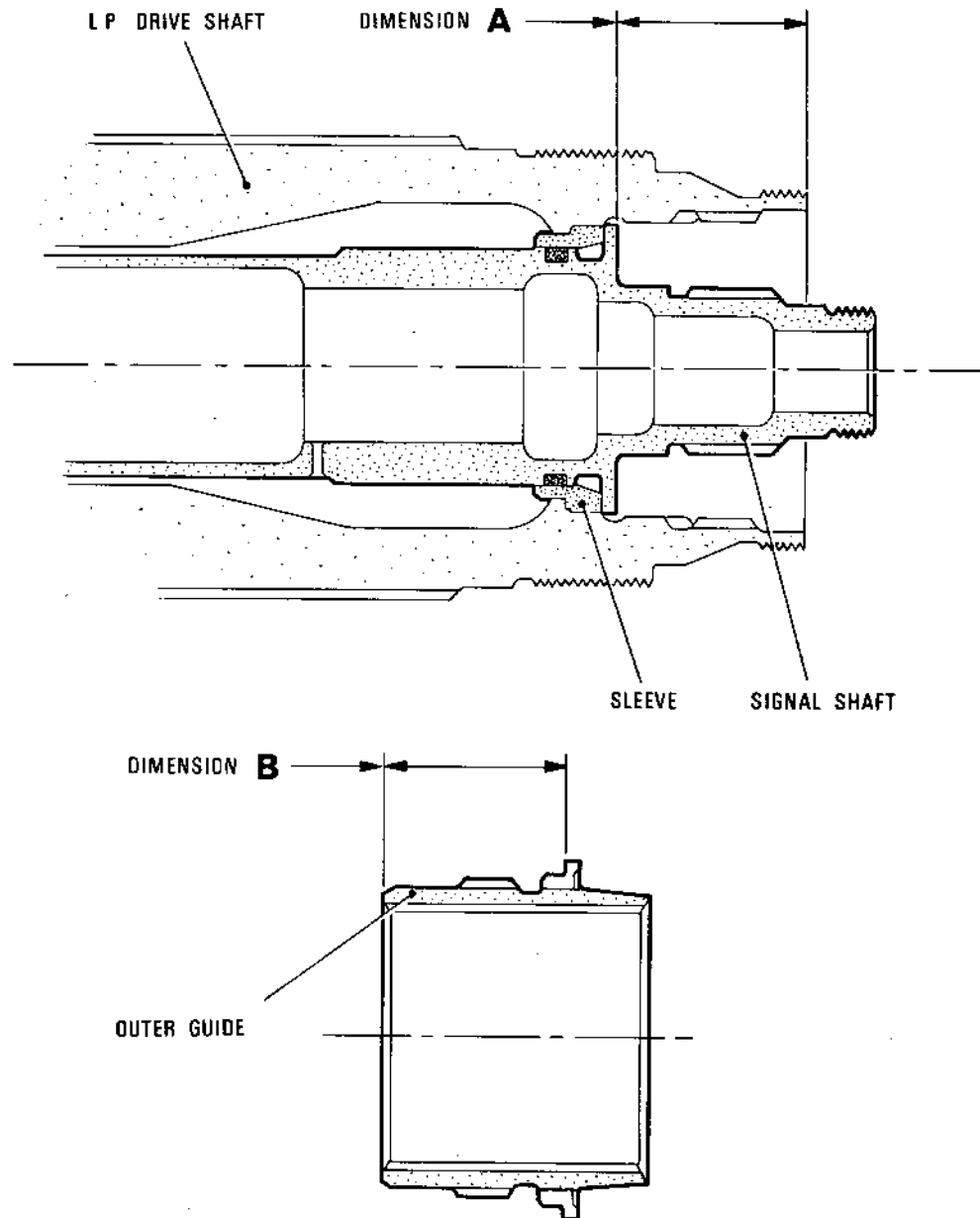


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR.31292/00A



Dimensional Check of Signal Shaft Tube and LP Drive Shaft  
Figure 512

SUB-ASSEMBLY

**72-31-04**

Page 537

Oct 1/76

PRINTED IN ENGLAND

TN27134





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (2) Using a depth gauge, measure the dimension from the forward face of the outer guide (72-31-05/1-90), to the front face of the flange (the abutment face that contacts the drive shaft when the outer guide is assembled to the drive shaft) (Ref.Fig.512). This dimension will be between 1.692 in. (42,98 mm) and 1.695 in. (43,05 mm). Record as dimension 'B'.
- (3) The clearance between the signal tube and the outer guide on final assembly will be = Dimension 'A' - Dimension 'B'. The clearance must be between 0.010 and 0.025 in. (0,254 and 0,635 mm).
- (4) Locate a suitable dial gauge fixture on the drive shaft near the rotor shaft rear, and position to engage the dial gauge pointer on the rear face of the rotor shaft rear. Check the end-float between the rotor shaft rear/spherical mounting and the drive shaft, by pushing/pulling the rotor shaft rear on the drive shaft and reading off the gauge. The end-float must be between 0.007 and 0.035 in. (0,18 and 0,89 mm).

NOTE: The trial assembly and dimensional check of rotor shaft rear and spherical mounting is now completed, though the rotor shaft and mounting are used for setting up the signal system.

#### 6. Assemble and Check the Signal System Items

- A. Assemble the Signal System Items to the Drive Shaft and Signal Tube (Ref.Fig.513).

NOTE: The signal system items are from breakdown 72-31-05.

- (1) Examine the rear end of the signal tube or the splines for two etched or pop marks. If no marks are evident, etch the end of the two splines, to align with the master splines on the outside diameter of the LP drive shaft rear end.

TN35023



OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR.31293/00A

THUMB SCREWS

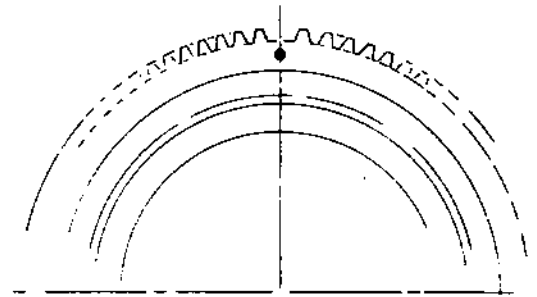
INNER GUIDE

SETTING GAUGE

CLAMP PLATES

SETTING GAUGE

HELICAL SPLINED NUT



VIEW ON END OF L P DRIVE SHAFT

DIMENSION T

DIMENSION X

LP DRIVE SHAFT

SETTING BLOCKS

OUTER GUIDE

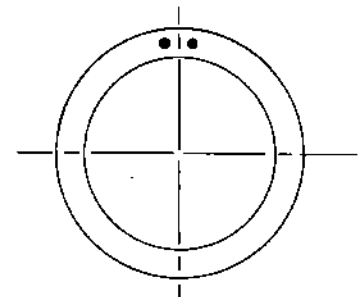
SLAVE SPACER

SIGNAL SHAFT

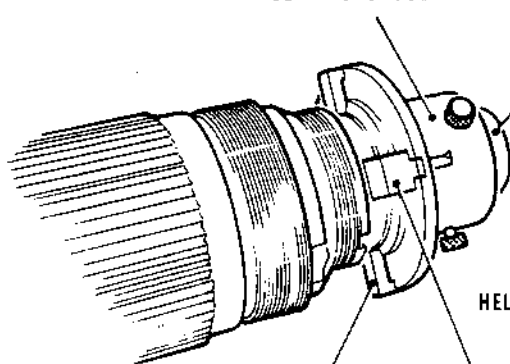
HELICAL SPLINED NUT

SETTING GAUGE

INNER GUIDE



VIEW ON END OF SIGNAL SHAFT



HELICAL SPLINED NUT

OUTER GUIDE

VIEW IN DIRECTION OF ARROW WITH ITEMS  
REMOVED FROM L P DRIVE SHAFT

CLAMP PLATE

SETTING BLOCK

Assembling Signal System Items to LP Drive Shaft  
and Signal Shaft Tube  
Figure 513

SUB-ASSEMBLY

72-31-04

Page 539

Oct 1/76

PRINTED IN ENGLAND

TN27219



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Examine the faces at the splined ends of the inner guide (1-60) and helical splined nut (1-50) for etched or pop marks, then offer the splined nut over the inner guide and (by trial and error) mesh the splines so that when the end faces are flush, the etched or pop marks align (Ref.Fig.513). If one or both items are new and are not etched or pop marked, they may be assembled to each other so that the splines are engaged in any position. With the end faces flush, etch (in line) both end faces, or if one item is already marked, etch the other unmarked item in alignment with the existing etched or pop mark.
- (3) With the inner guide and splined nut assembled with the etched or pop marks on the end faces aligned, offer the splined ends of the items on to the setting gauge (Tool 17) (Ref.Fig.513). Examine the sides of the inner guide and splined nut for an etched cross in line with the pop or etched marked front face. Ensure that the etched marks are correct, or if incorrect or unmarked, etch a vertical line on both items (in line with the pop marked front face), and a horizontal line across the vertical line, on the inner guide as close to the splined nut as possible. Delete any incorrect marks.
- (4) With the inner guide and splined nut correctly positioned, relative to one another, secure them in this position with the setting gauge (Tool 18).
  - (a) Ensure the setting gauge setting blocks are drawn outwards, the two clamp plates are turned sideways and the three thumbscrews are undone.
  - (b) Offer the setting gauge over the inner guide, and guide the end of the inner guide through the hole in the setting gauge. Ensure that the setting gauge flange abuts the splined nut flange, and that the splined nut and inner guide are in contact with their respective faces on the setting gauge.

IN35024

SUB-ASSEMBLY

**72-31-04**

Page 540

Oct 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) Tighten the three thumbscrews against the inner guide, then turn the two clamp plates and locate them under the splined nut flange and tighten the two locknuts.
- (5) To assist in aligning the inner guide with the signal tube, withdraw the signal tube approx. 0.75 in. (19,0 mm) out of the drive shaft to expose the splined portion, taking care it is not withdrawn completely from the sleeve housing in the rotor shaft rear. Offer the slave spacer ring (Tool 1296) (equivalent to the max. permissible thickness adjusting washer), over the end of the signal tube and push it onto the tube until it abuts the tube flange.
- (6) Remove the inner guide/splined nut/setting gauge from the setting gauge then offer the outer guide over the splined nut. Examine the end face of the outer guide for a pop or etched mark, then by trial and error, engage the outer guide on the splined nut so that the etched or pop mark on each item align with one another when the end faces are flush. If the outer guide has no etched or pop mark, it can be engaged with the splined nut in any position.
- (7) Offer the assembly of inner/outer guide/splined nut/setting gauge to the end of the signal tube, align the etched or pop mark on the inner guide between the two etched or pop marks on the signal tube, then ease the inner guide on to the signal tube engaging the splines. Push the assembly on to the signal tube and ease the outer guide (slightly) forward, as necessary, to engage the splines on the outer guide with those in the drive shaft. Push the assembly fully forward, ensuring that the signal tube is pushed fully forward and its flange is abutting the sleeve in the rear end of the drive shaft.

PRINTED IN ENGLAND

TN32970

SUB-ASSEMBLY

**72-31-04**

Page 541

Oct 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (8) Push the two setting blocks inwards abutting the splined nut, then tighten the block nuts. Ensure that the setting gauge is pushed fully towards the drive shaft then offer the checking gauge (Tool 19) to the gap between one of the setting blocks and the flange of the outer guide (dimension 'X'). The gauge is  $0.060 \pm 0.0002$  in. ( $1,524 \pm 0,005$  mm) and the dimension 'X' must be less than the gauge thickness. If the dimension 'X' is greater than the gauge, withdraw the assembly of the inner/outer guide from the drive shaft/signal tube, then withdraw the outer guide from the splined nut, reposition the guide relative to the nut, then slide the guide back on to the nut. Withdraw the signal tube approx. 0.75 in. (19,0 mm) out of the drive shaft to expose the splined portion, align the etched or pop mark on the inner guide with the etched or pop marks on the signal tube, then engage the inner guide with the signal tube and the outer guide with the drive shaft. Ensure that the signal tube is abutting the spacer and the location ring is pushed fully towards the drive shaft, then offer the gauge (Tool 19) to the gap between one of the setting blocks and the flange of the outer guide (dimension 'X'). Repeat the repositioning of the outer guide on the splined nut until dimension 'X' is less than 0.060 in. (1,524 mm).

B. Carry Out Dimensional Check to Determine the Adjusting Washer Thickness.

- (1) With dimension 'X' within limits, the signal tube abutting the spacer and the setting gauge pushed in, with the inner guide abutting the slave spacer ring hold the setting gauge from rotation and take up the spline tolerances by lightly pulling back on the outer guide. Using feeler gauges check the dimension 'T' between the rear face of the drive shaft and the front face of the outer guide flange. Record the dimension 'T'.

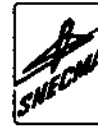
NOTE: The dimension 'T' is the amount to be deducted from the slave spacer ring thickness, to give the correct adjusting washer thickness to enable the flange of the outer guide to abut the drive shaft rear face, whilst the inner guide abuts the adjusting washer.

IN35025



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Withdraw the inner/outer guide assembly from the drive shaft/signal tube, ensuring the outer guide is not disengaged, and place the front faces of the items on a clean flat surface.
- (3) With the front face of the outer guide flush with the front face of the splined nut, ensure that the etched or pop mark on the outer guide (if present) is in line with the etched or pop mark on the splined nut. If the etched or pop mark on the outer guide is incorrectly positioned, cancel the old etched or pop mark and re-etch in line with the etched or pop mark on the splined nut. If no etched or pop mark is present on the front face of the outer guide, etch a mark in line with the etched or pop mark on the splined nut.

NOTE: When the front faces of the inner and outer guide and the helical nut are flush, the three pop marks must be in line (Ref.Fig.513).

- (4) Remove the slave spacer ring from the signal tube. Measure the thickness of the slave ring, then from this dimension subtract dimension 'T' (Ref. para.(1)). The resultant dimension is the thickness the adjusting washer must be. Measure the thickness of the original adjusting washer and if correct it can be used, or if incorrect obtain a washer of the required thickness. Apply marking blue to one of the faces of the correct thickness adjusting washer, then offer the washer over the end of the signal tube with the blue face facing outwards (rearwards). Push the washer on to the tube until it abuts the step on the tube.
- (5) Withdraw the signal tube approx. 0.75 in. (19,0 mm) out of the drive shaft to expose the splined portion, taking care it is not withdrawn completely from the sleeve housing in the rotor shaft rear. Apply marking blue to the rear face of the drive shaft.

SUB-ASSEMBLY

72-31-04

Page 543

Oct 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (6) Offer the assembly of inner/outer guide/splined nut/setting gauge to the end of the signal tube, align the mark on the inner guide between the two marks on the signal tube, then ease the inner guide on to the signal tube engaging the splines. Ensure the inner guide does not contact the adjusting washer, push the signal tube and the assembly forward and ease the outer guide (slightly) forward, as necessary, to engage the splines on the outer guide with those in the drive shaft. Push the signal tube forward and ensure it is abutting the spacer, then push the assembly fully forward.
- (7) With the assembly pushed fully forward, ensure the gap between the setting blocks and the flange of the outer guide (dimension 'X') is within limits, by offering the gauge (Tool 19) to the gaps. If the gap is outside the limits (0.060 in. (1,524 mm)), remove the assembly from the signal tube/drive shaft and clean off any marking blue from the inner and outer guides and if required, apply fresh blue to the adjusting washer and drive shaft. Ensure that the outer guide has not been removed and repositioned, by checking that the front faces of the splined nut and outer guide are flush when the etched or pop marks are aligned. If they are out of alignment, remove and re-engage the outer sleeve on the splined nut until the marks are aligned, then offer the assembly to the signal tube/drive shaft and recheck dimension 'X'. If the marks were aligned, offer the assembly to the signal tube/drive shaft, but ensure the outer guide is not moved too far forward engaging it in the wrong spline in the drive shaft. Recheck the dimension 'X'.
- (8) After achieving a satisfactory 'X' dimension, withdraw the assembly of the inner/outer guide from the drive shaft/signal tube and examine the inner and outer guides for blueing. Witness of blueing should have occurred on both faces which indicates the adjusting washer thickness is correct, ensuring the outer guide

IN35027

SUB-ASSEMBLY

72-31-04

Page 544

Oct 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



abuts the drive shaft, and the inner guide abuts the adjusting washer. If blueing has not occurred on the outer guide, offer the assembly to the signal tube/drive shaft, and with the assembly pushed fully forward, hold the setting gauge from rotation and take up the spline tolerances by lightly pulling back on the outer guide. Use feeler gauges and check the thickness of the gap between the outer guide and the rear face of the drive shaft. This dimension is the amount that must be removed from the adjusting washer to give the correct assembly. If blueing has not occurred on the inner guide, the adjusting washer is too thin, and it is recommended that the adjusting washer is removed and the slave spacer ring (Tool 1296) fitted and the required thickness of the washer recalculated as detailed in para.(1) - (4). On completion of the blue check remove all traces of marking blue from the inner and outer guides.

- (9) Place the front faces of the assembly on a clean flat surface, release and withdraw the two clamps of the location ring from the splined nut, then unscrew the three thumbscrews and withdraw the setting gauge from the inner guide and splined nut. Stow the setting gauges (Tool 17 and 18) and checking gauge (Tool 19) in their container (Tool 202).
- (10) Check that sufficient marking blue remains on the drive shaft rear face and the adjusting washer rear face. With the adjusting washer assembled to the signal tube, correctly engage the assembly of the inner/outer guide/splined nut with the signal tube/drive shaft. Check that the horizontal and vertical (etched) lines on the splined nut and inner guide are in the correct relationship with one another (Ref. para.6, (3)). Withdraw the inner/outer guide/splined nut and check that blueing has occurred on the inner and outer guides. If the position of the lines are incorrect and/or blueing has not occurred on both items, recheck by starting the procedure again (Ref. para.6.A.).

NOTE: This check ensures that the items did not move in the location ring during setting up, giving false dimensions.

SUB-ASSEMBLY

72-31-04

Page 545

Oct 1/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (11) Remove the adjusting washer from the signal tube, remove all traces of marking blue from the four items, then place the washer together with the inner/outer gauge and splined nut in the container with the remainder of the signal system items.

NOTE: The signal system items are now ready to be assembled to the signal tube at final build (Ref.72-00-00 Assembly).

C. Remove the Rotor Shaft Rear/Spherical Mounting from the Drive Shaft.

- (1) Screw the lifting fixture (Tool 1323) onto the rear end of the signal tube. Ease the signal tube rearwards until it comes out of contact with the sleeve housing and engages with the spherical mounting. Turn the signal tube 45 deg anti-clockwise (as viewed from the rear), then withdraw the signal tube from the spherical mounting until the tube abuts the drive shaft. Turn the tube 45 deg clockwise, then ease it rearwards and engage it in the master spline in the drive shaft.
- (2) Assemble the split sleeves (Tool 609) into the rear end of the drive shaft, then withdraw the signal tube out of the drive shaft taking care not to damage the carbon bearings inside the drive shaft. Remove the lifting fixture from the signal tube, then stow the tube in its fixture (Tool 1452). Remove the split sleeves from the drive shaft.
- (3) Withdraw the rotor shaft rear from the LP compressor drive shaft and place it in a suitable container. Return the rotor shaft rear to the LP compressor assembly final build station (Ref.72-31-00 Assembly).
- (4) Slide the protector (Tool 408) onto the rear end of the drive shaft, then assemble the split protector (Tool 999) to the front end of the drive shaft (to protect the splines and labyrinth), and secure the protector with its thumbnut.

NOTE: The LP compressor drive shaft is now complete, and can be built into the HP compressor assembly during its assembly (Ref.72-33-00 Assembly).

TN35029

SUB-ASSEMBLY

**72-31-04**

Page 546

Oct 1/76



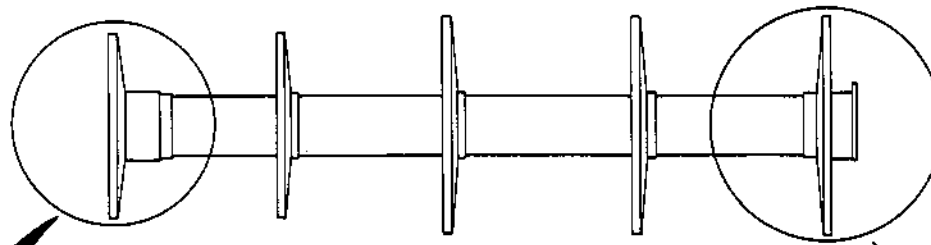
OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



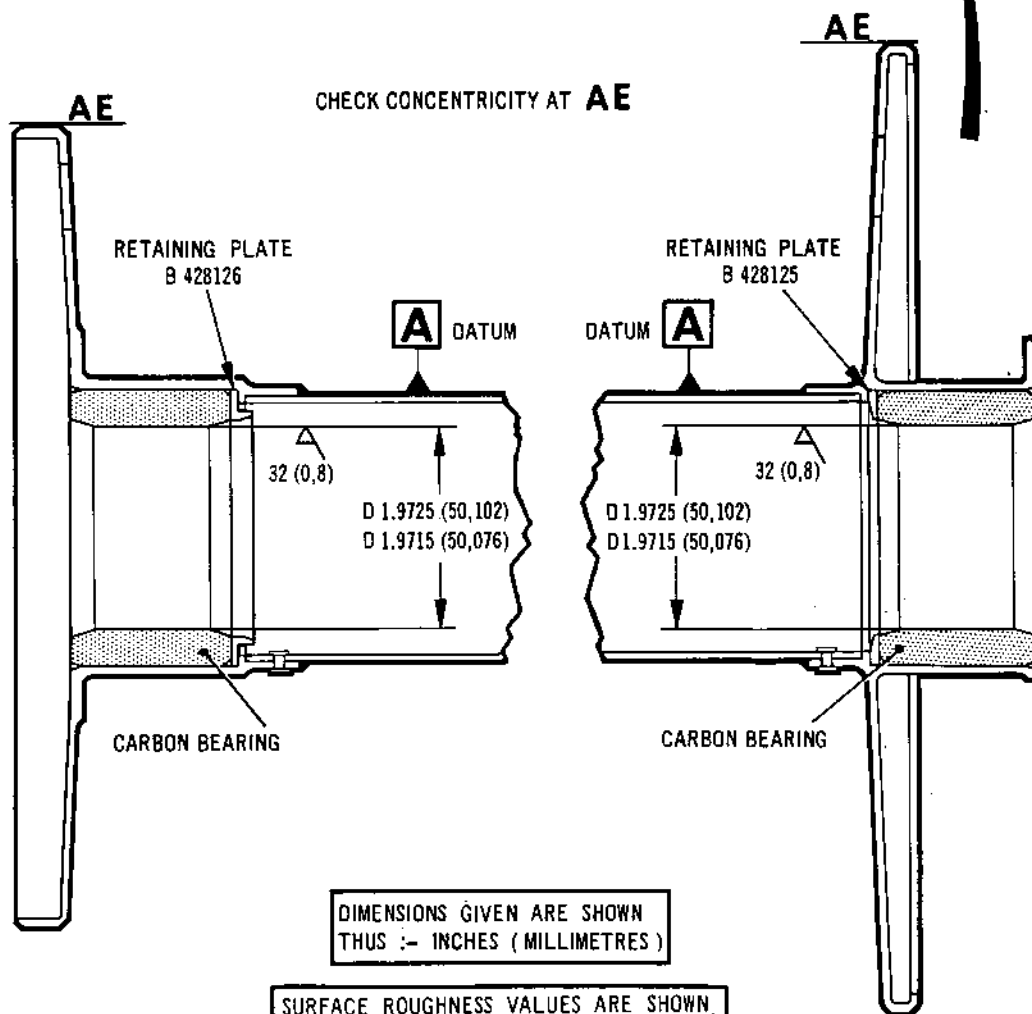
PRINTED IN ENGLAND

TN43829

CR 35607/00A



STIFFENING DISK ASSEMBLY



Stiffening Disk Assembly Details  
Figure 514

SUB-ASSEMBLY  
**72-31-04**

Page 547

Sep 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



7. Assembly Carbon Bearings to the Stiffener Disk (Ref.Fig.514)

A. Prepare to Assemble Bearings.

- (1) Check for condition and bore size 2.600 in./2.6012 in.  
(66,04 mm/66,07 mm).
- (2) Obtain two off part machined carbon bearings  
(1-200A).
- (3) Identify and check for condition of the two plates  
(1-204A, 1-206A).

B. Assemble Carbon Bearings.

- (1) Heat stiffening disk to  $400 \pm 10$  deg C. for one hour  
then assemble plates and bearings.

C. Finish Machine Carbon Bearings.

- (1) When cooled locate stiffener disk assembly in vee  
blocks on a surface table.
- (2) Set datum 'A' as true as possible at each end, and  
check rim diameters marked 'AE' Fig.514 are concentric  
to within 0.008 in. (0,20 mm) true indicated reading.
- (3) Finish bore through carbon bearing to 1.9715 in./  
1.9725 in. (50,076 mm/50,102 mm).
- (4) Turn stiffening disk assembly through 180 degrees  
and finish bore carbon bearing to 1.9715 in./1.9725 in.  
(50,076 mm/50,102 mm).
- (5) Remove all burrs and sharp edges.

IN43830

SUB-ASSEMBLY

**72-31-04**

Page 548

Sep 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



LP SHAFT SIGNAL SYSTEM GENERATING MECHANISM - SUB-ASSEMBLY

PRINTED IN ENGLAND

For information on the assembly of the LP Shaft Signal  
System Generating Mechanism, refer to 72-31-04 Assembly.

TN29604

SUB-ASSEMBLY

**72-31-05**

Page 501

Jan 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

COMPRESSOR INTERMEDIATE CASE ASSEMBLY - SUB-ASSEMBLYTABLE OF CONTENTS

Para.		Page
1.	General	501
2.	Prepare Assembly for Build	501
A.	Prepare Segments and Sub-assembly Inner Case...	501
B.	Assemble Segments to Sub-assembly Inner Case...	502
C.	Assemble Test Equipment to Sub-assembly Inner Case	502D
D.	Carry Out Pressure Test	502F
E.	Check for Leaks	502J
F.	Assemble the Housings to the Sub-assembly Outer Case	502K
G.	Assemble the Sub-assembly Inner Case to the Sub-assembly Outer Case	502K
H.	Prepare for Assembly of Inner Case to Outer Case	502P
J.	Check Component Serialization	502Q
K.	Check Plugs and Blanks	502Q
L.	Check the Security of the Self-locking Shank Nuts	504
M.	Assemble Pins and Pegs	504
N.	Prepare for Assembly (SB.0L.593-72-9019-404 Standard)	508
P.	Lap Metaflex Seals to Produce Desired Nip (Pre SB.0L.593-72-9019-404 Standard)	508
Q.	Assemble Inner Labyrinth to LP Bearing Housing	516
R.	Assemble the LP and HP Compressor Thrust Bearings	516
S.	Determine Thickness of LP Thrust Washer	518A
T.	Determine Thickness of HP Oil Baffle	519
U.	Determine Adjusting Washer Thickness of Right-hand Accessory Drive Inner End to Produce Axial Clearance	522
V.	Determine Adjusting Washer Thickness for Right-hand Housing	522
W.	Determine Adjusting Washer Thickness for Left-hand Housing	524
X.	Assemble Outer Case to Build Stand	526A
3.	Assemble Inner Case to Outer Case	528
A.	Assemble Drain Tube and Blank	528
B.	Assemble Inner Case	530
C.	Secure Drain Tube and Blanking Plate	530
D.	Secure Inner Case to Outer Case	531
E.	Assemble Tube Unit to No.6 Vane	531
4.	Determine Thickness of LP and Oil Thrower Adjusting Washers	532
A.	Determine Thickness of the LP Bearing Oil Thrower Adjusting Washer (SB.72-21 Standard)...	532

SUB-ASSEMBLY

**72-32-00**

Contents 1

Jun 1/99



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England

Para.		Page
B.	Determine Thickness of the HP Oil Thrower Adjusting Washer (SB.72-29 Standard) ...	537
C.	Determine B Dimension (Pre-SB.72-21 Standard) ...	541
D.	Prepare the LP Bearing Assembly for Probe Gauge Checks... ..	545
E.	Determine C Dimension (Pre-SB.72-29 Standard) ...	546
F.	Disassemble Items Used for Dimensional Check and Reassemble Intermediate Case to Build Stand ...	549
5.	Determine Thickness of Accessory Drive Adjusting Washers ... ..	551
A.	Assemble Right-hand Drive Housing to Inner Case ...	551
B.	Assemble Right-hand Accessory Items to Setting Gauge ... ..	552
C.	Assemble Right-hand Setting Gauge to Inner Case ...	552
D.	Assemble Left-hand Accessory Items to Housing and Setting Gauge ... ..	552
E.	Assemble Left-hand Setting Gauge to Inner Case ...	554B
F.	Assemble HP Bearing Housing and Setting Gauge to Case ... ..	556
G.	Determine Thickness of HP Driving Gear Adjusting Washer... ..	556
H.	Determine Thickness of Right-hand Driven Bevel Gear Adjusting Washer ... ..	558A
J.	Determine Thickness of Left-hand Driven Bevel Gear Adjusting Washer ... ..	558B
K.	Disassemble Accessory Items After Gauging Checks ...	559
L.	Assemble Housing Support to Sump and Sump to Inner Case ... ..	559
M.	Determine Adjusting Washer Sizes for LP Driving Bevel Gear and LP Driven Bevel Gear ... ..	561
6.	Assemble Oil Feed Housing and Bearing Failure Tube Unit ... ..	565
A.	Assemble Metaflex Seal, Housing, Tube and Location Plate ... ..	565
7.	Assemble HP Air Baffle Assembly to Inner Case ...	568
A.	Assemble Air Baffle ... ..	568
8.	Final Assembly of the LP Internal Accessory Drive (LP Pulse Probe Drive) ... ..	568
A.	Assemble and Secure the Bevel Gear and Housing ...	568
9.	Final Assembly of Right-hand Internal Accessory Drive ...	570
A.	Assemble and Secure Items to Gear ... ..	570
B.	Assemble Accessory Gear to Inner Case ... ..	572
10.	Final Assembly of the Left-hand Accessory Drive ...	572
A.	Assemble and Secure Items to Gear ... ..	572
B.	Assemble Accessory Gear to Inner Case ... ..	575
11.	Check Backlash of Internal Accessory Drives ...	577
A.	Check Backlash of the LP Drive Gears ... ..	577
B.	Check Backlash of the HP Drive Gears ... ..	578

SUB-ASSEMBLY

## 72-32-00

Contents 2

Jun 1/99



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England

Para.	Page
12. Assemble Left-hand and Right-hand Gearbox Mounting Bracket ...	581
A. Assemble the Left-hand Gearbox Mounting Bracket ...	581
B. Assemble the Right-hand Gearbox Mounting Bracket ...	585
13. Assemble Adapter, Splined Drive Shaft, Housing and Pressure Switches ...	587
A. Assemble Adapter Assembly to No.4 Vane...	587
B. Assemble Gland Nuts and Packing ...	589
C. Assemble Pulse Probe Drive and Housing...	591
D. Assemble LP Pulse Probe to Drive Housing ...	593
E. Assemble the Oil Pressure Transmitter to Drive Housing (Sump Case) ...	593
F. Assemble the Oil Pressure Switch to Drive Housing ...	595
14. Assemble the Lubrication System ...	598
A. Assemble Oil Jets and Tubes ...	598
B. Assemble Oil Distributor to No.2 Vane ...	598
C. Assemble Oil Distributor to Inner Case...	598.1
15. Assemble LP and HP Bearing Failure Probes to Oil Distributor ...	598.2
A. Assemble Adjusting Washers, Probes and Oil Distributor ...	598.2
B. Determine Thickness of LP Bearing Failure Probe Adjusting Washers ...	598.3
C. Determine Thickness of HP Bearing Failure Probe Adjusting Washers ...	598.7
16. Assemble Left-hand Gearbox ...	598.11
A. Determine Thickness of Adjusting Shims for Front and Rear Mounting Brackets ...	598.11
Refer Assembly 72-00-00, Para.28	
17. Assemble Right-hand Gearbox ...	598.15
A. Determine Thickness of Shims and Plates for Front and Rear Gearbox Mounting Brackets ...	598.15
Refer Assembly 72-00-00, Para.26	
18. Pressure Test the Intermediate Case ...	598.17
A. Check the Oil Distributor and Oil Feeds for Flow ...	598.17
B. Assemble HP Bearing to Housing and Housing to Case ...	598.19



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England

Para.		Page
C.	Assemble the LP Bearing Assembly...	598.21
D.	Assemble Pressure Test Equipment to the Outer Case ...	598.22
E.	Connect Mobile Oil Rig to Intermediate Case ...	598.23
F.	Check Connectors and Pressure Blanks ...	598.24
G.	Carry Out Pressure Test of Oil Chamber...	598.26
H.	Differential Oil Pressure Flow Check ...	598.28
J.	Check the LP and HP Bearing Failure Oil Warning System ...	598.32
K.	Assemble Fluid Passage Bolts, Multiple Connectors, Adapter and Tubes ...	598.37
L.	Carry Out Gland Seal Leak Check ...	598.39
19.	Finalize the Intermediate Case for Engine Build ...	598.42
A.	Drain Oil From the Intermediate Case ...	598.42
B.	Remove Pressure Test Equipment ...	598.45
C.	Final Assembly of HP Air Baffles ...	598.46
D.	Prepare the LP Bearing Housing and Air Baffles for Engine Build ...	598.47
E.	Assemble Static Seal Ring to Static Seal Housing ...	598.48
F.	Assemble Protectors to the Intermediate Case...	598.49
G.	Remove Intermediate Case from Build Stand ...	598.50

## TABLE OF ILLUSTRATIONS

Fig.No.		Page
501A	Torque-tightening Sequence for Vent Plugs and Securing Bolts...	502C
501B	Pressure Test Details ...	502H
501C	Identifying Alignment Holes Prior to Assembly of Cases ...	502L
501D	Assembling the Sub-assembly Outer Case to the Sub-assembly Inner Case ...	502N
501E	Checking Shank Nuts ...	503
502	Assembling Pins and Dowels (Sheet 1 of 2) ...	505
502	Assembling Pins and Dowels (Sheet 2 of 2) ...	506
503	Seal Locations (SB.0L.593-72-9019-404 Standard) ...	512
503A	Preparing the Metaflex Seals (Pre SB.0L.593-72-9019-404) (Sheet 1 of 2)...	513
503A	Preparing the Metaflex Seals (Pre SB.0L.593-72-9019-404) (Sheet 2 of 2)...	514
504	Assembling Inner Labyrinth Housing to LP Bearing Housing ...	515





# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

Printed in England

Fig.No.		Page
505	Calculating the LP Bearing Thrust Washer Thickness ... ..	517
506	Calculating the HP Bearing Oil Baffle Thickness ... ..	518B
507	Determining Adjusting Washer Thickness of Right-hand Accessory Drive Housing ...	520
508	Calculating the Accessory Drive Housing/Inner Case Adjusting Washer Thickness ... ..	521
509	Assembling Housing to Inner Case... ..	523
510	Assembling Outer Case to Build Stand ... ..	525
511	Assembling Drain Tube and Blanking Plate ... ..	527
512	Drain Tube Details ... ..	529
513	Measuring A Dimension (SB.72-21 Standard) ... ..	534
514	Preparing the LP Bearing ... ..	536
515	Measuring C Dimension (SB.72-29 Standard) ... ..	538
516	Measuring B Dimension (Pre-SB.72-21 Standard) ... ..	544
517	Measuring C Dimension (Pre-SB.72-29 Standard) ... ..	547
518	Assembling Right and Left-hand Accessory Items to Gauges ... ..	553
519	Preparing HP Bearing Housing for Gauging Checks... ..	555
520	Determining Thickness of HP Accessory Drive Adjusting Washers ... ..	557
521	Assembling Items to No.4 Vane ... ..	560
522	Determining Adjusting Washer Thickness For LP Bevel Gears ... ..	562
523	Assembling Oil Feed Housing and Bearing Failure Tube ... ..	564
524	Assembling HP Air Baffle ... ..	567
525	Assembling Internal (LP Tacho Drive) Accessory Drive Items ... ..	569
526	Assembling Right-hand Accessory Drive Items ... ..	571
527	Final Torque-tightening of No.3 and 5 Vane Accessory Drives ... ..	573
528	Assembling Left-hand Accessory Drive Items ... ..	574
529	Checking the Backlash of the LP Drive Gears ... ..	576
530	Checking the Backlash of the HP Drive Gears ... ..	579
531	Assembling the Left-hand Gearbox Mounting Bracket ... ..	583
532	Assembling the Right-hand Gearbox Mounting Bracket ... ..	586

SUB-ASSEMBLY

## 72-32-00

Contents 5

Jun 1/99



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

Printed in England

533	Assembling Adapter, Gland Nuts and Packing ...	588
534	Assembling the LP Pulse Probe Drive Shaft and Bearing ...	590
535	Assembling the Pulse Probe Drive and Housing to the Adapter ...	592
536	Assembling Oil Switches and Pulse Probe ...	594
537	Assembling HP Bearing Oil Feed Tube and Nozzle... ..	596
538	Assembling the Lubrication System ...	597
539	Determining the Thickness of the LP Bearing Failure Probe Adjusting Washers ...	598.4
540	Determining the Thickness of the HP Bearing Failure Probe Adjusting Washers ...	598.6
541	Raising the Left-hand Gearbox ...	598.9
542	Assembling the Left-hand Gearbox to Determine Adjusting Shim Thickness... ..	598.10
543	Preparing to Assemble the Right-hand Gearbox to Determine Adjusting Washers... ..	598.13
544	Checking the Oilways... ..	598.18
545	Preparing the HP Bearing ...	598.20
546	Connect Pressure Test Equipment ...	598.25
547	Oil Chamber Details ...	598.27
548	Holding Various Pressures for 15 Minute Periods ...	598.29
549	Checking for Oil Leaks ...	598.30
550	Differential Pressure Check ...	598.33
551	Checking the Bearing Failure Warning System ...	598.36
552	Assembling Connectors and Air Tubes ...	598.38
553	Checking the Gland Seals ...	598.41
554	Checking for Oil Leaks Past the Gland Seals ...	598.43

SUB-ASSEMBLY

## 72-32-00

Contents 6

Jun 1/99



OLYMPUS 593

MK.610-14-28  
OVERHAULCOMPRESSOR INTERMEDIATE CASE ASSEMBLY - SUB-ASSEMBLY1. General

- A. Prior to commencing assembly, refer to 72-09-00 Assembly for general information.
- B. Throughout the text special tools are quoted by their Ref.No. e.g. (Tool 1234). For a complete list of tooling required for the assembly and for the Manufacturer No., refer to Special Tools, Fixtures and Equipment Table 1002.
- C. During the sub-assembly procedure, reference will be made to the Illustrated Parts Catalogue to identify those items where the nomenclature does not positively identify them, due to the duplication of the title e.g. nuts, bolts, washers, bearings, gears, housings, tubes etc. When the item is a part of the breakdown of the text concerned, the item will be identified as bolt (1-10), the 1 referring to the I.P.C. Fig.No., and the 10 referring to the Item No. Where items from a different breakdown are introduced, then the breakdown number will be quoted in addition e.g. bolt (72-32-01/1-10).
- D. During the sub-assembly procedure, where the thickness of adjusting washers has to be determined, the words 'select' or 'select from the range' are used. If a range of washers is not available, it may be necessary to machine the washer to achieve the desired thickness. The information for machining washers is given under chapter 72-09-21 Repair. During the assembly procedure, the machining procedure reference will be given immediately after each adjusting washer I.P.C. Ref. No. in the appropriate part of the text e.g. select from the range the correct thickness adjusting washer (3-70) (72-09-21 Repair, Fig.401).

2. Prepare Assembly for Build

- A. Prepare Segments and Sub-assembly Inner Case.
  - (1) Place the sub-assembly inner case (5-330) on a clean worktop front face uppermost (the segment locations are nearest the front flange).
  - (2) Ensure the location pin (5-350) (TOP position) has been assembled to the front flange, then check the number of and security of the shank nuts (5-340) swaged to the front and rear flanges of the case.



OLYMPUS 593

MK.610-14-28

OVERHAUL



SNECMA

- (3) Check each segment location in the inner wall of the case for cleanliness, also check all the vent plug, locking plate and bolt abutment areas on the outer wall of the case for cleanliness.

CAUTION: MATERIAL TRAPPED BETWEEN ABUTMENT FACES  
COULD RESULT IN AN OIL LEAK.

- (4) Examine the six hexagon headed vent plugs, paying particular attention to the threads and the abutment face under the head, if necessary lightly stone the under head abutment face to dress any nicks or burrs.
- (5) Examine the segment securing bolts, nuts, washers and locking plates for cleanliness and nicks or burrs.
- (6) Examine each of the three segments for cleanliness, paying particular attention to the convex mating face of each segment.

B. Assemble Segments to Sub-assembly Inner Case (Ref.Fig.501A).

- (1) Position the sub-assembly inner case (5-330) on the worktop front face uppermost, with the locating pin (TOP) in the front flange of the case furthest from the operator.
- (2) Commencing at the (TOP) locating pin position, proceed in a counter-clockwise direction and mark the position of segments A, B and C on the case using a suitable marker or tape. Do not mark or use tape on the actual abutment faces.
- (3) Mark on the work surface the relative positions A, B and C.
- (4) If the segment positions relative to the case were identified and temporarily marked or recorded during disassembly procedure, then place the items in their respective positions, A, B and C on the worktop.
- (5) If the temporary identification markings have been removed refer to Fig.501A for the positions, then place the items in their respective positions on the worktop, A, B and C.

NOTE: Laying the items out in this manner will permit them to be assembled quickly in sequence after the Loctite has been applied.

SUB-ASSEMBLY

72-32-00

Page 502

Jun 1/99



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (6) Ensure all the segment securing bolts, nuts and vent plugs have been degreased and that the components have stabilized to room temperature. Carefully apply lubricant 'A' to the threads only of three bolts (5-326), and to the threads of one bolt (5-327).
- (7) Take a segment, identified as A from the worktop, then position it in the case (5-330), with the static seal location faces uppermost, to the first segment location counter-clockwise from the location pin (TOP) in the front flange.

NOTE: All the segment securing boltheads are to face inboard and the nuts assembled, initially finger-tight.

- (8) Insert a bolt (5-326) through the first hole counter-clockwise from TOP, then assemble a flat washer washer (5-324) and nut (5-323). Assemble the hexagon headed bolt (5-327) to the next hole and bolts (5-326) to the following two holes, then assemble a locking plate (5-325) over the two central bolts and retain the bolts and locking plate with nuts (5-323).
- (9) Hold the boltheads, then run the nuts down ensuring they have a locking (rundown) torque between 3 and 10 lbf in. (0,3 and 1,1 N.m). Do not tighten the bolts.
- (10) Apply locking compound 'B' to the threads and underhead radius of the two vent plugs (5-322), then screw the plugs into the assembled segment, do not tighten the plugs.

CAUTION: TORQUE-TIGHTENING SEQUENCE OF BOLTS AND VENT PLUGS MUST BE OBSERVED.

- (11) Refer to Fig.501A, then torque-tighten the bolts in sequence. Starting with the bolts in the centre of the segment, torque-tighten the two bolts numbered 1 to 135 lbf in. (15,2 N.m).

SUB-ASSEMBLY

72-32-00

Page 502A  
Dec 31/01



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

- (12) Torque-tighten the two vent plugs (5-322) numbered 2 between 550 and 600 lbf in. (62,1 and 67,8 N.m).
- (13) Torque-tighten the two outer bolts numbered 3 to 135 lbf in. (15,2 N.m).
- (14) Using 0.031 in. (0,8 mm) thickness locking wire, wire-lock each vent plug to the locking plate.
- (15) Carefully apply lubricant 'A' to the threads of four bolts (5-326).
- (16) Take a segment identified as B from the worktop, (note the smaller plugs and smaller vent holes in the segment), then position it in the case (5-330) to the bottom-most segment location.
- (17) Insert the four bolts (5-326) through the segment and case, then assemble a locking plate (5-325) to the two centre bolts and retain the bolts and locking plate with nuts (5-323).
- (18) Hold the bolts, then run the nuts down ensuring they have a locking (rundown) torque between 3 and 10 lbf in. (0,3 and 1,1 N.m). Do not tighten the bolts.
- (19) Apply locking compound 'B' to the threads and under-head radius of the two vent plugs (5-321), then screw the plugs into the segment assembled to the bottom of the case, do not tighten the plugs.
- (20) Refer to Fig.501A, then torque-tighten the bolts in sequence. Starting with the bolts in the centre of the segment, torque-tighten the two bolts numbered 1 to 135 lbf in. (15,2 N.m).
- (21) Torque-tighten the two vent plugs (5-321) numbered 2 between 310 and 340 lbf in. (35,0 and 38,4 N.m).
- (22) Torque-tighten the two outer bolts numbered 3 to 135 lbf in. (15,2 N.m).

SUB-ASSEMBLY

## 72-32-00

Page 502B

Dec 31/01

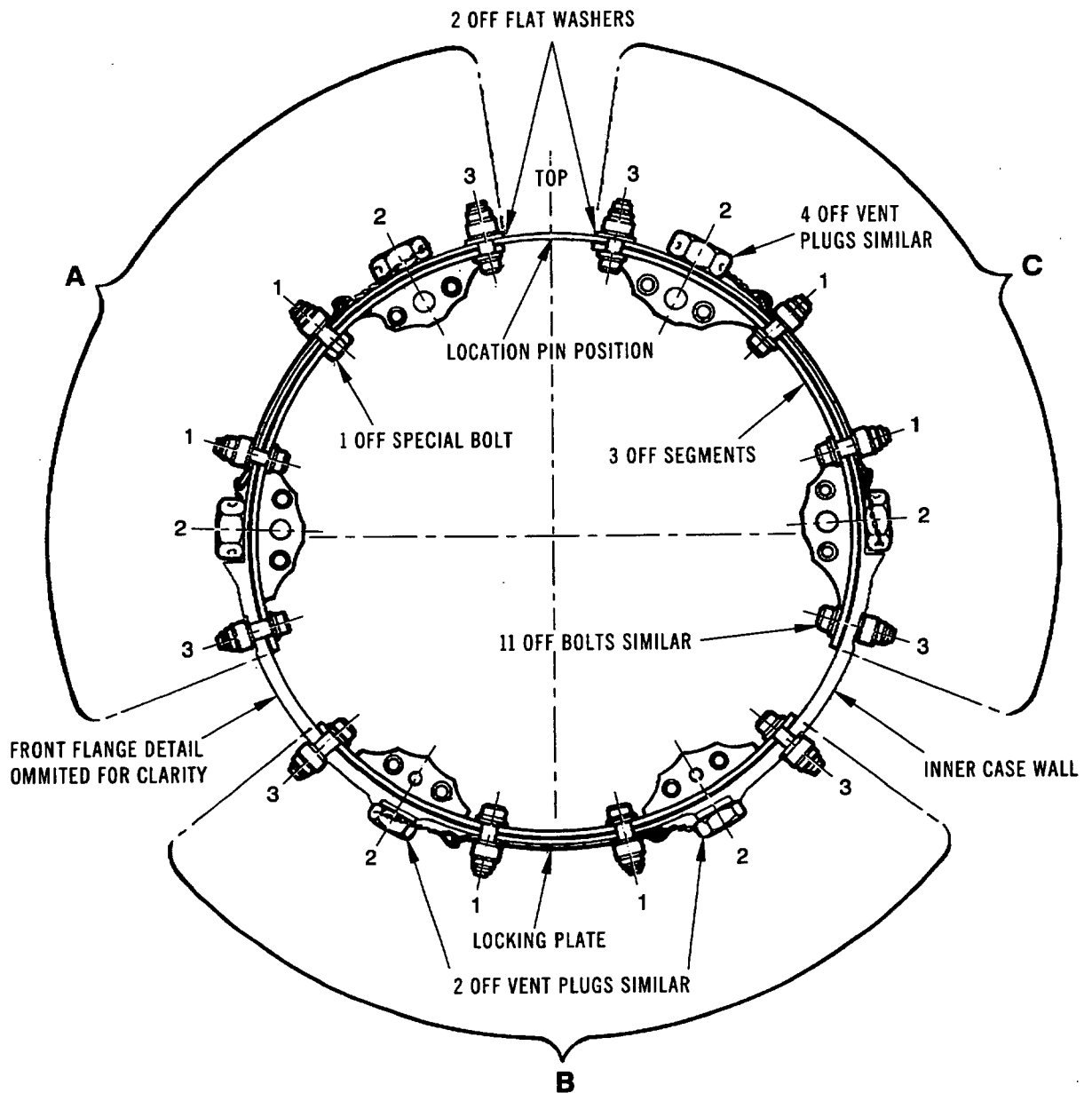


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



DIAGRAMMATIC VIEW OF THE SUB-ASSEMBLY  
INNER CASE LOOKING REARWARD

Torque-tightening Sequence for Vent Plugs and  
Securing Bolts  
Figure 501A



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (23) Using 0.031 in. (0,8 mm) thickness locking wire, wire-lock each vent plug to the locking plate.
  - (24) Apply lubricant 'A' to the threads of four bolts (5-326).
  - (25) Assemble the last segment to position C in the case and retain it in position with the four bolts (5-326), then assemble a locking plate (5-325) to the two centre bolts, nuts (5-323) and one flat washer (5-324). The flat washer is to be assembled under the nut at the last bolt position counter-clockwise from the location pin (TOP).
  - (26) Hold the boltheads, then run the nuts down ensuring they have a locking (rundown) torque between 3 and 10 lbf in. (0,3 and 1,1 N.m). Do not tighten the bolts.
  - (27) Apply locking compound 'B' to the threads and under-head radius of two vent plugs (5-322) then screw the plugs into the assembled segment, do not tighten the plugs.
  - (28) Refer to Fig.501A, then torque-tighten the bolts in sequence. Starting with the bolts in the centre of the segment, torque-tighten the two bolts numbered 1 to 135 lbf in. (15,2 N.m).
  - (29) Torque-tighten the two vent plugs (5-322) numbered 2 between 550 and 600 lbf in. (62,1 and 67,8 N.m).
  - (30) Torque-tighten the two outer bolts numbered 3 to 135 lbf in. (15,2 N.m).
  - (31) Using 0.031 in. (0,8 mm) thickness locking wire, wire-lock each vent plug to the locking plate.
- C. Assemble Test Equipment to Sub-assembly Inner Case (Ref.Fig.501B).
- (1) Ensure the front and rear flanges of the inner case (5-330) are clean and free from nicks or burrs, lightly stone the flanges if necessary.

SUB-ASSEMBLY

72-32-00

Page 502D

Dec 31/01





OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

- (2) Inspect the abutment faces of the sump, inner end drive housings and distributor for cleanliness, dress any nicks or burrs if necessary. Examine the six static seal locations of the segments for cleanliness, dress any nicks or burrs if necessary.
- (3) Position the case (5-330) on the worktop front face uppermost, then inspect the two blanks (Tool 1916) for cleanliness, ensuring that the gaskets are serviceable, assemble the blanks to the segment at the bottom-most position of the case (opposite the location pin (TOP) in the front flange). Secure the blanks with the captive bolts.
- (4) Examine the four blanks (Tool 1915) and their gaskets for cleanliness and serviceability, then assemble them to the remaining vent locations on the segments. Secure the blanks with the captive bolts.
- (5) Examine the following blanks and test equipment for cleanliness and serviceability of gaskets:  
  
Blank (Tool 3060) No.2 vane  
Blanks (Tool 3061) No 3 and 5 vanes  
Blank (Tool 3062) No 4 vane  
Clamp ends (Part of test equipment Tool 3063)
- (6) Assemble a blank (Tool 3060) to vane No.2 location and retain with six slave bolts, torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (7) Assemble a blank (Tool 3061) to No.3 vane location, noting the dowel location hole in the blank, secure the blank with six slave bolts, torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (8) Assemble a blank (Tool 3061) to No.5 vane location, noting the dowel location hole in the blank. Secure the blank with six slave bolts, torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m).

SUB-ASSEMBLY

72-32-00

Page 502E

Jun 1/99



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (9) Ensure the fibre washer is in position between the adapter and the blank (Tool 3062), observe the two location pin holes then assemble the blank to No.4 vane location and secure with slave bolts. Torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (10) Turn the case onto its side, then assemble the respective clamp ends (part of Tool 3063) onto the front and rear flanges of the case observing the location pin hole in the front clamp. Secure both clamp ends by tightening the nut on the front clamp end, do not over tighten.

D. Carry out Pressure Test (Ref.Fig.501B).

- (1) Position the sub-assembly inner case in a convenient location near the mobile oil rig (Tool 583 or 1926) with the blank at No.4 vane uppermost.

**WARNING:** A HIGH OIL TEMPERATURE WILL BE MAINTAINED DURING PRESSURE TEST. SAFETY PRECAUTIONS. MUST BE STRICTLY OBSERVED AT ALL TIMES.

- (2) Ensure all switches and valves on the test rig are in the OFF position before proceeding with the test.
- (3) Connect the delivery hose from the rig to the inlet connector on the inner case (No.4 vane).
- (4) Ensure that the pressure gauge (part of Tool 3063) has been assembled in the scavenge line up-stream of the scavenge throttle, then connect the scavenge hose from the rig to the inner case.
- (5) Place the safety screens (Tool 829) around the test rig and inner case.
- (6) Ensure that the workshop electrical supply for the rig is switched off, then connect the rig to the supply.

SUB-ASSEMBLY

**72-32-00**

Page 502F

Jun 1/99



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (7) Check the oil level in the rig then top-up with lubricant 'A' if necessary.
- (8) Fully open the throttling valve in the scavenge line.
- (9) Slacken the adapter at No.4 vane sufficiently to allow air to expel.
- (10) Switch on the electrical supply to the rig, then start the circulating pump motor. Open the delivery valve on the test rig sufficiently to allow the inner case to gradually fill with oil and expel air through the No.4 vane connector, then tighten the connector.
- (11) Check the blanks, end clamps and connectors for oil leaks. If there are any superficial leaks at this stage, switch off the circulating pump motor, drain the inner case of oil and rectify the leaks as necessary then repeat the appropriate parts of para. (9) and (10).
- (12) If there are no leaks, switch off the circulating pump motor, then close the delivery line at the rig.
- (13) Set the temperature control to 140°C then switch on the oil heater.

**WARNING:** ENSURE ADEQUATE VENTILATION IN THE TESTING AREA DURING HIGH OPERATING TEMPERATURES.

- (14) With the throttling valve fully open and the oil temperature raised to 140°C switch on the circulating pump motor, then open the delivery valve on the rig and flow full bore for 15 minutes to allow the case temperature to stabilize.
- (15) Adjust the scavenge throttle to produce 10 psig (69 kPa) on the pressure gauge installed in the scavenge line, then adjust the temperature control to obtain 120°C and flow for a further 30 minutes.

SUB-ASSEMBLY

**72-32-00**

Page 5026

Jun 1/99



# OLYMPUS 593

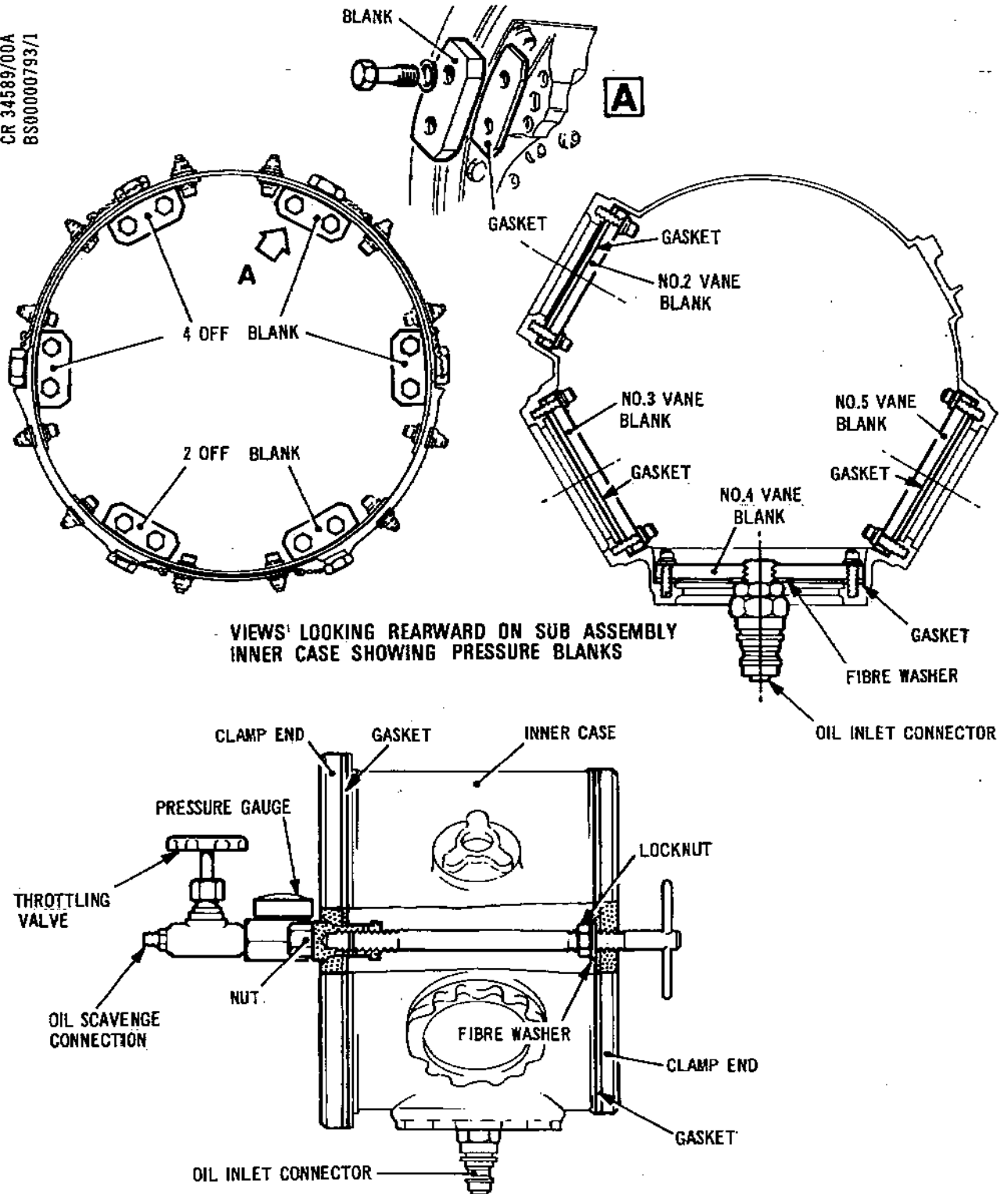
MK.610-14-28  
OVERHAUL



sneema

CR 34589/00A  
BS00000793/1

Printed in England



VIEWS LOOKING REARWARD ON SUB ASSEMBLY  
INNER CASE SHOWING PRESSURE BLANKS

Pressure Test Details  
Figure 501B



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

E. Check for Leaks.

- (1) Observe for leaks at each of the 12 segment retaining bolt positions, the six hexagon vent plugs and also check for seepage from under the locking plates.
- (2) Leaks from the mounting segment bolts, vent plugs and locking plates are acceptable provided that during the 30 minute leakage check period, the total leakage does not exceed 25 ml during the final 15 minutes, slight seepage is acceptable.

NOTE: "Seepage" is defined as a witness of dampness which does not form a droplet or globule during a minimum of 30 minutes under the specified test condition. Anything which does form a droplet or globule within this period is termed a "leak".

- (3) Switch off the circulating pump motor and heater, then close the delivery valve. Switch off the electrical supply to the rig.
- (4) Allow the sub-assembly inner to cool, then disconnect the delivery and scavenge hoses from the case and drain off the oil from the chamber.
- (5) Disassemble the clamp ends from the case and place them in a container.
- (6) If the pressure test proved unsatisfactory, leave the remaining blanks assembled to the case, then disassemble the segment items as required to rectify the leak (Ref.72-32-00, Disassembly).
- (7) Reassemble the items and repeat the pressure test as detailed in the appropriate para. of this chapter.
- (8) When the pressure test is satisfactory, remove the remaining blanks and place them in a container.



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

## F. Assemble the Housings to the Sub-assembly Outer Case.

- (1) Assemble the housing (5-410) at the No.2 vane position from the inside of the case (5-420), ensuring that the shaped profile of the housing matches that of the case.
- (2) Apply lubricant 'A' to six bolts (5-400), and assemble through the case and the housing with the bolt heads outside. Secure the housing with six nuts (5-390) on the inside.
- (3) Check that the locking (run-down) torque is at least 3.5 lbf in. (0,4 N.m), then torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (4) Assemble the housing (5-380) at the No.4 vane position from the inside of the case (5-420), ensuring that the shaped profile of the housing matches that of the case.
- (5) Apply lubricant 'A' to the six slave bolts, and assemble through the case and the housing with the bolt heads outside. Secure the housing with six slave nuts on the inside.
- (6) Check that the locking (run-down) torque is at least 3.5 lbf in. (0,4 N.m), then torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).

## G. Assemble the Sub-assembly Inner Case to the Sub-assembly Outer Case. (Ref. Fig.501C and 501D).

NOTE: The sub-assembly outer case (5-420) will require heating for reassembly to the inner assembly, preparatory work on items should be carried out at a convenient point near the oven.

- (1) Place the sub-assembly inner case (5-330) and the sub-assembly outer case (5-420) on a clean worktop front face uppermost.

NOTE: Three equi-spaced holes (120 deg apart) in both the cases are used to align the cases correctly during reassembly. Six slave bolts will be required to retain the two cases while the cases normalize to room temperature.

SUB-ASSEMBLY

72-32-00

Page 502K

Jun 1/99

CR 34596/00A  
BS00000800/1

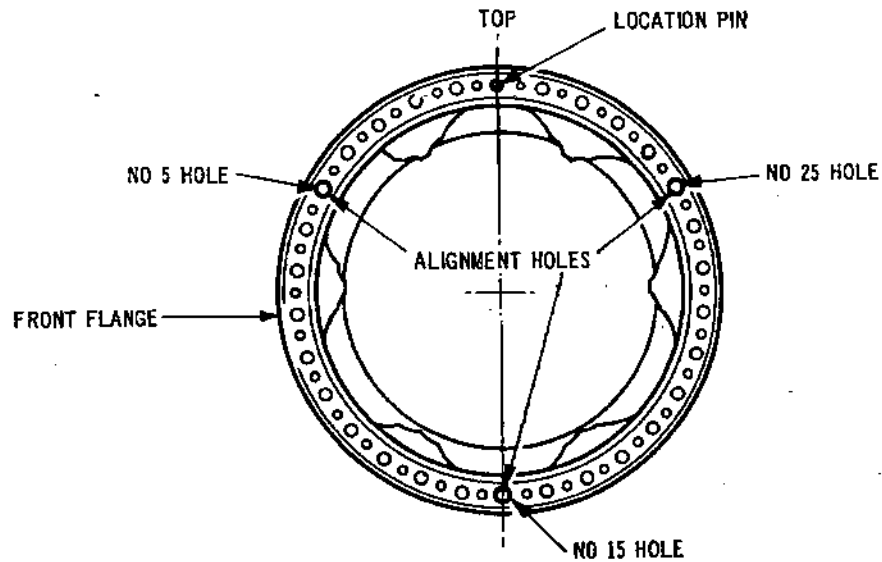


**OLYMPUS 593**

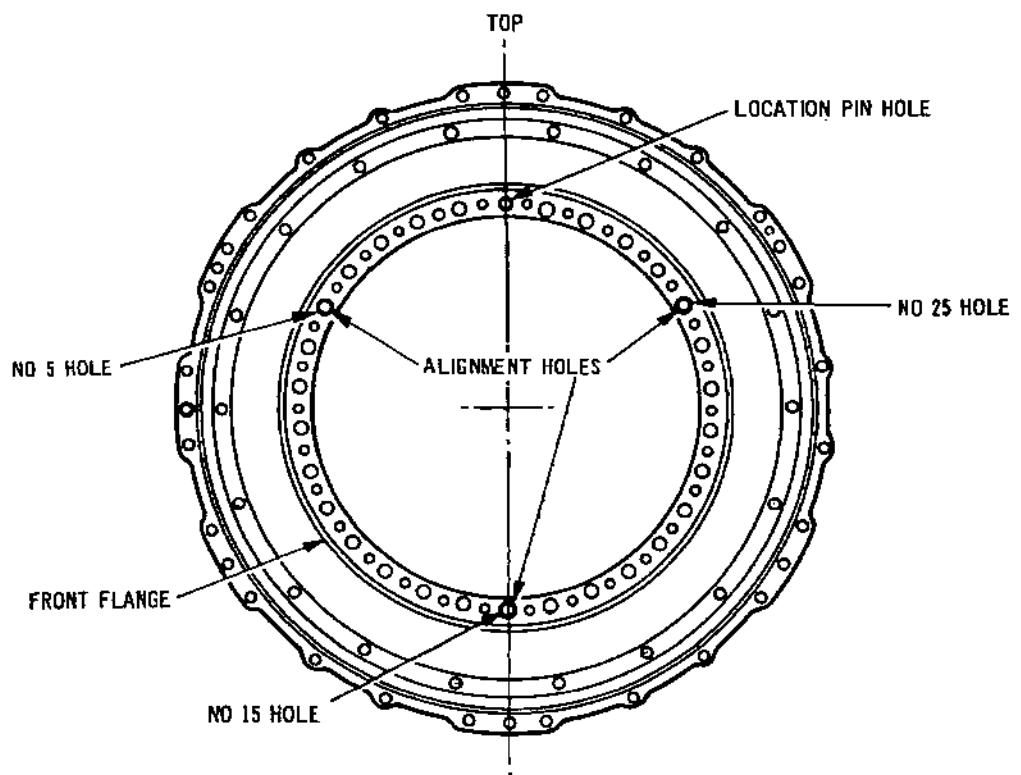


MK.610-14-28  
OVERHAUL

sheema



**VIEW ON SUB-ASSEMBLY INNER CASE LOOKING REARWARD**



**VIEW ON SUB-ASSEMBLY OUTER CASE LOOKING REARWARD**

Identifying Alignment Holes Prior to  
Assembly of Cases  
Figure 501C



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

- (2) Note the locating pin (5-350) (TOP) in the front flange of the sub-assembly inner case (5-330), then insert an alignment pin (Tool 3064) in No.5 hole counter-clockwise from the locating pin (TOP) (viewed rearward), then insert an alignment pin (Tool 3064) in No.15 hole from the present position and then No.25 hole. If difficulty is experienced inserting the alignment pins (Tool 3064), examine the pins and material around the holes for possible nicks or burrs, lightly dress damage marks if necessary.

NOTE: The alignment pin check on both cases is to ensure that the pins can be inserted into the holes quickly without problems arising after the sub-assembly outer case (5-420) has been heated to 120°C.

- (3) Note the locating pin hole (TOP) in the front flange of the sub-assembly outer case (5-420), then using the information in para.(2) identify each of the three corresponding equi-spaced location holes and suitably mark their positions on the outside of the case for reassembly convenience, then insert an alignment pin (Tool 3064) in each of the three holes. Lightly dress any nicks or burrs, if required, to ensure ease of assembly of the pins.
- (4) Clearly identify the TOP position on the front flange of the sub-assembly outer case (5-420).
- (5) Set the oven to 120°C and allow it to reach this temperature, then place the case (5-420) in the oven (front flange uppermost) for one hour.
- (6) Place the three alignment pins (Tool 3064) and the six slave bolts at a convenient point on the worktop in readiness for the assembly procedure.
- (7) Unscrew and remove the hand knob and clamping ring from the assembly fixture (Tool 3065), then observing the location pin (TOP) in the front flange of the sub-assembly inner case (5-330) and the TOP position of the assembly fixture, lower the case over the hexagon pillar ensuring that the location dowel in the base plate enters the hole in the rear flange of the inner case at the BOTTOM position. The correct hole strikes a line exactly 180 deg relative to the pin in the front flange.

SUB-ASSEMBLY

72-32-00

Page 502M

Jun 1/99





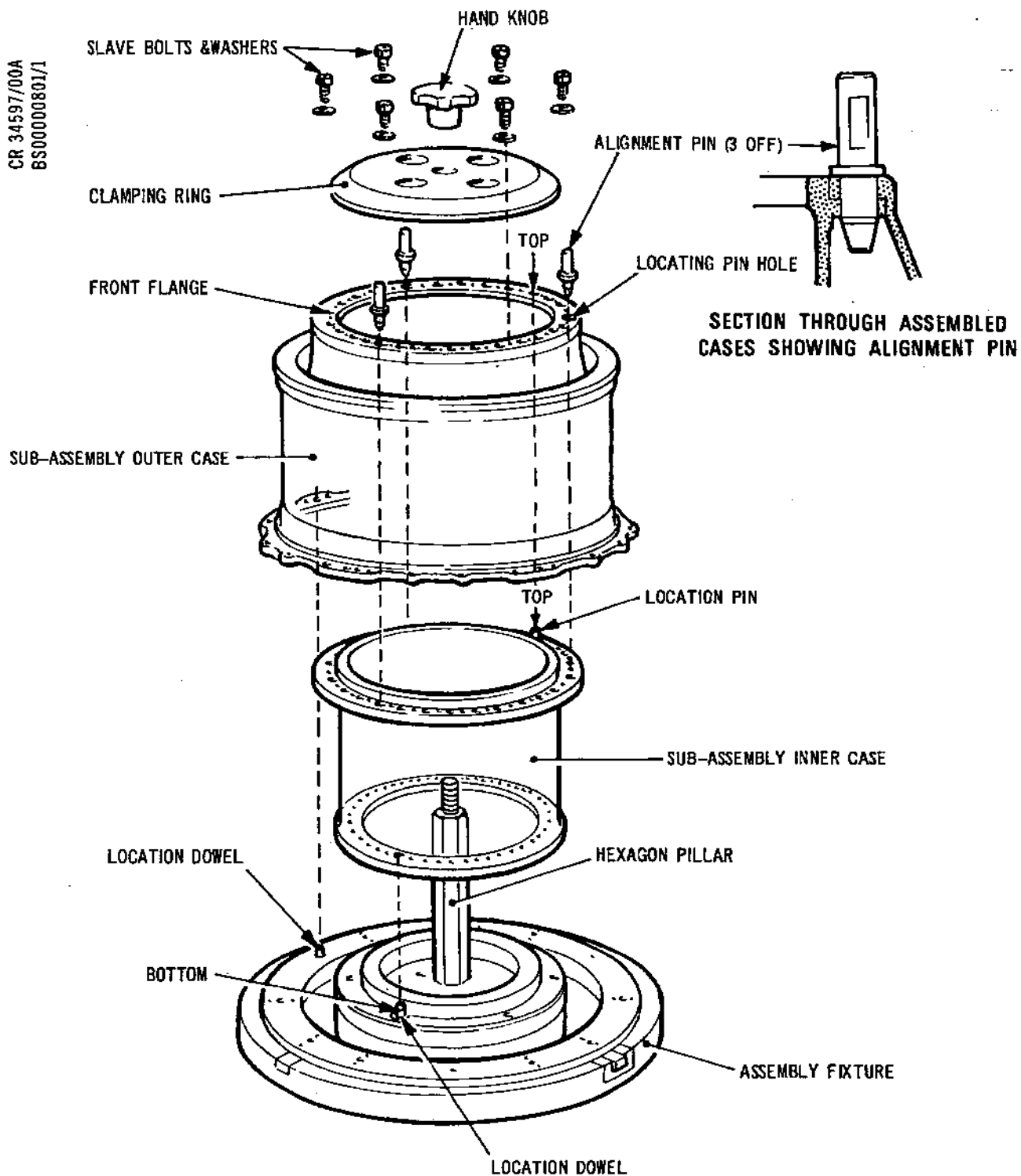
OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

CR 34597/00A  
BS00000801/1



Assembling the Sub-assembly Outer Case to  
the Sub-assembly Inner Case  
Figure 501D



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (8) Reassemble the clamping ring to the hexagon pillar then secure the ring to the inner case with the hand knob.

**WARNING:** OBSERVE SAFETY PRECAUTIONS WHEN REMOVING HOT CASE FROM OVEN.

**NOTE:** Assistance will be required during assembly of the two cases.

- (9) Wearing protective gloves, remove the outer case from the oven and position it over the inner case so that the location pin hole (TOP) in the outer case aligns the location pin (TOP) protruding from the inner case front flange.
- (10) Lower the outer case onto the inner case ensuring that the location pin (TOP) of the inner case enters the corresponding hole (TOP) of the outer case and that the location dowel in the fixture enters the hole in the outer rear flange of the sub-assembly outer case (5-420).
- (11) Insert the three alignment pins (Tool 3064) into the previously identified three equi-distant location holes, if necessary lightly tap the pins home to ensure correct alignment of the two cases before the temperature falls.
- (12) Assemble the six slave bolts (equally spaced) and washers to the front flanges of the two cases, then torque-tighten the six bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (13) Allow the cases to normalize to room temperature, then withdraw the three alignment pins and place them in a protective container.
- (14) Unscrew and remove the hand knob and clamping ring from the fixture and case (5-330) then remove the case assemblies and place the unit in a protective container. Reassemble the clamping ring and hand knob to the fixture.

#### H. Prepare for Assembly of Inner Case to Outer Case.

- (1) Prior to commencing assembly, check module compatibility of labyrinths SB.72-91 and SB.72-93.

SUB-ASSEMBLY

**72-32-00**

Page 502P

Jun 1/99



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

- (2) Ensure that six equally spaced slave bolts and washers (Ref.Fig.509) have been assembled to the front inner flange to secure the inner and outer sub-assemblies (5-330 and 5-420).

NOTE: Refer to 72-09-00 Assembly for cleaning and priming bearings. In addition refer to S.B.72-17 for information on the LP and HP thrust bearing assemblies and S.B.72-135 for the sub-assembly outer case (5-420).

J. Check Component Serialization.

- (1) Check to ensure that all components identify with the I.P.C. then mark new major items with the engine identification symbol.

NOTE: The HP zerol bevel gear (72-61-00/1-41) together with the right (72-61-00/1-42) and left-hand (72-61-00/1-43) gearbox driven bevel gears assembled within the intermediate case are supplied initially in a matched set of three. Should any one of the three gears be rejected for any reason, then the complete set of three must be withdrawn and a replacement "matched set" introduced.

K. Check Plugs and Blanks.

- (1) If already assembled ensure all plugs and blanks are secure and locked satisfactorily. Check self-locking wire inserts.
- (2) Apply lubricant 'A' to the threads of two machine bolts (6-70) then assemble one bolt to the outer case, near the front flange between No.1 and 2 vanes and the other bolt to the outer case between No.1 and 6 vanes. Torque-tighten the two bolts between to 370 lbf in. (42,0 N.m).
- (3) Assemble a plug (6-60) and the bracket (6-55) between No.4 and 5 vanes. Position the bracket to the top and bottom left plug-retaining bolt positions, with the leg of the bracket extended over the case and inclined towards the rear flange (viewing the case front flange uppermost). Secure the bracket and plug with three bolts (6-50), with lubricant 'B' applied. Torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m). Locking (Run-down) torque 3.5 lbf in. (0,4 N.m).

SUB-ASSEMBLY

72-32-00

Page 502Q

Dec 31/01



OLYMPUS 593



MK.610-14-28

*sneema*

OVERHAUL

This Page Left Blank Intentionally

SUB-ASSEMBLY

**72-32-00**

Page 502R

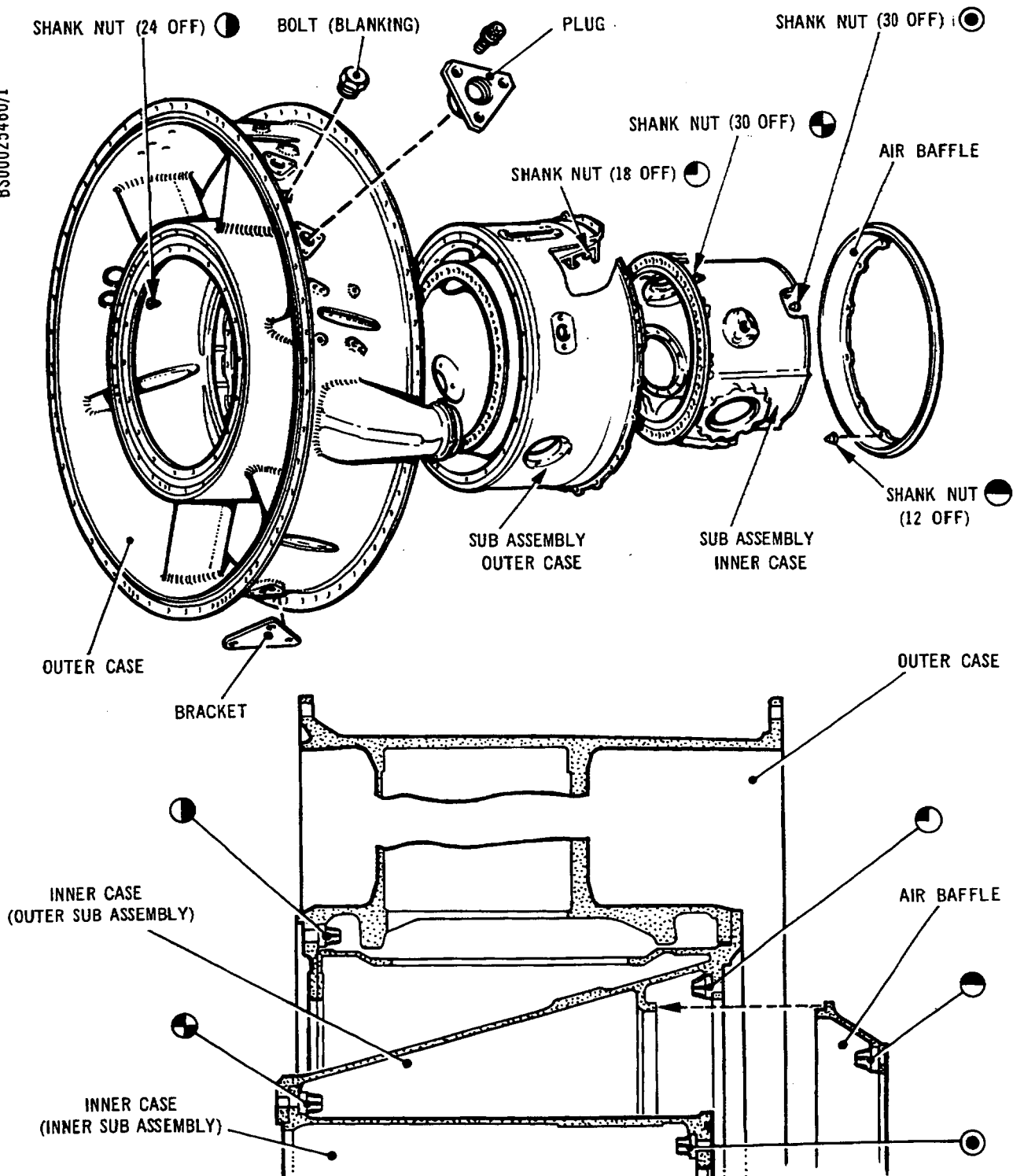
Jun 1/99

CR 33455/00C  
BS00025460/1



OLYMPUS 593

MK.610-14-28  
OVERHAUL



SECTION THROUGH INNER AND OUTER CASES SHOWING SHANK NUT LOCATIONS

Checking Shank Nuts  
Figure 501E



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (4) Assemble the remaining five plugs (6-60) to the outer case and retain them with bolts (6-50) lubricated with lubricant 'A'. Torque-tighten the bolts (6-50) to 135 lbf in. (15,2 N.m). Locking (Run-down) torque 3.5 lbf in. (0,4 N.m). Wire-lock all of the bolts (6-70 and 6-50).

L. Check the Security of the Self-locking Shank Nuts (Ref.Fig.501E).

- (1) Ensure that the self-locking shank nuts are correctly assembled to the following items.
  - (a) Inner case sub-assembly (5-330) front flange nuts (5-340).
  - (b) Inner case sub-assembly (5-330) rear flange nuts (5-340).
  - (c) Inner case (5-420) rear flange nuts (5-430).
  - (d) Outer case (6-100) front inner flange nuts (6-110).
  - (e) Outer case (6-100) rear inner flange nuts (6-160).
  - (f) Air baffle (2-240) nuts (2-250).

M. Assemble Pins and Pegs (Ref.Fig.502).

- (1) Degrease the pins, then, using an approved freezing agent and wearing protective gloves, shrink fit the pins and locating pegs to the following locations.

NOTE: If the pin locations are defective, refer to 72-32-00 Repair No.10 and/or No.11.

- (a) Using driver (Tool 1800), assemble a shouldered pin (5-190) to the inner case sub-assembly (5-330) at No.3 vane position.
- (b) Using driver (Tool 1801), assemble two shouldered pins (4-340) to the inner case sub-assembly (5-330) at No.4 vane position.
- (c) Using driver (Tool 1800), assemble a shouldered pin (5-190) to the inner case sub-assembly (5-330) at No.5 vane position.

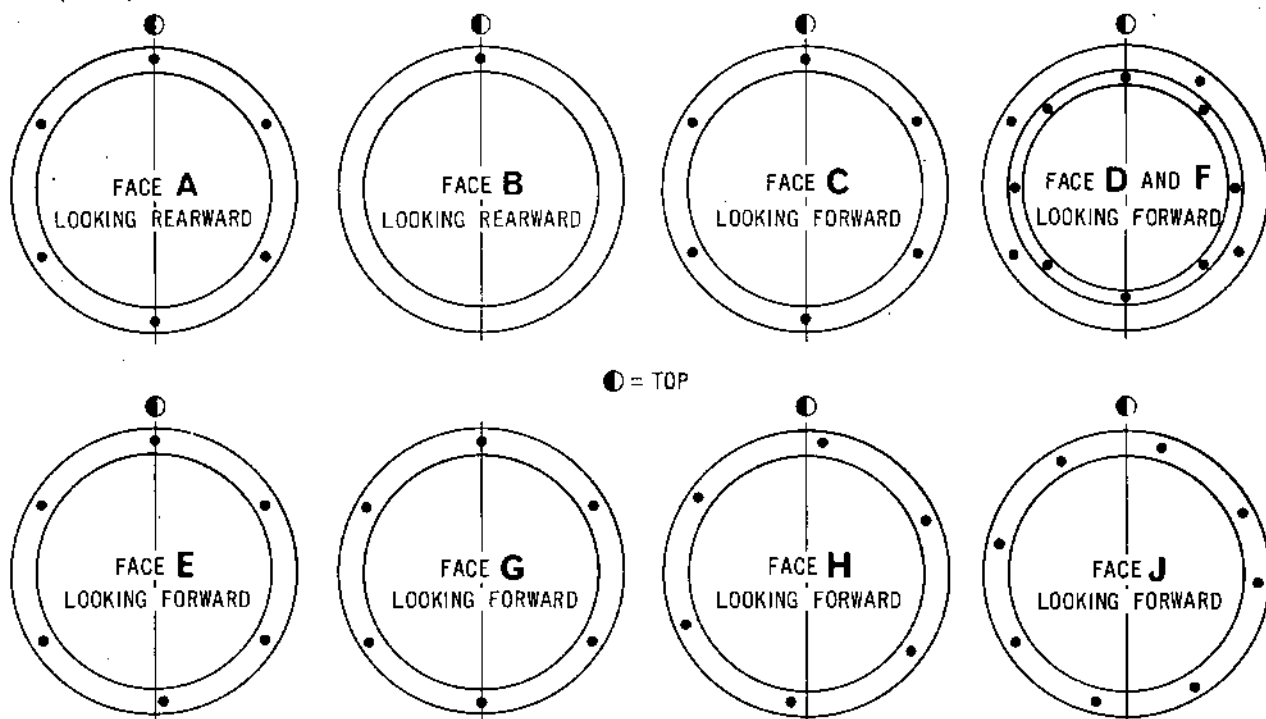
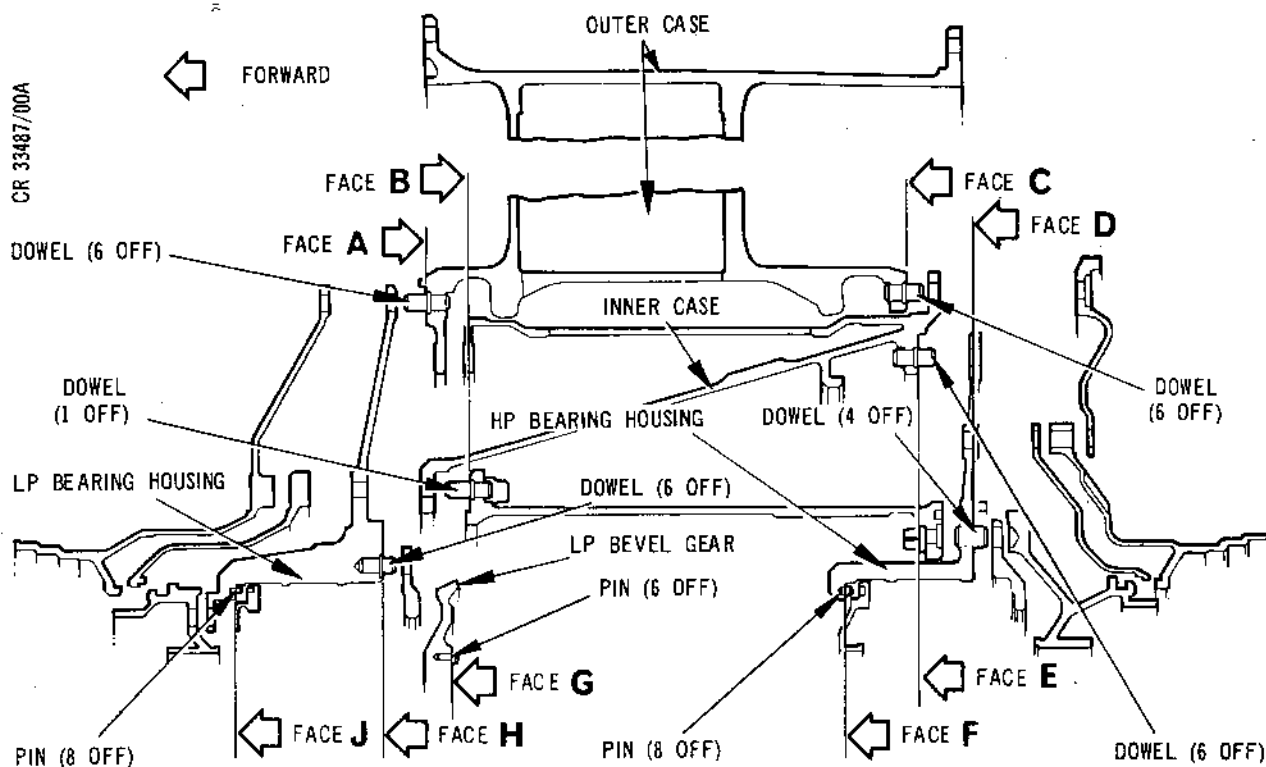


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



RADIAL POSITION OF PINS AND DOWELS

Assembling Pins and Dowels  
Figure 502 (Sheet 1 of 2)

SUB-ASSEMBLY  
**72-32-00**  
Page 505  
Mar 1/76

TN8573

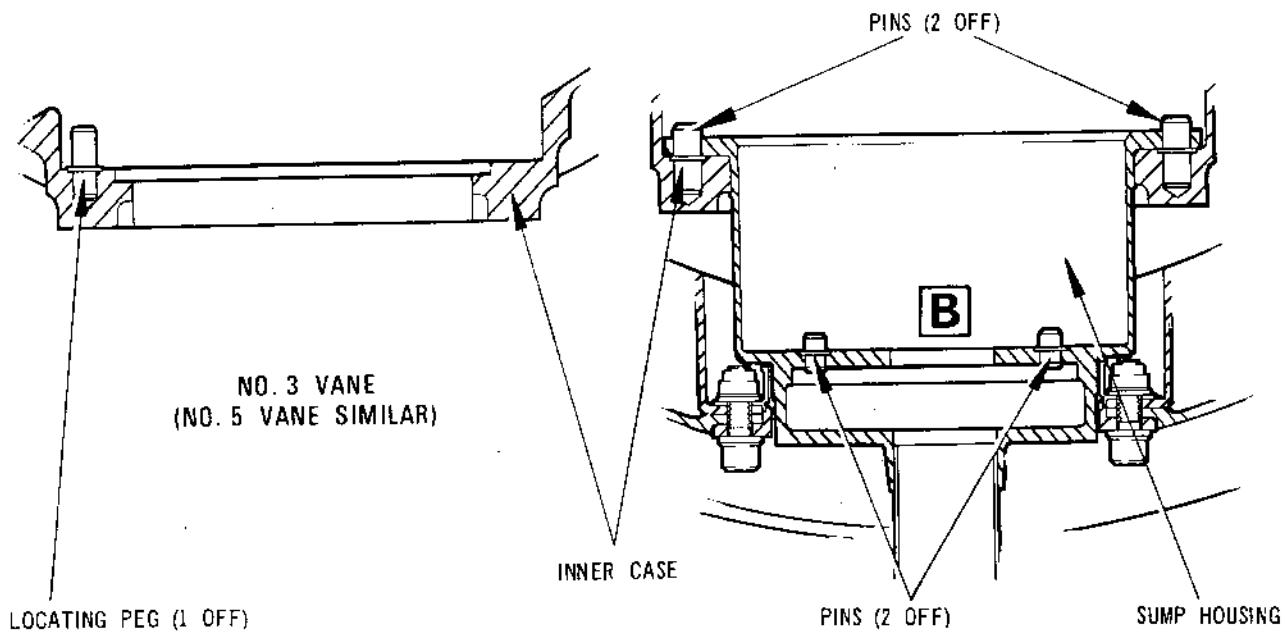
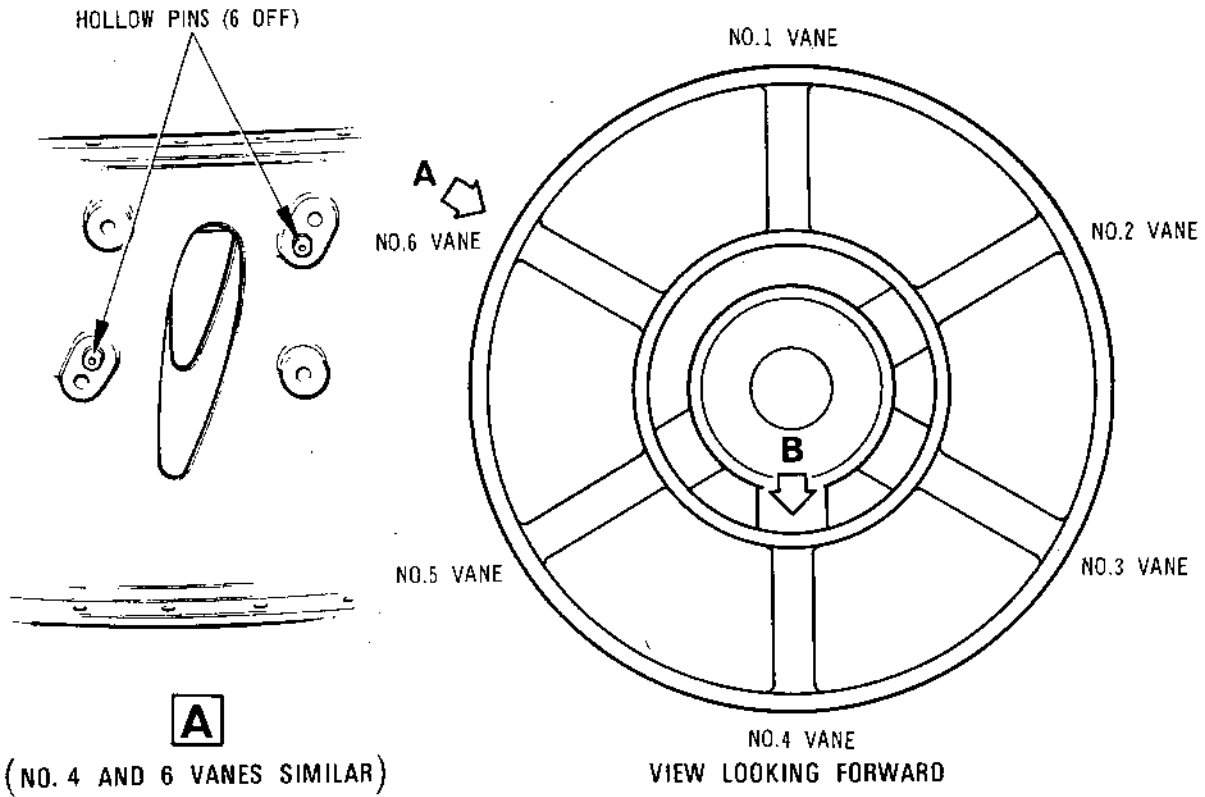


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33529/00A



TN8581

Assembling Pins and Dowels  
Figure 502 (Sheet 2 of 2)

SUB-ASSEMBLY  
**72-32-00**  
Page 506  
Mar 1/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (d) Assemble a stepped pin (5-350) to the inner case sub-assembly (5-330), inner front flange TOP position.
- (e) Using driver (Tool 1802), assemble six shouldered pins (5-200) to the inner case, outer sub-assembly (5-420) outer rear flange.
- (f) Using driver (Tool 1800), assemble a shouldered pin (6-40) to the front inner flange of the outer case (6-100) at the radial position between No.2 and 3 vanes.
- (g) Using driver (Tool 1801), assemble the six shouldered pins (6-30) to the front inner flange of the outer case (6-100).
- (h) Using driver (Tool 1800), assemble a locating peg (6-80) to the rear inner flange of the outer case (6-100) between No.2 and 3 vanes.
- (j) Using driver (Tool 1802), assemble the six shouldered locating pins (6-90) to the rear inner flange of the outer case (6-100).
- (k) Using driver (Tool 1802), assemble the two hollow-headed pins (4-40) to the outer case (6-100) at the outer location of No.2 vane.
- (l) Using driver (Tool 1803), assemble the eight pins (1-310) to the thrust washer location in the LP bearing housing (1-270).
- (m) Using driver (Tool 1802), assemble the six shouldered pins (1-180) to the bearing retainer location in the LP bearing housing (1-270).
- (n) Using driver (Tool 1803), assemble the six headed pins (1-30) to the LP bevel gear (1-40).
- (p) Using driver (Tool 1804), assemble the 12 hollow locating pins (5-70) to the static seal assembly (5-40).
- (q) Using driver (Tool 1803), assemble the eight headless pins (2-90) to the HP bearing housing (2-80), oil baffle location.
- (r) Using driver (Tool 1928), assemble the four pins (2-75) to the HP bearing housing (2-80) bearing retainer location.

SUB-ASSEMBLY

**72-32-00**

Page 507

Aug 1/78



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (s) Using driver (Tool 1801), assemble two pins (4-350) inside the sump assembly (4-360).
- (t) Using driver (Tool 1802), assemble the two hollow-headed pins (4-430) to the outer case (6-100) at the outer location of No.4 vane.
- (u) Using driver (Tool 1802), assemble the two hollow-headed pins (4-250) to the outer case (6-100) at the outer location of No.4 vane.
- (v) Assemble two pins (4-190) to the sump case (72-64-00/1-90).
- (w) Shrink hollow pin (7-300) then, assemble it to the adapter plate (7-270).

N. Prepare for Assembly (SB.0L.593-72-9019-404 Standard) (Ref.Fig.503).

- (1) Place the inner case unit (5-330 and 5-420) on the worktop with the front face uppermost. Measure from the front face of the case to the bottom of the seal location AA, then record the measurement.

P. Prepare the Sealing Grooves and Faces for the 'C' Seals for Assembly (SB.0L.593-72-9053-426) (Ref.Fig.503).

- (1) Visually inspect all the sealing grooves and sealing faces for the 'C' seals to ensure there are no damage marks. Ensure the surface finish of the sealing grooves and faces is 32 microinches (0,8 micrometres).
- (2) If necessary, use seal location lapping kit (Tool 3156) to hand lap the sealing groove(s) to remove any damage marks and produce a surface finish of 32 microinches (0,8 micrometres). Use fine grade lapping paste (OMat 540 and 541).

NOTE: The Intermediate Case Inner has five sealing groove locations. The HP Drive Housings, left hand and right hand, have one sealing groove at the front of each rear flange.



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (3) If necessary, locate the component in a suitable machine and set true. Skim grind the sealing face(s) to remove damage marks and produce a surface finish of 32 microinches (0,8 micrometres).

NOTE: The Intermediate Case Inner front flange drop dimension at position AA is 0.120/0.118 in (3,05/3,00 mm).

- (4) Visually inspect the lapped sealing groove(s) and/or sealing face(s) to ensure all damage marks have been removed and a surface finish of 32 microinches (0,8 micrometres) has been achieved. Dimensionally inspect sealing groove 0.120/0.118 in (3,05/3,00 mm) depth(s). Dimensionally inspect all other affected component(s).

NOTE: Where dimensions are outside those shown, contact the Rolls-Royce, Olympus 593 Project Office, Filton, Bristol; for corrective action.



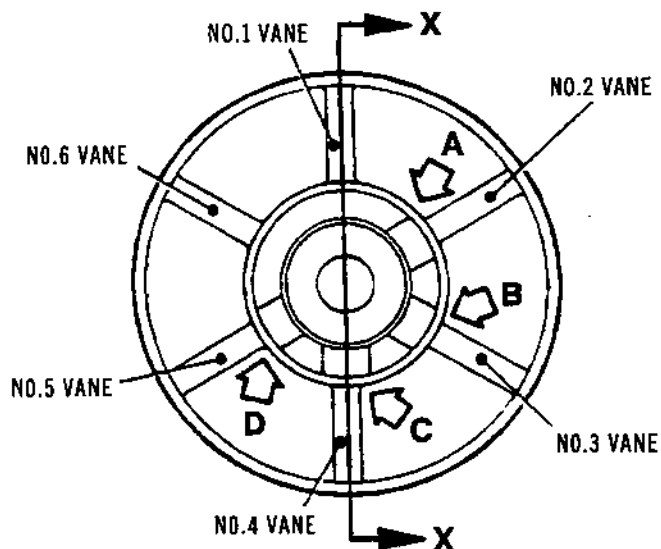
OLYMPUS 593

MK.610-14-28  
OVERHAUL



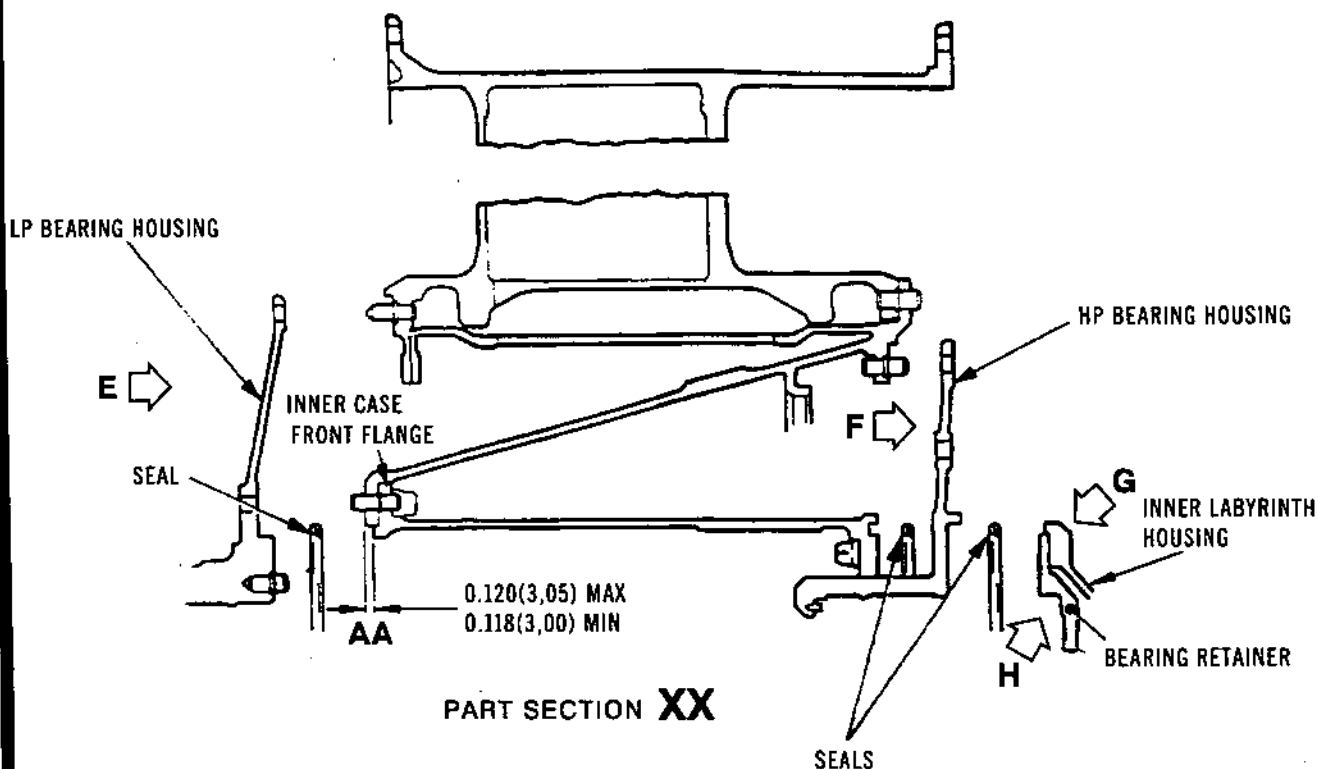
sneema

BS00026924/1



DIMENSIONS GIVEN ARE SHOWN  
THUS:- INCHES (MILLIMETRES)

VIEW ON INTERMEDIATE CASE  
LOOKING FORWARD



Metal 'C' Seals (SB.0L.593-72-9053-426) - Location and  
Surface Finish Data for Sealing Grooves and Faces  
Figure 503 (Sheet 1)

SUB-ASSEMBLY

72-32-00

Page 510

Dec 31/99

BS00026925/1

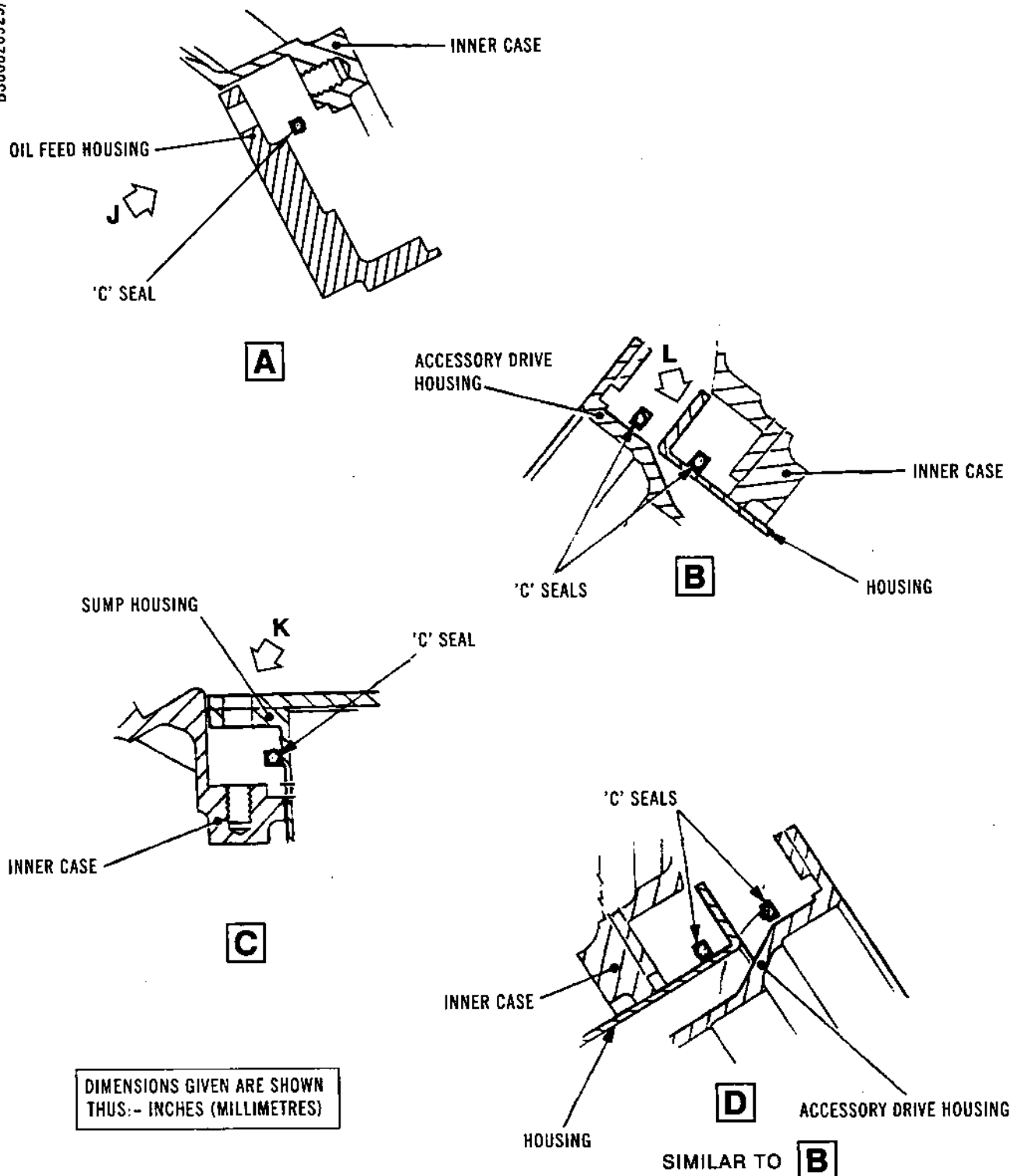


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Metal 'C' Seals (SB.0L.593-72-9053-426) - Location and  
Surface Finish Data for Sealing Grooves and Faces  
Figure 503 (Sheet 2)



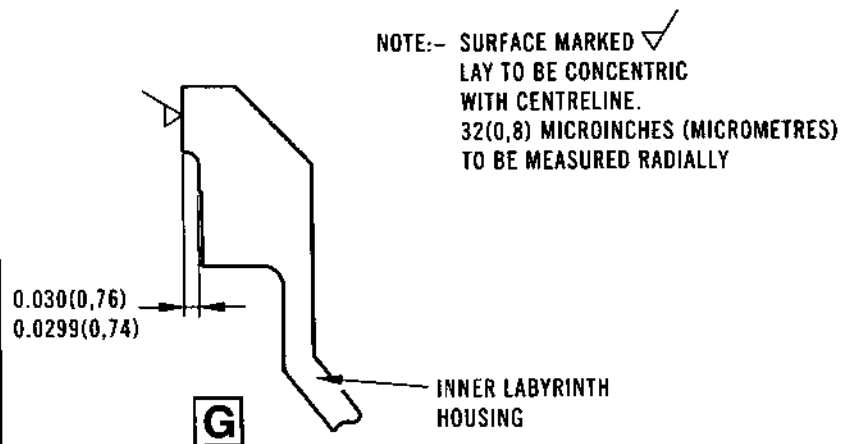
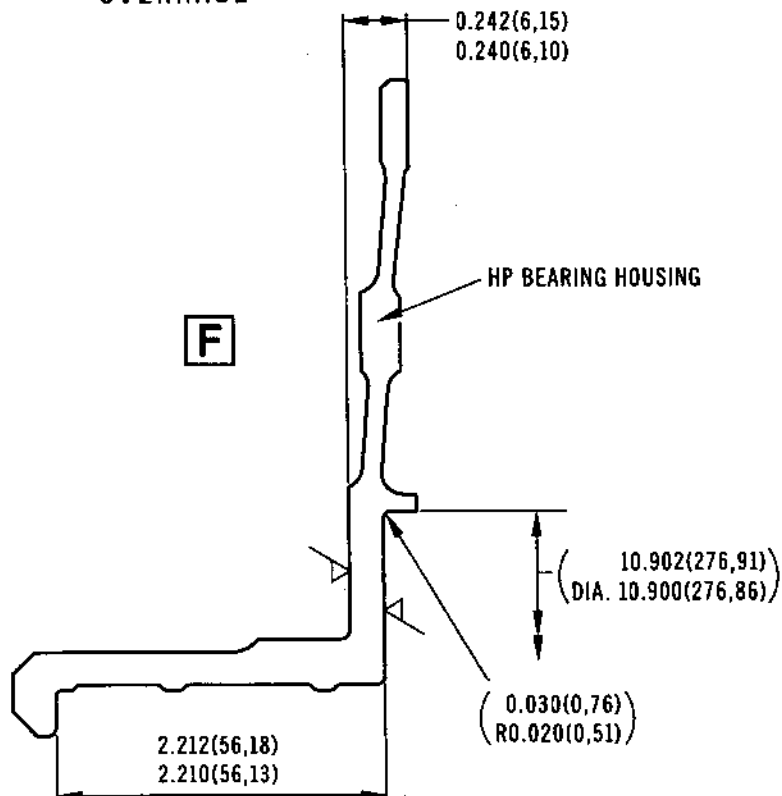
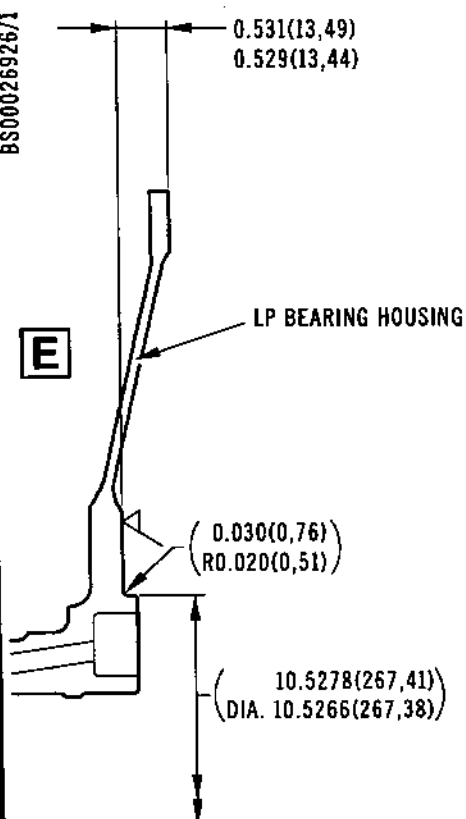
OLYMPUS 593

MK.610-14-28  
OVERHAUL

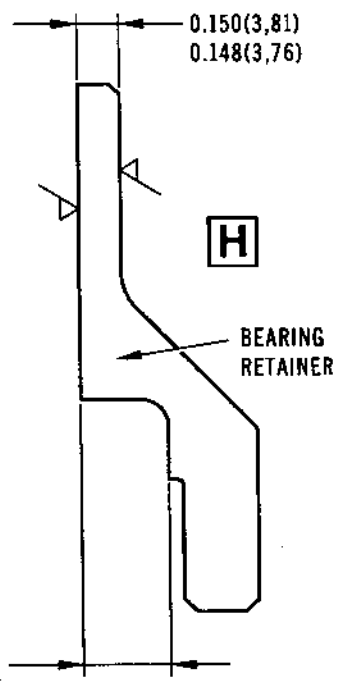


sneema

BS00026926/1



NOTE:- SURFACE MARKED  $\nabla$   
LAY TO BE CONCENTRIC  
WITH CENTRELINE.  
32(0,8) MICROINCHES (MICROMETRES)  
TO BE MEASURED RADially



Metal 'C' Seals (SB.0L.593-72-9053-426) - Location and  
Surface Finish Data for Sealing Grooves and Faces  
Figure 503 (Sheet 3)



# OLYMPUS 593

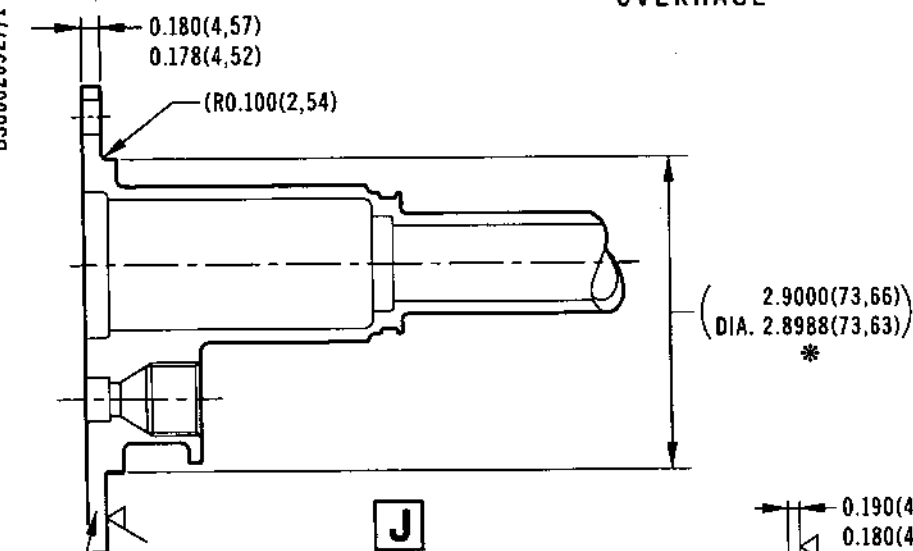
MK.610-14-28  
OVERHAUL



sneema

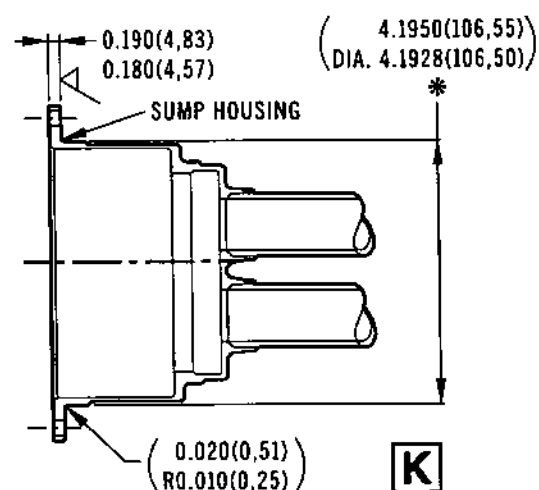
Printed in England

BS00026927/1

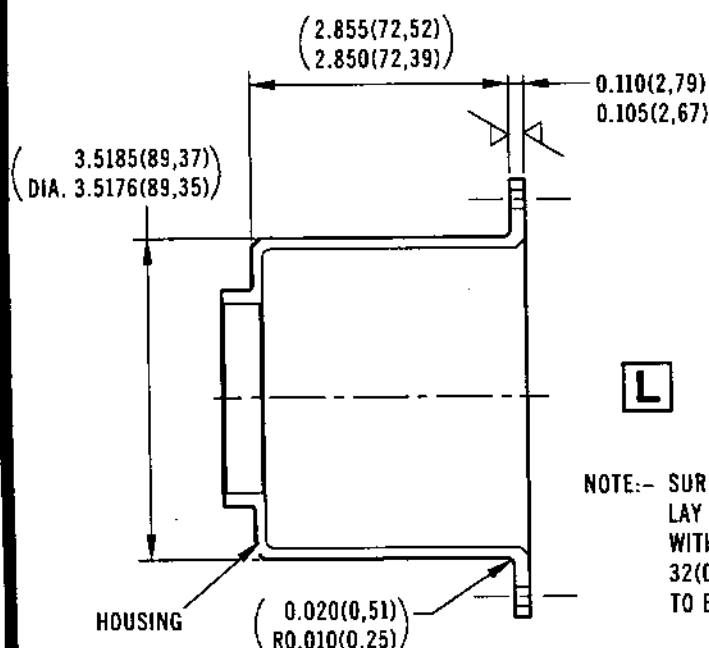


OIL FEED HOUSING

NOTE:- SURFACE MARKED ✓  
LAY TO BE CONCENTRIC  
WITH CENTRELINE.  
32(0,8) MICROINCHES (MICROMETRES)  
\* DIAMETER IS OFFSET



NOTE:- SURFACE MARKED ✓  
LAY TO BE CONCENTRIC  
WITH CENTRELINE.  
32(0,8) MICROINCHES (MICROMETRES)  
TO BE MEASURED RADIALLY  
\* DIAMETER IS OFFSET



NOTE:- SURFACE FINISH ✓  
LAY TO BE CONCENTRIC  
WITH CENTRELINE.  
32(0,8) MICROINCHES (MICROMETRES)  
TO BE MEASURED RADIALLY

Metal 'C' Seals (SB.0L.593-72-9053-426) - Location and  
Surface Finish Data for Sealing Grooves and Faces  
Figure 503 (Sheet 4)

SUB-ASSEMBLY

## 72-32-00

Page 513

Dec 31/99



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

CR. 31235/00A

L.P. BEARING HOUSING

INNER LABYRINTH SEAL HOUSING



REAR

DOUBLE DEE HEAD BOLTS

Assembling Inner Labyrinth Housing to LP Bearing Housing  
Figure 504

SUB-ASSEMBLY

72-32-00

Page 514

Dec 31/99





OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Q. Assemble Inner Labyrinth to LP Bearing Housing  
(Ref.Fig.504).

- (1) Heat inner labyrinth (1-330) to 100° then using protective gloves, assemble labyrinth to front of LP bearing housing (1-270). Assemble the 24 bolts (1-260), locating the heads on rear face of inner front flange, lubricate threads with lubricant 'A' and secure with self-lock nuts (1-250).
- (2) Using wrench (Tool 1575), torque-tighten the bolts to 135 lbf in. (15,2 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m). After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 2.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref. SB.72-8334-205).

R. Assemble the LP and HP Compressor Thrust Bearings  
(SB.72-17 and 79).

NOTE: The following procedures on assembling thrust bearings are only applicable if original items are used. If new bearings are used, remove protective wrapping and grease (Ref.72-09-00 Assembly).

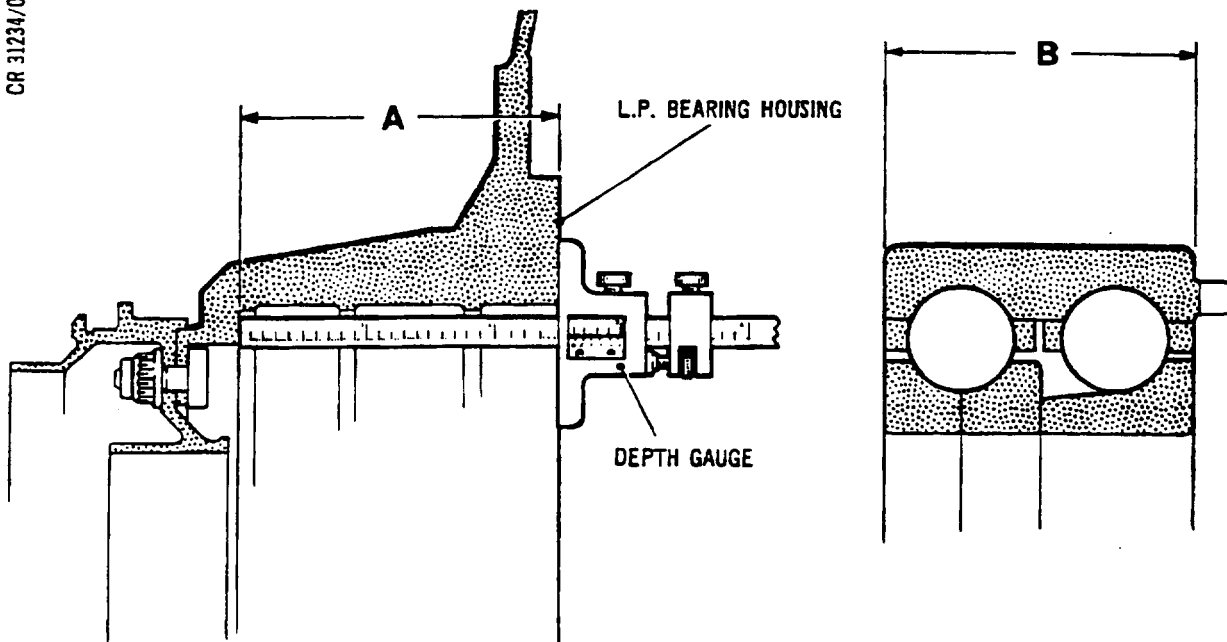
- (1) The following assembly procedure on each bearing should be carried out in an approved 'clean' room.
- (2) Mount the assembly tool (Tool 1986) either in a bench vice, or bolt it to an adapter plate (Tool 1987), which in turn must be bolted to a Hydraclamp. Ensure that the tool is mounted so that the tool handle when closed, points towards the operator.
- (3) Assemble the LP compressor thrust bearing (1-190).
  - (a) Hinge open the tool handle and release the clamp plates. Place the bearing outer track on the assembly tool so that the arrow on the outer track can be seen, then position and secure the tool clamps to hold the track.

SUB-ASSEMBLY

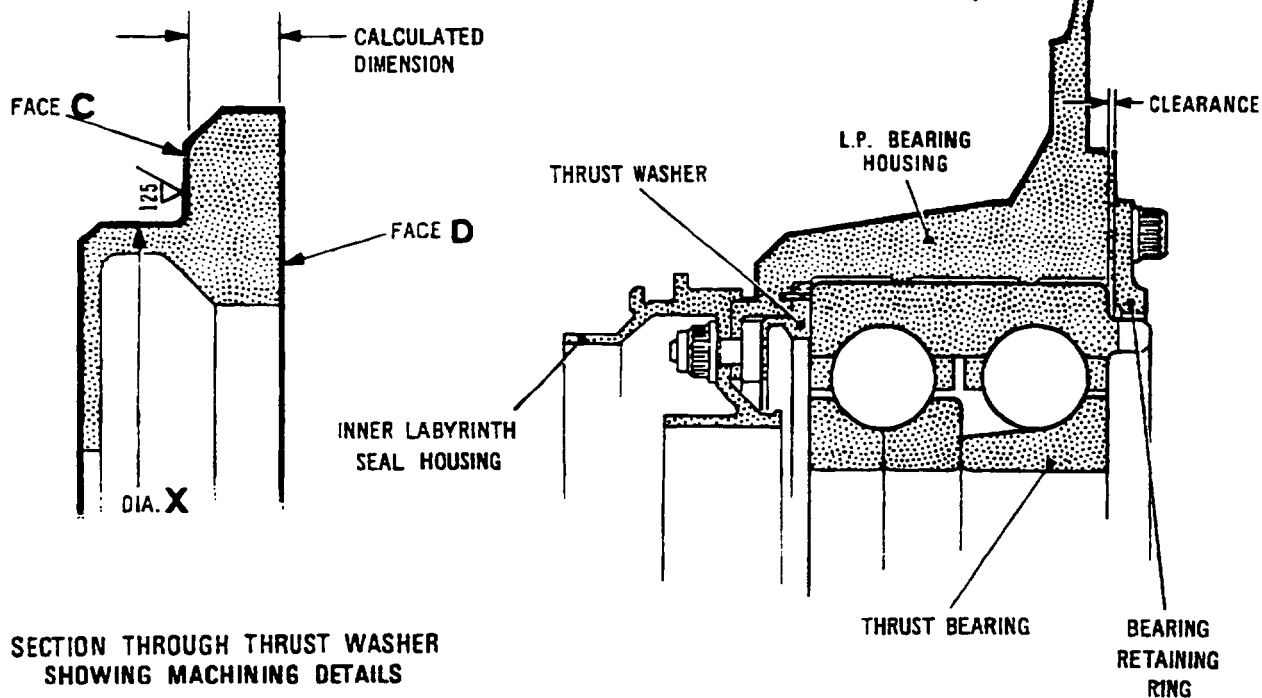
72-32-00

Page 515  
Dec 31/01

CR 31234/00B



SURFACE ROUGHNESS VALUES ARE SHOWN THUS:- MICRO INCHES (MICROMETRES) ✓



SECTION THROUGH THRUST WASHER  
SHOWING MACHINING DETAILS

Calculating the LP Bearing Thrust Washer Thickness  
Figure 505



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (b) Position the cage for the front set of balls within the outer track, so that the arrow is in correct relationship with the arrow on the track. From the set of front balls, select a ball, position it in the cage under the tool handle, then pull the handle forward and press the ball into the cage. Rotate the ball and cage approx. 120 deg and assemble another ball, then rotate the cage a further 120 deg and assemble a third ball to locate the cage. Assemble the remainder of the balls to the cage.
  - (c) Position the correct inner track to abut the inner side of the balls, then position the rear cage within the outer track, so that the arrow is in correct relationship with the arrow on the outer track.
  - (d) Position a ball in the rear cage under the tool handle, then pull the handle forward and press the ball into the cage. Rotate the ball and cage approx. 120 deg and assemble another ball, then rotate the cage a further 120 deg and assemble a third ball to locate the cage. Assemble the remainder of the balls to the cage.
  - (e) Ensure that each ball and cage rotates freely, then release and remove the bearing from the assembly tool. Position the two remaining inner tracks on the bearing, then align the arrow marks on the inner tracks and confirm the bearing has been assembled correctly. With the inner tracks held in position, rotate the outer track and check for free rotation. Apply temporary protection if required (Ref.72-09-00 Inspection/Check para.4).
- (4) Assemble the HP compressor thrust bearing (2-210).
- (a) Ensure that the tool handle is open and the clamp plates released. Place the bearing outer track on the assembly tool so that the arrow on the outer track can be seen, then position and secure the tool clamps to hold the track.
  - (b) Position the cage within the outer track, so that the arrow is in correct relationship with the arrow on the track. Position a ball in the cage under the tool handle, then pull the handle forward and press the ball into the cage. Rotate

SUB-ASSEMBLY

**72-32-00**

Page 517

Dec 31/99



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

the ball and cage approx. 120 deg and assemble another ball, then rotate the cage a further 120 deg and assemble a third ball to locate the cage. Assemble the remainder of the balls to the cage.

- (c) Ensure that each ball and the cage rotate freely, then release and remove the bearing from the assembly tool. Assemble the two inner tracks to the balls ensuring that the arrow marks on the inner tracks are in correct relationship with the arrow on the outer track. With the inner tracks held in position, rotate the outer track and check for free rotation. Apply temporary protection to the bearing if required (Ref. 72-09-00 Inspection/Check para.4).
- (d) Release and remove the assembly tool from the bench vice or adapter plate, and, if used, the adapter plate from the Hydraclamp.

S. Determine Thickness of LP Thrust Washer (Ref.Fig.505).

**NOTE:** The machining operation is only required if the desired clearance of between 0.001 and 0.003 in. (0,025 and 0,076 mm) cannot be obtained (Ref.SB.72-28 and SB.72-17).

- (1) Measure from the bearing housing (1-270) retaining ring abutment face of the thrust washer location face and record as dimension A. Measure the thickness of the LP bearing (1-190) and record as dimension B. The required thrust washer (1-300) thickness =  $A - B - 0.001/0.003$  in. (0,025/0,076 mm). If the thrust washer requires machining locate the thrust washer face D to the machine face plate and set true to diameter X. Grind material from face C to achieve the calculated dimension, then blend machining into existing radius and remove sharp edges. Inspect surface finish (Ref.72-09-00 Inspection/Check).
- (2) Heat treat the washer for 1 hour at 150 deg C, cool in air then check for cracks (Ref.72-32-00 Inspection/Check). Measure the thickness of the thrust washer then log the dimension on the engine record sheets.

SUB-ASSEMBLY

**72-32-00**

Page 518

Dec 31/99

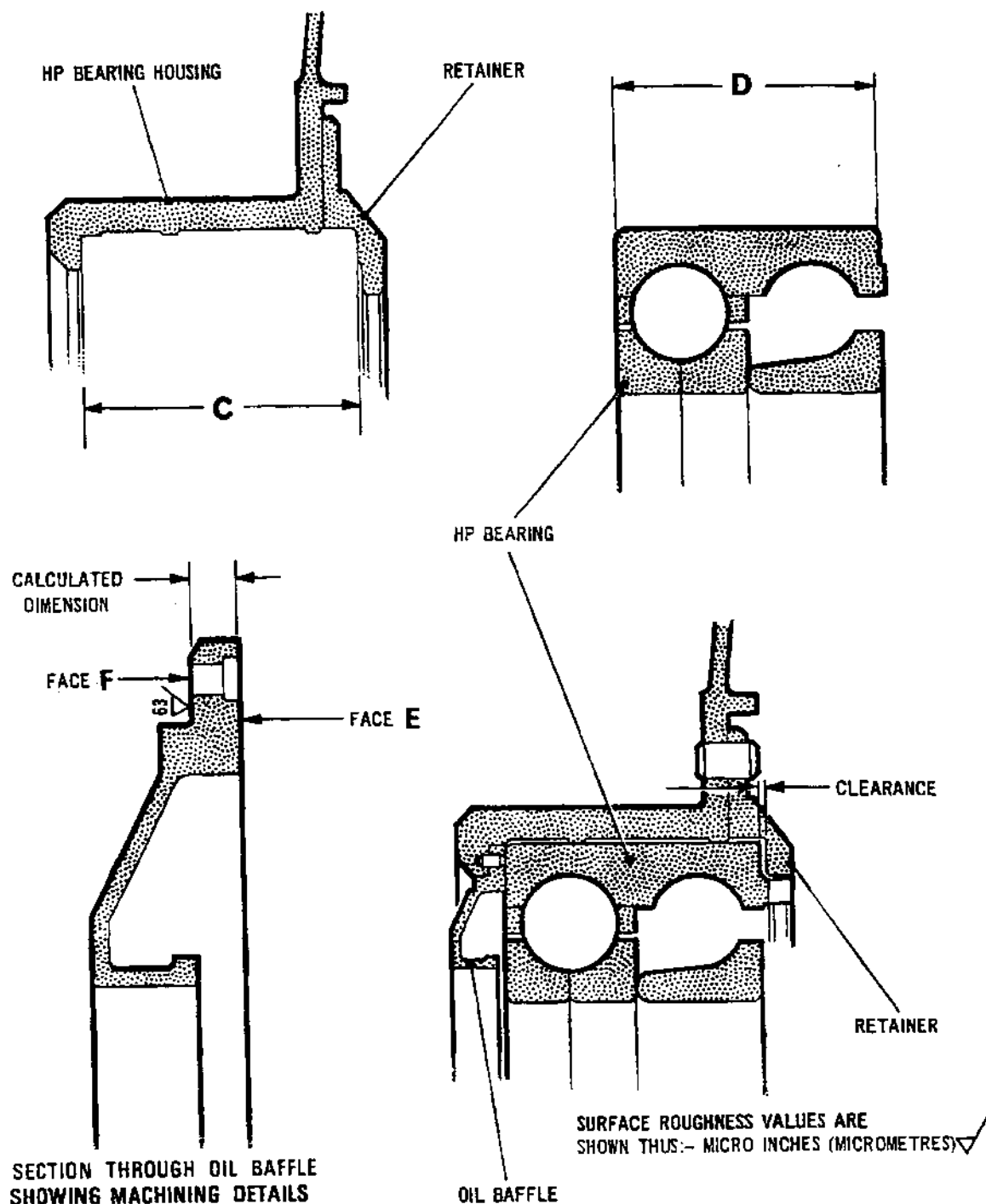


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Calculating the HP Bearing Oil Baffle Thickness  
Figure 506

Printed in England



OLYMPUS 593

MK.610-14-28  
OVERHAUL



THIS PAGE LEFT BLANK INTENTIONALLY

**OLYMPUS 593**

MK.610-14-28

sneema

OVERHAUL

Printed in England

- (3) Using a suitable freezing agent and wearing protective gloves shrink the thrust washer (1-300), noting the offset pin, into the bearing housing (1-270), then assemble the bearing (1-190) and retaining ring (1-170). Secure the ring with bolts (1-160) then check that a clearance between 0.001 and 0.003 in. (0,025 and 0,076 mm) exists between the bearing and retaining ring. Release and remove the bearing retaining ring, then withdraw the bearing and place it in its protective container.

T. Determine Thickness of HP Oil Baffle (Ref.Fig.506).

NOTE: The machining operation is only required if the desired clearance of between 0.001 and 0.003 in. (0,025 and 0,076 mm) cannot be obtained (Ref. SB.72-17).

- (1) Temporarily assemble the bearing retaining ring (2-110) to the housing (2-80) and secure with slave bolts, washers and nuts. Measure from the bearing retaining ring abutment face to the oil baffle location face and record as dimension C. Measure the thickness of the HP bearing (2-210) and record as dimension D. The required oil baffle thickness =  $C - D - 0.001/0.003$  in. (0,025/0,076 mm).
- (2) If the oil baffle requires machining, locate the baffle face E to the machine face plate. Grind material from F to achieve the calculated dimension, then blend machining into existing radius and remove sharp edges. Inspect surface finish (Ref.72-09-00 Inspection check).
- (3) Ultrasonic clean the oil baffle (Ref.72-09-00 Cleaning).
- (4) Release and remove the retaining ring (2-110) then observing the offset pin assemble the oil baffle to the bearing housing. Assemble the bearing (2-210) and retain with the retaining ring (2-110), bolts, nuts and slave washers.
- (5) Check that a clearance between 0.001 and 0.003 in. (0,025 and 0,076 mm) exists between the bearing retainer and the bearing outer race. Release and remove the bearing retainer, then withdraw bearing from the housing and place in a protective container.

SUB-ASSEMBLY

**72-32-00**

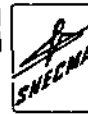
Page 519

Jun 1/99

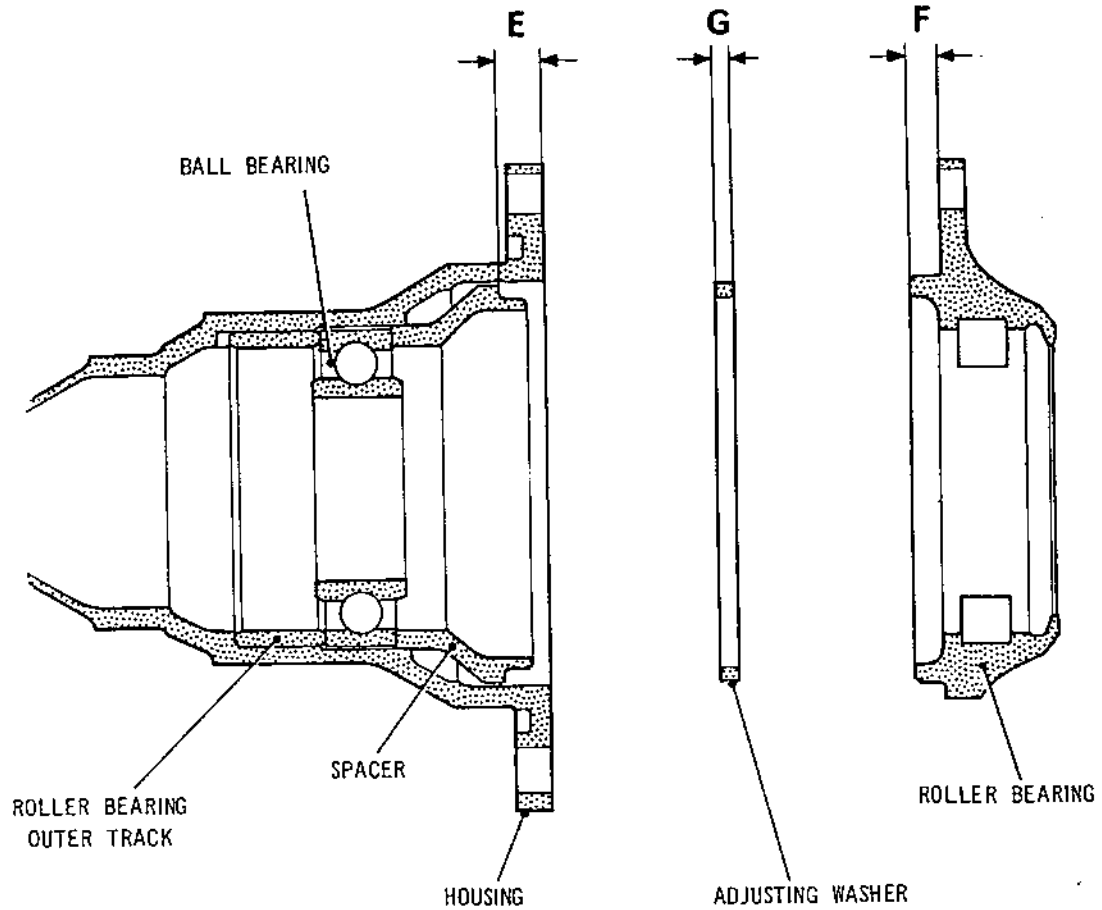


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33408/00A



Determining Adjusting Washer Thickness of Right-hand  
Accessory Drive Housing  
Figure 507

SUB-ASSEMBLY  
**72-32-00**  
Page 520  
Jul 1/76





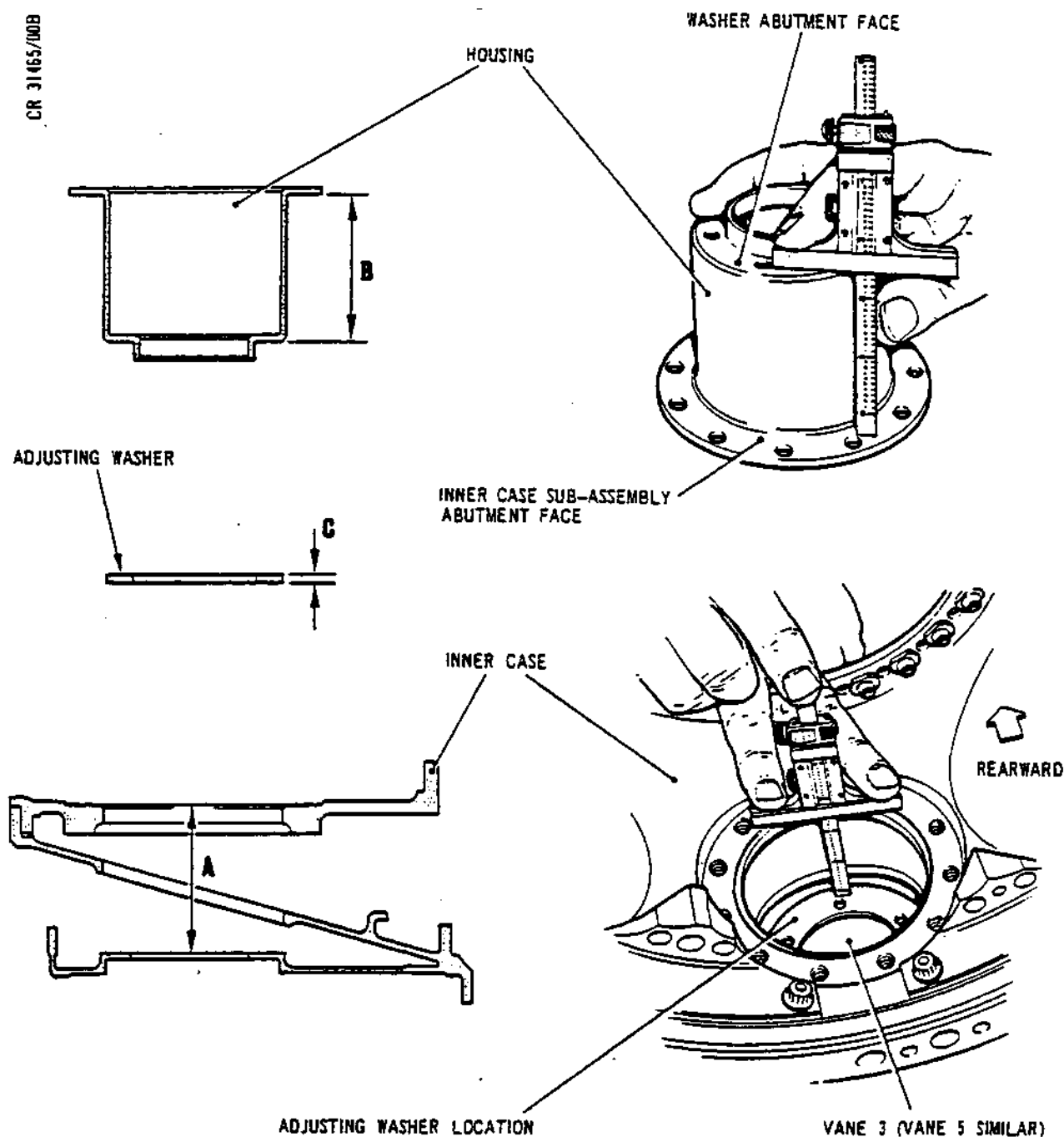
OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

CR 31465/00B



Calculating the Accessory Drive Housing Inner Case  
Adjusting Washer Thickness  
Figure 508



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

U. Determine Adjusting Washer Thickness of Right-hand Accessory Drive Inner End to Produce Axial Clearance (Ref.Fig.507).

- (1) Using Tool 254 and 1495 assemble the following items to the right-hand accessory drive housing (72-61-00/1-570).
  - (a) Roller bearing outer track (72-61-00/1-560).
  - (b) Ball bearing (72-61-00/1-380).
  - (c) Spacer (72-61-00/1-400).
- (2) Measure from the drive housing flange face to the washer abutment location and record as dimension E.
- (3) Measure from the roller bearing abutment flange to the washer abutment face and record as dimension F. The required adjusting washer thickness (72-61-00/1-410) (72-09-21 Repair, Fig.423) =  $E - F - 0.001 / 0.003$  in. (0,025/0,076 mm).

V. Determine Adjusting Washer Thickness for Right-hand Housing (Ref.Fig.508).

- (1) Measure from the washer location face on the inner case sub-assembly (5-330) to the housing abutment flange on the inner case outer sub-assembly (5-420) and record as dimension A.
- (2) Measure from the washer abutment face on the housing (5-100) to the inner case sub-assembly (5-330) abutment face on the housing (5-100) and record as dimension B.
- (3) Calculate adjusting washer thickness and select washer.
  - (a) Subtract dimension B from dimension A and record as dimension C.
  - (b) From the range available, select an adjusting washer (5-110) (72-09-21 Repair, Fig.408) within the tolerance of the following equation:

Adjusting washer thickness =

Dimension C plus 0.000 in. (0,00 mm)  
minus 0.002 in. (0,05 mm).

SUB-ASSEMBLY

72-32-00

Page 522

Jun 1/99



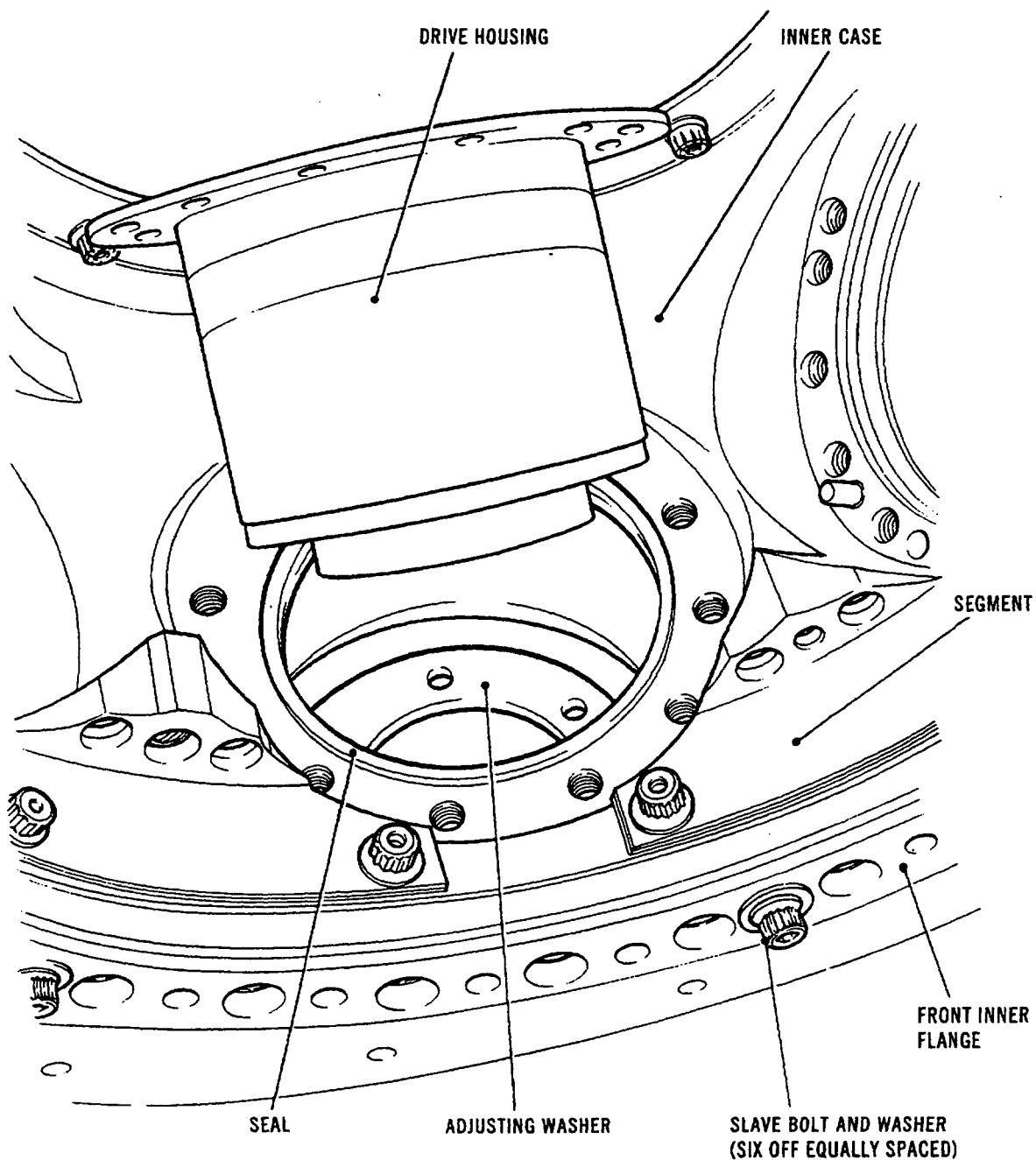
OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

Printed in England

CR 31462/00C



Assembling Housing to Inner Case  
Figure 509

SUB-ASSEMBLY  
**72-32-00**  
Page 523  
Dec 1/95



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

**NOTE:** The adjusting washers are increased through the range by increments of 0.0015 in. (0,038 mm) from a minimum size of 0.067 in. (1,701 mm) to a maximum size of 0.088 in. (2,235 mm).

- (4) Mark the housing and adjusting washer "right hand".
- (5) Install housing S.B.0L.593-72-9053-426 Standard. Ensure that the seal location is clean, then carefully manipulate the housing (5-100) with its correct adjusting washer (5-110) and seal (5-105) in position, through the bore of the case, at the same time aligning the locating pin on the inner flange. Press the housing into position (Ref.Fig.509).
- (6) Apply lubricant 'A' to six D-headed bolts (5-90), then assemble them to the inner case with the bolt-heads outboard. Ensure that the bolts are correctly assembled, then assemble nuts (5-80) to the bolts and torque-tighten the bolts to 135 lbf in. (15,2 N.m), ensure that the locking (run-down) torque is a minimum of 3.5 lbf in. (0,4 N.m). After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 2.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref.SB.72-8334-205).

W. Determine Adjusting Washer Thickness for Left-hand Housing (Ref.Fig.508).

- (1) Measure from the washer location face on the inner case sub-assembly (5-330) to the housing abutment flange on the inner case outer sub-assembly (5-420) and record as dimension A.



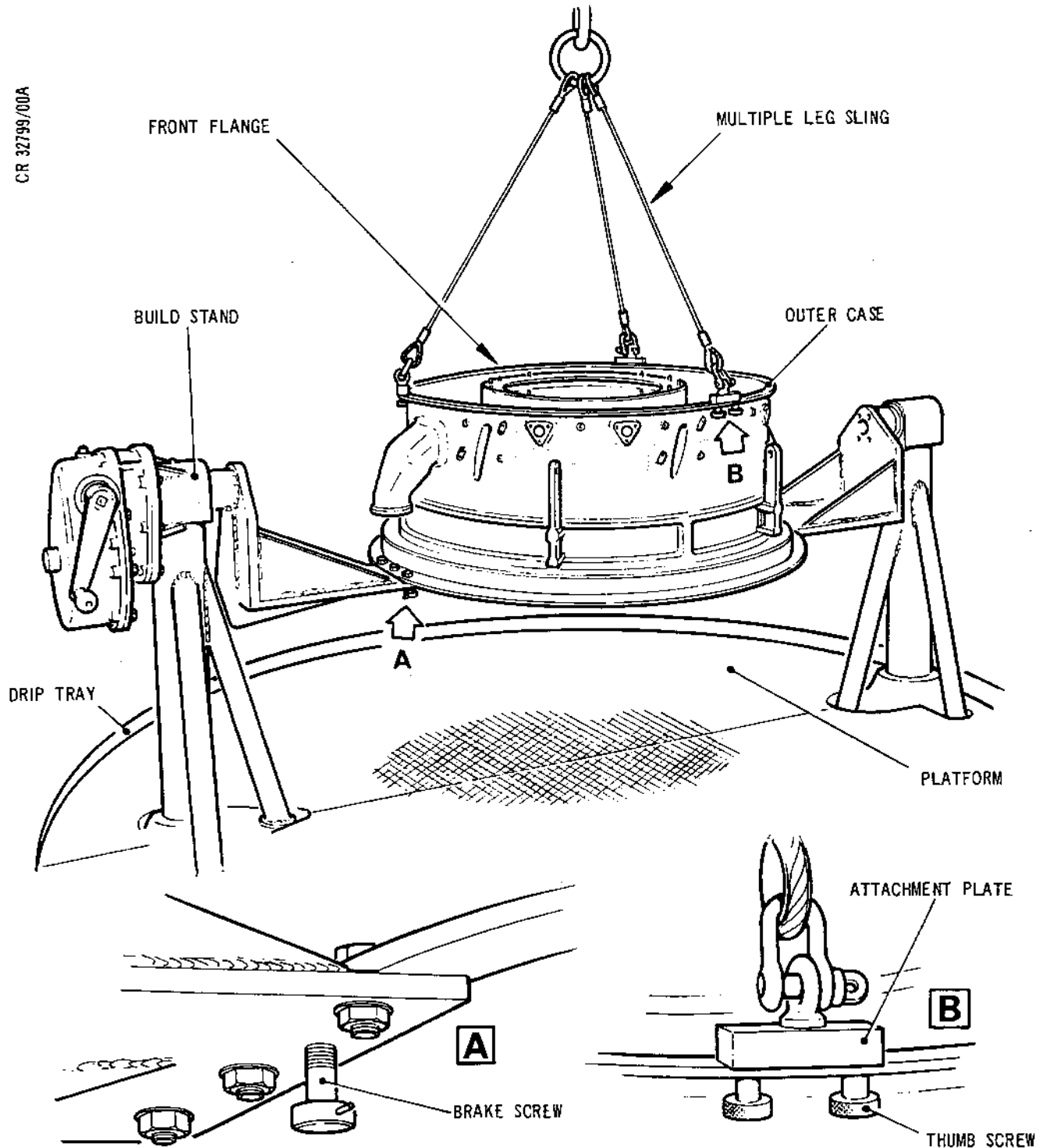
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32799/00A

PRINTED IN ENGLAND



Assembling Outer Case to Build Stand  
Figure 510

SUB-ASSEMBLY  
**72-32-00**  
Page 525  
Jul 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (2) Measure from the washer abutment face on the housing (5-100) to the inner case sub-assembly (5-330) abutment face on the housing (5-100) and record as dimension B.
  - (3) Calculate adjusting washer thickness and select washer.
    - (a) Subtract dimension B from dimension A and record as dimension C.
    - (b) From the range available, select an adjusting washer (5-110) (72-09-21 Repair, Fig.408) within the tolerance of the following equation:  
  
Adjusting washer thickness =  
  
Dimension C plus 0.000 in. (0,00 mm)  
minus 0.002 in. (0,05 mm).
- NOTE: The adjusting washers are increased through the range by increments of 0.0015 in. (0,038 mm) from a minimum size of 0.067 in. (1,701 mm) to a maximum size of 0.088 in. (2,235 mm).
- (4) Mark the housing and adjusting washer "left-hand".
  - (5) Install housing.
    - (a) Install 'C' seal SB.0L.593-72-9053-426 Standard. Ensure that the seal location is clean, then carefully manipulate the housing (5-100) with its correct adjusting washer (5-110) and 'C' seal (5-105) in position, through the bore of the case, at the same time aligning the locating pin on the inner flange.
    - (b) Press the housing into position (Ref.Fig.509).

SUB-ASSEMBLY

72-32-00

Page 526

Dec 31/99



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (6) Apply lubricant 'A' to six D-headed bolts (5-90), then assemble them to the inner case with the bolt-heads outboard. Ensure that the bolts are correctly assembled, then assemble nuts (5-80) to the bolts and torque-tighten the bolts to 135 lbf in. (15,2 N.m), ensure that the locking (run-down) torque is a minimum of 3.5 lbf in. (0,4 N.m). After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 2.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref.SB.72-8334-205).
- (7) Remove the six slave bolts and washers from the front inner flange securing the two inner assemblies (5-330 and 5-420).

X. Assemble Outer Case to Build Stand (Ref.Fig.510).

- (1) Assemble the slave mounting ring (Tool 1264) over the studs to the build stand (Tool 1263) then secure with eight-off barrel nuts. Ensure the cutaways in the slave ring align the corresponding cutaways in the build stand adapter plate. Place the two halves of the platform (Tool 1929) around the stand pedestals, then place the tray (Tool 1930) on the platform.
- (2) Turn the slave ring until the TOP position is 90 deg to the build stand pillar.
- (3) Lock the slave ring with the two locking screws positioned through the rear of the adapter plate flange.

NOTE: The front of the case can be readily identified by the larger leading edge section of the vanes.

- (4) Attach the multiple leg sling (Tool 1089) to three equally spaced positions on the front flange of the outer case and secure with six thumbscrews, then attach a hoist to the sling.
- (5) Raise the intermediate case above the build stand, then turn the case until its TOP position marked on the flange periphery, aligns with the TOP position marked on the slave ring. Lower the case



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

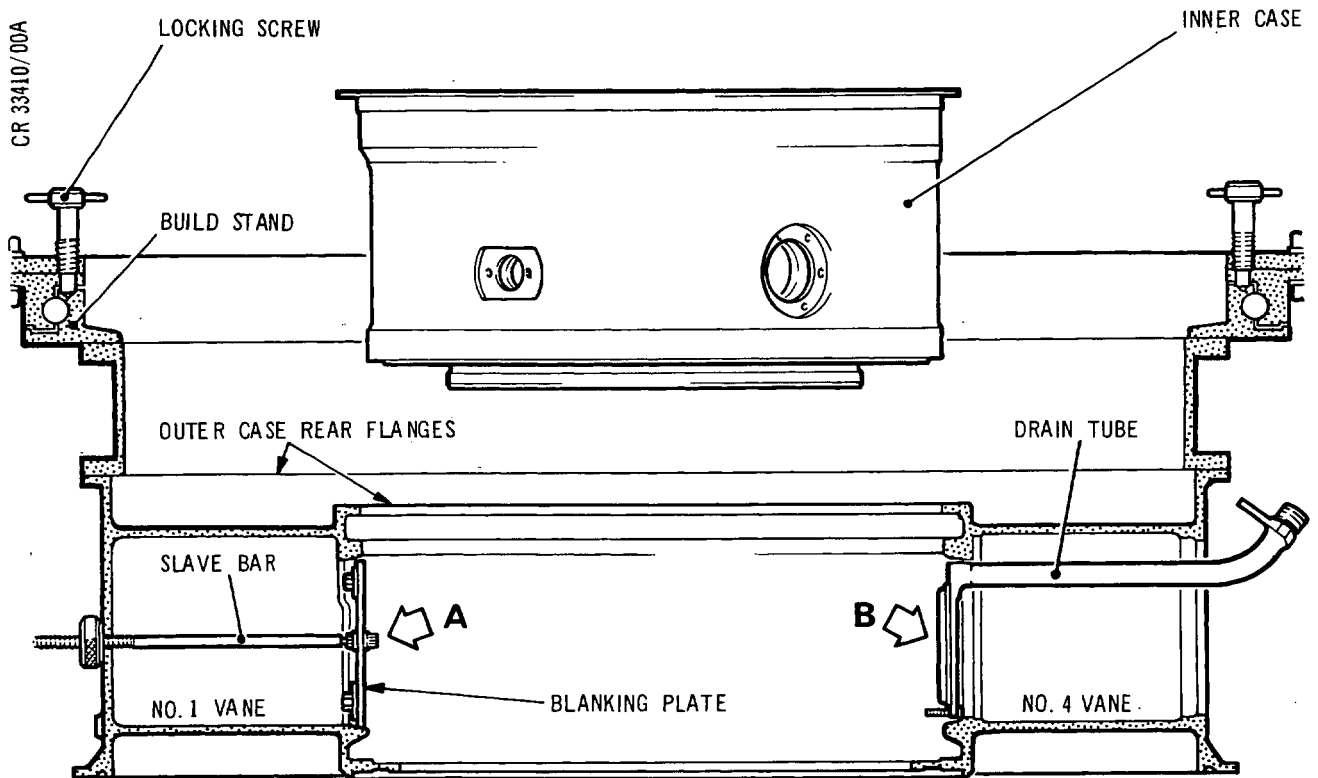
This Page Left Blank Intentionally



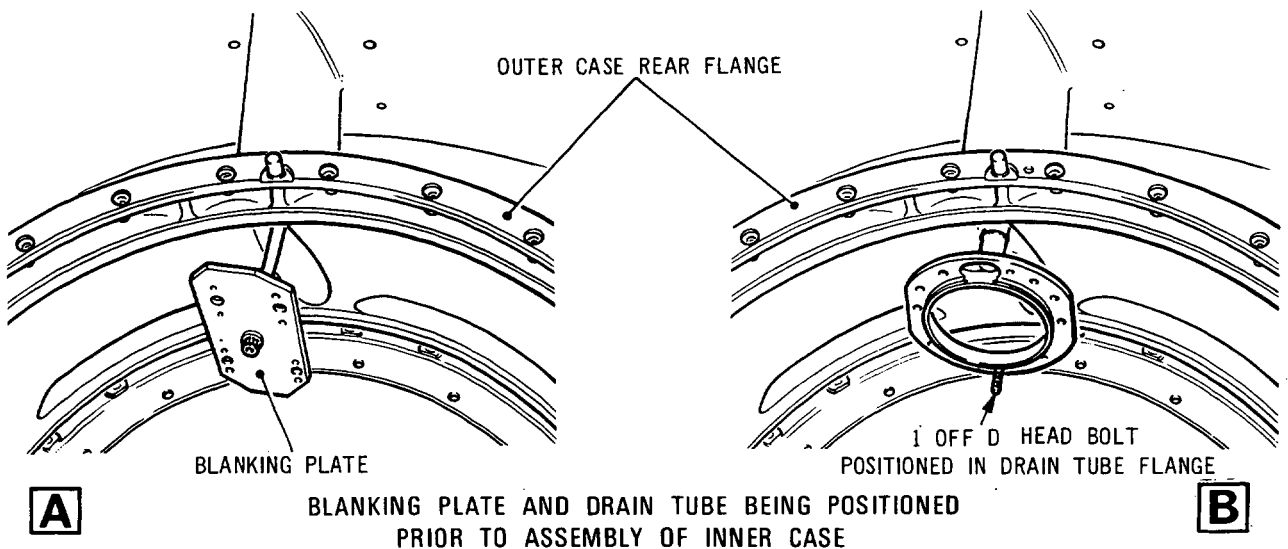


OLYMPUS 593

MK.610-14-28  
OVERHAUL



SECTION THROUGH NO. 1 AND NO. 4 VANES SHOWING  
OUTER CASE READY TO RECEIVE INNER CASE ASSEMBLY



Assembling Drain Tube and Blanking Plate  
Figure 511

SUB-ASSEMBLY  
**72-32-00**  
Page 527  
Jul 1/76



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

onto the slave ring and secure with slave washers and nuts. Release and remove the hoist and sling.

NOTE: Should the case not have a position marked TOP, take the No.1 vane position which is marked on the flange periphery as TOP.

### 3. Assemble Inner Case to Outer Case (Ref.Fig.511 and 512)

NOTE: Assistance will be required for this operation. The drain tube and plate retainer at the No.4 vane inner location and the inner blanking plate at the No.1 vane location will require placing into position from within the outer case, and supported while the inner case is assembled to the outer case.

#### A. Assemble Drain Tube and Blank.

- (1) Release the build stand lock, then turn the build stand until the rear face of the outer case is uppermost.
- (2) Insert a bolt (5-240) through the blanking plate (5-220) so that the bolt threads protrude the same side of the plate as the four assembled anchor plates.
- (3) Apply lubricant 'A' to the threads of the bolt, then secure the bolt to the plate with a nut (5-230).
- (4) Torque-tighten the bolt to 135 lbf in. (15,2 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).
- (5) Assemble a slave bar (Tool 1805) to the central bolt (5-240) attached to the blanking plate (5-220). Insert the slave bar from within the outer case into No.1 vane. Temporarily support the blanking plate against the inner wall of the case by holding the bar outside of the case then retain the plate with the slave thumbnut.
- (6) Apply a light smear of jointing compound 'C' or 'D' to the seal spigot of the drain tube (4-260), then assemble it from within the case through No.4 vane of the outer case, so that the orifice at the curved end of the tube faces to the rear of the case. Temporarily support the tube in this position.
- (7) Ensure that the slave bolts and nuts securing the housing (5-380) are removed from the outer sub-assembly (5-420). The bolts occupy the positions of the drain tube retaining bolts assembled later.

SUB-ASSEMBLY

## 72-32-00

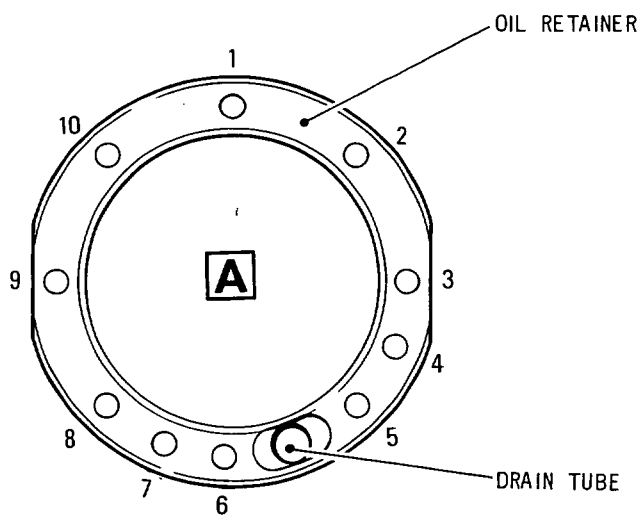
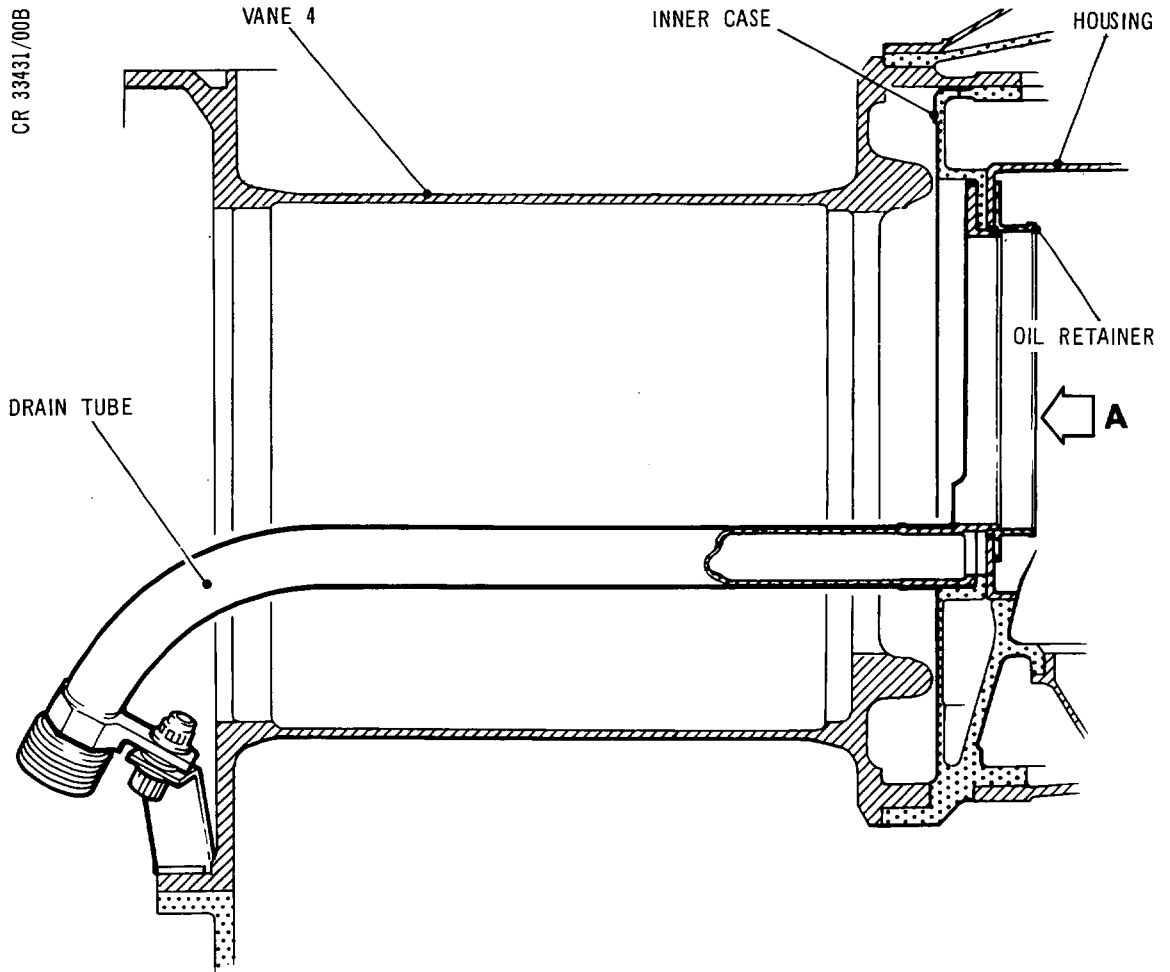
Page 528

Dec 31/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



BOLT POSITION NUMBER	I.P.C. REF. ITEM
1	4-300
2	4-280
3	4-280
4	4-280
5	4-290
6	4-290
7	4-280
8	4-280
9	4-280
10	4-280

NUT  
4-270

Drain Tube Details  
Figure 512

SUB-ASSEMBLY  
**72-32-00**

Page 529  
Oct 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

B. Assemble Inner Case.

- (1) Screw three pullers (Tool 1668) at equidistant positions in to the extraction positions in the rear flange of the inner case (5-420) so that the threads protrude about 1.0 in. (25,40 mm) through the flange.
- (2) Identify the locating peg on the rear inner flange of the outer case (between No.2 vane and No.3 vane) then lift the inner case onto the outer case aligning the locating peg with the corresponding small hole in the inner case rear flange. The three pullers should now be resting in the extraction recesses.

C. Secure Drain Tube and Blanking Plate.

- (1) Assemble the drain tube retainer (4-255) to the housing (5-380) in the inner case at No.4 vane. Ensure that the cut-away in the retainer aligns the drain hole in the housing.
- (2) Apply lubricant 'A' to the threads of a bolt (4-300) then assemble the bolt to the TOP of the retainer opposite the drain hole, the head of the bolt facing outboard. Secure the bolt with a nut (4-270), but do not tighten at this stage.
- (3) Unscrew and remove the three pullers from the inner case, then locate the inner case on the location dowels and tap the case onto its abutment flange with a suitable mallet. Secure the inner case outer assembly (5-420) rear flange to the rear inner flange of the outer case (6-100) with slave bolts and washers.
- (4) Apply lubricant 'A' to the threads of seven bolts (4-280) and two bolts (4-290), then assemble the bolts to the retainer with the boltheads facing inboard. Screw self-locking nuts (4-270) onto the bolts leaving them finger-tight.
- (5) Locate the setting tool (Tool 1806) on the rear flange of the intermediate case at the drain tube (4-260) position and secure. Align the drain tube with the setting tool.
- (6) Using the holding tool (Tool 1947) tighten two, diametrically opposite, drain tube retaining bolts, then check the alignment of the drain tube with the setting tool.

SUB-ASSEMBLY

72-32-00

Page 530

Dec 31/01



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (7) Tighten the remaining bolts, then recheck the alignment of the drain tube and setting tool. If the alignment is satisfactory, then torque-tighten the ten bolts 135 lbf in. (15,2 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m). Remove the alignment tool.

#### D. Secure Inner Case to Outer Case.

- (1) Secure the blanking plate (5-220) with two bolts (5-250) lubricated with lubricant 'A' and two tubes (5-270) and two bolts (5-260) lubricated with lubricant 'A'.
- (2) Torque-tighten the bolts to 135 lbf in. (15,2 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).
- (3) Assemble the fire cover (6-25) to the outer location of No.1 vane, with the long section of the bracket extended towards the outer case rear flange.
- (4) Apply lubricant 'A' to four bolts (6-23) then secure the bracket. Torque-tighten the bolts to 135 lbf in. (15,2 N.m). Wire-lock each of the bolts to the bracket.
- (5) Using the build stands cranked handle, turn the stand until the front face of the case is uppermost, then secure the inner case to the outer case at the front location with bolts (5-300) lubricated with lubricant 'A' (boltheads to face the front), and nuts (5-290). Using wrench (Tool 1576) torque-tighten the bolts to 135 lbf in. (15,2 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).

#### E. Assemble Tube Unit to No.6 Vane.

- (1) Ensure that the flange and splines of the tube unit (4-440) are clean and free from damage, apply lubricant 'H' (dry film lubricant) to the mating face of the tube, then assemble the tube to its location in No.6 vane.

SUB-ASSEMBLY

## 72-32-00

Page 531

Dec 31/01



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (2) Apply lubricant 'A' to two special bolts (4-450), then assemble the bolts (finger-tight) to the inner case and flange.
- (3) Assemble a locating plate (4-410) and fire cover (4-420) to the outer case location of No.6 vane, carefully engaging the splines, and the two locating pins (4-430). Lubricate four bolts (4-400) with lubricant 'B' and secure the locating plate to the outer case.
- (4) Using wrench (Tool 1521), torque-tighten the two bolts (4-450) at the inner case location to 135 lbf in. (15,2 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).
- (5) Torque-tighten the four bolts (4-400) at the outer case location between 85 and 95 lbf in. (9,6 and 10,7 N.m), then wire-lock the four bolts.

#### 4. Determine Thickness of LP and HP Oil Thrower Adjusting Washers

NOTE: For dimensional checks on engines to pre-SB.72-21 and pre-SB.72-29, refer to para. C, D, E and F, then continue with para.5 onwards as for normal build.

##### A. Determine Thickness of the LP Bearing Oil Thrower Adjusting Washer (SB.72-21 standard) (Ref.Fig.513).

- (1) If the LP thrust washer (1-300) has not been assembled, refer to para.2.S.(1) and (2) for the procedure to calculate its correct thickness. Identify the offset pin position of the thrust washer location in the LP bearing housing (1-270) and the corresponding offset position of the LP thrust washer. Mark both items with an approved marker.



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (2) Using an approved freezing agent and wearing protective gloves, assemble the correct thickness (Ref.para.2.S.(2), thrust washer (1-300) to the bearing housing (1-270).
- (3) Remove the slave LP bearing (Tool 1807) from its protective container (Tool 1808). Ensure that the bearing is clean, then apply a small quantity of lubricant 'A' to the outer diameter.
- (4) Ensure that the thrust washer is seating correctly, wipe the bearing housing clean, then apply a small quantity of lubricant 'A' to the wall of the bearing housing.
- (5) Assemble the slave bearing to the housing, temporarily support the bearing housing, then assemble the gauge (Tool 81) and clamp assembly (Tool 1809) to the slave bearing and housing locating the clamp assembly on the inner labyrinth seal (1-330).
- (6) Tighten the thumbnut on the clamp assembly to take up the end-float, but do not overtighten causing the possibility of seal deflection.
- (7) Using the stand handle, turn the intermediate case until the front flange is uppermost.
- (8) Identify the TOP position of the LP bearing housing, and the corresponding TOP position in the intermediate case, then assemble the bearing housing/gauge and clamp assembly to the intermediate case, locating them on the pins.
- (9) Using a suitable mallet, tap the bearing housing onto its abutment face, then retain with slave bolts and washers.

SUB-ASSEMBLY

72-32-00

Page 533

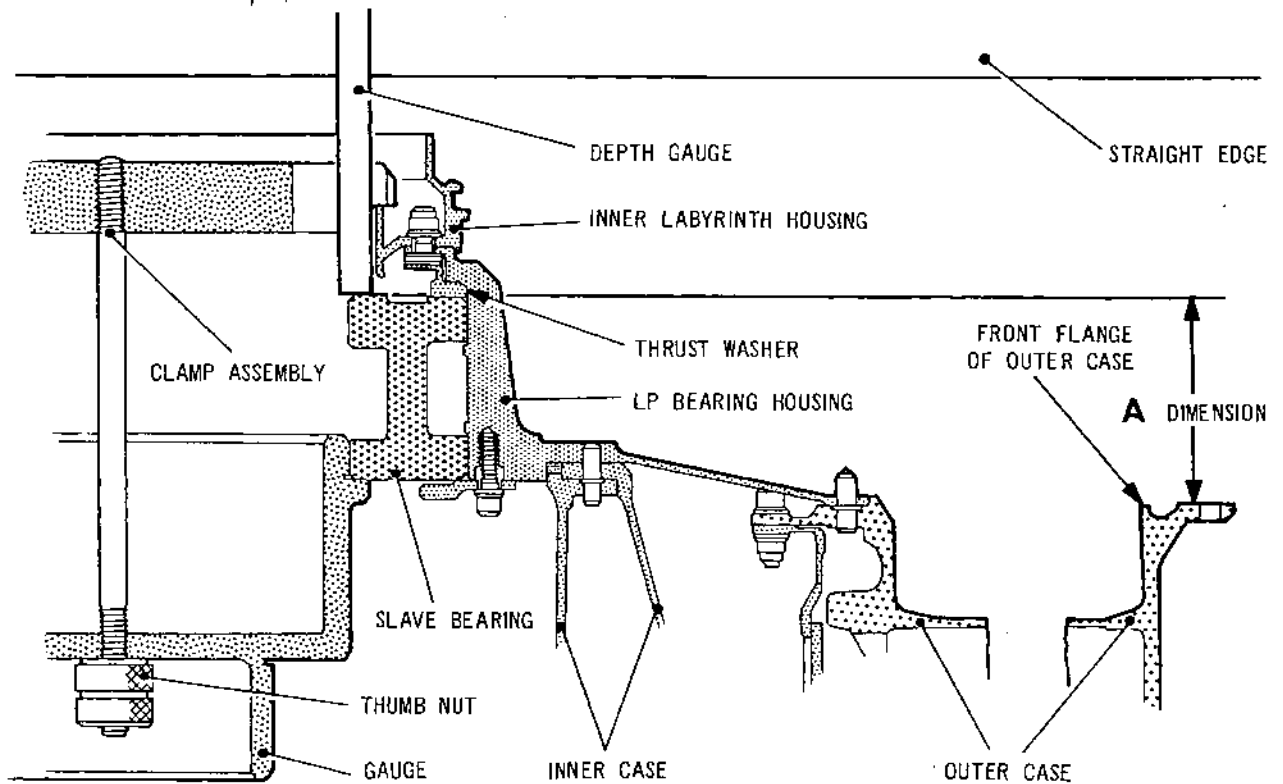
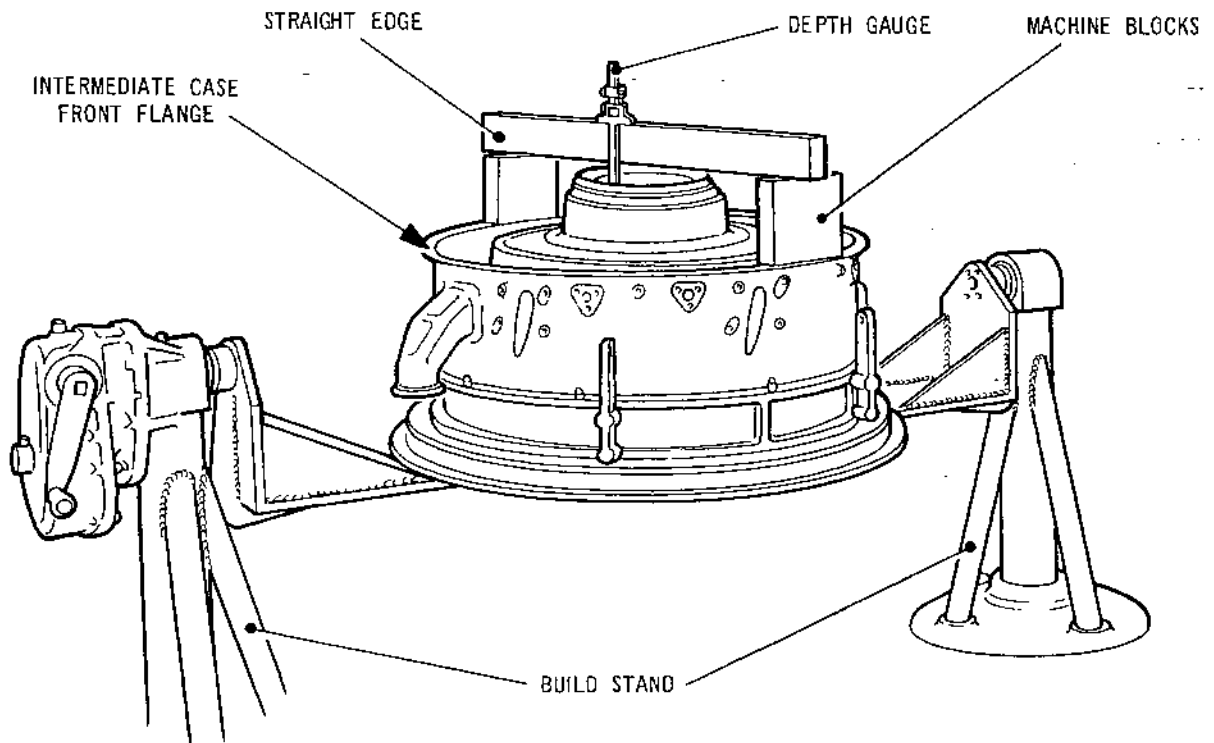
Jun 1/99



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 33411/00A



Measuring A Dimension (SB.72-21 Standard)  
Figure 513

SUB-ASSEMBLY  
**72-32-00**  
Page 534  
Jul 1/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (10) Clean the front face of the front flange of the intermediate case and lightly stone if necessary, then assemble two machine blocks to the flange positioning them diametrically opposite each other. Position a straight edge across the blocks.
- (11) Using a vernier depth gauge, measure from the front face of the outer flange of the intermediate case, to the front face of the slave LP bearing inner track. Obtain a measurement from the opposite side of the slave bearing, then reposition the two blocks and the straight edge to obtain two more readings at 90 deg to the first readings. Determine the mean dimension from the four results, then record this as Dimension A.
- (12) The required LP oil thrower (1-200) thickness = 2.835 in. (72,009 mm) - Dimension A  $\pm$  0.001 (0,0254 mm) machining tolerance.
- (13) Select the correct thickness oil thrower (1-200) (72-09-21 Repair, Fig.405) from the range, then record the thickness on the appropriate engine record sheet.
- (14) Remove the straight edge and machined blocks from the intermediate case, then remove the slave bolts and washers from the bearing housing.
- (15) Assemble a puller (Tool 1668) to each of the six shouldered pin positions at the outer location of the LP bearing housing.
- (16) Turn each puller in equal increments until the housing is free of its pins, then remove the housing, slave bearing gauge and clamp assembly and place on a worktop. Remove the gauge clamp assembly and slave bearing. Remove the pullers and place in a container. Place the items in their respective containers.
- (17) Position the LP bearing housing on the worktop with the inner labyrinth seal face down.

SUB-ASSEMBLY

72-32-00

Page 535

Jun 1/77

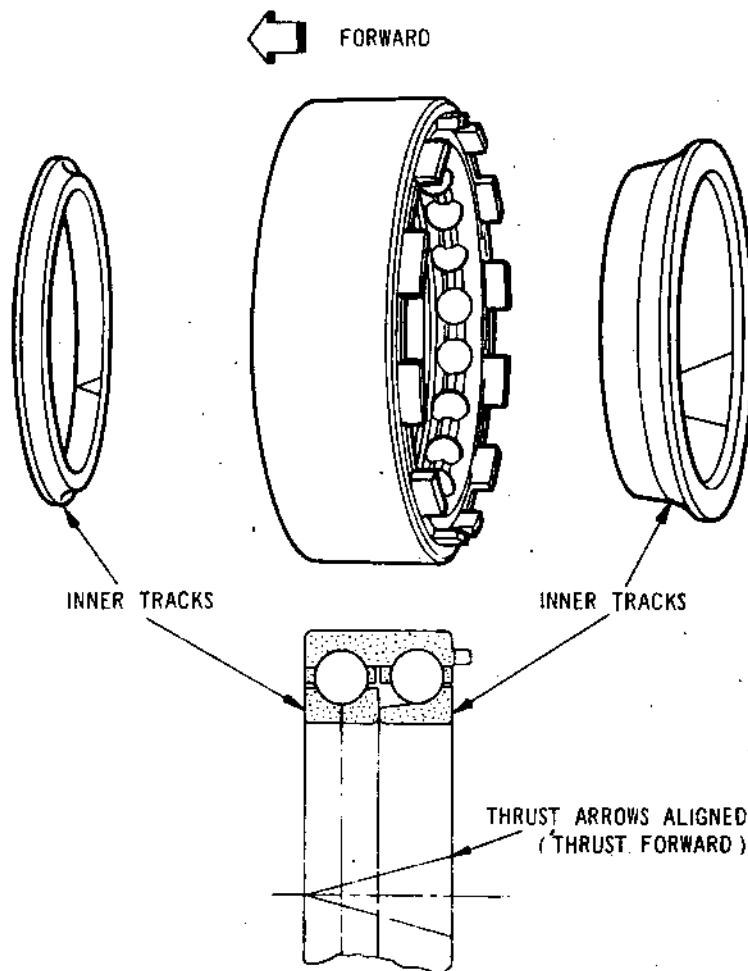


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31459/00A



TN32034

Preparing the LP Bearing  
Figure 514

SUB-ASSEMBLY  
**72-32-00**  
Page 536  
Jul 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (18) Rest the correct thickness oil thrower (1-200) on the labyrinth seal ensuring that the extended shroud section of the thrower is nearest the seal.
- (19) Remove the LP bearing (1-190) from its protective container, then place the bearing on a clean surface. Turn the inner tracks so that the thrust arrows correlate and point forward (Ref.Fig.514).

NOTE: The rear of the bearing can be identified by the castellated projections on its rear outer track.

- (20) Apply a small quantity of lubricant 'A' to the bearing outer track, then holding the bearing square, assemble the bearing with the arrows pointing downwards to the bearing housing (1-270).
- (21) Assemble the bearing retaining ring (1-170), correctly locating it on the pins, to the bearing housing. Temporarily retain the ring with 12 bolts.
- (22) Place the bearing housing assembly in a protective container, then pass the assembly to the LP compressor section (72-31-00) for LP probe gauge checks.

B. Determine Thickness of the HP Oil Thrower Adjusting Washer (SB.72-29 Standard) (Ref.Fig.515).

- (1) Using the stand handle, turn the build stand until the rear flange of the intermediate case is uppermost. Assemble the lifting fixture (Tool 1810) to No.1 and 4 vanes of the outer case, then connect the overhead hoist to the lifting fixture.
- (2) Position a pallet beneath the intermediate case, then carefully take the weight of the case with the hoist. Remove the slave bolts and washers securing the intermediate case to the build stand. Mark the stand and intermediate case for position for reassembly convenience.

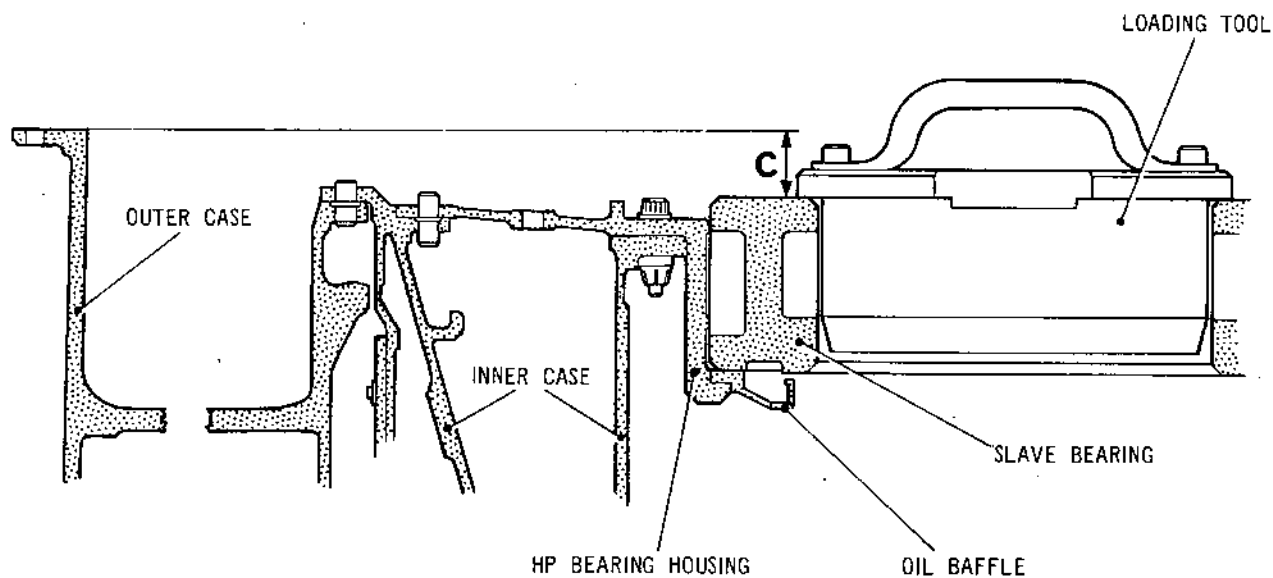
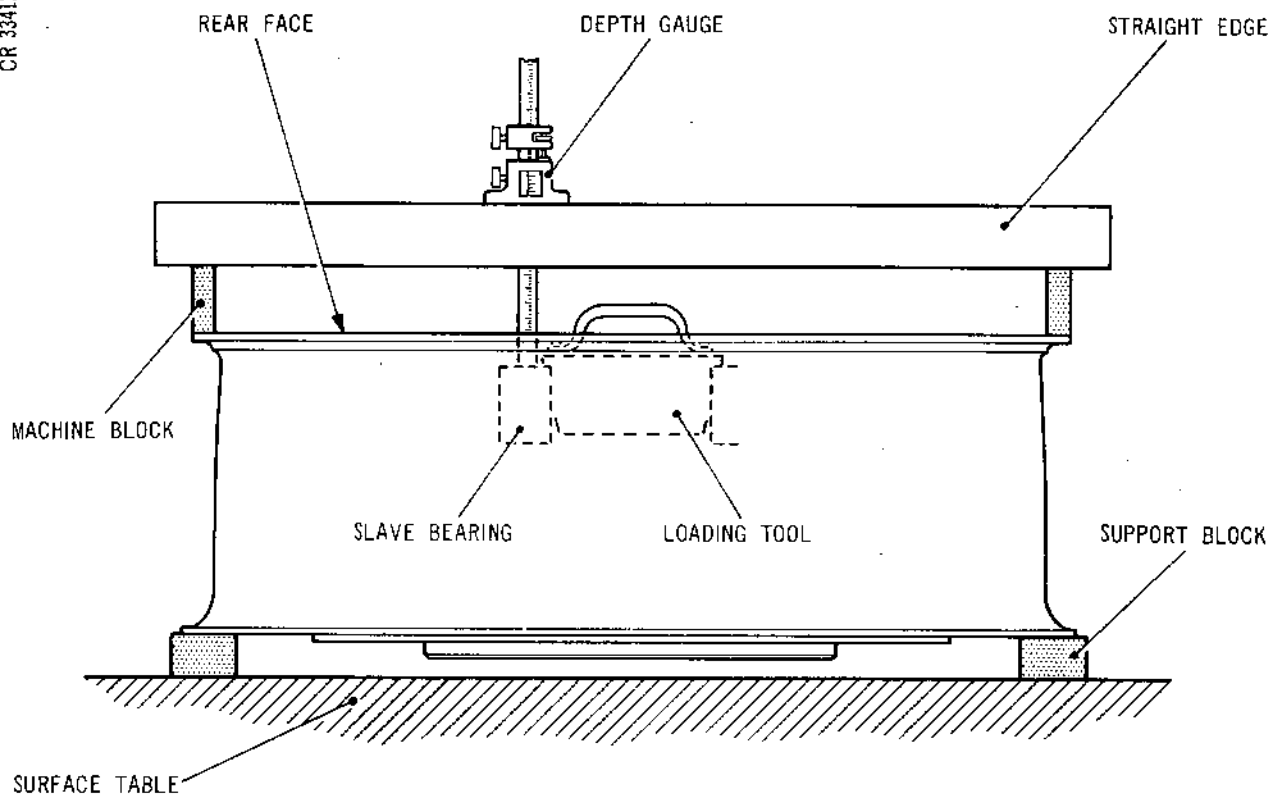


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33412/00A



TN32035

Measuring C Dimension (SB.72-29 Standard)  
Figure 515

SUB-ASSEMBLY  
**72-32-00**

Page 538  
Jul 1/76



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (3) Lower the intermediate case onto the pallet, then disconnect the hoist from the lifting fixture.
- (4) Withdraw the pallet and intermediate case from beneath the build stand, reassemble the hoist to the lifting fixture, then raise the intermediate case and locate it on a surface table with the rear face uppermost. Disconnect the hoist.
- (5) If the oil baffle (2-100) has not been assembled, refer to para.2.T.(1) and (2) for the procedure to calculate its correct thickness and (3) for cleaning prior to assembly.
- (6) Identify the offset pin position of the oil baffle location in the HP bearing housing (2-80), and the corresponding offset position of the HP oil baffle. Mark the offset positions of both items with an approved marker.
- (7) Using an approved freezing agent and wearing protective gloves, assemble the correct thickness oil baffle (2-100) to the HP bearing housing (2-80).
- (8) Identify the TOP position of the HP bearing housing and the corresponding TOP position in the intermediate case, then assemble the bearing housing to the intermediate case, locating it on the pins. Use a suitable mallet and tap the bearing housing onto its abutment face. Retain the bearing housing with slave bolts and washers.
- (9) Remove the slave bearing (Tool 1807) from its protective container (Tool 1808), ensure that the bearing is clean, then apply a small quantity of lubricant 'A' to its outer diameter.
- (10) Clean the bearing area of the HP bearing housing (2-80) with a cloth, then apply a small quantity of lubricant 'A' to the wall of the housing.

SUB-ASSEMBLY

72-32-00

Page 539

Jun 1/99



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (11) Assemble the slave bearing to the housing, then assemble the loading tool (Tool 1822) to the slave bearing.
- (12) Clean the rear outer flange of the intermediate case, lightly stone if necessary.
- (13) Position two machine blocks diametrically opposite each other on the rear outer flange, then position a straight edge across the blocks.
- (14) Using a vernier depth gauge, measure the distance from the rear face of the outer rear flange of the intermediate case to the rear face of the slave bearing inner track, record the dimension. Repeat the check on the opposite side of the slave bearing and record the dimension.
- (15) Reposition the blocks and straight edge 90 deg, then obtain two more readings and record the dimensions.
- (16) Determine the mean dimension from the four results, then record this figure and log it on the engine record sheets as Dimension C.
- (17) The required HP oil thrower (2-120) thickness =  $\text{Dimension C} - 0.812 \text{ (20,624 mm)} \pm 0.001 \text{ in. (0,0254 mm)}$  machining tolerance. Select the correct thickness oil thrower (2-120) (72-09-21 Repair, Fig.406) then record its actual thickness on the appropriate record sheet.
- (18) On completion of the dimensional check, remove the loading tool and slave bearing and place the items in protective containers.
- (19) Remove the slave bolts and washers retaining the HP bearing housing to the intermediate case, then assemble a puller (Tool 1668) to each of the locating pin positions at the outer location of the HP bearing housing.

SUB-ASSEMBLY

**72-32-00**

Page 540

Jun 1/77



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (20) Turn each puller in equal increments until the housing is free of its pins, then remove the housing from the intermediate case.
  - (21) Connect the overhead hoist to the lifting equipment already assembled to No.1 and 4 vanes, then remove the intermediate case from the worktop and lower onto the pallet. Disconnect the hoist, reposition the pallet and intermediate case beneath the build stand, then reconnect the hoist to the lifting equipment.
  - (22) Carefully raise the intermediate case making any necessary adjustment to locate the case in its original location marked previously.
  - (23) Secure the intermediate case to the build stand with the slave bolts and washers. Disconnect the hoist, then remove the lifting equipment.
- C. Determine B Dimension (Pre-SB.72-21 Standard) (Ref. Fig.516).
- (1) Obtain the engines exit guide cases (72-31-02/1-150) from the LP compressor section. Ensure that the cases are a matched pair.
- NOTE: The exit guide cases may be used for the dimensional check with or without their vanes assembled.
- (2) Using the build stands cranked handle turn the intermediate case front flange uppermost.
  - (3) If the thrust washer (1-300) has not been assembled to the bearing housing (1-270) refer to para.2.S.
  - (4) With the thrust washer correctly assembled to the bearing housing, apply a small quantity of lubricant 'A' to the wall of the bearing housing.

SUB-ASSEMBLY

72-32-00

Page 541

Jun 1/99



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (5) Remove the LP thrust bearing (1-190) from its protective container and place on a clean surface, rear face uppermost (Ref.Fig.514).
- (6) Apply a small quantity of lubricant 'A' to the outside diameter of the outer track.
- (7) Rest the oil thrower, pre-SB.72-21 standard, (1-200A) on the inner labyrinth housing (1-330) already assembled to the bearing housing. Ensure that the oil thrower is assembled with its extended outer diameter facing forward.
- (8) Place the front inner track (Ref.Fig.514) of the thrust bearing onto the oil thrower.
- (9) Keeping the bearing square above the housing, assemble the bearing to the housing.
- (10) Identify the TOP position of the bearing retainer (1-170), then locate it on the shouldered pins. Lightly tap the retainer into position and temporarily retain it with 12 bolts (1-160).
- (11) Remove the gauge (Tool 81) from the clamp (Tool 1199), then assemble the gauge to the rear bearing inner track. Raise the bearing and gauge assembly over the clamp, locating the clamp bolt through the gauge. Locate the clamp correctly on the bearing housing then secure. Tighten the gauge thumbnut to take up the bearing end-float, ensuring that the thrust is fully forward.
- (12) Observe the TOP position of the bearing housing and identify it with a suitable marker, then invert the bearing/gauge assembly so that the clamp is uppermost.

SUB-ASSEMBLY

**72-32-00**

Page 542

Jul 1/76





OLYMPUS 593

MK.610-14-28

OVERHAUL



- (13) Note the corresponding TOP position on the intermediate case, then assemble the bearing/gauge assembly to the intermediate case locating it correctly on the dowels. Tap the assembly onto the case flange then temporarily retain with bolts.
- (14) Ensure that the front and rear flanges of the exit guide cases (72-31-02/1-150) are clean and free from nicks and burrs, then assemble both half cases to the intermediate case front flange so that the rear flange of the cases abut the front flange of the intermediate case.
- NOTE: The e.g.v. rear flange can be quickly identified by the vane groove, which is nearest the rear flange.
- (15) Position the cases so that the dowel hole in the e.g.v. bottom half case aligns the corresponding dowel hole in the intermediate case flange (close to No.4 vane), then temporarily secure the e.g.v. case at their axial positions with bolts (72-31-02/1-20) and nuts (72-31-02/1-10) and to the intermediate front flange with slave nuts and bolts.
- (16) Assemble machine blocks diametrically opposite each other to the rear outer flange of the e.g.v. then rest the straight edge on the blocks.
- (17) With the bearing end-float loaded forward, measure from the front face of the e.g.v. case flange to the front face of the oil thrower, record the dimension. Repeat the check on the opposite side of the oil thrower.
- (18) Reposition the blocks and straight edge 90 deg, then obtain two more readings and record the dimensions. Remove the straight edge and blocks.

PRINTED IN ENGLAND

TN42742

SUB-ASSEMBLY

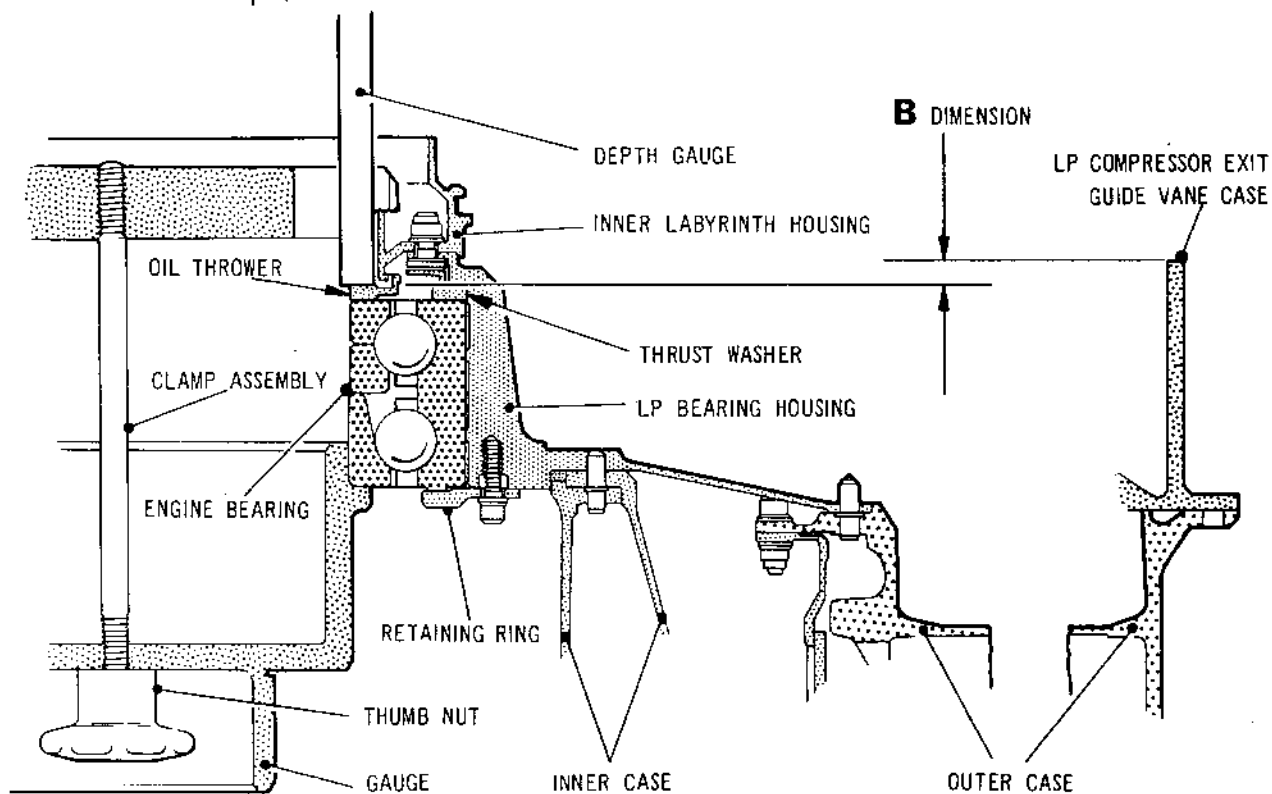
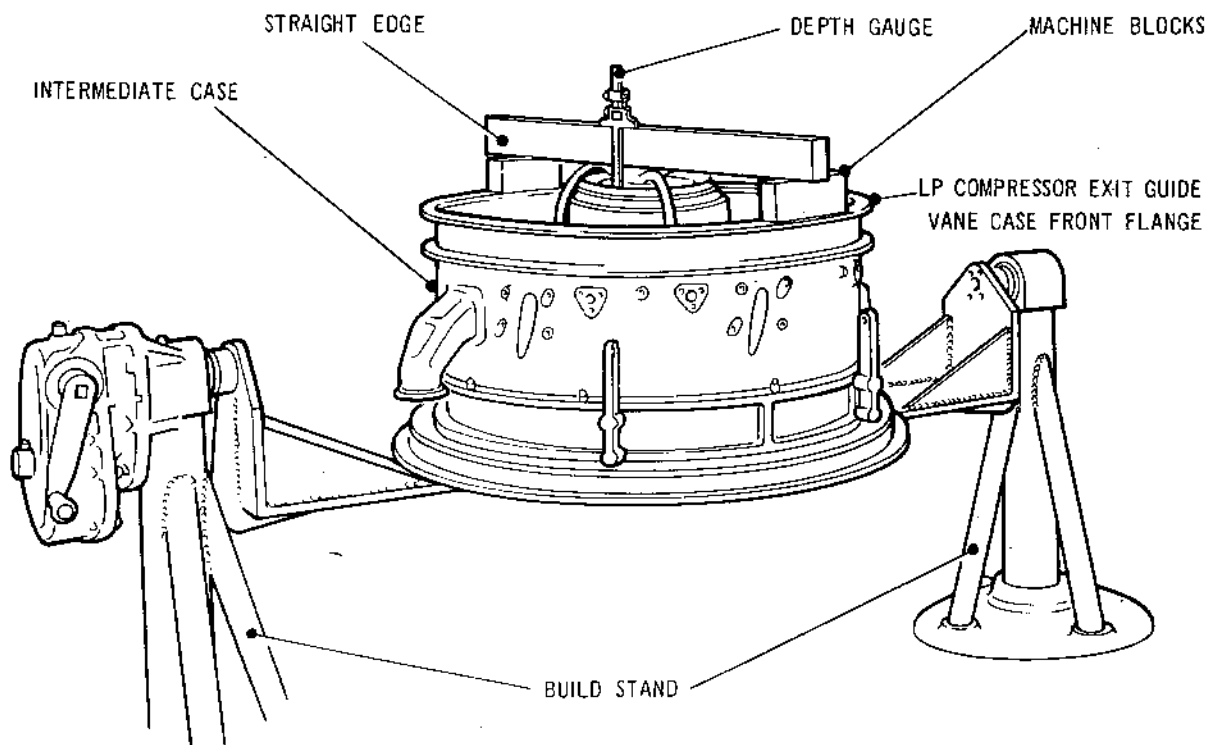
**72-32-00**

Page 543

Jul 1/76



**OLYMPUS 593**  
MK.610-14-28  
OVERHAUL



Measuring B Dimension (Pre-SB.72-21 Standard)  
Figure 516

SUB-ASSEMBLY  
**72-32-00**  
Page 544  
Jul 1/76

TN42741



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (19) Determine the mean dimension from the four results, then log the figure in the appropriate engine record sheets as dimension B.

NOTE: The LP compressor section (72-31-00 Sub-Assembly will require the dimension to assist them to calculate their engine adjusting washer.

D. Prepare the LP Bearing Assembly for Probe Gauge Checks.

- (1) Remove the bolts and nuts temporarily securing the e.g.v. cases, place the cases on a pallet and return them to 72-31-00 Sub-Assembly.
- (2) Disassemble the bolts temporarily securing the LP bearing housing assembly to the intermediate case.
- (3) Assemble a puller (Tool 1668) to each of the extraction positions (nearest the dowels) in the bearing housing. Turn each puller in small increments until the bearing housing is free of the dowels.
- (4) Carefully lift the bearing housing assembly from the intermediate case and place on the worktop.

CAUTION: SUPPORT THE BEARING REAR INNER TRACK WHEN DISASSEMBLING GAUGE.

- (5) Remove the pullers, then carefully disassemble the clamp and gauge from the bearing and housing.
- (6) Assemble the gauge and clamp together then place in a container.
- (7) Ensure that the bearing rear inner track is located in the bearing correctly, then assemble the bearing retainer (Tool 434) to the bearing and oil thrower, secure the retainer with the thumbnut.



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (8) Mark the engine No. on a label then tie the label to the bearing housing. Place the bearing assembly into a protective container then mark the outside of the container with the engine No.
  - (9) Pass the LP bearing assembly with any relevant paper work to 72-31-00 Assembly for LP probe dimensional checks.
- E. Determine C Dimension (Pre-SB.72-29 Standard) (Ref. Fig.517).
- NOTE: The C Dimension is required by the HP compressor section (72-33-00 Sub-Assembly).
- (1) Using the stand handle, turn the build stand until the rear flange of the intermediate case is uppermost. Assemble the lifting fixture (Tool 1810) to No.1 and 4 vanes of the outer case, then connect the overhead hoist to the lifting fixture.
  - (2) Position a pallet beneath the intermediate case, then carefully take the weight of the case with the hoist. Remove the slave bolts and washers securing the intermediate case to the build stand. Mark the stand and intermediate case for position for reassembly convenience.
  - (3) Lower the intermediate case onto the pallet, then disconnect the hoist from the lifting fixture.
  - (4) Withdraw the pallet and intermediate case from beneath the build stand, reassemble the hoist to the lifting fixture, then raise the intermediate case and locate it on a table with the rear face uppermost. Disconnect the hoist.
  - (5) If the oil baffle (2-100) has not been assembled, refer to para.2.T.(1) and (2) for the procedure to calculate its correct thickness and (3) for cleaning prior to assembly.

SUB-ASSEMBLY

**72-32-00**

Page 546

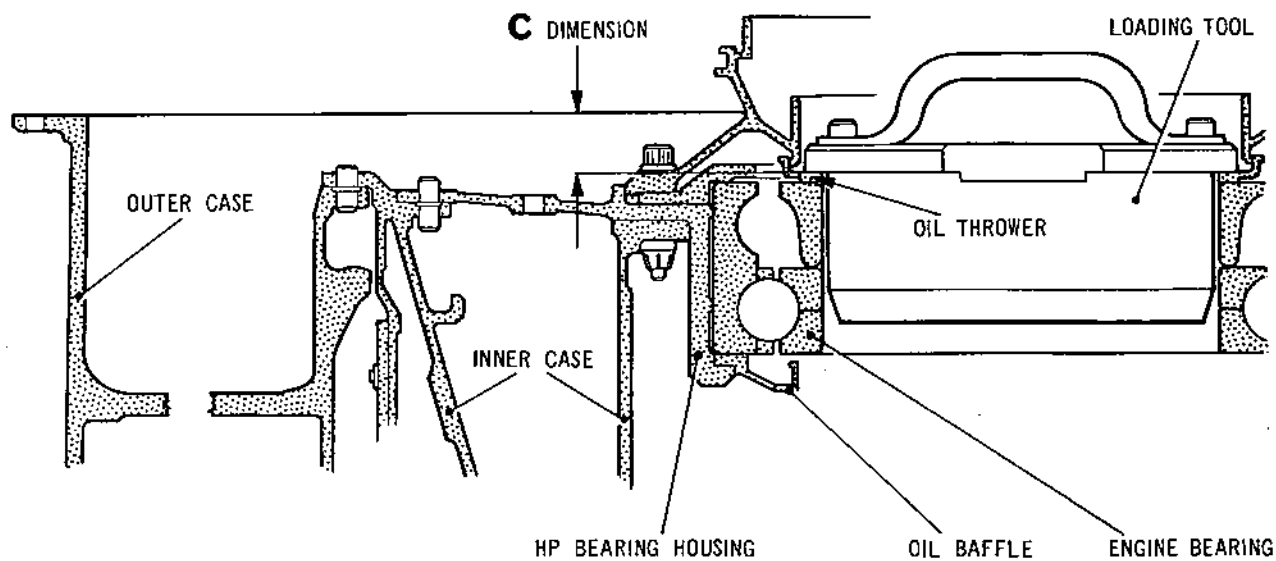
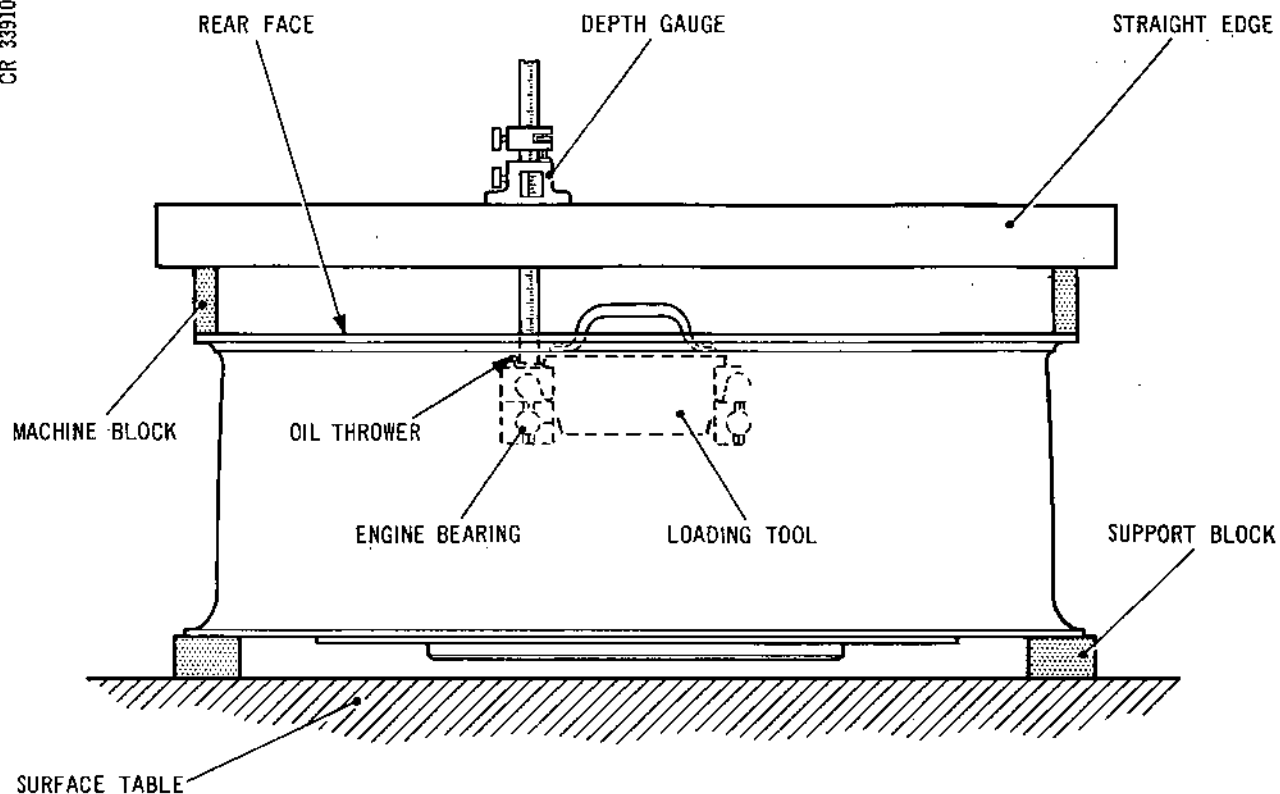
Jun 1/99



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 33910/00A



Measuring C Dimension (Pre-SB.72-29 Standard)  
Figure 517

SUB-ASSEMBLY  
**72-32-00**  
Page 547  
Jul 1/76

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

- (6) Identify the offset pin position of the oil baffle location in the HP bearing housing (2-80), and the corresponding offset position of the HP oil baffle. Mark the offset positions of both items with an approved marker.
- (7) Using an approved freezing agent and wearing protective gloves, assemble the correct thickness oil baffle (2-100) to the HP bearing housing (2-80).
- (8) Identify the TOP position of the HP bearing housing and the corresponding TOP position in the intermediate case, then assemble the bearing housing to the intermediate case, locating it on the pins. Use a suitable mallet and tap the bearing housing onto its abutment face. Retain the bearing housing with slave bolts and washers.
- (9) Remove the HP thrust bearing (2-210) from its protective container and place on a clean surface rear face uppermost. Ensure that the thrust arrows align correctly (Ref.Fig.545).
- (10) Ensure the bearing area of the HP bearing housing is clean, then apply a small quantity of lubricant 'A' to the wall of the housing and also to the outer diameter of the bearing.
- (11) With the inner and outer tracks correctly assembled and the thrust arrows pointing forward, position the bearing over the housing, then keeping the bearing square, assemble the bearing to the housing.
- (12) Observe the TOP of the bearing retaining ring (2-110), then assemble it to its corresponding TOP on the bearing housing.



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (13) Assemble the oil thrower, Pre-SB.72-29 standard (2-120A) to the bearing. Ensure the outside diameter of the thrower extends rearward.
- (14) Assemble the inner labyrinth housing (2-60) observing the TOP position, then temporarily secure the retaining ring and labyrinth housing with bolts (2-50).
- (15) Assemble the loading tool (Tool 1822) to the HP bearing and oil thrower ensuring that the thrust is fully forward for the dimensional check.
- (16) Clean the rear outer flange of the intermediate case, lightly stone if necessary.
- (17) Position two machine blocks diametrically opposite each other on the rear outer flange, then position a straight edge across the blocks.
- (18) Using a vernier depth gauge, measure the distance from the rear face of the outer rear flange of the intermediate case to the rear face of the oil thrower (Ref.Fig.517), record the dimension. Repeat the check on the opposite side of the oil thrower and record the dimension.
- (19) Reposition the blocks and straight edge 90 deg, then obtain two more readings and record the dimensions.
- (20) Determine the mean dimension from the four results, then record this figure and log it on the engine record sheets as Dimension C.
- (21) On completion of dimensional checks remove the straight edge and machine blocks.

F. Disassemble Items Used for Dimensional Check and Reassemble Intermediate Case to Build Stand.

- (1) Remove the loading tool and place in a container.

PRINTED IN ENGLAND

TN42745



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Unscrew and remove the bolts temporarily securing the inner labyrinth housing and bearing retaining ring.
- (3) Remove the bolted half segment from the inner disk of the mechanical puller (Tool 823) to facilitate assembly of the puller to the labyrinth housing.
- (4) Assemble the mechanical puller to the bearing housing so that the segment locates under the shoulder of the inner labyrinth housing.
- (5) Reassemble the half segment, then readjust the puller to engage both segments under the flange of the inner labyrinth.
- (6) With the outer ring of the puller located on the bearing housing, withdraw the inner labyrinth from its location. Remove the puller from the labyrinth housing, then place the housing in a container.
- (7) Remove the oil thrower, suitably identify, then place in a container. Ensure that the oil thrower is kept with the bearing housing items.
- (8) Screw a puller (Tool 1668) into each extraction position nearest the dowels locating the bearing retaining ring.
- (9) Turn each puller in equal increments until the retaining ring is free of its location, then place the ring in a container.
- (10) Carefully lift the HP thrust bearing from the bearing housing, then place the bearing in its protective container.
- (11) Remove the slave bolts and washers retaining the HP bearing housing to the intermediate case, then assemble a puller (Tool 1668) to each of the locating pin positions at the outer location of the HP bearing housing.

TN21716

SUB-ASSEMBLY

72-32-00

Page 550

Jul 1/76





OLYMPUS 593



MK.610-14-28  
OVERHAUL

shecma

- (12) Turn each puller in equal increments until the housing is free of its pins, then remove the housing from the intermediate case.
- (13) Connect the overhead hoist to the lifting equipment already assembled to No.1 and 4 vanes, then remove the intermediate case from the worktop and lower onto the pallet. Disconnect the hoist, reposition the pallet and intermediate case beneath the build stand, then reconnect the hoist to the lifting equipment.
- (14) Carefully raise the intermediate case making any necessary adjustment to locate the case in its original location marked previously.
- (15) Secure the intermediate case to the build stand with the slave bolts and washers. Disconnect the hoist, then remove the lifting equipment.

5. Determine Thickness of Accessory Drive Adjusting Washers

NOTE: The driven bevel gear adjusting washers (72-61-00/1-470) and 210) must not be assembled at this stage.

A. Assemble Right-hand Drive Housing to Inner Case.

- (1) Prepare the bearings for assembly (Ref.72-09-00).
- (2) Install 'C' seal SB.0L.593-72-9053-426 Standard. Ensure that the seal location is clean, then assemble the 'C' seal (72-61-00/1-590) to the housing (72-61-00/1-570).
- (3) Assemble the drive housing assembly (72-61-00/1-570) to its location in No.3 vane of the inner case, align it with the location pins assembled to inner housing, then press into position.

SUB-ASSEMBLY

**72-32-00**

Page 551

Dec 31/99



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Lubricate the securing bolts (72-61-00/1-580) with lubricant 'B' then secure the housing with the bolts. Torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).
- B. Assemble Right-hand Accessory Items to Setting Gauge (Ref.Fig.518).
- (1) Assemble items to the setting gauge (Tool 56) in the following sequence.
    - (a) Roller bearing (72-61-00/1-560).
    - (b) Spacer sleeve inner (72-61-00/1-390).
    - (c) Adjusting washer (72-61-00/1-410).
    - (d) Spacer sleeve outer (72-61-00/1-400).
    - (e) Ball bearing (72-61-00/1-380).
    - (f) Roller bearing (72-61-00/1-370).
  - (2) Secure the items to the setting gauge with the gauge thumbnut.
- C. Assemble Right-hand Setting Gauge to Inner Case.
- (1) Assemble the setting gauge with the correctly assembled items to the HP drive housing assembly in No.3 vane. Secure the gauge to the housing with the two thumbscrews.
- D. Assemble Left-hand Accessory Items to Housing and Setting Gauge (Ref.Fig.518).

SUB-ASSEMBLY

72-32-00

Page 552

Oct 1/76



OLYMPUS 593

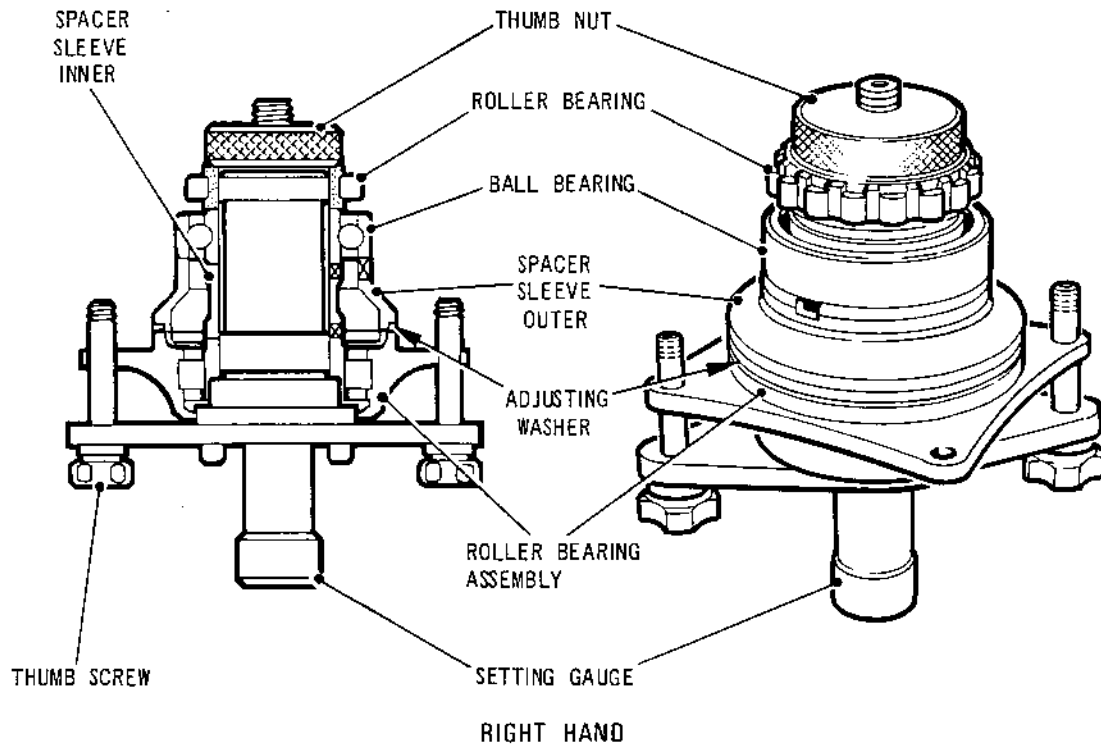
MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

CR 33506/00C



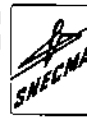
Assembling Right and Left-hand Accessory Items to Gauges  
Figure 518 (Sheet 1 of 2)

SUB-ASSEMBLY  
**72-32-00**

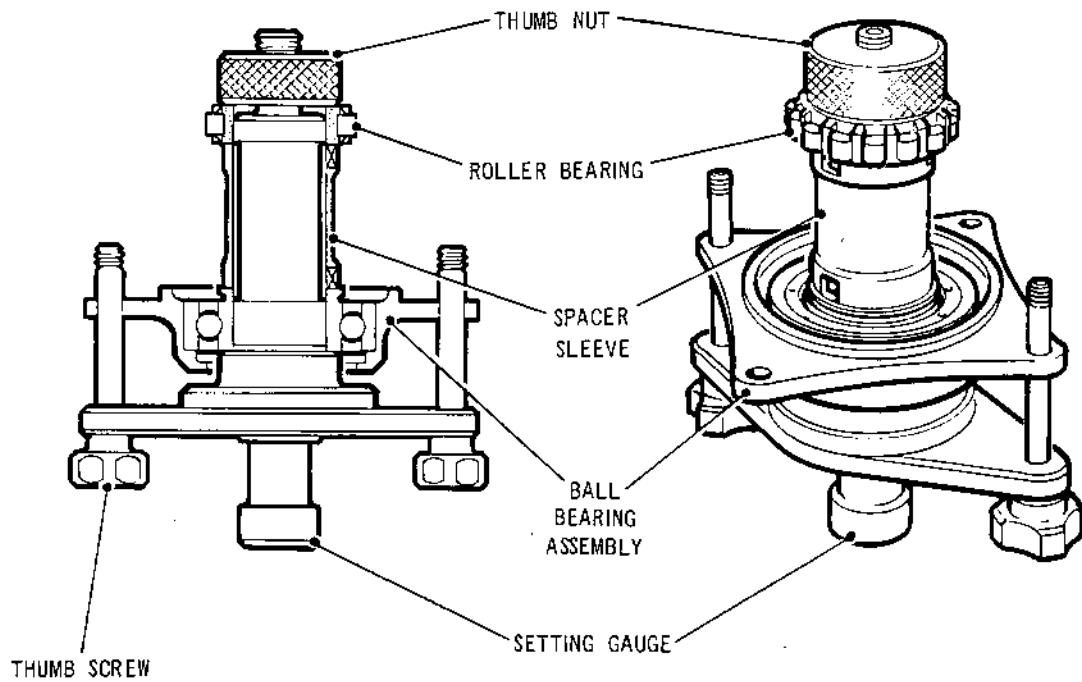
Page 553  
Apr 1/82



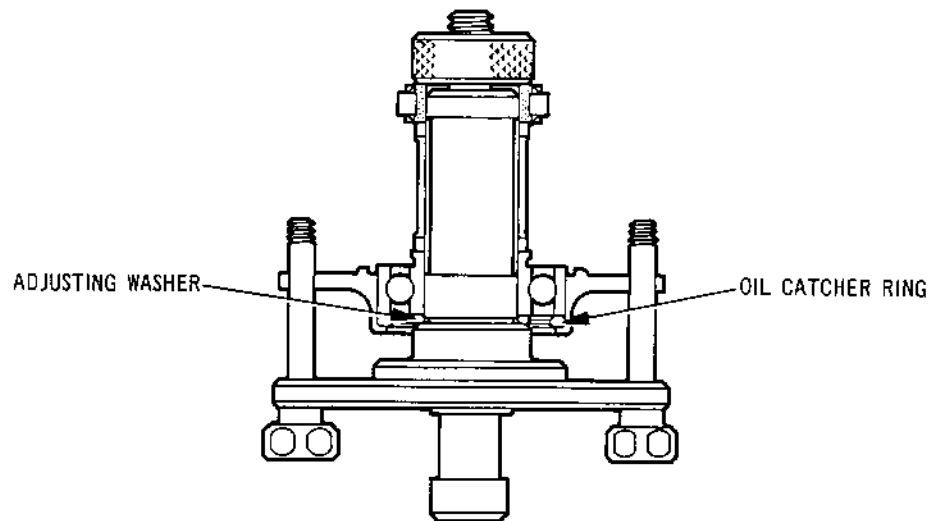
OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 35865/00A



LEFT HAND PRE SB. 72-8784-307



LEFT HAND SB. 72-8784-307

Assembling Right and Left-hand Accessory Items to Gauges  
Figure 518 (Sheet 2 of 2)

SUB-ASSEMBLY  
**72-32-00**

Page 554  
Apr 1/82



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (1) Using the driver (Tool 324) and support (Tool 254) assemble the outer track of the roller bearing (72-61-00/1-320) to the HP drive housing (72-61-00/1-330), then secure the outer track with the retaining ring (72-61-00/1-310).
- (2) Install 'C' seal SB.0L593-72-9053-426 Standard. Ensure that the seal location is then clean, assemble the 'C' seal (72-61-00/1-345) to the left-hand drive housing (72-62-00/1-330).
- (3) Assemble the drive housing (72-61-00/1-330) to the inner case at No.5 vane position aligning the housing with the location pins then press into position. Secure the housing with bolts (72-61-00/1-340) lubricated with lubricant 'B'. Torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).
- (4) On engines to pre-S.B.72-8784-307 standard, assemble items to setting gauge.
  - (a) Using the driver (Tool 620) and support (Tool 621) assemble the ball bearing (72-61-00/1-290) to the bearing housing (72-61-00/1-200).
  - (b) Assemble the bearing housing (72-61-00/1-200), spacer sleeve (72-61-00/1-300), and the roller bearing inner race (72-61-00/1-320) to the setting gauge (Tool 40), secure the items with the thumbnut.
- (5) On engines to S.B.72-8784-307 standard, assemble items to setting gauge.
  - (a) Using the driver (Tool 620) and support (Tool 621) assemble the oil catcher ring (72-61-00/1-205) and the ball bearing (72-61-00/1-290) to the bearing housing (72-61-00/1-200).

SUB-ASSEMBLY

**72-32-00**

Page 554A

Dec 31/99



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Obtain an adjusting washer from the range available (72-61-00/1-210 to 1-275) to use as a slave washer, then assemble the washer, followed by the bearing housing (complete with oil catcher ring and bearing), the spacer sleeve (72-61-00/1-300) and the roller bearing inner race (72-61-00/1-320) to the setting gauge (Tool 40). Secure the items with the thumbnut.

E. Assemble Left-hand Setting Gauge to Inner Case.

- (1) Assemble the setting gauge (Tool 40) with the correctly assembled left-hand accessory drive items to the HP drive housing assembly in No.5 vane. Secure the gauge to the inner housing with thumb-screws.



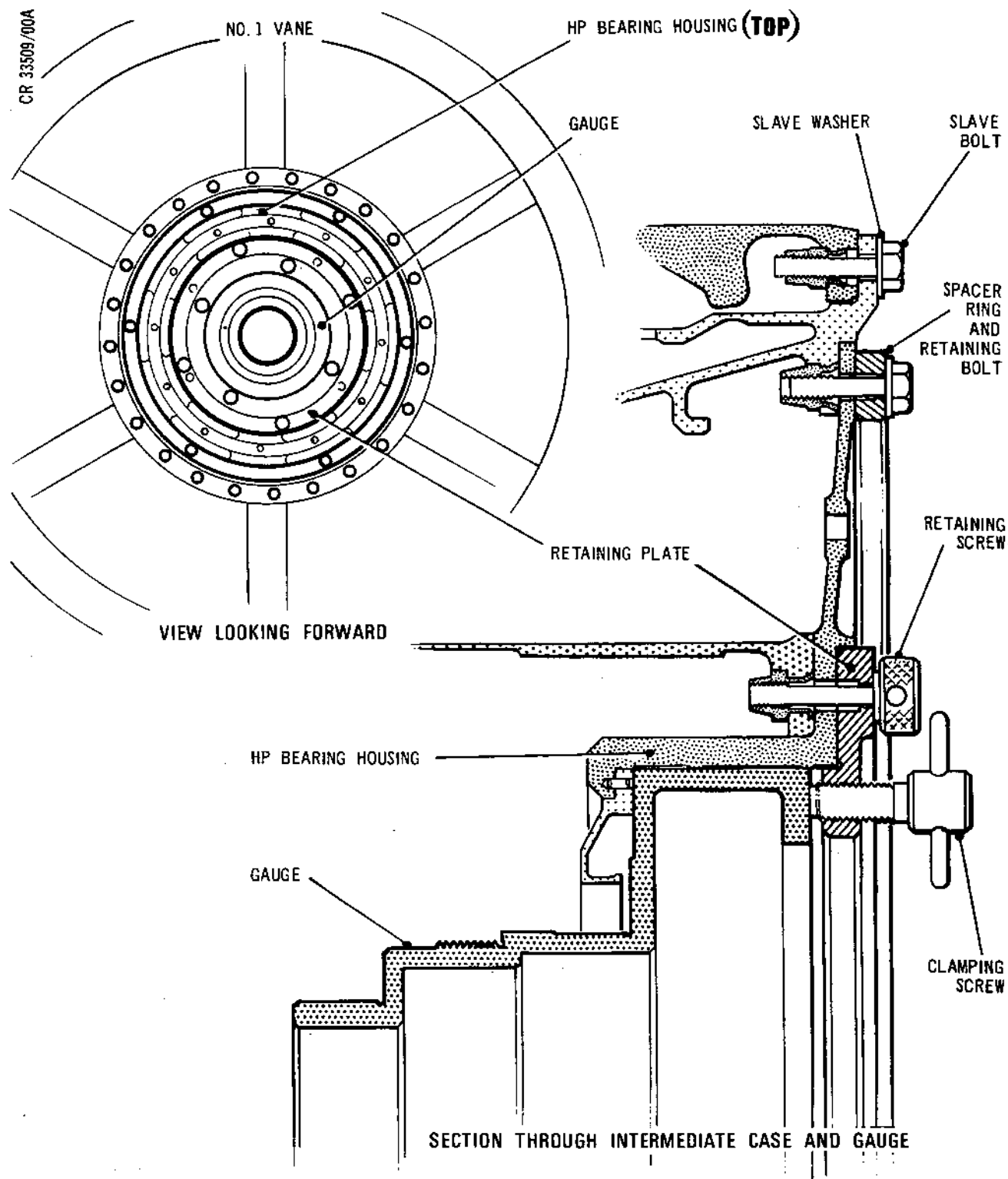
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

TN8587



Preparing HP Bearing Housing for Gauging Checks  
Figure 519

SUB-ASSEMBLY  
**72-32-00**  
Page 555  
Jul 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

F. Assemble HP Bearing Housing and Setting Gauge to Case (Ref.Fig.519).

- (1) Identify the offset pin in the HP bearing housing (2-80). Using a suitable freezing agent and wearing protective gloves shrink the oil baffle (2-100) into the HP bearing housing (if not already assembled).
- (2) Assemble the HP bearing housing (2-80) to the inner case, aligning the TOP of the housing with the TOP of the case. Ensure that the shouldered pins assembled to the inner case align correctly with the corresponding holes in the bearing housing, then lightly tap the housing onto its abutment flange.
- (3) Secure the HP bearing housing with the spacer ring (Tool 251) and six slave washers and captive bolts.
- (4) Assemble the setting gauge (Tool 1813) to the HP bearing housing (2-80) and secure with the clamping plate (Tool 253) and four waisted thumbscrews (Ref.Fig.522).
- (5) Take up the end-float of the gauge (Tool 1813) with the clamp plate clamping screws, do not overtighten the screws.
- (6) Using the build stand handle, rotate the intermediate case until the front face of the case is uppermost.

G. Determine Thickness of HP Driving Gear Adjusting Washer (Ref.Fig.520).

- (1) Using slip gauges measure dimensions X1 and X2 and record.
- (2) If the discrepancy between dimensions X1 and X2 is greater than 0.005 inch, this is unacceptable and the findings should be referred to Rolls Royce for investigation.
- (3) If the discrepancy between dimensions X1 and X2 is 0.005 inch or below, calculate the mean dimension X.

$$\text{i.e.} \quad X = \frac{X1 + X2}{2}$$

SUB-ASSEMBLY

72-32-00

Page 556

Dec 31/00



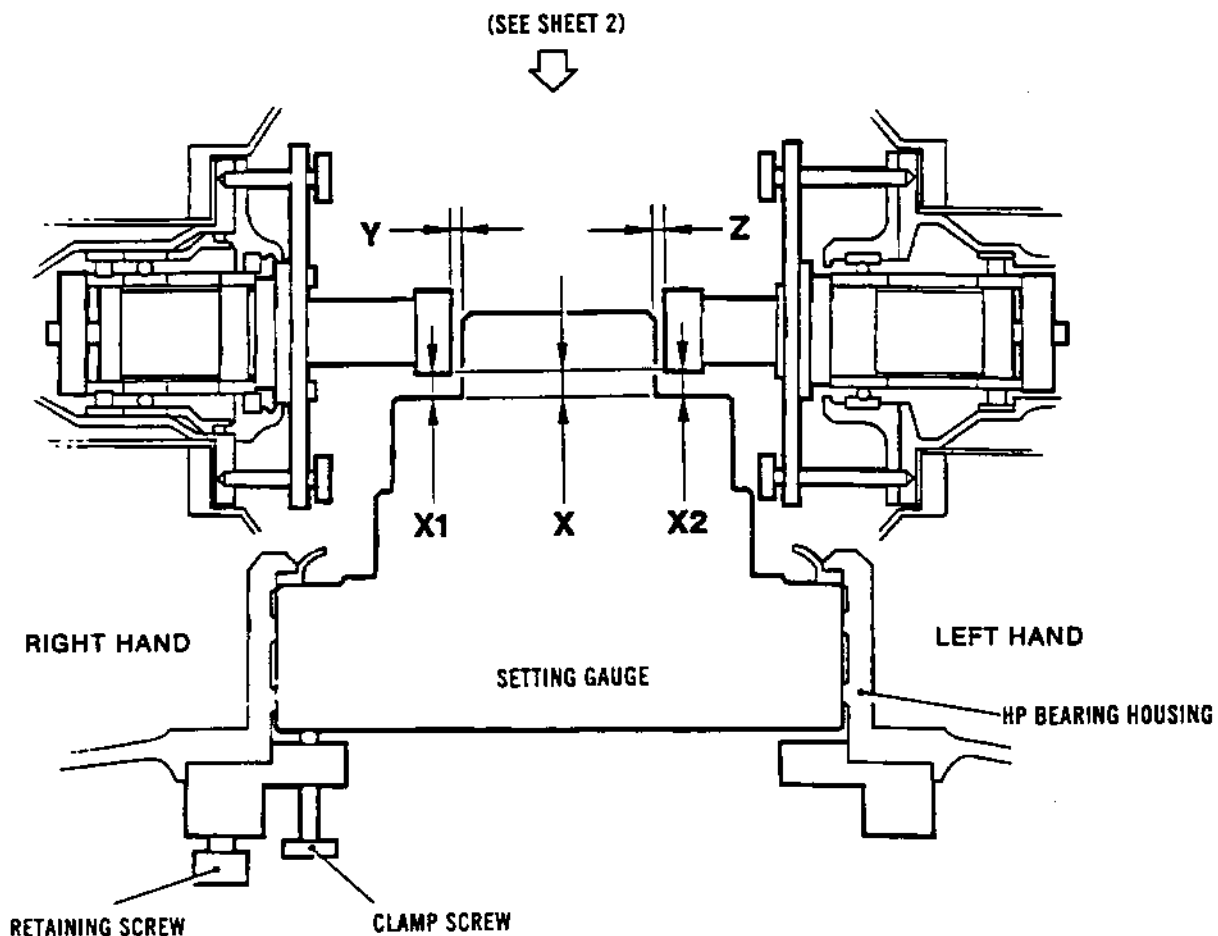


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Determining Thickness of HP Accessory Drive Adjusting Washers  
Figure 520 (Sheet 1 of 2)

SUB-ASSEMBLY  
**72-32-00**

Page 557  
Jun 30/97



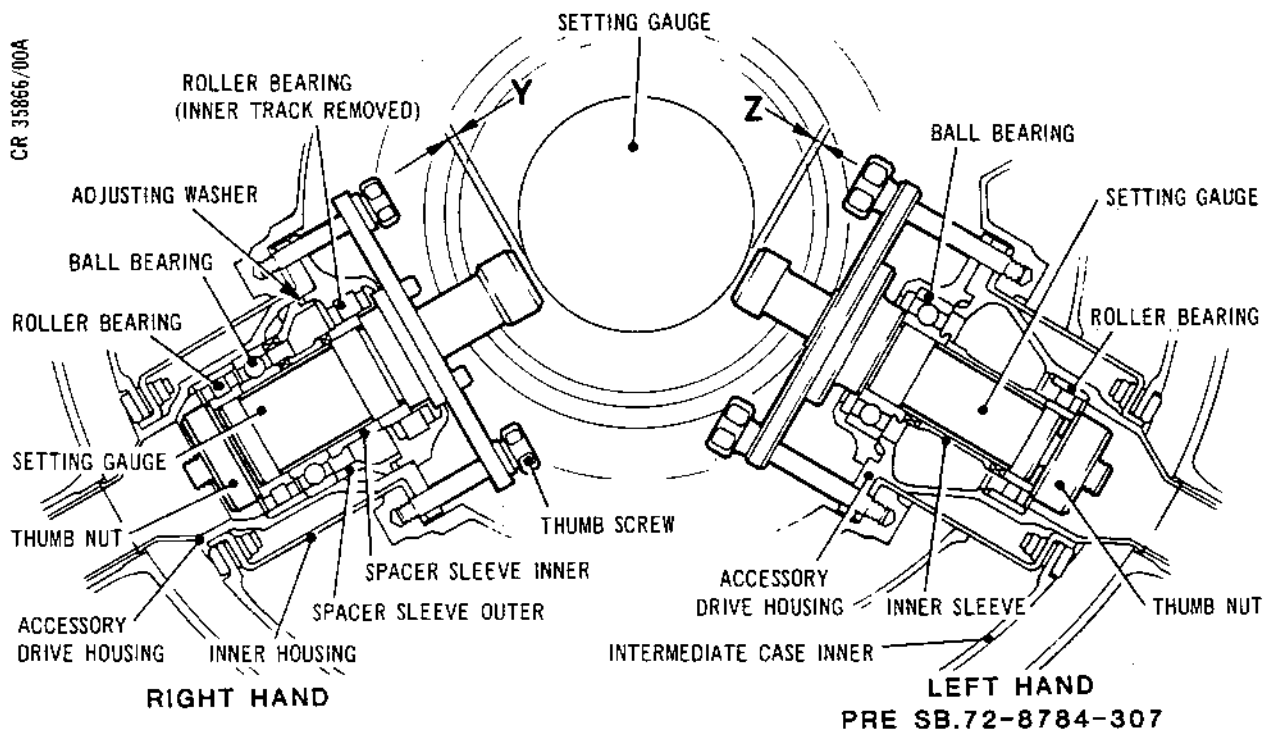
# OLYMPUS 593

MK.610-14-28

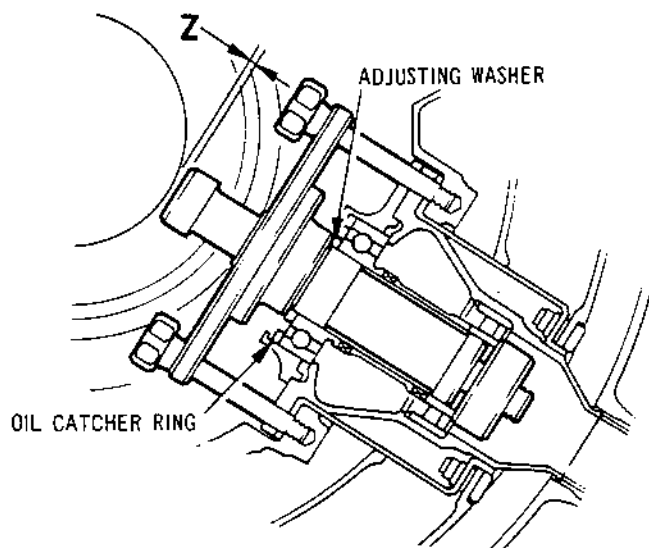
OVERHAUL



CR 35866/00A



VIEW IN DIRECTION OF ARROW  
(SEE SHEET 1)



LEFT HAND  
SB.72-8784-307

Determining Thickness of HP Accessory Drive Adjusting Washers  
Figure 520 (Sheet 2 of 2)

SUB-ASSEMBLY  
**72-32-00**

Page 558  
Apr 1/82



OLYMPUS 593

MK.610-14-28  
OVERHAUL *sneema*

- (4) The HP driving bevel gear adjusting washer (72-61-00/1-50) thickness =  $X + 2.700$  in. (72,580 mm) - M.D.

NOTE: M.D. is the mounting distance marked on the respective bevel gear, and 2.700 in. (72,580 mm) is the theoretical gauge dimension.

CAUTION: ADJUSTING WASHER (72-61-00/1-50) IS CASE HARDENED. NO MACHINING PERMISSIBLE.

- (5) Select the required thickness adjusting washer (72-61-00/1-50) from the range, then suitably identify the washer.

H. Determine Thickness of Right-hand Driven Bevel Gear Adjusting Washer (Ref. Fig. 520).

- (1) Engines to pre-S.B.72-8697-286 standard.

- (a) Using slip gauges, measure dimension Y and record.  
(b) The right-hand driven bevel gear adjusting washer (72-61-00/1-470) thickness =  $Y + 4.480$  in. (113,792 mm) - M.D.

NOTE: M.D. is the mounting distance marked on the respective bevel gear and 4.480 in. (113,792 mm) is the theoretical gauge dimension.

- (2) Engines to S.B.72-8697-286 standard.

- (a) Using slip gauges, measure dimension Y and record.  
(b) Measure the thickness of the damping plate (72-61-00/1-565) at the bore, and record.  
(c) The right-hand driven bevel gear adjusting washer thickness =  $Y + 4.480$  in. (113,792 mm) - damper plate thickness - M.D.

NOTE: M.D. is the mounting distance marked on the respective bevel gear and 4.480 in. (113,792 mm) is the theoretical gauge dimension.

SUB-ASSEMBLY

72-32-00

Page 558A

Jun 30/97



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (3) Select the required thickness adjusting washer (72-61-00/1-470) (72-09-21 Repair, Fig.424), then suitably identify the washer.

J. Determine Thickness of Left-hand Driven Bevel Gear Adjusting Washer (Ref.Fig.520).

- (1) Engines to pre-S.B.72-8784-307 standard.

- (a) Using slip gauges, measure dimension Z and record.
- (b) The left-hand driven bevel gear adjusting washer (72-61-00/1-210) thickness =  $Z + 4.320$  in. (109,728 mm) - M.D.

NOTE: M.D. is the mounting distance marked on the respective bevel gear and 4.320 in. (109,728 mm) is the theoretical gauge dimension.

- (2) Engines to S.B.72-8784-307 standard.

- (a) Using slip gauges measure and record dimension Z.
- (b) Measure and record the thickness of the damping plate (72-61-00/1-175) at the bore (dimension A).
- (c) Record the thickness of the slave adjusting washer used (dimension B).
- (d) The left-hand driven bevel gear adjusting washer (72-61-00/1-210) thickness =  $Z + 4.320$  in. (109,728 mm) - M.D. + dimension B - dimension A.

NOTE: M.D. is the mounting distance marked on the respective bevel gear and 4.320 in. (109,728 mm) is the theoretical gauge dimension.

- (3) Select the required thickness adjusting washer (72-61-00/1-210) (72-09-21 Repair, Fig.422), then suitably identify the washer.

SUB-ASSEMBLY

72-32-00

Page 558B

Dec 1/97



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

## K. Disassemble Accessory Items After Gauging Checks.

- (1) Rotate the build stand until the rear of the intermediate case is uppermost. Remove the retaining plate (Tool 253) securing the gauge to the bearing housing (2-80), then withdraw the gauge. Place the gauge and plate in the container (Tool 270).
- (2) Remove the bolts retaining the housing to the inner case. Assemble six pullers (Tool 1668) to the threaded extraction positions in the bearing housing close to the dowels. Turn each puller in turn, in small increments and extract the housing from the dowels.

**CAUTION:** AVOID TURNING THE PULLERS IN LARGE INCREMENTS OBVIATING POSSIBLE DOWEL DAMAGE AND BOWING OF THE BEARING HOUSING FLANGE.

- (3) Remove the HP bearing housing from the inner case then remove the pullers from the housing.
- (4) Release the thumbscrews securing the gauge at No.5 vane, then withdraw the gauge and ball bearing housing from the inner case. Remove the roller bearing, spacer sleeve, bearing housing (complete with bearing and oil catcher ring) and the slave adjusting washer from the gauge, then place the gauge in the container (Tool 270).
- (5) Release the thumbscrews securing the gauge at No.3 vane, then withdraw the gauge and roller bearing housing from the inner case. Remove the roller bearing, adjusting washer (72-61-00/1-410) and outer spacer from the gauge, then place the gauge in the container (Tool 270).

## L. Assemble Housing Support to Sump and Sump to Inner Case (Ref.Fig.521).

- (1) Assemble the housing support (72-61-00/2-210) to the oil sump (4-360), then using the wrench (Tool 1582), secure the support with two bolts (72-61-00/2-200) lubricated with lubricant 'B'. Torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).

SUB-ASSEMBLY

72-32-00

Page 559

Dec 1/96

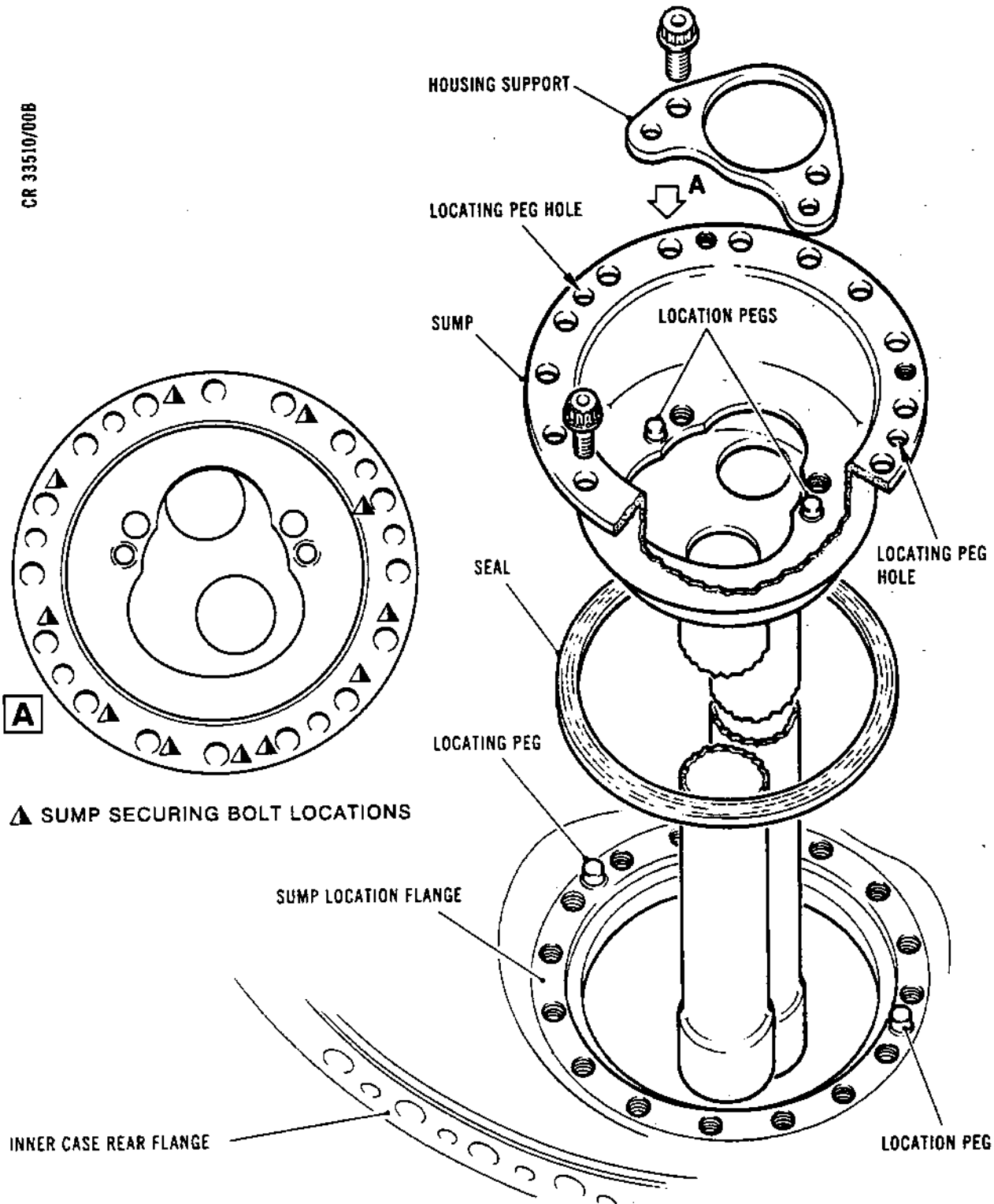


OLYMPUS 593



MK.610-14-28  
OVERHAUL

CR 33510/00B



Assembling Items to No.4 Vane  
Figure 521

SUB-ASSEMBLY  
**72-32-00**  
Page 560  
Dec 1/95

**OLYMPUS 593**

MK.610-14-28

sneema

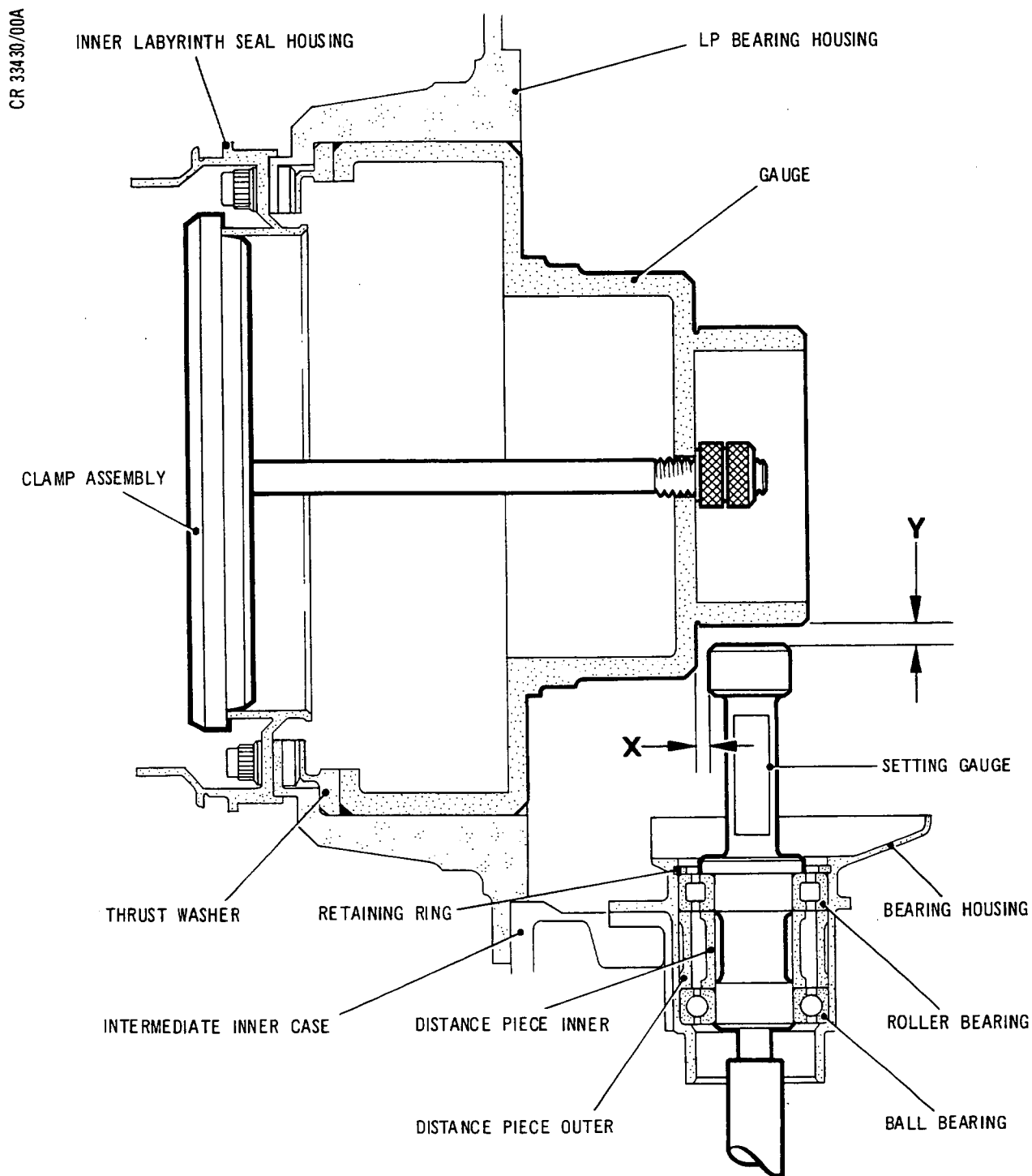
OVERHAUL

- (2) Assemble sump to inner case SB.0L593-72-9053-426 Standard. Ensure that the seal location for 'C' seal (4-390) is clean. Check that the locating pegs are assembled to the sump location flange in the inner case. Assemble the seal to the sump (4-360). Assemble the sump to its correct position in No.4 vane and secure with bolts (4-370) lubricated with lubricant 'A'. Torque-tighten the bolts to 135 lbf in. (15,2 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).
- M. Determine Adjusting Washer Sizes for LP Driving Bevel Gear and LP Driven Bevel Gear (Ref.Fig.522).
- (1) Using a driver (Tool 350) and support (Tool 351) press the ball bearing (72-61-00/2-170), distance piece outer (72-61-00/2-160) and the outer track of the roller bearing (72-61-00/2-140) into the bearing housing (72-61-00/2-180). Assemble the



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Determining Adjusting Washer Thickness For LP Bevel Gears  
Figure 522

SUB-ASSEMBLY  
**72-32-00**  
Page 562  
Jul 1/76





OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

distance piece inner (72-61-00/2-150) and the roller bearing inner (72-61-00/2-140) to the bearing housing (72-61-00/2-180), then secure the items by assembling the retaining ring (72-61-00/2-130) to the housing.

- (2) Assemble the setting gauge (Tool 31) to the bearing housing (72-61-00/2-180).
- (3) Assemble the bearing housing to the sump unit (4-360) at the inner location of No.4 vane and temporarily retain the housing with bolts (72-61-00/2-190).
- (4) Assemble the extension (Tool 935) through No.4 vane to the gauge and hand tighten sufficiently to take up the end-float of the bearings.
- (5) Assemble the gauge (Tool 41) in conjunction with the clamp assembly (Tool 1809) to the LP bearing housing (1-270) and secure with the thumbnut.
- (6) Using the stand handle rotate the build stand until the front flange is uppermost, then assemble the LP bearing housing (1-270) with the assembled gauge to the inner case, locating the LP bearing housing in its correct TOP position aligned with the engine TOP. Secure the LP bearing and gauge assembly to the inner case with slave bolts and washers.
- (7) Check that the M.D. marked on the LP driving gear (1-40) = 2.625 in. (66,675 mm) (SB.72-21), or 2.621 in. (66,573 mm) (Pre-SB.72-21). Record the M.D. dimension.

NOTE : M.D. (mounting distance) is the dimension marked on the gear (1-40) and the 2.600 in. (66,040 mm) dimension used in the calculation is the theoretical gauge dimension.

SUB-ASSEMBLY

72-32-00

Page 563

May 1/79



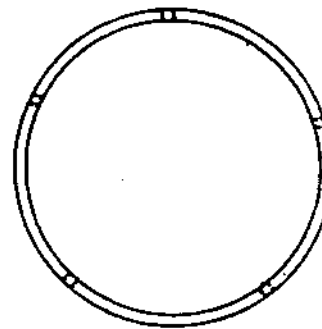
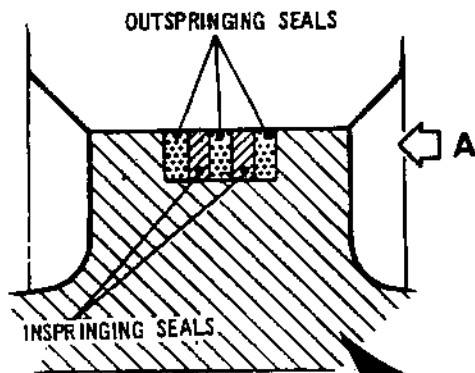
OLYMPUS 593



MK.610-14-28  
OVERHAUL

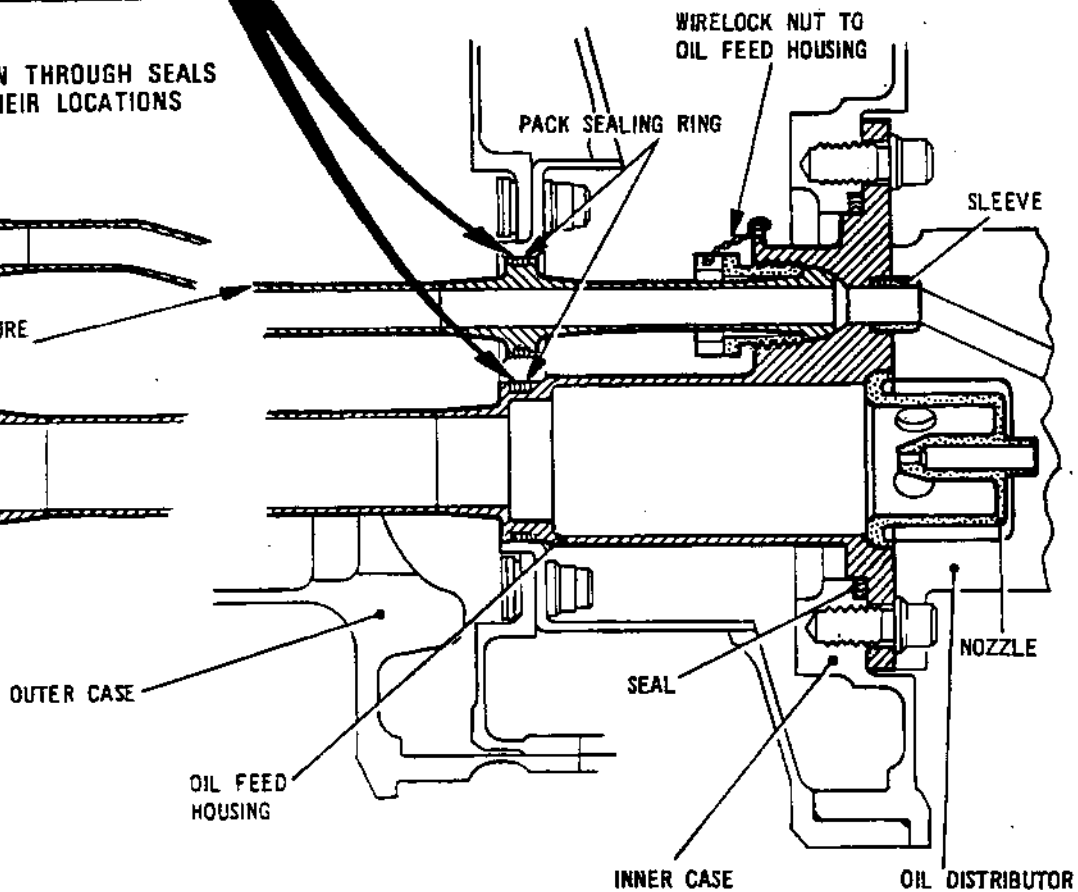
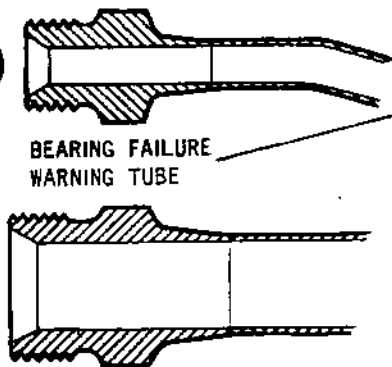
SHEEMA

CR 33505/00B



DIAGRAMMATIC VIEW ON ARROW A  
SHOWING DESIRED GAP POSITIONS

SECTION THROUGH SEALS  
IN THEIR LOCATIONS



Assembling Oil Feed Housing and Bearing Failure Tube  
Figure 523

SUB-ASSEMBLY  
**72-32-00**  
Page 564  
Dec 1/96



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England

- (8) Using slip gauges, determine dimension X and record the dimension obtained. The LP driving bevel gear adjusting washer (1-50) thickness =  $X + 2.600$  in. (66,040 mm) - M.D. Select the correct thickness adjusting washer (1-50) (72-09-21 Repair, Fig.404) from the range, then record its actual thickness on the appropriate record sheet.
- (9) Record the M.D. of the LP driven gear (72-61-00/2-20).

NOTE: M.D. (mounting distance) is the dimension marked on the driven bevel gear (72-61-00/2-20) and the 4.765 in. (121,031 mm) dimension used in the calculation is the theoretical gauge dimension.

- (10) Using slip gauges determine dimension Y and record the dimension obtained.
- (11) The LP driven gear adjusting washer (72-61-00-2-30) thickness =  $Y + 4.765$  in. (121,031 mm) - M.D. Select the correct thickness adjusting washer (72-61-00/2-30) (72-09-21 Repair, Fig.425) from the range, then record its actual thickness on the appropriate record sheet.
- (12) After the gauging checks, remove the LP bearing housing, gauge and clamp assembly, then remove the extension, bearing housing (LP pulse probe) and gauge. Place the bearing housing in the container (Tool 343).

6. Assemble Oil Feed Housing and Bearing Failure Tube Unit  
(Ref.Fig.523)

A. Assemble Seal, Housing, Tube and Location Plate.

- (1) Lubricate the pack sealing ring (4-90) with lubricant 'A', then assemble the sealing ring to the oil feed housing (4-60), ensuring that the sealing ring gaps are equally distributed.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (2) Install housing.
  - (a) Install a 'C' seal to SB.0L593-72-9053-426 Standard. Ensure that the seal location for 'C' seal (4-80) is clean, then assemble it over the oil feed housing (4-60).
  - (b) Assemble the housing to its location in No.2 vane of the inner case, align it with the pegs, then press the housing into position, ensuring that the 'C' seal is correctly located in its groove. Temporarily secure the housing with bolts (4-70).
- (3) Lubricate the sealing ring pack (4-110) with lubricant 'A', then assemble the pack to the bearing failure warning tube (4-100).
- (4) Lubricate the nut on the bearing failure tube with lubricant 'A', then assemble the tube from outside the outer case through No.2 vane to locate the oil feed housing bolted to the inner case. Run down the nut on the bearing failure tube using the wrench (Tool 1494) but do not tighten, allowing the tube to rotate sufficiently to engage the splines on the location plate (4-20) assembled in the following operation.
- (5) Assemble the location plate (4-20) and fire cover (4-30) manipulating it to engage the splines of both the oil feed housing tube and the bearing failure warning tube, and simultaneously aligning it with the two locating pins assembled to the outer case. Lightly tap the location plate home, then secure it with four bolts (4-10) lubricated with lubricant 'A'. Torque-tighten the bolts to 135 lbf in. (15,2 N.m), then wire-lock the four bolts.

SUB-ASSEMBLY

72-32-00

Page 566

Dec 31/01



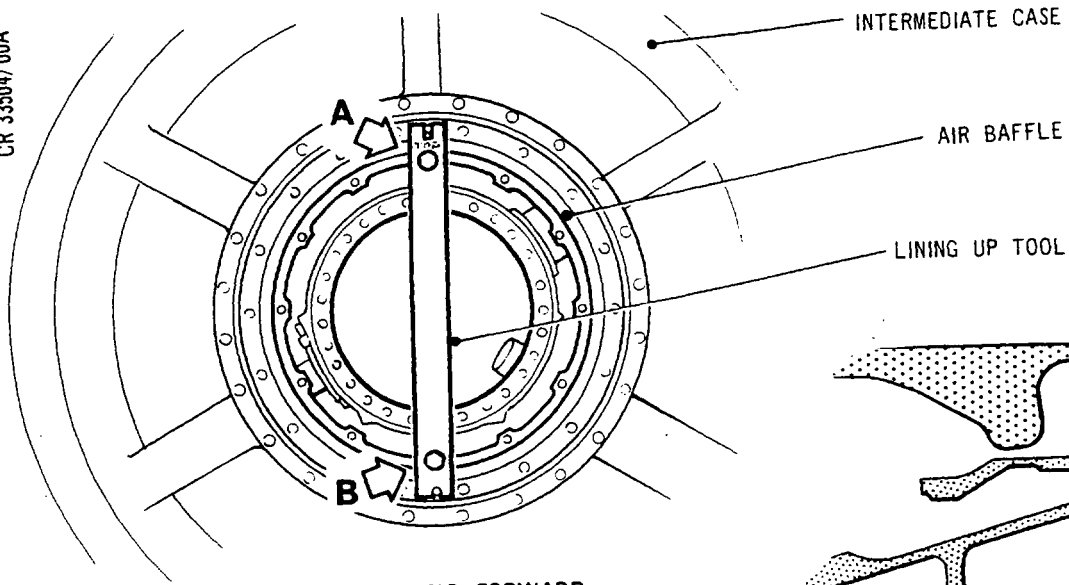
OLYMPUS 593

MK.610-14-28  
OVERHAUL

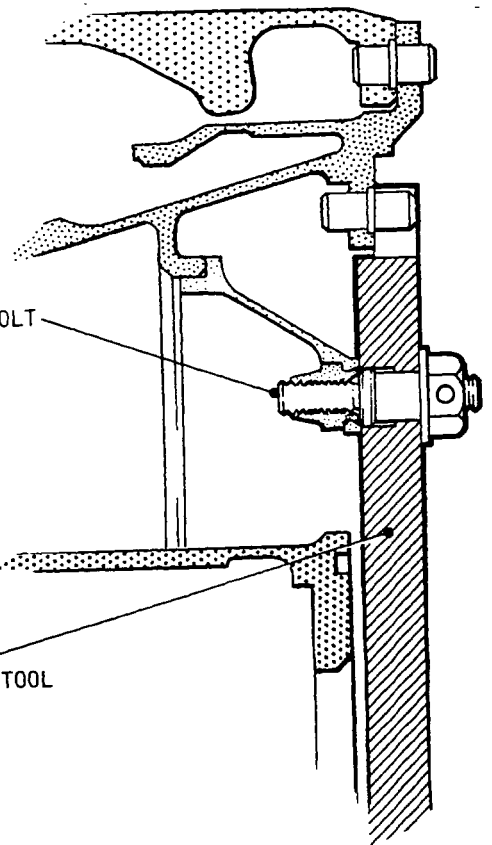
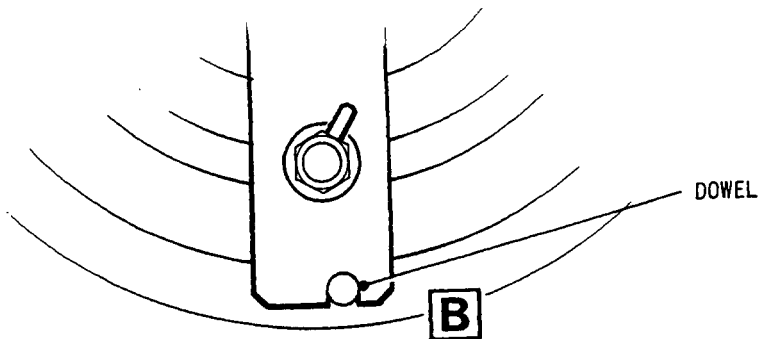
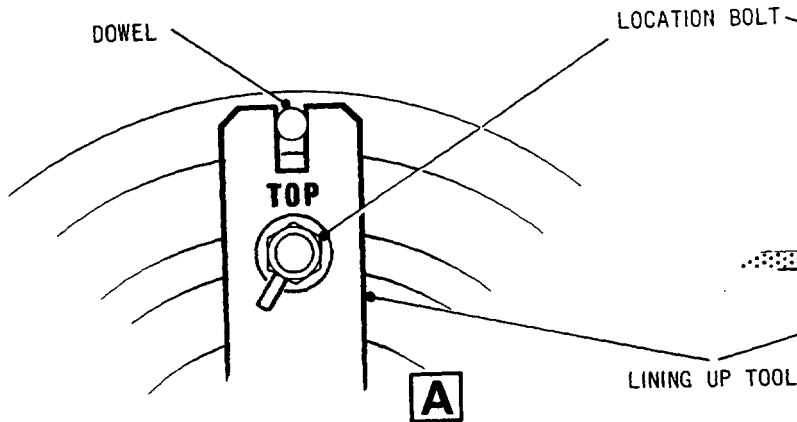


CR 33504/00A

PRINTED IN ENGLAND



VIEW LOOKING FORWARD



SECTION THROUGH  
INTERMEDIATE CASE

Assembling HP Air Baffle  
Figure 524



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (6) Using the wrench (Tool 1494) and adapter (Tool 849) determine on the torque setting rig the compensated torque value for 220 and 240 lbf in. (24,8 and 27,1 N.m).
- (7) Using the wrench (Tool 1494), torque-tighten the nut securing the bearing failure tube to the oil feed housing between 220 and 240 lbf in. (24,8 and 27,1 N.m). This will be the actual torque value required on the nut.
- (8) Remove the bolts (4-70) temporarily securing the oil feed housing, then partially withdraw the housing from the inner case and wire-lock the nut on the bearing failure tube.
- (9) Carefully reassemble the oil feed housing and bearing failure tube as a unit (ensuring that the seal seats correctly), to the locating pins in the inner case, and at the same time engaging the splines of both tubes with the corresponding splines in the location plate. Lightly tap the assembly home, then secure with the bolts (4-70) lubricated with lubricant 'A'. Torque-tighten the bolts to 135 lbf in. (15,2 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).
- (10) Assemble protectors (Tool 568) and (Tool 1365) to the oil feed housing and the bearing failure tube.

7. Assemble HP Air Baffle Assembly to the Inner Case  
(Ref.Fig.524)

A. Assemble Air Baffle.

- (1) Identify the TOP position marked on the air baffle (2-240), then using an approved freezing agent and wearing protective gloves, freeze the baffle for a suitable period. Using the alignment fixture (Tool 930) assemble the baffle, lining up the TOP of the inner case with the TOP of the baffle. Remove the alignment fixture from the inner case.

8. Final Assembly of the LP Internal Accessory Drive (LP Pulse Probe Drive (Ref.Fig.525)

A. Assemble and Secure the Bevel Gear and Housing.

SUB-ASSEMBLY

## 72-32-00

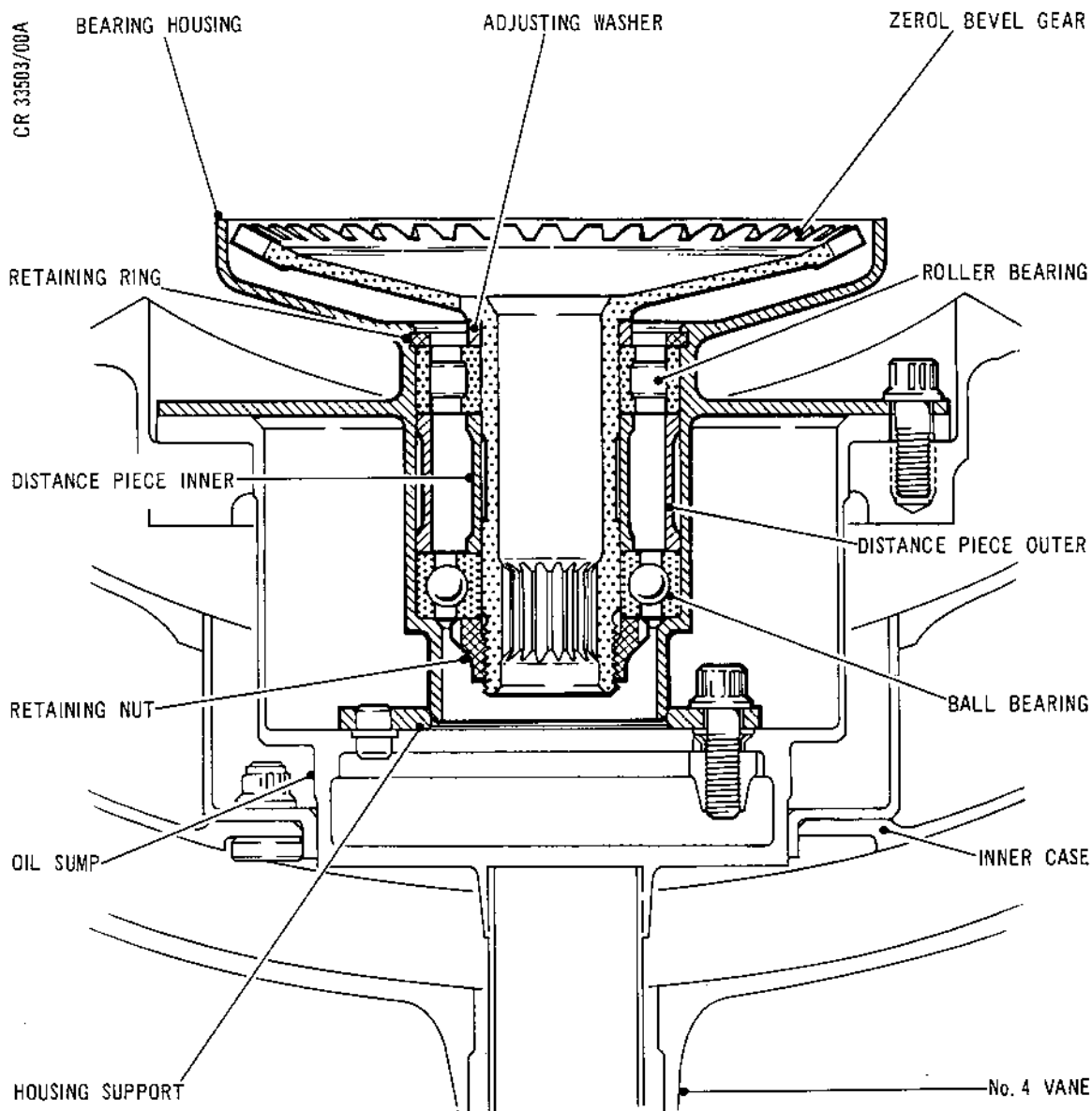
Page 568  
Dec 31/01



OLYMPUS 593

MK.610-14-28

OVERHAUL



Assembling Internal (LP Tacho Drive) Accessory Drive Items  
Figure 525

SUB-ASSEMBLY

72-32-00

Page 569

Jul 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (1) Assemble the correct size adjusting washer (72-61-00/2-30) calculated previously (Ref.5.M.(11)) to the bevel gear (72-61-00/2-20), then using the driver (Tool 1514) and support (Tool 354), assemble the bevel gear to the bearing housing (72-61-00/2-180).
- (2) Ensure that the self-locking feature of the retaining nut (72-61-00/2-10) is elliptical and not four lobed (Ref.S.B.72-105) then apply lubricant 'A' to the nut and screw it onto the bevel gear (72-61-00/2-20). Using the holder (Tool 356) and wrench (Tool 1516), record the locking (run-down) torque of the nut, this should be between 6 and 50 lbf ft (8,1 and 67,8 N.m). Torque-tighten the nut to 60 lbf ft (81 N.m), then add the recorded locking torque to this figure.
- (3) Assemble the bevel gear and bearing housing unit to its correct location at No.4 vane position in the inner case.
- (4) Apply lubricant 'B' to bolts (72-61-00/2-190), then secure the bearing housing (72-61-00/2-180) to the sump and inner case. Torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m) using the wrench (Tool 1581). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).

NOTE: If preferred at this stage, the backlash check of the LP bevel gears may be carried out, in which case refer to para.11.A. This would obviate the need to remove one of the HP bevel gears at a later stage to facilitate LP bevel gear washer adjustment, should the need arise, after which the build would proceed normally under para.9.

9. Final Assembly of Right-hand Internal Accessory Drive  
(Ref.Fig.526)

A. Assemble and Secure Items to Gear.

- (1) On engines to S.B.72-8697-286 standard, assemble the damping plate (72-61-00/1-565) to the gearshaft.
- (2) Apply lubricant 'B' to four bolts (72-61-00/1-350), then temporarily assemble the bolts to the flange of the roller bearing housing (72-61-00/1-560), ensuring that the boltheads face the gear.

SUB-ASSEMBLY  
**72-32-00**

Page 570  
Apr 1/82





# OLYMPUS 593

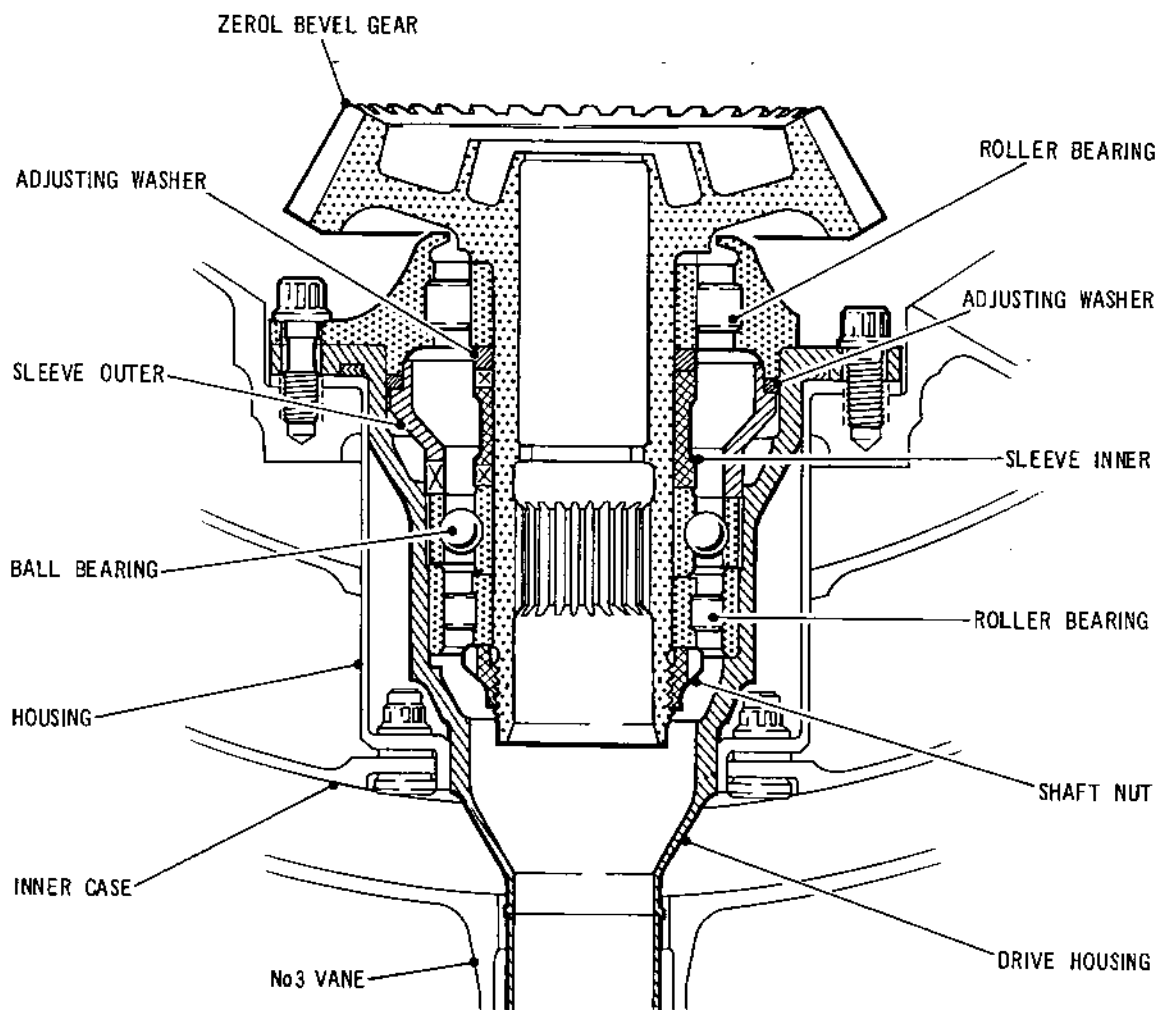
MK.610-14-28

OVERHAUL

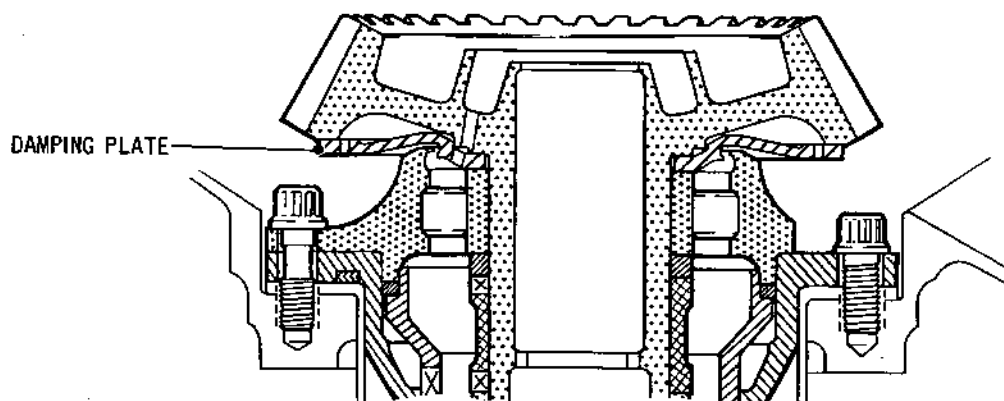


CR 33519/00B

PRINTED IN ENGLAND



PRE SB. 72-8697-286



SB. 72-8697-286

Assembling Right-hand Accessory Drive Items  
Figure 526

SUB-ASSEMBLY  
**72-32-00**  
Page 571  
Apr 1/82



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (3) Using driver (Tool 1496) and support (Tool 256), assemble the roller bearing assembly (72-61-00/1-560) to the driven bevel gear (72-61-00/1-42).
- (4) Assemble the correct size adjusting washer (72-61-00/1-470) calculated previously (Ref. para. 5.H.(2)) to the bevel gear.
- (5) Assemble the correct size adjusting washer (72-61-00/1-410) calculated previously (Ref. para. 2.V.(3)) to the roller bearing (72-61-00/1-560). Assemble the sleeve outer (72-61-00/1-400) and sleeve inner (72-61-00/1-390) to the roller bearing outer and bevel gear shaft.
- (6) Using driver (Tool 1496) and support (Tool 256), assemble the ball bearing (72-61-00/1-380) and roller bearing (72-61-00/1-370) to the gear shaft.
- (7) Ensure that the self-locking feature of the retaining nut (72-61-00/1-360) is elliptical and not four lobed (Ref. S.B.72-105) then apply lubricant 'A' to the nut and screw it onto the gear shaft (72-61-00/1-42). Using the holder (Tool 256) and wrench (Tool 1497), record the locking (run-down) torque of the nut, this should be between 10 and 67 lbf ft (13,6 and 90,8 N.m). Torque-tighten the retaining nut (72-61-00/1-360) to 120 lbf ft (163 N.m), then add the recorded locking torque to this figure.

B. Assemble Accessory Gear to Inner Case (Ref. Fig. 527).

- (1) Assemble the bevel gear assembly to the right-hand drive housing assembled to No.3 vane. Secure the assembly with the four bolts (72-61-00/1-350). Torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m) using wrench (Tool 1629). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).

- (2) Check that the bevel gear rotates freely.

10. Final Assembly of the Left-hand Accessory Drive  
(Ref. Fig. 528)

A. Assemble and Secure Items to Gear.



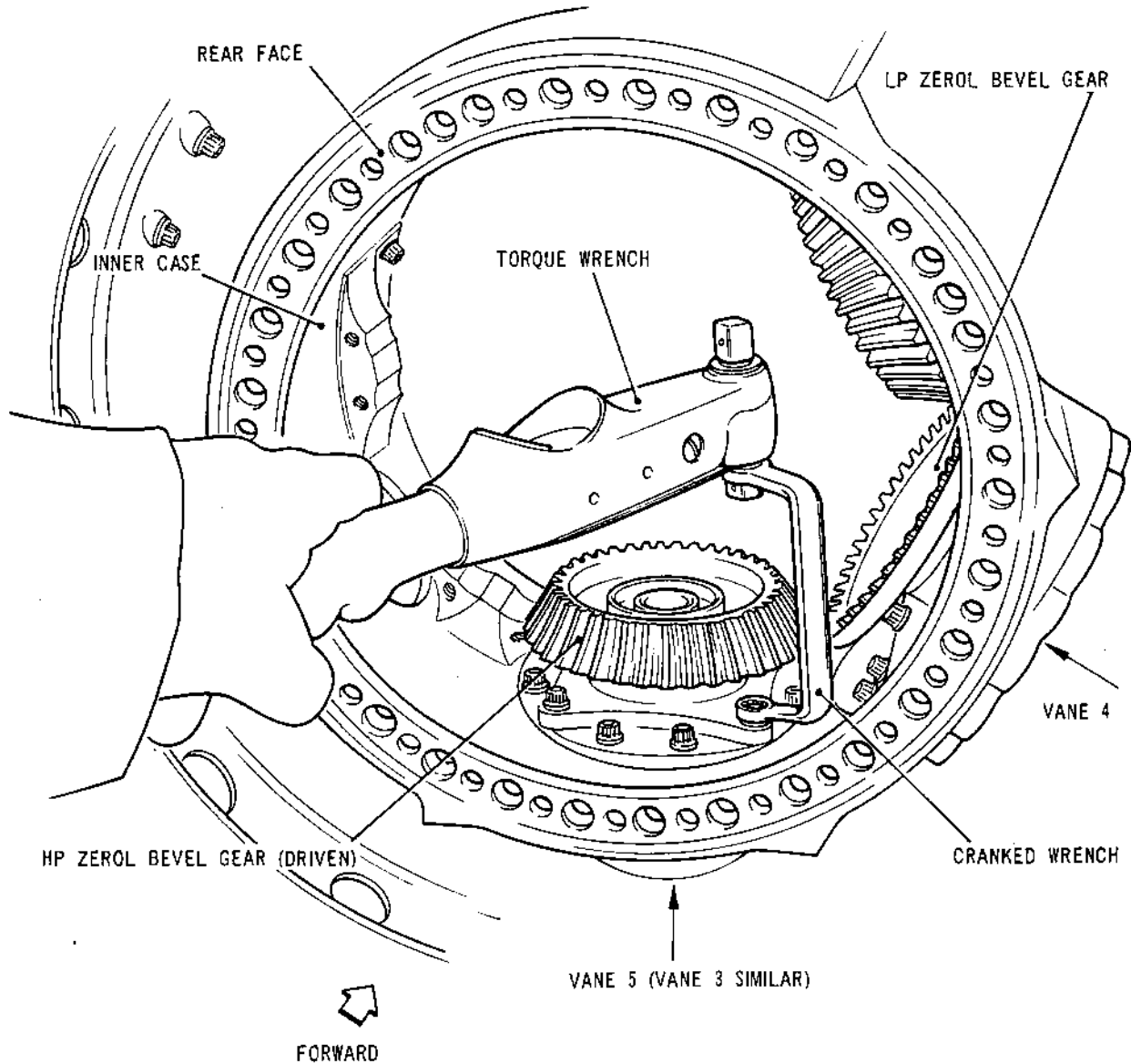
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31464/000A

PRINTED IN ENGLAND



Final Torque-tightening of No.3 and 5 Vane Accessory Drives  
Figure 527

SUB-ASSEMBLY

72-32-00

Page 573

Jul 1/76

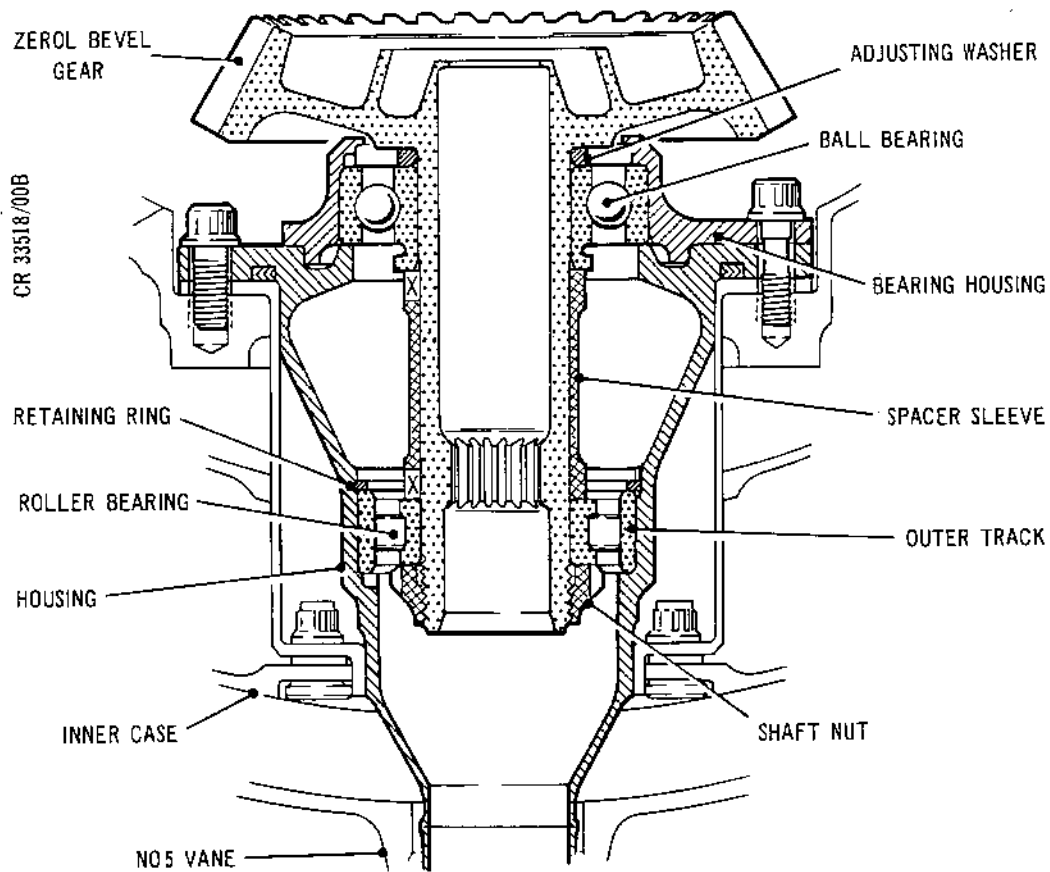
TN32037



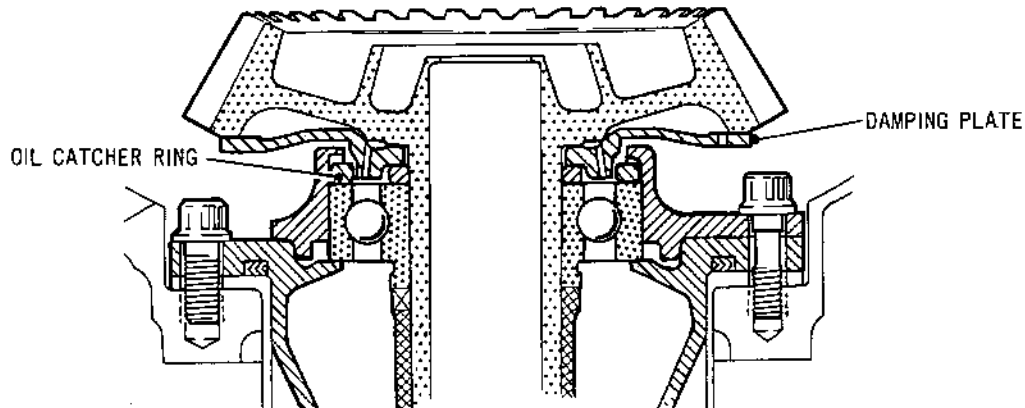
# OLYMPUS 593

MK.610-14-28

OVERHAUL



PRE SB. 72-8784-307



SB. 72-8784-307

NOTE.  
ENSURE OUTER TRACK AND RETAINING  
RING HAVE BEEN INSTALLED IN HOUSING  
BEFORE ASSEMBLING GEAR

Assembling Left-hand Accessory Drive Items  
Figure 528

SUB-ASSEMBLY  
**72-32-00**

Page 574  
Apr 1/82



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (1) Apply lubricant 'B' to four bolts (72-61-00/1-180), then temporarily assemble the bolts to the flange of the bearing housing (72-61-00/1-200) ensuring that the boltheads face the gear.
- (2) On engines to pre-S.B.72-8784-307 standard, assemble items to gear.
- (a) Using driver (Tool 323) and support (Tool 256), assemble the previously calculated adjusting washer (72-61-00/1-210) (Ref.para.5.J.(2)), ball bearing (72-61-00/1-290), housing (72-61-00/1-200) and spacer sleeve (72-61-00/1-300) to the gear (72-61-00/1-43).
- (3) On engines to S.B.72-8784-307 standard, assemble items to gear.
- (a) Using driver (Tool 323) and support (Tool 256), assemble the damping plate (72-61-00/1-175), the previously calculated adjusting washer (72-61-00/1-210), the bearing housing (72-61-00/1-200) complete with the oil catcher ring and bearing, and the spacer sleeve (72-61-00/1-300) to the gear (72-61-00/1-43).
- (4) Ensure that the self-locking feature of the retaining nut (72-61-00/1-190) is elliptical and not four lobed (Ref.S.B.72-105). Apply lubricant 'A' to the retaining nut, then assemble the roller bearing inner race (72-61-00/1-320) and retaining nut to the gear shaft (72-61-00/1-43). Using the holder (Tool 256) and wrench (Tool 327), record the locking (run-down) torque of the nut, this should be between 9 and 60 lbf ft (12,2 and 81,4 N.m). Torque-tighten the retaining nut (72-61-00/1-190) to 90 lbf ft (122 N.m), then add the recorded locking torque to this figure.

B. Assemble Accessory Gear to Inner Case (Ref.Fig.527).

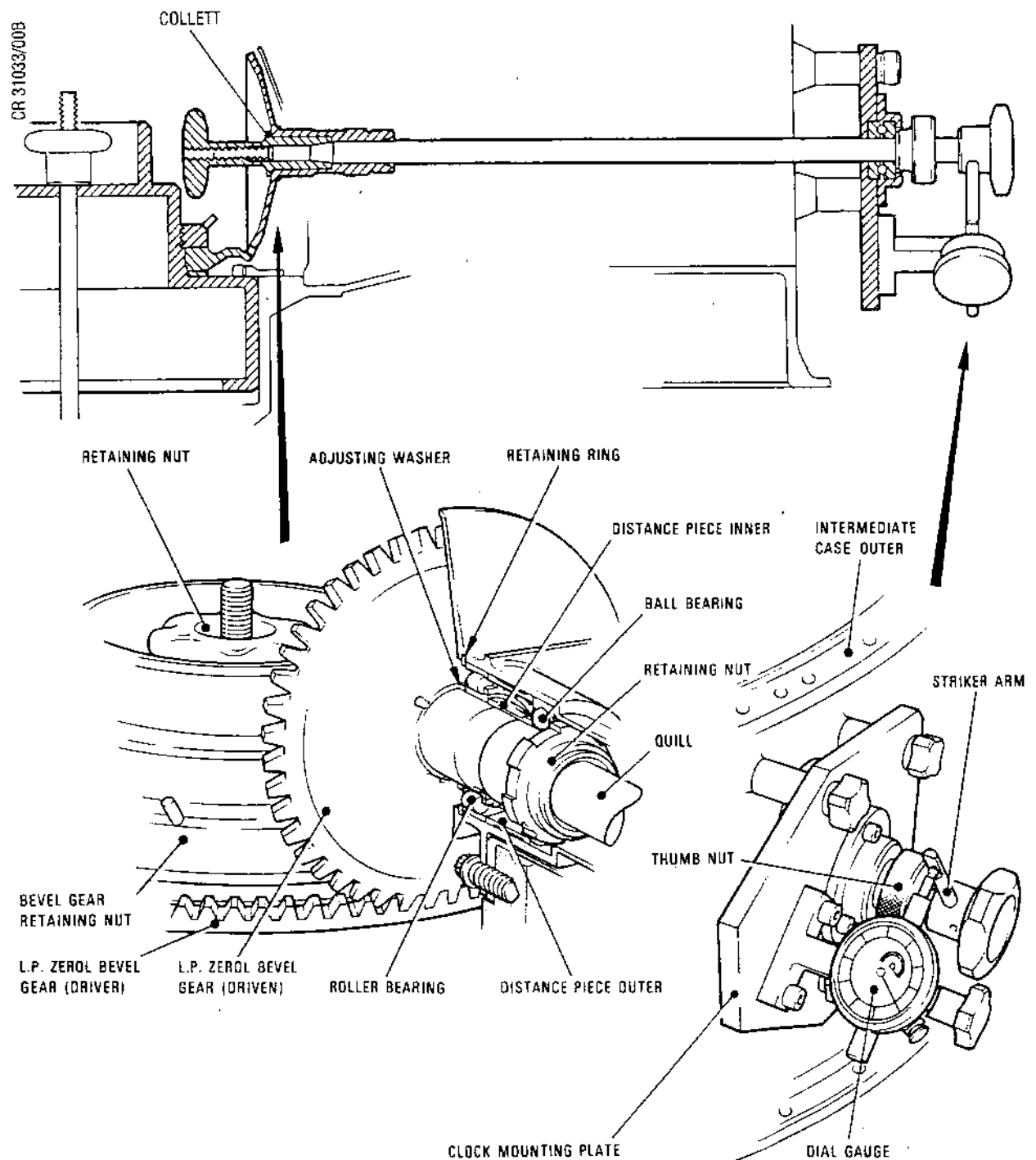
- (1) Check that the outer track of the roller bearing (72-61-00/1-320), secured by a retaining ring (72-61-00/1-310), is in position in the left-hand drive housing in No.5 vane.

SUB-ASSEMBLY

72-32-00

Page 575

Apr 1/82



Checking the Backlash of the LP Drive Gears  
Figure 529

SUB-ASSEMBLY  
72-32-00  
Page 576  
Jun 30/95



OLYMPUS 593

MK.610-14-28 *sneema*  
OVERHAUL

- (2) Assemble the bevel gear with its correctly assembled items to the left-hand drive housing in No.5 vane, taking care not to damage the exposed rollers on the gear shaft. Secure the assembly with the four bolts (72-61-00/1-180), then torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).
- (3) Check that the bevel gear rotates freely.

# 11. Check Backlash of Internal Accessory Drives

## A. Check Backlash of the LP Drive Gears (Ref.Fig.529).

- (1) Assemble a setting gauge (Tool 41) to the LP bearing housing (1-270), and secure the gauge with the clamp assembly (Tool 1199).
- (2) Assemble the selected adjusting washer (Ref.para. 5.M.(8)) and bevel gear (1-40) to the gauge, then retain with the special nut (Tool 635).
- (3) Assemble a clock mounting plate, quill and collet (Tool 359, 357 and 358) to the casing and gear at No.4 vane.
  - (a) Assemble the clock mounting (Tool 359) to the outer case at No.4 vane and secure with four thumbscrews.
  - (b) Assemble the quill (Tool 357) through the mounting plate to locate in the LP driven bevel gear. Ensure that the thumbnut is clear of the mounting plate.
  - (c) Assemble the collet (Tool 358) to the bevel gear and quill, then carefully position the quill to engage with the dial gauge and tighten the collet.
  - (d) Screw the thumbnut to the mounting plate to load the gear bearings outboard.
  - (e) Assemble the LP bearing housing (1-270) to the inner case and retain with the clamp and slave spacer (Tool 250).

SUB-ASSEMBLY

72-32-00

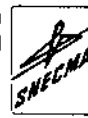
Page 577

Jun 30/95



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Determine the backlash between the LP driver and LP driven bevel gears. Record the amount. Ensure that the backlash is within the limits quoted in F.C.S. 72-32-00/438.
- (5) After the completion of the check, remove the clock mounting plate collet and quill, and place the items in container (Tool 360). Remove the LP bearing housing from the inner case, then remove the bevel gear, adjusting washer and gauge. Place gauge in container.

B. Check Backlash of the HP Drive Bevel Gears (Ref.Fig.530).

- (1) Assemble the setting gauge (Tool 1813) to the HP bearing housing (2-80). Assemble the selected adjusting washer (72-61-00/1-50) (Ref.para.5.G.(2) and HP bevel gear (72-61-00/1-41) to the gauge, and retain with the special nut (Tool 960). Turn the case until the rear of the case is uppermost. Assemble the HP bearing housing to the inner case aligning the TOP of the bearing housing with the TOP of the case. Retain the items with a clamping plate (Tool 253), tightened sufficiently to take up the end-float of the gauge. Retain the housing (2-80) at the outer location with the slave spacer (Tool 251).
- (2) Assemble the adapter, quill and special nut to the case.
  - (a) Assemble the adapter (Tool 617) and bracket to the outer case at No.3 vane position and retain with bolts, washers and nuts.
  - (b) Assemble the quill (Tool 618) through the adapter and locate the special nut in the HP driven bevel gear.
  - (c) Position the quill to engage with the dial gauge, then tighten the wingnut to expand the quill in the gear.
  - (d) Unscrew the special nut (outboard of the adapter plate) to load the gear bearings outboard.

SUB-ASSEMBLY

**72-32-00**

Page 578

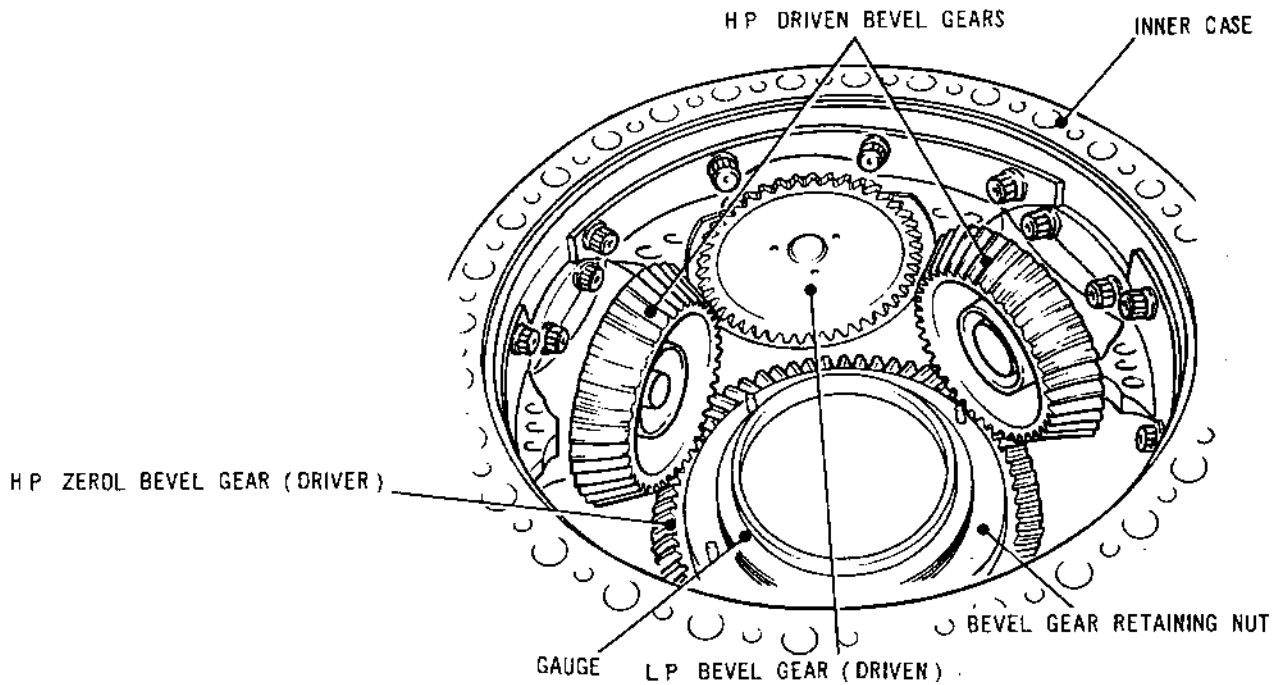
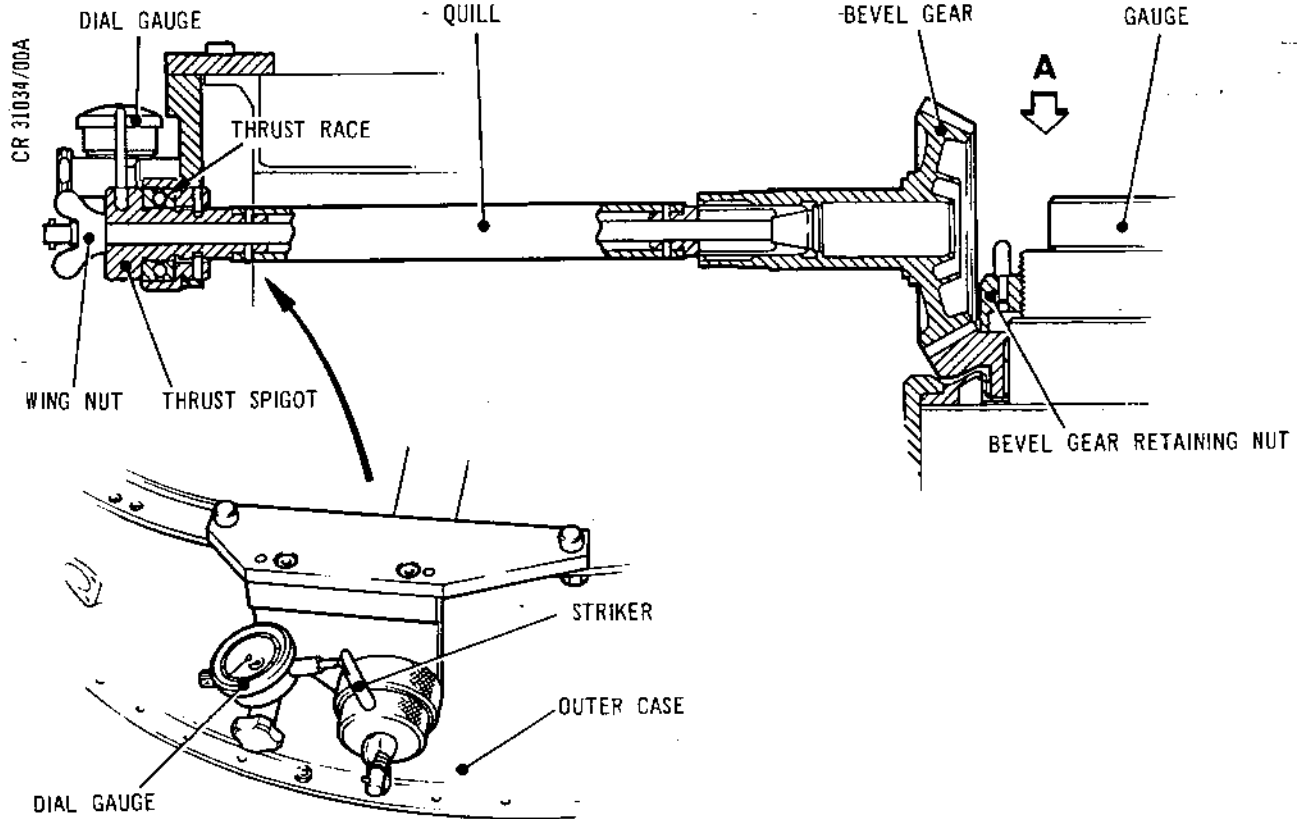
Apr 1/82





OLYMPUS 593

MK.610-14-28  
OVERHAUL



VIEW IN DIRECTION OF ARROW A  
Checking the Backlash of the HP Drive Gears  
Figure 530

SUB-ASSEMBLY

72-32-00

Page 579

Jul 1/76



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (e) Determine the backlash between the HP bevel driver and the HP bevel driven gear. Record the amount. Check that the backlash is within plus 0.004 in. (0,10 mm) of the minimum backlash marked on the gear. If this is not achieved, then the procedures to determine the thickness of the adjusting washers for the HP driving gear, and the RH and LH driven gears (paragraphs 5G, 5H and 5J) are to be repeated as appropriate, and the backlash re-checked.
- (f) After completion of the check, remove the adapter, bracket and quill.
- (3) Assemble the adapter, quill and special nut to No.5 vane.
  - (a) Assemble the adapter (Tool 617) and bracket to the outer case at No.5 vane position and retain with bolts, washers and nuts.
  - (b) Assemble the quill (Tool 619) through the adapter and locate the special nut in the left-hand HP driven bevel gear.
  - (c) Position the quill to engage with the dial gauge, then tighten the wingnut to expand the quill in the gear.
  - (d) Unscrew the special nut to load the gear bearings outboard.
  - (e) Determine the backlash between the HP bevel driver and the HP bevel driven gear. Record the amount. Check that the backlash is within plus 0.004 in. (0,10 mm) of the minimum backlash marked on the gear. If this is not achieved, then the procedures to determine the thickness of the adjusting washers for the HP driving gear, and the RH and LH driven gears (paragraphs 5G, 5H and 5J) are to be repeated as appropriate, and the backlash re-checked.
- (4) After the completion of the check, remove the adapter, bracket and quill. Place the items in containers (Tools 631 and 270).
- (5) Remove the HP bearing housing from the inner case, then remove the bevel gear adjusting washer and gauge. Place the gauge in the container (Tool 270).

SUB-ASSEMBLY

72-32-00

Page 580

Jun 1/99

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

12. Assemble Left-hand and Right-hand Gearbox Mounting Brackets  
(Ref.S.B.72-97)

A. Assemble the Left-hand Gearbox Mounting Bracket (Ref.  
Fig.531).

- (1) Adjust the position of the intermediate case and stand until No.5 vane is uppermost.

CAUTION: WHEN ASSEMBLING A "SUPAGRAF" SEAL (72-120) TO THE STANDARD OF SB.OL. 593-72-9026-408, CARE MUST BE TAKEN WHEN HANDLING, AS THEY ARE SOFT AND EASILY DAMAGED. THEY MUST BE LUBRICATED WITH ENGINE OIL BEFORE ASSEMBLY AND MUST NEVER BE RE-USED.

- (2) Assemble 15 bolts (7-40) to the adapter plate (7-270) and retain in position with the retaining rings (7-30) using the assembly sleeve (Tool 1507). Lubricate the bolts with lubricant 'B'. Centralize the mounting bracket (7-310) to the adapter plate (7-270), then secure with eight bolts (7-260) lubricated with lubricant 'A'. Torque-tighten the bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m). Apply a light smear of jointing compound 'D' to the adapter plate (7-270) at the gland packing location, then assemble the adapter plate/mounting bracket assembly to the drive housing already assembled in No.5 vane. Assemble the seal (7-120), air seal ring (7-110) and adjusting ring (7-70) and secure with the air seal retainer (7-60).

Printed in England

SUB-ASSEMBLY

**72-32-00**

Page 581

Jun 1/99



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England

THIS PAGE LEFT BLANK INTENTIONALLY

SUB-ASSEMBLY

**72-32-00**

Page 582

Jun 1/99



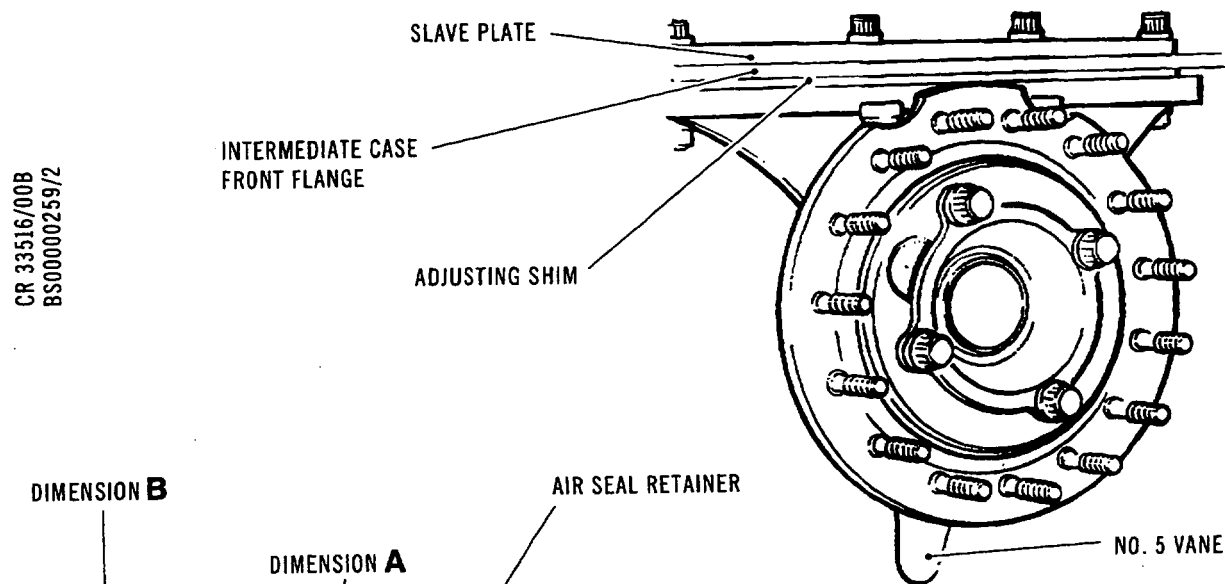
**OLYMPUS 593**

MK.610-14-28  
OVERHAUL

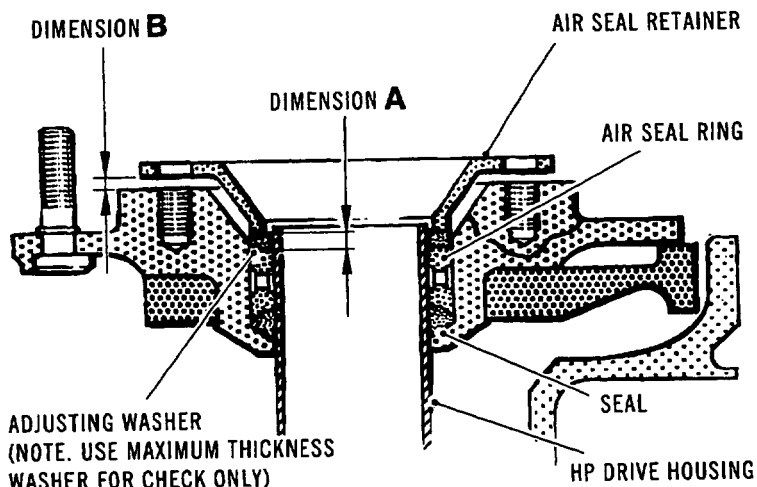


sneema

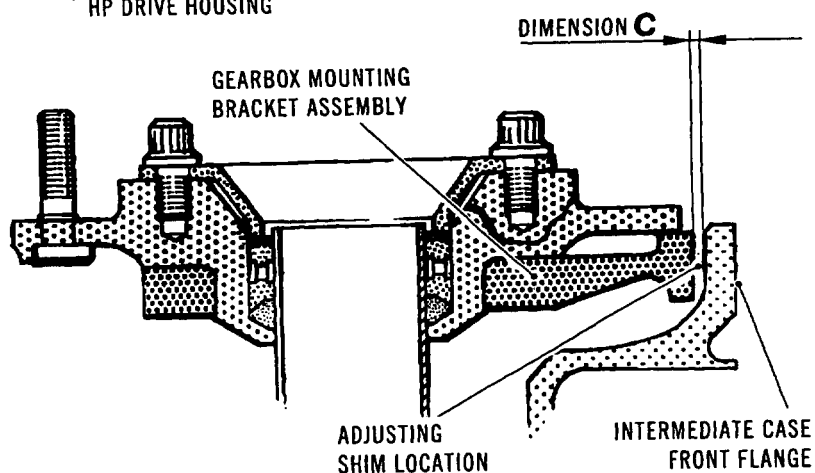
CR 33516/00B  
BS00000259/2



VIEW LOOKING ON ADAPTER  
PLATE AND GEARBOX  
MOUNTING BRACKET ASSEMBLY



CALCULATING THE  
AIR SEAL ADJUSTING WASHER



DETERMINING THE GEARBOX MOUNTING BRACKET  
TO INTERMEDIATE CASE FRONT FLANGE ADJUSTING SHIM

Assembling the Left-hand Gearbox Mounting Bracket  
Figure 531



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (3) Measure the gap which exists between the air seal retainer (7-60) and the adapter plate (7-270), and record as dimension B. Remove the air seal retainer and adjusting washer, then measure the thickness of the adjusting ring used for the check and record as dimension A.
  - (4) The thickness of the adjusting ring (7-70) required to produce a nip between 0.010 and 0.015 in. (0,254 and 0,381 mm) on the gland packing =  $A - B + 0.010/0.015$  in. (0,254/0,381 mm).
  - (5) Select the correct size adjusting ring (7-70) (72-09-21 Repair, Fig.409) from the range, then assemble it to the air seal ring (7-110). Reassemble the air seal retainer (7-60) and secure with the four bolts (7-50) lubricated with lubricant 'A'. Torque-tighten the bolts to 135 lbf in. (15,2 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).
  - (6) Measure the gap between the rear face of the front flange of the outer case and the mounting bracket to determine the required thickness of the adjusting washer (Ref.Fig.531). Select the correct size adjusting shim (7-180) (72-09-21 Repair, Fig.410), then assemble it to the case. Assemble the two hollow pins (7-250) through the front face of the intermediate case into the mounting bracket, with the threads of the pins facing outwards for extraction. Secure the mounting bracket and adjusting shim to the case with the slave plate (Tool 553), nuts and bolts. Torque-tighten the bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).
- NOTE:** If required, remove the hollow pins (7-250) using the mechanical puller (Tool 959).
- (7) Assemble blanks and protectors (Tools 576, 577 and 436).

SUB-ASSEMBLY

## 72-32-00

Page 584

Dec 31/01



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

B. Assemble the Right-hand Gearbox Bracket Assembly (Ref.Fig.532).

- (1) Place the bracket assembly (8-220) on the worktop.
- (2) Measure dimension A and record.

CAUTION: WHEN ASSEMBLING A "SUPAGRAF" SEAL (8-100) TO THE STANDARD OF SB.0L. 593-72-9026-408, CARE MUST BE TAKEN WHEN HANDLING, AS THEY ARE SOFT AND EASILY DAMAGED. THEY MUST BE LUBRICATED WITH ENGINE OIL BEFORE ASSEMBLY AND MUST NEVER BE RE-USED.

- (3) Assemble the seal (8-100) to the bracket assembly then assemble the diaphragm (8-30).
- (4) Measure dimension B and record.
- (5) Measure dimension C and record.
- (6) The thickness of the adjusting plate (8-40) required to produce a nip on the seal (8-100) of between 0.007 in. and 0.010 in. (0,177 and 0,254 mm) =  $A - B - C - 0.007 \text{ in.} / 0.010 \text{ in.} (0,177 / 0,254 \text{ mm}).$
- (7) Turn the build stand until No.3 vane is uppermost.

CAUTION: WHEN ASSEMBLING A "SUPAGRAF" SEAL (8-100) TO THE STANDARD OF SB.0L. 593-72-9026-408, CARE MUST BE TAKEN WHEN HANDLING, AS THEY ARE SOFT AND EASILY DAMAGED. THEY MUST BE LUBRICATED WITH ENGINE OIL BEFORE ASSEMBLY AND MUST NEVER BE RE-USED.

- (8) Apply a light smear of engine oil to the gearbox bracket assembly (8-220) at the seal location, then assemble it to the HP drive housing already assembled in No.3 vane. Assemble the seal (8-100) to the bracket assembly and selected adjusting plate (8-40) (72-09-21 Repair, Fig.411). Retain with the diaphragm (8-30) and secure with six bolts (8-20) lubricated with lubricant 'A'. Torque-tighten the bolts to 135 lbf in. (15,2 N.m). Locking (run-down) torque 2.0 lbf in. (0,23 N.m).



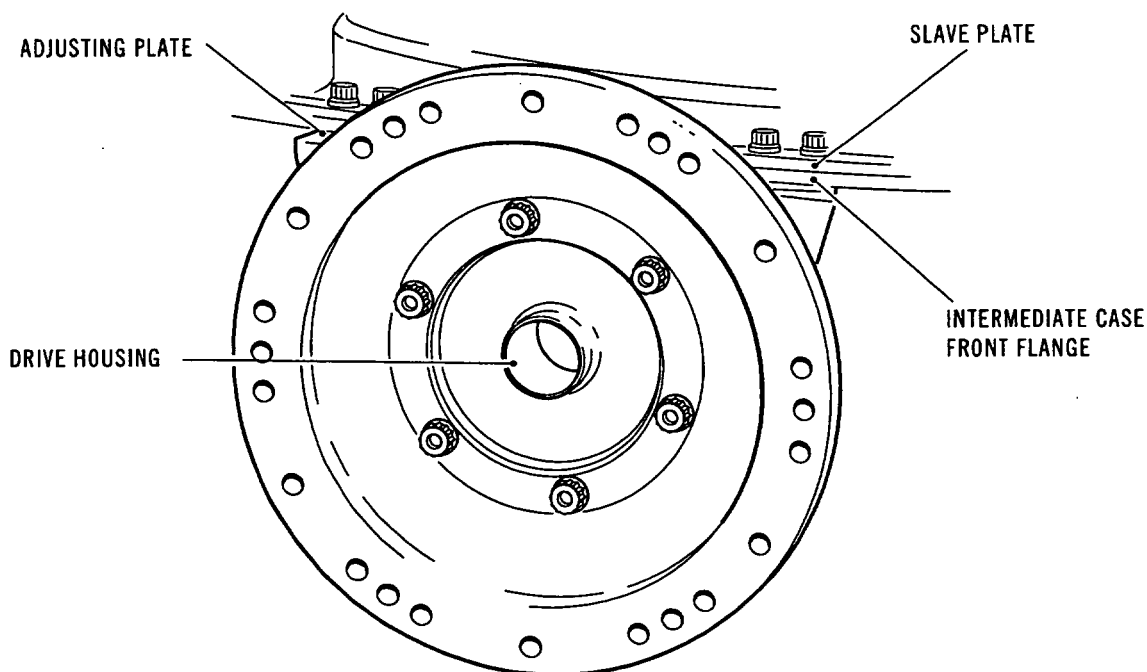
# OLYMPUS 593



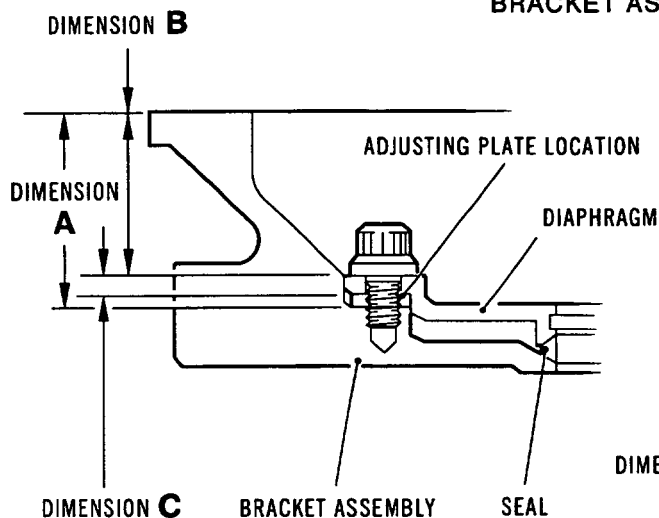
MK.610-14-28  
OVERHAUL

sneema

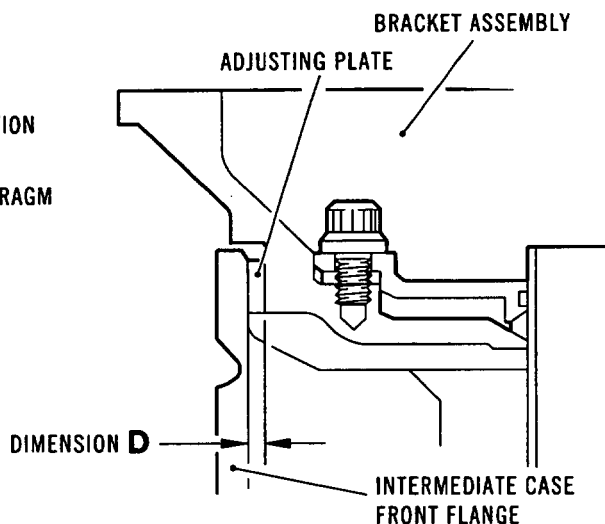
CR 33517/00D  
BS00000260/4



NO.3 VANE  
VIEW LOOKING ON GEARBOX  
BRACKET ASSEMBLY



CALCULATING THE ADJUSTING PLATE



DETERMINING THE GEARBOX  
BRACKET ASSEMBLY TO  
INTERMEDIATE CASE FRONT  
FLANGE ADJUSTING PLATE

Assembling the Right-hand Gearbox Mounting Bracket  
Figure 532

SUB-ASSEMBLY

72-32-00

Page 586  
Jun 1/99



**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

- (9) Select by trial assembly the correct thickness (dimension D) adjusting plate (8-150) (72-09-21 Repair, Fig.412) from the range, then assemble it between the bracket assembly (8-220) and the rear face of the front flange of the intermediate case (Ref.Fig.532). Record the size of the selected adjusting plate.
- (10) Assemble a hollow pin (8-180) (Ref.S.B.72-8678-249) with the extraction threads facing outwards. Secure the items with a slave plate (Tool 1561), bolts (8-120), lubricated with lubricant 'A', and nuts (8-110) at the outer position, and bolts (8-130) at the inner position. Torque-tighten the bolts to 135 lbf in. (15,2 N.m). Locking (Run-down) torque 3.5 lbf in. (0,4 N.m).

NOTE: If required remove the hollow pin using the mechanical puller (Tool 959).

- (11) Assemble protectors and screwed plug (Tools 702, 569 and 436) to the bracket assembly.

### 13. Assemble Adapter, Splined Drive Shaft, Housing and Pressure Switches

#### A. Assemble Adapter Assembly to No.4 Vane (Ref.Fig.533).

- (1) Check that the seals (4-180) have a good bore roundness and finish, with an end gap of 0.002 in. (0,05 mm) when held tightly on the oil sump assembly (4-360) tube seal locations. If necessary, ream out the bores to ensure a good finish and the correct end gap.
- (2) Check that the 12 shank nuts (4-230) are correctly assembled to the adapter assembly (4-200) and that the adapter is free from damage. Apply a light smear of jointing compound 'D' to the adapter at the packing ring location, then align the adapter with the locating dowels already assembled to the outer position of the intermediate case at No.4 vane, and gently tap onto its abutment face. Lubricate 3 bolts (4-210) and one special bolt (4-220) with lubricant 'B' and secure the adapter to the case. Torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m). Wire-lock the bolts.

SUB-ASSEMBLY

**72-32-00**

Page 587

Dec 31/01



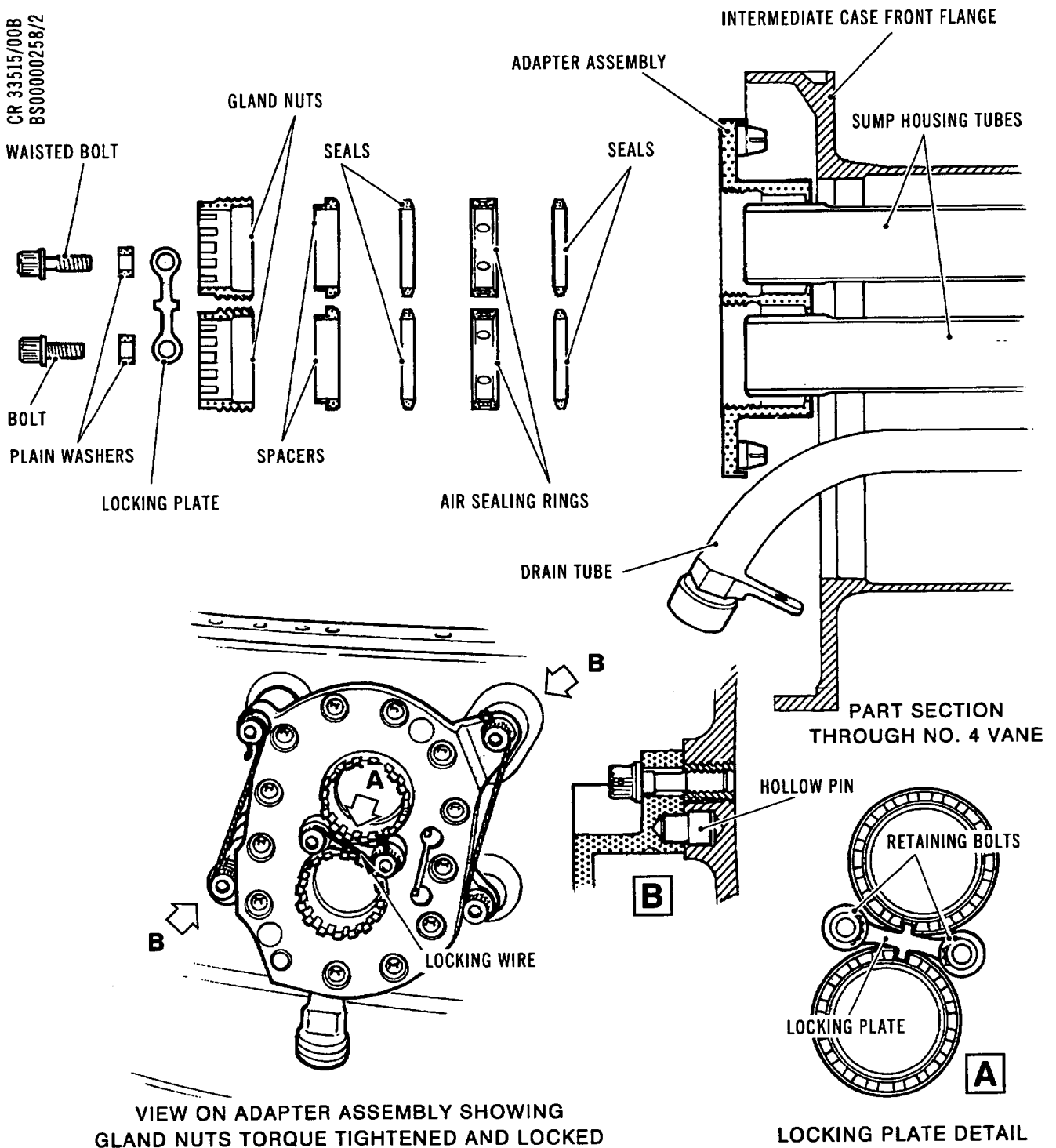
# OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

CR 33515/00B  
BS00000258/2



Assembling Adapter, Gland Nuts and Packing  
Figure 533

SUB-ASSEMBLY

72-32-00

Page 588

Jun 1/99



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

B. Assemble Gland Nuts and Packing (Ref.Fig.533).

CAUTION: WHEN ASSEMBLING A "SUPAGRAF" SEAL (72-120) TO THE STANDARD OF SB.OL.593-72-9026-408, CARE MUST BE TAKEN WHEN HANDLING, AS THEY ARE SOFT AND EASILY DAMAGED. THEY MUST BE LUBRICATED WITH ENGINE OIL BEFORE ASSEMBLY AND MUST NEVER BE RE-USED.

- (1) Assemble a seal (4-180) to each of the two tubes protruding through the adapter at No.4 vane, then assemble an air sealing ring (4-170) and another seal (4-180) to each tube and press the items into the adapter plate. Apply a light smear of jointing compound 'D' to the recessed diameters of two spacers (4-160), then assemble a spacer to each tube ensuring that the recessed diameter faces outboard.
- (2) With the items correctly assembled, lubricate two gland nuts (4-150) with lubricant 'A', then assemble a nut to each tube engaging them with the internal threads of the adapter. Screw down the two gland nuts by hand to nip the air sealing rings. Using wrench (Tool 1527) torque-tighten the two gland nuts (4-150) between 280 and 300 lbf in. (32,0 and 34,0 N.m), obtain a steady reading without movement of the nut. When this is achieved slacken off the gland nuts immediately, then torque-tighten each nut between 100 and 120 lbf in. (11,3 and 13,6 N.m).

NOTE: Prior to assembling the locking plate (4-140) it may be necessary to adjust the torque values of the gland nuts alternately, within the specified limits, to obviate malalignment of the locking tangs. If this is not possible torque-tighten to the next castellation.

- (3) Assemble a locking plate (4-140) so that the locking tangs locate both the gland nuts. Assemble two plain washers (4-130), then secure the locking plate with two bolts (4-120) lubricated with lubricant 'A'. Torque-tighten the bolts to 135 lbf in (15,2 N.m). Locking (Run-down) torque 3.5 lbf in. (0,4 N.m). Then wire-lock the bolts to each other.

SUB-ASSEMBLY

72-32-00

Page 589

Dec 31/01



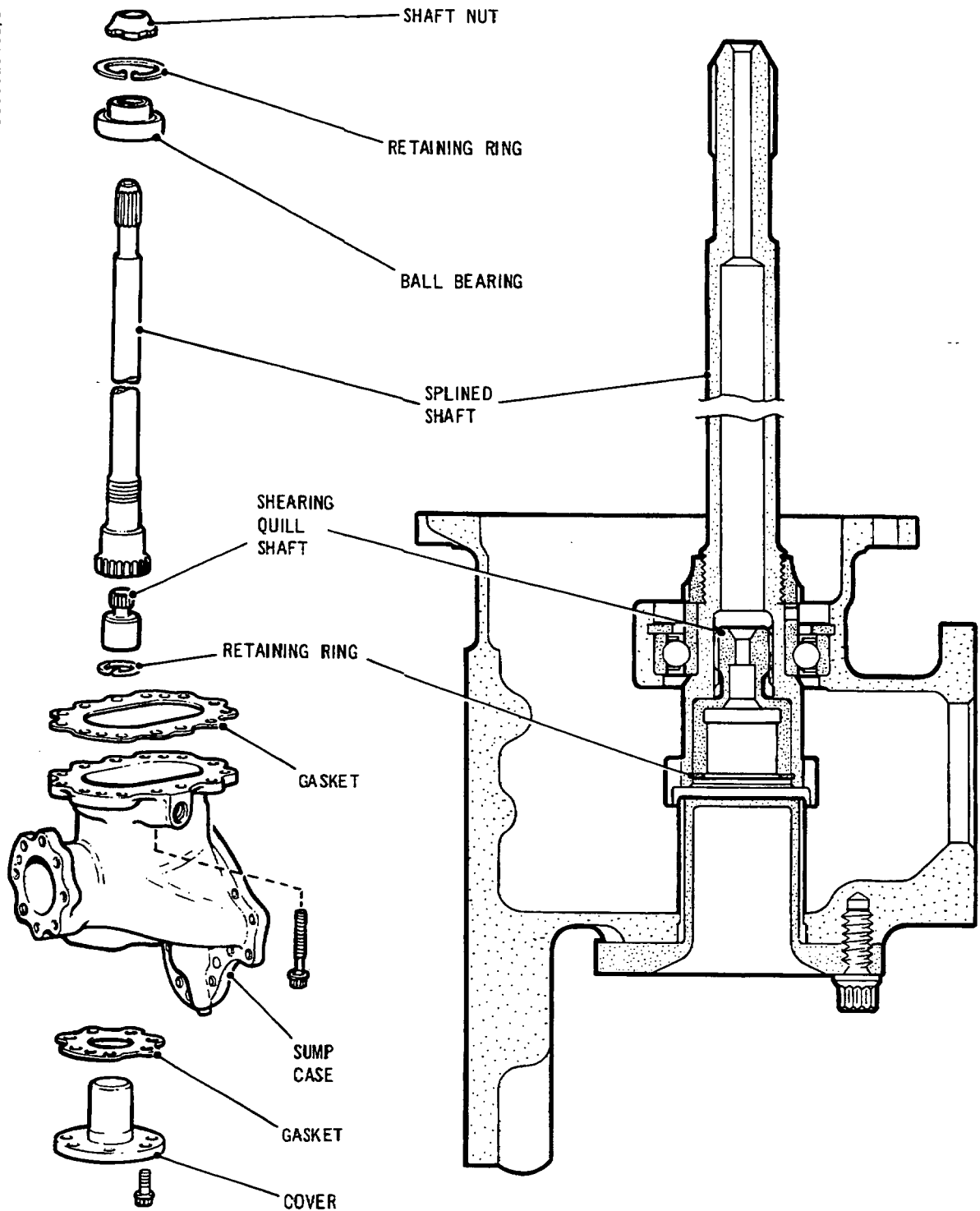
# OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

CR 33514/00A  
BS00025462/1



Assembling the LP Pulse Probe Drive Shaft and Bearing  
Figure 534

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

SNECMA

C. Assemble Pulse Probe Drive and Housing (Ref.Fig.534 and 535).

- (1) Prepare the bearing for assembly (Ref.72-09-00 Assembly).
- (2) Using driver (Tool 339) and support (Tool 337), assemble the ball bearing (72-64-00/1-70) to the splined shaft (72-64-00/1-80). Ensure that the self-locking feature of the retaining nut (72-64-00/1-50) is elliptical and not four lobed (Ref.S.B.72-105), then lubricate the nut with lubricant 'A' and screw it onto the shaft.
- (3) Retain the shaft with the holder (Tool 336), then check the locking torque of the nut, this should be between 4 and 35 lbf ft (5,4 and 47,4 N.m). Torque-tighten the nut between 40 and 50 lbf ft (54,2 and 67,8 N.m) then add the actual locking torque to the torque-tightening value.
- (4) Assemble the shearing quillshaft (72-64-00/1-40) (Ref.S.B.72-3) to the splined drive shaft (72-64-00/1-80), then secure the quillshaft with a retaining ring (72-64-00/1-30).
- (5) Using the mechanical driver (Tool 340) assemble the drive shaft and bearing assembly into the pulse probe drive housing (72-64-00/1-90), then secure the assembly with a retaining ring (72-64-00/1-60).
- (6) Place the gasket (72-64-00/1-140) over the drive shaft, then carefully insert the shaft into the upper aperture of the sump (nearest front flange of the intermediate case) at No.4 vane. Engage the splines of the shaft with those of the driven LP bevel gear, turning the gear slightly (if necessary) to effect engagement.
- (7) Align the gasket (72-64-00/1-140) with the bolt-holes, then press the housing onto its abutment face. Retain the housing with bolts (72-64-00/1-110 and 1-120) and nuts (72-64-00/1-100) lubricated with lubricant 'A'. Torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).

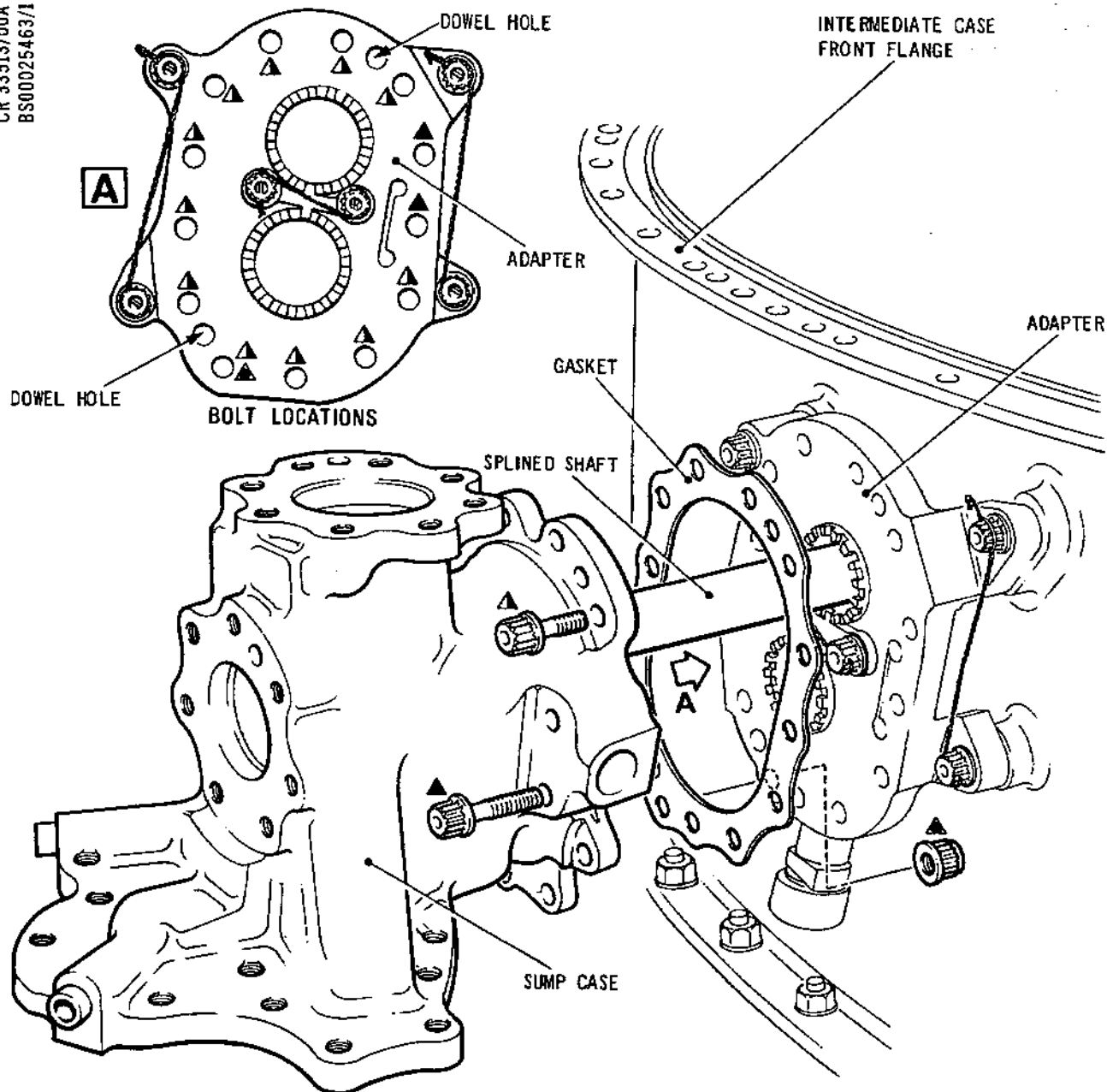
SUB-ASSEMBLY

**72-32-00**

Page 591

Jun 1/99

CR 33513/00A  
BS00025463/1



Assembling the LP Pulse Probe Drive and Housing to the Adapter  
Figure 535



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

# D. Assemble LP Pulse Probe to Drive Housing (Ref.Fig.536).

NOTE 1: Before assembling the LP pulse probe, refer to SB.76-9 and SB.76-11.

NOTE 2: If for any reason the LP pulse probe is not assembled at this stage, assemble protector (Tool 570) to the drive housing location.

- (1) Remove the pulse probe (76-12-01/1-10) from its protective container, check that the probe is not damaged. Assemble the probe and Corruplus seal (76-12-01/1-40) to the uppermost face of the drive housing (72-64-00/1-90), then secure the probe with eight bolts (76-12-01/1-20) lubricated with lubricant 'A'. Torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).
- (2) Ensure that the gap between the pulse probe and the splines of the drive shaft is between 0.010 and 0.020 in. (0,254 and 0,508 mm).

NOTE: Before assembling the drive housing cover refer to S.B.72-41.

- (3) Assemble the drive housing cover (72-64-00/1-20) and gasket (72-64-00/1-25) to the drive housing and secure with seven bolts (72-64-00/1-10) lubricated with lubricant 'A'. Torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).

# E. Assemble the Oil Pressure Transmitter to Drive Housing (Sump Case) (Ref.Fig.536).

NOTE: If for any reason the oil pressure transmitter is not assembled at this stage, assemble protector (Tool 571) to the drive housing location.

- (1) Ensure that the transmitter flange face is clean and undamaged. Assemble two seals (79-33-01/1-70 and 79-33-01/1-80) to the oil pressure transmitter flange (79-33-01/1-10), then assemble the transmitter to the drive housing. Lubricate seven bolts (79-33-01/1-20) with lubricant 'A', then secure the transmitter with the bolts. Torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).

SUB-ASSEMBLY

72-32-00

Page 593

Jun 1/99



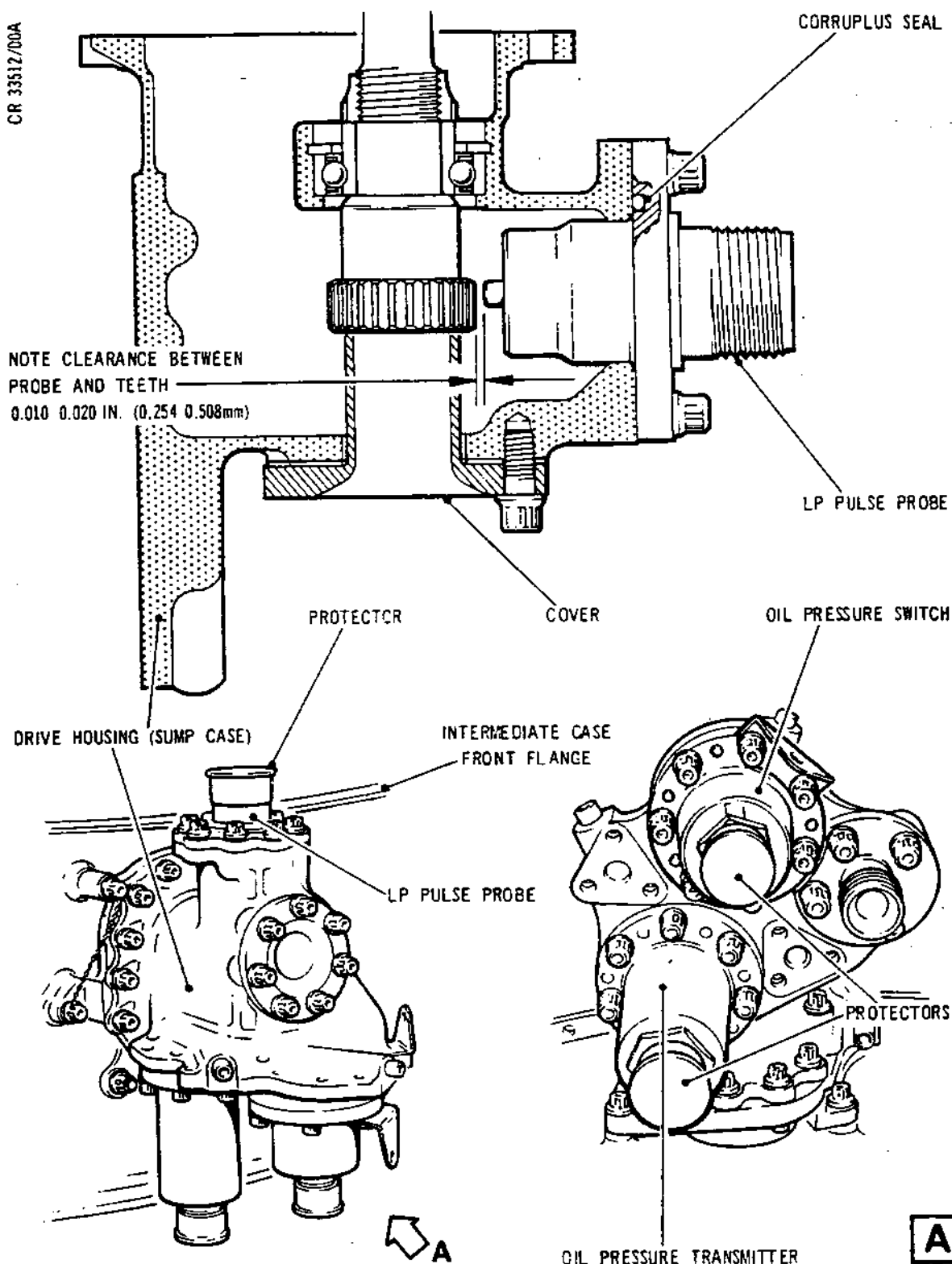
OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

CR 33512/00A



Assembling Oil Switches and Pulse Probe  
Figure 536





OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- F. Assemble the Oil Pressure Switch to Drive Housing  
(Ref.Fig.536).

NOTE: If for any reason the oil pressure switch is not assembled at this stage, assemble protector (Tool 572) to the drive housing location.

- (1) Ensure that the flange of the pressure switch (79-33-02/1-10) is clean and free from damage, then assemble two seals (79-33-02/1-70 and 79-33-02/1-80) to the switch flange. Lubricate seven bolts (79-33-02/1-20) with lubricant 'A', then secure the switch, together with a bracket. Torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).
- (2) Assemble the following protectors if not already assembled.
  - (a) Protector (Tool 574) to the bearing failure warning tube location and oil drain tube location.
  - (b) Protector (Tool 573) to the scavenge tube location.

Printed in England

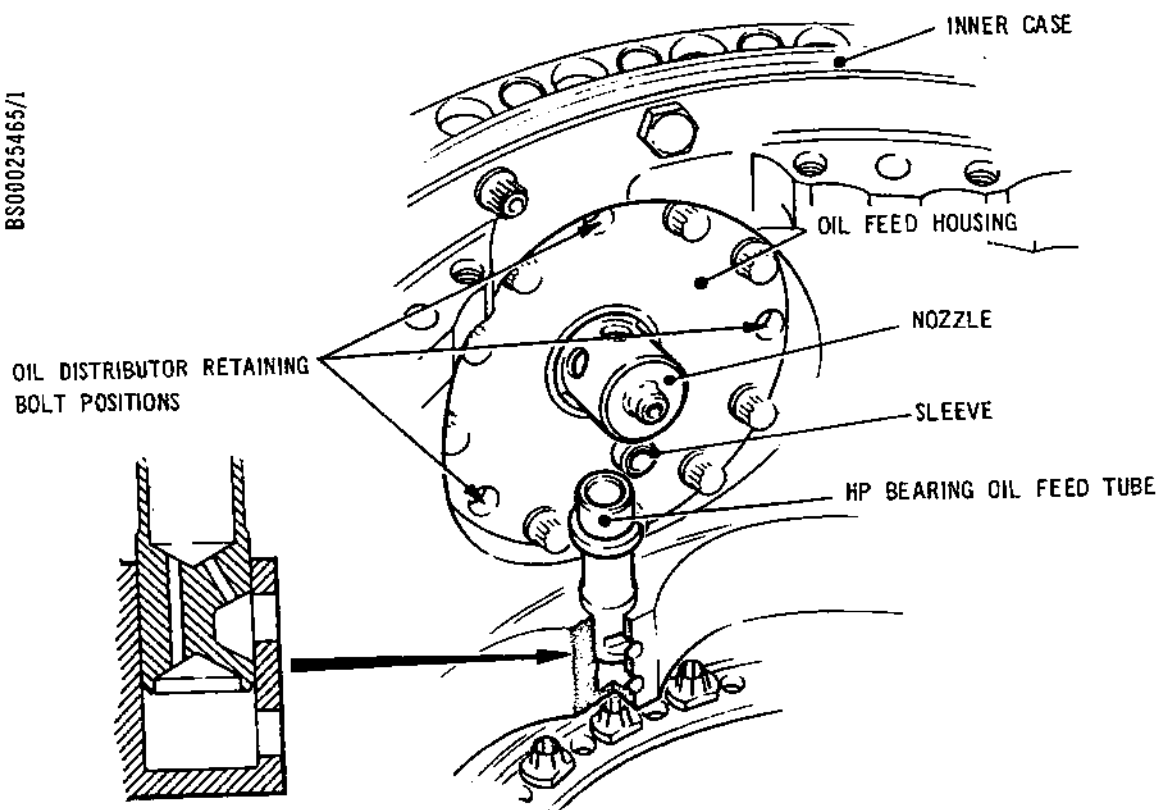
SUB-ASSEMBLY

72-32-00

Page 595

Jun 1/99

CR 30701/00B  
BS00025465/1



Assembling HP Bearing Oil Feed Tube and Nozzle  
Figure 537



# OLYMPUS 593

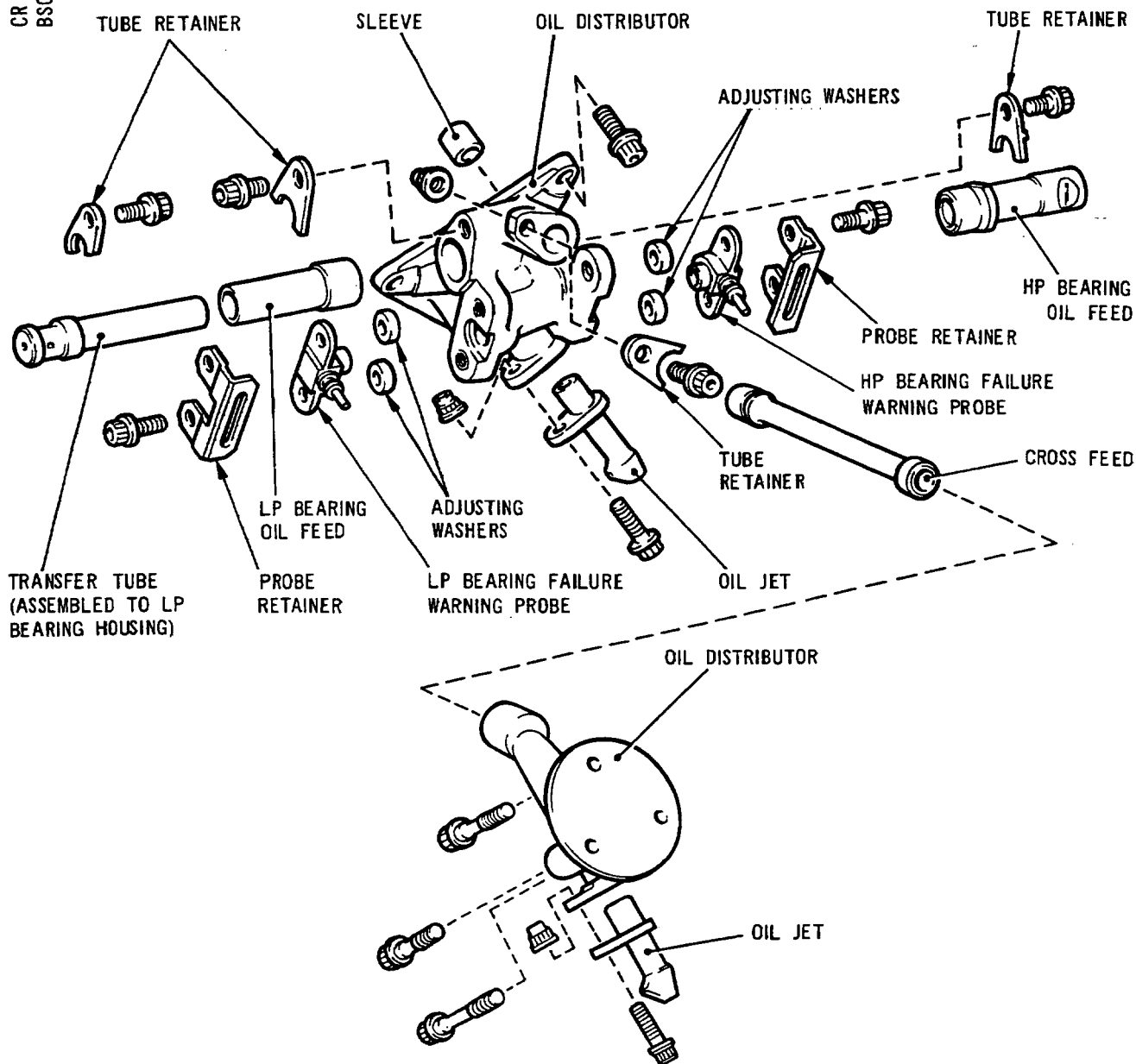
MK.610-14-28  
OVERHAUL



sneema

CR 33456/00A  
BS00025466/1

Printed in England



Assembling the Lubrication System  
Figure 538

SUB-ASSEMBLY  
**72-32-00**  
Page 597  
Jun 1/99



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

#### 14. Assemble the Lubrication System (Ref.Fig.537 and 538)

##### A. Assemble Oil Jets and Tubes.

- (1) Remove protectors from the distributor (3-410) then check that all passages in the oil distributor (3-410) are unrestricted and that flanges are undamaged. Assemble an oil jet (3-140) to the distributor and secure with a bolt (3-130) and nut (3-120) lubricated with lubricant 'A'. Torque-tighten the bolt to 135 lbf in. (15,2 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).
- (2) Assemble a nozzle (4-50), if not already assembled, to its location in the oil feed housing (4-60).
- (3) Ensure that a sleeve (3-440) is in position in the distributor (3-410). Check that the oil feed tube (3-400) has freedom of movement in its location in the inner case, and that the tube has a reasonable sliding movement, then press the tube without force to the bottom of its well. Ensure that the cut-away in the feed tube faces the two delivery holes in the HP feed location.

##### B. Assemble Oil Distributor to No.2 Vane.

- (1) Carefully manipulate the oil distributor (3-410) to align the sleeve (3-440) and nozzle (4-50) in their respective locations in the oil feed housing (4-60) already assembled to the inner case.
- (2) Support the distributor, then pull the oil tube (3-400) up and press it into its location in the distributor. Apply lubricant 'A' to three bolts (3-420), then retain the distributor, do not tighten the bolts at this stage.
- (3) Secure the oil tube with a retaining plate (3-390) and bolt (3-380) lubricated with lubricant 'A'.

NOTE: It may be necessary to slacken the distributor securing bolts and adjust (by slight movement) either the oil feed tube or retaining plate to align the flat on the feed tube with the retaining plate.

SUB-ASSEMBLY

**72-32-00**

Page 598

Dec 31/01



OLYMPUS 593



MK.610-14-28

SNECMA

OVERHAUL

- (4) Torque-tighten the three distributor securing bolts to 135 lbf in. (15,2 N.m). Torque-tighten the oil tube retaining plate bolt between 85 and 95 lbf in. (9,6 and 10,7 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).
- (5) Assemble the oil transfer tube (3-110) to its cross feed location in the distributor, then push the tube fully home to allow the oil distributor at No.6 vane to be assembled.
- (6) Assemble the oil transfer tube (3-370) to the LP bearing feed location in the distributor and secure with a retaining plate (3-360) and bolt (3-350) lubricated with lubricant 'A'. Torque-tighten the bolt to 135 lbf in. (15,2 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).

C. Assemble Oil Distributor to Inner Case.

- (1) Assemble the oil jet (3-30) to its location in the distributor (3-70), then retain the jet with a bolt (3-20) lubricated with lubricant 'A' and a nut (3-10).
- (2) Assemble the distributor (3-70) to its location in the inner case in line with No.6 vane. Retain the distributor at the top position with a bolt (3-60), the bottom right-hand position of the flange with a bolt (3-50) and bottom left-hand position on the flange with bolt (3-40). The three bolts to be lubricated with lubricant 'A'.

NOTE: The angular positions for the three bolts is relative to the intermediate case front flange being uppermost and the operator facing the distributor (3-70).

- (3) Torque-tighten the distributor (3-70) retaining bolts to 135 lbf in. (15,2 N.m), then torque-tighten the oil jet (3-30) retaining bolt (3-20) to 135 lbf in. (15,2 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).

SUB-ASSEMBLY

72-32-00

Page 598.1

Dec 31/01



OLYMPUS 593



MK.610-14-28  
OVERHAUL

snecma

- (4) Withdraw the transfer tube (3-110) at the cross-feed position in No.2 vane distributor and slide the tube into its location in the distributor. Retain the transfer tube with a retaining plate (3-100), bolt (3-90) and nut (3-80) lubricated with lubricant 'A'. Torque-tighten the bolt to 135 lbf in. (15,2 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).
- (5) Assemble a blank (Tool 399) and seal to the LP bearing transfer feed tube.

#### 15. Assemble LP and HP Bearing Failure Probes to Oil Distributor

CAUTION: THE FRANGIBLE PROBES ARE SUSCEPTIBLE TO DAMAGE DURING THE SETTING PROCEDURE, AND IF KNOCKED WHILST BEING ASSEMBLED THEY SHOULD BE REMOVED AND SUBJECTED TO AN INSPECTION FOR CRACKING AND DISTORTION. IF A PROBE IS FOUND DAMAGED IT SHOULD BE REJECTED.

##### A. Assemble Adjusting Washers, Probes and Oil Distributor (Ref.Fig.538).

- (1) Select from the range of adjusting washers (3-180), two of the thinnest (0.110 in. (2,794 mm)), then assemble a probe (3-170), probe retainer (3-160) and the two selected adjusting washers to the LP location of the oil distributor (3-410). Temporarily retain the probe assembly with two bolts (3-150).

SUB-ASSEMBLY

72-32-00

Page 598.2

Dec 31/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

- (2) Assemble a probe (3-170) together with its retainer (3-160) and two 0.110 in. (2,794 mm) thick adjusting washers (3-180), to the HP location of the oil distributor (3-410). Temporarily retain the probe assembly with two bolts (3-150).
- (3) Assemble the transfer sleeve (3-440) to its location in the distributor (3-410), then assemble the distributor to No.2 vane position in the inner case. Temporarily retain the distributor with three bolts (3-420).

**B. Determine Thickness of LP Bearing Failure Probe Adjusting Washers (Ref.Fig.539).**

**NOTE:** To enable the thickness of the adjusting washers to be determined, a dimension 'G' from the LP Compressor Assembly/Module must be available. If the LP Compressor Assembly/Module or the dimension 'G' is not available, then para.B. cannot be carried out, and the correct washers cannot be determined and assembled. As a temporary measure, assemble the original adjusting washers, but attach a label stating that the washer thickness must be determined, and the correct washers assembled. This must be carried out prior to assembling the LP Compressor Assembly/Module to the Intermediate Case Assembly/Module in accordance with Assembly 72-00-00 Para.7.D.

- (1) Ensure the intermediate case is positioned front flange uppermost.
- (2) Locate the measuring fixture (Tool 21) on the front flange of the inner case, aligning the claw and probe.
- (3) Adjust the claw of the gauge so that it is in contact with the rear face of the LP probe and, the alignment arrows on the top face of the gauge point towards each other.
- (4) Using slip gauges measure the distance between the top of the gauge and the thumbnut and record as dimension 'B'.
- (5) Obtain dimension 'G' from the LP compressor section (72-31-00) build record sheets.

SUB-ASSEMBLY  
**72-32-00**

Page 598.3  
Jun 1/99

CR 33494/00A  
BS00025501/1

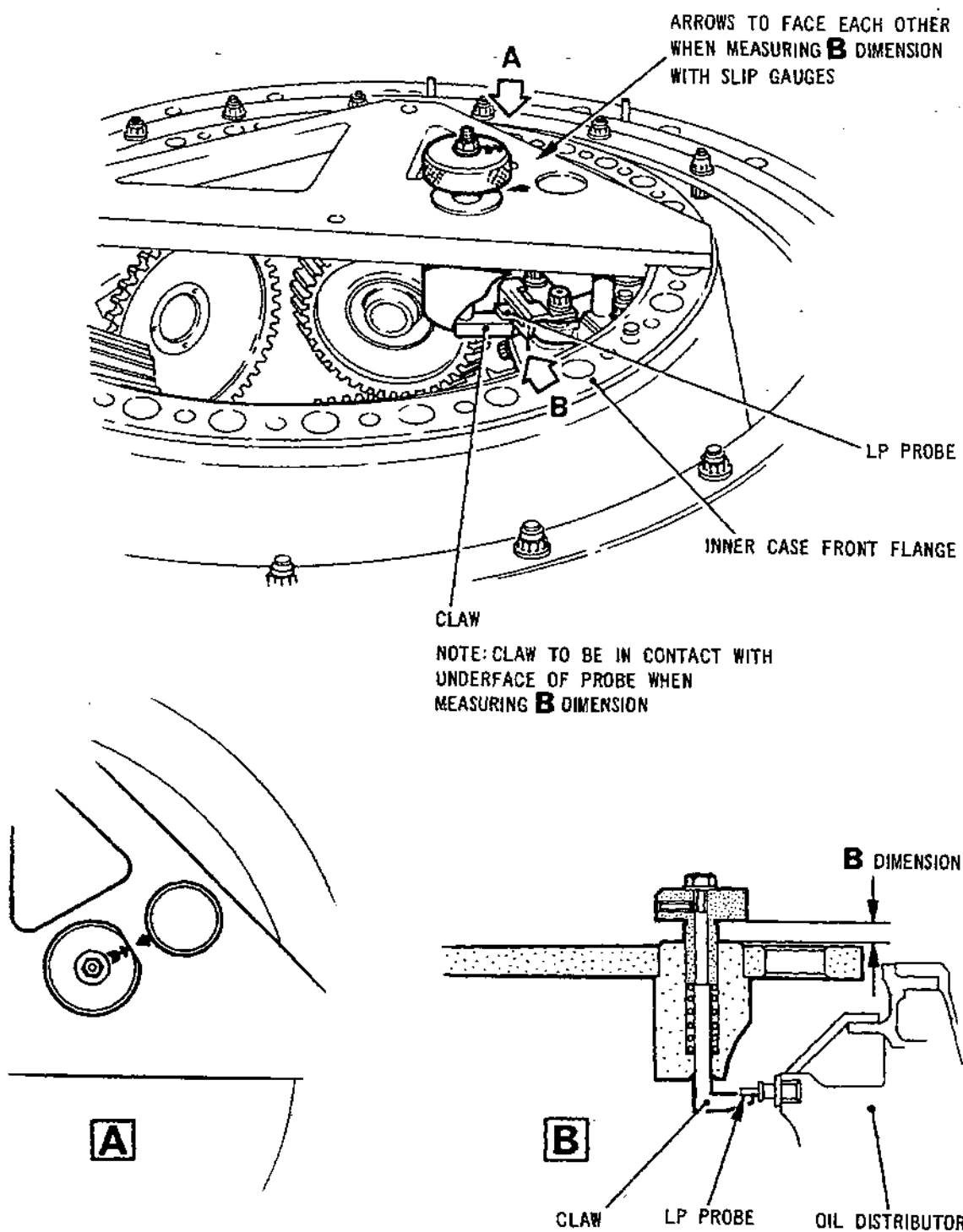


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Determining the Thickness of LP Bearing Failure  
Probe Adjusting Washers  
Figure 539





OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (6) Using the following formula, calculate the required thickness of the LP probe adjusting washers (3-180) to produce the desired clearance between the probe and operating ring of between 0.024 and 0.029 in. (0,609 and 0,736 mm) for SB.72-21 standard, or between 0.020 and 0.025 in. (0,508 and 0,635 mm) for pre-SB.72-21 standard engines.

- (a) The required adjusting washer thickness =  
 $D + (\text{size of washer assembled for check}) +$   
 $(\text{desired clearance}) - G$

NOTE: D = 2.563 - dimension B.

- (7) Select two adjusting washers (3-180) that will produce a clearance between the probe and operating probe ring of between 0.024 and 0.029 in. (0,609 and 0,736 mm) for SB.72-21 standard, or between 0.020 and 0.025 in. (0,508 and 0,635 mm) for pre-SB.72-21 standard engines. Remove the gauge (Tool 21) and place it in container (Tool 263).
- (8) Remove the LP probe (3-170) and retainer (3-160) from the oil distributor, then remove the two adjusting washers used for the check.

CAUTION: THE FRANGIBLE PROBES ARE SUSCEPTIBLE TO DAMAGE DURING THE SETTING PROCEDURE, AND IF KNOCKED WHILST BEING ASSEMBLED THEY SHOULD BE REMOVED AND SUBJECTED TO AN INSPECTION FOR CRACKING AND DISTORTION. IF A PROBE IS FOUND DAMAGED IT SHOULD BE REJECTED.

- (9) Reassemble the probe retainer and the two selected adjusting washers (3-180) (72-09-21 Repair, Fig.407) to the distributor. Secure the probe with two bolts (3-150) lubricated with lubricant 'A'. Torque-tighten the bolts to 135 lbf in. (15,2 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).

SUB-ASSEMBLY

72-32-00

Page 598.5

Dec 31/01



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

CR 33491/00A  
BS00025467/1

REAR LAND OF PROBE RING

NOTE: LOCK GAUGE TO  
THIS DIMENSION THEN  
TRANSFER TO INNER  
CASE

LOCKING SCREW  
HP BEARING HOUSING  
ABUTMENT FACE

GAUGE  
THUMBSCREW

SECTION THROUGH HP ASSEMBLY AND GAUGE

WING NUT  
PROBE OPERATING RING  
HP BEVEL GEAR  
HP OIL BAFFLE  
ADJUSTING WASHER  
HP BEARING  
HP BEARING HOUSING  
FIXTURE  
SURFACE TABLE

OIL DISTRIBUTOR

HP PROBE

PROBE RETAINER

OIL DISTRIBUTOR

LP PROBE

ADJUSTING WASHER

HP PROBE

PROBE RETAINER

MEASURING K DIMENSION

INNER CASE  
REAR FLANGE  
GAUGE PRE-SET  
AND LOCKED  
LOCKING SCREW

ADJUSTING  
SCREW

Determining Thickness of the HP Bearing Failure  
Probe Adjusting Washers

Figure 540

SUB-ASSEMBLY

## 72-32-00

Page 598.6

Jun 1/99

**OLYMPUS 593**

MK.610-14-28

sneema

OVERHAUL

C. Determine Thickness of HP Bearing Failure Probe Adjusting Washers (Ref.Fig.540).

- (1) Prepare the HP bearing (Ref.72-09-00 Assembly). Assemble the HP bearing (2-210) to the HP bearing housing (2-80), then locate the assembly on the fixture (Tool 826). Assemble the correct size adjusting washer (72-61-00/1-50) (Ref.para.5.G.(2)), bevel gear (72-61-00/1-41), operating probe ring/labyrinth assembly (72-61-00/1-30) to the fixture and secure the items to the fixture with the wingnut. Tighten the wingnut sufficiently to take up the bearing end-float.
- (2) Set the gauge (Tool 44) to the dimension from the operating probe ring rear land to the abutment face of the HP bearing housing and lock the gauge with the locking screw. With the setting gauge (Tool 44) locked securely, unscrew the bottom thumbscrew to release the gauge, then transfer the gauge to the inner case rear flange and secure with the thumbscrew. With the setting gauge correctly positioned, determine the dimension between the setting gauge and the rear face of the HP probe, record this as dimension K. The required adjusting washer size = Dimension K + (washer assembled for check) - between 0.022 and 0.027 in. (0,558 and 0,685 mm) for SB.72-29 standard, or between 0.020 and 0,025 in. (0,508 and 0,635 mm) for pre-SB.72-29 standard engine.
- (3) Remove gauge, do not disturb the setting. Remove the HP probe retainer, HP probe and the two adjusting washers assembled for the check, from the oil distributor.

CAUTION: THE FRANGIBLE PROBES ARE SUSCEPTIBLE TO DAMAGE DURING THE SETTING PROCEDURE, AND IF KNOCKED WHILST BEING ASSEMBLED THEY SHOULD BE REMOVED AND SUBJECTED TO AN INSPECTION FOR CRACKING AND DISTORTION. IF A PROBE IS FOUND DAMAGED IT SHOULD BE REJECTED.

SUB-ASSEMBLY

**72-32-00**

Page 598.7

Jun 1/99



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (4) Reassemble the HP probe, probe retainer and the two selected adjusting washers (3-180) (72-09-21 Repair, Fig.407) to the distributor. Lubricate two bolts (3-150) with lubricant 'A', then secure the probe assembly. Torque-tighten the bolts to 135 lbf in. (15,2 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m). Reassemble the gauge, then check the gap between probe and gauge to prove the desired 0.022/0.027 in. (0,558/ 0,685 mm) clearance for engines to SB.72-29 standard, or between 0.020 and 0.025 in. (0,508 and 0,635 mm) for engines to pre-SB.72-29 standard.
- (5) After completing the check, remove the gauge and place it in the container (Tool 825). Remove the oil distributor.
- (6) Assemble protectors to the following locations.
  - (a) Protector (Tool 433) to the oil filter location in the distributor.
  - (b) Protector (Tool 1814) to the LP bearing feed location in the distributor.
  - (c) Protector (Tool 1815) to the HP bearing feed location in the distributor.
  - (d) Protector (Tool 1816) to the oil jet location in the distributor.
  - (e) Protector (Tool 565) to the cross-feed location in the distributor, temporarily retain the protector with a retaining plate (3-100), bolt (3-90) and nut (3-80).
  - (f) Protectors (Tool 1817) to the oil distributor (3-70).

SUB-ASSEMBLY

72-32-00

Page 598.8

Dec 31/01



OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

Printed in England

DELETED

Raising the Left-hand Gearbox  
Figure 541

SUB-ASSEMBLY  
**72-32-00**  
Page 598.9  
Jun 1/99

Printed in England



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

DELETED

Assembling the Left-hand Gearbox to Determine  
Adjusting Shim Thickness  
Figure 542

SUB-ASSEMBLY

**72-32-00**

Page 598.10

Jun 1/99



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

16. Temporarily Assemble Left-hand Gearbox

- A. Determine Thickness of Adjusting Shims for Front and Rear Mounting Brackets.

NOTE: The procedure for determining the thickness of adjusting shims for front and rear gearbox mounting brackets is transferred from the intermediate case section to the engine build section. Refer Assembly 72-00-00, para.28.

Printed in England

SUB-ASSEMBLY

**72-32-00**

Page 598.11

Jun 1/99



OLYMPUS 593

MK.610-14-28  
OVERHAUL



*sneema*

Printed in England

This Page Left Blank Intentionally

SUB-ASSEMBLY

**72-32-00**

Page 598.12

Jun 1/99





OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England

DELETED

Preparing to Assemble the Right-hand Gearbox  
to Determine Adjusting Washers  
Figure 543

SUB-ASSEMBLY  
**72-32-00**  
Page 598.13  
Jun 1/99

This Page Left Blank Intentionally



OLYMPUS 593



MK.610-14-28  
OVERHAUL  
SMECMA



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

17. Temporarily Assemble Right-hand Gearbox

- A. Determine Thickness of Adjusting Shims for Front and Rear Mounting Brackets.

NOTE: The procedure for determining the thickness of adjusting shims for front and rear gearbox mounting brackets is transferred from the intermediate case section to the engine build section. Refer Assembly 72-00-00, para.26.

Printed in England

SUB-ASSEMBLY

**72-32-00**

Page 598.15

Jun 1/99



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England

This Page Left Blank Intentionally

SUB-ASSEMBLY

**72-32-00**

Page 598.16

Jun 1/99



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

18. Pressure Test the Intermediate Case

A. Check the Oil Distributor and Oilways for Flow  
(Ref.Fig.544).

- (1) Turn the intermediate case until No.1 vane is uppermost.
- (2) Place a suitable container to collect drainage oil beneath the intermediate case.
- (3) Allow a quantity of clean lubricant A to enter the oil feed tube orifice at No.2 vane, then observe the emission of oil from the accessory gear oil feed jets, LP oil feed and the HP oil feed orifice.
- (4) After completion of the check, allow surplus oil to drain, then remove the container.
- (5) If the check is unsatisfactory and a blockage in the system is indicated then rectify the fault before proceeding further.

Printed in England

SUB-ASSEMBLY

**72-32-00**

Page 598.17

Jun 1/99

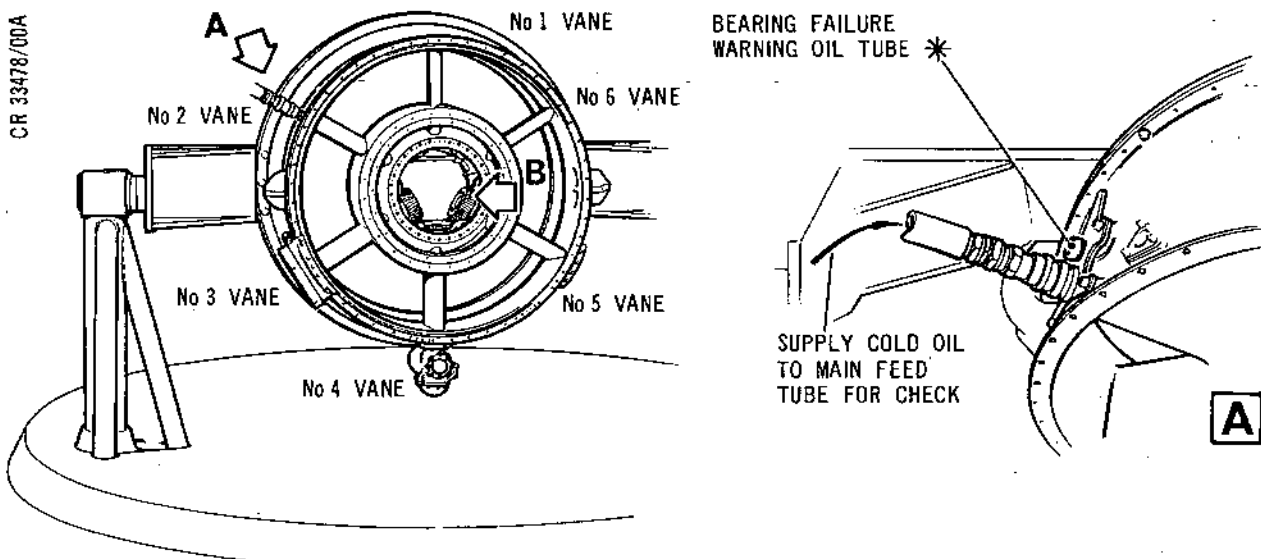


OLYMPUS 593

MK. 610-14-28  
OVERHAUL

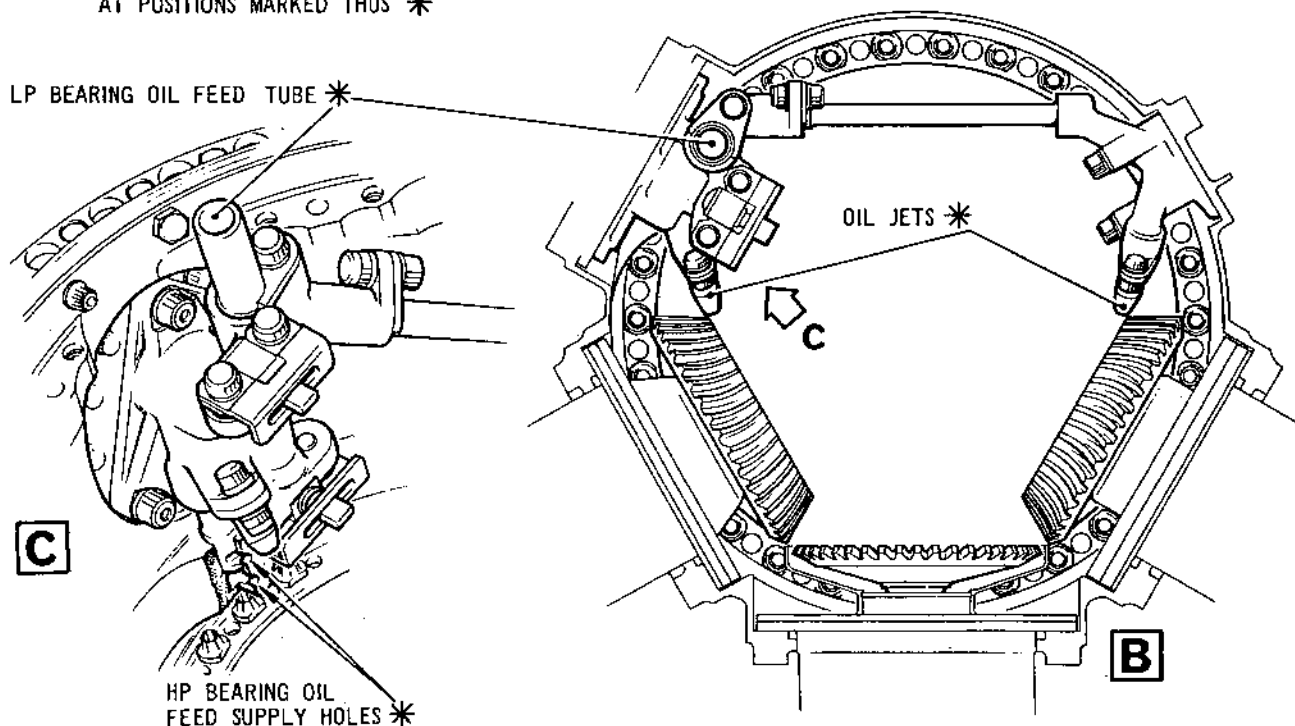


CR 33478/00A



VIEW ON INTERMEDIATE CASE LOOKING REARWARD

NOTE: OBSERVE EMISSION OF OIL  
AT POSITIONS MARKED THUS \*



VIEW ON INNER CAVITY SHOWING OIL DISTRIBUTORS AND JETS

Checking the Oilways  
Figure 544



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

B. Assemble HP Bearing to Housing and Housing to Case.

- (1) Assemble the HP bevel gear (driver) (72-61-00/1-41) to the inner case, resting the gear on the two driven bevel gears, then assemble the previously calculated bevel gear adjusting washer (72-61-00/1-50).
- (2) Check that the air baffle (2-240) has been correctly assembled to the inner case, that the oil baffle (2-100) has been assembled to the HP bearing housing (2-80) and that the seal location is clean.
- (3) Install 'C' seal SB.0L593-72-9053-426 Standard. Assemble the 'C' seal (2-230) to the HP bearing housing abutment flange in the inner case.
- (4) Assemble the HP bearing housing to the inner case aligning the TOP position of the housing with the TOP of the case. Secure the bearing housing at its outer location with 18 bolts (2-220) lubricated with lubricant 'A'. Torque-tighten the bolts to 135 lbf in. (15,2 N.m). Locking (run-down torque 3.5 lbf in. (0,4 N.m).
- (5) Secure the housing at the mid location with the slave spacer and captive bolts (Tool 249).
- (6) Remove the HP thrust bearing (2-210) from its protective container then check that it has its full complement of ball bearings.

NOTE: The HP bearing is a single row race thrust bearing.

- (7) Ensure that the thrust arrows marked on the inside diameter of the inner tracks are aligned (Ref. Fig.545), then assemble the HP thrust bearing to the bearing housing with the arrows pointing forward. Assemble the oil thrower (2-120) and bearing retainer (2-110) to the bearing housing.



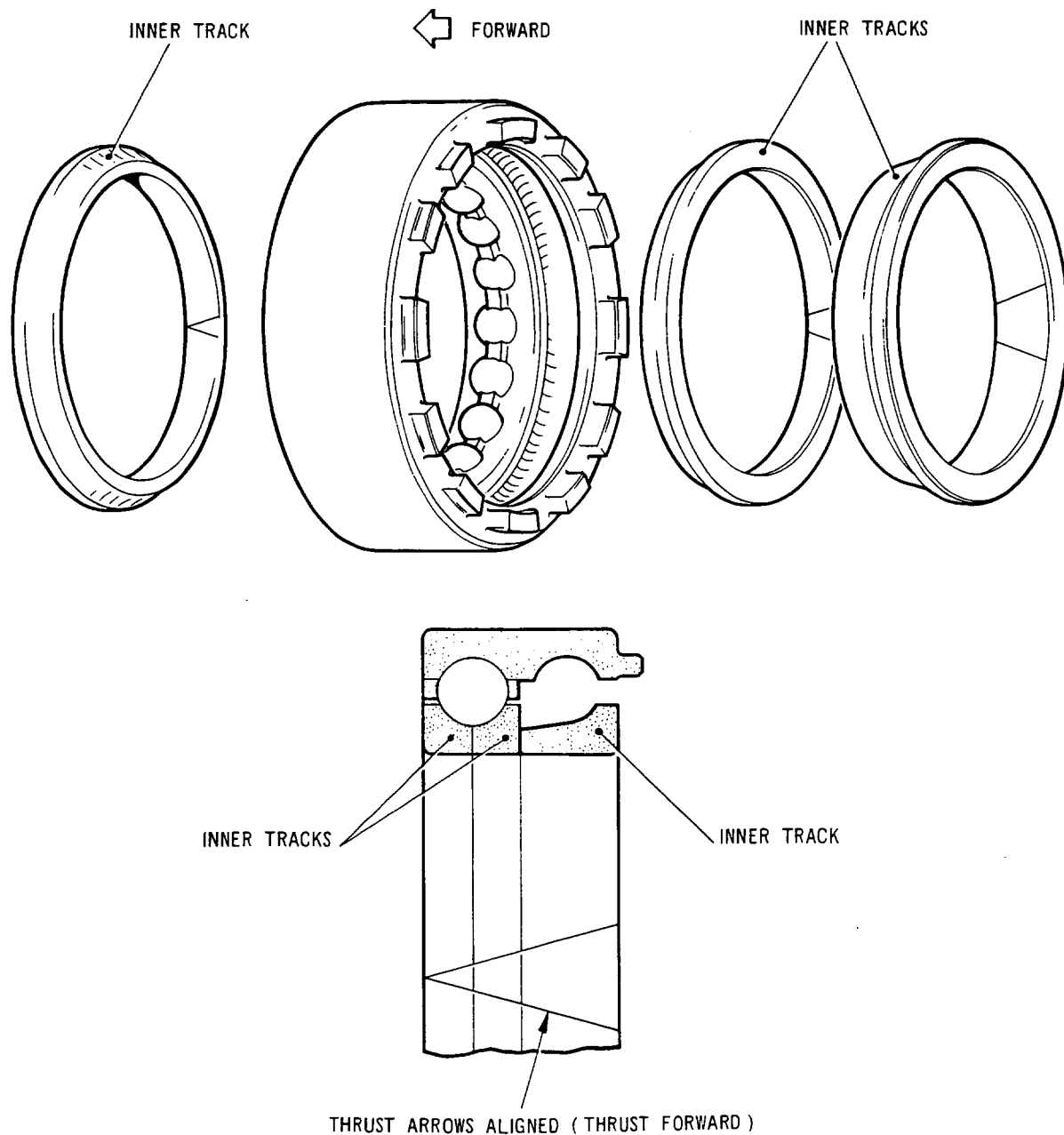
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 31460/00A



Preparing the HP Bearing  
Figure 545





OLYMPUS 593



MK.610-14-28  
OVERHAUL

shema

- (8) Install labyrinth housing to bearing housing SB.0L.593-72-9053-426 Standard. Assemble the 'C' seal (2-70) and inner labyrinth housing (2-60) to the bearing housing. Apply locking compound 'C' under the heads of the bolts (2-50) and apply lubricant 'A' to the threads, then secure the items. Torque-tighten the bolts in correct sequence (Ref.72-09-00) to 135 lbf in. (15,2 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).

C. Assemble the LP Bearing Assembly.

NOTE: The LP thrust bearing is a double row race. Prior to assembly ensure that the thrust arrows on the inside diameter of the inner tracks are correlated and point forward (Ref.Fig.514).

- (1) Using the stand handle turn the intermediate case until the front flange is uppermost.
- (2) Assemble the oil thrower (1-200) to the bearing housing (1-270), then assemble the LP bearing (1-190) with the thrust arrows pointing forward. Assemble the LP bearing retainer (1-170) to the bearing housing, then secure with bolts (1-160) lubricated with lubricant 'A'. Torque-tighten the bolts to 135 lbf in. (15,2 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).
- (3) Assemble four pressure blanks (Tool 1915) and two pressure blanks (Tool 1916) and six gaskets to the static seal locations in the inner case. Refer to Fig.547 for assembly detail.
- (4) Check that the LP oil transfer tube outer (3-370) is in position in the oil distributor at No.2 vane and the LP oil transfer tube inner (3-340) is in position in the LP bearing housing.

SUB-ASSEMBLY

72-32-00

Page 598.21

Dec 31/01



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (5) Install 'C' seal SB.0L593-72-9053-426 Standard. Assemble the 'C' seal (1-320) to the inner case. Do not use jointing compound.

NOTE: For the purposes of pressure testing only, a seal that has already been used may be fitted.

- (6) Assemble the LP bearing housing (1-270) to the inner case aligning the TOP symbols with the TOP of the case. Secure the housing to the inner case with a spacer ring (Tool 252) and slave bolts, and at the outer position with a slave spacer (Tool 250) and slave bolts.
- (7) Ensure that the seals are in position in the two clamp ends of the pressure test equipment (Tool 1820), then assemble the equipment to the LP and HP bearing housing assemblies, engaging the threads of the long bolt in the clamp end assembled to the LP housing. Tighten sufficiently to form an effective seal but do not overtighten. Assemble a blank (Tool 616) to the LP side of seal plate.

D. Assemble Pressure Test Equipment to the Outer Case.

- (1) Assemble an inlet feed adapter (Tool 1819) to the oil feed tube (4-60) at No.2 vane, then assemble a blank (Tool 441) to the bearing failure warning tube (4-100).
- (2) Assemble blank to gearbox mounting bracket.
  - (a) On engines to pre SB.72-8689-272 standard, assemble blank (Tool 439) and lockring (Tool 690) to the mounting bracket at vane No.3.
  - (b) On engines to SB.72-8689-272 standard, ensure that a serviceable seal is installed on the blank (Tool 3123) then assemble the blank to the mounting bracket at vane No.3 and secure it with the 18 bolts, flat washers and nuts.



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

Printed in England

(c) Assemble adapter (Tool 442) to the air pressurizing connector.

- (3) Assemble a gasket (8-210) and blank cover (8-200) to the right-hand gearbox mounting bracket (No.3 vane) then retain the blank cover and gasket with three bolts (8-190) lubricated with lubricant 'A'. Torque-tighten the bolts to 135 lbf in. (15,2 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).
- (4) Assemble a blank (Tool 689) to the bearing failure warning tube location at No.4 vane (LP pulse probe drive housing flange). Assemble a blank (Tool 1821) to the oil scavenge tube location at No.4 vane. Assemble a blank (Tool 815) to the LP pulse probe drive housing flange (72-64-00/1-90), if the drain tube from the right-hand gearbox adapter, pressure switch and transmitter have not been assembled. If the LP probe is not in position (No.4 vane) then assemble a blank (Tool 816).
- (5) Assemble a blank (Tool 892) to the left-hand gearbox adapter location at No.5 vane.

E. Connect Mobile Oil Rig to Intermediate Case (Ref.Fig.546).

**WARNING:** A HIGH OIL TEMPERATURE WILL BE MAINTAINED DURING PRESSURE TEST, SAFETY PRECAUTIONS MUST BE STRICTLY OBSERVED AT ALL TIMES.

- (1) Position the mobile pressure test rig (Tool 1926) at a convenient point near the intermediate case.
- (2) Position the protection screens (Tool 829) around the oil rig and intermediate case.
- (3) Withdraw the dipstick from the rig and check the oil level, if necessary top up the rig to the required level with lubricant 'A'.
- (4) Ensure that the circulating pump motor switch and the oil heater switch, at the rear of the rig, are both in the 'OFF' position.
- (5) Connect the oil feed line from the rig to the oil inlet adapter (Tool 1819) at vane 2 of the intermediate case.

SUB-ASSEMBLY

## 72-32-00

Page 598.23

Dec 31/01



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (6) Connect the rig test return line to the No.4 vane scavenge location of the intermediate case. Using the stand handle turn the intermediate case until No.4 vane is uppermost.
- (7) Remove the electrical cable from the oil test rig then plug it into the shop supply (30 amp 600 volt). Refer to the manufacturers recommendations for general information about the oil rig.

F. Check Connectors and Pressure Blanks (Ref.Fig.546).

NOTE : This is a preliminary check to ensure that the oil test rig functions correctly and that pressure blanks and adapters assembled to the intermediate case do not leak oil.

- (1) Ensure that the oil pressure control on the supply rig is closed.
- (2) Switch on the shop electricity supply.
- (3) Switch on the circulating pump motor.
- (4) Regulate the oil pressure control on the supply rig to deliver oil at 10 psig (69 kPa) measured on the gauge in the line at No.2 vane.
- (5) Allow the circulating pump motor to run long enough to prime the intermediate case with oil and to expel air.
- (6) Check all screwed connections, blanks and adapters on the intermediate case for leaks. If a leak occurs at any of these points switch off the circulating pump, investigate the nature of the leak and rectify as necessary.
- (7) If the check is satisfactory switch off the circulating pump motor.

SUB-ASSEMBLY

72-32-00

Page 598.24

Jul 1/76

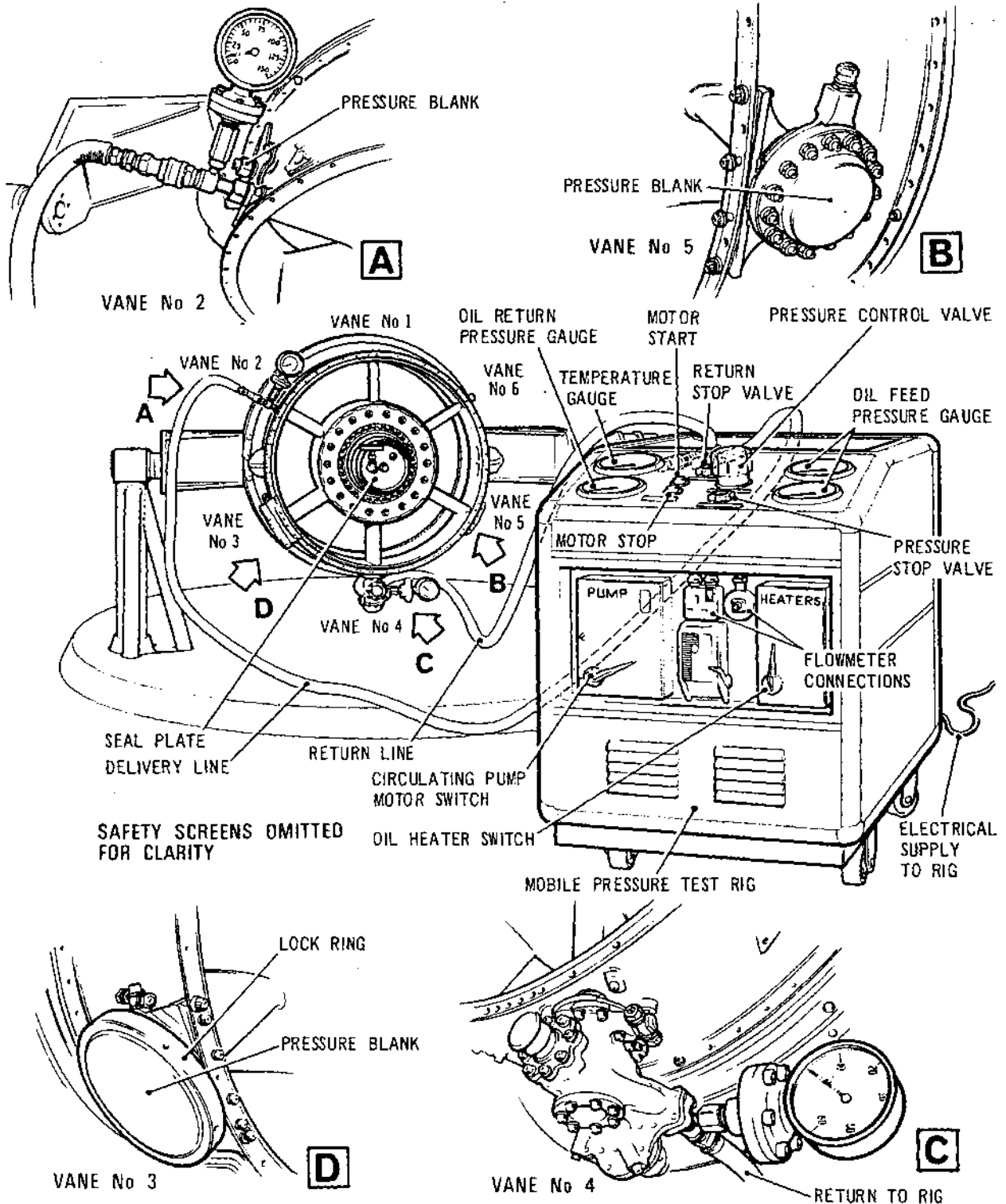
CR 33432/00A



OLYMPUS 593

MK.610-14-28

OVERHAUL



Connect Pressure Test Equipment  
Figure 546



OLYMPUS 593



MK.610-14-28

SNECMA

OVERHAUL

- (d) On completion of checks and /or rectification, re-assemble the HP turbine assembly to the HP compressor (Ref.para.5.), then re-balance the complete assembly (Ref.para.6.).
- (6) Readings within the limits.
- (a) The following procedures are those required to balance the assembly at F and T3 to within 6 drn in.
- NOTE: Apply lubricant 'A' to bolt threads before assembly of nuts.
- (b) Reduce unbalance by adding at T3 balancing weights (72-51-04/1-200) maximum of 8 off (72-51-04/1-205, 210, 215) maximum of 4 off each and (72-51-04/1-220) maximum of 8 off, retained by self-locking nuts (72-51-04/1-190) maximum of 10 off. Ensure the nuts have a minimum locking (run-down) torque of 6.5 lbf in. (0,73 N.m) torque-tighten to 210 lbf in. (24 N.m).
- NOTE: Self-locking nuts are not to be fitted without balancing weights.
- (c) Reduce unbalance by adding at U balancing weights (02/3-140) use a maximum of 3 off each for all the weights provided and retain each weight with self-locking nuts (02/3-130) and bolts (02/3-170) use a maximum of 5 off each. Ensure the nuts have a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m) torque-tighten to 100 lbf in. (11,5 N.m).
- (d) Record the angular position and weights used at T3 and U.

D. Remove the HP Compressor and Turbine Assembly from the Balancing Machine.

- (1) Remove the top half of the guard (if fitted) from around the turbine disk, then assemble the split sleeves (Tool 393) to the LP drive shaft and HP turbine rear labyrinth. Release and hinge open the bridge piece of the adjustable support.



# OLYMPUS 593

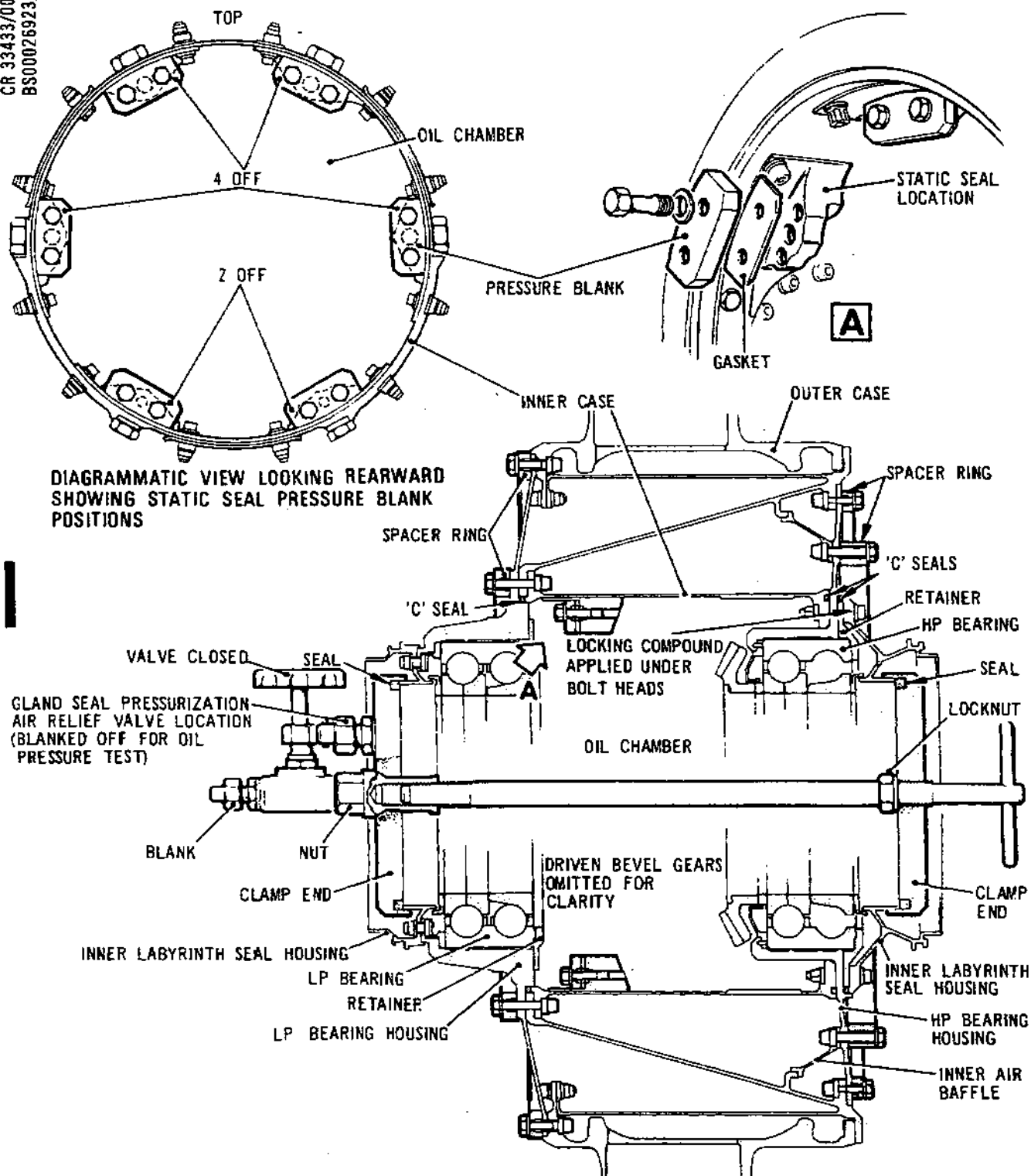
MK.610-14-28  
OVERHAUL



sneema

CR 33433/008  
BS00026923/1

Printed in England



Oil Chamber Details  
Figure 547

SUB-ASSEMBLY

## 72-32-00

Page 598.27

Dec 31/99



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

(9) With the oil temperature steady at  $120 \pm 50^{\circ}\text{C}$  adjust the scavenge outlet pressure to produce a 4 psig (27.5 kPa) reading on the pressure gauge at No.4 vane (Ref.Fig.548).

(10) Flow for 15 minutes checking for leaks continuously (Ref.Fig.549).

NOTE: During testing, the gland seals at No.3, 4 and 5 vane positions will be unpressurized. These are pressurized and tested in para.1 and leaks from them may be ignored at this stage.

(11) Readjust the scavenge outlet pressure on the rig to produce a 10 psig (69 kPa) on the scavenge outlet pressure gauge at No.4 vane.

(12) Flow for a further 15 minutes checking for leaks continuously (Ref.Fig.549).

(13) If leakage occurs from the six vent plugs or the twelve segment retaining bolts, it will be necessary to remove the inner case assembly (5-330 and 5-420). The vent plugs can then be removed, cleaned and replaced. To remove the bolts, the inner case must be disassembled. For assembly procedure, refer to Para.2.

#### H. Differential Oil Pressure Flow Check (Ref.Fig.550).

NOTE: A differential oil pressure of 30 psig (207 kPa) is to be measured between the inlet and outlet pressure gauges assembled to the adapters on No.2 and 4 vanes. For example, a regulated delivery pressure of 50 psig (345 kPa) measured on the gauge at No.2 vane should produce 20 psig (138 kPa) measured on the gauge at No.4 vane. The differential oil pressure would then be 30 psig (207 kPa).

(1) Fully open the scavenge line at the supply rig leaving the return oil from No.4 vane completely unrestricted.

(2) Adjust the oil delivery pressure control regulator on the supply rig to obtain the differential oil pressure of 30 psig (207 kPa) measured between the inlet and outlet pressure gauges on the intermediate case.

SUB-ASSEMBLY

72-32-00

Page 598.28

Jun 1/99





OLYMPUS 593

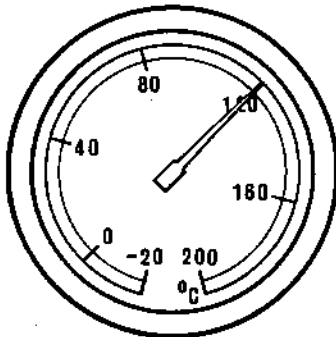
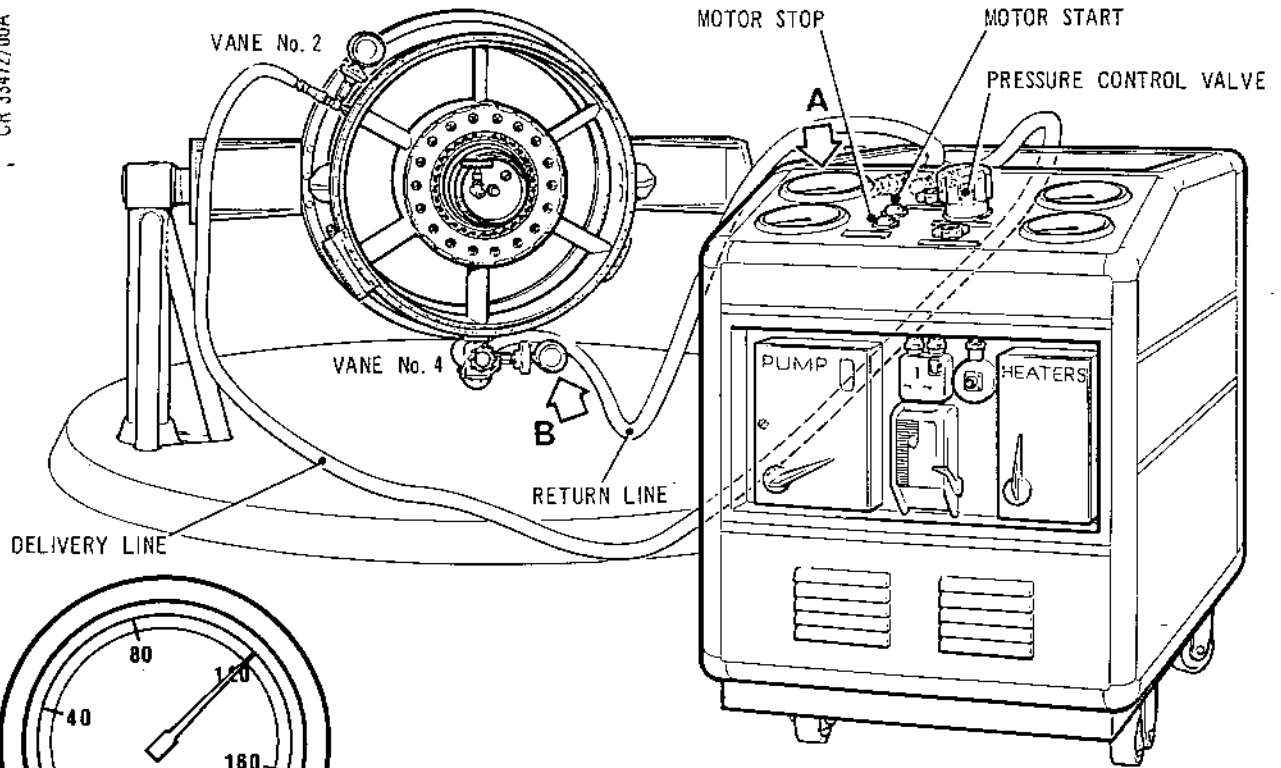
MK.610-14-28

OVERHAUL



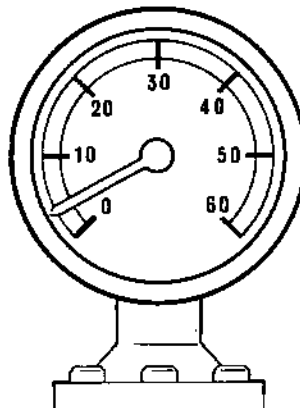
CR 33472/00A

PRINTED IN ENGLAND

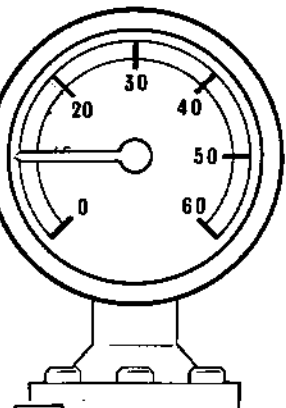


TEMPERATURE GAUGE

**A**



SCAVENGE OUTLET GAUGE



**B**

FLOW FOR 15 MINUTES AT  
4 POUNDS PER SQUARE INCH GAUGE  
(27.5 KILO PASCALS)

FLOW FOR 15 MINUTES AT  
10 POUNDS PER SQUARE INCH GAUGE  
(69 KILO PASCALS)

Holding Various Pressures for 15 Minute Periods  
Figure 548

SUB-ASSEMBLY  
**72-32-00**

Page 598.29  
Jul 1/76



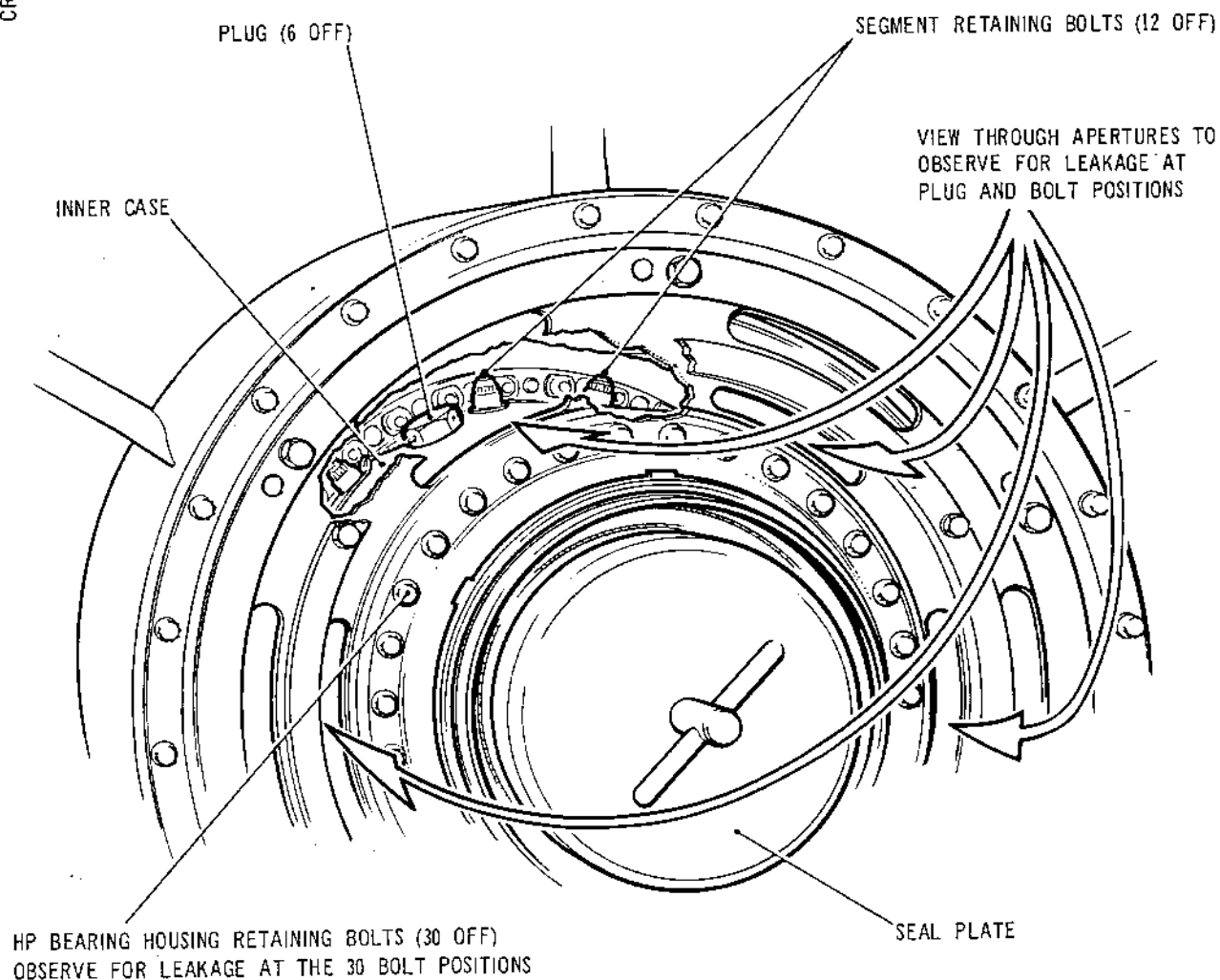
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33477/00A

PRINTED IN ENGLAND



VIEW LOOKING FORWARD ON INTERMEDIATE CASE REAR FLANGES

Checking for Oil Leaks  
Figure 549

SUB-ASSEMBLY  
**72-32-00**  
Page 598/30  
Jul 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Observe that the oil temperature is steady at  $120 \pm 5^{\circ}\text{C}$  and that the 30 psig (207 kPa) differential oil pressure measured between the inlet and outlet gauges on the intermediate is steady.
- (4) Remove the flowmeter indicator from its protective container.
- (5) Ensure that the flowmeter indicator is of the type (BE 71N 1300320, SN 333/73).
- (6) Ensure that the flowmeter indicator has been calibrated correctly to indicate on the scale the required flow, between 240 and 260 gallons per hour.
- (7) Position the flowmeter indicator on a flat surface at a convenient point near the supply rig.
- (8) Plug in the flowmeter indicator electrical leads to the rear of the rig.
- (9) Switch on the flowmeter indicator.
- (10) Record the gallons per hour shown on the flowmeter indicator.

NOTE: If the metered oil flow is not within limits this may indicate an internal oil leak, or that the flow through the jets feeding the LP and HP bearings, bevel gears etc., is not within limits. An internal oil leak would eventually be observed draining from the drain tube at No.4 vane.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (11) If the check is unsatisfactory and all reasoning for superficial defects exhausted, then prepare to disassemble the intermediate case as far as is deemed necessary, employing the process of elimination to investigate and detect the fault.
  - (12) Press the circulating pump motor STOP button.
  - (13) Switch off the electrical supply.
  - (14) Wearing protective clothing disconnect the supply and return lines to the intermediate case.
  - (15) Allow the intermediate case to cool then drain the oil.
  - (16) Disassemble the intermediate case to check the seal of internal pressure blanks.
  - (17) Visually check the sealing grooves and sealing faces for the 'C' seals. Ensure there is a satisfactory sealing witness mark. If necessary, refer to Para. 2.G. for surface finish details.
  - (18) Check the oil distributor, feed tubes and jets for faults.
  - (19) Use new 'C' seals and reassemble the intermediate case and repeat the oil pressure checks until satisfactory results are achieved.
- J. Check the LP and HP Bearing Failure Oil Warning System (Ref.Fig.551).
- (1) Disconnect and remove the gauge from No.2 vane.
  - (2) Reconnect the oil delivery line to No.2 vane.
  - (3) Assemble the pressure test rig (Tool 1917) to the front face of the intermediate case and secure to the flange with thumbnut and to No.1 vane with the retainer and thumbnut.

SUB-ASSEMBLY

**72-32-00**

Page 598.32

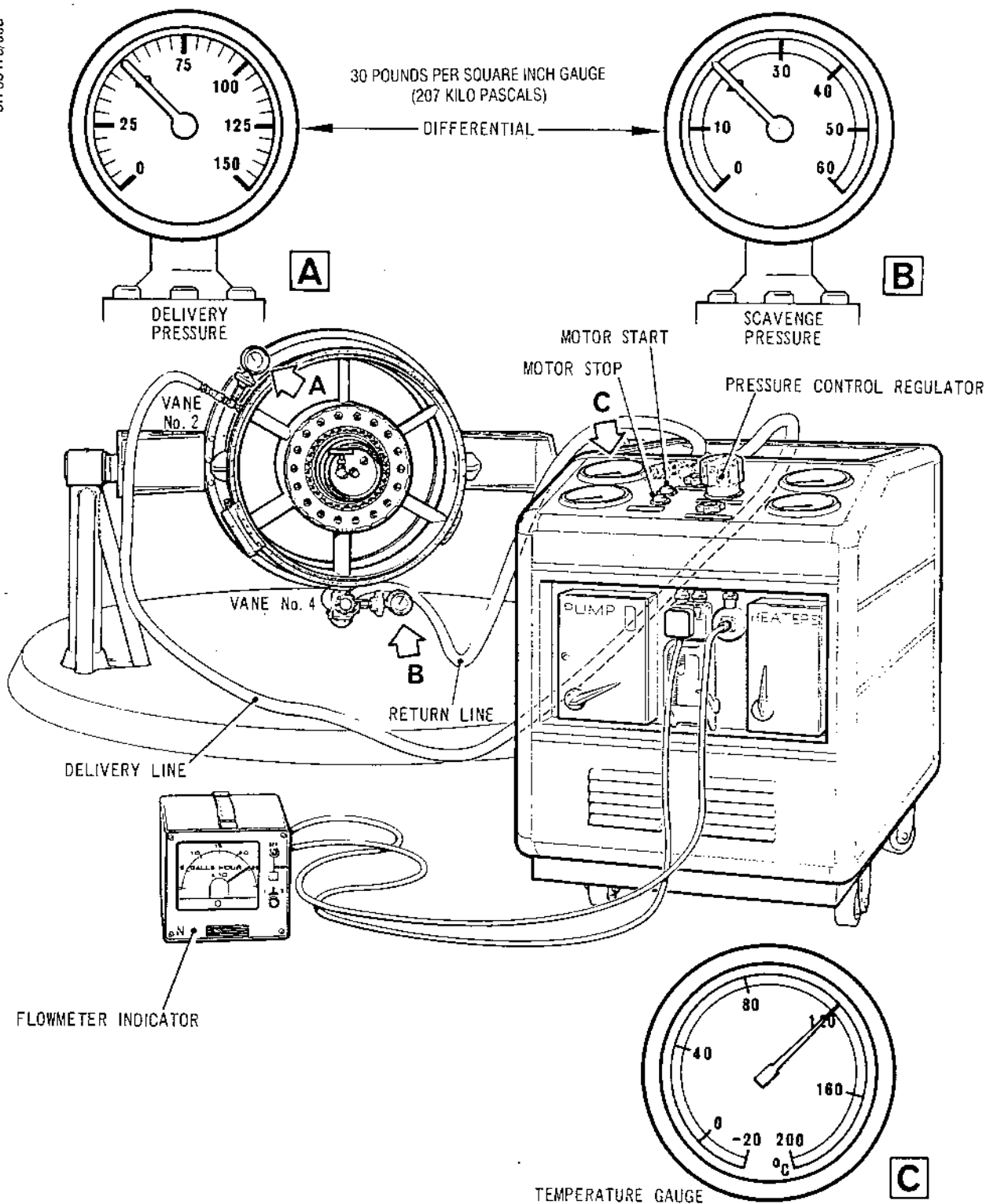
Dec 31/99



OLYMPUS 593



MK.610-14-28 sheema  
OVERHAUL



Differential Pressure Check  
Figure 550



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (4) Remove the pressure blank from the bearing failure warning tube at No.2 vane then assemble the short flexible tube from the small rig to the bearing failure warning location.
- (5) Assemble the small diameter tube from the small rig to the oil feed adapter at No.2 vane.
- (6) Connect a flexible hose to the outlet connection on the small rig.

NOTE: The oil flow from this hose must be an unrestricted return to the supply rig or directed into an enclosed container.

- (7) Ensure that the pressure control regulator is closed.
- (8) Open the scavenge line.
- (9) Switch on the electrical supply to the oil supply rig.
- (10) Switch on the oil heater to the rear of the rig.
- (11) Allow the oil to heat to  $120 \pm 5^{\circ}\text{C}$ .
- (12) Close the bearing failure warning oil control valve.
- (13) Press the circulating pump motor START button.
- (14) Open the oil delivery line on the rig.
- (15) Regulate the pressure control to deliver oil at 10 psig (69 kPA) measured on the LP and HP bearing oil pressure gauge on the small rig attached to the intermediate case.
- (16) Observe the oil pressure measured on the bearing failure warning pressure gauge, this should be within 2 psig (14 kPA) of the oil inlet pressure measured on the LP/HP bearing pressure gauge.

SUB-ASSEMBLY

**72-32-00**

Page 598.34

Jul 1/76



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (17) Open the valve on the small rig, this will direct warning oil back to the supply rig.

NOTE: The bearing failure warning pressure gauge should now read zero, the oil inlet pressure will probably drop and there should be a substantial flow of warning oil directed back to the supply rig.

- (18) Observe the warning oil returning to the supply rig through the flow indicator on the small test rig.

NOTE: If there is no flow of warning oil back to the rig, a blockage somewhere in the bearing failure warning system is indicated.

- (19) If the test is unsatisfactory, press the circulating pump motor STOP button then switch off the electrical supply to the rig.

- (20) Allow the intermediate case to cool then drain all the oil.

- (21) Disconnect the rigs from the intermediate case then remove the seal plates.

- (22) Disassemble the intermediate case only as far as is necessary to investigate the fault and rectify.

NOTE: It will not be necessary to remove the HP bearing housing assembly.

- (23) Rebuild the intermediate case observing the correct torque-tightening values.

- (24) Reconnect the two pressure test rigs, fill the intermediate case with oil and repeat the relevant test procedure under para.J.

- (25) If the test is satisfactory, press the circulating pump motor STOP button then switch off the heater. Disconnect and release the small rig from the intermediate case.

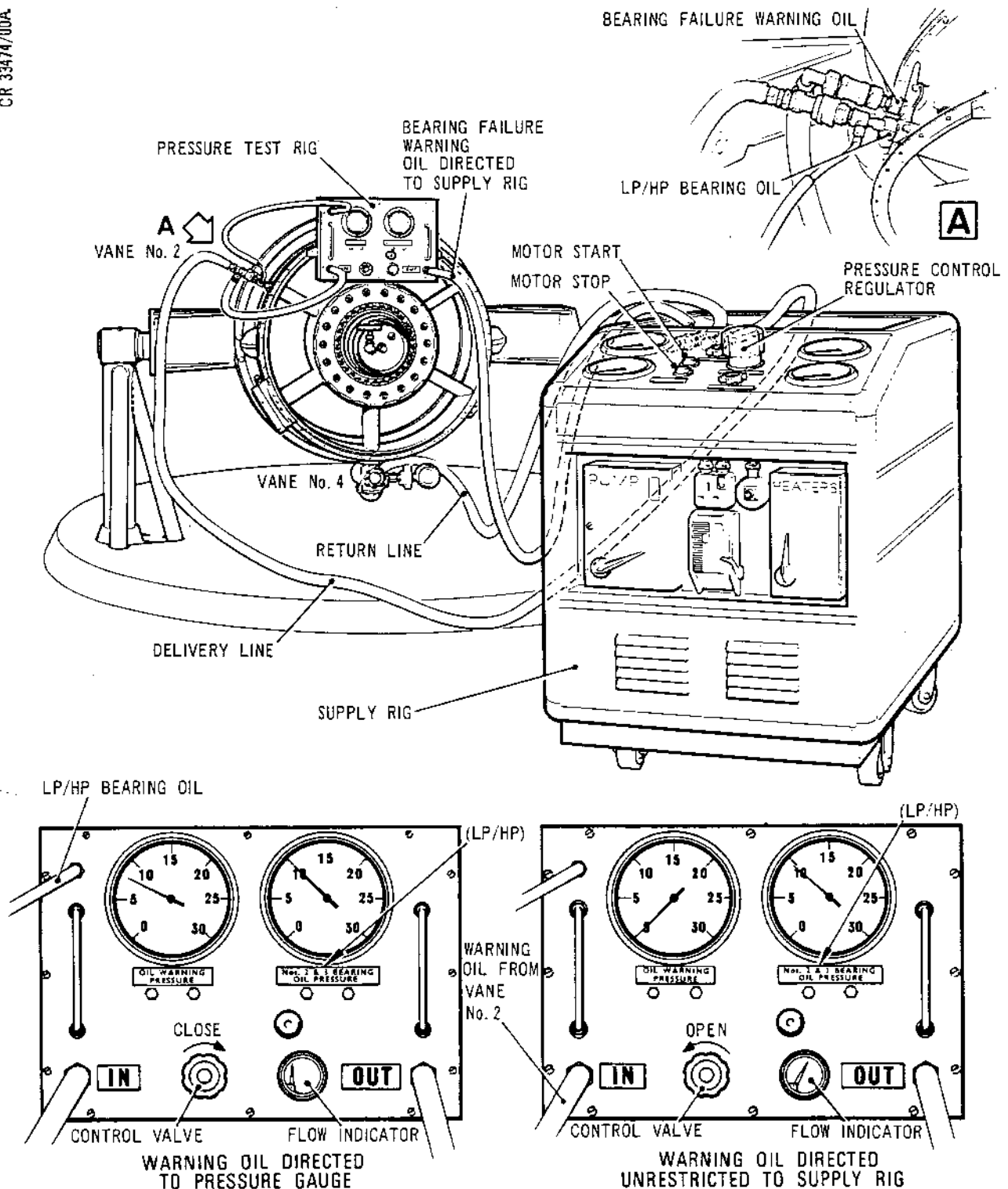
SUB-ASSEMBLY

72-32-00

Page 598.35

Jun 30/95

CR 33474/00A



Checking the Bearing Failure Warning System  
Figure 551





OLYMPUS 593

MK.610-14-28

OVERHAUL



K. Assemble Fluid Passage Bolts, Multiple Connectors, Adapter and Tubes (Ref.Fig.552).

- (1) Apply lubricant 'A' to a fluid passage bolt (75-05-02/1-160) then assemble it with a flat washer (75-05-02/1-150) to the adapter at No.3 vane. Torque-tighten the bolt between 120 and 140 lbf in. (13,6 and 15,8 N.m).
- (2) Assemble a multiple connector (75-05-02/1-170) to the fluid passage bolt then retain the connector with a capnut (75-05-02/1-140) lubricated with lubricant 'A'. Do not tighten at this stage.
- (3) Apply lubricant 'A' to a fluid passage bolt (75-05-02/1-300) then assemble it with a flat washer (75-05-02/1-290) to the housing at No.4 vane. Torque-tighten the bolt between 120 and 140 lbf in. (13,6 and 15,8 N.m).
- (4) Assemble a multiple connector (75-05-02/1-310) to the fluid passage bolt, then retain the connector with a capnut (75-05-02/1-280) lubricated with lubricant 'A'. Do not tighten at this stage.
- (5) Apply lubricant 'A' to adapter (75-05-02/1-420) then assemble it with a flat washer (75-05-02/1-430) to the adapter at No.5 vane. Torque-tighten the bolt between 120 and 140 lbf in. (13,6 and 15,8 N.m).
- (6) Apply lubricant 'A' to the threads of the multiple connectors at No.3 and 4 vanes then assemble a tube (75-05-02/1-250) to the connectors.

NOTE: The run of this tube extends forward of the front flange of the intermediate case.

PRINTED IN ENGLAND

TN15916

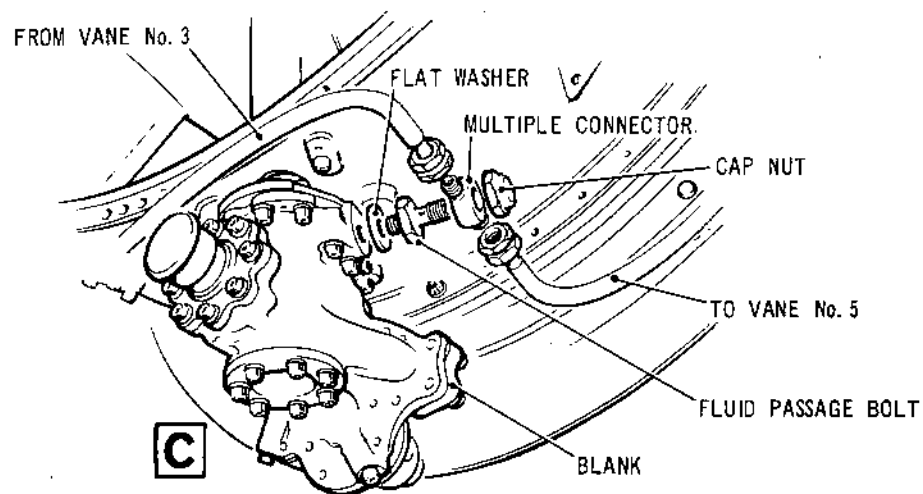
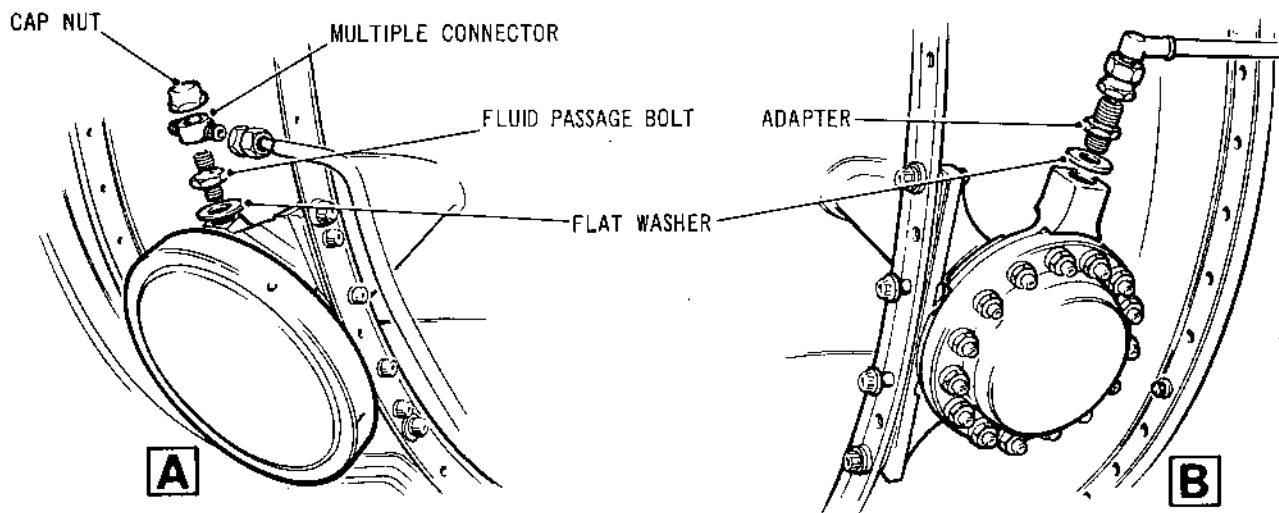
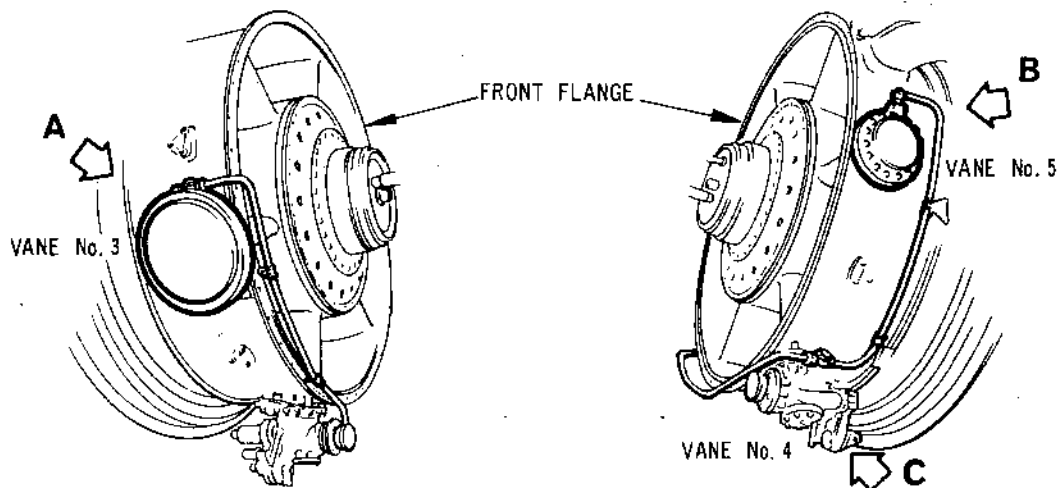


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 33475/00B



Assembling Connectors and Air Tubes  
Figure 552

SUB-ASSEMBLY

72-32-00

Page 598.38

May 1/79

TN8059



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (7) Apply lubricant 'A' to the threads of the adapter at No.5 vane then assemble the tube (75-05-02/1-390) to the connector at No.4 vane and adapter at No.5 vane.

NOTE: With the capnuts still loose the multiple connectors may be moved slightly, if necessary, so that the air tubes take up their correct positions without being stressed.

- (8) Torque-tighten the capnuts at No.3 and 4 vanes between 120 and 140 lbf in. (13,6 and 15,8 N.m).
- (9) Torque-tighten the unions securing the tube between No.3 and 4 vanes between 90 and 100 lbf in. (10,2 and 11,3 N.m).
- (10) Torque-tighten the unions securing the tube between No.4 and 5 vanes between 90 and 100 lbf in. (10,2 and 11,3 N.m).

L. Carry Out Gland Seal Leak Check (Ref.Fig.553 and 554).

NOTE: This check is carried out whilst the intermediate case is still hot at  $120 \pm 5^{\circ}\text{C}$ .

- (1) Disconnect the scavenge line from the adapter at No.4 vane.
- (2) Connect a flexible hose to the adapter at No.4 vane then connect the other end of the hose to the supply rig.
- (3) Close the delivery line on the supply rig.
- (4) Open the valve in the return line at the side of the rig.
- (5) Press the circulating pump motor START button.

PRINTED IN ENGLAND

TN1352

SUB-ASSEMBLY

**72-32-00**

Page 598.39

May 1/79



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (6) Press the circulating pump motor STOP button when the oil in the intermediate case falls to the level of the vent in the seal plate.
  - (7) Close the drain valve in the return line at the side of the rig.
  - (8) Ensure that the entries to No.3 and 5 vanes, which carry the main drives, are fully submerged.
  - (9) Remove the pressure blank (Tool 616) from the LP side of the seal plate (Ref.Fig.547 and 553), then assemble a relief valve (Tool 595) to this position.
  - (10) Remove a capnut from the air pressure connector at No.4 vane then assemble the adapter and gauge (Tool 596) to this position.
  - (11) Assemble the air pressure test rig (Tool 584) to the arm of the build stand and secure.
  - (12) Connect the flexible hose (marked vane 3) from the air pressure test rig to the adapter at No.3 vane.
  - (13) Connect the flexible hose (marked vane 2) from the air pressure test rig to the adapter at No.2 vane.
  - (14) Connect the shop air supply to the air pressure test rig.
  - (15) Adjust the relief valve (assembled to the seal plate) to open at 10 psig (69 kPA).
- NOTE: The oil level must be below the relief valve.
- (16) Ensure that the pressure regulators on the air pressure test rig are closed.

TN5888

SUB-ASSEMBLY

**72-32-00**

Page 598.40

Jul 1/76



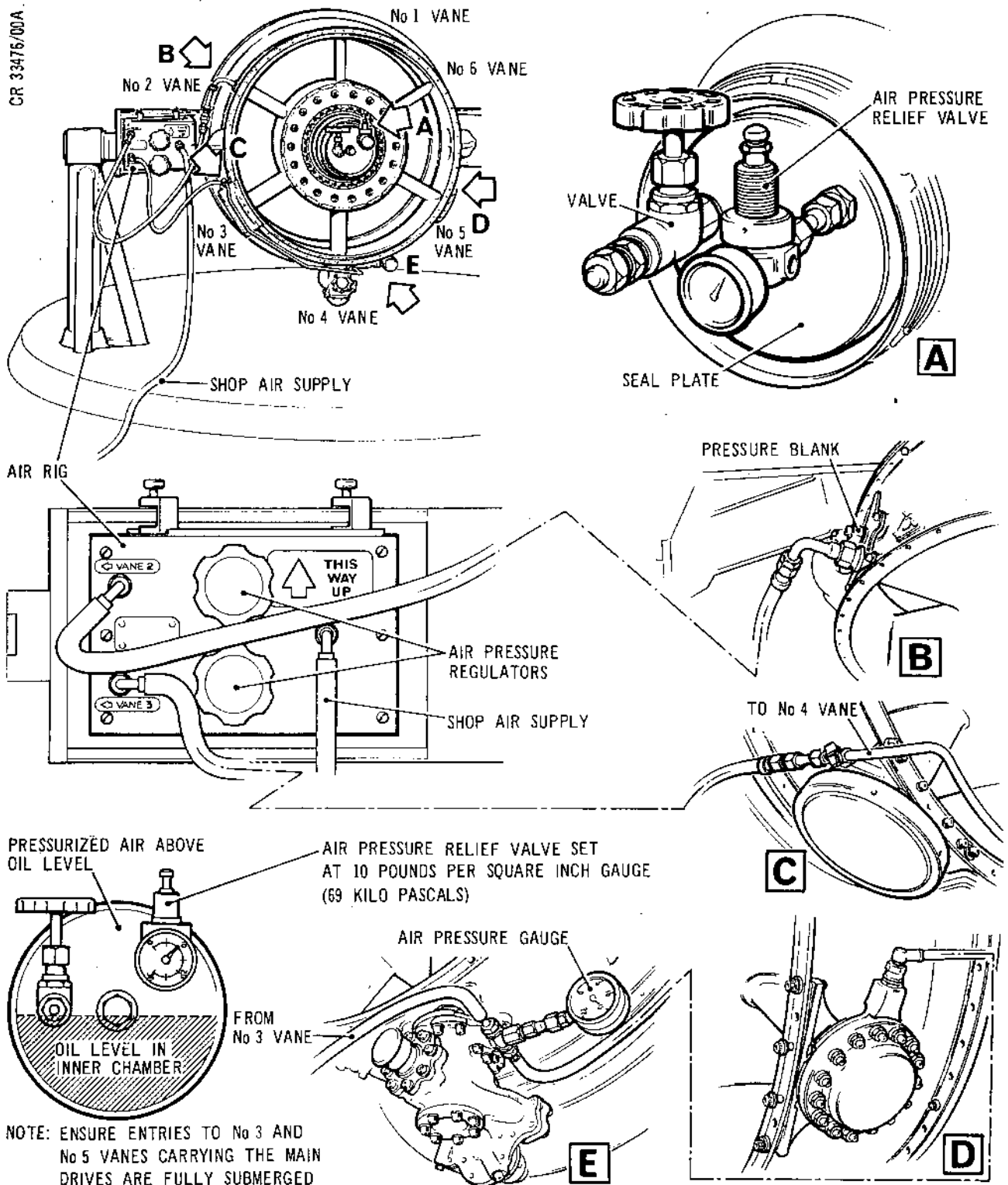
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 33476/00A



TN32276

Checking the Gland Seals  
Figure 553



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (17) Open the shop delivery air line gradually then regulate the air at the air pressure rig so that the air space above the oil is pressurized to 10 psig (69 kPa).

NOTE: Under this condition, with the gland seals unpressurized, oil leakage past the gland seals can be observed.

- (18) Record on the engine record sheets if no leakage past the seals occurs.
- (19) Close the air supply to No.2 vane, then carefully slacken the inlet connector at No.2 vane to depressurize the oil chamber. Retighten the connector.
- (20) Open the air supply to No.2 vane.
- (21) Apply approximately 15 psig (103 kPa) air pressure to the gland seals, then raise the oil chamber pressure again to 10 psig (69 kPa).
- (22) Regulate the various air pressures until conditions are steady, with the oil chamber pressure at 10 psig (69 kPa) and the gland seal pressurizing air between 2 and 5 psig (between 14 and 35 kPa) above the oil chamber air pressure.
- (23) Check that under these conditions, oil leakage from the pressurized gland seals ceases completely.
- (24) If the leak does not cease, check the air system for blockages and repeat the check.
- (25) If after repeating the check, the gland seals still leak oil turn off the air supply.
- (26) Drain all the oil from the intermediate case.

TN14880

SUB-ASSEMBLY

72-32-00

Page 598.42

Jul 1/76

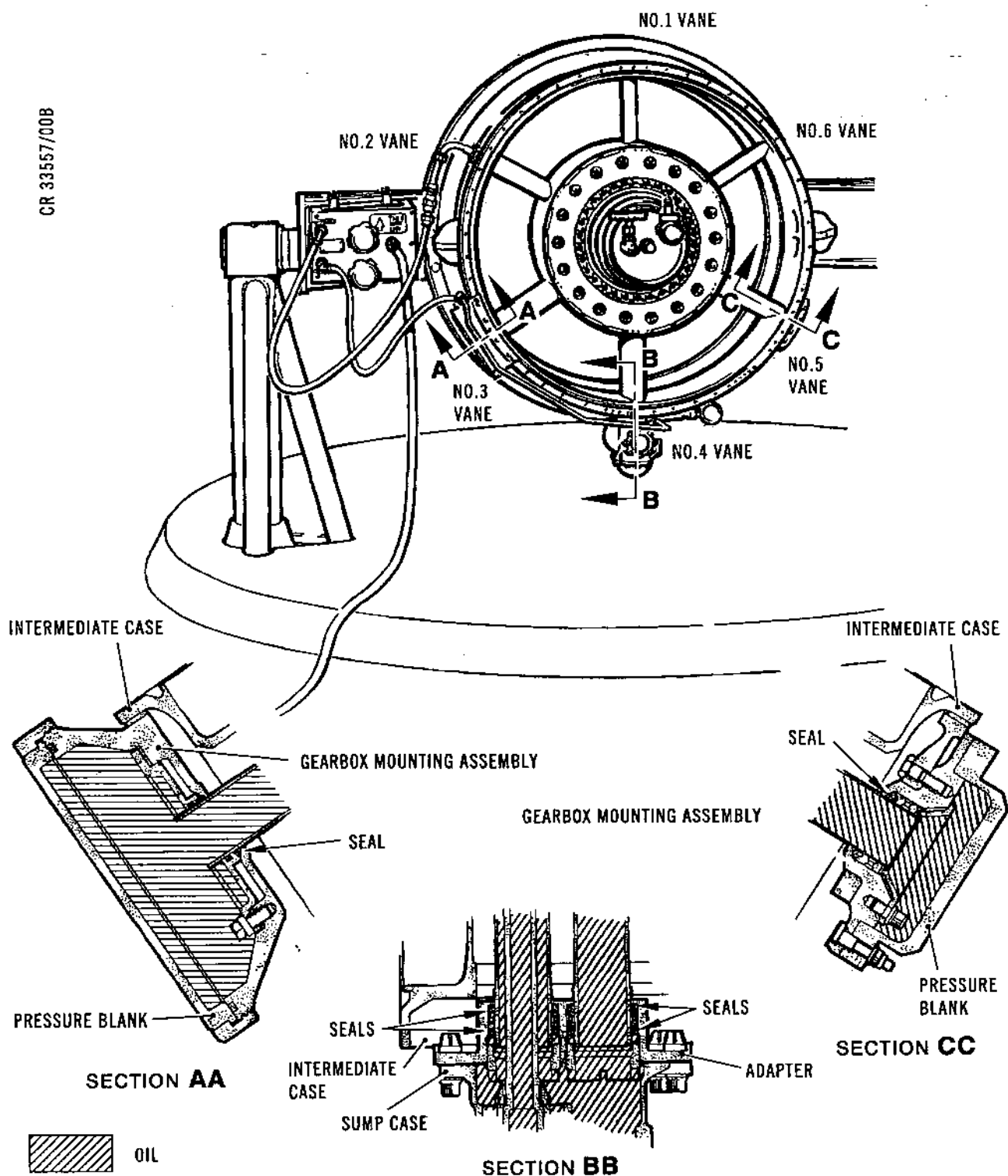


OLYMPUS 593



MK.610-14-28  
OVERHAUL

CR 33557/00B



Checking for Oil Leaks Past the Gland Seals  
Figure 554

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

- (27) Remove the suspect seals from the relevant vane ends, refer 72-32-00 Disassembly.
- (28) Examine the seals for fit and damage.
- (29) Reassemble new seals as required, refer to Sub-Assembly para.12.A, B and para.13.A, B and C.
- (30) Half fill the intermediate case with oil and repeat the pressurized gland seal check as detailed in para.L.

#### 19. Finalize the Intermediate Case for Engine Build

##### A. Drain Oil From the Intermediate Case.

- (1) Ensure that the flexible hose from No.4 vane is connected to the drain connector in the side of the rig.
- (2) Open the drain valve positioned to the side of the rig.
- (3) Press the motor START button and drain oil from the intermediate case.
- (4) Press the motor STOP button, close the drain valve and disconnect the hose from the side of the rig.
- (5) Switch off the electrical switches to the rear of the rig, then switch off the main electrical supply to the rig.
- (6) Stow the feed and scavenge flexible hoses in the top of the rig. Coil and stow the main electrical cable.

CAUTION: DO NOT REMOVE PRESSURE TEST EQUIPMENT FROM THE INTERMEDIATE CASE UNTIL COOL.





OLYMPUS 593

MK.610-14-28

OVERHAUL



NOTE: A residue of oil still remains in No.3 and 5 vanes.

- (7) Place a suitable container beneath the intermediate case.
- (8) Ensure the case is cool then release the lockscrew on the build plate and turn the case until No.3 vane is at the bottom.
- (9) Remove the pressure blank from the end of the vane and allow the oil to drain into the container.
- (10) Turn the case until No.5 vane is at the bottom, then remove the pressure blank and allow the oil to drain into the container.

B. Remove Pressure Test Equipment.

- (1) Remove the adapter and pressure gauge from No.2 vane then remove the pressure blank from the bearing failure warning tube at No.2 vane.
- (2) Remove the adapter and pressure gauge from No.4 vane.
- (3) Remove the air relief valve from the seal plate.
- (4) Unscrew the seal plate retaining nut, then release both the seal plates from the centre of the intermediate case.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

C. Final Assembly of HP Air Baffles.

- (1) Using the stand handle turn the intermediate case until the rear flange is uppermost.
- (2) Remove the slave spacer (Tool 249) from the HP bearing housing.
- (3) Identify the TOP position of the inner rear baffle (2-40) then assemble it to the bearing housing locating the baffle on the rear of the inner housing (2-60). Ensure the bolt-holes in the baffle (2-40) align with the bolt-holes in the bearing housing (2-80).
- (4) Observe the TOP position of the outer rear baffle (2-30) then assemble the baffle locating the cutaways of the baffle and dogs of the inner housing (2-60). Using a suitable driver and mallet tap the baffle into its locked position, ensure that all TOP markings correlate.
- (5) Assemble the air baffle (2-20) to its correct position (observe the TOP) to the rear outer baffle and inner case.
- (6) Apply lubricant 'A' to the threads of 24 bolts (5-310) then assemble the bolts to the outer location of the air baffle (2-20). Do not tighten.
- (7) Apply lubricant 'A' to the threads of 12 bolts (2-10) then secure the inner and outer baffle and the air baffle (2-20) at the mid position. Torque-tighten the bolts (5-310) and (2-10) in their correct sequence (Ref.72-09-00) to 135 lbf in. (15,2 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).

SUB-ASSEMBLY

**72-32-00**

Page 598.46

Dec 31/01



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

D. Prepare the LP Bearing Housing and Air Baffles for Engine Build.

- (1) Place the LP bearing housing assembly (1-270) front face down on the worktop.
- (2) Check that the oil thrower (1-200) is in position (resting on the inner labyrinth seal).
- (3) Check that the LP bearing (1-190) has been assembled correctly to the bearing housing with the thrust arrows on the inner tracks correlated and pointing forward.
- (4) Check that bearing retainer (1-170) is seating properly and the retaining bolts (1-160) torque-tightened to 135 lbf in. (15,2 N.m). Locking (run-down) torque 3.5 lbf in. (0,4 N.m).
- (5) Ensure the transfer tube inner (3-340) is in position in the LP bearing housing and retained with the plate (3-330) and bolt (3-320).
- (6) Turn the LP bearing housing assembly front face uppermost.
- (7) Identify the TOP positions of the front inner baffle (1-340) and outer housing (1-350) and the LP bearing housing.
- (8) Assemble the front inner baffle (1-340) to the LP bearing housing, locating the baffle on the inner labyrinth housing (1-330) already assembled to the LP bearing housing.
- (9) Align the outer housing (1-350) with the dogs of the inner labyrinth housing, then assemble the outer housing.



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (10) Using a suitable driver and mallet tap the outer housing (1-350) into its locked position. Ensure that all TOP markings correlate.
- (11) Temporarily assemble 30 bolts (1-20) to the inner location.
- (12) Place 24 bolts (1-10) in a canvas bag, then attach the bag to the bearing housing. Place the bearing housing assembly in a container (Tool 1231).
- (13) Place the LP bevel gear (1-40) and its calculated adjusting washer (1-50) in the container with the LP bearing assembly.
- (14) Store the container with the bearing assembly and loose items on a pallet, mark the container with the engine number, then transfer the LP bearing housing assembly with any relevant documentation to the engine build area.

E. Assemble Static Labyrinth Ring to Static Housing Seal Ring Assembly.

- (1) Ensure that the abutment faces of the static labyrinth ring (5-30) and the static housing seal ring assembly (5-40) are clean and free from damage, lightly stone if necessary.

NOTE: Prior to the following operation ensure that that static seal ring assembly is to the standard of SB.72-8853-322.

- (2) Place the static housing seal ring assembly on the worktop, resting on its six legs. Identify the single (unpaired) hole in the inner flange (TOP), then identify the corresponding hole (TOP) in the static labyrinth ring and position the ring (5-30) on the housing assembly (5-40).
- (3) Secure the labyrinth ring (5-30) to the housing assembly (5-40) with 11 bolts (5-20), lubricant 'A' applied, and nuts (5-10). Ensure that the boltheads face forward (towards the housing legs).
- (4) Torque-tighten the 11 bolts between 36 and 40 lbf in. (4,1 and 4,5 N.m). Locking (run-down) torque 2.0 lbf in. (0,23 N.m).



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

- (5) Ensure that the 12 hollow locating pins (5-70) have been assembled to the static seal housing (5-40) (Ref. 2.M.(1)(p) then label the seal housing with the correct engine No., and place the housing in a protective container.

F. Assemble Protectors to the Intermediate Case.

- (1) Assemble a protector (Tool 232) to the turbo pump air feed duct.
- (2) Assemble a protector (Tool 578) to the air feed pressure elbow.
- (3) Assemble a protector (Tool 564) to the HP rear outer air baffle.
- (4) Assemble a protector (Tool 565) to the oil distributor at No.2 vane, oil transfer tube location.
- (5) Assemble a protector (Tool 566) to the oil distributor transfer tube location at No.6 vane.
- (6) Assemble a protector (Tool 568) to the oil feed tube at No.2 vane.
- (7) Assemble a protector (Tool 1365) to the bearing failure warning tube No.2 vane.
- (8) Assemble protector to the gearbox adapter plate at No.3 vane.
  - (a) On engines to pre SB.72-8689-272 standard, assemble protector (Tool 702) to the adapter plate.
  - (b) On engines to SB.72-8689-272 standard, assemble protector (Tool 3124) to the adapter plate.
- (9) Assemble screwed plugs (Tool 436) to the air tube location at No.3 and 5 vanes if air supply tubes have not been assembled.
- (10) If the LP pulse probe is not assembled then assemble a protector (Tool 570) to the sump position at No.4 vane.

SUB-ASSEMBLY

**72-32-00**

Page 598.49

Jun 1/99



OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

- (11) Assemble a protector (Tool 571) to No.4 vane at the oil pressure transmitter location face, if the transmitter has not been assembled.
- (12) If the oil pressure switch has not been assembled then assemble a protector (Tool 572) to its location on the oil sump.
- (13) Assemble a protector (Tool 574) to the bearing failure warning tube location at No.4 vane (sump).
- (14) Assemble a protector (Tool 573) to the scavenge tube location at No.4 vane.
- (15) Assemble a protector (Tool 574) to the oil drain tube location at No.4 vane.
- (16) Assemble a protector (Tool 1927) to the vent chamber oil drain tube at No.4 vane.
- (17) Assemble a protector (Tool 576) and pillar nut (Tool 577) to the gearbox adapter at No.5 vane.
- (18) Assemble a protector (Tool 568) to the air tube at No.6 vane.
- (19) Check that all loose items are suitably identified and if necessary placed in protective containers.
- (20) Ensure that loose shims and adjusting washers have been clearly identified.

G. Remove Intermediate Case from Build Stand.

- (1) Position the case front flange uppermost in the build stand.
- (2) Assemble the multiple leg sling (Tool 1089) to the front flange, then connect the overhead hoist to the sling.



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (3) Release the intermediate case from the build stand and place the slave nuts and washers in a container.
- (4) Raise the hoist, then secure three (equally spaced) transport blocks (Tool 1232) to the rear outer case flange with slave washers and nuts. Lower the intermediate case onto a pallet, then disconnect the hoist and remove the sling.
- (5) Assemble a protector (Tool 563) to the intermediate case front flange.
- (6) Pass the intermediate case assembly and loose items complete with the relevant record documents to the HP compressor assembly section.
- (7) If S.B.72-21, 29, 91 and 93 have been incorporated, module interchangeability will be affected. Check to ensure that the module identification plate is in accordance with the interchangeability chart.

Printed in England

SUB-ASSEMBLY

**72-32-00**

Page 598.51

Jun 1/99



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



# HP COMPRESSOR ASSEMBLY - SUB-ASSEMBLY

## TABLE OF CONTENTS

Para.	Page
1. General	501
2. Assemble the HP Compressor Assembly	503
A. Carry out the HP Compressor Rear (No.12) Labyrinth Dimensional Check...	503
B. Assemble the Drive Shaft to the Beam Type Sling...	507
C. Assemble the Slave Rear Roller Bearing Inner Race to the HP Drive Shaft	509
D. Assemble the Rear Bearing Adapter to the Pit Stand	511
E. Assemble the HP Drive Shaft to the Rear Bearing Adapter	511
F. Centralize the HP Drive Shaft in the Rear Bearing Adapter	514
G. Assemble the LP Compressor Drive Shaft and Air Transfer Tube to the HP Drive Shaft	516
H. Assemble the HP Compressor Rear Case to the Rear Bearing Adapter	520
J. Assemble the Stage 6-7 Spacer Ring to the Stage 7 Compressor Disk...	521
K. Assemble the Stage 7 Disk/6-7 Spacer Ring to the HP Drive Shaft	525
L. Assemble the Stage 6 Stator Vanes to the Rear Case	531
M. Assemble the Stage 6 Bladed Compressor Disk and Stage 5-6 Spacer Ring...	533
N. Assemble the HP Compressor Front Case to the HP Compressor Rear Case	540
P. Assemble the Stage 5 Bladed Compressor Disk and Stage 4-5 Spacer Ring	541
Q. Assemble the Stage 4 Stator Vanes and Blanks to the Front Case	548
R. Assemble the Stage 4 Bladed Compressor Disk and Stage 3-4 Spacer Ring...	549
S. Assemble the Stage 3 Stator Vanes and Blanks to the Front Case	554
T. Assemble the Stage 3 Bladed Compressor Disk/ Stage 2-3 Spacer Ring Assembly	557
U. Assemble the Stage 2 Stator Vanes and Blanks to the Front Case	560
V. Assemble the Stage 2 Bladed Compressor Disk and Rotor Shaft Front	564

PRINTED IN ENGLAND

TN12588

SUB-ASSEMBLY  
**72-33-00**  
Contents 1  
Nov 1/76





# OLYMPUS 593

MK.610-14-28  
OVERHAUL



Para.	Page
W. Assemble the Stage 1 Stator Vanes and Blanks to the Front Case ...	572
X. Assemble the Stage 1 Bladed Compressor Disk ...	574
Y. Determine the Thickness of the HP Rotor Shaft Front Adjusting Washer ...	578
Z. Assemble the Front Bearing Adapter to the HP Front Case and the Rotor Shaft Front ...	580
AA. Assemble the HP Compressor Rear (No.12) Labyrinth to the HP Drive Shaft... ..	586
3. Prepare and Check the HP Compressor Assembly for Concentricity and Swash ...	591
A. Assemble the HP Compressor Assembly to the Surface Table ...	591
B. Check the Swash and Concentricity of the HP Compressor Rotor ...	598
4. Prepare and Balance the HP Compressor Assembly ...	598.3
A. Prepare the Balancing Machine (Avery 72N 56) ...	598.3
B. Assemble the HP Compressor Assembly to the Balancing Machine ...	598.3
C. Balance the HP Compressor Rotor ...	598.7
D. Remove the HP Compressor Assembly from the Balancing Machine ...	598.11
5. Assemble the HP Turbine Assembly to the HP Compressor Assembly (Pre SB.72-8305-154 Part 2 Standard) ...	598.12
A. Prepare the HP Compressor Assembly ...	598.12
B. Assemble the HP Turbine Assembly ...	598.14
6. Prepare and Balance the HP Compressor and Turbine Assembly ...	598.19
A. Prepare the Balancing Machine (Avery 72N 56) ...	598.19
B. Assemble the HP Compressor and Turbine Assembly to the Balancing Machine ...	598.19
C. Balance the HP Compressor Rotor and Turbine Assembly ...	598.23
D. Remove the HP Compressor and Turbine Assembly from the Balancing Machine ...	598.26
7. Prepare and Check the Swash of the HP Turbine Assembly ...	598.29
A. Prepare the Surface Table Equipment for Checking the Swash... ..	598.29
B. Assemble the HP Compressor and Turbine Assembly to the Surface Table ...	598.29
C. Check the Swash of the HP Turbine Assembly ...	598.31
D. Remove the HP Compressor and Turbine Assembly from the Surface Table ...	598.32
8. Remove the HP Turbine Assembly from the HP Compressor Assembly ...	598.32
A. Remove the Rear Labyrinth from the HP Turbine Disk ...	598.32

TN12589

SUB-ASSEMBLY  
**72-33-00**  
Contents 2  
Apr 1/78



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

Printed in England

B.	Remove the HP Turbine Disk from the Hub/Labyrinth Unit	598.34
C.	Remove the HP Turbine Front Labyrinth and Hub Assembly from the HP Drive Shaft	598.37
9.	Assemble the HP Turbine Simulator to the HP Compressor Assembly (SB.72-8305-154 Part 2 Standard)	598.38
A.	Prepare the HP Compressor Assembly	598.38
B.	Assemble the HP Turbine Simulator	598.40
10.	Prepare and Balance the HP Compressor and HP Turbine Simulator Assembly	598.43
A.	Prepare the Balance Machine (Avery 72N 56)	598.43
B.	Assemble the HP Compressor and Turbine Simulator Assembly to the Balancing Machine	598.43
C.	Balance the HP Compressor and HP Turbine Simulator Assembly	598.43
D.	Remove the HP Compressor and HP Turbine Simulator Assembly from the Balancing Machine	598.46
E.	Remove the HP Turbine Simulator from the HP Compressor Assembly	598.48
11.	Preparation and Assembly of the Intermediate Case Assembly	598.49
A.	Remove the Front Bearing Adapter from the HP Compressor Assembly	598.49
B.	Assemble the Intermediate Case Assembly to the HP Compressor Assembly	598.55
C.	Check the HP Rotor Shaft Front Adjusting Washer for Correct Thickness	598.64
D.	Assemble the Static Seal Housing to the Intermediate Case	598.66
E.	Determine Thickness of LP Bearing Failure Probe Adjusting Washers	598.66
F.	Assemble the Probe Assembly to the Intermediate Case Oil Distributor	598.66B
G.	Assemble the Brackets to the Compressor/Intermediate Case	598.68
H.	Replacement of the HP Rotor Shaft Front Adjusting Washer	598.68
12.	Prepare the HP Compressor/Intermediate Case Assembly for Engine Build	598.76
A.	Assemble the HP Compressor/Intermediate Case to the Mobile Stand	598.76
B.	Assemble Brackets to the HP Compressor Case (Front) at Stage 3 Stator Vane Location	598.78

SUB-ASSEMBLY

72-33-00

Contents 3

Jun 1/99



# OLYMPUS 593

MK.610-14-28

OVERHAUL



Fig.No.

Page

501	Dimensional Check of HP Compressor Rear (No.12)	
	Labyrinth...	502
502	HP Drive Shaft Assembled to Beam Type Sling	506
503	Assembling Bearing to HP Drive Shaft	508
504	Assembling HP Drive Shaft to Rear Bearing	
	Adapter	510
505	Securing Rear End of HP Drive Shaft to Rear	
	Bearing Adapter...	513
506	Positioning HP Drive Shaft in Rear Bearing	
	Adapter	515
507	Assembling Lifting Fixture to LP Drive Shaft	517
508	Assembling Air Transfer Tube to HP Drive Shaft	519
509	Rotor Disk/Spacer Ring Heating Equipment	524
510	Assembling Index Plate and Restrainer	527
511	Positioning Check of Stage 7 Rotor Disk	530
512	Assembling Stage 6 Stator Vanes to Rear Case	532
513	Assembling Stage 6 Bladed Disk to Heater Unit	534
514	Assembling Stage 6 Disk and 5-6 Spacer Ring	537
515	Attachment of Front Case to Rear Case	542
516	Assembling Stage 4 Stator Vanes and Blanks to	
	Front Case	547
517	Assembling Stage 3 Stator Vanes and Blanks to	
	Front Case	555
517A	Painted Areas on Stage 3 Disk and Stage 2-3	
	Spacer Ring	561
518	Assembling Stage 2 Stator Vanes and Blanks to	
	Front Case	562
519	Assembling Stage 2 Bladed Disk to Stage 2-3	
	Spacer Ring	565
520	Assembling Rotor Shaft Front to Stage 2 Disk and	
	Air Transfer Tube	567
521	Assembling Stage 1 Stator Vanes and Blanks to	
	Front Case	571
521A	Painted Areas on Stage 2 Disk...	572A
522	Checking HP Rotor Shaft Front Adjusting Washer	577
523	Assembling Front Bearing Adapter to Front Case	579
524	Assembling Front Bearing Adapter Bearing to	
	Rotor Shaft Front	581
525	Tightening Front Bearing Retaining Nut	583
526	Supporting LP Drive Shaft	585
527	Assembling HP Compressor Assembly to Mobile	
	Stand	587
528	Assembling HP Compressor Rear Labyrinth to HP	
	Drive Shaft	589
529	Assembling Beam Type Sling to HP Compressor	
	Assembly Using Pit Stand	592

SUB-ASSEMBLY

## 72-33-00

Contents 4

Jun 1/89



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



Fig.No.

Page

530	Assembling Beam Type Sling to HP Compressor Assembly Using Front and Rear Supports ...	594
531	Assembling HP Compressor Assembly to Surface Table ...	596
532	Checking Swash and Concentricity of HP Compressor Assembly ...	597
533	Assembling HP Compressor Assembly to Balancing Machine ...	598.5
534	Assembling Balancing Washers to HP Compressor Assembly ...	598.8
535	Assembling HP Turbine Hub Assembly and Retaining Nut to HP Drive Shaft...	598.13
536	Assembling HP Turbine Wheel Unit to HP Hub ...	598.16
537	Assembling HP Compressor and Turbine Assembly to Balancing Machine ...	598.21
538	Assembling Balancing Washers to HP Compressor and Turbine Assembly ...	598.24
539	Assembling HP Compressor and Turbine Assembly to Surface Table ...	598.28
540	Checking Swash of HP Turbine Assembly ...	598.30
541	Removing Rear Labyrinth from HP Turbine Wheel ...	598.33
542	Assembling HP Turbine Disk to Mobile Stand ...	598.35
543	Removing HP Turbine Hub and Labyrinth ...	598.36
544	Assembling HP Turbine Simulator to HP Drive Shaft ...	598.39
545	Torque-tightening the HP Drive Shaft Slave Nut ...	598.42
546	Assembling Balancing Washers to HP Compressor ...	598.44
547	Removing the HP Turbine Simulator ...	598.47
548	Securing Rear End of LP and HP Drive Shafts to Rear Bearing Adapter ...	598.50
549	Removing LP Drive Shaft Front Support ...	598.51
550	Removing Front Bearing Adapter ...	598.53
551	Assembling Intermediate Case to HP Front Case ...	598.56
552	Assembling HP Rotor Bearing to Rotor Shaft Front ...	598.58
553	Positioning Brackets and Bolts on HP Compressor Case/Intermediate Case Abutment Flanges...	598.61
554	Tightening HP Rotor Bearing Retaining Nut ...	598.63
555	Assembling LP Drive Shaft Steady Support to Intermediate Case ...	598.65
556	Assembling Static Seal Housing to Intermediate Case ...	598.67
557	Removing Intermediate Case ...	598.69

PRINTED IN ENGLAND

TN19651

SUB-ASSEMBLY

## 72-33-00

Contents 5

Apr 1/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



Fig.No.		Page
558	Assembling HP Compressor Assembly/Intermediate Case to Mobile Stand ... ..	598.75
559	Assembling Brackets to Underside of HP Compressor Case ... ..	598.77
560	Assembling Brackets to Left and Right-Hand Side of HP Compressor Case ... ..	598.79
561	Securing the Intermediate Case Sump Drain Tube ...	598.82

TN30352

SUB-ASSEMBLY

**72-33-00**

Contents 6

Jun 1/77

# British airways

## CONCORDE

### OLYMPUS 593 OVERHAUL MANUAL

TEMPORARY REVISION No. 72-518  
Insert in 72-33-00 before page 501

#### REASON FOR ISSUE:

The current Overhaul Manual does not give sufficient information on build requirements of H.P. compressor stator vanes in relation to the part number of the compressor case involved. (MRA 75).

#### ACTION

Add the following NOTE after 1.B. General.

NOTE: The current instructions with respect to the build of the H.P. compressor stator vanes make no reference to the part number of the compressor cases in which they are to be built, and this is important for configuration reasons. Therefore, at build, refer to the I.P.C. for the appropriate stage to ensure that the intended combination of vane/case is acceptable.



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



SEE TR

HP COMPRESSOR ASSEMBLY - SUB-ASSEMBLY

1. General

- A. Prior to commencing the sub-assembly, refer to 72-09-00 Assembly for general information.
- B. During the sub-assembly procedure, reference will be made to the Illustrated Parts Catalogue (I.P.C.) to identify those items where the nomenclature does not positively identify them, due to the duplication of the title e.g., nuts, bolts, washers, vanes, spacer, disks etc. An item will be identified as bolt (1-10), the 1 referring to the I.P.C. Fig.No., and the 10 referring to the Item No. To distinguish between the HP compressor case items which are under breakdown 72-33-01, and the HP rotor items which are under 72-33-02, the case items will be identified by their Fig. and Item No. only, but the rotor items will be prefixed 02/ before their Fig. and Item No. e.g. (02/1-10). Where items from any other breakdown are introduced, the full breakdown numbers will be quoted e.g. bolt (72-51-03/1-90).
- C. Throughout the text special tools are quoted by their Ref. No. e.g. (Tool 1234). For a complete list of tooling required for the assembly and balance, and for the Manufacturers Part No., refer to Special Tools, Fixtures and Equipment Tables 1004 to 1007. Where special tools are quoted in the assembly for storage and protection of the rotor blades, disks, etc., suitable alternative containers and protectors may be used.
- D. This chapter details the work necessary for preparing the HP compressor assembly ready for engine final build. The assembly comprises the HP compressor case and vanes, and the HP compressor rotor, but in addition, the LP compressor drive shaft must be assembled at the initial stage of the assembly. On engines to pre SB.72-8305-154 Part 2 standard the HP compressor assembly is dynamically balanced in conjunction with the HP turbine rotor (72-51-03) and hub and labyrinth assemblies (72-51-04). On engines or modules overhauled (or repaired) with the tooling introduced by SB.72-8305-154 Part 2 standard, the HP compressor assembly can be dynamically balanced using a HP turbine simulator, providing that the HP turbine hub and labyrinths are the original, or are statically balanced with either a balanced bladed HP turbine rotor, or a slave turbine rotor (Ref. 72-51-03, para.9 onwards). On completion of the balancing the intermediate case is assembled to the compressor assembly prior to its despatch to engine build.
- E. The HP compressor case and vanes will be received from 72-33-01 Assembly, with the exit guide vanes and blanks assembled to the rear case, and the stage 5 vanes and blanks assembled to the front case. In addition the

SUB-ASSEMBLY

**72-33-00**

Page 501

Jan 1/78

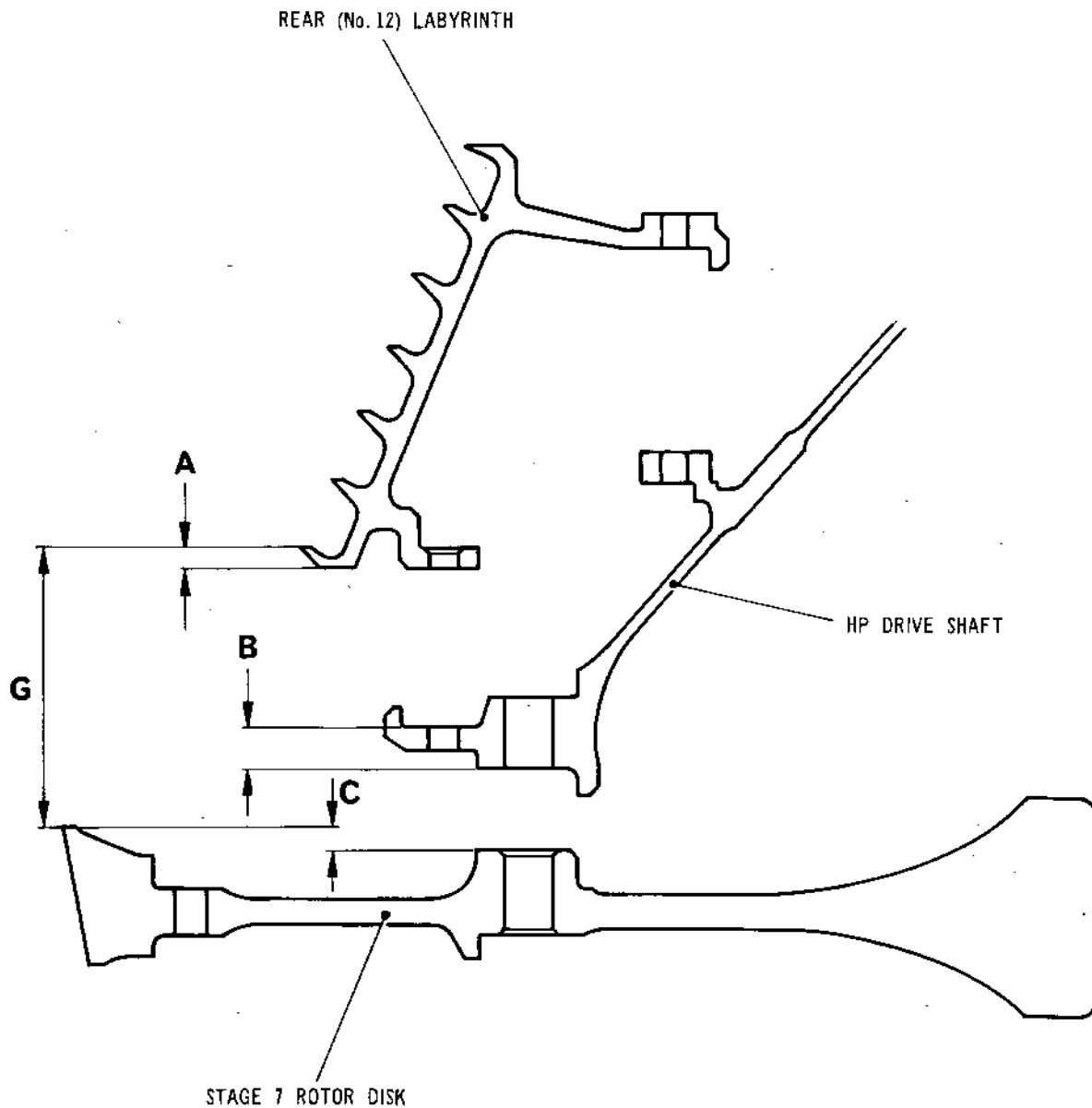


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 30410/00A



TN19553

Dimensional Check of HP Compressor Rear (No.12) Labyrinth  
Figure 501

SUB-ASSEMBLY  
**72-33-00**  
Page 502  
Aug 27/75





OLYMPUS 593

MK.610-14-28  
OVERHAUL



stage 1 and 2 stator vane inner fixing ring assemblies will be assembled.

- F. The HP compressor rotor will be received from 72-33-02 Assembly ready for assembly into the HP front and rear cases. The blades will have been mass moment weighed, the bladed compressor disks and spacers balanced, the blades numbered, assembled and locked (as appropriate), and the datum points marked. Prior to the assembly of the bladed compressor disks to the casings, the No.1 datum blade of each stage may be painted to assist identification of blade positions when internal examinations of the HP compressor are carried out during the operation of the engine. Refer to Standard Practices 72-09-00 Assembly.
- G. The LP drive shaft will be received from 72-31-04 Assembly having been assembled, balanced and the signal system checks carried out, and the HP turbine will be received from 72-51-00 Assembly having been assembled and balanced. The intermediate case will be received from 72-32-00 Assembly having been assembled and pressure tested, the LP compressor rear bearing diaphragm assembly is removed from the intermediate case prior to its despatch to the HP compressor assembly.
- H. On receipt of the sub-assemblies from their various build stations ensure that the assemblies have been signed for as having had all the necessary work carried out on them, and that they are ready for inclusion in the HP compressor assembly build.

SUB-ASSEMBLY

**72-33-00**

Page 503

Jun 1/85



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## 2. Assemble the HP Compressor Assembly

### A. Carry out the HP Compressor Rear (No.12) Labyrinth Dimensional Check (Ref. Fig.501).

- (1) Position the drive shaft (02/3-330) on the surface table.
  - (a) If the drive shaft is supported in its fixture (Tool 1453), withdraw the fixture pin and hinge the clamp clear.
  - (b) Raise the rear (smaller diameter) end of the drive shaft, unscrew and remove the protector (Tool 1238) from the end, then screw the lifting fixture (Tool 1069) onto the rear end.
  - (c) Attach a hoist to the lifting ring of the fixture, then steadily raise the hoist guiding the shaft out of the fixture. Position and lower the drive shaft onto a surface table then remove the hoist.
- (2) Position stage 7 rotor disk (02/3-370) on the surface table.
  - (a) Attach a hoist to the lifting eye of the multiple leg sling (Tool 1086), then position the hoist over the stage 7 disk.
  - (b) Remove a thumbnut from each of the three adapters of the sling, then insert the adapter studs through three of the outer ring of bolt holes in the disk ensuring that the adapters are evenly spaced. Turn the adapters so that the step on the adapters are towards the outer diameter of the disk, then screw a thumbnut onto each adapter stud.

SUB-ASSEMBLY

**72-33-00**

Page 504

May 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) Raise the hoist and position and lower the disk onto three or four support blocks on the surface table.
  - (d) Release and remove the sling from the disk and the hoist. Retain thumbnuts with sling.
  - (e) Remove the disk from the support blocks and lower onto the surface table ensuring that the rear face of the disk (identified by the inner ring of bolt holes having extended bosses) is uppermost.
- (3) Position the HP compressor rear (No.12) labyrinth (02/3-300) on the surface table with the rear face uppermost (identified by the smaller external diameter). Release and remove the two halves of the protector (Tool 1239).
- (4) Using a suitable depth gauge, step gauges and a clock, check the dimensions at the following positions (Ref. Fig.501), ensuring that they are checked at a number of positions around each item, and that an average dimension is recorded.
- (a) Measure the distance from the rear labyrinth front fin rear tip to the surface table and record as dimension 'A'.
  - (b) Measure the distance on the drive shaft from its labyrinth abutment face to its disk abutment face and record as dimension 'B'.

PRINTED IN ENGLAND

TN56231

SUB-ASSEMBLY

**72-33-00**

Page 504A

May 1/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



Left blank intentionally

SUB-ASSEMBLY

**72-33-00**

Page 504B

Jun 1/92



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (c) Measure the distance on the disk from its drive shaft abutment face to the rear (top) face of the disk platforms and record as dimension 'C'.
- (5) Determine the 'G' dimension from the rear (top) face of the labyrinth front fin, to the rear (top) face of the disk platforms  $G = A + B - C$ . The dimensions should be within the following limits.
- 'A' = 0.150 to 0.155 in. (3,81 to 3,94 mm) (Pre Mod.8305 standard)
- 'A' = 0.145 to 0.155 in. (3,68 to 3,94 mm) (Mod. 8305 standard)
- 'B' = 0.340 to 0.350 in. (8,63 to 8,89 mm)
- 'C' = 0.070 to 0.085 in. (1,77 to 2,15 mm)
- 'G' = 0.405 to 0.435 in. (10,28 to 11,05 mm)
- NOTE: The dimension 'G' is required for setting up the HP compressor rear labyrinth mating part located in the delivery/combustion section (Ref. 72-00-51).
- (6) Position the two halves of the protector (Tool 1239) around the rear labyrinth, then secure the two halves with the hinge bolts and thumbnuts. Remove the labyrinth from the table and place on a suitable pallet.
- (7) Remove the stage 7 disk from the surface table.
- (a) Attach a hoist to the lifting eye of the multiple leg sling (Tool 1086), then position the hoist over the disk.
- (b) Support the disk on three or four blocks, then insert the three adapter studs through the outer ring of bolt holes in the disk ensuring the adapters are evenly spaced. Turn the adapters so that the step on the adapters are towards the outer diameter of the disk, then screw a thumbnut onto each adapter stud.
- (c) Raise the hoist and position the disk on a suitable pallet then release and remove the sling from the disk and the hoist. Screw the thumbnuts onto the adapter studs.

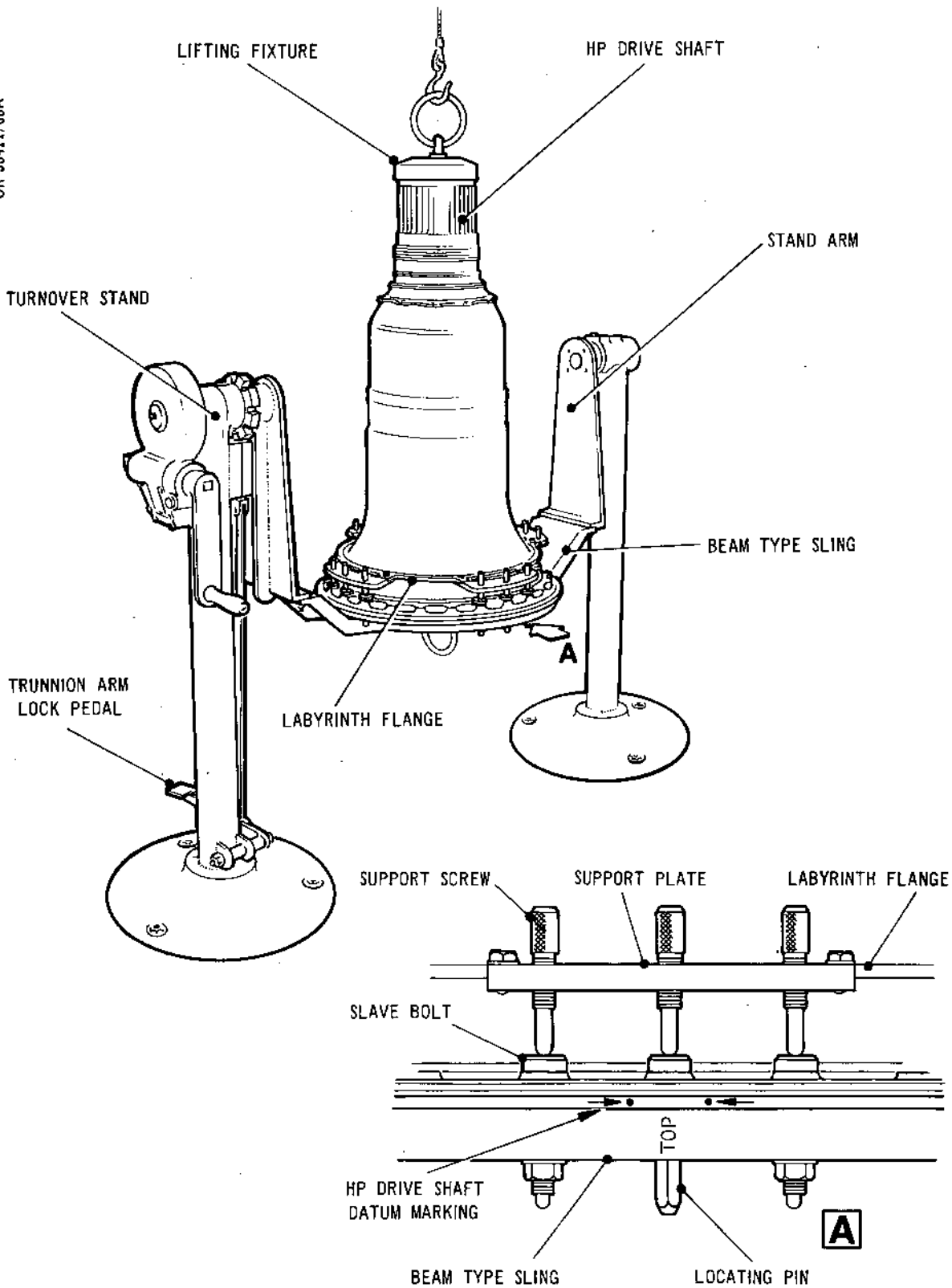


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 30411/00A



TN34253

HP Drive Shaft Assembled to Beam Type Sling  
Figure 502

SUB-ASSEMBLY  
**72-33-00**  
Page 506  
Aug 27/75



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



B. Assemble the Drive Shaft to the Beam Type Sling.  
(Ref. Fig.502).

- (1) Ensure that the beam type sling (Tool 1060) is assembled to the turnover stand (Tool 405) and that the stand arms extend downwards. If the beam type sling is not assembled to the stand, assemble it to the stand as follows.
  - (a) Attach a hoist to the lifting eye of the beam type sling, then position the beam over the stand.
  - (b) Ensure that the stand arms extend upwards, then lower the beam onto the two studs in each arm.
  - (c) Assemble a washer and nut to each stud, tighten the nuts, then release the hoist.
  - (d) Release the stand trunnion arm lock, rotate the arms 180 deg until the arms extend downwards, then apply the lock.
- (2) Attach a hoist to the lifting eye of the lifting fixture (Tool 1069) attached to the drive shaft, then raise the hoist and position the drive shaft over the turnover stand.
- (3) Identify the datum hole at the front (larger diameter) end of the drive shaft by the datum marking  $\rightarrow 0 \quad 0 \leftarrow$  on the step of the bolt hole flange (Ref. Fig.502) and the position marked 'TOP' on the beam type sling. Lower the drive shaft onto the beam type sling aligning the bolt holes and the datum mark on the drive shaft with the 'TOP' marked on the beam.
- (4) Offer a locating pin (Tool 928) into the datum hole of the drive shaft and through the hole in the beam type sling. Assemble three more locating pins to the drive shaft/beam at 90 deg spacing from the fitted locating pin. Secure the drive shaft to the beam with eight slave bolts and nuts (Tool 385), fitting a bolt to each side of each locating pin. Mark the datum hole locating pin with chalk.

PRINTED IN ENGLAND

TN34254

SUB-ASSEMBLY

72-33-00

Page 507

Jan 28/75



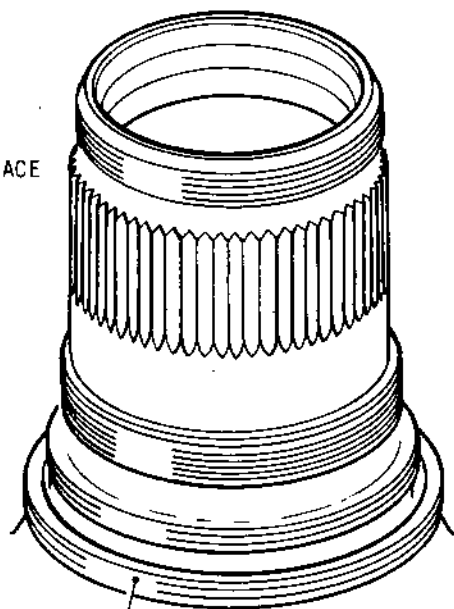
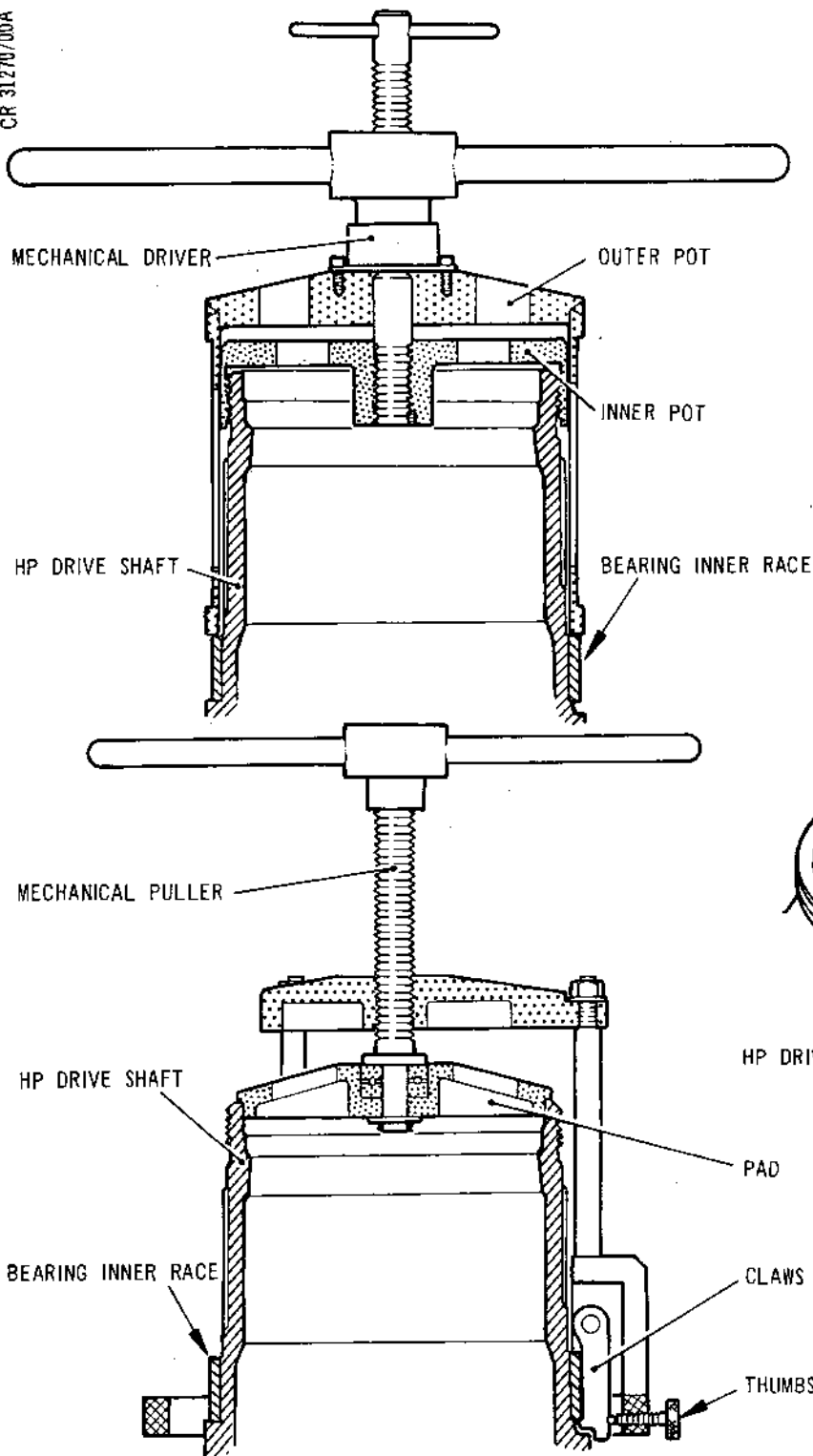
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 31270/00A



HP DRIVE SHAFT

Assembling Bearing to HP Drive Shaft  
Figure 503

SUB-ASSEMBLY  
**72-33-00**

Page 508

Aug 27/75

TN19554





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (5) Locate a support plate (Tool 378) on the labyrinth flange of the drive shaft directly above each of the four sets of pins and bolts, and secure each plate to the flange with two slave washers and bolts. Screw three support screws into each support plate until they contact the heads of the locating pins and slave bolts.
- (6) Release the hoist, then unscrew and remove the lifting fixture from the drive shaft.

NOTE: If the build is not to be continued,  
Screw a protector (Tool 1238) onto the  
threaded end of the drive shaft.

- C. Assemble the Slave Rear Roller Bearing Inner Race to the HP Drive Shaft(Ref. Fig.503).

NOTE: If the protector is assembled, remove it  
from the end of the drive shaft.

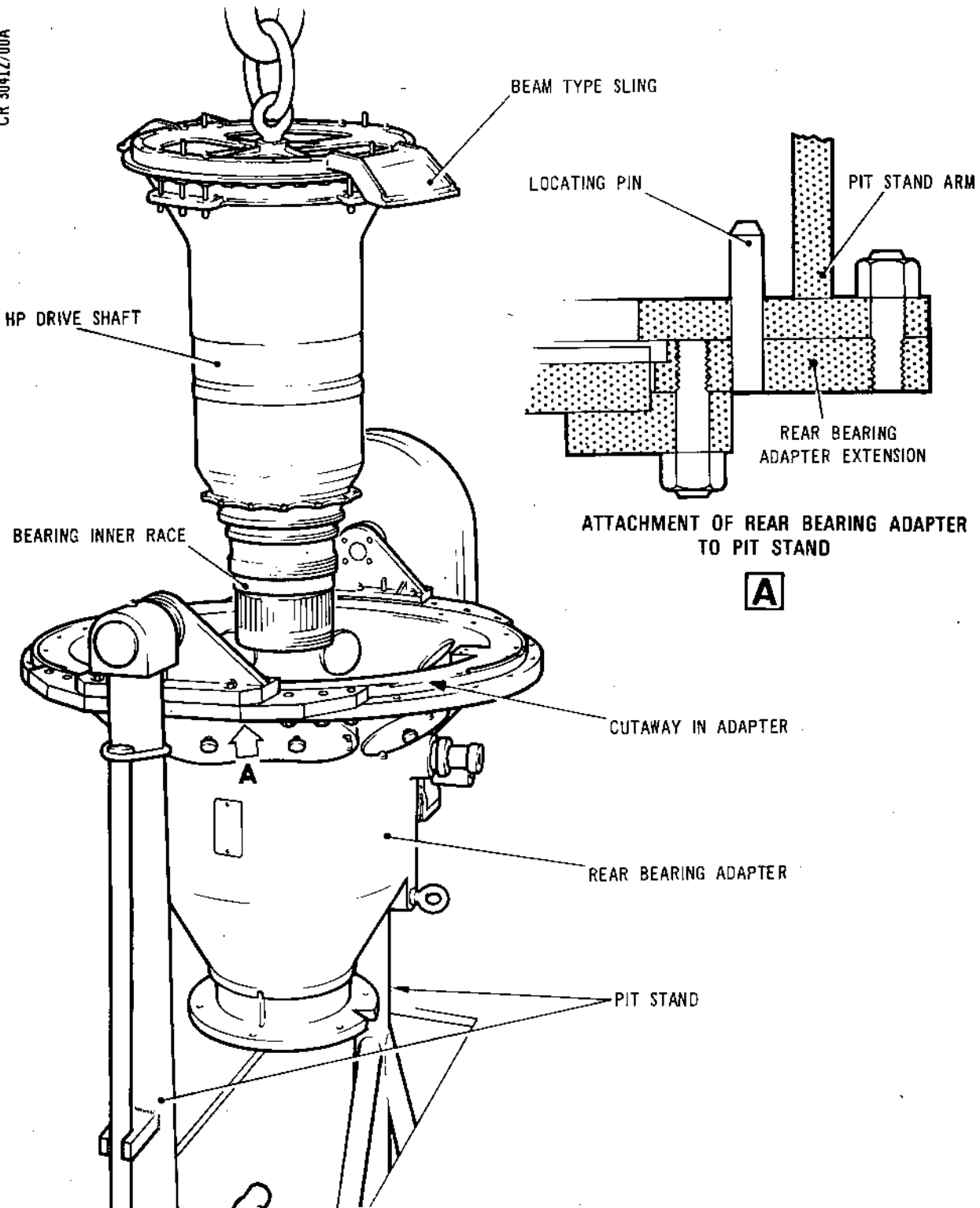
- (1) Offer the slave bearing inner race (Tool 248) over the rear (top) end of the drive shaft and lower it over the splines and onto its location on the shaft. Due to the tolerances of the two items, the race may slide onto the shaft and abut the step on the shaft without using the mechanical driver. If the race is tight, use the mechanical driver (Tool 1070) as follows:
- (a) Screw the small tommy bars of the inner pot in until the thread is nearly used up.
- (b) Offer the driver over the end of the drive shaft and screw the inner pot onto the shaft using the small tommy bars.
- (c) Screw in on the outer pot large tommy bar so that it contacts the race and pushes it onto the shaft. Tighten down on the outer pot to ensure the race abuts the step on the shaft.



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 30412/00A



Assembling HP Drive Shaft to Rear Bearing Adapter  
Figure 504

SUB-ASSEMBLY  
**72-33-00**

Page 510

Aug 27/75

TN19555



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) If the mechanical driver was used, unscrew the inner pot from the drive shaft until released, then remove the tool.
- (3) Screw a protector (Tool 1238) onto the threaded end of the drive shaft.

D. Assemble the Rear Bearing Adapter to the Pit Stand (Ref. Fig.504).

NOTE: Ensure that the slave bearing (outer ring and rollers) (Tool 248) is assembled to the rear bearing adapter (Tool 1028) and that it is secured with a ringnut.

- (1) Offer the multiple leg sling (Tool 1054) to the rear (smaller diameter) end of the rear bearing adapter (Tool 1028) aligning the captive bolts with the tapped holes, then secure the sling to the adapter with the captive bolts.
- (2) Ensure that the arms of the pit stand (Tool 1027) extend upwards. Attach a hoist to the ring of the sling, then raise the hoist and position the adapter front flange over the pit stand arms (Ref. Fig.504). Lower the adapter locating its extensions over the stand arms and inserting its two locating pins and five studs into each stand arm. Assemble, and fully tighten, a washer and nut to each of the studs.
- (3) Release the hoist, then release and remove the sling from the adapter.
- (4) Rotate the pit stand arms 180 deg until the adapter extends downwards. Withdraw the three rollers by releasing the smaller knurled lock rings (on the outside of the adapter), and turning the larger knurled rings clockwise.

E. Assemble the HP. Drive Shaft to the Rear Bearing Adapter (Ref. Fig.504 and 505).

- (1) Release the trunnion arm lock on stand (Tool 405), then rotate the arms 180 deg so that the drive shaft extends downwards with the ring of the beam type sling (Tool 1060) uppermost, then apply the lock. Attach a hoist to the lifting ring, then release and remove the two nuts and washers securing the beam to each stand arm. (Ref. Fig.502).

SUB-ASSEMBLY

**72-33-00**

Page 511  
Apr 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Raise the hoist and position the drive shaft over the rear bearing adapter, then remove the protector (Tool 1238) from the rear (lower) end of the drive shaft, and the protector (Tool 1241) from the labyrinths. Steadily lower the drive shaft into the adapter engaging the bearing inner race (on the drive shaft) in the bearing housed in the bottom of the adapter, and engaging the beam type sling in the cutaways in the adapter (top) flange spigot. Secure each end of the beam to the adapter with two slave nuts and bolts. Release the hoist.
- (3) Rotate the pit stand arms 180 deg until the adapter extends upwards. Offer the HP drive shaft support sleeve (Tool 1031) over the drive shaft engaging the splines, then lower it until it abuts the bearing.
- (4) Offer the mechanical jack (Tool 1029) over the support sleeve and align the captive bolts with the tapped holes in the adapter. Unscrew the jack adjuster (if required), to allow the jack to abut the adapter, then screw the captive bolts into the adapter. Using the tommy bars, screw in on the jack adjuster until it abuts the support sleeve, then release the jack half a turn. Temporarily lock the jack by screwing down on the lock ring using the tommy bars.
- (5) Offer the LP drive shaft support sleeve (Tool 1030) into the assembled HP support sleeve and screw it onto the HP drive shaft. Screw the sleeve onto the shaft until it abuts the assembled HP support sleeve, then release the sleeve one and a half turns.

NOTE: Through the medium of the HP support sleeve, the mechanical jack and the LP support sleeve, the HP drive shaft is now supported and secured at its rear end to the adapter and can be raised or lowered to obtain correct settings. The LP support sleeve will also provide support for the LP drive shaft when it is assembled.

TN34257

SUB-ASSEMBLY

**72-33-00**

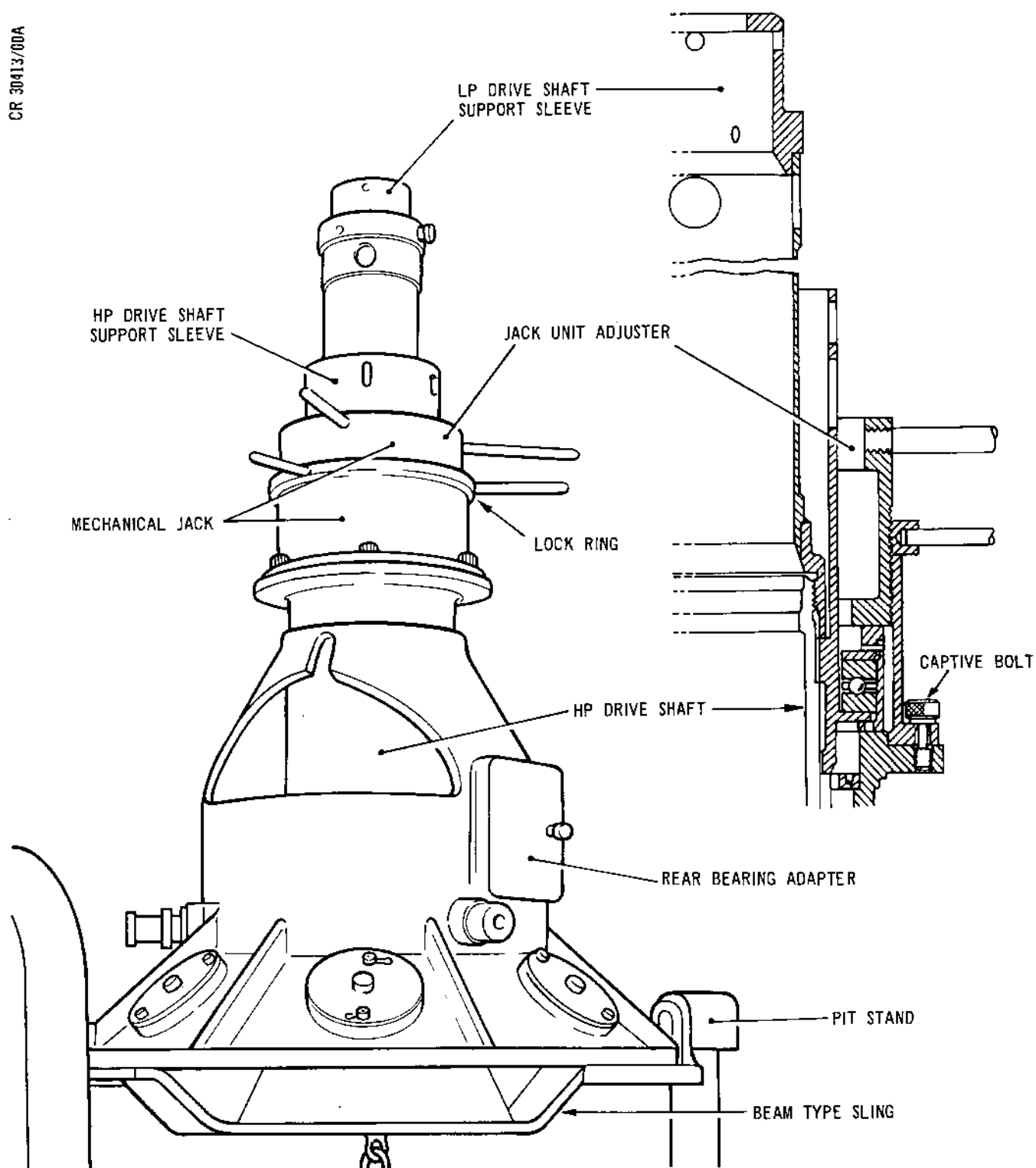
Page 512

Apr 1/76



OLYMPUS 593

MK. 610-14-28  
OVERHAUL



Securing Rear End of HP Drive Shaft to Rear Bearing Adapter  
Figure 505

SUB-ASSEMBLY  
**72-33-00**

Page 513  
Aug 27/75



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (6) Rotate the pit stand arms 180 deg until the adapter extends downwards. Attach a hoist to the ring of the drive shaft beam type sling then release and remove the slave nuts and bolts securing the beam to the adapter and the slave nuts securing it to the drive shaft.
  - (7) Raise the hoist and position the beam type sling over its stand (Tool 405). Ensure that the stand arms extend upwards, then lower the beam onto the two studs in each arm. Assemble a washer and nut to each stud, tighten the nuts, then release the hoist. Release the stand trunnion arm lock, rotate the arms 180 deg until the arms extend downwards, then apply the lock.
- F. Centralize the HP Drive Shaft in the Rear Bearing Adapter (Ref. Fig.506).
- (1) Engage the three rollers of the adapter with the drive shaft by turning the three (larger) knurled rings (on the outside of the adapter) in a counter-clockwise direction until each roller abuts the shaft. Ensure that the rollers abut the drive shaft with equal pressure, sufficient to hold the shaft in position, but enabling it to be turned with a light pressure (when released). Lock the rollers in position by tightening the (smaller) knurled lock rings clockwise.
  - (2) Remove the checking fixture (Tool 63) from its container and locate it over one of the drive shaft slave bolts, and retain the fixture with a slave nut. Assemble a clock gauge to the fixture and secure it with the knurled nut, then adjust the position of the fixture bar and gauge to zero the gauge on the centre point of one of the three internal bosses inside the top of the adapter. Ensure the retaining nuts are fully tightened.
  - (3) Rotate the drive shaft and check the reading on the other two bosses. The T.I.R. should not exceed 0.002 in. (0,050 mm). If the T.I.R. is outside the limit, adjust on the positioning of the three rollers to bring the T.I.R. within the 0.002 in. (0,050 mm) limit. Ensure that the rollers are locked on completion of any adjustment.
  - (4) Release and remove the clock gauge. Unscrew and remove the slave nut and checking fixture and stow the fixture in its container.

SUB-ASSEMBLY

**72-33-00**

Page 514  
Dec 1/95



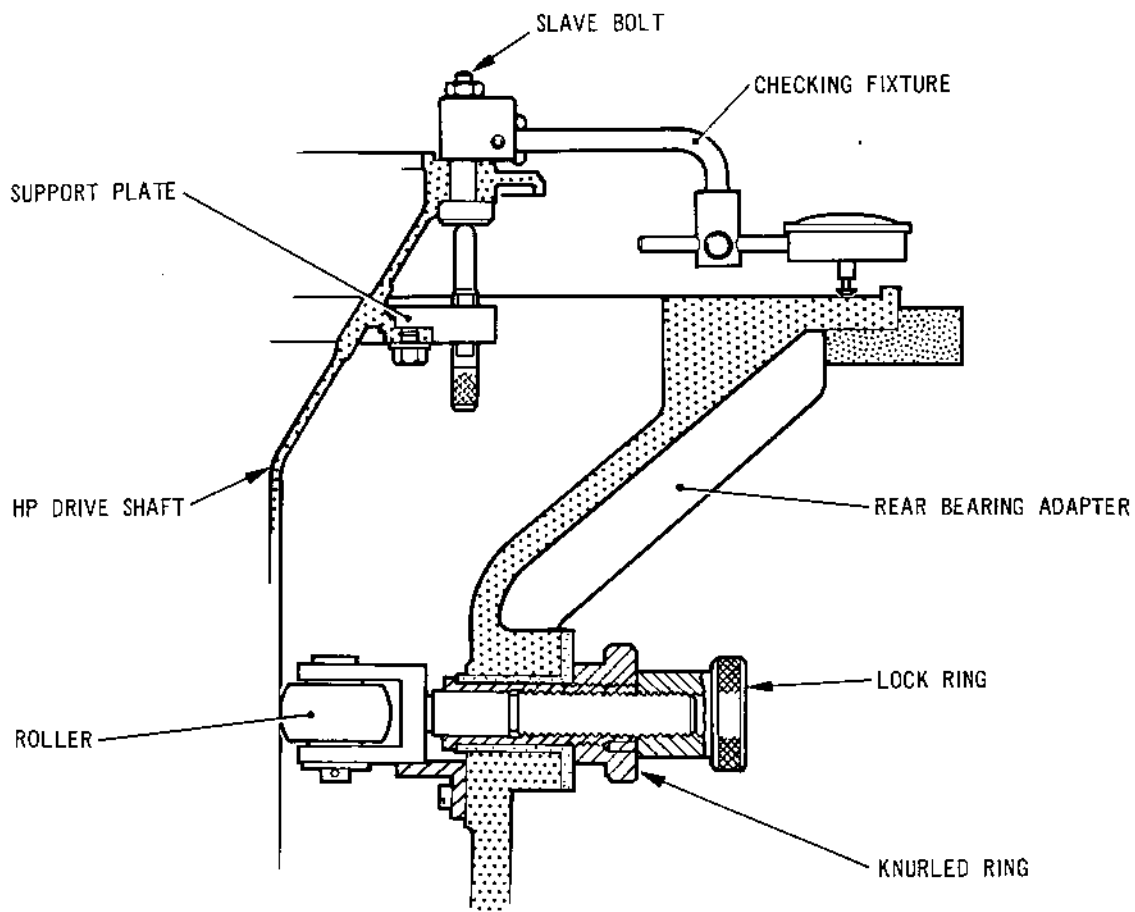
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 32171/00B



Positioning HP Drive Shaft in Rear Bearing Adapter  
Figure 506

SUB-ASSEMBLY  
**72-33-00**

Page 515  
Aug 27/75



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- G. Assemble the LP Compressor Drive Shaft and Air Transfer Tube to the HP Drive Shaft (Ref. Fig.508).

**CAUTION:** IT IS IMPORTANT THAT AIR TRANSFER TUBES (ATT) AND HPC DRIVE SHAFTS (HPC DS) WHICH HAVE BEEN MODIFIED IN ACCORDANCE WITH SB.0L593-72-9031-411 ARE MATCHED TOGETHER AS FOLLOWS. REWORK METHOD A (ATT) ONLY ASSEMBLED WITH REWORK METHOD B (HPC DS) AND REWORK METHOD C (ATT) ONLY ASSEMBLED WITH REWORK METHOD D (HPC DS) (REF. FIG.508A).

**NOTE:** Collect the LP compressor drive shaft from its sub-assembly station (Ref. 72-31-04 Assembly) ensuring that all the necessary work has been carried out and signed for.

- (1) Unscrew and remove the protector (Tool 408) from the LP drive shaft (rear), then release the thumbnut and withdraw the hinged protector (Tool 407 and 406) from the end of the LP drive shaft (front). Screw the guide sleeve (Tool 377) onto the LP drive shaft (rear), then attach the lifting fixture (Tool 1068) to the front end of the LP drive shaft as follows (Ref.Fig.507).
  - (a) Unscrew the locknut and withdraw the keep plate from the four body pins and towards the lifting plate.
  - (b) Offer the fixture to the LP drive shaft and slide the four lobes of the body through the four cutaways in the shaft, then turn the body so that the lobes locate behind the lands in the shaft. Push the keep plate towards the shaft locating the two lobes in two of the cutaways in the shaft and over the four pins of the body. Screw on the locknut and tighten it against the keep plate.
- (2) If the LP drive shaft is in its mobile stand (Tool 1332) release the top halves of each clamp. Attach a hoist to the lifting plate, then steadily raise the hoist holding the rear end of the shaft steady in the mobile stand (Tool 1332) or transporter (Tool 1092). Position the LP drive shaft over the HP drive shaft, then lower the shaft into the HP drive shaft. Ensure that the guide sleeve on the LP drive shaft locates correctly in the LP support sleeve (Tool 1030). Disconnect the hoist.

SUB-ASSEMBLY

**72-33-00**

Page 516  
Dec 1/95





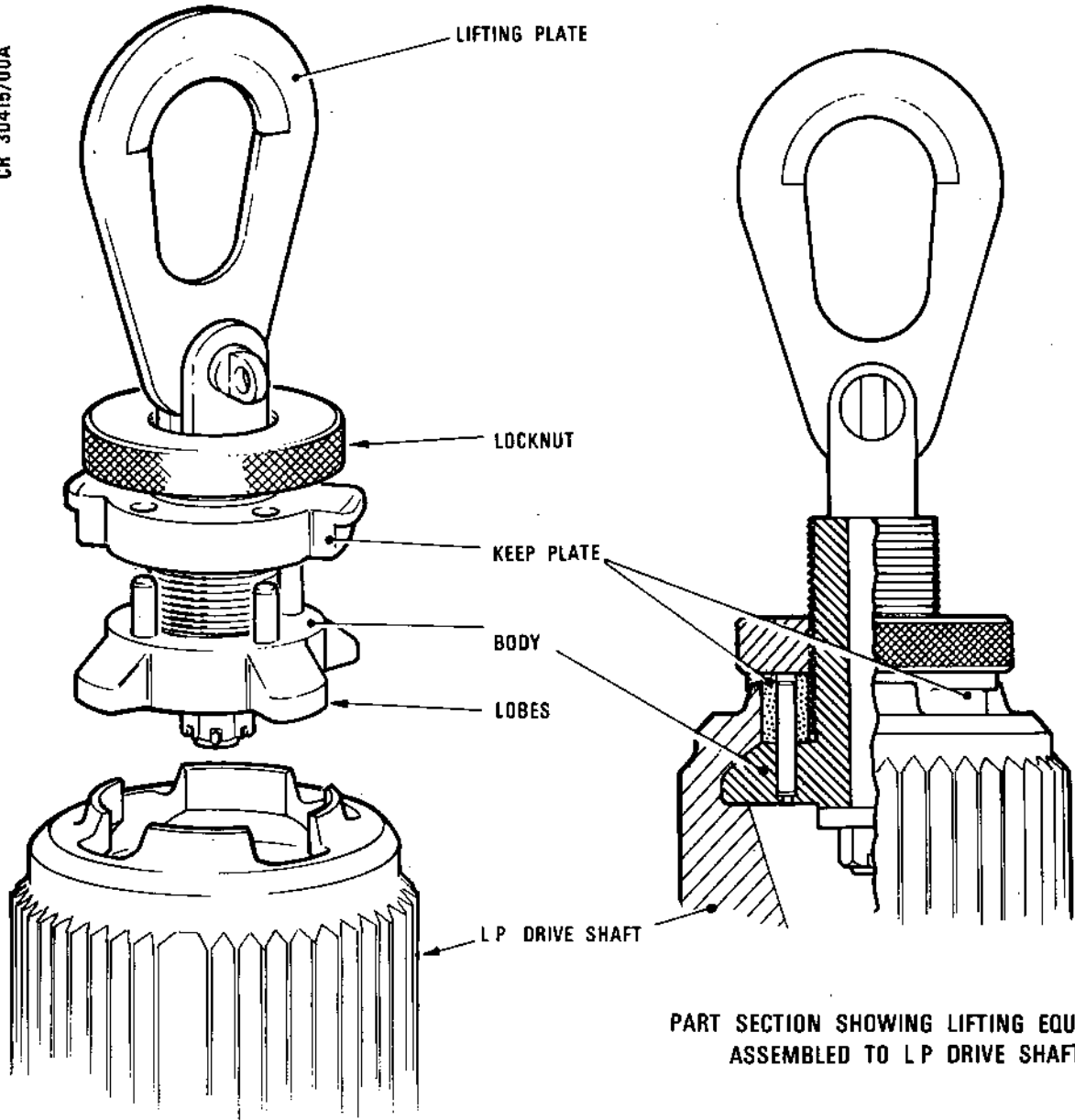
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 30415/00A



PART SECTION SHOWING LIFTING EQUIPMENT  
ASSEMBLED TO LP DRIVE SHAFT

Assembling Lifting Fixture to LP Drive Shaft  
Figure 507

SUB-ASSEMBLY

**72-33-00**

Page 517

Aug 27/75

TN19558



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Remove the lifting fixture (Tool 1068) from the LP drive shaft by releasing the locknut, withdrawing the keep plate, then turning the body until its lobes align with the cutaways in the shaft, withdraw the body.
- (4) Identify the datum screw of the lifting/assembly fixture (Tool 1071) by examining the inside face of the screw flange for two scribed lines, one on each side of the datum screw. If the datum screw is not indicated, determine the datum screw and mark the casing as follows (Ref. Fig.508).
  - (a) Examine the circumference of guide (Tool 1072) for two scribed lines, one to each side of one of the four bushes. This bush is to be assembled to the location pin in the disk datum bolt hole in the HP rotor shaft (Ref. para.(8)).
  - (b) Offer the lifting/assembly fixture into the centre of the guide and align the three offset cutaways in the assembly fixture flange with the three offset guide bars in the guide.
  - (c) Trace a line from the datum bush in the guide (Ref. para.(a)) and paint a datum mark on the outside casing of the assembly fixture adjacent to the appropriate screw. This screw will be the datum screw and will screw into the datum hole in the air transfer tube.
- (5) With the rear (larger diameter) of the air transfer tube resting on a clean flat surface, examine the front (top) inside diameter for the datum mark  $\rightarrow 0$  on the scalloping arrowed to one of the flats, or  $\rightarrow 0 \leftarrow$  on the flat itself. The tapped hole in line with the flat is the datum hole.
- (6) Attach a hoist to the lifting/assembly fixture (Tool 1071), then raise the hoist and position the fixture over the air transfer tube. Lower the hoist and align the datum screw of the fixture with the datum hole in the tube. When the fixture abuts the tube, screw the fixture captive screws into the tube and fully tighten the screws.

TN34260

SUB-ASSEMBLY

**72-33-00**

Page 518

Apr 1/76



OLYMPUS 593

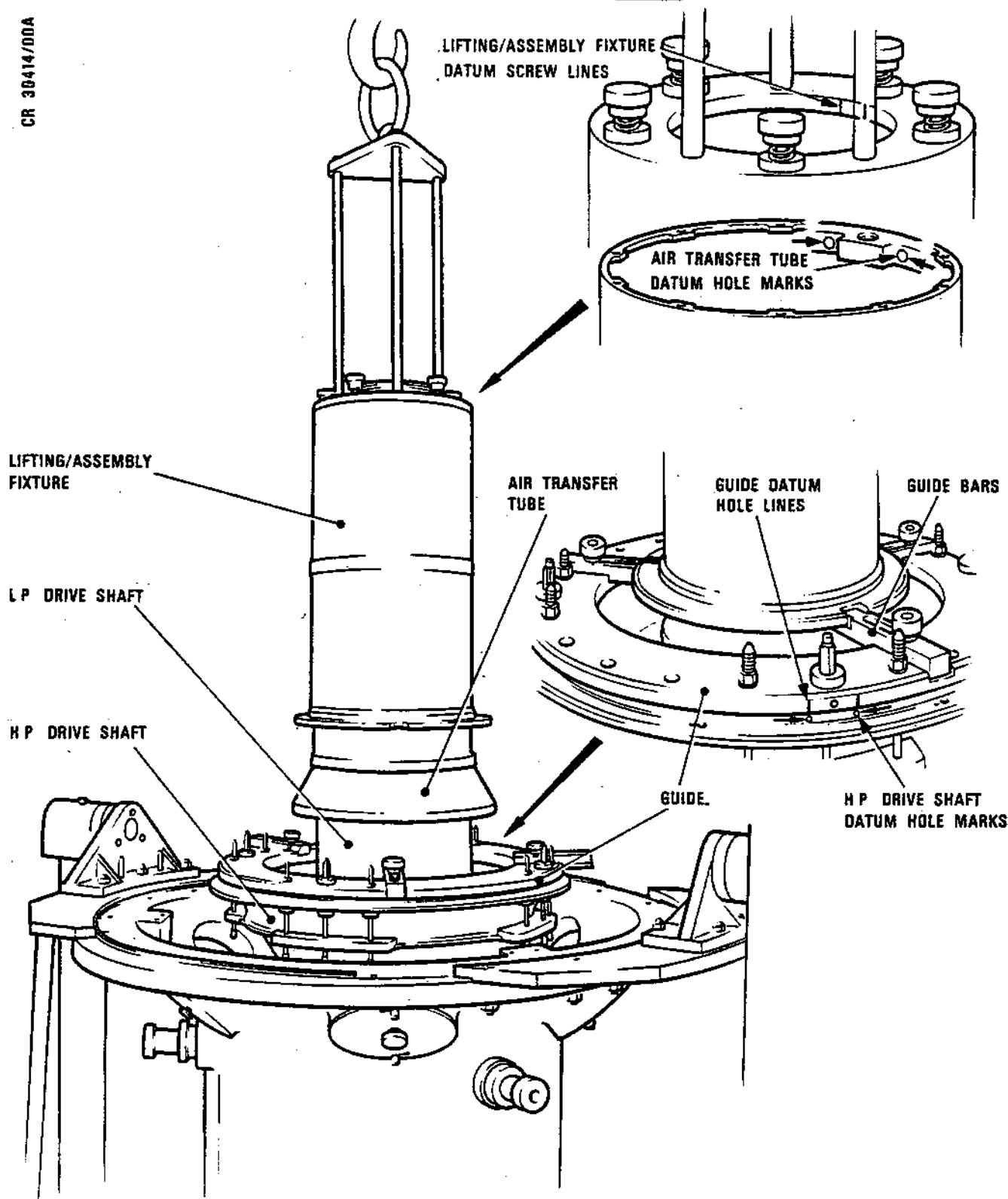
MK.610-14-28

OVERHAUL



CR 30414/DDA

PRINTED IN ENGLAND



TN19571

Assembling Air Transfer Tube to HP Drive Shaft  
Figure 508

SUB-ASSEMBLY  
**72-33-00**

Page 519  
Aug 27/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (7) With the aid of the hoist, place the fixture and tube in an oven for (approx.) 20 min at 100 deg C.
  - (8) Offer the guide (Tool 1072) to the H.P. drive shaft and align the datum bush, identified by two scribed lines on the circumference of the guide, with the location pin in the datum hole in the shaft, identified by the datum mark O on the scalloping inside the front (top) of the shaft and arrowed to a flat in line with a bolt hole. Screw slave nuts onto the eight slave bolts and tighten the nuts. Chalk a datum mark on the drive shaft, below the support plate and in line with the datum hole, for future reference.
  - (9) With the aid of a hoist and protective gloves, remove the lifting/assembly fixture and the air transfer tube from the oven. Position the air transfer tube over the LP drive shaft, then release and remove the protector (Tool 406) (if assembled) from the LP drive shaft (upper) labyrinth. Steadily lower the hoist guiding the transfer tube over the LP drive shaft until the flange on the assembly fixture nears the guide. Ensure that the guide bars are fully inwards and that they are locked with the knurled nuts, then align the three offset cutaways in the assembly fixture with the three offset guide bars. Lower the air transfer tube and ensure that the tube locates over the spigot on the HP drive shaft.
  - (10) When the assembly fixture and air transfer tube have cooled to the workshop temperature, release the assembly fixture knurled screws, then raise the hoist and remove the fixture. Lower the fixture then release the hoist.
  - (11) Offer the steady (Tool 287) over the LP drive shaft and secure it to the transfer tube with the two captive bolts.
  - (12) Release and remove the eight slave nuts securing the guide to the HP drive shaft, then remove the guide.
- H. Assemble the HP Compressor Rear Case to the Rear Bearing Adapter.
- (1) Ensure that the HP rear case is complete and ready for assembly, with the exit guide vanes, blanks etc. assembled (Ref.72-33-01 Assembly).
  - (2) Assemble the multiple leg sling (Tool 1960) to the rear case front (larger dia) flange.

TN34261



OLYMPUS 593


 MK.610-14-28 *sneema*  
OVERHAUL

EXISTING PART NUMBER	NEW PART NUMBER	REWORK METHOD
B927837 B514411 B927840	B517220 B517221 B517222	A
B517221 B517220 B517222	B517223 B517224 B517225	C

TUBE, ASSEMBLY OF, AIR TRANSFER. (TABLE 1)

EXISTING PART NUMBER	NEW PART NUMBER	REWORK METHOD
B923990 B923991 B925461 B935451 B935454 B935455 B512232 B512234 B512235 B512236 B512238 B512239	B517189 B517190 B517191 B517192 B517193 B517194 B517195 B517196 B517197 B517198 B517199 B517200	B
B517189 B517190 B517191 B517192 B517193 B517194 B517195 B517196 B517197 B517198 B517199 B517200	B517201 B517202 B517203 B517204 B517205 B517206 B517207 B517208 B517209 B517210 B517211 B517212	D

SHAFT, DRIVE, COMPRESSOR HP. (TABLE 2)

Air Transfer Tube and HPC Drive Shaft Matching Chart  
(SB.0L593-72-9031-411)  
Figure 508A



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

THIS PAGE LEFT BLANK INTENTIONALLY

SUB-ASSEMBLY

**72-33-00**

Page 520B

Dec 1/95



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (a) Release and remove the thumbscrews from the three attachment brackets.
- (b) Evenly dispose the three brackets on the front flange, then secure them to the flange with the thumbscrews.
- (3) Attach a hoist to the ring of the sling, then raise the hoist and position the case over the LP drive shaft. Steadily lower the case and align the locating pin in the rear (bottom) flange with the locating pin hole in the rear bearing adapter flange (in line with the lifting eye). Ensure that the bolt-holes in each item are aligned, then secure the rear case to the adapter with slave D-headed bolts and nuts.
- (4) Release and remove the sling from the rear case, then remove the hoist from the sling.

NOTE: If the build is not to be continued, place the wooden protector (Tool 1359) over the exit guide vanes.

J. Assemble the Stage 6-7 Spacer Ring to the Stage 7 Compressor Disk (Ref.Fig.511).

- (1) Remove the stage 6-7 spacer ring (02/3-390) from its container (Tool 1441) and place its front face (with the centre ring of bolt-holes) on a clean protected flat surface.

NOTE: On engines incorporating SB.72-99, at each build it is essential to use new SB.72-8766-291 standard nuts (3-340) and bolts (3-350A). Engines not incorporating SB.72-99, use new nuts only.

- (2) Apply lubricant 'A' to the threads and fitting dia of the bolts (02/3-350A SB.72-8766-291 standard). Assemble a bolt to the outer ring of bolt-holes (from inside the spacer), screw an assembly pin (Tool 978) onto the bolt then lower the bolt to rest on the spacer. Assemble the remaining 35 bolts to the spacer and screw an assembly pin onto each bolt.
- (3) Invert the spacer and place a number of support blocks under the spacer to raise it (approx.) five inches. Apply lubricant 'A' to the threads and fitting dia of the bolts (02/3-380), then insert the 36 bolts, from the underside, through the centre ring of bolt-holes so that they extend upward and the flats on the heads of the bolts lock against the spacer. Assemble a retaining clip (Tool 1038) to the protruding part of each bolt so that the clips abut the spacer.

SUB-ASSEMBLY

**72-33-00**

Page 521

Sep 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Examine the rear of the spacer ring (inward facing flange) for a double datum mark 00 on the flat, or on the scalloping pointing to the flat. The spacer datum hole is in the outer ring of holes and in line with the mark. To assist assembly chalk a datum line on the front face of the spacer in line with the datum hole.
- NOTE: The centre ring of bolts in the spacer secure the stage 6 disk and the datum mark chalked on the spacer will also be the datum for assembly of the stage 6 disk.
- (5) Position the three support blocks (Tool 608) on a work surface and ensure the correct location pins (Tool 604) are assembled to the blocks.
- (6) Attach a hoist to the lifting eye of the multiple leg sling (Tool 1086) then position the hoist over the stage 7 disk (02/3-370). Ensure that the front face of the disk, identified by the inward slope of the blade platforms, is uppermost. Remove the thumbnuts from each of the sling adapters then insert the adapter studs through three of the outer ring of bolt-holes in the disk, ensuring the adapters are evenly spaced. With the step on adapters facing outward screw a thumbnut onto each adapter stud.
- (7) Raise the hoist and position the disk above the three support blocks, align the pins in the blocks with the inner ring of bolt-holes in the disk. Lower the disk onto the pins, unscrew and remove the thumbnuts from the sling adapters raise the hoist and remove the sling. Identify, in the outer ring of bolt-holes, the datum hole of the disk by the datum mark 00 on the outer blade platforms, adjacent to the No.1 blade slot, the hole is in line with the mark.
- (8) Identify the stage 7 blades (02/3-360), remove them from their container, then examine the blade roots for their positional No. and lay them out in numerical sequence. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades, then insert the blades in numerical sequence into the front face of the disk, starting at No.1 position and working in an anti-clockwise direction when viewing from above.

IN30420





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (9) Position the shield (Tool 1922), with the outer flange uppermost, over the blades. Invert the heater (Tool 757), on its stand (Tool 759), so that the heater handles are uppermost. Attach the shackles of the multiple leg sling (Tool 1645) to the handles of the heater then connect the sling to a hoist (Ref.Fig.509).
- (10) Raise the hoist and position the heater above the disk then lower the hoist until the heater rests within the shield. Heat the disk to 70 deg C by operating the heater control (Tool 758).

NOTE: If the heater, control or stand are not available, use suitable units based on the wiring diagram (Ref.Fig.509).

- (a) Connect the heater control input supply plug to a suitable mains supply connection and turn the mains switch 'ON'.
- (b) Turn the three 'HEATER CONTROLS' band switches to 'FULL'.
- (c) Turn the heater time controller to nine minutes.
- (d) Switch the 'HEATERS' toggle switch to 'ON', then press the 'TIMER START' push button to start the heating cycle. During the period the heater is on, the 'ON' indicator light will remain illuminated, and at the completion of 9 min the heaters and light will automatically be switched off.
- (e) When the timer switch cuts out, switch the 'HEATERS' toggle switch to 'OFF' the 'HEATER CONTROLS' switches to 'OFF' and the mains supply switch to 'OFF'.

- (11) Assemble the lifting equipment (Tool 1088) to the stage 6-7 spacer ring.

NOTE: Do not remove the retaining clips from the bolts to which the sling is attached.

- (a) Attach a hoist to the sling and position the sling above the spacer.

SUB-ASSEMBLY

72-33-00

Page 523

Nov 1/78

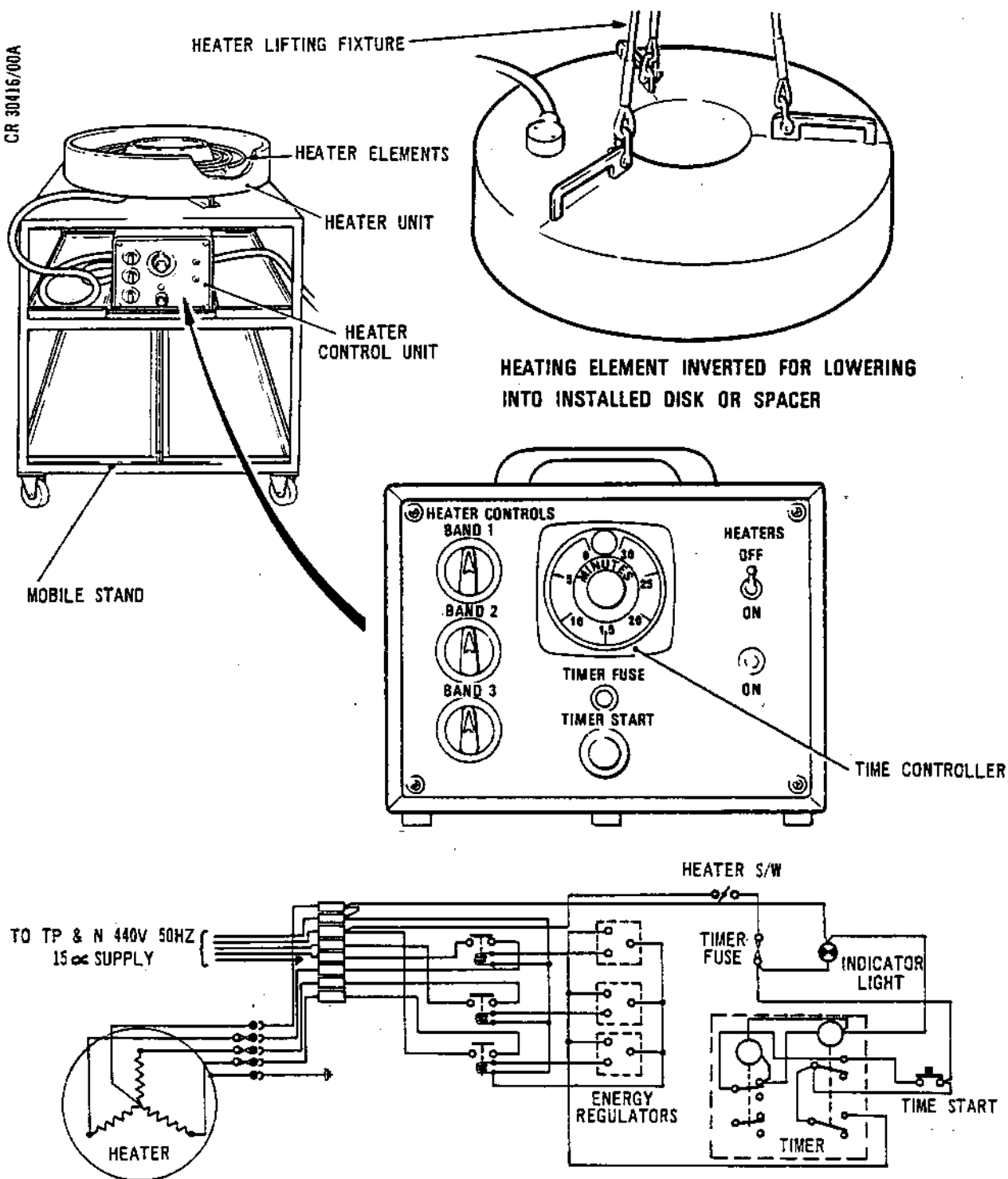


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 30416/00A



Rotor Disk/Spacer Ring Heating Equipment  
Figure 509

SUB-ASSEMBLY

72-33-00

Page 524

Apr 1/76

FN19572



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Position the three sling adapters evenly around the spacer and screw the thumbnuts onto the spacer bolts held captive by the retaining clips. Identify the datum hole of the spacer.
- (c) Raise the hoist and position the spacer close to the disk being heated.
- (12) Immediately the disk heating cycle is complete raise the hoist and remove the heating unit from the disk. Reposition the heating unit on the mobile stand then disconnect and remove the hoist.
- (13) Using protective gloves remove the shield from the blades then position the spacer above the disk and align the datum holes of disk and spacer. Lower the spacer and engage the assembly pins, attached to outer ring of bolts in the spacer, with the bolt-holes in the disk, continue to lower the spacer until it abuts the disk.
- (14) Unscrew the thumbnuts from the sling adapters then raise the hoist and remove the sling. Allow the assembly of disk/spacer to cool to normal workshop temperature.
- (15) Using the scissor retaining clips (Tool 1923) hold one of the outer ring of bolts, unscrew and remove the assembly pin then screw a nut (O2/3-340 Ref. SB.72-8766-291) onto the bolt, repeat the procedure until all assembly pins have been removed.
- (16) Ensure each nut has a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m) then tighten the bolts sufficient to prevent separation of disk and spacer when lifting the assembly.
- (17) Remove the retaining straps from the blades.
- K. Assemble the Stage 7 Disk/6-7 Spacer Ring to the HP Drive Shaft.
- (1) Assemble the sling (Tool 1088) to the stage 6-7 spacer ring.
- (a) Attach a hoist to the sling and position the sling above the disk/spacer assembly.

SUB-ASSEMBLY

72-33-00


Page 525

Sep 1/81



- (b) Position the three sling adapters evenly around the spacer and screw the thumbnuts onto the spacer bolts held captive by the retaining clips.

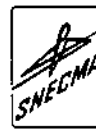
NOTE: Do not remove the retaining clips from the bolts to which the sling is attached.

- (2) Position the heating unit (Tool 757) with its heating coils uppermost, then assemble the heat shield, outer flange pointing downward to the heater. Raise the hoist and position the disk/spacer on the heating unit.
- (3) Heat the assembly to 70°C operating the heating equipment in accordance with para.J.(9).
- (4) Immediately the heating cycle is complete raise the hoist and position the assembly above the LP drive shaft. Align the datum hole, in the inner ring of holes, with the chalked datum pin in the HP drive shaft flange. The datum hole is in line with the double datum mark  pointing downwards on the outer blade platforms adjacent to the No.1 blade slot. Lower the hoist and ensure the disk abuts the drive shaft, unscrew the thumbnuts on the sling adapters raise the hoist and remove the sling.
- (5) Allow the disk/spacer to cool to workshop temperature. Gain access through the apertures in the rear bearing adapter and unscrew and remove the bolts securing the four support plates which are attached to the HP drive shaft and remove the plates. Remove the location pins and slave bolts from the disk/spacer.
- (6) Examine the heads of the bolts (02/3-320) for positional numbers and lay them out in numerical sequence. If new bolts are to be used, etch a number on the head of each bolt from 1 to 24. Replacement bolts are to be numbered with the number of the bolts being replaced.
- (7) Apply lubricant 'A' to the threads and fitting dia of the bolts. Identify the datum hole for the inner ring of disk/spacer bolts and insert No.1 bolt, locating the flat on the bolthead against the spacer. Insert the remaining 23 bolts in numerical sequence in a counter-clockwise direction as viewed from above. Apply lubricant 'A' to locknuts (02/3-310) then gain access through the rear bearing adapter access holes, screw the nuts onto the bolts.



OLYMPUS 593

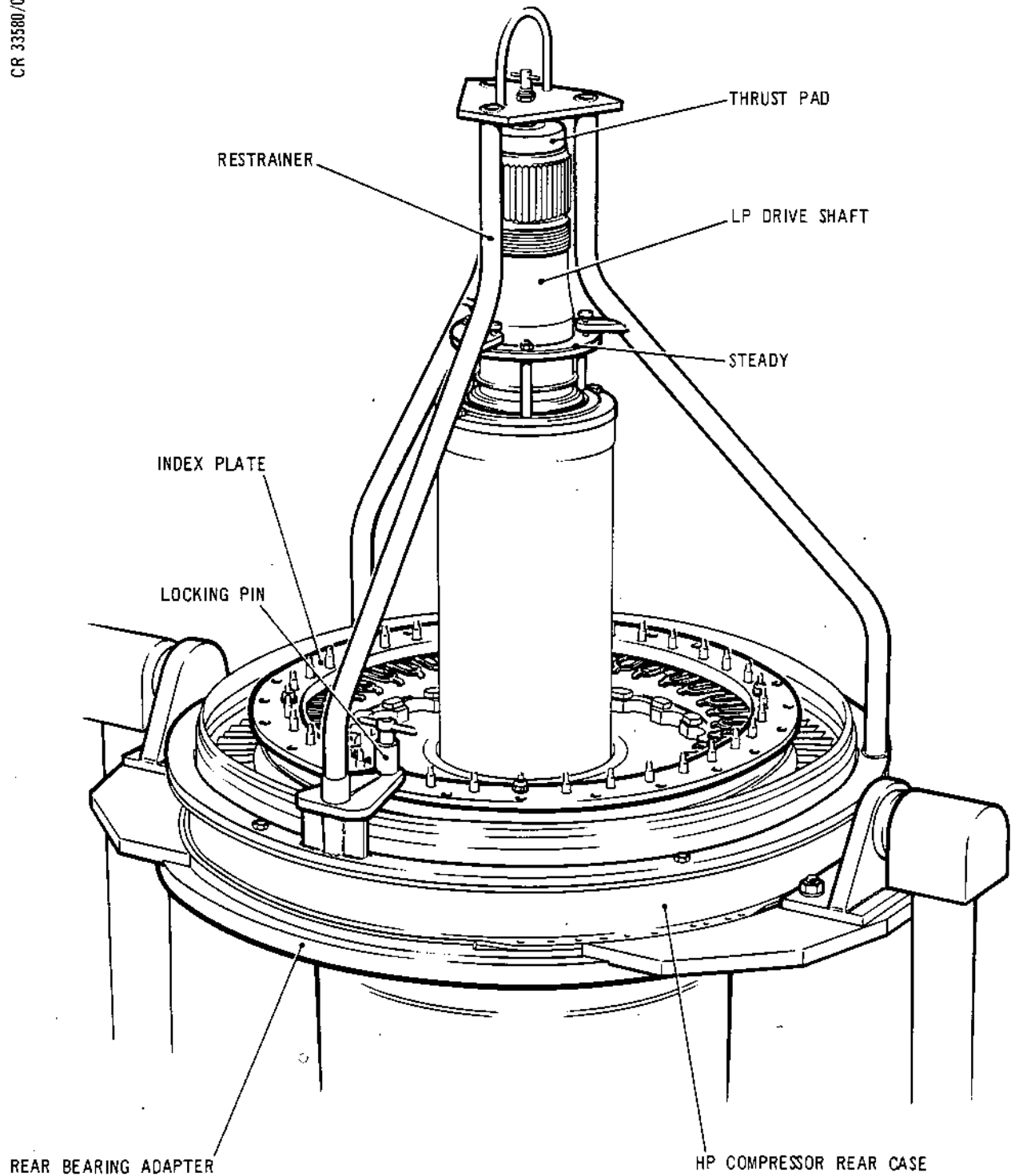
MK. 610-14-28  
OVERHAUL



CR 33580/00A

PRINTED IN ENGLAND

TN31217



Assembling Index Plate and Restrainer  
Figure 510

SUB-ASSEMBLY  
**72-33-00**

Page 527  
Apr 1/76

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



- (8) With stepped face of index plate (Tool 1924) on the underside, position plate over the LP drive shaft. Align inner ring of holes in plate with the captive bolts in the spacer, lower plate onto the bolts and secure with four slave nuts (Ref. Fig.510).

NOTE: Do not remove any retaining clips from the spacer bolts.

- (9) Attach a hoist to the restrainer (Tool 1925) then raise the hoist and position the restrainer over the LP drive shaft. Lower the hoist until the restrainer flange abuts the HP compressor rear case, align the holes and secure the retainer to the case with five slave bolts, nuts and washers. Rotate the stage 7 disk/spacer and engage the restrainer locking pin in one of the outer ring of holes on the index plate. Screw in the thrustpad of the restrainer until it abuts the LP drive shaft then screw in the three cap-screws of the restrainer until they abut the steady (Tool 287).
- (10) Rotate pit stand arms until rear bearing adapter extends upward. Gain access through ports in the rear bearing adapter and torque-tighten the nuts (02/3-310) around the HP drive shaft flange using the cranked ring wrench (Tool 1517). Check the torque loading of wrench in accordance with 72-09-00 Assembly, then tighten nuts in accordance with the following procedure and order. Ensure each nut has a minimum locking (run-down) torque of 14 lbf in. (1,6 N.m) and torque-tighten (in the correct sequence) in 100 lbf in. (11,5 N.m) increments to a final torque of 690 lbf in. (78 N.m) and in the sequence: 1, 13, 7, 19, 4, 16, 10, 22, 2, 14, 8, 20, 5, 17, 11, 23, 3, 15, 9, 21, 6, 18, 12 and 24. Torque-tighten the outer ring of nuts (02/3-340) to 100 lbf in. (11,5 N.m) in the following sequence: 1, 19, 28, 10, 32, 14, 23, 6, 36, 18, 27, 9, 31, 13, 21, 3, 35, 17, 26, 8, 30, 12, 25, 7, 33, 16, 24, 5, 34, 15, 22, 4, 29, 11, 20, 2. After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 2.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref.SB.72-8446-172).

NOTE: With the locking pin of the restrainer engaged in the index plate the HP drive shaft can be locked in any desired position. To rotate the HP shaft to a new position, withdraw the locking pin, rotate the shaft and re-engage the pin in the index plate.

SUB-ASSEMBLY

**72-33-00**

Page 528

Dec 1/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (11) Rotate the pit stand arms until the restrainer is uppermost then attach a hoist to the restrainer. Unscrew and remove the five nuts and bolts securing the restrainer to the HP compressor rear case then raise the hoist and remove the restrainer. Unscrew and remove the four slave nuts securing the index plate to the stage 7 disk/spacer then remove the plate.

NOTE: The HP drive shaft and stage 7 disk should now be set up, relative to the HP compressor rear case, in order that the remainder of the compressor can be assembled in the correct position to check the tip clearance of the compressor blades and vanes.

- (12) Release the lockring of the mechanical jack (Ref. Fig.505) then raise or lower the HP drive shaft until the three checking gauges (Tool 57) can be inserted between the stage 7 disk and the internal bosses of the rear bearing adapter (Ref.Fig.511). Using the above tool will ensure this dimension conforms to the Fits and Clearance Schedule 72-33-00 120. Ensure the mechanical jack is locked, using the lockring, after any adjustment.

NOTE: The clearance between gauge and disk should only be sufficient to facilitate entry and removal of the gauges.

- (13) Remove the three gauges from the rear bearing adapter. Using feeler gauges check the tip clearance between the stage 7 compressor blades and the HP compressor rear case. Find the longest blade, then check the minimum tip clearance of the longest blade and the case at eight equi-spaced positions. Ensure the minimum tip clearance is in accordance with the Fits and Clearance Schedule 72-33-00 F.C.S.146.

NOTE: If the build is not to be continued, place the wooden protector (Tool 1359) over the compressor blades.

PRINTED IN ENGLAND

TN30425

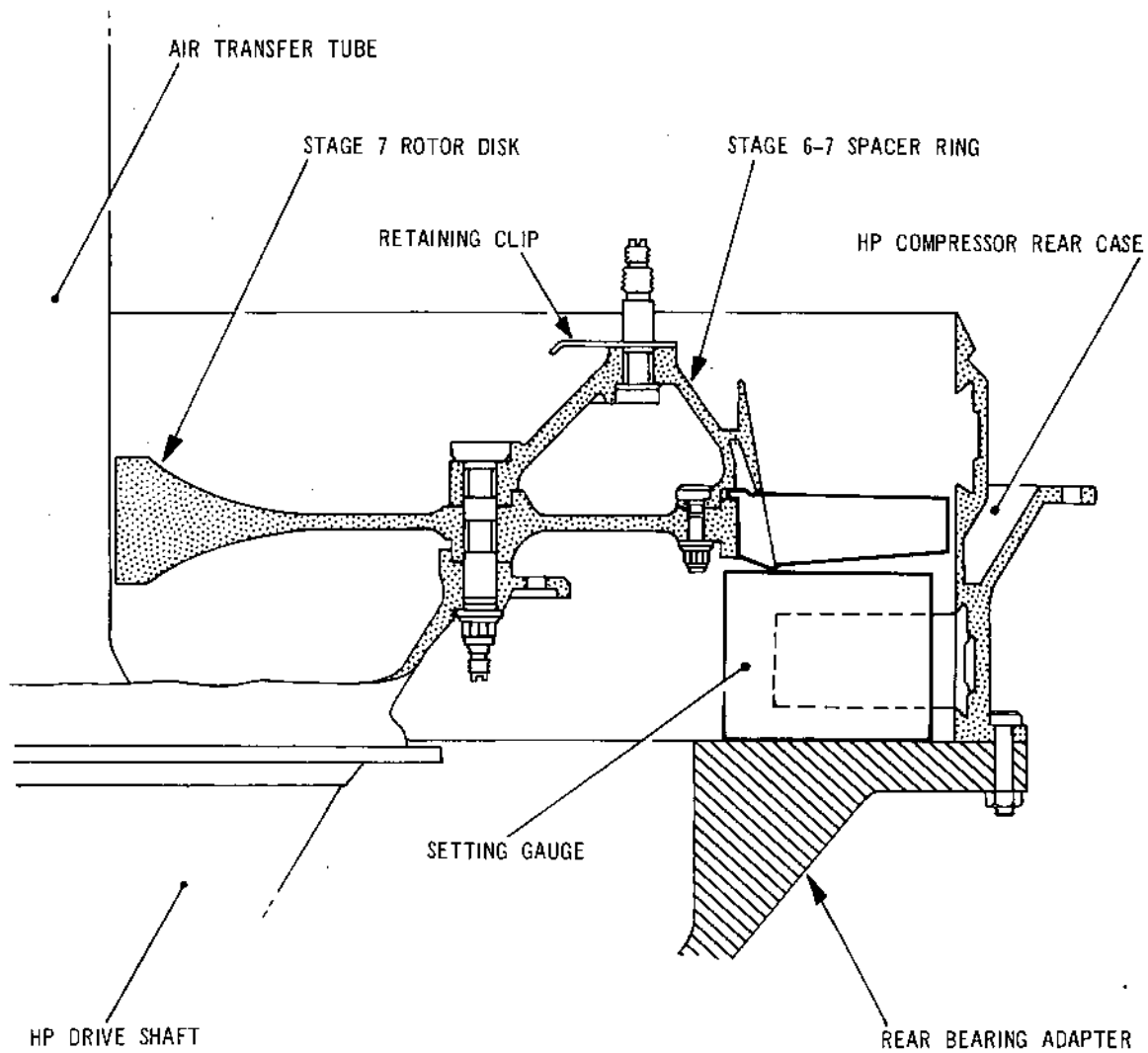


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 30417/00B



FN19573

Positioning Check of Stage 7 Rotor Disk  
Figure 511

SUB-ASSEMBLY  
**72-33-00**

Page 530  
Apr 1/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- L. Assemble the Stage 6 Stator Vanes to the Rear Case  
(Ref.Fig.512 and 512A).

NOTE: If the wooden protector is fitted, remove it from the compressor blades.

- (1) On engines to SB.72-8806-313 standard, assemble the liners (8-115-116) to the stage 6 vane grooves. Ensure that the end gaps of the liners are aligned with the blade loading slot and that the bolt and probe holes in the case are not obscured by the liners.

NOTE: Ensure that any repaired vanes are evenly distributed around the case and that the aggregate depth of blending does not exceed 2.000 in. (50,8 mm)  
(Ref.72-33-01, Repair No.2).

- (2) Apply lubricant 'A' to the stage 6 vane groove or liner.

- (3) With the trailing edge (shorter length) of the vane at the bottom, offer the vanes to the groove loading slot at the left-hand side viewed from above, and engage them in the groove, then ease them round the groove in either direction. Assemble 91 vanes (3-30), 6 probe vanes (3-50) and 3 bolted vanes (3-40) to the positions shown on Fig.512.

NOTE: Compressor case rear to Mod. 0L.8039 standard (B515596, B515597, B925037, B925038, B936646 and B936647) may incorporate up to qty 4 off handed probe vanes (3-51 and 3-52), in lieu of standard probe vanes (3-50). These vanes should be assembled in the order shown in Fig.512A.

- (4) Apply lubricant 'C' to the new bolts (3-10), then secure each bolted vane and the probe vane at 'D' with two sleeves (3-20) and bolts (3-10). Torque-tighten the bolts to 100 lbf in. (11,5 N.m), then wire-lock the two bolts of each vane to one another.
- (5) Check that the probe vanes are correctly assembled and positioned, by inserting the pin gauge (Tool 289) through the case and the holes in the vanes on each side of the case.



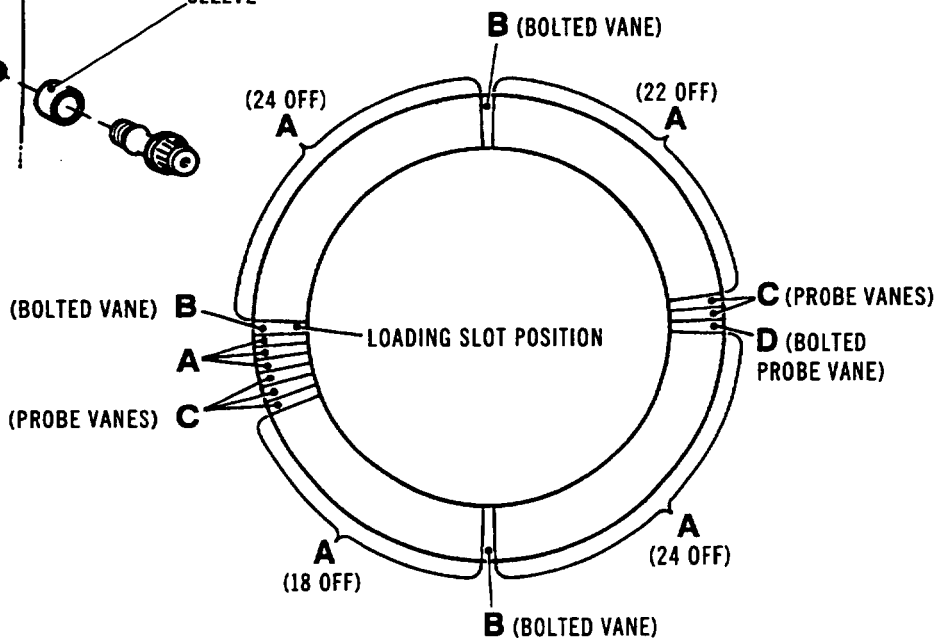
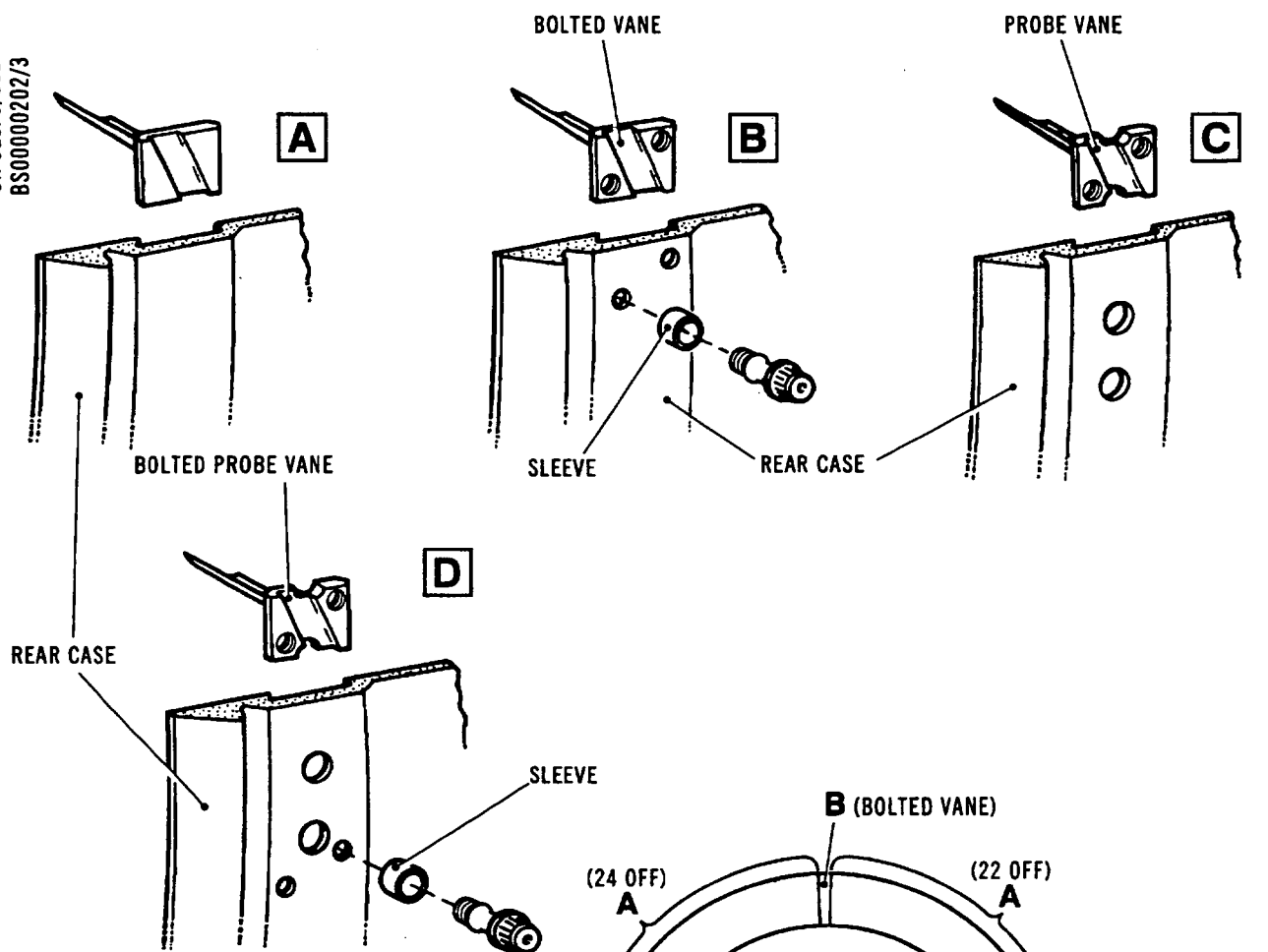
# OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

CR 32173/00B  
BS00000202/3



Assembling Stage 6 Stator Vanes to Rear Case  
Figure 512



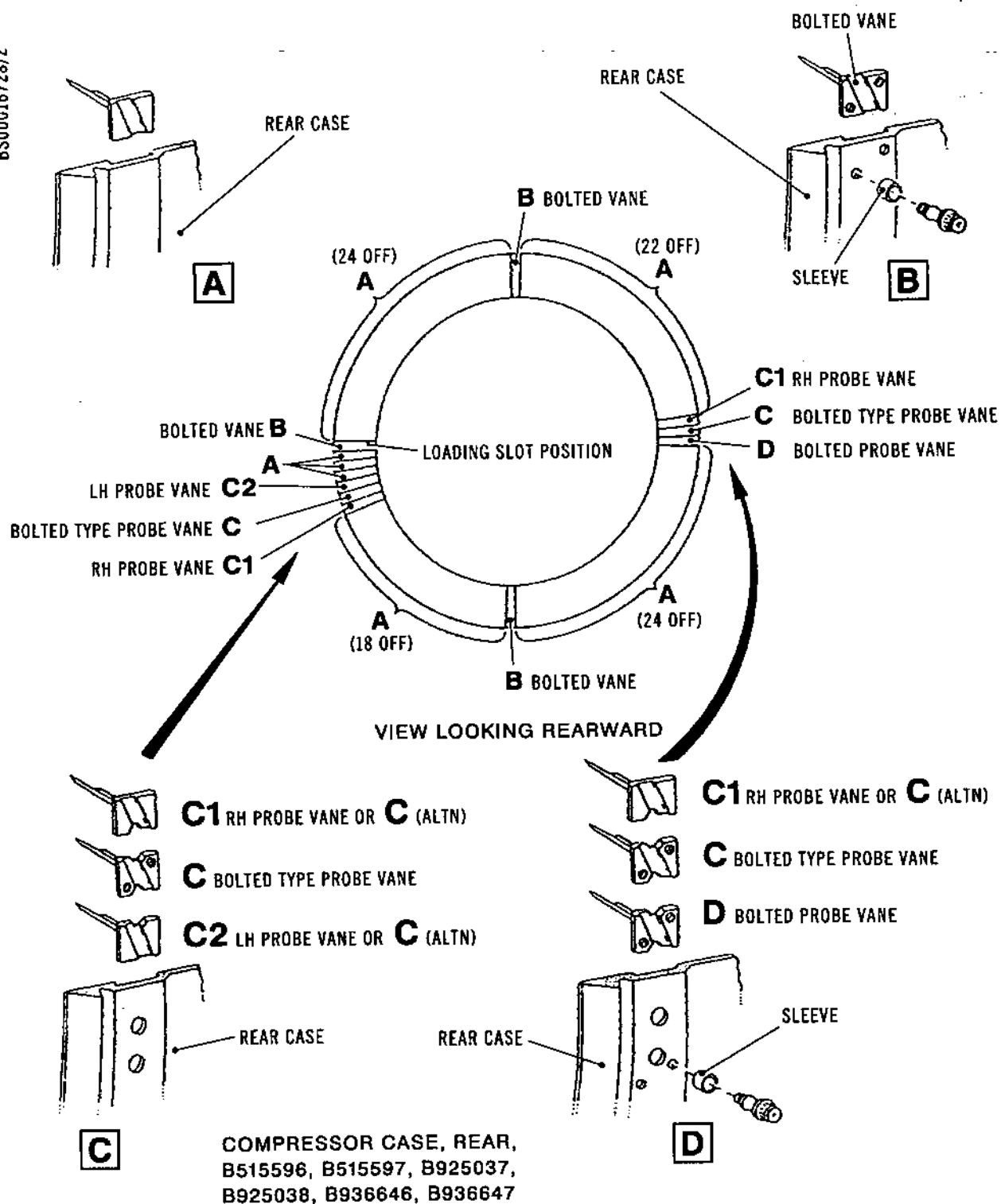
OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

BS00016728/2



Assembling Stage 6 Stator Vanes to Rear Case  
Figure 512A



OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

- (6) Using feeler gauges, check the clearance between stage 6 vanes and the spacer ring. Check each vane by (lightly) pulling the vane upwards (forward) to take up the play, then inserting the feeler at the mid position of the vane tip. Turn the HP drive shaft 90 deg and recheck each stator vane. Repeat the check with the shaft turned two further 90 deg turns. The minimum tip clearance must not be less than that quoted in the Fits and Clearance Schedule 72-33-00 F.C.S.136.

NOTE: If the build is not to be continued, place the wooden protector (Tool 1359) over the stator vanes.

SUB-ASSEMBLY

**72-33-00**

Page 532B  
Dec 1/97

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

snecma

- M. Assemble the Stage 6 Bladed Compressor Disk and Stage 5-6 Spacer Ring (Ref.Fig.513 and 514).

NOTE: If the wooden protector is assembled, remove it from the stator vanes.

- (1) Screw an assembly pin (Tool 1065) on to each of the bolts protruding from the stage 6-7 spacer ring. Withdraw the clips from the bolts and lower the bolts to rest on the stage 7 disk.
- (2) Ensure that the front face of the disk (02/2-120) is uppermost, by the inward slope of the disk and blade platforms towards the front and the blade tangs underneath.
- (3) Examine the blade platforms and identify the two adjacent platforms to No.1 blade with datum marks 0 then chalk a datum mark on the front face of the disk in line with the bolt hole between the datum marks.
- (4) Assemble a retainer strap (Tool 1166) to consecutive groups of six or seven blades, so that every blade has been strapped to a series of blades, then remove the blade retainer from the blade tips. Remove the masking tape (if assembled) from the blade roots rear (bottom) face, then ensure that the face of the disk and blade roots/tangs are perfectly clean.

NOTE: The retainer straps prevent the blades from dropping out of the disk when it is raised.

- (5) Assemble the multiple leg sling (Tool 404) to the stage 6 disk (Ref. Fig.513).
  - (a) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk.
  - (b) Ensure that the three lifting clip chains are positioned in the outermost slot of each plate. Loosen the wingnut on each lifting clip, then ensuring that the three clips are evenly disposed around the disk, locate each clip under a blade.

SUB-ASSEMBLY

**72-33-00**Page 533  
Dec 1/97

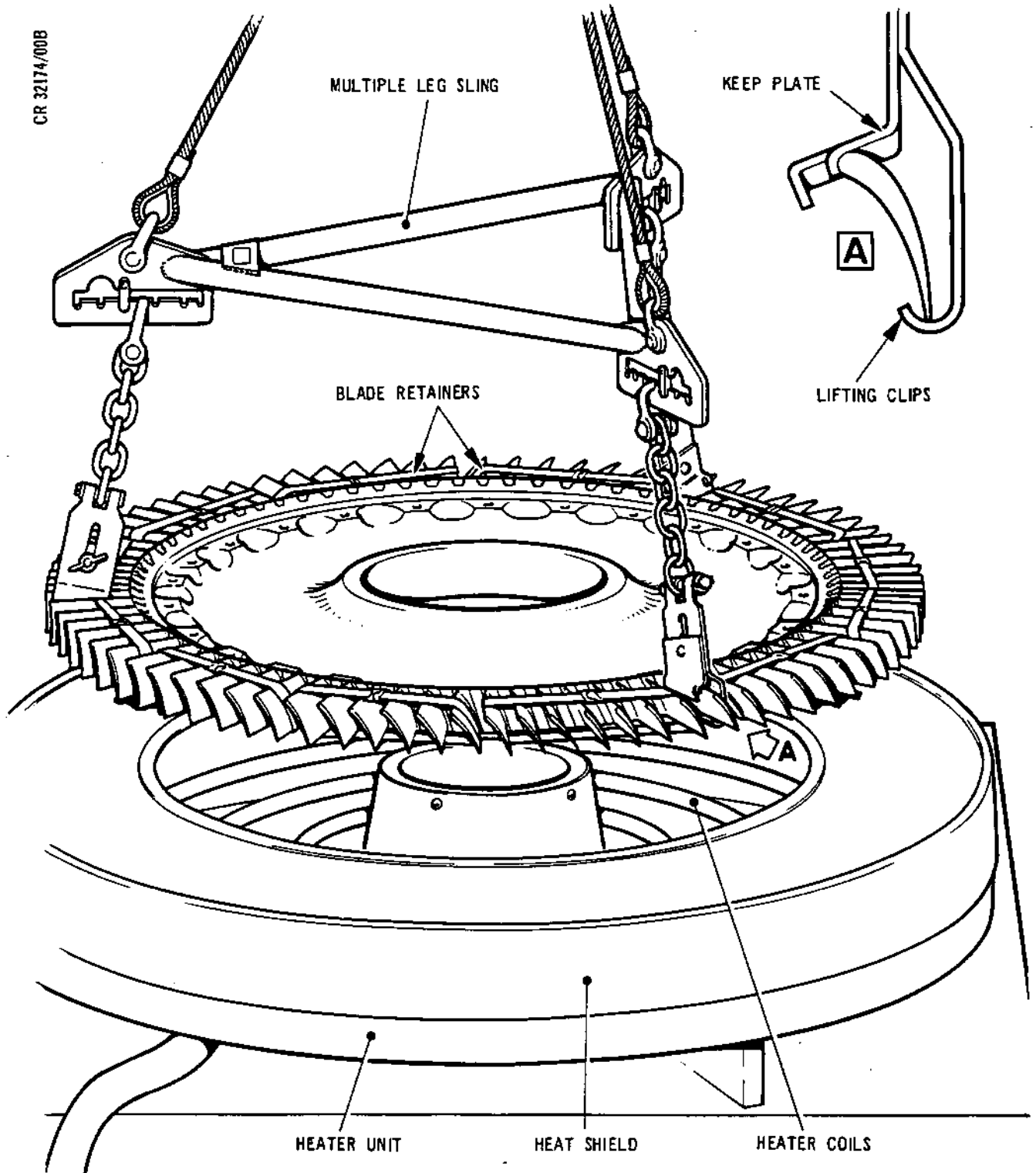


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 32174/00B



Assembling Stage 6 Bladed Disk to Heater Unit  
Figure 513

SUB-ASSEMBLY  
**72-33-00**  
Page 534  
Apr 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

- (c) Position the keep plate (of each lifting clip) over the top of a blade, and ensuring that the keep and lifting clips are abutting the blades, secure each clip with its wingnut.
- (6) With the heater (Tool 757) correctly positioned, heating coils uppermost, on its mobile stand (Tool 759) position the shield (Tool 1922) on the heater, this shield will protect the blade retaining straps. Position the disk over the heater then lower the disk to rest within the shield. With Ref. to para.J, (9) for the operation of the heater, set the time controller to 9 min and heat the disk to 60 deg C.
- (7) On completion of the heating cycle, hoist the disk and position and lower it over the LP drive shaft and above the assembly pins assembled to the spacer ring. Insert an alignment rod (Tool 1955) through the datum hole of the disk (Ref. para. (3)) and insert it into the marked assembly pin in the datum hole of the spacer ring. Insert an alignment rod through each hole in the disk and into the assembly pin aligned underneath. Lower the disk, and using the alignment rods, guide the disk over the assembly pins until the disk abuts the spacer. Ensure that the blades are in the fully forward (upward) position, otherwise the blades will contact the outside dia of the spacer preventing the disk from abutting the spacer.
- (8) Release and remove the sling from the blades, then remove the sling from the hoist. Withdraw the alignment rods from the assembly pins, and the retainer straps from the blades.
- (9) Pull up on the assembly pins until all the thread and a small waisted portion of the bolts are visible, then clip a retaining clip (Tool 1038) onto the waisted portion of each bolt as it is pulled up. Ensure that the clips extend towards the centre of the disk. If a bolt does not pull up sufficiently, apply a light upward pull on the assembly pin, then turn the pin to align the bolt head with the spacer (ensuring that the pin is not unscrewed from the bolt), and pull up on the pin. If any of the bolts are too tight to pull up with the assembly pins, proceed as follows:
- (a) Screw the mechanical driver (Tool 1064) onto a pin (Ref.Fig.514), then insert the appropriate locating key (Tool 1066 or 1079) into the assembly pin locating the key into the slot in the bolt.

SUB-ASSEMBLY

72-33-00

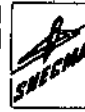
Page 535  
Dec 1/85



# OLYMPUS 593

MK.610-14-28

OVERHAUL



**NOTE:** Use locating key (Tool 1066) with assembly pins (Tool 1065) and locating key (Tool 1079) with assembly pins (Tool 1067).

- (b) Lock the locating key by screwing the thumbnut onto the assembly pin, then turn the key handle until it points towards the centre of the disk, this aligns a flat on the bolt head with the spacer.
- (c) Screw down on the driver tommy bars and draw the bolt up until it abuts the spacer ring.
- (d) Release and remove the locating key and driver, clip a retaining clip onto the waisted portion of the bolt, then remove the assembly pin.
- (e) Repeat the procedure on any bolt that is tight.

**NOTE:** If all the bolts are tight, then the disk has not been heated sufficiently and must be removed and reheated. Do not attempt to draw all the bolts up using the mechanical driver.

**NOTE:** If the assembly of the disk to the spacer has been carried out without any delays, the disk will be hot enough to enable the spacer to be assembled without reheating the disk (Ref. para.(10) and (11)). If delays have caused the disk to cool, reheat the disk (Ref. para.(12), (d) to (e) prior to assembling the spacer ring.

**NOTE:** Care must be taken to ensure that during the assembly of the spacer, the bolts protruding through the disk are not displaced from the clips and allowed to drop from the disk.

If this occurs, the bolt(s) cannot be repositioned, and the disk and stage 6-7 spacer ring will have to be removed from the stage 7 disk (Ref. 72-33-00 Disassembly).

SUB-ASSEMBLY

## 72-33-00

Page 536

Dec 1/85



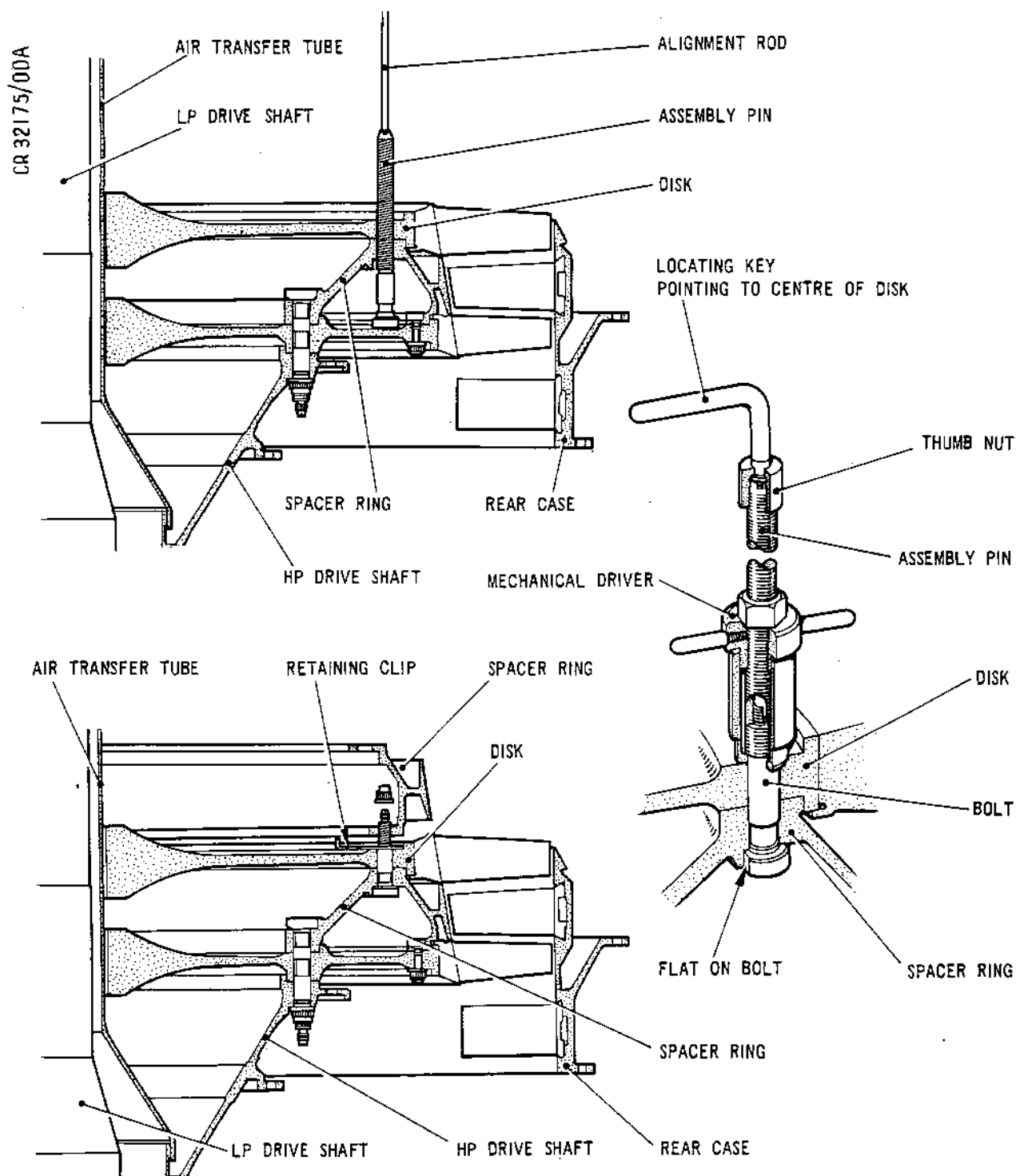


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



Assembling Stage 6 Disk and 5-6 Spacer Ring  
Figure 514

SUB-ASSEMBLY

72-33-00

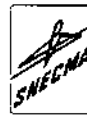
Page 537

Apr 1/76

TN19574



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (10) Remove the stage 5-6 spacer ring (02/2-100) from its container (Tool 1441) and examine the front (smaller dia) internal flange edge of the spacer ring for two datum marks  $\rightarrow 00 \leftarrow$  on scalloping pointing to a flat. The hole in line with the flat is the datum hole for the front face. Offer the spacer to the stage 6 disk, positioning the front datum hole to the left of the disk datum hole (as viewed from above), then lower the spacer over the bolts and rest it on the retaining clips, ensuring that none of the bolts are pushed down (Ref.Fig.511).
- (11) Apply lubricant 'A' to nuts (02/2-90), then screw the nuts onto the bolts ensuring that the nuts do not abut the spacer preventing the removal of the clips. Withdraw the retaining clips from the bolts and lower the spacer ensuring it abuts the disk. Use the wrench (Tool 1956) and torque-tighten the nuts in the following sequence: 1, 19, 28, 10, 32, 14, 23, 6, 36, 18, 27, 9, 31, 13, 21, 3, 35, 17, 26, 8, 30, 12, 25, 7, 33, 16, 24, 5, 34, 15, 22, 4, 29, 11, 20 and 2 ensuring that the nuts have a minimum locking (run-down) torque of 9.5 lbf in. (1.1 N.m). Torque-tighten the nuts (in the correct sequence) in 80 lbf in. (9.0 N.m) increments, to a final torque of 450 lbf in. (51 N.m). During the torque-tightening of the nuts should it be found necessary to re-align the flats on the boltheads with the spacer use the angled key (Tool 1952).

NOTE: If the disk had cooled to the extent of preventing the spacer abutting the disk (because of the interference fit between the two), proceed as detailed in para.(12).

- (12) If on lowering the spacer onto the disk the spacer would not assemble proceed as follows:
- (a) Assemble the retaining clips to the bolts (under the spacer), then remove the nuts from the bolts.
  - (b) Withdraw the spacer from the bolts, then check that the retaining clips are correctly clipped to the waisted portion of the bolts.

FN34270



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (c) Assemble six equi-spaced packing pieces (Tool 1950) to the bolts and retain with slave nuts. Remove the retaining clips from these bolts and tighten the nuts to ensure the stage 6 disk is correctly seated on the stage 6-7 spacer. Unscrew the nuts sufficient to allow reassembly of the retaining clips, beneath the packing pieces, to the spacer retaining bolts then assemble the clips and remove the nuts and packing pieces.
- (d) Invert the heater unit (Tool 757) on its stand so that the heater handles are uppermost. Attach the shackles of the multiple leg sling (Tool 1645) to the handles of the heater then connect the sling to a hoist (Ref.Fig.509).
- (e) Position and lower the heater over the LP drive shaft and onto the disk. With Ref. to para.J, (9) for the operation of the heater, set the time controller to 9 min and heat the disk to 60 deg C.
- (f) On completion of the heating cycle remove the heater and place in on its stand.
- (g) Assemble the spacer ring to the disk as detailed in para.(10) and (11).
- (13) Using feeler gauges, check the tip clearance between the stage 6 compressor blades and the HP rear case. Find the longest blade, then check the minimum tip clearance of the longest blade and the case at eight equi-spaced positions. Ensure the minimum tip clearance is in accordance with the Fits and Clearance Schedule 72-33-00 F.C.S.145.
- (14) Apply lubricant 'A' to the threads and fitting dia of the bolts (02/2-80), then assemble a bolt to each bolt hole in the front flange of stage 5-6 spacer ring (from the inside of the spacer), screw an assembly pin (Tool 1065 or 1067) onto each bolt and lower the bolt heads to rest on the spacer. Position the bolts to align a flat on each bolt head with the step in the spacer, for ease of locating the bolt heads when the bolts are pulled up into position.

SUB-ASSEMBLY

**72-33-00**

Page 539

Sep 1/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (15) Examine the front flange of the spacer ring for two datum marks  $\rightarrow 00 \leftarrow$  on scalloping pointing to a flat. The hole in line with the flat is the datum hole for the front flange, and to identify the hole during the assembly of the stage 5 disk, mark the assembly pin.

NOTE: If the build is not to be continued, place a wooden protector (Tool 1359) over the blades.

N. Assemble the HP Compressor Front Case to the HP Compressor Rear Case.

- (1) Ensure that the HP front case is complete and ready for assembly with the stage 5 stator vanes etc. assembled (Ref. 72-33-01 Assembly).

- (2) Assemble the multiple leg sling (Tool 1053) to the front case.

(a) Release and remove the thumbscrews from the three attachment brackets.

(b) Evenly dispose the three brackets on the front (smaller diameter) flange of the case and secure them to the flange with thumbscrews.

NOTE: If the wooden protector (Tool 1359) is assembled to the compressor blades, remove it.

- (3) Attach a hoist to the ring of the sling, then raise the hoist and position the front case over the LP drive shaft. Steadily lower the front case and align the locating pin in the rear (bottom) flange with the locating pin hole in the rear case taking care to guide the stator vanes in the front case over the spacer ring assembly in the rear case. Ensure that the bolt-holes in each item are aligned.
- (4) With Ref. to Fig.515 for the positioning of brackets and bolts (bolts are inserted from the HP rear case), secure the front case to the rear case having lubricated the bolts with lubricant 'A'. Ensure the nuts have a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m) then torque-tighten to 100 lbf in. (11,5 N.m).

SUB-ASSEMBLY

**72-33-00**

Page 540

Apr 1/82



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (5) Check that the probe vane access holes at the stage 6 location in the compressor case front are aligned with the holes in the compressor case rear by inserting a pin gauge (Tool 289) through both cases and the holes in the vanes.
  - (a) Compressor case front with twin probe access. Apply lubricant 'A' to the four blanking plugs (4-300 and 5-410), assemble a washer (4-310 and 5-420) to each plug, then screw the plugs into the probe access holes on the left-hand and right-hand sides of the case. Torque-tighten the plugs to 65 lbf in. (7,3 Nm), then wire-lock each pair of plugs together.
  - (b) Compressor case front with single probe access. Apply lubricant 'A' to the two blanking plugs (4-300 and 5-410), assemble a washer (4-310 and 5-420) to each plug, then screw the plugs into the probe access holes on the left-hand and right-hand sides of the case. Torque-tighten the plugs to 65 lbf in. (7,3 Nm), then wire-lock the plugs to the adjacent stage 5 blanking plug.
- (6) Release and remove the sling from the front case, then remove the hoist from the sling.
- (7) Using feeler gauges, check the tip clearance between the stage 5 stator vanes and the spacer ring. Check each vane by (lightly) pulling the vane forward (up) to take up the play, then inserting the feeler at the mid position of the vane tip. Rotate the HP drive shaft 90 deg and recheck each stator vane. Repeat the check with the shaft turned two further 90 deg turns. Ensure the minimum tip clearance is in accordance with the Fits and Clearance Schedule 72-33-00 F.C.S.137.

NOTE: If the build is not to be continued, place the wooden protector (Tool 1360) over the stator vanes.

P. Assemble the Stage 5 Bladed Compressor Disk and Stage 4-5 Spacer Ring.

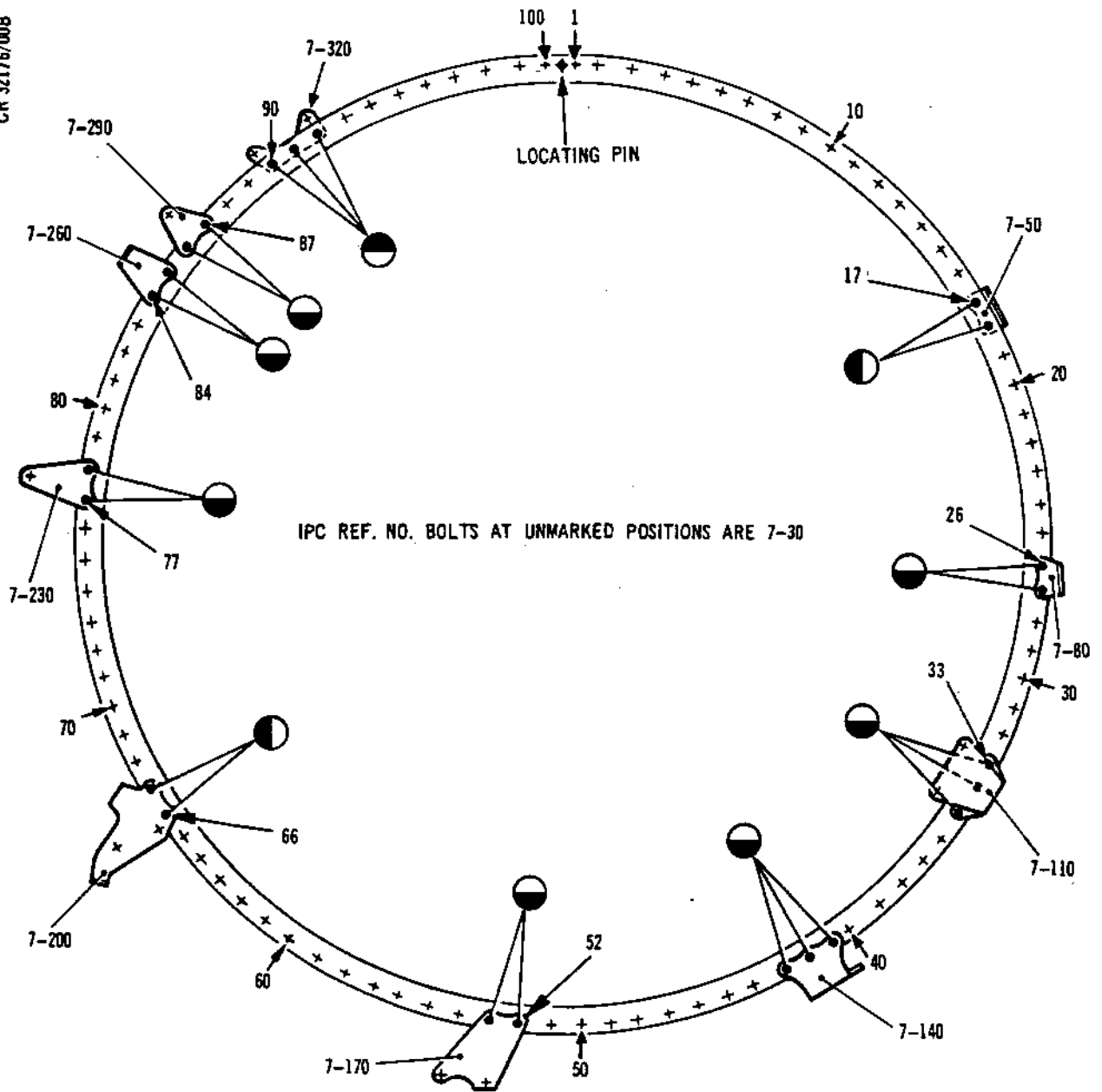
- (1) Ensure that the front face of the disk (02/2-70), identified by the inward slope of the disk and blade platforms, is uppermost.



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 32176/008



DIAGRAMMATIC VIEW LOOKING FORWARD ON REAR OF HP COMPRESSOR CASE

7-330 7-60 7-210 7-90 7-120 7-150 7-180 7-240 7-270 7-300

IPC REF. NO. OF BOLTS AT POSITIONS INDICATED

Attachment of Front Case to Rear Case  
Figure 515

SUB-ASSEMBLY  
**72-33-00**  
Page 542  
Apr 1/76

**OLYMPUS 593**

MK.610-14-28

sneema

OVERHAUL

- (2) Examine the blade platforms and identify the two adjacent platforms to No.1 blade with datum marks 0 then chalk a datum mark on the front face of the disk in line with the bolt-hole between the datum marks.
- (3) Assemble a retainer strap (Tool 1166) to consecutive groups of six or seven blades, so that every blade has been strapped to a series of blades, then remove the blade retainer from the blade tips. Remove the masking tape (if assembled) from the blade roots rear (bottom) face and ensure that the face of the disk and the blade roots/tangs are perfectly clean.

NOTE: The retainer straps prevent the blades from dropping out of the disk when it is raised.

- (4) Assemble the multiple leg sling (Tool 404) to the stage 5 disk (Ref. Fig.513).
  - (a) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk.
  - (b) Ensure that the three lifting clip chains are positioned in the outermost slot of each plate. Loosen the wingnut on each lifting clip, then ensuring that the three clips are evenly disposed around the disk, locate each clip under a blade.
  - (c) Position the keep plate (of each lifting clip) over the top of a blade, and ensuring that the keep and lifting clips are abutting the blades, secure each clip with its wingnut.
- (5) Position the heater (Tool 757), heating coils uppermost, on its mobile stand (Tool 759). Position the shield (Tool 1922) (Ref. Fig.513) on the heater then raise the hoist and position the disk above the heater, lower the disk to rest on the shield. With Ref. to para.J.(9), for the operation of the heater, set the time controller to 9 min and heat the disk to 60 deg C.

SUB-ASSEMBLY

**72-33-00**

Page 543

Dec 1/97

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

- (6) On completion of the heating cycle, hoist the disk and position and lower it over the LP drive shaft and above the assembly pins assembled to the spacer ring. Insert an alignment rod (Tool 1955) through the datum hole of the disk (Ref. para.(2)) and insert it into the marked assembly pin in the datum hole of the spacer ring. Insert an alignment rod through each hole in the disk and into the assembly pin aligned underneath. Lower the disk, and using the alignment rods, guide the disk over the assembly pins until the disk abuts the spacer. Ensure that the blades are in the fully forward (upward) position, otherwise the blades will contact the outside dia of the spacer preventing the disk from abutting the spacer.
- (7) Release and remove the sling from the blades, then remove the sling from the hoist. Withdraw the alignment rods from the assembly pins, and the retainer straps from the blades.
- (8) Pull up on the assembly pins until all the thread and a small waisted portion of the bolts are visible, then clip a retaining clip (Tool 1038) onto the waisted portion of each bolt as it is pulled up. Ensure that the clips extend towards the centre of the disk. If a bolt does not pull up sufficiently, apply a light upward pull on the assembly pin, then turn the pin to align the bolthead with the spacer (ensuring that the pin is not unscrewed from the bolt), should any of the bolts be too tight to pull up with the assembly pins, proceed as follows:
- (a) Screw the mechanical driver (Tool 1064) on to a pin (Ref. Fig.514), then insert the appropriate locating key (Tool 1066 or 1079) into the assembly pin locating the key into the slot in the bolt.

**NOTE:** Use locating key (Tool 1066) with assembly pins (Tool 1065), and locating key (Tool 1079) with assembly pins (Tool 1067).

- (b) Lock the locating key by screwing the thumbnut onto the assembly pin. Turn the key handle until it points towards the centre of the disk to align a flat on the bolthead with the spacer.
- (c) Screw down on the driver tommy bars and draw the bolt up until it abuts the spacer ring.

SUB-ASSEMBLY

**72-33-00**Page 544  
Dec 1/97





OLYMPUS 593



MK.610-14-28

SNECMA

OVERHAUL

(d) Release and remove the locating key and driver, clip a retaining clip onto the waisted portion of the bolt, then remove the assembly pin.

(e) Repeat the procedure on any bolt that is tight.

NOTE: If all the bolts are tight, then the disk has not been heated sufficiently and must be removed and reheated. Do not attempt to draw all the bolts up using the mechanical driver.

NOTE: If the assembly of the disk to the spacer has been carried out without any delays, the disk will be hot enough to enable the spacer to be assembled without reheating the disk (Ref. para. (9) and (10)). If delays have caused the disk to cool, reheat the disk (Ref. para. (11), (c) to (e)) prior to assembling the spacer ring.

NOTE: Care must be taken to ensure that during the assembly of the spacer, the bolts protruding through the disk are not displaced from the clips and allowed to drop from the disk. If this occurs, the bolt(s) cannot be repositioned, and the disk will have to be removed from the stage 5-6 spacer (Ref. 72-33-00 Disassembly).

(9) Remove the stage 4-5 spacer ring (02/2-50) from its container (Tool 1441) and examine the front (smaller dia) internal flange edge of the spacer ring for two datum marks 00 on scalloping pointing to a flat. The hole in line with the flat is the datum hole for the front face. Offer the spacer to the stage 5 disk, positioning the front datum hole to the right of the disk datum hole (as viewed from above), then lower the spacer over the bolts and rest it on the retaining clips, ensuring that none of the bolts are pushed down.

SUB-ASSEMBLY

72-33-00

Page 545

Dec 1/97

**OLYMPUS 593**

MK.610-14-28

sneema

OVERHAUL

- (10) Apply lubricant 'A' to nuts (02/2-40), then screw the nuts onto the bolts ensuring that the nuts do not abut the spacer preventing the removal of the clips. Withdraw the retaining clips from the bolts and lower the spacer ensuring it abuts the disk. Using the wrench (Tool 1956) torque-tighten the nuts in the following sequence: 1, 19, 28, 10, 32, 14, 23, 6, 36, 18, 27, 9, 31, 13, 21, 3, 35, 17, 26, 8, 30, 12, 25, 7, 33, 16, 24, 5, 34, 15, 22, 4, 29, 11, 20 and 2, ensuring that the nuts have a minimum locking (run-down) torque of 9.5 lbf in. (1,1 N.m). Torque-tighten the nuts (in the correct sequence) in 80 lbf in. (9,0 N.m) increments, to a final torque of 450 lbf in (51 N.m). During the torque-tightening of the nuts should it be necessary to re-align the flats on the boltheads with the spacer use the angled key (Tool 1952).

NOTE: If the disk had cooled to the extent of preventing the spacer abutting the disk (because of the interference fit between the two), proceed as detailed in para.(11).

- (11) If on lowering the spacer onto the disk the spacer would not assemble proceed as follows:
- (a) Assemble the retaining clips to the bolts (under the spacer), then remove the nuts from the bolts.
  - (b) Withdraw the spacer from the bolts, then check that the retaining clips are correctly clipped to the waisted portion of the bolts.
  - (c) Assemble six equi-spaced packing pieces (Tool 1950) to the bolts and retain with slave nuts. Remove the retaining clips from these bolts and tighten the nuts to ensure the stage 5 disk is correctly seated on the stage 5-6 spacer. Unscrew the nuts sufficient to allow reassembly of the retaining clips, beneath the packing pieces, to the spacer retaining bolts then assemble the clips and remove the nuts and packing pieces.
  - (d) Invert the heater (Tool 757) on its stand so that the heater handles are uppermost. Attach the shackles of the multiple leg sling (Tool 1645) to the handles of the heater then connect the sling to a hoist (Ref.Fig.509).

SUB-ASSEMBLY

**72-33-00**

Page 546

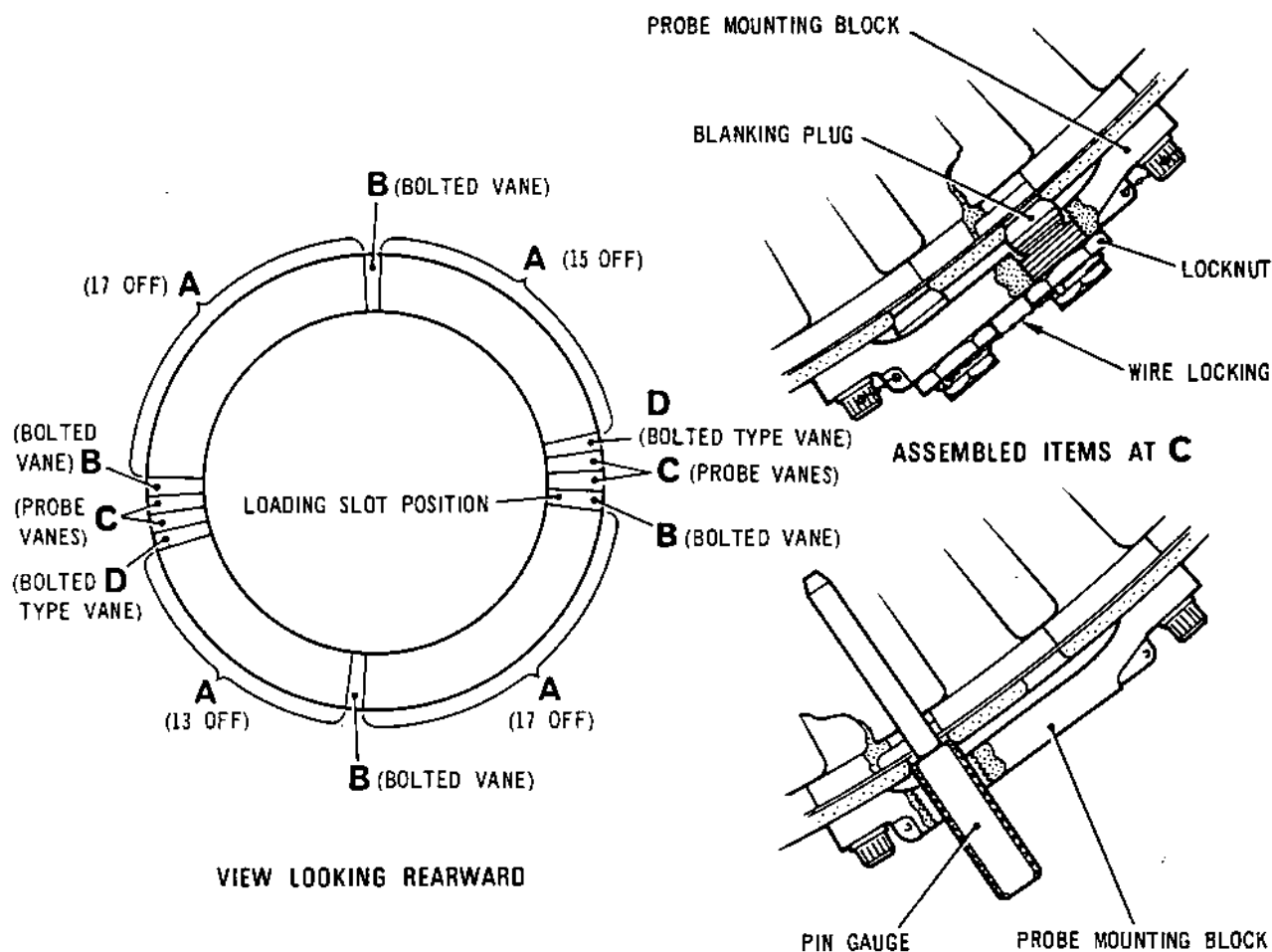
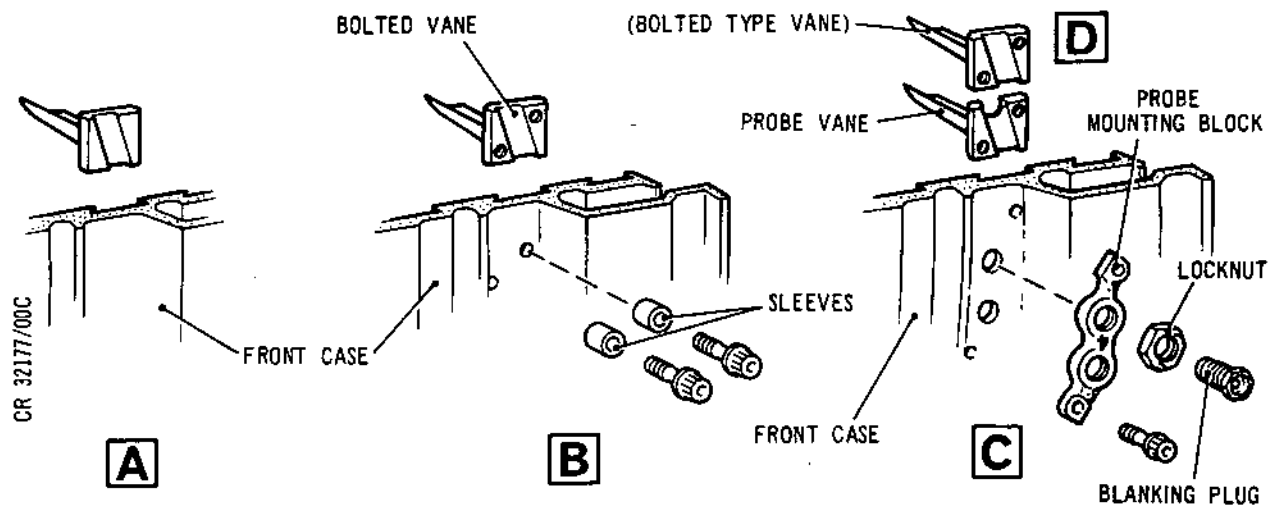
Dec 1/97



OLYMPUS 593

MK.610-14-28

OVERHAUL



Assembling Stage 4 Stator Vanes and Blanks to Front Case  
Figure 516

SUB-ASSEMBLY  
**72-33-00**

Page 547  
Jun 1/76



OLYMPUS 593



MK.610-14-28  
OVERHAUL

- (e) Position and lower the heater over the LP drive shaft and onto the disk. With Ref. to para.J, (9) for the operation of the heater, set the time controller to 9 min and heat the disk to 60 deg C.
  - (f) On completion of the heating cycle remove the heater and place in on its stand.
  - (g) Assemble the spacer ring to the disk as detailed in para.(9) and (10).
- (12) Using feeler gauges, check the tip clearance between the stage 5 compressor blades and the HP front case. Find the longest blade, then check the minimum tip clearance of the longest blade and the case at eight equi-spaced positions. Ensure minimum tip clearance is in accordance with the Fits and Clearance Schedule 72-33-00 F.C.S.144.
- (13) Apply lubricant 'A' to the threads and fitting dia of the bolts (02/2-30), then assemble a bolt to each bolt-hole in the front flange of stage 4-5 spacer ring (from the inside of the spacer), screw an assembly pin (Tool 1065 or 1067) onto each bolt then lower the bolt to rest on the spacer. Position the bolts to align the flat on each bolthead with the step in the spacer, for ease of locating the boltheads when the bolts are pulled up into position.
- (14) Examine the front flange of the spacer ring for two datum marks 00 on scalloping pointing to a flat. The hole in line with the flat is the datum hole for the front flange, and to identify the hole during the assembly of the disk, mark the assembly pin.

NOTE: If the build is not to be continued, place a wooden protector (Tool 1360) over the blades.

- Q. Assemble the Stage 4 Stator Vanes and Blanks to the Front Case (Ref. Figs.516 and 516A).

NOTE: If the wooden protector is assembled, remove it from the compressor blades.

NOTE: Ensure that any repaired vanes are evenly distributed around the case and that the aggregate depth of blending does not exceed 1.400 in. (35,56 mm) (Ref.72-33-01, Repair No.2).

- (1) Apply lubricant 'A' to the stage 4 vane grooves.

SUB-ASSEMBLY

72-33-00

Page 548  
Dec 1/97



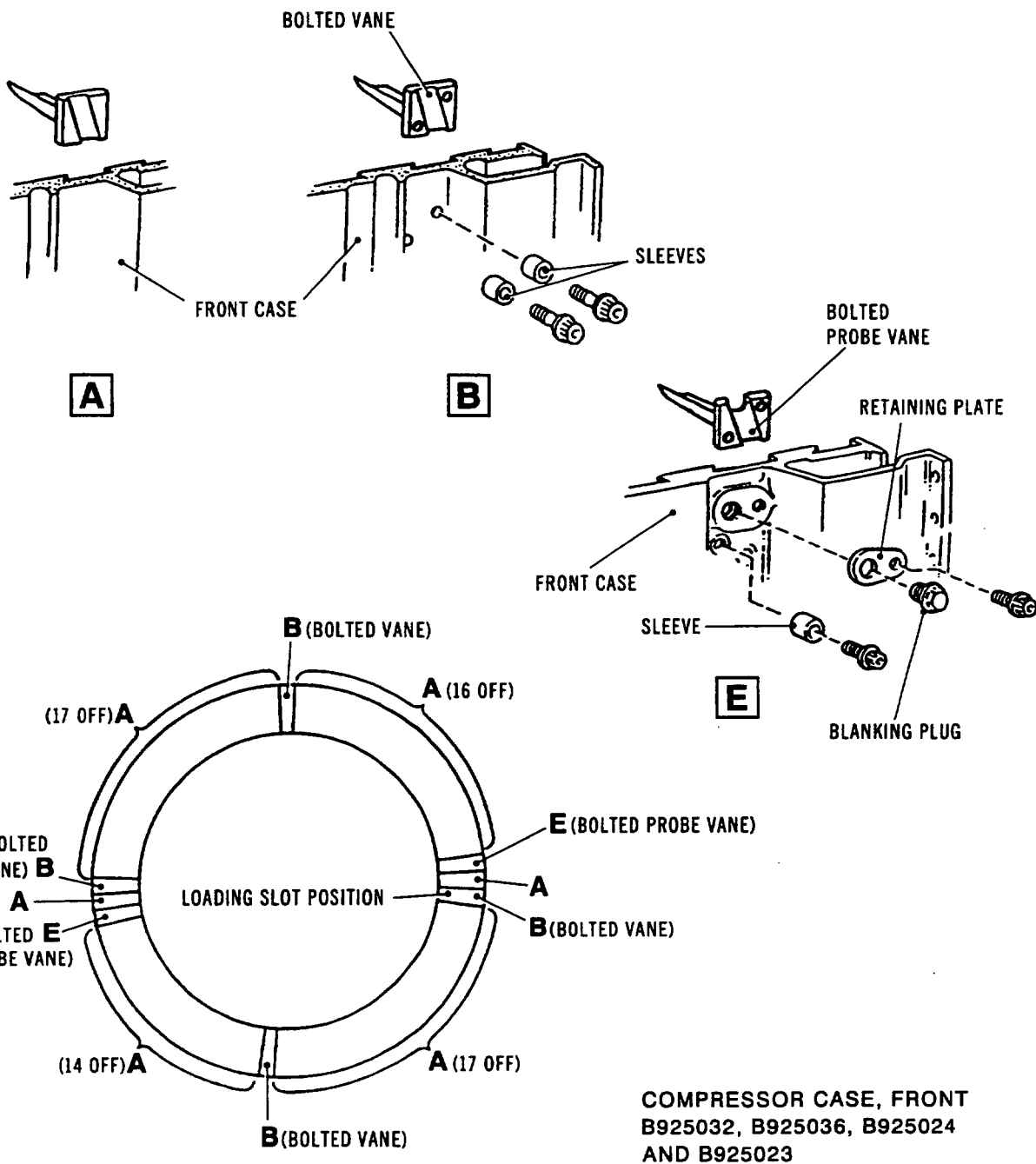
**OLYMPUS 593**

MK.610-14-28  
OVERHAUL



sneema

BS00016729/1



VIEW LOOKING REARWARD

Assembling Stage 4 Stator Vanes and Blanks to Front Case  
Figure 516A

SUB-ASSEMBLY

**72-33-00**

Page 548A  
Dec 1/97



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

- (2) With the trailing edge (shorter length) of the vanes at the bottom, offer the vanes to the groove loading slot at the right-hand side as viewed from above, and engage them in the groove, then ease them round the groove in either direction.
- (a) Compressor case front with twin probe access (Ref.Fig.516). Assemble 62 vanes (2-170), 4 probe vanes (2-190) and 6 bolted vanes (2-180) to the groove in the position shown in Fig.516. Ensure that the bolted vanes align with the bolt holes in the case, and the probe vanes align with the probe holes in the case.
- (b) Compressor case front with single probe access (B925023, B925024, B925032 and B925036) (Ref. Fig.516A). Assemble 66 vanes (2-170), 2 bolted probe vanes (2-190) and 4 bolted vanes (2-180) to the groove in the position shown in Fig.516A. Ensure that the bolted vanes align with the bolt holes in the case, and the probe vanes align with the probe holes in the case.
- (3) Apply lubricant 'C' to the 8 bolts (2-110), then secure each of the four bolted vanes with two sleeves (2-120) and bolts (2-110). Torque-tighten the bolts to 100 lbf in. (11,5 N.m), then wire-lock the bolts of each vane to one another.
- (4) Check that the probe vanes are correctly positioned by inserting the probe pin gauge (Tool 289) through the case and the holes in the vanes at the positions shown in Fig.516 and 516A.
- (5) Using feeler gauges, check the clearance between stage 4 vanes and the spacer ring. Check each vane by (lightly) pulling the vane forward (upwards) to take up the play, then inserting the feeler at the mid position of the vane tip. Turn the HP drive shaft 90 deg and recheck each stator vane. Repeat the check with the shaft turned two further 90 deg turns. Ensure the minimum tip clearance is in accordance with the Fits and Clearance Schedule 72-33-00 F.C.S.138.

SUB-ASSEMBLY

72-33-00

Page 548B

Dec 31/01



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

(6) Assemble the probe mounting blocks and blanking plugs (Compressor case front with twin probe access) (Ref.Fig.516).

- (a) Apply lubricant 'C' to two bolts (2-150), then offer the probe mounting block (2-160) to the left-hand side of the case, correctly position the block (Ref.Fig.516) to align it with the probe and threaded holes, then secure the block with the two bolts. Torque-tighten the bolts to 100 lbf in. (11,5 Nm), then wire-lock each bolt to the adjacent lock hole in the block.
- (b) Apply lubricant 'A' to the blanking plug (2-140). Screw a locknut (2-130) on to the plug until the nut is at the opposite end to the nipple. Screw the plug into the mounting block and seat the nipple in the front case. Using a square drive, torque-tighten the plug to 70 lbf in. (7,9 Nm). Hold the plug stationary, and torque-tighten the locknut to 370 lbf in. (41,8 Nm). Assemble another blanking plug and locknut to the remaining hole in the mounting block and torque-tighten. Wire-lock the two plugs together.
- (c) Assemble a further mounting block and plugs to the right-hand side of the case using the procedure detailed in Para (6)(a) and (6)(b).

NOTE: If the build is not to be continued, place the wooden protector (Tool 1361) over the stator vanes.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

THIS PAGE LEFT BLANK INTENTIONALLY

SUB-ASSEMBLY

**72-33-00**

Page 548D  
Dec 1/97





OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (7) Assemble retaining plates and blanking plugs  
(Compressor case front with single probe access)  
(Ref.Fig.516A).

- (a) Apply lubricant 'C' to a bolt (2A-124).  
Assemble a retaining plate (2A-125) to the  
probe position on the left-hand side of the  
case and secure with the bolt (2A-124).  
Assemble a sleeve (2-120) to a bolt (2-110)  
with lubricant 'C' applied and screw the bolt  
into the hole in the case above the retaining  
plate. Torque-tighten the two bolts to 100  
lbf in. (11,5 Nm). Apply lubricant 'A' to the  
blanking plug (2A-123). Screw the plug into  
the retaining plate and torque-tighten to 65  
lbf in. (7,3 Nm). Wire-lock the two bolts to  
the locking holes in the plug.

- (b) Assemble a retaining plate (2A-125) and blanking  
plug (2A-123) to the right-hand side of the case  
and secure with two bolts (2A-124 and 2-110) and  
a sleeve (2-120) using the procedure detailed in  
Para (7)(a).

NOTE: If the build is not to be continued,  
place the wooden protector (Tool  
1361) over the stator vane.

- R. Assemble the Stage 4 Bladed Compressor Disk and  
Stage 3-4 Spacer Ring.

NOTE: If the wooden protector is assembled, remove it  
from the stator vanes.

- (1) Ensure that the front face of the disk (02/2-20)  
identified by the inward slope of the disk and blade  
platforms is uppermost.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Examine the blade platforms and identify the two adjacent platforms to No.1 blade with datum marks O then chalk a datum mark on the front face of the disk in line with the bolt hole between the datum marks.
- (3) Assemble a retainer strap (Tool 1166) to consecutive groups of six or seven blades, so that every blade has been strapped to a series of blades, then remove the blade retainer from the blade tips. Remove the masking tape (if assembled) from the blade roots rear (bottom) face and ensure that the face of the disk and blade roots/tangs are perfectly clean.

NOTE: The retainer straps prevent the blades from dropping out of the disk when it is raised.

- (4) Assemble the multiple leg sling (Tool 404) to the stage 4 disk (Ref. Fig.513).
  - (a) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk.
  - (b) Ensure that the three lifting clip chains are positioned in the outermost slot of each plate. Loosen the wingnut on each lifting clip, then ensuring that the three clips are evenly disposed around the disk, locate each clip under a blade.
  - (c) Position the keep plate (of each lifting clip) over the top of a blade, and ensuring that the keep and lifting clips are abutting the blades, secure each clip with its wingnut.
- (5) Position the heater (Tool 757), heating coils uppermost, on its mobile stand (Tool 759). Position the shield (Tool 1922) (Ref.Fig.513) on the heater then raise the hoist and position the disk above the heater, lower the disk to rest on the shield. With Ref. to para.J (9) for the operation of the heater, set the time controller to 9 min and heat the disk to 60 deg C.
- (6) On completion of the heating cycle, hoist the disk and position and lower it over the LP drive shaft and above the assembly pins assembled to the spacer ring. Insert an alignment rod (Tool 1955) through the datum hole of the disk (Ref. para.(2)) and insert it into the marked assembly pin in the datum hole of the spacer ring. Insert an alignment rod through each

SUB-ASSEMBLY

**72-33-00**

Page 550

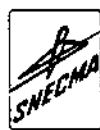
Apr 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



hole in the disk and into the assembly pin aligned underneath. Lower the disk, and using the alignment rods, guide the disk over the assembly pins until the disk abuts the spacer. Ensure that the blades are in the fully forward/upward position, otherwise the blades will contact the outside dia of the spacer preventing the disk from abutting the spacer.

- (7) Release and remove the sling from the blades, then remove the sling from the hoist. Withdraw the alignment rods from the assembly pins, and the retainer straps from the blades.
- (8) Pull up on the assembly pins until all the thread and a small waisted portion of the bolts are visible, then clip a retaining clip (Tool 1038) onto the waisted portion of each bolt as it is pulled up. Ensure that the clips extend towards the centre of the disk. If a bolt does not pull up sufficiently, apply a light upward pull on the assembly pin, then turn the pin to align the bolthead with the spacer (ensuring that the pin is not unscrewed from the bolt). If any of the bolts are too tight to pull up with the assembly pins, proceed as follows:

- (a) Screw the mechanical driver (Tool 1064) onto a pin (Ref. Fig.514), then insert the appropriate locating key (Tool 1066 or 1079) onto the assembly pin locating the key into the slot in the bolt.

NOTE: Use locating key (Tool 1066) with assembly pins (Tool 1065), and locating key (Tool 1079) with assembly pins (Tool 1067).

- (b) Lock the locating key by screwing the thumbnut onto the assembly pin. Turn the key handle until it points towards the centre of the disk to align a flat in the bolthead with the spacer.
- (c) Screw down on the driver tommy bars and draw the bolt up until it abuts the spacer ring.
- (d) Release and remove the locating key and driver, clip a retaining clip onto the waisted portion of the bolt, then remove the assembly pin.
- (e) Repeat the procedure on any bolt that is tight.

NOTE: If all the bolts are tight, then the disk has not been heated sufficiently and must be removed and reheated. Do not attempt to draw all the bolts up using the mechanical driver.

SUB-ASSEMBLY

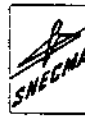
72-33-00

Page 551

Apr 1/76



**OLYMPUS 593**  
MK.610-14-28  
OVERHAUL



NOTE: If the assembly of the disk to the spacer has been carried out without any delays, the disk will be hot enough to enable the spacer to be assembled without re-heating the disk (Ref.para. (9) and (10)). If delays have caused the disk to cool, re-heat the disk (Ref.para. (11), (c) to (e)) prior to assembling the spacer ring.

NOTE: Care must be taken to ensure that during the assembly of the spacer, the bolts protruding through the disk are not displaced from the clips and allowed to drop from the disk. If this occurs, the bolt(s) cannot be repositioned, and the disk will have to be removed from the stage 4-5 spacer (Ref.72-33-00 Disassembly).

- (9) Remove the stage 3-4 spacer ring (02/1-380) from its container (Tool 1441) and examine the front (smaller dia) internal flange edge of the spacer ring for two datum marks  $\rightarrow 00 \leftarrow$  on scalloping pointing to a flat. The hole in line with the flat is the datum hole for the front face. Offer the spacer to the stage 4 disk, positioning the front datum hole above the disk datum hole, then lower the spacer over the bolts and rest it on the retaining clips, ensuring that none of the bolts are pushed down.
- (10) Apply lubricant 'A' to nuts (02/1-370), then screw the nuts onto the bolts ensuring that the nuts do not abut the spacer preventing the removal of the clips. Withdraw the retaining clips from the bolts and lower the spacer ensuring it abuts the disk. Using the wrench (Tool 1956) torque-tighten the nuts in the following sequence: 1, 19, 28, 10, 32, 14, 23, 6, 36, 18, 27, 9, 31, 13, 21, 3, 35, 17, 26, 8, 30, 12, 25, 7, 33, 16, 24, 5, 34, 15, 22, 4, 29, 11, 20 and 2, ensuring that the nuts have a minimum locking (run-down) torque of 9.5 lbf in. (1.1 N.m). Torque-tighten the nuts (in the correct sequence) in 80 lbf in. (9.0 N.m) increments, to a final torque of 450 lbf in. (51 N.m). During the torque-tightening of the nuts should it be necessary to re-align the flats on the boltheads with the spacer use the angled key (Tool 1952).

NOTE: If the disk had cooled to the extent of preventing the spacer abutting the disk (because of the interference fit between the two), proceed as detailed in para.(11).

TN34282



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(11) If on lowering the spacer onto the disk the spacer would not assemble, proceed as follows:

- (a) Assemble the retaining clips to the bolts (under the spacer) then remove the nuts from the bolts.
  - (b) Withdraw the spacer from the bolts, then check that the retaining clips are correctly clipped to the waisted portion of the bolts.
  - (c) Assemble six equi-spaced packing pieces (Tool 1950) to the bolts and retain with slave nuts. Remove the retaining clips from these bolts and tighten the nuts to ensure the stage 4 disk is correctly seated on the stage 4-5 spacer. Unscrew the nuts sufficient to allow reassembly of the retaining clips, beneath the packing pieces, to the spacer retaining bolts then assemble the clips and remove the nuts and packing pieces.
  - (d) Invert the heater (Tool 757) on its stand so that the heater handles are uppermost. Attach the shackles of the multiple leg sling (Tool 1645) to the handles of the heater then connect the sling to a hoist (Ref.Fig.509).
  - (e) Position and lower the heater over the LP drive shaft and onto the disk. With Ref. to para.J.(9) for the operation of the heater, set the time controller to 9 min and heat the disk to 60 deg C.
  - (f) On completion of the heating cycle remove the heater and place it on its stand.
  - (g) Assemble the spacer ring to the disk as detailed in para.(9) and (10).
- (12) Using feeler gauges, check the tip clearance between the stage 4 compressor blades and the HP front case. Find the longest blade, then check the minimum tip clearance of the longest blade and the case at eight equi-spaced positions. Ensure the minimum tip clearance is in accordance with the Fits and Clearance Schedule 72-33-00 F.C.S.143.



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

(13) Apply lubricant 'A' to the threads and fitting dia of the bolts (02/1-360), then assemble a bolt to each bolt-hole in the front flange of stage 3-4 spacer ring (from the inside of the spacer), screw an assembly pin (Tool 1065 or 1067) onto each bolt then lower the bolt to rest on the spacer. Position the bolts to align the flat on each bolthead with the step in the spacer, for ease of locating the boltheads when the bolts are pulled up into position.

(14) Examine the front flange of the spacer ring for two datum marks 00 on scalloping pointing to a flat. The hole in line with the flat is the datum hole for the front flange, and to identify the hole during the assembly of the disk, mark the assembly pin.

NOTE: If the build is not to be continued, place a wooden protector (Tool 1361) over the blades.

S. Assemble the Stage 3 Stator Vanes and Blanks to the Front Case.

NOTE: If the wooden protector is assembled, remove it from the compressor blades.

NOTE: Ensure that any repaired vanes are evenly distributed around the case and that the aggregate depth of blending does not exceed 1.600 in. (40,64 mm) (Ref.72-33-01, Repair No.2).

(1) Apply lubricant 'A' to the stage 3 vane groove.

(2) With the trailing edge (shorter length) of the vanes at the bottom, offer the vanes to the groove loading slot at the top as viewed from above, and engage them in the groove, then ease them round the groove in either direction. Assemble 70 vanes (2-80), 4 probe vanes (2-100) and 4 bolted vanes (2-90) to the groove in the positions shown on Fig.517. Ensure that the bolted vanes align with the bolt-holes in the case, and the probe vanes align with the probe holes in the case.

(3) Apply lubricant 'C' to eight bolts (2-10), then secure each of the four bolted vanes with two bolts and sleeves (2-20). Torque-tighten the bolts to 100 lbf in. (11,5 N.m), then wire-lock the bolts of each vane to one another.

SUB-ASSEMBLY

## 72-33-00

Page 554

Dec 31/01



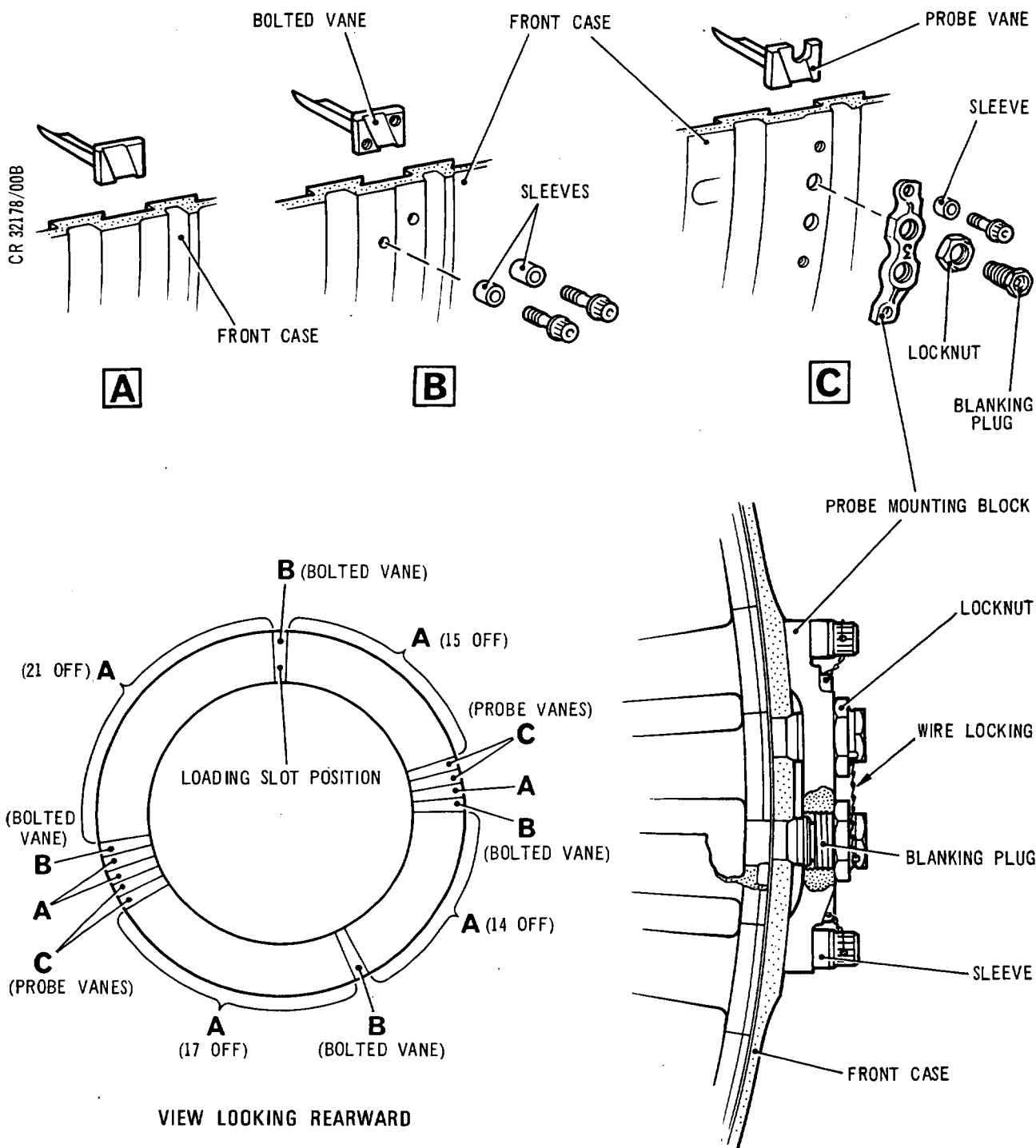
OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND



Assembling Stage 3 Stator Vanes and Blanks to Front Case  
Figure 517



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



*sneema*

- (4) Check that the probe vanes are correctly positioned by inserting the probe pin gauge (Tool 289) through the case and the holes in the vanes at the positions shown in Fig.517.
- (5) Using feeler gauges, check the distance between stage 3 vanes and the spacer ring. Check each vane by (lightly) pulling the vane forward (upwards) to take up the play, then inserting the feeler at the mid position of the vane tip. Turn the HP drive shaft 90 deg and re-check each stator vane. Repeat the check with the shaft turned two further 90 deg turns. Ensure the minimum tip clearance is in accordance with Fits and Clearance Schedule 72-33-00 F.C.S.139.
- (6) Apply lubricant 'C' to two bolts (2-50), then offer the probe mounting block (2-60) to the left-hand side of the case, correctly position the block (Ref. Fig.517) to align it with the probe vane and threaded holes, then secure the block with two sleeves (2-70) and bolts. Torque-tighten the bolts to 100 lbf in. (11,5 N.m), then wire-lock each bolt to the adjacent lock hole in the block.
- (7) Apply lubricant 'A' to the blanking plug (2-40). Screw a locknut (2-30) onto the plug until the nut is at the opposite end to the nipple. Screw the plug into the mounting block and seat the nipple in the front case. Using a square drive, torque-tighten the plug to 70 lbf in. (7,9 N.m). Hold the plug stationary, and torque-tighten the locknut to 370 lbf in. (41,8 N.m). Assemble another blanking plug and locknut to the remaining hole in the mounting block and torque-tighten. Wire-lock the two plugs together.
- (8) Assemble a further mounting block and plugs to the right-hand side of the case as detailed in para.(6) and (7).

NOTE: If the build is not to be continued, place the wooden protector (Tool 1362) over the stator vanes.





OLYMPUS 593

MK.610-14-28

OVERHAUL



T. Assemble the Stage 3 Bladed Compressor Disk/Stage 2-3 Spacer Ring Assembly.

NOTE: If the wooden protector is assembled, remove it from the stator vanes.

- (1) Ensure that the stage 2-3 spacer ring (02/1-330) is uppermost.
- (2) Examine the blade platforms and identify the two adjacent platforms to No.1 blade with datum marks O, then chalk a datum mark on the front face of the disk, or spacer, in line with the bolt-hole between the datum marks.
- (3) Remove the blade retainer from the blade tips. Remove the masking tape (if assembled) from the blade roots rear (bottom) face and ensure that the face of the disk and blade roots/tangs are perfectly clean.
- (4) Assemble the multiple leg sling (Tool 404) to the stage 3 disk (Ref.Fig.513).
  - (a) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk.
  - (b) Ensure that the three lifting clip chains are positioned in the outermost slot of each plate. Loosen the wingnut on each lifting clip, then ensuring that the three clips are evenly dispersed around the disk, locate each clip under a blade.
  - (c) Position the keep plate (of each lifting clip) over the top of a blade, and ensuring that the keep and lifting clips are abutting the blades, secure each clip with its wingnut.
- (5) Position the heater (Tool 757), heating coils uppermost, on its mobile stand (Tool 759). Position the shield (Tool 1922) (Ref.Fig.513) on the heater then raise the hoist and position the disk above the heater, lower the disk to rest on the shield. With Ref. to para.J.(9), for the operation of the heater, set the time controller to 9 min and heat the disk to 60 deg C.

PRINTED IN ENGLAND

TN34287

SUB-ASSEMBLY

**72-33-00**

Page 557

Nov 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (6) On completion of the heating cycle, hoist the disk/spacer and position and lower it over the LP drive shaft and above the assembly pins assembled to the spacer ring. Insert an alignment rod (Tool 1955) through the datum hole of the disk (Ref. para.(2)) and insert it into the marked assembly pin in the datum hole of the spacer ring. Insert an alignment rod through each hole in the disk and into the assembly pin aligned underneath. Lower the disk, and using the alignment rods, guide the disk over the assembly pins until the disk abuts the spacer. Ensure that the blades are in the fully forward (upward) position, otherwise the blades will contact the outside dia of the spacer preventing the disk from abutting the spacer.
- (7) Release and remove the sling from the blades, then remove the sling from the hoist. Withdraw the alignment rods from the assembly pins, and the retainer straps from the blades.
- (8) Pull up on the assembly pins until all the thread and a small waisted portion of the bolts are visible, then clip a retaining clip (Tool 1989) onto the waisted portion of each bolt as it is pulled up. Ensure that the clips extend outwards. If a bolt does not pull up sufficiently, apply a light upward pull on the assembly pin, then turn the pin to align the bolthead with the spacer (ensuring that the pin is not unscrewed from the bolt), and pull up on the pin. If any of the bolts are too tight to pull up with the assembly pins, proceed as follows:
  - (a) Screw the mechanical driver (Tool 1064) onto a pin (Ref.Fig.514), then insert the appropriate locating key (Tool 1066 or 1079) into the assembly pin locating the key into the slot in the bolt.

NOTE: Use locating key (Tool 1066) with assembly pins (Tool 1065), and locating key (Tool 1079) with assembly pins (Tool 1067).

TN34288

SUB-ASSEMBLY  
**72-33-00**

Page 558  
Nov 1/76



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

- (b) Lock the locating key by screwing the thumbnut onto the assembly pin. Turn the key handle until it points towards the centre of the disk to align a flat on the bolthead with the spacer.
- (c) Screw down on the driver tommy bars and draw the bolt up until it abuts the spacer ring.
- (d) Release and remove the locating key and driver, clip a retaining clip onto the waisted portion of the bolt, then remove the assembly pin.
- (e) Repeat the procedure on any bolt that is tight.

NOTE: If all the bolts are tight, then the disk/spacer has not been heated sufficiently and must be removed and reheated. Do not attempt to draw all the bolts up using the mechanical driver.

- (9) Apply lubricant 'A' to nuts (02/1-320), then screw the nuts onto the bolts ensuring that the nuts do not prevent the removal of the clips. Withdraw the retaining clips from the bolts. Using the wrench (Tool 1956) torque-tighten the nuts in the following sequence 1, 19, 28, 10, 32, 14, 23, 6, 36, 18, 27, 9, 31, 13, 21, 3, 35, 17, 26, 8, 30, 12, 25, 7, 33, 16, 24, 5, 34, 15, 22, 4, 29, 11, 20 and 2, ensuring that the nuts have a minimum locking (run-down) torque of 9.5 lbf in. (1.1 N.m). Torque-tighten the nuts (in the correct sequence) in 80 lbf in. (9.0 N.m) increments, to a final torque of 450 lbf in. (51 N.m). During the torque-tightening of the nuts should it be necessary to re-align the flats on the boltheads with the spacer use the angled key (Tool 1952).
- (10) On engines to SB.72-8896-347 standard, apply heat resisting aluminium touch-up enamel (PL82) to the stage 3 disk and the stage 2-3 spacer ring on the areas not protected by Sermetel W (Ref. Fig.517A). For procedure, refer to 72-09-04 Repair.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (11) Using feeler gauges, check the tip clearance between the stage 3 compressor blades and the HP front case. Find the longest blade, then check the minimum tip clearance of the longest blade and the case at eight equi-spaced positions. Ensure the minimum tip clearance is in accordance with the Fits and Clearance Schedule 72-33-00 F.C.S.142.
- (12) Apply lubricant 'A' to the threads and fitting dia of the bolts (02/1-310), then assemble a bolt to each bolt-hole in the front flange of stage 2-3 spacer ring (from the inside of the spacer), screw an assembly pin (Tool 1065) onto each bolt and lower the bolts to rest on the spacer. Position the bolts to align a flat on each bolthead with the step in the spacer, for ease of locating the boltheads when the bolts are pulled up into position.
- (13) Examine the side of the spacer ring for a datum mark  $\emptyset$  (Ref. para.(2)), and the hole in line with mark is the datum hole for the front flange. To identify the hole during the assembly of the disk, mark the assembly pin.

NOTE: If the build is not to be continued, place a wooden protector (Tool 1362) over the blades.

- U. Assemble the Stage 2 Stator Vanes and Blanks to the Front Case (Ref.SB.72-104).

NOTE: If the wooden protector is assembled, remove it from the compressor blades.

NOTE : Ensure that any repaired vanes are evenly distributed around the case and that the aggregate depth of blending does not exceed 1.920 in. (48,77 mm) (Ref.72-33-01, Repair No.2).

- (1) Remove the stage 2 stator inner fixing ring assembly (1-360/370) from its container (Tool 1441) and ensure that the three labyrinth retainer plates (1-340) are assembled and secured (Ref.72-33-01 Assembly). With the labyrinth extending forwards (upwards) and the retaining nuts on top, lower the ring over the LP drive shaft, and taking care not to damage the labyrinths, ease the ring over the stage 2-3 spacer ring labyrinth and rest the inner ring on the stage 3 disk/blades.



OLYMPUS 593

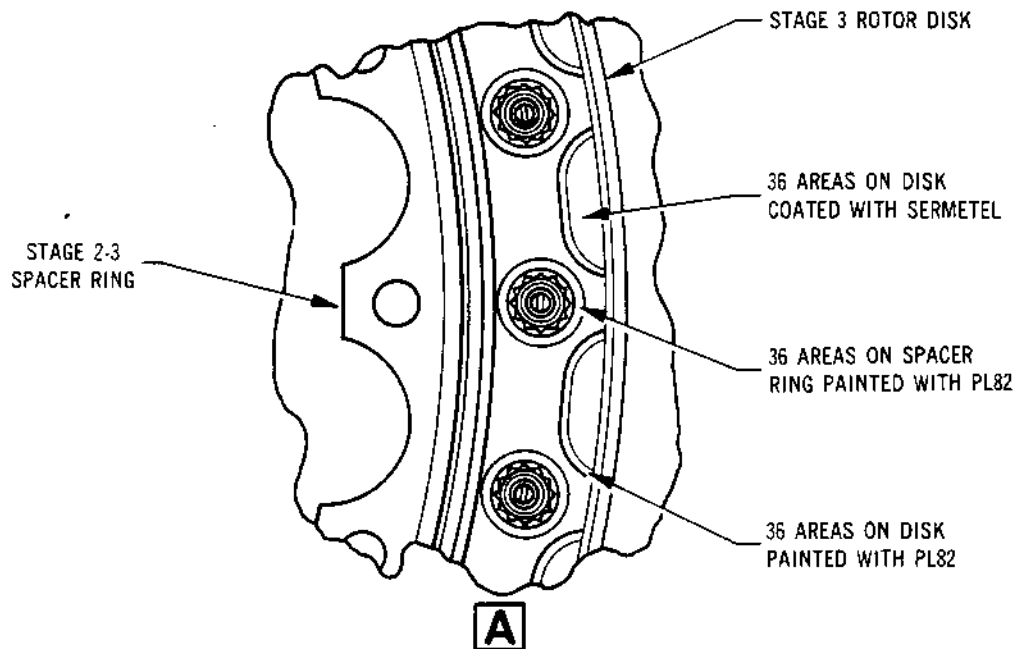
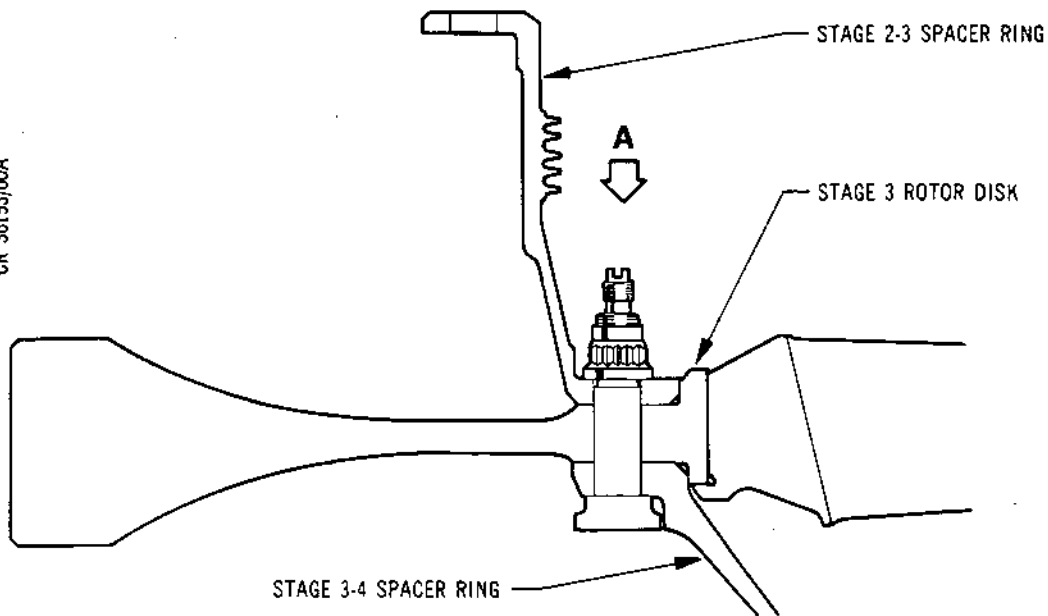
MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

CR 36193/00A



SB 72-8896-347 STANDARD

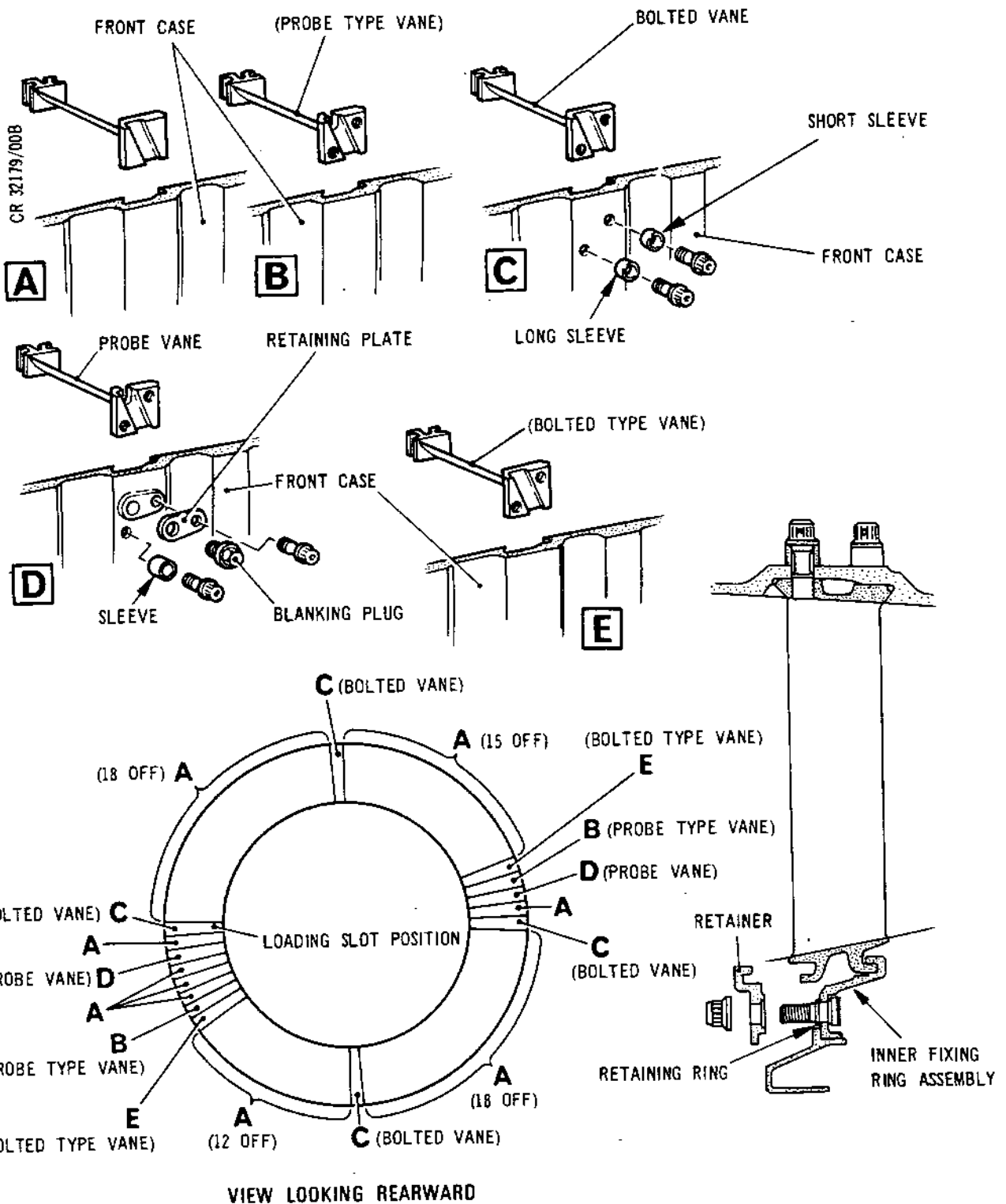
Painted Areas on Stage 3 Disk and Stage 2-3 Spacer Ring  
Figure 517A

SUB-ASSEMBLY  
**72-33-00**  
Page 561  
Jun 1/89



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



Assembling Stage 2 Stator Vanes and Blanks to Front Case  
Figure 518

SUB-ASSEMBLY  
**72-33-00**

Page 562  
Apr 1/76



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England

- (2) Turn the inner ring (as necessary), to align the loading slot with the loading slot at the left-hand side of the front case (as viewed from above).
- (3) Apply lubricant 'A' to the stage 2 vane groove in the front case, and to the vane groove in the inner ring.
- (4) With the trailing edge (shorter length) of a vane (1-470) at the bottom, offer the vane to the case at an angle with the vane outer platform lower than its inner platform. Locate the outer platform into its loading slot, lower the inner platform by pivoting the vane about its outer platform, then raise the inner fixing ring and locate the vane in the loading slot. Ease the vane along the groove in the case and inner ring (in either direction), easing the ring up/down to allow the vane to move to the position opposite the loading slots. Assemble 68 vanes (1-470), 4 probe vanes (1-490), 5 bolted vanes (1-480) and 1 bolted loading slot vane (1-460) to the grooves in the positions shown on Fig.518. During the assembly of the first few vanes, it will be necessary to support and/or move the ring (slightly) up/down, and also to turn the inner ring to ensure the loading slots remain aligned. Ensure that the bolted vanes align with the bolt-holes in the case, and the probe vanes align with the probe holes in the case.
- (5) Examine the two bolts (1-320) at the inner ring loading slot position, and ensure that the bolt retaining rings (1-300) are located in the bolt grooves. If a ring has been displaced, pull the bolt up (locating the flat on its head against the inner ring), and refit the ring in its groove. Assemble the stator vane retainer (1-310) to the two bolts. Apply lubricant 'C' to the two nuts (1-290), then screw the nuts onto the bolts. Ensure the nuts have a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m), torque-tighten to 100 lbf in. (11,5 N.m).
- (6) Apply lubricant 'C' to eight bolts (1-380), then secure each of the four bolted vanes with two bolts, the front (top) bolts having long sleeves (1-390) assembled, and the rear (bottom) bolts having short sleeves (1-400) assembled. Torque-tighten the bolts to 100 lbf in. (11,5 N.m), then wire-lock the bolts of each vane to one another.

SUB-ASSEMBLY

## 72-33-00

Page 563

Dec 31/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (7) Check that the probe vanes are correctly positioned, by inserting the probe pin gauge (Tool 289) through the case and the holes in the vanes at the positions shown in Fig.518.
- (8) Using feeler gauges, check the clearance between stage 2 vanes inner fixing ring and the spacer ring labyrinth. Check the clearance at eight equi-spaced positions, then turn the HP drive shaft 90 deg and recheck the clearance. Repeat the check with the shaft turned two further 90 deg turns. Ensure the minimum clearance is in accordance with the Fits and Clearance Schedule 72-33-00 F.C.S.96.
- (9) Apply lubricant 'C' to a bolt (1-440). Assemble a retaining plate (1-450) to the probe position on the left-hand side of the case and secure with the bolt (1-440). Assemble a sleeve (1-420) to a bolt (1-410) with lubricant 'C' applied and screw the bolt into the hole in the case above the retaining plate. Torque-tighten the two bolts to 100 lbf in. (11,5 N.m). Apply lubricant 'A' to the blanking plug (1-430). Screw the plug into the retaining plate, torque-tighten to 65 lbf in. (7,3 N.m), then wire-lock the two vane securing bolts to the locking holes in the plug.
- (10) Assemble a retaining plate (1-450) and blanking plug (1-430) to the right-hand side of the case and secure with two bolts (1-440 and 1-410) and a sleeve (1-420) as detailed in para.(9).

NOTE: If the build is not to be continued, place the wooden protector (Tool 1363) over the stator vanes.

V. Assemble the Stage 2 Bladed Compressor Disk and Rotor Shaft Front.

NOTE: Prior to assembly of the rotor shaft front check its compatibility with No.6, 7 and 8 labyrinths assembled to the rear of the intermediate case (Ref.72-32-00 Assembly) refer to SB.72-91.

NOTE: If the wooden protector is assembled, remove it from the stator vanes.

- (1) Ensure that the front face of the disk (02/1-300), identified by the inward slope of the disk and blade platforms is uppermost.





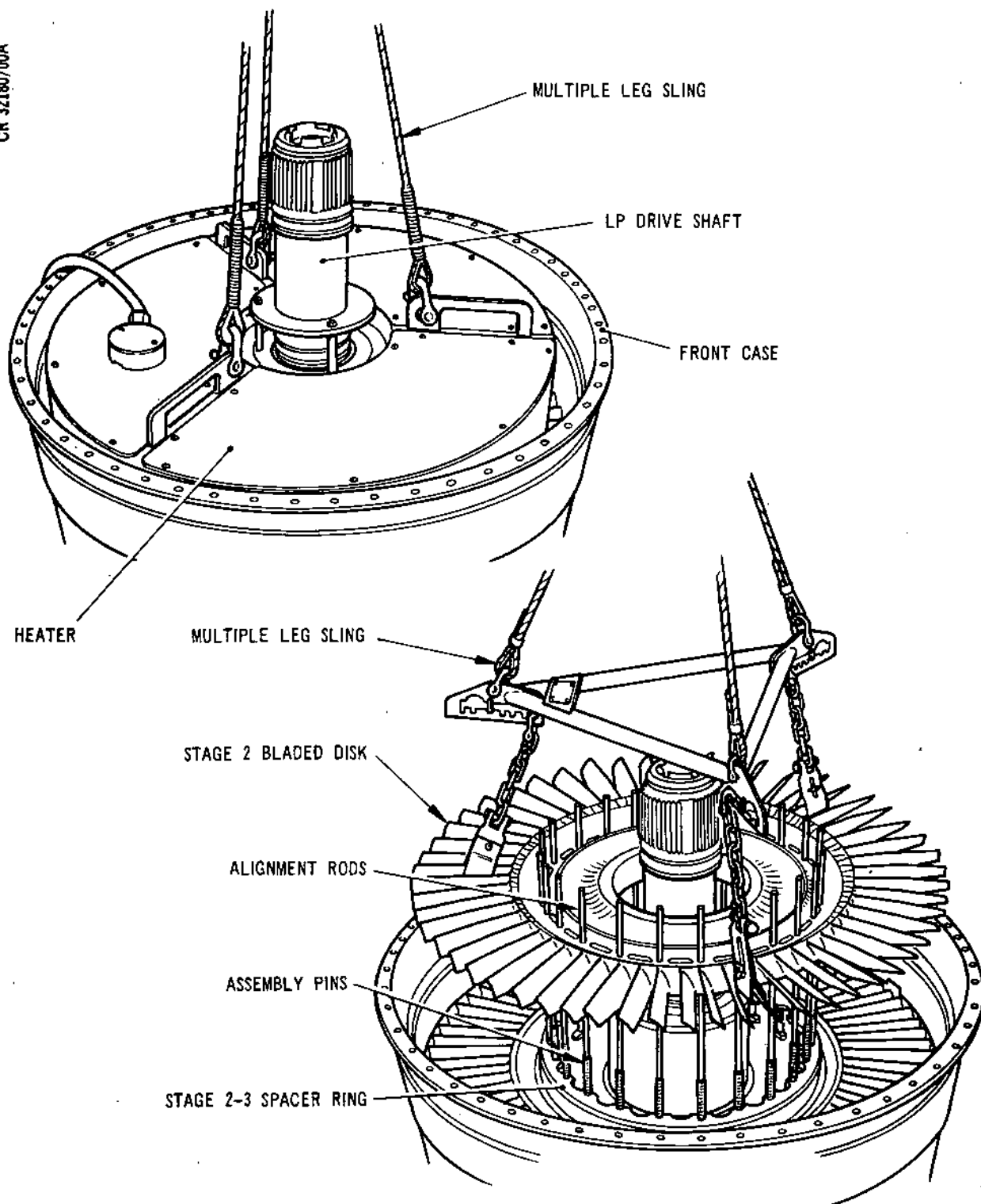
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32180/00A

PRINTED IN ENGLAND



Assembling Stage 2 Bladed Disk to Stage 2-3 Spacer Ring  
Figure 519

SUB-ASSEMBLY  
**72-33-00**

Page 565  
Apr 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (2) Examine the blade platforms and identify the two adjacent platforms to No.1 blade with datum marks O then chalk a datum mark on the front face of the disk in line with the bolt-hole between the datum marks.
- (3) Assemble the multiple leg sling (Tool 404) to the stage 2 disk (Ref. Fig.513).
  - (a) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk.
  - (b) Ensure that the three lifting clip chains are positioned in number 2 slot of each plate. Loosen the wingnut on each lifting clip, then ensuring that the three clips are evenly disposed around the disk, locate each clip under a blade.
  - (c) Position the keep plate (of each lifting clip) over the top of a blade, and ensuring that the keep and lifting clips are abutting the blades, secure each clip with its wingnut. Disconnect the hoist and lower the sling onto the disk.
- (4) Invert the heater (Tool 757) so that the handles are uppermost. Attach the shackles of the multiple leg sling (Tool 1645) to the handles of the heater then connect the sling to a hoist (Ref.Fig.509). Raise the hoist and position and lower the heater over the LP drive shaft and suspend it over the stage 2-3 spacer ring (Ref. Fig.519). With Ref. to para.J.(9) for the operation of the heater, set the time controller to 9 min and heat the spacer ring to 70 deg C.
- (5) On completion of the heating cycle, hoist the heater clear of the spacer/LP drive shaft and lower it onto its stand. Release the hoist and lower the sling onto the unit.
- (6) Connect a hoist to the lifting ring of the sling, then raise the hoist and position and lower the stage 2 disk over the LP drive shaft and above the assembly pins assembled to the spacer ring. Insert an alignment rod (Tool 1955) through the datum hole of the disk (Ref. para.(2)) and insert it into the marked assembly pin in the datum hole of the spacer ring. Insert an alignment rod through each hole in the disk and into the assembly pin aligned underneath. Lower the disk, and using the alignment rods, guide the disk over the assembly pins until the disk abuts the spacer.

TN34294



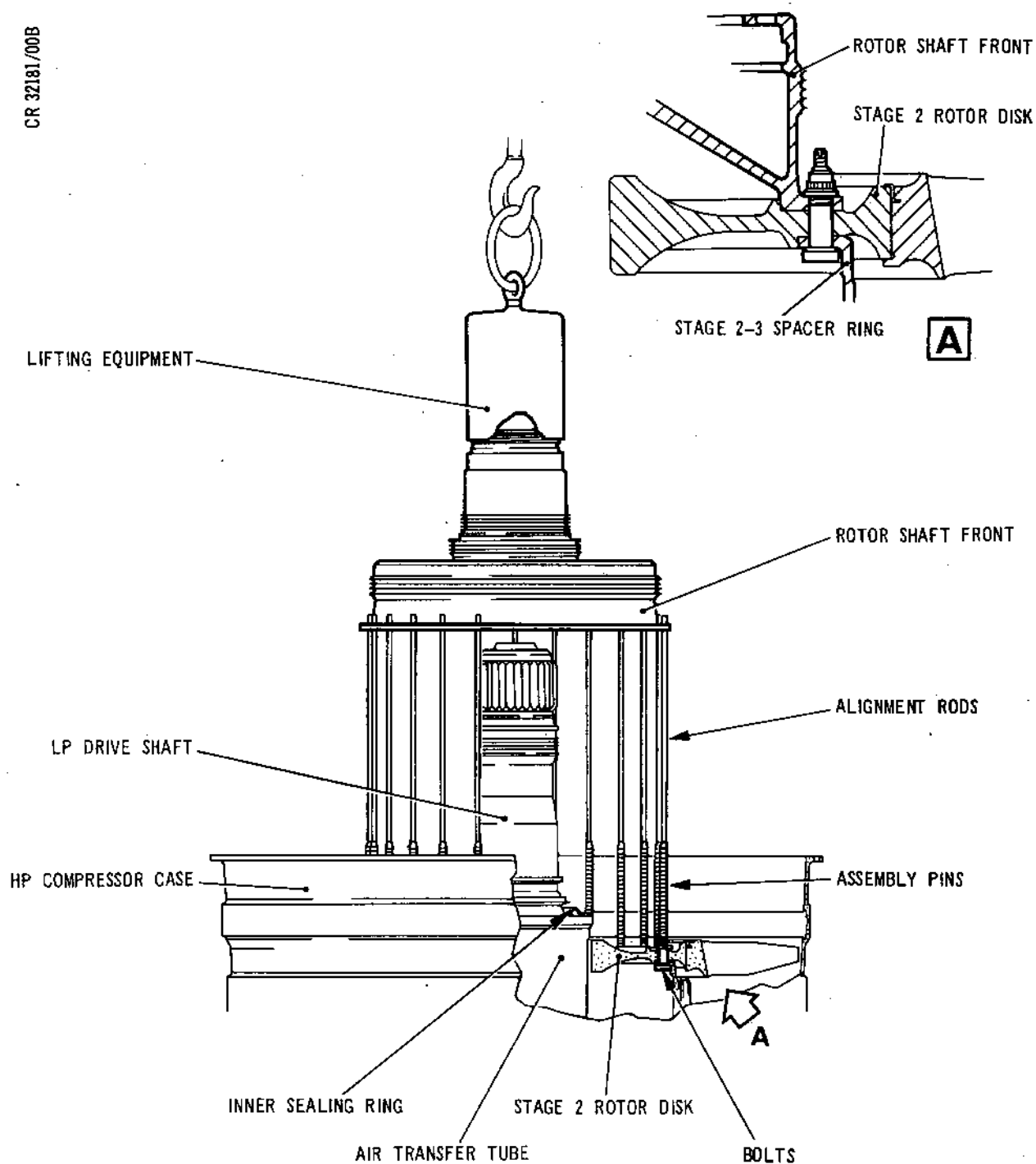
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32181/00B

PRINTED IN ENGLAND



Assembling Rotor Shaft Front to Stage 2 Disk and Air  
Transfer Tube  
Figure 520



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (7) Release and remove the sling from the blades, then remove the sling from the hoist. Withdraw the alignment rods from the assembly pins.

NOTE: Due to the heating of the stage 2-3 spacer ring, the assembly pins/bolts will have expanded and cannot be drawn up through the disk until they have cooled. The procedure following, details leaving the bolts lowered until the rotor shaft front is assembled, then pulling the bolts up. If preferred, the bolts can be left to cool, then pulled up through the disk (with the assembly pins), retaining clips assembled to the bolts (to hold them up), then the rotor shaft front heated and lowered over the bolts and onto the disk. Nuts assembled to the bolts, then the clips removed and the nuts tightened (Ref.Fig.520).

- (8) Remove the hand nut/spindle and clamp plate from the container (Tool 1420), then withdraw the rotor shaft front from the container and place it on a clean protected flat surface with the front (smaller diameter) end uppermost. Withdraw the protector (Tool 392) from the front labyrinths. Examine the flats on the rear flange for two datum marks → 00 ← to identify the datum hole, then chalk a datum mark on the circumference of the shaft in line with the hole.
- (9) Release and remove the steady (Tool 287) from the air transfer tube/LP drive shaft. Examine the scalloping inside the air transfer tube for datum marks → 0 pointing to a flat and check that it is offset to the left of the datum mark chalked on the stage 2 disk (as viewed from above).
- (10) Invert the heater (Tool 757) on its mobile stand (Tool 759) so that the heating coils are uppermost (Ref.Fig.509). Screw the lifting fixture (Tool 388) onto the threaded end of the rotor shaft front, then attach a hoist onto the ring of the fixture. Position and lower the rotor shaft front onto the heater, then with Ref. to para.J.(9) for the operation of the heater, set the time controller to 9 min and heat the shaft to 70 deg C.
- (11) Assemble the inner sealing ring (02/1-270) to the air transfer tube with the seal extending forwards (upwards) and the seal spigot located inside the flange of the tube (Ref.Fig.520). Turn the ring to align the bolt-holes of the ring and tube.

FN34295

SUB-ASSEMBLY

**72-33-00**

Page 568

Apr 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (12) On completion of the heating cycle, hoist the rotor shaft front and position and lower it over the LP drive shaft and above the assembly pins protruding through the disk. Align the chalked datum mark on the rotor shaft front (Ref. para. (8)) with the datum marked assembly pin. Insert an alignment rod (Tool 1955) through each hole in the rotor shaft outer flange, and into the assembly pin aligned underneath. Lower the rotor shaft, and using the alignment rods, guide the rotor shaft over the assembly pins until the rotor shaft abuts the disk. Examine the inner ring of bolt-holes to ensure that they align with the air transfer tube/inner sealing ring bolt-holes.
- (13) Release the hoist, then unscrew and remove the lifting fixture from the rotor shaft front. Withdraw the alignment rods from the assembly pins.

NOTE: Care must be taken to ensure that during the assembly of the rotor shaft front, the bolts are not allowed to drop from the rotor shaft. If it occurs, the bolt(s) cannot be re-positioned and the rotor shaft and disk will have to be removed from the stage 2-3 spacer (Ref. 72-33-00 Disassembly).

- (14) Pull up on the assembly pins until all the thread of the bolts are visible, then clip a retaining clip (Tool 1989) onto each bolt. If a bolt does not pull up sufficiently, apply a light upward pull on the assembly pin, then turn the pin to align the bolt-head with the spacer (ensuring that the pin is not unscrewed from the bolt) and pull up on the pin. If difficulty is experienced aligning the bolt-head with the spacer, insert the key (Tool 1066) into the assembly pin and engage the key in the slot in the bolt. Turn the key handle until it points to the centre of the rotor centre front, which indicates the bolt is correctly aligned with the spacer and can be pulled up. Assemble six equi-spaced packing pieces (Tool 1954) to the bolts and retain with slave nuts. Remove the retaining clips from these bolts and tighten the nuts to ensure the stage 2 disk is correctly seated on the stage 2-3 spacer. Unscrew the nuts sufficient to allow reassembly of the retaining clips, beneath the packing pieces, to the spacer retaining bolts then assemble the clips and remove the nuts and packing pieces.

NOTE: If the bolts pull up correctly, proceed as detailed in para. (16), but if difficulty is experienced in pulling the bolts up Ref. to para. (15).

SUB-ASSEMBLY

72-33-00

Page 569

Nov 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (15) If all the bolts are tight and cannot be pulled up, the disk bolt-holes may be out of alignment with the stage 2-3 spacer ring bolt-holes. Proceed as follows:
- (a) Screw the lifting fixture (Tool 388) onto the rotor shaft front, attach a hoist, and remove the rotor shaft. If the rotor shaft has cooled, and there is an interference fit between the shaft and the disk, heat the shaft using the heater (Tool 757), then withdraw the shaft with the lifting fixture.
  - (b) Screw the mechanical driver (Tool 1064) on to a pin (Ref. Fig.514), then insert the locating key (Tool 1066) into the assembly pin locating the key into the slot in the bolt.
  - (c) Lock the locating key by screwing the thumbnut onto the assembly pin, then turn the key handle until it points towards the centre of the disk, this aligns a flat on the bolthead with the spacer.
  - (d) Screw down on the driver tommy bars and draw the bolt up until it abuts the spacer ring.
  - (e) Draw another bolt up (diametrically opposite the first bolt) as detailed in para.(b), (c) and (d).
  - (f) Pull up on the assembly pins to confirm that the disk and spacer holes are aligned.
  - (g) If the rotor shaft front has lost its heat, reheat the rotor shaft (Ref.para.(10)).
  - (h) Assemble the rotor shaft front to the stage 2 disk (Ref.para.(12) onwards).
- (16) Apply lubricant 'A' to nuts (02/1-240), then screw the nuts onto the bolts. Withdraw the retaining clips from the bolts, then using the cranked ring wrench (Tool 1956) tighten the nuts in the following sequence: 1, 13, 7, 19, 4, 16, 10, 22, 2, 14, 8, 20, 5, 17, 11, 23, 3, 15, 9, 21, 6, 18, 12 and 24 ensuring that the nuts have a minimum locking (run-down) torque of 9.5 lbf in. (1.1 N.m). Torque-tighten (in the correct sequence) in 80 lbf in. (9.0 N.m) increments to a final torque of 450 lbf in. (51 N.m). During the torque-tightening of the nuts should it be necessary to re-align the flats on the boltheads with the spacer use the angled key (Tool 1952).

TN34297

SUB-ASSEMBLY  
**72-33-00**

Page 570  
Sep 1/81

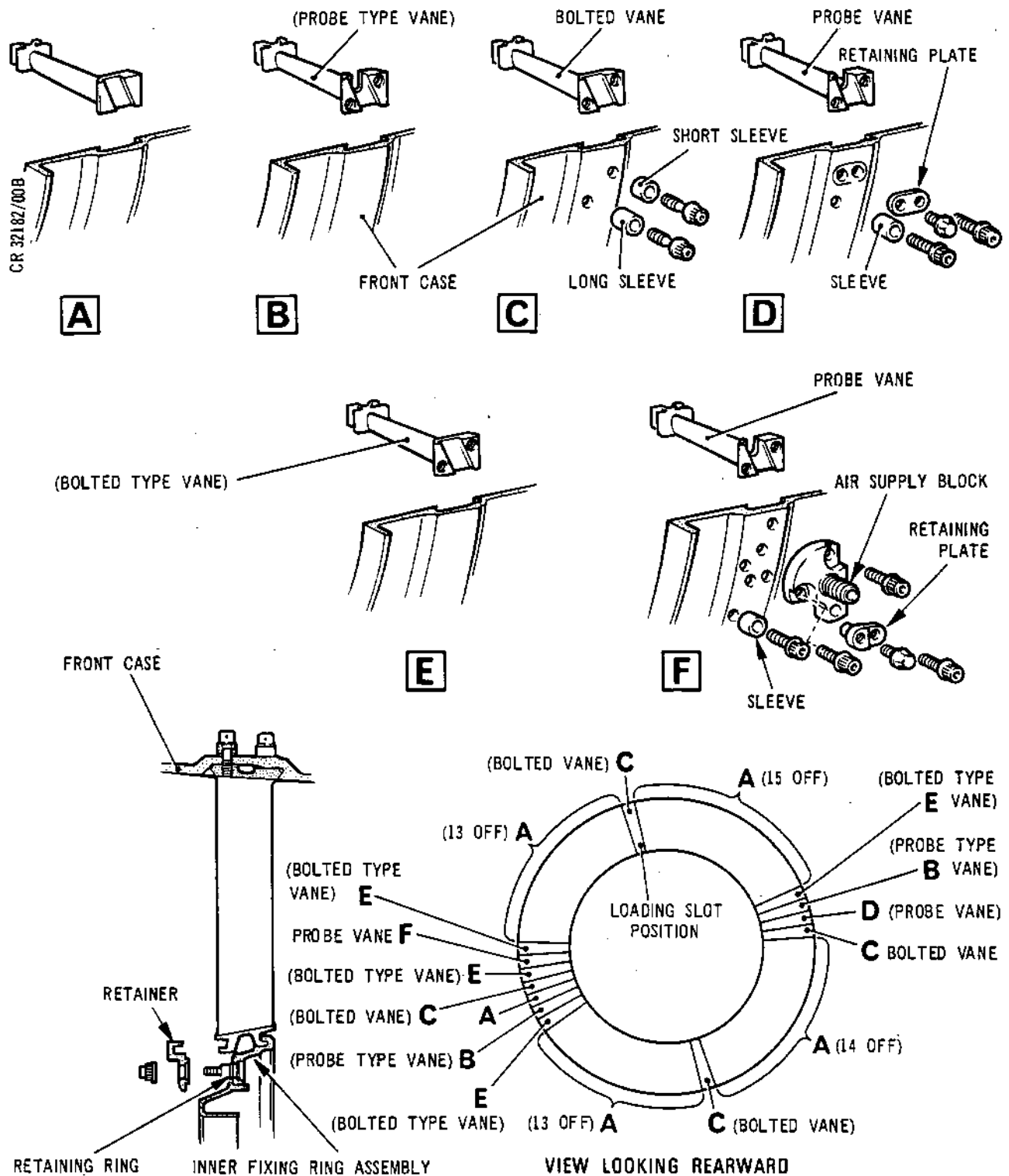


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



Assembling Stage 1 Stator Vanes and Blanks to Front Case  
Figure 521

SUB-ASSEMBLY  
**72-33-00**  
Page 571  
Apr 1/76



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (17) On engines to SB.72-8896-347 standard, apply heat resisting aluminium touch-up enamel (PL82) to the stage 2 disk on the areas not protected by Sermetel W (Ref.Fig.521A). For procedure, refer to 72-09-04 Repair.
- (18) Apply lubricant 'A' to bolts (02/1-250), then locate the bolts in the inner ring of holes in the rotor shaft front/inner sealing ring and screw them into the air transfer tube. Ensure the bolts have a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m) torque-tighten to 100 lbf in. (11,5 N.m.).
- (19) Using feeler gauges, check the tip clearance between the stage 2 compressor blades and the HP front case. Find the longest blade, then check the minimum tip clearance of the longest blade and the case at eight equi-spaced positions. Ensure the minimum tip clearance is in accordance with the Fits and Clearance Schedule 72-33-00 F.C.S.141.
- (20) Offer the steady (Tool 288) over the LP drive shaft and screw it onto the threaded end of the rotor shaft front, then assemble the labyrinth protector (Tool 392) to the rotor shaft.

NOTE: If the build is not to be continued, place a wooden protector (Tool 1364) over the blades.

- W. Assemble the Stage 1 Stator Vanes and Blanks to the Front Case (Ref.SB.72-104).

NOTE: If the wooden protector is assembled, remove it from the compressor blades.

NOTE: Ensure that any repaired vanes are evenly distributed around the case and that the aggregate depth of blending does not exceed 1.680 in. (42,67 mm) (Ref.72-33-01, Repair No.2).

- (1) Remove the stage 1 stator inner fixing ring assembly (1-80/90) from the container (Tool 1441) and ensure that the three labyrinth retainer plates (1-60) are assembled and secured (Ref.72-33-01 Assembly). With the labyrinth extending forwards (upwards) and the retaining nuts on top, lower the ring over the LP drive shaft. Taking care not to damage the labyrinths, ease the ring over the rotor shaft front labyrinth and rest the inner ring on the stage 2 disk/blades.

SUB-ASSEMBLY  
**72-33-00**

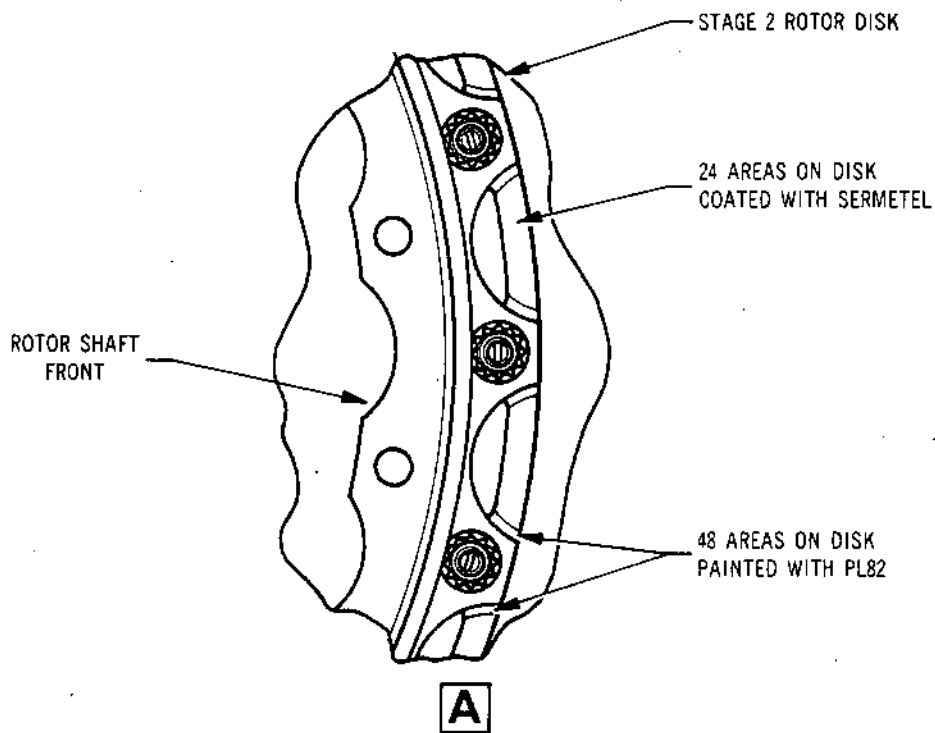
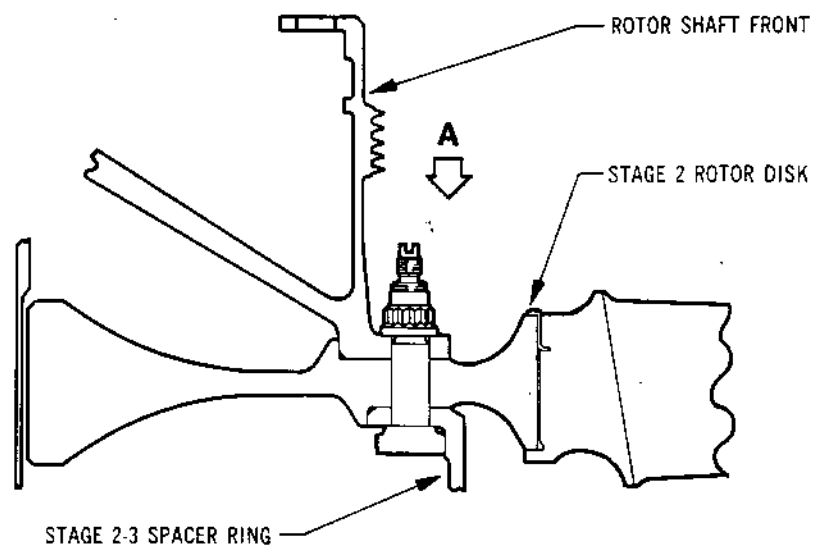
Page 572  
Jun 1/89





OLYMPUS 593

MK.610-14-28  
OVERHAUL



SB 72-8896-347 STANDARD

Painted Areas on Stage 2 Disk  
Figure 514



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Turn the inner ring (as necessary), to align the loading slot with the loading slot at the top of the front case.

SUB-ASSEMBLY

72-33-00

Page 572B

Jun 1/89



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

- (3) Apply lubricant 'A' to the stage 1 vane groove in the front case, and to the vane groove in the inner ring.
- (4) With the trailing edge (shorter length) of the vane (1-260) at the bottom, offer the vane to the case at an angle, with the vane outer platform lower than its inner platform. Locate the outer platform into its loading slot, lower the inner platform by pivoting the vane about its outer platform, then raise the inner ring and locate the vane in the loading slot. Ease the vane along the groove in the case and inner ring (in either direction), easing the ring up/down to allow the vane to move to the position opposite the loading slot. Assemble 56 vanes (1-260), 4 probe vanes (1-280), 7 bolted vanes (1-270) and 1 bolted loading slot vane (1-250) to the grooves in the positions shown in Fig.521. During the assembly of the first few vanes, it will be necessary to support and/or move the ring (slightly) up/down, and also to turn the inner ring to ensure the loading slots remain aligned. Ensure that the bolted vanes align with the bolt holes in the case, and the probe vanes align with the probe holes in the case.
- (5) Examine the two bolts (1-40) at the inner ring loading slot position, and ensure that the bolt retaining rings (1-20) are located in the bolt grooves. If a ring has been displaced, pull the bolt up (locating the flat on its head against the inner ring), and refit the ring in its groove. Assemble the stator vane retainer (1-30) to the two bolts. Apply lubricant 'C' to the two nuts (1-10), then screw the nuts onto the bolts. Ensure the nuts have a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m) torque-tighten to 100 lbf in. (11,5 N.m).
- (6) Apply lubricant 'C' to eight bolts (1-100), then secure the loading slot vane and three of the seven bolted vanes with two bolts, the front (top) bolts having long sleeves (1-110) assembled, and the rear (bottom) bolts having short sleeves (1-120) assembled (Ref.Fig.521). Torque-tighten the bolts to 100 lbf in. (11,5 N.m), then wire-lock the bolts of each vane to one another.
- (7) Check that the probe vanes are correctly positioned by inserting the probe gauge pin (Tool 289) through the case and the holes in the vanes at the positions shown on Fig.521.

SUB-ASSEMBLY

72-33-00

Page 573

Dec 31/01



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (8) Using feeler gauges, check the clearance between stage 1 vanes inner fixing ring and the rotor shaft front labyrinth. Check the clearance at eight equi-spaced positions, then turn the HP drive shaft 90 deg and recheck the clearance. Repeat the check with the shaft turned two further 90 deg turns. Ensure the minimum tip clearance is in accordance with the Fits and Clearance Schedule 72-33-00 F.C.S.89.
- (9) Apply lubricant 'C' to two bolts (1-220 and 200). Assemble a retaining plate (1-240) to the probe position on the right-hand side of the case (as viewed from above), and secure with a bolt (1-220). Assemble a sleeve (1-210) to a bolt (1-200) and screw the bolt into the hole in the case above the retaining plate. Torque-tighten the two bolts to 100 lbf in. (11,5 N.m). Screw a blanking plug (1-230) into the retaining plate, torque-tighten the plug to 65 lbf in. (7,3 N.m). Wire-lock the two securing bolts to the plug.
- (10) Apply lubricant 'C' to three bolts (1-180 and 130). Assemble the air supply block to the probe position on the left-hand side of the case (as viewed from above) and secure with two bolts (1-180). Torque-tighten the bolts to 100 lbf in. (11,5 N.m), then wire-lock the bolts to one another. Apply lubricant 'C' to bolt (1-150), then assemble the retaining plate (1-170) to the probe hole and part of the air supply block and secure with the bolt. Assemble a sleeve (1-140) to the remaining bolt (1-130) and screw the bolt into the hole above the retaining plate. Torque-tighten the two bolts to 100 lbf in. (11,5 N.m). Apply lubricant 'A' to the blanking plug (1-160). Screw the plug into the retaining plate, torque-tighten to 100 lbf in. (11,5 N.m), then wire-lock the two securing bolts to the plug.

NOTE: If the build is not to be continued, place the wooden protector (Tool 1364) over the stator blades.

## X. Assemble the Stage 1 Bladed Compressor Disk.

NOTE: If the wooden protector is assembled, remove it from the stator vanes.

- (1) Apply lubricant 'A' to the threads and fitting dia. of the bolts (02/1-200), then assemble a bolt to each bolt-hole in the front flange of the rotor shaft front



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(from the inside of the shaft), screw an assembly pin (Tool 1065) onto each bolt and lower the bolts to rest on the rotor shaft. Examine the flats in the front flange of the rotor shaft (in line with the chalked datum mark) for two datum marks →OO← to identify the datum hole, then mark the top of the assembly pin in the datum hole.

- (2) Ensure that the front face of the disk (02/1-230), identified by the inward slope of the disk and blade platforms, is uppermost.
- (3) Examine the blade platforms and identify the two adjacent platforms to No.1 blade with datum marks →OO← then chalk a datum mark on the front face of the disk in line with the bolt-hole between the marks.
- (4) Assemble the multiple leg sling (Tool 404) to the stage 1 disk (Ref.Fig.513).
  - (a) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk.
  - (b) Ensure that the three lifting clip chains are positioned in number 1 slot of each plate. Loosen the wingnut on each lifting clip, then ensuring that the three clips are evenly disposed around the disk, locate each clip under a blade.
  - (c) Position the keep plate (of each lifting clip) over the top of a blade, and ensuring that the keep and lifting clips are abutting the blades, secure each clip with its wingnut.
- (5) Hoist the disk and position and lower it over the LP drive shaft. Align the datum hole of the disk and rotor shaft front (Ref.para. (1) and (3)), then steadily lower the disk over the rotor shaft front until the disk is just touching the assembly pins. Ensure that all the pins are aligned with and entering into the disk bolt holes (with the marked pin aligned with the chalked datum hole of the disk), then steadily lower the disk over the pins until it abuts the rotor shaft front.
- (6) Release and remove the sling from the blades, then remove the sling from the hoist.

SUB-ASSEMBLY

**72-33-00**

Page 575

Apr 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (7) Pull up on the assembly pins until all the threads of the bolts are visible and a waisted portion evident, then clip a retaining clip (Tool 1989) into each bolt at the waisted portion. If a bolt does not pull up sufficiently, apply a light upward pull on the assembly pin, then turn the pin to align the bolthead with the spacer (ensuring that the pin is not unscrewed from the bolt), and pull up on the pin. If any of the bolts are too tight to pull up with the assembly pins, proceed as follows:
- (a) Screw the mechanical driver (Tool 1064) on to a pin (Ref.Fig.514), then insert the locating key (Tool 1066) into the assembly pin locating the key into the slot in the bolt.
  - (b) Lock the locating key by screwing the thumbnut onto the assembly pin, then turn the key handle until it points towards the centre of the disk, this aligns a flat on the bolthead with the spacer.
  - (c) Screw down on the driver tommy bars and draw the bolt up until it abuts the spacer ring.
  - (d) Release and remove the locating key and driver, clip a retaining clip onto the waisted portion of the bolt, then remove the assembly pin.
  - (e) Repeat the procedure on any bolt that is tight.
- (8) Apply lubricant 'A' to nuts (02/1-160). Assemble a nut to each of the bolts then screw the nuts onto the bolts ensuring that they do not abut the clips. On engines embodying SB.72-73 interpose a plain washer (02/1-170) between the nut and disk. Withdraw the retaining clips from the bolts then tighten the nuts in the following sequence: 1, 11, 7, 17, 4, 14, 9, 19, 3, 13, 6, 16, 10, 20, 5, 15, 2, 12, 8 and 18 ensuring that the nuts have a minimum locking (run-down) torque of 9.5 lbf in. (1.1 N.m). Torque-tighten the nuts (in the correct sequence) in 80 lbf in. (9.0 N.m) increments, to a final torque of 450 lbf in. (51 N.m). During the torque-tightening of the nuts should it be necessary to re-align the flats on the boltheads with the rotor shaft front use the angled key (Tool 1952). After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 2.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref.SB.72-8446-172).
- (9) Using feeler gauges, check the tip clearance between the stage 1 compressor blades and the HP front case. Find the longest blade, then check the

TN1443

SUB-ASSEMBLY

**72-33-00**

Page 576

Sep 1/81



OLYMPUS 593

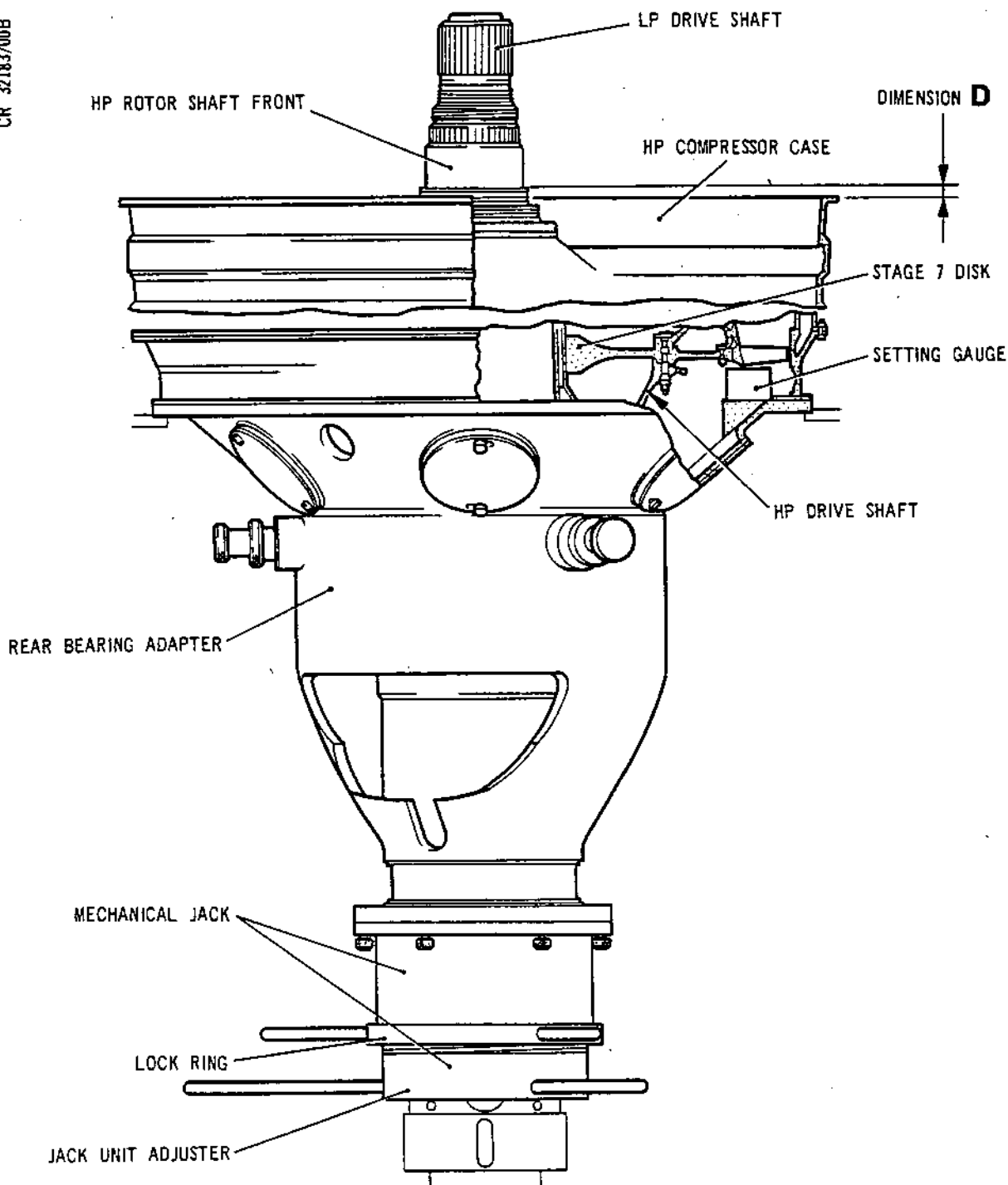
MK.610-14-28

OVERHAUL



CR 32183/00B

PRINTED IN ENGLAND



Checking HP Rotor Shaft Front Adjusting Washer  
Figure 522

SUB-ASSEMBLY  
**72-33-00**  
Page 577  
Apr 1/76

TN45930



OLYMPUS 593

MK.610-14-28  
OVERHAUL



minimum tip clearance of the longest blade and the case at eight equi-spaced positions. Ensure the minimum tip clearance is in accordance with the Fits and Clearance Schedule 72-33-00 F.C.S.140.

- (10) Place the wooden protector (Tool 1364) over the blades.
- Y. Determine the Thickness of the HP Rotor Shaft Front Adjusting Washer (Ref.Fig.522).
- (1) Ensure that the set gap between the stage 7 compressor disk and the rear flange of the HP rear case is still correct (Ref. para.K.(12)).
- (a) Release and remove the access covers from the rear bearing adapter.
- (b) Check that the setting gauge (Tool 57) can just be inserted between each of the three internal bosses in the adapter and the rear (bottom) outer blade platforms of the disk.
- (c) If the clearance is incorrect, release the lock ring and adjust on the mechanical jack (Tool 1029) to give the dimension of the block (2.3070 - 2.3075 in.) (58,59 mm).
- (d) Replace and secure the access covers to the rear bearing adapter.
- (2) Remove the protector from the rotor shaft front. Determine the dimension between the front face of the HP front case flange and the adjusting washer abutment face of the rotor shaft front. Record as dimension 'D'. Assemble the protector (Tool 392) to the rotor shaft front.
- (3) Obtain dimension 'C' from the intermediate case (Ref. 72-32-00 Assembly) if the engine is to pre-SB.72-29, or the Set Gap dimension from the Fits and Clearances Schedule 72-33-00 F.C.S.162 if the engine incorporates SB.72-29.
- NOTE: Dimension 'C' is the distance between the intermediate outer casing rear flange, to the rear face of the oil thrower ring with (No.3) HP compressor front bearing loaded forwards.
- (4) Determine the thickness of the adjusting washer required by subtracting dimension 'D' from dimension 'C' or the Set Gap dimension. The thickness of the washer must be within the limits of 0.249 to 0.345 in. (6,325 to 8,763 mm) for pre-SB.72-29 standard, or 0.237 to 0.309 in. (6,019 to 7,848 mm) for SB.72-29 standard engine.

SUB-ASSEMBLY

**72-33-00**

Page 578

May 1/81

TN7543





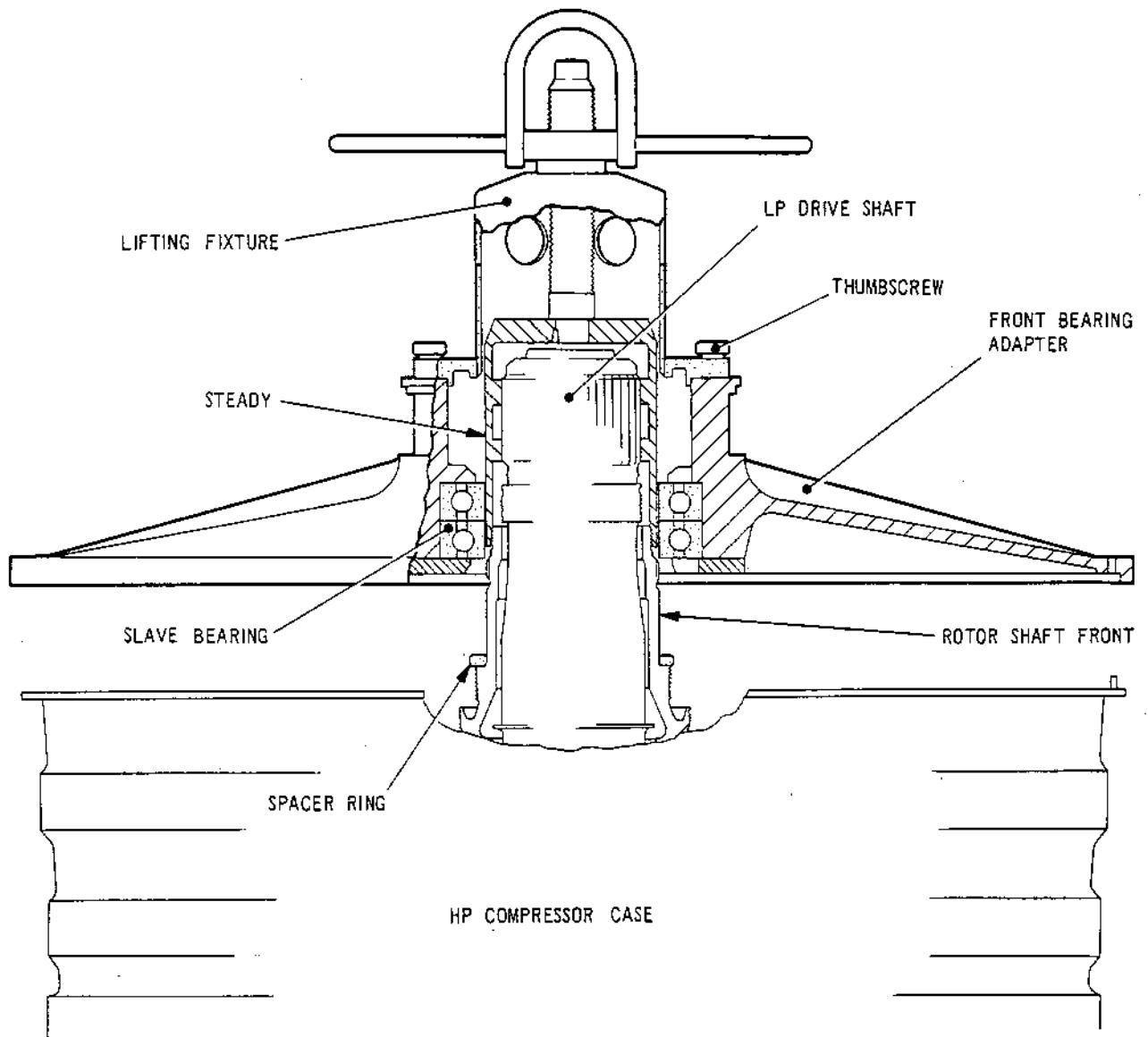
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32053/00A

PRINTED IN ENGLAND



TN19592

Assembling Front Bearing Adapter to Front Case  
Figure 523

SUB-ASSEMBLY  
**72-33-00**  
Page 579  
Apr 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



Z. Assemble the Front Bearing Adapter to the HP Front Case and the Rotor Shaft Front (Ref.Fig.523).

- (1) Ensure that the slave bearing (Tool 1289) is assembled and secured to the front bearing adapter (Tool 1032). Offer the lifting/extracting fixture (Tool 1353) to the adapter, align the offset thumbscrew with the offset tapped hole in the adapter, then screw the thumbscrews into the adapter. Fully tighten the screws.
- (2) Ensure that the steady (Tool 288) is screwed onto the rotor shaft front, then remove the wooden protector and the protector from the rotor shaft front. Apply lubricant 'A' to bearing location on the rotor shaft front, then assemble the spacer ring (Tool 870) to the shaft (in lieu of the adjusting washer and oil thrower).
- (3) Ensure that the LP support sleeve (Tool 1030) (Ref. Fig.505) has been unscrewed one and a half turns from contact with the HP support sleeve (Tool 1031) on the bottom of the rear bearing adapter. Release the mechanical jack (Tool 1029) lockring, then screw in on the jack to raise the HP compressor (approx.) 0.125 in. (4,0 mm).

NOTE: Unless the LP support sleeve is loosened off from the jack, there is no operating clearance, and the jack cannot be operated.

- (4) Attach a hoist to the lifting/extracting fixture, then position and lower the front bearing adapter over the steady. Release the hoist, then screw the fixture onto the steady, pressing the slave bearing onto the rotor shaft front. Align the dowel hole in the front bearing adapter with the dowel in the HP front case (with the lifting eyes in the front and rear adapters aligned), then screw down on the fixture until the bearing is fully down. Release the thumbscrews securing the fixture to the front bearing adapter, then unscrew and remove the fixture. Unscrew and remove the steady from the rotor shaft front.
- (5) Locate the adapter (Tool 891) (Ref.Fig.524) on the inner race of the front bearing adapter slave bearing. Screw the extension (Tool 521) onto the hydraulic mechanical driver (Tool 900). Lower the driver over the LP drive shaft until it abuts the rotor shaft front, then screw the driver housing (LEFT-HAND thread) onto the rotor.

CAUTION: Do not overtighten.

TN7544

SUB-ASSEMBLY

72-33-00

Page 580

Aug 1/81



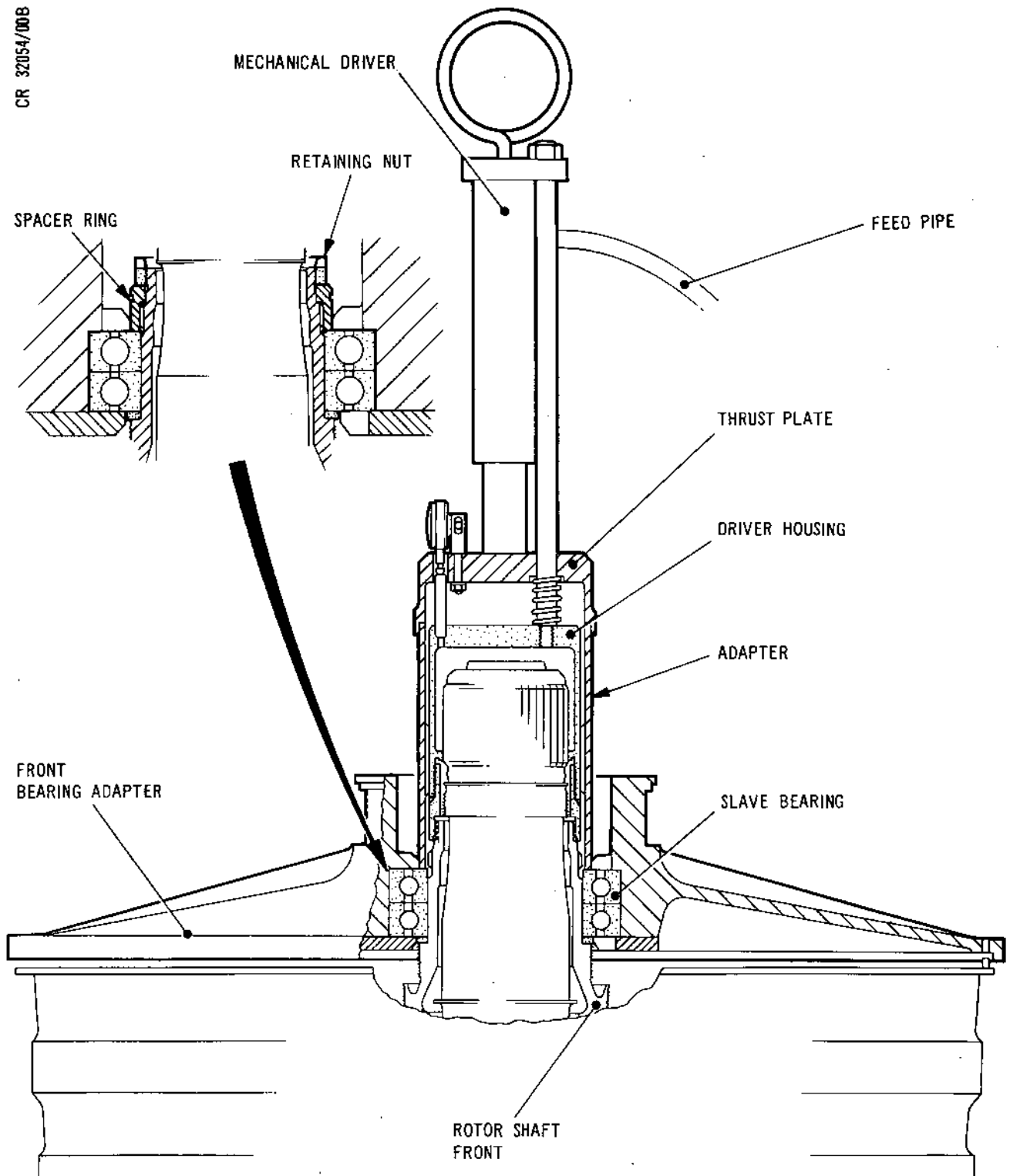
OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 32054/008

PRINTED IN ENGLAND



Assembling Front Bearing Adapter Bearing to Rotor Shaft Front  
Figure 524

SUB-ASSEMBLY  
**72-33-00**  
Page 581  
Apr 1/76

TN19593



OLYMPUS 598

MK.610-14-28  
OVERHAUL



- (6) Connect the feed pipe from a hand operated hydraulic pump to the driver connection. Operate the hand pump and apply pressure to the driver, ensure that as the piston moves down, the thrust plate locates correctly over the adapter. Apply a pressure of 7500 psig (51 700 kPa) to the driver.
- (7) Release the hydraulic pressure and check that the driver thrust plate rises (under its spring pressure). Disconnect the feed pipe from the driver, then unscrew and withdraw the driver and extension. Remove the adapter from the front bearing adapter.
- (8) Apply lubricant 'B' to the threads of the rotor shaft front, then assemble the spacer ring (Tool 988) and the 'LEFT-HAND' threaded retaining nut (72-61-00/1-10) to the rotor. Hand-tighten the nut using spanner wrench (Tool 1324) (Ref.Fig.525).
- (9) With the dowel hole in the front bearing adapter engaged in, or aligned with, the dowel in the HP front case (Ref. para.(4)), and the bolt-holes in the adapter and case aligned, lower the mechanical jack until the adapter abuts the HP case flange. Secure the adapter to the case with slave nuts and bolts. Lock the jack with its lockring.
- (10) Offer the steady (Tool 1158) to the front bearing adapter, align the bolts with the adapter holes, then screw the bolts into the adapter and fully tighten. Offer the immobilizer (Tool 387) into the steady and over the LP drive shaft, and engage it in the cutaways inside the HP rotor shaft front. Ensure that the multiplier (Tool 1022) is bolted to the spanner wrench (Tool 386), then offer the spanner/multiplier over the immobilizer. Turn the HP rotor shaft as necessary to engage the spanner pin in the cutaway in the steady and the spanner dogs in the retaining nut. Using a torquemeter wrench torque-tighten the 'LEFT-HAND' threaded retaining nut to 1250 lbf ft (1694,8 N.m) (reading of 50 lbf ft (67,8 N.m) on the wrench because of the 25 to 1 multiplier). Remove the torquemeter wrench multiplier/spanner, immobilizer and steady from the assembly.

TN7545



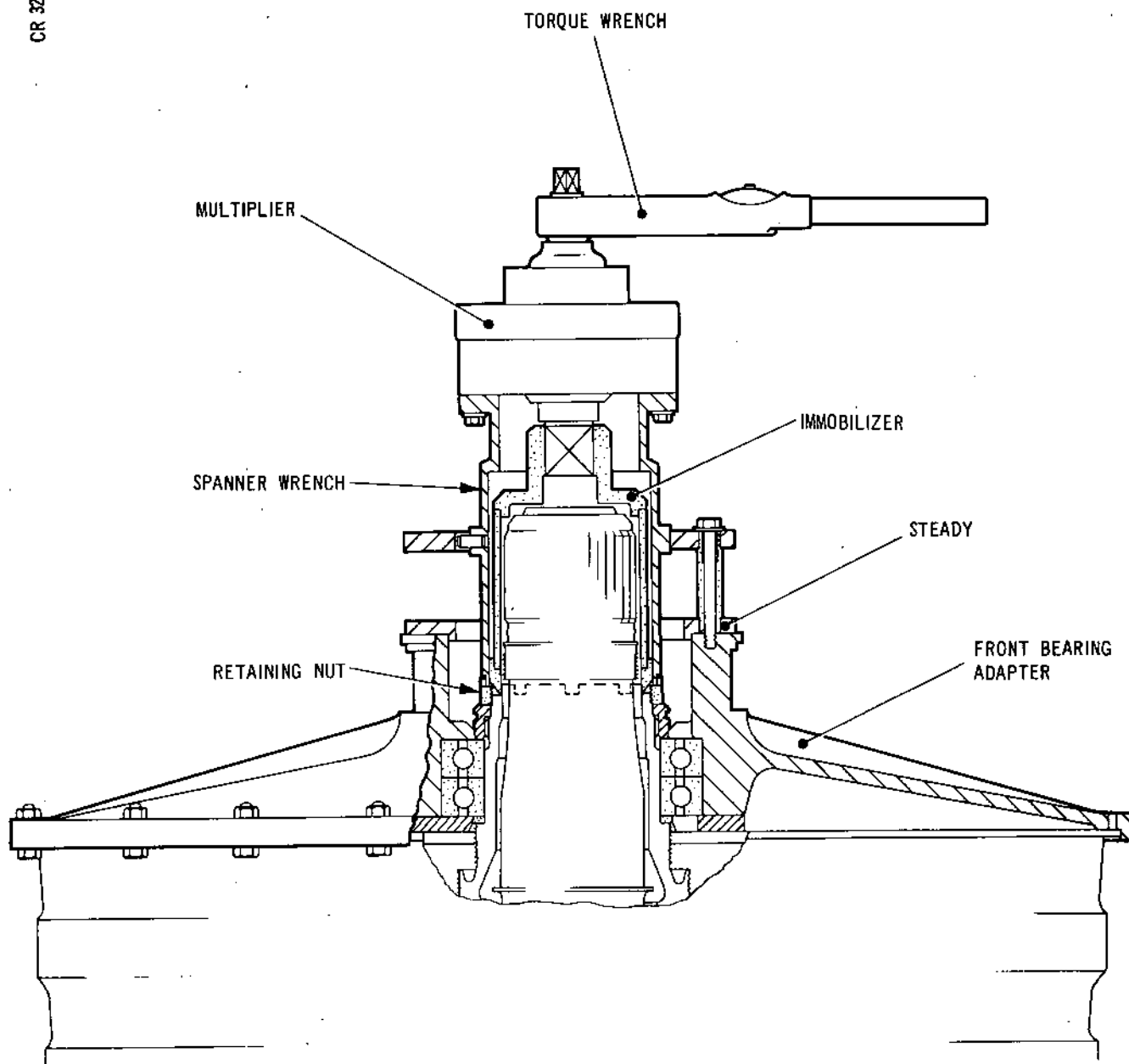
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32055/00A

PRINTED IN ENGLAND



TN19598

Tightening Front Bearing Retaining Nut  
Figure 525

SUB-ASSEMBLY  
**72-33-00**  
Page 583  
Apr 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (11) Assemble the steady, support and immobilizer to the LP drive shaft and the front bearing adapter (Ref.Fig.526).
- (a) Offer the immobilizer (Tool 1339) into the front bearing adapter and engage the teeth in the HP drive shaft front retaining nut.
  - (b) Unscrew the knurled locknut, then withdraw the location bush towards the eye end of the steady (Tool 290). Offer the steady shaft to the LP drive shaft and slide the four lobes of the shaft through the cutaways in the drive shaft, turn the steady shaft 45 deg so that the lobes locate behind the lands of the drive shaft. Push the location bush down, locating it over the drive shaft and ensuring that its peg locates in one of the cutaways in the drive shaft. Screw on the knurled locknut and tighten it against the location bush.
  - (c) Offer the front support (Tool 292) over the steady, then withdraw the immobilizer from the (rotor drive shaft) nut, align the immobilizer pins and threaded studs with the plain holes in the front support then engage the two. Screw knurled nuts (Tool 1340) onto the protruding end of the studs until the immobilizer is held against the support.
  - (d) Push the support onto the steady and screw the support locknut onto the steady. Align the offset screw of the support with the offset tapped hole in the front bearing adapter, then screw the screws into the adapter ensuring that the support locknut is screwed fully into the steady. Release the support locknut to allow a 0.005 in. (0,127 mm) clearance between the nut and the support, then screw the steady locking nut (Tool 291) onto the end of the steady and lock it against the support locknut.
- (12) Assemble and secure protector (Tool 395) to the blow-off position at stage 3 location, and protector (Tool 394) to the vent position at stage 5 location of the compressor front case.

FN7546

SUB-ASSEMBLY

**72-33-00**

Page 584

Apr 1/76



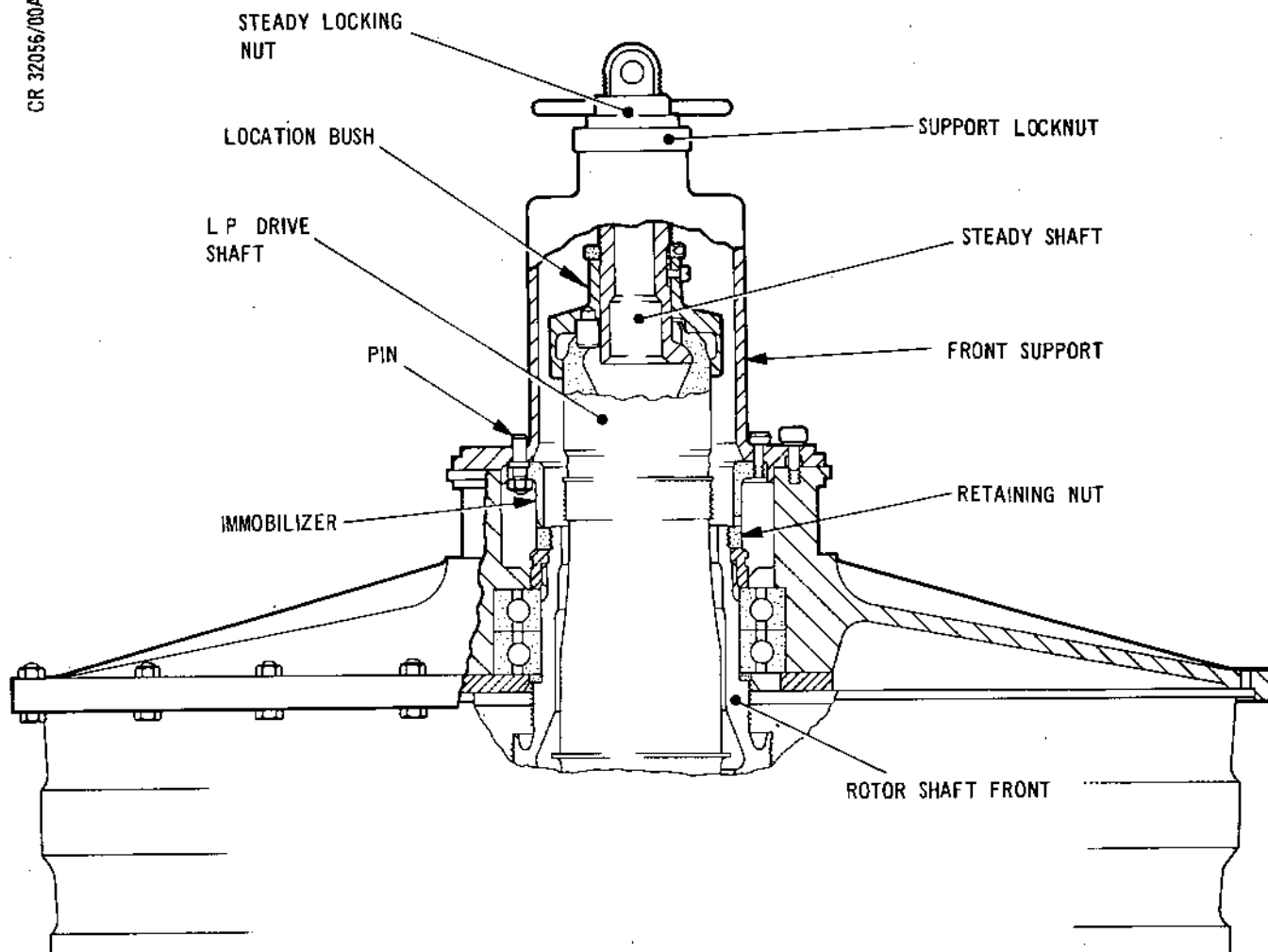
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32056/00A



Supporting LP Drive Shaft  
Figure 526

SUB-ASSEMBLY  
**72-33-00**  
Page 585  
Apr 1/76

TN19599



OLYMPUS 593

MK.610-14-28  
OVERHAUL



AA. Assemble the HP Compressor Rear (No.12) Labyrinth to the HP Drive Shaft (Ref.Fig.528).

- (1) Rotate the pit stand arms 180 deg until the rear bearing adapter is uppermost.
- (2) Unscrew and remove the LP drive shaft support sleeve (Tool 1030) from the HP drive shaft (Ref.Fig.505), then release the mechanical jack (Tool 1029) locking and unscrew the jack a turn. Unscrew the jack captive bolts, then remove the jack. Withdraw the HP drive shaft support sleeve (Tool 1031) from the HP drive shaft.
- (3) Separate the two halves of the split sleeve (Tool 1058), offer the sleeves to the LP drive shaft and locate the ends in the HP drive shaft, then secure the two halves together (Ref.Fig.527). Unscrew and remove the guide sleeve (Tool 377) from the LP drive shaft, then screw the lifting fixture (Tool 1055) onto the end of the shaft.
- (4) Attach a hoist to the lifting plate of the fixture, then remove the five nuts and washers securing each rear bearing adapter extension to each pit stand arm (Ref.Fig.504). Steadily raise the hoist until the arm locating pins are clear, then traverse the hoist and guide the assembly out sideways from the pit stand, and position it over the mobile stand (Tool 1036). Ensure that the stand clamps are clear, align the lifting eye and attachment nuts in the adapter with the cutaways in the stand, then lower the assembly onto the stand and secure with the stand clamps. Release the hoist and unscrew and remove the lifting fixture.
- (5) Offer the multiple leg sling (Tool 1054) (Ref.Fig.527) over the LP and HP drive shaft and align its captive bolts with the tapped holes in the rear (top) flange of the rear bearing adapter. Screw the bolts into the adapter and fully tighten the bolts. Release and remove the slave nuts and bolts securing the rear bearing adapter to the HP rear case. Withdraw the three rear bearing adapter rollers from the HP drive shaft (Ref.Fig.506), by releasing the smaller knurled lock-rings (on the outside of the adapter) and turning the larger rings clockwise.

IN7548

SUB-ASSEMBLY

72-33-00

Page 586

Apr 1/76



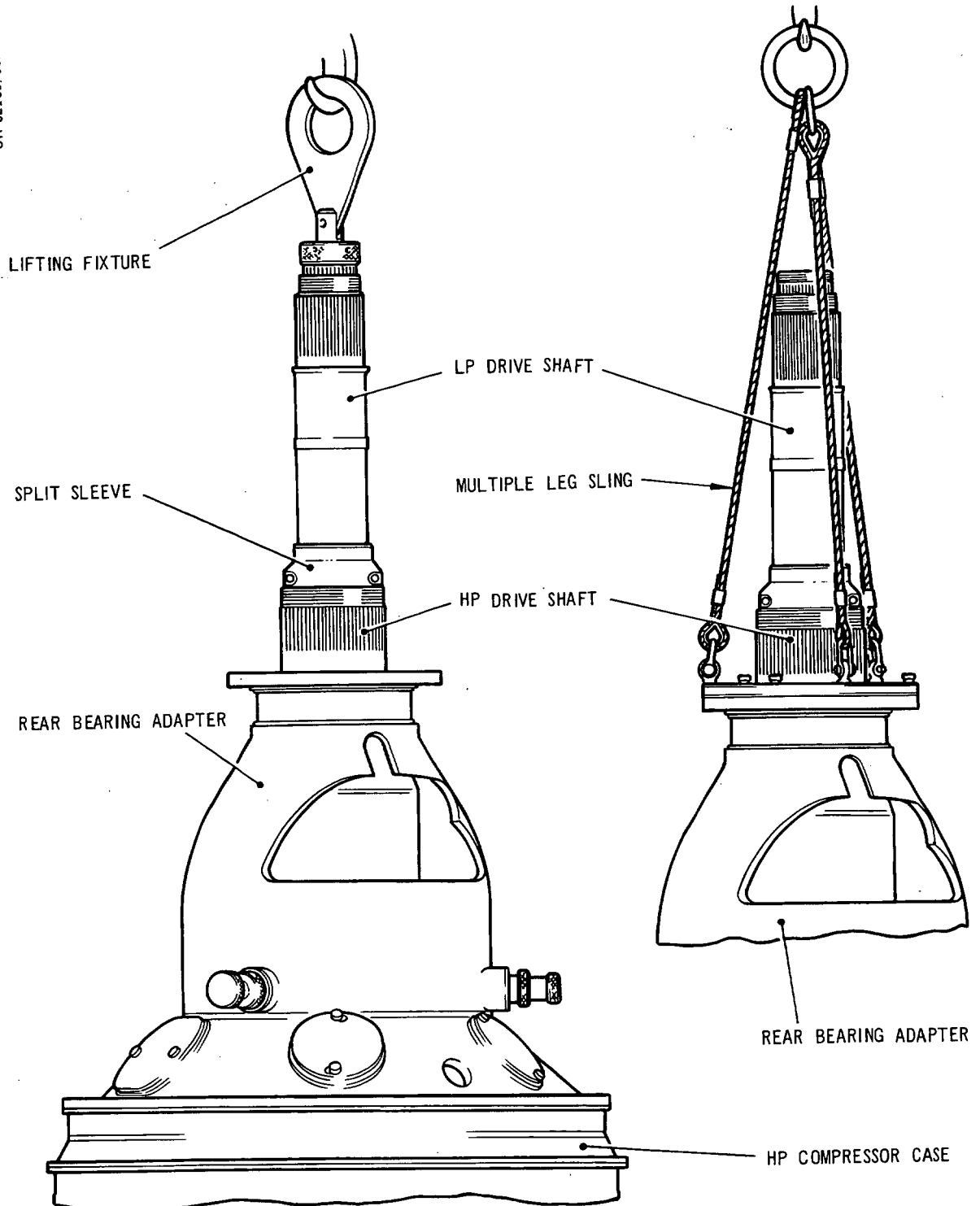


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32186/00A



Assembling HP Compressor Assembly to Mobile Stand  
Figure 527

SUB-ASSEMBLY  
**72-33-00**  
Page 587  
Apr 1/76



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (6) Attach a hoist to the ring of the sling then steadily raise the adapter until clear of the LP drive shaft. Position and lower the adapter onto a suitable pallet.

NOTE: Prior to the assembly of bolts (02/3-240) to the rear labyrinth they are to be paired with their nuts (02/3-230) and a locking (run-down) torque check carried out. On engines to Pre SB.72-8775-295 standard, the bolts must be new (zero lifed).

- (7) Apply lubricant C to the threads of bolts (02/3-240) and screw onto each bolt a nut (02/3-230). Check the locking (run-down) torque of each nut Ref.72-09-00 Assembly. For engines pre SB 72-8923-363, the minimum locking torque is 10 lbf in. (1,1 N.m). For engines to SB 72-8923-363 standard, the minimum locking torque is 3.5 lbf in. (0,4 Nm). On completion of the locking torque checks, number both nuts and bolts in pairs.
- (8) Examine the labyrinth (02/3-300) in between the two rear (smaller dia) labyrinth fins for the datum marks 00 then chalk a datum mark on the rear face. Assemble the eight numbered D-headed bolts (02/3-240) to the front (larger) flange holes, lock the bolt flats against the labyrinth and assemble a clip (of the retaining clip assembly Tool 977 or 1149) onto the protruding waisted portion of each bolt. Place the labyrinth in the container (Tool 755) and pack with a freezing agent, then assemble the lid and leave for approx. 40 min.
- (9) On engines to Pre SB.72-8305-154 Part 1 standard, assemble the eight bolts (02/3-220A) to the rear (smaller) No.12 labyrinth flange on the HP drive shaft.

NOTE: Use only bolts that are new (zero lifed).

- (a) Apply lubricant 'A' to the bolt thread and offer the bolt, so that it extends rearwards (upward) into one of the eight bolt-holes. Locate the assembly sleeve (Tool 1321) over the thread of the bolt.



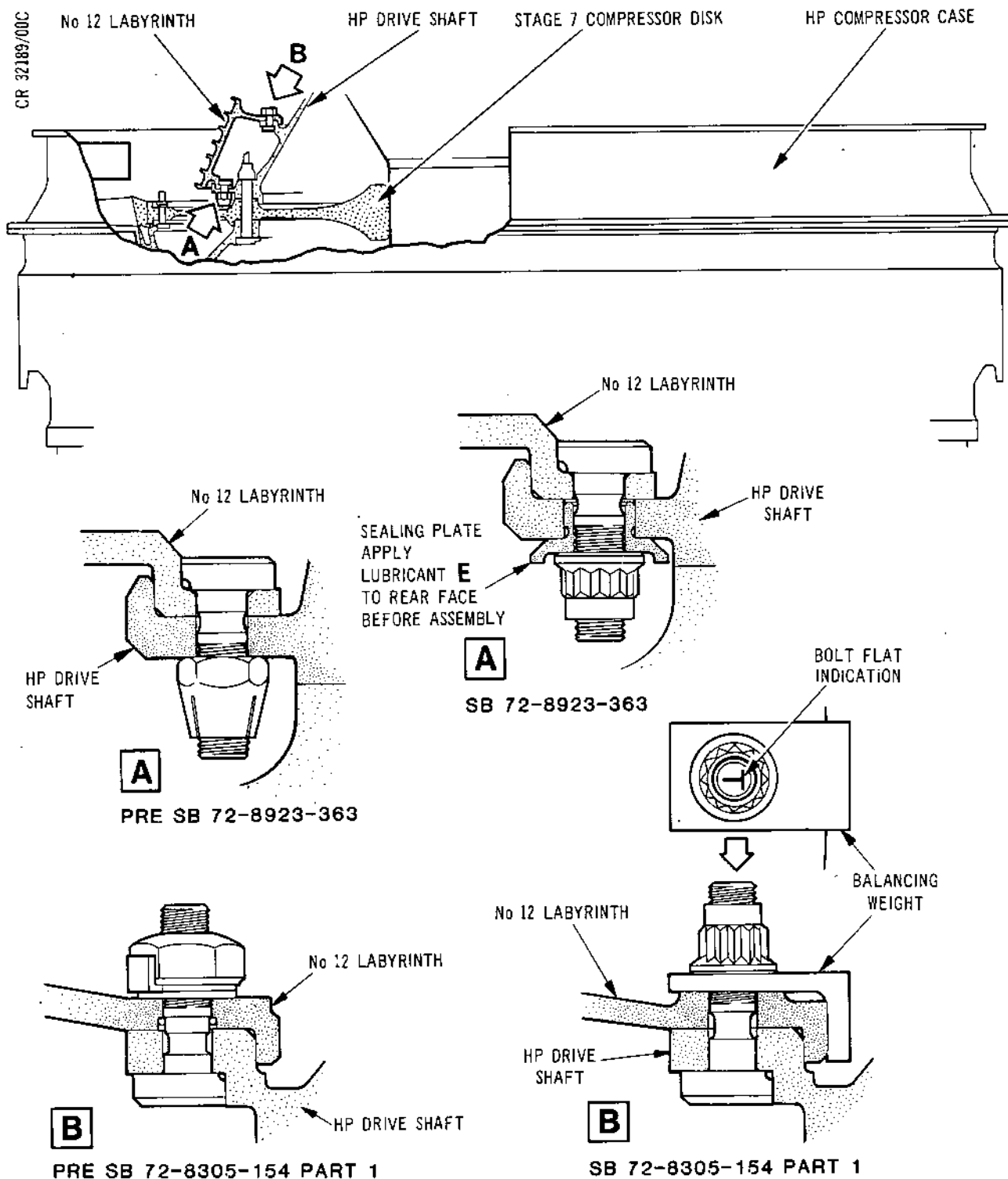
# OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND



Assembling HP Compressor Rear Labyrinth to HP Drive Shaft  
Figure 528

SUB-ASSEMBLY

## 72-33-00

Page 589

Jun 1/91



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Press a retaining ring (02/3-210) over the end of the assembly sleeve and ease it onto the bolt. Remove the assembly sleeve and press the ring into the groove in the bolt.
  - (c) Assemble the remaining seven bolts and retaining rings in the same manner.
- (10) On engines embodying SB.72-8305-154 Part 1 assemble the eight bolts (02/3-220B) to the rear (smaller) No.12 labyrinth flange on the HP drive shaft.

**NOTE:** On engines to Pre SB.72-8775-295 standard use only bolts that are new (zero lifed), and to verify correct D-head assembly they must be marked at their tip with a capital letter 'T' (the cross of the T parallel with the D flat) (Ref.Fig.528 Detail B). Use either the vibro percussion engraving or electro-chemical method of marking; for procedure refer to (72-09-00 Repair).

- (a) Apply lubricant 'A' to the bolt thread and offer the bolt, so that it extends rearwards (upward) into one of the eight bolt-holes.
- (b) Ensure the flat on the head is located against the shaft and retain the bolt in the assembled position with a retaining clip (Tool 1999), ensure the body of the clip lies against the shaft.
- (c) Assemble and secure the remaining seven bolts in the same manner.



OLYMPUS 593

MK.610-14-28

OVERHAUL



## (11) Assemble the labyrinth (Ref.Fig.528).

- (a) Using protective gloves, remove the labyrinth from the container at the completion of its cooling period, and apply lubricant 'A' to the bolt threads.
- (b) On engines to SB 72-8923-363 standard, apply lubricant 'E' to the rear face of eight sealing plates (02/3-232). Avoid excessive use of lubricant, and use protective gloves. Assemble the plates into the bolt-holes in the front (lower) labyrinth mounting flange of the drive shaft.
- (c) Offer the labyrinth over the drive shaft, align the chalked datum mark on the labyrinth with the datum hole chalked on the drive shaft, then lower the labyrinth and locate the clipped bolts in the drive shaft flange. Screw a nut (02/3-230) onto each of the front (lower) clipped bolts, and remove the clips (Tool 977).
- (d) On engines Pre SB 72-8305-154 Part 1 standard, assemble a flat washer (02/3-200), keywasher (02/3-190) and nut (02/3-180A) to each of the rear (top) bolts. Lower the labyrinth, ensuring that it abuts the drive shaft. Torque-tighten the nuts to 100 lbf in. (11,5 Nm) and lock the nuts with the keywashers.
- (e) On engines to SB 72-8305-154 Part 1 standard, assemble a nut (02/3-180B) to each of the rear (top) bolts. Remove the retaining clips (Tool 1999), and lower the labyrinth, ensuring that it abuts the drive shaft. Check that the nuts have a locking torque of 10 lbf in. (1,1 Nm) and torque-tighten to 100 lbf in. (11,5 Nm).

**NOTE:** Ensure that the front (lower) bolts are seated correctly by checking the position of the letter T (bolt flat indication) on the tip of the bolts before tightening. (Ref.Fig.528).

- (f) Using the cranked ring wrench (Tool 1543 Pre SB 72-8923-363 or Tool 3141 SB 72-8923-363 standard), torque-tighten the front (lower) ring of nuts to 100 lbf in. (11,5 Nm). Check, using a mirror, the amount of bolt stand-out (Ref. 72-09-00 Assembly) on each nut to ensure that the bolts are seated correctly.

SUB-ASSEMBLY

**72-33-00**

Page 590A

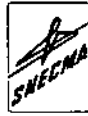
Jun 1/91



OLYMPUS 593

MK.610-14-28

OVERHAUL



Left blank intentionally

SUB-ASSEMBLY

**72-33-00**

Page 590B

May 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

- (12) Attach a hoist to the ring of the rear bearing adapter sling, then raise the adapter and position it over the LP drive shaft. Insert the balancing machine drive belt (Tool ) (length 106 in. (2692,4 mm) width 3 in. (76,2 mm)) into the large cutaway in the adapter, and ensure that when the adapter is lowered, the belt is guided around the HP drive shaft. Steadily lower the adapter over the HP drive shaft and guide the adapter slave bearing over the inner race on the shaft. Align the locating pin in the HP rear case with the pin hole in the adapter flange, and ensure the bolt-holes in each item align. Secure the adapter to the rear case with slave nuts and bolts. Release and remove the sling from the rear bearing adapter and the hoist.
- (13) Offer the spacer ring (Tool 414) with its flanged end to the rear (uppermost), over the LP and HP drive shaft and rest it on the bearing inner race. Apply lubricant 'B' to the slave retaining nut (Tool 418), then screw it into the HP shaft. Tighten the nut with the hand spanner wrench (Tool 410).

NOTE: The H.P. compressor assembly is now ready for concentricity, swash checks and balancing.

3. Prepare and Check the HP Compressor Assembly for Concentricity and Swash

A. Assemble the HP Compressor Assembly to the Surface Table (Ref.Fig.531).

- (1) Prepare the surface table equipment for checking the concentricity.
- (a) Position two supports (Tool 1073) on the surface table.
- (b) Assemble a spacer (Tool 1074) to one support, and spacer (Tool 1075) to the remaining support. Assemble clamp plates to each support to secure the spacers.

TN7550

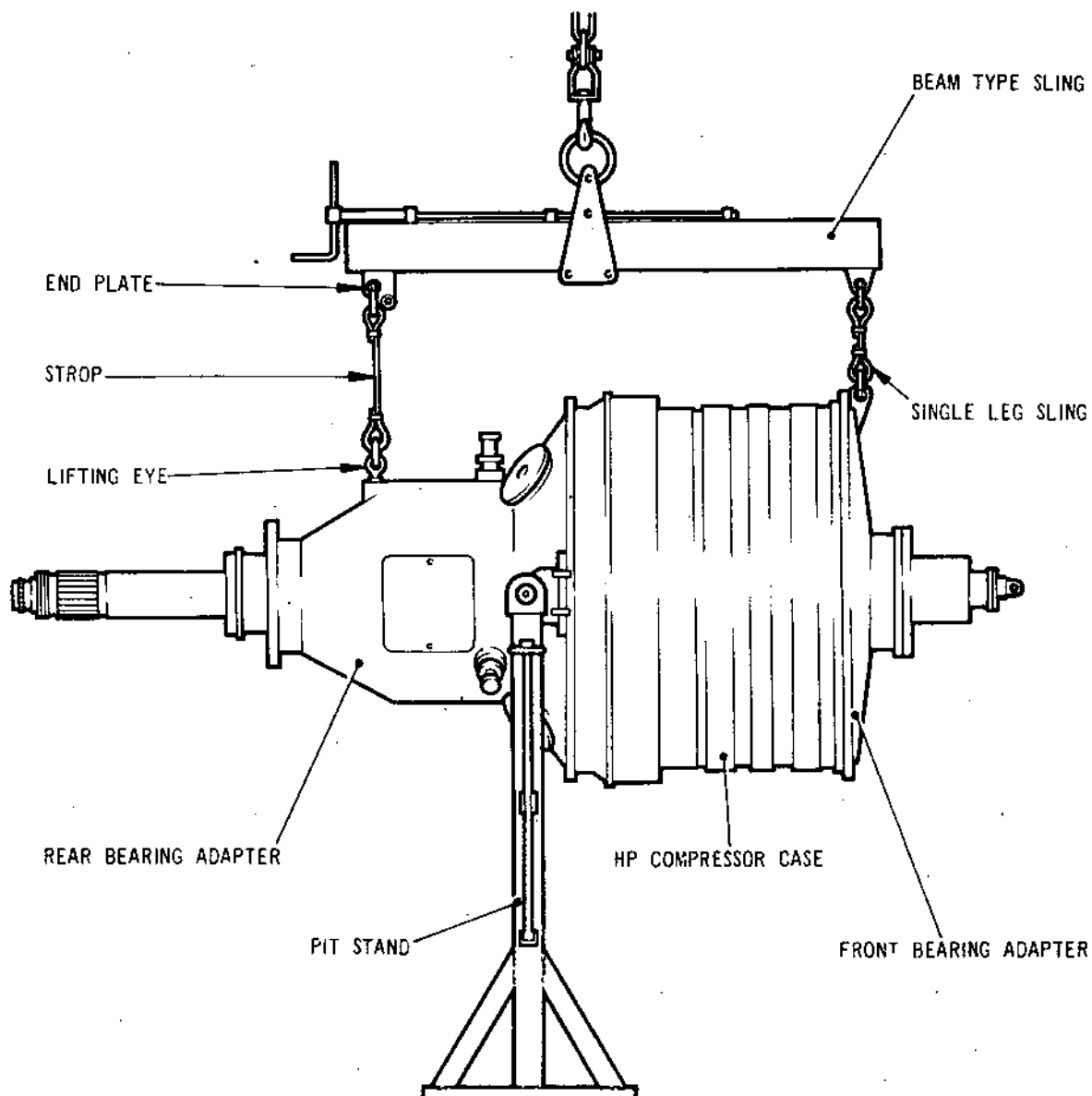


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32190/00A



JN27227

Assembling Beam Type Sling to HP Compressor Assembly Using  
Pit Stand  
Figure 529

SUB-ASSEMBLY  
**72-33-00**  
Page 592  
Apr 1/76





OLYMPUS 593

MK.610-14-28

OVERHAUL



- (c) Position the jack (Tool 1059) on the surface table.

NOTE: In order to assemble the HP compressor assembly to the surface table, the assembly must be turned to the horizontal position. Two methods are possible, and the choice is left to the operator and/or the availability of equipment. The first method is detailed in para.(2) to (4), and the second method is detailed in para.(5) to (7).

- (2) Screw the lifting fixture (Tool 1055) onto the end of the LP drive shaft, then attach a hoist to the fixture. Release the mobile stand clamps, then raise the hoist and position the assembly alongside the pit stand (Tool 1027). Ensure that the arms of the stand extend upwards, and that the rear bearing adapter flange is positioned above the locating pins of the arms. Traverse the hoist and guide the cases in between the stand arms until the rear bearing adapter extensions are positioned above the stand arms. Lower the adapter and guide the two locating pins and the five studs of each adapter extension, into the holes in each stand arm. Assemble a washer and nut to each of the studs, then fully tighten the nuts. Release and remove the lifting fixture from the LP drive shaft and the hoist.
- (3) Rotate the pit stand arms 90 deg with the lifting eyes on the front and rear bearing adapters uppermost (Ref.Fig.529). Attach a hoist to the roller of the beam type sling (Tool 1056), then raise the hoist and position the beam over the HP compressor assembly. Ensure that the strop is shackled to the upper hole in the end plate, then attach the single leg sling (Tool 1394) to the bracket at the other end of the beam with a shackle. Remove the shackles from the bottom of the strop and single leg sling, then attach the strop/sling to the rear bearing adapter eye, and the front bearing adapter plate with the shackles. Position the beam lifting roller to the beam mid position, or as marked on the beam.

PRINTED IN ENGLAND

TN7551

SUB-ASSEMBLY

72-33-00

Page 593

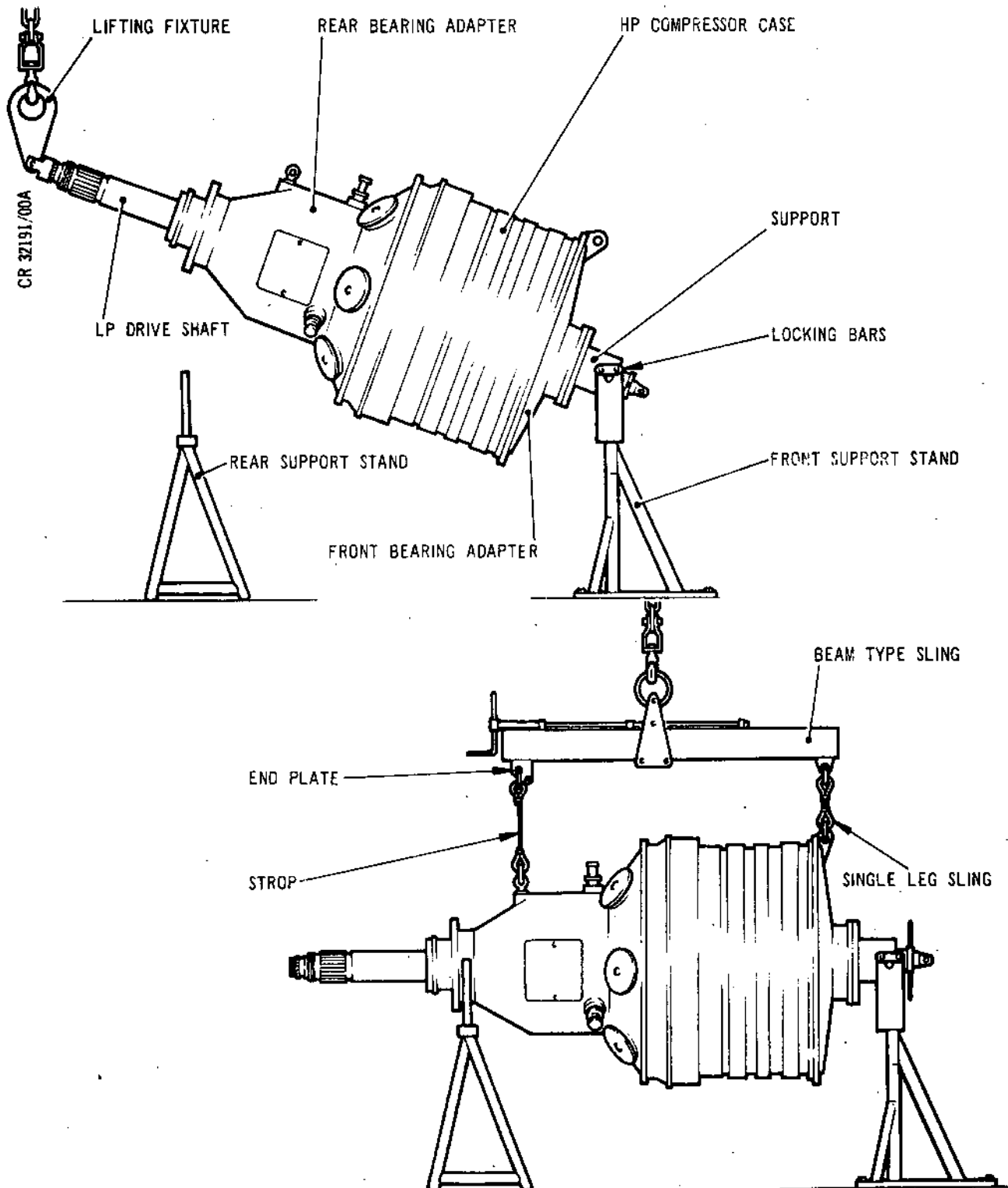
Jun 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



Assembling Beam Type Sling to HP Compressor Assembly  
Using Front and Rear Supports

Figure 530

SUB-ASSEMBLY  
**72-33-00**

Page 594

Apr 1/76

TN27228



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (4) Raise the hoist to tension the strop/sling, then unscrew and remove the nuts and washers securing the adapter to the pit stand arms. Adjust the position of the beam lifting roller to support the assembly in the horizontal position. Traverse the hoist to disengage the adapter from the locating pins of the arms. Raise the hoist taking care to guide the assembly out of the stand, then position the assembly over the surface table.

NOTE: Refer to para.(8) and assemble the compressor assembly to the surface table.

- (5) Screw the lifting fixture (Tool 1055) onto the end of the LP drive shaft, then attach a hoist to the fixture. Release the mobile stand clamps, then raise the hoist and position the assembly over the front support (Tool 1076) (Ref.Fig.530). Release the two locking bars of the support, then steadily lower the assembly engaging the lugs of the support (Tool 292) in the recesses of the front support. Secure the support with the locking bars of the front support. Moving the hoist as necessary, lower the rear end of the assembly, pivoting about the support, and rest the recessed part of the rear bearing adapter on the rear support (Tool 1306), ensuring that the lifting eye and plate of the adapters are uppermost.

CAUTION: ENSURE THAT THE LIFTING FIXTURE  
(TOOL 1055) PLATE PIVOTS AS THE  
ASSEMBLY IS LOWERED.

- (6) Remove the hoist then unscrew and remove the lifting fixture from the LP drive shaft. Attach a hoist to the roller of the beam type sling (Tool 1056), then raise the hoist and position the beam over the HP compressor assembly. Ensure that the strop is shackled to the upper hole in the end plate, then attach the single leg sling (Tool 1394) to the bracket at the other end of the beam with a shackle. Remove the shackles from the bottom of the strop and single leg sling, then attach the strop/sling to the rear bearing adapter eye, and the front bearing adapter plate with the shackles. Position the beam lifting roller to the beam mid position, or as marked on the beam.

SUB-ASSEMBLY  
**72-33-00**

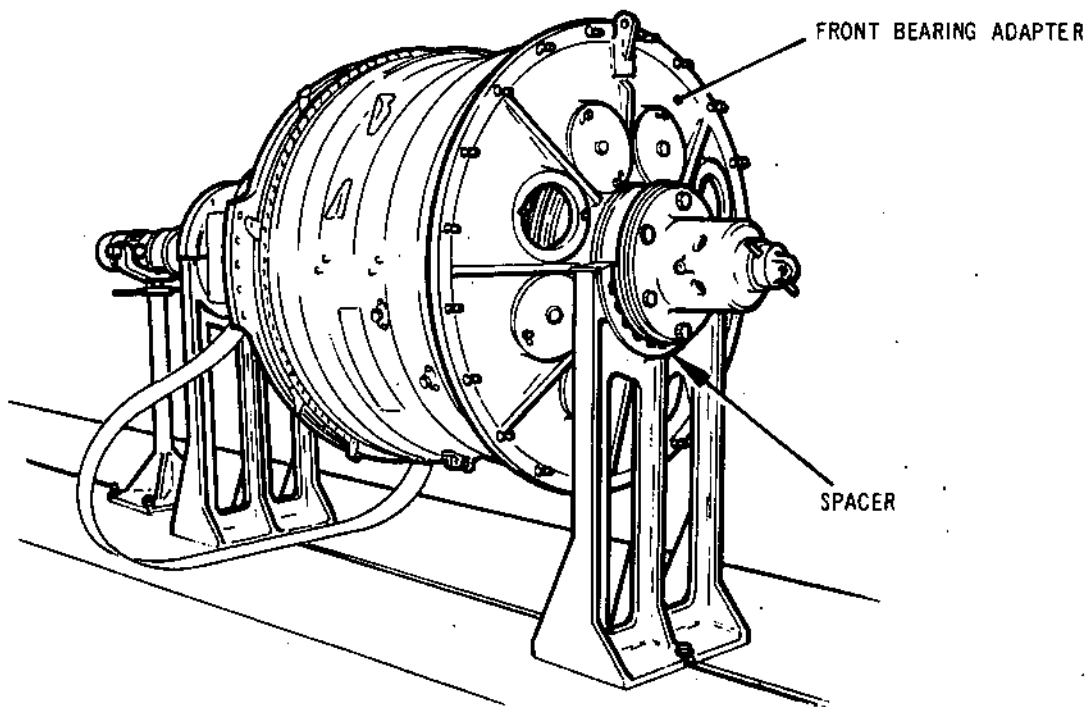
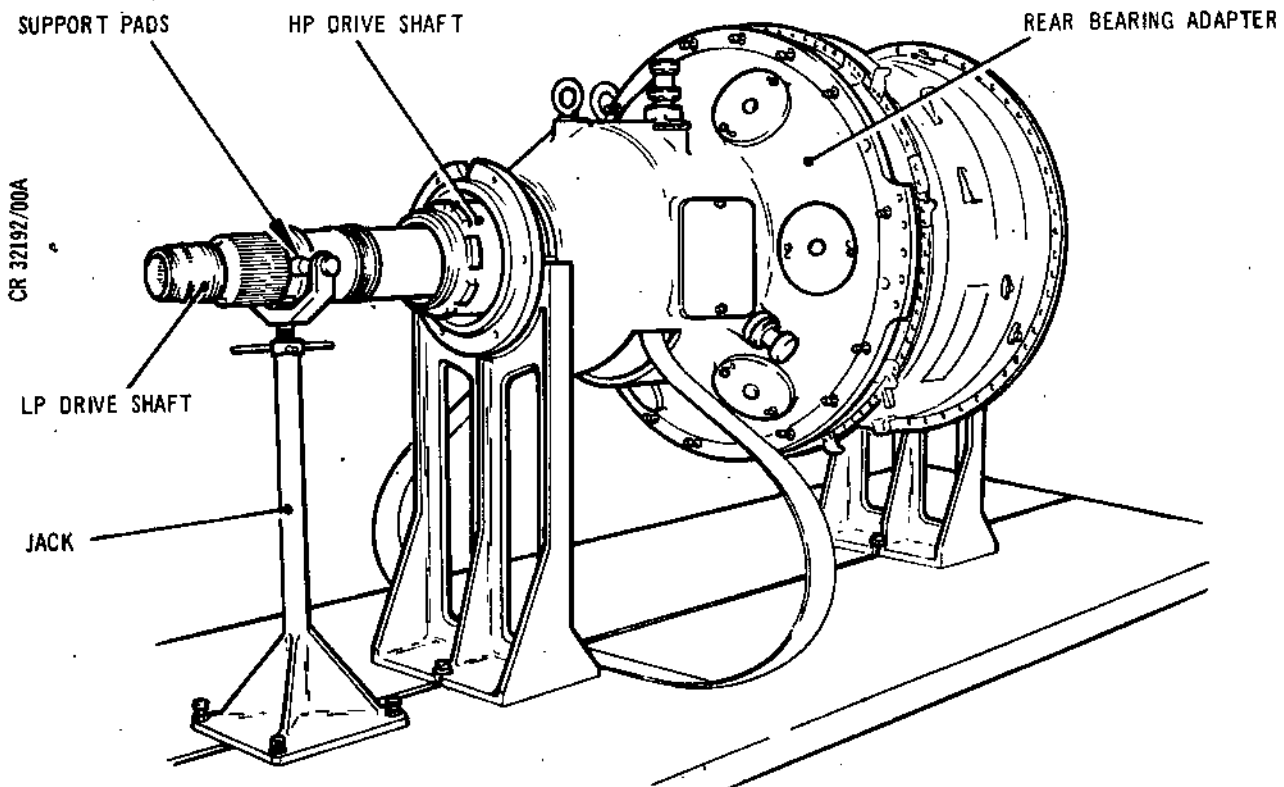
Page 595

Jun 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Assembling HP Compressor Assembly to Surface Table  
Figure 531

SUB-ASSEMBLY  
**72-33-00**  
Page 596  
Apr 1/76

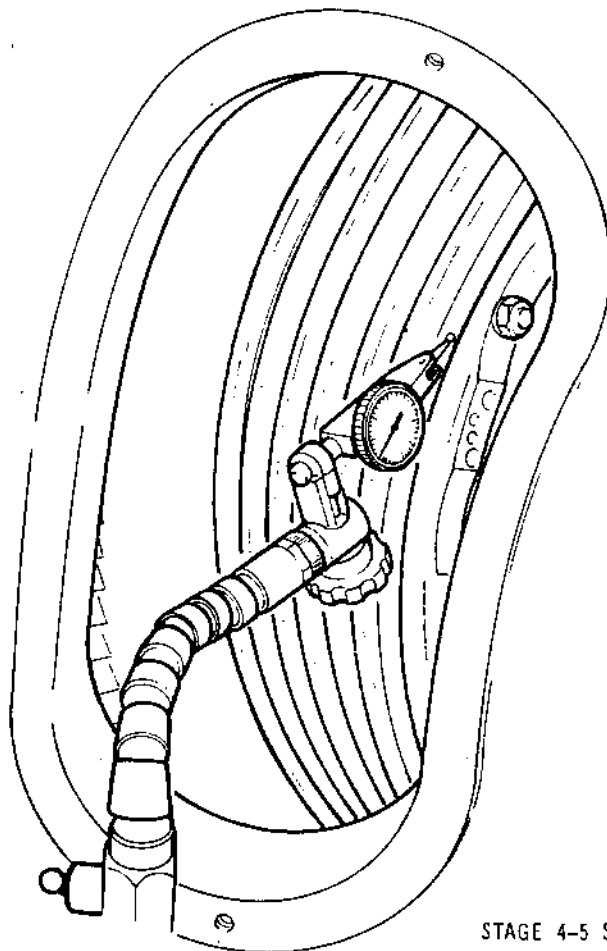
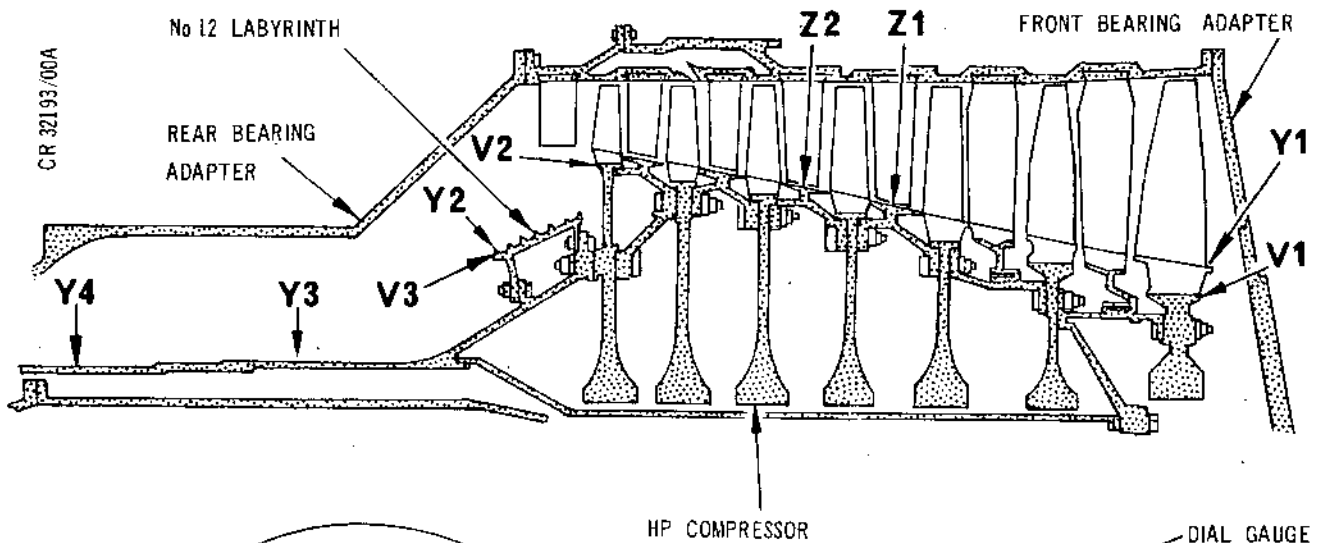
TN22943



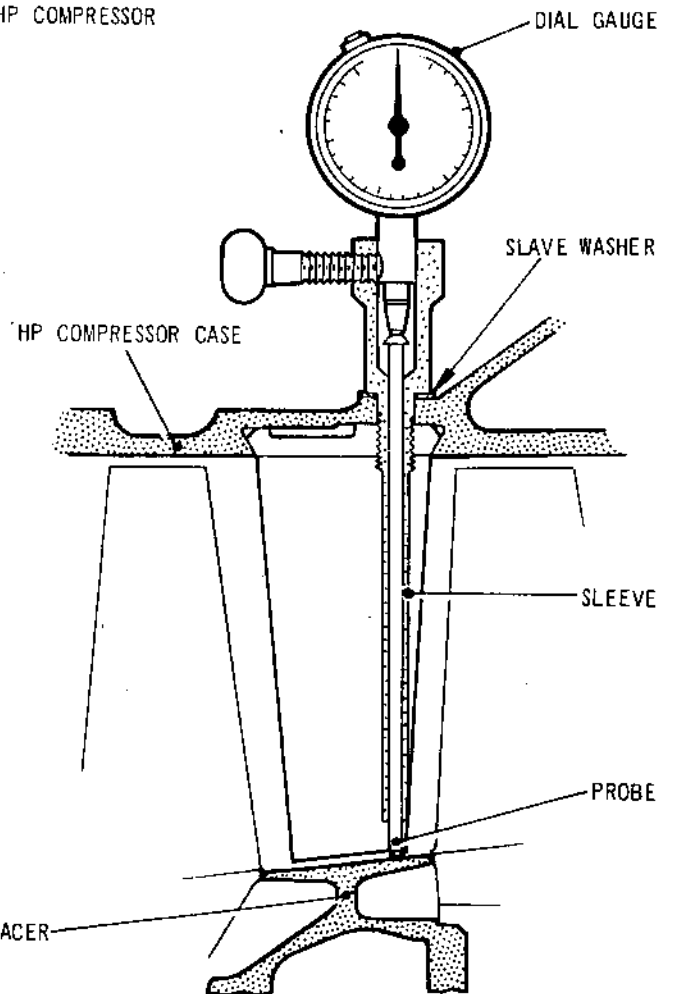
OLYMPUS 593

MK.610-14-28

OVERHAUL



TYPICAL SWASH CHECK



TYPICAL CONCENTRICITY CHECK

Checking Swash and Concentricity of HP Compressor Assembly  
Figure 532

SUB-ASSEMBLY  
**72-33-00**

Page 597

Apr 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (2) Allow the assembly to rotate long enough to eliminate the effects of differential temperature on the readings obtained, then calibrate the machine and continue to rotate the assembly until the change in the mean average readings of unbalance at F and Rc over a period of three minutes are less than 2 drin in.

NOTE: 1 drin in. = 45 g mm.

- (3) Calibration checks.
- (a) The application of 4 drms of plasticine to the HP drive shaft 9 in. (228,6 mm) rearward of Rc should register approximately 9 drin in. at F and 33 drin in. at Rc 180 deg from the reading at F.
  - (b) Rotating the spacer ring (Tool 414) through 180 deg should not affect balance at Rc by more than 2 drin in.
- (4) Should the initial unbalance readings be within the following limits, at F 220 drin in. and at Rc 250 drin in. continue with the balance of the assembly ref. para.(6).
- (5) With the unbalance readings outside the initial limits, rectify in accordance with the following procedures.
- (a) Record the angle and amount of unbalance.
  - (b) Remove the HP compressor from the balancing machine and reassemble to the pit stand, ref. para.4.D.
  - (c) Disassemble the HP compressor in accordance with 72-33-00 Disassembly, to the area causing the unbalance.
  - (d) Inspect for excessive or inadequate clearances between components, burrs or unbalance in individual components. Rectify the defect, then reassemble the HP compressor in accordance with the appropriate text in this chapter.
  - (e) Remove the assembly from the pit stand and assemble to the surface table, ref. para.3.A.
  - (f) Carry out swash and concentricity checks, ref. para.3.B.

SUB-ASSEMBLY

**72-33-00**

Page 598.9

Jun 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (g) On completion of satisfactory swash and concentricity checks, remove the HP compressor from the surface table and reassemble it to the balancing machine for dynamic balance.
- (6) With the unbalance readings within the initial limits, balance the assembly within 8 drn in. by the following procedures in accordance with the SB. standard to which the compressor is built.
- (a) On engines to Pre SB.72-8305 Part 2 standard, correct the unbalance at F by the addition of balance washers beneath the nuts securing the first stage rotor disk. On engines embodying SB.72-73 remove the plain washers (02/1-170) from the bolts to which balancing washers are fitted. Maximum number of washers that can be used for balancing purposes are, 2 off (02/1-180), 2 off (02/1-185) and 5 off (02/1-190). Torque-tighten nuts, after assembling washers, to 450 lbf in. (9,5 N.m).
- (b) On engines embodying SB.72-8305 Part 2, correct the unbalance at F by applying a temporary correction i.e., plasticine to the disk at the balancing weight diameter (Ref.Fig.534).
- (c) On engines to Pre SB.72-8305 Part 1, correct the unbalance at Rc by the addition of keywashers (02/3-290) and balancing bolts (02/3-250 to 280) to a maximum of 32 off from the range of balancing bolts provided. Apply lubricant 'A' to the threads of the balancing bolts and torque-tighten to 100 lbf in. (11,5 N.m). Lock the bolts with the keywashers.

**NOTE:** On engines to Pre SB.72-8775-295 standard, the balancing bolts provided must be new (zero lifed).

SUB-ASSEMBLY

**72-33-00**

Page 598.10

Dec 1/83



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (d) Turn the rotor to position the datum line at the top vertical position, then position and lock the dial gauge scale to (zero) '0'.
- (e) Turn the rotor in a clockwise direction as viewed from the rear, and record the swash or eccentricity at eight equi-spaced angular positions. Ensure that when the rotor returns to its starting point, the gauge returns to '0'. If the gauge doesn't return to '0', check the equipment to ensure there is no looseness and that the gauge is locked, then recheck until a satisfactory result is achieved.
- (f) When swash checks entail the dial gauge pointer passing over blade roots, care must be taken to ensure that the gauge setting is not altered.
- (g) On completion of the checks replace and secure the panels, and assemble the split sleeves (Tool 1058) to the LP and HP drive shafts.

(2) Check and record the amount of swash and eccentricity as detailed in para.(1) at the following positions.

- (a) The eccentricity at the rear land of the rear (No.12) labyrinth (position Y2).
- (b) The eccentricity at the mid position of the HP drive shaft (position Y3).
- (c) The eccentricity at the rear end of the HP drive shaft (position Y4).
- (d) The swash of the stage 7 disk at the blade root location (position V2).
- (e) The swash at the rear land of the rear (No.12) labyrinth (location V3).
- (f) The swash of the stage 1 disk at the blade root (position V1).
- (g) The eccentricity of the stage 1 disk at the blade platform lip (position Y1).
- (h) The concentricity at position Z1 and Z2 as follows:
  - (i) Remove the rear bolt and spacer from the bolted vane at the top of the compressor case at the stage 3 vane location.

SUB-ASSEMBLY

**72-33-00**

Page 598.1

Jun 1/77





# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (ii) Remove the checking gauge (Tool 1) from its container (Tool 90) and slide the probe out of the sleeve. Ensure that a slave washer is assembled to the sleeve, then screw the sleeve into the hole in the case and fully tighten the sleeve.
  - (iii) Insert the probe into the sleeve, then insert the dial gauge indicator into the sleeve and secure it in the sleeve with the wing screw, ensuring that the gauge is in its mid travel position.
  - (iv) Check the amount of eccentricity at stage 3-4 spacer ring (position Z1) as detailed in para.(1), (c) to (e).
  - (v) Release and remove the dial gauge indicator, then unscrew and remove the gauge sleeve and washer. Stow the gauge in its container. With the sleeve (2-20) assembled to the bolt (2-10) screw the bolt into the case with lubricant 'C' applied to bolt threads. Then torque-tighten the bolt to 100 lbf in. (11,5 N.m). Wire-lock the bolt to the other stator vane securing bolt.
  - (vi) Check the amount of eccentricity at stage 4-5 spacer ring (position Z2) by removing the rear bolt (2-110) and sleeve (2-120) from the bolted vane at the left-hand side of the compressor case at the stage 4 vane location. Using the check gauge (Tool 2) follow the procedure as detailed in para. (ii) to (v).
- (3) The total indicator reading (T.I.R.) of swash at positions V1, V2 and V3 must not exceed 0.005 in. (0,127 mm), and the T.I.R. of eccentricity at positions Y1, Y2, Y3, Z1 and Z2 should not exceed 0.004 in. (0,102 mm). If the swash and/or eccentricity are in excess of the figures quoted, determine from the amount of swash and/or eccentricity at the positions checked, and the angular and longitudinal relationships, the area of the rotor that is causing the malalignment and producing the excessive swash and/or eccentricity. The HP compressor assembly must be removed from the surface table, assembled to the stand and disassembled (Ref.72-33-00 Disassembly) to the area causing the defect. The items in the area

SUB-ASSEMBLY

## 72-33-00

Page 598.2

Dec 31/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



inspected to determine the defect, then the defect rectified and the HP compressor reassembled in accordance with the appropriate text in this Chapter. Repeat the swash and concentricity checks, and, if necessary, rectify until satisfactory figures within the limits are obtained.

#### 4. Prepare and Balance the H.P. Compressor Assembly

##### A. Prepare the Balancing Machine (Avery 72 N 56) (Ref.Fig.533).

- (1) Assemble a spacer (Tool 1075) to the left-hand and centre cradles of the machine, and spacer (Tool 1074) to the right-hand cradle. Assemble clamp plates to each cradle to secure the spacers.

NOTE: If the availability of equipment entails using the spacers used for swash/concentricity, remove the HP compressor from the surface table and place on the support stands (Ref.para.B.(1)), then release and remove the spacers from the surface table supports and assemble the spacers to the balancing machine.

- (2) Assemble the adjustable support (Tool 1090) to the spacer in the left-hand cradle so that the hinged bridge piece opens away from the operator. Assemble clamp plates to the spacer to secure the support, then open the bridge piece. Ensure that the three support pads are withdrawn.

##### B. Assemble the HP Compressor Assembly to the Balancing Machine.

NOTE: If the availability of the balancing machine entails a delay before the HP compressor is balanced, but the surface table is required for other use, or the position or availability of equipment prevents the HP compressor from being assembled direct to the machine, the HP compressor can be assembled to the mobile stand or support stands.

SUB-ASSEMBLY

**72-33-00**

Page 598.3

Apr 1/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (1) Attach a hoist to the roller of the beam type sling (Tool 1056) (Ref.Fig.530), then raise the hoist and position the beam over the HP compressor. Ensure that the strop is shackled to the upper hole in the end plate, and the single leg sling (Tool 1394) is shackled to the bracket at the other end of the beam. Remove the shackles from the bottom of the strop and single leg sling, then attach the strop/sling to the rear bearing adapter eye, and the front bearing adapter plate with the shackles. Position the beam lifting roller to the beam mid position, or as marked on the beam.

NOTE: If the HP compressor is to be assembled direct to the balancing machine proceed as detailed in para.(6) onwards. If, however, the HP compressor is not to be assembled to the machine direct, assemble the HP compressor to the mobile or support stands as follows.

- (2) Raise the hoist and adjust the position of the beam lifting roller (if necessary) to support the assembly in the horizontal position. Position the assembly over the front support (Tool 1076) and rear support (Tool 1306) (Ref.Fig.530), then lower the assembly engaging the front bearing support lugs in the front support and the recessed part of the rear bearing adapter on the rear support. If the assembly has to remain on the support stands for a period, or has to be assembled to the mobile stand, release the beam type sling and lower it to the floor.

NOTE: When the assembly is required for assembling to the balancing machine, remove it from the supports and assemble it to the machine as detailed in para.(5) onwards.

NOTE: If the assembly requires transporting in the mobile stand, assemble it to the stand as detailed in para.(3).

TN25603

SUB-ASSEMBLY

72-33-00

Page 598.4

Apr 1/78

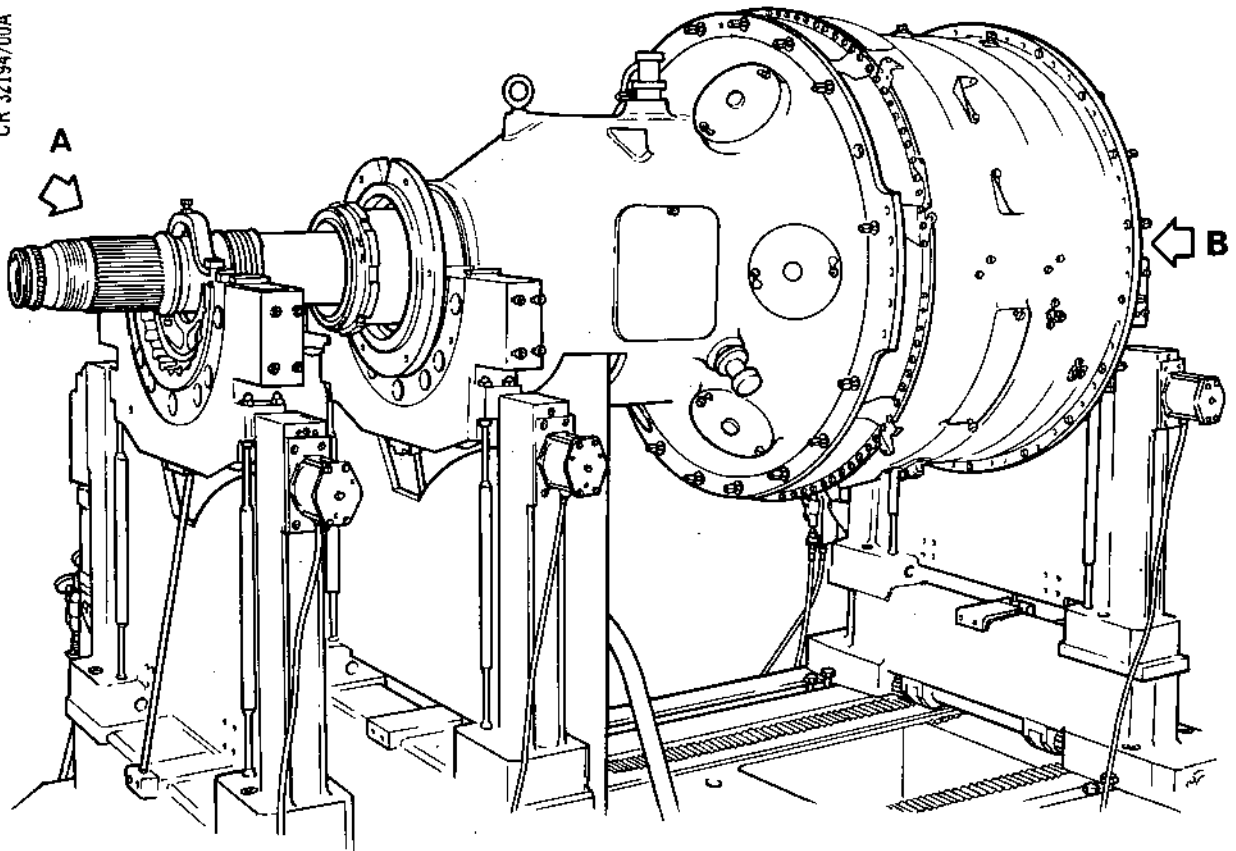


OLYMPUS 593  
MK.610-14-28  
OVERHAUL



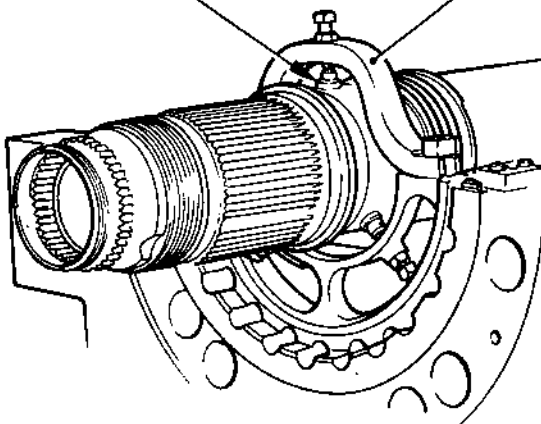
PRINTED IN ENGLAND

CR 32194/00A

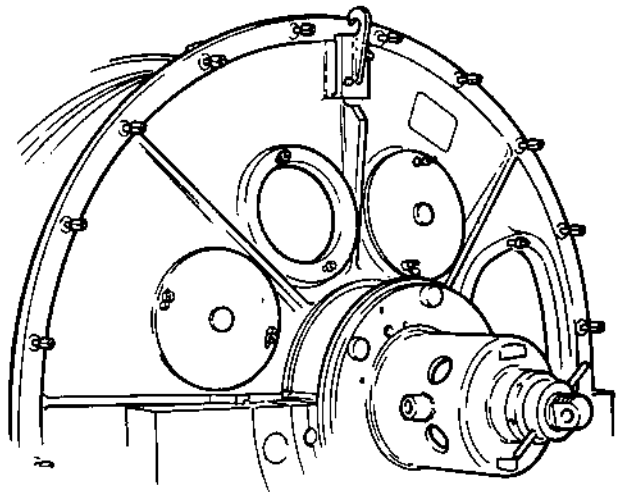


SUPPORT PAD

BRIDGE PIECE



**A**



**B**

Assembling HP Compressor Assembly to Balancing Machine  
Figure 533

SUB-ASSEMBLY

**72-33-00**

Page 598.5  
Apr 1/78

TN22945



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Close and secure the front support locking bars, then screw the lifting fixture (Tool 1055) onto the end of the LP drive shaft and attach a hoist to the fixture. Moving the hoist as necessary, raise the rear end of the assembly, pivoting about the front support, until the assembly is vertical. Release the front support locking bars, then raise the hoist and position it over the mobile stand (Tool 1036). Ensure that the stand clamps are clear, align the lifting eye and attachment nuts of the adapter with the stand cut-aways, then lower the assembly onto the stand. Secure the adapter to the stand with the stand clamps. Release the hoist.

NOTE: When the assembly is required for assembling to the balancing machine, remove it from the mobile stand and assemble it to the machine as detailed in para.(4) onwards.

- (4) Attach a hoist to the lifting fixture, then release the mobile stand clamps and raise the hoist and position the assembly over the front support (Tool 1076). Lower the assembly engaging the lugs of the front bearing support in the front support, then close and secure the front support locking bars. Moving the hoist as necessary, lower the rear end of the assembly, pivoting about the support, and rest the recessed part of the rear bearing adapter on the rear support (Tool 1306), ensuring that the lifting eye and plate of the adapters are uppermost. Release the hoist, then unscrew and remove the lifting fixture from the LP drive shaft.

CAUTION: ENSURE THAT THE LIFTING FIXTURE (TOOL 1055) PLATE PIVOTS AS THE ASSEMBLY IS LOWERED.

- (5) Attach a hoist to the roller of the beam type sling (Tool 1056) then raise the hoist and position the beam over the HP compressor. Ensure that the strop is shackled to the upper hole in the end plate, and the single leg sling (Tool 1394) is shackled to the bracket at the other end of the beam. With the shackles remove from the bottom of the strop and single leg sling, attach the strop/sling to the rear bearing adapter eye, and the front bearing adapter plate with the shackles. Position the beam lifting roller to the beam mid position, or as marked on the beam.

TN25604

SUB-ASSEMBLY

**72-33-00**

Page 598.6

Apr 1/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (6) Raise the hoist and adjust the position of the beam lifting roller (if necessary) to support the assembly in the horizontal position. Position the assembly over the balancing machine with the front bearing adapter at the right-hand side. Position the balancing machine cradles to align with the recessed portion in each adapter and the plain portion of the LP drive shaft, then lock the cradles. Steadily lower the assembly and guide the adapter recesses onto the cradle spacers (Ref. Fig.533). Close and secure the bridge piece, then adjust in on the three support pads until they abut the LP drive shaft. Lock the support pads with their locknuts.
- (7) Align the balancing machine motor and rollers with the belt protruding from the cutaway of the rear bearing adapter, assemble the belt to the motor/rollers and adjust as necessary to operate correctly, then secure the motor/rollers.
- (8) Assemble the belt guard supports (Tool 1988) to the bed of the balancing machine. Position and secure the belt guards and supports so that the belt is centrally placed within the guards. Ensure that the belt does not foul the guard.
- (9) Attach a strip of black adhesive tape around the HP drive shaft, clear of the belt, but within the area of the cutaway in the rear bearing adapter. Mark this adhesive tape with a white spot in line with the datum hole of the drive shaft and use the spot as the datum for balancing.
- (10) Release and remove the split sleeves from the LP drive shaft.
- (11) Prepare the balancing machine for balancing in accordance with the manufacturers instructions, setting up the pick-ups, nodel bar, pick-up wires and scanning head etc.

C. Balance the HP Compressor Rotor (Ref.Fig.534).

- (1) Start the balancing machine and run the assembly up to balancing speed in accordance with the manufacturer's instructions.

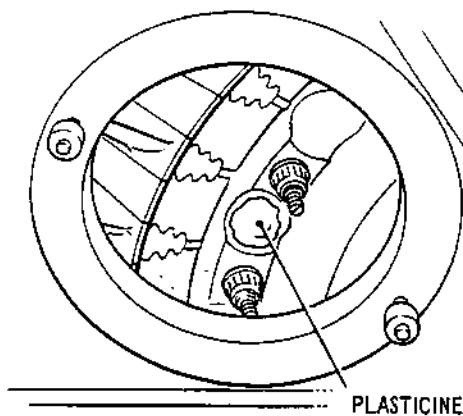
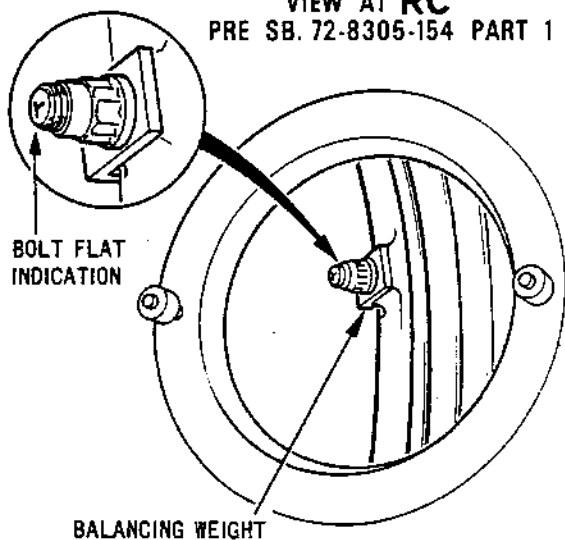
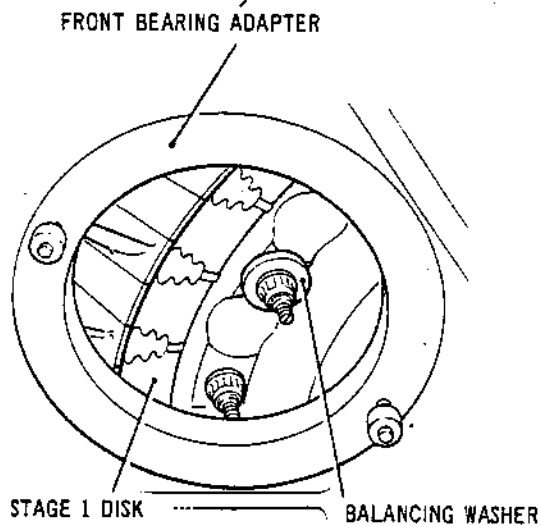
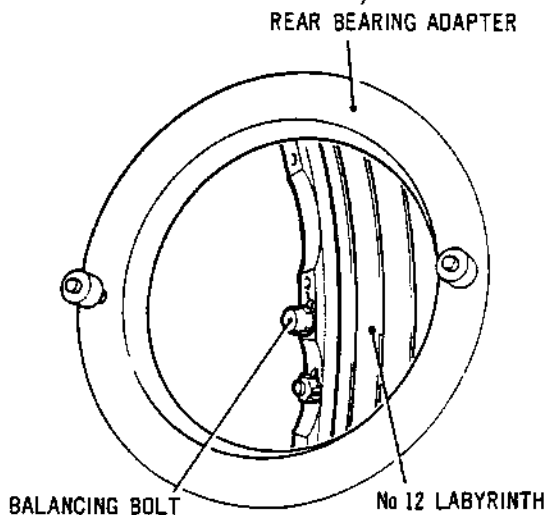
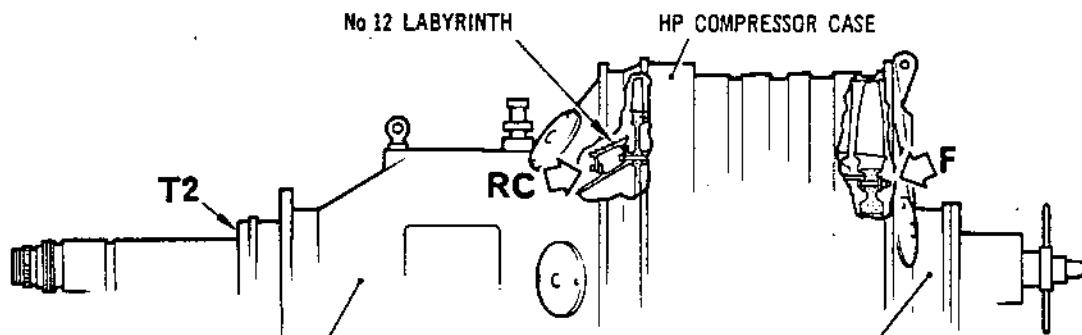


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 32195/00C



Assembling Balancing Washers to HP Compressor Assembly  
Figure 534

SUB-ASSEMBLY  
**72-33-00**  
Page 598.8  
May 1/81

TN22946



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Allow the assembly to rotate long enough to eliminate the effects of differential temperature on the readings obtained, then calibrate the machine and continue to rotate the assembly until the change in the mean average readings of unbalance at F and Rc over a period of three minutes are less than 2 drm in.

NOTE: 1 drm in. = 45 g mm.

- (3) Calibration checks.

(a) The application of 4 drms of plasticine to the HP drive shaft 9 in. (228,6 mm) rearward of Rc should register approximately 9 drm in. at F and 33 drm in. at Rc 180 deg from the reading at F.

(b) Rotating the spacer ring (Tool 414) through 180 deg should not affect balance at Rc by more than 2 drm in.

- (4) Should the initial unbalance readings be within the following limits, at F 220 drm in. and at Rc 250 drm in. continue with the balance of the assembly ref. para.(6).

- (5) With the unbalance readings outside the initial limits, rectify in accordance with the following procedures.

(a) Record the angle and amount of unbalance.

(b) Remove the HP compressor from the balancing machine and reassemble to the pit stand, ref. para.4.D.

(c) Disassemble the HP compressor in accordance with 72-33-00 Disassembly, to the area causing the unbalance.

(d) Inspect for excessive or inadequate clearances between components, burrs or unbalance in individual components. Rectify the defect, then reassemble the HP compressor in accordance with the appropriate text in this chapter.

(e) Remove the assembly from the pit stand and assemble to the surface table, ref. para.3.A.

(f) Carry out swash and concentricity checks, ref. para.3.B.

SUB-ASSEMBLY

**72-33-00**

Page 598.9

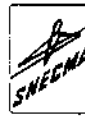
Jun 1/77





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (g) On completion of satisfactory swash and concentricity checks, remove the HP compressor from the surface table and reassemble it to the balancing machine for dynamic balance.
- (6) With the unbalance readings within the initial limits, balance the assembly within 8 drn in. by the following procedures in accordance with the SB. standard to which the compressor is built.
- (a) On engines to Pre SB.72-8305 Part 2 standard, correct the unbalance at F by the addition of balance washers beneath the nuts securing the first stage rotor disk. On engines embodying SB.72-73 remove the plain washers (02/1-170) from the bolts to which balancing washers are fitted. Maximum number of washers that can be used for balancing purposes are, 2 off (02/1-180), 2 off (02/1-185) and 5 off (02/1-190). Torque-tighten nuts, after assembling washers, to 450 lbf in. (9,5 N.m).
- (b) On engines embodying SB.72-8305 Part 2, correct the unbalance at F by applying a temporary correction i.e., plasticine to the disk at the balancing weight diameter (Ref.Fig.534).
- (c) On engines to Pre SB.72-8305 Part 1, correct the unbalance at Rc by the addition of keywashers (02/3-290) and balancing bolts (02/3-250 to 280) to a maximum of 32 off from the range of balancing bolts provided. Apply lubricant 'A' to the threads of the balancing bolts and torque-tighten to 100 lbf in. (11,5 N.m). Lock the bolts with the keywashers.

NOTE: The balancing bolts provided must be new (zero lifed).

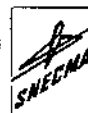
TN21101



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (d) On engines embodying SB.72-8305 Part 1, correct the unbalance at Rc by the addition of balancing weights (O2/3-183 to 187) to the labyrinth rear flange securing bolts. Use a maximum of eight weights in any combination from the weights provided.

CAUTION: ONE BALANCING WEIGHT MUST BE ASSEMBLED AT RC TO FACILITATE VENTING.

- (e) Ensure the nuts have a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m) and torque-tighten to 100 lbf in. (11,5 N.m).

NOTE: Check that the D headed bolts are assembled correctly. The cross of the letter 'T' marked on the tip of the bolt denotes the position of the bolt flat (Ref.Fig.534 detail Rc).

- (7) After balancing the assembly, measure the unbalance at F and T2. Should the unbalance at F exceed 12 drn in. or at T2 6 drn in., reduce the amount of unbalance at F to 6 drn in. by rebalancing the assembly in accordance with para.(6). Recheck the unbalance at F and T2, and, if necessary, rebalance until satisfactory.
- (8) Record the angle and weights of washers, bolts or weights used to achieve balance at F and Rc.

PRINTED IN ENGLAND

TN56235

SUB-ASSEMBLY

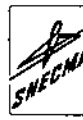
**72-33-00**

Page 598.10A

Sep 1/81



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



Left blank intentionally

SUB-ASSEMBLY

**72-33-00**

Page 598.10B

May 1/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



D. Remove the HP Compressor Assembly from the Balancing Machine.

- (1) Offer the two halves of the split sleeve (Tool 1058) to the LP drive shaft and locate the ends in the HP drive shaft, then secure the two halves together. Release and hinge open the bridge piece of the adjustable support.
- (2) Release and position the belt guards and supports clear of the belt, then release and remove the drive belt from the motor and rollers, and secure the belt clear of the machine to prevent possible fouling. Remove the black adhesive tape from the HP drive shaft.
- (3) Attach a hoist to the roller of the beam type sling (Tool 1056), then raise the hoist and position the beam over the HP compressor (Ref.Fig.529). Ensure that the strop is shackled to the upper hole in the end plate, and the single leg sling (Tool 1394) is shackled to the bracket at the other end of the beam. Attach the strop/sling to the rear bearing adapter eye and the front bearing adapter plate with the shackles. Position the beam lifting roller to the beam mid position, or as marked on the beam.

NOTE: If the availability of the pit stand or its position prevents the HP compressor from being assembled direct (by hoist) into the stand (Ref.para.(4) and (5)), assemble it to the mobile stand as detailed in para.B, (2) and (3), then assemble it to the pit stand.

PRINTED IN ENGLAND

TN25607

SUB-ASSEMBLY

72-33-00

Page 598.11

May 1/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (4) Release and remove the clamp plates from the spacers. Raise the hoist and adjust the position of the beam lifting roller (if necessary) to support the assembly in the horizontal position. Steadily raise the hoist until the HP compressor is clear of the machine, then position it above the pit stand (Tool 1027) (Ref.Fig.529). Position the pit stand arms so that the locating pins/studs are at 90 deg to the vertical, then lower the compressor into the stand so that the front face of the rear bearing adapter flange faces the pins/studs and is level with them. Traverse the hoist and engage the pins/studs into the extensions of the adapter flange, then assemble and fully tighten a washer and nut to each of the studs.
- (5) Release and remove the beam type sling from the adapters, then lower the beam onto a suitable container and release the hoist. Rotate the pit stand arms 90 deg to position the rear bearing adapter lowermost.

NOTE: The HP compressor is now ready for final balance of the compressor and HP turbine assembly Pre SB.72-8305-154 Part 2 (Ref.Para.5, 6, 7 and 8) or on engines embodying SB.72-8305-154 Part 2, the final balance of the compressor with a turbine simulator (Ref.Para.9 and 10).

5. Assemble the HP Turbine Assembly to the HP Compressor Assembly (Pre SB.72-8305-154 Part 2 Standard)

NOTE: The HP turbine assembly will be received from the assembly/balancing section having been balanced as separate items, with the items marked with the alignment datum marks. The turbine wheel will be bladed with the blades correctly locked, and the hub unit (72-51-04/1-300) will have the front labyrinth (72-51-04/1-250) assembled to it, whilst the rear labyrinth will be loose. The labyrinths, hub and blade tips will have protectors assembled.

A. Prepare the HP Compressor Assembly.

- (1) Release and remove the three knurled nuts from the front support (Tool 292) (Ref.Fig.535) releasing the immobilizer (Tool 1339), then push the three studs of the immobilizer to engage the immobilizer in the teeth of the HP drive shaft front retaining nut, turning the rotor (slightly) to achieve engagement. Screw three knurled headed bolts (Tool 1341) into the three tapped holes in the front support to secure the immobilizer in engagement with the retaining nut.

FN25608

SUB-ASSEMBLY

**72-33-00**

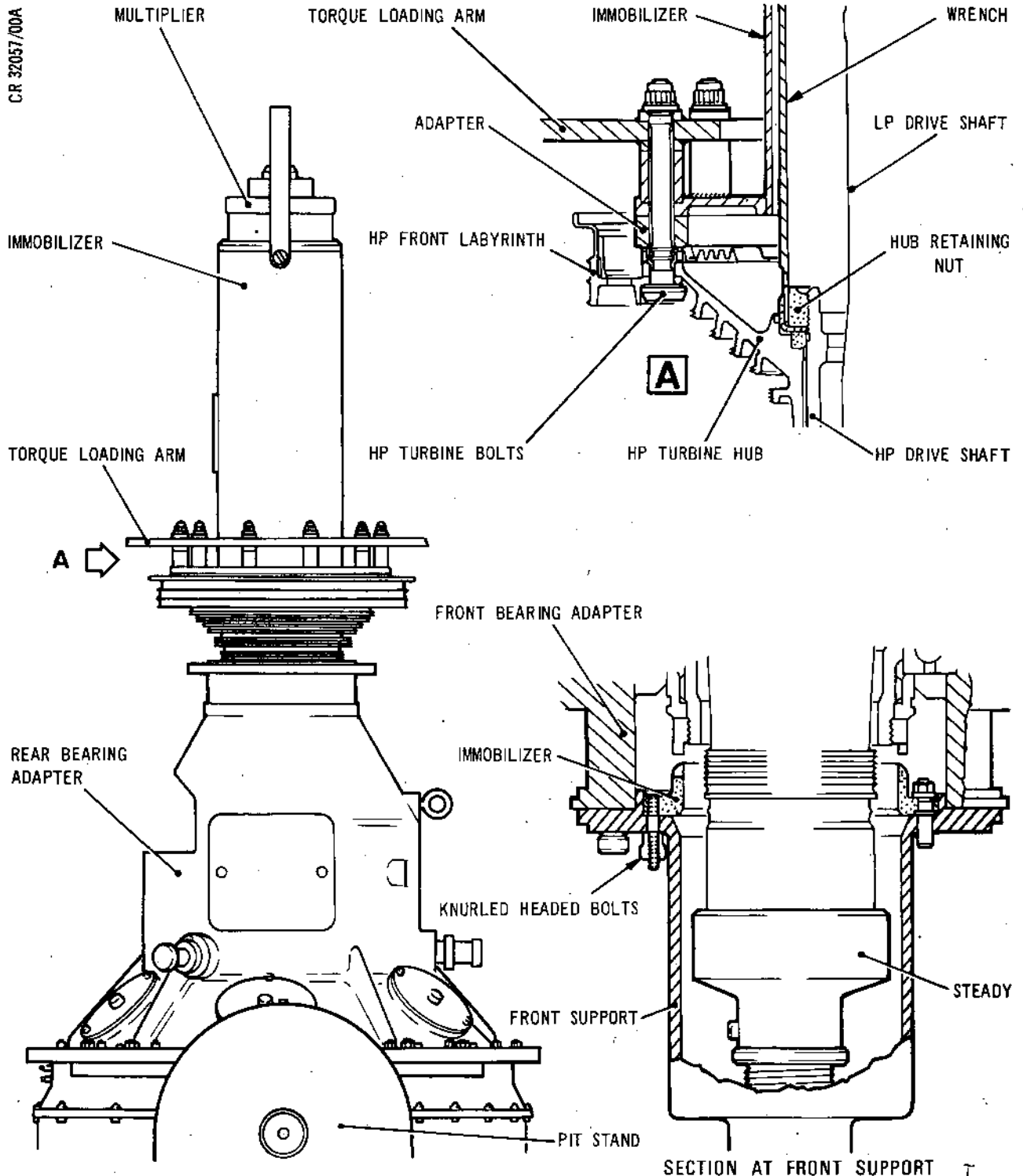
Page 598.12

Apr 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Assembling HP Turbine Hub Assembly and Retaining  
Nut to HP Drive Shaft  
Figure 535

SUB-ASSEMBLY  
**72-33-00**  
Page 598.13  
Apr 1/78

PRINTED IN ENGLAND

TN22947



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Turn the stand arms 180 deg to position the rear bearing adapter uppermost. Release and remove the split sleeves (Tool 1058) from the LP and HP drive shafts. Release and remove the retaining nut from the HP drive shaft using the hand spanner wrench (Tool 410), then withdraw the spacer ring (Tool 414) from the shaft.

B. Assemble the HP Turbine Assembly.

- (1) Slide a slave adjusting washer (72-51-04/1-35) over the LP and HP drive shafts and rest it on the bearing. Slide the HP front labyrinth and hub assembly over the LP drive shaft, align the master serration of the hub and the HP drive shaft, then engage the two. Assemble the keywasher (72-51-04/1-30), plain washer (72-51-04/1-20) and round nut (72-51-04/1-10) to the HP drive shaft (Ref.Fig.535).
- (2) Locate the adapter (Tool 1315) on the dowels of the immobilizer (Tool 1343) then secure the adapter to the immobilizer with five cap screws (of the immobilizer). Locate the multiplier (Tool 1022) on the end of the immobilizer, align the holes of both items, then secure them together with eight cap screws (of the immobilizer).
- (3) Slide the spanner wrench (Tool 1085) over the LP drive shaft and engage it in the hub nut. Attach a hoist to the handle of the immobilizer, then raise the hoist and position and lower it over the LP drive shaft. Turn the drive of the multiplier as necessary to engage its square drive in the spanner, and the adapter serrations on those of the hub. Unscrew and remove the lifting ring from the side of the immobilizer. Ensuring that the painted instructions on the arm are uppermost lower the torque loading arm (Tool 1342) over the immobilizer and locate the clearance holes over the pillars.

TN25609



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

- (4) Unscrew the three knurled headed bolts (Tool 1341) located in the front support, allowing the immobilizer to drop and release the rotor. Turn the rotor to align the datum bolt hole in the labyrinth hub with the cutaway in the rear bearing adapter. Examine the heads of the turbine bolts (72-51-04/1-180) for the position numbers, then insert No.1 bolt through the labyrinth/hub, adapter, immobilizer and arm and secure with a slave nut lubricated with lubricant 'C'. Insert the remaining nine bolts in numerical sequence in a clockwise direction (as viewed from the rear), by turning the rotor to align the holes with the cutaway, and secure with slave nuts.

NOTE: If the protector on the hub prevents the insertion of the turbine bolts, release and remove the protector.

- (5) Turn the stand arms 90 deg to position the HP compressor horizontal in its correct attitude. Looking from the rear of the assembly turn the arm so that it is horizontal, with the painted instruction dealing with the spring balance on the right-hand side. Engage the immobilizer (Tool 1339) in the HP drive shaft front retaining nut and secure with the three knurled headed bolts (Tool 1341). Fully tighten the turbine bolt nuts.
- (6) Attach a spring balance (capable of a load of 200 lb. (90,7 kg)) to a hoist, then attach the balance to the shackle on the right-hand end of the arm. Hook the weights carrier (Tool 1344) to the shackle at the left-hand end of the arm, then add the five weights (Tool 1345) (totalling 170 lb.) to the carrier, ensuring that as the weights are added, an equal load is applied by the hoist, until the total weight of 170 lb. (77,11 kg) on one end of the arm, is equalled by a load of 170 lb. (77,11 kg) on the scale at the other end of the arm. Using a torque-meter wrench and multiplier, torque-tighten the retaining nut between 3000 and 3300 lbf ft (4067,0 and 4474,0 N.m) (reading of 120 to 130 lbf ft (162,7 and 176,2 N.m) on the wrench because of the 25 to 1 multiplier). Remove the wrench, then remove the weights and reduce the load on the spring balance an equivalent amount,

SUB-ASSEMBLY

## 72-33-00

Page 598.15

Dec 31/01

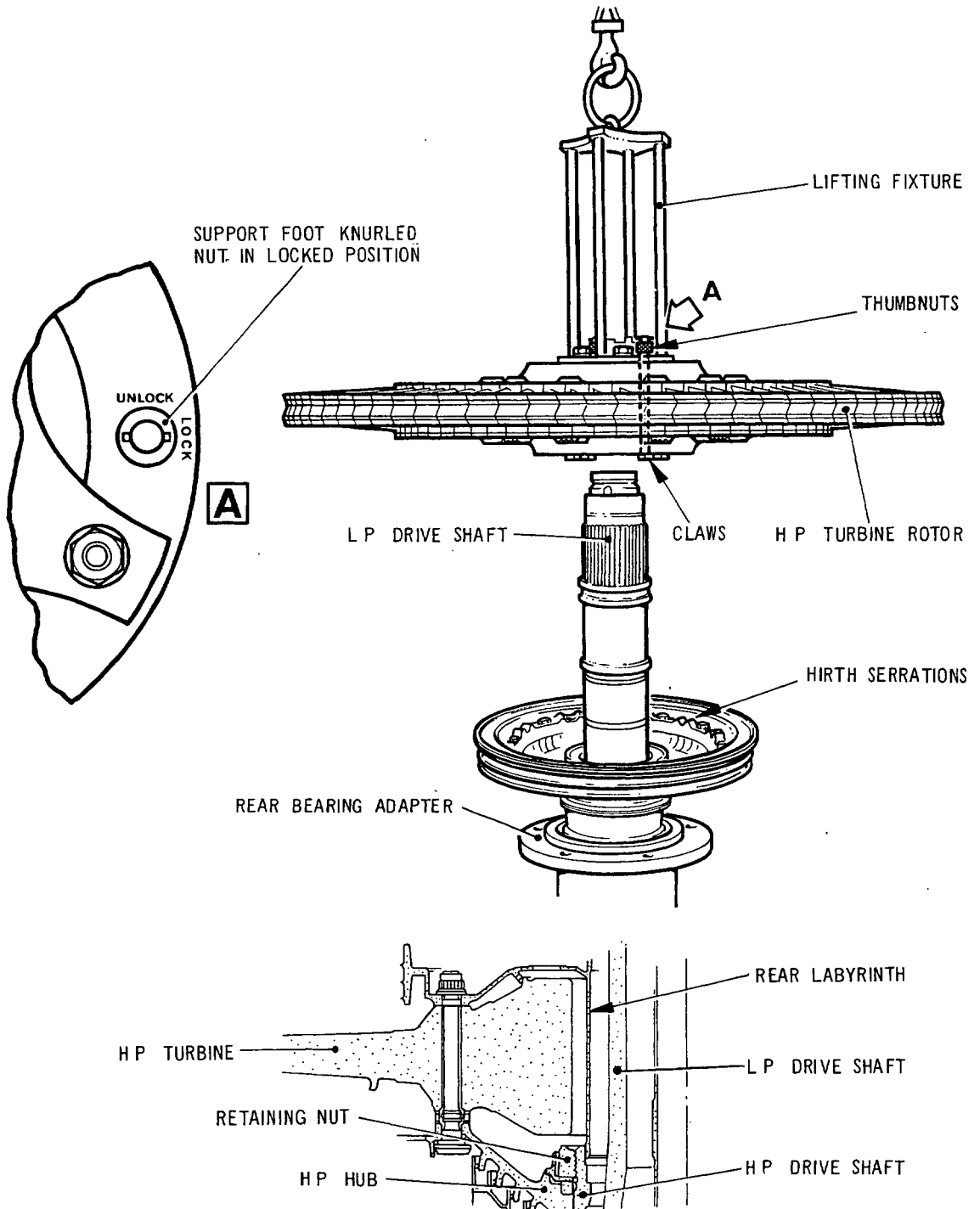




OLYMPUS 593

MK.610-14-28

OVERHAUL



Assembling HP Turbine Wheel Unit to HP Hub  
Figure 536



OLYMPUS 593

MK.610-14-28

OVERHAUL



until all the weights are removed and the spring balance reads zero. Disconnect the spring balance from the arm and hoist, and the weight carrier from the other end of the arm.

NOTE: Do not peen the keywasher.

- (7) Turn the stand arms 90 deg to position the rear bearing adapter uppermost. Release the turbine bolt nuts, then unscrew the three knurled headed bolts (Tool 1341) located in the front support, allowing the immobilizer to drop and release the rotor. Turning the rotor as necessary to align the turbine bolts with the rear bearing adapter cutaway, release and remove the turbine bolts. Remove the torque-loading arm from the immobilizer, then screw the lifting ring into the side of the immobilizer. Attach a hoist to the handle of the immobilizer, then raise the hoist and position and lower the immobilizer onto a suitable container. Release the hoist from the immobilizer. Remove the spanner wrench from the hub nut.
- (8) Assemble the lifting fixture (Tool 1120) to the HP turbine unit (Ref.Fig.536).
  - (a) Ensure that the thumbnuts are loose and the tommy bars of the claws point to the 'UNLOCK' position.
  - (b) Attach a hoist to the lifting ring of the fixture, then position and lower the fixture into the centre of the turbine wheel, ensuring that the rear of the turbine is uppermost as denoted by the blade locking plates. Turn the tommy bars of the claws to the 'LOCK' position, then lock the claws with the thumbnuts.
- (9) Determine the datum hole of the hub by examining the face of the outside circumference in line with a Hirth serration for a datum mark→O. This mark will be in line with a datum mark→O on the rear face of the front labyrinth. Then determine the datum hole in the turbine wheel by examining the outer face of the bolt bosses on the rear (uppermost) face of the wheel for a datum mark→O. Note the position of the datum hole in each item.

SUB-ASSEMBLY

**72-33-00**

Page 598.17

Apr 1/78



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



snecma

- (10) Raise the hoist and position and lower the turbine wheel over the LP drive shaft. Align the datum holes, then lower the wheel onto the hub engaging the Hirth serrations. Release the thumbnuts of the lifting fixture, then turn the tommy bars to the 'UNLOCK' position. Raise the hoist, then position and lower the fixture onto a suitable container and disconnect the hoist.
- (11) Examine the rear labyrinth (72-51-04/1-160) rear face, inboard of the attachment bolt holes, for a datum mark 0 indicating the datum hole. Offer the rear labyrinth over the LP drive shaft, align the datum holes of the labyrinth and turbine wheel, then rest the labyrinth on the wheel. Turn the rotor to align the datum bolt hole in the labyrinth/hub with the cutaway in the rear bearing adapter. Examine the heads of the turbine bolts (72-51-04/1-180) for the position numbers, then insert No.1 bolt through the labyrinth/hub, turbine wheel and rear labyrinth and secure with a self-locking nut (72-51-04/1-120) lubricated with lubricant 'C'. Insert the remaining nine bolts in numerical sequence in a clockwise direction (as viewed from the rear) by turning the rotor to align the bolt holes with the cutaway, and secure the bolts with the nuts, having lubricated them with lubricant 'C'.
- (12) Engage the immobilizer (Tool 1339) in the HP drive shaft front retaining nut and secure by screwing in the three knurled headed bolts. Tighten the turbine wheel nuts in the following sequence 1, 6, 3, 8, 2, 7, 4, 9, 5 and 10 in progressive increments to a final torque between 80 and 90 lbf ft (108,5 and 122,0 N.m).
- (13) Assemble the split sleeve (Tool 393) to the LP drive shaft and HP turbine rear labyrinth. Ensure that the protector (Tool 1062) is assembled to the hub labyrinth, and the protectors (Tool 1061, 1063 and 1126) are assembled to the turbine front and rear labyrinths and the turbine blades.

NOTE: The HP compressor and turbine assembly is now ready for balancing.



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



6. Prepare and Balance the HP Compressor and Turbine Assembly

A. Prepare the Balancing Machine (Avery 72N 56) (Ref.Fig.537).

- (1) Assemble a spacer (Tool 1075) to the left-hand and centre cradles of the machine, and spacer (Tool 1074) to the right-hand cradle. Assemble clamp plates to each cradle to secure the spacers.
- (2) Assemble the adjustable support (Tool 1090) to the spacer in the left-hand cradle so that the hinged bridge piece opens away from the operator. Assemble clamp plates to the spacer to secure the support, then open the bridge piece. Ensure that the three support pads are withdrawn.
- (3) Assemble and (temporarily) secure two brackets (Tool 1291) to the bed of the machine in between the left-hand and centre cradles. Position the bottom half of the turbine guard (Tool 1303) on the two brackets, then locate the bracket/guard securing studs in the slots in the guard brackets and secure with washers and nuts.

B. Assemble the HP Compressor and Turbine Assembly to the Balancing Machine.

NOTE: If the availability of the balancing machine entails a delay before the HP compressor is balanced, but the pit stand is required for other use, the HP compressor can be assembled to the support stands (Ref.para.(3)) or mobile stand (Ref.para.(4)).

- (1) Rotate the pit stand arms 90 deg with the lifting eyes on the front and rear adapters uppermost. Attach a hoist to the roller of the beam type sling (Tool 1056), then raise the hoist and position the beam over the HP compressor assembly (Ref.Fig.529). Ensure that the strop is shackled to the upper hole in the end plate, and the single leg sling (Tool 1394) is shackled to the bracket at the other end of the beam. Attach the strop/sling to the rear bearing adapter eye and the front bearing adapter plate with the shackles. Position the beam lifting roller towards the turbine wheel end of the beam, or as marked on the beam.

PRINTED IN ENGLAND

TN10979

SUB-ASSEMBLY

**72-33-00**

Page 598.19

Apr 1/78



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (2) Raise the hoist to tension the strop/sling, then unscrew and remove the nuts and washers securing the adapter to the pit stand arms. Adjust the position of the beam lifting roller to support the assembly in the horizontal position. Traverse the hoist to disengage the adapter from the locating pins of the arms, then raise the hoist taking care to guide the assembly out of the stand.

NOTE: If the HP compressor is to be assembled direct to the balancing machine proceed as detailed in para.(7) onwards. If, however, the HP compressor is not to be assembled to the machine direct, assemble the HP compressor to the support stands or mobile stand (Ref. para. (3) and (4)).

- (3) Position the assembly over the front support (Tool 1076) and rear support (Tool 1306) (Ref. Fig. 530), then lower the assembly engaging the front bearing support lugs in the front support and the recessed part of the rear bearing adapter in the rear support. If the assembly has to remain on the support stands for a period, or has to be assembled to the mobile stand, release the beam type sling and lower it to the floor.

NOTE: When the assembly is required for assembling to the balancing machine, remove it from the supports and assemble it to the machine as detailed in para. (6) onwards.

NOTE: If the assembly requires transporting in the mobile stand, assemble it to the stand as detailed in para. (4).

- (4) Close and secure the front support locking bars, then screw the lifting fixture (Tool 1055) onto the end of the LP drive shaft and attach a hoist to the fixture. Moving the hoist as necessary, raise the rear end of the assembly, pivoting about the front support, until the assembly is vertical. Release the front support locking bars, then raise the hoist and position it over the mobile stand (Tool 1036). Ensure that the stand clamps are clear, align the lifting eye and attachment nuts of the adapter with the stand cut-aways, then lower the assembly onto the stand. Secure the adapter to the stand with the stand clamps. Release the hoist.

NOTE: When the assembly is required for assembling to the balancing machine, remove it from the mobile stand and assemble it to the machine as detailed in para. (5) onwards.

TN25612

SUB-ASSEMBLY  
**72-33-00**

Page 598.20  
Apr 1/78



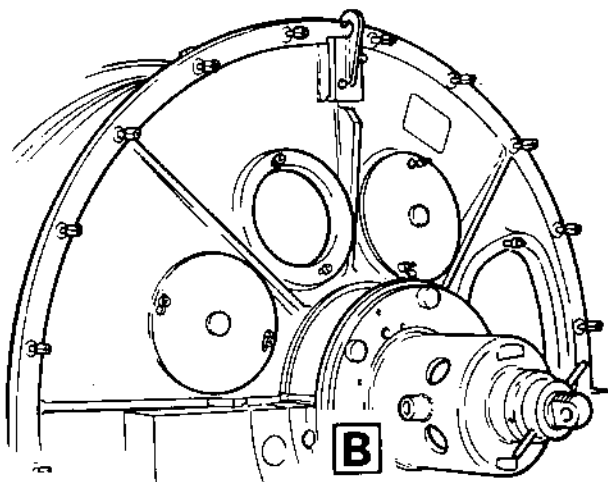
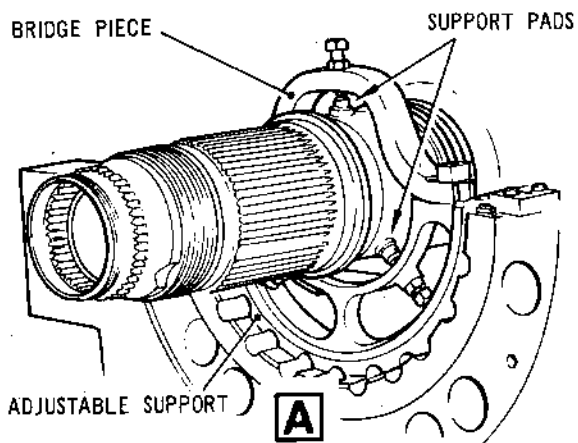
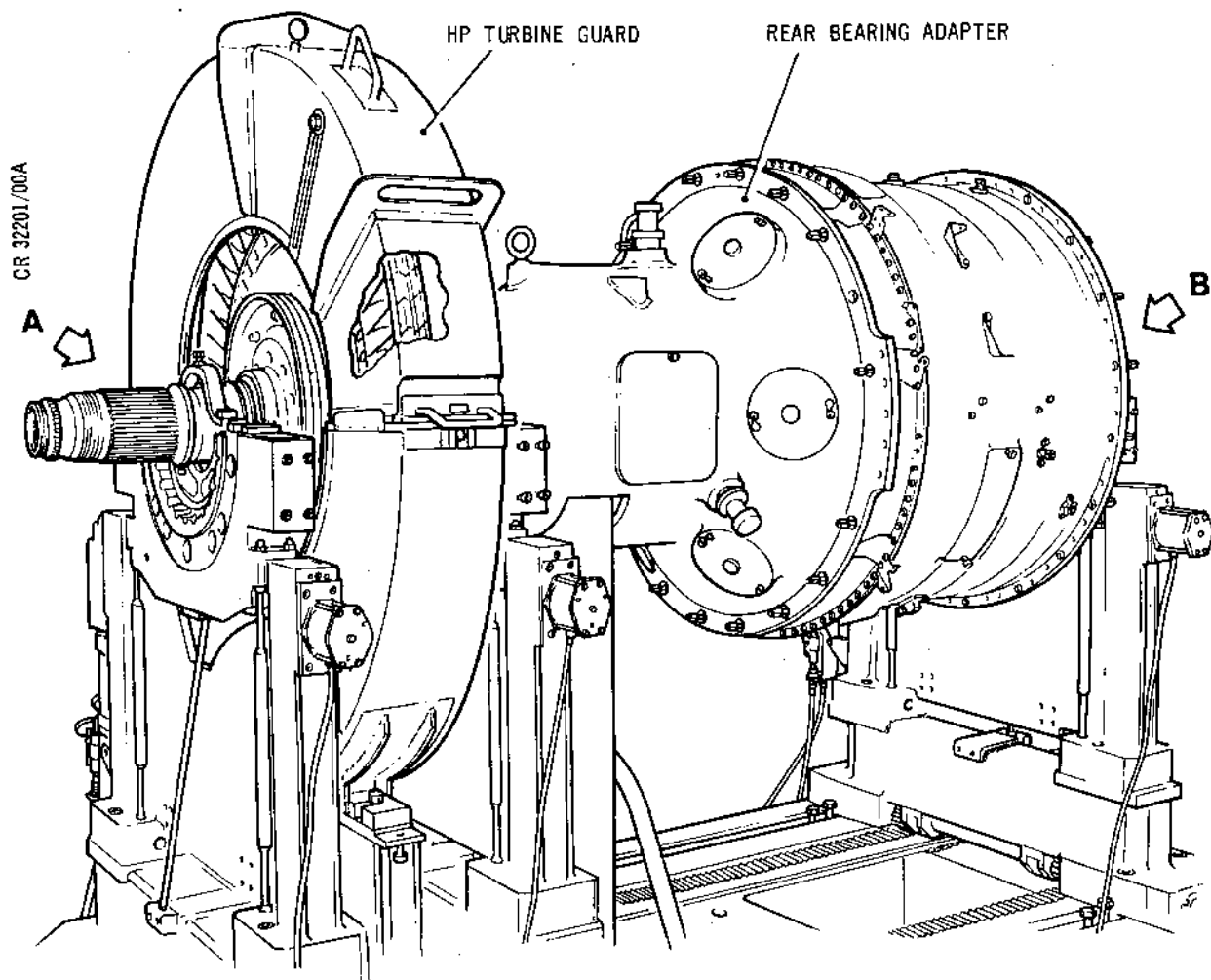
OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND



Assembling HP Compressor and Turbine Assembly to Balancing Machine  
Figure 537

SUB-ASSEMBLY  
**72-33-00**

Page 598.21

Apr 1/78

TN42653



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (5) Attach a hoist to the lifting fixture, then release the mobile stand clamps and raise the hoist and position the assembly over the front support (Tool 1076). Lower the assembly engaging the lugs of the front bearing support in the front support, then close and secure the front support locking bars. Moving the hoist as necessary, lower the rear end of the assembly, pivoting about the support, and rest the recessed part of the rear bearing adapter on the rear support (Tool 1306), ensuring that the lifting eye and plate of the adapters are uppermost. Release the hoist, then unscrew and remove the lifting fixture from the LP drive shaft.

CAUTION: ENSURE THAT THE LIFTING FIXTURE (TOOL 1055) PLATE PIVOTS AS THE ASSEMBLY IS LOWERED.

- (6) Attach a hoist to the roller of the beam type sling (Tool 1056), then raise the hoist and position the beam over the HP compressor. Ensure that the strop is shackled to the upper hole in the end plate, and the single leg sling (Tool 1394) is shackled to the bracket at the other end of the beam. With the shackles removed from the bottom of the strop and single leg sling, attach the strop/sling to the rear bearing adapter eye, and the front bearing adapter plate with the shackles. Position the beam lifting roller towards the turbine wheel end of the beam, or as marked on the beam. Raise the hoist and adjust the position of the beam lifting roller (if necessary) to support the assembly in the horizontal position.
- (7) Position the assembly over the balancing machine with the front bearing adapter at the right-hand side. Position the balancing machine cradles to align with the recessed portion in each adapter and the plain portion of the LP drive shaft, then lock the cradles. Release the guard brackets, then position the guard and brackets to align with the turbine wheel. Secure the brackets and guard. Release and remove the protectors from the turbine wheel, hub and labyrinths. Steadily lower the assembly and guide the adapter recesses onto the cradle spacers (Ref.Fig.537), then assemble clamp plates to each spacer to secure the adapters. Close and secure the bridge piece, then adjust in on the three support pads until they abut the LP drive shaft. Lock the support pads with their locknuts.

TN10982

SUB-ASSEMBLY

72-33-00

Page 598.22

Apr 1/78



OLYMPUS 598

MK.610-14-28

OVERHAUL



- (8) Align the balancing machine motor and rollers with the belt protruding from the cutaway of the rear bearing adapter, assemble the belt to the motor/rollers and adjust as necessary to operate correctly, then secure the motor/rollers.
- (9) Assemble the belt guard supports (Tool 1988) to the bed of the balancing machine. Position and secure the belt guards and supports so that the belt is centrally placed within the guards. Ensure that the belt does not foul the guard.
- (10) Attach a strip of black adhesive tape around the HP drive shaft, clear of the belt, but within the area of the cutaway in the rear bearing adapter. Mark the adhesive tape with a white spot in line with the datum hole of the drive shaft (chalked on the shaft) and use the spot as the datum for balancing.
- (11) Assemble a tie bar (Tool 1292) to the front face of the left-hand and centre cradle of the balancing machine, and secure with four bolts or Allen screws, then secure a tie bar (Tool 1293) to the rear face of the left-hand and centre cradle.
- (12) Release and remove the split sleeves from the LP drive shaft and the beam type sling from the adapters. Lower the beam onto a suitable container and release the hoist.

NOTE: It is recommended that the beam type sling is painted to indicate the position the lifting beam roller should be in with the HP turbine assembled.

- (13) Prepare the balancing machine for balancing in accordance with the manufacturers instructions, setting up the pick-ups, nodal bar, pick-up wires and scanning head etc.

C. Balance the HP compressor Rotor and Turbine Assembly (Ref.Fig.538).

- (1) Start the balancing machine and run the assembly up to balancing speed in accordance with the manufacturers instructions.

SUB-ASSEMBLY

**72-33-00**

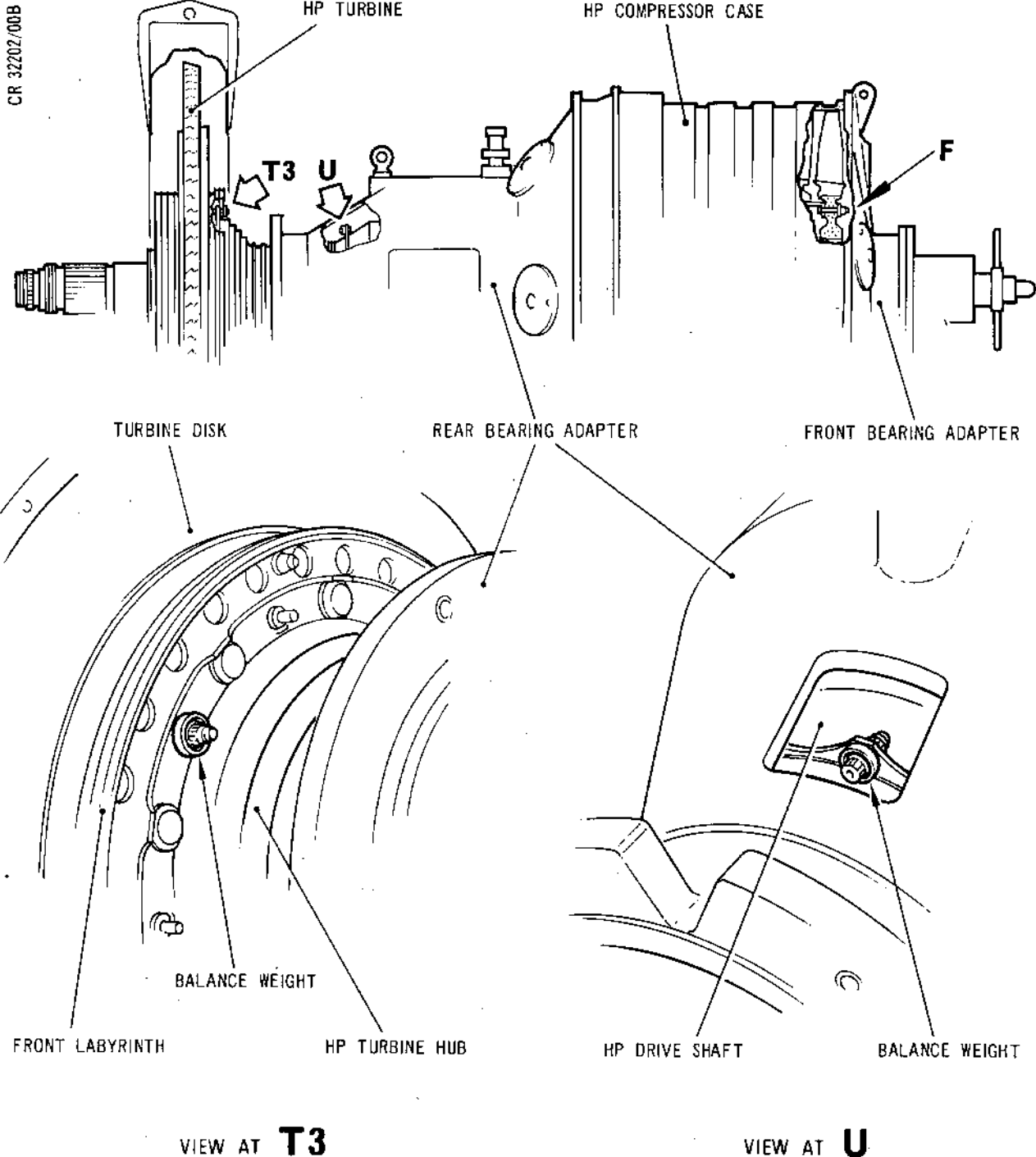
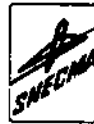
Page 598.23

Apr 1/78





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



TN42654

Assembling Balancing Washers to HP Compressor and Turbine Assembly  
Figure 538

SUB-ASSEMBLY  
**72-33-00**  
Page 598.24  
Apr 1/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Allow the assembly to rotate long enough to eliminate the effects of differential temperature on the readings obtained, then calibrate the machine and continue to rotate the assembly until the change in the mean average readings of unbalance at F and T3 over a period of three minutes are less than 2 drin in.

NOTE: 1 drin in. = 45 g mm.

- (3) Record the change of unbalance at F and the initial unbalance at T3.
- (4) The change of unbalance at F must not exceed 20 drin in. from that recorded during the balance of the HP compressor rotor (Ref. para. 4.C.), and the maximum initial unbalance at T3 must not exceed 190 drin in. Should both readings be within the limits quoted, continue to balance the assembly (Ref. para. (6)). Should the readings be outside the limits, rectify as detailed in para. (5).
- (5) Readings outside the limits.
- (a) Record the angle and amount of unbalance at F and T3.

- (b) Carry out a swash check on the HP turbine wheel (Ref. para. 7) and determine if the swash TIR is in excess of 0.005 in. (0,127 mm).

NOTE: Swash in excess of 0.005 in. (0,127 mm) indicates malalignment of items, and the angular position of excess unbalance and swash should correspond.

- (c) Rectify excess unbalance and swash as follows:

- (i) Transfer the HP compressor and turbine assembly to the pit stand (Ref. para. 7.D.).

- (ii) Remove the HP turbine assembly from the HP drive shaft (Ref. para. 8) and examine all items, including the rear bearing inner track, for damage or loose particles. Pay particular attention to the Hirth serrations.

- (iii) If no apparent cause of malalignment is evident, the HP turbine bladed disk, labyrinth and hub must be checked for balance, swash and dimensions as detailed in 72-51-03 Assembly.

SUB-ASSEMBLY

**72-33-00**

Page 598.25

Apr 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (d) On completion of checks and /or rectification, re-assemble the HP turbine assembly to the HP compressor (Ref.para.5.), then re-balance the complete assembly (Ref.para.6.).

(6) Readings within the limits.

- (a) The following procedures are those required to balance the assembly at F and T3 to within 6 drn in.

NOTE: Apply lubricant 'A' to bolt threads before assembly of nuts.

- (b) Reduce unbalance by adding at T3 balancing weights (72-51-04/1-200) maximum of 8 off (72-51-04/1-205, 210, 215) maximum of 4 off each and (72-51-04/1-220) maximum of 8 off, retained by self-locking nuts (72-51-04/1-190) maximum of 10 off. Ensure the nuts have a minimum locking (run-down) torque of 6.5 lbf in. (0,73 N.m) torque-tighten to 210 lbf in. (24 N.m).

NOTE: Self-locking nuts are not to be fitted without balancing weights.

- (c) Reduce unbalance by adding at U balancing weights (02/3-140) use a maximum of 3 off each for all the weights provided and retain each weight with self-locking nuts (02/3-130) and bolts (02/3-170) with lubricant 'A' applied. Use a maximum of 5 off each. Ensure the nuts have a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m) torque-tighten to 100 lbf in. (11,5 N.m).

- (d) Record the angular position and weights used at T3 and U.

D. Remove the HP Compressor and Turbine Assembly from the Balancing Machine.

- (1) Remove the top half of the guard (if fitted) from around the turbine disk, then assemble the split sleeves (Tool 393) to the LP drive shaft and HP turbine rear labyrinth. Release and hinge open the bridge piece of the adjustable support.

SUB-ASSEMBLY

72-33-00

Page 598.26

Dec 31/01



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (2) Release and position the belt guards and supports clear of the belt, then release and remove the drive belt from the motor and rollers, and secure the belt clear of the machine to prevent possible fouling. Remove the black adhesive tape from the HP drive shaft.
- (3) Attach a hoist to the roller of the beam type sling (Tool 1056) (Ref.Fig.529), then raise the hoist and position the beam over the HP compressor. Ensure that the strop is shackled to the upper hole in the end plate, and the single leg sling (Tool 1394) is shackled to the bracket at the other end of the beam. Attach the strop/sling to the rear bearing adapter eye and the front bearing adapter plate with the shackles. Position the beam lifting roller towards the turbine wheel end of the beam, or as marked on the beam.
- (4) Release and remove the clamp plates from the spacers. Raise the hoist and adjust the position of the beam lifting roller (if necessary) to support the assembly in the horizontal position. Steadily raise the hoist until the HP compressor is clear of the machine.

NOTE: If the availability of the pit stand or its position prevents the HP compressor from being assembled direct by hoist into the stand (Ref.para.(5) and (6)), assemble it to the support stands or mobile stand as detailed in para.B, (3) and (4), then when possible, assemble it to the pit stand (Ref.para.B.(5) and (6) and D.(5) and (6)).

NOTE: If initial unbalance of the HP turbine is outside acceptable limits and swash checks are required, assemble the HP compressor to the surface table and carry out swash checks as detailed in para.7.

- (5) Position the HP compressor and turbine assembly above the pit stand (Tool 1027). Position the pit stand arms so that the locating pins/studs are at 90 deg to the vertical, then lower the compressor into the stand so that the front face of the rear bearing adapter flange faces the pins/studs and is level with them. Traverse the hoist and engage the pins/studs into the extensions of the adapter flange, then assembly and fully tighten a washer and nut to each of the studs.

SUB-ASSEMBLY

**72-33-00**

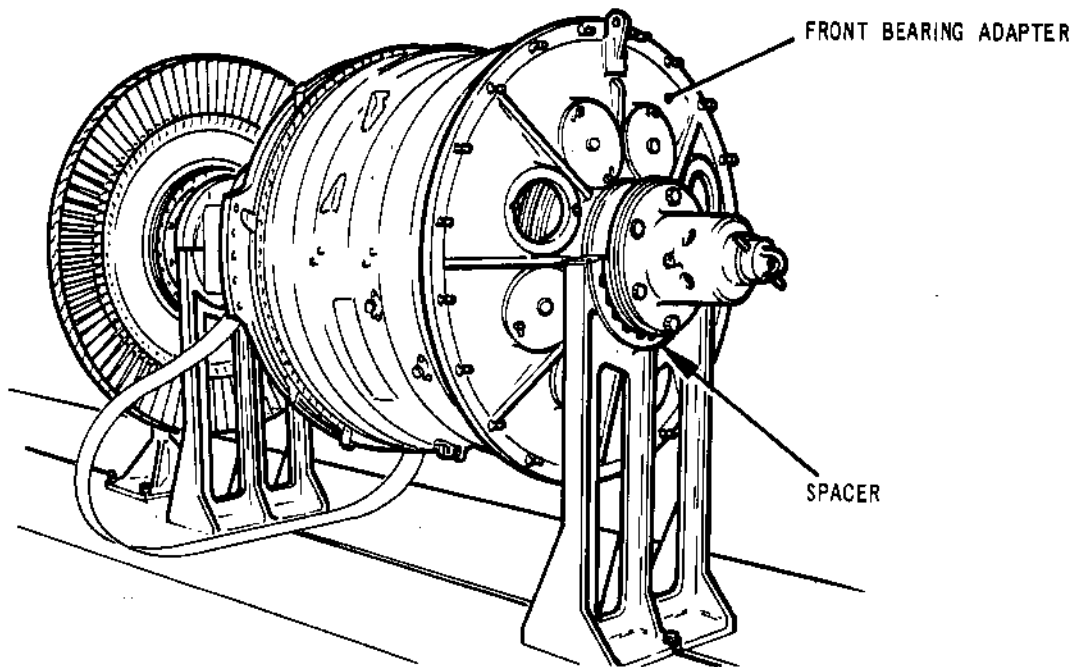
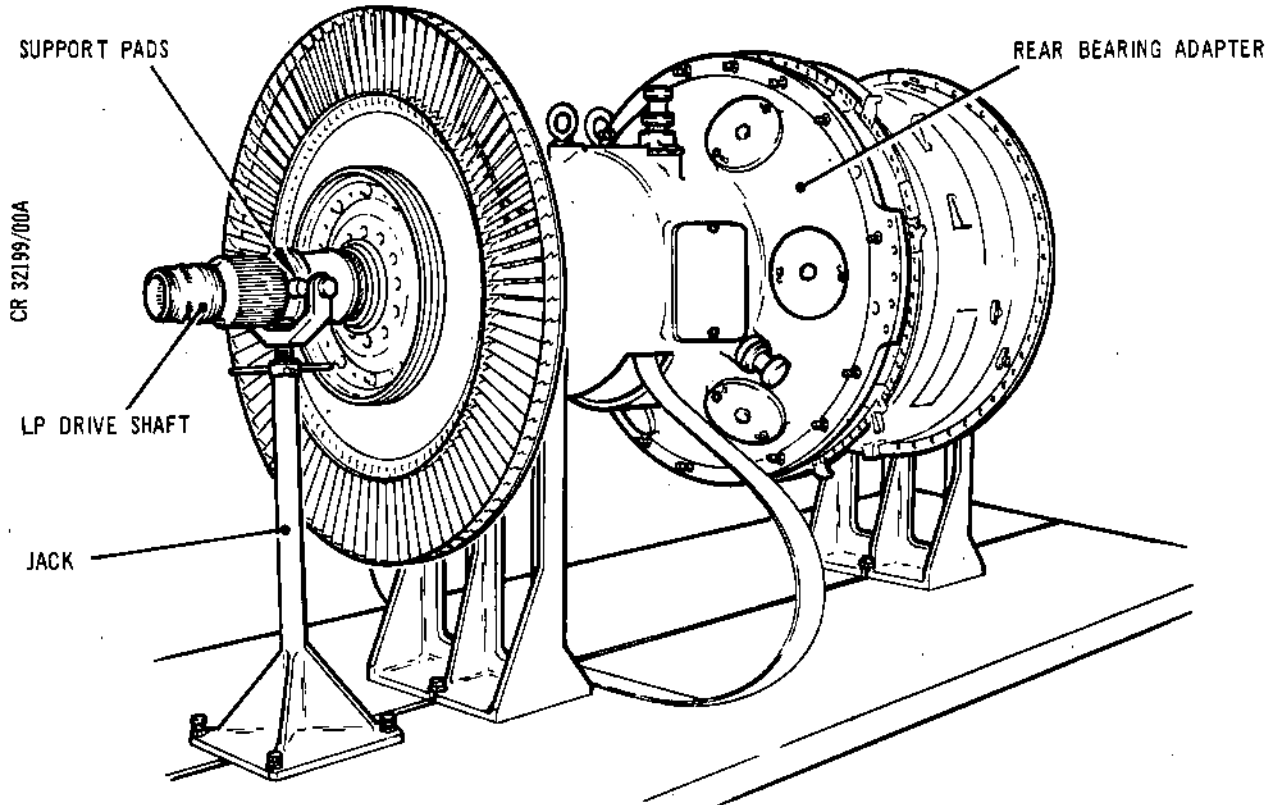
Page 598.27

Apr 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Assembling HP Compressor and Turbine Assembly to Surface Table  
Figure 539

SUB-ASSEMBLY

**72-33-00**

Page 598.28

Apr 1/78

TN42650



OLYMPUS 598

MK.610-14-28

OVERHAUL



- (6) Release and remove the beam type sling from the adapters, then lower the beam onto a suitable container and release the hoist. Rotate the pit stand arms 90 deg to position the rear bearing adapter uppermost. Assemble the protectors (Tool 1061, 1062, 1063 and 1126) to the turbine wheel, hub and labyrinths.

#### 7. Prepare and Check the Swash of the HP Turbine Assembly

NOTE: Swash checks on the HP turbine are only required to help assess the cause of unbalance outside acceptable limits (Ref.para.6.C.(5)).

- A. Prepare the Surface Table Equipment for Checking the Swash (Ref.Fig.539).

NOTE: If the equipment was left on the surface table following the concentricity and swash check on the HP compressor (Ref.para.3.A.), para.(1) to (3) will not be required.

- (1) Position two supports (Tool 1073) on the surface table.
- (2) Assemble a spacer (Tool 1074) to one support, and spacer (Tool 1075) to the remaining support. Assemble clamp plates to each support to secure the spacers.

NOTE: If the availability of equipment entails using the spacers used for balancing, remove the HP compressor from the machine and place on the support stands (Ref.para.6.D.), then release and remove the spacers from the balancing machine and assemble the spacers to the surface table supports.

- (3) Position the jack (Tool 1059) on the surface table.

- B. Assemble the HP Compressor and Turbine Assembly to the Surface Table.

- (1) Position the HP compressor and turbine assembly over the surface table.
- (2) Ensure that the supports on the surface table are aligned with the recessed portion in each adapter, and that the supports are secured to the surface table.
- (3) With the front bearing adapter located over the spacer (Tool 1074), lower the assembly and guide the adapter recesses onto the spacers, then assemble clamp plates to each spacer to secure the adapters.

SUB-ASSEMBLY

**72-33-00**

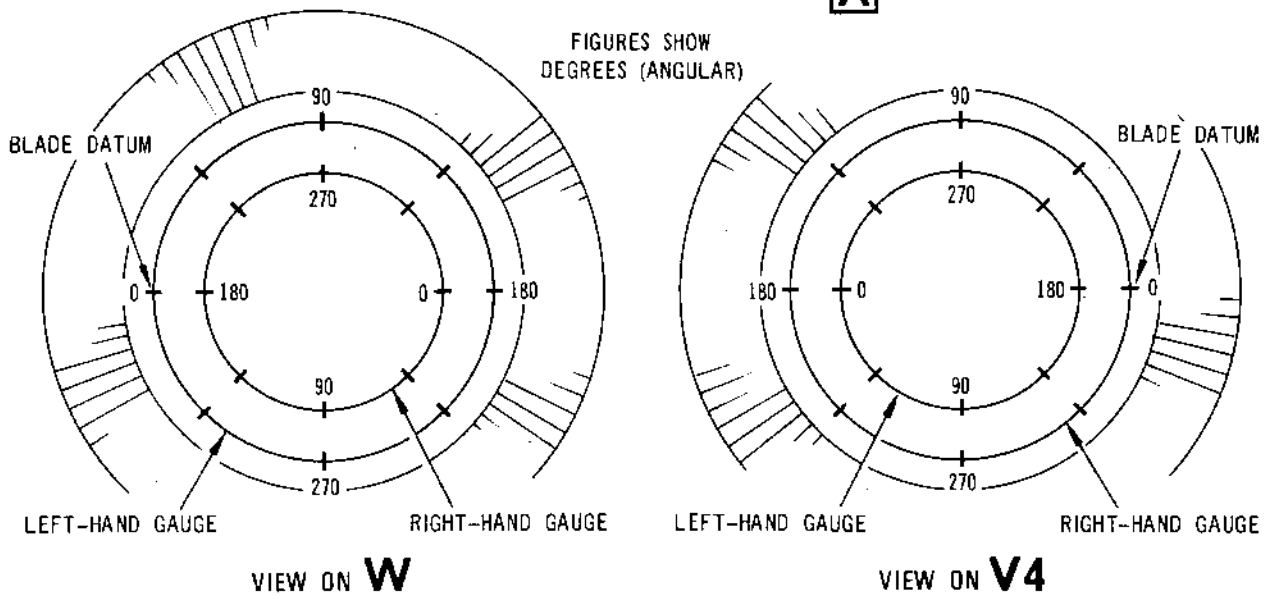
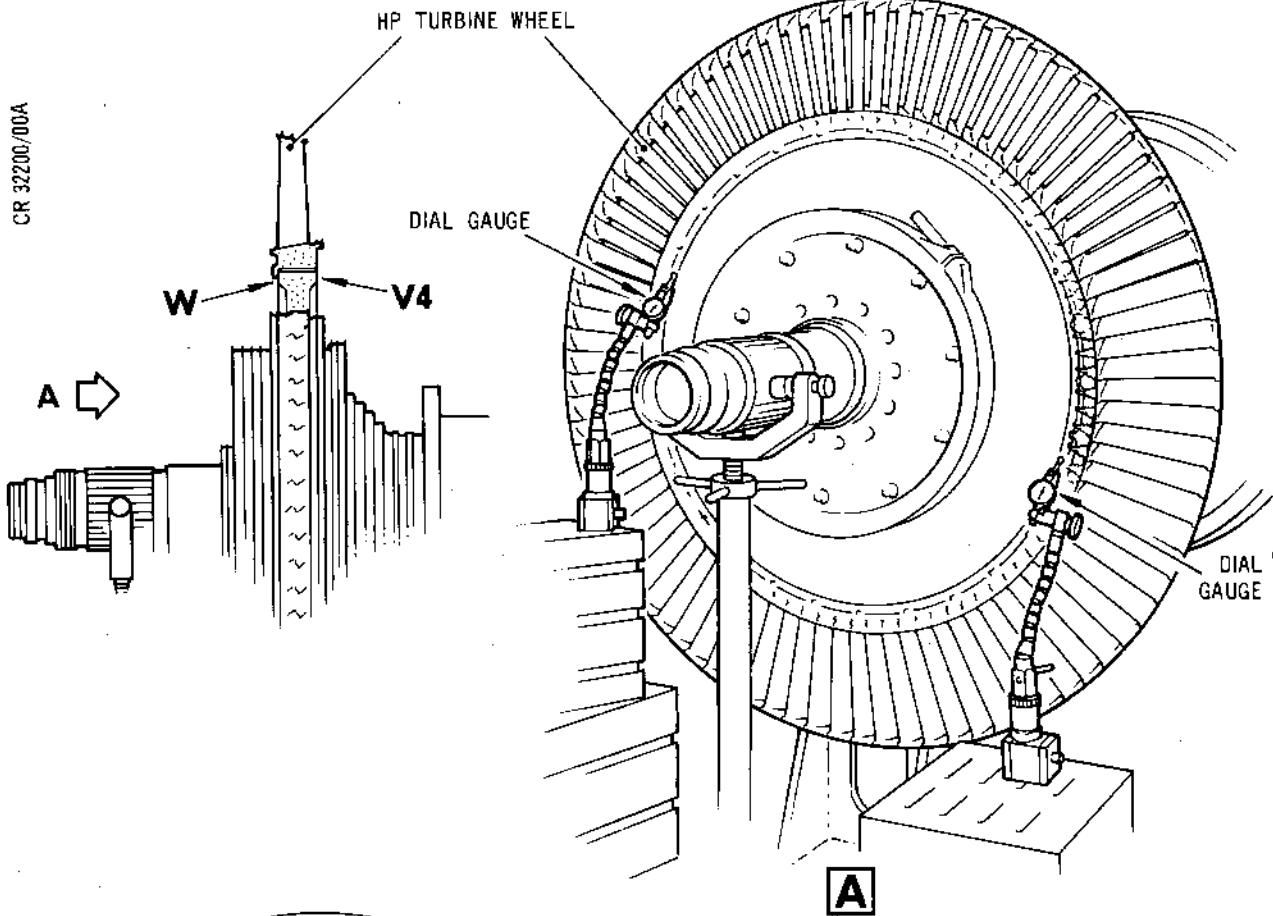
Page 598.29

Apr 1/78



OLYMPUS 598

MK.610-14-28  
OVERHAUL



Checking Swash of HP Turbine Assembly  
Figure 540

SUB-ASSEMBLY  
**72-33-00**  
Page 598.30  
Apr 1/78

TN42652



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (4) Release and remove the beam type sling from the adapters, then lower the beam onto a suitable container and release the hoist.
- (5) Position the jack (Tool 1059) under the LP drive shaft, at a plain portion of the shaft, then adjust in on the three support pads until they abut the shaft. Release and remove the split sleeves (Tool 393) from the LP drive shaft and turbine labyrinth.
- C. Check the Swash of the HP Turbine Assembly (Ref.Fig.540).
- (1) The checks on both the front and rear face entail the use of two dial gauges. Readings on each face are taken simultaneously at the left and right-hand sides of the disk.
- NOTE: Before carrying out swash checks it is recommended that both front and rear faces of the turbine disk are chalked up as in Fig.540, using the disk datum as zero.
- (2) Swash at rear face, position W.
- (a) With both dial gauges set to zero, and each positioned at its own disk zero rotate the disk counter-clockwise, looking from the rear, and record both dial readings at each of the eight angular positions. Ensure that on returning to the start position both gauges again read zero.
- (b) For each gauge add the two largest readings to record the maximum T.I.R. and angle.
- (c) Total swash for rear face is recorded as the mean average of T.I.R. readings from left and right-hand gauges and at the mean average of both angles.
- (3) Swash at front face, position V4, repeat the procedure described for position W.

PRINTED IN ENGLAND

TN10980

SUB-ASSEMBLY

**72-33-00**

Page 598.31

Apr 1/78





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



D. Remove the HP Compressor and Turbine Assembly from the Surface Table.

- (1) Assemble the split sleeves (Tool 393) to the LP drive shaft and turbine labyrinth, then release the three support pads of the jack (Tool 1059) from the LP drive shaft.
- (2) Attach a hoist to the roller of the beam type sling (Tool 1056), then raise the hoist and position the beam over the HP compressor (Ref.Fig.530). Ensure that the strop is shackled to the upper hole in the end plate, and the single leg sling (Tool 1394) is shackled to the bracket at the other end of the beam. Remove the shackles from the bottom of the strop and single leg sling, then attach the strop/sling to the rear bearing adapter eye, and the front bearing adapter plate with the shackles. Position the beam lifting roller to the beam mid position, or as marked on the beam.
- (3) Raise the hoist and adjust the position of the beam lifting roller (if necessary) to support the assembly in the horizontal position. Position the HP compressor and turbine assembly over the pit stand (Tool 1027), then attach the assembly to the stand as detailed in para.6.D.(5) and (6).

8. Remove the HP Turbine Assembly from the HP Compressor Assembly

A. Remove the Rear Labyrinth from the HP Turbine Disk (Ref. Fig.541).

- (1) Release and remove the protector (Tool 1062) from the hub labyrinth then unscrew and remove the 10 nuts securing the labyrinth to the turbine disk and lower the bolts onto the rear bearing adapter flange. Release and remove the split steady (Tool 393) from the labyrinth and the LP drive shaft.
- (2) Ensure that the tommy bars of the mechanical puller (Tool 1247) are turned to 'FREE' and the thrust bolts are unscrewed.
- (3) Offer the puller over the LP drive shaft and guide the claws through the air holes in the labyrinth. Turn the claw tommy bars to 'LOCK', then screw in on the three thrust bolts until they contact the disk. Screw the thrust bolts in, in equal increments, until the labyrinth is released.

TN10981



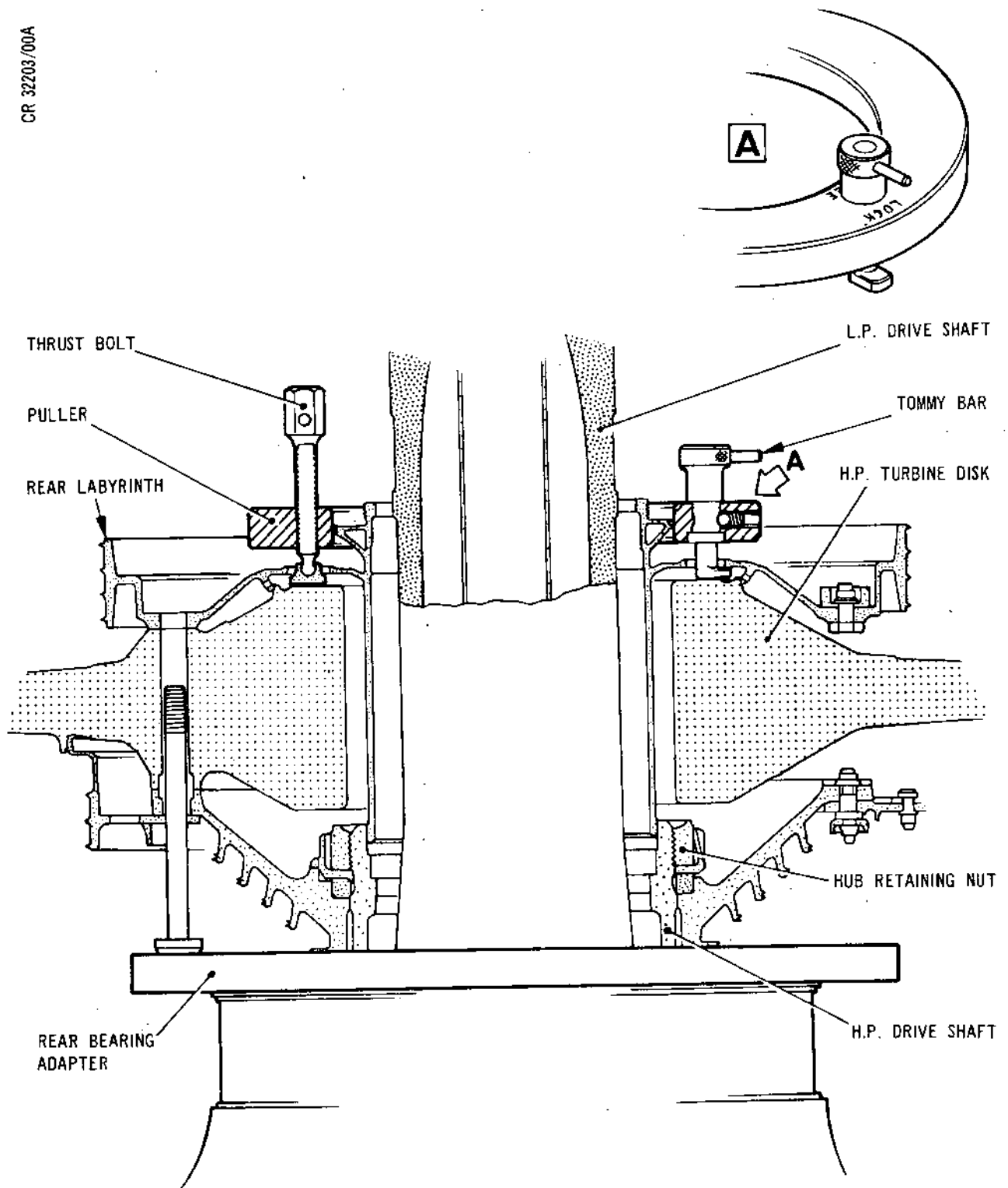
OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 32203/00A

PRINTED IN ENGLAND

TN42655



Removing Rear Labyrinth from HP Turbine Disk  
Figure 541



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (4) Withdraw the labyrinth/puller over the LP drive shaft and place them on a clean flat surface. Turn the claw tommy bars to 'FREE' and remove the puller from the labyrinth.

B. Remove the HP Turbine Disk from the Hub/Labyrinth Unit (Ref. Fig.536 and 542).

- (1) Ensure that the lifting fixture (Tool 1120) thumbnuts are undone, that the claws are pushed out and the claw tommy bars point to 'UNLOCK'.
- (2) Attach a hoist to the lifting fixture, then lower the fixture over the LP drive shaft and guide the bottom locating ring into the centre hole of the disk, until the top locating ring abuts the disk.
- (3) Turn the tommy bars to 'LOCK' adjusting their position as required to locate them under the disk, then tighten the thumbnuts to lock the claws.
- (4) Steadily raise the turbine disk until clear of the LP drive shaft, then position and lower it onto a suitable pallet (Ref. para.5) or onto its mobile stand (Tool 1111) (Ref.Fig.542) as follows.
  - (a) Ensure that the mandrel (Tool 139) is assembled to a bearing of the mobile stand, with the mandrel secured in the vertical position and the Hirth serrations of the mandrel disk uppermost. Screw the lifting fixture (Tool 1113) into the (top) end of the mandrel.
  - (b) Position the disk over the mandrel, then lower the hoist and guide the disk over the mandrel and engage the mandrel studs in the bolt holes of the disk. Screw the disk nuts onto the studs and fully tighten the nuts.
  - (c) Release the lifting fixture thumbnuts, then turn the claw tommy bars to 'UNLOCK'. Steadily raise the hoist until the fixture is clear of the mandrel, then lower the fixture onto a suitable container and remove the hoist.

7N34377

SUB-ASSEMBLY

**72-33-00**

Page 598.34

Jun 1/77



OLYMPUS 593

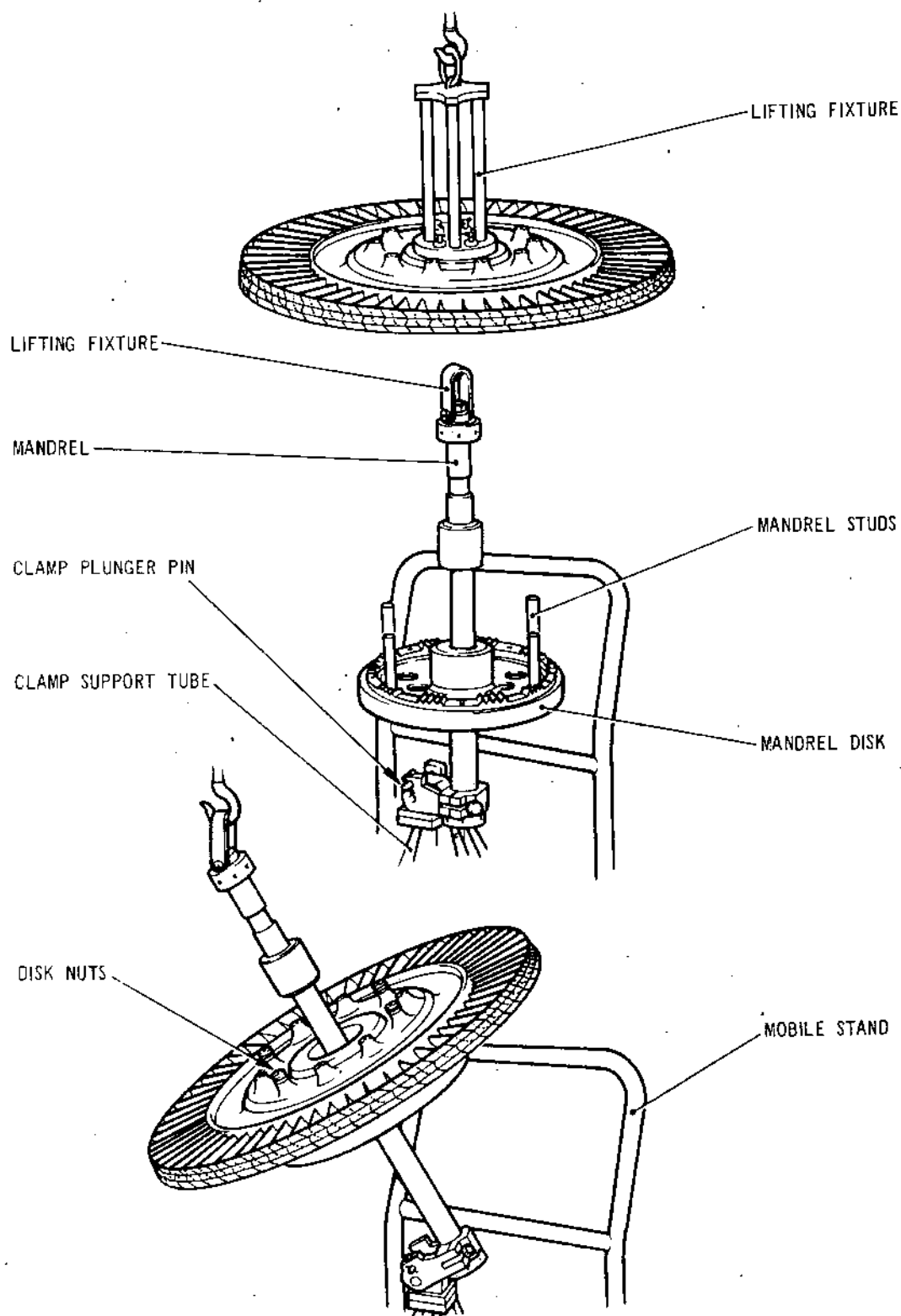
MK.610-14-28

OVERHAUL



CR 32204/00A

PRINTED IN ENGLAND



Assembling HP Turbine Disk to Mobile Stand  
Figure 542

TN42656

SUB-ASSEMBLY  
**72-33-00**  
Page 598.35  
Jun 1/77



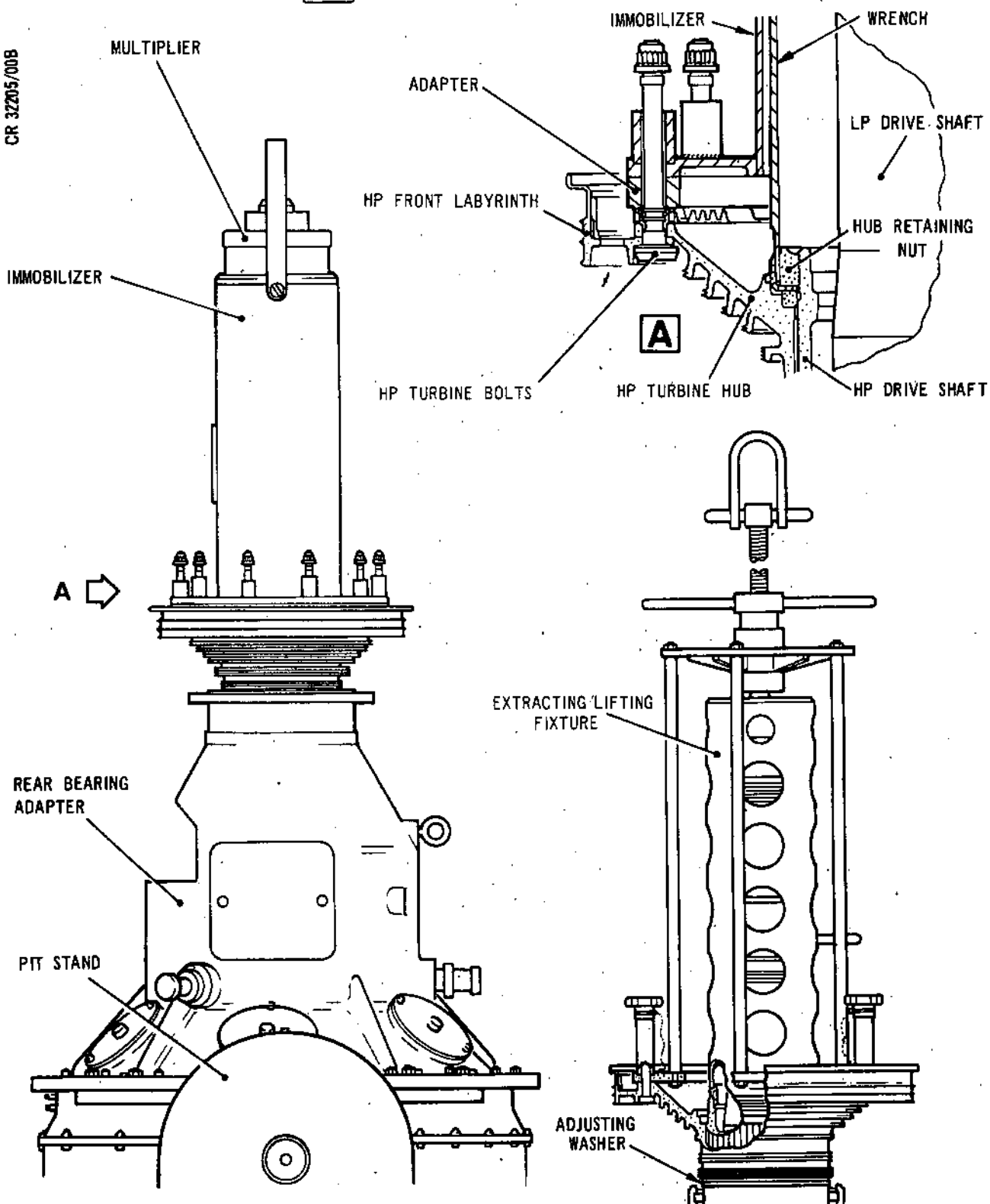
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 32205/008



Removing HP Turbine Hub and Labyrinth  
Figure 543

SUB-ASSEMBLY  
**72-33-00**  
Page 598.36  
Jun 1/77

TN33740



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (d) Attach the hoist to the lifting fixture of the mandrel, then withdraw the plunger from the bearing. Lower the hoist, pivot the mandrel about the bearing, until the mandrel is horizontal and locate it in the other bearing. Pivot the bearing cap over the mandrel and secure the cap with its pivot bolt and thumbnut. Push in the plunger on the other bearing. Release and remove the hoist.
- (5) If the turbine disk was placed on a pallet, release the lifting fixture thumbnuts, turn the claw tommy bars to 'UNLOCK', taking the weight of the disk as required to disengage the claws from under the disk, then withdraw the fixture from the disk. Remove the fixture from the disk and place it on a suitable container.
- C. Remove the HP Turbine Front Labyrinth and Hub Assembly from the HP Drive Shaft.
- (1) Ensure that the adapter (Tool 1315) is located and secured to the plate of the immobilizer (Tool 1343) and the multiplier (Tool 1022) is secured to the handle end of the immobilizer.
- (2) Lower the spanner wrench (Tool 1085) over the LP drive shaft and locate it in the retaining nut (Ref. Fig.543). Attach a hoist to the handle of the immobilizer (Tool 1022), then lower the immobilizer over the spanner and turn the multiplier drive as necessary to engage it in the spanner and to align the immobilizer pillars with the bolts in the hub. Disconnect the hoist from the handle.
- (3) Push the bolts up through the pillars and screw slave nuts onto the bolts, fully tightening the nuts. Insert a bar into the immobilizer, then unscrew the nut.
- (4) Unscrew and remove the nuts and lower the bolts onto the adapter flange. Attach a hoist to the handle, then steadily raise the hoist until the immobilizer is clear of the spanner. Position and lower the immobilizer onto a suitable container, then disconnect the hoist. Withdraw the spanner from the LP drive shaft and place it on a suitable container.
- (5) Unscrew the hub retaining nut, then remove the nut, plain washer and keywasher from the HP drive shaft.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (6) Attach a hoist to the extractor/lifting equipment (Tool 1057), then steadily lower the extractor over the LP drive shaft until the cylinder engages in the HP drive shaft (Ref.Fig.543). Aligning the pillars with the hub bolts, turn the handle to lower the extractor until it abuts the hub. Push the hub bolts up through the pillars, then screw slave nuts onto the five bolts. Withdraw the remaining five bolts by turning the HP drive shaft, as necessary, to remove the bolts through the cutaway in the rear bearing adapter flange.
- (7) Screw in on the extractor handle until the hub/labyrinth is released, then steadily raise the hoist until the hub is clear of the LP drive shaft. Lower the hub onto a clean flat surface. Unscrew and remove the slave nuts, then remove the extractor from the hub and lower it onto a suitable container. Disconnect the hoist.
- (8) Remove the bolts from the hub, then assemble the protector (Tool 1062) to the hub labyrinth.
- (9) Remove the slave adjusting washer from the HP drive shaft.
- (10) If the HP compressor is not to be worked on for a period, assemble the split sleeves (Tool 1058) to the HP and LP drive shafts.
- (11) Continue the assembly of the HP compressor assembly as detailed in para.11.

9. Assemble the HP Turbine Simulator to the HP Compressor Assembly (SB.72-8305-154 Part 2 Standard)

NOTE: The procedure using the HP turbine simulator can only be carried out providing that the HP turbine hub and labyrinths are the original, or if replacements, have been statically balanced using a HP turbine rotor or slave rotor (Ref.72-51-03, para.9 onwards).

A. Prepare the HP Compressor Assembly.

- (1) Release and remove the three knurled nuts from the front support (Tool 292) (Ref.Fig.544) releasing the immobilizer (Tool 1339). Push the three studs of the immobilizer to engage the immobilizer in the teeth of the HP drive shaft front retaining nut, turning the rotor slightly to achieve engagement. Screw the three knurled head bolts (Tool 1341) into the three tapped holes in the front support to secure the immobilizer in engagement with the retaining nut.

SUB-ASSEMBLY

**72-33-00**

Page 598.38

Jan 1/78

JN10985



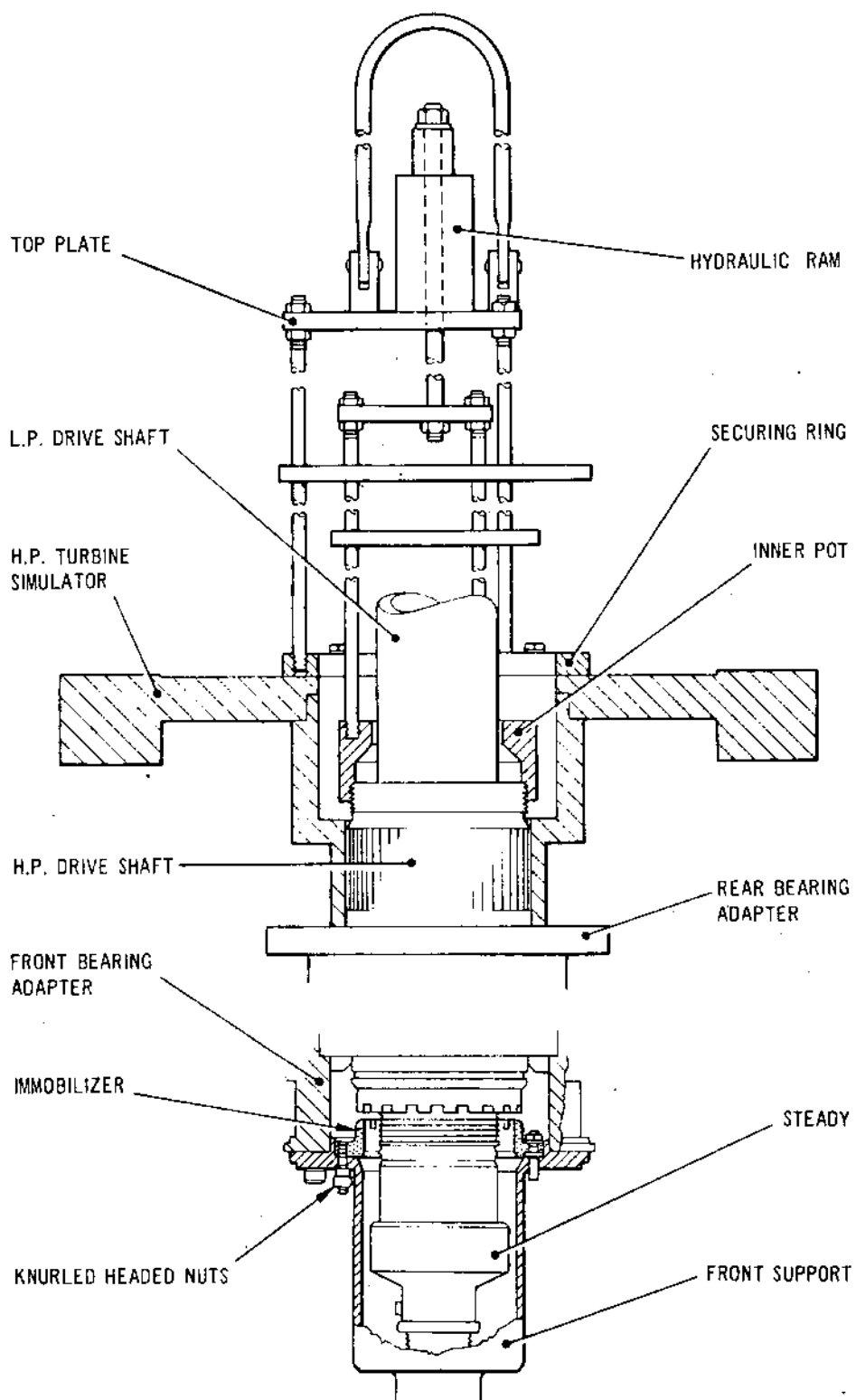
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 34399/00A



Assembling HP Turbine Simulator to HP Drive Shaft  
Figure 544

SUB-ASSEMBLY  
**72-33-00**  
Page 598.39  
Jun 1/77





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Turn the stand arms 180 deg to position the rear bearing adapter uppermost. Release and remove the split sleeves (Tool 1058) from the LP and HP drive shafts. Release and remove the retaining nut from the HP drive shaft using the hand spanner wrench (Tool 410), then withdraw the spacer ring (Tool 414) from the shaft.

B. Assemble the HP Turbine Simulator.

- (1) Ensure the hydraulic ram (Enerpac) is assembled above the top plate of the lifting/assembly/extractor (Tool 1993) and the inner pot is raised to its fullest height by adjusting the nuts at the inner plate (Ref.Fig.544). Secure the combination tool to a hoist and position above the simulator (Tool 1994). Lower the hoist and secure the combination tool to the simulator with the four captive bolts in the securing ring.
- (2) Raise the hoist and position the simulator above the LP drive shaft. Carefully lower the simulator and engage the serrations of both HP shaft and simulator, release and remove the hoist.

NOTE: The simulator may be assembled in any rotational position.

- (3) Screw the inner pot onto the HP drive shaft then connect a hand operated hydraulic pump to the hydraulic ram. Operate the pump and apply a pressure of 3000 psig (20,685 kPa). Ensure the simulator abuts the bearing in the adapter, then release the pressure and disconnect the pump. Unscrew the inner pot from the HP drive shaft and release the captive bolts securing the combination tool to the simulator. Attach a hoist to the combination tool then remove the tool from the simulator, lower the tool into its container and disconnect the hoist.
- (4) Apply lubricant 'B' to the slave nut (Tool 418) then screw the nut onto the HP shaft to secure the simulator (Ref.Fig.545). Secure the lifting ring (Tool 334), with the two captive bolts, to the spanner wrench (Tool 1085), then using a hoist raise the wrench and position it above the LP drive shaft. Lower the wrench to engage the slave nut then release and remove the lifting ring and hoist.

TN14265



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (5) Using a hoist, raise the torque restrainer (Tool 1995) and position it above the wrench. Lower the restrainer until it abuts the simulator, then secure it with the four captive bolts. Disconnect and remove the hoist.
- (6) Lower the multiplier (Tool 1022) through the lifting ring (Tool 1996), then secure the multiplier to the plain side of the adapter plate (Tool 1997) with the eight captive bolts. Attach the tool assembly to a hoist and position the assembly above the torque restrainer. Lower the assembly and engage the dogs on the underside of the adapter plate with the restrainer and the gearbox drive with the wrench. Secure the plate to the restrainer with two bolts, then disconnect and remove the hoist.
- (7) Using a torquemeter wrench, tighten the HP drive shaft slave nut to 500 lbf ft (678 N.m). Attach a hoist to the lifting eyes of the torque restrainer. Unscrew the four bolts securing the restrainer to the simulator then raise the hoist to remove the restrainer and multiplier. Secure the lifting ring (Tool 334) to the spanner wrench (Tool 1085) with two captive bolts then using a hoist remove the wrench.
- NOTE: Leave the multiplier and restrainer assembled to each other in preparation for the removal of the HP drive shaft slave nut.
- (8) Assemble the two halves of the centralizing sleeve (Tool 1998) to the simulator and secure with the captive bolts to restrict the movement of the LP drive shaft.
- (9) Unscrew and remove the three bolts (Tool 1341) from the front support. Screw the three knurled nuts onto the protruding studs in the support to withdraw the immobilizer from the HP drive shaft nut allowing the HP compressor to rotate.



SUB-ASSEMBLY

**72-33-00**

Page 598.41

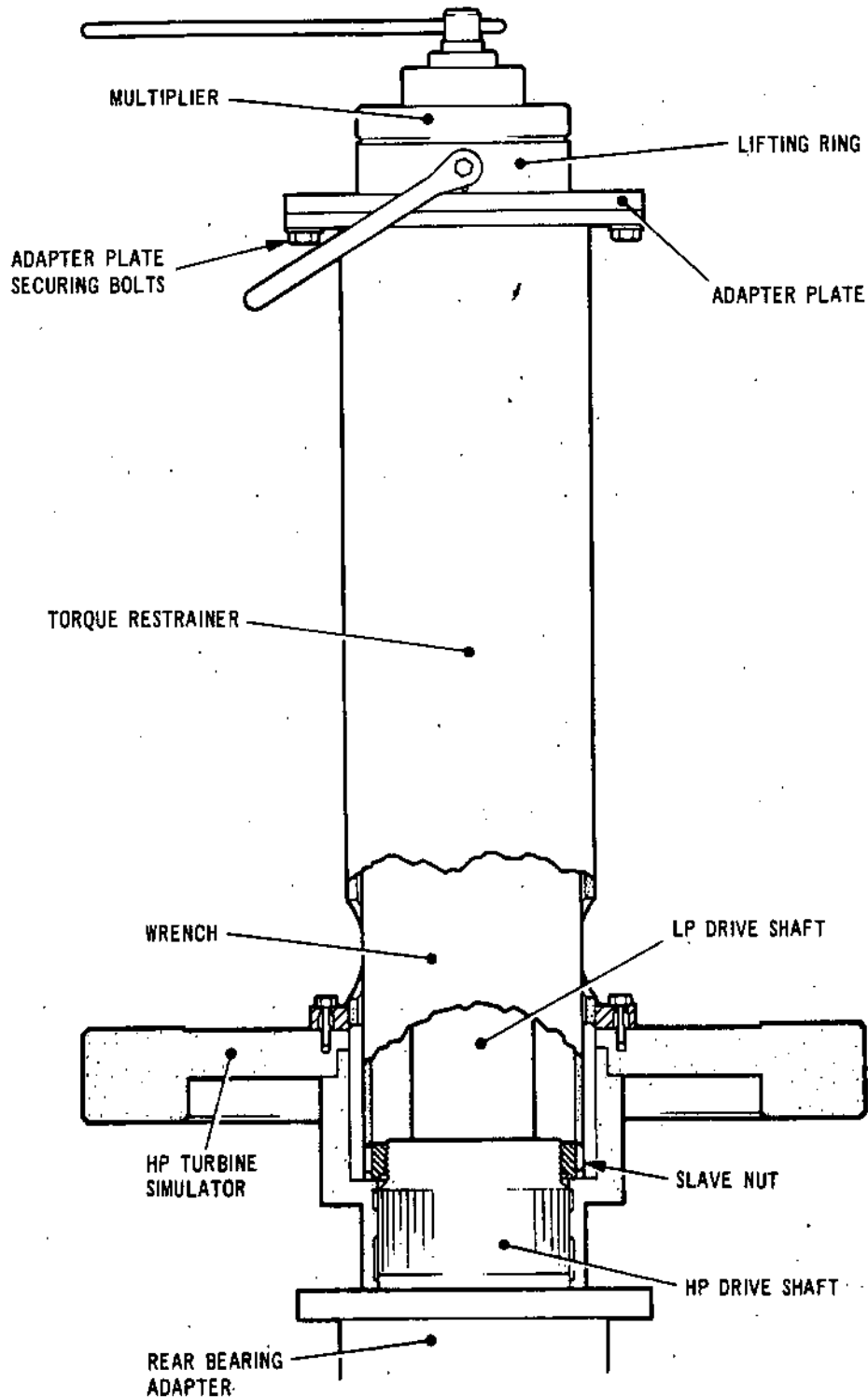
Jun 1/77



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 34400/00A



TN3062

Torque-tightening the HP Drive Shaft Slave Nut  
Figure 545

SUB-ASSEMBLY  
**72-33-00**  
Page 598.42  
Jun 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



10. Prepare and Balance the HP Compressor and HP Turbine Simulator Assembly

A. Prepare the Balancing Machine (Avery 72N 56) (Ref.Fig.539).

(1) Refer to para.6.A. for the procedure.

B. Assemble the HP Compressor and Turbine Simulator Assembly to the Balancing Machine.

(1) Refer to para.6.B. for the procedure, but remove the centralizing sleeve (Tool 1998) instead of split sleeves (Tool 393) (Ref.para.6.B.(11)).

C. Balance the HP Compressor and HP Turbine Simulator Assembly.

NOTE: The operator must ensure that during initial use, out-of-balance correction must also be made to the simulator (Ref.para.(6)).

(1) Start the balancing machine and run the assembly up to balancing speed in accordance with the manufacturers instructions.

(2) Allow the assembly to rotate long enough to eliminate the effects of differential temperature on the readings obtained. Calibrate the machine and continue to rotate the assembly until the change in the mean average readings of unbalance at F and U (Ref. Fig.546) over a period of three minutes are less than 2 dram in.

NOTE: 1 dram in. = 45 g mm.

(3) Remove the temporary correction applied at F (Ref. para.4.C.(7)). Observe the change of unbalance at F and the initial unbalance at U. A change of unbalance at F of 220 dram in. and initial unbalance at U of 150 dram in. is acceptable and the balancing operation may continue (Ref.para.(5)).

PRINTED IN ENGLAND

TN3064

SUB-ASSEMBLY

**72-33-00**

Page 598.43

Apr 1/78

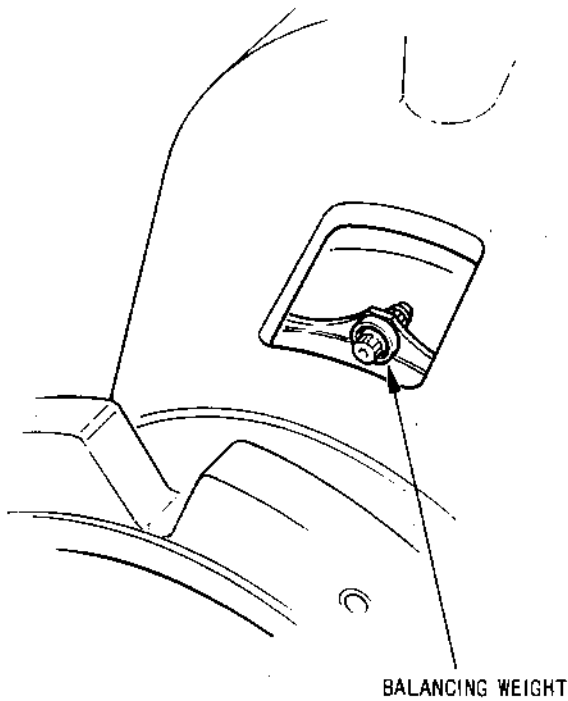
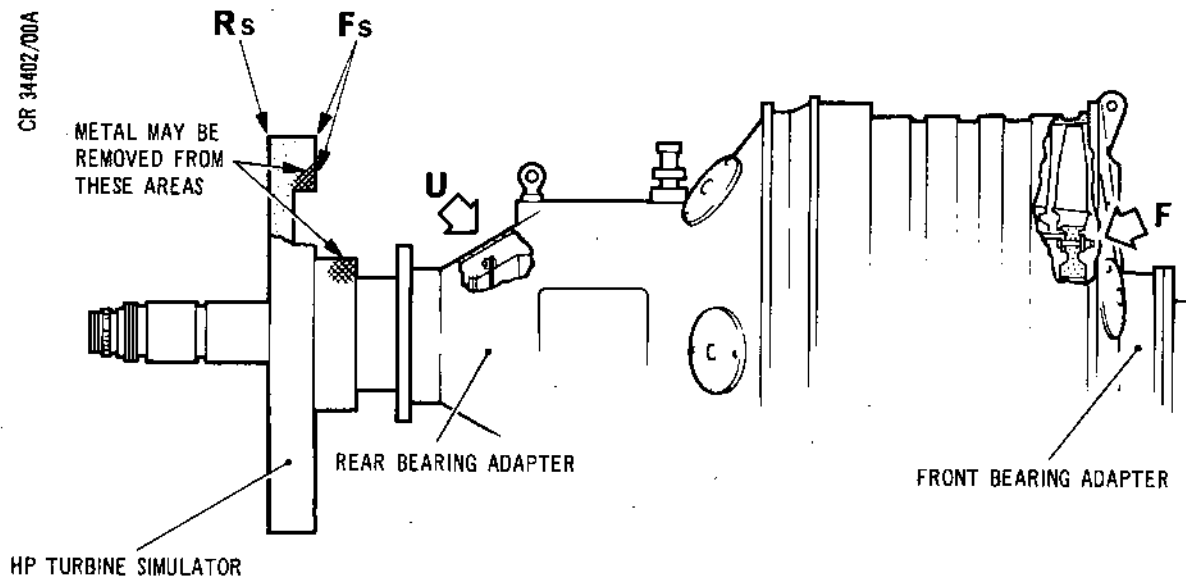


OLYMPUS 593

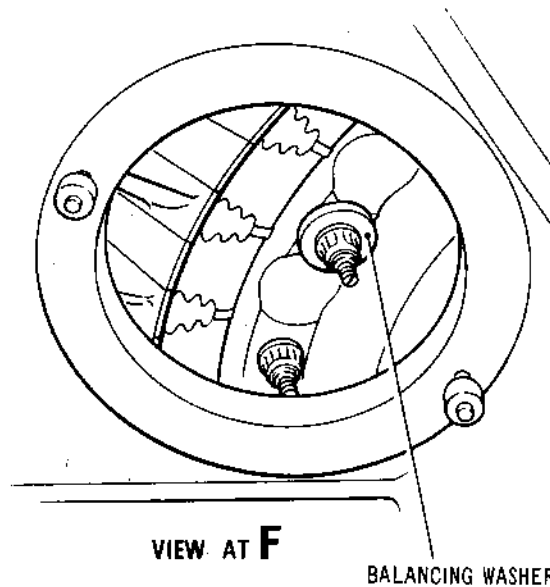
MK.610-14-28  
OVERHAUL



CR 34402/00A



VIEW AT U



VIEW AT F

BALANCING WASHER

Assembling Balancing Washers to HP Compressor  
Figure 546

SUB-ASSEMBLY  
**72-33-00**

Page 598.44  
Jun 1/77

TN3065



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (4) With the unbalance readings outside the limits rectify in accordance with the following procedure.
- (a) Remove the HP compressor assembly from the balancing machine (Ref. para. 6.D.) but assemble the centralizing sleeve (Tool 1998) instead of split sleeves (Tool 393).
  - (b) Remove the simulator from the HP drive shaft (Ref. para. E.).
  - (c) Reassemble the HP compressor assembly to the balancing machine and recheck the balance (Ref. para. 4.).
  - (d) Check the abutment faces of the simulator and the slave bearing within the rear adapter for damage or foreign matter.
  - (e) Assemble the simulator to the HP compressor assembly and rebalance (Ref. para. 9 and 10).
- (5) With the unbalance readings within initial limits, balance the assembly within 6 dram in. in accordance with the following procedure.
- (a) Correct unbalance at F by the addition of balancing washers beneath the nuts securing the first stage rotor disk. On engines embodying S.B.72-73 remove the plain washers (02/1-170) from the bolts to which balancing washers are assembled. Maximum number of washers to be used are, 2 off (02/1-180), 2 off (02/1-185) and 5 off (02/1-190). Torque-tighten nuts after assembling washers between 300 and 330 lbf in. (33,9 and 37,3 N.m).
  - (b) Correct unbalance at U by the addition of balancing weights (02/3-140). Use a maximum of 5 weights to achieve balance, but a maximum of three from any one weight in the range. Retain each weight with a bolt (02/3-170) and self-locking nut (02/3-130) with lubricant 'A' applied. Ensure each nut has a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m), then torque-tighten to 100 lbf in. (11,5 N.m).

SUB-ASSEMBLY

**72-33-00**

Page 598.45

Sep 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (6) Initial balancing of the HP turbine simulator.
- (a) Remove the HP compressor and HP turbine simulator assembly from the balancing machine and assemble to the pit stand (Ref.para.6.D.) but assemble the centralizing sleeve (Tool 1998) instead of split sleeves (Tool 393).
  - (b) Remove the HP turbine simulator (Ref.para.E.) and turn through 180 deg, relative to the HP drive shaft, and reassemble to the HP compressor (Ref.para.9.B.).
  - (c) Assemble the HP compressor assembly to the balancing machine (Ref.para.6.B.).
  - (d) Observe the change of unbalance at F and U. Should the change of unbalance exceed 10 dram in. at either location, correct half the change at F or U and half on the simulator at RS and FS by the addition of balancing bolts.
  - (e) Repeat para.(a), (b), (c) and (d) and repeat as necessary until turning the simulator 180 deg relative to the compressor affects the balance at F or U by less than 10 dram in.

NOTE: For permanent balance correction of the HP turbine simulator, metal may be removed from the areas shown in Fig.546.

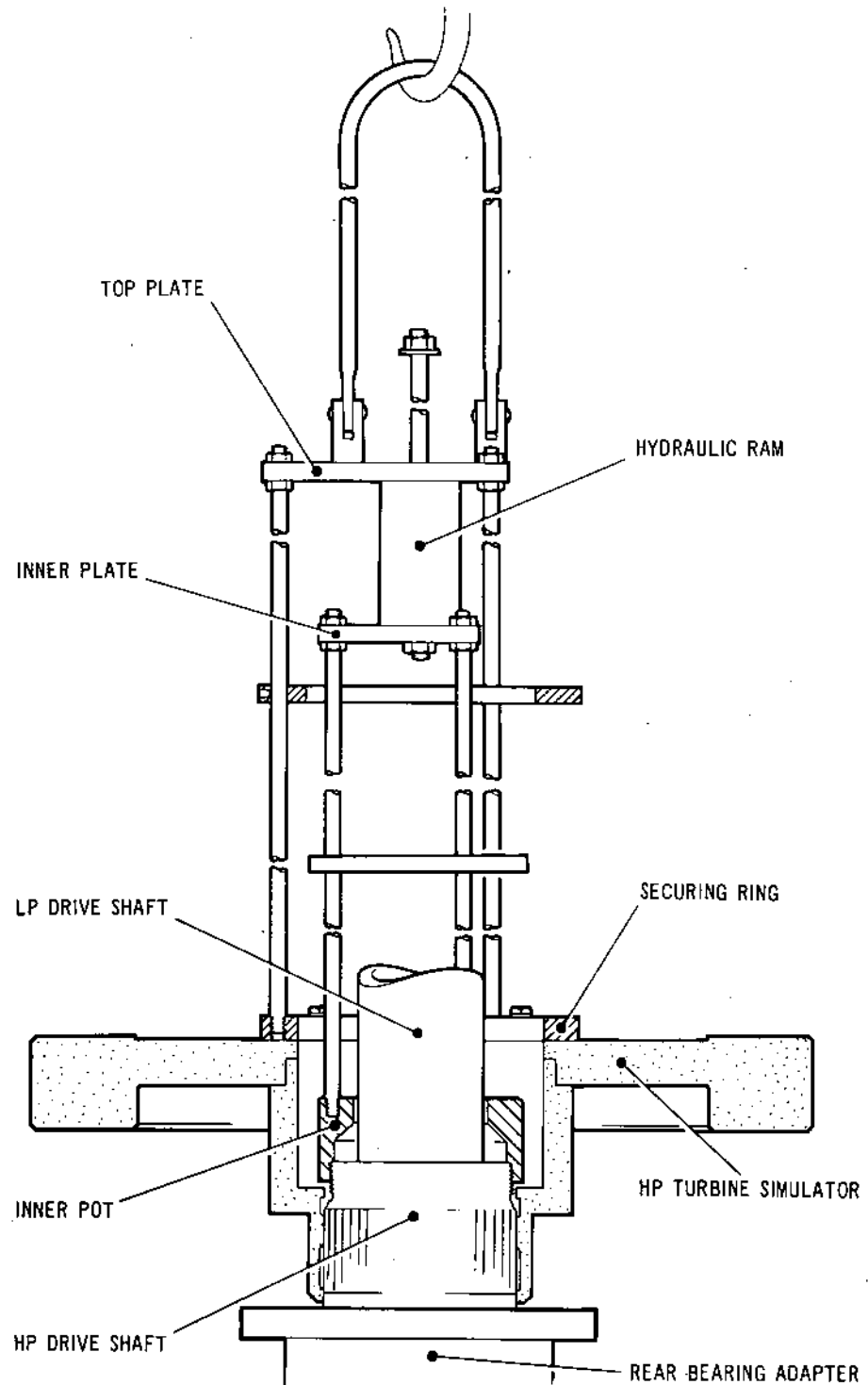
- D. Remove the HP Compressor and HP Turbine Simulator Assembly from the Balancing Machine.
- (1) Refer to para.6.D. for the procedure, but assemble the centralizing sleeve (Tool 1998) instead of split sleeves (Tool 393) (Ref.para.6.D.(1)).

IN3068



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Removing the HP Turbine Simulator  
Figure 547





OLYMPUS 598

MK.610-14-28  
OVERHAUL



E. Remove the HP Turbine Simulator from the HP Compressor Assembly.

- (1) Release and remove the three knurled nuts from the front support (Tool 292) (Ref.Fig.544) releasing the immobilizer (Tool 1339). Push the three studs of the immobilizer to engage the immobilizer in the teeth of the HP drive shaft front retaining nut, turning the rotor slightly to achieve engagement. Screw the three knurled head bolts (Tool 1341) into the three tapped holes in the front support to secure the immobilizer in engagement with the retaining nut.
- (2) Release and remove the centralizing sleeve (Tool 1996) from the turbine simulator. Using a hoist, raise the lifting ring/spanner wrench (Tool 1085) and position above the LP drive shaft. Lower the wrench to engage the slave nut, then release and remove the lifting ring and hoist.
- (3) Using a hoist raise the tool assembly of multiplier (Tool 1022), adapter plate (Tool 1997) and restrainer (Tool 1995) and position them above the LP drive shaft. Carefully lower the assembly until the restrainer contacts the simulator and the multiplier drive engages the spanner wrench. Secure the restrainer to the simulator, then disconnect and remove the hoist. Insert a spanner wrench into the multiplier then unscrew the slave nut until released. Release the restrainer and remove the tool assembly by hoist. Secure the lifting ring to the wrench, remove the wrench by hoist, then remove the slave nut from the HP drive shaft.
- (4) Ensure the hydraulic ram is assembled below the top plate of the combination tool (Tool 1993) (Ref. Fig.547) and the inner pot is raised to its fullest height by adjusting the nuts at the inner plate. Using a hoist, raise the combination tool above the LP drive shaft, then lower and secure the inner pot to the HP drive shaft and the outer ring to the simulator.

CAUTION: LEAVE THE HOIST ATTACHED.

- (5) Connect a hand operated hydraulic pump to the hydraulic ram. Operate the pump to raise the simulator from the HP drive shaft. Take up the weight of the simulator with the hoist, then release

FN3070

SUB-ASSEMBLY  
**72-33-00**

Page 598.48  
Jan 1/78



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



the pressure applied to the ram. Unscrew the inner pot from the HP drive shaft, then raise the hoist to remove the simulator. Replace the simulator in its container (Tool 3051) and disconnect the hoist.

- (6) If the HP compressor is not to be worked on for a period, assemble the split sleeves (Tool 1058) to the HP and LP drive shafts.
- (7) Continue the assembly of the HP compressor assembly as detailed in para.11.

#### 11. Preparation and Assembly of the Intermediate Case Assembly

##### A. Remove the Front Bearing Adapter (Tool 1032) from the HP Compressor Assembly.

- (1) If assembled remove the split sleeves (Tool 1058) from the LP and HP drive shafts. Screw the guide sleeve (Tool 377) onto the LP drive shaft, then offer the HP support sleeve (Tool 1031) over the LP drive shaft engaging the splines, and lower it until it abuts the bearing (Ref.Fig.548).
- (2) Offer the mechanical jack (Tool 1029) over the HP support sleeve and align the captive bolts with the tapped holes in the adapter. Unscrew the jack (if required) to allow the jack to abut the adapter, then screw the captive bolts into the adapter. Using the tommy bars, screw in on the jack until it lightly abuts the HP support sleeve, then lock the jack with the lockring.
- (3) Offer the LP support sleeve (Tool 1030) into the HP support sleeve and screw it onto the HP drive shaft. Screw the sleeve onto the shaft until it abuts the HP support sleeve, then release it a quarter of a turn. Screw the three restrainer screws (Tool 1226) into the tapped holes in the end of the support sleeve and screw the screws fully in. The screws locate in front of the guide sleeve on the LP drive shaft and prevent it from moving forwards.

NOTE: Through the medium of the HP support sleeve, the mechanical jack, LP support sleeve and the three restraining screws, the LP and HP drive shafts are now supported and secured at their rear ends to the rear bearing adapter.

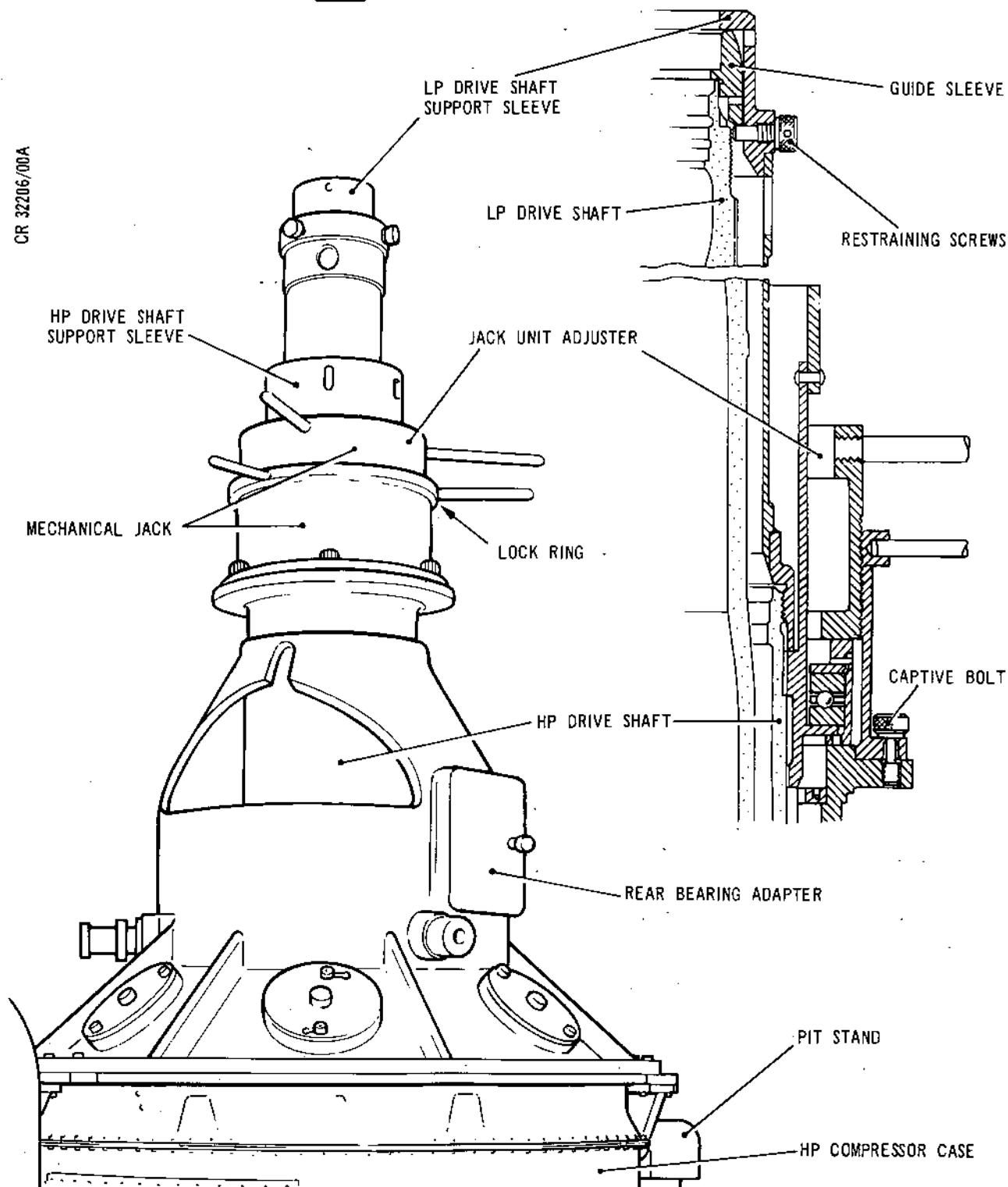


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 32206/00A



Securing Rear End of LP and HP Drive Shafts to  
Rear Bearing Adapter  
Figure 548

TN26871

SUB-ASSEMBLY  
**72-33-00**

Page 598.50

Jun 1/77



OLYMPUS 593

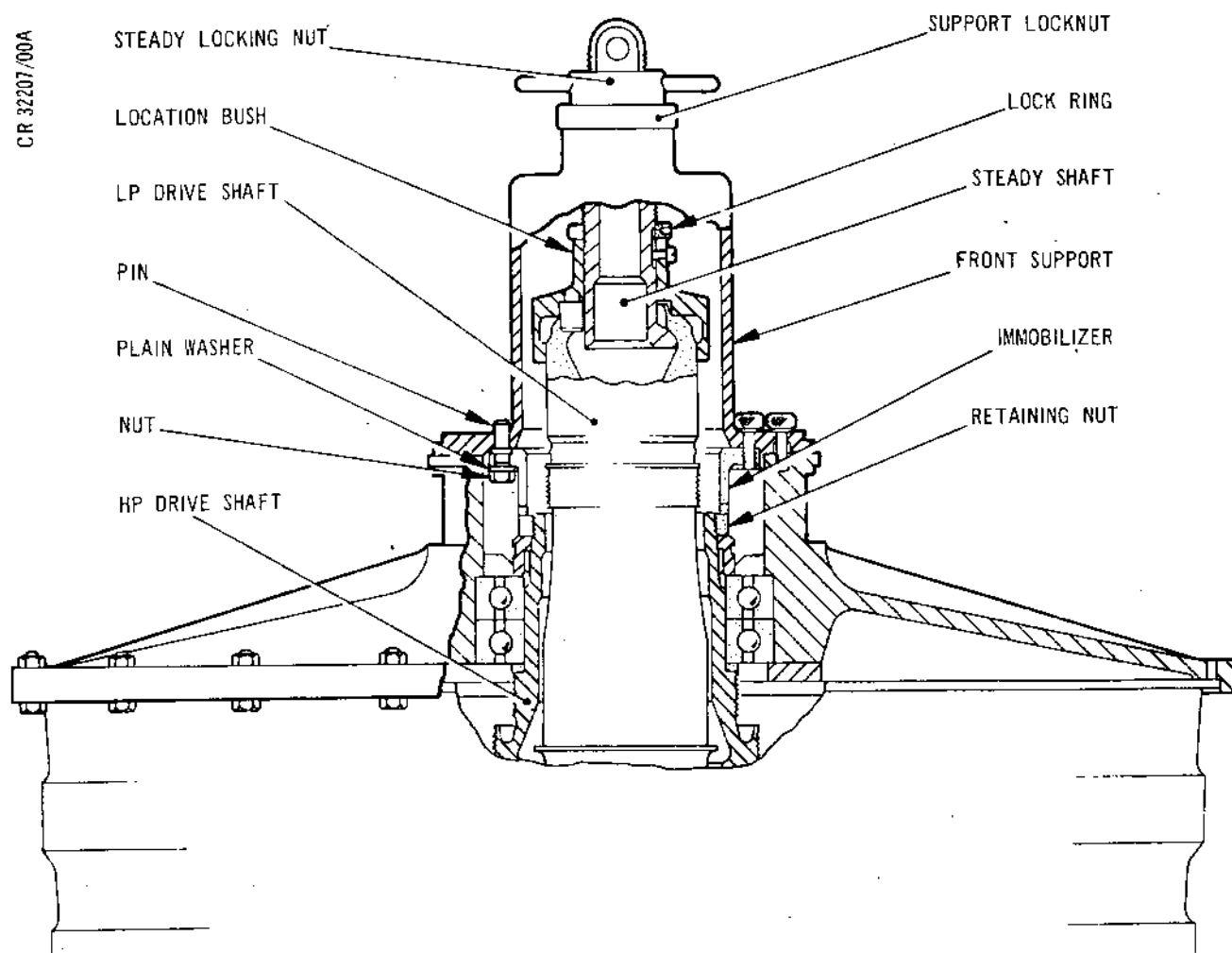
MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

CR 32207/00A



TN34379

Removing LP Drive Shaft Front Support  
Figure 549

SUB-ASSEMBLY  
**72-33-00**  
Page 598.51  
Jun 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (4) Rotate the pit stand arms 180 deg until the front bearing adapter is uppermost.
- (5) Remove the support (Tool 292), steady (Tool 290) and immobilizer (Tool 1339) from the LP drive shaft and the front bearing adapter (Ref.Fig.549).
  - (a) Unscrew and remove the three knurled nuts (Tool 1340) from the immobilizer studs that protrude through the support.
  - (b) Unscrew and remove the steady locking nut (Tool 291) from the steady shaft, then release the knurled screws of the support. Unscrew the support locknut until the support is released, then withdraw the support disengaging it from the pins of the immobilizer.
  - (c) Unscrew the knurled lockring, then withdraw the location bush from the LP drive shaft. Turn the steady shaft, to disengage its lobes from behind the LP drive shaft lands, and withdraw the shaft from the LP drive shaft. Assemble the knurled lockring and locking nut to the steady shaft.
  - (d) Withdraw the immobilizer from the LP drive shaft.
- (6) Remove the retaining nut from the HP rotor shaft front (Ref.Fig.525).
  - (a) Offer the steady (Tool 1158) over the LP drive shaft, align the three captive bolts with the tapped holes in the front bearing adapter, then screw the bolts into the adapter and tighten bolts.
  - (b) Offer the immobilizer (Tool 387) over the LP drive shaft and engage it in the cutaways inside the HP rotor shaft front.
  - (c) Locate the multiplier (Tool 1022) on the spanner wrench (Tool 386) and screw the spanner captive bolts into the multiplier ensuring the bolts are tight.

TN34381



OLYMPUS 593

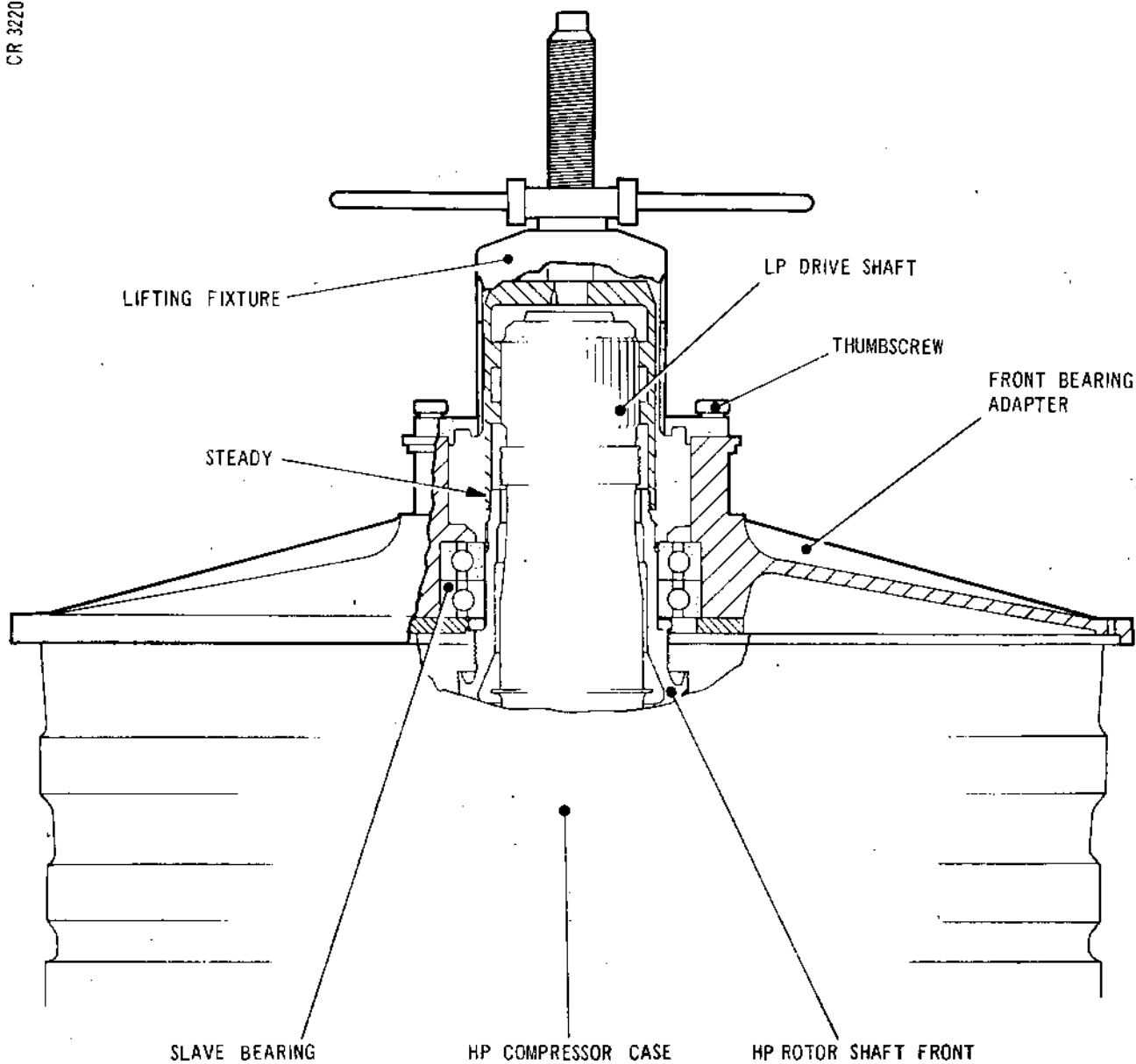
MK.610-14-28

OVERHAUL



CR 32208/00A

PRINTED IN ENGLAND



Removing Front Bearing Adapter  
Figure 550

SUB-ASSEMBLY  
**72-33-00**  
Page 598.53  
Jun 1/77

TN5127



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (d) Offer the spanner/multiplier over the LP drive shaft and immobilizer and engage the multiplier square drive in the immobilizer, then turn the HP rotor shaft as necessary to engage the spanner pin in the cutaway in the steady and the spanner dogs in the retaining nut.
  - (e) Using a torquemeter wrench in the multiplier release the 'LEFT-HAND' threaded retaining nut.
  - (f) Remove the wrench, multiplier/spanner, immobilizer and steady from the assembly.
  - (g) Unscrew and withdraw the nut and spacer ring (Tool 988) from the rotor shaft front.
- (7) Offer the steady (Tool 288) (Ref.Fig.550) over the LP drive shaft and screw it onto the HP rotor shaft front, then screw the lifting/extracting fixture (Tool 1353) onto the steady. Align the offset thumbscrews of the lifting fixture with the tapped holes in the front bearing adapter then re-screw the thumbscrews into the adapter. Screw the fixture onto the steady until the fixture abuts the adapter, then fully tighten the thumbscrews.
- (8) Unscrew and remove the slave nuts and bolts securing the front bearing adapter to the front flange of the HP front case. Unscrew the lifting/extracting fixture handle and raise the adapter, drawing the slave bearing off the rotor shaft front. When the bearing is released, attach a hoist to the lifting fixture, then steadily raise the hoist and unscrew the lifting fixture handle until it is released from the steady. When the adapter is clear, position and lower it onto a suitable pallet, then release the hoist. Remove the spacer ring (Tool 870) from the rotor shaft front, then offer a protector (Tool 1246) over the LP and HP shafts and rest it on the HP front case flange.

TN34382



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (9) Release the locking ring of the mechanical jack attached to the rear adapter, then screw in on the jack to raise the HP compressor rotor approx. 0.125 in. (3,175 mm).

**NOTE:** The raising of the HP rotor ensures that there is sufficient clearance between the abutting flanges of the intermediate and HP case to enable the bearing assembly in the intermediate case to abut the adjusting washer on the rotor shaft front.

- B. Assemble the Intermediate Case Assembly to the HP Compressor Assembly.

**CAUTION:** THE FRANGIBLE PROBES ARE SUSCEPTIBLE TO DAMAGE DURING ASSEMBLY OF THE ENGINE MODULES, AND IF KNOCKED THEY SHOULD BE REMOVED AND SUBJECTED TO AN INSPECTION FOR CRACKING AND DISTORTION. IF A PROBE IS FOUND DAMAGED IT SHOULD BE REJECTED.

**NOTE:** Before assembling the intermediate assembly to the HP compressor assembly, ensure that all dimensional checks have been carried out, and that the assembly is complete and ready for assembly to the HP compressor (Ref.72-32-00 Assembly) (Ref. SB.72-91).

- (1) From inside the centre of the intermediate case front end, unscrew and remove the two bolts securing the LP probe, then withdraw the retaining plate, LP probe, and two adjusting washers (Ref.Fig.556).
- (2) Remove the protector (Tool 1246) from the HP front case, then unscrew and remove the steady (Tool 288) from the rotor shaft front.
- (3) Select the adjusting washer, as calculated in para.2.Y.(3), from the range (02/1-10). Should the required size be unavailable machine a washer to the required size (Ref.72-09-21 Repair, Fig.413). Offer the washer over the rotor shaft front and ensure that the washer seats correctly on the shaft. Lubricate the bearing location on the rotor shaft front with lubricant A.
- (4) Assemble the immobilizer (Tool 1352) to the LP drive shaft (Ref. Fig.551).
  - (a) Unscrew the lockring and withdraw the location bush.

SUB-ASSEMBLY

**72-33-00**

Page 598.55

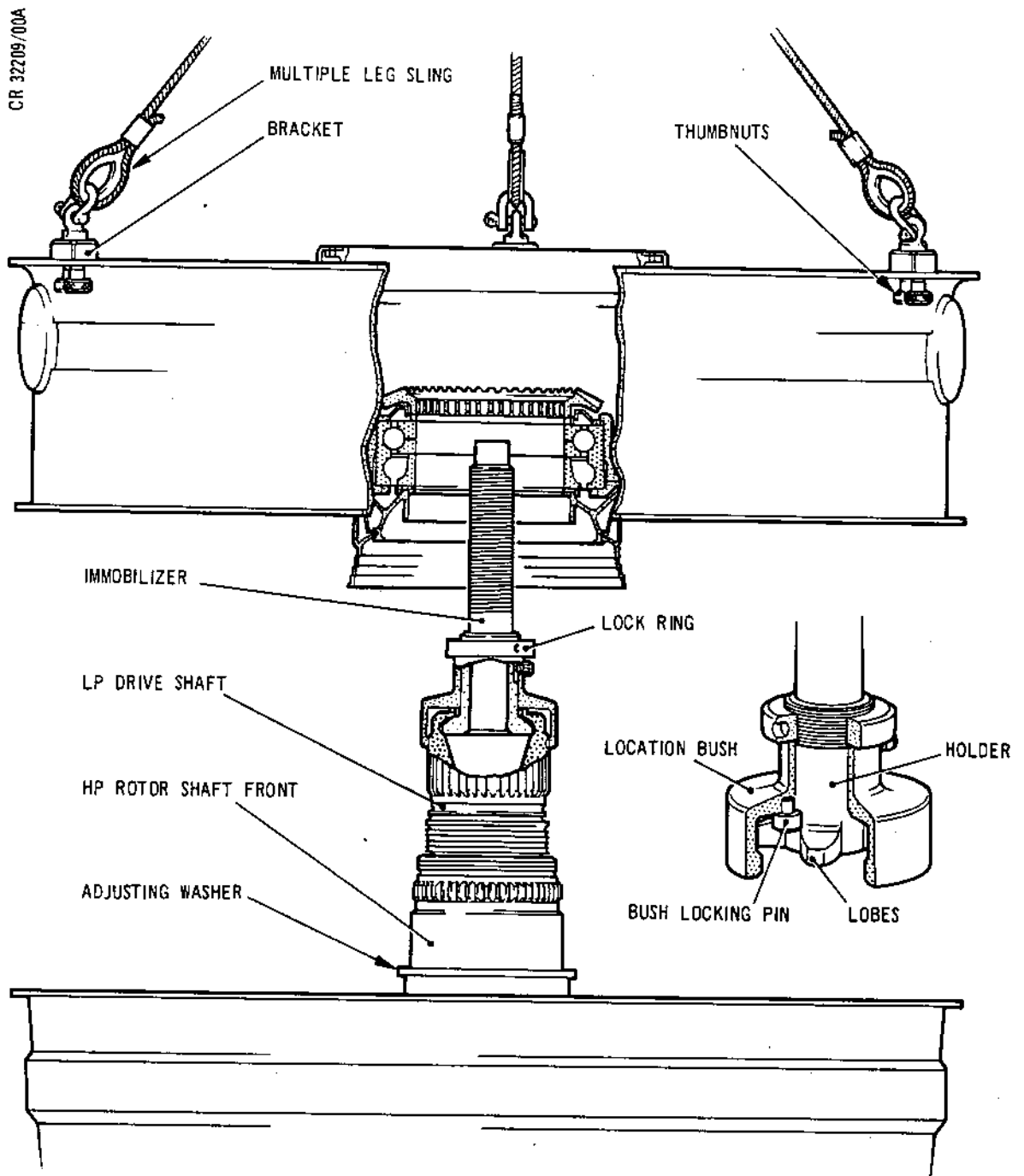
Dec 1/97





OLYMPUS 593

MK.610-14-28  
OVERHAUL



Assembling Intermediate Case to HP Front Case  
Figure 551

SUB-ASSEMBLY  
**72-33-00**  
Page 598.56  
Jun 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Offer the holder into the LP drive shaft sliding the lobes of the holder through the cutaways in the shaft, turn the holder so that the lobes locate behind the lands of the shaft.
- (c) Slide the location bush down over the holder, ensuring the bush locking pin locates in one of the cutaways in the drive shaft. Screw the lockring onto the holder shaft and tighten the lockring.
- (5) Attach the multiple leg sling (Tool 1089) to the intermediate case front flange, identified by the larger diameter flange with a groove in its mating face (Ref.Fig.551).
- (a) Attach a hoist to the ring of the multiple leg sling and position the hoist over the intermediate case.
- (b) Remove the thumbnuts from the three attachment bracket studs. Evenly dispose the brackets on the front flange of the case, then insert the studs through the bolt holes and secure the brackets with the thumbnuts.
- (6) Raise the hoist and position the intermediate case over the HP front case. Examine the bearing inner races and align the V marks on the races with one another, then ensure the oil thrower is flush with the races. If assembled, release and remove the three transport blocks (Tool 1232) from the rear flange of the case. Steadily lower the intermediate case guiding the oil thrower and inner races over the immobilizer and onto the rotor shaft. Release and remove the sling from the intermediate case and the hoist.
- (7) Pass the sleeve (Tool 520), larger outside diameter uppermost, over the immobilizer and sit the sleeve in the recess of the bevel gear.

PRINTED IN ENGLAND

TN34384

SUB-ASSEMBLY

**72-33-00**

Page 598.57

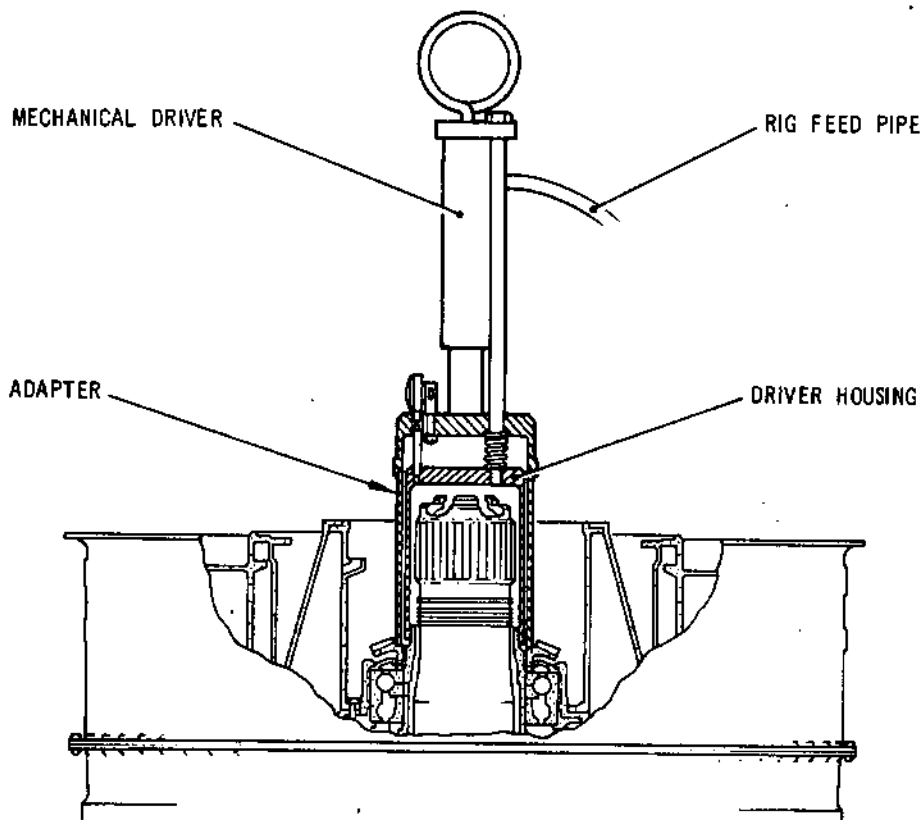
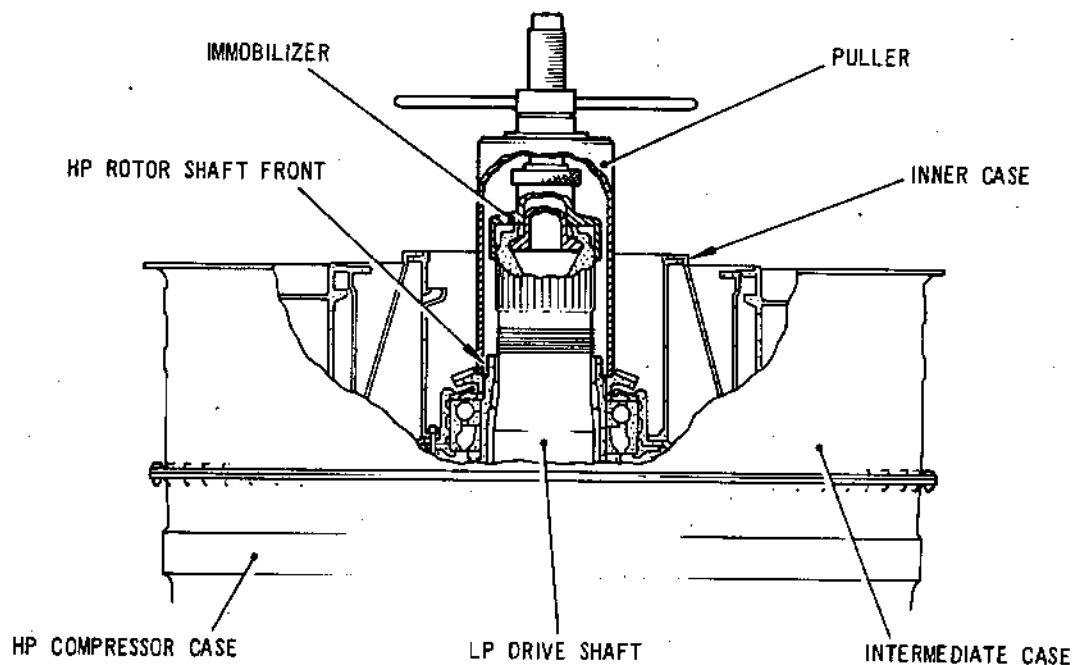
Jun 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



Assembling HP Rotor Bearing to Rotor Shaft Front  
Figure 552

CR 32210/00A

TN26869



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (8) Offer the mechanical puller (Tool 1351) (Ref.Fig.552) to the immobilizer. Screw the puller handle onto the immobilizer and press the bearing inner races onto the rotor shaft front. When the intermediate case rear flange is approx. 0.70 in. (17,7 mm) from the HP front case flange, align the serrations on the bevel gear with those on the rotor shaft front. Extreme care must be taken until the serrations are meshed. Align with one another, by viewing through the view/access holes in the puller, or if in doubt, by removing the puller to ensure alignment, before continuing to press the bearing on. As the flanges of the intermediate and HP front case approach each other, align the locating dowel holes in the intermediate case flange with the locating dowel in the HP front case flange. Ensure the bearing has been pressed fully onto the rotor shaft front.
- (9) Unscrew the handle of the puller and remove it from the immobilizer. Unscrew the immobilizer lockring and withdraw the location bush from the LP drive shaft, then turn the holder and withdraw its lobes through the cutaways in the LP drive shaft. Slide the location bush over the holder, then screw the lockring onto the holder.
- (10) Offer the adapter (Tool 891) (Ref.Fig.552) into the centre of the intermediate case and rest it on the bevel gear.
- (11) Screw the extension (Tool 521) onto the hydraulic mechanical driver (Tool 900). Offer the driver to the adapter, slide the driver housing into the adapter and screw the housing onto HP rotor shaft front.

CAUTION: Do not overtighten.



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (12) Connect the feed pipe from a hand operated hydraulic pump to the hydraulic driver connection (Ref.Fig.552). Operate the hand pump and apply a pressure to the driver, ensuring that as the piston moves down, the thrust plate locates correctly over the adapter. Apply a pressure of 7500 psig (51 700 kPa) to the driver. Bolt a (Mercer) clock gauge to the clock holder, positioning the pointer in the hole in the thrust plate and engage it on the pin. Ensure the pressure of 7500 psig (51 700 kPa) is maintained, then set the clock to '0' and check for evidence of creep for a period of 5 minutes. If creep occurs, check for a further period of 5 minutes. Repeat until no creep occurs.
- (13) Release and remove the clock gauge. Release the hydraulic pressure and check that the driver thrust plate rises (under its spring pressure). Disconnect the feed pipe from the driver then unscrew and withdraw the driver and extension. Remove the adapter from the intermediate case.

**CAUTION:** THE FRANGIBLE PROBES ARE SUSCEPTIBLE TO DAMAGE DURING ASSEMBLY OF THE ENGINE MODULES, AND IF KNOCKED THEY SHOULD BE REMOVED AND SUBJECTED TO AN INSPECTION FOR CRACKING AND DISTORTION. IF A PROBE IS FOUND DAMAGED IT SHOULD BE REJECTED.

- (14) Place the labyrinth probe ring (72-61-00/1-30) in a freezing agent (2-3 min in liquid nitrogen or 15 min in Cardice). Using protective gloves remove the probe ring from the freezing agent and offer the ring over the HP rotor shaft front to locate in the recessed face of the bevel gear. Ensure the probe ring seats correctly on the gear and does not foul the HP probe.
- (15) Offer the locking washer (72-61-00/1-20) into the probe ring and locate the washer lugs in the probe ring cutaways. Apply lubricant 'B' to the threads of the rotor shaft front then screw the LEFT-HAND threaded retaining nut (72-61-00/1-10) onto the shaft. Locate the spanner wrench steady (Tool 397) (Ref.Fig. 554) on the inner part of the intermediate case and secure the steady with its captive bolts, then hand-tighten the retaining nut using spanner wrench (Tool 1324).

SUB-ASSEMBLY

**72-33-00**

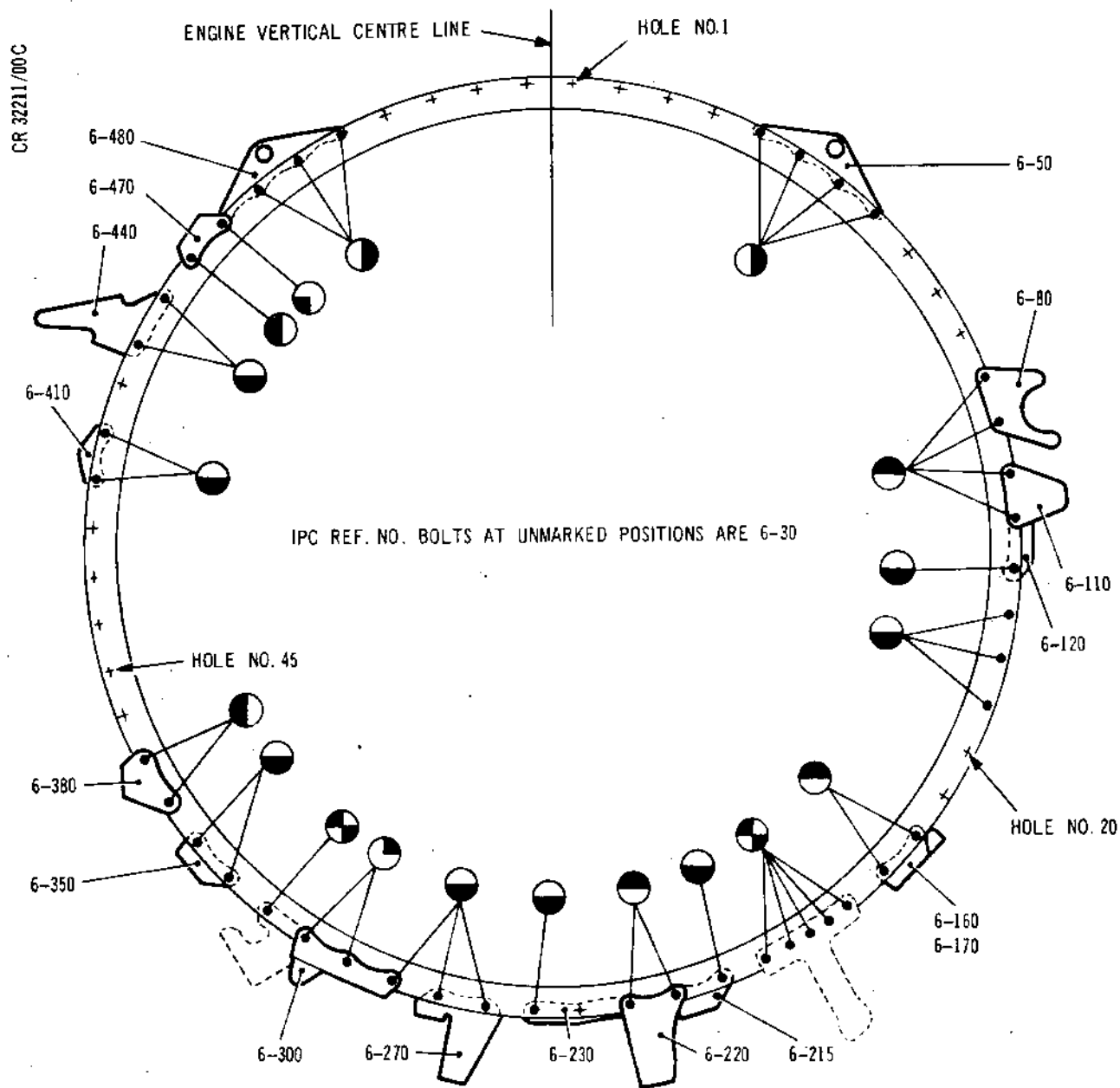
Page 598.60

Dec 1/97



OLYMPUS 593

MK.610-14-28  
OVERHAUL



DIAGRAMMATIC VIEW LOOKING FORWARD ON FRONT FLANGE OF HP COMPRESSOR CASE (FRONT)

6-320 6-390 6-490 6-500 6-200 6-330 6-60 6-510  
6-90 6-130 6-180 6-250 6-140 6-147 6-240 6-280 6-310 6-360 6-420 6-450

IPC REF. NO. OF BOLTS AT POSITIONS INDICATED

Positioning Brackets and Bolts on HP Compressor Case/  
Intermediate Case Abutment Flanges  
Figure 553

SUB-ASSEMBLY  
**72-33-00**  
Page 598.61  
Jun 1/77

PRINTED IN ENGLAND

TN26868



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (16) Apply lubricant 'B' to 20 bolts (6-30) and 3 bolts (6-147), then assemble the bolts (6-30) and nuts (6-20) to the unmarked bolt positions and the bolts (6-147) and nuts (6-145) to the holes numbered 17, 18 and 19 on the HP compressor/intermediate case flange (Ref.Fig.553).
- (17) Release the mechanical jack lockring and unscrew the jack (Tool 1029) (Ref.Fig.548) to lower its inner member and through the HP drive shaft the intermediate case, until its flange abuts the HP case. Lower the jack a further 0.125 in. (3,175 mm) approx. then lock the lockring. Ensure the flange nuts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m), torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (18) Offer the immobilizer (Tool 387) (Ref.Fig.554) over the LP drive shaft and engage it in the cutaways inside the HP rotor shaft front. Ensure that the multiplier (Tool 1022) is bolted to the spanner wrench (Tool 386), then offer the spanner/multiplier over the immobilizer and engage the multiplier square drive in the immobilizer. Turn the HP rotor shaft as necessary to engage the spanner pin in the cutaway in the steady and the spanner dogs in the retaining nut. Using a torquemeter wrench in the multiplier, torque-tighten the 'LEFT-HAND' threaded retaining nut between 1200 lbf ft and 1300 lbf ft (1627 and 1763 N.m) (readings of 48 to 52 lbf ft on the wrench because of the 25 to 1 multiplier). Remove the torquemeter wrench, multiplier/spanner, immobilizer and steady from the assembly. Do not lock the locking washer.
- (19) Offer the steady support (Tool 396) (Ref.Fig.555) over the LP drive shaft and locate its flanged spigot in the intermediate inner case. Align the clearance hole in the steady with the stepped pin in the casing, then screw the steady bolts into the casing. Screw in on the hand nut until the support abuts the LP drive shaft.

TN34388

SUB-ASSEMBLY

**72-33-00**

Page 598.62

Jun 1/77



OLYMPUS 593

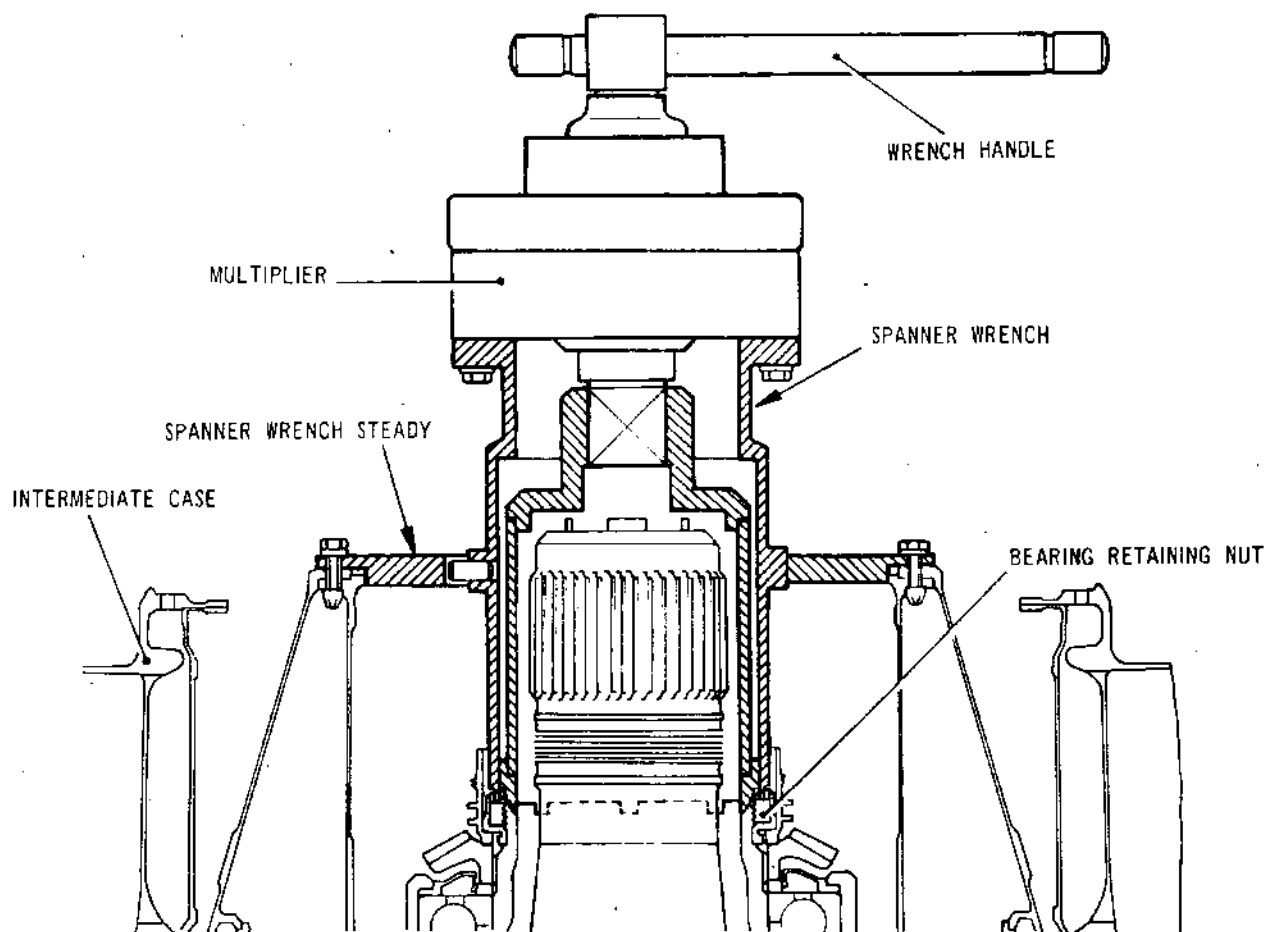
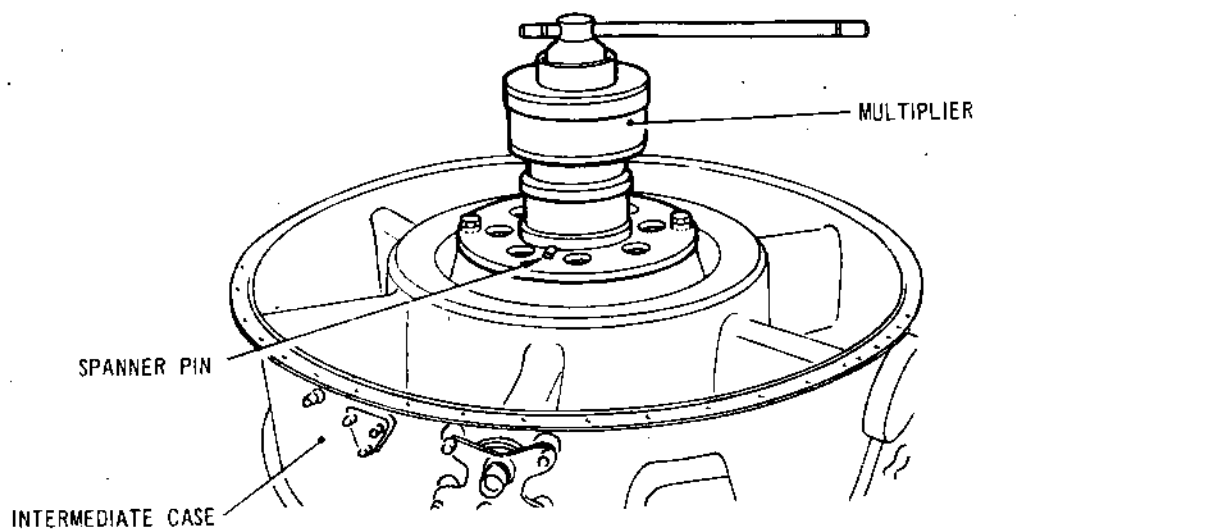
MK.610-14-28

OVERHAUL



CR 32051/00A

PRINTED IN ENGLAND



TN21649

Tightening HP Rotor Bearing Retaining Nut  
Figure 554

SUB-ASSEMBLY  
**72-33-00**  
Page 598.63  
Jun 1/77





OLYMPUS 593

MK.610-14-28

OVERHAUL



C. Check the HP Rotor Shaft Front Adjusting Washer for Correct Thickness.

- (1) Rotate the pit stand arms 180 deg until the rear bearing adapter is uppermost. Release the mechanical jack lockring, then release the jack by unscrewing.
- (2) Using the 'GO' and 'NO GO' checking gauges (Tool 50) check the clearance between the rear (bottom) outer blade platforms of the stage 7 rotor disk and the three internal bosses in the rear bearing adapter (Ref.Fig.511 for the position). The clearance must be between 2.307 and 2.312 in. (58,597 and 58,724 mm). If the gap (as indicated by the gauges) is incorrect, the adjusting washer (72-33-02/1-10) assembled to the rotor shaft front must be replaced by an adjusting washer of the required thickness, to give the correct clearance (Ref. para.G. for the procedure).
- (3) On completion of a satisfactory clearance check between the stage 7 rotor disk and the rear flange of the HP rear case, screw in on the mechanical jack until it abuts the HP drive shaft, then lock the lockring. Rotate the pit stand arms 180 deg. Release the steady/support (Tool 396) captive bolts and remove the steady.
- (4) Lock the retaining nut (72-61-00/1-10) with its locking washer (72-61-00/1-20) using the peening fixture (Tool 990) and pins (Tool 991, 1009 and 1010).
  - (a) Offer the fixture over the LP drive shaft and into the labyrinth, positioning the 'C' washer at the position the washer is to be locked, and locating the locator pin in a castellation of the nut.

TN478

SUB-ASSEMBLY

**72-33-00**

Page 598.64

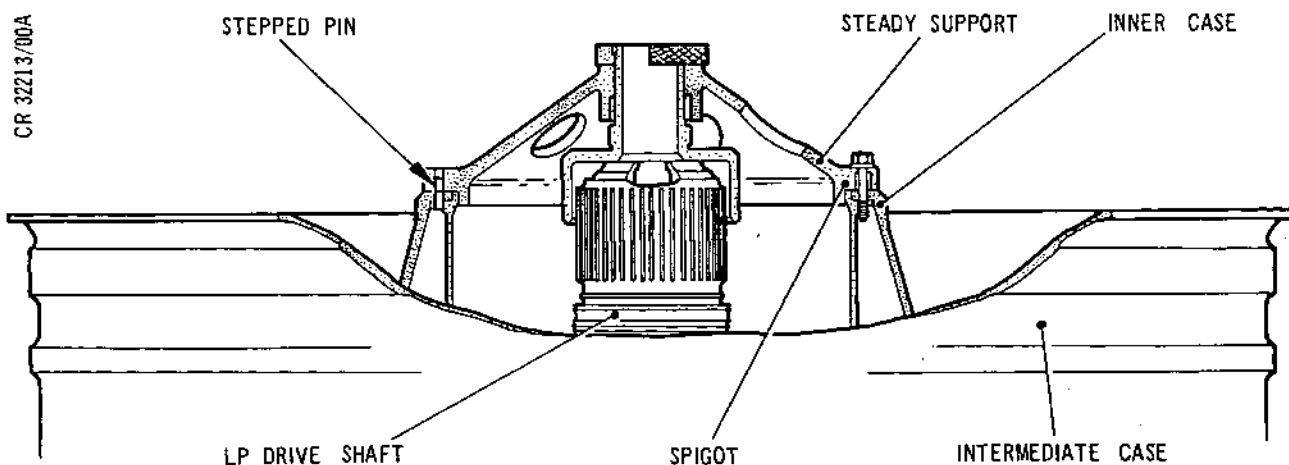
Jun 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



Assembling LP Drive Shaft Steady Support to Intermediate Case  
Figure 555

SUB-ASSEMBLY

**72-33-00**

Page 598.65

Jun 1/77

**OLYMPUS 593**

MK.610-14-28

sneema

OVERHAUL

Printed in England

- (b) Insert No.1 pin (Tool 991) into the hole in the fixture by the 'C' washer aligning the flat on the pin with the grub screw in the fixture. Using a drift and hammer, drift No.1 pin down onto the locking washer until the pin abuts the 'C' washer.
- (c) Remove No.1 pin from the fixture, then use No.2 and 3 pins (Tool 1009 and 1010) (in sequence) to lock the washer into the castellations of the retaining nut.
- (d) Using the fixture and pins (in sequence) lock the nut at a further two positions, ensuring that the three positions the nut/washer are locked at, are evenly spaced.

**D. Assemble the Static Seal Housing to the Intermediate Case.**

- (1) Check that the 12 hollow locating pins (72-32-00/5-70) are assembled to the seal housing then assemble the housing (72-32-00/5-40) (note the offset position) to its segmented location in the inner case (Ref.Fig.556).
- (2) Assemble a keywasher (72-32-00/5-60) to each of the housing securing bolt positions, apply lubricant B to the threads of the bolts (72-32-00/5-50) then secure the housing to the inner case.
- (3) Torque-tighten the bolts between 80 and 90 lbf in. (9,0 and 10,2 N.m) and lock the keywashers.

**E. Determine Thickness of LP Bearing Failure Probe Adjusting Washers (Ref.Fig.556).**

**CAUTION:** THE FRANGIBLE PROBES ARE SUSCEPTIBLE TO DAMAGE DURING ASSEMBLY OF THE ENGINE MODULES, AND IF KNOCKED THEY SHOULD BE REMOVED AND SUBJECTED TO AN INSPECTION FOR CRACKING AND DISTORTION. IF A PROBE IS FOUND DAMAGED IT SHOULD BE REJECTED.

**NOTE:** If the dimension 'D' and the thickness of the adjusting washers (72-32-00/3-180) were recorded during assembly of the Intermediate Case Assembly (Ref. Assembly 72-32-00 Para.14.B), proceed to Para.(4).

SUB-ASSEMBLY

**72-33-00**

Page 598.66

Jun 1/99



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (1) Measure and record the thickness of the two probe adjusting washers (72-32-00/3-180).
- (2) Assemble the two adjusting washers, the probe and probe retainer (72-32-00/3-170, 160) to the intermediate case and temporarily secure them with bolts (72-32-00/3-150).
- (3) Measure from the front face of the intermediate case (inner) flange to the rear face of the probe and record as dimension 'D'.
- (4) Obtain dimension 'G' recorded during dimensional check of the LP Compressor Assembly on engine build (Ref. Assembly 72-00-00 Para.7.A) (or Sub-assembly 72-31-00 Para.2.D, if recorded during build of the LP Compressor Assembly).

NOTE: If the dimension 'G' is not available, pass dimensions recorded in paras.(1) and (3) to engine build section for use in final calculation of required washer thickness.

- (5) Using the following formula, calculate the required thickness of the LP probe adjusting washers (72-32-00/3-180) to produce the desired clearance between the probe and probe operating ring of between 0.024 and 0.029 in. (0,609 and 0,736 mm) for SB.72-21 standard, or between 0.020 and 0.025 in. (0,508 and 0,635 mm) for pre-SB.72-21 standard engines.
  - (a) The required adjusting washer thickness =  

$$D + (\text{size of washer assembled for check}) + (\text{desired clearance}) - G.$$
- (6) If adjustment is required, select two adjusting washers (72-32-00/3-180) that will produce a clearance between 0.024 and 0.029 in. (0,609 and 0,736 mm) for SB.72-21 standard, or between 0.020 and 0.025 in. (0,508 and 0,635 mm) for pre-SB.72-21 standard engines.

SUB-ASSEMBLY

**72-33-00**

Page 598.66A

Jun 1/99



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (7) Remove the LP probe and retainer (72-32-00/3-170, -160) from the oil distributor, then remove the two adjusting washers used for the check.
- (8) Reassemble the LP probe, retainer and the two selected adjusting washers (72-32-00/3-180) (72-09-21 Repair, Fig.407) to the oil distributor. Secure the probe with two bolts (72-32-00/3-150) lubricated with lubricant 'A'. Torque-tighten the bolts to 135 lbf in. (15,2 N.m.). Locking (run-down) torque 3.5 lbf in. (0,4 N.m.).

F. Assemble the Probe Assembly to the Intermediate Case Oil Distributor (Ref.Fig.556).

CAUTION: THE FRANGIBLE PROBES ARE SUSCEPTIBLE TO DAMAGE DURING ASSEMBLY OF THE ENGINE MODULES, AND IF KNOCKED THEY SHOULD BE REMOVED AND SUBJECTED TO AN INSPECTION FOR CRACKING AND DISTORTION. IF A PROBE IS FOUND DAMAGED IT SHOULD BE REJECTED.

SUB-ASSEMBLY

72-33-00

Page 598.66B

Dec 31/01

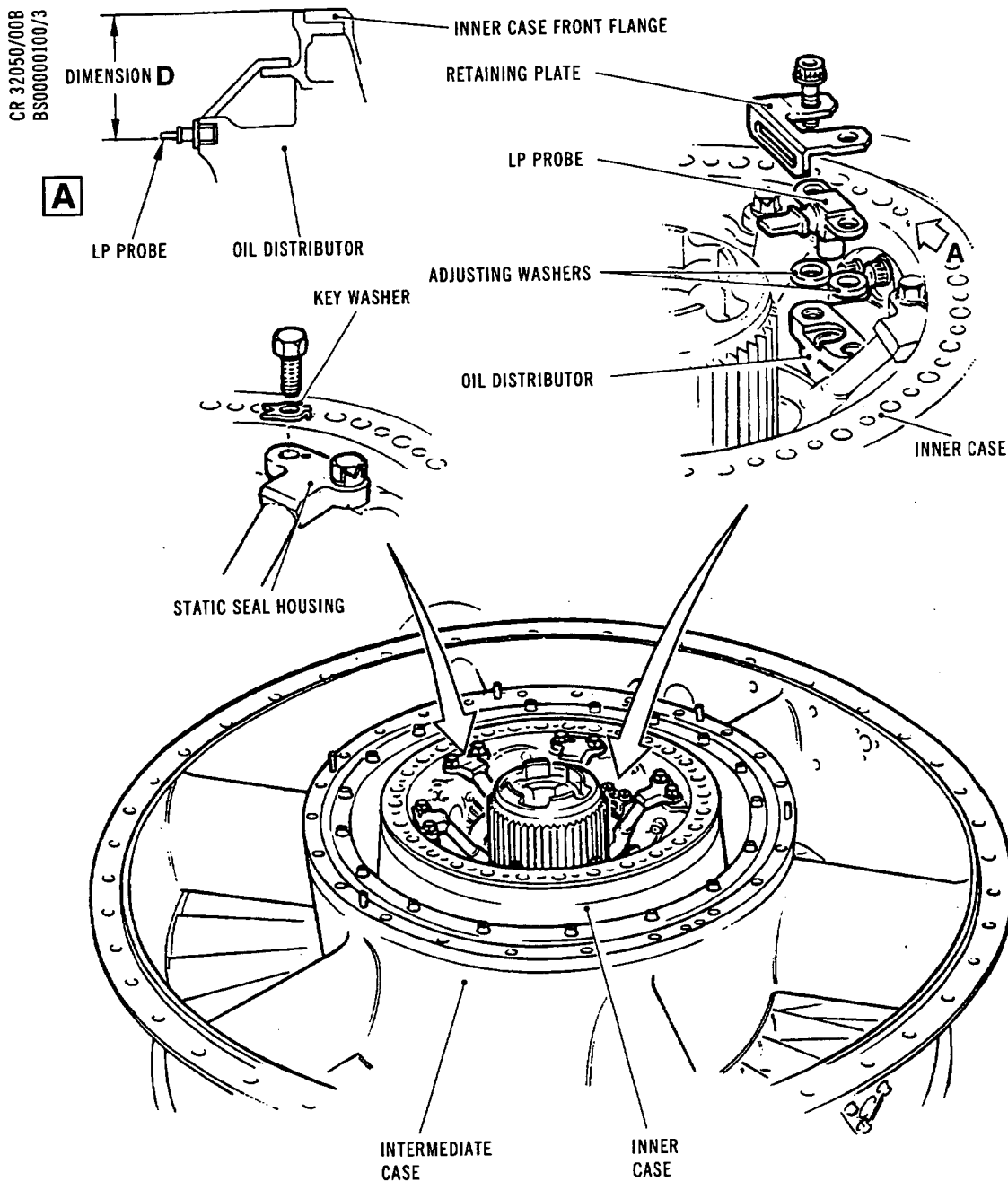


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Assembling Static Seal Housing to Intermediate Case  
Figure 556



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (1) Position the two adjusting washers (72-32-00/3-180) over the tapped holes in the oil distributor block (72-32-00/3-410) in line with No.2 vane position. Assemble the probe (72-32-00/3-170) to the probe retainer (72-32-00/3-160). Apply lubricant 'A' to the threads of the two bolts (72-32-00/3-150) then assemble the bolts to the probe assembly. Locate the probe in the distributor block and the bolts through the adjusting washers. Screw the bolts into the block and ensure the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m), torque-tighten to 135 lbf in. (15,2 N.m).
- (2) Offer the steady support (Tool 396) (Ref.Fig.555) over the LP drive shaft and locate its flanged spigot in the intermediate inner case. Align the clearance hole in the steady with the stepped pin in the casing then screw the steady bolts into the case. Screw in the hand nut until the support abuts the LP drive shaft.
- (3) Rotate the pit stand arms 180 deg until the rear bearing adapter is uppermost.

#### G. Assemble the Brackets to the Compressor/Intermediate Case.

- (1) Assemble the brackets to the compressor case/intermediate case abutment flanges as shown on Fig.553. Apply lubricant 'B' to the securing bolts. Ensure the nuts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m), torque-tighten the locknuts between 67 and 73 lbf in. (7,6 and 8,2 N.m).

NOTE: The HP compressor/intermediate case assembly build is now complete. The assembly must now be transferred to the mobile stand and prepared for engine build. (Ref.para.12).

#### H. Replacement of the HP Rotor Shaft Front Adjusting Washer.

NOTE: The procedure for replacing the adjusting washer need only be carried out if the gauge check (Ref.para.C) is incorrect.

- (1) Rotate the pit stand arms 180 deg until the intermediate case is uppermost. Release and remove the nuts and bolts from the intermediate case/HP front case flanges. Release and remove the steady support from the LP drive shaft.

SUB-ASSEMBLY

## 72-33-00

Page 598.68

Dec 31/01



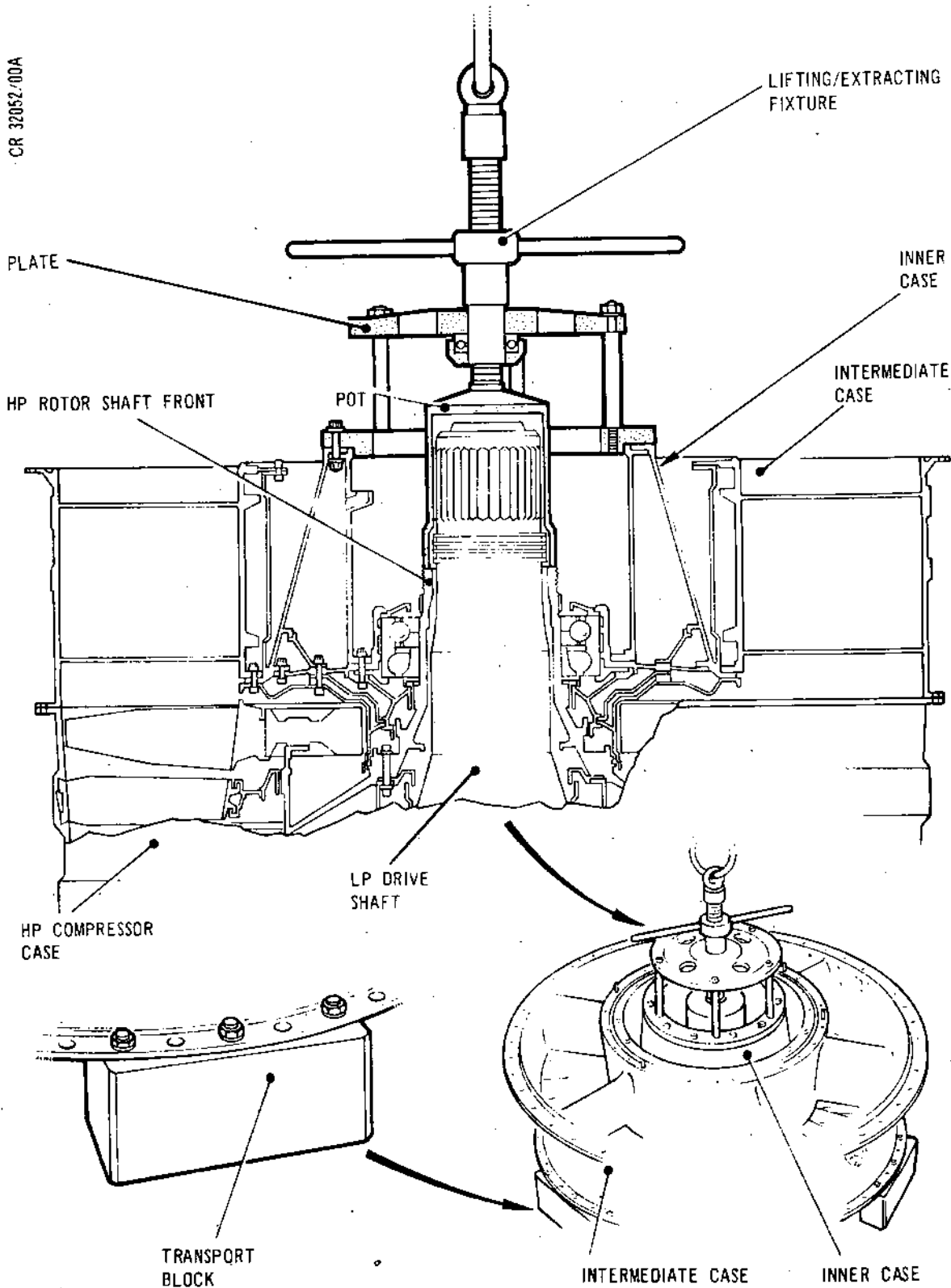
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 32052.00A



Removing Intermediate Case  
Figure 557

SUB-ASSEMBLY  
**72-33-00**  
Page 598.69  
Jun 1/77

PRINTED IN ENGLAND

TN14391





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Release the mechanical jack (Tool 1029) lockring, then screw in on the jack until the HP support sleeve (Tool 1031) lightly abuts the HP drive shaft bearing. Screw the LP support sleeve (Tool 1030) onto the HP drive shaft until it lightly abuts the slave distance piece.
- (3) Locate the spanner steady (Tool 397) on the inner part of the intermediate case and secure the steady to the case with its captive bolts. Offer the immobilizer (Tool 387) (Ref.Fig.554), over the LP drive shaft and engage it in the cutaways inside the HP rotor shaft front. Ensure that the multiplier (Tool 1022) is bolted to the spanner wrench (Tool 386), then offer the spanner/multiplier over the immobilizer and engage the multiplier square drive in the immobilizer. Turn the HP rotor shaft as necessary to engage the spanner pin in the cutaway in the steady and the spanner dogs in the retaining nut. Using a torque-meter wrench in the gearbox, unscrew the 'LEFT-HAND' threaded retaining nut. Remove the torquemeter wrench, multiplier/spanner and immobilizer from the assembly. Remove the retaining nut and locking washer from the HP rotor shaft front.
- (4) Remove the intermediate case from the HP front case (Ref.Fig.557).
  - (a) Attach a hoist to the lifting/extracting fixture (Tool 411) lifting ring then position the hoist over the intermediate case.
  - (b) Screw in the extractor handle, then lower the extractor onto the intermediate inner case locating the extractor clearance hole over the dowel in the intermediate case flange, and aligning the captive bolts of the extractor with the tapped holes in the case. Screw in and fully tighten the captive bolts.

TN47754

SUB-ASSEMBLY

**72-33-00**

Page 598.70

Jun 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (c) Unscrew the extractor handle so that the extractor pot abuts the HP rotor shaft front, then continue unscrewing the extractor handle until the intermediate case/HP rotor bearing is released from the rotor shaft front.

NOTE: The extractor handle will be stiff to turn, but this is normal.

- (d) Raise the hoist until the intermediate case is clear, then position it over a suitable pallet. Bolt three (evenly spaced) transport blocks (Tool 1232) to the bottom flange of the outer case, then lower the case onto the pallet. Release the hoist.
- (5) Withdraw the adjusting washer from the rotor shaft front. Offer an adjusting washer, of the required thickness, as ascertained in para.C.(2) over the rotor shaft front. Ensure that the washer seats correctly without any gap between it and the rotor shaft front.
- (6) Assemble the immobilizer (Tool 1352) to the LP drive shaft (Ref.Fig.551).
- (a) Unscrew the lockring and withdraw the location bush.
- (b) Offer the holder into the LP drive shaft sliding the four lobes of the holder through the four cutaways in the LP drive shaft, then turn the holder so that the lobes locate behind the lands of the LP drive shaft.
- (c) Slide the location bush down over the holder ensuring that the bush locking pin locates in one of the cutaways in the drive shaft. Screw the lockring onto the holder shaft and tighten the lockring.



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (7) Screw in the handle of the lifting/extracting fixture (Tool 411) then attach a hoist to its lifting ring. Raise the hoist and release and remove the three transport blocks (Tool 1232) from the rear flange of the case. Position the intermediate case over the HP front case, then examine the bearing inner races and align the V marks on the races with one another and ensure the oil thrower is flush with the races. Steadily lower the case guiding the oil thrower and inner races over the immobilizer and onto the rotor shaft front. Release and remove the lifting fixture from the intermediate case and the hoist.
- (8) Offer the mechanical puller (Tool 1351) (Ref.Fig.552) to the immobilizer and screw the handle onto the immobilizer shaft.
- (9) Screw the puller handle onto the immobilizer and press the bearing inner races onto the rotor shaft front. When the intermediate case rear flange is approx. 0.70 in. (17,7 mm) from the HP front case flange, align the serrations on the bevel gear with those on the rotor shaft front. Extreme care must be taken until the serrations are meshed to ensure they do not abut, but align with one another, by viewing through the view/access holes in the puller, or if in doubt, by removing the puller to ensure alignment, before continuing to press the bearing on. As the flanges of the intermediate and HP front case approach each other, align the locating dowel hole in the intermediate case flange with the locating dowel in the HP front case flange. Ensure the bearing has been pressed fully onto the rotor shaft front.
- (10) Unscrew the handle of the puller and remove it from the immobilizer. Unscrew the restrainer lockring and withdraw the location bush from the LP drive shaft, then turn the holder and withdraw its lobes through the cutaways in the LP drive shaft. Slide the location bush over the holder, then screw the lockring onto the holder.

TN47756



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (11) Offer the adapter (Tool 891) (Ref.Fig.552) into the centre of the intermediate case.
- (12) Screw the extension (Tool 521) onto the hydraulic mechanical driver (Tool 900). Lower the driver over the adapter until it abuts the HP rotor shaft front, screw the adapter housing onto the rotor.

NOTE: Do not overtighten.

- (13) Connect the feed pipe from a hand operated hydraulic pump to the hydraulic driver connection (Ref.Fig.552). Ensure the location pins in the bevel gear are positioned in the cutaways in the adapter, then operate the hand pump and apply a pressure to the driver, ensuring that as the piston moves down, the thrust plate locates correctly over the adapter. Apply a pressure of 7500 psig (51 700 kPa) to the driver. Bolt a (Mercer) clock gauge to the clock holder, positioning the pointer in the hole in the thrust plate and engage it on the pin. Ensure the pressure of 7500 psig (51 700 kPa) is maintained, then set the clock to '0' and check for evidence of creep for a period of 5 minutes. If creep occurs, check for a further period of 5 minutes. Repeat until no creep occurs.
- (14) Release and remove the clock gauge. Release the hydraulic pressure and check that the driver thrust plate rises (under its spring pressure). Disconnect the feed pipe from the driver then unscrew and withdraw the driver and extension. Remove the thrust adapter from the intermediate case.
- (15) Offer the locking washer (72-61-00/1-20) into the probe ring and locate the washer lugs in the probe ring cutaways. Screw the 'LEFT-HAND' threaded retaining nut (72-61-00/1-10) onto the rotor shaft. Locate the spanner wrench steady (Tool 397) on the inner part of the intermediate case and secure the steady with its captive bolts, then hand-tighten the retaining nut using spanner wrench (Tool 1324).

PRINTED IN ENGLAND

TN47757



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (16) Apply lubricant 'B' to 20 bolts (6-30) and 3 bolts (6-147), then assemble the bolts (6-30) and nuts (6-20) to the unmarked bolt positions and the bolts (6-147) and nuts (6-145) to the holes numbered 17, 18 and 19 on the HP compressor/intermediate case flanges (Ref.Fig.553).
- (17) Release the mechanical jack lockring and unscrew the jack (Tool 1029) to lower its inner member and through the HP drive shaft the intermediate case, until its flange abuts the HP case. Lower the jack a further 0.125 in. (3,175 mm) approx. then lock the lockring. Ensure the flange nuts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m), torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (18) Offer the immobilizer (Tool 387) (Ref.Fig.554) over the LP drive shaft and engage it in the cutaways inside the HP rotor shaft front. Ensure that the multiplier (Tool 1022) is bolted to the spanner wrench (Tool 386), then offer the spanner/multiplier over the immobilizer and engage the multiplier square drive in the immobilizer. Turn the HP rotor shaft as necessary to engage the spanner pin in the cutaway in the steady and the spanner dogs in the retaining nut. Using a torque-meter wrench in the multiplier, torque-tighten the 'LEFT-HAND' threaded retaining nut 1200 lbf ft and 1300 lbf ft (1627 and 1763 N.m) (readings of 48 to 52 lbf ft on the wrench because of the 25 to 1 multiplier). Remove the torque-wrench, multiplier/spanner, immobilizer and steady from the assembly. Do not lock the locking washer.
- (19) Offer the steady support (Tool 396) (Ref.Fig.555) over the LP drive shaft and locate its flanged spigot in the intermediate inner case. Align the clearance hole in the steady with the stepped pin in the casing, then screw the steady bolts into the casing. Screw in on the hand nut until the support abuts the LP drive shaft.
- (20) Check the HP rotor shaft front adjusting washer for correct thickness, repeat para.C.

TN47758



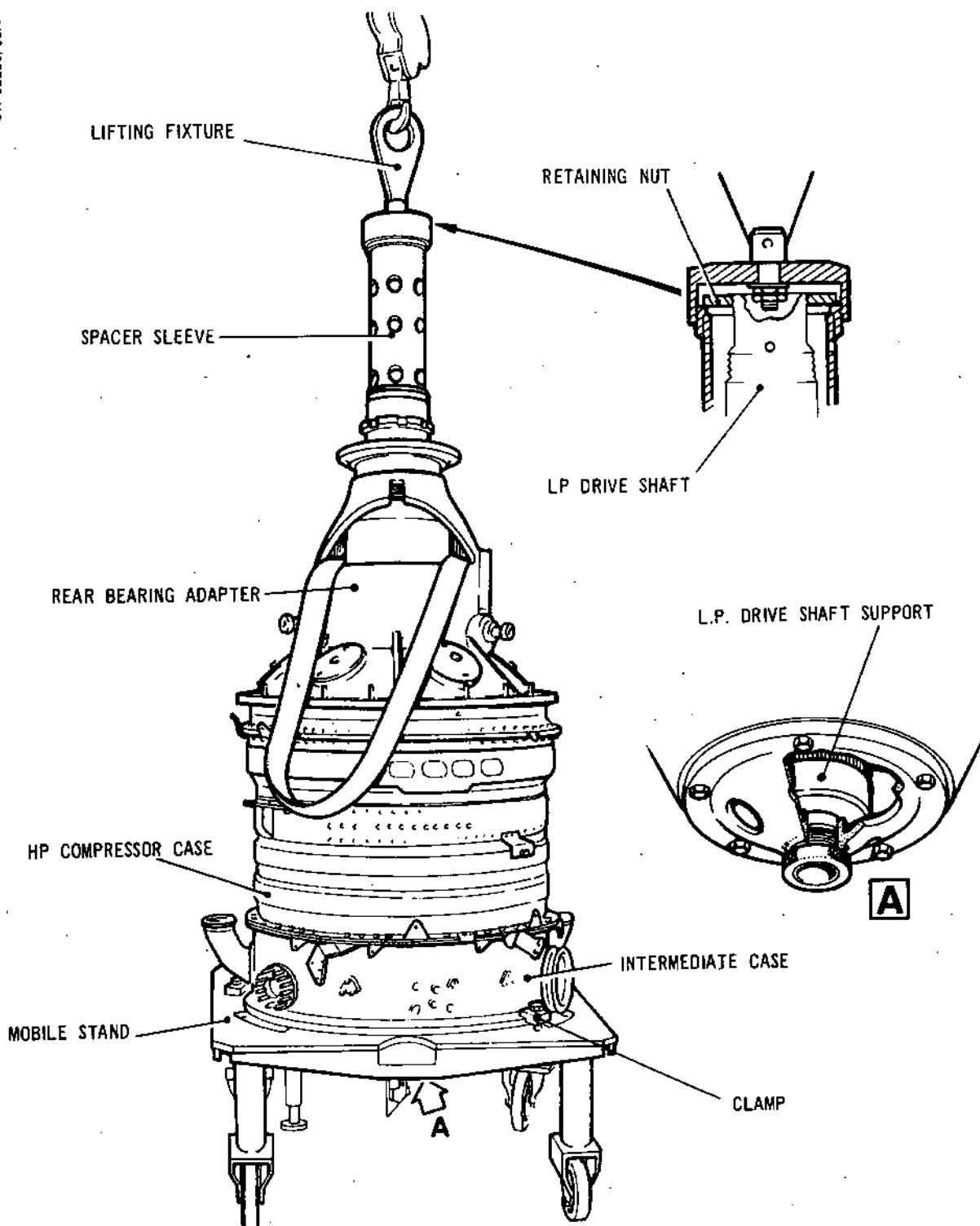
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32216/00A

PRINTED IN ENGLAND



TN47761

Assembling HP Compressor Assembly/Intermediate Case  
to Mobile Stand  
Figure 558

SUB-ASSEMBLY  
**72-33-00**  
Page 598.75  
Jun 1/77



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



12. Prepare the HP Compressor/Intermediate Case Assembly for Engine Build

A. Assemble the HP Compressor/Intermediate Case to the Mobile Stand (Ref.Fig.558).

- (1) Unscrew and remove the three restrainer screws (Tool 1226) (Ref.Fig.548) from the LP support sleeve (Tool 1030), then unscrew and remove the sleeve from the HP drive shaft.
- (2) Unscrew the captive bolts of the mechanical jack (Tool 1029) until released from the adapter, then remove the jack from the adapter. Unscrew and remove the HP support sleeve (Tool 1031) from the HP drive shaft, then unscrew and remove the guide sleeve (Tool 377) from the LP drive shaft.
- (3) Offer the spacer sleeve (Tool 389) over the LP drive shaft and screw it onto the HP drive shaft until it abuts the rear bearing adapter, then screw the slave retaining nut (Tool 1042) into the LP drive shaft until it abuts the spacer sleeve.
- (4) Screw the lifting fixture (Tool 1043) onto the spacer sleeve, then attach a hoist to the lifting fixture. Remove the nuts and washers securing the rear bearing adapter extensions to the pit stand arms. Steadily raise the hoist until the arm locating pins are clear, then traverse the hoist and guide the assembly out sideways from the pit stand, and position it over the mobile stand (Tool 1036). Ensure the brake of the mobile stand is applied and the stand clamps are clear. Steadily lower the assembly onto the stand and secure with the stand clamps. Release the hoist.
- (5) Unscrew and remove the lifting fixture (Tool 1043), then unscrew and remove the retaining nut (Tool 1042) from the LP drive shaft. Unscrew and remove the spacer sleeve (Tool 389) from the HP drive shaft. Assemble the split sleeves (Tool 1058) to the LP drive shaft.

TN25614



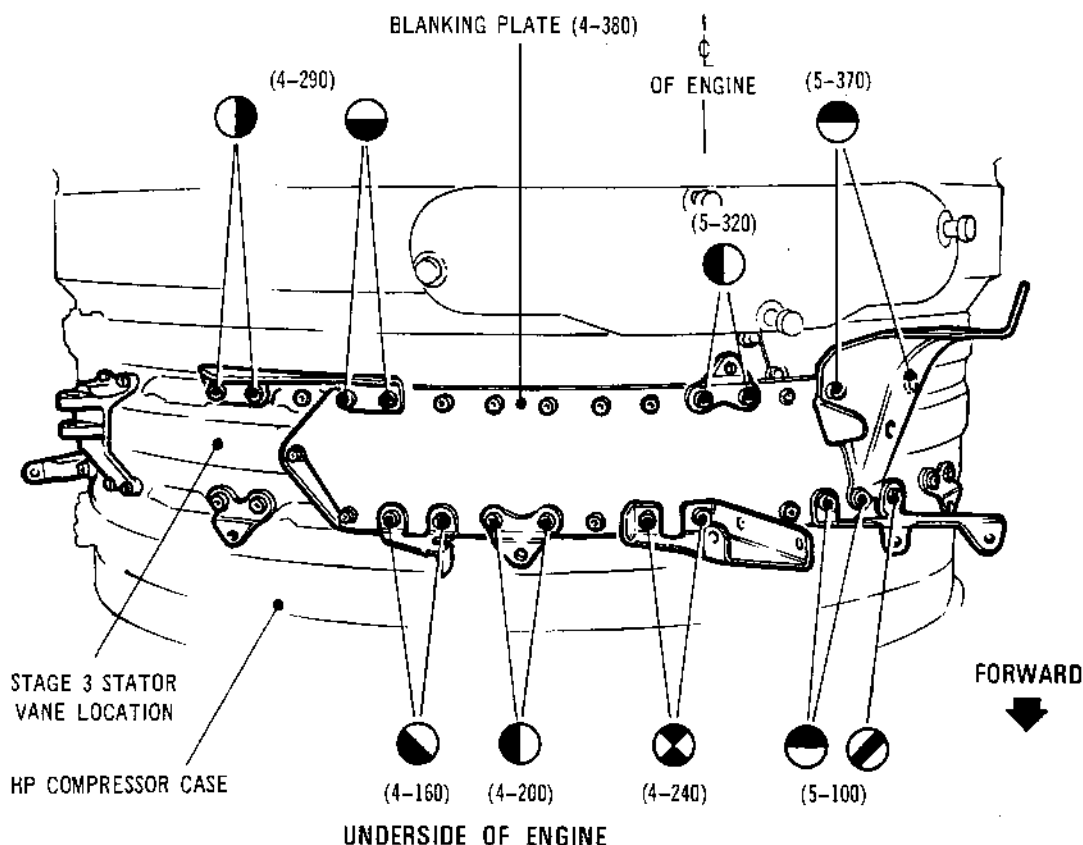
# OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33799/00A

PRINTED IN ENGLAND



BRACKETS		SECURING BOLTS AND WASHERS			
CASE WITH BLANKING PLATE	CASE WITHOUT BLANKING PLATE		CASE WITH BLANKING PLATE	CASE WITHOUT BLANKING PLATE	
4-290	4-280		4-260	4-250	{ 5-380/5-110 FITTED BETWEEN BRACKET AND COMPRESSOR CASE (ONLY REQUIRED WHEN BLANKING PLATE FITTED)
5-320	5-310		4-270	5-290	
5-370	5-360		5-300	5-330	
			5-340	5-350	
5-100	5-90		5-350	5-350	
			5-70 } 5-80	5-60 } 5-80	
			5-50 }	5-40 }	
4-240	4-230		4-220	4-210	
4-200	4-190		4-180	4-170	
4-160	4-150		4-130	4-120	
BLANKING PLATE SECURING BOLTS 4-360 (13 OFF)					

Assembling Brackets to Underside of HP Compressor Case  
Figure 559

SUB-ASSEMBLY  
**72-33-00**

Page 598.77  
Jun 1/77





OLYMPUS 593

MK.610-14-28

OVERHAUL



- (6) Pass the larger end of the canvas protector (Tool 210) over the LP drive shaft and position and tighten its lower draw string below the larger rear bearing adapter flange. Tighten and tie off the upper draw string to enclose the LP drive shaft.

B. Assemble Brackets to the HP Compressor Case (Front) at Stage 3 Stator Vane Location.

- (1) Assemble brackets to the underside of the compressor case (Ref.Fig.559).

NOTE: Two standards of HP compressor case (front) are in existence, some require a blanking plate at the stage 3 stator vane location.

- (a) To a case requiring a blanking plate assemble the blanking plate (4-380) to the case and secure with 13 bolts (4-360). Ensure each bolt is lubricated, lubricant 'A', and has a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m). Torque-tighten to 100 lbf in. (11,5 N.m). Wire-lock each plate end, securing bolt to an adjacent bolt.
- (b) To a case requiring a blanking plate assemble and secure the following brackets (4-290), (5-320), (5-370), (5-100), (4-240), (4-200) and (4-160) to the case as shown in Fig.559. Apply lubricant 'A' to the threads of all securing bolts and ensure each bolt has a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m). Torque-tighten the securing bolts to 100 lbf in. (11,5 N.m).

SUB-ASSEMBLY

**72-33-00**

Page 598.78

Apr 1/82



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 33800/00A

STAGE 3 STATOR  
VANE LOCATION

OIL COOLER FRONT  
MOUNTING BRACKET

(4-110)

FORWARD  
↓

BRACKET (5A-170)  
POST MOD 7848

(5-400)

LEFT HAND SIDE

(4-30)

(4-350)

VANE SECURING BOLT

(5-130)

FORWARD  
↓

INTERMEDIATE CASE FLANGE

(5-270)

RIGHT HAND SIDE

GUIDE TUBE

FORWARD  
↓

Assembling Brackets to Left and Right-Hand Side of  
HP Compressor Case  
Figure 560

SUB-ASSEMBLY  
**72-33-00**  
Page 598.79  
Jun 1/77



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (c) To a case not requiring a blanking plate assemble and secure the following brackets (4-280), (5-310), (5-360), (5-90), (4-230), (4-190) and (4-150), to the case as shown in Fig.559. Apply lubricant 'A' to the threads of all securing bolts and ensure each bolt has a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m). Torque-tighten the securing bolts to 100 lbf in. (11,5 N.m).
- (2) Assemble brackets to the left and right-hand side of the compressor case (Ref.Fig.560).
  - (a) Apply lubricant 'A' to all bolts unless stated otherwise. Check that all bolts have a minimum locking (run-down) torque of 10 lbf in. (1,1 N.m) unless stated otherwise.
  - (b) Assemble the bracket (4-30) to the case, secure with two bolts (4-10) and plain washers (4-20). Torque-tighten the bolts to 100 lbf in. (11,5 N.m).
  - (c) Assemble the bracket (4-350) to the case, secure with two bolts (4-340). Interpose two plain washers (4-355) between the bracket and case. Torque-tighten the bolts to 100 lbf in. (11,5 N.m).
  - (d) Assemble the oil cooler front mounting bracket (4-60A), (4-60B).
    - (i) On engines pre-SB.72-10 locate the distance piece (4-70) on the forward (lower) headless pin and align the bolt-holes. Assemble the bracket (4-60) to the case and secure with four bolts, two bolts (4-50) in the forward location and two bolts (4-40) in the rear (upper) location. Torque-tighten the bolts to 100 lbf in. (11,5 N.m).



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

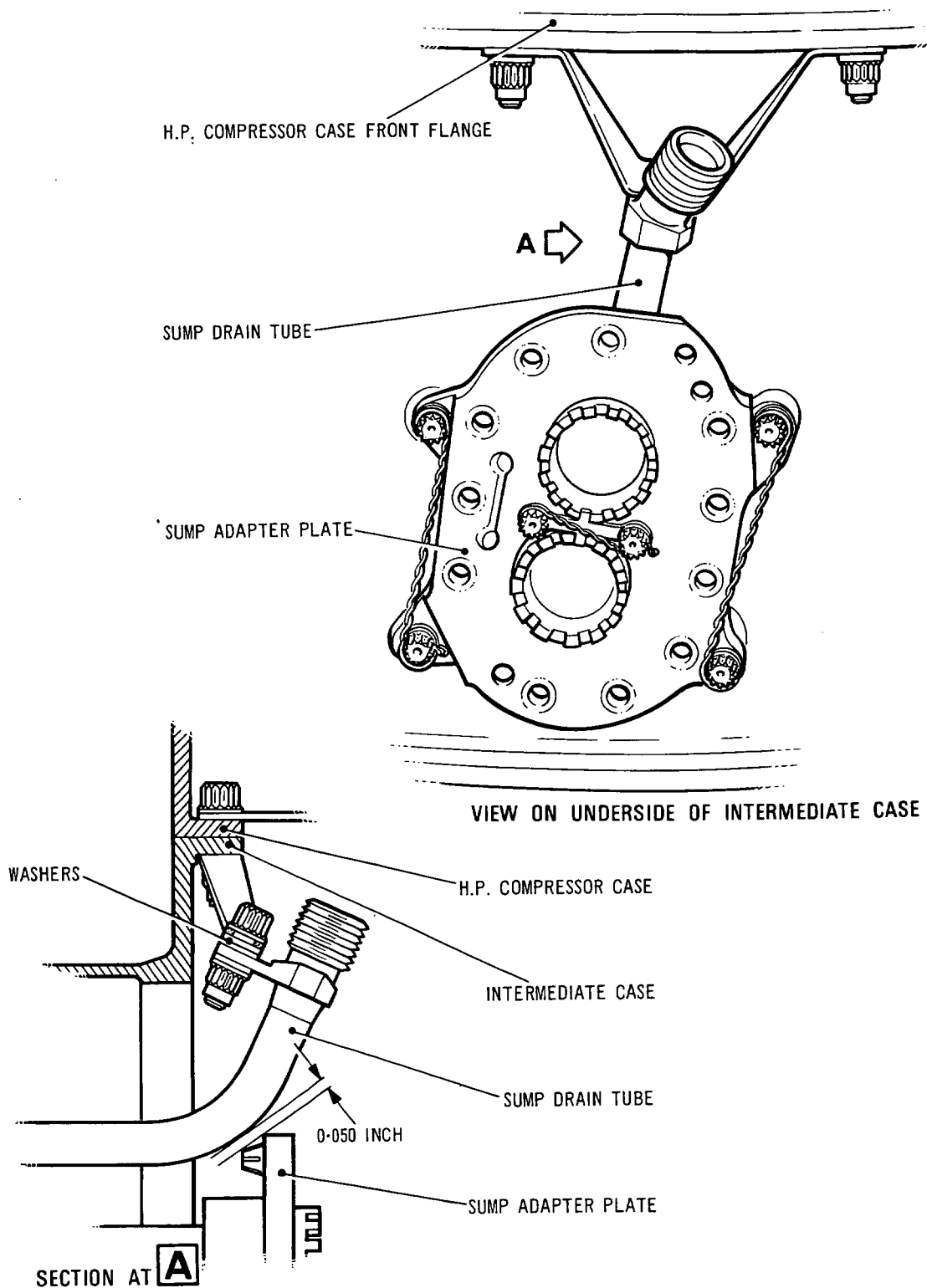
- (ii) On engines embodying SB.72-10 assemble the bracket (4-60B) to the case and secure with four bolts (4-50B). Torque-tighten the bolts to 100 lbf in. (11,5 N.m).
- (e) Assemble the bracket (4-110) to the case and secure with two bolts (4-100). Torque-tighten the bolts to 100 lbf in. (11,5 N.m).
- (f) Assemble the bracket (5-130) to the case, secure with two bolts (5-120). Torque-tighten the bolts to 100 lbf in. (11,5 N.m).
- (g) On engines pre-Mod.7848 assemble the mounting bracket (aircraft supply) for the air starter air supply tube, secure using bolts (5-140). Torque-tighten and wire-lock bolts as for bracket (5A-170) para.h.
- (h) On engines embodying Mod.7848 assemble the mounting bracket (5A-170) to the case and secure with five bolts (5A-140B) with lubricant 'C' applied. Torque-tighten the bolts to 100 lbf in. (11,5 N.m). Wire-lock the central bolt in the upper flange to the vane securing bolt within the bracket. Wire-lock the right-hand bolt in the lower flange to the vane securing bolt above.
- (j) Assemble the bracket (5-270) to the case and secure with four bolts (5-280). Torque-tighten the bolts to 100 lbf in. (11,5 N.m). Secure the guide tube to the bracket (6-170) at the HP compressor/intermediate flange with two loop clamps (5-200) bolts (5-230) plain washers (5-220) and self-locking nuts (5-210). Position the plain washers beneath the boltheads. Torque-tighten to 100 lbf in. (11,5 N.m).

SUB-ASSEMBLY

72-33-00

Page 598.81

Dec 31/01



Securing the Intermediate Case Sump Drain Tube  
Figure 561



OLYMPUS 593



MK.610-14-28  
OVERHAUL

snecma

- (k) Assemble the bracket (5-400A) to the case and secure with two bolts (5-390A), on engines embodying Mod.8160 assemble the bracket (5A-400B). On engines embodying SB.75-10 assemble the bracket (5A-400C) secure this bracket with two bolts (5A-390B) and plain washers (5A-395). Torque-tighten the bolts to 100 lbf in. (11,5 N.m).
- (l) All unused holes at the stage 3 stator vane location are to be blanked using bolts (4-320) and plain washers (4-330).
- (m) Secure the intermediate case drain tube to the bracket (6-230) located on the HP compressor/ intermediate case flange. Use bolt (72-32-00/4-320) with lubricant 'A' applied, plain washers (72-32-00/4-330) and nut (72-32-00/4-310). To make up any gap between the tube flange and bracket use any number of the three washers for packing purposes as required. Washers not used for this purpose must be positioned beneath the nut (Ref.Fig.561). Ensure the nut has a locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten to 135 lbf in. (15,2 N.m).

CAUTION: DO NOT ATTEMPT TO DISTORT TUBE TO ACHIEVE ALIGNMENT.

- (n) After the tube has been secured check that the clearance between the tube and the sump adapter plate is not less than 0.050 in. (1,270 mm).

NOTE: The assembly is now ready to be transferred to engine build 72-00-00 Assembly.

NOTE: If SB.72-91 has been incorporated, module interchangeability will be affected. Check to ensure that the module identification plate is in accordance with the interchangeability chart.

**OLYMPUS 593**

MK.610-14-28

sneema

OVERHAUL

HP COMPRESSOR CASE AND VANES - SUB-ASSEMBLYTABLE OF CONTENTS

Para.	Page
1. General ... ..	501
2. Assemble the Rear Case ... ..	501
A. Assemble Exit Guide Vanes to Rear Case ... ..	501
B. Assemble Exit Guide Vane Probe Blank Plugs to Rear Case... ..	504
C. Assemble Exit Guide Vane Probe Blank Plugs to Rear Case... ..	504
D. Assemble Shouldered Pin... ..	505
3. Assemble the Front Case ... ..	505
A. Assemble Stage 5 Stator Vanes to Front Case ... ..	505
B. Assemble Stage 5 Probe Blank Plugs to Front Case ... ..	509
4. Assemble Items to Inner Fixing Rings ... ..	511
A. Assemble Items to Stage 1 Rings ... ..	511
B. Assemble Items to Stage 2 Rings ... ..	512

TABLE OF ILLUSTRATIONS

Fig.No.	Page
501 Assemble Exit Guide Vanes and Blanks to Rear Case... ..	503
502 Assemble Inner Fixing Rings and Stage 5 Vanes and Blanks to Front Case ... ..	506
502A Assemble Inner Fixing Rings, and Stage 5 Vanes and Blanks to Front Case ... ..	506A
502B Assemble Inner Fixing Rings, and Stage 5 Vanes and Blanks to Front Case ... ..	506B
503 Inner Fixing Ring Anti-Fret Liner Assembly ... ..	510

SUB-ASSEMBLY

**72-33-01**

Contents 1

Dec 1/97



OLYMPUS 593

MK.610-14-28  
OVERHAUL



HP COMPRESSOR CASE AND VANES - SUB-ASSEMBLY

1. General

- A. Prior to commencing assembly, refer to 72-09-00 Assembly for general information.
- B. Throughout the text, special tools are quoted by their reference number; e.g. Tool 1324. For a complete List of the tooling required for assembly and for the Manufacturers Part Number, refer to Special Tools, Fixtures and Equipment, Table 1002.
- C. During the sub-assembly procedure, reference will be made to the Illustrated Parts Catalogue (I.P.C.) to identify those items where the nomenclature does not positively identify them due to the duplication of the title e.g. bolts, vanes, plugs etc. An item will be identified as bolt (3-60), the 3 referring to the I.P.C. Fig.No., and the 60 referring to the Item No.

2. Assemble the Rear Case (Ref.Fig.501)

A. Assemble Exit Guide Vanes to Rear Case.

- (1) Identify the top of the case by examining the periphery of the end flange for the word 'TOP', or, if this is not evident, examine the flange for a shouldered pin, or the recessed hole for the pin, which is at the top position. Reference to positioning of items will then be as viewed from the front of the compressor, the rear being the flanged end of the rear case.
- (2) Place the rear case on a suitable clean protected flat surface, with the rear flange resting on the surface with the pin (if assembled) over the edge of the surface.
- (3) On engines to SB.72-8806-313 standard, assemble the liners (8-117-118) to the stage 7 exit guide vane grooves. Ensure that the end gaps of the liners are aligned with the blade loading slot and that the bolt and probe holes in the case are not obscured by the liners.

PRINTED IN ENGLAND





OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (4) Apply lubricant 'A' to the lower exit guide vane groove or liner.

**NOTE:** Ensure that any repaired vanes are evenly distributed around the case and that the aggregate depth of blending does not exceed 2.800 in. (71,12 mm) (Ref.72-33-01, Repair No.2).

- (5) Remove the exit guide vanes from their container/platform (Tool 1373 and 1390), and with the trailing edge cutaway of each vane at the bottom, engage the vanes in the groove loading slot on the left-hand side of the case, and ease them round the groove in either direction.
- (a) On cases with single probe inspection (Mod.8039), assemble 128 vanes (3-110), one probe vane (3-130), eight bolted vanes (3-120) and one bolted probe vane (3-131) in the positions shown in Figure 501.
- (b) On cases with double probe inspection (post Mod.8039), assemble 125 vanes (3-110), three probe vanes (3-130) and ten bolted vanes (3-120) in the positions shown in Figure 501. The three probe vanes are positioned in between the two bolted vanes secured by the probe mounting block bolts.
- (6) Apply lubricant 'C' to 16 new bolts (3-60), then secure each of the eight bolted vanes that are not aligned with the probe mounting block (3-100) or retaining plate (3-75), with two sleeves (3-70) and bolts (3-60). Torque-tighten the bolts to 100 lbf in. (11,5 N.m), then wire-lock the two bolts of each vane together.
- (7) Using suitable measuring equipment, measure the distance between the (inner) tips of two diametrically opposite vanes. Repeat the check at three further equi-spread positions and record the average dimension. Refer to 72-00-51 para.9 for the dimension of the seal diameter and ensure the minimum tip clearance of the vanes is within the dimension quoted in the Fits and Clearances Schedule (72-33-00) FCS 135.

CR 32098/000  
BS00000132/5

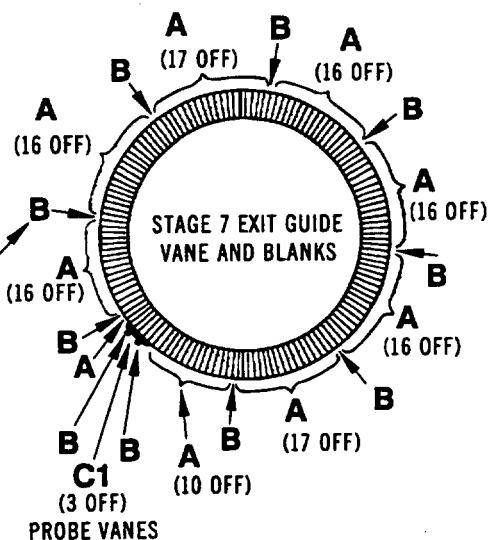
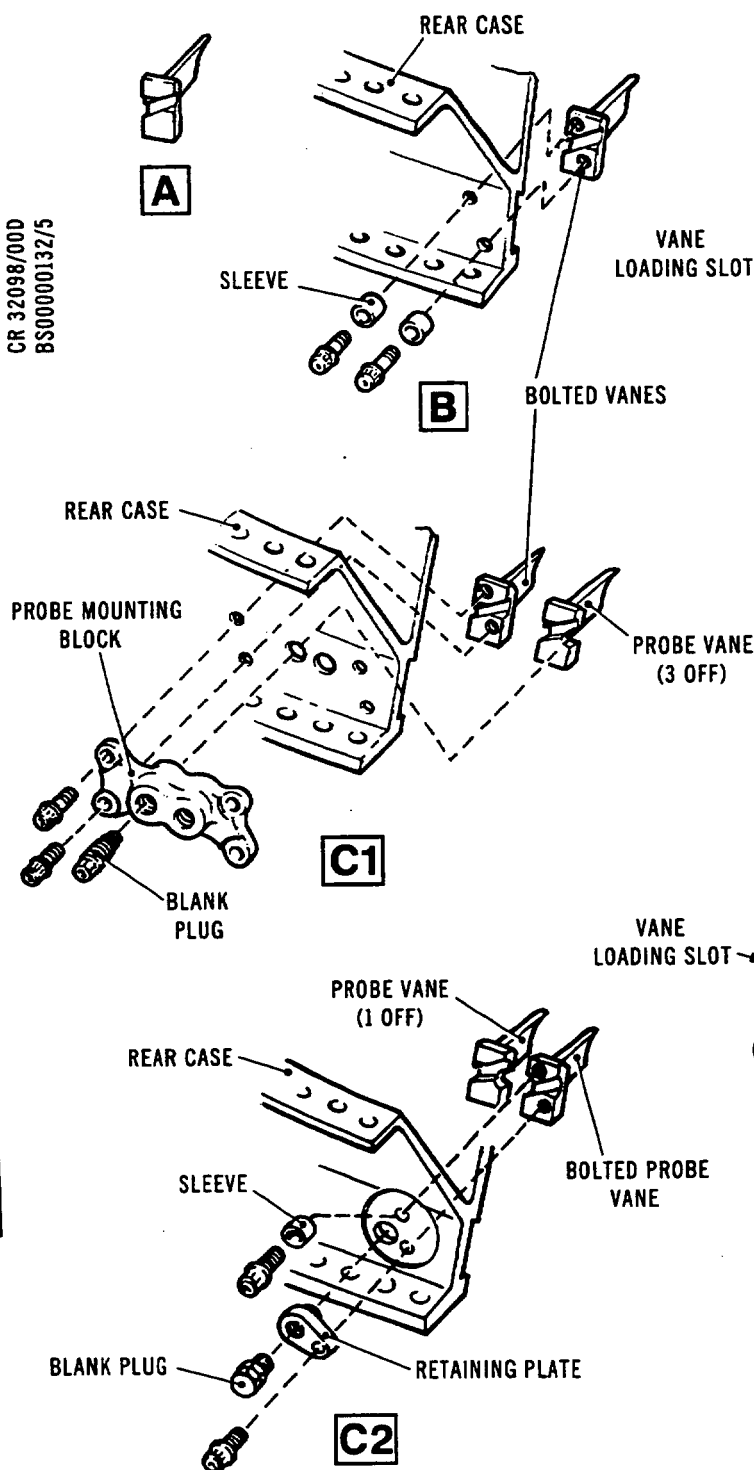


OLYMPUS 593

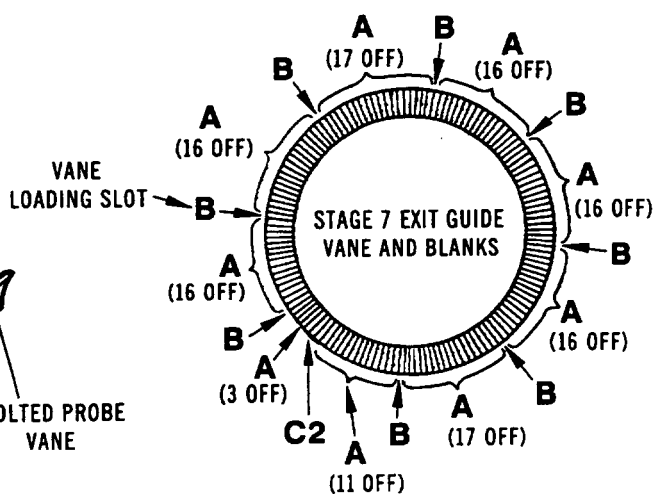
MK.610-14-28  
OVERHAUL



sneema



VIEW LOOKING REARWARD  
(DOUBLE PROBE STANDARD)



VIEW LOOKING REARWARD  
(SINGLE PROBE STANDARD)  
(MOD 8039)

Assembling Exit Guide Vanes and Blanks to Rear Case  
Figure 501

SUB-ASSEMBLY

72-33-01

Page 503  
Dec 1/97



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

B. Assemble Exit Guide Vane Probe Blanking Plug to Rear Case  
(single inspection probe; Mod.8039 cases only).

- (1) Apply lubricant 'C' to two new bolts (3-60, 74), then position the retaining plate (3-75) on the lower right-hand side of the case and secure by inserting a bolt (3-74) through the plate and into the bolted vane (3-131). Assemble a bolt (3-60) and sleeve (3-70) to the bolted vane (3-131). Torque-tighten the bolts to 100 lbf in. (11,5 Nm).
- (2) Check that the probe vane is correctly assembled by inserting the probe checking pin (Tool 289) through the retaining plate and ensuring that it passes through the vane.
- (3) Apply lubricant 'C' to the blanking plug (3-73), and screw it into the retaining plate. Torque-tighten to 65 lbf in. (7,3 Nm). Wire-lock the plug and the two bolts together.

C. Assemble Exit Guide Vane Probe Blank Plugs to Rear Case  
(double inspection probe; post Mod.8039 cases only).

- (1) Apply lubricant 'C' to four new bolts (3-90), then position the probe mounting block (3-100) on the lower right-hand side of the case and secure the block by inserting the bolts through the block and screwing them into the bolted vanes. Torque-tighten the bolts to 100 lbf in. (11,5 N.m), then wire-lock the two bolts of each vane together.
- (2) Check that the probe vanes are correctly assembled by inserting the probe checking pin (Tool 289) into each of the two holes in the mounting block and ensure that it passes through the vanes.
- (3) Apply lubricant 'A' to the two blank plugs (3-80) then screw the two plugs into the probe mounting block using a square drive. Torque-tighten each plug in turn in gradual stages until both reach a torque of 70 lbf in. (7,9 N.m), then wire-lock the plugs together.



OLYMPUS 593

MK.610-14-28

OVERHAUL



D. Assemble Shouldered Pin.

- (1) Check that a shouldered pin (8-110) is assembled to the top position in the rear flange of the case. If the pin is not assembled, place the pin (8-110) in a freezing agent for approximately 20 minutes. Remove the pin and assemble it from the rear into the recessed hole in the rear flange ensuring that the shoulder does not protrude above the surface of the flange.

3. Assemble the Front Case (Ref.Fig.502)

A. Assemble Stage 5 Stator Vanes to Front Case.

- (1) Identify the top of the case, by examining the periphery of either flange for the word 'TOP', or, if this is not evident, examine the flange for the shouldered pin, or the recessed hole for the pin which is at the top position.
- (2) Place the front case on a clean, protected, flat surface, with the rear, larger diameter flange uppermost for ease of assembling the vanes. Ensure that the shouldered pin (if assembled) does not rest on the surface. If required, assemble the multiple leg sling (Tool 1053) to the flange of the case to move the case onto the selected working surface.
- (3) Apply lubricant 'A' to the stage 5 stator vane groove at the top of the case.

NOTE: Ensure that any repaired vanes are evenly distributed around the case and that the aggregate depth of blending does not exceed 2.000 in. (50,80 mm) (Ref.72-33-01, Repair No.2).

PRINTED IN ENGLAND



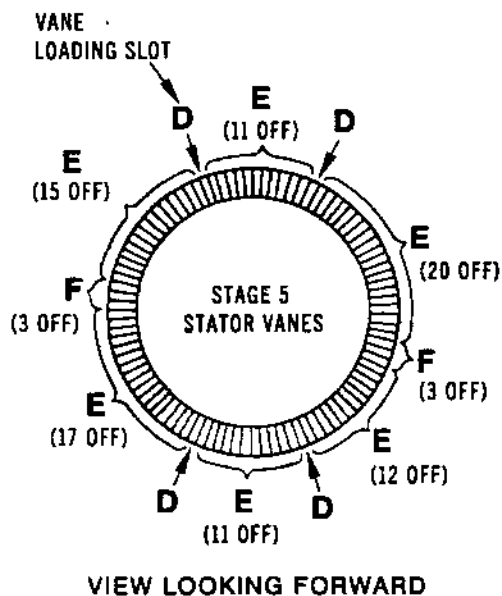
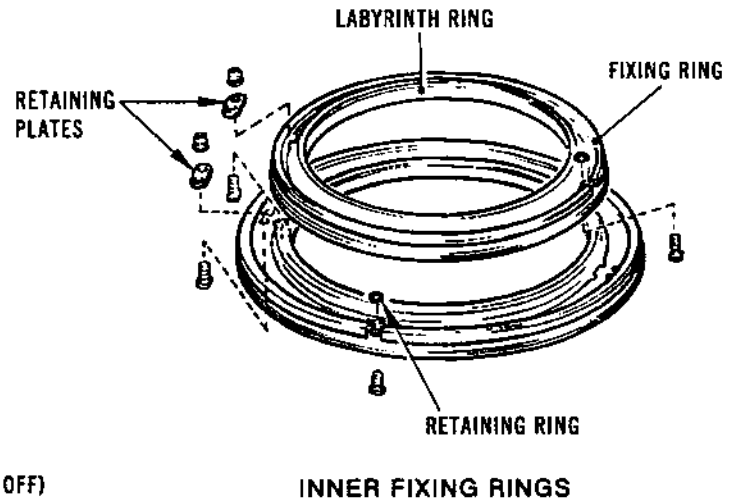
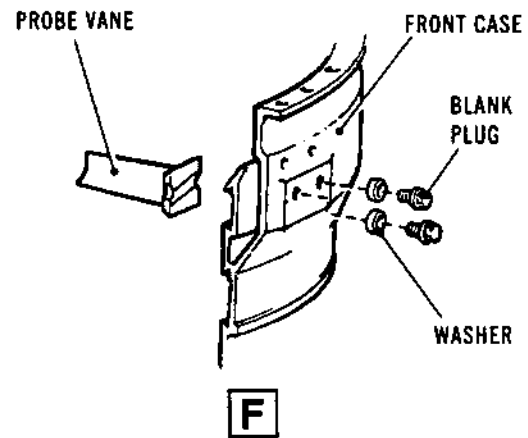
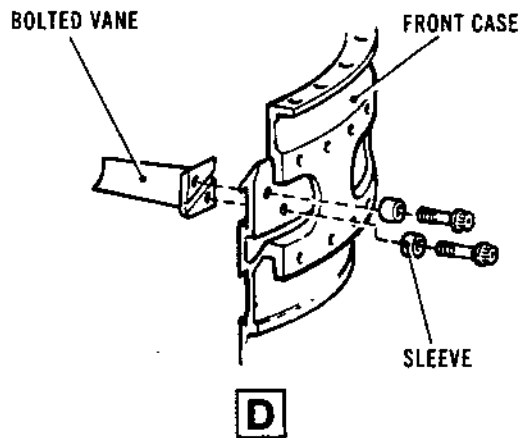
# OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

CR 36132/00A  
BS00002206/2



Assemble Inner Fixing Rings, and Stage 5 Vanes  
and Blanks to Front Case  
Figure 502

SUB-ASSEMBLY  
**72-33-01**  
Page 506  
Dec 1/97

BS00016730/1



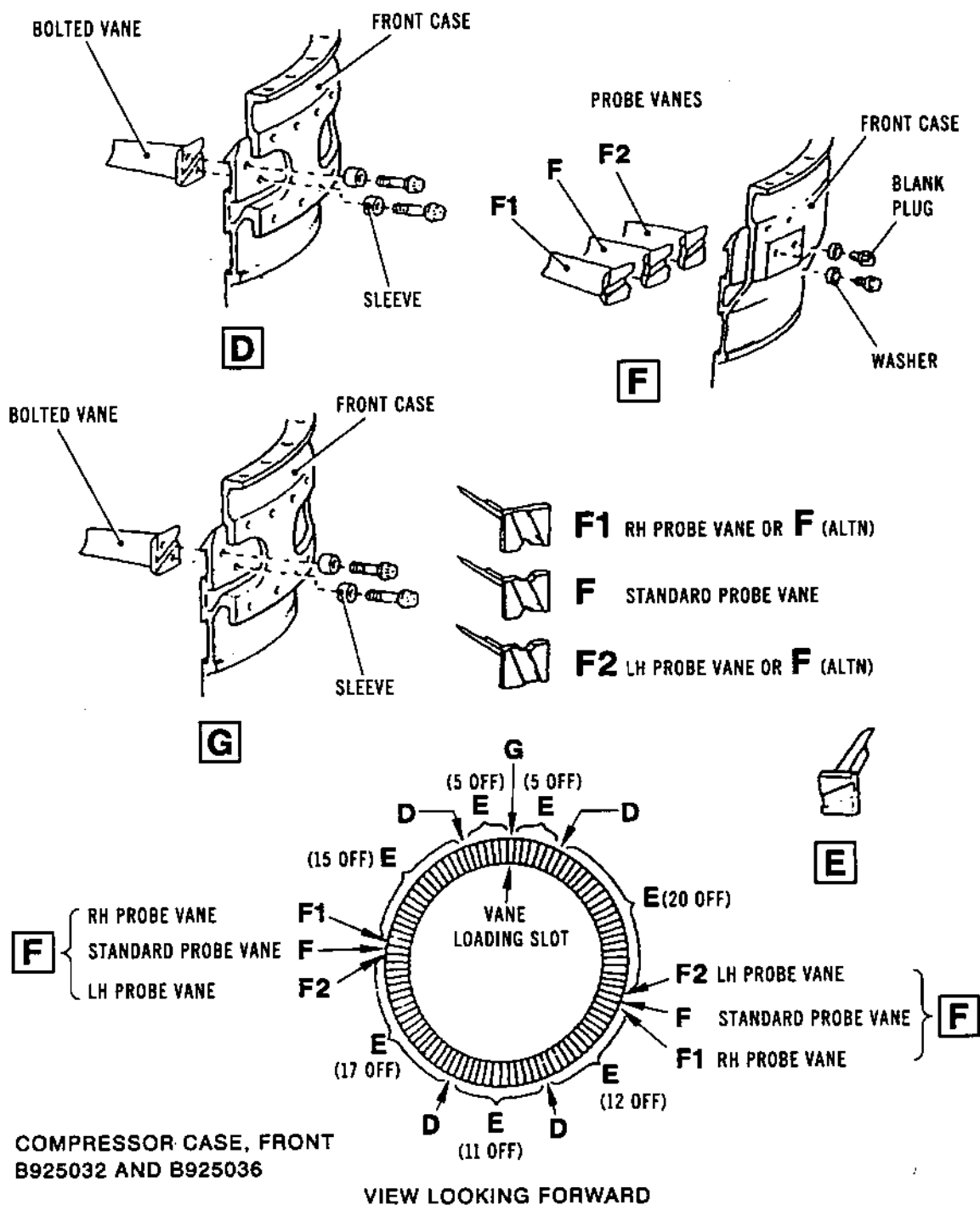
OLYMPUS 593

MK.610-14-28

OVERHAUL



SNECMA



Assemble Inner Fixing Rings, and Stage 5 Vanes  
and Blanks to Front Case  
Figure 502A



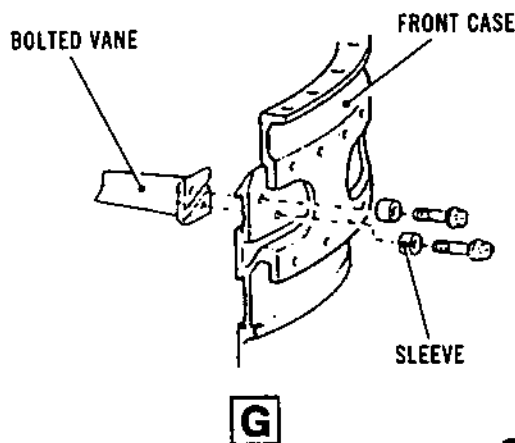
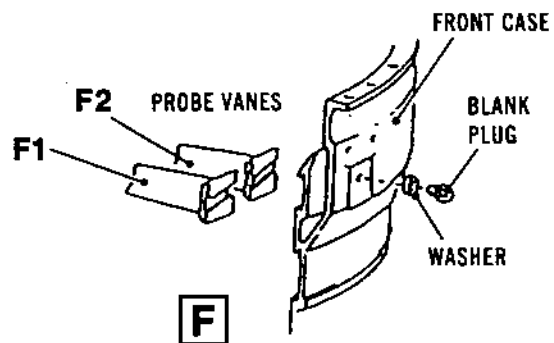
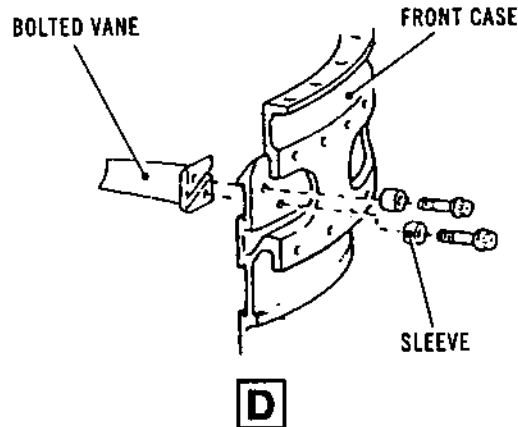
# OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

BS00016731/1



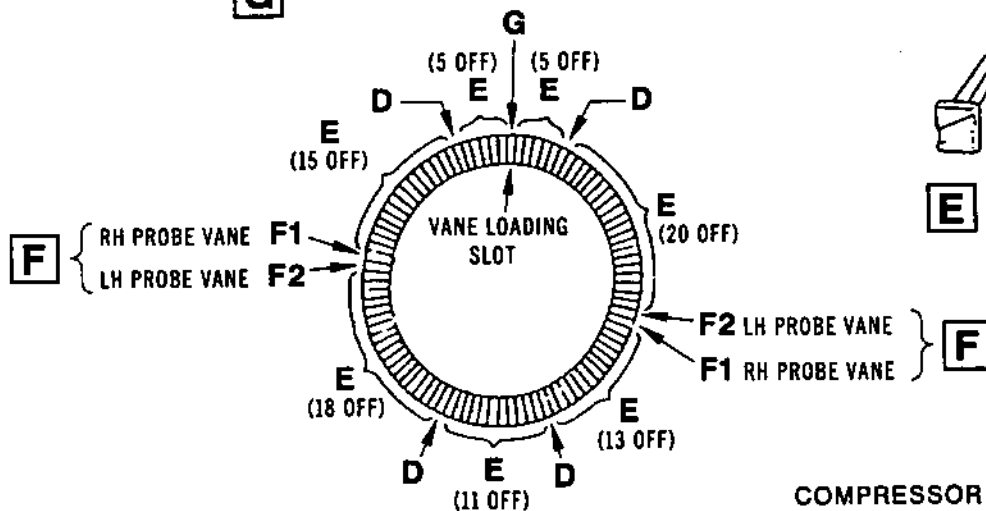
**F1** RH PROBE VANE OR **F** (ALTN)



**F2** LH PROBE VANE OR **F** (ALTN)



**F** STANDARD PROBE VANE (ALTN)



COMPRESSOR CASE, FRONT  
B925024 AND B925023

VIEW LOOKING FORWARD  
(SINGLE PROBE STANDARD)

Assemble Inner Fixing Rings, and Stage 5 Vanes  
and Blanks to Front Case  
Figure 502B

SUB-ASSEMBLY  
**72-33-01**

Page 506B  
Dec 1/97



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (4) Compressor case front (except B925023, B925024, B925032 and B925036) (Ref.Fig.502).

- (a) Remove the stage 5 vanes from their container/platform (Tool 1373 and 1390), and with the trailing edge (shorter length) of the vane towards the rear (uppermost) end of the case, engage the vanes in the groove loading slot at the top left-hand side of the case and ease them round in either direction. Assemble 86 vanes (2-220), six probe vanes (2-240) and four bolted vanes (2-230) to the groove in the position shown in Fig.502.

NOTE: Each of the two sets of three probe vanes is positioned to make two inspection ports.

- (b) Apply lubricant 'C' to the eight bolts (2-200), then secure each of the four bolted vanes with two sleeves (2-210) and two bolts (2-200), inserting the bolts through the cutaways in the outer skin at the top and bottom of the case. Torque-tighten the bolts to 210 lbf in. (24 Nm), then wire-lock the bolts together at each vane.

- (5) Compressor case front B925032 and B925036 (Ref.Fig.502A).

- (a) Remove the stage 5 vanes from their container/platform (Tool 1373 and 1390), and with the trailing edge (shorter length) of the vane towards the rear (uppermost) end of the case, engage the vanes in the groove of the loading slot at the top of the case and ease them round in either direction. Assemble 85 vanes (2-220), six probe vanes (2-240), four bolted vanes (2-230) and one bolted vane (2-231, at vane loading slot position) to the groove in the position shown in Fig.502A.

NOTE 1: Each of the two sets of three probe vanes is positioned to make two inspection ports.

NOTE 2: Compressor case front B925032 and B925036 may incorporate up to qty 4 off handed probe vanes (2-241 and 2-242), in lieu of standard probe vanes (2-240). These vanes should be assembled in the order shown in Fig.502A, to make two inspection ports.

SUB-ASSEMBLY

72-33-01

Page 507  
Dec 31/01





OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

- (b) Apply lubricant 'C' to the eight bolts (2-200), then secure each of the four bolted vanes (2-230) with two sleeves (2-210) and two bolts (2-200), inserting the bolts through the cutaways in the outer skin at the top and bottom of the case. Apply lubricant 'C' to the two bolts (2-201), then secure the bolted vane (2-231) at the vane loading slot position with two sleeves (2-211) and two bolts (2-201). Torque-tighten all bolts (2-200) to 210 lbf in. (24 Nm) and bolts (2-201) to 100 lbf in. (11,5 N.m). Then wire-lock the bolts together at each vane.
- (6) Compressor case front B925023 and B925024 with single probe access (Ref.Fig.502B).
- (a) Remove the stage 5 vanes from their container/platform (Tool 1373 and 1390), and with the trailing edge (shorter length) of the vane towards the rear (uppermost) end of the case, engage the vanes in the groove loading slot at the top of the case and ease them round in either direction. Assemble 87 vanes (2-220), four probe vanes (2-240), four bolted vanes (2-230) and one bolted vane (2-231, at vane loading slot position) to the groove in the position shown in Fig.502B.
- NOTE: Compressor case front B925023 and B926024 may incorporate up to qty 4 off handed probe vanes (2-241 and 2-242), in lieu of standard vanes (2-240). These vanes should be assembled in the order shown in Fig.502B, to make single inspection ports.
- (b) Apply lubricant 'C' to the eight bolts (2-200), then secure each of the four bolted vanes (2-230) with two sleeves (2-210) and two bolts (2-200), inserting the bolts through the cutaways in the outer skin at the top and bottom of the case. Apply lubricant 'C' to the two bolts (2-201), then secure the bolted vane (2-231) at the vane loading slot position with two sleeves (2-211) and two bolts (2-201). Torque tighten all bolts (2-200) to 210 lbf in. (24 Nm) and bolts (2-201) to 100 lbf in. (11,5 N.m). Then wire-lock the bolts together at each vane.

SUB-ASSEMBLY

72-33-01

Page 508

Dec 31/01



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

B. Assemble Stage 5 Probe Blank Plugs to Front Case.

- (1) Ensure that the probe vanes are correctly installed by inserting the probe checking pin (Tool 289) through the outer and inner skins and the holes in the vanes at both the left and right-hand sides of the case.
- (2) Assemble blanking plugs.
  - (a) Compressor case front with twin probe access. Apply lubricant 'A' to the four blanking plugs (4-300, 5-410), assemble a washer (4-310, 5-420) to each plug, then screw the plugs into the outer skin at the left-hand and right-hand sides of the case above the probe vanes. Torque-tighten the plugs to 65 lbf in. (7,3 Nm), then wire-lock each pair of plugs together.
  - (b) Compressor case front with single probe access. Apply lubricant 'A' to the two blanking plugs (4-300, 5-410), assemble a washer (4-310, 5-420) to each plug, then screw the plugs into the outer skin at the left-hand and right-hand sides of the case above the probe vanes. Torque-tighten the plugs to 65 lbf in. (7,3 Nm). Wire-locking of single probe access stage 5 blanking plugs to the stage 6 blanking plugs is carried out during HP compressor assembly. (72-33-00 Assembly).
- (3) Check that a shouldered pin (5-430) is assembled to the TOP position in both the front and rear flange of the compressor case. If the pins are not assembled, assemble as described in para.6.
- (4) Check that two pins are assembled to the left-hand side of the compressor case, below the engine horizontal centre line, at the stage 3 stator vane location. If the pins are not assembled, on engines to pre SB.72-10 assemble the retaining rings (4-80) to the pins (4-90), and on engines embodying SB.72-10 assemble the retaining rings to the pins (4-90B). Assemble the pins to the case as described in para.6.
- (5) On engines embodying Mod.7848 (part 2) check that a shouldered pin (5A-190) is assembled to the right-hand side of the compressor case, below the engine horizontal centre line, at the stage 3 stator vane location. If the pin is not assembled, assemble as described in para.6.

SUB-ASSEMBLY

72-33-01

Page 509  
Dec 1/97



OLYMPUS 593

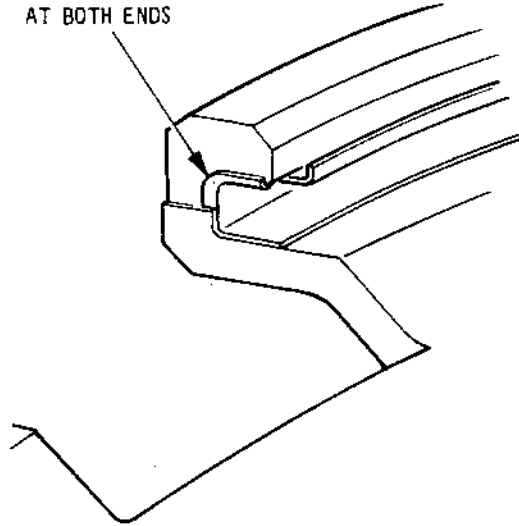
MK.610-14-28

OVERHAUL

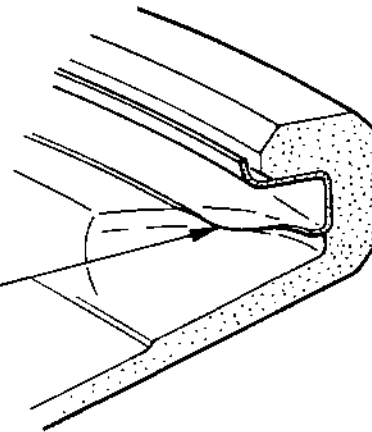


CR 35932/00A

PEEN FRONT LINER  
AT BOTH ENDS



PEEN REAR LINER INTO  
RECESS IN RING AT BOTH ENDS



Inner Fixing Ring  
Anti-fret Liner Assembly  
Figure 503



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (6) Place the pins described in paras.3, 4 and 5 in a freezing agent (Cardice) for approximately 20 minutes. Wearing protective gloves, remove each pin in turn from the freezing agent and assemble to its location in the case. Ensure the shoulders or retaining rings of pins do not protrude above the surface of the case.

#### 4. Assemble Items to Inner Fixing Rings (Ref.Fig.502)

##### A. Assemble Items to Stage 1 Rings.

- (1) Remove the assembled labyrinth ring/fixing ring (1-80/90) from its container (Tool 1441) and place on to a flat protected surface with the labyrinth extending upwards.
- (2) Identify the cutaway in the fixing ring and insert a bolt (1-40) into one of the holes from underneath, then using the sleeve (Tool 1321), assemble a retaining ring (1-20) to the groove in the bolt securing it in position. Assemble and secure a bolt to the remaining hole in the same manner.
- (3) Apply lubricant 'C' to two bolts (1-70), then insert the bolts into one of the pairs of holes in the rings from underneath. Assemble a retaining plate (1-60) to the bolts so that the flange of the plate locates on the labyrinth, then screw a nut (1-50) onto each bolt. Ensure that the minimum locking (run-down) torque of the nuts is 10 lbf in. (1,1 N.m), then torque-tighten the nuts to 100 lbf in. (11,5 N.m). After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 2.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref. SB.72-8259-153).
- (4) Assemble and secure a retaining plate to the two remaining two holed positions in the rings in the same manner (Ref.para.(3)). Place the rings in the appropriate part of container (Tool 1441).
- (5) On engines to SB.72-8694-297 standard, install anti-fret liners (Ref.Fig.503).
- (a) Assemble the front and rear anti-fret liners (1-94 and 1-96) to the inner fixing ring and clamp in position for peening using two restraining tools (Tool 3134).



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (b) Peen the ends of the liners with a soft metal drift, radiused at the end, then assemble the retaining protector (Tool 3136) to the fixing ring.

## B. Assemble Items to Stage 2 Rings.

- (1) Remove the assembled labyrinth ring/fixing ring (1-370/360) from its container (Tool 1441) and place on to a flat protected surface with the labyrinth extending upwards.
- (2) Identify the cutaway in the fixing ring and insert a bolt (1-320) into one of the holes from underneath, then using a sleeve (Tool 1321), assemble a retaining ring (1-300) to the groove in the bolt securing it in position. Assemble and secure a bolt to the remaining hole in the same manner.
- (3) Apply lubricant 'C' to two bolts (1-350), then insert the bolts into one of the pairs of holes in the rings from underneath. Assemble a retaining plate (1-340) to the bolts so that the flange of the plate locates on the labyrinth, then screw a nut (1-330) onto each bolt. Ensure that the minimum locking (run-down) torque of the nuts is 10 lbf in. (1,1 N.m), then torque-tighten the nuts to 100 lbf in. (11,5 N.m). After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 2.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref.SB.72-8259-153).
- (4) Assemble and secure a retaining plate to the two remaining two holed positions in the rings in the same manner (Ref.para.(3)). Place the ring in the appropriate part of container (Tool 1441).
- (5) On engines to SB.72-8694-297 standard, install anti-fret liners (Ref.Fig.503).
  - (a) Assemble the front and rear anti-fret liners (1-374 and 1-376) to the inner fixing ring and clamp in position for peening using two restraining tools (Tool 3134).

SUB-ASSEMBLY

72-33-01

Page 512

Dec 31/01



OLYMPUS 593



MK.610-14-28

SNECMA

OVERHAUL

- (b) Peen the ends of the liners with a soft metal drift, radiused at the end, then assemble the retaining protector (Tool 3135) to the fixing ring.

NOTE: The front and rear cases and the labyrinth/fixing rings are now ready to be passed to the HP Compressor Assembly (72-33-00 Assembly).



OLYMPUS 593



MK.610-14-28  
OVERHAUL

*sneema*

THIS PAGE LEFT BLANK INTENTIONALLY

SUB-ASSEMBLY

**72-33-01**

Page 514  
Dec 1/97



# OLYMPUS 593

MK.610-14-28

OVERHAUL



## HP COMPRESSOR ROTOR - SUB-ASSEMBLY

### TABLE OF CONTENTS

Para.	Page
1. General	501
2. Mass Moment Weigh the HP Compressor Rotor Blades	502
A. Prepare the (Avery 62N5) Scales for Mass Moment Weigh of Rotor Blades	502
B. Carry out Mass Moment Weigh of Rotor Blades	504
3. Datum Alignment Check of Rotor Disks and Spacer Rings	505
A. Check Original Rotor Disks and Spacer Rings	505
B. Check New Rotor Disks and Spacer Rings	505
4. Check Balance of Balancing Mandrels Used for Horizontal Balance	509
A. General	509
B. Prepare the Balancing Machine (Avery 7210)	509
C. Assemble a Balancing Mandrel to the Balancing Machine	511
D. Balancing the Balancing Mandrel	511
E. Remove the Balance Mandrel from the Balancing Machine	513
5. Balance the Stage 1 Rotor	515
A. Apply Dry Film Lubricant	515
B. Assemble Blades to Stage 1 Disk and Prepare for Balance	515
C. Assemble the Stage 1 Bladed Disk to the Balancing Machine	521
D. Balance the Stage 1 Bladed Disk	523
E. Remove the Bladed Disk from the Balancing Machine.	523
F. Secure the Blades to the Stage 1 Disk	524
6. Balance the Stage 2 Rotor	530
A. Assemble Blades to Stage 2 Disk and Prepare for Balancing	530
B. Assemble the Stage 2 Bladed Disk to the Balancing Machine	535
C. Balance the Stage 2 Bladed Disk	536
D. Remove the Bladed Disk from the Balancing Machine	537
E. Secure the Blades to the Stage 2 Disk	538
7. Balance the Stage 3 Rotor and Stage 2-3 Spacer Ring	543
A. Assemble the Stage 2-3 Spacer Ring to the Stage 3 Disk	543
B. Assemble Blades to Stage 3 Disk and Prepare for Balance	547
C. Assemble the Stage 3 Bladed Disk/Spacer Ring to the Balancing Machine	550
D. Balance the Stage 3 Bladed Disk/Spacer Ring	554

SUB-ASSEMBLY

# 72-33-02

Contents 1

Jun 1/87





OLYMPUS 593

MK.610-14-28  
OVERHAUL



Para.

Page

E.	Remove the Bladed Disk/Spacer Ring from the Balancing Machine and Number the Blades	554
F.	Remove the Bladed Disk/Spacer Ring from the Balancing Mandrel	556
8.	Balance the Stage 4 Rotor and Stage 3-4 Spacer Ring...	557
A.	Assemble the Stage 3-4 Spacer Ring to the Stage 4 Disk...	557
B.	Assemble Blades to Stage 4 Disk and Prepare for Balance	558
C.	Assemble the Stage 4 Bladed Disk/Spacer Ring to the Balancing Machine	558
D.	Balance the Stage 4 Bladed Disk/Spacer Ring	558
E.	Remove the Bladed Disk/Spacer Ring from the Balancing Machine and Number the Blades	558
F.	Remove the Stage 3-4 Spacer Ring from the Stage 4 Disk	560
G.	Remove the Bladed Disk from the Balancing Mandrel	561
9.	Balance the Stage 5 Rotor and Stage 4-5 Spacer Ring...	561
A.	Assemble the Stage 4-5 Spacer Ring to the Stage 5 Disk...	561
B.	Assemble Blades to Stage 5 Disk and Prepare for Balance	561
C.	Assemble the Stage 5 Bladed Disk/Spacer Ring to the Balancing Machine	562
D.	Balance the Stage 5 Bladed Disk/Spacer Ring	562
E.	Remove the Bladed Disk/Spacer Ring from the Balancing Machine and Number the Blades	562
F.	Remove the Stage 4-5 Spacer Ring from the Stage 5 Disk...	562
G.	Remove the Bladed Disk from the Balancing Mandrel.	562
10.	Balance the Stage 6 Rotor and Stage 5-6 Spacer Ring...	563
A.	Assemble the Stage 5-6 Spacer Ring to the Stage 6 Disk...	563
B.	Assemble Blades to Stage 6 Disk and Prepare for Balance	563
C.	Assemble the Stage 6 Bladed Disk/Spacer Ring to the Balancing Machine	563
D.	Balance the Stage 6 Bladed Disk/Spacer Ring	564
E.	Remove the Bladed Disk/Spacer Ring from the Balancing Machine and Number the Blades	564
F.	Remove the Stage 5-6 Spacer Ring from the Stage 6 Disk...	564
G.	Remove the Bladed Disk from the Balancing Mandrel.	564



# OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

Para.	Page
11. Balance the Stage 7 Rotor and Stage 6-7 Spacer Ring...	564
A. Assemble the Stage 6-7 Spacer Ring to the Stage 7 Disk ... ..	564
B. Preparation for Balancing the Stage 7 Disk/Stage 6-7 Spacer Ring ... ..	566
C. Balance the Stage 7 Disk/Stage 6-7 Spacer Ring ...	571
D. Remove the Disk/Spacer Ring from the Balancing Machine ... ..	571
E. Remove the Stage 6-7 Spacer Ring from the Stage 7 Disk ... ..	573
F. Assemble the Stage 7 Disk to the Balancing Machine	574
G. Balance the Stage 7 Disk ... ..	575
H. Remove the Stage 7 Disk from the Balancing Machine and Assemble Blades to the Disk ... ..	576
J. Assemble the Stage 7 Bladed Disk to the Balancing Machine and Balance the Disk... ..	577
K. Remove the Stage 7 Bladed Disk from the Balancing Machine and Assemble the Stage 6-7 Spacer Ring to the Disk ... ..	578
L. Assemble the Stage 7 Bladed Disk/Spacer Ring to the Balancing Machine and Check Balance the Disk... ..	579
M. Remove the Stage 7 Bladed Disk from the Balancing Machine and Remove the Spacer Ring from the Disk... ..	580
N. Number and Remove the Blades from the Stage 7 Disk... ..	580
P. Remove the Stage 7 Disk from the Balancing Mandrel	581
12. Balance the Stage 1 Rotor ... ..	582
A. Apply Dry Film Lubricant ... ..	582
B. Assemble Blades to Stage 1 Disk and Prepare for Balancing ... ..	582
C. Assemble the Stage 1 Bladed Disk and Adapter to the (Schenck ZE.40) Balancing Machine ...	586
D. Balance the Stage 1 Bladed Disk ... ..	586
E. Remove the Bladed Disk/Adapter from the Balancing Machine ... ..	588
F. Secure the Blades to the Stage 1 Disk ... ..	588
13. Balance the Stage 2 Rotor ... ..	590
A. Assemble Blades to Stage 2 Disk and Prepare for Balancing ... ..	590
B. Assemble the Stage 2 Bladed Disk and Adapter to the (Schenck ZE.40) Balancing Machine ...	594
C. Balance the Stage 2 Bladed Disk ... ..	596
D. Remove the Bladed Disk/Adapter from the Balancing Machine ... ..	596
E. Secure the Blades to the Stage 2 Disk ... ..	597

SUB-ASSEMBLY

## 72-33-02

Contents 3

Jun 1/87



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



Para.

Page

14.	Balance the Stage 3 Rotor and Stage 2-3 Spacer Ring...	598.1
A.	Assemble the Stage 2-3 Spacer Ring to the Stage 3 Disk ... ..	598.1
B.	Assemble Blades to Stage 3 Disk and Prepare for Balance ... ..	598.5
C.	Prepare the Balancing Machine (Schneck ZE.40) to Balance Stage 3 Bladed Disk/Spacer Ring ...	598.7
D.	Assemble the Stage 3 Bladed Disk/Spacer Ring to the Balancing Machine ... ..	598.9
E.	Balance the Stage 3 Bladed Disk/Spacer Ring ...	598.10
F.	Remove the Bladed Disk/Spacer Ring from the Balancing Machine and Number the Blades...	598.10
G.	Position the Stage 3 Disk/Spacer on a Suitable Pallet ... ..	598.13
H.	Remove the Balancing Adapter from the Balancing Machine ... ..	598.13
15.	Balance the Stage 4 Rotor and Stage 3-4 Spacer Ring...	598.14
A.	Assemble the Stage 3-4 Spacer Ring to the Stage 4 Disk ... ..	598.14
B.	Assemble Blades to Stage 4 Disk and Prepare for Balance ... ..	598.15
C.	Prepare the Balancing Machine (Schenck ZE.40) to Balance the Stage 4 Bladed Disk/Spacer Ring..	598.15
D.	Assemble the Stage 4 Bladed Disk/Spacer Ring to the Balancing Machine ... ..	598.15
E.	Balance the Stage 4 Bladed Disk/Spacer Ring ...	598.15
F.	Remove the Bladed Disk/Spacer Ring from the Balancing Machine and Number the Blades...	598.15
G.	Remove the Stage 3-4 Spacer Ring from the Stage 4 Disk ... ..	598.17
H.	Remove the Balancing Adapter from the Balancing Machine ... ..	598.18
16.	Balance the Stage 5 Rotor and Stage 4-5 Spacer Ring...	598.18
A.	Assemble the Stage 4-5 Spacer Ring to the Stage 5 Disk ... ..	598.18
B.	Assemble Blades to Stage 5 Disk and Prepare for Balance ... ..	598.18
C.	Prepare the Balancing Machine (Schenck ZE.40) to Balance the Stage 5 Bladed Disk/Spacer Ring..	598.19
D.	Assemble the Stage 5 Bladed Disk/Spacer Ring to the Balancing Machine ... ..	598.19
E.	Balance the Stage 5 Bladed Disk/Spacer Ring ...	598.19
F.	Remove the Bladed Disk/Spacer Ring from the Balancing Machine and Number the Blades...	598.19
G.	Remove the Stage 4-5 Spacer Ring from the Stage 5 Disk ... ..	598.19
H.	Remove the Balancing Adapter from the Balancing Machine ... ..	598.19

SUB-ASSEMBLY

## 72-33-02

Contents 4

Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL

Para.		Page
17.	Balance the Stage 6 Rotor and Stage 5-6 Spacer Ring...	598.20
A.	Assemble the Stage 5-6 Spacer Ring to the Stage 6 Disk ... ..	598.20
B.	Assemble Blades to Stage 6 Disk and Prepare for Balance ... ..	598.20
C.	Prepare the Balancing Machine (Schenck ZE.40) to Balance the Stage 6 Bladed Disk/Spacer Ring..	598.20
D.	Assemble the Stage 6 Bladed Disk/Spacer Ring to the Balancing Machine... ..	598.21
E.	Balance the Stage 6 Bladed Disk/Spacer Ring ...	598.21
F.	Remove the Bladed Disk/Spacer Ring from the Balancing Machine and Number the Blades ...	598.21
G.	Remove the Stage 5-6 Spacer Ring from the Stage 6 Disk ... ..	598.21
H.	Remove the Balancing Adapter from the Balancing Machine ... ..	598.21
18.	Balance the Stage 7 Rotor and Stage 6-7 Spacer Ring...	598.22
A.	Assemble the Stage 6-7 Spacer Ring to the Stage 7 Disk ... ..	598.22
B.	Prepare the Balancing Machine (Schenck ZE.40) to Balance the Stage 7 Disk and Spacer Ring ...	598.23
C.	Assemble the Stage 7 Disk/Spacer Ring to the Balancing Machine ... ..	598.23
D.	Balance the Stage 7 Disk/Spacer Ring ... ..	598.25
E.	Remove the Stage 7 Disk/Spacer Ring from the Balancing Machine ... ..	598.25
F.	Remove the Stage 6-7 Spacer Ring from the Stage 7 Disk ... ..	598.27
G.	Assemble the Stage 7 Disk to the Balancing Machine ... ..	598.28
H.	Balance the Stage 7 Disk ... ..	598.28
J.	Remove the Stage 7 Disk from the Balancing Machine and Assemble the Blades ... ..	598.28
K.	Assemble the Stage 7 Bladed Disk to the Balancing Machine and Balance the Disk ... ..	598.30
L.	Remove the Stage 7 Bladed Disk from the Balancing Machine and Assemble the Stage 6-7 Spacer Ring to the Disk ... ..	598.31
M.	Assemble the Stage 7 Bladed Disk/Spacer Ring to the Balancing Machine and Check Balance the Disk ... ..	598.32
N.	Remove the Stage 7 Bladed Disk/Spacer Ring from the Balancing Machine and Remove the Spacer from the Disk ... ..	598.33
P.	Number and Remove the Blades from the Stage 7 Disk ... ..	598.33

SUB-ASSEMBLY

72-33-02

Contents 5

Nov 1/76

**OLYMPUS 593**

MK.610-14-28

OVERHAUL

TABLE OF ILLUSTRATIONS

Fig. No.		Page
501	Mass Moment Weigh Rotor Blades ... ..	503
502	Identification of Datum Holes, Blade Slots and Numbering (Sheet 1 of 2) ... ..	506
502	Identification of Datum Holes, Blade Slots and Numbering (Sheet 2 of 2) ... ..	507
503	Preparing Balancing Machine ... ..	510
504	Assembling Balancing Mandrel to Balancing Machine ... ..	512
504 A	Dry Film Lubricant Application ... ..	514
505	Assembling Balancing Mandrel to Mounting Plate ...	514 A
506	Assembling Stage 1 Disk to Balancing Mandrel ...	516
507	Assembling Blades to Stage 1 Disk ... ..	518
508	Assembling Bladed Disk/Mandrel to Mobile Stand ...	522
509	Securing Blades in Stage 1 Disk ... ..	526
510	Assembling Stage 2 Disk to Balancing Mandrel ...	531
511	Assembling Blades to Stage 2 Disk ... ..	533
512	Securing Blades in Stage 2 Disk ... ..	541
513	Assembling Disk to Spacer Ring Locating Pins ...	544
514	Equipment for Heating Compressor Disks ... ..	546
515	Assembling Stage 3 Disk/Stage 2-3 Spacer Ring to Balancing Mandrel ... ..	551
516	Assembling Blades to Stage 3 Disk ... ..	553
517	Removing Stage 3-4 Spacer Ring from Stage 4 Disk... ..	559
518	Assembling Stage 7 Disk/Stage 6-7 Spacer Ring to Balancing Mandrel ... ..	568
519	Removing Stage 7 Disk/Stage 6-7 Spacer Ring from Mounting Plate ... ..	570
520	Removing Stage 6-7 Spacer Ring from Stage 7 Disk... ..	572
520 A	Dry Film Lubricant Application ... ..	582 A
521	Assembling Lifting Fixture to Stage 1 Disk ...	585
522	Assembling Adapter/Disk to the Balancing Machine..	587
523	Securing Blades in Stage 1 Disk ... ..	589
524	Assembling Multiple Leg Sling to Stage 2 Disk ...	591
525	Assembling Adapter/Disk to Balancing Machine ...	595
526	Securing Blades in Stage 2 Disk ... ..	597
527	Assembling Disk to Spacer Ring Locating Pins ...	598.2
528	Equipment for Heating Compressor Disks ... ..	598.4
529	Assembling Adapter to Balancing Machine ... ..	598.8
530	Assembling Stage 3 Bladed Disk/Spacer Ring to Balancing Machine ... ..	598.12

SUB-ASSEMBLY

**72-33-02**

Contents 6

Jun 1/87



OLYMPUS 593

MK.610-14-28

OVERHAUL



Fig.No.

Page

531	Removing Stage 3-4 Spacer Ring from Stage 4 Disk..	598.16
532	Assembling the Multiple Leg Sling to the Stage 7 Disk/Stage 6-7 Spacer Ring ... ..	598.24
533	Removing Stage 6-7 Spacer Ring from the Stage 7 Disk ... ..	598.26

LIST OF TABLES

Table No.

Page

501	Disk Balancing Mandrels... ..	509
-----	-------------------------------	-----

PRINTED IN ENGLAND

TN17098

SUB-ASSEMBLY

**72-33-02**

Contents 7

Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



HP COMPRESSOR ROTOR - SUB-ASSEMBLY

1. General

- A. Prior to commencing the balancing, refer to 72-09-00 Assembly for general information on assembly.
- B. Two methods of balancing are described within this chapter, para.5 to 11 detail the procedures necessary for horizontal balancing using Avery equipment (72N 17) and para.12 to 18 detail the procedures necessary for vertical balancing using Schenck equipment (ZE 40). It is assumed that all adapters and retaining plates quoted in the vertical balance procedure have been balanced at manufacture.
- C. During the balancing procedure, reference will be made to the Illustrated Parts Catalogue (I.P.C.) to identify those items where the nomenclature does not positively identify them, due to the duplication of the titles e.g. blades, disks, spacer rings etc. When an item is a part of the breakdown of the text concerned, the item will be identified e.g. blade (1-180) the 1 referring to the I.P.C. Fig.No., and the 180 referring to the Item No. Where items from a different breakdown are introduced, the breakdown numbers will be quoted in addition e.g. blade (72-31-00/1-180).
- D. Throughout the text special tools are quoted by their Ref.No. e.g. (Tool 1234). For a complete list of tooling required for the mass moment weighing of blades, horizontal and vertical balancing procedures, and for the Manufacturers Part No., refer to Special Tools, Fixtures and Equipment Table 1002, 1003 and 1004 respectively.
- E. This chapter details the work necessary to static balance the individual stages of the rotor, to a degree of balance, that will ensure that the assembled rotor (within the HP compressor assembly), will be within an out of balance state that can be corrected to within the limits required for the complete HP compressor rotor.

PRINTED IN ENGLAND

TN11250

SUB-ASSEMBLY

**72-33-02**

Page 501

Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- F. During the datum alignment check and balancing (as required), the spacer rings are allied to the disks attached to their rear faces i.e. stage 3-4 spacer ring to stage 4 disk, stage 4-5 spacer ring to stage 5 disk etc.
- G. All stages of disks are balanced with the blades assembled, and in addition, stages 3 to 7 require the spacer rings to be assembled. Balance on all stages is achieved by the interchange of blades.
- H. On completion of the balancing, all spacer rings; except the stage 2-3 spacer ring, will be removed from their respective disks, adhesive labels and adhesive residue removed from the blades with a suitable solvent. Disks 1 to 6 will have their blades assembled, though only disks 1 and 2 will have their blades locked in position. When the balancing is completed the disks/blades and spacer rings must be despatched to the HP compressor assembly (72-33-00 Assembly) for inclusion in the assembly.

## 2. Mass Moment Weigh the HP Compressor Rotor Blades

NOTE: The following procedure need not be carried out on the blades of any stage if all the original blades are undamaged and are to be assembled to the original disk of stages 1 and 2, or to the original disk/spacer assembly of stages 3 to 7.

- A. Prepare the (Avery 62N5) Scales for Mass Moment Weigh of Rotor Blades (Ref.Fig.501).
  - (1) Ensure that the scale is level.
  - (2) Position the locator (Tool 1273) on the end of the adapter arm (Tool 1272) slide, align the holes, then insert the two adapter arm cap screws into the holes in the locator and screw them into the slide.
  - (3) Position the adapter arm on the right-hand end of the scale arm and secure with the knurled nut of the scale.

TN11251





OLYMPUS 593

MK.610-14-28  
OVERHAUL



WEIGHTS IN TOP SCALE PAN  
TO BALANCE LOCATOR AND  
ADAPTER ARM

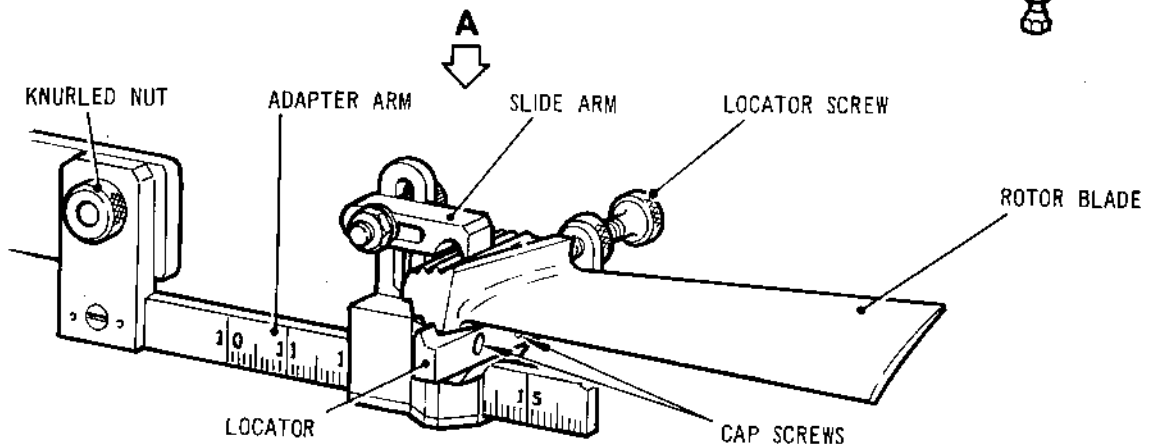
AVERY SCALE

CR 32127/00A

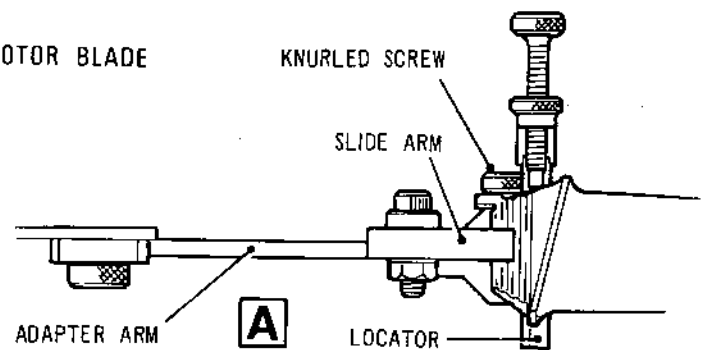
BOTTOM SCALE PAN

SCREWED ADJUSTMENT WEIGHTS  
(LOCKED BY ABUTMENT)

PRINTED IN ENGLAND



ATTACHMENT AND POSITIONING OF ROTOR BLADE



Mass Moment Weigh Rotor Blades  
Figure 501

TN19488

SUB-ASSEMBLY  
**72-33-02**  
Page 503  
Dec 1/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Release the knurled screw of the slide and position the left-hand edge of the slide at the 10 in. (254 mm) mark. All blades of each stage are to be mass moment weighed with the slide set at this position.

NOTE: Fig.501 does not illustrate the slide in its correct position.

- (5) Select a blade from the stage to be weighed, then position the blade root fir-tree on the locator and adjust the slide arm to engage on the top of the blade root with the bottom edge of the blade parallel with the (scale) arm. Secure the slide arm, then adjust the locator screw to form a stop for the blade when it is centrally positioned over the scale arm. Secure the locator screw with its thumbnut, then remove the blade.
- (6) Balance out the weight of the adapter arm/locator so that the scale reads zero, by placing weight(s) on the (top) scale pan, and adjusting the position of the balancing weight of the scale.
- (7) Select a (known) weight to counter-balance the weight of the blade and place the weight on the (bottom) scale pan.

B. Carry Out Mass Moment Weigh of Rotor Blades.

- (1) Assemble a blade (of the stage to be weighed) to the locator/arm.
- (2) Calculate the mass moment weight of the blade to the nearest tenth oz in. (72 grm mm), by adding the weight indicated on the scale dial to the (known) weight on the (bottom) scale pan.
- (3) Record the weight of the blade on an adhesive label, remove the blade from the locator/arm and attach the label to the (tip) end of the blade. Mass moment weigh each blade in turn in the same manner.

TN11253

SUB-ASSEMBLY

72-33-02

Page 504

Nov 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (4) Remove the stage 5 vanes from their container/platform (Tool 1373 and 1390), and with the trailing edge (shorter length) of the blade towards the rear (uppermost) end of the case, engage the vanes in the groove loading slot at the top left-hand side of the case and ease them round in either direction. Assemble 86 vanes (2-220), six probe vanes (2-240) and four bolted vanes (2-230) to the groove in the position shown on Fig.502.

NOTE: Each of the two sets of three probe vanes are positioned to make two inspection holes.

- (5) Apply lubricant 'B' to the eight bolts (2-200), then secure each of the four bolted vanes with two sleeves (2-210) and two bolts (2-200), inserting the bolts through the cutaways in the outer skin at the top and bottom of the case. Torque-tighten the bolts between 60 and 65 lbf in. (6,78 and 7,34 N.m), then wire-lock the bolts together at each vane.

B. Assemble Stage 5 Probe Blank Plugs to Front Case.

- (1) Ensure that the probe vanes are correctly installed by inserting the probe checking pin (Tool 289) through the outer and inner skins and the holes in the vanes at both the left and right-hand sides of the case.
- (2) Apply lubricant 'B' to the four blanking plugs (4-300 and 5-410), assemble a washer (4-310 and 5-420) to each plug, then screw the plugs into the outer skin at the left and right-hand sides of the case above the probe vanes. Torque-tighten the plugs between 30 and 40 lbf in. (3,4 and 4,5 N.m), then wire-lock each pair of plugs together.
- (3) Check that a shouldered pin (5-430) is assembled to the TOP position in both the front and rear flange of the compressor case. If the pins are not assembled, assemble as described in para.6.

SUB-ASSEMBLY

72-33-01

Page 505

Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Check that two pins are assembled to the left-hand side of the compressor case, below the engine horizontal centre line, at the stage 3 stator vane location. If the pins are not assembled, on engines to pre SB.72-10 assemble the retaining rings (4-80) to the pins (4-90), and on engines embodying SB.72-10 assemble the retaining rings to the pins (4-90B). Assemble the pins to the case as described in para.6.
- (5) On engines embodying Mod.7848 (part 2) check that a shouldered pin (5A-190) is assembled to the right-hand side of the compressor case, below the engine horizontal centre line, at the stage 3 stator vane location. If the pin is not assembled, assemble as described in para.6.
- (6) Place the pins described in paras.3, 4 and 5 in a freezing agent (Cardice) for approximately 20 minutes. Wearing protective gloves, remove each pin in turn from the freezing agent and assemble to its location in the case. Ensure the shoulders or retaining rings of pins do not protrude above the surface of the case.

#### 4. Assemble Items to Inner Fixing Rings (Ref.Fig.501)

##### A. Assemble Items to Stage 1 Rings.

- (1) Remove the assembled labyrinth ring/fixing ring (1-80/90) from its container (Tool 1441) and place on to a flat protected surface with the labyrinth extending upwards.
- (2) Identify the single hole in the rings and insert a bolt (1-40) into the hole from underneath, then using the sleeve (Tool 1321), assemble a retaining ring (1-40) to the groove in the bolt securing it in position.
- (3) Apply lubricant 'B' to two bolts (1-70), then insert the bolts into one of the pairs of holes in the rings from underneath. Assemble a retaining plate (1-60) to the bolts so that the flange of the plate locates on the labyrinth, then screw a nut (1-50) onto each bolt. Ensure that the minimum locking (run-down) torque of the nuts is 3.5 lbf in. (0,4 N.m), then torque-tighten the nuts between 85 and 95 lbf in. (9,6 and 10,7 N.m).

IN13896

SUB-ASSEMBLY

**72-33-01**

Page 506

Jun 1/77

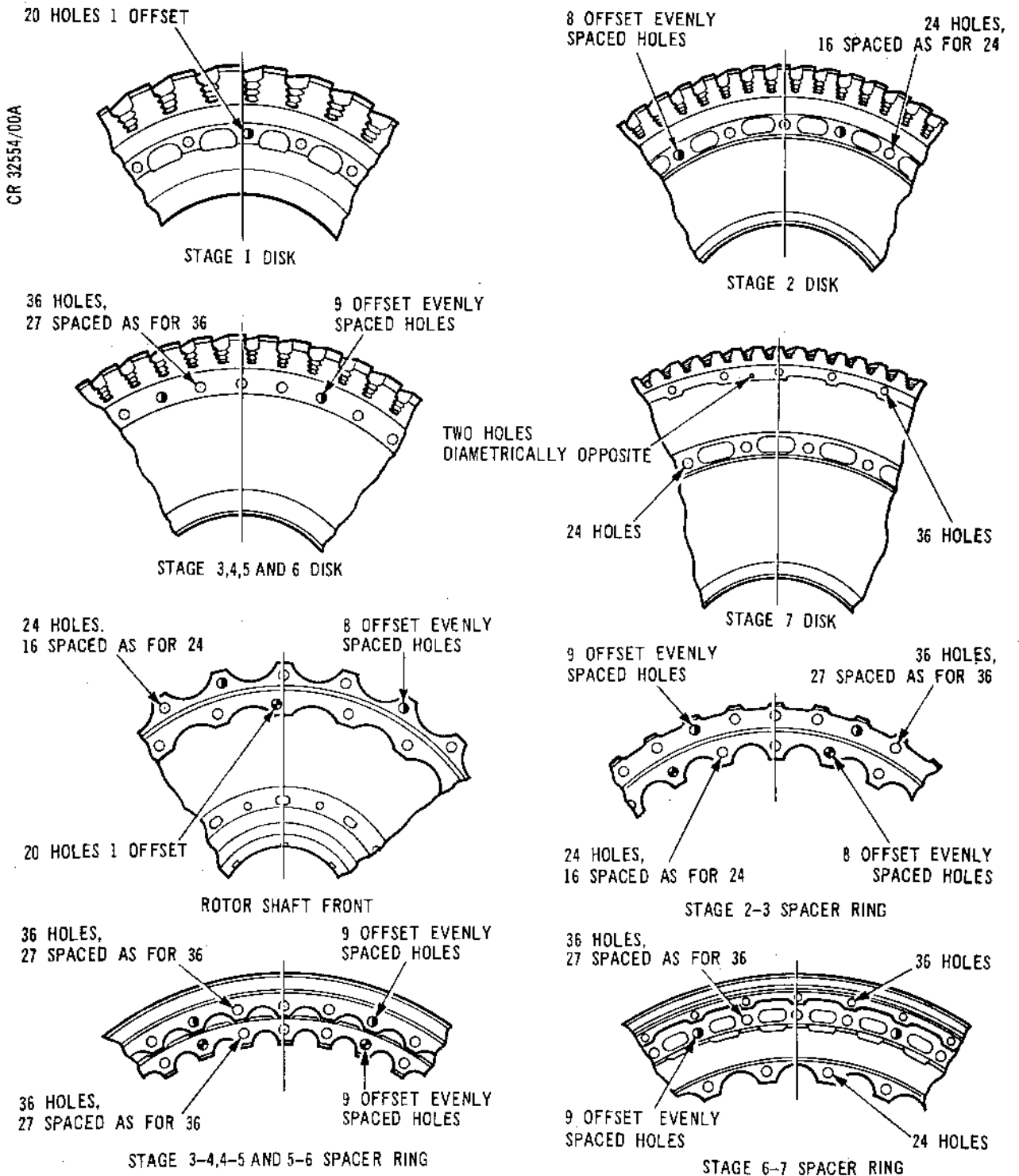


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



ROTOR SHAFT FRONT VIEWED FROM FRONT  
ALL DISKS AND SPACER RINGS VIEWED FROM REAR

Identification of Datum Holes, Blade Slots and Numbering  
Figure 502 (Sheet 2 of 2)

SUB-ASSEMBLY  
**72-33-02**  
Page 507  
Dec 1/75

TN24933



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) If any of the remaining spacer rings are new they must be checked as follows:

NOTE: The spacer rings (stage 3-4, 4-5, 5-6 and 6-7) (and their disks) have 36 holes, 27 spaced as for 36 and the remaining 9 (evenly spaced) holes are offset. The spacers will be marked with a manufacture datum mark on the edge of each flange which can be ignored.

- (a) Examine the edge of the small dia. flange of the new spacer for a light spot 'L', then examine the edge of the disk that is assembled to the spacer (rear) larger dia. flange for a light spot 'L'. Place the spacer on the (correct) disk and position the light spot on the spacer as near diametrically opposite the light spot on the disk as the nine offset holes will allow.
- (b) Etch the datum marks on the edge of the large and small flange of the spacer in line with the datum mark on the disk (if the manufacture datum mark is incorrect), then obliterate the original datum marks (if incorrect).
- (3) If any disk is a new item, the datum hole and the datum No.1 blade will be marked on the disk edge at manufacture (Ref.Fig.502). Ensure that the datum hole of each disk is marked, and is in correct relationship with the No.1 blade slot.
- (4) Trace through the datum holes (of the old and/or new disks and spacer) from the stage 7 disk, stage 6-7 spacer ring etc. to the stage 1 disk and ensure that the No.1 blades of the disks are in line.

IN8461

SUB-ASSEMBLY

**72-33-02**

Page 508

Nov 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



4. Check Balance of Balancing Mandrels used for Horizontal Balance

A. General.

- (1) The tolerances of the manufacture of the balancing mandrels are such that concentricity checks etc. are not required on the mandrels, but each mandrel must be dynamically balanced to within 1 dram in. (45 grm mm) prior to being used as a balancing mandrel. On the first occasion, and on any occasion it is deemed necessary, the mandrels listed in Table 501 must be balanced in accordance with the following procedure.

STAGE OF DISK	1	2	3	4	5	6	7
TOOL REF.NO. OF BALANCING MANDREL	371	546	1151	1115	1116	1114	552

Disk Balancing Mandrels  
Table 501

B. Prepare the Balancing Machine (Avery 7210) (Ref.Fig.503).

NOTE: With the Avery 7210 balancing machine, the bearings assembled to the cradles will be the correct size for the balancing mandrels, therefore no further bearing, spacers etc. will be required.

- (1) Position the left or right-hand edges of the bearings in the machine cradles (approx.) 11 or 14 in. (280 or 355 mm) apart to suit the mandrel to be balanced, by adjusting the position of the cradles. Lock the cradles and ensure that the cradle retaining arms are swung open.
- (2) Position the bottom half of the protection guard (Tool 1500) in between the cradles so that the left-hand side of the guard is approx. 0.5 in. (12 mm) from the left-hand cradle. Secure the guard to the bed of the balancing machine.

PRINTED IN ENGLAND

TN17447

CR 32129/00A



OLYMPUS 593

MK.610-14-28  
OVERHAUL



AVERY 7210 BALANCING MACHINE

ACCESS COVER

PROTECTION GUARD

HINGE BOLT

PROTECTION GUARD

THUMB NUT

PILLAR

RETAINING ARM

Preparing Balancing Machine  
Figure 503

SUB-ASSEMBLY  
**72-33-02**

Page 510  
Dec 1/75

TN19501





OLYMPUS 593

MK.610-14-28  
OVERHAUL



C. Assemble a Balancing Mandrel to the Balancing Machine  
(Ref.Fig.504).

- (1) Attach a hoist to the lifting fixture (Tool 1171), then position the fixture over the balancing mandrel and assemble the mandrel to the lifting fixture.
- (2) Position the hoist over the balancing machine with the studded end of the mandrel towards the balancing machine drive. Lower the mandrel into the bottom half of the protection guard, lift the balancing machine drive and engage the mandrel studs in it. Adjust the position of the cradles (if required) to align with the bearing journals of the mandrel, with the mandrel correctly engaged with the drive. Adjust the position of the guard (if required) to give running clearance of the mandrel, then secure the cradles and guard (if required). Lower the mandrel on to the cradles, then disengage the lifting fixture from the mandrel and the hoist.
- (3) Assemble washers and nuts to the mandrel studs and fully tighten the nuts. Pivot the retaining arms of the cradles over the mandrel and engage them around the pillars, then secure them with thumbnuts. Using a hoist lower the top half of the guard (Tool 1500) on to the bottom half, then pivot the bottom guard swing bolts into the top guard and secure with the thumbnuts.

D. Balance the Balancing Mandrel.

- (1) Apply lubricant 'A' to the spindles of the adjustable bearings and the journals of the mandrel, and ensure that they remain well lubricated throughout the balancing operation.

PRINTED IN ENGLAND

TN11255

SUB-ASSEMBLY

72-33-02

Page 511

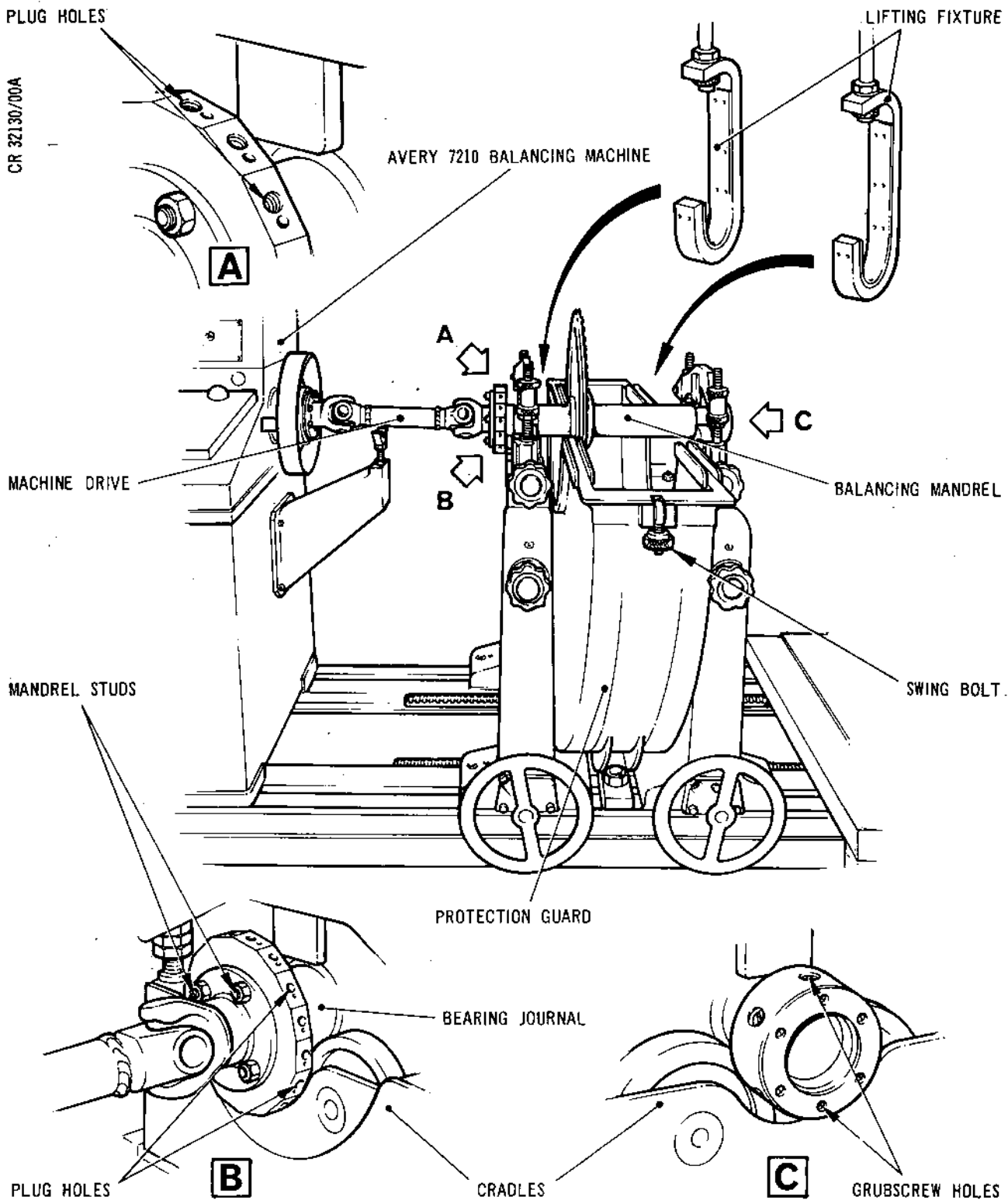
Nov 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



Assembling Balancing Mandrel to Balancing Machine  
Figure 504

SUB-ASSEMBLY  
**72-33-02**  
Page 512  
Dec 1/75

TN19502



OLYMPUS 593

MK.610-14-28

OVERHAUL



- PRINTED IN ENGLAND
- (2) Carry out dynamic balancing of the mandrel, operating the balancing machine in accordance with the manufacturers instructions. The mandrel should be rotated at (approx.) 450 rpm and run for (approx.) two to three min for the temperature to stabilise. The balance of the mandrel must be within 1 dram in. (45 grm mm). If the balance of the mandrel is outside the limits, balance out the right-hand end of the mandrel by slackening the axial grub screws in the end face of the mandrel and removing and/or re-positioning the radial grub screws in the right-hand flange (Ref.Fig.504 view 'C'). Re-secure the locking screws after adjustment. Balance out the left-hand end by adding plugs (1/4 UNF 28 T.P.I. x 1/4 in. long) and lockwashers to the studded flange at the left-hand end of the mandrel (Ref.Fig.504 view 'A').

NOTE: If a new mandrel is seriously out of balance it may be necessary to correct its static balance first, by grinding the bore of one or more of the lightening holes in the web of the mandrel.

E. Remove the Balance Mandrel from the Balancing Machine.

- (1) Release the retaining arm of each cradle and pivot the arms out of the way. Release and pivot down the swing bolts securing the top half of the guard, then using a hoist, raise the guard until clear of the mandrel and lower on to a suitable surface. Remove the hoist from the guard.
- (2) Attach a hoist to the lifting fixture (Tool 1171), then position and lower the hoist over the mandrel and engage the two hooks of the fixture around the mandrel. Remove the nuts and washers securing the mandrel to the balancing machine drive. Raise the hoist and guide the mandrel out of the guard, and when possible, disengage the drive from the mandrel studs and lower the drive.
- (3) Position and lower the mandrel into its storage stand, then remove the fixture from the mandrel and the hoist.

SUB-ASSEMBLY

72-33-02

Page 513

Jun 1/87



OLYMPUS 593

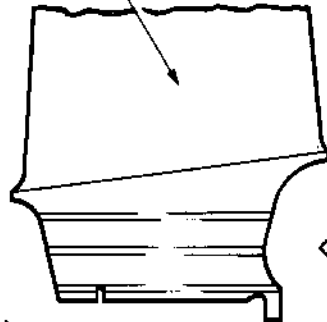
MK.610-14-28

OVERHAUL



CR 36093/00A

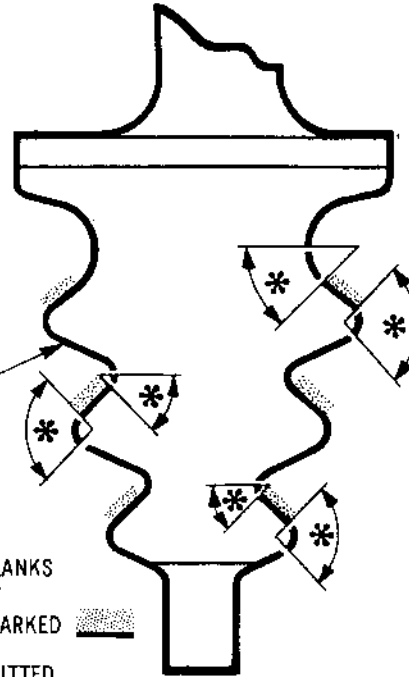
HP COMPRESSOR  
STAGE 1 BLADE



DISCOLOURATION OF  
UNLOADED FLANKS  
PERMISSIBLE

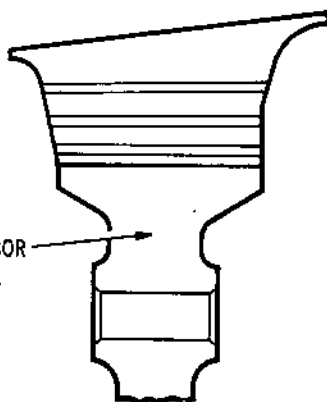
COAT LOADED FLANKS  
WITH LUBRICANT  
AT POSITIONS MARKED

OVERSPRAY PERMITTED  
ON BLADE ROOT ENDS  
AND AREAS INDICATED \*



TYPICAL VIEW AT A

HP COMPRESSOR  
STAGE 1 DISK



TYPICAL SECTION  
THROUGH DISK  
SLOT

B

OVERSPRAY PERMITTED  
HERE

APPLY TWO COATS OF  
LUBRICANT AT POSITIONS  
MARKED

TYPICAL VIEW AT B

Dry Film Lubricant Application  
Figure 504A

SUB-ASSEMBLY

72-33-02

Page 514

Jun 1/87



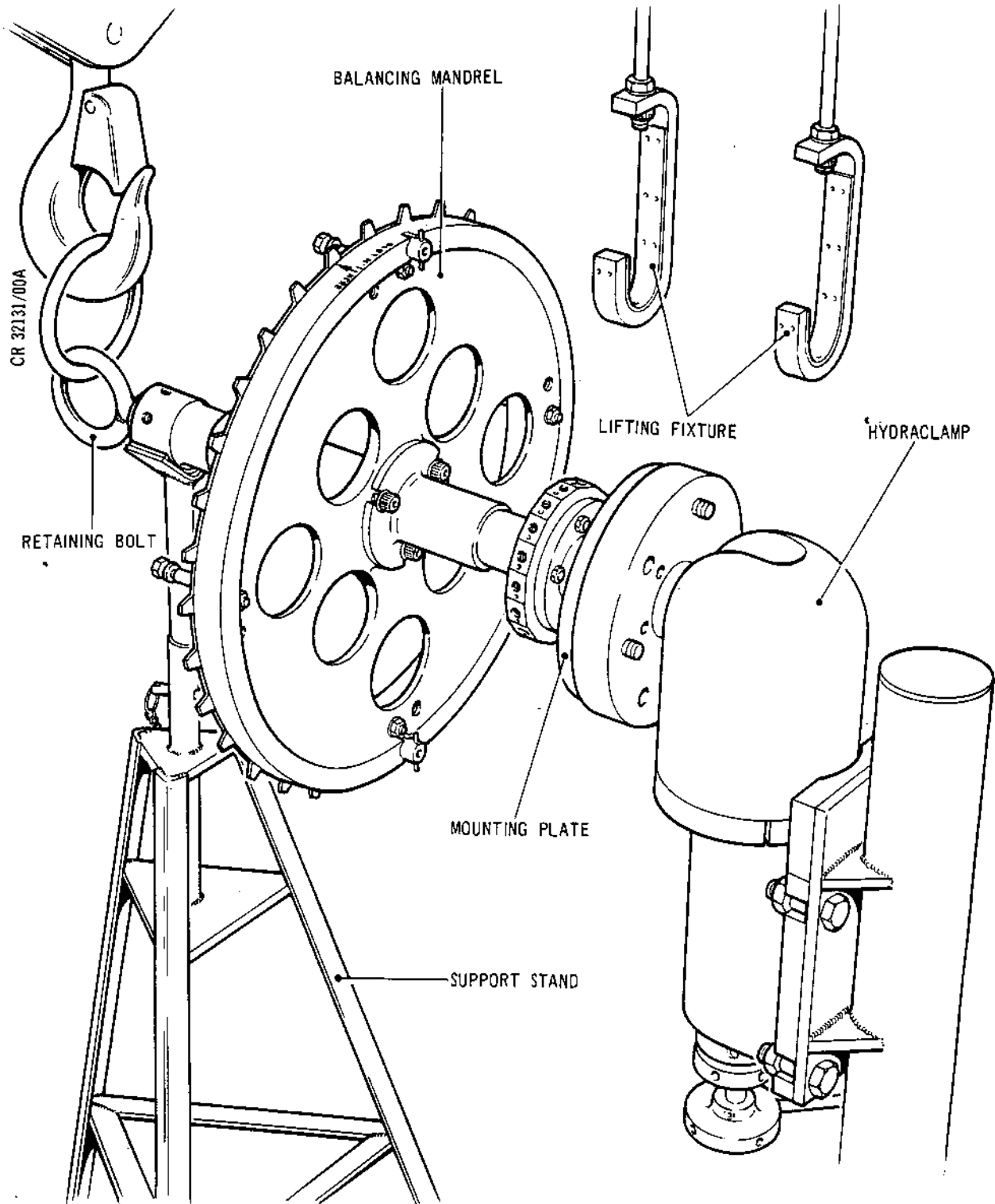
OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND



Assembling Balancing Mandrel to Mounting Plate  
Figure 505

SUB-ASSEMBLY

**72-33-02**

Page 514A

Jun 1/87



OLYMPUS 593

MK.610-14-28  
OVERHAUL



This Page Left Blank Intentionally

SUB-ASSEMBLY

**72-33-02**

Page 514B

Jun 1/87



OLYMPUS 593

MK.610-14-28

OVERHAUL



5. Balance the Stage 1 Rotor

NOTE: If all the original blades are available and undamaged and are to be assembled to the original disk, the bladed disk does not require balancing, but the blades must be assembled to the disk with serviceable retaining plates (1-220) as detailed in para.B and F.

A. Apply Dry Film Lubricant (Engines to SB 72-8879-338 standard only) (Ref.Fig.504A).

- (1) Apply one coat of dry film lubricant to the loaded flanks of the stage 1 rotor blades as instructed in Chapter 72-09-18 Repair.
- (2) Apply two coats of dry film lubricant to the stage 1 disk root serrations, with a minimum drying time of 10 minutes between coats, as instructed in Chapter 72-09-18 Repair.

B. Assemble Blades to Stage 1 Disk and Prepare for Balance (Ref.Fig.505).

- (1) Ensure that a Hydraclamp (Tool 1673) is bolted to a pedestal (Tool 1674), then position the mounting plate (Tool 1163) on the Hydraclamp and secure with its slave bolts. Position the mounting plate so that its axis is horizontal, then lock the Hydraclamp.
- (2) Connect a hoist to the lifting eye of the lifting fixture (Tool 1171), then position the hoist over the static balance mandrel (Tool 371) and assemble the mandrel to the lifting fixture.
- (3) Position the hoist alongside the mounting plate, then traverse the hoist and engage the balancing mandrel over the mounting plate, ensuring that the mandrel studs locate in the holes in the mounting plate. Assemble washers and nuts to the mandrel studs and fully tighten the nuts.
- (4) Position and adjust the support stand (Tool 1667) to support the end of the balancing mandrel. Disconnect the lifting fixture from the mandrel, and the fixture from the hoist. Insert the retaining bolt (Tool 547) into the end of the mandrel and when it contacts the mounting plate, screw it into the plate. Attach a hoist to the ring of the bolt, then release the Hydraclamp and raise/traverse the hoist to bring the mandrel to the vertical position. Lock the Hydraclamp, then release the hoist.

SUB-ASSEMBLY

**72-33-02**

Page 515

Jun 1/87

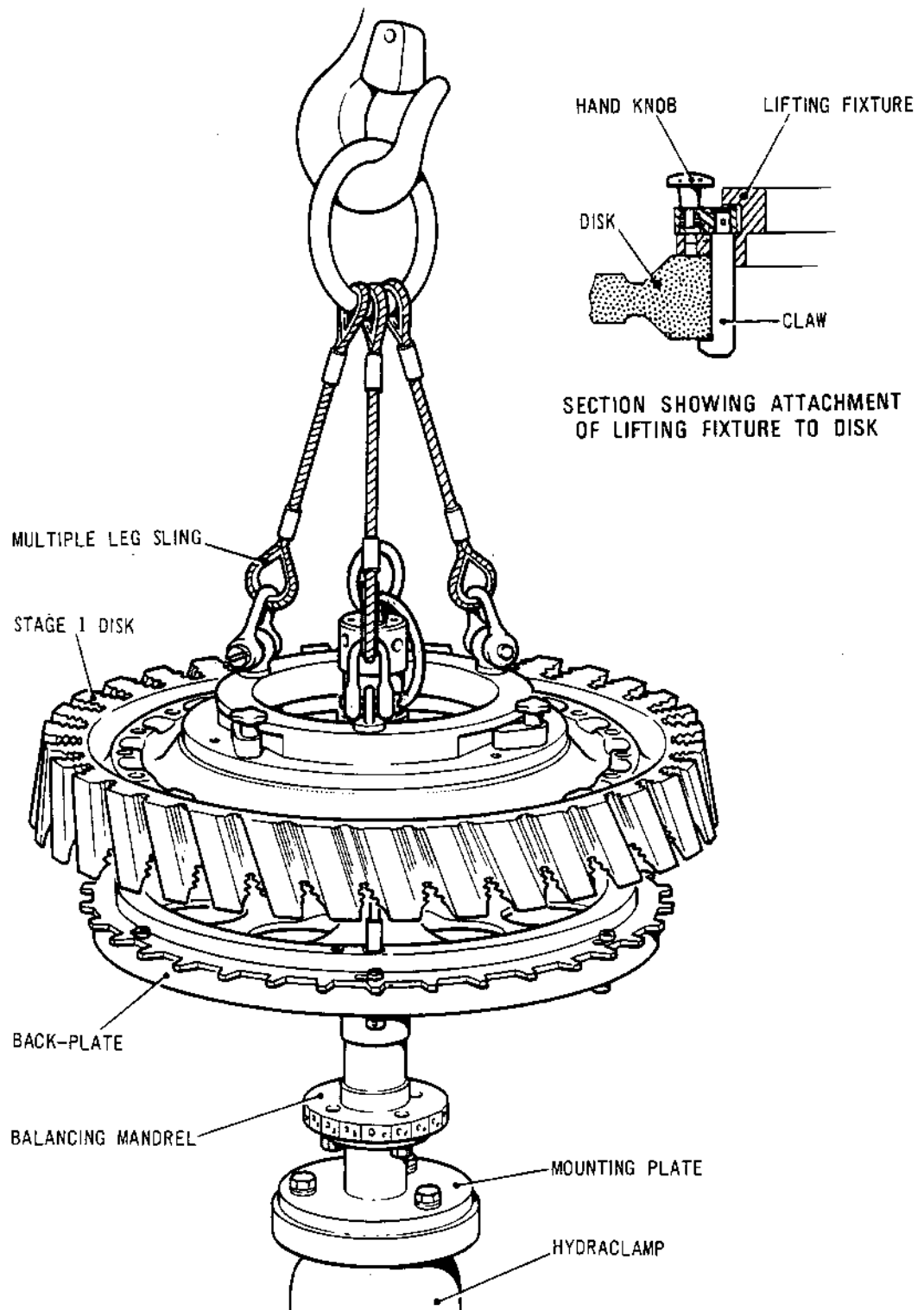


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32132/00A



Assembling Stage 1 Disk to Balancing Mandrel  
Figure 506

SUB-ASSEMBLY  
**72-33-02**  
Page 516  
Dec 1/75





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (5) Assemble the lifting fixture (Tool 369) to the stage 1 disk (1-230) (Ref.Fig.506).
- (a) Attach a hoist to the lifting ring of the fixture, then position the hoist over the disk.
  - (b) Raise the disk by positioning three suitable support blocks under the disk, ensuring that the blocks are evenly positioned.
  - (c) Ensure that the hand knobs are engaged in the holes at the 'FREE' position. Lower the hoist and engage the plate in the disk, then withdraw each hand knob from its locking hole, turn the knobs to the 'LOCK' position engaging the claws under the disk, and release the knobs engaging them in the lock holes.
- (6) Assemble the disk to the balancing mandrel (Ref. Fig.506).
- (a) Raise the hoist and position the disk over the balancing mandrel. Align the bolt holes of the disk with the mandrel locating/securing studs, ensuring that the offset datum hole of the disk is not aligned with the studs.
  - (b) Lower the disk on to the studs, ensuring that it is lowered squarely and does not get jammed. Lightly tap with a suitable (soft faced) mallet if necessary. When the disk abuts the mandrel, screw the special nuts onto the studs and fully tighten the nuts.
  - (c) Withdraw each hand knob from its locking hole, turn the knobs to the 'FREE' position and engage them in the locking holes. Raise the fixture from the disk, then remove the the fixture from the hoist.

PRINTED IN ENGLAND

TN11269

SUB-ASSEMBLY

**72-33-02**

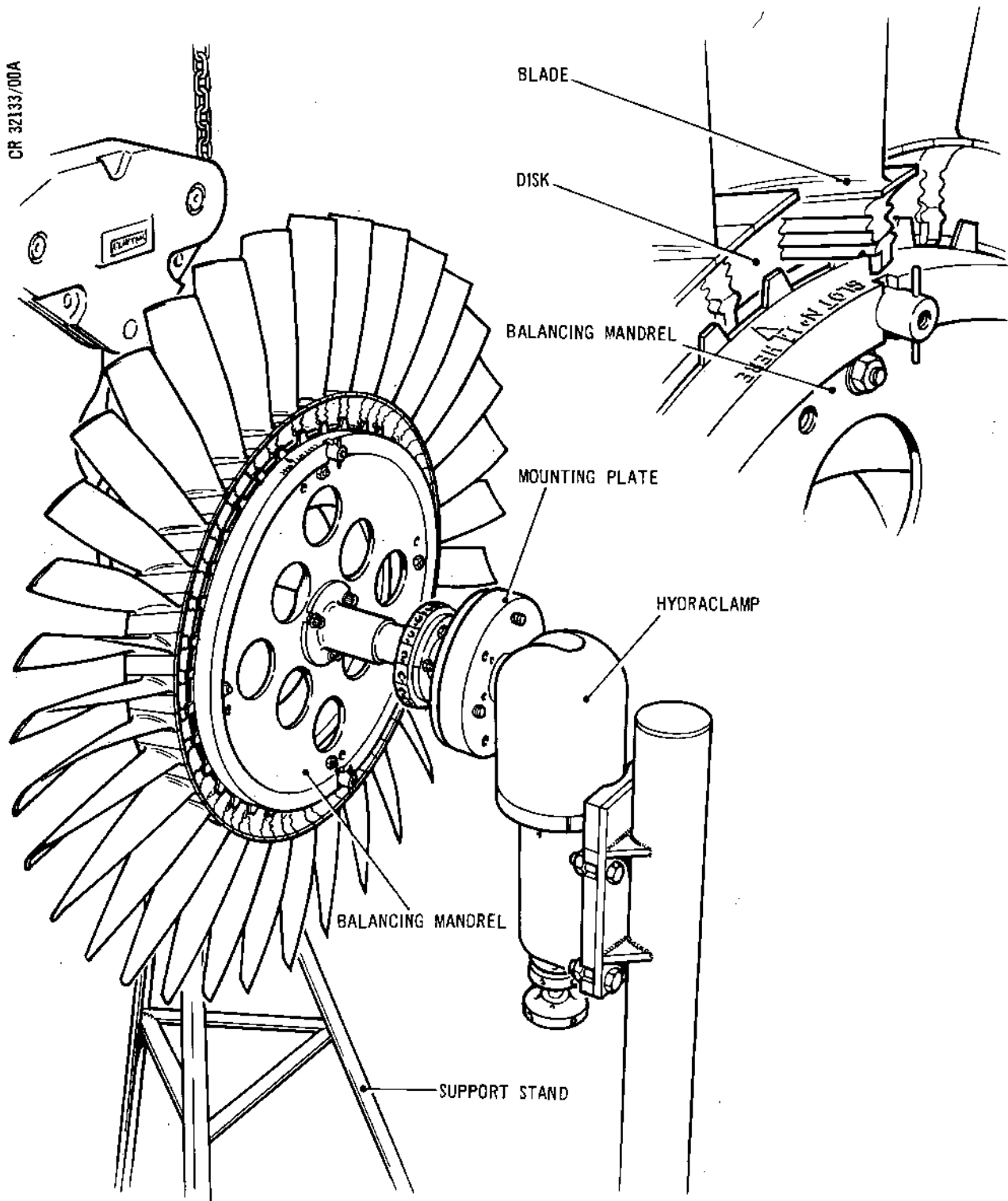
Page 517  
Nov 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 32133/00A



Assembling Blades to Stage 1 Disk  
Figure 507

SUB-ASSEMBLY  
**72-33-02**  
Page 518  
Dec 1/75

TN19505



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (7) Attach a hoist to the ring of the retaining bolt, then release the Hydraclamp and lower the mandrel to the horizontal position. Position the support stand (Tool 1667) under the end of the mandrel to take the weight, then remove the hoist and unscrew and remove the retaining bolt.
- (8) Assemble the blades to the stage 1 disk (Ref.Fig.507).

NOTE: If the disk is to SB.72-34 standard, only blade positions No.1 and 34 will be marked on the edge of the disk.

- (a) Ensure that the two handles of the mandrel are withdrawn from engagement in the retaining plate and the plate is turned to the unlocked position allowing the blades to be assembled to the disk.

NOTE: If all the original blades are available and undamaged, then assemble the blades as detailed in para.(b). If the blades include four repaired and/or new blades, then the blades must be assembled as detailed in para.(c). If the blades include more than four repaired and/or new blades, then the blades must be assembled as detailed in para.(d). Ensure that the aggregate depth of blending of repaired blades does not exceed 0.90 in. (22,86 mm) (Ref.72-33-02 Repair No.6).

- (b) Identify the stage 1 blades (1-210), then examine the blade roots for their positional No. (Ref.Fig.502) and lay the blades out in numerical sequence. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades, then insert the blades in numerical sequence into the disk, starting at No.1 position and working in a clockwise direction when viewing the mandrel side of the disk.

PRINTED IN ENGLAND

TN11270



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) Identify the stage 1 blades (1-210), then examine the roots of the original blades for their positional No. (Ref.Fig.502) and lay the blades out in numerical sequence, leaving spaces where new blades are to be positioned. Noting the mass moment weight of the new blades, place the lightest new blades in vacant positions next to the heaviest original blades, and position the heaviest new blades in vacant positions next to the lightest original blades. Assemble the blades to the disk as detailed in para.(b).
- (d) Identify the stage 1 blades (1-210), then according to the mass moment weight of the blades (quoted on the labels), lay the blades out in sequence of weight, starting with the heaviest blade at one end and ending with the lightest blade at the other end. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades (Ref.Fig.502). Assemble the blades to the disk positioning the heaviest blade at No.1 position and the next heaviest blade diametrically opposite, then assemble the two lightest blades diametrically opposite each other and next to the heaviest blades. Assemble the remainder of the blades to the disk in sequence of weight, assembling alternate heavy and light blades and where possible, positioning equal weight blades diametrically opposite each other.
- (e) Turn the retaining plate to lock the blades in position and ensure that the two handle plungers engage in the plate locking it in position.

TN4184

SUB-ASSEMBLY

**72-33-02**

Page 520

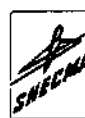
Nov 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

C. Assemble the Stage 1 Bladed Disk to the Balancing Machine.

- (1) Attach a hoist to the lifting eye of the lifting fixture (Tool 1171), then position the hoist over the balancing mandrel and engage the two hooks of the fixture around the mandrel.
- (2) Remove the nuts and washers securing the mandrel to the mounting plate, then remove the support stand and traverse the hoist to disengage the mandrel from the mounting plate. If the mandrel/disk cannot be assembled direct to the balancing machine, lower it into the mobile stand (Tool 1165) engaging the mandrel journals in the stand support brackets (Ref. Fig.508). Disconnect the lifting fixture, then position the stand near the balancing machine. With the lifting fixture (Tool 1171) attached to a hoist, position the hooks of the fixture around the mandrel and raise it out of the stand.
- (3) Position the hoist over the balancing machine with the studded end of the mandrel towards the balancing machine drive. Lower the disk into the bottom half of the protection guard (Tool 1500), lift the balancing machine drive and engage the mandrel studs in it, then adjust the position of the cradles (if necessary) to align with the bearing journals of the mandrel, with the mandrel correctly engaged with the drive. Adjust the guard position (if necessary) to give running clearance of the mandrel/bladed disk, then secure the cradles and guard (if required). Lower the mandrel on to the cradles, then disengage the lifting fixture from the mandrel and the hoist.
- (4) Assemble washers and nuts to the mandrel studs and fully tighten the nuts. Pivot the retaining arms of the cradles over the mandrel and engage them around the pillars, then secure them with thumbnuts. Using a hoist, lower the top half of the guard (Tool 1500) onto the bottom half ensuring that the access cover of the guard is towards the balancing machine operator. Pivot the bottom guard swing bolts into the top guard and secure with the thumbnuts.

SUB-ASSEMBLY

72-33-02

Page 521

Jun 1/87



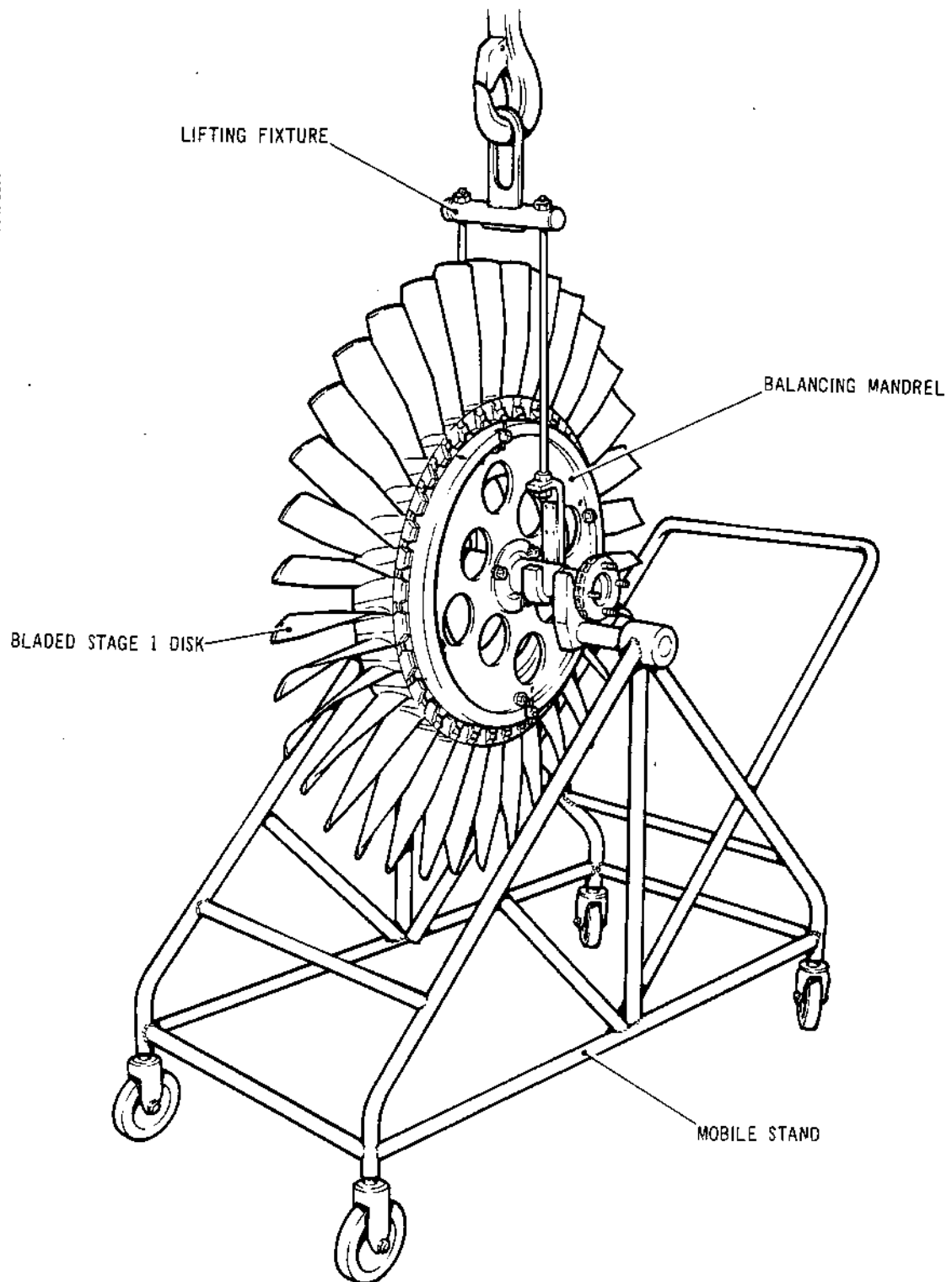
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 32134/00A



Assembling Bladed Disk/Mandrel to Mobile Stand  
Figure 508

SUB-ASSEMBLY  
**72-33-02**  
Page 522  
Nov 1/76

**OLYMPUS 593**

MK.610-14-28

OVERHAUL

**D. Balance the Stage 1 Bladed Disk.**

- (1) Apply Lubricant 'A' to the spindles of the adjustable bearings and the journals of the mandrel, and ensure that they remain well lubricated throughout the balancing operation.
- (2) Carry out a static balance of the bladed disk, operating the balancing machine in accordance with the manufacturers instructions. The disk should be rotated at (approx.) 450 rpm and run for (approx.) two to three min. for the temperature to stabilise. The balance of the disk must be within 4 drn in. (180 grm mm). If the balance of the disk is outside the limit, rectify by the interchange of heavy and light-weight blades (Ref. para.(3)) from the out of balance angular position, until the disk is within limits.
- (3) To exchange the blades, release the swing bolts securing the top half of the guard and using a hoist, remove the guard. Withdraw the two handle plungers locking the mandrel retaining plate, then turn the plate to release the blades. Withdraw a heavy blade from as near the out of balance position as possible and exchange it for a light blade as near diametrically opposite as possible. Turn the retaining plate to lock the blades in position and ensure that the two handle plungers engage in the plate locking holes. Lower the top half of the guard on to the bottom half and secure the top with the swing bolts. Release the hoist. Recheck the balance of the bladed disk.

**E. Remove the Bladed Disk from the Balancing Machine.**

- (1) Release the retaining arm of each cradle and pivot the arms out of the way. Release and pivot down the swing bolts securing the top half of the guard, then using a hoist, raise the guard until clear of the disk and lower on to a suitable surface. Remove the hoist from the guard.

SUB-ASSEMBLY

**72-33-02**

Page 523

Jun 1/87



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Attach a hoist to the lifting fixture (Tool 1171), then position and lower the hoist over the disk and engage the two hooks of the fixture around the mandrel. Remove the nuts and washers securing the mandrel to the balancing machine drive. Raise the hoist and guide the disk out of the machine, and when possible, disengage the drive from the mandrel studs and lower the drive.
- (3) If the mandrel/disk cannot be assembled direct to the Hydraclamp, lower it into the mobile stand (Tool 1165) engaging the mandrel journals in the stand support brackets (Ref.Fig.508). Disconnect the lifting fixture, then position the stand by the Hydraclamp. With the lifting fixture (Tool 1171) attached to a hoist, position the hooks of the fixture around the mandrel and raise it out of the stand.
- (4) Position the hoist alongside the Hydraclamp, then engage the mandrel over the mounting plate and insert the studs through the plate. Assemble the mandrel washers and nuts on to the studs and fully tighten the nuts.
- (5) Position the support stand (Tool 1667) under the end of the mandrel, then disconnect the lifting fixture from the mandrel and the fixture from the hoist. Insert the retaining bolt (Tool 547) into the end of the mandrel and screw it into the mounting plate.
- (6) Attach a hoist to the ring of the retaining bolt, then release the Hydraclamp and raise/traverse the hoist to position the mandrel vertically. Lock the Hydraclamp, then release the hoist.

**F. Secure the Blades to the Stage 1 Disk.**

- (1) Assemble the lifting fixture (Tool 369) to the disk (Ref.Fig.506).
  - (a) Attach a hoist to the lifting ring of the fixture, then position the hoist over the disk.

SUB-ASSEMBLY

**72-33-02**

Page 524

Jun 1/87





OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Ensure that the hand knobs are engaged in the holes of the 'FREE' position. Lower the hoist and engage the plate in the disk, then withdraw each hand knob from its locking hole, turn the knobs to the 'LOCK' position engaging the claws under the disk, and release the knobs engaging them in the lock holes.
- (2) Remove the disk from the balancing mandrel and assemble it to the blading mandrel (Tool 370).
- (a) Remove the special nuts securing the disk to the mandrel, then assemble a protection/retaining band (Tool 1130) to the tips of the blades.
- (b) Raise the hoist and withdraw the disk from the mandrel studs, lightly tapping the disk with a (soft faced) hammer (if required). Position and lower the disk on to a suitable surface, then disconnect the hoist and lower the fixture on to the disk.
- (c) Attach a hoist to the ring of the retaining bolt, then release the Hydraclamp and lower the mandrel to the horizontal position. Position the support stand (Tool 1667) under the end of the mandrel to take the weight, then remove the hoist and unscrew and remove the retaining bolt.
- (d) Attach a hoist to the lifting eye of the lifting fixture (Tool 1171), then position the hoist over the balancing mandrel and engage the two hooks of the fixture around the mandrel. Remove the nuts and washers securing the mandrel to the mounting plate, then remove the support stand and traverse the hoist to disengage the mandrel from the mounting plate. Position and lower the mandrel into its storage stand, then remove the lifting fixture from the mandrel.

PRINTED IN ENGLAND

TN11279

SUB-ASSEMBLY

72-33-02

Page 525

Nov 1/76

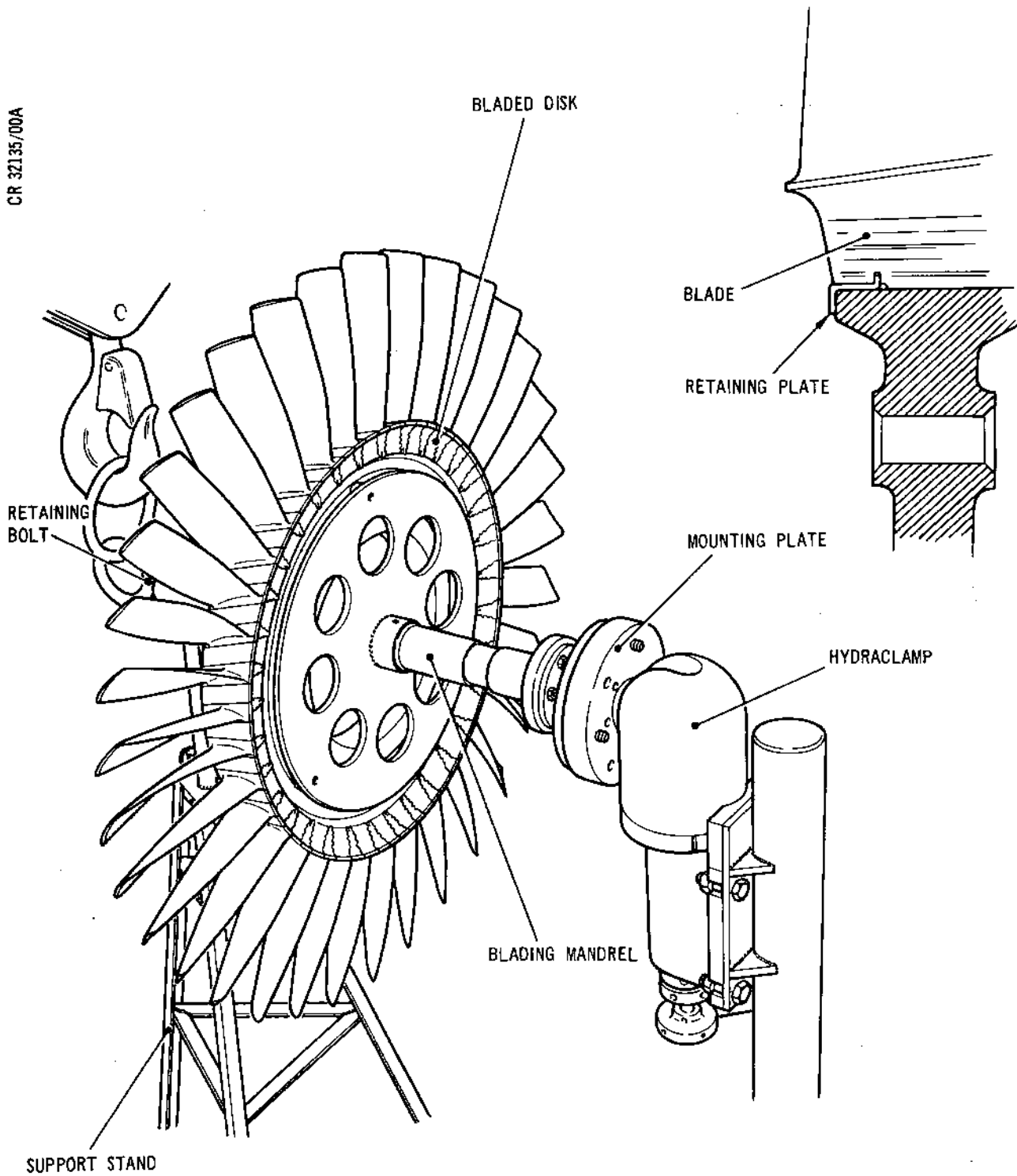


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32135/00A



TN19508

Securing Blades in Stage 1 Disk  
Figure 509

SUB-ASSEMBLY  
**72-33-02**

Page 526  
Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (e) Position the hoist over the blading mandrel (Tool 370) and assemble the mandrel to the lifting fixture. Position the hoist alongside the mounting plate, then traverse the hoist and engage the blading mandrel over the mounting plate, ensuring that the mandrel studs locate in the holes in the mounting plate. Assemble the washers and nuts to the mandrel studs and fully tighten the nuts (Ref.Fig.509).
- (f) Position and adjust the support stand (Tool 1667) to support the end of the blading mandrel. Disconnect the lifting fixture from the mandrel and the fixture from the hoist. Insert the retaining bolt (Tool 547) into the end of the mandrel and when it contacts the mounting plate, screw it into the plate. Attach a hoist to the ring of the bolt, then release the Hydraclamp and raise/traverse the hoist to bring the mandrel to the vertical position. Lock the Hydraclamp, then release the hoist.
- (g) Attach a hoist to the ring of the lifting fixture (Tool 369), then raise the disk and position it over the mandrel. Align the disk bolt holes with the mandrel studs, then lower the disk onto the mandrel. Assemble washers and nuts to the studs and fully tighten the nuts. Withdraw each hand knob of the fixture from its locking hole, turn the knobs to the 'FREE' position and engage them in the locking holes. Raise the fixture from the disk, then remove the fixture from the hoist.
- (h) Attach a hoist to the ring of the retaining bolt, then release the Hydraclamp and lower the mandrel to the horizontal position. Position the support stand (Tool 1667) under the end of the mandrel to take the weight, then remove the hoist.

PRINTED IN ENGLAND

TN11280

SUB-ASSEMBLY

72-33-02

Page 527

Nov 1/76

**SEE TR**



**OLYMPUS 593**

MK.610-14-28  
OVERHAUL



- (3) Remove the protection/retaining band from the blade tips. Examine the edge of the disk for the No.1 blade datum mark  $\rightarrow 0$ , then examine the blade roots for their numbering (Ref.Fig.502) and ensure that all the blades are numbered correctly in numerical sequence in a clockwise direction as viewed from the mandrel side, with No.1 blade in the datum slot. Etch all new blades with their position No., and renumber any blades that have been re-positioned, ensuring that old position No. are obliterated.
- (4) Remove No.1 blade from its slot, assemble a retaining plate (1-220) to the groove in the end face, then refit the blade/plate to the disk (Ref.Fig.509). Ensure that the blade is fully in, then using the hammer (Tool 1655), bend the protruding end of the retaining plate against the disk. Ensure that the retaining plate is bent over the edge of the disk, but care must be taken that the bend of the plate is not too acute causing a fracture of the plate. Assemble a retaining plate to each of the blades, and lock each plate against the disk. Using feeler gauges, check each blade to ensure that the maximum end-float of the blade root in the disk does not exceed 0.015 in. (0,38 mm). Assemble the protection/retaining band (Tool 1130) to the tips of the blades.
- (5) Attach a hoist to the ring of the retaining bolt, then release the Hydraclamp and raise/traverse the hoist to position the mandrel vertically. Lock the Hydraclamp, then release the hoist.
- (6) Assemble the lifting fixture (Tool 369) to the disk (Ref.Fig.506).
  - (a) Attach a hoist to the lifting ring of the fixture, then position the hoist over the disk.

FN11291

SUB-ASSEMBLY

**72-33-02**

Page 528

Nov 1/76

**ATP  
TEMPORARY  
REVISION**

**British airways**

CONCORDE

OLYMPUS 593 OVERHAUL MANUAL

This Temporary Revision complies with BCAR's Chapter A6-2 and TSS No.0-2

*David Handell*

For Chief Technical and Industrial Services Engineer CAA Design Approval No.DA1/8566/78

TEMPORARY REVISION NO.72-572

Insert in 72-33-02 after page 528

REASON FOR ISSUE

BEOL NOTE added

ACTION

Read the following NOTE after paragraph E (3)

BEOL NOTE: To avoid re-etching, note on a blade card the original position number (as etched on the blade root against the position assembled to in the disc after balancing). This will enable the reassembly of the blades to their correct positions should they come out of the disc after balancing. Applicable to H.P. stage 1-7 rotor assemblies.

23 July 1981

TR 72-572  
72-33-02  
TR Page 1 of 1



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Ensure that the hand knobs are engaged in the holes at the 'FREE' position. Lower the hoist and engage the plate in the disk, then withdraw each hand knob from its locking hole, turn the knobs to the 'LOCK' position engaging the claws under the disk, and release the knobs engaging them in the lock holes.
- (7) Remove the nuts and washers securing the disk to the mandrel, then raise the hoist and position and lower the disk on to a suitable pallet or container. Withdraw each hand knob of the fixture from its locking hole, turn the knobs to the 'FREE' position and engage them in the locking holes. Raise the fixture from the disk, then remove the fixture from the hoist.

NOTE: The stage 1 bladed disk is now ready to be passed to the HP Compressor Assembly (72-33-00 Assembly).

- (8) Remove the blading mandrel from the Hydraclamp.
- (a) Attach a hoist to the ring of the retaining bolt, release the Hydraclamp, then lower the mandrel on to the support stand. Release the hoist, then remove the retaining bolt.
- (b) Attach a hoist to the lifting eye of the lifting fixture (Tool 1171), then position the hoist over the blading mandrel and engage the two hooks of the fixture around the mandrel.
- (c) Remove the nuts and washers securing the mandrel to the mounting plate, then remove the support stand and traverse the hoist to disengage the mandrel from the mounting plate. Position and lower the mandrel into its storage stand, then remove the lifting fixture from the mandrel and the hoist. Assemble the washers and nuts to the mandrel and the hoist. Assemble the washers and nuts to the mandrel studs, and the special nuts to the mandrel locating/securing studs.

PRINTED IN ENGLAND

TN11292

SUB-ASSEMBLY

72-33-02

Page 529

Nov 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



## 6. Balance the Stage 2 Rotor

NOTE: If all the original blades are available and undamaged and are to be assembled to the original disk, the bladed disk does not require balancing, but the blades must be assembled to the disk with serviceable retaining plates (1-220) as detailed in para.A.and E.(4) to (8).

### A. Assemble Blades to Stage 2 Disk and Prepare for Balancing.

- (1) Ensure that a Hydraclamp (Tool 1673) is bolted to a pedestal (Tool 1674), and the mounting plate (Tool 1163) is bolted to the Hydraclamp. Position the mounting plate in the horizontal position, then lock the Hydraclamp.
- (2) Connect a hoist to the lifting eye of the lifting fixture (Tool 1171), then position the hoist over the static balance mandrel (Tool 546) and assemble the mandrel to the lifting fixture.
- (3) Position the hoist alongside the mounting plate (Ref.Fig.505), then traverse the hoist and engage the balancing mandrel over the mounting plate, ensuring that the mandrel studs locate in the holes in the mounting plate. Assemble washers and nuts to the mandrel studs and fully tighten the nuts.
- (4) Position and adjust the support stand (Tool 1667) to support the end of the balancing mandrel. Disconnect the lifting fixture from the mandrel, and the fixture from the hoist. Insert the retaining bolt (Tool 547) into the end of the mandrel and when it contacts the mounting plate, screw it into the plate. Attach a hoist to the ring of the bolt, then release the Hydraclamp and raise/traverse the hoist to bring the mandrel to the vertical position. Lock the Hydraclamp, then release the hoist.

FN4185

SUB-ASSEMBLY

**72-33-02**

Page 530

Nov 1/76



OLYMPUS 593

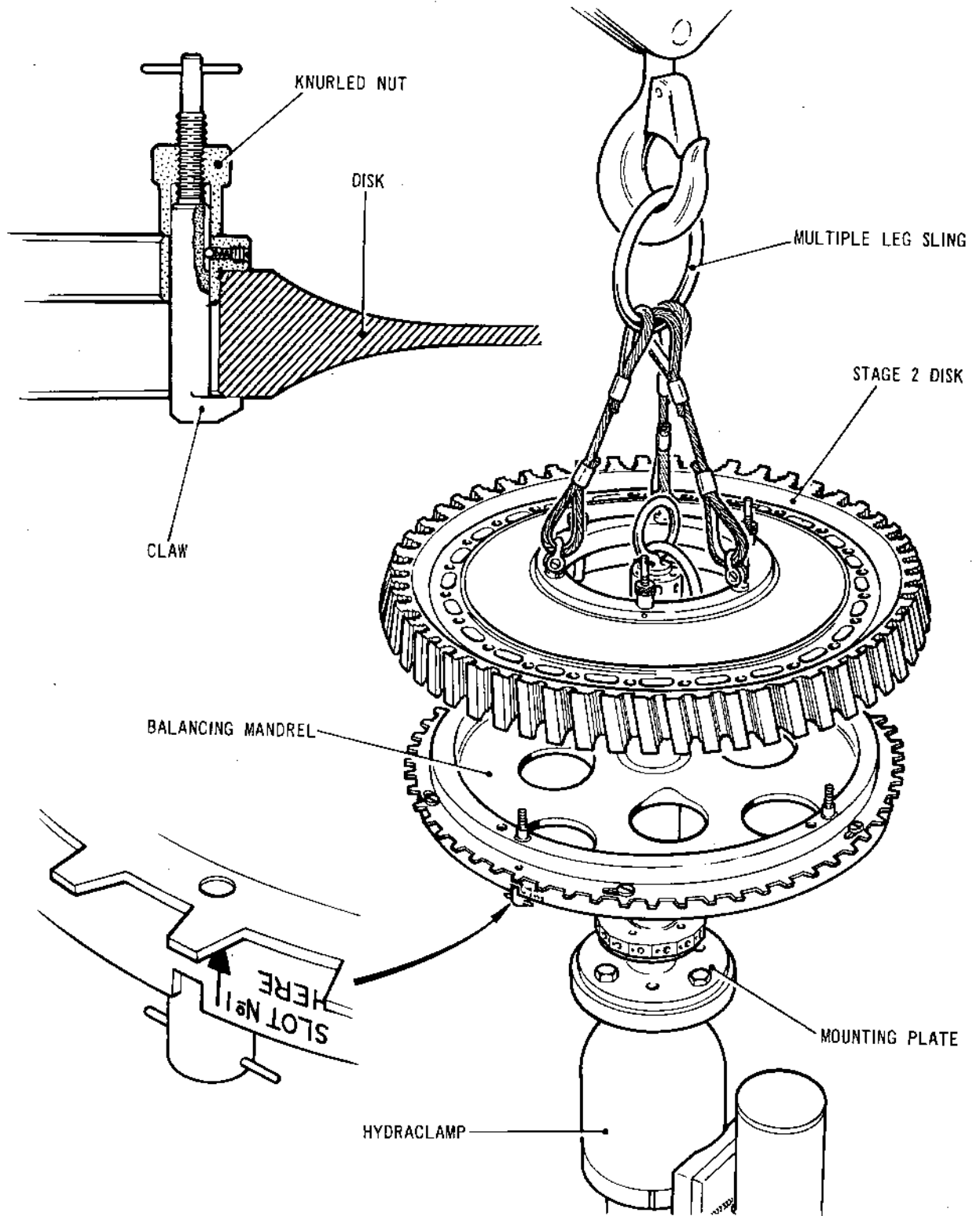
MK.610-14-28

OVERHAUL



CR 32136/00A

PRINTED IN ENGLAND



TN19509

Assembling Stage 2 Disk to Balancing Mandrel  
Figure 510

SUB-ASSEMBLY  
**72-33-02**

Page 531  
Nov 1/76





OLYMPUS 593

MK.610-14-28

OVERHAUL



- (5) Assemble the multiple leg sling (Tool 1173) to the stage 2 disk (1-300) (Ref.Fig.510).
  - (a) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk.
  - (b) Ensure that the knurled nuts are unscrewed and the claws turned to align them with the plate. Lower the hoist and engage the plate in the disk, then turn the claws outwards to engage them under the disk. Tighten the knurled nuts to lock the claws in position.
- (6) Assemble the disk to the balancing mandrel (Ref. Fig.510).
  - (a) Raise the hoist and position the disk over the balancing mandrel. Align the bolt hole at the datum blade slot with one of the two mandrel locating/securing studs aligned with 'SLOT NO.1' in the mandrel edge.
  - (b) Lower the disk over the studs, ensuring that it is lowered squarely and does not get jammed. Lightly tap with a suitable (soft faced) mallet if necessary. When the disk abuts the mandrel, screw the special nuts on to the studs and fully tighten the nuts.
  - (c) Release the knurled nuts of the sling, turn the claws sideways, then raise the sling from the disk. Remove the sling from the hoist.
- (7) Attach a hoist to the ring of the retaining bolt, then release the Hydraclamp and lower the mandrel to the horizontal position. Position the support stand (Tool 1667) under the end of the mandrel to take the weight, then remove the hoist and unscrew and remove the retaining bolt.

TN11293

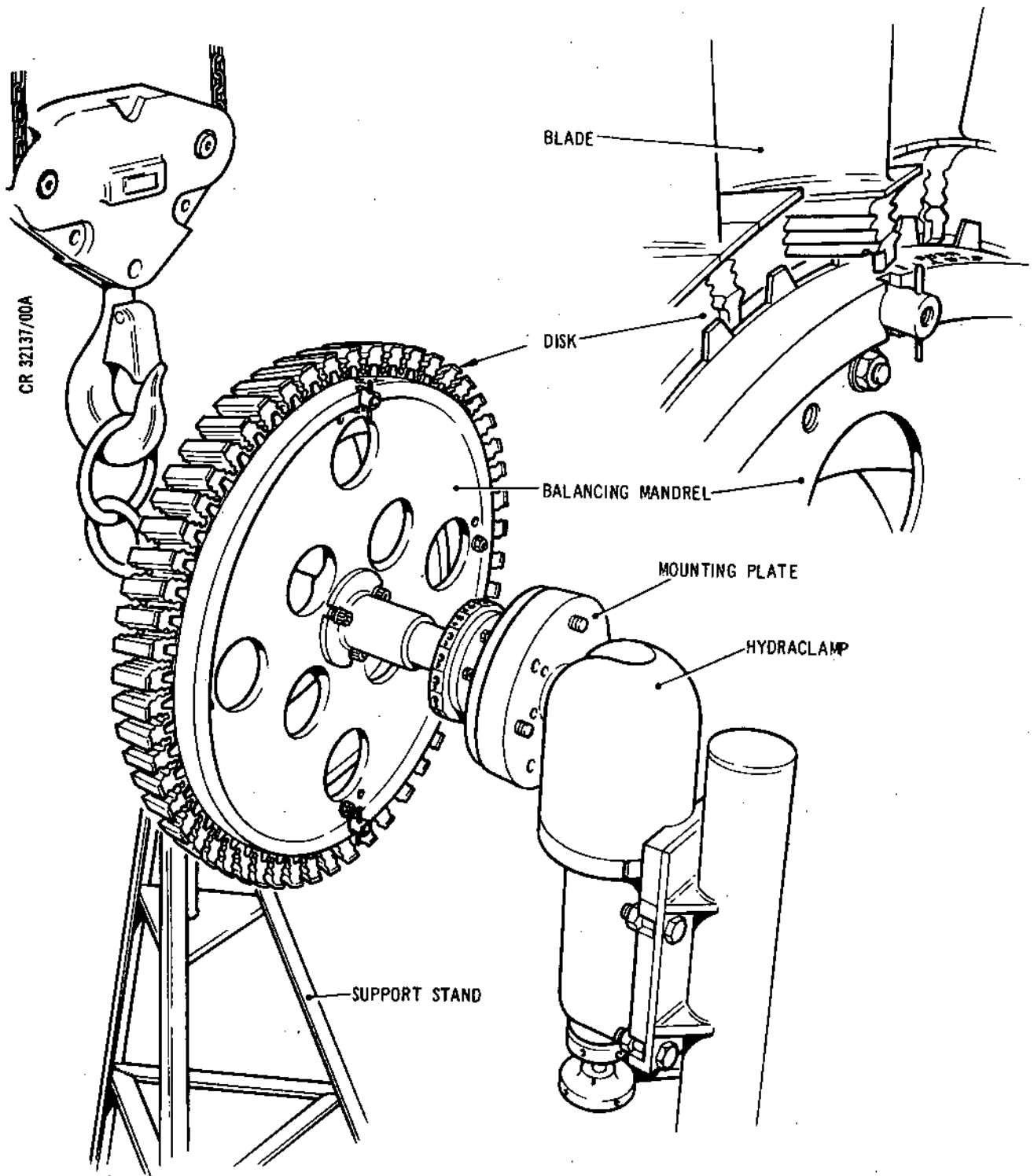


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



TN19510

Assembling Blades to Stage 2 Disk  
Figure 511

SUB-ASSEMBLY  
**72-33-02**  
Page 533  
Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (8) Assemble the blades to the stage 2 disk (Ref.Fig.511).

NOTE: If the disk is to SB.72-34 standard, only blade positions No.1 and 54 will be marked on the edge of the disk.

- (a) Ensure that the two handles of the mandrel are withdrawn from engagement in the retaining plate and the plate is turned to the unlocked position allowing the blades to be assembled to the disk.

NOTE: If all the original blades are available and undamaged, then assemble the blades as detailed in para.(b). If the blades include six repaired and/or new blades, then the blades must be assembled as detailed in para.(c). If the blades include more than six repaired and/or new blades then the blades must be assembled as detailed in para.(d). Ensure that the aggregate depth of blending of repaired blades does not exceed 1.50 in. (38,10 mm) (Ref.72-33-02 Repair No.6).

- (b) Identify the stage 2 blades (1-280), then examine the blade roots for their positional No. (Ref.Fig.502) and lay the blades out in numerical sequence. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades, then insert the blades in numerical sequence into the disk, starting at No.1 position and working in a clockwise direction when viewing the mandrel side of the disk.
- (c) Identify the stage 2 blades (1-280), then examine the roots of the original blades for their positional No. (Ref.Fig.502) and lay the blades out in numerical sequence, leaving spaces where new blades are to be positioned. Noting the mass moment weight of the new blades, place the lightest new blades in vacant positions next to the heaviest original blades, and position the heaviest new blades in vacant positions next to the lightest original blades. Assemble the blades to the disk as detailed in para.(b).

TN11294



OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

- (d) Identify the stage 2 blades (1-280), then according to the mass moment weight of the blades (quoted on the labels), lay the blades out in sequence of weight, starting with the heaviest blade at one end and ending with the lightest blade at the other end. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades (Ref.Fig.502). Assemble the blades to the disk positioning the heaviest blade at No.1 position and the next heaviest blade diametrically opposite, then assemble the two lightest blades diametrically opposite each other and next to the heaviest blades. Assemble the remainder of the blades to the disk in sequence of weight, assembling alternate heavy and light blades and where possible, positioning equal weight blades diametrically opposite each other.
- (e) If the disk is to SB 72-8925-358 standard, check that there is at least 0.010 in. (0,25 mm) side-ways movement at the tip of each blade, to ensure adequate clearance in disk slots coated with Sermetel 709.
- (f) Turn the retaining plate to lock the blades in position and ensure that the two handle plungers engage in the plate locking the blades.

**B. Assemble the Stage 2 Bladed Disk to the Balancing Machine.**

- (1) Attach a hoist to the lifting eye of the lifting fixture (Tool 1171), then position the hoist over the balancing mandrel and engage the two hooks of the fixture around the mandrel.
- (2) Remove the nuts and washers securing the mandrel to the mounting plate, then remove the support stand and traverse the hoist to disengage the mandrel from the mounting plate. If the mandrel/disk cannot be assembled direct to the balancing machine, lower it into the mobile stand (Tool 1165) engaging the mandrel journals in the stand support brackets (Ref.Fig.508). Disconnect the lifting fixture, then position the stand near the balancing machine. With the lifting fixture (Tool 1171) attached to a hoist, position the hooks of the fixture around the mandrel and raise it out of the stand.

SUB-ASSEMBLY  
**72-33-02**

Page 535  
Jun 1/90



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Position the hoist over the balancing machine with the studded end of the mandrel towards the balancing machine drive. Lower the disk into the bottom half of the protection guard (Tool 1500), lift the balancing machine drive and engage the mandrel studs in it, then adjust the position of the cradles (if required) to align with the bearing journals of the mandrel, with the mandrel correctly engaged with the drive. Adjust the guard position (if required) to give running clearance of the mandrel/bladed disk, then secure the cradles and guard (if necessary). Lower the mandrel on to the cradles, then disengage the lifting fixture from the mandrel and hoist.
- (4) Assemble washers and nuts to the mandrel studs and fully tighten the nuts. Pivot the retaining arms of the cradles over the mandrel and engage them around the pillars, then secure them with thumbnuts. Using a hoist, lower the top half of the guard (Tool 1500) on to the bottom half ensuring that the access cover of the guard is towards the balancing machine operator. Pivot the bottom guard swing bolts into the top guard and secure with the thumbnuts.

C. Balance the Stage 2 Bladed Disk.

- (1) Apply lubricant 'A' to the spindles of the adjustable bearings and the journals of the mandrel, and ensure they remain well lubricated throughout the balancing operations.
- (2) Carry out a static balance of the bladed disk, operating the balancing machine in accordance with the manufacturers instructions. The disk should be rotated at (approx.) 450 rpm and run for (approx.) two to three min for the temperature to stabilise. The balance of the disk must be within 4 grm in. (180 grm mm). If the balance of the disk is outside the limit, rectify by the interchange of heavy and light-weight blades (Ref. para. (3) to (5)) from the out of balance angular position, until the disk is within limits.

SUB-ASSEMBLY

**72-33-02**

Page 536

Jun 1/90



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (3) To exchange the blades, release the swing bolts securing the top half of the guard and using a hoist, remove the guard. Withdraw the two handle plungers locking the mandrel retaining plate, then turn the plate to release the blades. Withdraw a heavy blade from as near the out of balance position as possible and exchange it for a light blade from as near diametrically opposite as possible.
- (4) If the disk is to SB 72-8925-358 standard, check that there is at least 0.010 in. (0,25 mm) sideways movement at the tip of each blade.
- (5) Turn the retaining plate to lock the blades in position and ensure that the two handle plungers engage in the plate locking holes. Lower the top half of the guard on to the bottom half and secure the top with the swing bolts. Release the hoist. Recheck the balance of the bladed disk.

D. Remove the Bladed Disk from the Balancing Machine.

- (1) Release the retaining arm of each cradle and pivot the arms out of the way. Release and pivot down the swing bolts securing the top half of the guard, then using a hoist, raise the guard until clear of the disk and lower on to a suitable surface. Remove the hoist from the guard.
- (2) Attach a hoist to the lifting fixture (Tool 1171), then position and lower the hoist over the disk and engage the two hooks of the fixture around the mandrel. Remove the nuts and washers securing the mandrel to the balancing machine drive. Raise the hoist and guide the disk out of the machine, and when possible, disengage the drive from the mandrel studs and lower the drive.
- (3) If the mandrel/disk cannot be assembled direct to the Hydraclamp, lower it into the mobile stand (Tool 1165) engaging the mandrel journals in the stand support brackets (Ref.Fig.508). Disconnect the lifting fixture, then position the stand by the Hydraclamp. With the lifting fixture (Tool 1171) attached to a hoist, position the hooks of the fixture around the mandrel and raise it out of the stand.

SUB-ASSEMBLY  
**72-33-02**

Page 537  
Jun 1/90



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Position the hoist alongside the Hydraclamp, then engage the mandrel over the mounting plate and insert the studs through the plate. Assemble the mandrel washers and nuts on to the studs and fully tighten the nuts.
- (5) Position the support stand (Tool 1667) under the end of the mandrel, then disconnect the lifting fixture from the mandrel and the fixture from the hoist. Insert the retaining bolt (Tool 547) into the end of the mandrel and screw it into the mounting plate.
- (6) Attach a hoist to the ring of the retaining bolt, then release the Hydraclamp and raise/traverse the hoist to position the mandrel vertically. Lock the Hydraclamp, then release the hoist.

E. Secure the Blades to the Stage 2 Disk.

- (1) Assemble the multiple leg sling (Tool 1173) to the stage 2 disk (Ref.Fig.510).
  - (a) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk.
  - (b) Ensure that the knurled nuts are unscrewed and the claws turned to align with the plate. Lower the hoist and engage the plate in the disk, then turn the claws outwards to engage them under the disk. Tighten the knurled nuts to lock the claws in position.
- (2) Remove the disk from the balancing mandrel and assemble it to the blading mandrel (Tool 545).
  - (a) Remove the special nuts securing the disk to the mandrel, then assemble a protection/retaining band (Tool 1130) to the tips of the blades.

SUB-ASSEMBLY

72-33-02

Page 538

Nov 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Raise the hoist and withdraw the disk from the mandrel studs, lightly tapping the disk with a (soft faced) hammer (if required). Position and lower the disk onto a suitable surface, then disconnect the hoist and lower the sling on to the disk.
- (c) Attach a hoist to the ring of the retaining bolt, then release the Hydraclamp and lower the mandrel to the horizontal position. Position the support stand (Tool 1667) under the end of the mandrel to take the weight, then remove the hoist and unscrew and remove the retaining bolt.
- (d) Attach a hoist to the lifting eye of the lifting fixture (Tool 1171), then position the hoist over the balancing mandrel and engage the two hooks of the fixture around the mandrel. Remove the nuts and washers securing the mandrel to the mounting plate, then remove the support stand and traverse the hoist to disengage the mandrel from the mounting plate. Position and lower the mandrel into its storage stand, then remove the lifting fixture from the mandrel.
- (e) Position the hoist over the blading mandrel (Tool 545) and assemble the mandrel to the lifting fixture. Position the hoist alongside the mounting plate, then traverse the hoist and engage the blading mandrel over the mounting plate, ensuring that the mandrel studs locate in the holes in the mounting plate. Assemble the washers and nuts to the mandrel studs and fully tighten the nuts (Ref.Fig.512).
- (f) Position and adjust the support stand (Tool 1667) to support the end of the blading mandrel. Disconnect the lifting fixture from the mandrel, and the fixture from the hoist. Insert the retaining bolt (Tool 547) into the end of the mandrel and when it contacts the mounting plate, screw it into the plate. Attach a hoist to the ring of the bolt, then release the Hydraclamp and raise/traverse the hoist to bring the mandrel to the vertical position. Lock the Hydraclamp, then release the hoist.

SUB-ASSEMBLY

72-33-02

Page 539

Nov 1/76





OLYMPUS 593

MK.610-14-28

OVERHAUL



- (g) Attach a hoist to the ring of the multiple lug sling (Tool 1173), then raise the disk and position it over the mandrel. Align the disk bolt holes with the mandrel studs, then lower the disk into the mandrel. Assemble washers and nuts to the studs and fully tighten the nuts. Release the knurled nuts of the sling, turn the claws sideways, then raise the sling from the disk. Remove the sling from the hoist.
- (h) Attach a hoist to the ring of the retaining bolt, then release the Hydraclamp and lower the mandrel to the horizontal position. Position the support stand (Tool 1667) under the end of the mandrel to take the weight, then remove the hoist.
- (3) Remove the protection/retaining band from the blade tips. Examine the edge of the disk for the No.1 blade datum mark  $\rightarrow 0$ , then examine the blade roots for their numbering (Ref.Fig.502) and ensure that all the blades are numbered correctly in numerical sequence in a clockwise direction as viewed from the mandrel side, with No.1 blade in the datum slot. Etch all new blades with their position No., and renumber any blades that have been re-positioned, ensuring that all old numbers are obliterated.
- (4) Remove No.1 blade from its slot, assemble a retaining plate (1-290) to the groove in the end face, then refit the blade/plate to the disk (Ref.Fig.512). Ensure that the blade is fully in, then using the hammer (Tool 1655), bend the protruding end of the retaining plate against the disk. Ensure that the retaining plate is bent over the edge of the disk, but care must be taken that the bend of the plate is not too acute causing a fracture of the plate. Assemble a retaining plate to each of the blades, and lock each plate against the disk. Using feeler gauges, check each blade to ensure that the maximum end-float of the blade root in the disk does not exceed 0.015 in. (0,38 mm). Assemble the protection/retaining band (Tool 1130) to the tips of the blades.

FN11273



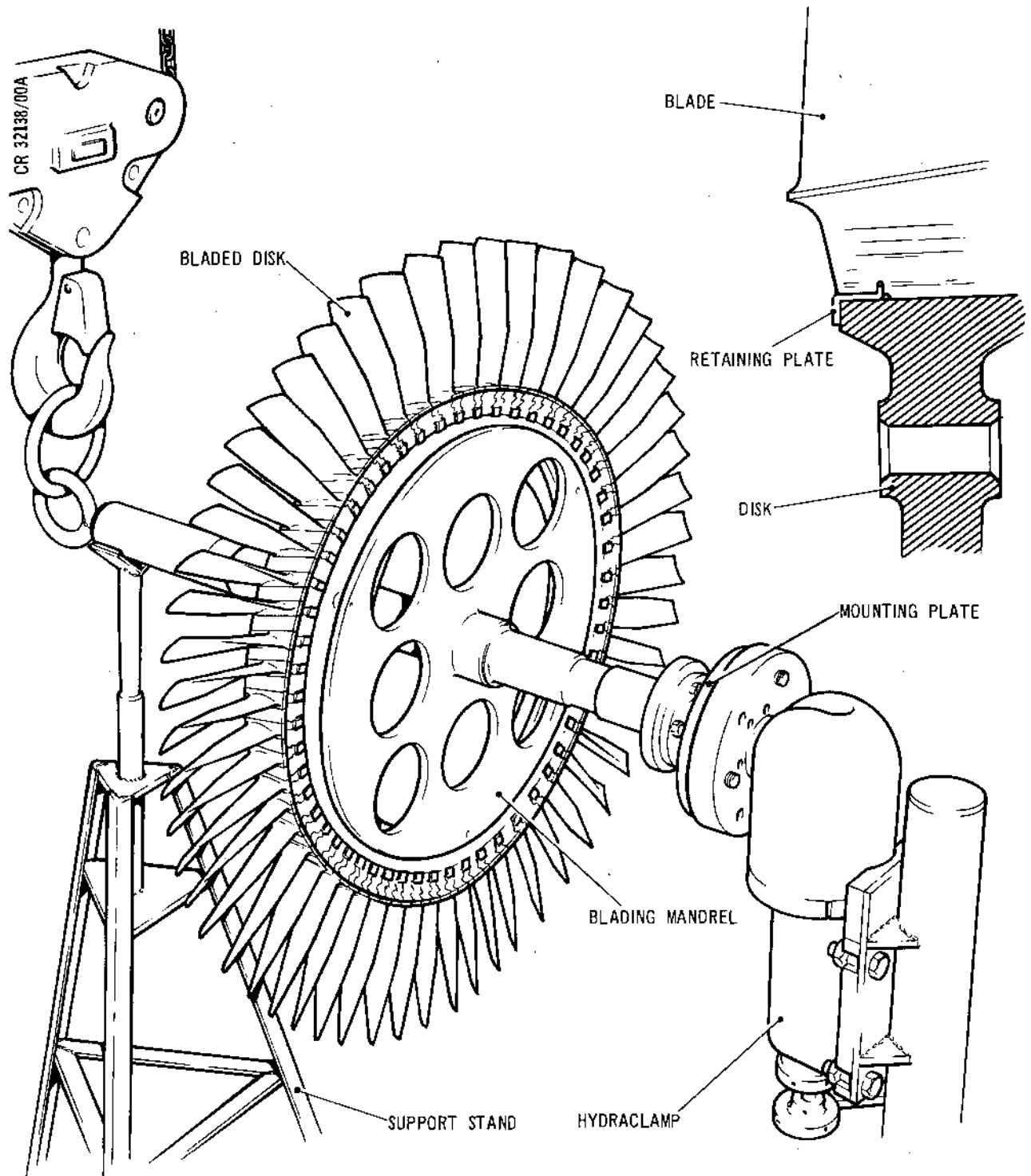
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

TN19522



Securing Blades in Stage 2 Disk  
Figure 512

SUB-ASSEMBLY  
**72-33-02**

Page 541  
Nov 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (5) Attach a hoist to the ring of the bolt, then release the Hydraclamp and raise/traverse the hoist to bring the mandrel to the vertical position. Lock the Hydraclamp, then release the hoist.
  - (6) Assemble the multiple leg sling (Tool 1173) to the disk (Ref.Fig.510).
    - (a) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk.
    - (b) Ensure that the knurled nuts are unscrewed and the claws turned to align them with the plate. Lower the hoist and engage the plate in the disk, then turn the claws outwards to engage them under the disk. Tighten the knurled nuts to lock the claws in position.
  - (7) Remove the nuts and washers securing the disk to the mandrel, then raise the hoist and position and lower the disk on to a suitable pallet or container. Release the knurled nuts of the sling, turn the claws sideways, then raise the sling from the disk. Remove the sling from the hoist.
- NOTE: The stage 2 bladed disk is now ready to be passed to the HP Compressor Assembly (72-33-00 Assembly).
- (8) Remove the blading mandrel from the Hydraclamp.
    - (a) Attach a hoist to the ring of the retaining bolt, release the Hydraclamp, then lower the mandrel on to the support stand. Release the hoist, then remove the retaining bolt.
    - (b) Attach a hoist to the lifting eye of the lifting fixture (Tool 1171), then position the hoist over the blading mandrel and engage the two hooks of the fixture around the mandrel.

TN11274



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (c) Remove the nuts and washers securing the mandrel to the mounting plate, then remove the support stand and traverse the hoist to disengage the mandrel from the mounting plate. Position and lower the mandrel into its storage stand, then remove the lifting fixture from the mandrel and the hoist. Assemble the washers and nuts to the mandrel studs, and the special nuts to the mandrel locating/securing studs.

7. Balance the Stage 3 Rotor and Stage 2-3 Spacer Ring

NOTE: If all the original blades are available and undamaged and are to be assembled to the original disk/spacer, the bladed disk/spacer does not require balancing, but the spacer and blades must be assembled to the disk as detailed in para.A, B and F.

A. Assemble the Stage 2-3 Spacer Ring to the Stage 3 Disk.

- (1) Assemble a locating pin (Tool 607) to each of the three supports (Tool 608) and space the supports on a suitable clean flat surface.
- (2) Assemble the multiple leg sling (Tool 1173) to the stage 3 disk (1-350) (Ref.Fig.513).
  - (a) Raise the disk by positioning three suitable support blocks under the disk, ensuring that the blocks are evenly positioned.
  - (b) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk.
  - (c) Ensure that the knurled nuts are unscrewed, and the claws are turned to align them with the plate. Lower the hoist and engage the plate in the disk, then turn the claws outwards to engage them under the disk. Tighten the knurled nuts to lock the claws.

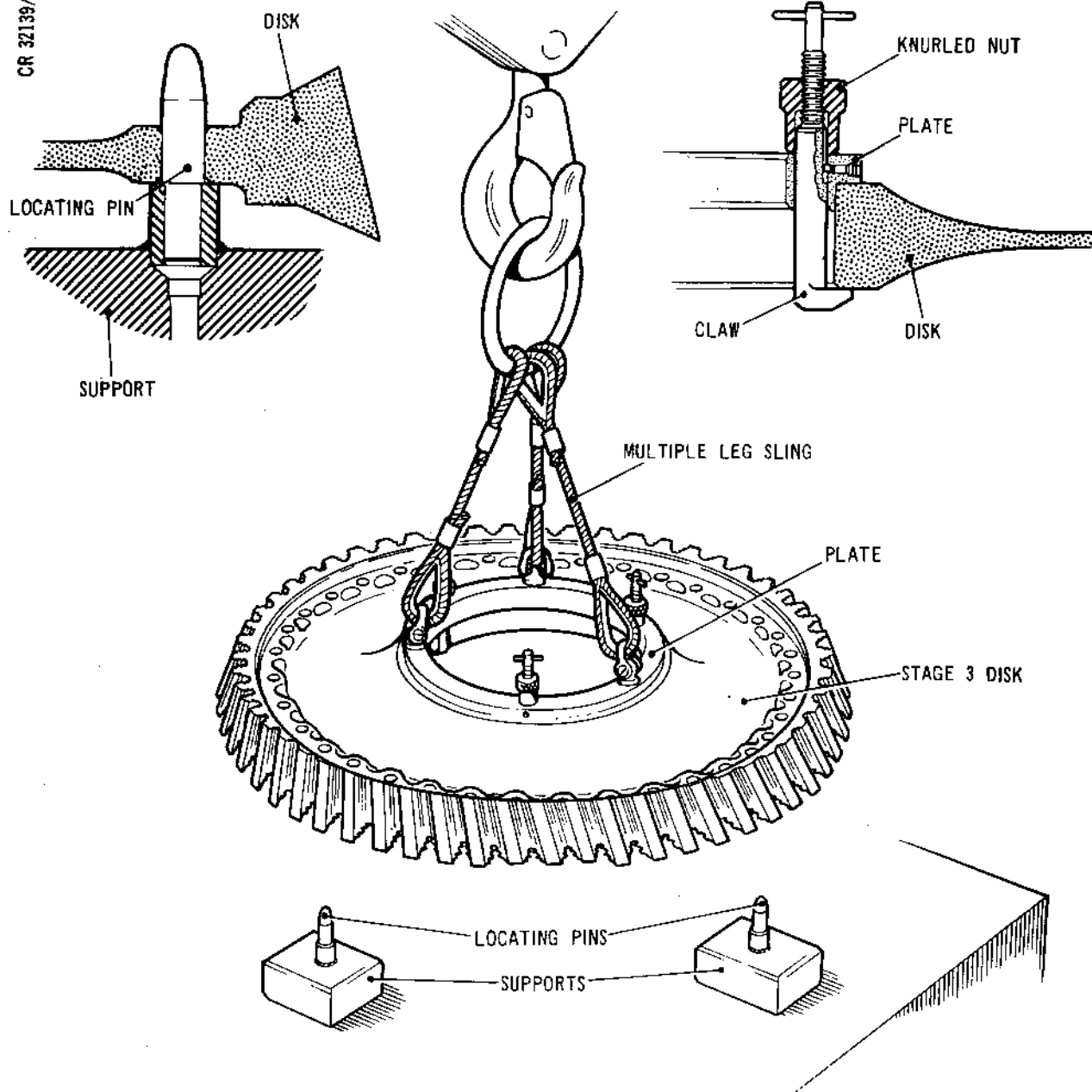
SUB-ASSEMBLY

**72-33-02**

Page 543

Nov 1/76

CR 32139/00A



TN19523

Assembling Disk to Spacer Ring Locating Pins  
Figure 513

SUB-ASSEMBLY  
**72-33-02**

Page 544  
Nov 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (3) Raise the hoist and position the disk over the three supports (Tool 608). Evenly dispose the supports under the disk and align the pins with the bolt holes. Lower the disk over the pins and rest it on the supports.
- (4) Release the knurled nuts of the sling, turn the claws sideways, then raise the sling from the disk. Remove the sling from the hoist.
- (5) Ensure that the heater (Tool 757) (Ref.Fig.514) is positioned on its mobile stand (Tool 759) with its handles uppermost, then attach the multiple leg sling (Tool 1645) to the holes in the three handles with the sling shackle pins. Attach a hoist to the lifting eye of the sling, then position and lower the heater over the stage 3 disk ensuring that it is concentric with the disk.
- (6) Heat the disk to 70 deg.C by operating the heater control (Tool 758) (Ref.Fig.514).

NOTE: If the heater, control or stand are not available, use suitable units based on the wiring diagram (Ref.Fig.514).

- (a) Connect the heater control input supply plug to a suitable mains supply connection and turn the mains switch 'ON'.
- (b) Turn the three 'HEATER CONTROLS' band switches to 'FULL'.
- (c) Turn the heater time controller to nine minutes.
- (d) Switch the 'HEATERS' toggle switch to 'ON', then press the 'TIMER START' pushbutton to start the heating cycle. During the period the heater is on, the 'ON' indicator light will be remain illuminated and at the completion of nine minutes the heaters and light will automatically be switched off.

SUB-ASSEMBLY

**72-33-02**

Page 545

Nov 1/76

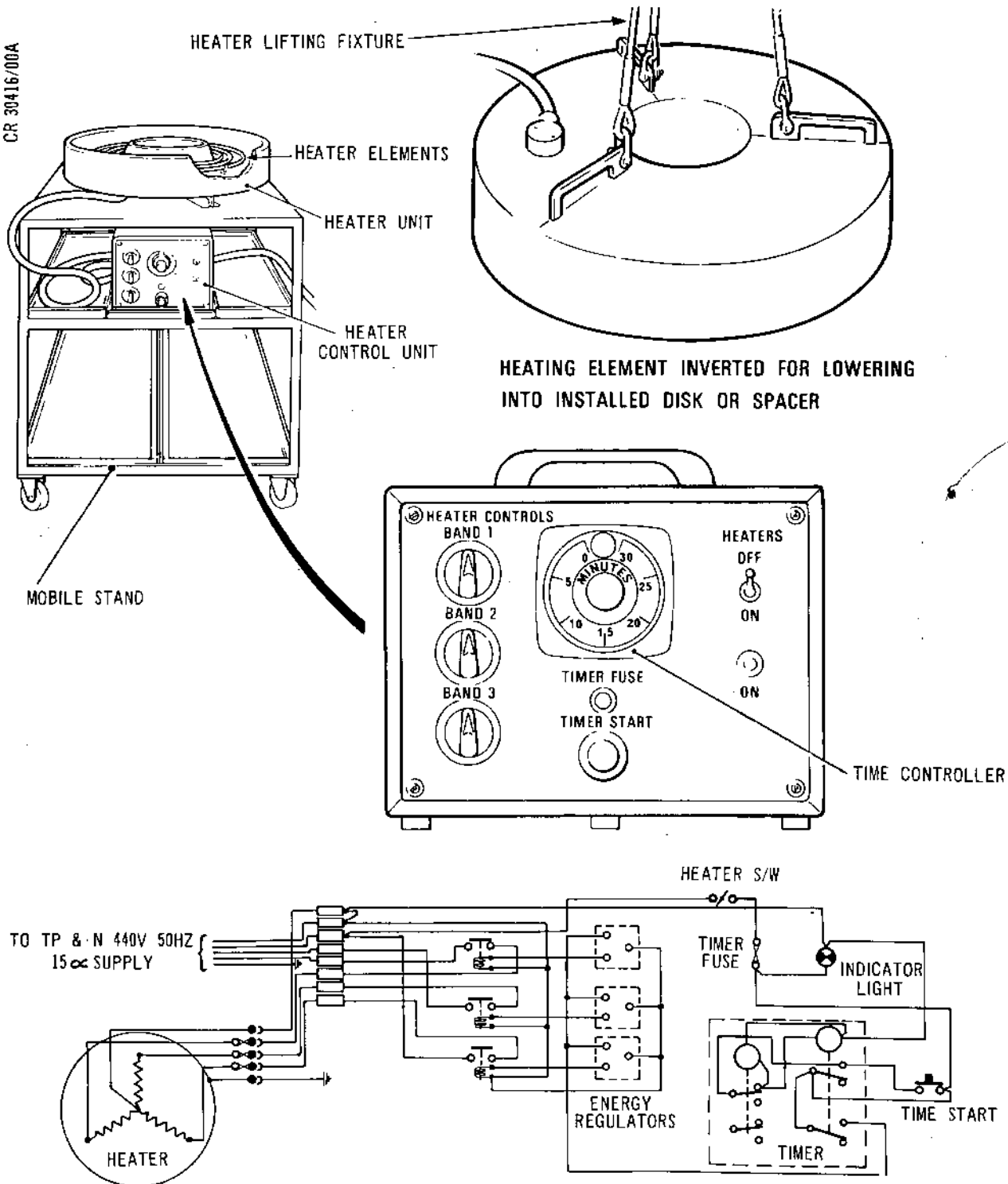


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 30416/00A



Equipment for Heating Compressor Disks  
Figure 514

SUB-ASSEMBLY  
**72-33-02**

Page 546  
Nov 1/76

TN19524



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (e) When the timer switch cuts out, switch the 'HEATERS' toggle switch to 'OFF', the 'HEATER CONTROLS' switches to 'OFF' and the mains supply switch to 'OFF'.
- (f) Remove the heater from the disk and position and lower it on to its stand. Release the hoist and lower the sling on to the heater, taking care not to touch the heater unless protective gloves are worn.

NOTE: The multiple leg sling (Tool 1645) is also used for lifting mechanical pullers in addition to the heater. If only one sling is available, the operator must assemble and remove the sling from the heater each time it is used.

- (7) Note the position of the datum hole in line with the datum mark→O on the edge of the blade roots at the No.1 blade position of the stage 3 disk, and the datum mark→O on the edge of the flange of the stage 2-3 spacer ring (1-330) (Ref.Fig.502). Position the spacer ring over the disk, align the datum marks on both items and lower the spacer over the locating pins and on to the disk. Ensure that the spacer abuts the disk, then allow the disk to cool.

B. Assemble Blades to Stage 3 Disk and Prepare for Balance (Ref.Fig.515 and 516).

- (1) Ensure that a Hydraclamp (Tool 1673) is bolted to a pedestal (Tool 1674), and the mounting plate (Tool 1163) is bolted to the Hydraclamp (Ref.Fig.505). Position the mounting plate so that its axis is horizontal, then lock the Hydraclamp.
- (2) Connect a hoist to the lifting eye of the lifting fixture (Tool 1171), then position the hoist over the static balance mandrel (Tool 1151) and assemble the mandrel to the lifting fixture.

SUB-ASSEMBLY

72-33-02

Page 547

Nov 1/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Position the hoist alongside the mounting plate, then traverse the hoist and engage the balancing mandrel over the mounting plate, ensuring that the mandrel studs locate in the holes in the mounting plate. Assemble washers and nuts to the mandrel studs and fully tighten the nuts.
- (4) Position and adjust the support stand (Tool 1667) to support the end of the balancing mandrel. Disconnect the lifting fixture from the mandrel and the fixture from the hoist. Insert the retaining bolt (Tool 547) into the end of the mandrel and when it contacts the mounting plate, screw it into the plate. Attach a hoist to the ring of the bolt, then release the Hydraclamp and raise/traverse the hoist to bring the mandrel to the vertical position. Lock the Hydraclamp, then release the hoist.
- (5) Assemble the multiple leg sling (Tool 1173) to the stage 3 disk (Ref.Fig.513).
  - (a) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk.
  - (b) Ensure that the knurled nuts are unscrewed and the claws turned to align them with the plate. Lower the hoist and engage the plate in the disk, then turn the claws outwards to engage them under the disk. Tighten the knurled nuts to lock the claws in position.
- (6) Assemble the stage 3 disk/spacer to the balancing mandrel.
  - (a) Raise the hoist and ensure that the locating pins are disengaged from the disk, then position the hoist over the balancing mandrel.
  - (b) Correctly position the disk relative to the mandrel locating/securing studs, then lower the disk over the studs, ensuring that it is lowered squarely and does not get jammed. Lightly tap with a suitable (soft faced) mallet if necessary. When the disk abuts the mandrel, screw the special nuts on to the studs and fully tighten the nuts.

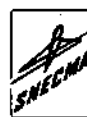
TN9943



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (c) Release the knurled nuts of the sling, turn the claws sideways, then raise the sling from the disk. Remove the sling from the hoist.
- (7) Attach a hoist to the ring of the retaining bolt, then release the Hydraclamp and lower the mandrel to the horizontal position. Position the support stand (Tool 1667) under the end of the mandrel to take the weight, then remove the hoist and unscrew and remove the retaining bolt.
- (8) Assemble the blades to the stage 3 disk.

NOTE: If all the original blades are available and undamaged, then assemble the blades as detailed in para.(a). If the blades include six repaired and/or new blades, then the blades must be assembled as detailed in para.(b). If the blades include more than six repaired and/or new blades then the blades must be assembled as detailed in para.(c). Ensure that the aggregate depth of blending of repaired blades does not exceed 1.20 in. (30,48 mm) (Ref.72-33-02 Repair No.6).

- (a) Identify the stage 3 blades (1-340), then examine the blade roots for their positional No. (Ref.Fig.502) and lay the blades out in numerical sequence. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades, then insert the blades in numerical sequence into the disk, starting at No.1 position and working in a clockwise direction when viewing the mandrel side of the disk.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Identify the stage 3 blades (1-340), then examine the roots of the original blades for their positional No. (Ref.Fig.502) and lay the blades out in numerical sequence, leaving spaces where new blades are to be positioned. Noting the mass moment weight of the new blades, place the lightest new blades in vacant positions next to the heaviest original blades, and position the heaviest new blades in vacant positions next to the lightest original blades. Assemble the blades to the disk as detailed in para.(a).
  - (c) Identify the stage 3 blades (1-340), then according to the mass moment weight of the blades (quoted on the labels), lay the blades out in sequence of weight, starting with the heaviest blade at one end and ending with the lightest blade at the other end. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades (Ref. Fig.502). Assemble the blades to the disk positioning the heaviest blade at No.1 position and the next heaviest blade diametrically opposite, then assemble the two lightest blades diametrically opposite each other and next to the heaviest blades. Assemble the remainder of the blades to the disk in sequence of weight, assembling alternate heavy and light blades and where possible, positioning equal weight blades diametrically opposite each other.
  - (d) If the disk is to SB 72-8925-358 standard, check that there is at least 0.010 in. (0,25 mm) side-ways movement at the tip of each blade, to ensure adequate clearance in disk slots coated with Sermetel 709.
  - (e) Attach masking tape to the rear face of the disk over the blade roots.
- C. Assemble the Stage 3 Bladed Disk/Spacer Ring to the Balancing Machine (Ref.Fig.503 and 504).
- (1) Attach a hoist to the Lifting eye of the Lifting fixture (Tool 1171), then position the hoist over the balancing mandrel and engage the two hooks of the fixture around the mandrel.

SUB-ASSEMBLY  
**72-33-02**

Page 550  
Jun 1/90



OLYMPUS 593

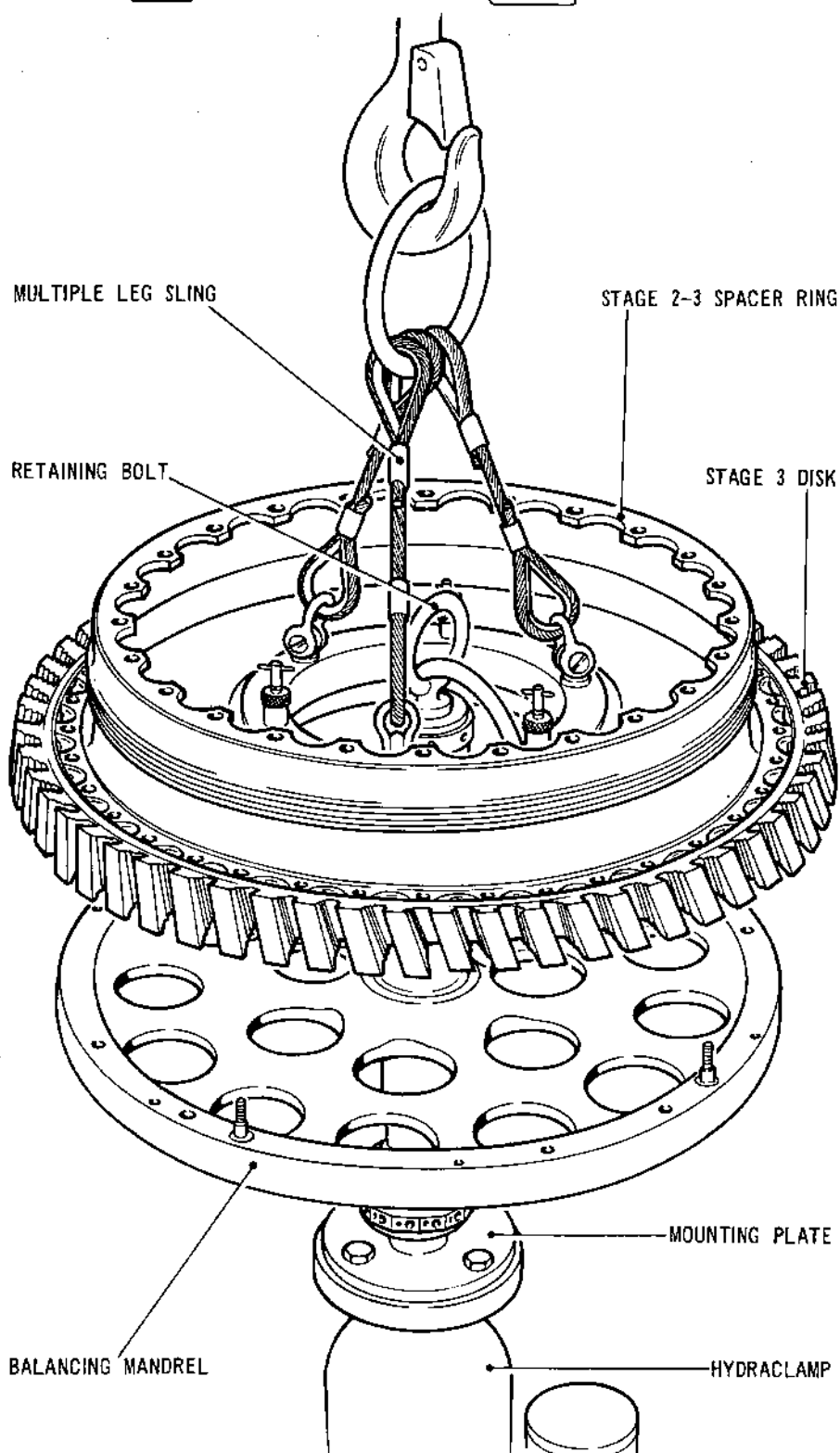
MK.610-14-28

OVERHAUL



CR 32141/00A

PRINTED IN ENGLAND



Assembling Stage 3 Disk/Stage 2-3 Spacer Ring to  
Balancing Mandrel  
Figure 515

TN19525

SUB-ASSEMBLY  
**72-33-02**  
Page 551  
Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Remove the nuts securing the mandrel to the mounting plate, then remove the support stand and traverse the hoist to disengage the mandrel from the mounting plate. If the mandrel/disk cannot be assembled direct to the balancing machine, lower it into the mobile stand (Tool 1165) engaging the mandrel journals in the stand support brackets (Ref.Fig.508). Disconnect the lifting fixture, then position the stand near the balancing machine. With the lifting fixture (Tool 1171) attached to a hoist, position the hooks of the fixture around the mandrel and raise it out of the stand.
- (3) Position the hoist over the balancing machine with the studded end of the mandrel towards the balancing machine drive. Lower the disk into the bottom half of the protection guard (Tool 1500). Lift the balancing machine drive and engage the mandrel studs in it, then adjust the position of the cradles (if necessary) to align with the bearing journals of the mandrel, with the mandrel correctly engaged with the drive. Adjust the guard position (if necessary) to give running clearance of the mandrel/bladed disk, then secure the cradles and guard (if required). Lower the mandrel on to the cradles, then disengage the lifting fixture from the mandrel and the hoist.
- (4) Assemble washers and nuts to the mandrel studs and fully tighten the nuts. Pivot the retaining arms of the cradles over the mandrel and engage them around the pillars, then secure them with thumbnuts. Using a hoist, lower the top half of the guard (Tool 1500) on to the bottom half ensuring that the access cover of the guard is towards the balancing machine operator. Pivot the bottom guard swing bolts into the top guard and secure with the thumbnuts.

TN15987

SUB-ASSEMBLY

72-33-02

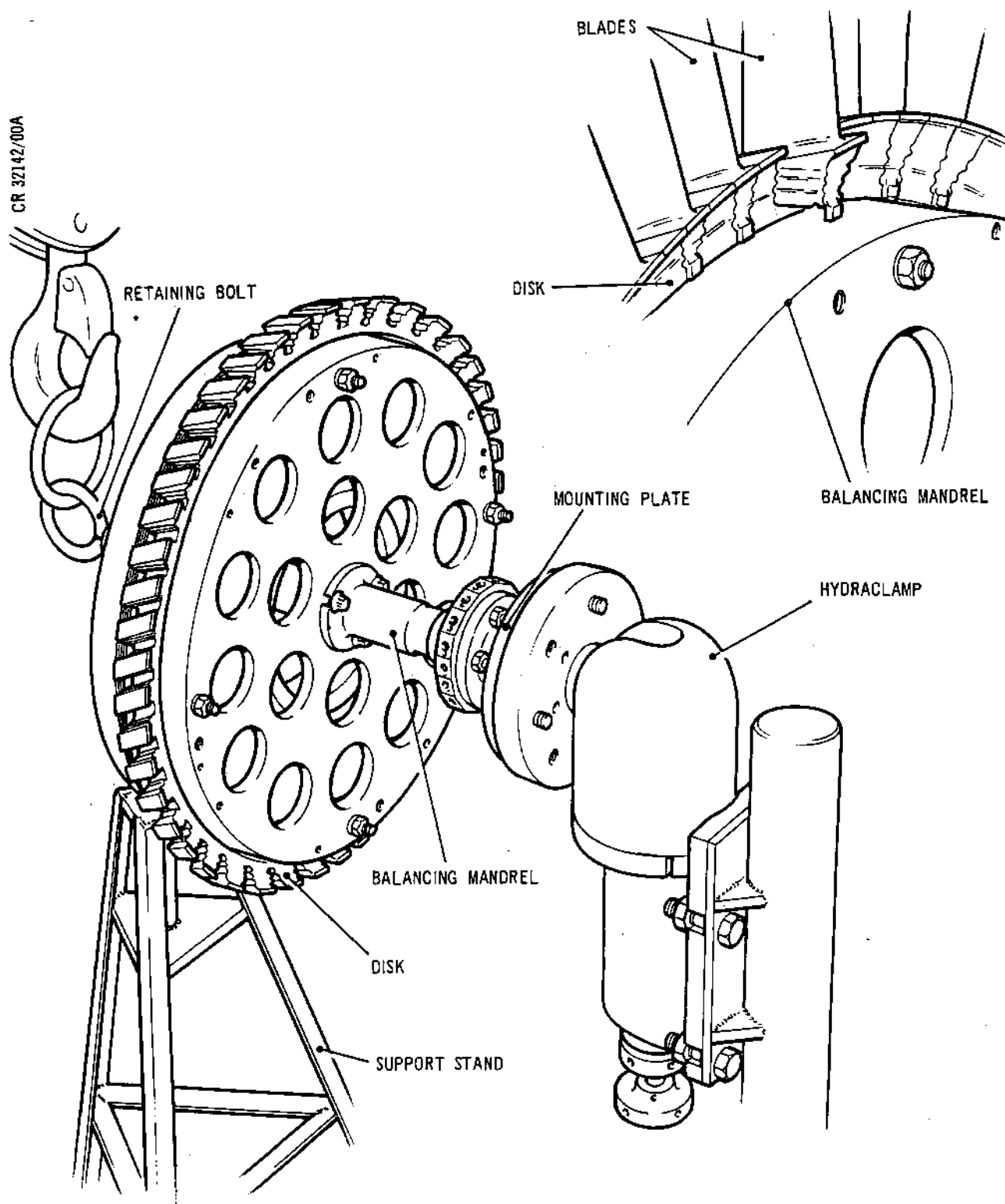
Page 552

Nov 1/76



OLYMPUS 593

MK. 610-14-28  
OVERHAUL



Assembling Blades to Stage 3 Disk  
Figure 516

SUB-ASSEMBLY  
**72-33-02**  
Page 553  
Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



D. Balance the Stage 3 Bladed Disk/Spacer Ring.

- (1) Apply lubricant 'A' to the spindles of the adjustable bearings and the journals of the mandrel, and ensure that they remain well lubricated throughout the balancing operation.
- (2) Carry out a static balance of the bladed disk, operating the balancing machine in accordance with the manufacturers' instructions. The disk should be rotated at (approx.) 450 rpm and run for (approx.) two to three min for the temperature to stabilise. The balance of the disk must be within 4 drn in. (180 grm mm). If the balance of the disk is outside the limits, rectify by the interchange of heavy and light weight blades (Ref. para.(3)) from the out of balance angular position, until the disk is within limits.
- (3) To exchange the blades, hinge open the access cover, release the masking tape then withdraw a heavy blade from as near the out of balance position as possible and exchange it for a light blade from as near diametrically opposite as possible. If the disk is to SB 72-8925-358 standard, check that there is at least 0.010 in. (0,25 mm) sideways movement at the tip of each blade. Replace the masking tape and close the access cover. Recheck the balance of the bladed disk/spacer ring.

E. Remove the Bladed Disk/Spacer Ring from the Balancing Machine and Number the Blades.

- (1) Release the retaining arm of each cradle and pivot the arms out of the way. Release and pivot down the/swing bolts securing the top half of the guard, then using a hoist, raise the guard until clear of the disk and lower on to a suitable surface. Remove the hoist from the guard.



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Attach a hoist to the lifting fixture (Tool 1171), then position and lower the hoist over the disk and engage the two hooks of the fixture around the mandrel. Remove the nuts and washers securing the mandrel to the balancing machine drive. Raise the hoist and guide the disk out of the machine, and when possible, disengage the drive from the mandrel studs and lower the drive.
- (3) If the mandrel/disk cannot be assembled direct to the Hydraclamp, lower it into the mobile stand (Tool 1165) engaging the mandrel journals in the stand support brackets (Ref.Fig.508). Disconnect the lifting fixture, then position the stand by the Hydraclamp. With the lifting fixture (Tool 1171) attached to a hoist, position the hooks of the fixture around the mandrel and raise it out of the stand.
- (4) Position the hoist alongside the Hydraclamp, then engage the mandrel over the mounting plate and insert the studs through the plate. Assemble the mandrel washers and nuts to the studs and fully tighten the nuts.
- (5) Position the support stand (Tool 1667) under the end of the mandrel, then disconnect the lifting fixture from the mandrel and the fixture from the hoist. Insert the retaining bolt (Tool 547) into the end of the mandrel and screw it into the mounting plate.
- (6) Remove the masking tape from the blade roots. Examine the edge of the disk for the No.1 blade datum mark→0, then examine the blade roots for their numbering (Ref.Fig.502) and ensure that all the blades are numbered correctly in numerical sequence in a clockwise direction as viewed from the mandrel side, with No.1 blade in the datum slot. Etch all new blades with their position No., and renumber any blades that have been re-positioned, ensuring that all old position No. are obliterated. Replace the masking tape over the blade roots.

PRINTED IN ENGLAND

TN15989

SUB-ASSEMBLY

72-33-02

Page 555

Nov 1/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



F. Remove the Bladed Disk/Spacer Ring from the Balancing Mandrel (Ref.Fig.515).

NOTE: The stage 2-3 spacer ring is not normally removed from the stage 3 disk. If for some reason it is desired to separate the two, remove the spacer whilst the disk is still attached to the balancing mandrel. Use the mechanical puller (Tool 457), thrust bolts (Tool 458) and slave bolts (Tool 460) to remove the spacer, and stow the spacer in its container (Tool 1441). Refer to para.A. for the assembly of the spacer ring to the disk.

- (1) Attach a hoist to the ring of the retaining bolt, then release the Hydraclamp and raise/traverse the hoist to position the mandrel vertically. Lock the Hydraclamp, then release the hoist.
- (2) Unscrew and remove the mandrel nuts from the spacer ring.
- (3) Assemble the multiple leg sling (Tool 1173) to the disk.
  - (a) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk/spacer.
  - (b) Ensure that the knurled nuts are unscrewed, and the claws are turned to align them with the plate. Lower the hoist and engage the plate in the disk, then turn the claws outwards to engage them under the disk. Tighten the knurled nuts to lock the claws.
- (4) Raise the hoist and withdraw the disk/spacer from the mandrel studs, lightly tapping the disk with a (soft faced) mallet (if required). Position and lower the disk/spacer on to a suitable pallet or container. Release the knurled nuts of the sling, turn the claws sideways, then raise the sling from the disk and remove the sling from the hoist. Assemble the protection/retaining band (Tool 1130) to the tips of the blades.

NOTE: The stage 3 bladed disk/spacer assembly is now ready to be passed to the HP Compressor Assembly (72-33-00 Assembly).

TN15988

SUB-ASSEMBLY  
**72-33-02**

Page 556  
Aug 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (5) Remove the balancing mandrel from the Hydraclamp.
- (a) Attach a hoist to the ring of the retaining bolt, release the Hydraclamp, then lower the mandrel on to the support stand. Release the hoist, then remove the retaining bolt.
  - (b) Attach a hoist to the lifting eye of the lifting fixture (Tool 1171), then position the hoist over the balancing mandrel and engage the two hooks of the fixture around the mandrel.
  - (c) Remove the nuts and washers securing the mandrel to the mounting plate, then remove the support stand and traverse the hoist to disengage the mandrel from the mounting plate. Position and lower the mandrel into its storage stand, then remove the lifting fixture from the mandrel and the hoist. Assemble the washers and nuts to the mandrel studs, and the special nuts to the mandrel locating/securing studs.

8. Balance the Stage 4 Rotor and Stage 3-4 Spacer Ring

NOTE: If all the original blades are available and undamaged and are to be assembled to the original disk/spacer, the bladed disk/spacer does not require balancing, but the blades must be assembled to the disk as detailed in para.B and G.

A. Assemble the Stage 3-4 Spacer Ring to the Stage 4 Disk.

- (1) Assemble the spacer ring (1-380) to the disk (2-20) as detailed in para.7.A with the difference that the locating pin (Tool 606) must be used instead of (Tool 607) (Ref.para.(1)).

SUB-ASSEMBLY

**72-33-02**

Page 557

Nov 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



B. Assemble Blades to Stage 4 Disk and Prepare for Balance.

- (1) Assemble the disk to the balancing mandrel and the blades (2-10) to the disk as detailed in para.7.B, with the difference that the balancing mandrel (Tool 1115) must be used instead of (Tool 1151) (Ref.para.(2)), and the 'NOTE' (Ref.para.(8)) reads as follows:

NOTE: If all the original blades are available and undamaged, then assemble the blades as detailed in para.(a). If the blades include eight repaired and/or new blades, then the blades must be assembled as detailed in para.(b). If the blades include more than eight repaired and/or new blades, then the blades must be assembled as detailed in para.(c). Ensure that the aggregate depth of blending of repaired blades does not exceed 1.68 in. (42,67 mm) (Ref.72-33-02 Repair No.6).

C. Assemble the Stage 4 Bladed Disk/Spacer Ring to the Balancing Machine.

- (1) Assemble the bladed disk to the balancing machine as detailed in para.7.C.

D. Balance the Stage 4 Bladed Disk/Spacer Ring.

- (1) Balance the bladed disk/spacer as detailed in para.7.D. to within 4 grm in. (180 grm mm) by the interchange of blades.

E. Remove the Bladed Disk/Spacer Ring from the Balancing Machine and Number the Blades.

- (1) Remove the bladed disk/spacer from the balancing machine and number the blades as detailed in para.7.E.

TN15924

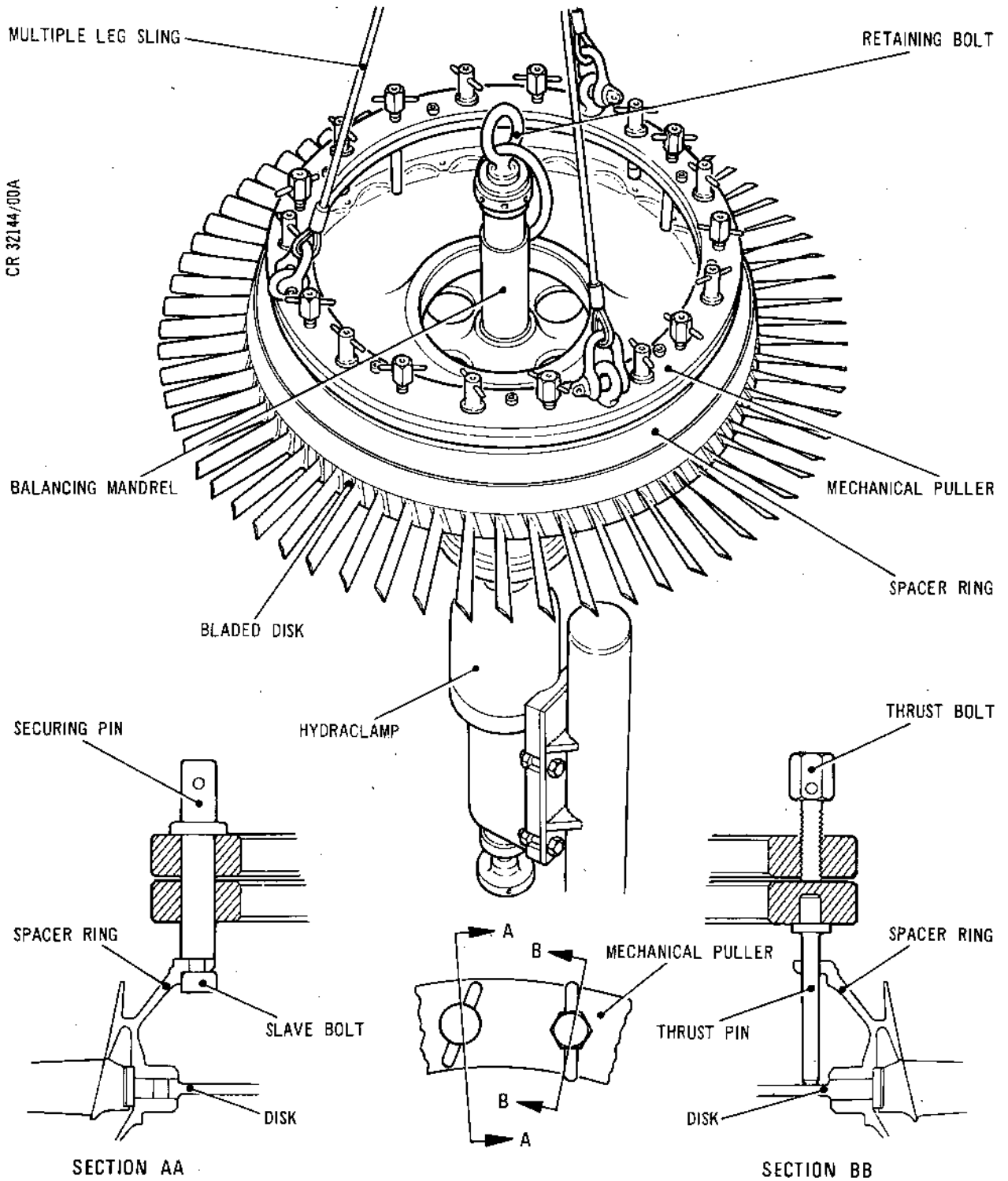


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



TN19516

Removing Stage 3-4 Spacer Ring from Stage 4 Disk  
Figure 517



OLYMPUS 593

MK.610-14-28  
OVERHAUL



F. Remove the Stage 3-4 Spacer Ring from the Stage 4 Disk  
(Ref.Fig.517).

- (1) Attach a hoist to the ring of the retaining bolt, then release the Hydraclamp and raise/traverse the hoist to position the mandrel vertically. Lock the Hydraclamp, then release the hoist.
- (2) Attach a hoist to the multiple leg sling (Tool 1645), then position the hoist over the mechanical puller (Tool 471) and secure the sling to the puller eye bolts with shackles. Ensure that the puller thrust bolts are unscrewed.
- (3) Unscrew and remove the mandrel nuts from the spacer ring. Position and lower the puller, guiding the thrust pins through the bolt holes in the spacer, and rest the pins on the disk. Insert the nine securing pins (Tool 474), into the holes in the puller plate, then insert the nine slave bolts (Tool 475) into the front flange of the spacer and screw the securing pins on to them. Ensure that the flats on the slave bolts locate correctly, and that the pins are tightened.
- (4) Screw in on the thrust bolts until the play on the top plate is taken up, then separate the spacer from the disk by screwing in the thrust bolts in equal progressive increments until the items are separated.
- (5) Raise the hoist and position and lower the spacer ring on to a suitable clean flat surface. Unscrew the securing pins and remove the slave bolts. Raise the hoist and position and lower the puller on to a suitable surface, then release and remove the sling from the puller and hoist. Stow the spacer ring into its correct slot in the container (Tool 1441).

TN25560

SUB-ASSEMBLY

**72-33-02**

Page 560

Jan 1/78



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



G. Remove the Bladed Disk from the Balancing Mandrel.

- (1) Remove the bladed disk from the balancing mandrel as detailed in para.7.F.(3) and (4).

NOTE: The stage 4 bladed disk and stage 3-4 spacer ring are now ready to be passed to the HP Compressor Assembly (72-33-00 Assembly).

9. Balance the Stage 5 Rotor and Stage 4-5 Spacer Ring

NOTE: If all the original blades are available and undamaged and are to be assembled to the original disk/spacer, the bladed disk/spacer does not require balancing, but the blades must be assembled to the disk as detailed in para.B and G.

A. Assemble the Stage 4-5 Spacer Ring to the Stage 5 Disk.

- (1) Assemble the spacer ring (2-50) to the disk (2-70) as detailed in para.7.A. with the difference that the locating pin (Tool 606) must be used instead of (Tool 607) (Ref.para.(1)).

B. Assemble Blades to Stage 5 Disk and Prepare for Balance.

- (1) Assemble the disk to the balancing mandrel and the blades (2-60) to the disk as detailed in para.7.B., with the difference that the balancing mandrel (Tool 1116) must be used instead of (Tool 1151) (Ref.para.(2)), and the 'NOTE' (Ref.para.(8)) reads as follows:

NOTE: If all the original blades are available and undamaged, then assemble the blades as detailed in para.(a). If the blades include nine repaired and/or new blades, then the blades must be assembled as detailed in para.(b). If the blades include more than nine repaired and/or new blades, then the blades must be assembled as detailed in para.(c). Ensure that the aggregate depth of blending of repaired blades does not exceed 1.92 in. (48,76 mm) (Ref.72-33-02 Repair No.6).

SUB-ASSEMBLY

**72-33-02**

Page 561

Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. Assemble the Stage 5 Bladed Disk/Spacer Ring to the Balancing Machine.
- (1) Assemble the bladed disk to the balancing machine as detailed in para.7.C.
- D. Balance the Stage 5 Bladed Disk/Spacer Ring.
- (1) Balance the bladed disk/spacer as detailed in para.7.D. to within 4 drmm in. (180 grm mm) by the interchange of blades.
- E. Remove the Bladed Disk/Spacer Ring from the Balancing Machine and Number the Blades.
- (1) Remove the bladed disk/spacer from the balancing machine and number the blades as detailed in para.7.E.
- F. Remove the Stage 4-5 Spacer Ring from the Stage 5 Disk.
- (1) Remove the spacer ring from the disk as detailed in para.8.F. with the difference that the mechanical puller (Tool 472) must be used instead of (Tool 471) (Ref.para.(2)).
- G. Remove the Bladed Disk from the Balancing Mandrel.
- (1) Remove the bladed disk from the balancing mandrel as detailed in para.7.F.(3) and (4).

NOTE: The stage 5 bladed disk and stage 4-5 spacer ring are now ready to be passed to the HP Compressor Assembly (72-33-00 Assembly).

TN41866

SUB-ASSEMBLY

**72-33-02**

Page 562  
Jan 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



10. Balance the Stage 6 Rotor and Stage 5-6 Spacer Ring

NOTE: If all the original blades are available and undamaged and are to be assembled to the original disk/spacer, the bladed disk/spacer does not require balancing, but the blades must be assembled to the disk as detailed in para.B and G.

A. Assemble the Stage 5-6 Spacer Ring to the Stage 6 Disk.

- (1) Assemble the spacer ring (2-100) to the disk (2-120) as detailed in para.7.A. with the difference that the locating pin (Tool 605) must be used instead of (Tool 607) (Ref.para.(1)).

B. Assemble Blades to Stage 6 Disk and Prepare for Balance.

- (1) Assemble the disk to the balancing mandrel and the blades (2-110) to the disk as detailed in para.7.B., with the difference that the balancing mandrel (Tool 1114) must be used instead of (Tool 1151) (Ref. para.(2)), and the 'NOTE' (Ref.para.(8)) reads as follows:

NOTE: If all the original blades are available and undamaged, then assemble the blades as detailed in para.(a). If the blades include nine repaired and/or new blades, then the blades must be assembled as detailed in para.(b). If the blades include more than nine repaired and/or new blades, then the blades must be assembled as detailed in para.(c). Ensure that the aggregate depth of blending of repaired blades does not exceed 1.92 in. (48,76 mm) (Ref.72-33-02 Repair No.6).

C. Assemble the Stage 6 Bladed Disk/Spacer Ring to the Balancing Machine.

- (1) Assemble the bladed disk to the balancing machine as detailed in para.7.C.

SUB-ASSEMBLY

72-33-02

Page 563

Nov 1/76

PRINTED IN ENGLAND

TN24080





OLYMPUS 593

MK.610-14-28  
OVERHAUL



D. Balance the Stage 6 Bladed Disk/Spacer Ring.

- (1) Balance the bladed disk/spacer as detailed in para.7.D. to within 4 drmm in. (180 grmm mm) by the interchange of blades.

E. Remove the Bladed Disk/Spacer Ring from the Balancing Machine and Number the Blades.

- (1) Remove the bladed disk/spacer from the balancing machine and number the blades as detailed in para.7.E.

F. Remove the Stage 5-6 Spacer Ring from the Stage 6 Disk.

- (1) Remove the spacer ring from the disk as detailed in para.8.F. with the difference that the mechanical puller (Tool 473) must be used instead of (Tool 471) (Ref.para.(2)).

G. Remove the Bladed Disk from the Balancing Mandrel.

- (1) Remove the bladed disk from the balancing mandrel as detailed in para.7.F.(3) and (4).

NOTE: The stage 6 bladed disk and stage 5-6 spacer ring are now ready to be passed to the HP Compressor Assembly (72-33-00 Assembly).

11. Balance the Stage 7 Rotor and Stage 6-7 Spacer Ring

NOTE: If all the original blades are available and undamaged and are to be assembled to the original disk/spacer, the balancing of the bladed disk/spacer is not required and para.11. need not be carried out.

A. Assemble the Stage 6-7 Spacer Ring to the Stage 7 Disk.

- (1) Assemble a locating pin (Tool 604) to each of the three supports (Tool 608) and place the supports on a suitable clean, flat surface.

TN25500

SUB-ASSEMBLY

**72-33-02**

Page 564  
Jan 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Assemble the multiple leg sling (Tool 1173) to the stage 7 disk (3-370).
- (a) Raise the disk by positioning three suitable support blocks under the disk, ensuring the blocks are evenly positioned.
  - (b) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk.
  - (c) Ensure that the knurled nuts are unscrewed, and the claws turned to align them with the plate. Lower the hoist and engage the plate in the disk, then turn the claws outwards to engage them under the disk. Tighten the knurled nuts to lock the claws in position.
- (3) Raise the hoist and position the disk over the three supports (Tool 608). Evenly dispose the supports under the disk and align the pins with the inner ring of holes. Lower the disk over the pins and rest it on the supports.
- (4) Release the knurled nuts of the sling, turn the claws sideways, then raise the sling from the disk. Remove the sling from the hoist.
- (5) Ensure that the heater (Tool 757) (Ref.Fig.514) is positioned on its mobile stand (Tool 759) with its handles uppermost and the multiple leg sling (Tool 1645) is assembled to the holes in the three handles with the sling shackle pins. Attach a hoist to the lifting eye of the sling, then position and lower the heater over stage 7 disk ensuring that it is concentric with the disk.
- (6) Heat the disk to 70 deg.C by operating the heater control (Tool 758) in accordance with para.7.A.(6). On completion of its heating cycle, remove the heater from the disk and position and lower it on to its stand. Release the hoist and lower the sling on to the heater, taking care not to touch the heater unless protective gloves are worn.

PRINTED IN ENGLAND

TN12574

SUB-ASSEMBLY

72-33-02

Page 565

Nov 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (7) Note the position of the datum hole in line with the datum mark → 00 ← on the edge of the outer (inward facing) flange of the stage 6-7 spacer ring (3-390), and the datum hole in line with the datum mark → 0 on the blade roots at the No.1 blade position (Ref.Fig.502). Position the spacer ring over the disk, then align the datum marks on both items and lower the spacer ring over the locating pins and on to the disk. Ensure that the spacer abuts the disk, then allow the disk to cool.

B. Preparation for Balancing the Stage 7 Disk/Stage 6-7 Spacer Ring.

- (1) Ensure that a Hydraclamp (Tool 1673) is bolted to a pedestal (Tool 1674), and the mounting plate (Tool 1163) is bolted to the Hydraclamp. Position the mounting plate so that its axis is horizontal, then lock the Hydraclamp.
- (2) Connect a hoist to the lifting eye of the lifting fixture (Tool 1171), then position the hoist over the static balance mandrel (Tool 552) and assemble the mandrel to the lifting fixture.
- (3) Position the hoist alongside the mounting plate, then traverse the hoist and engage the balancing mandrel over the mounting plate, ensuring that the mandrel studs locate in the holes in the mounting plate. Assemble washers and nuts to the mandrel studs and fully tighten the nuts.
- (4) Position and adjust the support stand (Tool 1667) to support the end of the balancing mandrel. Disconnect the lifting fixture from the mandrel, and the fixture from the hoist. Insert the retaining bolt (Tool 547) into the end of the mandrel and when it contacts the mounting plate, screw it into the plate. Attach a hoist to the ring of the bolt, then release the Hydraclamp and raise/traverse the hoist to bring the mandrel to the vertical position. Lock the Hydraclamp, then release the hoist.

TN12575

SUB-ASSEMBLY

72-33-02

Page 566

Nov 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (5) Assemble the multiple leg sling (Tool 1173) to the stage 7 disk.
- (a) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk.
  - (b) Ensure that the knurled nuts are unscrewed, and the claws turned to align them with the plate. Lower the hoist and engage the plate in the disk, then turn the claws outwards to engage them under the disk. Tighten the knurled nuts to lock the claws in position.
- (6) Assemble the stage 7 disk/stage 6-7 spacer to the balancing mandrel (Ref.Fig.518).
- (a) Raise the hoist and ensure that the locating pins are disengaged from the disk, then position the hoist over the balancing mandrel.
- NOTE: Due to the nine (equally spaced) offset bolt holes, the disk can only be assembled to the mandrel in a certain position.
- (b) Correctly position the disk relative to the mandrel locating/securing studs, then lower the disk over the studs, ensuring that it is lowered squarely and does not get jammed. Lightly tap with a suitable (soft faced) mallet (if necessary). When the disk abuts the mandrel, screw the special nuts on to the studs and fully tighten the nuts.
  - (c) Release the knurled nuts of the sling, turn the claws sideways, then raise the sling from the disk. Remove the sling from the hoist.
- (7) Attach a hoist to the ring of the retaining bolt, then release the Hydraclamp and lower the mandrel so that its axis is horizontal (Ref.Fig.519). Position the support stand (Tool 1667) under the end of the mandrel to take the weight, then remove the hoist and unscrew and remove the retaining bolt.

SUB-ASSEMBLY

72-33-02

Page 567

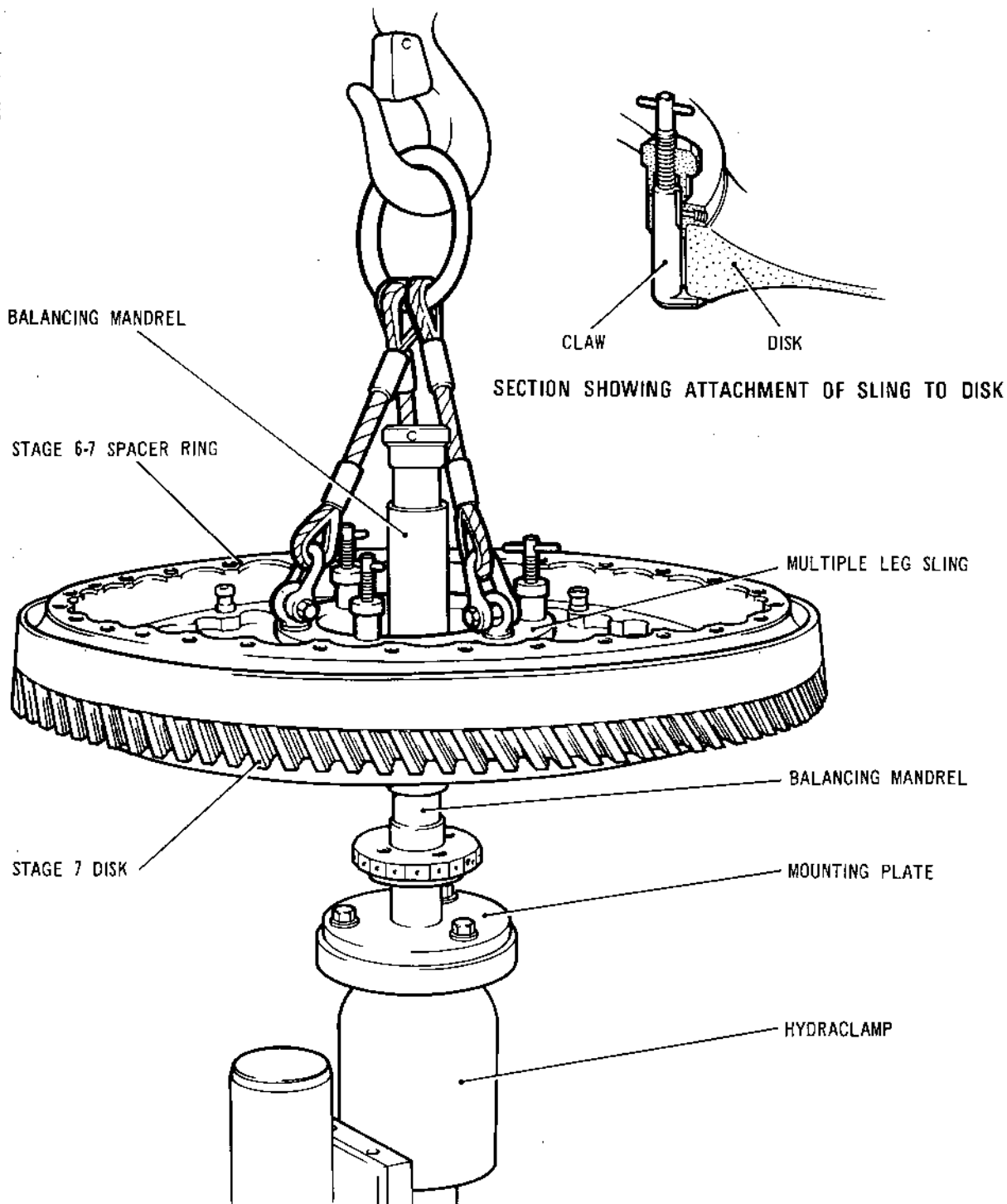
Nov 1/76



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 31777/00A



TN19517

Assembling Stage 7 Disk/Stage 6-7 Spacer  
Ring to Balancing Mandrel  
Figure 518

SUB-ASSEMBLY  
**72-33-02**  
Page 568  
Nov 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (8) Attach a hoist to the lifting eye of the lifting fixture (Tool 1171), then position the hoist over the balancing mandrel and engage the two hooks of the fixture around the mandrel.
- (9) Remove the nuts and washers securing the mandrel to the mounting plate, then remove the support stand and traverse the hoist to disengage the mandrel from the mounting plate. If the mandrel/disk assembly cannot be assembled to the balancing machine direct, lower it into the mobile stand (Tool 1165) engaging the mandrel journals in the stand support brackets. Disconnect the lifting fixture, then position the stand adjacent to the balancing machine. With the lifting fixture (Tool 1171) attached to a hoist, position the hooks of the fixture around the mandrel and raise it out of the stand.
- (10) Position the hoist over the balancing machine with the studded end of the mandrel towards the balancing machine drive. Lower the disk into the bottom half of the protection guard (Tool 1500), lift the balancing machine drive and engage the mandrel studs in it, then adjust the position of the cradles (if necessary) to align with the bearing journals of the mandrel, with the mandrel correctly engaged with the drive. Adjust the guard position (if necessary) to give running clearance of the mandrel/disk, then secure the cradles and guard. Lower the mandrel on to the cradles, then disengage the lifting fixture from the mandrel and the hoist.
- (11) Assemble washers and nuts to the mandrel studs and fully tighten the nuts. Pivot the retaining arms of the cradles over the mandrel and engage them around the pillars, then secure them with thumbnuts. Using a hoist, lower the top half of the guard (Tool 1500) on to the bottom half ensuring that the access cover of the guard is towards the balancing machine operator. Pivot the bottom guard swing bolts into the top guard and secure with the thumbnuts.

PRINTED IN ENGLAND

TN12577

SUB-ASSEMBLY

72-33-02

Page 569

Nov 1/76

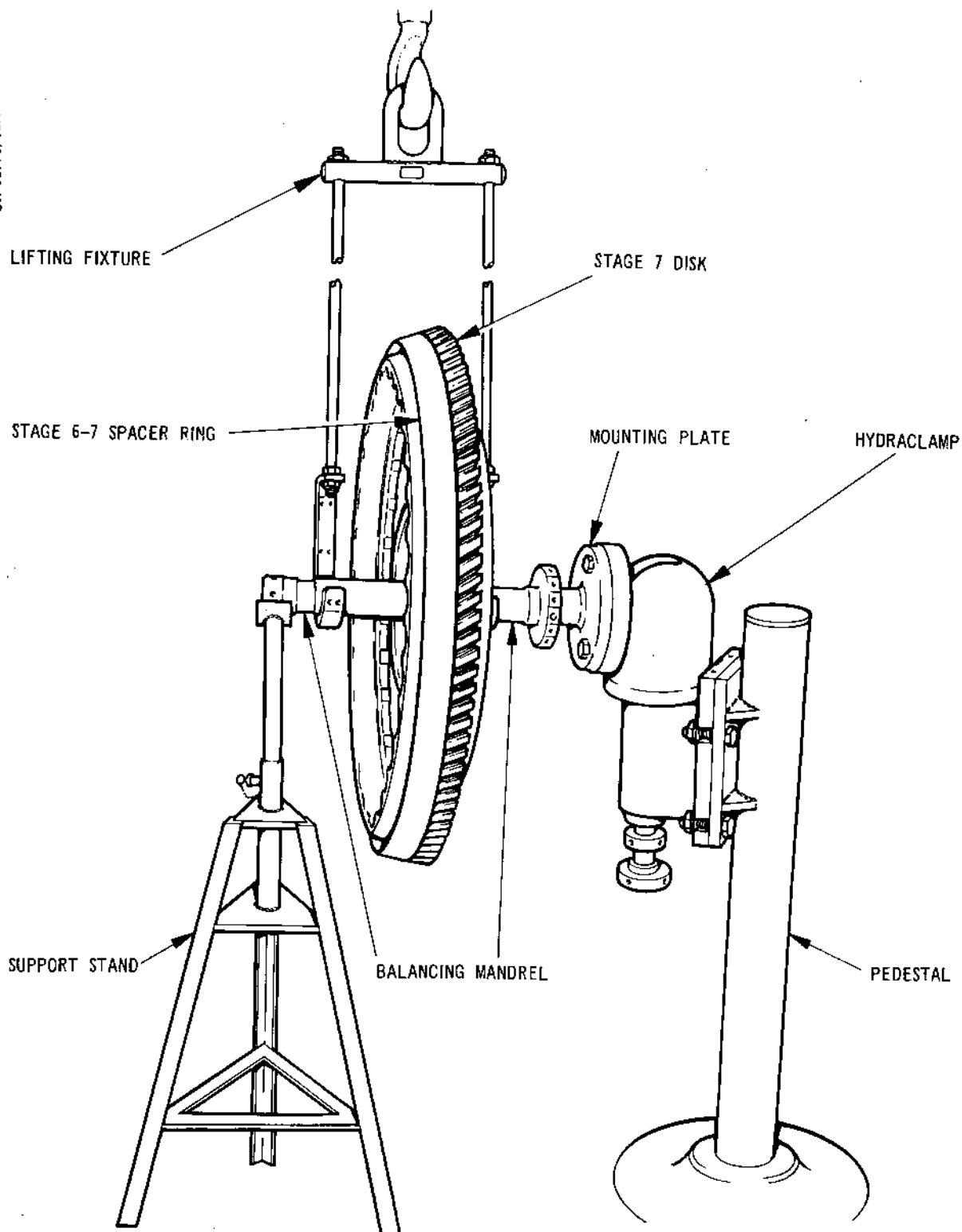


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31778/00A



Removing Stage 7 Disk/Stage 6-7 Spacer Ring from  
Mounting Plate  
Figure 519



OLYMPUS 593

MK.610-14-28

OVERHAUL



C. Balance the Stage 7 Disk/Stage 6-7 Spacer Ring.

- (1) Apply lubricant 'A' to the spindles of the adjustable bearings and the journals of the mandrel, and ensure that they remain well lubricated throughout the balancing operation.
- (2) Carry out a static balance of the disk/spacer, operating the balancing machine in accordance with the manufacturers instructions. The disk/spacer should be rotated at (approx.) 450 rpm and run for (approx.) two to three min for the temperature to stabilise. The balance of the disk/spacer must be within 2 drmm in. (90 grm mm). If the balance is outside the limit, rectify by adding plasticine to the disk face at the outer ring bolt hole location, in line with the out of balance angular position. Gain access to the disk face by hinging open the access cover. Identify the plasticine as balance No.1.

D. Remove the Disk/Spacer Ring from the Balancing Machine.

- (1) Release the retaining arm of each cradle and pivot the arms out of the way. Release and pivot down the swing bolts securing the top half of the guard, then using a hoist, raise the guard until clear of the disk and lower on to a suitable surface. Remove the hoist from the guard.
- (2) Attach a hoist to the lifting fixture (Tool 1171), then position and lower the fixture over the disk and engage the two hooks of the fixture around the mandrel. Remove the nuts and washers securing the mandrel to the balancing machine drive. Raise the hoist and guide the disk out of the machine, and when possible, disengage the drive from the mandrel studs and lower the drive.
- (3) If the mandrel/disk cannot be assembled to the Hydraclamp direct, lower it into the mobile stand (Tool 1165) engaging the mandrel journals in the stand support brackets. Disconnect the lifting fixture, then position the stand adjacent to the Hydraclamp. With the lifting fixture (Tool 1171) attached to a hoist, position the hooks of the fixture around the mandrel and raise it out of the stand.

SUB-ASSEMBLY

72-33-02

Page 571

Nov 1/76



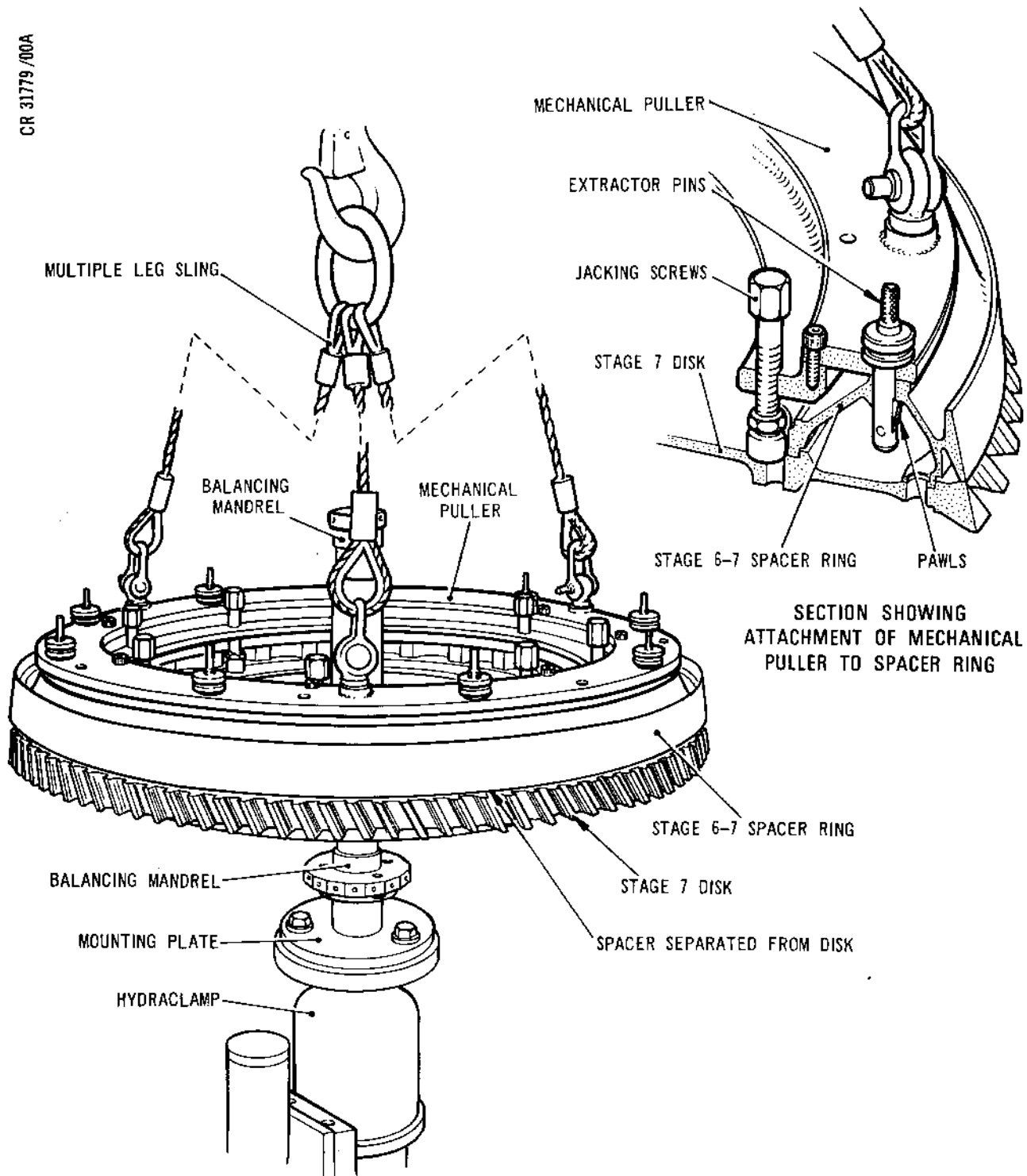


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31779 /00A



Removing Stage 6-7 Spacer Ring from Stage 7 Disk  
Figure 520

SUB-ASSEMBLY  
**72-33-02**  
Page 572  
Nov 1/76

IN37410



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

- (4) Position the hoist alongside the Hydraclamp, then engage the mandrel over the mounting plate and insert the studs through the plate. Assemble the washers and nuts to the mandrel studs and fully tighten the nuts.
- (5) Position the support stand (Tool 1667) under the end of the mandrel, then disconnect the lifting fixture from the mandrel and the fixture from the hoist.
- (6) Insert the retaining bolt (Tool 547) into the end of the mandrel and screw it into the mounting plate. Attach a hoist to the ring of the retaining bolt, then release the Hydraclamp and raise/traverse the hoist to position the mandrel vertically. Lock the Hydraclamp then release the hoist.

E. Remove the Stage 6-7 Spacer Ring from the Stage 7 Disk (Ref.Fig.520).

- (1) Attach a hoist to the multiple leg sling (Tool 1645), then position the hoist over the mechanical puller (Tool 976) and secure the sling to the puller eye bolts with shackles.
- (2) Unscrew and remove the mandrel nuts from the spacer ring. Position and lower the mechanical puller over the spacer ring and align the puller extractor pins with the bolt holes in the spacer. Ensure that the pawls of the extractor pins spring out from the pins, and that the knurled nuts are unscrewed. Lower the puller on to the spacer ensuring that the pins enter the spacer bolt holes. Push the pins into the spacer until the pawls spring out and engage behind the spacer, then pull up on the pins and tighten the knurled locknuts, ensuring that the pawls of all the pins are located and locked underneath the spacer ring.

TN12579

SUB-ASSEMBLY

**72-33-02**

Page 573

Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Screw in on the six jacking screws until they contact the disk, then separate the spacer from the disk by screwing in the jacking screws in equal progressive increments until the items are separated.
- (4) Raise the hoist and position and lower the spacer ring on to a suitable clean flat surface. Release the mechanical puller extractor pin knurled locknuts, press the pawls into the pins, then withdraw the pins from the spacer ring. Raise the mechanical puller and lower on to a suitable surface, then release and remove the multiple leg sling from the puller, and the sling from the hoist.
- (5) Screw the nuts on to the mandrel studs to secure the disk to the mandrel.

F. Assemble the Stage 7 Disk to the Balancing Machine.

- (1) Attach a hoist to the ring of the retaining bolt, then release the Hydraclamp and lower/traverse the hoist and rest the end of the mandrel on the support stand (Tool 1667). Release the hoist, then unscrew and remove the retaining bolt.
- (2) Attach a hoist to the lifting fixture (Tool 1171), then position the hoist above the disk and engage the two hooks of the fixture around the mandrel.
- (3) Remove the nuts and washers securing the mandrel to the mounting plate, then remove the support stand and traverse the hoist to disengage the mandrel from the mounting plate. Position the disk above the balancing machine. If the hoist cannot move direct to the balancing machine, lower the mandrel/disk into the mobile stand (Tool 1165), transport it to the area concerned, then using the lifting equipment, lift the mandrel/disk from the stand.

IN13778

SUB-ASSEMBLY

72-33-02

Page 574

Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Lower the disk into the bottom half of the protection guard (Tool 1500), lift the balancing machine drive and engage the mandrel studs in it. Check that the cradles and guard are correctly aligned with the journals of the mandrel and the disk (adjust if necessary), then lower the mandrel on to the cradles. Disengage the lifting fixture from the mandrel, then remove the fixture from the hoist.
- (5) Assemble washers and nuts to the mandrel studs and fully tighten the nuts. Pivot the retaining arms of the cradles over the mandrel and engage them around the pillars, then secure them with thumbnuts. Using a hoist, lower the top half of the guard (Tool 1500) on to the bottom half ensuring that the access cover of the guard is towards the balancing machine operator. Pivot the bottom guard swing bolts into the top guard and secure with the thumbnuts.

G. Balance the Stage 7 Disk.

- (1) Apply lubricant 'A' to the spindles of the adjustable bearings and the journals of the mandrel, and ensure that they remain well lubricated throughout the balancing operation.
- (2) Carry out a static balance of the disk, operating the balancing machine in accordance with the manufacturers instructions. The disk should be rotated at (approx.) 450 rpm and run for (approx.) two to three min for the temperature to stabilise. The balance of the disk must be within 2 drn in. (90 grm mm). If the balance is outside the limit, rectify by adding plasticine to the disk face at the outer ring bolt hole location, in line with the out of balance angular position. Do not touch the balance No.1 plasticine, and identify the second lump of plasticine as balance No.2. Gain access to the disk face by hinging open the access cover.

PRINTED IN ENGLAND

TN12580

SUB-ASSEMBLY

**72-33-02**

Page 575

Nov 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



H. Remove the Stage 7 Disk from the Balancing Machine and Assemble Blades to the Disk.

- (1) Remove the stage 7 disk from the balancing machine and assemble to the Hydraclamp as detailed in para.D.(1) to (5).
- (2) Assemble blades to the stage 7 disk.

NOTE: If all the original blades are available and undamaged, then assemble the blades as detailed in para.(a). If the blades include 12 repaired and/or new blades, then the blades must be assembled as detailed in para.(b). If the blades include more than 12 repaired and/or new blades then the blades must be assembled as detailed in para.(c). Ensure that the aggregate depth of blending of repaired blades does not exceed 2.40 in. (60,96 mm) (Ref.72-33-02 Repair No.6).

- (a) Identify the stage 7 blades (3-360), then examine the blade roots for their positional No. (Ref.Fig.502) and lay the blades out in numerical sequence. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades, then insert the blades in numerical sequence into the front face of the disk, starting at No.1 position and working in a clockwise direction when viewing the rear (mandrel) side of the disk. Attach masking tape to the front face of the disk over the blade roots.
- (b) Identify the stage 7 blades (3-360), then examine the roots of the original blades for their positional No. (Ref.Fig.502) and lay the blades out in numerical sequence, leaving spaces where new blades are to be positioned. Noting the mass moment weight of the new blades, place the lightest new blades in vacant positions next to the heaviest original blades, and position the heaviest new blades in vacant positions next to the lightest original blades. Assemble the blades to the disk as detailed in para.(a).

TN12581

SUB-ASSEMBLY

72-33-02

Page 576

Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

- (c) Identify the stage 7 blades (3-360), then according to the mass moment weight of the blades (quoted on the labels), lay the blades out in sequence of weight, starting with the heaviest blade at one end and ending with the lightest blade at the other end. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades (Ref. Fig.502). Assemble the blades into the front face of the disk positioning the heaviest blade at No.1 position and the next heaviest blade diametrically opposite, then assemble the two lightest blades diametrically opposite each other and next to the heaviest blades. Assemble the remainder of the blades to the disk in sequence of weight, assembling alternate heavy and light blades and where possible, positioning equal weight blades diametrically opposite each other. Attach masking tape to the front face of the disk over the blade roots.

J. Assemble the Stage 7 Bladed Disk to the Balancing Machine and Balance the Disk.

- (1) Assemble the stage 7 bladed disk to the balancing machine as detailed in para.F.(2) to (5).
- (2) Apply lubricant 'A' to the spindles of the adjustable bearings and the journals of the mandrel, and ensure that they remain well lubricated throughout the balancing operation.
- (3) Remove the balance No.1 lump of plasticine, then carry out a static balance of the bladed disk, operating the balancing machine in accordance with the manufacturers instructions. The disk should be rotated at (approx.) 450 rpm and run for (approx.) two to three min for the temperature to stabilise. The balance of the disk must be within 2 drn in. (90 grm mm). If the balance of the disk is outside the limit, rectify by the interchange of heavy and light weight blades (Ref. para.(4)) from the out of balance angular position, until the disk is within limits.

TN12582

SUB-ASSEMBLY

**72-33-02**

Page 577

Nov 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (4) To exchange the blades, hinge open the access cover, release the masking tape then withdraw a heavy blade from as near the out of balance position as possible and exchange it for a light blade from as near diametrically opposite as possible. Replace the masking tape and close the access cover.
- K. Remove the Stage 7 Bladed Disk from the Balancing Machine and Assemble the Stage 6-7 Spacer Ring to the Disk.
- (1) Remove the stage 7 bladed disk from the balancing machine and assemble to the Hydraclamp as detailed in para.D.(1) to (6).
  - (2) Assemble a locating pin (Tool 604) to each of the three supports (Tool 608) and place the supports on a suitable clean flat surface.
  - (3) Assemble the multiple leg sling (Tool 1173) to the disk.
    - (a) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk.
    - (b) Ensure that the knurled nuts are unscrewed, and the claws are turned to align them with the plate. Lower the hoist and engage the plate in the disk, then turn the claws outwards to engage them under the disk. Tighten the knurled nuts to lock the claws.
  - (4) Unscrew and remove the mandrel nuts securing the disk. Raise the hoist and withdraw the disk from the mandrel studs, lightly tapping the disk with a (soft faced) mallet (if required). Position the disk over the three supports (Tool 608), evenly dispose the three supports under the disk to align the pins with the inner ring of holes. Lower the disk over the pins and rest it on the supports.

TN12583

SUB-ASSEMBLY

**72-33-02**

Page 578

Nov 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (5) Release the knurled nuts of the sling, turn the claws sideways, then raise the sling from the disk. Remove the sling from the hoist. Remove the masking tape from the front (top) face of the disk and ensure that the disk and blade roots are perfectly clean.
- (6) Ensure that the heater (Tool 757) is positioned on its mobile stand (Tool 759) with its handles uppermost and the multiple leg sling (Tool 1645) is assembled to the holes in the three handles with the sling shackle pins. Attach a hoist to the lifting eye of the sling, then position and lower the heater over stage 7 disk ensuring that it is concentric with the disk.
- (7) Heat the disk to 70 deg.C by operating the heater control (Tool 758) in accordance with para.7.A.(6). On completion of its heating cycle, remove the heater from the disk and position and lower it on to its stand. Release the hoist and lower the sling on to the heater, taking care not to touch the heater unless protective gloves are worn. When the heater is cool release and remove the sling from the heater.
- (8) Note the position of the datum hole in line with the datum mark → OO ← on the edge of the outer (inward facing) flange of the stage 6-7 spacer ring, and the datum hole in line with the datum mark → O on the blade roots at the No.1 blade position (Ref.Fig.502). Position the spacer ring over the disk, then align the datum marks on both items and lower the spacer ring over the locating pins and on to the disk. Ensure that the spacer abuts the disk, then allow the disk to cool.
- L. Assemble the Stage 7 Bladed Disk/Spacer Ring to the Balancing Machine and Check Balance the Disk.
- (1) Assemble the disk/spacer to the balancing mandrel, then assemble the mandrel/disk/spacer to the balancing machine as detailed in para.B.(5) to (11).

SUB-ASSEMBLY

72-33-02

Page 579

Nov 1/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Apply lubricant 'A' to the spindles of the adjustable bearings and the journals of the mandrel, and ensure that they remain well lubricated throughout the balancing operation.
  - (3) Remove the balance No.2 lump of plasticine, then carry out a static balance of the bladed disk/spacer, operating the balancing machine in accordance with the manufacturers instructions. The disk should be rotated at (approx.) 450 rpm and run for (approx.) two to three min for the temperature to stabilise. The balance of the disk must be within 8 drmm in. (360 grm mm). If the balance of the disk is outside the limits, no form of rectification is possible at this stage. The spacer ring and blades must be removed from the disk and the complete procedure repeated, ensuring that it is strictly adhered to, and that the balancing No.1 and 2 lumps of plasticine are not mistaken.
- M. Remove the Stage 7 Bladed Disk from the Balancing Machine and Remove the Spacer Ring from the Disk.
- (1) Remove the stage 7 bladed disk/spacer ring from the balancing machine and assemble to the Hydraclamp as detailed in para.D.(1) to (6).
  - (2) Remove the stage 6-7 spacer ring from the stage 7 disk as detailed in para.E.(1) to (4).
- N. Number and Remove the Blades from the Stage 7 Disk.
- (1) Examine the edge of the disk for the No.1 blade datum mark → O , then examine the blade roots for their numbering (Ref.Fig.502) and ensure that all the blades are numbered correctly in numerical sequence in a clockwise direction as viewed from the mandrel side, with No.1 blade in the datum slot. Etch all new blades with their position No., and renumber any blades that have been re-positioned, ensuring that all old position No. are obliterated.

TN13779

SUB-ASSEMBLY  
**72-33-02**

Page 580  
Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) With the platform (Tool 1390) assembled to the container (Tool 1373), withdraw the blades from the disk and insert them in the container platform.

P. Remove the Stage 7 Disk from the Balancing Mandrel.

- (1) Assemble the multiple leg sling (Tool 1173) to the disk.
  - (a) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk.
  - (b) Ensure that the knurled nuts are unscrewed and the claws turned to align them with the plate. Lower the hoist and engage the plate in the disk, then turn the claws outwards to engage them under the disk. Tighten the knurled nuts to lock the claws in position.
- (2) Remove the hand nut and clamp plate from the container (Tool 1419). Raise the hoist and withdraw the disk from the mandrel studs, lightly tapping the disk with a (soft faced) mallet (if required). Position the disk over its container (Tool 1419), then lower the hoist and locate the disk on the containers locating plate. Release the knurled nuts of the sling, turn the claws sideways and lower the disk on to the locating plate. Remove the sling from the hoist and the disk. Assemble the clamp plate to the centre screw and secure it with the hand nut.

NOTE: The stage 7 disk, spacer ring and blades are now ready to be passed to the HP Compressor Assembly (72-33-00 Assembly).

- (3) Remove the balancing mandrel from the Hydraclamp.
  - (a) Attach a hoist to the ring of the retaining bolt, release the Hydraclamp, then lower the mandrel on to the support stand. Release the hoist, then remove the retaining bolt.

SUB-ASSEMBLY

**72-33-02**

Page 581

Nov 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Attach a hoist to the lifting eye of the lifting fixture (Tool 1171), then position the hoist over the balancing mandrel and engage the two hooks of the fixture around the mandrel.
- (c) Remove the nuts and washers securing the mandrel to the mounting plate, then remove the support stand and traverse the hoist to disengage the mandrel from the mounting plate. Position and lower the mandrel into its storage stand, then remove the lifting fixture from the mandrel and the hoist. Assemble the washers and nuts to the mandrel studs and the special nuts to the mandrel locating/securing studs.

## 12. Balance the Stage 1 Rotor

NOTE: If all the original blades are available and undamaged and are to be assembled to the original disk, the bladed disk does not require balancing, but the blades must be assembled to the disk with serviceable retaining plates (1-220) as detailed in para.B and F.

A. Apply Dry Film Lubricant (Engines to SB 72-8879-338 standard only) (Ref.Fig.520A).

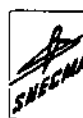
- (1) Apply one coat of dry film lubricant to the loaded flanks of the stage 1 rotor blades as instructed in Chapter 72-09-18 Repair.
- (2) Apply two coats of dry film lubricant to the stage 1 disk root serrations, with a minimum drying time of 10 minutes between coats, as instructed in Chapter 72-09-18 Repair.



OLYMPUS 593

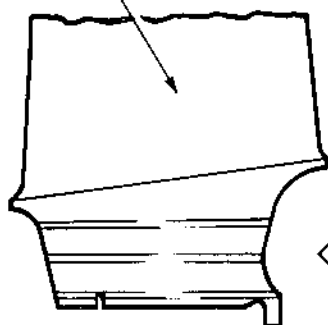
MK.610-14-28

OVERHAUL



CR 36093/00A

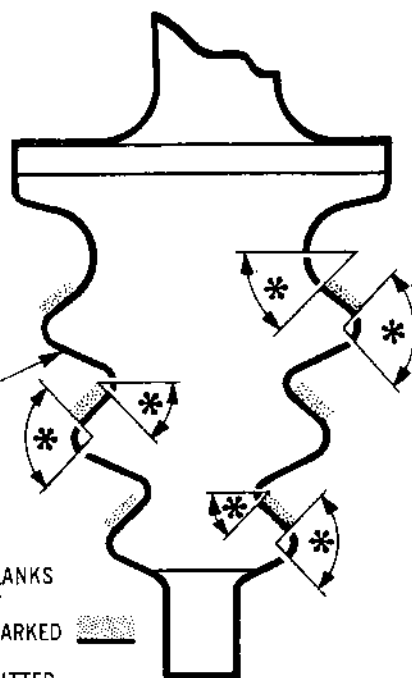
HP COMPRESSOR  
STAGE 1 BLADE



DISCOLOURATION OF  
UNLOADED FLANKS  
PERMISSIBLE

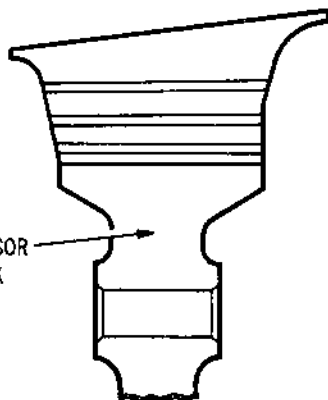
COAT LOADED FLANKS  
WITH LUBRICANT  
AT POSITIONS MARKED

OVERSPRAY PERMITTED  
ON BLADE ROOT ENDS  
AND AREAS INDICATED \*



TYPICAL VIEW AT A

HP COMPRESSOR  
STAGE 1 DISK

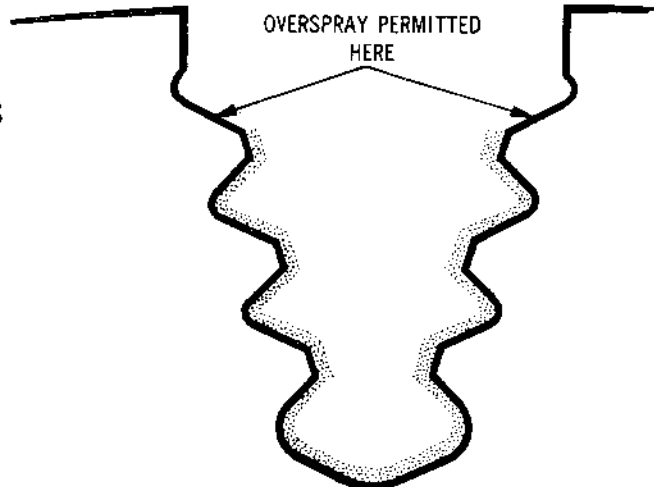


TYPICAL SECTION  
THROUGH DISK  
SLOT

B

OVERSPRAY PERMITTED  
HERE

APPLY TWO COATS OF  
LUBRICANT AT POSITIONS  
MARKED



TYPICAL VIEW AT B

Dry Film Lubricant Application  
Figure 520A

SUB-ASSEMBLY

72-33-02

Page 582 A

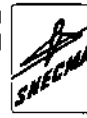
Jun 1/87



OLYMPUS 593

MK.610-14-28

OVERHAUL



B. Assemble Blades to Stage 1 Disk and Prepare for Balancing.

NOTE: If the disk is to SB.72-34 standard, only blade positions No.1 and 34 will be marked on the edge of the disk.

- (1) Screw a suitable lifting eye-bolt (Ref.Fig.522) in to the balancing adapter (Tool 1825).
- (2) Attach a hoist to the lifting eye, then raise the hoist and position and lower the adapter onto a work surface.
- (3) Disengage and remove the hoist, then unscrew and remove the nuts and washers from the adapter location pins (Tool 1841).
- (4) Assemble the lifting fixture (Tool 369) to the stage 1 disk (1-230) (Ref.Fig.521).

NOTE: The lifting fixture should be offered to the front face of the disk, denoted by the smaller outside diameter.

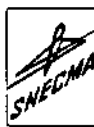
- (a) Attach a hoist to the lifting ring of the fixture, then position the hoist over the disk.



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Raise the disk from its container (Tool 1418) and position three equi-spaced support blocks beneath it.
- (c) Ensure that the fixture hand knobs are engaged at the 'FREE' position. Lower the hoist and engage the plate in the disk. Withdraw each hand knob from its locking hole, turn the knobs to the 'LOCK' position engaging the claws under the disk, then depress the knobs to engage them in their lock holes.
- (d) Raise the hoist and position the disk over the balancing adapter. Align the holes in the disk with the location pins, then lower the disk on to the adapter.
- (e) Withdraw each lifting fixture hand knob from its locking hole, turn the knobs to the 'FREE' position, then depress the knobs to engage the locking holes. Raise the fixture from the disk, then remove the fixture from the hoist.
- (5) Reassemble the nuts and washers to the location pins to secure the disk to the adapter.
- (6) Assemble the blades to the stage 1 disk.

NOTE: Blades are assembled from the rear face of the disk.

NOTE: If all the original blades are available and undamaged, then assemble the blades as detailed in para.(a). If the blades include four repaired and/or new blades, then the blades must be assembled as detailed in para.(b). If the blades include more than four repaired and/or new blades, then the blades must be assembled as detailed in para.(c). Ensure that the aggregate depth of blending of repaired blades does not exceed 0.90 in. (22,86 mm) (Ref.72-33-02 Repair No.6).

SUB-ASSEMBLY

72-33-02

Page 583

Nov 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (a) Identify the stage 1 blades (1-210), then examine the blade roots for their positional No. (Ref.Fig.502) and lay the blades out in numerical sequence. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades. Assemble a slave retaining plate (1-220) to the groove in each blade root (Ref.Fig.523), then insert the blades in numerical sequence into the disk, starting at No.1 position and working in a counter-clockwise direction when viewed from above. Bend each retaining plate inward across the face of the disk, sufficient to lock each blade in position.
- (b) Identify the stage 1 blades (1-210), then examine the roots of the original blades for their positional No. (Ref.Fig.502) and lay the blades out in numerical sequence, leaving spaces where new blades are to be positioned. Noting the mass moment weight of the new blades, place the lightest new blades in vacant positions next to the heaviest original blades, and position the heaviest new blades in vacant positions next to the lightest original blades. Assemble the slave retaining plates and blades to the disk as detailed in para.(a).
- (c) Identify the stage 1 blades (1-210), then according to the mass moment weight of the blades (quoted on the labels), lay the blades out in sequence of weight, starting with the heaviest blade and ending with the lightest. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades (Ref.Fig.502). Assemble a slave retaining plate (1-220) to the groove in each blade root (Ref.Fig.523), then assemble the blades to the disk positioning the heaviest blade at No.1 position and the next heaviest blade diametrically opposite. Assemble the two lightest blades diametrically opposite each other and next to the heaviest blades. Assemble the remainder of the blades to the disk in sequence of weight, assembling alternate

IN11858

SUB-ASSEMBLY  
72-33-02

Page 584

Aug 1/81

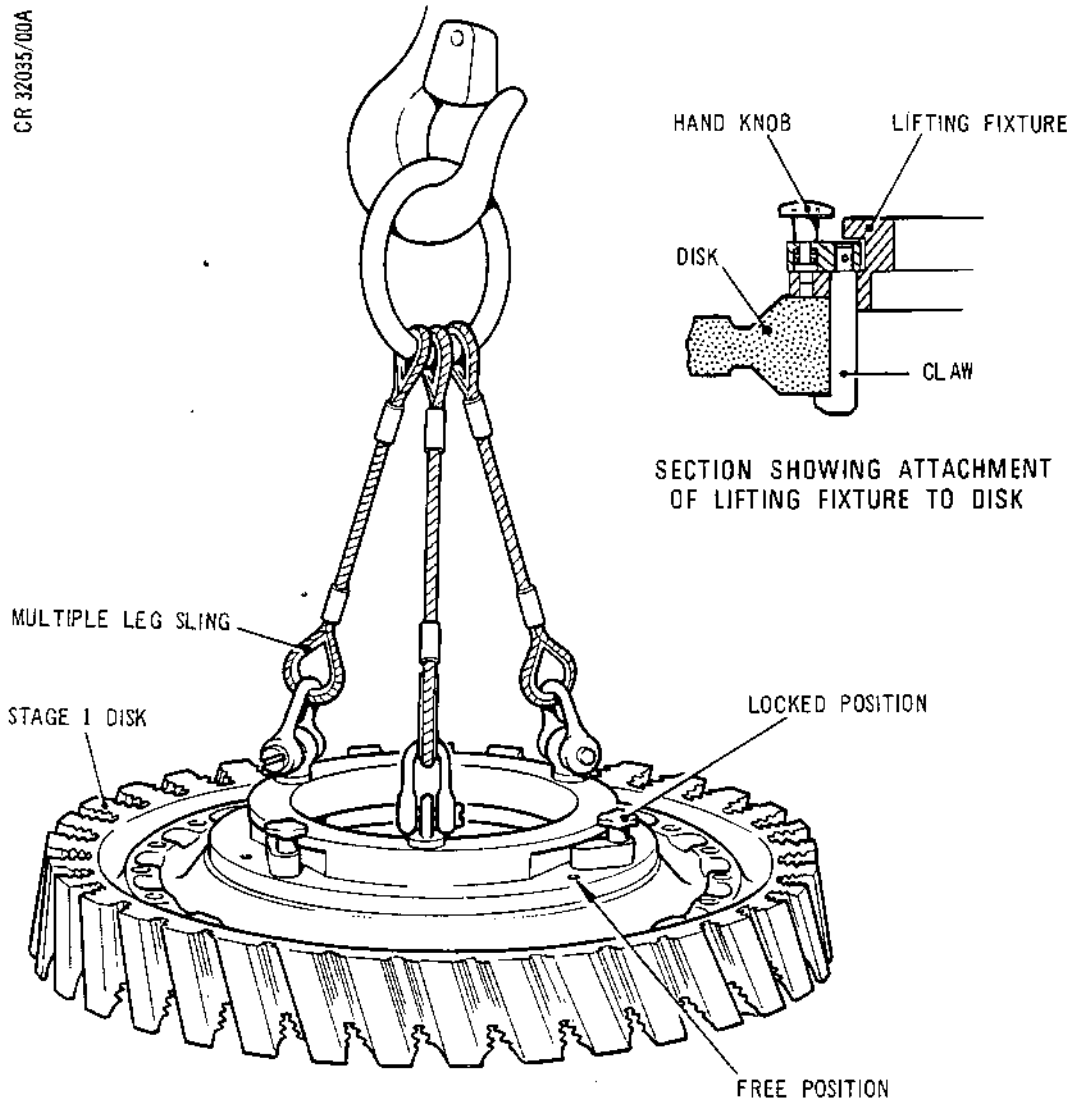


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32035/Q0A



Assembling Lifting Fixture to Stage 1 Disk  
Figure 521

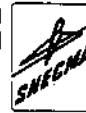




OLYMPUS 593

MK.610-14-28

OVERHAUL



heavy and light blades and where possible, positioning equal weight blades diametrically opposite each other. Bend each retaining plate inward, across the face of the disk, sufficient to lock each blade in position.

(d) Assemble a blade protector (Tool 1130) to the blade tips.

C. Assemble the Stage 1 Bladed Disk and Adapter to the (Schenck ZE.40) Balancing Machine.

- (1) Attach a hoist to the lifting eye of the adapter (Ref.Fig.522).
- (2) Raise the hoist and position the adapter/disk above the spindle head of the balancing machine. Align the holes in the adapter hub with those of the spindle head, then lower the adapter on to the machine.
- (3) Secure the adapter to the machine with the six retaining screws (Tool 1826).
- (4) Disengage and remove the hoist, then unscrew and remove the lifting eye from the adapter and the protector from the blade tips.

D. Balance the Stage 1 Bladed Disk.

- (1) Carry out a static balance of the bladed disk, operating the balancing machine in accordance with the manufacturers instructions. The disk should be rotated as for engine rotation, (counter-clockwise viewed from the rear). Balance must be within 4 drn in. (180 grm mm) and is achieved by the interchange of heavy and light blades. Before any blades are interchanged, check the out of balance readings by rotating the disk 180 degrees relative to the adapter and repeating the balancing procedure.

SUB-ASSEMBLY

**72-33-02**

Page 586

Jun 1/87

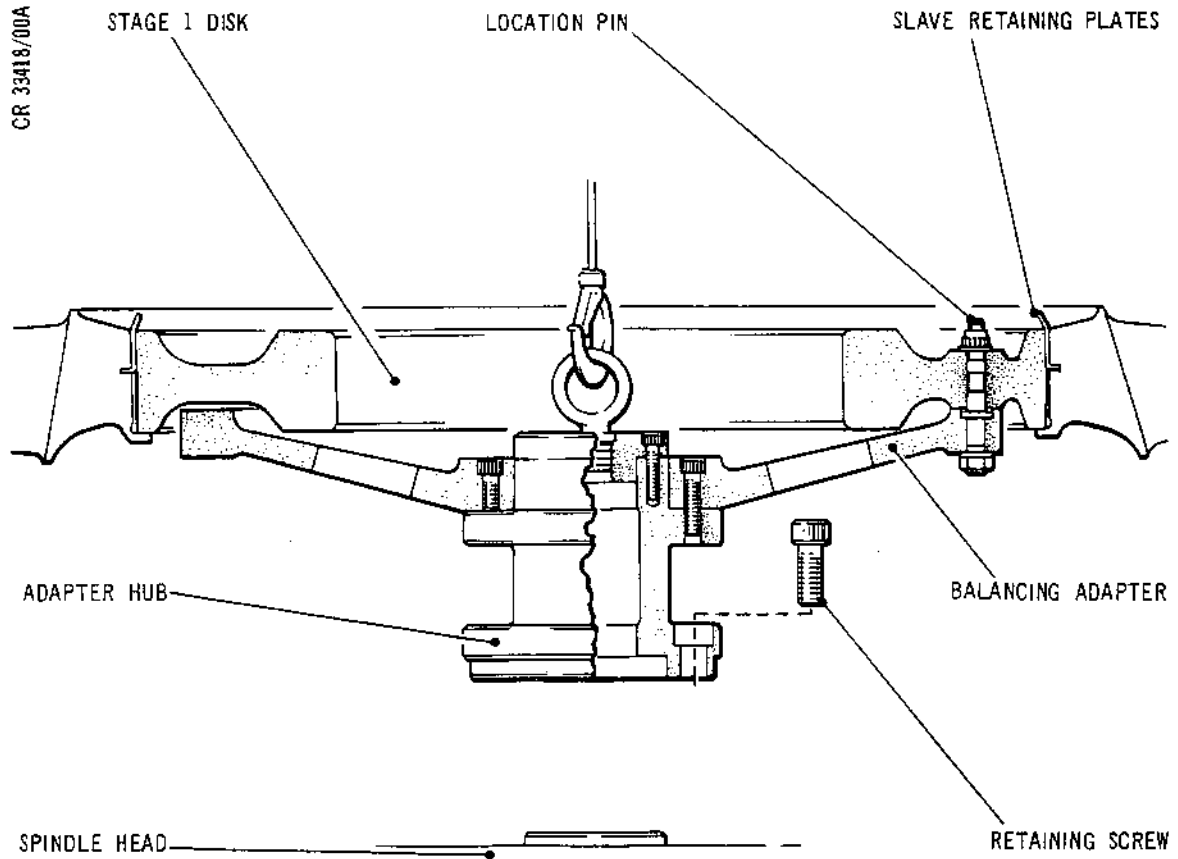


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



Assembling Adapter/Disk to the Balancing Machine  
Figure 522

SUB-ASSEMBLY  
**72-33-02**

Page 587  
Nov 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



E. Remove the Bladed Disk/Adapter form the Balancing Machine.

- (1) Screw a lifting eye into the adapter hub and assemble the protector (Tool 1130) to the blade tips.
- (2) Attach a hoist to the adapter lifting eye, then unscrew and remove the six retaining screws which secure the adapter to the balancing machine.
- (3) Raise the hoist and remove the adapter/disk from the machine. Position the assembly on a work surface, then disengage and remove the hoist.
- (4) Examine the edge of the disk for the No.1 blade datum mark  $\rightarrow 0$ , then examine the blade roots for their numbering (Ref.Fig.502). Ensure that all the blades are numbered correctly in numerical sequence in a clockwise direction (viewed from the rear), with No.1 blade in the datum slot. Etch all new blades with their position No. and renumber any blades that have been re-positioned. Ensure that old position No. are obliterated.

F. Secure the Blades to the Stage 1 Disk.

- (1) Remove the protector from the blade tips. Bend the slave retaining plate of the No.1 blade upward, away from the disk face, and slide the blade down out of its slot. Remove the slave retaining plate from the blade and assemble a serviceable plate (1-220), then assemble the blade/plate to the disk (Ref.Fig.523). Ensure that the blade is fully in, then using the hammer (Tool 1655), bend the protruding end of the retaining plate against the disk. Ensure that the bend of the plate is not too acute causing a fracture of the plate. Assemble a retaining plate to each of the blades, and lock each plate against the disk. Using feeler gauges, check each blade to ensure that the maximum end-float of the blade root in the disk does not exceed 0.015 in. (0,38 mm). Assemble the protection/retaining band (Tool 1130) to the tips of the blades.

SUB-ASSEMBLY  
**72-33-02**

Page 588  
Jun 1/87



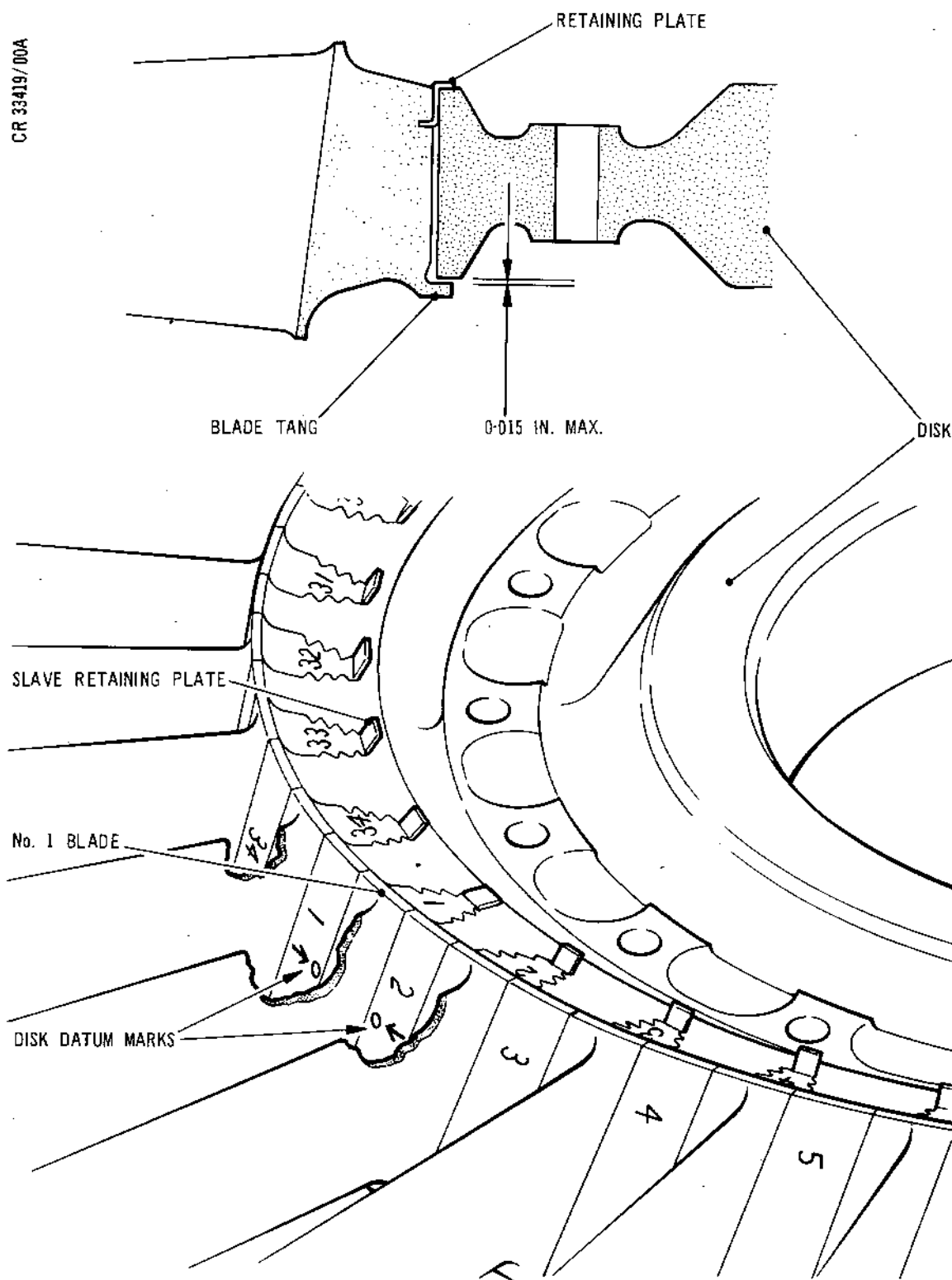
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 33419/00A



Securing Blades in Stage 1 Disk  
Figure 523

SUB-ASSEMBLY  
**72-33-02**  
Page 589  
Nov 1/76

PRINTED IN ENGLAND

TN17088



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Assemble the lifting fixture (Tool 369) to the disk (Ref.Fig.521).
  - (a) Attach a hoist to the lifting ring of the fixture, then position the hoist over the disk.
  - (b) Ensure that the hand knobs are engaged at the 'FREE' position. Lower the hoist and engage the plate in the disk, then withdraw each hand knob from its locking hole, turn the knobs to the 'LOCK' position, engaging the claws under the disk, depress the knobs to engage the lock holes.
- (3) Unscrew and remove the nuts and washers securing the disk to the balancing adapter.
- (4) Raise the hoist and position and lower the disk on to a suitable pallet or container. Withdraw each hand knob of the fixture from its locking hole, turn the knobs to the 'FREE' position, then depress the knobs to engage the locking holes. Raise the fixture from the disk, then remove the fixture from the hoist.

NOTE: The stage 1 bladed disk is now ready to be passed to the HP Compressor Assembly (72-33-00 Assembly).

### 13. Balance the Stage 2 Rotor

NOTE: If all the original blades are available and undamaged and are to be assembled to the original disk, the bladed disk does not require balancing, but the blades must be assembled to the disk with serviceable retaining plates (1-220) as detailed in para.A and E.

#### A. Assemble Blades to Stage 2 Disk and Prepare for Balancing.

- (1) Assemble a suitable lifting eye to the balancing adapter (Tool 1827).

TN15497



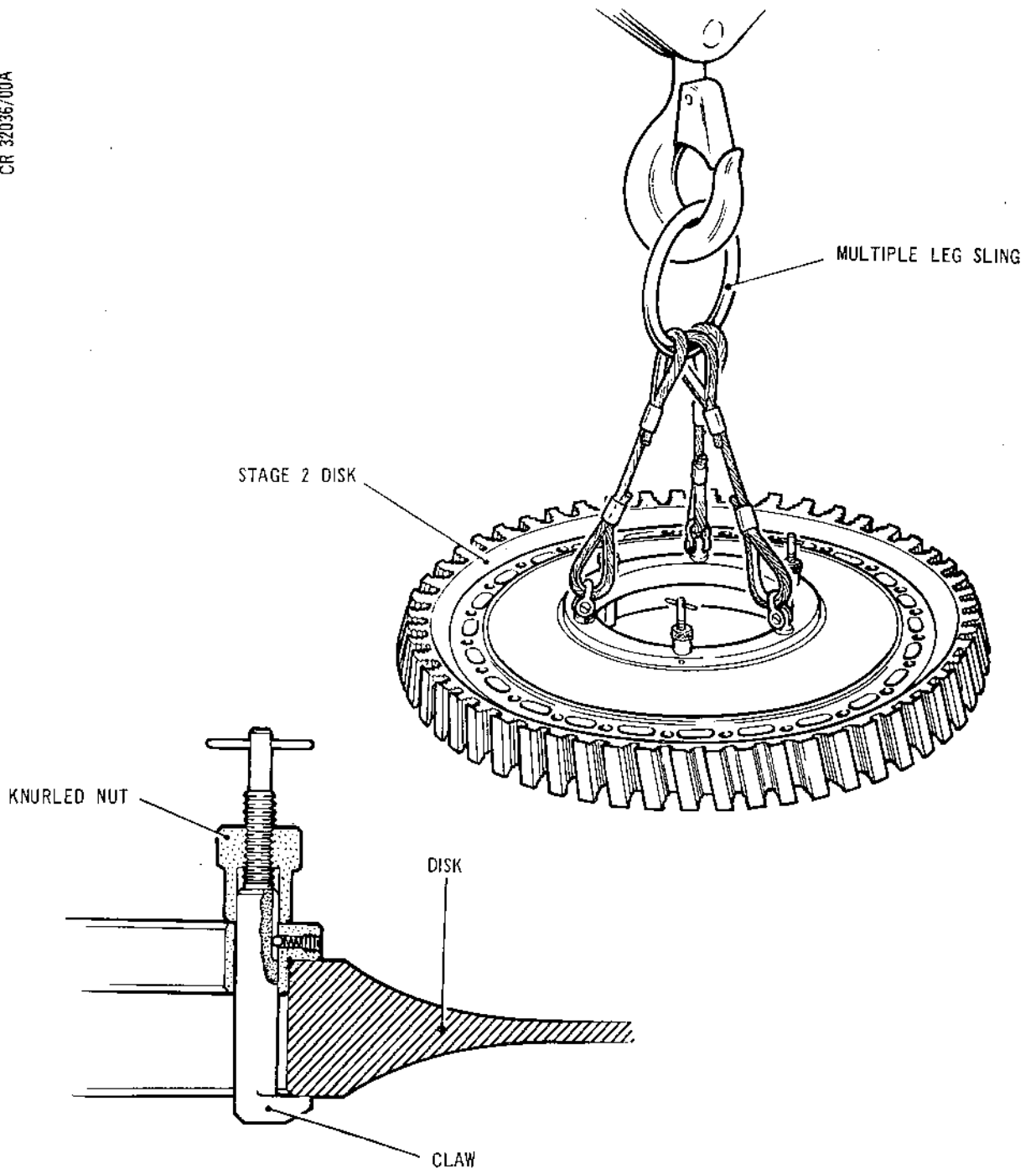
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32036/00A



TN31867

Assembling Multiple Leg Sling to Stage 2 Disk  
Figure 524

SUB-ASSEMBLY  
**72-33-02**  
Page 591  
Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Attach a hoist to the lifting eye, raise the hoist and position the adapter on a work surface.
- (3) Disengage and remove the hoist, then unscrew and remove the nuts and washers from the adapter location pins.
- (4) Assemble the multiple leg sling (Tool 1173) to the stage 2 disk (1-300) (Ref.Fig.524).

NOTE: The lifting fixture should be offered to the front face of the disk, denoted by the smaller outside diameter.

- (a) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk.
  - (b) Ensure that the knurled nuts are unscrewed and the claws turned to align them with the plate.
  - (c) Raise the disk from its container (Tool 1419) and position three equi-spaced supports blocks beneath it.
  - (d) Lower the hoist and engage the plate in the disk, then turn the claws outwards to engage them under the disk. Tighten the knurled nuts to lock the claws in position.
- (5) Raise the hoist and position the disk above the balancing adapter. Align the holes in the disk with the adapter location pins then lower the disk on to the adapter (Ref.Fig.525).
  - (6) Reassemble the nuts and washers to the location pins to secure the disk to the adapter.

TN31866

SUB-ASSEMBLY

**72-33-02**

Page 592

Nov 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (7) Assemble the blades to the stage 2 disk.

NOTE: If the disk is to SB 72-34 standard, only blade positions No.1 and 54 will be marked on the edge of the disk.

NOTE: Blades are assembled from the rear face of the disk.

NOTE: If all the original blades are available and undamaged, then assemble the blades as detailed in para.(a). If the blades include six repaired and/or new blade, then the blades must be assembled as detailed in para.(b). If the blades include more than six repaired and/or new blades, then the blades must be assembled as detailed in para.(c). Ensure that the aggregate depth of blending of repaired blades does not exceed 1.50 in. (38,10 mm) (Ref.72-33-02 Repair No.6).

- (a) Identify the stage 2 blades (1-280), then examine the blade roots for their positional No. (Ref.Fig.502) and lay the blades out in numerical sequence. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades. Assemble a slave retaining plate 1-220) to the groove in each blade root (Ref.Fig.525), then insert the blades in numerical sequence into the disk, starting at No.1 position and working in a counter-clockwise direction when viewed from above.
- (b) Identify the stage 2 blades (1-280), then examine the roots of the original blades for their positional No. (Ref.Fig.502) and lay the blades out in numerical sequence, leaving spaces where new blades are to be positioned. Noting the mass moment weight of the new blades, place the lightest new blades in vacant positions next to the heaviest original blades, and position the heaviest new blades in vacant positions next to the lightest original blades. Assemble the slave retaining plates and blades to the disk as detailed in para.(a).





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) Identify the stage 2 blades (1-280), then according to the mass moment weight of the blades (quoted on the labels), lay the blades out in sequence of weight, starting with the heaviest blade and ending with the lightest. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades (Ref.Fig.502). Assemble a slave retaining plate (1-290) to the groove in each blade root (Ref. Fig.525), then assemble the blades to the disk positioning the heaviest blade at No.1 position and the next heaviest blade diametrically opposite, then assemble the two lightest blades diametrically opposite each other and next to the heaviest blades. Assemble the remainder of the blades to the disk in sequence of weight, assembling alternate heavy and light blades and where possible, positioning equal weight blades diametrically opposite each other.
  - (d) If the disk is at SB 72-8925-358 standard, check that there is at least 0.010 in. (0,25 mm) side-ways movement at the tip of each blade, to ensure adequate clearance in disk slots coated with Sermetel 709.
  - (e) Bend each retaining plate inward across the face of the disk, sufficient to lock each blade in position.
  - (f) Assemble a blade protector (Tool 1130) to the blade tips.
- B. Assemble the Stage 2 Bladed Disk and Adapter to the (Schenck ZE.40) Balancing Machine.
- (1) Attach a hoist to the lifting eye of the adapter.
  - (2) Raise the hoist and position the adapter/disk above the spindle head of the balancing machine. Align the holes in the adapter hub with those of the spindle head, then lower the adapter on to the machine (Ref.Fig.525).
  - (3) Secure the adapter to the machine with the six retaining screws (Tool 1826).
  - (4) Disengage and remove the hoist, then unscrew and remove the lifting eye from the adapter and the protector from the blade tips.

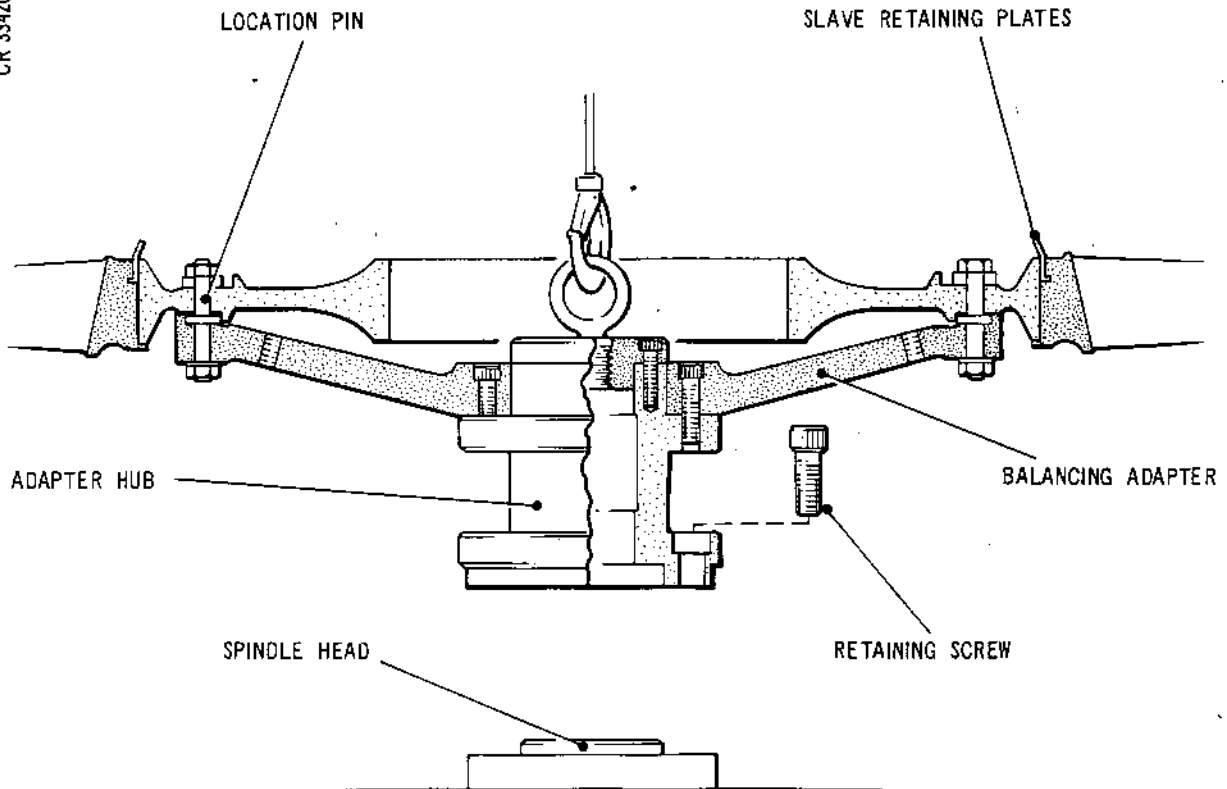
SUB-ASSEMBLY  
**72-33-02**

Page 594  
Jun 1/90

CR 33420/00A



**OLYMPUS 593**  
MK. 610-14-28  
OVERHAUL



Assembling Adapter/Disk to Balancing Machine  
Figure 525

SUB-ASSEMBLY  
**72-33-02**  
Page 595  
Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



C. Balance the Stage 2 Bladed Disk.

- (1) Carry out a static balance of the bladed disk, operating the balancing machine in accordance with the manufacturers instructions. The disk should be rotated as for engine rotation (counter-clockwise viewed from the rear). Balance must be within 4 drn in. (180 grm mm) and is achieved by the interchange of heavy and light blades. Before any blades are interchanged, check the out of balance readings by rotating the disk 180 degrees, relative to the adapter, and repeating the balancing procedure.
- (2) If the disk is to SB 72-8925-358 standard, check that there is at least 0.010 in. (0,25 mm) sideways movement at the tip of each blade.

D. Remove the Bladed Disk/Adapter from the Balancing Machine.

- (1) Screw the lifting eye into the adapter hub and assemble the protector (Tool 1130) to the blade tips.
- (2) Attach a hoist to the adapter lifting eye, then unscrew and remove the six retaining screws which secure the adapter to the balancing machine.
- (3) Raise the hoist and remove the adapter/disk from the machine. Position the assembly on a work surface, then disengage and remove the hoist.
- (4) Examine the edge of the disk for the No.1 blade datum mark 0, then examine the blade roots for their numbering (Ref.Fig.502). Ensure that all the blades are numbered correctly in numerical sequence in a clockwise direction (viewed from the rear), with No.1 blade in the datum slot. Etch all new blades with their position No. and renumber any blades that have been re-positioned. Ensure that old position No. are obliterated.



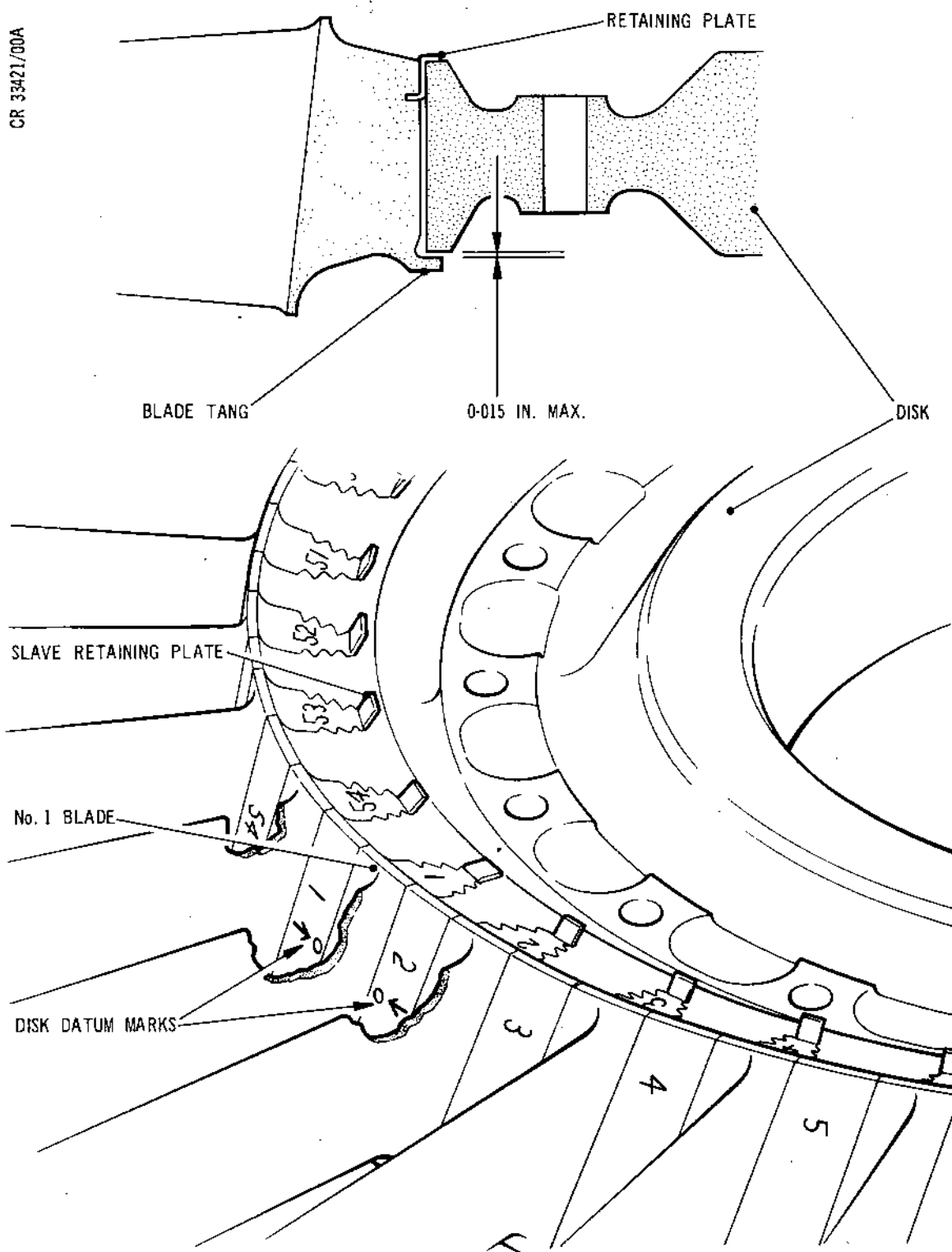
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 33421/00A



Securing Blades in Stage 2 Disk  
Figure 526

SUB-ASSEMBLY  
**72-33-02**  
Page 597  
Nov 1/76

PRINTED IN ENGLAND

TN31802



OLYMPUS 593

MK.610-14-28  
OVERHAUL



E. Secure the Blades to the Stage 2 Disk.

- (1) Remove the protector from the blade tips. Bend the retaining plate of the No.1 blade upward, away from the disk face, and slide the blade down out of its slot. Remove the slave retaining plate, and assemble a serviceable plate (1-290), then assemble the blade/plate to the disk (Ref.Fig.526). Ensure that the blade is fully in, then using the hammer (Tool 1655), bend the protruding end of the retaining plate against the disk. Ensure that the bend of the plate is not too acute causing a fracture of the plate. Assemble a retaining plate to each of the blades, and lock each plate against the disk. Using feeler gauges, check each blade to ensure that the maximum end-float of the blade root in the disk does not exceed 0.015 in. (0,38 mm). Assemble the protection/retaining band (Tool 1130) to the tips of the blades.
- (2) Assemble the multiple leg sling (Tool 1173) to the disk (Ref.Fig.524).
  - (a) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk.
  - (b) Ensure that the knurled nuts are unscrewed and the claws turned to align them with the plate. Lower the hoist and engage the plate in the disk, then turn the claws outwards to engage them under the disk. Tighten the knurled nuts to lock the claws in position.
- (3) Raise the hoist and position and lower the disk on to a suitable pallet or container. Release the knurled nuts of the sling, turn the claws sideways, then raise the sling from the disk. Remove the sling from the hoist.

NOTE: The stage 2 bladed disk is now ready to be passed to the HP Compressor Assembly (72-33-00 Assembly).

FN13493

SUB-ASSEMBLY

**72-33-02**

Page 598

Nov 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



#### 14. Balance the Stage 3 Rotor and Stage 2-3 Spacer Ring

NOTE: If all the original blades are available and undamaged and are to be assembled to the original disk/spacer, the bladed disk/spacer does not require balancing, but the spacer and blades must be assembled to the disk as detailed in para.A, B and G.

##### A. Assemble the Stage 2-3 Spacer Ring to the Stage 3 Disk.

- (1) Assemble a locating pin (Tool 607) to each of the three supports (Tool 608) and space the supports on a suitable clean flat surface.
- (2) Assemble the multiple leg sling (Tool 1173) to the stage 3 disk (1-350) (Ref.Fig.527).

NOTE: The sling should be assembled to the front face of the disk, denoted by the smaller outside diameter.

- (a) Raise the disk and position three equi-spaced support blocks beneath it.
  - (b) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk.
  - (c) Ensure that the knurled nuts are unscrewed, and the claws are turned to align them with the plate. Lower the hoist and engage the plate in the disk, then turn the claws outward to engage them under the disk. Tighten the knurled nuts to lock the claws.
- (3) Raise the hoist and position the disk over the three supports (Tool 608). Evenly dispose the supports under the disk and align the pins with the bolt holes. Lower the disk over the pins and rest it on the supports.

PRINTED IN ENGLAND

TN14591

SUB-ASSEMBLY

**72-33-02**

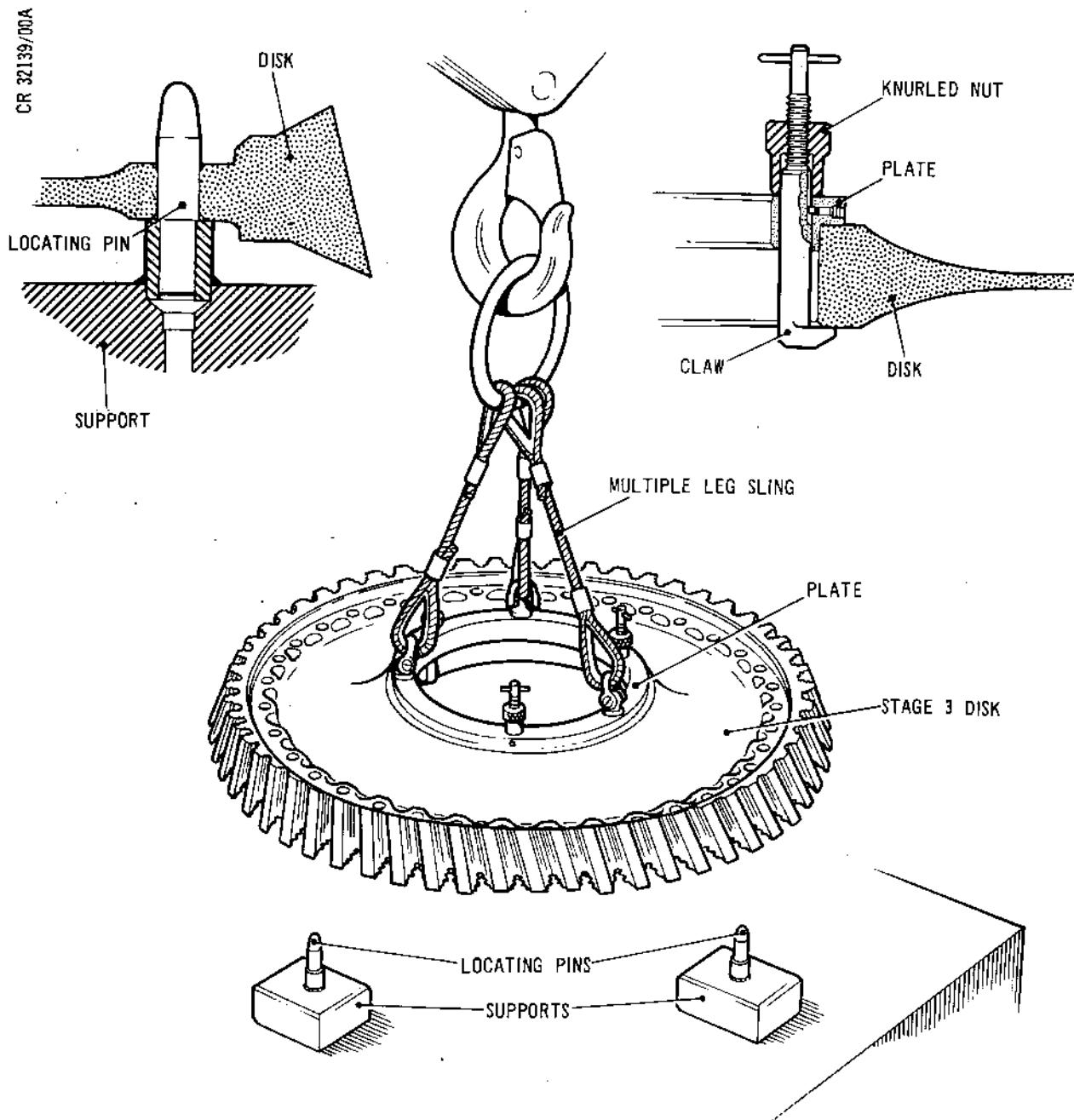
Page 598.1

Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TN14592

Assembling Disk to Spacer Ring Locating Pins  
Figure 527

SUB-ASSEMBLY  
**72-33-02**  
Page 598.2  
Nov 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (4) Release the knurled nuts of the sling, turn the claws sideways, then raise the sling from the disk. Remove the sling from the hoist.
- (5) With the heater (Tool 757) handles uppermost (Ref. Fig.528) and positioned on its mobile stand (Tool 759), attach the multiple leg sling (Tool 1645) to the holes in the three handles with the sling shackles. Attach a hoist to the lifting eye of the sling, then position and lower the heater over the stage 3 disk ensuring that it is concentric with the disk.
- (6) Heat the disk to 70 deg.C by operating the heater control (Tool 758) (Ref.Fig.528).

NOTE: If the heater, control or stand are not available, use suitable units based on the wiring diagram (Ref.Fig.528).

- (a) Connect the heater control input supply plug to a suitable mains supply connection and turn the mains switch 'ON'.
- (b) Turn the three 'HEATER CONTROLS' band switches to 'FULL'.
- (c) Turn the heater time controller to nine minutes.
- (d) Switch the 'HEATERS' toggle switch to 'ON', then press the 'TIMER START' pushbutton to start the heating cycle. During the period the heater is on, the 'ON' indicator light will be remain illuminated and at the completion of nine minutes the heaters and light will automatically be switched off.
- (e) When the timer switch cuts out, switch the 'HEATERS' toggle switch to 'OFF', the 'HEATER CONTROLS' switches to 'OFF' and the mains supply switch to 'OFF'.

PRINTED IN ENGLAND

TN14593





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



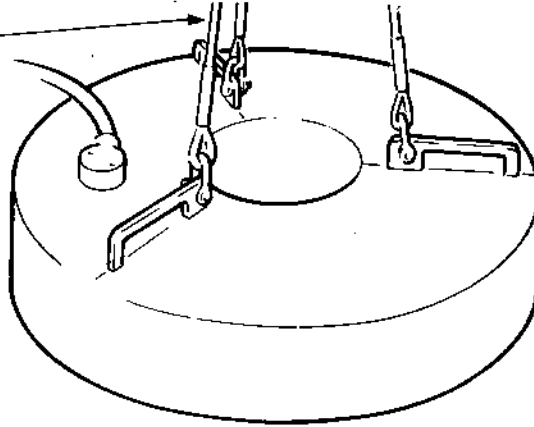
CR 30416/00A

HEATER LIFTING FIXTURE

HEATER ELEMENTS

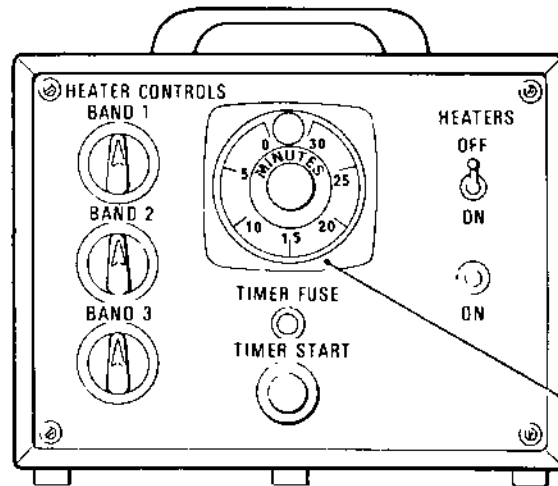
HEATER UNIT

HEATER  
CONTROL UNIT



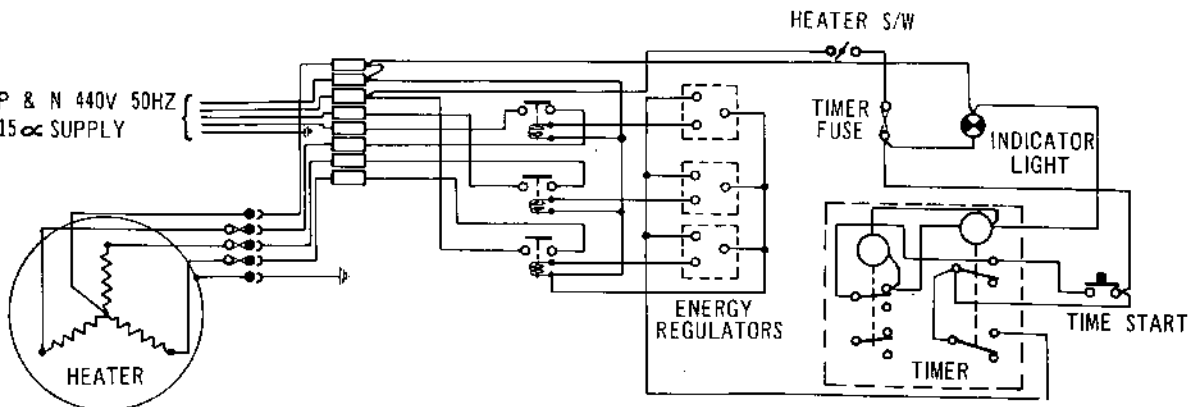
HEATING ELEMENT INVERTED FOR LOWERING  
INTO INSTALLED DISK OR SPACER

MOBILE STAND



TIME CONTROLLER

TO TP & N 440V 50HZ  
15 $\phi$  SUPPLY



Equipment for Heating Compressor Disks  
Figure 528

SUB-ASSEMBLY  
**72-33-02**  
Page 598.4  
Nov 1/76

TN14594



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (f) Remove the heater from the disk and position and lower it on to its stand. Release the hoist and lower the sling on to the heater, do not touch the heater unless protective gloves are worn.

NOTE: The multiple leg sling (Tool 1645) is also used for lifting mechanical pullers in addition to the heater. If only one sling is available, the operator must assemble and remove the sling from the heater each time it is used.

- (7) Note the position of the datum hole in line with the datum mark → 0 on the edge of the blade roots at the No.1 blade position of the stage 3 disk, and the datum mark 0 on the edge of the flange of the stage 2-3 spacer ring (1-330) (Ref.Fig.502). Position the spacer ring over the disk, align the datum marks on both items and lower the spacer over the locating pins and on to the disk. Ensure that the spacer abuts the disk, then allow the disk to cool.
- (8) Secure the disk to the spacer using six equi-spaced slave bolts and nuts (Tool 1828) (Ref.Fig.530).

B. Assemble Blades to Stage 3 Disk and Prepare for Balance.

- (1) Remove the disk/spacer from the supports, then reposition the supports to suit the holes in the front face of the spacer.
- (2) Invert the disk/spacer and reposition the assembly on the supports.

PRINTED IN ENGLAND

TN14595

SUB-ASSEMBLY

72-33-02

Page 598.5

Nov 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (3) Assemble the blades to the stage 3 disk.

NOTE: If all the original blades are available and undamaged, then assemble the blades as detailed in para.(a). If the blades include six repaired and/or new blades, then the blades must be assembled as detailed in para.(b). If the blades include more than six repaired and/or new blades, then the blades must be assembled as detailed in para.(c). Ensure that the aggregate depth of blending of repaired blades does not exceed 1.20 in. (30,48 mm) (Ref.72-33-02 Repair No.6).

- (a) Identify the stage 3 blades (1-340), then examine the blade roots for their positional No. (Ref.Fig.502) and lay the blades out in numerical sequence. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades, then insert the blades in numerical sequence into the disk, starting at No.1 position and working in a clockwise direction when viewed from above.
- (b) Identify the stage 3 blades (1-340), then examine the roots of the original blades for their positional No. (Ref.Fig.502) and lay the blades out in numerical sequence, leaving spaces where new blades are to be positioned. Noting the mass moment weight of the new blades, place the lightest new blades in vacant positions next to the heaviest original blades, and position the heaviest new blades in vacant positions next to the lightest original blades. Assemble the blades to the disk as detailed in para.(a).

IN13780

SUB-ASSEMBLY

**72-33-02**

Page 598.6

Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) Identify the stage 3 blades (1-340), then according to the mass moment weight of the blades (quoted on the labels), lay the blades out in sequence of weight, starting with the heaviest blade and ending with the lightest. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades (Ref.Fig.502). Assemble the blades to the disk positioning the heaviest blade at No.1 position and the next heaviest blade diametrically opposite, then assemble the two lightest blades diametrically opposite each other and next to the heaviest blades. Assemble the remainder of the blades to the disk in sequence of weight, assembling alternate heavy and light blades and where possible, positioning equal weight blades diametrically opposite each other.
  - (d) If the disk is to SB 72-8925-358 standard, check that there is at least 0.010 in. (0,25 mm) side-ways movement at the tip of each blade, to ensure adequate clearance in disk slots coated with Sermetel 709.
- C. Prepare the Balancing Machine (Schenck ZE.40) to Balance Stage 3 Bladed Disk/Spacer Ring.
- (1) Assemble the adapter hub (Tool 209) to the spindle head of the balancing machine and secure with the six screws (Tool 1826) (Ref.Fig.529).
  - (2) Assemble the multiple leg sling (Tool 1645) to the adapter (Tool 1840).
    - (a) Screw three lifting eye-bolts (1/2 in UNC) into the adapter.
    - (b) Attach the sling to a hoist and position the sling above the adapter. Assemble each leg of the sling to a lifting eye and secure with a shackle.
  - (3) Raise the hoist and position the adapter above the balancing machine. Align the holes in the adapter with those in the adapter hub, then lower the adapter on to the machine.

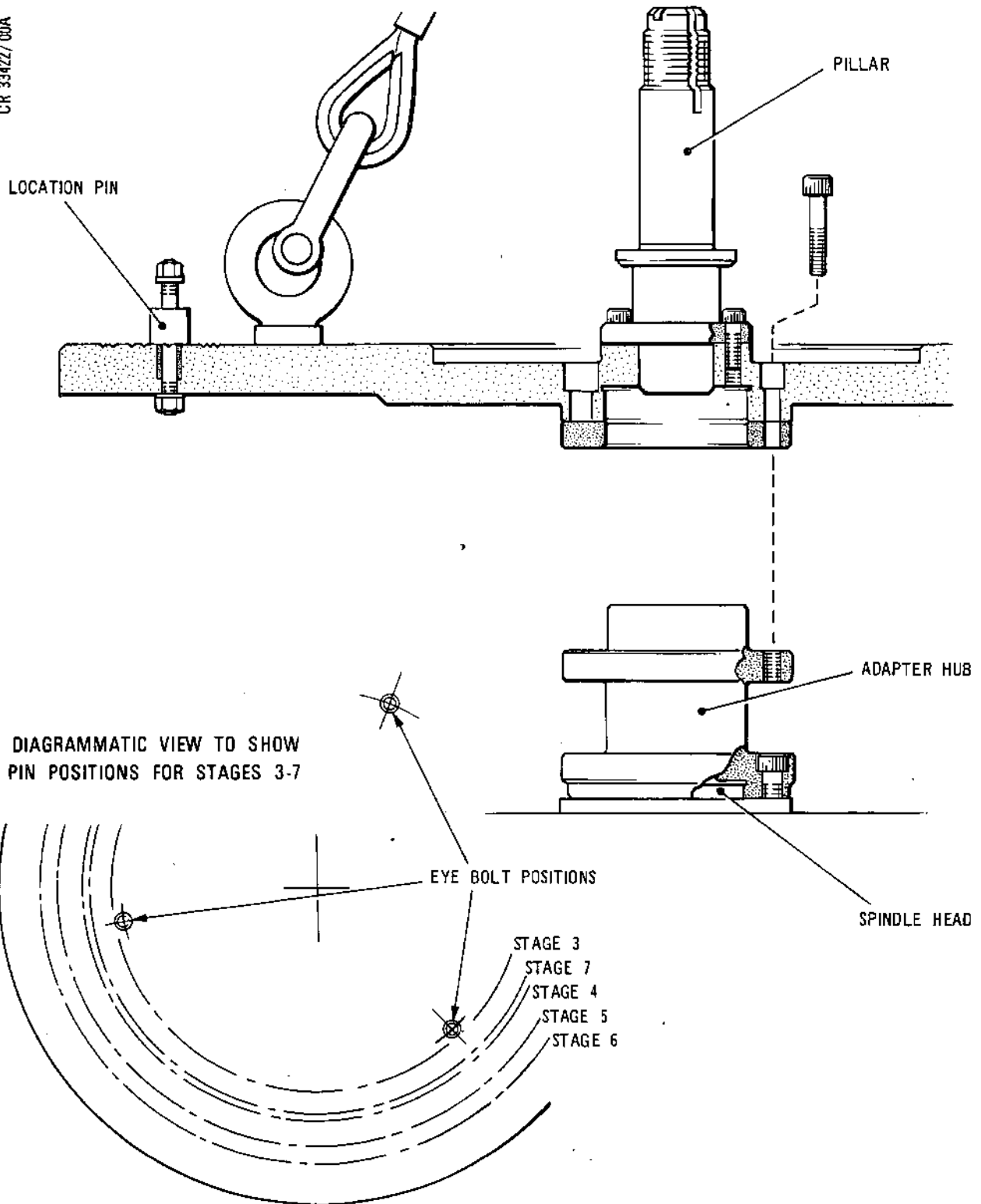


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33422/00A



Assembling Adapter to Balancing Machine  
Figure 529

SUB-ASSEMBLY  
**72-33-02**  
Page 598.8  
Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Secure the adapter to the hub with the six retaining screws of the adapter. Remove the sling from the adapter, then unscrew and remove the three lifting eye bolts.
- (5) Screw the eight location pins (Tool 1829) into the appropriate holes in the adapter (Ref.Fig.529).
- D. Assemble the Stage 3 Bladed Disk/Spacer Ring to the Balancing Machine.
- (1) Assemble the multiple leg sling (Tool 1173) to the stage 3 disk/spacer (Ref.Fig.527).
- (a) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk/spacer.
- (b) Ensure that the knurled nuts are unscrewed and the claws are turned to align them with the plate. Lower the hoist and engage the plate in the disk, then turn the claws outward to engage them under the disk. Tighten the knurled nuts to lock the claws.
- (2) Raise the hoist and position the disk/spacer above the adapter assembled to the balancing machine.
- (3) Align the holes in the spacer with the eight location pins and ensure the eight nuts and washers are removed from the pins. Lower the disk/spacer on to the pins, then using the nuts secure the disk/spacer to the pins (Ref.Fig.530).
- (4) Release the knurled nuts of the sling, turn the claws sideways, then raise the hoist and remove the sling from the disk.
- (5) Unscrew and remove the knurled nut from the pillar of the adapter, then assemble the adjusting washer (Tool 1830) to the pillar.

SUB-ASSEMBLY

**72-33-02**

Page 598.9

Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (6) Secure a sling to the eye-bolts of the retaining plate (Tool 1831), then using a hoist raise and position the plate above the balancing machine. Align the key, secured across the aperture in the plate, with the slot in the adapter pillar, then carefully lower the plate into position.
- (7) Disengage and remove the sling, then unscrew and remove the eye-bolts from the retaining plate. Screw the knurled nut on to the pillar to secure the plate to the adapter.

E. Balance the Stage 3 Bladed Disk/Spacer Ring.

- (1) Carry out a static balance of the bladed disk, operating the balancing machine in accordance with the manufacturers instructions. The disk should be rotated as for engine rotation (counter-clockwise viewed from the rear). Balance must be within 4 drn in. (180 grm mm) and is achieved by the interchange of heavy and light blades. Before any blades are interchanged, check the out of balance readings by rotating the disk 180 degrees, relative to the adapter and retaining plate and repeating the balancing procedure.
- (2) If the disk is to SB 72-8925-358 standard, check that there is at least 0.010 in. (0,25 mm) sideways movement at the tip of each blade.

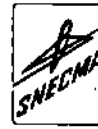
F. Remove the Bladed Disk/Spacer Ring from the Balancing Machine and Number the Blades.

- (1) Screw the two Lifting eye-bolts into the retaining plate and unscrew and remove the knurled nut from the adapter pillar.
- (2) Attach a sling to a hoist and position the sling above the balancing machine. Assemble the sling to the retaining plate lifting eyes, then raise the hoist and remove the plate.
- (3) Remove the retaining plate from the sling and the sling from the hoist.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Unscrew and remove the nuts and washers from the eight location pins.
- (5) Assemble the multiple leg sling (Tool 1173) to the stage 3 disk/spacer (Ref.Fig.527).
  - (a) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk/spacer.
  - (b) Ensure that the knurled nuts are unscrewed and the claws are turned to align with the plate. Lower the hoist and engage the plate in the disk, then turn the claws outward to engage them under the disk. Tighten the knurled nuts to lock the claws.
- (6) Raise the hoist and position the disk/spacer on a work surface.
- (7) Remove the multiple leg sling from the disk.
  - (a) Unscrew the knurled nuts and turn the claws inward to align with the plate.
  - (b) Raise the hoist and remove the sling from the disk, then remove the sling from the hoist.
- (8) Examine the edge of the disk for the No.1 blade datum mark→O, then examine the blade roots for their numbering (Ref.Fig.502) ensure that all the blades are numbered correctly in numerical sequence in a clockwise direction (viewed from above) with No.1 blade in the datum slot. Etch all new blades with their position No., and renumber any blades that have been re-positioned, ensuring that all old position No. are obliterated. Assemble the protection/retaining band (Tool 1130) to the blade tips.

PRINTED IN ENGLAND

TN14623

SUB-ASSEMBLY

**72-33-02**

Page 598.11

Nov 1/76



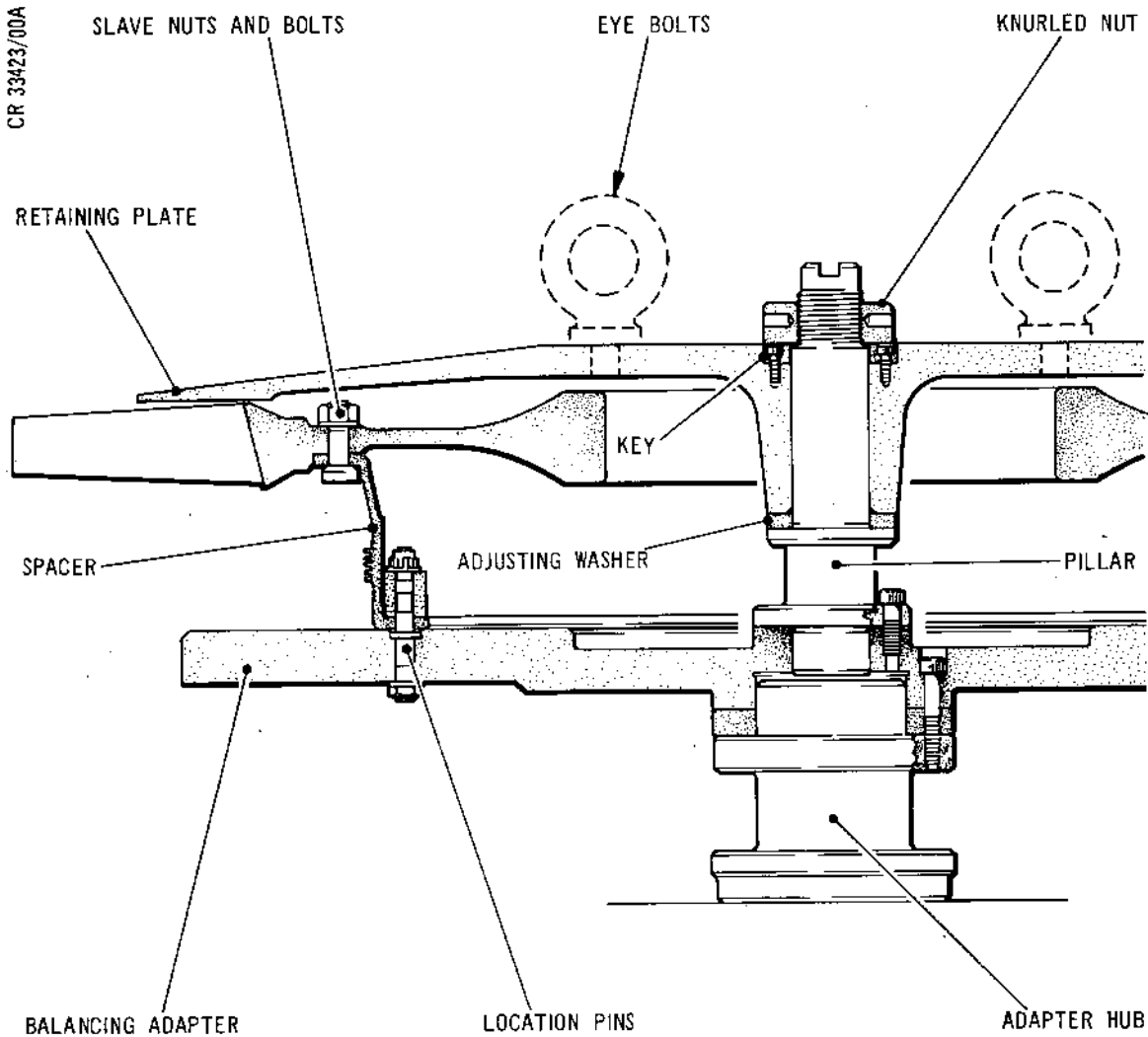


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33423/00A



TN17089

Assembling Stage 3 Bladed Disk/Spacer Ring to  
Balancing Machine  
Figure 530

SUB-ASSEMBLY

**72-33-02**

Page 598.12

Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- G. Position the Stage 3 Disk/Spacer on a Suitable Pallet (Ref.Fig.513).

NOTE: The disk/spacer should now be repositioned with the spacer uppermost.

- (1) Unscrew and remove the slave nuts and bolts which secure the spacer to the disk.
- (2) Assemble the multiple leg sling (Tool 1173) to the disk.
  - (a) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk/spacer.
  - (b) Ensure that the knurled nuts are unscrewed, and the claws are turned to align them with the plate. Lower the hoist and engage the plate in the disk, then turn the claws outwards to engage them under the disk. Tighten the knurled nuts to lock the claws.
- (3) Raise the hoist and position and lower the disk/spacer on to a suitable pallet or container. Release the knurled nuts of the sling, turn the claws sideways, then raise the sling from the disk and remove the sling from the hoist.

NOTE: The stage 2-3 spacer ring is not normally removed from the stage 3 disk. If for some reason it is desired to separate the two, remove the spacer using mechanical puller (Tool 457), thrust bolts (Tool 458) and slave bolts (Tool 460). Stow the spacer in its container (Tool 1441). Refer to para.A. for the assembly of the spacer ring to the disk.

NOTE: The stage 3 bladed disk/spacer assembly is now ready to be passed to the HP Compressor Assembly (72-33-00 Assembly).

- H. Remove the Balancing Adapter from the Balancing Machine.

NOTE: The adapter is used to balance stages 3 to 7 of the HP Compressor and may be left assembled to the machine.

- (1) Screw the three lifting eye-bolts into the appropriate holes in the adapter (Ref.Fig.529).

SUB-ASSEMBLY

72-33-02

Page 598.13

Aug 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Attach the sling (Tool 1645) to a hoist and position the sling above the adapter. Secure each leg of the sling to the eye-bolts with shackles.
- (3) Unscrew and remove the six retaining screws which secure the adapter to the adapter hub, then raise the hoist and remove the adapter.
- (4) Lower the adapter on to a suitable pallet and disconnect the hoist from the sling.
- (5) Unscrew and remove the six screws securing the adapter hub to the spindle head of the balancing machine, then remove the hub.

15. Balance the Stage 4 Rotor and Stage 3-4 Spacer Ring

NOTE: If all the original blades are available and undamaged, and are to be assembled to the original disk/spacer, the bladed disk/spacer does not require balancing, but the blades must be assembled to the disk as detailed in para.B., and relevant parts of para.A and F for lifting the disk and protecting/retaining the blades.

A. Assemble the Stage 3-4 Spacer Ring to the Stage 4 Disk.

- (1) Assemble the spacer ring (1-380) to the disk (2-20) as detailed in para.14.A. (1) to (7) with the difference that the locating pin (Tool 606) must be used instead of (Tool 607) (Ref.para.(1)).
- (2) Secure the disk to the spacer using six slave bolts and nuts (Tool 1832).

FN31803

SUB-ASSEMBLY

**72-33-02**

Page 598.14

Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



B. Assemble Blades to Stage 4 Disk and Prepare for Balance.

- (1) Assemble the blades (2-10) to the disk as detailed in para.14.B, with the difference that 'NOTE' (Ref.para.(3)) reads as follows:

NOTE: If all the original blades are available and undamaged, then assemble the blades as detailed in para.(a). If the blades include eight repaired and/or new blades, then the blades must be assembled as detailed in para.(b). If the blades include more than eight repaired and/or new blades, then the blades must be assembled as detailed in para.(c). Ensure that the aggregate depth of blending of repaired blades does not exceed 1.68 in. (42,67 mm) (Ref.72-33-02 Repair No.6).

C. Prepare the Balancing Machine (Schenck ZE.40) to Balance the Stage 4 Bladed Disk/Spacer Ring.

- (1) Assemble the hub and adapter as detailed in para.14.C (1) to (4).
- (2) Screw the six location pins (Tool 1833) into the appropriate holes in the adapter (Ref.Fig.529).

D. Assemble the Stage 4 Bladed Disk/Spacer Ring to the Balancing Machine.

- (1) Assemble the disk/spacer to the machine as detailed in para.14.D (1) to (4) and (6) to (7).

E. Balance the Stage 4 Bladed Disk/Spacer Ring.

- (1) Balance the bladed disk/spacer ring as detailed in para.14.E.

F. Remove the Bladed Disk/Spacer Ring from the Balancing Machine and Number the Blades.

- (1) Remove the disk/spacer from the machine and number the blades as detailed in para.14.F.

PRINTED IN ENGLAND

TN31805



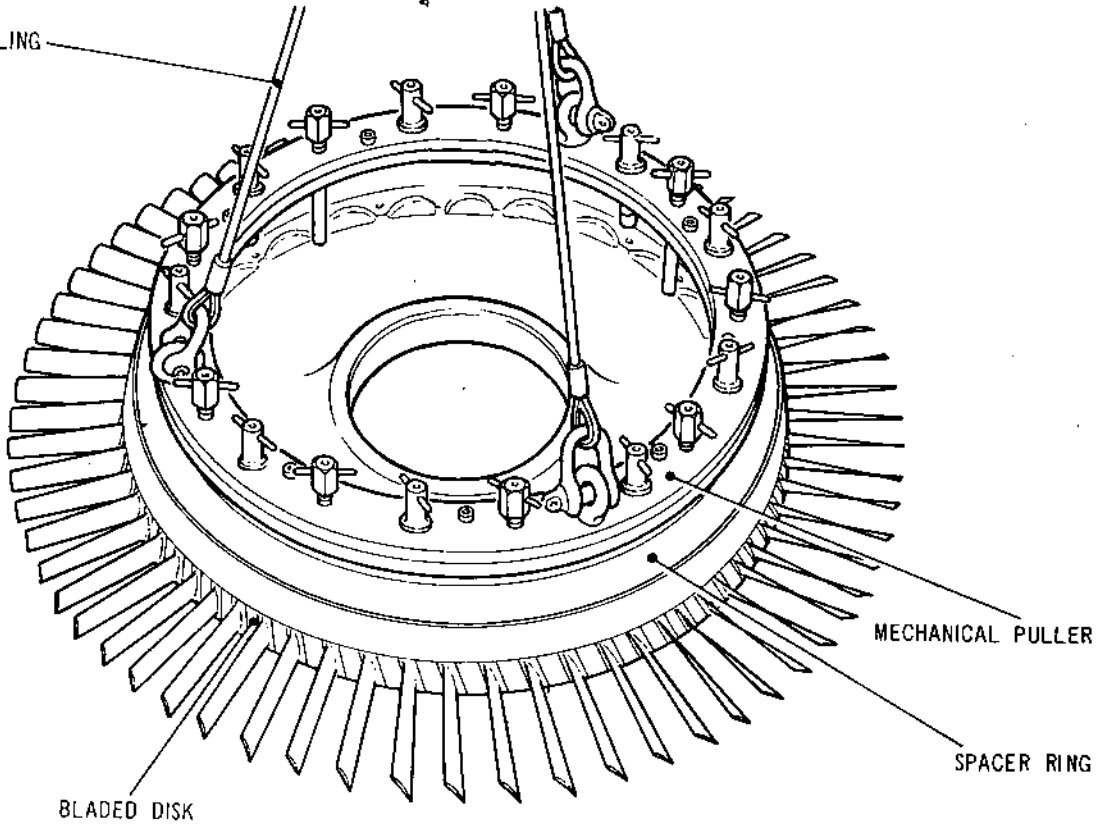
OLYMPUS 593

MK. 610-14-28  
OVERHAUL



MULTIPLE LEG SLING

CR 33425/00A



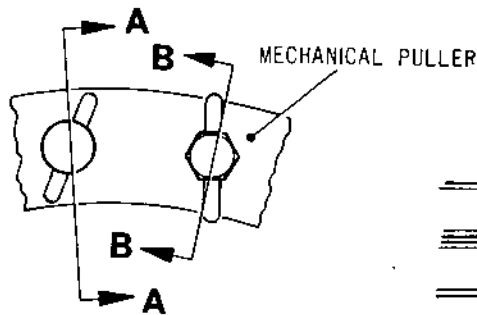
SECURING PIN

SPACER RING

SLAVE BOLT

DISK

SECTION AA



MECHANICAL PULLER

THRUST BOLT

SPACER RING

THRUST PIN

DISK

SECTION BB

Removing Stage 3-4 Spacer Ring from Stage 4 Disk  
Figure 531

SUB-ASSEMBLY

72-33-02

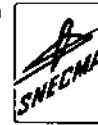
Page 598.16  
Nov 1/76

TN31804



OLYMPUS 593

MK.610-14-28  
OVERHAUL



G. Remove the Stage 3-4 Spacer Ring from the Stage 4 Disk (Ref.Fig.531).

- (1) Attach a hoist to the multiple leg sling (Tool 1645), then position the hoist over the mechanical puller (Tool 471) and secure the sling to the puller eye bolts with shackles. Ensure that the puller thrust bolts are unscrewed.
- (2) Unscrew and remove the slave bolts and nuts securing the spacer ring to the disk. Raise and position the puller above the spacer/disk. Lower the hoist and guide the puller thrust pins through the bolt holes in the spacer, until the pins abut the disk. Insert the nine securing pins (Tool 474) into the holes in the puller plate, then insert the nine slave bolts (Tool 475) into the front flange of the spacer and screw the securing pins on to them. Ensure that the flats on the slave bolts locate correctly, then tighten the pins.
- (3) Screw in on the thrust bolts until the play on the top plate is taken up, then separate the spacer from the disk by screwing in the thrust bolts in equal progressive increments until the items are separated.
- (4) Raise the hoist and position and lower the spacer ring on to a suitable clean flat surface. Unscrew the securing pins and remove the slave bolts. Raise the hoist and position and lower the puller on to a suitable surface, then release and remove the sling from the puller and hoist. Stow the spacer ring into its correct slot in the container (Tool 1441).

NOTE: The stage 4 bladed disk and stage 3-4 spacer ring are now ready to be passed to the HP Compressor Assembly (72-33-00 Assembly).

PRINTED IN ENGLAND

TN14624



OLYMPUS 593

MK.610-14-28  
OVERHAUL



H. Remove the Balancing Adapter from the Balancing Machine.

NOTE: The adapter is used to balance stages 3 to 7 of the HP compressor and may be left assembled to the machine.

- (1) Remove the balancing adapter from the machine as detailed in para.14.H.

16. Balance the Stage 5 Rotor and Stage 4-5 Spacer Ring

NOTE: If all the original blades are available and undamaged and are to be assembled to the original disk/spacer, the bladed disk/spacer does not require balancing, but the blades must be assembled to the disk as detailed in para.B., and the relevant parts of para.A and F for lifting the disk and protecting/retaining the blades.

A. Assemble the Stage 4-5 Spacer Ring to the Stage 5 Disk.

- (1) Assemble the spacer ring (2-50) to the disk (2-70) as detailed in para.14.A. with the difference that the locating pin (Tool 606) must be used instead of (Tool 607) (Ref.para.(1)).
- (2) Secure the disk to the spacer using slave bolts and nuts (Tool 1832).

B. Assemble Blades to Stage 5 Disk and Prepare for Balance.

- (1) Assemble the blades (2-60) to the disk as detailed in para.14.B., with the difference that 'NOTE' (Ref.para.(3)) reads as follows:

NOTE: If all the original blades are available and undamaged, then assemble the blades as detailed in para.(a). If the blades include nine repaired and/or new blades, then the blades must be assembled as detailed in para.(b). If the blades include more than nine repaired and/or new blades, then the blades must be assembled as detailed in para.(c). Ensure that the aggregate depth of blending of repaired blades does not exceed 1.92 in. (48,76 mm) (Ref. 72-33-02 Repair No.6).

TN31698

SUB-ASSEMBLY

**72-33-02**

Page 598.18

Jan 1/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



- C. Prepare the Balancing Machine (Schenck ZE.40) to Balance the Stage 5 Bladed Disk/Spacer Ring.
- (1) Assemble the hub and adapter as detailed in para.14.C. (1) to (4).
  - (2) Screw the six location pins (Tool 1835) into the appropriate holes in the adapter (Ref.Fig.529).
- D. Assemble the Stage 5 Bladed Disk/Spacer Ring to the Balancing Machine.
- (1) Assemble the disk/spacer to the machine as detailed in para.14.D. (1) to (4) and (6) to (7).
- E. Balance the Stage 5 Bladed Disk/Spacer Ring.
- (1) Balance the bladed disk/spacer ring as detailed in para.14.E.
- F. Remove the Bladed Disk/Spacer Ring from the Balancing Machine and Number the Blades.
- (1) Remove the disk/spacer from the machine and number the blades as detailed in para.14.F.
- G. Remove the Stage 4-5 Spacer Ring from the Stage 5 Disk.
- (1) Remove the spacer ring from the disk as detailed in para.15.G. with the difference that the mechanical puller (Tool 472) must be used instead of (Tool 471).

NOTE: The stage 5 bladed disk and stage 4-5 spacer ring are now ready to be passed to the HP Compressor Assembly (72-33-00 Assembly).

- H. Remove the Balancing Adapter from the Balancing Machine.

NOTE: The adapter is used to balance the stages 3 to 7 of the HP compressor and may be left assembled to the machine.

- (1) Remove the balancing adapter from the machine as detailed in para.14.H.

SUB-ASSEMBLY

**72-33-02**

Page 598.19

Jan 1/78





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



17. Balance the Stage 6 Rotor and Stage 5-6 Spacer Ring

NOTE: If all the original blades are available and undamaged, and are to be assembled to the original disk/spacer, the bladed disk/spacer does not require balancing, but the blades must be assembled to the disk as detailed in para.B., and the relevant parts of para.A and F for lifting the disk and protecting/retaining the blades.

A. Assemble the Stage 5-6 Spacer Ring to the Stage 6 Disk.

- (1) Assemble the spacer ring (2-100) to the disk (2-120) as detailed in para.14.A. (1) to (7) with the difference that the locating pin (Tool 605) must be used instead of (Tool 607) (Ref.para.(1)).
- (2) Secure the spacer to the disk using six slave bolts and nuts (Tool 1836).

B. Assemble Blades to Stage 6 Disk and Prepare for Balance.

- (1) Assemble the blades (2-110) to the disk as detailed in para.14.B., with the difference that 'NOTE' (Ref.para.(3)) reads as follows:

NOTE: If all the original blades are available and undamaged, then assemble the blades as detailed in para.(a). If the blades include nine repaired and/or new blades, then the blades must be assembled as detailed in para.(b). If the blades include more than nine repaired and/or new blades, then the blades must be assembled as detailed in para.(c). Ensure that the aggregate depth of blending of repaired blades does not exceed 1.92 in. (48,76 mm) (Ref.72-33-02 Repair No.6).

C. Prepare the Balancing Machine (Schenck ZE.40) to Balance the Stage 6 Bladed Disk/Spacer Ring.

- (1) Assemble the hub and adapter as detailed in para.14.C. (1) to (4).

FN1957



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Screw the six location pins (Tool 1837) into the appropriate holes in the adapter (Ref.Fig.529).

D. Assemble the Stage 6 Bladed Disk/Spacer Ring to the Balancing Machine.

- (1) Assemble the disk/spacer to the machine as detailed in para.14.D. (1) to (4) and (6) to (7).

E. Balance the Stage 6 Bladed Disk/Spacer Ring.

- (1) Balance the bladed disk/spacer ring as detailed in para.14.E.

F. Remove the Bladed Disk/Spacer Ring from the Balancing Machine and Number the Blades.

- (1) Remove the disk/spacer from the machine and number the blades as detailed in para.14.F.

G. Remove the Stage 5-6 Spacer Ring from the Stage 6 Disk (Ref.Fig.531).

- (1) Remove the spacer ring from the disk as detailed in para.14.F. with the difference that the mechanical puller (Tool 473) must be used instead of (Tool 471).

NOTE: The stage 6 bladed disk and stage 5-6 spacer ring are now ready to be passed to the HP Compressor Assembly (72-33-00 Assembly).

H. Remove the Balancing Adapter from the Balancing Machine.

NOTE: The adapter is used to balance the stages 3 to 7 of the HP compressor and may be left assembled to the machine.

- (1) Remove the balancing adapter from the machine as detailed in para.14.H.

PRINTED IN ENGLAND

TN1906

SUB-ASSEMBLY

**72-33-02**

Page 598.21

Jan 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



18. Balance the Stage 7 Rotor and Stage 6-7 Spacer Ring

NOTE: If all the original blades are available and undamaged and are to be assembled to the original disk/spacer, the balancing of the bladed disk/spacer is not required and para.18 need not be carried out.

A. Assemble the Stage 6-7 Spacer Ring to the Stage 7 Disk.

- (1) Assemble a locating pin (Tool 604) to each of the three supports (Tool 608) and place the supports on a suitable clean flat surface.
- (2) Assemble the multiple leg sling (Tool 1173) to the stage 7 disk (3-370) (Ref.Fig.527).

NOTE: The sling is attached to the front face of the disk, denoted by the smaller outside diameter.

- (a) Raise the disk and position three equi-spaced support blocks beneath it.
  - (b) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk.
  - (c) Ensure that the knurled nuts are unscrewed, and the claws turned to align with the plate. Lower the hoist and engage the plate in the disk, then turn the claws outward to engage them under the disk. Tighten the knurled nuts to lock the claws in position.
- (3) Raise the hoist and position the disk over the three supports (Tool 608). Evenly dispose the supports under the disk and align the pins with the inner ring of holes. Lower the disk over the pins and rest it on the supports.
  - (4) Release the knurled nuts of the sling, turn the claws sideways, then raise the sling from the disk. Remove the sling from the hoist.

FN13785

SUB-ASSEMBLY

**72-33-02**

Page 598.22

Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (5) With the heater (Tool 757) handles uppermost (Ref. Fig.528) and positioned on its mobile stand (Tool 759), attach the multiple leg sling (Tool 1645) to the holes in the three handles with the sling shackles. Attach a hoist to the lifting eye of the sling, then position and lower the heater over stage 7 disk ensuring that it is concentric with the disk.
- (6) Heat the disk to 70 deg.C by operating the heater control (Tool 758) in accordance with para.14.A.(6). On completion of its heating cycle, remove the heater from the disk and position and lower it on to its stand. Release the hoist and lower the sling on to the heater, do not touch the heater unless protective gloves are worn.
- (7) Note the position of the datum hole in line with the datum mark  $\rightarrow 00 \leftarrow$  on the edge of the outer (inward facing) flange of the stage 6-7 spacer ring (3-390), and the datum hole in line with the datum mark  $\rightarrow 0$  on the blade roots at the No.1 blade position (Ref.Fig.502). Position the spacer ring over the disk, align the datum marks on both items and lower the spacer ring over the locating pins and on to the disk. Ensure that the spacer abuts the disk, then allow the disk to cool.
- B. Prepare the Balancing Machine (Schenck ZE.40) to Balance the Stage 7 Disk and Spacer Ring.
- (1) Assemble the hub and balancing adapter to the balancing machine as detailed in para.14.C.(1) to (4).
- (2) Assemble to the adapter the six location pins (Tool 1838) (Ref.Fig.529).
- C. Assemble the Stage 7 Disk/Spacer Ring to the Balancing Machine (Ref.Fig.518).
- (1) Assemble the multiple leg sling (Tool 1173) to the stage 7 disk/spacer (Ref.Fig.532).

SUB-ASSEMBLY

72-33-02

Page 598.23

Nov 1/76

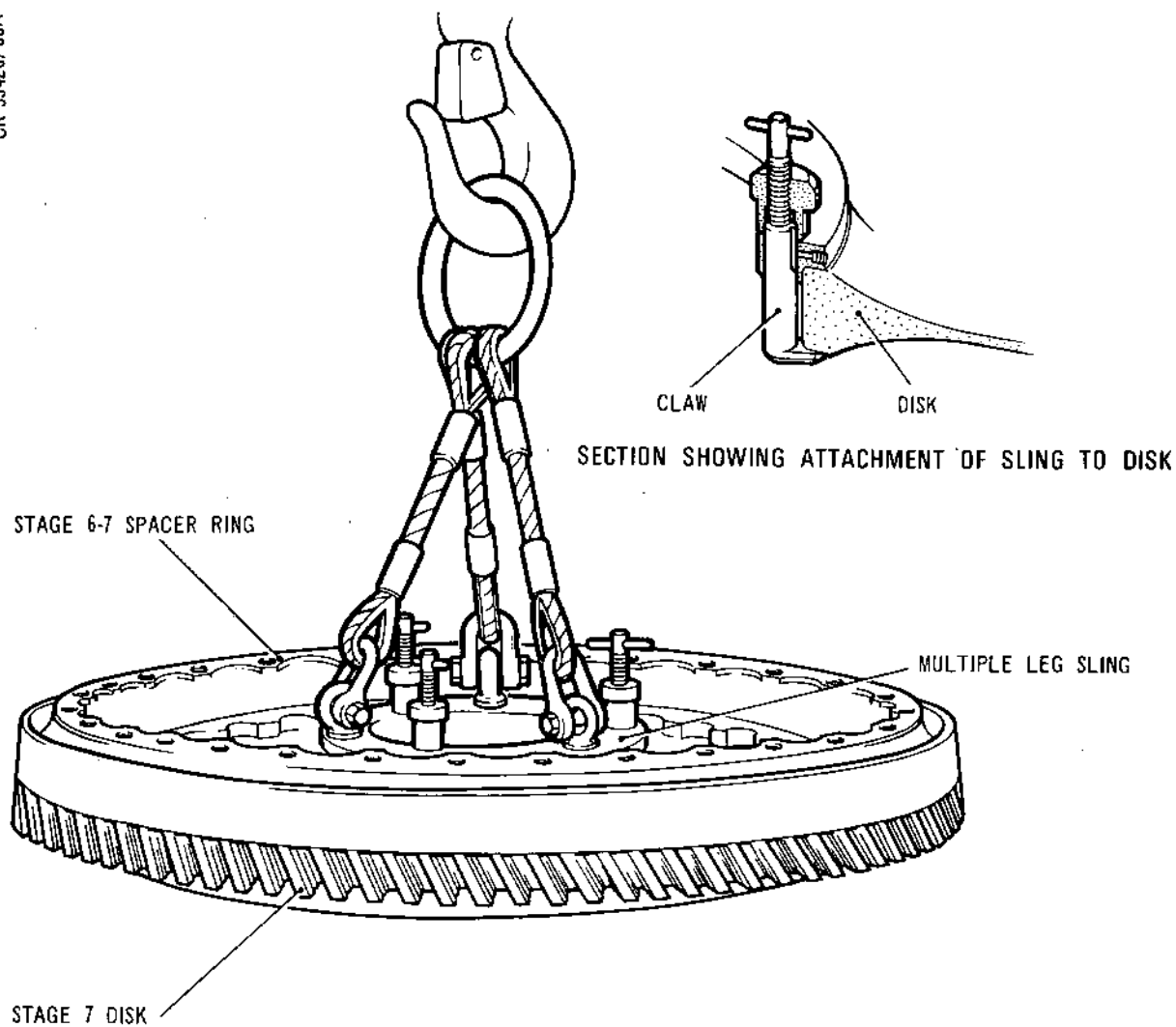


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33426/00A



TN1923

Assembling the Multiple Leg Sling to the Stage 7  
Disk/Stage 6-7 Spacer Ring  
Figure 532

SUB-ASSEMBLY

72-33-02

Page 598.24

Nov 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (a) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk.
- (b) Ensure that the knurled nuts are unscrewed, and the claws turned to align with the plate. Lower the hoist and engage the plate in the disk, then turn the claws outward to engage them under the disk. Tighten the knurled nuts to lock the claws in position.
- (c) Raise the hoist and ensure that the support locating pins are disengaged from the disk, then position the hoist over the balancing machine.
- (d) Correctly position the disk relative to the adapter location pins, then lower the disk on to the pins, ensuring that it is lowered squarely and does not get jammed. When the disk abuts the pins, screw the nuts and washers on to the pins and fully tighten the nuts.
- (e) Release the knurled nuts of the sling, turn the claws sideways, then raise the sling from the disk. Remove the sling from the hoist.

D. Balance the Stage 7 Disk/Spacer Ring.

- (1) Carry out a static balance of the disk/spacer, operating the balancing machine in accordance with the manufacturers instructions. The balance of the disk/spacer must be within 2 drmm in. (90 grmm mm). If the balance is outside the limit, rectify by adding plasticine to the disk face at the outer ring bolt hole location, in line with the out of balance angular position. The plasticine will be identified as balance No.1.

E. Remove the Stage 7 Disk/Spacer Ring from the Balancing Machine.

- (1) Assemble the multiple leg sling (Tool 1173) to the stage 7 disk/spacer (Ref.Fig.532).
  - (a) Attach a hoist to the lifting ring of the sling, then position the hoist over the disk.

SUB-ASSEMBLY

72-33-02

Page 598.25

Nov 1/76

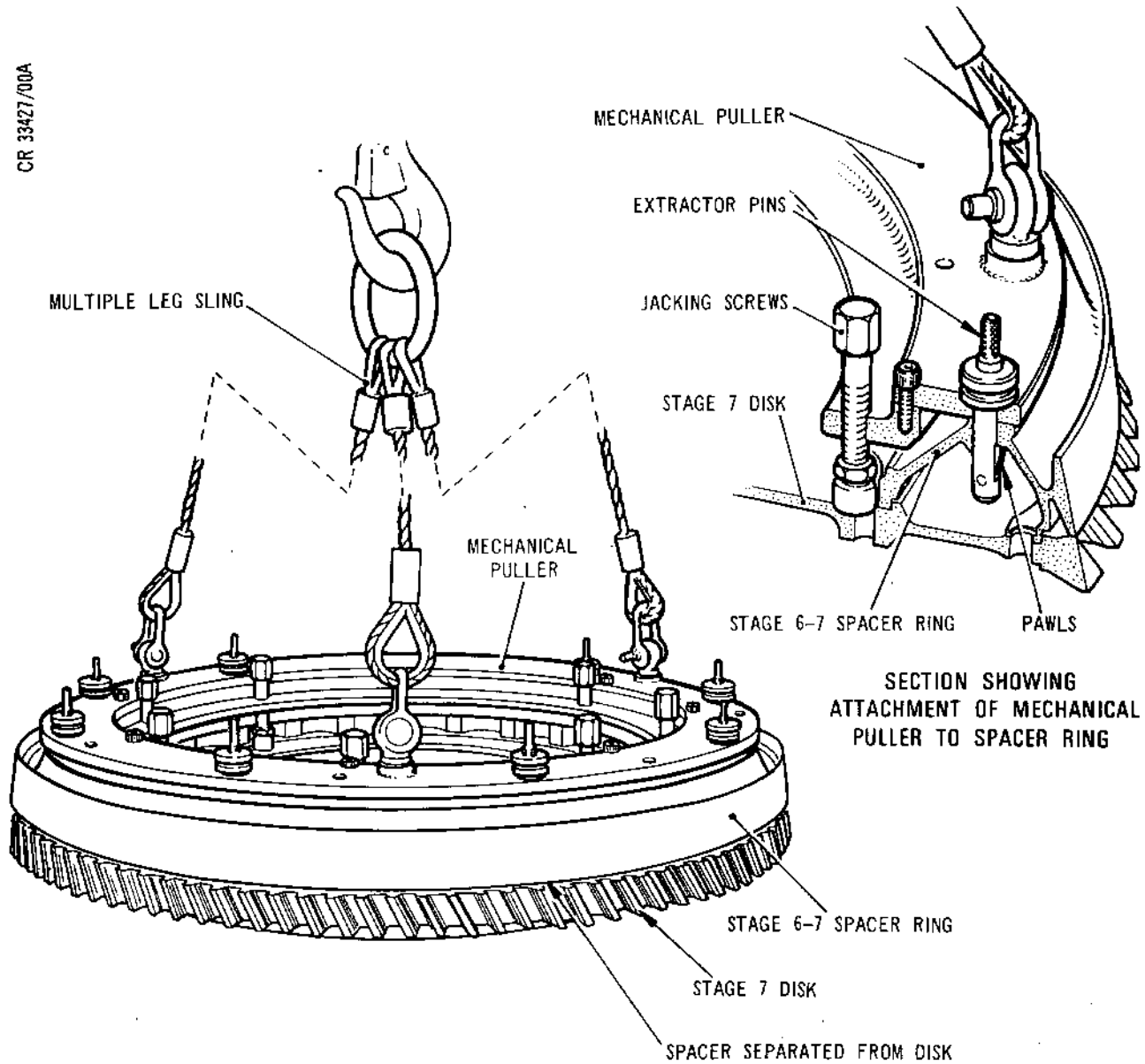


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33427/00A



TN1928

Removing Stage 6-7 Spacer Ring from Stage 7 Disk  
Figure 533

SUB-ASSEMBLY  
**72-33-02**

Page 598.26  
Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Ensure the knurled nuts are unscrewed and the claws turned to align with the plate. Lower the hoist and engage the plate in the disk, then turn the claws outward to engage them under the disk. Tighten the knurled nuts to lock the claws in position.
- (c) Unscrew and remove the six nuts and washers which secure the disk/spacer to the adapter location pins.
- (d) Raise the hoist and remove the disk/spacer from the balancing machine, then position the disk/spacer onto the three supports (Tool 608).
- (e) Unscrew the knurled nuts and turn the claws to align with the plate. Tighten the knurled nuts then raise the hoist and remove the sling.

F. Remove the Stage 6-7 Spacer Ring from the Stage 7 Disk (Ref.Fig.533).

- (1) Attach a hoist to the multiple leg sling (Tool 1645), then position the hoist over the mechanical puller (Tool 976) and secure the sling to the puller eye-bolts with shackles.
- (2) Position and lower the mechanical puller over the spacer ring and align the puller extractor pins with the bolt holes in the spacer. Ensure that the pawls of the extractor pins spring out from the pins, and that the knurled nuts are unscrewed. Lower the puller on to the spacer ensuring that the pins enter the spacer bolt holes. Push the pins into the spacer until the pawls spring out and engage behind the spacer, then pull up on the pins and tighten the knurled locknuts, ensuring that the pawls of all the pins are located and locked underneath the spacer ring.
- (3) Screw in on the six jacking screws until they contact the disk, then separate the spacer from the disk by screwing in the jacking screws in equal progressive increments until the items are separated.

SUB-ASSEMBLY

72-33-02

Page 598.27

Nov 1/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Raise the hoist and position and lower the spacer ring on to a suitable clean flat surface. Release the mechanical puller extractor pin knurled locknuts, press the pawls into the pins, then withdraw the pins from the spacer ring. Raise the mechanical puller and lower on to a suitable surface, then release and remove the multiple leg sling from the puller, and the sling from the hoist.

G. Assemble the Stage 7 Disk to the Balancing Machine.

- (1) Assemble the multiple leg sling (Tool 1173) to the disk and the disk to the balancing machine as detailed in para.C.

H. Balance the Stage 7 Disk.

- (1) Carry out a static balance of the disk, operating the balancing machine in accordance with the manufacturers instructions. The balance of the disk must be within 2 drmm in. (90 grm mm). If the balance is outside the limit, rectify by adding plasticine to the disk face at the outer ring bolt hole location, in line with the out of balance angular position. Do not touch the balance No.1 plasticine, and identify the second lump of plasticine as balance No.2.

J. Remove the Stage 7 Disk from the Balancing Machine and Assemble the Blades.

- (1) Remove the stage 7 disk from the balancing machine as detailed in para.E.(1) (a) to (e).

JN1958

SUB-ASSEMBLY

**72-33-02**

Page 598.28

Nov 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



(2) Assemble blades to the stage 7 disk.

NOTE: If all the original blades are available and undamaged, then assemble the blades as detailed in para.(a). If the blades include 12 repaired and/or new blades, then the blades must be assembled as detailed in para.(b). If the blades include more than 12 repaired and/or new blades, then the blades must be assembled as detailed in para.(c). Ensure that the aggregate depth of blending of repaired blades does not exceed 2.40 in. (60,96 mm) (Ref.72-33-02 Repair No.6).

- (a) Identify the stage 7 blades (3-360), then examine the blade roots for their positional No. (Ref.Fig.502) and lay the blades out in numerical sequence. Examine the edge of the disk at the blade root position and identify the position of No.1, 2 and 3 blades, then insert the blades in numerical sequence into the front face of the disk, starting at No.1 position and working in a counter-clockwise direction when viewed from above.
- (b) Identify the stage 7 blades (3-360), then examine the roots of the original blades for their positional No. (Ref.Fig.502) and lay the blades out in numerical sequence, leaving spaces where new blades are to be positioned. Noting the mass moment weight of the new blades, place the lightest new blades in vacant positions next to the heaviest original blades, and position the heaviest new blades in vacant positions next to the lightest original blades. Assemble the blades to the disk as detailed in para.(a).

PRINTED IN ENGLAND

TN3690



OLYMPUS 598  
MK.610-14-28  
OVERHAUL



- (c) Identify the stage 7 blades (3-360), then according to the mass moment weight of the blades (quoted on the labels), lay the blades out in sequence of weight, starting with the heaviest blade and ending with the lightest. Examine the edge of the disk at the blade root position and identify the position of No.1; 2 and 3 blades (Ref.Fig.502). Assemble the blades into the front face of the disk positioning the heaviest blade at No.1 position and the next heaviest blade diametrically opposite, then assemble the two lightest blades diametrically opposite each other and next to the heaviest blades. Assemble the remainder of the blades to the disk in sequence of weight, assembling alternate heavy and light blades and where possible, positioning equal weight blades diametrically opposite each other.
- K. Assemble the Stage 7 Bladed Disk to the Balancing Machine and Balance the Disk.
- (1) Assemble the stage 7 bladed disk to the balancing machine as detailed in para.C.(1) (a) to (e).
  - (2) Assemble two lifting eye-bolts to the retaining plate (Tool 1839). Attach a sling to a hoist and position the sling above the plate. Assemble and secure the sling to the eye-bolts with shackles.
  - (3) Raise the hoist and position the retaining plate above the balancing machine. Align the retaining plate key, bridging the aperture in the top of the plate, with the slot in the pillar of the adapter.
  - (4) Lower the plate on to the adapter and secure with the knurled nut.

SUB-ASSEMBLY

**72-33-02**

Page 598.30

Nov 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (5) Remove the plasticine balance No.1, then carry out a static balance of the bladed disk, operating the balancing machine in accordance with the manufacturers instructions. The disk should be rotated as for engine rotation (counter-clockwise from the rear). The balance of the disk must be within 2 drn in. (90 grm mm). If the balance of the disk is outside the limit, rectify by the interchange of heavy and light weight blades from the out of balance angular position, until the disk is within limits. Before any blades are interchanged check the out of balance readings by rotating the disk 180 degrees, relative to the adapter and retaining plate, and repeating the balancing procedure.

L. Remove the Stage 7 Bladed Disk from the Balancing Machine and Assemble the Stage 6-7 Spacer Ring to the Disk.

- (1) Attach the sling to a hoist and position the sling above the balancing machine.
- (2) Unscrew and remove the knurled nut from the pillar of the adapter, then screw the two lifting eye-bolts into the retaining plate.
- (3) Secure the sling to the plate with shackles then raise the hoist and remove the plate. Position the plate on a suitable surface or pallet then remove the sling from the plate and hoist.
- (4) Remove the stage 7 bladed disk from the balancing machine as detailed in para.E.(1) (a) to (c).

SUB-ASSEMBLY

72-33-02

Page 598.31

Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (5) Raise the hoist and withdraw the disk from the pins. Position the disk over the three supports (Tool 608), evenly dispose the three supports under the disk to align the pins with the inner ring of holes. Lower the disk over the pins and rest it on the supports.
- (6) Release the knurled nuts of the sling, turn the claws sideways, then raise the sling from the disk. Remove the sling from the hoist. Ensure that the disk and blade roots are perfectly clean.
- (7) With the heater (Tool 757) positioned on its mobile stand (Tool 759), handles uppermost, assemble the multiple leg sling (Tool 1645) to the holes in the three handles with the sling shackles. Attach a hoist to the lifting eye of the sling, then position and lower the heater over stage 7 disk ensuring that it is concentric with the disk.
- (8) Heat the disk to 70 deg.C. operating the heater control (Tool 758) in accordance with para.6.A.(6). On completion of its heating cycle, remove the heater from the disk and position and lower it on to its stand. Release the hoist and lower the sling on to the heater, do not touch the heater unless protective gloves are worn. When the heater is cool, release and remove the sling from the heater.
- (9) Note the position of the datum hole in line with the datum mark  $\Rightarrow 00 \Leftarrow$  on the edge of the outer (inward facing) flange of the stage 6-7 spacer ring, and the datum hole in line with the datum mark  $\Rightarrow 0$  on the blade roots at the No.1 blade position (Ref.Fig.502). Position the spacer ring over the disk, align the datum marks on both items and lower the spacer ring over the locating pins and on to the disk. Ensure that the spacer abuts the disk, then allow the disk to cool.

M. Assemble the Stage 7 Bladed Disk/Spacer Ring to the Balancing Machine and Check Balance the Disk.

- (1) Assemble the disk/spacer to the balancing machine as detailed in para.C.(1) (a) to (e).

TN276

SUB-ASSEMBLY

72-33-02

Page 598.32

Nov 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

- (2) Remove the balance No.2 lump of plasticine, then carry out a static balance of the bladed disk/spacer, operating the balancing machine in accordance with the manufacturers instructions. The balance of the disk must be within 8 drmm in. (360 grm mm). If the balance of the disk is outside the limits, no form of rectification is possible at this stage. The spacer ring and blades must be removed from the disk and the complete procedure repeated, ensure that it is strictly adhered to, and that the balancing No.1 and 2 lumps of plasticine are not mistaken.

N. Remove the Stage 7 Bladed Disk/Spacer Ring from the Balancing Machine and Remove the Spacer from the Disk.

- (1) Remove the stage 7 bladed disk/spacer ring from the balancing machine as detailed in para.E.(1) (a) to (e).
- (2) Remove the stage 6-7 spacer ring from the stage 7 disk as detailed in para.F.(1) to (4).

P. Number and Remove the Blades from the Stage 7 Disk.

- (1) Examine the edge of the disk for the No.1 blade datum mark  $\rightarrow 00 \leftarrow$ , then examine the blade roots for their numbering (Ref.Fig.502) and ensure that all the blades are numbered correctly in numerical sequence in a clockwise direction, viewed from the rear, with No.1 blade in the datum slot. Etch all new blades with their position No., and renumber any blades that have been re-positioned, ensure that all old position No. are obliterated.
- (2) With the platform (Tool 1390) assembled to the container (Tool 1373), withdraw the blades from the disk and insert them in the container platform.
- (3) Assemble the stage 7 disk to its container (Tool 1419).

NOTE: The stage 7 disk, spacer ring and blades are now ready to be passed to the HP Compressor Assembly (72-33-00 Assembly).



OLYMPUS 593

MK.610-14-28  
OVERHAUL



HP COMPRESSOR DIFFUSER CASE ASSEMBLY - SUB-ASSEMBLY

PRINTED IN ENGLAND

For information on the assembly of the HP Compressor  
Diffuser Case Assembly, refer to 72-00-51 Assembly.

TN29606

SUB-ASSEMBLY

**72-34-00**

Page 501  
Jan 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



COMBUSTION SECTION - SUB-ASSEMBLY

PRINTED IN ENGLAND

For information on the assembly of the Combustion  
Section, refer to 72-00-51 Assembly.

TN29608

SUB-ASSEMBLY

**72-40-00**

Page 501

Jan 1/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



COMBUSTION CHAMBER - SUB-ASSEMBLY

PRINTED IN ENGLAND

For information on the assembly of the Combustion Chamber, refer to 72-00-51 Assembly.

TN29610

SUB-ASSEMBLY

**72-41-01**

Page 501

Jan 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



COMBUSTION CHAMBER OUTER CASE - SUB-ASSEMBLY

PRINTED IN ENGLAND

For information on the assembly of the Combustion  
Chamber Outer Case, refer to 72-00-51 Assembly.

TN29610

SUB-ASSEMBLY

**72-42-01**

Page 501

Jan 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



HP TURBINE ASSEMBLY - SUB-ASSEMBLY

PRINTED IN ENGLAND

For information on the assembly of the HP  
Turbine Assembly, refer to 72-00-51 Assembly.

TN29891

SUB-ASSEMBLY

**72-51-00**

Page 501

Jan 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



HP TURBINE BEARING SUPPORT - SUB-ASSEMBLY

PRINTED IN ENGLAND

For information on the assembly of the HP Turbine  
Bearing Support, refer to 72-00-51 Assembly.

TN29893

SUB-ASSEMBLY

**72-51-01**

Page 501

Jan 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



HP TURBINE NOZZLE - SUB-ASSEMBLY

PRINTED IN ENGLAND

For information on the assembly of the HP  
Turbine Nozzle, refer to 72-00-51 Assembly.

TN29895

SUB-ASSEMBLY

**72-51-02**

Page 501

Jan 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



# HP TURBINE ROTOR - SUB-ASSEMBLY

## TABLE OF CONTENTS

Para.	Page
1. General	501
2. Pressure Wash HP Turbine Blades	503
A. Assemble HP Turbine Blades to Pressure Wash Fixture	503
B. Install Support Bracket	503
C. Pressure Wash Procedure	503
3. Mass Moment Weigh Turbine Blades (Schenk Vertical Spindle Machine)	505
A. Prepare Equipment	505
B. Calibrate Equipment	506
C. Mass Moment Weigh Each Blade	507
4. Mass Moment Weigh Turbine Blades (Avery Scales TYPE 62N/5)	507
A. Prepare Equipment	507
B. Mass Moment Weigh Each Blade	509
5. Assemble HP Turbine Blades to Disk...	509
A. Prepare to Install Turbine Blades	509
B. Install Turbine Blades	513
6. Statically Balance HP Turbine Rotor	516
A. Prepare Balancing Equipment	516
B. Install HP Turbine Rotor on Balancing Machine	520
C. Check Unbalance of HP Turbine Rotor	521
D. Acceptance Limits	521
E. Locking Plates Installation Procedure to Rectify Unbalance	521
F. Numerically Identify Turbine Blades	522
G. Blade Repositioning Procedure to Rectify Unbalance	524
H. Re-check Static Balance of HP Turbine Rotor	526
7. Dimensional Checks	527
A. Dimensionally Check HP Turbine Rotor...	527
B. Dimensionally Check Turbine Hub	529
8. Prepare Assembly for Dynamic Balance with HP Compressor Rotor Assembly	529
A. Assemble Labyrinth Assembly to HP Turbine Hub Unit	529
9. Turbine Rotor Swash Check and Blade Length Checking Procedure	533
A. Prepare for Swash Check	533
B. Blade Length Checking Procedure	542
C. Swash Measuring Procedure	544
D. Excessive Swash Rectification Procedure	545

SUB-ASSEMBLY

**72-51-03**

Contents 1

Jan 1/78



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



Para.	Page
10. Statically Balance the Turbine Hub Using a Bladed Turbine Disk ... ..	550
A. Prepare Equipment ... ..	550
B. Statically Balance Turbine Hub Using Turbine Disk Assembly ... ..	552
11. Statically Balance Turbine Hub Using Slave Turbine Disk ... ..	562
A. Assemble the Slave Disk Turbine Hub and Mandrel ...	562
B. Prepare for Static Balance Check ... ..	564
C. Static Balancing Procedure ... ..	565

#### TABLE OF ILLUSTRATIONS

Fig.No.	Page
501 HP Turbine Blades Pressure Wash Equipment ... ..	502
502 Installing Mass Moment Weighing Equipment (Schenk) ... ..	504
503 Turbine Blades Mass Moment Weighing (Avery)..	508
504 Assembling Lifting Fixture to HP Turbine Disk ...	510
505 Assembling Turbine Disk to Blading Fixture...	512
506 Adjusting Roller Setting Procedure ... ..	517
507 Installing Turbine Rotor in Balancing Machine ...	519
508 Assembling Turbine Blades Locking Plates ... ..	523
509 HP Turbine Rotor/Hub Unit Dimensional Check ...	528
510 No.24 and 26 Labyrinth Seal Blanking Bolts...	528
511 Assembling Balancing Mandrel to Assembly/Torque Stand ... ..	532
512 Assembling Turbine Hub to Mandrel ... ..	534
513 Torque-tightening Turbine Hub Securing Nut ...	536
514 Positioning of Turbine Securing Bolts ... ..	538
515 Setting Adjustable Bearings ... ..	540
516 Measuring Turbine Blade Lengths and Turbine Swash..	543
517 Removing HP Turbine Hub ... ..	547
518 Installing HP Turbine Rotor in Balancing Machine...	549
519 HP Turbine Hub Static Balancing with Bladed Disk...	551

#### LIST OF TABLES

Table No.	Page
501 HP Turbine Blades Locking Plates Identification ...	522
502 Turbine Assembly Balancing Weights ... ..	558

SUB-ASSEMBLY

**72-51-03**

Contents 2

Jan 1/78

TN29542



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



HP TURBINE ROTOR - SUB-ASSEMBLY

1. General

- A. Prior to commencing assembly, refer to 72-09-00 Assembly for general information.
- B. During the sub-assembly procedure reference will be made to the Illustrated Parts Catalogue (I.P.C.) to identify those items where the nomenclature does not positively identify them due to duplication of the title e.g. nuts, bolts, washers etc. Where the item is part of this text it will be identified as e.g. bolt (1-10), the 1 referring to the I.P.C. Fig.No. and the 10 referring to the Item No. Where items from a different breakdown (module) are introduced, then the breakdown number will be quoted in addition e.g. bolt (72-51-04/1-180).
- C. Throughout the text special tools are quoted by their Ref.No. e.g. (Tool 1234). For a complete list of tooling required for the assembly and for the Manufacturers Part No., refer to Special Tools, Fixtures and Equipment Table 1002.
- D. This chapter details the work necessary for preparing the HP Turbine Rotor for a further engine or module life. The assembly comprises the washing and mass moment weighing of the blades, the assembly of the blades to the disk and the static balance of the assembly (Ref.para.1 to 8).
- E. On engines to Pre SB.72-8305-154 Part 2 standard, the HP Turbine Rotor and Hub and Labyrinth Assemblies (72-51-04) are dynamically balanced in conjunction with the HP Compressor Assembly (72-33-00). On engines or modules overhauled or repaired with the tooling introduced by SB.72-8305-154 Part 2, the HP Compressor Assembly can be dynamically balanced using a HP Turbine simulator, providing that the HP Turbine Hub and Labyrinths are the original, or are statically balanced with either a balanced bladed HP Turbine Rotor, or a slave turbine rotor as detailed in this chapter (Ref.para.9 onwards).

CAUTION: TURBINE BLADES (72-51-03/1-30A) SB.72-43 PART 1 MUST NOT BE MIXED WITH TURBINE BLADES (72-51-03/1-30B) SB.72-43 PART 2 OR WITH BLADES TO PRE-SB.72-43 STANDARD.

SUB-ASSEMBLY  
**72-51-03**

Page 501  
Jan 1/78

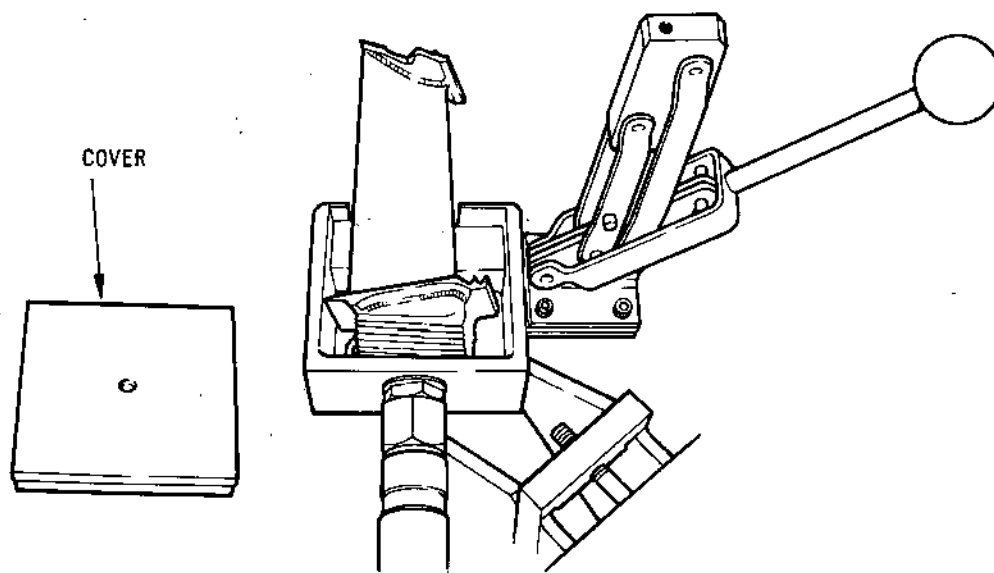
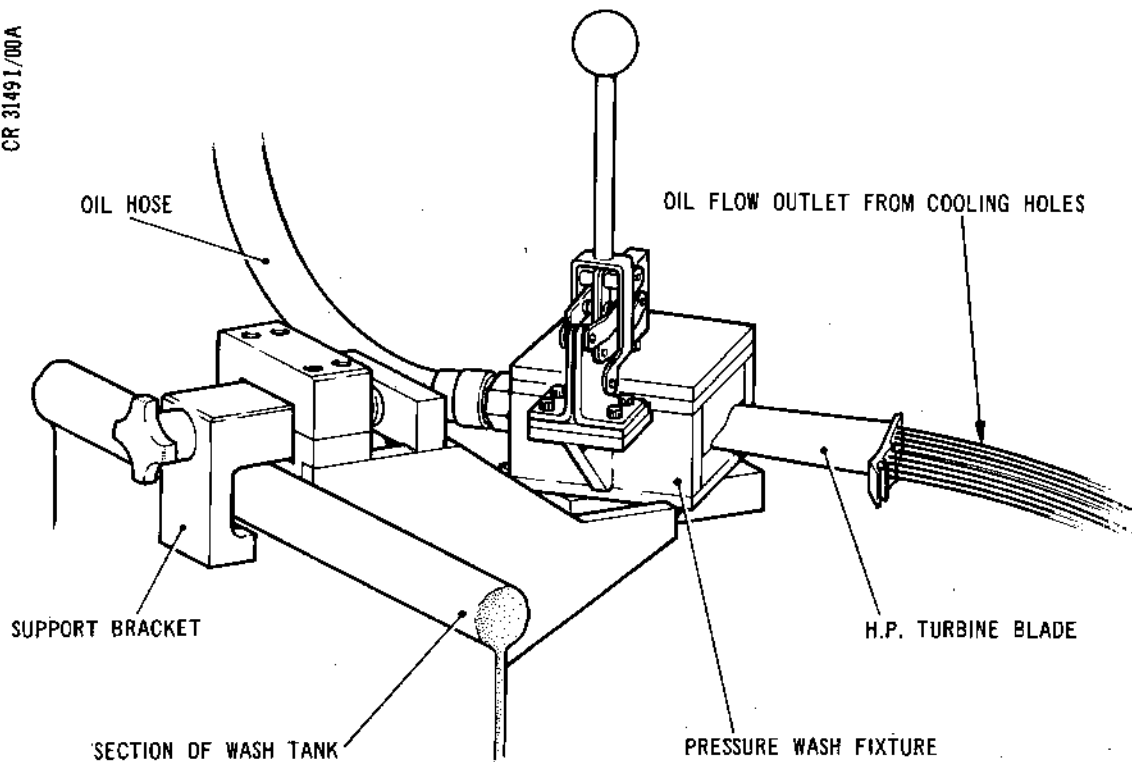




OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 31491/00A



HP Turbine Blades Pressure Wash Equipment  
Figure 501

SUB-ASSEMBLY  
**72-51-03**  
Page 502  
Aug 14/75

TN46069



OLYMPUS 593

MK.610-14-28  
OVERHAUL



2. Pressure Wash HP Turbine Blades (Ref.Fig.501)

A. Assemble HP Turbine Blades to Pressure Wash Fixture (Tool 390).

- (1) Open the fixture by operating the lever, then remove the lid. Place the turbine blade in the fixture. Place the fixture lid in position and close the fixture.

B. Install Support Bracket.

- (1) Position the support bracket (Tool 754) on the wash tank and secure with the handnut.
- (2) Assemble the pressure wash fixture to the support bracket and secure it with the nut, bolt and washer on the underside of the fixture.

C. Pressure Wash Procedure.

NOTE: The following procedure is a non-calibrated witness check requiring equipment capable of delivering a low pressure flow of filtered paraffin through an outlet hose capable of connecting to the pressure wash fixture (Tool 390).

- (1) Securely connect the oil hose union nut to the union on the pressure wash fixture. Place an anti-splash screen around the assembly.
- (2) Adjust the pressure wash equipment to obtain a flow pressure of 5 psig and thoroughly wash out each turbine blade. Ensure that oil flows freely through each cooling hole.
- (3) Investigate and rectify obstruction of any cooling hole.
- (4) Switch off the pressure wash equipment and remove the turbine blade from the pressure wash fixture. Remove residual paraffin oil from the turbine blade.

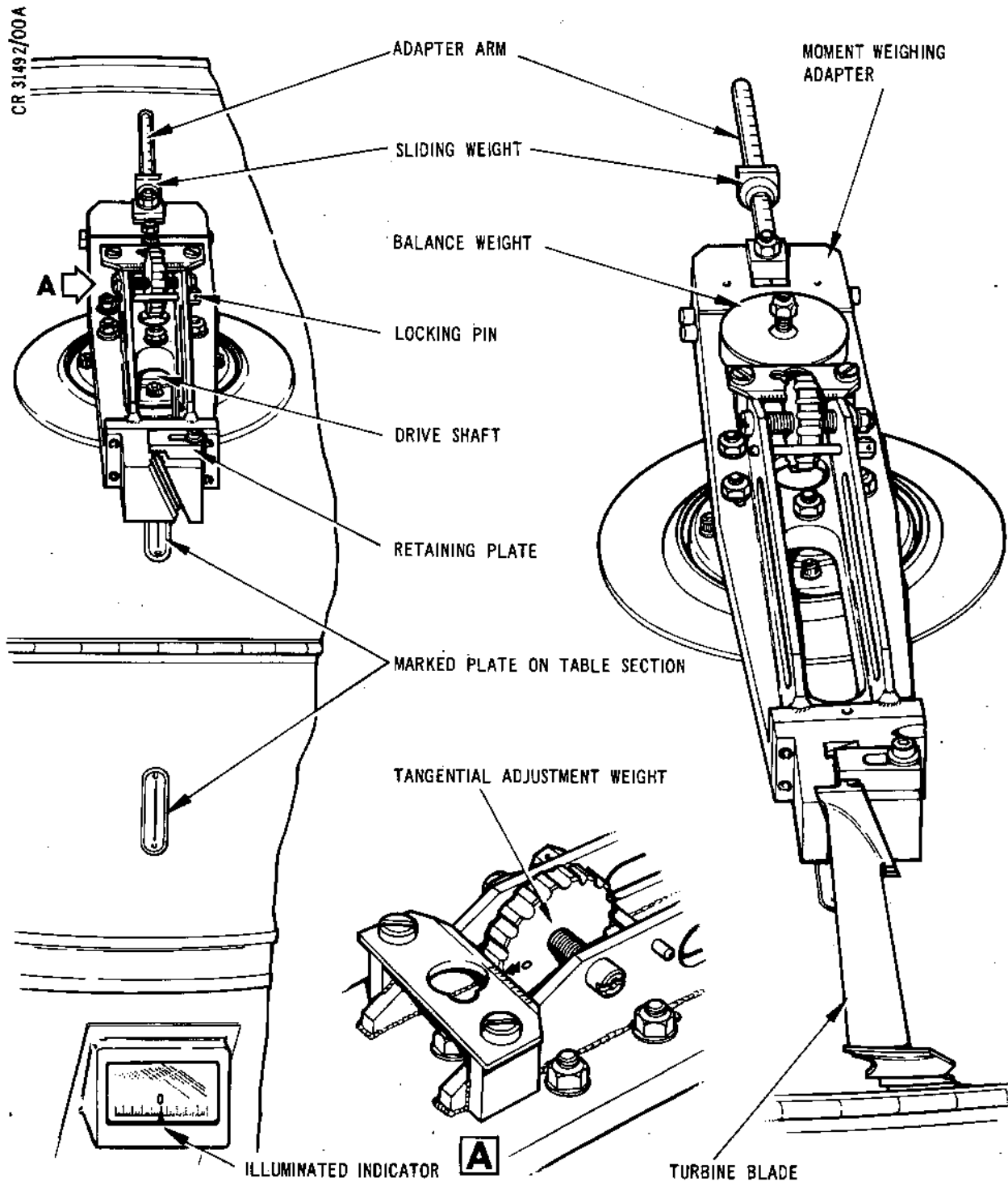
WARNING: ENSURE THAT SAFETY PRECAUTIONS ARE APPLIED IF COMPRESSED AIR IS USED TO REMOVE PARAFFIN.

- (5) Place the turbine blades into container (Tool 1425).



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Installing Mass Moment Weighing Equipment (Schenk)  
Figure 502

SUB-ASSEMBLY  
**72-51-03**  
Page 504  
Aug 14/75

TN46070



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(6) Disconnect the oil hose from the pressure wash fixture and remove the fixture from the support bracket.

(7) Remove the support bracket from the wash tank.

3. Mass Moment Weigh Turbine Blades (Schenk Vertical Spindle Machine)

NOTE: Operate the machine in accordance with the manufacturers instructions. Set the machine to operate in a clockwise direction.

A. Prepare Equipment (Ref.Fig.502).

- (1) Assemble moment weighing adapter (Tool 15) to the drive shaft.
  - (a) Remove the adapter from container (Tool 267).
  - (b) Ensure thorough cleanliness of the adapter and the drive shaft.
  - (c) Rotate the drive shaft to achieve 0 setting on the illuminated indicator situated on the front of the drive shaft cabinet.
  - (d) Place the adapter in position on the drive shaft studs. Ensure that the turbine blade location end of the adapter is positioned on the marked plate on the table section. The setting in (c) must also be maintained during this procedure.
  - (e) Secure the adapter to the drive shaft with six nuts and washers.
- (2) Assemble adapter arm (Tool 11) to the weighing adapter.
  - (a) Remove the adapter arm from container (Tool 169) and ensure thorough cleanliness of the unit.
  - (b) Place the adapter arm in position on the adapter and secure with the nut and washer.
  - (c) Set the sliding weight on the adapter arm to 0 oz in.

NOTE: The sliding weight is moved by depressing the flat section before setting to the required scale setting.

SUB-ASSEMBLY

72-51-03

Page 505

Jan 1/78



OLYMPUS 593

MK. 610-14-28

OVERHAUL



- (3) Assemble the squared graticule (Tool 33) to the vectometer screen location.
  - (a) Hold the existing screen in position whilst lifting the hinged retaining clips and releasing the retaining screw at the top of the screen.
  - (b) Carefully withdraw the screen and place in a protective container.
  - (c) Place the squared graticule in position ensuring that the slot engages with the pin at bottom position.
  - (d) Secure the graticule with the hinged clips and retaining screw.

B. Calibrate Equipment (Ref.Fig.502).

- (1) Operate the weighing machine and adjust to obtain 0 horizontal/vertical setting.
- (2) If the vectometer light spot is horizontally outside of the graticule squares, adjust as follows.
  - (a) Unscrew and remove the tangential adjustment weight locking pin on the mass moment weighing adapter (Tool 15).
  - (b) Rotate the weight in order to adjust to the right or left in accordance with the graduated plate and marks on the side of the weight.
  - (c) On completion of the adjustment, screw the adjustment weight locking pin into position and tighten. Repeat the procedure detailed in (1).
- (3) Check sliding weight on the adapter arm.
  - (a) Set the sliding weight to 2 oz in. (56.699 g) on the adapter arm.
  - (b) Operate the machine to check the sliding weight setting.
  - (c) Set the sliding weight to each position on the adapter arm and check each setting by operating the machine.

IN7059

SUB-ASSEMBLY  
**72-51-03**

Page 506  
Jan 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (d) In the event of unsatisfactory calibration results, check the assembly of the tools and security of the sliding weight before investigation of balancing machine malfunction.

C. Mass Moment Weigh Each Blade (Ref.Fig.502).

- (1) Insert the turbine blade into the blade root location in the end of the moment weighing adapter.
- (2) Secure the blade with the retaining plate and bolt on the adapter.
- (3) Place balance weight (Tool 27) on the weighing adapter and secure with the locknut. Set the sliding weight on the adapter arm to 20 oz in. (566.990 g).

NOTE: The 20 oz in. setting is an approximation for the first blade, final adjustment of the sliding weight will be made to suit each blade.

- (4) Check the security of the assembly then operate the machine to mass moment weigh.
- (5) Remove each blade from the adapter on completion of weighing.
- (6) Attach an adhesive label to each blade and inscribe with the weight and engine serial number.
- (7) Place the blades into the containers and convey to the appropriate sub-assembly area.

4. Mass Moment Weigh Blades (Avery Scales TYPE 62N/5)

NOTE: This is an alternative method to that detailed in para.3.

A. Prepare Equipment (Ref.Fig.503).

- (1) Assemble the adapter arm locator (Tool 1274) to the adapter arm (Tool 1272).
- (2) Adjust the setting on the adapter arm to 13.405 in. (340.487 mm).
- (3) Attach the adapter arm to the weighing scale arm and secure firmly.
- (4) Ensure that the scale pans suspension piece is correctly positioned.

SUB-ASSEMBLY

**72-51-03**

Page 507

Jan 1/78

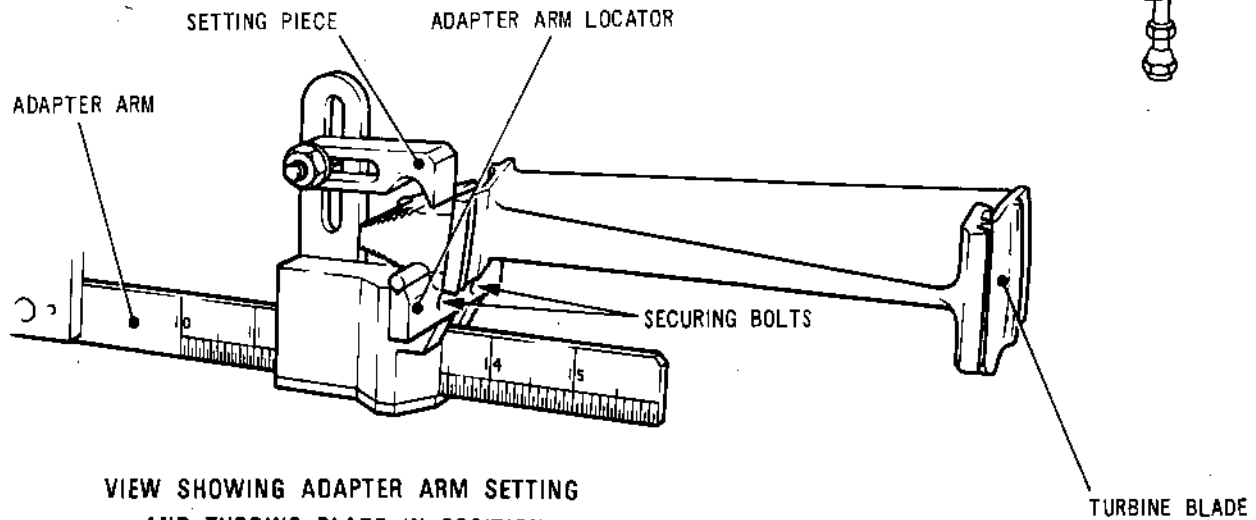
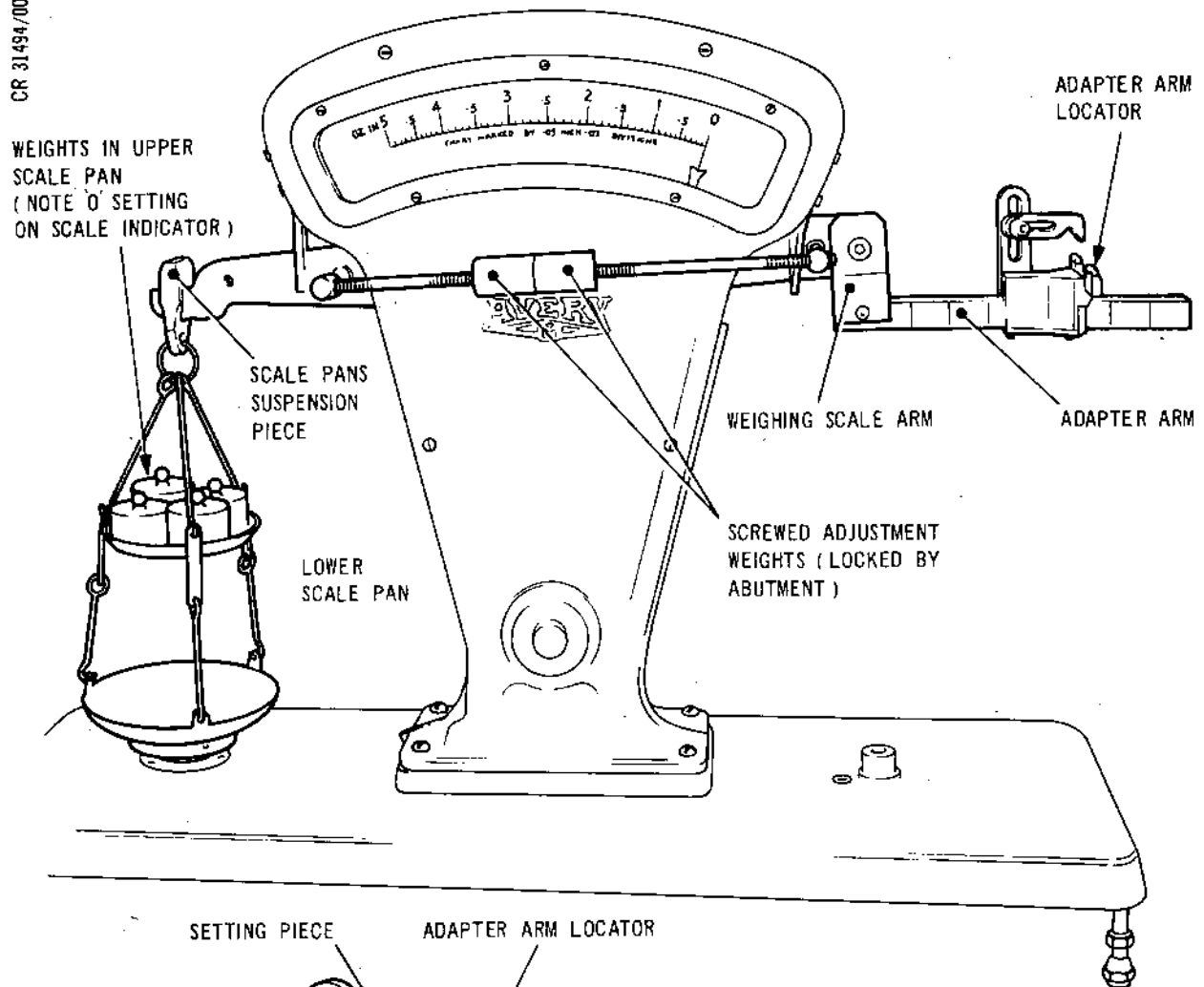


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31494/00A



Turbine Blades Mass Moment Weighing (Avery)  
Figure 503

SUB-ASSEMBLY  
**72-51-03**  
Page 508  
Aug 14/75

TN31879



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (5) Carefully add weights to the upper scale pan to achieve 0 reading on the scale. Fine adjustment can be effected by moving the screwed adjustment weights on the front of the scale.
- (6) Ensure that the screwed adjustment weights are locked together when 0 setting is achieved.
- (7) Check the scale reading progressively by adding weights 1 oz (28.35 g) increments to the upper scale pan.
- (8) On completion of the checks return to 0 reading on the scale as detailed in (5).

B. Mass Moment Weigh Each Blade (Ref.Fig.503).

CAUTION: EXERCISE CARE DURING ASSEMBLY OF BLADES TO ADAPTER ARM. AVOID EXCESSIVE VIBRATION AS DAMAGE TO SCALE OR DISPLACEMENT OF PANS COULD RESULT.

- (1) Carefully place the blade in position on the adapter arm locator and simultaneously engage the blade root with the setting piece on the adapter arm.
- (2) Adjust the setting piece in order to achieve a parallel setting between the blade and adapter arm. Ensure that the setting piece is secure after adjustment.
- (3) Carefully add weights to the lower scale pan until the scale indicator moves.
- (4) Add the total weight value in the lower scale pan to the scale indicator reading.
- (5) Remove the blade from the adapter arm and attach an adhesive label inscribed with the weight and engine serial number.
- (6) Place the blades into the containers and convey the set to the appropriate sub-assembly area on completion of weighing.

5. Assemble HP Turbine Blades to Disk

A. Prepare to Install Turbine Blades (Ref.Fig.504).

- (1) Secure the lifting fixture (Tool 1113) to the end of balancing mandrel (Tool 139) and tighten the securing bolt.

SUB-ASSEMBLY  
**72-51-03**  
Page 509  
Jan 1/78



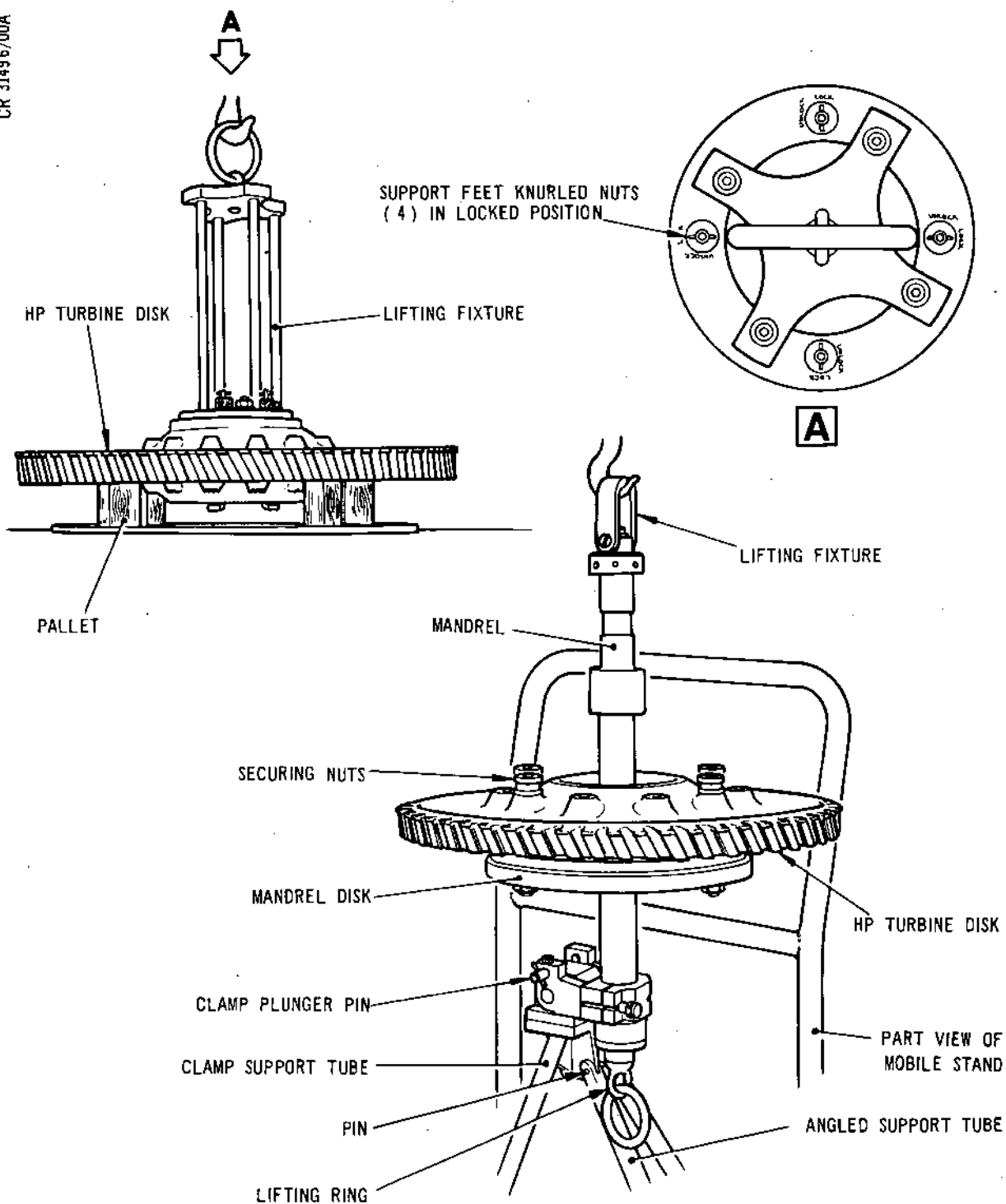


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 31496/00A



Assembling Lifting Fixture to HP Turbine Disk  
Figure 504

SUB-ASSEMBLY  
**72-51-03**  
Page 510  
Aug 14/75

TN29466



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Prepare the mobile stand (Tool 1111) to accept the mandrel.
- (a) Check that the clamp support tubes are securely held in the vertical position by the pins located on the angled support tubes.
- (b) Open the clamps in readiness for the mandrel and lower the mandrel horizontally on to the clamps.
- (3) Place the lifting ring (Tool 1121) in position on the studs in the end of the mandrel and secure with four nuts and washers.
- (4) Close and secure the clamp positioned near the lifting ring. Swivel the mandrel to the vertical position so that the serrations in the mandrel disk are uppermost. Remove the nuts from the disk studs.
- NOTE: Each clamp is secured vertically or horizontally by a plunger type pin which must be released or engaged by hand.
- (5) Assemble the lifting fixture (Tool 1120) to the HP turbine disk.
- (a) With the turbine disk on a pallet (Tool 1082) and serrations on underside, carefully lower the lifting fixture into the centre bore of the disk. Engage the support feet by turning the knurled nuts to the locked position.
- (6) Attach a crane hoist to the lifting fixture and carefully lower the turbine disk over the vertical mandrel ensuring that the serrations in the turbine disk and datum mark O align with those of the mandrel.
- (7) Carefully lower the disk over the studs in the mandrel disk and finally secure the assembly with nuts previously removed.
- (8) Remove the lifting fixture from the turbine disk.
- (9) Attach a crane hoist to the lifting fixture on the end of the mandrel. Carefully lower the assembly into the horizontal position on the mobile stand and secure the clamp.
- (10) Remove the lifting fixture from the mandrel.

SUB-ASSEMBLY

72-51-03

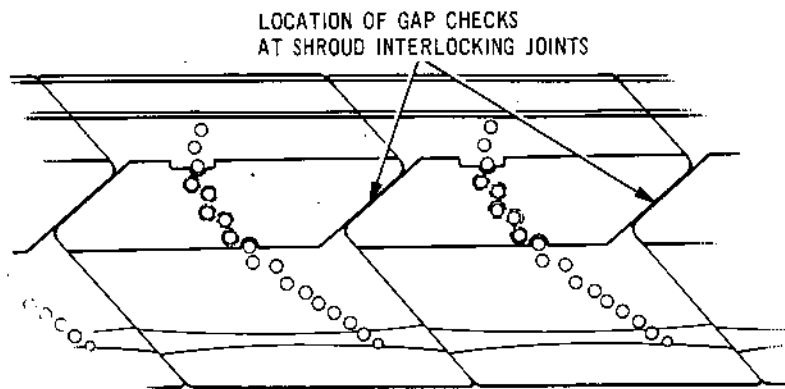
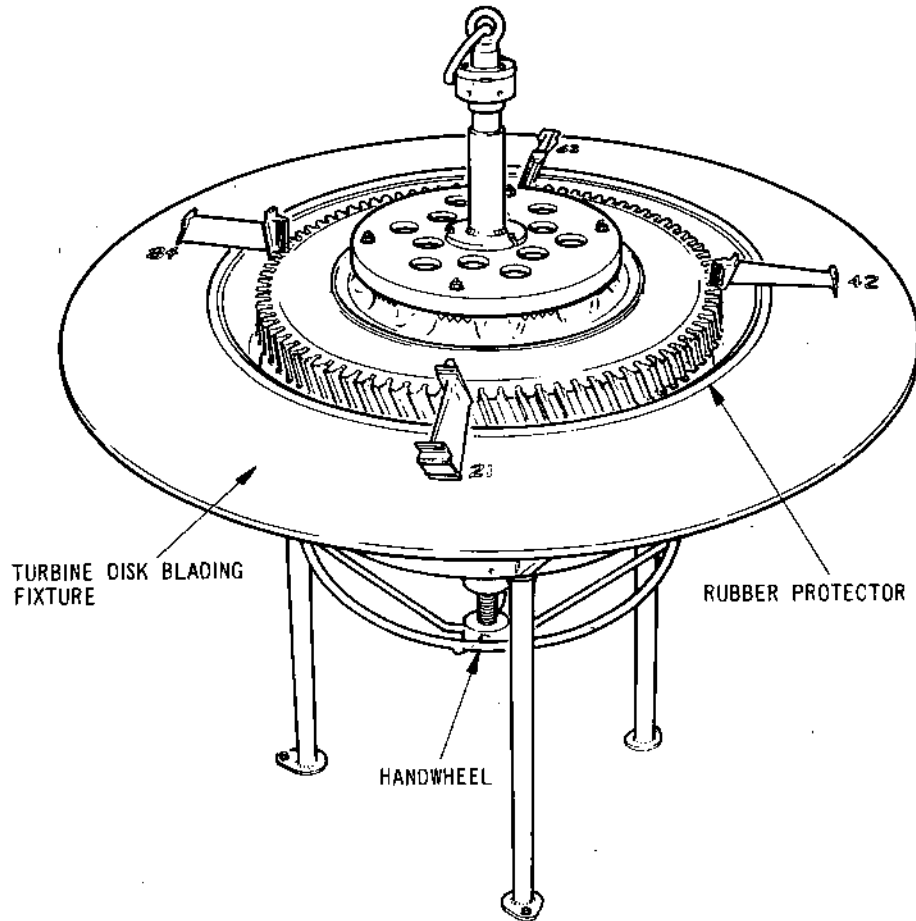
Page 511  
Jan 1/78



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 31497/008



TURBINE BLADES SLACKNESS CHECKS

Assembling Turbine Disk to Blading Fixture  
Figure 505

SUB-ASSEMBLY  
**72-51-03**  
Page 512  
Nov 1/76

TN29467



OLYMPUS 593



MK.610-14-28 sheema  
OVERHAUL

- (11) Attach the crane hoist to the lifting ring (Tool 1121) on the opposite end of the mandrel and swivel the assembly to the vertical position.

B. Install Turbine Blades (Ref.Fig.505).

- (1) Assemble the mandrel and disk to the turbine disk blading fixture (Tool 1122).
  - (a) Examine the bottom surface of the turbine disk at the blade root locations to identify positions 21, 42, 63, 84 and the light spot marked 'D/L'.
  - (b) Use a suitable non-permanent marking substance to transfer the identified locations to the top surface of the disk. Ensure that the weight value at position 'D/L' is noted.
  - (c) Release the clamp securing the mandrel and transfer the assembly to the turbine disk blading fixture.
  - (d) Lower the mandrel and disk into the blading fixture and adjust the hand wheel until the top edge of the turbine disk is slightly above the top of the protective rubber on the blading fixture surface.
  - (e) Remove the crane hoist.
- (2) Place the blades in descending weight order on a suitable flat surface.
- (3) Select four blades of equal weight and enter them into the disk at positions 21, 42, 63 and 84.
- (4) Select the heaviest blade from those to be assembled and enter it into the disk at the identified 'D/L' mark.
- (5) Select a blade of weight value to counter-balance that assembled to the 'D/L' position. Insert the blade into the position opposite to the 'D/L' location.

SUB-ASSEMBLY

72-51-03

Page 513  
Dec 1/95



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

- (6) Select two blades nearest in weight value to that assembled to the 'D/L' location. Assemble each one to the turbine disk at 90 deg each side of 'D/L'.
- (7) Repeat the selection of blades in descending weight order and insert into the disk at opposite positions in order to achieve a balanced assembly.
- (8) Assemble the blades to the disc as follows:

NOTE: The HP turbine blade root to turbine disc design is such that the tolerances on manufacture are extremely tight to ensure long and satisfactory service of the turbine. However, it has been found by both practical experience and design assessment that in exceptional circumstances where the blade root and disc slots are on extremes of tolerances with regard to maximum material conditions and blade root stagger that a foul can exist on assembly. Although very few engines will experience this condition, the possibility of a foul does exist which cannot be corrected by re-machining.

- (a) When all the blades are located into their appropriate disc slots, use a suitable non-permanent marker to number the blades in accordance with its location in the disc.
- (b) Remove each blade in sequence and again place on a suitable work surface.
- (c) Adjust the hand wheel on the blading fixture so that blades can be fitted to the disc over the complete root slot width.
- (d) Apply lubricant "A" to the blade roots.
- (e) Again in sequence try each blade in its corresponding disc slot. The blade root should enter the disc slot over its complete width using hand-pressure only. Mechanical force (eg. hide mallet) should not be used.

SUB-ASSEMBLY

72-51-03

Page 514  
Dec 1/95



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

- (f) Should a blade not fit the disc slot using this method the blade should be replaced with one of identical weight from serviceable stores stock that will, fit the root slot. The rejected blade being returned to stock.
  - (g) Lower the mandrel and disc into the blading fixture by adjusting the hand wheel until the top edge of the turbine disc is slightly above the top of the protective rubber on the blading fixture surface.
- NOTE:** Do not insert the blade roots fully into the turbine disc in one operation as the last blade will not engage by this method. Enter the blade roots into the turbine disc in small increments.
- (h) Locate each blade in its appropriate disc slot when all the blades are entered into the disc root slots, use drive (Tool 907) and a light weight hammer to install the blades. Ensure that the point of contact with the driver is confined to the solid section of the blade root.
- (9) Adjust the hand wheel on the blading fixture to raise the turbine disk assembly slightly, then continue to insert the blades until contact with the rubber protector is made.
  - (10) Repeat the hand wheel and blade assembly procedure in gradual stages until all of the blades are fully and evenly engaged with the turbine disk.

SUB-ASSEMBLY

72-51-03

Page 514A

Dec 1/95



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

(11) Check the turbine blades for slackness.

- (a) Carefully check each blade for movement at the shroud interlocking joint. If movement is evident and clearance occurs at the centre section of the interlocking joints measure the gaps as follows:
  - (i) Evenly and progressively shim the gaps around the total circumference of the interlocking shroud assembly. Initially use one shim only of no more than 0.0015 in. (0,0381 mm) thickness at each gap position. If the gap is less than the shim thickness, shim alternate gaps. Progressively increase the shim thickness at each gap until the maximum thickness is achieved.

SUB-ASSEMBLY

**72-51-03**

Page 514B

Dec 1/95



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (ii) Record the mean thickness of the final shimming, this must be no greater than 0.001 in. (0,0254 mm). If the mean gap exceeds the given limit the blades are unacceptable for further engine running and must be rejected.
- (12) Carefully raise the turbine assembly out of the blading fixture. With the assembly in the vertical position secure the mandrel to the clamp on the mobile stand then carefully swivel the assembly to the horizontal position on the mobile stand and secure the clamp. Remove the lifting equipment from the end of the mandrel.
- (13) If the turbine blades slackness checks are satisfactory convey the assembly to the appropriate area for static balance checks (Ref. para.6).
- (14) If the turbine blades are rejected because of excess slackness invert the turbine assembly, remove it from the mobile stand and transfer it to the blading fixture for de-blading.
- (a) Place the blade platform stand (Tool 954) on top of the blading fixture.
- (b) Assemble the lifting fixture (Tool 1113) to the end of the mandrel. Ensure that the securing bolt is tightened. Secure the mandrel extension (Tool 1135) to the opposite end of the mandrel.
- (c) Attach a crane hoist to the lifting fixture and carefully transfer the turbine and mandrel to the blading fixture.
- (d) Lower the assembly into the blading fixture and adjust the hand wheel so that the underside of the blades are slightly above the blade platform stand.

NOTE: Owing to the interlocking turbine blade shrouds, the blades cannot be removed from the turbine disk singly in one operation.

SUB-ASSEMBLY  
**72-51-03**

Page 515  
Nov 1/76





OLYMPUS 593

MK.610-14-28

OVERHAUL



- (e) Using a driver (Tool 907) and a light weight hammer to remove the blades, carefully tap each blade at the solid section of the blade root to effect a gradual and even removal of the blades from the turbine disk. Adjust the hand wheel on the blading fixture to regulate the progressive disassembly of the blades.
  - (f) Identify each blade with the reason for rejection following removal from the disk. Place the blades in containers (Tool 1425). On completion of disassembly remove the rejected blades from the sub-assembly area.
- (15) Prepare the turbine disk for the assembly of replacement turbine blades.
- (a) Attach a crane hoist to the lifting fixture secured to the end of the mandrel. Carefully transfer the assembly to the mobile stand, secure the mandrel to the clamp on the mobile stand, swivel the assembly to the horizontal position and secure the clamps.
  - (b) Remove the extension (Tool 1135) from the mandrel and assemble the lifting ring (Tool 1121) to the mandrel. Remove the lifting fixture from the opposite end of the mandrel.
  - (c) Attach a crane hoist to the lifting ring and transfer the assembly to the blading fixture. Remove the blade platform stand (Tool 954) from the top of the blading fixture and carefully lower the assembly into the fixture.
- (16) Install replacement turbine blades (Ref.para.2.3.4.5).

6. Statically Balance HP Turbine Rotor

WARNING: ISOLATE BALANCING MACHINE FROM ELECTRICITY SUPPLY BEFORE COMMENCING PREPARATION, INSTALLATION, UNBALANCE RECTIFICATION OR TURBINE REMOVAL PROCEDURES.

A. Prepare Balancing Equipment.

TN38016

SUB-ASSEMBLY  
**72-51-03**

Page 516  
Nov 1/76



OLYMPUS 593

MK. 610-14-28

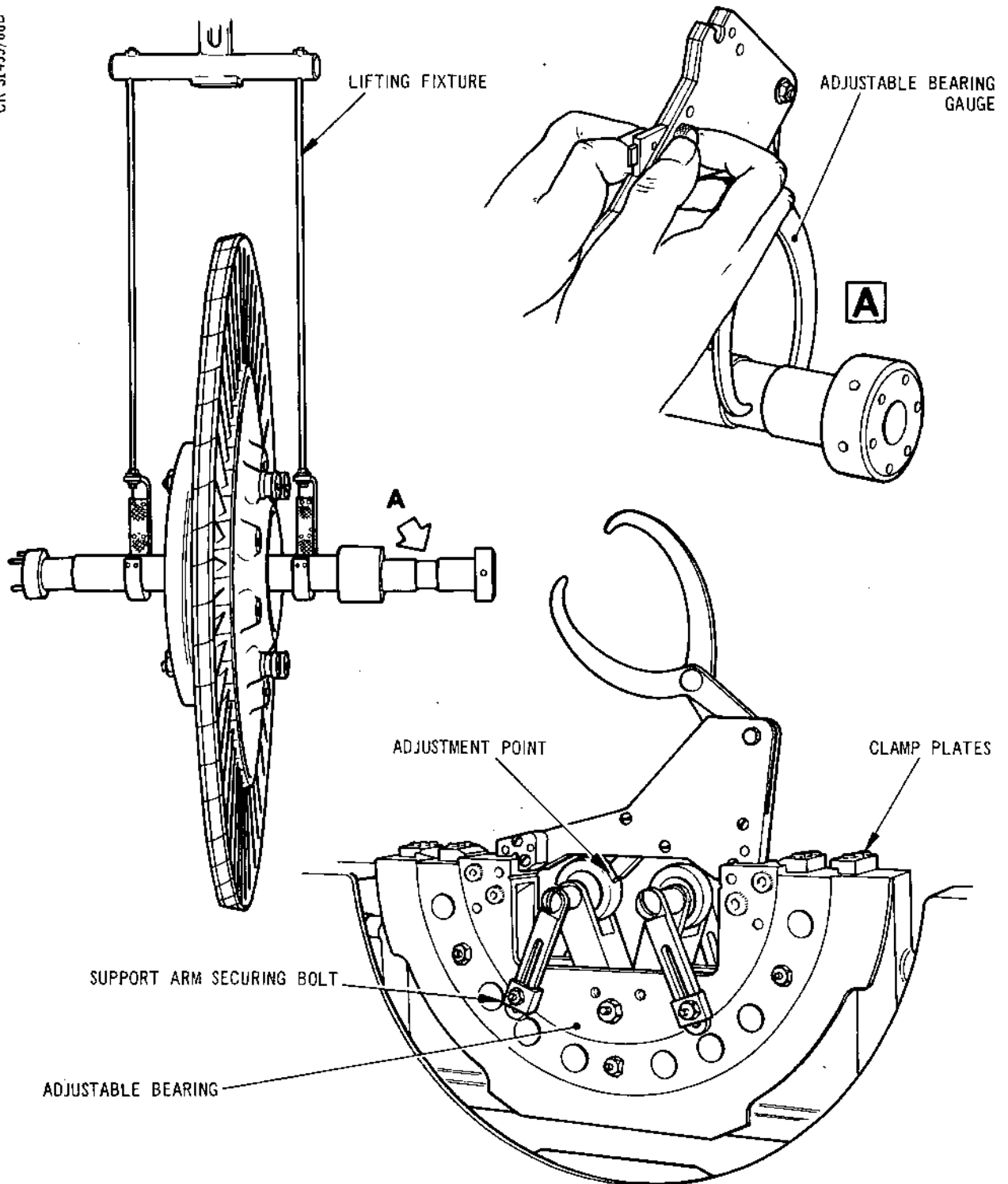
OVERHAUL



CR 31499/00B

PRINTED IN ENGLAND

TN29468



Adjusting Roller Setting Procedure  
Figure 506

SUB-ASSEMBLY  
**72-51-03**

Page 517

Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (1) Place the adjustable bearing (Tool 1637) in the bearing support positioned at the greater distance from the balancing machine drive shaft. Secure the adjustable bearing to the bearing support with two clamp plates and bolts (Ref.Fig.506).
- (2) Set the adjustable bearing to the mandrel diameter (Ref.Fig.506).
  - (a) Attach a crane hoist to lifting fixture (Tool 1131) and position the lifting fixture on the mandrel.
  - (b) Release the mobile stand clamps and carefully lift the turbine assembly.
  - (c) Measure the bearing location of the mandrel with adjustable bearing gauge (Tool 1641).
  - (d) Carefully lock the gauge and check that the setting has not been disturbed.
  - (e) Place the gauge on the adjustable bearing housing. Slacken the bolt securing the support arm connected to the bearing roller positioned nearest the adjustment point on the gauge.
  - (f) Carefully move the roller until it is in contact with the adjustment point on the gauge.
  - (g) Tighten the roller support arm securing bolt and check to ensure that the roller remains in contact with the gauge.
  - (h) Remove the gauge and re-position it for adjustment of the opposite roller.
  - (j) Set and lock the roller in accordance with the previously described procedure. Remove the gauge.
- (3) Assemble bearing housing and bearing to balancing machine (Ref.Fig.507).
  - (a) Place the lower half of the bearing housing (Tool 1652) in the bearing location positioned near the drive shaft on the balancing machine.
  - (b) Secure the bearing housing with two clamp plates and bolts.

TN15281

SUB-ASSEMBLY

**72-51-03**

Page 518

Nov 1/76



OLYMPUS 593

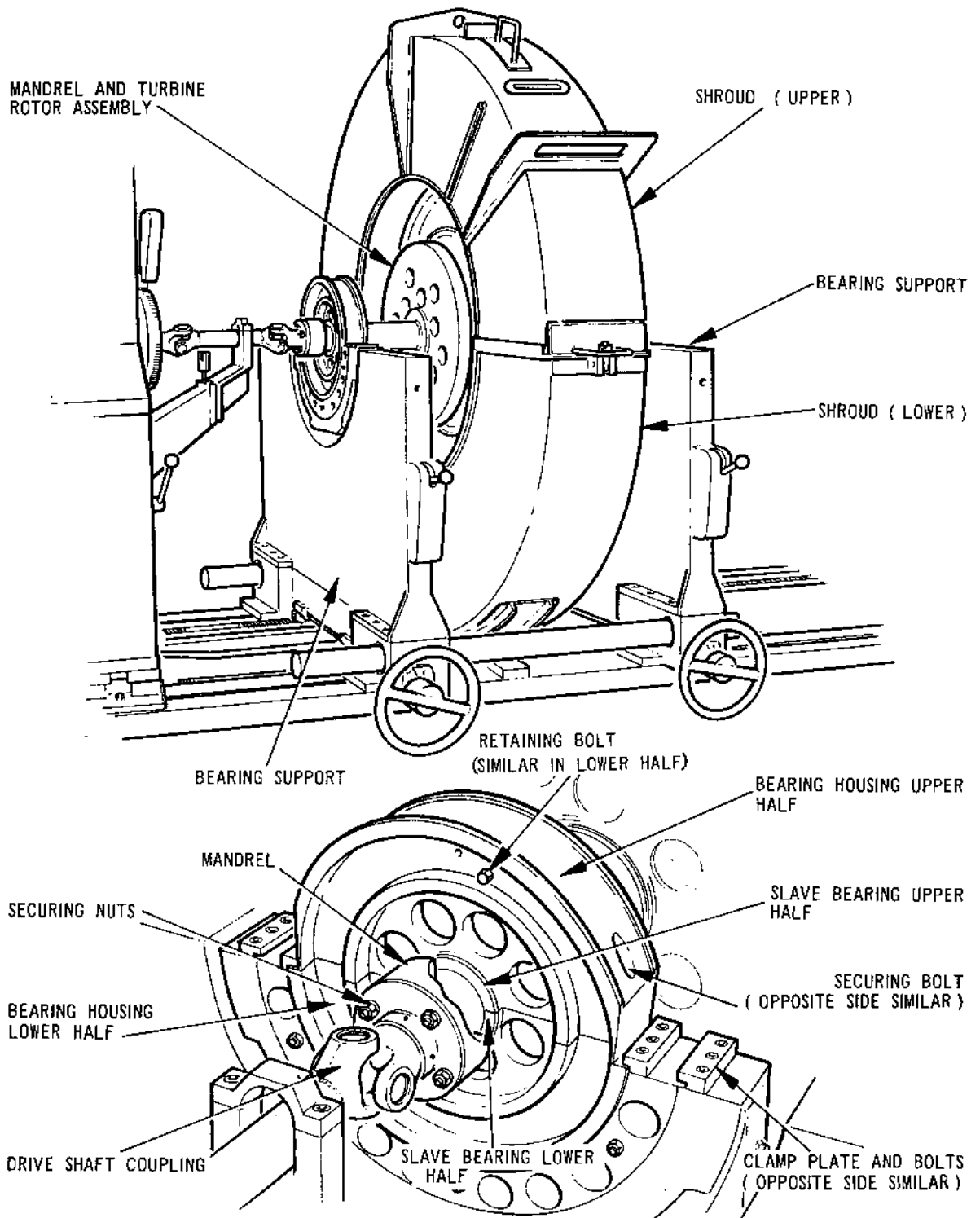
MK. 610-14-28

OVERHAUL



PRINTED IN ENGLAND

CR 31500/00A



Installing Turbine Rotor in Balancing Machine  
Figure 507

SUB-ASSEMBLY  
**72-51-03**

Page 519

Nov 1/76

TN29469



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (c) Place the lower half of the slave bearing (Tool 363) into the bearing housing and secure with the retaining bolt in the bearing housing.

NOTE: The lower half of the slave bearing is identified by the oil drain hole at the bottom position.

- (4) Position the lower half of shroud (Tool 1642) between the balancing machine bearing supports in preparation to accept the turbine rotor.

B. Install HP Turbine Rotor on Balancing Machine.

- (1) Attach the lifting fixture (Tool 1131) and crane hoist to the mandrel and carefully raise the turbine assembly out of the mobile stand.
- (2) Transfer the assembly to the balancing machine.
  - (a) Carefully lower the assembly into position over the balancing machine with the mandrel disk positioned near the balancing machine shaft coupling.
  - (b) Refer to the balancing machine manufacturers instructions for information regarding the adjustment of the bearing supports and adjust the bearing supports to accommodate the installation of the HP turbine assembly. Lock the supports.
  - (c) Finally lower the turbine assembly into the bearing support. Engage the drive shaft coupling with the mandrel and secure with nuts.
  - (d) Check to ensure that the mandrel is correctly located on the slave bearing and adjustable rollers.
  - (e) Finally position the shroud half to ensure adequate clearance for the turbine rotor.
  - (f) Secure the shroud half to the balancing machine.
  - (g) Assemble upper half of slave bearing (Tool 363) to the upper half of the bearing housing (Tool 1652) and secure it with the retaining bolt in the bearing housing section.

TN8642

SUB-ASSEMBLY  
**72-51-03**

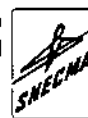
Page 520  
Nov 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



(h) Place the slave bearing and bearing housing upper half over the mandrel and the lower half of the assembly. Secure it with the two securing bolts.

(3) Remove the lifting fixture from the mandrel.

(4) Lubricate the slave bearing assembly with lubricant 'A' and ensure that the assembly rotates freely by hand.

(5) Install the upper half of shroud (Tool 1642).

(a) Carefully lower the shroud section into position over the turbine wheel and secure the sections together, with the hinge bolts.

#### C. Check Unbalance of HP Turbine Rotor.

(1) Operate the balancing machine in accordance with the manufacturers instructions. Maintain lubrication of bearings.

(2) Record the amount of unbalance, also the angular position of unbalance with reference to the blade position numbers.

#### D. Acceptance Limits.

(1) Provided the unbalance does not exceed 4 drn in. the disk is acceptable. Install 29 locking plates (1-40) as detailed in para.E.(4).

(2) If the unbalance is between 4 and 150 drn in., make corrections by assembling locking plates of varying weights as detailed in para.E.(1) to (5).

(3) If the unbalance is greater than 150 drn in., carry out blade position change as detailed in para.G.

#### E. Locking Plates Installation Procedure to Rectify Unbalance.

(1) Gain access to the turbine blades by raising the access panel in the top half of the shroud. If necessary remove the shroud half. Identify the angular position on the turbine disk at which the unbalance occurs.

(2) Select locking plates as given in Table 501 and calculate the approximate unbalance correction weight. The distance from the centre of the turbine disk to the locking plate positions is 13.330 in. (338.58 mm).

SUB-ASSEMBLY

72-51-03

Page 521

Jun 1/78

**OLYMPUS 593**

MK.610-15-28

OVERHAUL



- (a) Refer to SB.72-8568-163 Revision 1 before proceeding. If necessary, examine each locking plate for the hardness identification letter 'H'. Replace any unidentified plate with an identified plate of the same part number.

IPC REF. NO.	APPROX. WEIGHT (DRM IN.)	MAXIMUM NUMBER PER ASSEMBLY
(1-60)	8	4
(1-50)	5	8
(1-40)	4.5	29*

HP Turbine Blades Locking Plates Identification  
Table 501

- \* This is the total number of standard locking plates. Deduct from this the heavier plates used for balancing correction.
- (3) Use plasticine to prove the calculated unbalance correction weight as the locking plates must be finally locked in position when assembled.
- (4) Assemble locking plates to the turbine disk and blades (Ref.Fig.508).
- (a) Fully insert each locking plate under the blades securing lugs.
- (b) Use locking tools (Tool 1080 and 1081) and secure the locking plates by bending the locking legs into contact with the turbine disk locking pillars.
- (5) Secure the turbine shroud and re-check the balance of the assembly.

F. Numerically Identify Turbine Blades.

- (1) On satisfactory completion of the balance check, disconnect the mandrel from the drive shaft coupling and remove items as necessary to allow removal of the turbine assembly from the balancing machine.
- (2) Use lifting fixture (Tool 1131) to transfer the turbine assembly to the mobile stand. Secure it in the horizontal position.

SUB-ASSEMBLY

**72-51-03**

Page 522

Apr 1/83



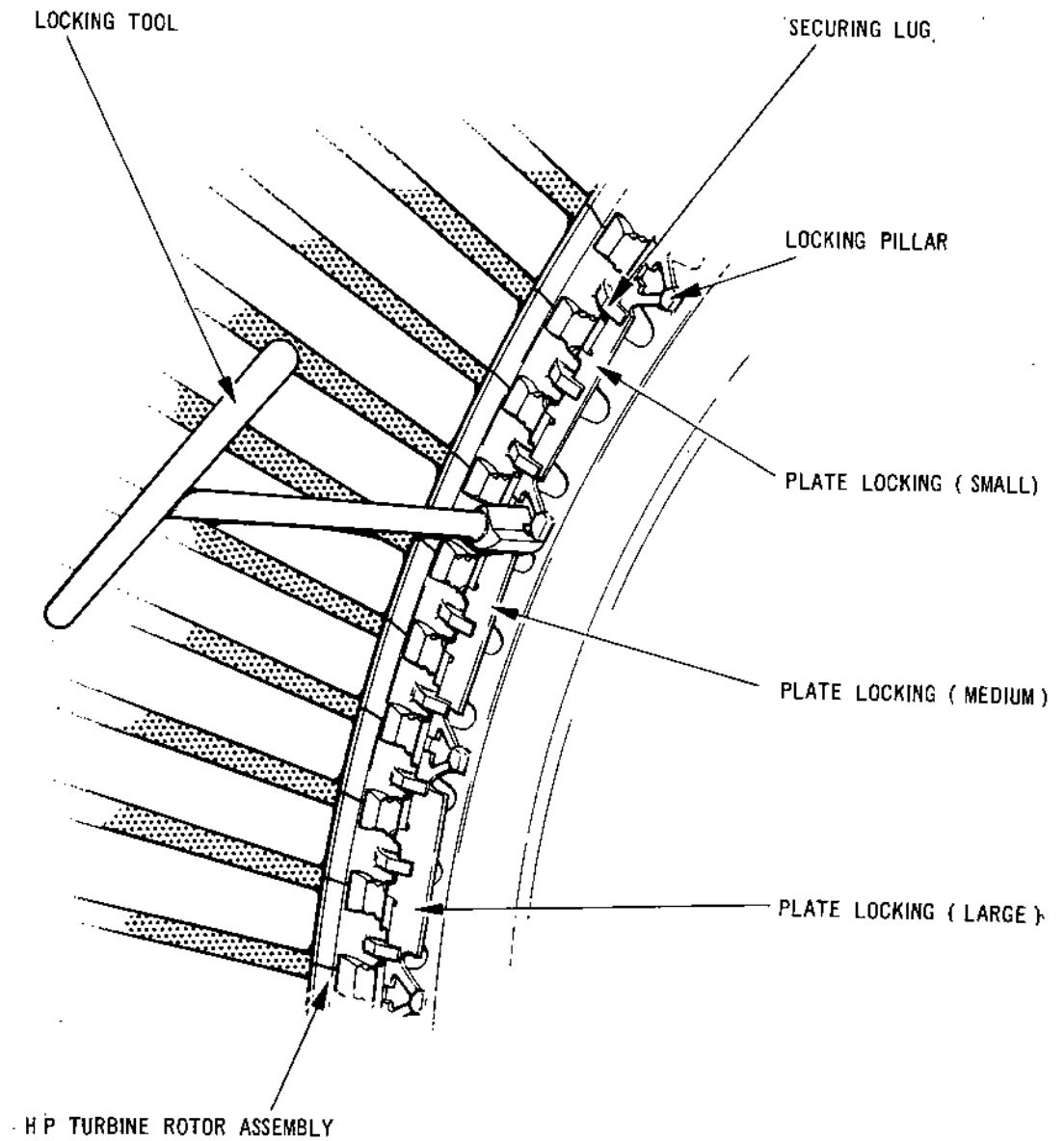
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 31501/00A



TN29470

Assembling Turbine Blades Locking Plates  
Figure 508

SUB-ASSEMBLY  
**72-51-03**  
Page 523  
Nov 1/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Commencing at No.1 position on the turbine disk blade root, lightly vibro-etch each turbine blade root with its position number to correspond with the number on the disk.

G. Blade Re-positioning Procedure to Rectify Unbalance.

- (1) Remove the assembly from the balancing machine.
  - (a) Disconnect the mandrel from the drive shaft coupling and remove items as necessary to allow removal of the turbine assembly from the balancing machine.
  - (b) Use lifting fixture (Tool 1131) to transfer the turbine assembly to the mobile stand. Secure it in the horizontal position.
- (2) Install turbine assembly in blading fixture.
  - (a) Place blade platform stand (Tool 954) on the top of the blading fixture.
  - (b) Assemble lifting fixture (Tool 1113) to the end of the mandrel. Ensure that the securing bolt is tightened. Secure mandrel extension (Tool 1135) to the opposite end of the mandrel.
  - (c) Attach a crane hoist to the lifting fixture and carefully transfer the turbine and mandrel to the blading fixture.
  - (d) Lower the assembly into the blading fixture and adjust the hand wheel so that the underside of the blades are slightly above the blade platform stand.
- (3) Remove the blades from the turbine disk.

NOTE: Owing to the interlocking turbine blade shrouds, the blades cannot be removed from the turbine disk singly in one operation.

- (a) Use the driver (Tool 907) and a light-weight hammer to remove the blades. Carefully tap each blade at the solid section of the blade root to effect a gradual and even removal of the blades from the turbine disk. Adjust the hand wheel on the blading fixture to regulate the progressive disassembly of the blades.

SUB-ASSEMBLY

72-51-03

Page 524

Nov 1/76

TN7427



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) On completion of the blades removal, place the blades in descending weight order on a suitable flat surface.
- (4) Remove the turbine assembly from the blading fixture, secure the lower end of the mandrel to the mobile stand clamp then carefully swivel the assembly horizontally into the stand.
- (5) Remove the mandrel extension from the end of the mandrel and assemble lifting ring (Tool 1121) to that location.
- (6) Remove the lifting fixture from the opposite end of the mandrel.
- (7) Attach a crane hoist to the lifting ring and swivel the assembly to the vertical position in the mobile stand.
- (8) Ensure that the datum position is clearly marked on the upper side of the disk also positions 21, 42, 63 and 84.
- (9) Release the clamp securing the mandrel then transfer the assembly to the turbine disk blading fixture.
- (10) Remove the blade platform stand from the top of the blading fixture.
- (11) Lower the assembly into the blading fixture and adjust the hand wheel until the top edge of the turbine disk is slightly above the top of the protective rubber on the blading fixture surface.
- (12) Remove the crane hoist.
- (13) Reposition the turbine blades in the turbine disk.
- (a) Apply lubricant 'A' to the blade roots.
- (b) Enter four blades of equal weight into positions 21, 42, 63 and 84.
- (c) Select blades of appropriate weight to correct the unbalance factor and enter each one into the disk accordingly.

PRINTED IN ENGLAND

TN10163

SUB-ASSEMBLY

72-51-03

Page 525

Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (d) When all blades are entered into the disk roots, carefully insert each blade in turn until the edge of every blade is in contact with the rubber protector on the blading fixture. Use driver (Tool 907) and a light-weight hammer to install the blades. Ensure that the point of contact with the driver is confined to the solid section of the blade root.
- (e) Adjust the hand wheel on the blading fixture to raise the turbine disk assembly slightly then continue to insert the blades until contact with the rubber protector is made.
- (f) Repeat the hand wheel and blade assembly procedure in gradual stages until all of the blades are fully and evenly engaged with the turbine disk.
- (g) Carefully raise the turbine assembly out of the blading fixture.
- (h) With the assembly in the vertical position secure the mandrel to the mobile stand clamp.
- (j) Carefully swivel the assembly to the horizontal position on to the mobile stand and secure the clamp.
- (k) Remove the lifting equipment from the mandrel.
- (l) Convey the assembly to the appropriate area for static balance checks.

H. Re-Check Static Balance of HP Turbine Rotor.

- (1) Prepare the balancing machine (Ref. para.6.A.).
- (2) Install the HP turbine rotor in the balancing machine (Ref. para.6.B.).
- (3) Check the unbalance of the HP turbine rotor (Ref. para.6.C.).
- (4) Acceptance limits (Ref. para.6.D.).
- (5) Install the locking plates to rectify unbalance (Ref. para.6.E.).

7N8216



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (6) Numerically identify the turbine blades (Ref. para.6.F.).

## 7. Dimensional Checks

### A. Dimensionally Check HP Turbine Rotor.

NOTE: This procedure does not conform to module interchangeability requirement.

- (1) On engines to Pre S.B.72-94 standard place the hub unit (72-51-04/1-300) on a measuring table so that the Hirth serrations are at top position in preparation for assembly of the turbine rotor (Ref.Fig.509).
- (2) Assemble the turbine rotor to the hub.
  - (a) Secure the bolted lifting fixture (Tool 1113) to the end of the mandrel. Attach a crane hoist to the lifting fixture and swivel the assembly to the vertical position.
  - (b) Assemble the lifting fixture (Tool 1120) to the turbine disk and ensure that it is correctly locked in position. Attach a crane hoist to the lifting fixture.
  - (c) Unscrew the nuts securing the turbine disk to the mandrel, carefully lift the turbine rotor in preparation for assembly to the hub.
  - (d) Ensure thorough cleanliness of Hirth serrations. Align the serrations of the hub with the rotor, use two bolts to assist with this operation. Carefully lower the rotor on to the hub.

CAUTION: CRANE HOIST AND LIFTING FIXTURE MUST REMAIN ATTACHED TO ASSEMBLY TO PREVENT TURBINE DISK FROM FALLING SIDEWAYS THROUGH ACCIDENTAL DISTURBANCE.

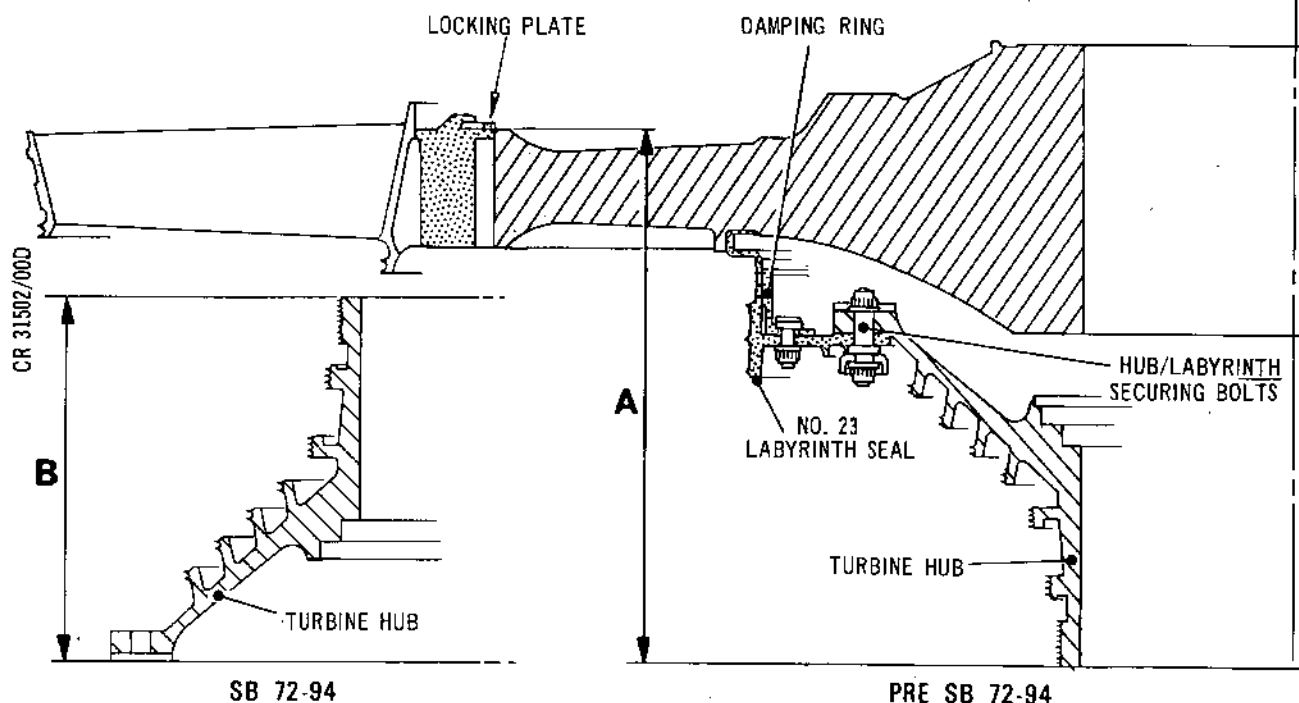
- (3) Check and record dimension A from the rear face of the turbine disk to the front edge of the hub at four equally spaced positions (Ref.Fig.509). The dimension must be within the limit of 8.236 and 8.246 in. (209,194 and 209,408 mm) to be acceptable.

SUB-ASSEMBLY  
**72-51-03**

Page 527  
Nov 1/76

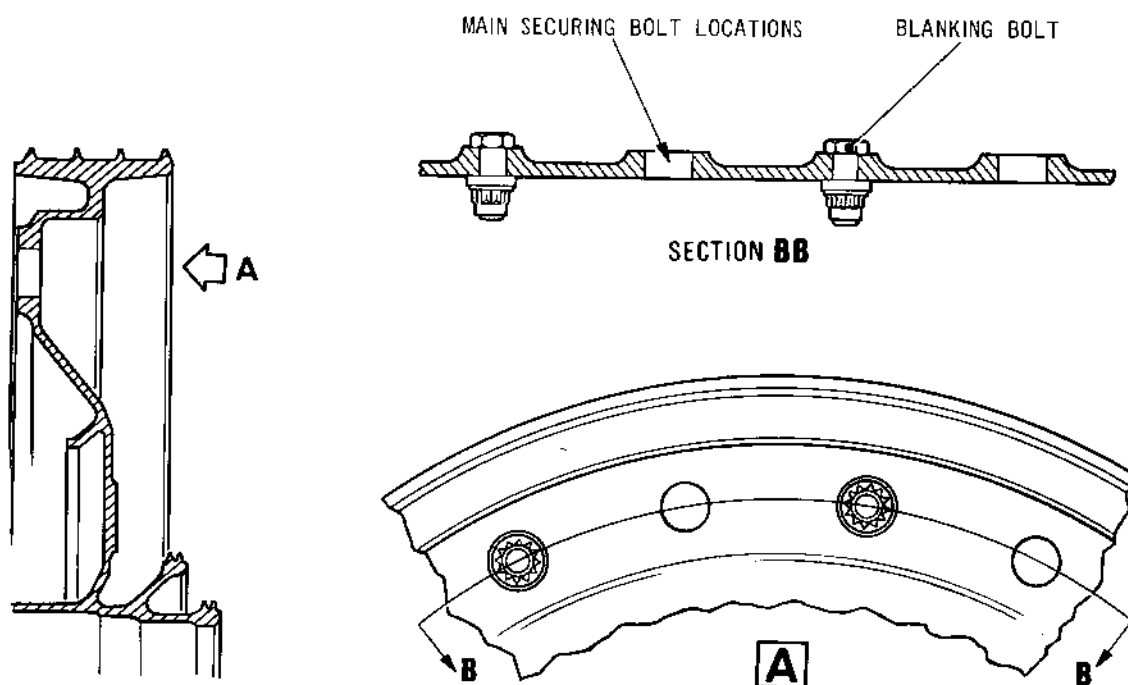


OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



HP Turbine Rotor/Hub Unit Dimensional Check  
Figure 509

CR 33381/00A



No.24 and 26 Labyrinth Seal Blanking Bolts SB.72-113  
Figure 510

TN29541



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (4) On completion of the dimensional check, transfer the turbine to the pallet (Tool 1082). Remove the lifting fixture from the turbine disk.

B. Dimensionally Check Turbine Hub.

NOTE: This procedure conforms to module interchangeability requirement.

- (1) On engines to S.B.72-94 standard place the turbine hub (72-51-04/1-300) on a measuring table (Ref.Fig. 509). Measure and record the length of the turbine hub from the tips of the Hirth serrations to the opposite end of the turbine hub. Record as dimension B for engine assembly reference.
- (2) Transfer the turbine rotor from the mobile stand to the pallet (Tool 1082).
  - (a) Secure the bolted lifting fixture (Tool 1113) to the end of the mandrel. Attach a crane hoist to the lifting fixture and swivel the assembly to the vertical position.
  - (b) Assemble the lifting fixture (Tool 1120) to the turbine disk and ensure that it is correctly locked in position. Attach a crane hoist to the lifting fixture.
  - (c) Unscrew the nuts securing the turbine disk to the mandrel, carefully lift the turbine rotor and transfer it to the pallet. Remove the lifting fixture.

8. Prepare Assembly for Dynamic Balance with HP Compressor Rotor Assembly

A. Assemble Labyrinth Assembly to HP Turbine Hub Unit (Ref.Fig.509).

- (1) Assemble the damping ring (72-51-04/1-290) to No.23 labyrinth seal (72-51-04/1-250).

NOTE: The damping ring and labyrinth seal are balanced and matched components.

- (a) Shrink the damping ring by use of a freezing agent.



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (b) Align the balance datum marks on the damping ring and labyrinth seal. Press the damping ring fully into the labyrinth seal.
  - (c) Secure the damping ring with nuts (72-51-04/1-260), washers (72-51-04/1-270) and bolts (72-51-04/1-280). Apply lubricant 'C' to the bolts.
  - (d) Ensure that the nuts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the nuts to 100 lbf in. (11,3 N.m).
- (2) Assemble the labyrinth seal and turbine hub together, ensuring that the balance marks 0 are aligned as near as possible.
- (3) Secure the assembly together with pillar bolts (72-51-04/1-240) and self-locking nuts (72-51-04/1-230).
- (a) Apply lubricant 'C' to the bolts. Ensure that the nuts have a minimum locking (run-down) torque of 6.5 lbf in. (0,73 N.m). Torque-tighten the nuts to 210 lbf in. (24 N.m). After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 2.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref.SB.72-8444-225).
- NOTE: The unsecured ends of the pillar bolts will be used to carry balancing weights and locknuts in conjunction with later balancing requirements.
- (4) Assemble the protectors (Tool 1061, 1062 and 1063) to the turbine hub and labyrinth seal.
- (5) Ensure that each bolt (72-51-04/1-180) carries the letter T on the threaded end of the shank (Ref. SB.72-87). Reject all bolts which are not lettered.

SUB-ASSEMBLY

72-51-03

Page 530

Dec 31/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

- (6) Examine previously used bolts (72-51-04/1-180) to ascertain that each bolthead is clearly vibro-etch marked with a number from 1 to 10. If the bolts do not follow numerical sequence (1 to 10) lightly vibro-etch identification numbers on boltheads as necessary to produce the required sequence. Ensure that redundant numbers are rendered illegible. If new bolts are used lightly vibro-etch a position number (1 to 10) on the head of each bolt.
- (7) On engines to SB.72-113 standard assemble bolts (72-51-04/1-150), washers (72-51-04/1-140) and nuts (72-51-04/1-130) to the balance hole positions on No.24 and 26 labyrinth seal (Ref.Fig.510).
- (a) Apply lubricant 'C' to the securing items. Ensure that the nuts have a minimum locking (run-down) torque of 6.5 lbf in. (0,73 N.m). Torque-tighten the nuts to 210 lbf in. (24 N.m). After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 2.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref.SB.72-8444-225).
- (8) Pass the following components to the appropriate section for dynamic balance with the HP compressor rotor assembly. On completion of dynamic balance, convey the turbine rotor and loose items to the engine assembly area.

NOTE: Para.(8) applies only to pre SB.72-8305-154 Part 2 standard.

- |   |      |
|---|------|
| (a) No.23 labyrinth seal/damping ring/turbine hub assembly (72-51-04/1-250-290-300) | (1)  |
| (b) Turbine assembly  | (1)  |
| (c) Bolts (72-51-04/1-180)  | (10) |
| (d) Nuts (72-51-04/1-120)   | (10) |
| (e) Retaining rings (72-51-04/1-170)  | (10) |
| (f) Labyrinth seal No.24 and 26   | (1)  |

SUB-ASSEMBLY

72-51-03

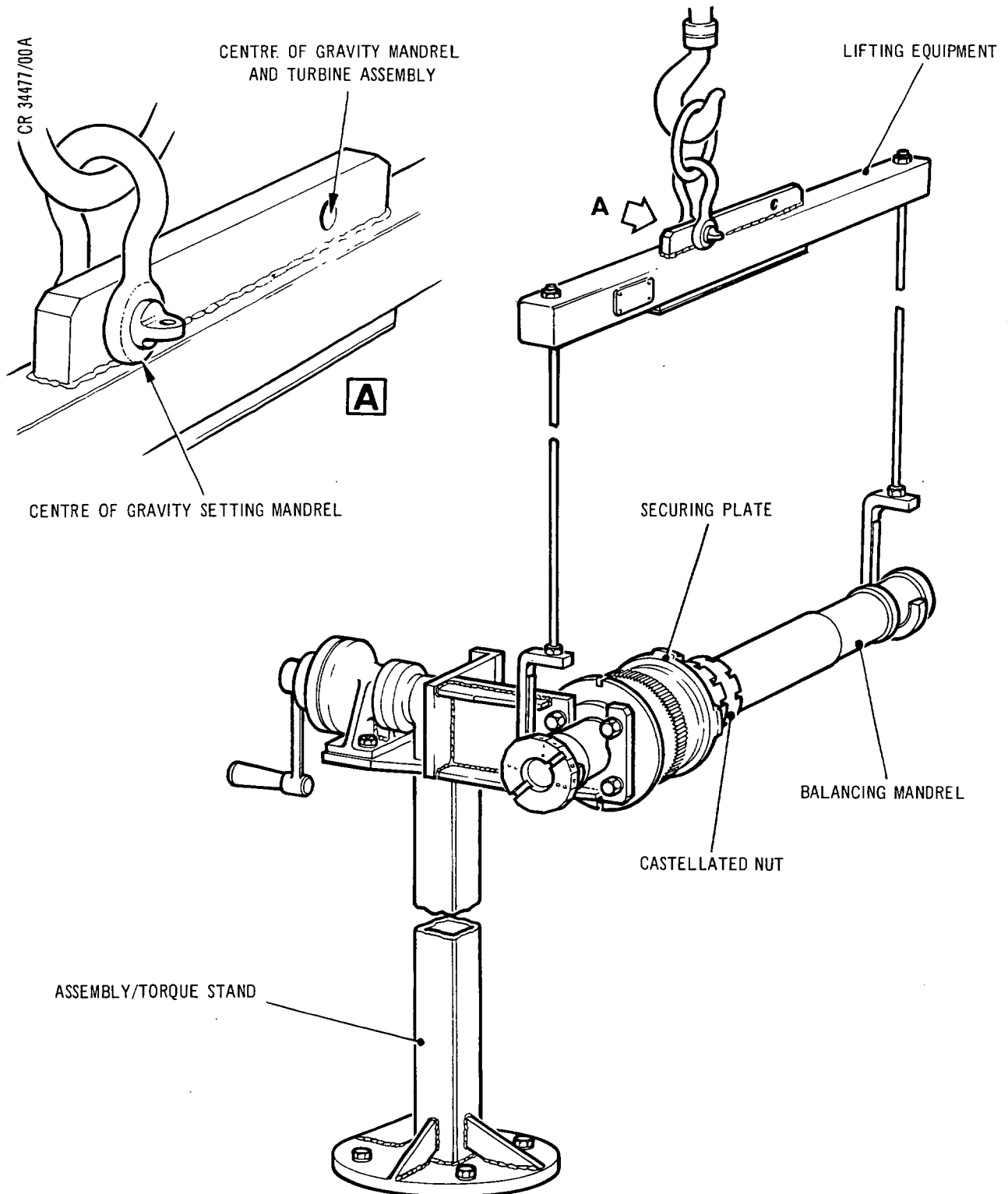
Page 531  
Dec 31/01





OLYMPUS 593

MK.610-14-28  
OVERHAUL



Assembling Balancing Mandrel to Assembly/Torque Stand  
Figure 511



OLYMPUS 593

MK.610-14-28  
OVERHAUL



9. Turbine Rotor Swash Check and Blade Length Checking Procedure

NOTE: This procedure and para.10 and 11 are only required if the tooling introduced by SB.72-8305-154 Part 2 is available, and the HP Turbine Hub and Labyrinth Assemblies (72-51-04) are new items and require balancing with the HP Turbine Rotor or slave rotor.

A. Prepare for Swash Check (Ref.Fig.511).

- (1) Assemble the balancing mandrel (Tool 3052) to the turbine assembly/torque stand (Tool 3053). The mandrel is stored in container (Tool 3066).
  - (a) Ensure that the lifting shackle on the lifting equipment (Tool 3054) is set to the correct centre of gravity position before lifting the balancing mandrel. The lifting equipment is stored in transport stand (Tool 3055).
  - (b) Adjust the assembly stand to accept the mandrel horizontally then using lifting equipment (Tool 3054) transfer the mandrel from its transport stand to the assembly stand. Secure the mandrel to the assembly stand with four bolts securely tightened.
  - (c) Remove the lifting equipment from the mandrel and place it in the transport stand.
  - (d) Swivel the mandrel to the vertical position, with the long section of the mandrel uppermost.
- (2) Assemble the turbine hub/No.23 labyrinth seal/damping ring (72-51-04/300-250-290) to the mandrel (Ref.Fig.512).
  - (a) Remove the castellated nut and securing plate from the mandrel.
  - (b) Ensure thorough cleanliness of components, especially splines. Using an approved non-permanent marking substance, clearly identify the position of a master spline on the outer surface of the turbine hub.

PRINTED IN ENGLAND

TN49006

SUB-ASSEMBLY

**72-51-03**

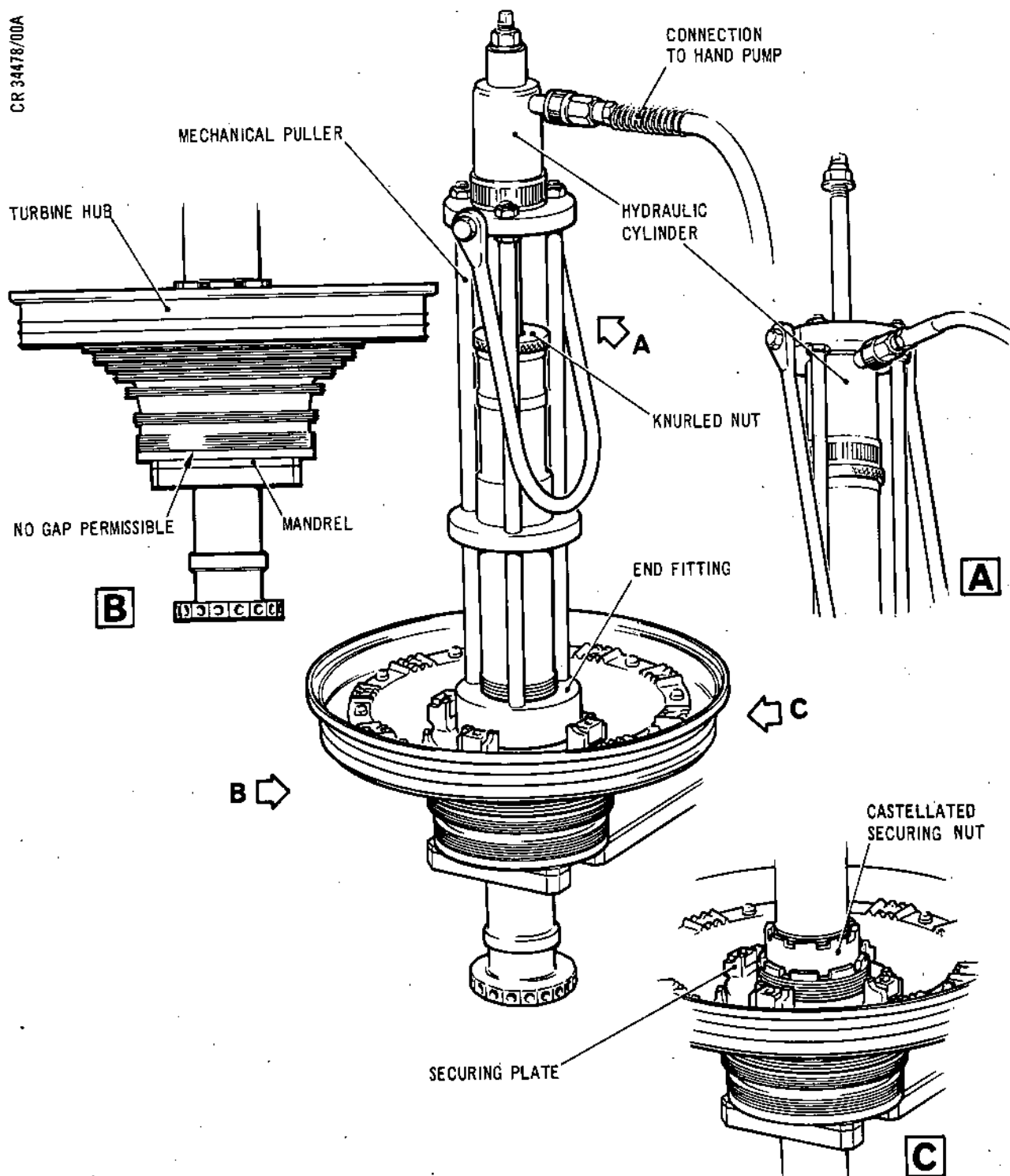
Page 533  
Jan 1/78

CR 34478/00A



OLYMPUS 593

MK. 610-14-28  
OVERHAUL



Assembling Turbine Hub to Mandrel  
Figure 512

SUB-ASSEMBLY

72-51-03

Page 534

Jan 1/78

TN49007



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (c) Place the turbine hub assembly on the mandrel and press it as far as possible in position by hand.
  - (d) Assemble the securing plate to the mandrel/turbine hub unit and press it as far as possible in position by hand.
- (3) Press the hub in position with mechanical puller (Tool 3056) (Ref.Fig.512).
- (a) Ensure that the hydraulic cylinder is assembled to the top of the mechanical puller.
  - (b) Carefully lower the mechanical puller over the mandrel and screw the end fitting as far as possible on the securing plate. Tighten the knurled nut on the mechanical puller until the assembly is securely in position.
  - (c) Connect the hand pump to the hydraulic cylinder and carefully apply sufficient pressure to fully press the hub in position. Remove the mechanical puller from the mandrel.
  - (d) Ensure that no gap is present between the bottom of the hub and the mandrel (Ref. detail B).
- (4) Assemble the castellated securing nut to the mandrel and torque-tighten it (Ref.Fig.513).
- (a) Screw the nut in position as far as possible by hand.
  - (b) Carefully place the torque spanner (Tool 3057) over the mandrel and engage it with the nut.

PRINTED IN ENGLAND

TN49008

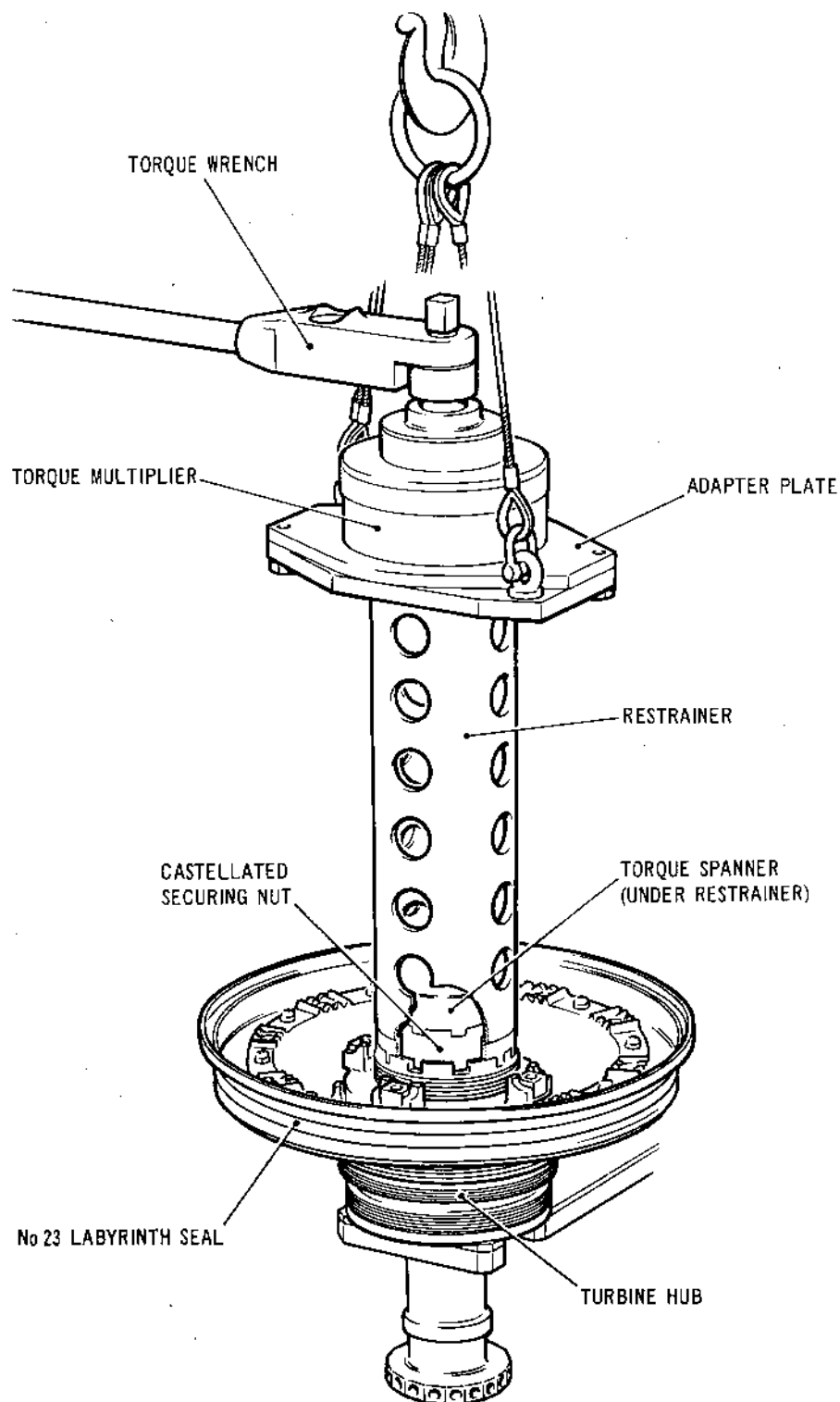


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 34479/00A



Torque-tightening Turbine Hub Securing Nut  
Figure 513

SUB-ASSEMBLY  
**72-51-03**

Page 536  
Jan 1/78

TN49009



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

- (c) Ensure that the torque multiplier (Tool 1022) adapter plate (Tool 3058) and restrainer (Tool 3059) are securely assembled together. Attach a crane hoist to the torque multiplier and carefully lower the assembly over the torque spanner assembled to the mandrel. Turn the square drive of the torque multiplier (if necessary) until engagement is achieved with the torque spanner.

**WARNING:** MAINTAIN SUPPORT OF TORQUE MULTIPLIER ASSEMBLY WITH CRANE TO PREVENT ASSEMBLY FROM DROPPING SUDDENLY.

- (d) When the restrainer is engaged with the torque spanner, continue lowering the assembly until engagement with the securing plate is achieved.
- (e) Use a suitable torque wrench and torque-tighten the mandrel nut to 300 lbf ft. (406,7 N.m).

**NOTE:** The torque multiplier has a ratio of 25 to 1; therefore the input torque must be 12 lbf ft. (16,2 N.m).

- (f) Remove the equipment.

(5) Assemble the turbine to the turbine hub.

- (a) Secure the lifting fixture (Tool 1113) to the end of the balancing mandrel (Tool 139) and tighten the securing bolt.
- (b) Attach a crane hoist to the lifting fixture and swivel the mandrel/turbine to the vertical position.
- (c) Carefully lower the lifting fixture (Tool 1120) into the centre bore of the turbine disk. Engage the support feet to the disk by turning the knurled nuts to the locked position.

SUB-ASSEMBLY

**72-51-03**

Page 537  
Jan 1/78

TN49010

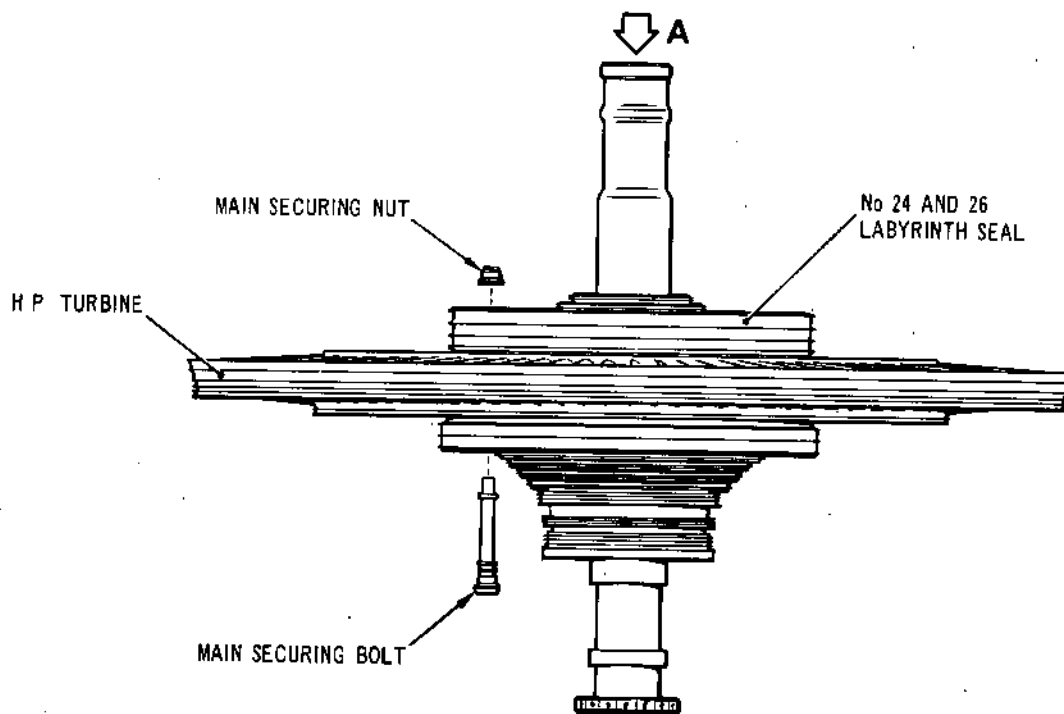
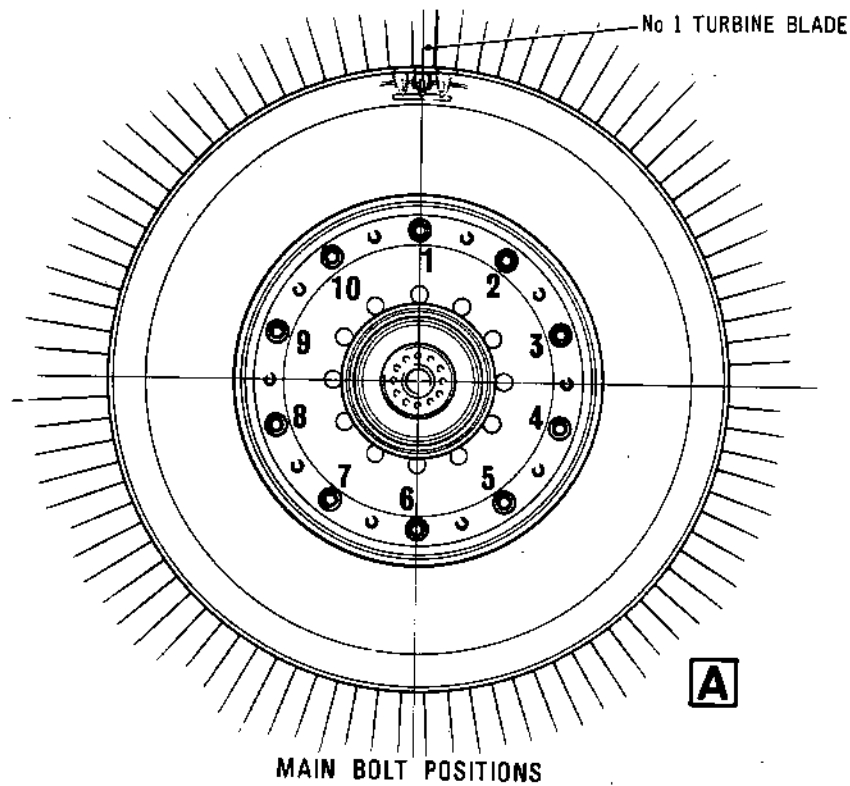


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 34480/00A



Positioning of Turbine Securing Bolts  
Figure 514

SUB-ASSEMBLY  
**72-51-03**

Page 538  
Jan 1/78

TN49011



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (d) Remove the knurled nuts securing the turbine disk to the mandrel and carefully raise the turbine clear of the mobile stand.
  - (e) Ensure that the Hirth serrations on the turbine disk and hub are thoroughly clean and damage free. Carefully lower the turbine on to the hub ensuring that the balance datum marks 0 on the hub and disk are aligned as near as possible. Remove the lifting fixture.
- (6) Assemble No.24 and 26 labyrinth seal to the turbine disk and secure the complete assembly with the main securing bolts (Ref.Fig.514).
- (a) Ensure that the balance datum marks 0 on the labyrinth seal are aligned as near as possible with the marks on the turbine disk. Place the labyrinth seal on the turbine disk with main bolt-holes aligned.
  - (b) Using an approved non-permanent marking substance identify the main bolt-holes numerically (1 to 10) by marking the uppermost surface of the labyrinth seal in a clockwise direction. No.1 position must be near No.1 turbine blade.
  - (c) Apply lubricant 'C' to the main securing bolts (72-51-04/1-180). Insert No.1 bolt through the turbine hub, disk and labyrinth at No.1 bolt position. Secure the bolt with a nut (72-51-04/1-120). Insert the remaining bolts in numerical sequence and secure with nuts (72-51-04/1-120).
  - (d) Torque-tighten the nuts evenly in increments of 30 lbf ft. (40,6 N.m) in the following sequence, 1, 6, 3, 8, 4, 9, 2, 7, 5, 10 until a maximum torque between 80 and 90 lbf ft. (108,5 and 122,0 N.m) is achieved. After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 2.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref.SB.72-8444-225).

SUB-ASSEMBLY

72-51-03

Page 539

Dec 31/01



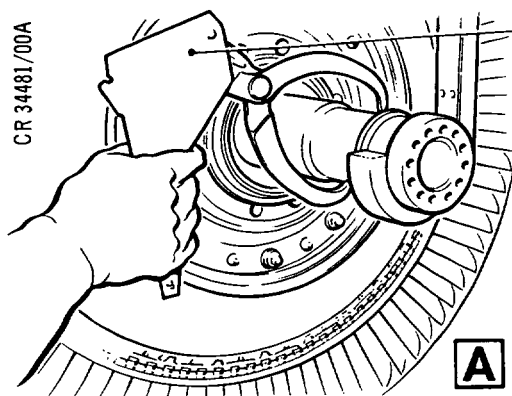


OLYMPUS 593

MK.610-14-28  
OVERHAUL

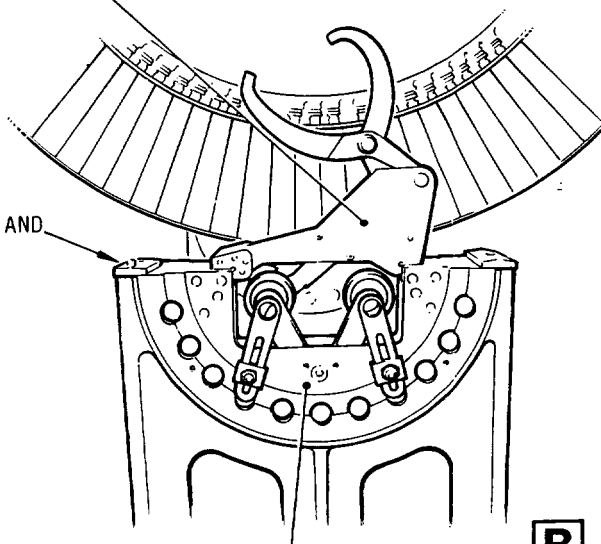


CR 34481/00A

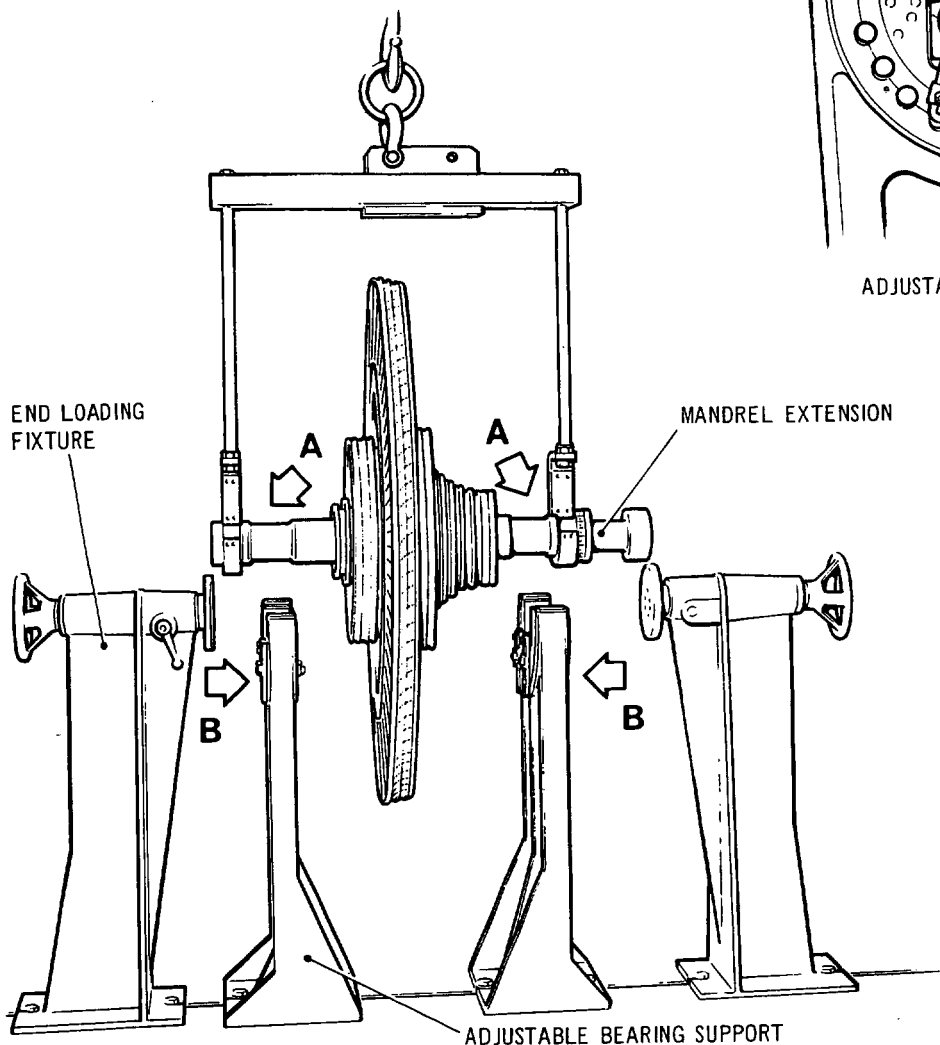


ADJUSTABLE BEARING  
SETTING GAUGE  
(OPPOSITE END SIMILAR)

CLAMPING PLATE AND  
RETAINING BOLT



ADJUSTABLE BEARING



END LOADING  
FIXTURE

MANDREL EXTENSION

ADJUSTABLE BEARING SUPPORT

Setting Adjustable Bearings  
Figure 515

SUB-ASSEMBLY

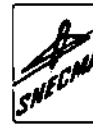
72-51-03

Page 540  
Jan 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (7) Remove turbine assembly from assembly stand.
- (a) Carefully rotate the mandrel and turbine until the mandrel is in the horizontal position. Attach a crane hoist to the lifting fixture (Tool 3054). The fixture is stored in the transport stand.
  - (b) Ensure that the lifting shackle on the lifting fixture is set to the correct centre of gravity position before lifting the mandrel/turbine assembly (Ref.Fig.511).
  - (c) Position the lifting fixture on the mandrel in readiness to remove the turbine assembly from the stand. Remove the bolts securing the mandrel to the stand and carefully transfer the assembly to the transport stand. Place the lifting fixture in the transport stand.
  - (d) Transfer the assembly to the swash check area.
- (8) Prepare swash check equipment (Ref.Fig.515).
- (a) Ensure that the adjustable bearing supports (Tool 1073) and end loading fixtures (Tool 1666) are in position.
  - (b) Assemble the adjustable bearings (Tool 1637) to the supports and secure with clamping plates and retaining bolts.
  - (c) Using the lifting fixture (Tool 3054) carefully lift the turbine assembly from the transport stand and assemble the mandrel extension (Tool 1135) to the short end of the mandrel.
  - (d) Set the adjustable bearings to the mandrel diameters (Ref.Fig.515).
    - (i) Using adjustable bearing setting gauge (Tool 1641) measure the adjustable bearing location at one end of the mandrel. Carefully lock the gauge and check that the setting has not been disturbed.

PRINTED IN ENGLAND

TN49014



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (ii) Place the gauge on the appropriate adjustable bearing housing. Slacken the bolt securing the support arm connected to the bearing roller positioned nearest the adjustment point on the gauge.
- (iii) Carefully move the roller until it is in contact with the adjustment point on the gauge.
- (iv) Tighten the roller support arm securing bolt and check to ensure that the roller remains in contact with the gauge.
- (v) Remove the gauge and reposition it for adjustment of the opposite roller.
- (vi) Set and lock the roller in accordance with the previously described procedure. Remove the gauge.
- (vii) Repeat the setting procedure for the remaining mandrel diameter and adjustable bearing.
- (e) Using lifting fixture (Tool 3054) carefully lift the turbine assembly from the transport stand. Ensure that the mandrel and adjustable bearings are clean. Lower the assembly on to the supports, tighten the bolts securing the supports to the table, then remove the lifting fixture and place it in the transport trolley.
- (f) Carefully move the end loading fixtures until light contact with each end of the mandrel is achieved. The turbine assembly must be free to rotate without axial movement.

B. Blade Length Measuring Procedure (Ref.Fig.516).

- (1) Position the No.1 blade (0 station) horizontally and set the dial indicator on the outer edge of the turbine.

TN49015

SUB-ASSEMBLY

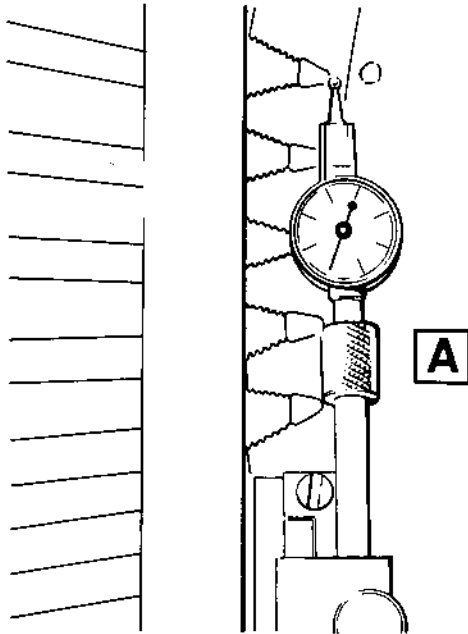
**72-51-03**

Page 542  
Jan 1/78

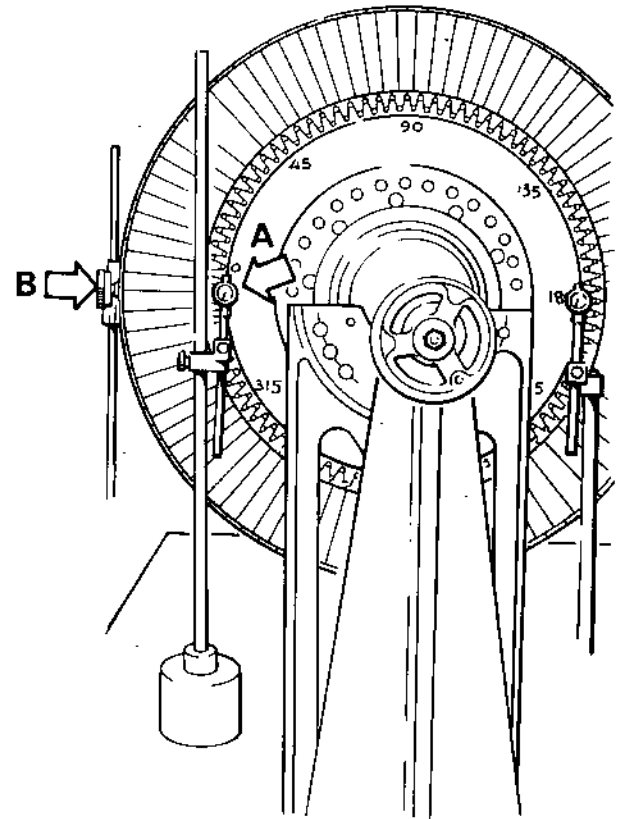


OLYMPUS 593

MK.610-14-28  
OVERHAUL



SWASH CHECK



BLADE LENGTH CHECK

Measuring Turbine Blade Lengths and Turbine Swash  
Figure 516

CR 34482/00A

TN49016



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Carefully rotate the turbine and note the variation of blade lengths, identify the shortest and longest blade by using an adhesive label endorsed with the actual variation. Record the dimensions and positions.

NOTE: This information is required for turbine blade tip clearance measurement during engine build.

C. Swash Measuring Procedure (Ref.Fig.516).

- (1) Commencing at No.1 turbine blade mark the turbine disk at 45 degree intervals in a clockwise direction. Use an approved non-permanent marking substance.
- (2) Position the No.1 blade (0 station) horizontally and prepare the inspection equipment to commence the check. The point of measurement is at the blade root location near the outer rim of the rotor disk.
- (3) Position two dial indicator gauges 180 degrees apart on the horizontal centre line of the turbine disk.
- (4) Carefully rotate the turbine and record the maximum variation (total dial indicator reading) measured by each dial indicator gauge, also note the angle of occurrence. The final maximum swash is obtained by calculating the average variation of these readings.
- (5) Acceptance limits.
  - (a) The maximum permissible swash measured by total dial indicator reading must be within 0.005 in. (0,1270 mm).
- (6) Remove the assembly from the bearing supports and transfer it to the transport stand.
  - (a) Attach the lifting equipment (Tool 3054) to the mandrel. Slide the end loading fixtures away from the mandrel and carefully raise the turbine assembly.

TN49017

SUB-ASSEMBLY

72-51-03

Page 544

Jan 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Remove the mandrel extension from the end of the mandrel and carefully lower the assembly into the transport trolley.

D. Excessive Swash Rectification Procedure.

- (1) Examine the tools and components for incorrect setting or malfunction. If necessary transfer the turbine to the assembly/torque stand (Tool 3053) for disassembly and further investigation.
- (2) Adjust the assembly stand to accept the mandrel horizontally, then using the lifting equipment (Tool 3054) transfer the mandrel to the assembly stand. Secure the mandrel to the stand with four bolts securely tightened.
- (3) Remove the lifting fixture and rotate the assembly to position the mandrel vertically with the turbine assembly uppermost.
- (4) Using cranked ring wrench (Tool 1630) slacken the main securing nuts, then remove the nuts and bolts. Carefully remove No.24 and 26 labyrinth seal and assemble protectors (Tools 1061 and 1063) to the seal.
- (5) Remove the turbine rotor for examination of Hirth serrations.
  - (a) With the knurled nuts of the lifting fixture (Tool 1120) in the unlocked position carefully lower the lifting fixture into the centre bore of the disk and engage the support feet under the disk by turning the knurled nuts to the locked position.
  - (b) Attach a crane hoist to the lifting fixture and carefully raise the rotor.

SUB-ASSEMBLY

**72-51-03**

Page 545

Jan 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) Examine the Hirth serrations on the turbine disk and hub for possible cause of incorrect swash. Carefully lower the turbine disk on to a pallet (Tool 1082), or if the turbine is to be transported for further investigation, assemble it to the balancing mandrel (Tool 139) and mobile stand (Tool 1111).
- (i) Secure the lifting fixture (Tool 1113) to the end of the balancing mandrel (Tool 139) and tighten the securing bolt.
  - (ii) Attach a crane hoist to the lifting fixture and swivel the mandrel in the mobile stand to the vertical position.
  - (iii) Carefully lower the turbine disk over the mandrel and secure it with the knurled nuts and retaining bolts. Remove the crane hoist and turbine disk lifting fixture.
  - (iv) Using a crane hoist carefully swivel the mandrel/turbine on to the mobile stand. Secure the clamps and remove the crane hoist.
- (6) If the reason for excessive swash has not been established remove the turbine hub for examination.
- (a) Carefully place the torque spanner (Tool 3057) over the mandrel and engage it with the castelated nut.
  - (b) Attach a crane hoist to the torque multiplier assembly (Tools 1022, 3058 and 3059) and carefully lower the assembly over the torque spanner assembled to the mandrel. Turn the square drive of the torque multiplier (if necessary) until engagement is achieved with the torque spanner.

**WARNING:** MAINTAIN SUPPORT OF TORQUE MULTIPLIER ASSEMBLY WITH CRANE TO PREVENT ASSEMBLY FROM DROPPING SUDDENLY.

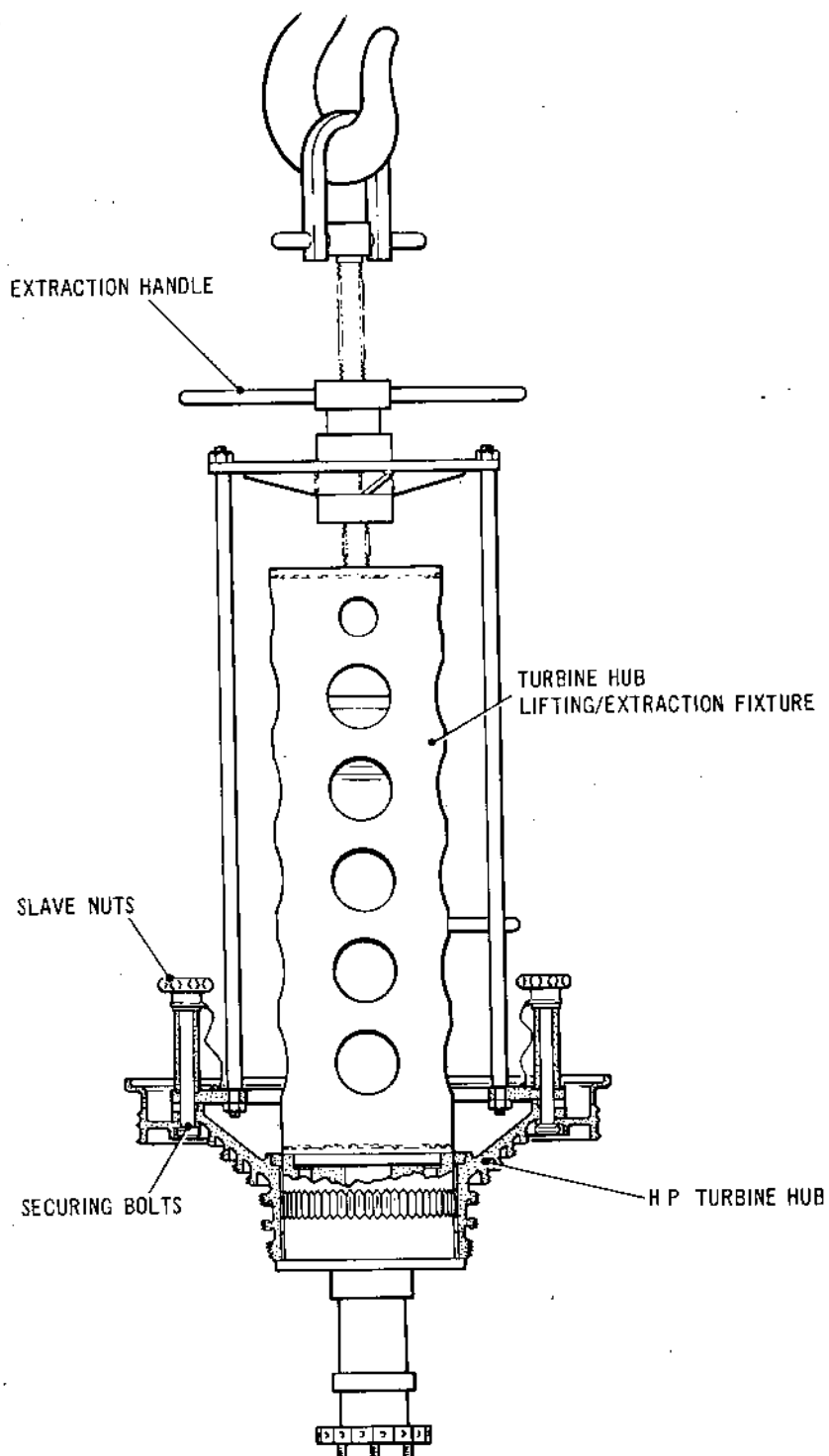
TN49019

CR 34483/00A



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Removing HP Turbine Hub  
Figure 517





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) When the immobilizer is engaged with the torque spanner, continue lowering the assembly until engagement with the securing plate is achieved.
  - (d) Using a suitable wrench spanner, slacken the castellated securing nut. Remove the tools and unscrew the turbine hub nut.
  - (e) Remove the securing plate with the mechanical puller (Tool 3056).
    - (i) Ensure that the hydraulic cylinder is assembled in the bottom position (Ref. Fig.512, detail A).
    - (ii) Carefully lower the mechanical puller over the mandrel and screw the end fitting as far as possible on the securing plate. Tighten the knurled nut on the mechanical puller until the tool is securely in position.
    - (iii) Connect the hand pump to the hydraulic cylinder and carefully apply sufficient pressure to remove the securing plate. Remove the mechanical puller and securing plate from the mandrel.
  - (f) Carefully place the turbine hub lifting/extracting fixture (Tool 1057) over the mandrel and secure it with the turbine securing bolts and slave nuts (attached to the fixture). Turn the handle of the tool to remove the turbine hub from the mandrel (Ref.Fig.517).
  - (g) On completion of the turbine hub extraction procedure remove the tool and detach the turbine hub. Examine the turbine hub for possible cause of excessive swash.
- (7) On completion of excessive swash investigation, reassemble the turbine hub, disk and labyrinth and repeat the swash checks (Ref.para.9. A and C.)

TN49021



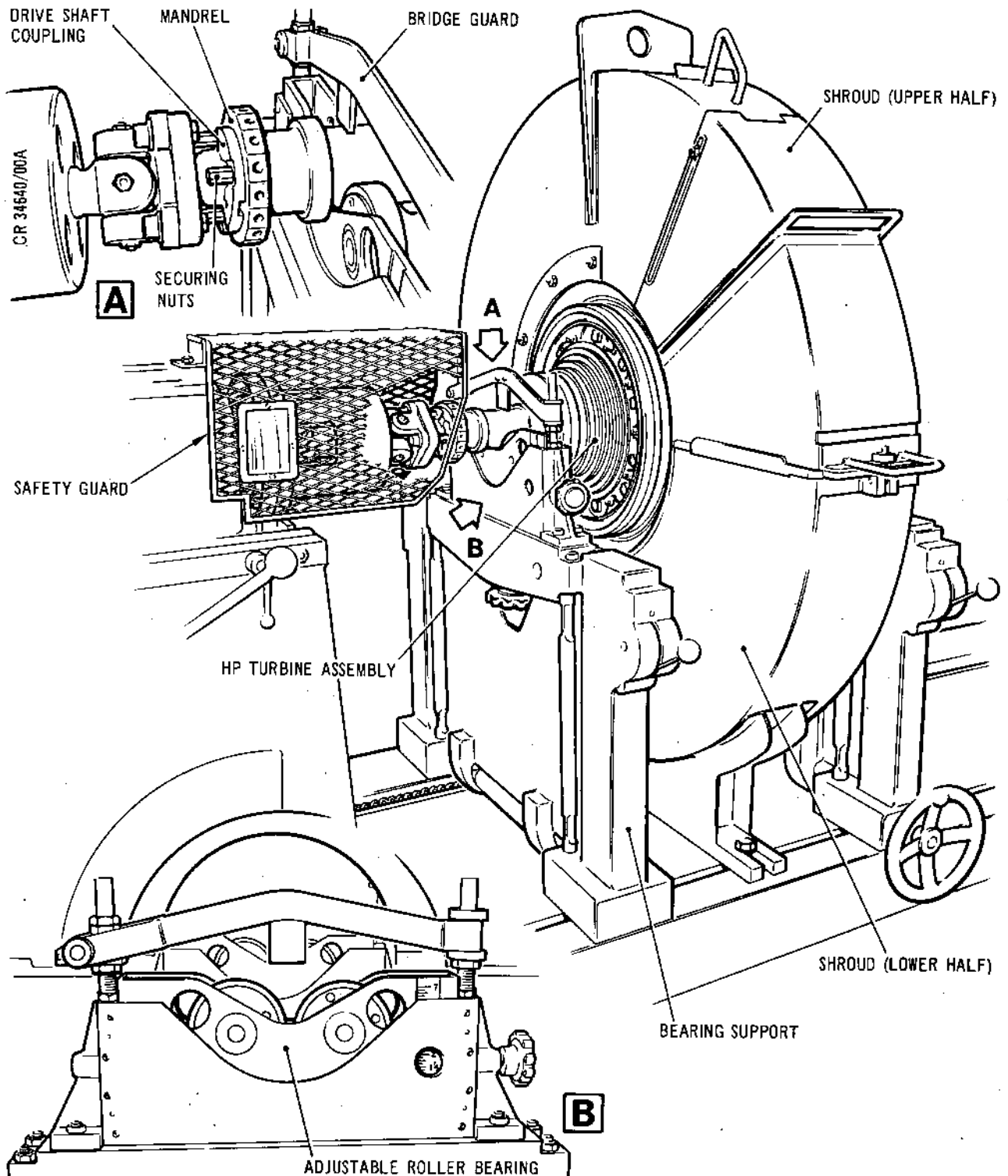
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

TN49Q22



Installing HP Turbine Rotor in Balancing Machine  
Figure 518

SUB-ASSEMBLY  
**72-51-03**  
Page 549  
Jan 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



10. Statically Balance the Turbine Hub Using a Bladed Turbine Disk

NOTE: If a bladed turbine disk is not available, a slave disk (Tool 3067) may be used (Ref.para.11).

WARNING: ISOLATE BALANCING MACHINE FROM ELECTRICITY SUPPLY BEFORE COMMENCING PREPARATION, INSTALLATION OR TURBINE REMOVAL PROCEDURES.

A. Prepare Equipment (Ref.Fig.518).

- (1) Refer to the balancing machine manufacturer's information for details of machine operation, calibration and adjustment (Avery 72 E-8).
- (2) Position the lower half of the shroud (Tool 3068) between the balancing machine bearing supports in preparation to accept the turbine rotor. Loosely assemble the bolts securing the shroud to the base of the machine.
- (3) Using lifting equipment (Tool 3054), carefully raise the mandrel and turbine assembly from the transport stand and position it in readiness for installation in the balancing machine.
- (4) Set the adjustable roller bearings on the balancing machine to suit the corresponding diameters of the mandrel.
- (5) Adjust the distance between pedestals to accept the mandrel and turbine assembly. Ensure thorough cleanliness of the mandrel and adjustable roller bearings and carefully lower the assembly on to the rollers.
- (6) Apply lubricant 'A' to the bearings and check that the assembly rotates freely.
- (7) Secure the drive shaft coupling to the end of the mandrel. Remove the lifting equipment.

TN49023

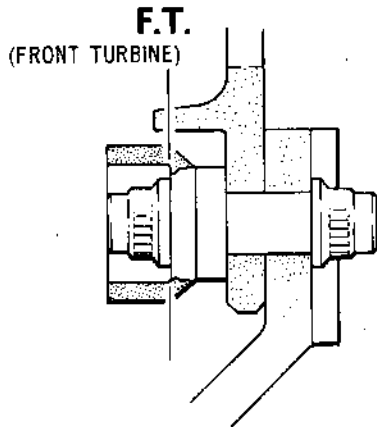
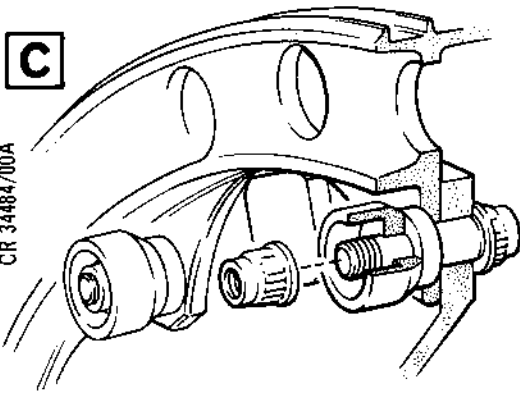


OLYMPUS 593

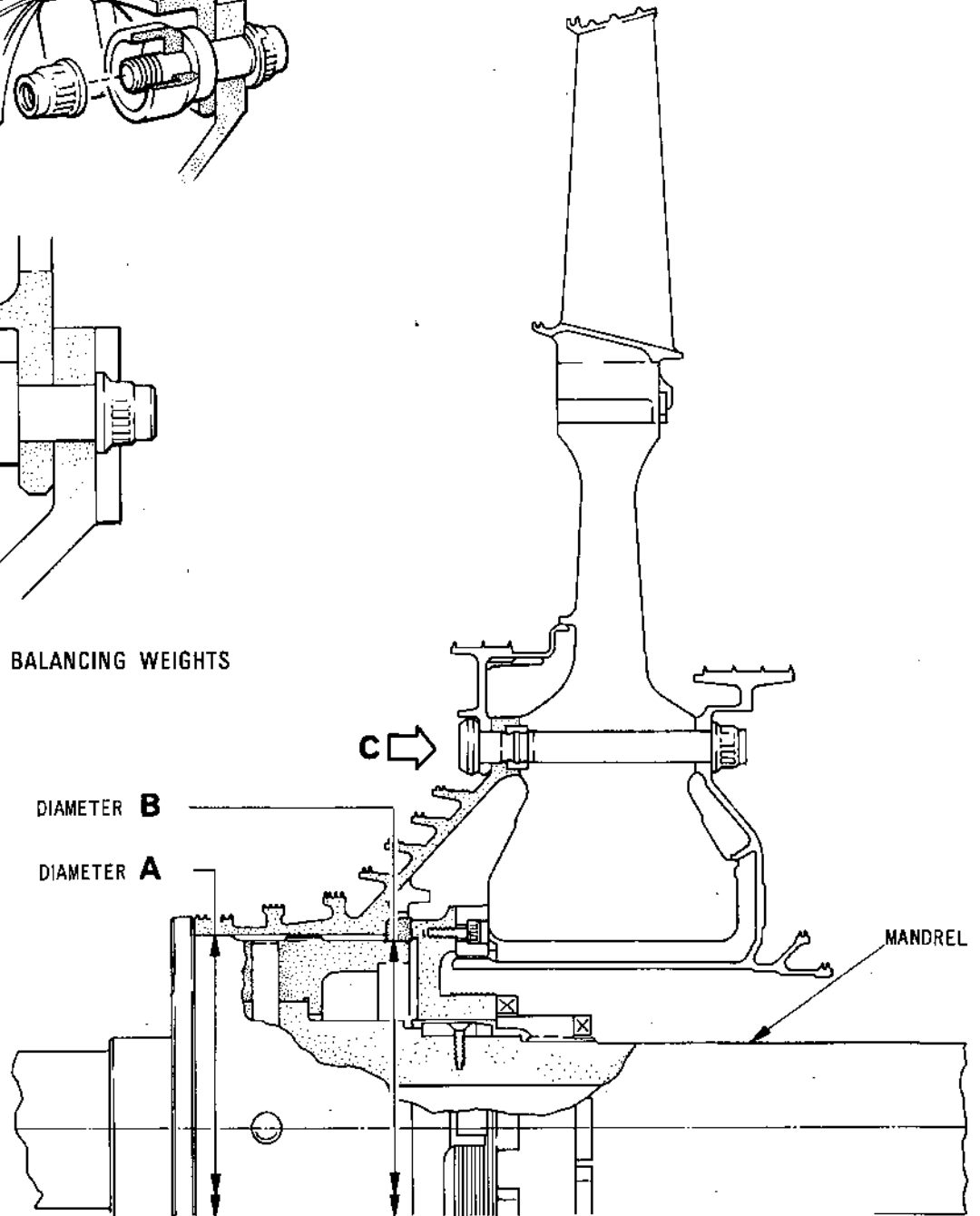
MK. 610-14-28  
OVERHAUL



PRINTED IN ENGLAND



ASSEMBLING BALANCING WEIGHTS



HP Turbine Hub Static Balancing with Bladed Disk  
Figure 519

SUB-ASSEMBLY  
**72-51-03**  
Page 551  
Jan 1/78

TN49024



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (8) Check that adequate clearance exists between the turbine and lower half of the shroud, then tighten the bolts securing the shroud to the balancing machine. Assemble the upper half of the shroud to the lower half.
  - (9) Position the bridge guards over the mandrel and adjustable rollers. Ensure that a small clearance exists between the guards and mandrel then tighten the securing nuts.
- B. Statically Balance Turbine Hub Using Turbine Disk Assembly. (Ref.Fig.519).
- (1) Using plasticine, correct the static unbalance at position FT to within 1 dram inch.
  - (2) Turn the turbine 180 degrees in relation to the mandrel.
    - (a) Switch off the electricity supply and isolate the balancing machine.
    - (b) Disconnect the mandrel from the drive shaft coupling and remove items as necessary to allow removal of the turbine assembly from the balancing machine. Using the lifting fixture (Tool 3054), set to the correct centre of gravity, transfer the turbine assembly to the transport stand (Tool 3055) and convey the assembly to the assembly/torque stand (Tool 3053).
    - (c) Adjust the assembly stand to accept the mandrel horizontally then using the lifting fixture (Tool 3054) transfer the mandrel to the assembly stand. Secure the mandrel to the stand with four bolts securely tightened.
    - (d) Remove the lifting fixture and rotate the assembly to position the mandrel vertically with the turbine assembly uppermost.
    - (e) Carefully place the torque spanner (Tool 3057) over the mandrel and engage it with the nut.

TN49025



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (f) Attach a crane hoist to the torque multiplier assembly (Tools 1022, 3058 and 3059) and carefully lower the assembly over the torque spanner assembled to the mandrel. Turn the square drive of the torque multiplier (if necessary) until engagement is achieved with the torque spanner.

**WARNING:** MAINTAIN SUPPORT OF TORQUE MULTIPLIER ASSEMBLY WITH CRANE TO PREVENT ASSEMBLY FROM DROPPING SUDDENLY.

- (g) When the restrainer is engaged with the torque spanner continue lowering the assembly until engagement with the securing plate is achieved.
- (h) Using a suitable wrench spanner, slacken the turbine hub securing nut. Remove the tools and unscrew the turbine hub nut.
- (j) Using mechanical puller (Tool 3056) remove the securing plate.
- (i) Ensure that the hydraulic cylinder is assembled in the bottom position (Ref. Fig.512, detail A).
- (ii) Attach a crane hoist to the mechanical puller and carefully lower the tool over the mandrel. Screw the end fitting as far as possible on the securing plate. Tighten the knurled nut on the mechanical puller until the assembly is securely in position.
- (iii) Connect the hand pump to the hydraulic cylinder and carefully apply sufficient pressure to separate the securing plate from the mandrel.

PRINTED IN ENGLAND

TN49026



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (iv) Using the crane hoist attached to the mechanical puller raise the turbine assembly clear of the splines on the mandrel. Note the position of the spline marked externally on the turbine hub then turn the turbine assembly 180 degrees relative to the mandrel. Lower the assembly as far as possible on to the mandrel and ensure that it cannot drop involuntarily.
- (k) Press the turbine assembly on to the mandrel with mechanical puller (Tool 3056).
  - (i) Assemble the hydraulic cylinder to the top of the mechanical puller.
  - (ii) Ensure that the securing plate is correctly in position on the mandrel and that the mechanical puller is screwed on to it. Also tighten the knurled nut on the tool until the assembly is securely in position.
  - (iii) Carefully apply sufficient hydraulic pressure to the cylinder to fully press the turbine assembly in position on the mandrel.
  - (iv) Ensure that no gap is present between the bottom of the hub and the mandrel. Remove the mechanical puller from the turbine.
- (l) Assemble the castellated securing nut to the mandrel and torque-tighten it (Ref.para.9.A.(4)).
- (m) Adjust the assembly stand to position the mandrel horizontally. Using the lifting equipment (Tool 3054) transfer the turbine/mandrel assembly to the transport stand (Tool 3055). Convey the assembly to the balancing machine and install it (Ref.para.10.A.) for continuation of balancing procedure.

TN18938

SUB-ASSEMBLY

**72-51-03**

Page 554

Jan 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Measure the static unbalance at position FT.  
Acceptance limit/correction procedure is as follows.
- (a) If the static unbalance is within 30 dram inches continue with the procedure detailed in para.(6).
  - (b) If the static unbalance exceeds 30 dram inches correct half of this unbalance at the angle of error at position FT. Correct the remaining unbalance by applying plasticine to the mandrel.
  - (c) Turn the turbine assembly 180 degrees to its original position on the mandrel (Ref.para.B.(2)). The plasticine must remain in position.
- (4) Measure the static unbalance of the assembly, if this is within 30 dram inches continue with the procedure detailed in para.(6).
- (5) If the unbalance measured in (4) exceeds 30 dram inches, remove the turbine from the mandrel and inspect the turbine hub and mandrel splines for excessive clearance at diameters A and B.
- (a) Switch off the electricity supply and isolate the balancing machine.
  - (b) Disconnect the mandrel from the drive shaft coupling and remove items as necessary to allow removal of the turbine assembly from the balancing machine. Using the lifting equipment (Tool 3054) set to the correct centre of gravity, transfer the turbine assembly to the transport stand (Tool 3055) and convey the assembly to the assembly/torque stand (Tool 3053).
  - (c) Adjust the assembly stand to accept the mandrel horizontally then, using the lifting equipment (Tool 3054), transfer the mandrel to the stand. Secure the mandrel to the stand with four bolts securely tightened.

SUB-ASSEMBLY

72-51-03

Page 555

Jan 1/78





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (d) Remove the lifting equipment and rotate the assembly to position the mandrel vertically with the turbine assembly uppermost.
  - (e) Using cranked ring wrench (Tool 1630) slacken the main securing nuts then remove the nuts and bolts. Carefully remove No.24 and 26 labyrinth seal and assemble protectors (Tools 1061 and 1063) to the seal.
  - (f) Carefully lower the lifting fixture (Tool 1120) into the centre bore of the disk and engage the support feet under the disk by turning the knurled nuts to the locked position.
  - (g) Attach a crane hoist to the lifting fixture and carefully transfer the turbine rotor to the pallet (Tool 1082).
  - (h) Carefully place the torque spanner (Tool 3057) over the mandrel and engage it with the turbine hub securing nut. Attach a crane hoist to the torque multiplier assembly (Tools 1022, 3058 and 3059) and carefully lower the assembly over the torque spanner. Turn the square drive of the torque multiplier (if necessary) until engagement is achieved with the torque spanner.
- WARNING: MAINTAIN SUPPORT OF TORQUE MULTIPLIER ASSEMBLY WITH CRANE TO PREVENT ASSEMBLY FROM DROPPING SUDDENLY.
- (j) When the immobilizer is engaged with the torque spanner, continue lowering the assembly until engagement with the securing plate is achieved.
  - (k) Using a suitable wrench spanner, slacken the turbine hub securing nut. Remove the tools, unscrew and remove the turbine hub securing nut.

TN49028



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

- (l) Ensure that the hydraulic cylinder of mechanical puller (Tool 3056) is assembled in the bottom position (Ref.Fig.512, detail A). Carefully lower the tool over the mandrel and screw the end fitting as far as possible on the securing plate. Tighten the knurled nut on the mechanical puller until the tool is securely in position.
- (m) Connect the hand pump to the hydraulic cylinder and carefully apply sufficient pressure to separate the securing plate from the mandrel. Remove the mechanical puller and securing plate from the mandrel.
- (n) Carefully place the turbine hub lifting/extracting fixture (Tool 1057) over the mandrel and secure it to the hub with the turbine securing bolts and slave nuts (attached to the fixture). Turn the handle of the tool to remove the turbine hub from the mandrel.
- (p) On completion of the turbine hub extraction procedure remove the tool and detach the turbine hub.
- (q) Measure the drive shaft location bore in the turbine hub (Ref. Inspection/Check, 72-51-04, para.6.). Also measure the corresponding diameter on the mandrel. Maximum permissible assembly clearance = 0.0001 in. (0,003 mm).
- (r) On completion of investigation and rectification assemble the turbine hub, disk and labyrinth and repeat the swash checks (Ref. para.9.A. and C.).
- (s) On completion of satisfactory swash check repeat the static balancing procedure (Ref. para.10).
- (6) Remove the plasticine from position FT but do not remove the correction applied to the mandrel. Measure the initial unbalance.
  - (a) If the initial unbalance is in excess of 250 dram inches, recheck the static unbalance of the bladed turbine disk (Ref. para.6).

SUB-ASSEMBLY

72-51-03

Page 557

Jan 1/78



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (b) If the initial unbalance is within the limit of 250 dram inches, balance out to within 4 dram inches by assembling weights to position FT (Ref. Table 502 and Fig.519).

I.P.C. REF. NO.	MAXIMUM NO.
72-51-04/1-200	8
72-51-04/1-205	4
72-51-04/1-210	4
72-51-04/1-215	4
72-51-04/1-220	8

Turbine Assembly Balancing Weights  
Table 502

- (c) Apply lubricant 'C' where appropriate to the bolt threads at position FT. Assemble balancing weights to position FT and secure with nuts (72-51-04/1-190). Ensure that the nuts have a minimum locking (run-down) torque of 6.5 lbf in. (0,73 N.m). Torque-tighten the nuts to 210 lbf in. (24 N.m).
- (d) Record the remaining couple unbalance at any two planes 10 inches (254,000 mm) apart.
- (7) Remove the turbine assembly from the balancing machine and separate the turbine hub, bladed disk and No.24 and 26 labyrinth. Do not remove No.23 labyrinth from the hub.
- (a) Switch off the electricity supply and isolate the balancing machine. Disconnect the mandrel from the drive shaft coupling and remove items as necessary to allow removal of the turbine assembly from the balancing machine. Using the lifting equipment (Tool 3054) set to the correct centre of gravity, transfer the turbine assembly to the transport stand (Tool 3055) and convey the assembly to the assembly/torque stand (Tool 3053).

SUB-ASSEMBLY

## 72-51-03

Page 558  
Dec 31/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Adjust the assembly stand to accept the mandrel horizontally then, using the lifting equipment, transfer the mandrel to the assembly stand. Secure the mandrel to the stand with four bolts securely tightened.
- (c) Remove the lifting fixture and rotate the assembly to position the mandrel vertically with the turbine assembly uppermost.
- (d) Using cranked ring wrench (Tool 1630), slacken the main securing nuts, then remove the nuts and bolts. Carefully remove No.24 and 26 labyrinth seal and assemble protectors (Tools 1061 and 1063) to the seal.
- (e) With the knurled nuts of the lifting fixture (Tool 1120) in the unlocked position, carefully lower the lifting fixture into the centre bore of the disk and engage the support feet under the disk by turning the knurled nuts to the locked position. Attach a crane hoist to the lifting fixture and remove the turbine disk from the hub. Carefully lower the turbine disk on to the pallet (Tool 1082).
- (f) Carefully place the torque spanner (Tool 3057) over the mandrel and engage it with the nut.
- (g) Attach a crane hoist to the torque multiplier assembly (Tools 1022, 3058 and 3059) and carefully lower the assembly over the torque spanner assembled to the mandrel. Turn the square drive of the torque multiplier (if necessary) until engagement is achieved with the torque spanner.

**WARNING:** MAINTAIN SUPPORT OF IMMOBILIZER  
ASSEMBLY WITH CRANE TO PREVENT  
ASSEMBLY FROM DROPPING SUDDENLY.

- (h) When the immobilizer is engaged with the torque spanner, continue lowering the assembly until engagement with the securing plate is achieved.

PRINTED IN ENGLAND

TN49031

SUB-ASSEMBLY

**72-51-03**

Page 559  
Jan 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (j) Using a suitable wrench spanner, slacken the turbine hub securing nut. Remove the tools and the turbine hub securing nut.
- (k) Remove the securing plate with mechanical puller (Tool 3056).
  - (i) Ensure that the hydraulic cylinder is assembled in the lower position on the mechanical puller (Ref.Fig.512, detail A).
  - (ii) Carefully lower the mechanical puller over the mandrel and screw the end fitting as far as possible on the securing plate. Tighten the knurled nuts on the mechanical puller until the tool is securely in position.
  - (iii) Connect the hand pump to the hydraulic cylinder and carefully apply sufficient pressure to separate the securing plate from the mandrel. Remove the mechanical puller and securing plate from the mandrel.
- (l) Remove the turbine hub from the mandrel using lifting/extracting tool (Tool 1057).
  - (i) Place the extracting tool over the mandrel and secure it to the hub with the turbine securing bolts and slave nuts (attached to the fixture). Turn the handle of the tool to remove the turbine hub from the mandrel.
  - (ii) On completion of the turbine hub extraction procedure, remove the tool and detach the turbine hub. Assemble the protector (Tool 1062) to the turbine hub. Do not disturb the balance weights assembled to the hub and labyrinth.

IN49032

SUB-ASSEMBLY

**72-51-03**

Page 560

Jan 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(m) If the initial unbalance is within limits (Ref. para.(6) (a)), pass the following components to the engine assembly area.

- (i) No.23 labyrinth seal/damping ring/  
turbine hub assembly (72-51-04/  
1-250-290-300) (1)
- (ii) Turbine assembly (1)
- (iii) Bolts (72-51-04/1-180) (10)
- (iv) Nuts (72-51-04/1-120) (10)
- (v) Retaining rings (72-51-04/1-170) (10)
- (vi) Labyrinth seal No.24 and 26 (1)

(8) If the initial unbalance is not within limits (Ref. para.(6) (a)) recheck the static unbalance of the bladed turbine disk.

(a) Remove the turbine assembly from the balancing machine and separate the turbine hub, bladed disk and No.24 and 26 labyrinth (Ref. para.(5) (a), (b), (c), (d) and (e)).

(b) Prepare the balancing mandrel (Tool 139) to accept the bladed disk.

(i) Ensure that the mandrel is secured to the mobile stand (Tool 1111). Secure the lifting fixture (Tool 1113) to the end of the balancing mandrel and tighten the securing bolt.

(ii) Attach a crane hoist to the lifting fixture on the end of the mandrel and raise the mandrel to the vertical position.

(c) With the knurled nuts of the lifting fixture (Tool 1120) in the unlocked position, carefully lower the lifting fixture into the centre bore of the disk and engage the support feet under the disk by turning the knurled nuts to the locked position.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (d) Ensure that the Hirth serrations on the mandrel are thoroughly clean. Attach a crane hoist to the lifting fixture attached to the turbine disk and carefully lower the assembly over the vertical mandrel ensuring that the serrations on the turbine disk and datum mark → 0 ← align with those of the mandrel.
  - (e) Carefully lower the turbine disk over the studs in the mandrel disk and finally secure the assembly with the mandrel nuts.
  - (f) Attach a crane hoist to the lifting fixture on the end of the mandrel. Carefully lower the assembly into the horizontal position on the mobile stand. Remove the lifting fixture from the mandrel.
  - (g) Convey the assembly to the static balancing area.
- (9) Statically balance HP turbine rotor (Ref. para.6.).
- NOTE: If it is necessary to remove turbine blades locking plates, use locking tools (Tools 1080 and 1081).
- (10) Check swash of turbine rotor (Ref. para.9.).
- (11) Statically balance turbine hub (Ref. para.10.).

#### 11. Statically Balance Turbine Hub Using Slave Turbine Disk

NOTE: For balancing purposes the slave turbine disk is an alternative to the bladed turbine disk. This procedure applies only to SB.72-8305 standard and conforms to module interchangeability requirement.

##### A. Assemble the Slave Disk Turbine Hub and Mandrel.

- (1) Assemble the balancing mandrel (Tool 3052) to the turbine assembly/torque stand (Tool 3053), (Ref. para.9.A.(1)).

TN49034



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (2) Assemble the turbine hub to the mandrel (Ref. para.9.A.(2)).
- (3) Press the hub in position with mechanical puller (Ref. para.9.A.(3)).
- (4) Assemble the castellated nut to the mandrel and torque-tighten it (Ref. para.9.A.(4)).
- (5) Assemble the slave turbine disk (Tool 3067) to the turbine hub.

NOTE: The slave turbine disk is stored in container (Tool 3069).

- (a) Carefully lower the lifting fixture (Tool 1120) into the centre bore of the slave turbine disk. Engage the support feet to the disk by turning the knurled nuts to the locked position.
- (b) Carefully raise the slave disk out of the transport container and ensure that the Hirth serrations on the disk and hub are thoroughly clean and damage free.
- (c) Lower the slave turbine on to the hub ensuring that the balance datum marks 0 on the hub and disk are aligned as near as possible. Remove the lifting fixture.
- (6) Secure the turbine hub and slave disk together with the main securing bolts. This procedure is similar to that shown (Ref.Fig.514).
- (a) Using an approved non-permanent marking substance identify the main securing bolt-holes numerically (1 to 10) by marking the uppermost surface of the slave turbine disk in a clockwise direction.
- (b) Apply lubricant 'C' to the main securing bolts, insert the bolts in numerical sequence into the appropriately marked holes and secure with nuts (72-51-04/1-120).





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) Torque-tighten the nuts evenly in increments of 30 lbf ft. (40,6 N.m) in the following sequence, 1, 6, 3, 8, 4, 9, 2, 7, 5, 10 until a torque between 80 and 90 lbf ft. (108,5 and 122,0 N.m) is achieved.
- (7) Remove the slave disk and hub assembly from the assembly stand.
- (a) Carefully rotate the mandrel and slave disk until the mandrel is in the horizontal position. Attach a crane hoist to the lifting equipment (Tool 3054). The lifting equipment is stored in the transport stand (Tool 3055).
  - (b) Ensure that the lifting shackle on the lifting equipment is set to the correct centre of gravity position before lifting the mandrel/slave disk assembly.
  - (c) Position the lifting equipment on the mandrel in readiness to remove the turbine assembly from the stand. Remove the bolts securing the mandrel to the stand and carefully transfer the assembly to the transport stand. Place the lifting fixture in the transport stand and convey the assembly to the static balancing area.
- B. Prepare for Static Balance Check (Ref.Fig.518).
- WARNING: ISOLATE BALANCING MACHINE FROM ELECTRICITY SUPPLY BEFORE COMMENCING PREPARATION INSTALLATION OR TURBINE REMOVAL PROCEDURES.
- (1) Refer to the balancing machine manufacturer's information for details of machine operation calibration and adjustment (Avery 72 E-8).
  - (2) Position the lower half of the shroud (Tool 3068) between the balancing machine bearing supports in preparation to accept the turbine rotor. Loosely assemble the bolts securing the shroud to the base of the machine.



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (3) Using lifting equipment (Tool 3054) carefully raise the mandrel and turbine assembly from the transport stand and position it in readiness for installation in the balancing machine.
- (4) Set the adjustable roller bearings on the balancing machine to suit the corresponding diameters of the mandrel.
- (5) Adjust the distance between the supports to accept the mandrel and turbine assembly. Ensure thorough cleanliness of the mandrel and adjustable roller bearings and carefully lower the assembly on to the rollers.
- (6) Apply lubricant 'A' to the bearings and check that the assembly rotates freely.
- (7) Secure the drive shaft coupling to the end of the mandrel. Remove the lifting equipment.
- (8) Check that adequate clearance exists between the slave turbine disk and lower half of the shroud then tighten the bolts securing the shroud to the balancing machine. Assemble the upper half of the shroud to the lower half.
- (9) Position the bridge guards over the mandrel and adjustable rollers. Ensure that a small clearance exists between the guards and mandrel then tighten the securing nuts.

#### C. Static Balancing Procedure.

- (1) Using plasticine correct the static unbalance at position FT to within 1 dram inch.
- (2) Turn the slave turbine disk 180 degrees in relation to the turbine hub.
  - (a) Switch off the electricity supply and isolate the balancing machine.

SUB-ASSEMBLY

**72-51-03**

Page 565

Jan 1/78



# OLYMPUS 593



MK.610-14-28

SNECMA

OVERHAUL

- (b) Disconnect the mandrel from the drive shaft coupling and remove items as necessary to allow removal of the assembly from the balancing machine. Using the lifting fixture (Tool 3054) set to the correct centre of gravity, transfer the assembly to the transport stand (Tool 3055) and convey the assembly to the assembly/torque stand (Tool 3053).
- (c) Adjust the assembly stand to accept the mandrel horizontally, then using the lifting fixture (Tool 3054) transfer the mandrel to the assembly stand. Secure the mandrel to the stand with four bolts securely tightened.
- (d) Remove the lifting fixture and rotate the assembly to position the mandrel vertically with the turbine assembly uppermost.
- (e) Using cranked ring wrench (Tool 1630) slacken the main securing nuts then remove the nuts and bolts.
- (f) Carefully lower the lifting fixture (Tool 1120) into the centre bore of the disk and engage the support feet to the disk by turning the knurled nuts to the locked position.
- (g) Note the position of the slave turbine disk in relation to the hub. Attach a crane hoist to the slave disk and carefully raise it clear of the hub. Turn the slave disk 180 degrees on the hub and lower it on to the hub.
- (h) Apply lubricant 'C' to the main securing bolts, insert the bolts in numerical sequence into the appropriately marked holes and secure with the nuts.
- (j) Torque-tighten the nuts evenly in increments of 30 lbf ft. (40,6 N.m) in the following sequence, 1, 6, 3, 8, 4, 9, 2, 7, 10 until a torque of between 80 and 90 lbf ft. (108,5 and 122,0 N.m) is achieved.

SUB-ASSEMBLY

## 72-51-03

Page 566

Dec 31/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Carefully rotate the mandrel and slave disk until the mandrel is in the horizontal position. Attach a crane hoist to the lifting equipment (Tool 3054). Ensure that the lifting shackle on the lifting equipment is set to the correct centre of gravity position before lifting the mandrel/slave disk.
- (4) Transfer the mandrel/slave disk to the transport stand (Tool 3055) and convey the assembly to the balancing machine for installation and continuation of balancing procedure.
- (5) Check the static unbalance of the assembly at position FT. If the unbalance is in excess of 10 dram inches, correct half of this unbalance at the angle of error at position FT. Correct the remaining unbalance by applying plasticine to the slave turbine disk.
- (6) Turn the slave turbine 180 degrees in relation to the mandrel.
  - (a) Switch off the electricity supply and isolate the balancing machine.
  - (b) Disconnect the mandrel from the drive shaft coupling and remove items as necessary to allow removal of the assembly from the balancing machine. Using the lifting fixture (Tool 3054) set to the correct centre of gravity, transfer the assembly to the transport stand (Tool 3055) and convey the assembly to the assembly/torque stand (Tool 3053).
  - (c) Adjust the assembly stand to accept the mandrel horizontally then using the lifting fixture (Tool 3054) transfer the mandrel to the assembly stand. Secure the mandrel to the stand with four bolts securely tightened.
  - (d) Remove the lifting fixture and rotate the assembly to position the mandrel vertically with the slave turbine uppermost.

SUB-ASSEMBLY

**72-51-03**

Page 567

Jan 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (e) Carefully place the torque spanner (Tool 3057) over the mandrel and engage it with the nut.
- (f) Attach a crane hoist to the torque multiplier assembly (Tools 1022, 3058 and 3059) and carefully lower the assembly over the torque spanner assembled to the mandrel. Turn the square drive of the torque multiplier (if necessary) until engagement is achieved with the torque spanner.

WARNING: MAINTAIN SUPPORT OF TORQUE MULTIPLIER ASSEMBLY WITH CRANE TO PREVENT ASSEMBLY FROM DROPPING SUDDENLY.

- (g) When the restrainer is engaged with the torque spanner, continue lowering the assembly until engagement with the securing plate is achieved.
- (h) Using a suitable wrench spanner, slacken the turbine hub securing nut. Remove the tools and unscrew the turbine hub nut.
- (j) Using mechanical puller (Tool 3056) remove the securing plate.
  - (i) Ensure that the hydraulic cylinder is assembled in the bottom position (Ref. Fig.512, detail A).
  - (ii) Attach a crane hoist to the mechanical puller and carefully lower the tool over the mandrel. Screw the end fitting as far as possible on the securing plate. Tighten the knurled nut on the mechanical puller until the assembly is securely in position.
  - (iii) Connect the hand pump to the hydraulic cylinder and carefully apply sufficient pressure to separate the securing plate from the mandrel.

TN49040

SUB-ASSEMBLY

72-51-03

Page 568  
Jan 1/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (iv) Using the crane hoist attached to the mechanical puller raise the assembly clear of the splines on the mandrel. Note the position of the spline marked externally on the turbine hub then turn the assembly 180 degrees relative to the mandrel. Lower the assembly as far as possible on to the mandrel and ensure that it cannot drop involuntarily.
- (k) Press the assembly on to the mandrel with mechanical puller (Tool 3056).
- (i) Assemble the hydraulic cylinder to the top of the mechanical puller.
- (ii) Ensure that the securing plate is correctly in position on the mandrel and that the mechanical puller is screwed on to it. Also tighten the knurled nut on the tool until the assembly is securely in position.
- (iii) Carefully apply sufficient hydraulic pressure to the cylinder to fully press the assembly in position on the mandrel.
- (iv) Ensure that no gap is present between the bottom of the hub and the mandrel. Remove the mechanical puller from the turbine.
- (l) Assemble the castellated securing nut to the mandrel and torque-tighten it (Ref. para.9.A. (4)).
- (m) Adjust the assembly stand to position the mandrel horizontally. Using the lifting equipment (Tool 3054) transfer the assembly to the transport stand (Tool 3055). Convey the assembly to the balancing machine and install it (Ref. para.10.A.). for continuation of balancing procedure.
- (7) Measure the static unbalance at position FT. Acceptance limit/correction procedure is as follows.

SUB-ASSEMBLY

72-51-03

Page 569

Jan 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (a) If the static unbalance is within 30 dram inches, continue with the procedure detailed in para.(8).
- (b) If the static unbalance exceeds 30 dram inches, correct half of this unbalance at the angle of error at position FT. Correct the remaining unbalance by applying plasticine to the mandrel.
- (c) Turn the turbine 180 degrees to its original position (Ref.para.(6)). The plasticine must remain in position.
- (d) Measure the static unbalance of the assembly, if this is within 30 dram inches, continue with the procedure detailed in para.(8).
- (e) If the unbalance measured in (d) exceeds 30 dram inches, remove the slave turbine disk from the mandrel and inspect the turbine hub and mandrel splines for excessive clearance at diameters A and B (Ref.Fig.519).
  - (i) Switch off the electricity supply and isolate the balancing machine.
  - (ii) Disconnect the mandrel from the drive shaft coupling and remove items as necessary to allow removal of the slave turbine from the balancing machine. Using the lifting equipment (Tool 3054) set to the correct centre of gravity, transfer the assembly to the transport stand (Tool 3055) and convey the assembly to the assembly/torque stand (Tool 3053).
  - (iii) Adjust the assembly stand to accept the mandrel horizontally, then using the lifting equipment (Tool 3054) transfer the mandrel to the stand. Secure the mandrel to the stand with four bolts securely tightened.

TN49042

SUB-ASSEMBLY

**72-51-03**

Page 570

Jan 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (iv) Remove the lifting equipment and rotate the assembly to position the mandrel vertically with the slave turbine disk uppermost.
- (v) Using the cranked ring wrench (Tool 1630) slacken the main securing nuts then remove the nuts and bolts.
- (vi) Carefully lower the lifting fixture (Tool 1120) into the centre bore of the slave turbine disk and engage the support feet under the disk by turning the knurled nuts to the locked position.
- (vii) Attach a crane hoist to the lifting fixture and carefully transfer the slave disk assembly.
- (viii) Carefully place the torque spanner (Tool 3057) over the mandrel and engage it with the turbine hub securing nut. Attach a crane hoist to the torque multiplier assembly (Tools 1022, 3058 and 3059) and carefully lower the assembly over the torque spanner. Turn the square drive of the torque multiplier (if necessary) until engagement is achieved by the torque spanner.
- WARNING:** MAINTAIN SUPPORT OF TORQUE MULTIPLIER ASSEMBLY WITH CRANE TO PREVENT ASSEMBLY FROM DROPPING SUDDENLY.
- (ix) When the immobilizer is engaged with the torque spanner, continue lowering the assembly until engagement with the securing plate is achieved.
- (x) Using a suitable wrench spanner, slacken the turbine hub securing nut. Remove the tools, unscrew and remove the turbine hub securing nut.





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (xi) Ensure that the hydraulic cylinder of mechanical puller (Tool 3056) is assembled in the bottom position (Ref. Fig.512, detail A). Carefully lower the tool over the mandrel and screw the end fitting as far as possible on the securing plate. Tighten the knurled nut on the mechanical puller until the tool is securely in position.
- (xii) Connect the hand pump to the hydraulic cylinder and carefully apply sufficient pressure to separate the securing plate from the mandrel. Remove the mechanical puller and securing plate from the mandrel.
- (xiii) Carefully place the turbine hub lifting/extracting fixture (Tool 1057) over the mandrel and secure it to the hub with the turbine securing bolts and slave nuts (attached to the fixture). Turn the handle of the tool to remove the turbine hub from the mandrel.
- (xiv) On completion of the turbine hub extraction procedure, remove the tool and detach the turbine hub.
- (xv) Measure the drive shaft location bore in the turbine hub (Ref. Inspection/Check, 72-51-04, para.6). Also measure the corresponding diameter on the mandrel. Maximum permissible assembly clearance = 0.0001 in. (0,003 mm).
- (xvi) On completion of investigation and rectification, assemble the slave disk, turbine hub and mandrel (Ref. para.11.A.) and repeat the static balancing procedure (Ref. para.11. B and C).

TN49044

SUB-ASSEMBLY

**72-51-03**

Page 572  
Jan 1/78



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (8) Remove the plasticine from position FT but do not remove the correction applied to the mandrel. Measure the initial unbalance.
  - (a) If the initial unbalance is in excess of 250 dram inches, it will be necessary to recheck the static unbalance of the slave turbine disk.
  - (b) If the initial unbalance is within 250 dram inches, balance out to within 4 dram inches by assembling weights to position FT (Ref. Table 502 and Fig.519).
  - (c) Apply lubricant 'C' where appropriate to the bolt threads at position FT. Assemble balancing weights to position FT and secure with nuts (72-51-04/1-190). Ensure that the nuts have a minimum locking (run-down) torque of 6.5 lbf in. (0,73 N.m). Torque-tighten the nuts to 210 lbf in. (24 N.m).
  - (d) Record the remaining couple unbalance at any two planes 10 inches (254,000 mm) apart.
- (9) Remove the slave turbine disk assembly from the balancing machine and separate the turbine hub from the disk.
  - (a) Switch off the electricity supply and isolate the balancing machine. Disconnect the mandrel from the drive shaft coupling and remove items as necessary to allow removal of the slave turbine assembly from the balancing machine. Using the lifting equipment (Tool 3054) set to the correct centre of gravity, transfer the turbine assembly to the transport stand (Tool 3055). Convey the assembly to the assembly/torque stand (Tool 3053).
  - (b) Adjust the assembly stand to accept the mandrel horizontally, then using the lifting equipment transfer the mandrel to the assembly stand. Secure the mandrel to the stand with four bolts securely tightened.

SUB-ASSEMBLY

72-51-03

Page 573

Dec 31/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) Remove the lifting fixture and rotate the assembly to position the mandrel vertically with the slave turbine uppermost.
- (d) Using cranked ring wrench (Tool 1630) slacken the main securing nuts and remove the nuts and bolts.
- (e) With the knurled nuts of the lifting fixture (Tool 1120) in the unlocked position, carefully lower the lifting fixture into the centre bore of the disk and engage the support feet under the disk by turning the knurled nuts to the locked position. Attach a crane hoist to the lifting fixture and remove the slave turbine disk from the hub. Carefully lower the slave turbine disk on to the pallet (Tool 1082).
- (f) Carefully place the torque spanner (Tool 3057) over the mandrel and engage it with the nut.
- (g) Attach a crane hoist to the torque multiplier assembly (Tools 1022, 3058 and 3059) and carefully lower the assembly over the torque spanner assembled to the mandrel. Turn the square drive of the torque multiplier (if necessary) until engagement is achieved with the torque spanner.

WARNING: MAINTAIN SUPPORT OF IMMOBILIZER  
ASSEMBLY WITH CRANE TO PREVENT  
ASSEMBLY FROM DROPPING SUDDENLY.

- (h) When the immobilizer is engaged with the torque spanner continue lowering the assembly until engagement with the securing plate is achieved.
- (j) Using a suitable wrench spanner, slacken the turbine hub securing nut. Remove the tools and the turbine hub securing nut.

SUB-ASSEMBLY

**72-51-03**

Page 574  
Jan 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (k) Remove the securing plate with mechanical puller (Tool 3056).
- (i) Ensure that the hydraulic cylinder is assembled to the bottom position (Ref. Fig.512, detail A).
  - (ii) Carefully lower the mechanical puller over the mandrel and screw the end fitting as far as possible on the securing plate. Tighten the knurled nut on the mechanical puller until the tool is securely in position.
  - (iii) Connect the hand pump to the hydraulic cylinder and carefully apply sufficient pressure to separate the securing plate from the mandrel. Remove the mechanical puller and securing plate from the mandrel.
- (l) Remove the turbine hub from the mandrel using lifting/extracting tool (Tool 1057).
- (i) Place the extracting tool over the mandrel and secure it to the hub with the turbine securing bolts and slave nuts (attached to the fixture). Turn the handle of the tool to remove the turbine hub from the mandrel.
  - (ii) On completion of the turbine hub extraction procedure, remove the tool and detach the turbine hub. Assemble protector (Tool 1062) to the turbine hub. Do not disturb the balance weights assembled to the hub and labyrinth.

PRINTED IN ENGLAND

TN49047



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

(m) Pass the following components to the engine assembly area.

- (i) No.23 labyrinth seal/damping ring/  
turbine hub assembly (72-51-04/  
1-250-290-300) (1)
- (ii) Turbine assembly (1)
- (iii) Bolts (72-51-04/1-180A) (10)  
Pre-S.B.72-8444-225 and/or  
(72-57-04/1-180B) S.B.72-8444-225
- (iv) Nuts (75-51-04/1-120) (10)
- (v) Retaining rings (72-51-04/1-170) (10)
- (vi) Labyrinth seal No.24 and 26 (1)

SUB-ASSEMBLY

**72-51-03**

Page 576

Dec 31/00



OLYMPUS 593

MK.610-14-28  
OVERHAUL



HP TURBINE ROTOR, HUB AND LABYRINTH ASSEMBLIES - ASSEMBLY

For information on the assembly of the HP Turbine Rotor,  
Hub and Labyrinth Assemblies, refer to 72-51-03 Assembly.

SUB-ASSEMBLY

**72-51-04**

Page 501

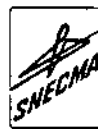
Oct 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



LP TURBINE NOZZLE - SUB-ASSEMBLY

TABLE OF CONTENTS

Para.	Page
1. General ... ..	501
2. LP Turbine Nozzle Assembly ... ..	501
A. Prepare Nozzle Vane Support Diaphragm ... ..	501
B. Separate and Identify Nozzle Vanes ... ..	503
C. Assemble Nozzle Vanes to Support Diaphragm... ..	504
3. Check and Adjust Nozzle Area Throat Gaps... ..	506
A. Assemble Nozzle Assembly to Combustion Chamber Outer Case (CCOC) for Throat Gap Checks ... ..	506
B. Throat Gap Checks Nozzle Vanes ... ..	508
C. Investigate and Rectify Incorrect Total Throat Area... ..	513

TABLE OF ILLUSTRATIONS

Fig. No.	Page
501 Assembling Cover to Diaphragm ... ..	502
502 Assembling Nozzle Vanes to Diaphragm .. ...	505
503 Assembling LP Turbine Nozzle Assembly to CCOC ...	507
504 Preparing for LP Turbine Nozzle Throat Gap Checks ... ..	509
505 Throat Gap Checking Procedure ... ..	511

LIST OF TABLES

Table No.	Page
501 LP Turbine Nozzle Vanes Identification ... ..	504

SUB-ASSEMBLY

**72-52-01**

Contents 1

Sep 1/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## LP TURBINE NOZZLE - SUB-ASSEMBLY

### 1. General

- A. Prior to commencing assembly, refer to 72-09-00, Assembly for general information.
- B. During the sub-assembly procedure reference will be made to the Illustrated Parts Catalogue (I.P.C.) to identify those items where the nomenclature does not positively identify them due to duplication of title e.g. nuts, bolts, washers etc. Where the item is part of this text it will be identified as e.g. bolt (1-10), the 1 referring to the I.P.C. Fig.No. and the 10 referring to the Item No.
- C. Throughout the text special tools are quoted by their Ref.No. e.g. (Tool 1234). For a complete list of tooling required for the assembly, and for the Manufacturers Part No. refer to the Special Tools, Fixtures and Equipment Table 1002.
- D. The LP turbine nozzle is composed of 24 nozzle vanes assembled to a centrally positioned diaphragm. Measurements are recorded at each nozzle vane and the total air flow throat area is calculated. On completion of assembly the nozzle is placed on a transportation table by use of a lifting fixture incorporating retaining hooks which engage with each vane. The lifting fixture remains attached to the nozzle until it is assembled to an engine.

### 2. LP Turbine Nozzle Assembly

- A. Prepare Nozzle Vane Support Diaphragm (Ref. Fig.501).
  - (1) Insert twelve cover retaining bolts (1-40) through the flange in the rear section of the diaphragm (1-120). Ensure that the bolt heads are correctly positioned on the flange. Secure each bolt with a retaining ring (1-30A) use assembly sleeve (Tool 1321) to assemble them to the bolts.
  - (2) Place the diaphragm into an oven and heat to a temperature of 100 deg C for 15 minutes. Prepare a suitable flat surface as near as possible to the oven and on completion of the given heating time remove the diaphragm from the oven and place it on the prepared surface with the installed bolts uppermost. Wear suitable protective gloves when handling the heated component.



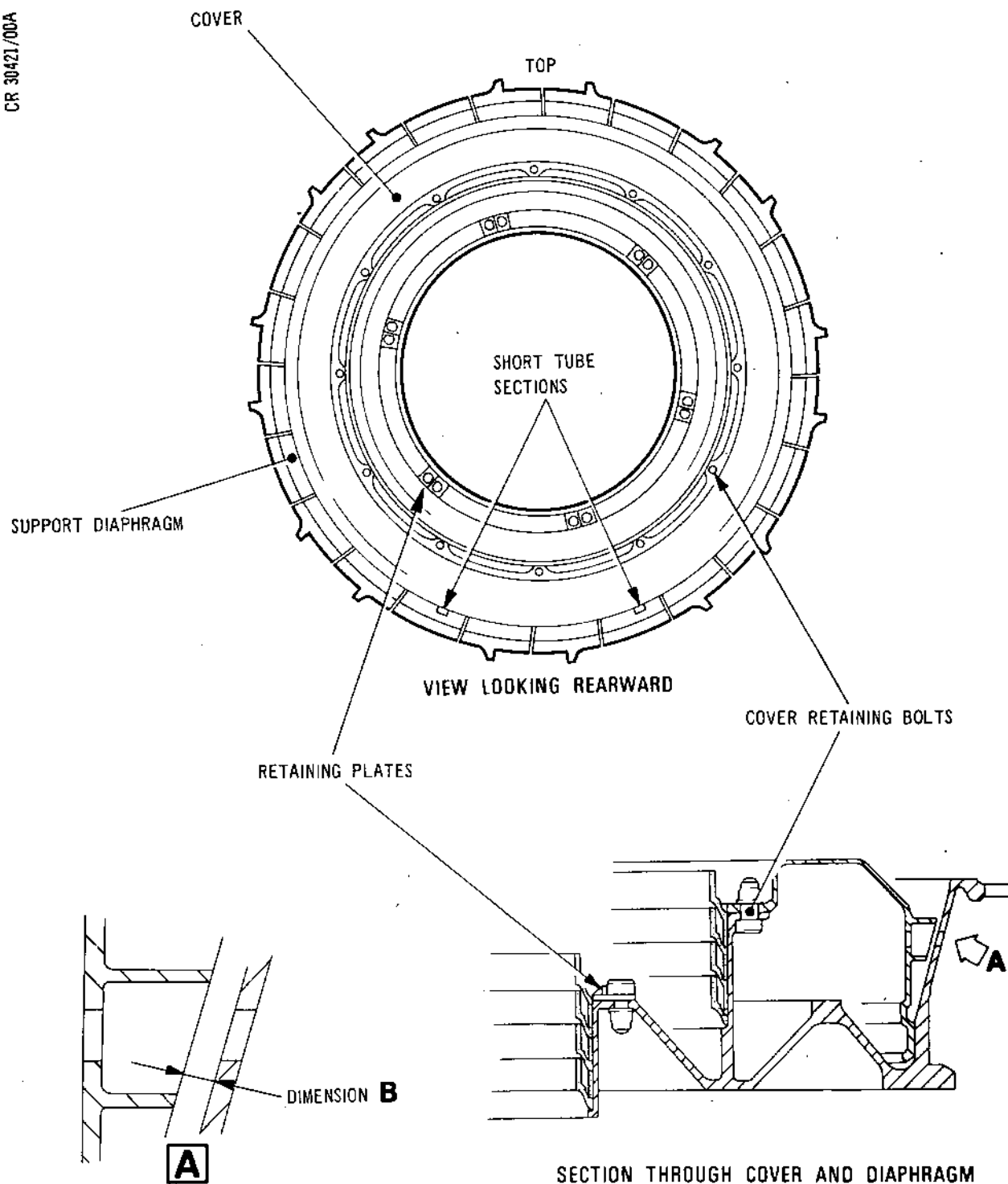


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 30421/00A



Assembling Cover to Diaphragm  
Figure 501

SUB-ASSEMBLY  
**72-52-01**  
Page 502  
Mar 1/76

TN13433



OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

- (3) Place the cover unit (1-10) in position on the diaphragm ensuring that the two short tube sections on the outer diameter of the cover unit are aligned with the holes in the diaphragm. Evenly press the cover fully into position on the diaphragm, and temporarily secure with four nuts equally spaced.
- (4) Apply lubricant 'C' to the bolt threads and finally secure the cover to the diaphragm with twelve nuts (1-20) torque-tightened to 100 lbf in. (11,5 N.m).
- (5) Check dimension B between the short tube sections on outer diameter of the cover and the diaphragm. Minimum clearance 0.080 in. (2,032 mm).
- (6) Assemble six retaining plates (1-70) to the twin hole locations on the inner flange of the diaphragm.
  - (a) Position each retaining plate so that the flat side locates on the flange and the chamfer overlaps the machined section of the labyrinth ring.
  - (b) Insert two bolts (1-60) through each retaining plate with the flat edge section of each bolt located against the raised section of the retaining plate.
  - (c) Apply lubricant 'C' to the bolt threads and secure the bolts with nuts (1-50) torque-tightened to 100 lbf in. (11,5 N.m).

#### B. Separate and Identify Nozzle Vanes.

- (1) Examine all original nozzle vane assemblies on the outer section between the vane ends for their position number, then lay the vanes out in numerical sequence leaving spaces for any replacement vane assemblies.
- (2) Check replacement vane assemblies to ensure that they are to the same SB. or Mod. standard as the original vanes, by checking that their Part Numbers are the same as the original vanes dependent on their respective position as detailed in Table 501.
- (3) With reference to Table 501, position the replacement vane assemblies in their correct positions, then lightly vibro etch the appropriate position number on the outer section between the vane ends on each vane assembly.

SUB-ASSEMBLY

72-52-01

Page 503

Dec 31/01

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

I.P.C. NO.	QUANTITY	ASSY POSITION IDENT NO.
(1-80)	13	1-2-4-5-7-8-10- 16-17-19-20-22-23
(1-90)	8	3-6-9-12- 15-18-21-24
(1-110)	2	11-14
(1-100)	1	13

LP Turbine Nozzle Vanes Identification  
Table 501

## C. Assemble Nozzle Vanes to Support Diaphragm (Ref.Fig.502).

- (1) Assemble the support diaphragm to the assembly tool (Tool 3071).
  - (a) Carefully raise the centre block section of the tool and assemble the diaphragm to it. Ensure that the diaphragm is fully and evenly positioned on the centre block.
- (2) Assemble turbine nozzle vanes to the diaphragm.

NOTE: Position marked 'TOP' on diaphragm is No.1 nozzle vane location. Nozzle vanes are positioned in numerical sequence in the clockwise direction when viewed from the rear.

- (a) Commencing at No.24 vane position, engage the 'V' section recess of the nozzle vane with the lip on the diaphragm.
- (b) Assemble the remaining nozzle vanes in numerical sequence.

NOTE: The vanes at positions 11 and 14 contain a thermocouple locating tube which aligns with a location in the diaphragm. No.13 vane incorporates a hole for an internal inspection probe.

SUB-ASSEMBLY

**72-52-01**

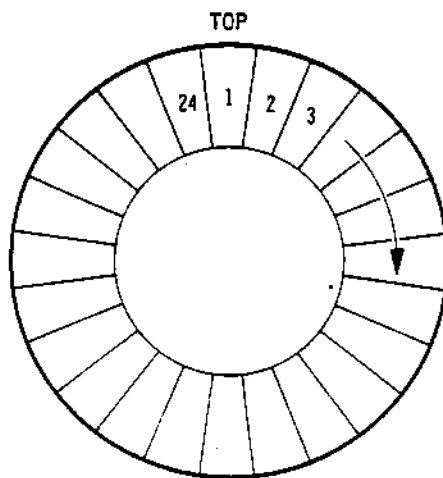
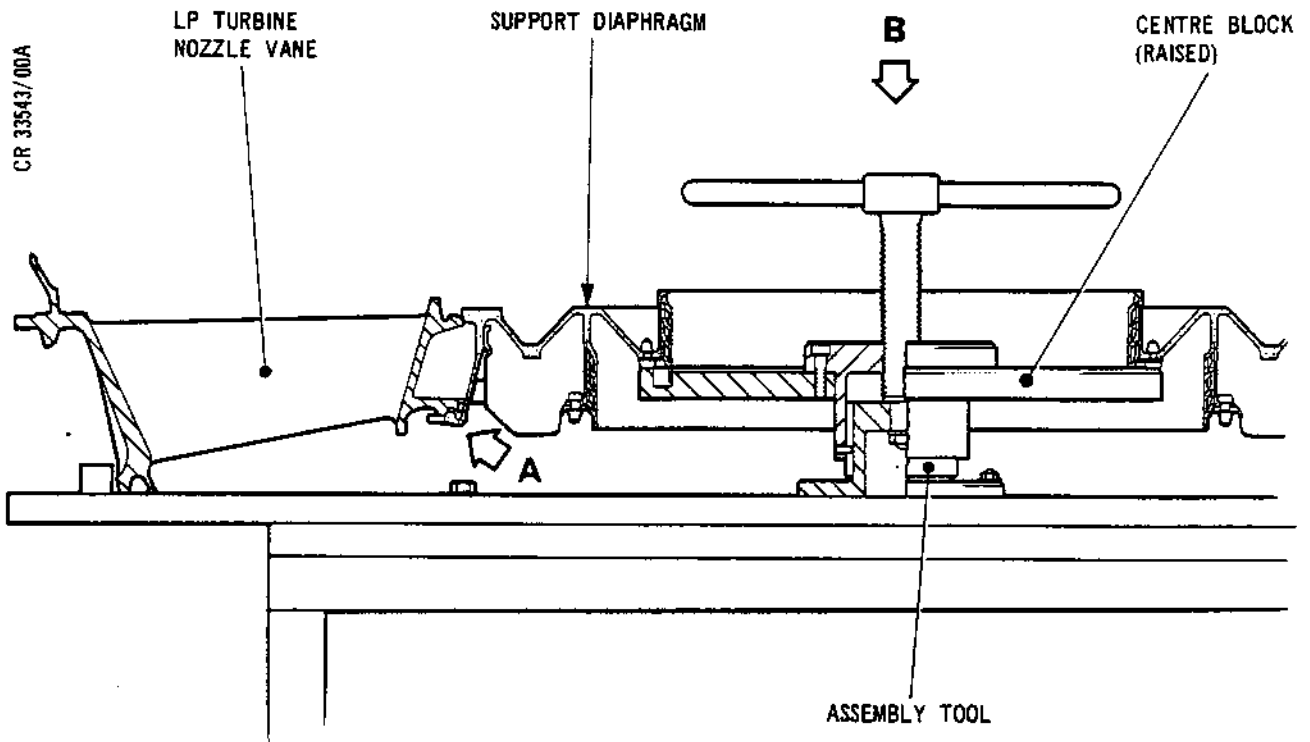
Page 504

Feb 1/78

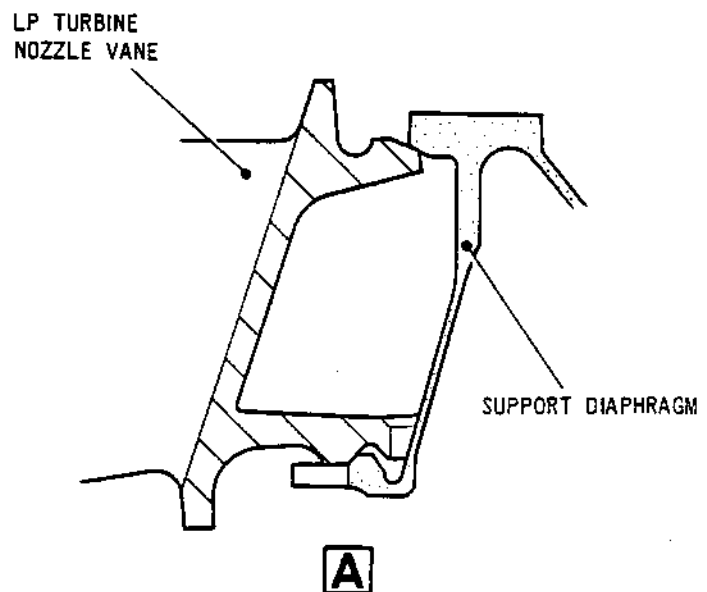


OLYMPUS 593

MK.610-14-28  
OVERHAUL



VIEW IN DIRECTION OF ARROW B  
SHOWING NOZZLE VANE POSITIONS



Assembling Nozzle Vanes to Diaphragm  
Figure 502

SUB-ASSEMBLY  
**72-52-01**  
Page 505  
Mar 1/76



OLYMPUS 593

MK. 610-14-28

OVERHAUL



- (3) Ensure that all vanes are in position on the diaphragm then carefully lower the diaphragm and centre block until the nozzle vanes are fully engaged with the diaphragm.
- (4) If nozzle area throat gap checks are to be carried out, continue with the procedure of paragraph 3. If checks are not required, secure the module identification plate to the nozzle assembly then transfer the nozzles to engine assembly (72-00-00, Assembly).

### 3. Check and Adjust Nozzle Area Throat Gaps

NOTE: This check is optional at engine build but is applicable during fault diagnosis following loss of performance on engine test.

#### A. Assemble Nozzle Assembly to Combustion Chamber Outer Case (CCOC) for Throat Gap Checks (Ref.Fig.503).

- (1) Assemble the multiple leg sling (Tool 1192) to the nozzle assembly.
  - (a) Ensure that the nozzle vane retaining hooks on the multiple leg sling are fully retracted and turned outward. Attach a sling (Tool 1645) to the multiple leg sling and position the tools over the nozzle vanes.
  - (b) Carefully lower the equipment and ensure that the support bosses on the tool locate correctly on the diaphragm flange. Position the tool so that the retaining hooks will penetrate between the blades of each nozzle vane.
  - (c) Depress the retaining hooks and turn them to engage with the forward edges of the nozzle vanes blades. Retract the hooks to retain the nozzle vanes and secure the hooks and vanes by tightening the knurled nuts.
- (2) Assemble the nozzle assembly to the CCOC.
  - (a) Place the CCOC on a pallet (Tool 1014). The rear flange of the CCOC must be uppermost.
  - (b) Check to ensure that all nozzle vanes are properly secured with the retaining hooks then carefully lift the assembly clear of the assembly tool.
  - (c) Align the top of the diaphragm with the top of the CCOC. Lower the nozzle assembly into position on the CCOC flange ensuring that the inspection port on the CCOC aligns with the hole in No.13 nozzle vane. Also ensure that

SUB-ASSEMBLY

**72-52-01**

Page 506

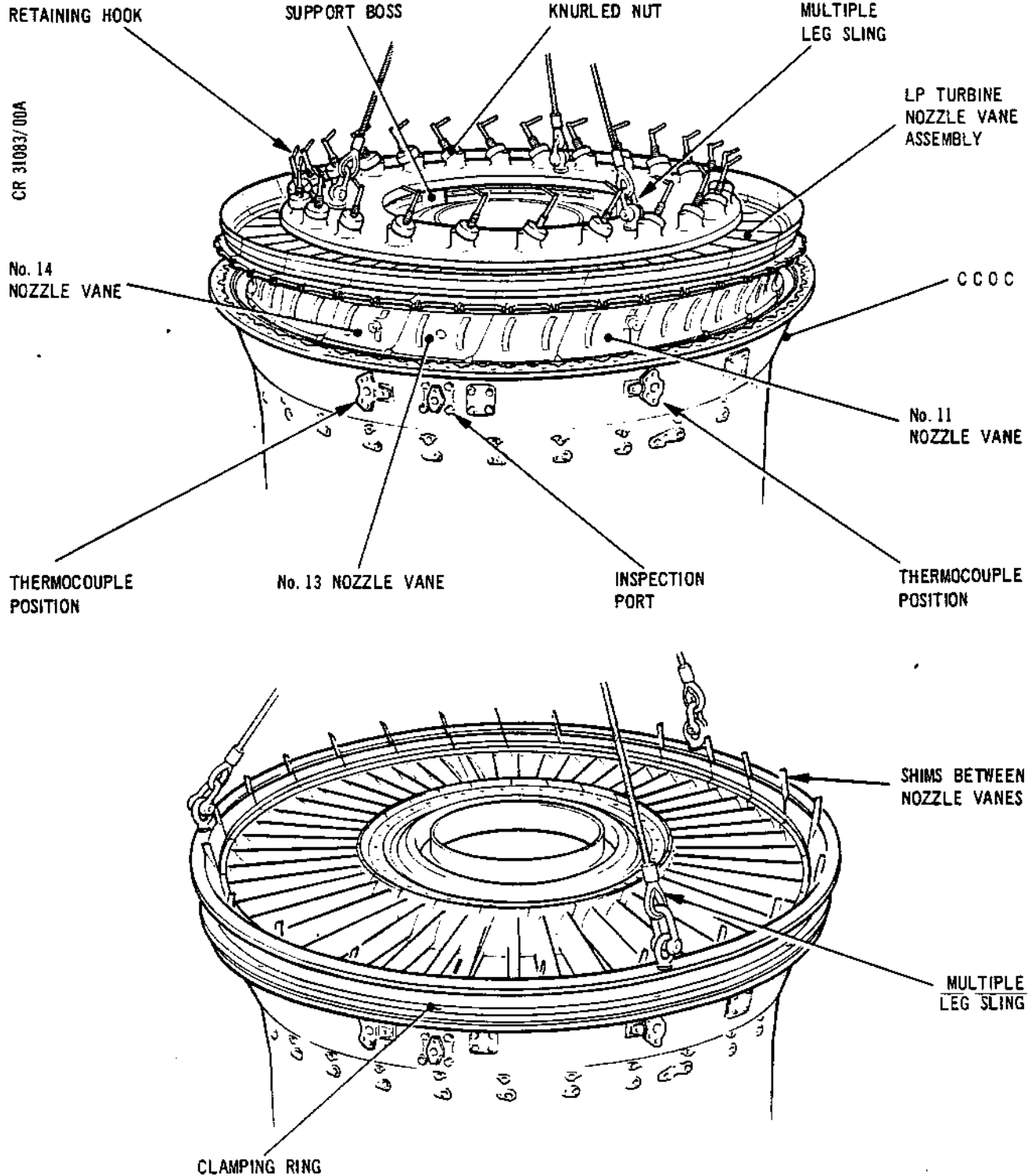
Sep 1/80

FN32480



OLYMPUS 593

MK. 610-14-28  
OVERHAUL



Assembling LP Turbine Nozzle Assembly to CCOC  
Figure 503

SUB-ASSEMBLY  
**72-52-01**

Page 507  
Mar 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



No.11 and No.14 vanes align with the thermo-couple locations in the casing.

- (3) Remove the multiple leg sling from the nozzle assembly.
  - (a) Unscrew the knurled nuts, disengage the hooks from the nozzle vanes and fully retract the hooks. Remove the tool from the nozzle vane assembly.
- (4) Check and ensure that all nozzle vanes are fully engaged with the recess in the CCOC flange and that the nozzle assembly bolt holes are accurately aligned with those in the CCOC flange.
- (5) Measure the gaps between the nozzle vanes with feeler gauges (Tool 1935) which are stored in a container (Tool 1018). Insert shims of even thickness between the nozzle vanes.
- (6) Assemble the clamping ring (Tool 1262) to the CCOC.
  - (a) Position the clamping ring in position on the CCOC flange and nozzle assembly. Secure the clamping ring with nuts evenly tightened.

B. Throat Gap Checks Nozzle Vanes (Ref.Fig.504 and 505).

- (1) Commencing at No.1 vane place the station marking gauge (Tool 1936) on each vane in preparation for marking. The gauge must locate on each vane separately and not span the joint between vanes. Ensure that the spigots on the gauge are in contact with the nozzle vane during marking procedure.
- (2) Lightly mark the vanes along the edge of each slot indicated by an arrow on the marking gauge. The marked positions will be referred to as A, B or C for checking purposes (Ref.Fig.504).
- (3) Set the dial indicator(s) (Tool 1937) in preparation for throat gap checks (Ref.Fig.504).

NOTE: The dial indicators (Tool 1937) listed as alternatives for measuring throat gap areas A, B and C are adjusted to the setting gauge (Tool 1938) and distance pieces (Tools 1939, 1940 and 1941). Dial indicator (T.367769) has insufficient indicator movement to measure stations A, B and C through one

SUB-ASSEMBLY

72-52-01

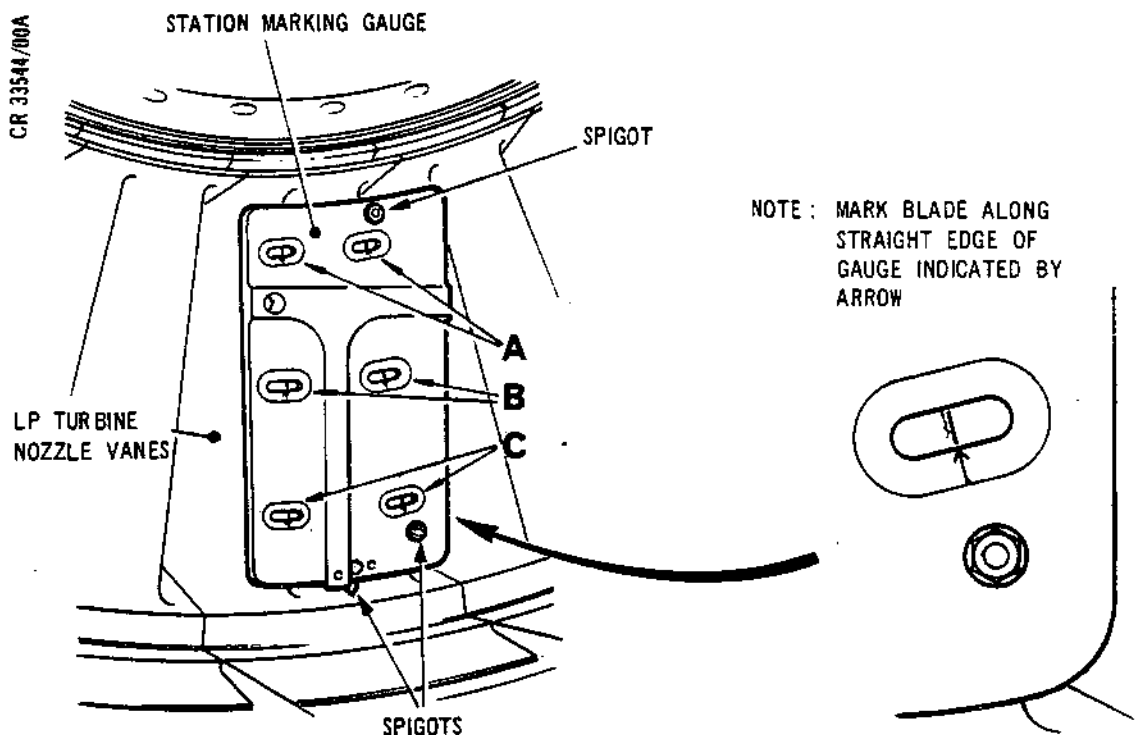
Page 508

Sep 1/80

IN32832

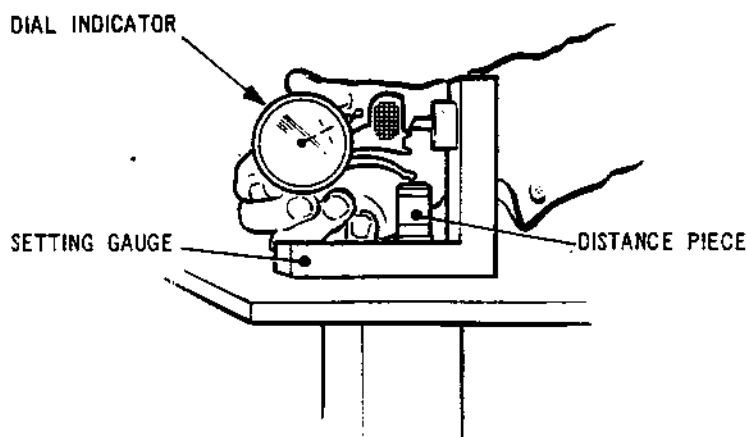


**OLYMPUS 593**  
MK.610-14-28  
OVERHAUL



MARKING LP TURBINE NOZZLE VANES  
FOR THROAT GAP CHECKS

MARKING STATION (TYPICAL)



METHOD OF SETTING DIAL INDICATOR

Preparing for LP Turbine Nozzle Throat Gap Checks  
Figure 504





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



setting, therefore three separately adjusted dial indicators of that type are required. Dial indicator (S3S.15217-000) has sufficient indicator movement to measure stations A, B and C through one setting.

- (a) Ensure thorough cleanliness of the setting gauge (Tool 1938) and distance pieces. Assemble the following distance pieces to the setting gauge and adjust the dial indicator(s) to the required settings.

- Position A distance piece (Tool 1939)
  - Position B distance piece (Tool 1940)
  - Position C distance piece (Tool 1941)

- (b) Throat gap setting dimensions are as follows:

- Position A 0.968 in. (24,587 mm)
  - Position B 1.152 in. (29,261 mm)
  - Position C 1.324 in. (33,630 mm)

- (4) Check and record throat gaps (Ref.Fig.505).

NOTE: In order to measure the throat gap at each position carefully manipulate the dial indicator to achieve a 'rocking' movement during the checking procedure.

- (a) Commencing at No.1 vane place the station guide (Tool 1942) in position on the nozzle vane blade. Using the previously set dial indicator(s) check and record the minimum gaps between the slots in the checking tool and the marked positions A, B, C on the adjacent blade.

- (b) Repeat the throat gaps measuring procedure between each blade until the complete nozzle assembly has been measured. Ensure that an accurate record of each throat gap is recorded in order to identify exact points for correction.

- (5) Set the length gauge (Tool 1943) in preparation for turbine nozzle vanes length checks (Ref.Fig.505).

- (a) Assemble the length gauge to the setting block (Tool 1944) and adjust the dial indicator to 0 setting.

TN32834

SUB-ASSEMBLY

72-52-01

Page 510  
Sep 1/80



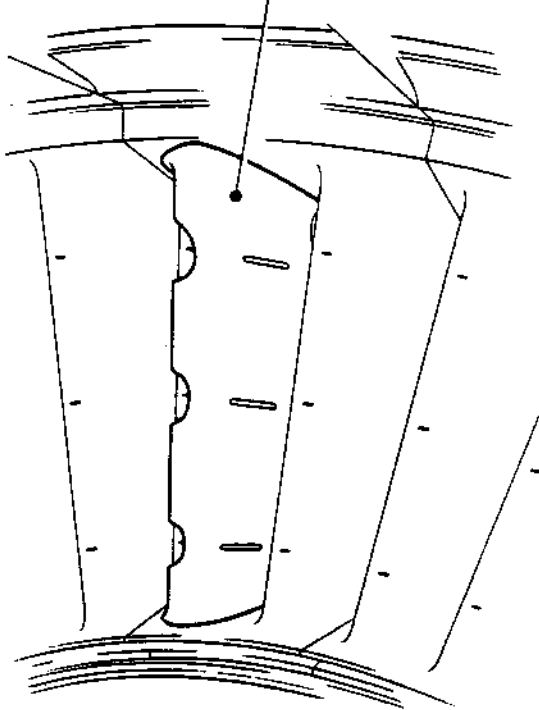
OLYMPUS 593

MK.610-14-28  
OVERHAUL



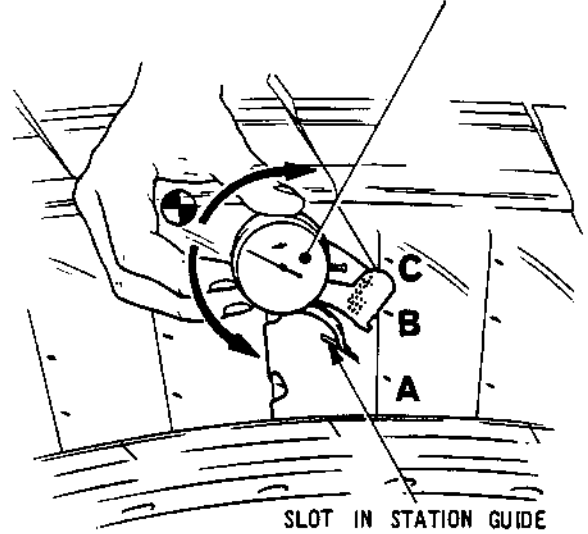
CR 33545/00B

STATION GUIDE



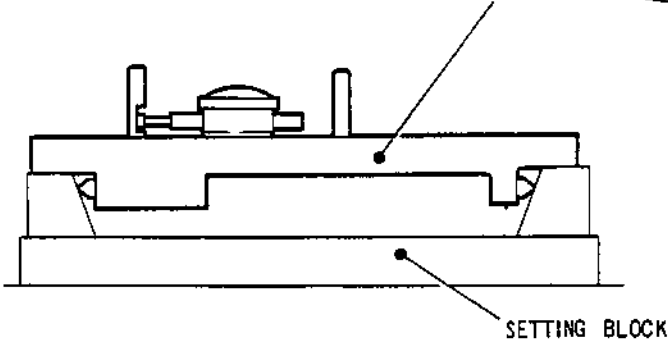
STATION GUIDE IN POSITION  
ON NOZZLE VANE BLADE

DIAL INDICATOR

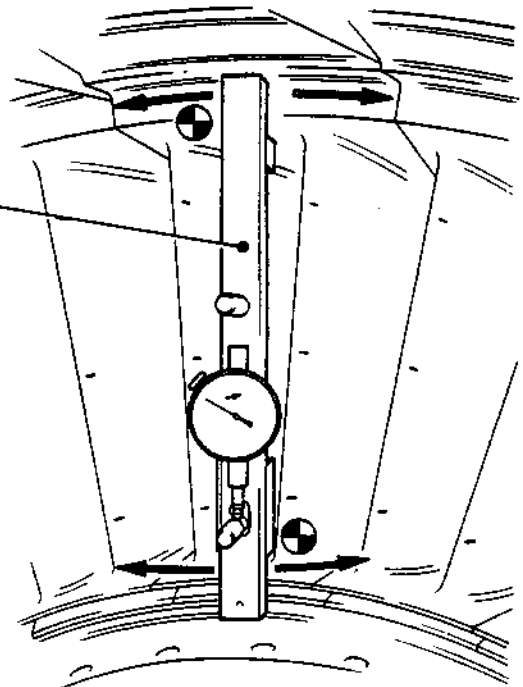


CHECKING GAPS BETWEEN  
SLOTS AND MARKED POSITIONS

LENGTH GAUGE



SETTING LENGTH GAUGE



CHECKING NOZZLE VANE LENGTHS



ARROWS INDICATE MANIPULATION  
TECHNIQUE TO ACHIEVE CORRECT  
MEASUREMENTS

Throat Gap Checking Procedure  
Figure 505

SUB-ASSEMBLY  
**72-52-01**

Page 511  
May 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (6) Check and record nozzle vanes lengths (Ref.Fig.505).

NOTE: In order to measure the vane length at each position carefully manipulate the length gauge during the checking procedure.

- (a) Place the length gauge between the vanes of No.1 nozzle vane assembly. Ensure that the gauge is correctly in position then check and record the minimum dial indicator reading.
  - (b) Repeat the measuring procedure at No.2 vane assembly and continue checking until the length of each vane assembly is recorded. Do not measure the joint locations between the vanes.
  - (c) Nozzle vane lengths are between 8.925 in. (226,695 mm) and 8.985 in. (228,219 mm).
- (7) Calculate the mean value of throat gaps A, B, C as follows:

$$\frac{\text{Sum of 144 throat gaps}}{144} = \text{DIMENSION V}$$

- (8) Calculate the mean value of nozzle vane lengths as follows:

$$\frac{\text{Sum of 24 lengths}}{24} = \text{DIMENSION W}$$

- (9) Calculation to obtain total throat area

$$V \times W \times 48 \times 0.958 \text{ in. (24,333 mm)}$$

- (10) Acceptance limit for total throat area.

- (a) On engines to SB.72-44 472 sq in. - 2 sq in. (304515 sq mm - 1290 sq mm).
  - (b) On engines to SB.72-89 464 sq in. - 2 sq in. (299354 sq mm - 1290 sq mm).
- (11) If the throat areas are satisfactory, remove the assembly from the CCOC.
- (a) Assemble the multiple leg sling (Tool 1192) to the nozzle assembly. Ensure that the retaining hooks are correctly engaged with the nozzle vanes.

SUB-ASSEMBLY

**72-52-01**

Page 512

Sep 1/80

TN32836



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Remove the clamping ring from the assembly, also remove the shims from between the nozzle vanes.
- (c) Transfer the nozzle assembly from the CCOC to the mobile table (Tool 1307) in preparation for despatch to the main engine assembly area. Do not remove the multiple leg sling.

C. Investigate and Rectify Incorrect Total Throat Area.

- (1) Examine the recorded figures A, B, C also the length figures to establish the possible points of error.
- (2) Rectify incorrect throat gaps.
  - (a) Using the setting tool (Tool 1008) carefully open or close the nozzle vane throat gap(s). Check the edge of each blade for straightness. Variation must be within 0.010 in (0,254 mm).
  - (b) On completion of throat gap setting procedure measure and record the resultant gaps and recalculate the total throat gap area (Ref. para.B).
- (3) Despatch the nozzle vanes for heat-treatment.
  - (a) Assemble the multiple leg sling (Tool 1192) to the nozzle assembly. Ensure that the retaining hooks are correctly engaged with the nozzle vanes.
  - (b) Remove the clamping ring from the assembly, also remove the shims from between the nozzle vanes and transfer the nozzle assembly from the CCOC to the mobile table (Tool 1307).
  - (c) Carefully disassemble the nozzle vanes from the diaphragm unit and place them in transport containers (Tool 1371). Identify the diaphragm unit with the engine assembly number and place it in container (Tool 1417).
  - (d) Ensure that the nozzle vanes are clearly identified in the respective containers to avoid interchange with similar components.



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (e) Pre-heat an oven to a temperature of 1050 deg C. then place the nozzle vanes in the oven for a period of 10 minutes at the specified temperature. Protective clothing must be worn when handling hot components.
- (4) On completion of heat-treatment recheck the throat gaps.
  - (a) Place the diaphragm assembly in position on the mobile table.
  - (b) Separate and identify the nozzle vanes (Ref. para.2.B.).
  - (c) Assemble the nozzle vanes to the diaphragm (Ref. para.2.C.).
  - (d) Temporarily assemble the nozzle vane assembly to CCOC (Ref. para.3.A.).
  - (e) Check the throat gap areas (Ref. para.3.B.).
- (5) After satisfactory re-check of throat gap despatch the nozzle vanes for crack detection.
  - (a) Assemble the multiple leg sling (Tool 1192) to the nozzle assembly, remove the clamping ring and shims and transfer the assembly to the mobile table.
  - (b) Remove the nozzle vanes from the diaphragm and place them in transport containers (Tool 1371) and despatch for crack detection (Ref. Inspection/Check 72-52-01).
- (6) On return from crack detection reassemble the nozzle vanes to the diaphragm, assemble the multiple leg sling to the nozzle assembly and transfer it to the mobile table. Do not remove the multiple leg sling from the nozzle assembly as the nozzle vanes must be despatched in the assembled state to the engine assembly area.
- (7) If SB.72-44 or 72-89 is embodied, module interchangeability will be affected. Ensure that the module identification plate is correctly marked.
- (8) Secure the module plate to the nozzle assembly, then transfer the nozzles to engine assembly (72-00-00, Assembly).

SUB-ASSEMBLY

**72-52-01**

Page 514

Sep 1/80

TN32838

**OLYMPUS 593**MK.610-14-28  
OVERHAULLP TURBINE ROTOR - SUB-ASSEMBLYTABLE OF CONTENTS

Para.	Page
1. General ... ..	501
2. Air Flow LP Turbine Blades ... ..	501
A. Prepare for Air Flow ... ..	501
B. Air Flow Turbine Blades... ..	501
3. Mass Moment Weigh Turbine Blades (Schenk Vertical Spindle Machine) ... ..	502
A. Prepare Equipment... ..	502
B. Calibrate Equipment ... ..	504
C. Mass Moment Weigh Each Blade ... ..	505
4. Mass Moment Weigh Turbine Blades (Avery Scales) ... ..	505
A. Prepare Equipment... ..	505
B. Mass Moment Weigh Each Blade ... ..	507
5. Assemble LP Turbine Blades to Disk ... ..	507
A. Prepare for Assembly ... ..	507
B. Install Turbine Blades ... ..	510
6. Statically Balance LP Turbine Rotor ... ..	516
A. Prepare Balancing Equipment ... ..	516
B. Install Turbine Rotor on Balancing Machine ... ..	518
C. Check Unbalance of Turbine Rotor ... ..	520
D. Acceptance Limits... ..	520
E. Numerically Identify Turbine Blades, Lock the Tabs and Check End-float ... ..	521
F. Blade Re-positioning Procedure to Rectify Unbalance ... ..	521
G. Re-check Static Balance of LP Turbine Rotor ... ..	525
7. Assembly of Hub Unit and Labyrinths to LP Turbine Rotor ... ..	527
A. Assemble Slave Bearing Track to Turbine Hub Unit ... ..	527
B. Assemble Air Duct to Hub Unit... ..	527
C. Assemble Turbine Rotor to Hub Unit ... ..	529
8. LP Turbine Rotor Swash Checks ... ..	531
A. Prepare for Checks ... ..	531
B. Position Turbine Rotor for Swash Check ... ..	534
C. Swash Check Procedure ... ..	537
9. Dynamically Balance LP Turbine Rotor ... ..	538
A. Prepare Equipment... ..	538
B. Check Dynamic Unbalance of Turbine Rotor ... ..	542
10. Removal of Slave Bearing ... ..	555
A. Remove Retaining Nuts ... ..	555
B. Remove Slave Bearing ... ..	555
11. LP Turbine Main Securing Bolts Stretch Procedure ... ..	556
A. Transfer Rotor from Mandrel to Stand Assembly ... ..	556
B. Stretch Turbine Bolts ... ..	556

SUB-ASSEMBLY

**72-52-02**

Contents 1

Aug 1/79



OLYMPUS 593

MK.610-14-28

OVERHAUL



SNECMA

Para.	Page
12. Install LP Turbine Bearing Inner Track ...	558
A. Prepare Turbine Rotor ...	558
B. Install Bearing Track ...	560
13. Turbine Rotor Dimensional Checks and Final Inspection ...	560
A. Prepare for Dimensional Checks ...	560
B. Dimensional Check Procedure ...	560
C. Final Inspection ...	561

### TABLE OF ILLUSTRATIONS

Fig.No.	Page
501	Installing Mass Moment Weighing Equipment (Schenk) ...
502	Turbine Blades Mass Moment Weighing (Avery) ...
503	Assembling LP Turbine Disk to Mobile Stand ...
504	Assembling LP Turbine Disk to Blading Fixture ...
505	Positioning Turbine Assembly on Blading Base ...
506	Setting Procedures of Adjustable Bearing ...
507	Installing LP Turbine Rotor in Balancing Machine..
508	Locking Arrangement and End-float Check of Turbine Blades ...
509	Assembling Slave Bearing Track, Hub and Air Duct..
510	Assembling Labyrinths and Turbine Rotor to Hub ...
511	Assembling Turbine Rotor to Balancing Mandrel ...
512	Checking LP Turbine Swash ...
513	Installing Turbine Rotor in Dynamic Balancing Machine ...
514	LP Turbine Dynamic Balancing Diagram ...
515	Removing No.25 and 26 Labyrinth Assembly ...
516	Bolt Stretch Procedure and Turbine Lifting Fixture ...
517	Assembling Turbine Bearing Inner Track ...
518	Turbine Rotor Dimensional Check ...

SUB-ASSEMBLY

72-52-02

Contents 2

Dec 31/00



OLYMPUS 593

MK.610-14-28

OVERHAUL



## LP TURBINE ROTOR - SUB-ASSEMBLY

### 1. General

- A. Prior to commencing assembly, refer to 72-09-01 Assembly for general information.
- B. During the sub-assembly procedure reference will be made to the Illustrated Parts Catalogue (I.P.C.) to identify those items where the nomenclature does not positively identify them due to duplication of the title e.g. nuts, bolts, washers etc. Where the item is part of this text it will be identified as e.g. bolt (1-10), the 1 referring to the I.P.C. Fig.No. and the 10 referring to the Item No.
- C. Throughout the text special tools are quoted by their Ref. No. e.g. (Tool 1234). For a complete list of tooling required for the assembly and for the Manufacturers Part No., refer to Special Tools, Fixtures and Equipment Table 1001.
- D. The LP turbine rotor sub-assembly is composed of 79 turbine blades assembled to a disk to form an inter-locking assembly. Blade roots are slotted into the disk and separately locked with expendable locking tabs. Static unbalance correction is effected by means of turbine blades interchange. The sub-assembly is dynamically balanced in conjunction with a slave mandrel.

CAUTION: TURBINE BLADES (72-52-02/1-230B) SB.72-22  
STANDARD MUST NOT BE MIXED WITH TURBINE BLADES  
(72-52-02/1-230A) PRE SB.72-22 STANDARD.

### 2. Air Flow LP Turbine Blades

#### A. Prepare for Air Flow.

- (1) Assemble air nozzle (Tool 950) to the blow gun.

NOTE: The air nozzle is designed to be used with a Schraeder No.7184 standard blow gun.

#### B. Air Flow Turbine Blades.

- (1) Blow air through each hole in every turbine blade and ensure that air flows freely through each cooling hole.
- (2) Investigate and rectify obstruction of any cooling hole.

SUB-ASSEMBLY  
**72-52-02**

Page 501  
Oct 1/76





OLYMPUS 593

MK.610-14-28

OVERHAUL



- (3) On completion of air flow check place the blades into container (Tool 1426).

3. Mass Moment Weigh Turbine Blades (Schenk Vertical Spindle Machine)

NOTE: Operate the machine in accordance with the manufacturers instructions. Set the machine to operate in a clockwise direction.

A. Prepare Equipment (Ref.Fig.501).

- (1) Assemble the moment weighing adapter (Tool 16) to the drive shaft.
  - (a) Remove the adapter from container (Tool 268). Ensure thorough cleanliness of the adapter and the drive shaft.
  - (b) Rotate the drive shaft to achieve 0 setting on the illuminated indicator situated on the front of the drive shaft cabinet.
  - (c) Place the adapter in position on the drive shaft studs. Ensure that the turbine blade location end of the adapter is positioned on the marked plate on the table section. The setting in (b) must also be maintained during this procedure.
  - (d) Secure the adapter to the drive shaft with six nuts and washers.
- (2) Assemble the adapter arm (Tool 11) to the weighing adapter.
  - (a) Remove the adapter arm from container (Tool 169) and ensure thorough cleanliness of the unit.
  - (b) Place the adapter arm in position on the adapter and secure with the nut and washer.
  - (c) Set the sliding weight on the adapter arm to 0 oz in.

NOTE: The sliding weight is moved by depressing the flat section before setting to the required scale setting.

IN10769

SUB-ASSEMBLY  
**72-52-02**

Page 502  
Oct 1/76

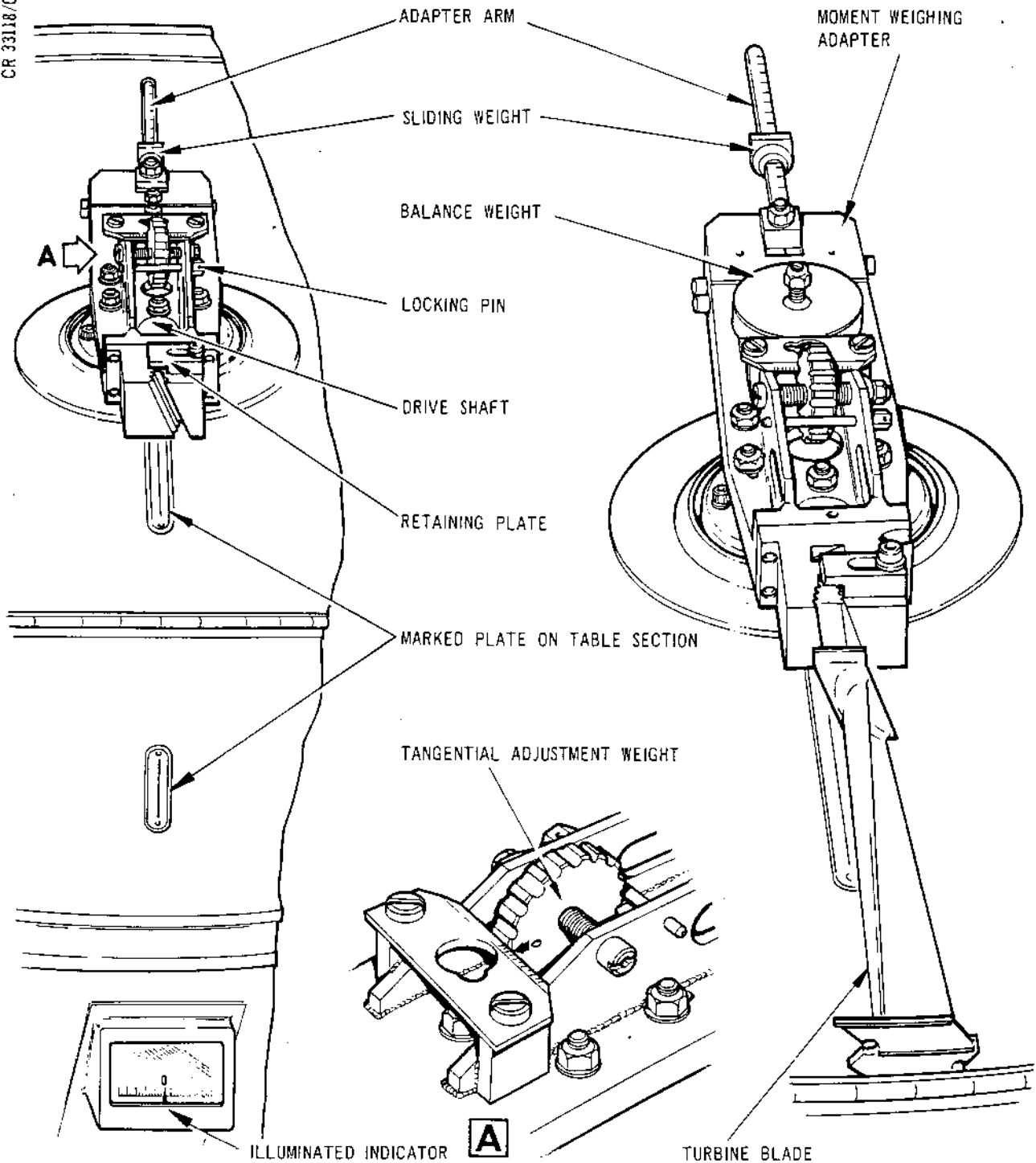


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33118/00A



Installing Mass Moment Weighing Equipment (Schenk)  
Figure 501



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

- (3) Assemble the squared graticule (Tool 33) to the vectometer screen location.
  - (a) Hold the existing screen in position whilst lifting the hinged retaining clips and releasing the retaining screw at the top of the screen.
  - (b) Carefully withdraw the screen and place in a suitable protective container.
  - (c) Place the squared graticule in position ensuring that the slot engages with the pin at bottom position.
  - (d) Secure the graticule with the hinged clips and retaining screw.

B. Calibrate Equipment (Ref.Fig.501).

- (1) Operate the weighing machine and adjust to obtain 0 horizontal/vertical setting.
- (2) If the vectometer light spot is horizontally outside of the graticule squares, adjust as follows.
  - (a) Unscrew and remove the tangential adjustment weight locking pin on the mass moment weighing adapter (Tool 16).
  - (b) Rotate the weight in order to adjust to the right or left in accordance with the graduated plate and marks on the side of the weight.
  - (c) On completion of the adjustment, screw the adjustment weight locking pin into position and tighten. Repeat the procedure detailed in para.(1).
- (3) Check sliding weight on the adapter arm.
  - (a) Set the sliding weight to 2 oz in. on the adapter arm.
  - (b) Operate the machine to check the sliding weight setting.
  - (c) Set the sliding weight to each position on the adapter arm and check each setting by operating the machine.



OLYMPUS 593



MK.610-14-28 snecma  
OVERHAUL

- (d) In the event of unsatisfactory calibration results, check the assembly of the tools and security of the sliding weight before investigation of balancing machine malfunction.

C. Mass Moment Weigh Each Blade (Ref.Fig.501).

- (1) Insert the turbine blade into the blade root location in the end of the moment weighing adapter.
- (2) Secure the blade with the retaining plate and bolt on the adapter.
- (3) Place the balance weight (Tool 28) on the weighing adapter and secure with the locknut. Set the sliding weight on the adapter arm to 20 oz in.

NOTE: The 20 oz in. setting is an approximation for the first blade final adjustment of the sliding weight will be made to suit each blade.

- (4) Check the security of the assembly then operate the machine to mass moment weigh.
- (5) Remove each blade from the adapter on completion of weighing.
- (6) Attach a suitable adhesive label to each blade and inscribe with the weight and engine serial number.
- (7) Place the blades into the containers and convey to the appropriate sub-assembly area.

4. Mass Moment Weigh Turbine Blades (Avery Scales TYPE 62N/5)

NOTE: This is an alternative method to that detailed in para.3.

A. Prepare Equipment (Ref.Fig.502).

- (1) Assemble the adapter arm locator (Tool 1274) to the adapter arm (Tool 1272).
- (2) Adjust the setting on the adapter arm to 10.525 in. (254,525 mm).
- (3) Attach the adapter arm to the weighing scale arm and secure firmly.
- (4) Ensure that the scale pans suspension piece is correctly positioned.

SUB-ASSEMBLY

72-52-02

Page 505

Jun 30/95



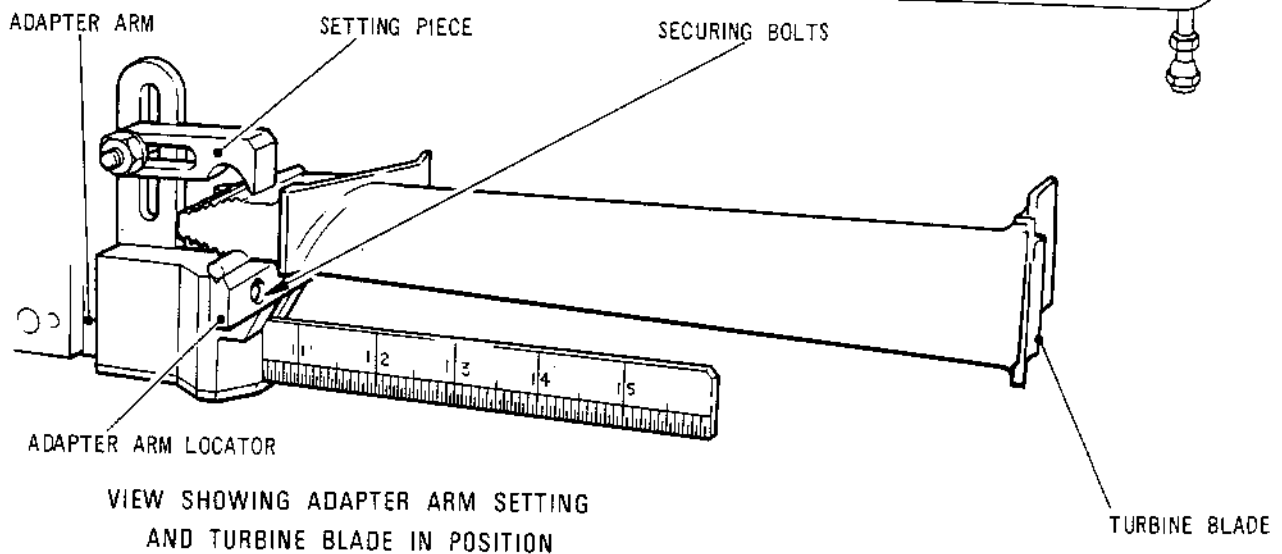
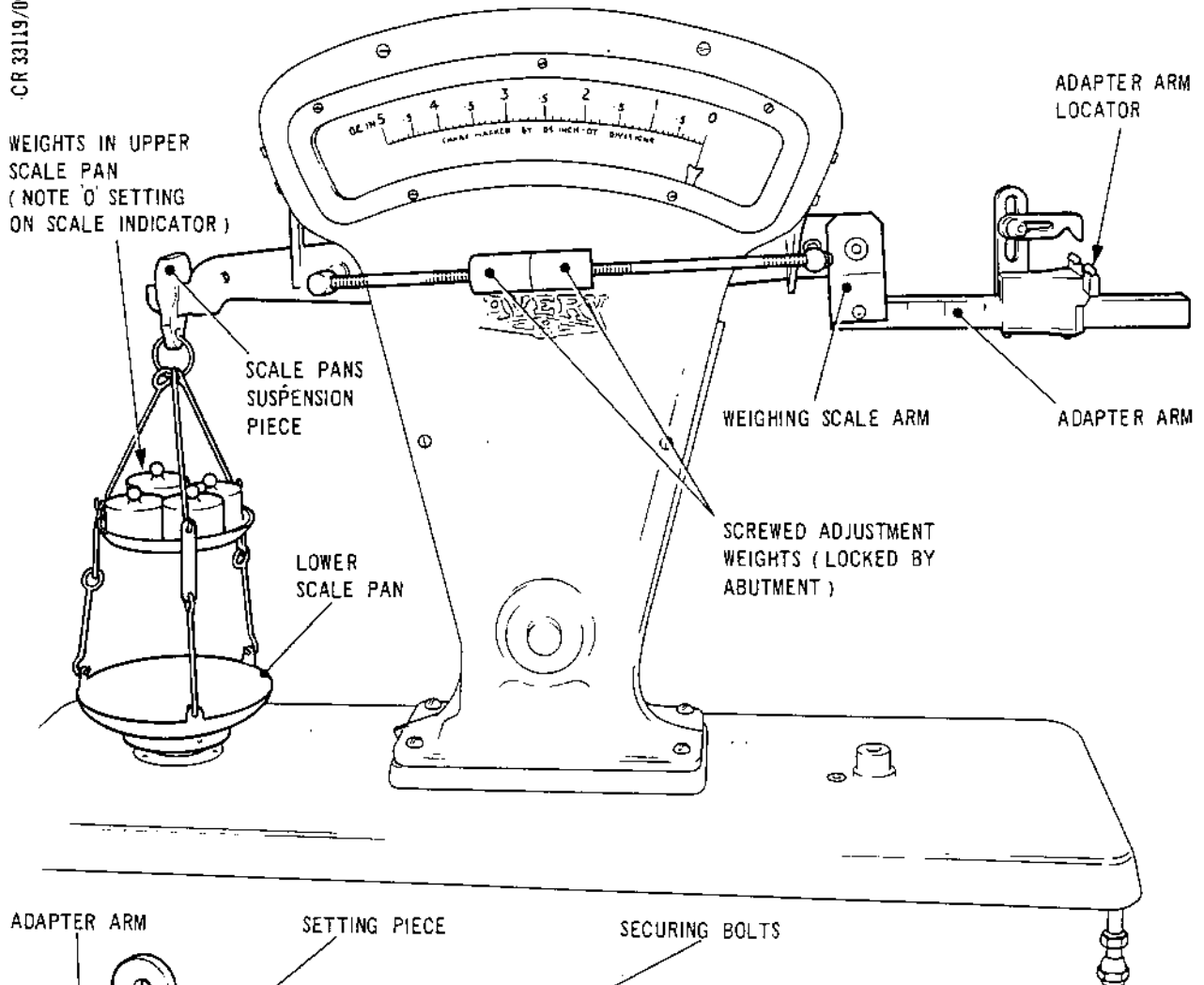
OLYMPUS 593

MK. 610-14-28

OVERHAUL



CR 33119/00A



LP Turbine Blades Mass Moment Weighing (Avery)  
Figure 502

SUB-ASSEMBLY  
**72-52-02**

Page 506  
Aug 28/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (5) Carefully add weights to the upper scale pan to achieve 0 reading on the scale. Fine adjustment can be effected by moving the screwed adjustment weights on the front of the scale.
- (6) Ensure that the screwed adjustment weights are locked together when 0 setting is achieved.
- (7) Check the scale reading progressively by adding weights in 1 oz (28,350 g) increments to the upper scale pan.
- (8) On completion of the checks return to 0 reading on the scale as detailed in (5).

B. Mass Moment Weigh Each Blade (Ref.Fig.502).

CAUTION: EXERCISE CARE DURING ASSEMBLY OF BLADES TO ADAPTER ARM. AVOID EXCESSIVE VIBRATION AS DAMAGE TO SCALE OR DISPLACEMENT OF PANS COULD RESULT.

- (1) Carefully place the blade in position on the adapter arm locator and simultaneously engage the blade root with the setting piece on the adapter arm.
- (2) Adjust the setting piece in order to achieve a parallel setting between the blade and adapter arm. Ensure that the setting piece is secure after adjustment.
- (3) Carefully add weights to the lower scale pan until the scale indicator moves.
- (4) Add the total weight value in the lower scale pan to the scale indicator reading.
- (5) Remove the blade from the adapter arm and attach a suitable adhesive label inscribed with the weight and engine serial number.
- (6) Place the blades into the transport containers and convey the set to the appropriate sub-assembly area on completion of weighing.

5. Assemble LP Turbine Blades to Disk

A. Prepare for Assembly (Ref.Fig.503).

- (1) Place the blades in descending weight order on a suitable flat surface.

SUB-ASSEMBLY

**72-52-02**

Page 507  
Aug 28/75



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



- (2) Secure the lifting fixture (Tool 1113) to the end of mandrel (Tool 1132). Ensure that the securing bolt is tightened.
- (3) Prepare the mobile stand (Tool 1111) to accept the mandrel.
  - (a) Check that the clamp support tubes are securely held in the vertical position by the pins located on the angled support tubes.
  - (b) Open the clamps in readiness for the mandrel and lower the mandrel on to the clamps.
- (4) Place the lifting ring (Tool 1121) in position on the studs at the end of the mandrel and secure with four nuts and washers.
- (5) Close and secure the clamp positioned near the lifting ring. Swivel the mandrel to the vertical position so that the serrations in the disk mandrel are uppermost. Remove the nuts from the disk studs.

NOTE: Each clamp is secured vertically or horizontally by a plunger type pin which must be released or engaged by hand.

- (6) Assemble the lifting fixture (Tool 1133) to the LP turbine disk.
  - (a) With the turbine disk on a support (Tool 1012) and serrations on underside carefully lower the lifting fixture into the centre bore of the disk and engage the support feet by turning the knurled nuts to the locked position.
- (7) Attach a crane hoist to the lifting fixture and carefully lower the turbine disk over the vertical mandrel ensuring that the serrations in the turbine disk and the datum mark O align with those of the mandrel.
- (8) Carefully lower the disk over the studs in the mandrel disk and finally secure the assembly with nuts previously removed.
- (9) Remove the lifting fixture from the turbine disk.

TN10778



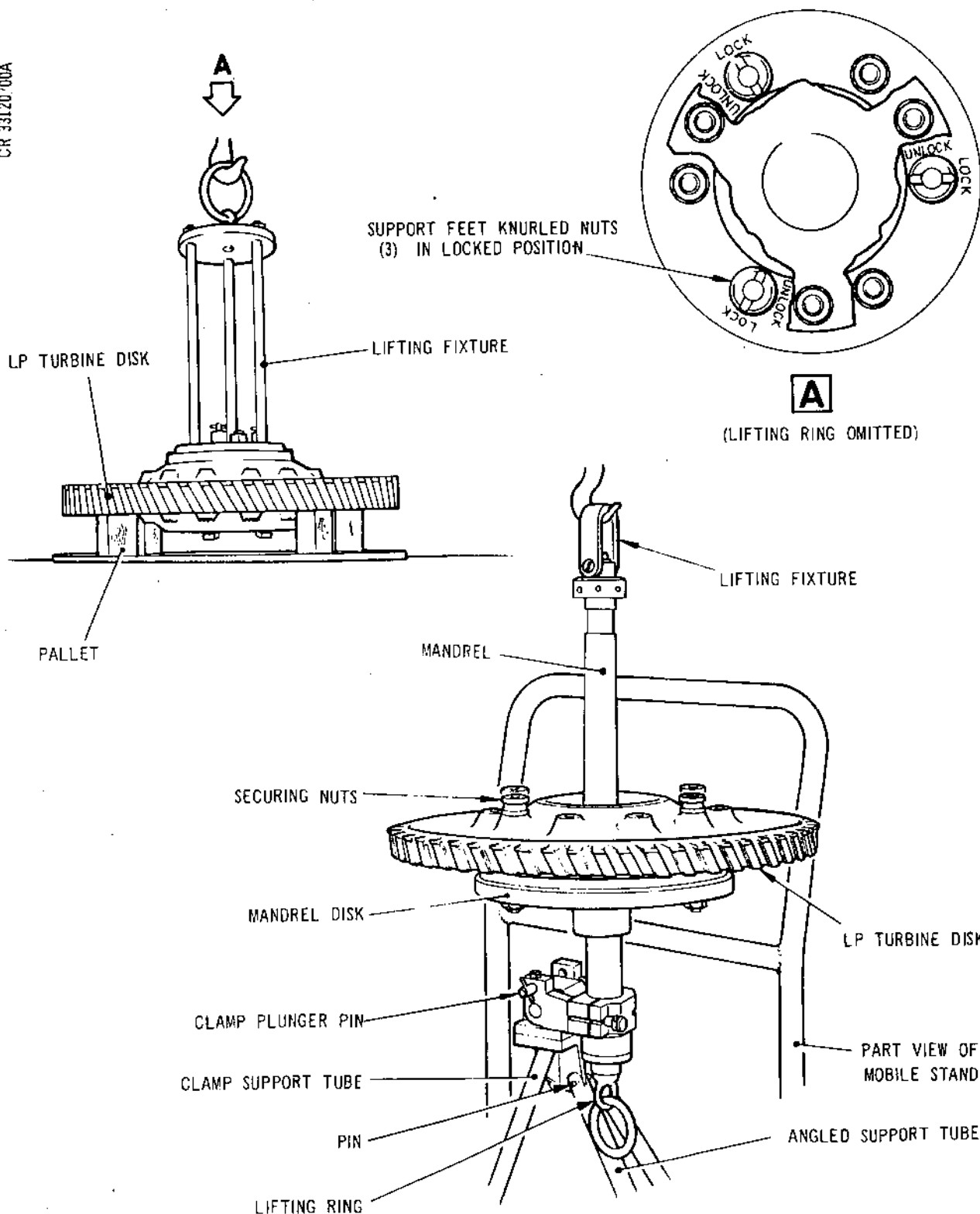
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33120/00A

PRINTED IN ENGLAND



Assembling LP Turbine Disk to Mobile Stand  
Figure 503

TN30107





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (10) Attach a crane hoist to the lifting fixture on the end of the mandrel. Carefully lower the assembly into the horizontal position on the mobile stand and secure the clamp.
- (11) Remove the bolted lifting fixture (Tool 1113) from the mandrel.
- (12) Attach the crane hoist to the lifting ring on the opposite end of the mandrel and swivel the assembly to the vertical position.

B. Install Turbine Blades (Ref.Fig.504).

- (1) Assemble the mandrel and disk to the turbine disk blading fixture (Tool 1122).
  - (a) Examine the bottom surface of the turbine disk at the blade root locations to identify the light spot marked 'D/L'.
  - (b) Use a suitable non permanent marking substance to transfer the identified location to the top surface of the disk. Ensure that the weight value at position 'D/L' is noted.
  - (c) Release the clamp securing the mandrel and transfer the assembly to the turbine disk blading fixture.
  - (d) Lower the mandrel and disk into the blading fixture. Adjust the blading fixture hand wheel until the top edge of the turbine disk is slightly above the top of the protective rubber on the blading fixture surface.
- (2) Remove the crane hoist.
- (3) Apply lubricant 'A' to the blade roots.
- (4) Select the heaviest blade for assembly to the 'D/L' location in the disk.

NOTE: Do not insert the blade roots fully into the turbine disk in one operation as the last blade will not engage by this method. Enter the blade roots into the turbine disk in small increments.

TN10779

SUB-ASSEMBLY

**72-52-02**

Page 510  
Aug 28/75

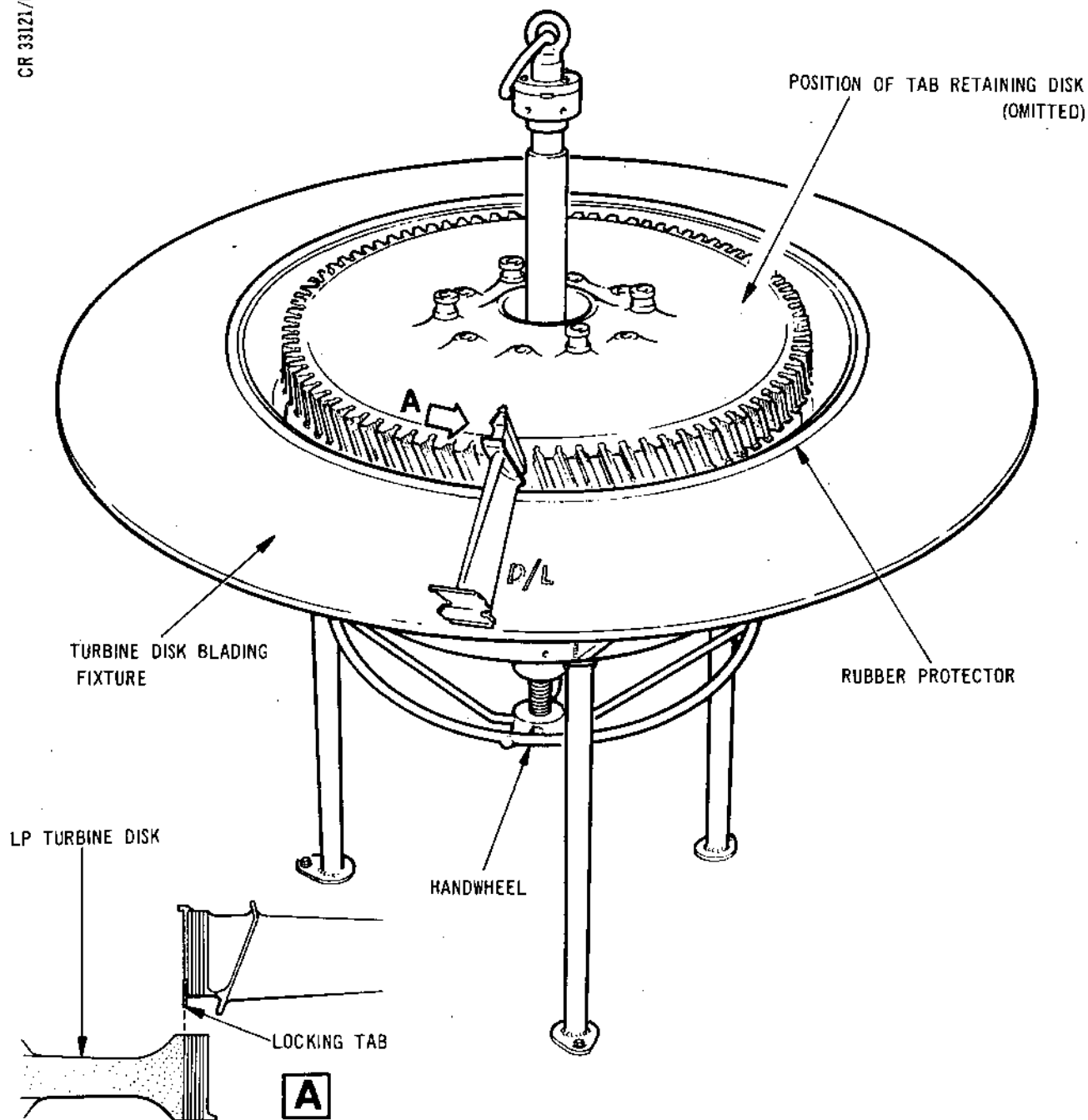


OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 33121/00A

PRINTED IN ENGLAND



TN30108

Assembling LP Turbine Disk to Blading Fixture  
Figure 504

SUB-ASSEMBLY  
**72-52-02**  
Page 511  
Aug 28/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (5) Insert a locking tab (1-240) into the blade base and carefully enter the blade root and locking tab into the identified 'D/L' location.
- (6) Select a blade of suitable weight to counter balance that assembled to the 'D/L' position. Enter the blade root and a locking tab into the position opposite to the 'Light Spot'.
- (7) Select two blades nearest in weight value to the blade assembled to the 'D/L' location. Assemble a locking tab to each blade and insert each blade into the turbine disk at positions 90 deg each side of the 'D/L' position.
- (8) Repeat the selection of blades in descending weight order. Insert the blades and locking tabs into the disk at opposite positions in order to achieve a balanced assembly.
- (9) When all blades are entered into the disk roots, ensure that the locking tabs engage with the slots in the blade roots and are not dislodged during blade insertion procedure. Use tab retaining disk (Tool 942) to hold the tabs in position.
- (10) Carefully insert each blade in turn until the edge of every blade is in contact with the rubber protector on the blading fixture. Use driver (Tool 907) and a light weight hammer to install the blades. Ensure that the point of contact with the driver is confined to the solid section of the blade root.
- (11) Adjust the hand wheel on the blading fixture to raise the turbine disk assembly slightly, then continue to insert the blades until contact with the rubber protector is made.
- (12) When all of the blades are inserted approximately half-way into the turbine disk carefully remove the assembly from the blading fixture.
- (13) Place the blading base (Tool 1152) concentrically in the blading fixture (Ref.Fig.505). This tool will protect the turbine blade lugs from damage through excessive penetration of the blades in the turbine disk.

TN10780

SUB-ASSEMBLY

**72-52-02**

Page 512

Aug 28/75



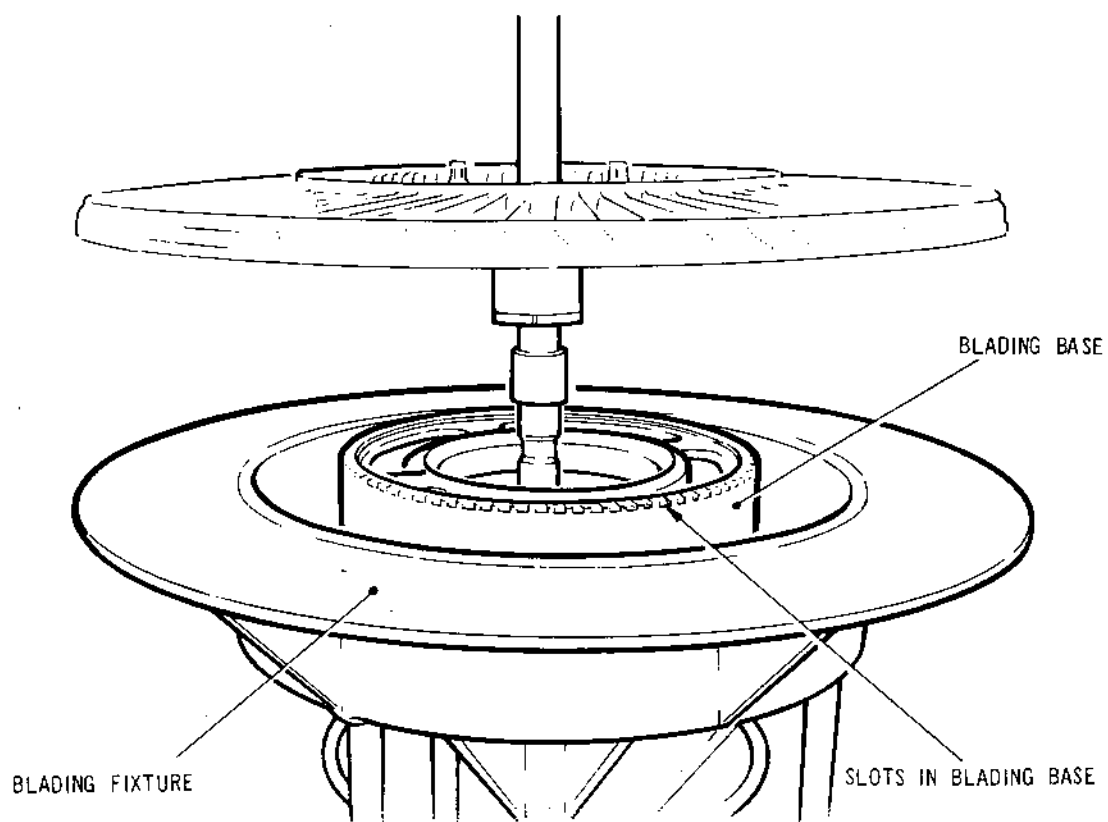
OLYMPUS 593

MK.610-14-28  
OVERHAUL

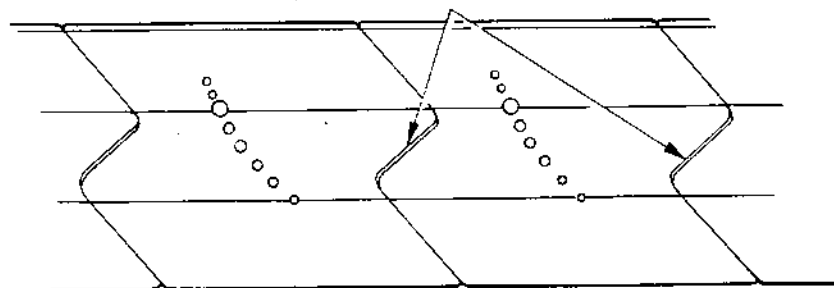


CR 33122/00B

PRINTED IN ENGLAND



LOCATION OF GAP CHECKS  
AT SHROUD INTERLOCKING JOINTS



TURBINE BLADES SLACKNESS CHECKS

Positioning Turbine Assembly on Blading Base  
Figure 505

SUB-ASSEMBLY  
**72-52-02**  
Page 513  
Nov 1/76

TN30109



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (14) Carefully lower the turbine rotor assembly into the blading fixture until it rests on the blading base. Ensure that the blade roots rest on the stepped sections between the blading base slots.
- (15) Continue to insert each blade in turn by gradual stages and ensure that all blades are fully and evenly assembled to the disk.
- (16) Check the turbine blades for slackness.
  - (a) Carefully check each blade for movement at the shroud interlocking joint. If movement is evident and clearance occurs at the centre section of the interlocking joints measure the gaps to ascertain the amount of clearance.
  - (b) If the clearance exceeds 0.001 in. (0,0254 mm) at any centre section of the interlocking joints the blades are unacceptable for further running and must be rejected.
- (17) Carefully raise the turbine out of the blading fixture. With the assembly in the vertical position secure the mandrel to the clamp in the mobile stand.
- (18) Remove the pin securing the angled support tube to the clamp support tube on the opposite end of the mobile stand. Carefully swivel the clamp tube forward to provide clearance for the turbine blades when lowering the mandrel into the horizontal position.
- (19) Carefully swivel the mandrel until it is almost horizontal in the mobile stand. Position the clamp support tube vertically and secure it to the angled support tube with the pin. Lower the mandrel onto the clamp and secure it.
- (20) If the turbine blades slackness checks are satisfactory convey the assembly to the appropriate area for static balance checks (Ref. para.6).
- (21) If the turbine blades are rejected because of excess slackness invert the turbine assembly, remove it from the mobile stand and transfer it to the blading fixture for de-blading.
  - (a) Remove the blading base from the blading fixture and place the blade platform stand (Tool 954) on top of the blading fixture.

SUB-ASSEMBLY

**72-52-02**

Page 514

Aug 1/79

IN9006



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Assemble the lifting fixture (Tool 1113) to the end of the mandrel. Ensure that the securing bolt is tightened. Secure the mandrel extension (Tool 1135) to the opposite end of the mandrel.
- (c) Attach a crane hoist to the lifting fixture, open the adjacent clamp and raise the mandrel slightly.

CAUTION: TURBINE BLADES MUST NOT CONTACT CLAMP SUPPORT TUBE. DAMAGE TO BLADES COULD RESULT.

- (d) Carefully swivel the clamp support tube forward to provide clearance for the turbine blades.
- (e) Transfer the turbine and mandrel to the blading fixture. Lower the assembly into the blading fixture and adjust the hand wheel so that the underside of the blades are slightly above the blade platform stand.

NOTE: Owing to the interlocking turbine blade shrouds, the blades cannot be removed from the turbine disk singly in one operation.

- (f) Using a driver (Tool 907) and a light weight hammer carefully tap each blade at the solid section of the blade root to effect a gradual and even removal of the blades from the turbine disk. Adjust the hand wheel on the blading fixture to regulate the progressive disassembly of the blades.
- (g) Identify each blade with the reason for rejection following removal from the disk. Place the blades in containers (Tool 1426). On completion of disassembly remove the rejected blades from the sub-assembly area.

(22) Prepare the turbine disk for the assembly of replacement turbine blades.

- (a) Attach a crane hoist to the lifting fixture attached to the end of the mandrel. Carefully transfer the assembly to the mobile stand, secure the mandrel to the clamp on the mobile stand, swivel the assembly to the horizontal position and secure the clamps.

SUB-ASSEMBLY

72-52-02

Page 515

Aug 1/79



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Remove the extension (Tool 1135) from the mandrel and assemble the lifting ring (Tool 1121) to the mandrel. Remove the lifting fixture from the opposite end of the mandrel.
- (c) Attach a crane hoist to the lifting ring and transfer the assembly to the blading fixture. Remove the blade platform stand (Tool 954) from the top of the blading fixture and carefully lower the assembly into the fixture.

- (23) Install replacement turbine blades (Ref. para. 2, 3, 4, 5).

6. Statically Balance LP Turbine Rotor (Avery Balancing Machine Type 72.N.17)

**WARNING:** ISOLATE BALANCING MACHINE FROM ELECTRICITY SUPPLY BEFORE COMMENCING PREPARATION, INSTALLATION OR TURBINE REMOVAL PROCEDURES.

A. Prepare Balancing Equipment.

- (1) Place the adjustable bearing (Tool 1637) in the bearing support positioned at the greater distance from the balancing machine drive shaft. Secure the adjustable bearing to the bearing support with two clamp plates and bolts (Ref. Fig. 506).
- (2) Set the adjustable bearing to the mandrel diameter (Ref. Fig. 506).
  - (a) Attach a crane hoist to the lifting fixture (Tool 1131) then position the fixture on the mandrel. Release the mobile stand clamps and carefully lift the turbine assembly. Measure the bearing location of the mandrel with adjustable bearing gauge (Tool 1641). Carefully lock the gauge and check that the setting has not been disturbed.
  - (b) Place the gauge on the adjustable bearing housing. Slacken the bolt securing the support arm connected to the bearing roller positioned nearest the adjustment point on the gauge. Carefully move the roller until it is in contact with the adjustment point on the gauge. Tighten the roller support arm securing bolt and check to ensure that the roller remains in contact with the gauge.

TN9563

SUB-ASSEMBLY

**72-52-02**

Page 516

Aug 1/79



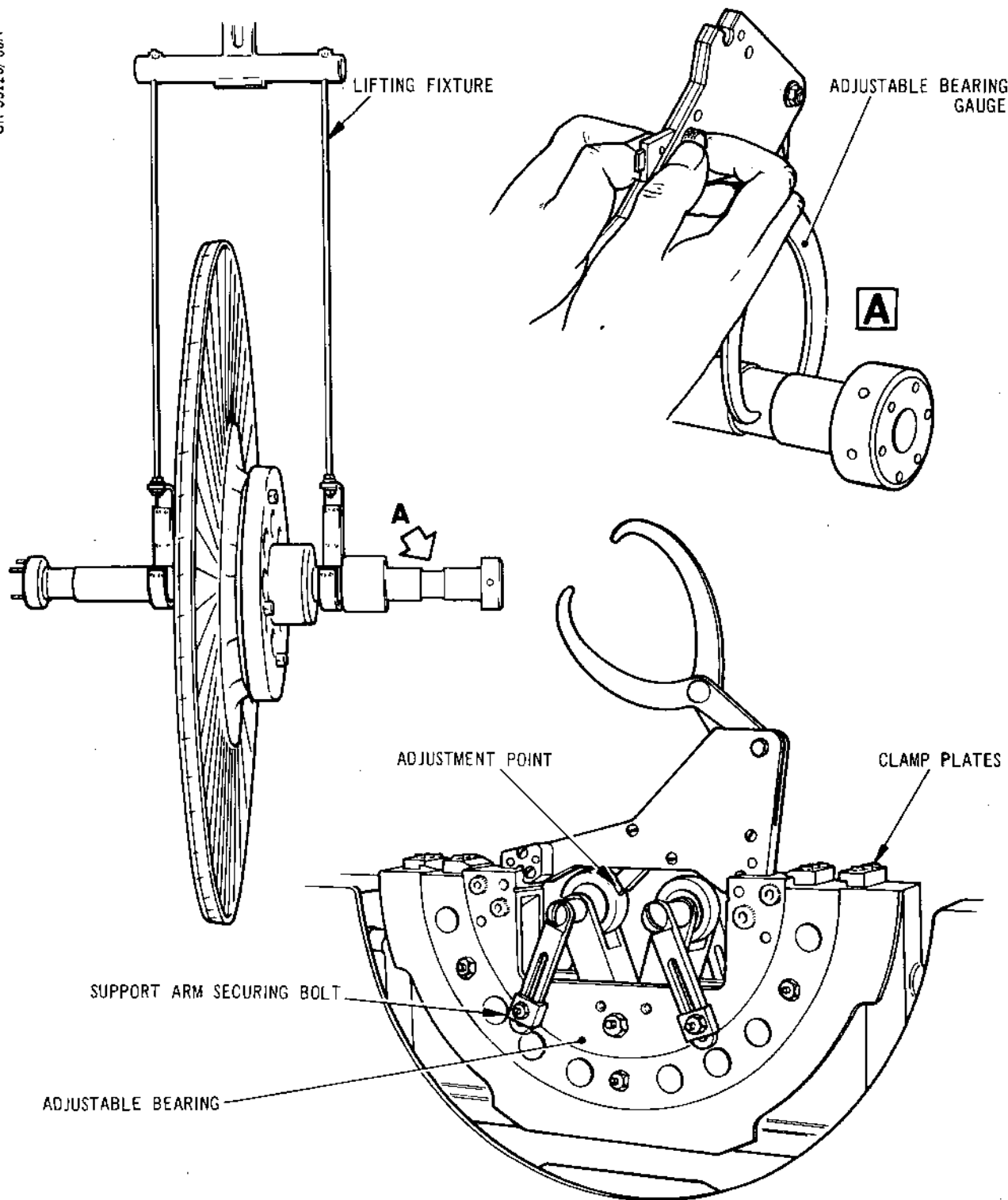
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33123/00A

PRINTED IN ENGLAND



TN30110

Setting Procedure of Adjustable Bearing  
Figure 506

SUB-ASSEMBLY  
**72-52-02**  
Page 517  
Nov 1/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) Remove the gauge and re-position it for adjustment of the opposite roller. Set and lock the roller in accordance with the previously described procedure. Remove the gauge.
- (3) Assemble the bearing housing and bearing to the balancing machine (Ref.Fig.507).
  - (a) Place the lower half of the bearing housing (Tool 1652) in the bearing location positioned near the drive shaft on the balancing machine. Secure the bearing housing with two clamp plates and bolts.
  - (b) Place the lower half of the slave bearing (Tool 363) into the bearing housing and secure with the retaining bolt in the bearing housing.

NOTE: The lower half of the slave bearing is identified by the oil drain hole at the bottom position.

- (4) Position the lower half of shroud (Tool 1642) between the balancing machine bearing supports in preparation to accept the turbine rotor.

B. Install Turbine Rotor on Balancing Machine.

- (1) Attach the lifting fixture (Tool 1131) and crane hoist to the mandrel and carefully raise the turbine assembly out of the mobile stand.
- (2) Transfer the assembly to the balancing machine.
  - (a) Carefully lower the assembly into position over the balancing machine with the mandrel disk positioned near the balancing machine shaft coupling.
  - (b) Refer to the balancing machine manufacturers instructions for information regarding the adjustment of the bearing supports and adjust the bearing supports to accommodate the installation of the LP turbine assembly. Lock the supports.

TN8556

SUB-ASSEMBLY

72-52-02

Page 518

Aug 1/79



OLYMPUS 593

MK.610-14-28

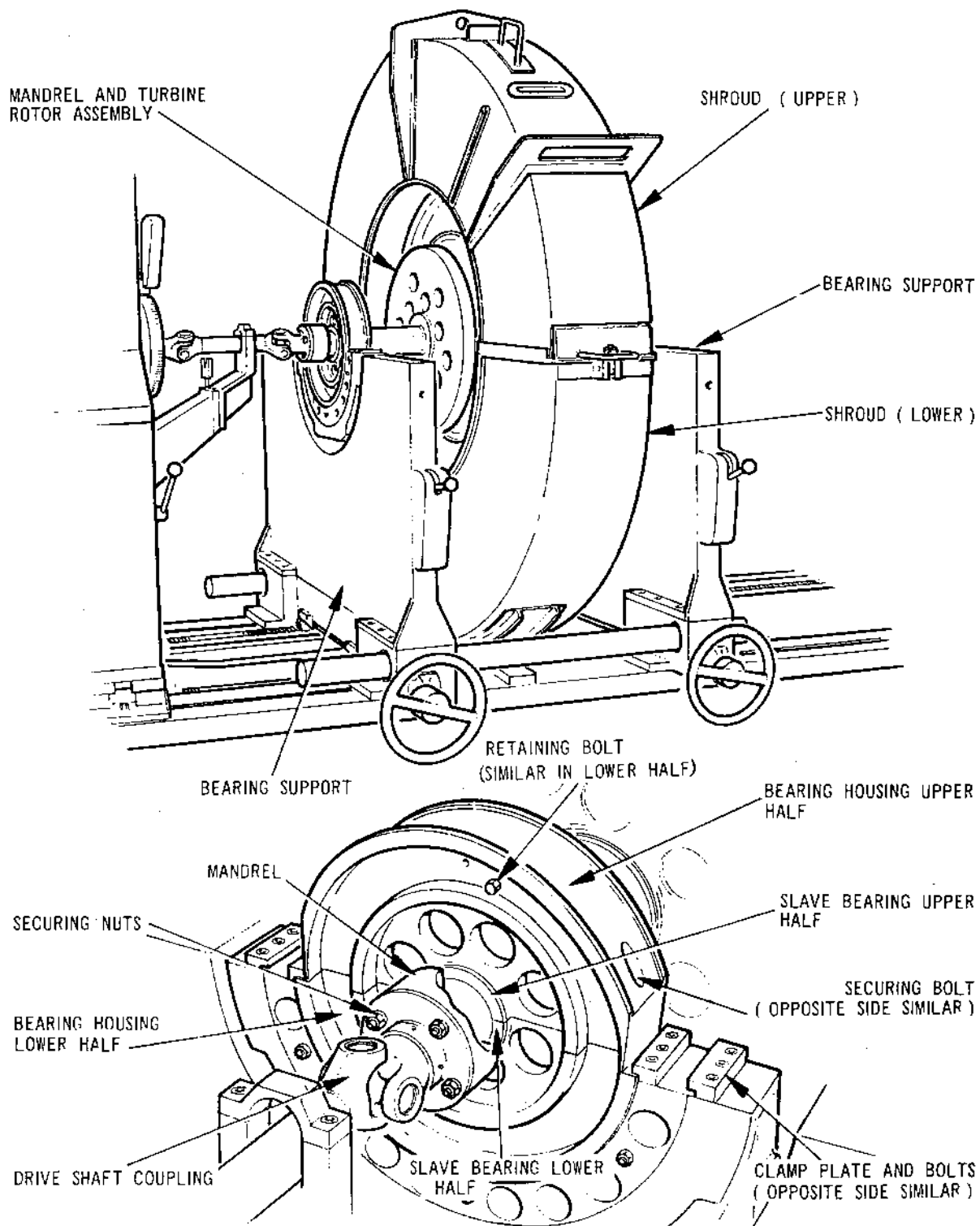
OVERHAUL



CR 31500/00A

PRINTED IN ENGLAND

TN30111



Installing LP Turbine Rotor in Balancing Machine  
Figure 507

SUB-ASSEMBLY

**72-52-02**

Page 519

Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) Finally lower the turbine assembly into the bearing support. Engage the drive shaft coupling with the mandrel and secure with nuts. Check to ensure that the mandrel is correctly located on the slave bearing and adjustable rollers.
  - (d) Finally position the shroud half to ensure adequate clearance for the turbine rotor, then secure the shroud to the balancing machine.
  - (e) Assemble the upper half of the slave bearing (Tool 363) to the upper half of the bearing housing (Tool 1652), then secure it with the retaining bolt in the bearing housing section. Place the slave bearing and bearing housing upper half over the mandrel and the lower half of the assembly. Secure it with the two securing bolts.
- (3) Remove the lifting fixture from the mandrel.
- (4) Lubricate the slave bearing assembly with lubricant 'A' and ensure that the assembly rotates freely by hand.
- (5) Install the upper half of the shroud (Tool 1642).
- (a) Carefully lower the shroud section into position over the turbine wheel. Secure the shroud sections together with the hinge bolts.
- C. Check the Unbalance of LP Turbine Rotor.
- (1) Operate the balancing machine in accordance with the manufacturers instructions. Maintain lubrication of the bearings. Record the amount of unbalance; also record the angular position of unbalance with reference to the blade position numbers.
- D. Acceptance Limits.
- (1) Provided the unbalance does not exceed 80 drn in. the disk is acceptable. If the unbalance is greater than 80 drn in. carry out blade position change (Ref. para.F.).

TN9941

**ATP  
TEMPORARY  
REVISION**

**British airways**

CONCORDE

OLYMPUS 593 OVERHAUL MANUAL

This Temporary Revision complies with BCAR's Chapter A6-2 and TSS No.0-2

*Dennis Howdell*

For Chief Technical and Industrial Services Engineer CAA Design Approval No.DAI/8566/78

TEMPORARY REVISION NO.72-573

Insert in 72-52-02 before page 521

REASON FOR ISSUE

BEOL amendment

ACTION

Delete existing paragraph E (2) and read the following:-

- (2) Commencing at No.1 position on the turbine disk blade root check the blade serial number and record the serial number in position sequence on the turbine blade card.

23 July 1981

TR 72-573  
72-52-02  
TR Page 1 of 1



OLYMPUS 593

MK.610-14-28

OVERHAUL



SEE TR

E. Numerically Identify Turbine Blades and Lock the Tabs  
(Ref.Fig.508).

- (1) On satisfactory completion of the balance check, disconnect the mandrel from the drive shaft coupling and remove items as necessary to allow removal of the turbine assembly from the balancing machine. Using the lifting fixture (Tool 1131), transfer the turbine assembly to the mobile stand and secure it in the horizontal position.
- (2) Commencing at No.1 position on the turbine disk blade root, lightly vibro-etch each turbine blade root with its position number to correspond with the number on the disk.
- (3) Taking care to avoid striking the blade tang, carefully tap the front face of each blade root with a soft faced hammer or drift, until the tangs of all blades are in contact with the front face of the turbine disk.
- (4) While preventing forward movement of the blades in their slots, use the hammer (Tool 1655) and bend the locking tab of each blade over the edge of the disk as shown.
- (5) Ensure that all blade tangs are contacting the front face of the disk, then check the clearance at the end of each locking tab with feeler gauges. The maximum acceptable clearance at this point is 0.010 in. (0,254 mm).

F. Blade Re-positioning Procedure to Rectify Unbalance.

- (1) Remove the assembly from the balancing machine.
  - (a) Disconnect the mandrel from the drive shaft coupling and remove items as necessary to allow removal of the turbine assembly from the balancing machine. Using the lifting fixture (Tool 1131), transfer the turbine assembly to the mobile stand and secure it in the horizontal position.

PRINTED IN ENGLAND

TN14468

SUB-ASSEMBLY

72-52-02

Page 521

Aug 1/79

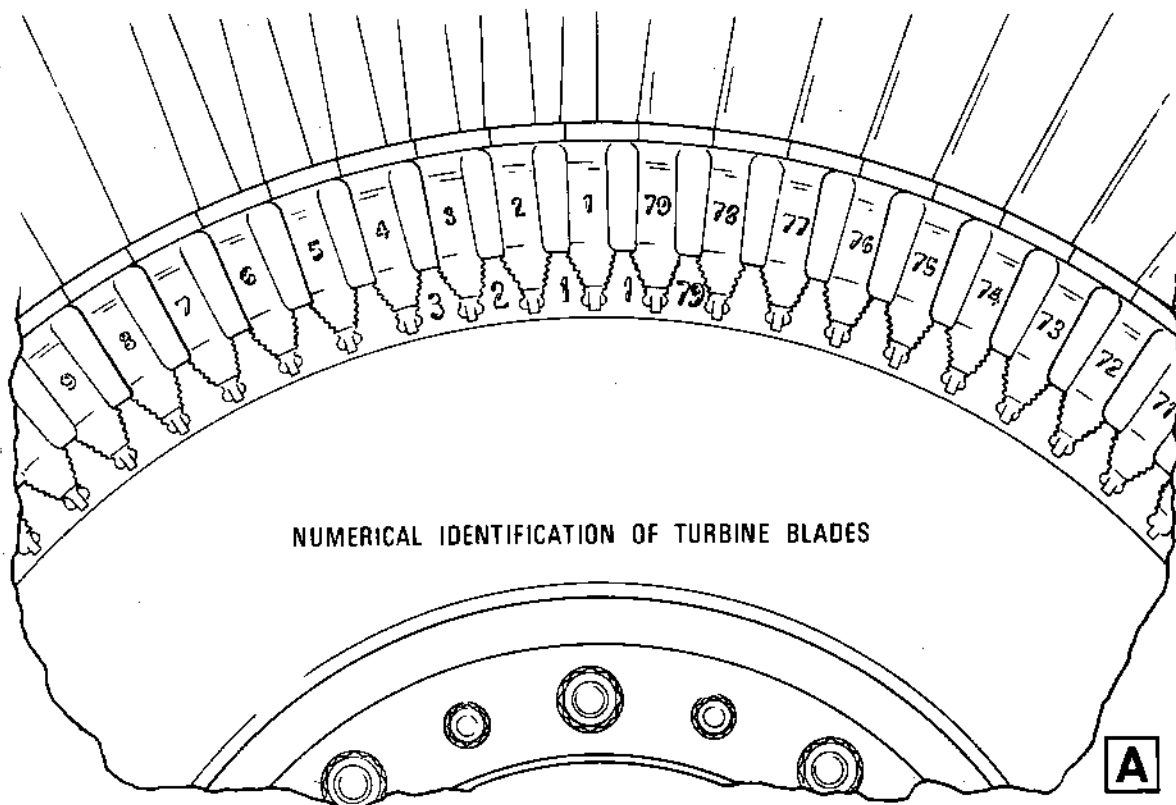
CR 33124/00B



OLYMPUS 593

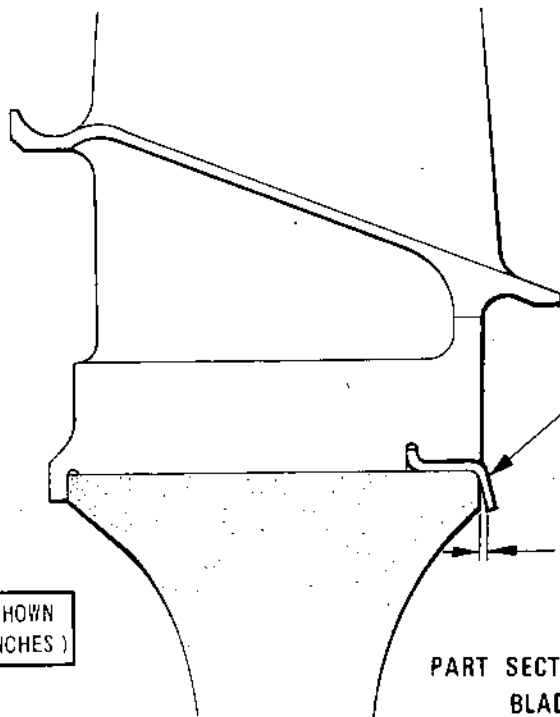
MK.610-14-28

OVERHAUL



NUMERICAL IDENTIFICATION OF TURBINE BLADES

A →



LOCKING TAB (LOCKED)

0.010 (0.25) MAXIMUM PERMISSIBLE  
CLEARANCE (AT END)

DIMENSIONS GIVEN ARE SHOWN  
THUS :- MILLIMETRES (INCHES)

PART SECTION OF TURBINE  
BLADE IN DISK

TN30112

Turbine Blade Numbering and Locking Details  
Figure 508

SUB-ASSEMBLY  
**72-52-02**

Page 522  
Aug 1/79



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Install the turbine assembly in the blading fixture.
- (a) Place the blade platform stand (Tool 954) on top of the blading fixture.
  - (b) Assemble the lifting fixture (Tool 1113) to the end of the mandrel and ensure that the securing bolt is tightened. Assemble the mandrel extension (Tool 1135) to the opposite end of the balancing mandrel.
  - (c) Attach a crane hoist to the lifting fixture bolted to the end of the mandrel, open the adjacent clamp and raise the mandrel slightly.
- CAUTION: TURBINE BLADES MUST NOT CONTACT CLAMP SUPPORT TUBE. DAMAGE TO BLADES COULD RESULT.
- (d) Remove the pin securing the angled support tube to the clamp support tube. Carefully swivel the clamp tube forward to provide clearance for the turbine blades when raising the assembly. Swivel the mandrel to the vertical position, release the clamp and transfer the assembly to the blading fixture.
  - (e) Lower the assembly into the blading fixture and adjust the hand wheel so that the underside of the blades are slightly above the blade platform stand.
- (3) Remove the blades from the turbine disk.

NOTE: Owing to the interlocking turbine blade shrouds, the blades cannot be removed from the turbine disk in one operation.

- (a) Use the driver (Tool 907) and a light weight hammer to remove the blades. Carefully tap each blade at the solid section of the blade root to effect a gradual and even removal of the blades from the turbine disk. Adjust the hand wheel on the blading fixture to regulate the progressive disassembly of the blades.
- (b) On completion of the removal of the blades, place the blades in descending weight order on a suitable flat surface and retain the locking tabs.

SUB-ASSEMBLY

**72-52-02**

Page 523

Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Remove the turbine disk and mandrel from the blading fixture. Secure the lower end of the mandrel to the mobile stand clamp, then carefully swivel the assembly horizontally into the stand. Ensure that the clamp support tube is correctly secured, then secure the clamp to the mandrel.
- (5) Remove the mandrel extension from the end of the mandrel and assemble the lifting ring (Tool 1121). Remove the lifting fixture from the opposite end of the mandrel.
- (6) Attach a crane hoist to the lifting ring secured to the end of the mandrel, open the adjacent clamp and raise the mandrel slightly.

CAUTION: TURBINE BLADES MUST NOT CONTACT CLAMP SUPPORT TUBE. DAMAGE TO BLADES COULD RESULT.

- (7) Remove the pin securing the angled support tube to the clamp support tube. Carefully swivel the clamp tube forward to provide clearance for the turbine blades when raising the assembly. Swivel the mandrel to the vertical position in the mobile stand.
- (8) Ensure that the datum position is clearly marked on the top surface of the disk. Release the clamp securing the mandrel then transfer the assembly to the turbine disk blading fixture. Remove the blade platform stand from the top of the blading fixture. Lower the assembly into the blading fixture and adjust the hand wheel until the top edge of the turbine disk is slightly above the top of the protective rubber on the blading fixture surface. Remove the crane hoist.
- (9) Reposition the turbine blades in the turbine disk.
  - (a) Apply lubricant 'A' to the blade roots. Select blades of suitable weight to correct the unbalance factor. Assemble a locking tab to each blade and enter it into the disk.
  - (b) When all blades are entered into the disk roots, ensure that the locking tabs engage with the slots in the blade roots and are not dislodged during blade insertion procedure. Use tab retaining disk (Tool 942) to hold the tabs in position.

IN8712

SUB-ASSEMBLY

**72-52-02**

Page 524

Nov 1/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) Carefully insert each blade in turn until the edge of every blade is in contact with the rubber protector on the blading fixture. Use driver (Tool 907 ) and a light weight hammer to install the blades. Ensure that the point of contact with the driver is confined to the solid section of the blade root.
- (d) Adjust the hand wheel on the blading fixture to raise the turbine disk assembly slightly then continue to insert the blades until contact with the rubber protector is made. When all of the blades are inserted approximately half-way into the turbine disk, carefully remove the assembly from the blading fixture.
- (e) Place the blading base (Tool 1152) concentrically in the blading fixture.
- (f) Carefully lower the turbine rotor assembly into the blading fixture until it rests on the blading base. Ensure that the blade roots rest on the stepped sections between the blading base slots. Continue to insert each blade in turn by gradual stages and ensure that all blades are fully and evenly assembled to the disk.
- (g) Carefully remove the turbine assembly from the blading fixture and assemble it in the vertical position to the mobile stand. Secure the clamp and carefully swivel the assembly to the horizontal position. Ensure that the clamp support tube is correctly secured, then secure the clamp to the mandrel.
- (h) Remove the lifting ring from the end of the mandrel. Convey the assembly to the appropriate area for static balance checks. Remove the blading base from the blading fixture.
- G. Re-Check Static Balance of LP Turbine Rotor.
- (1) Prepare the balancing equipment (Ref.para.6.A.).
  - (2) Install the turbine rotor on the balancing machine (Ref.para.6.B.).
  - (3) Check the unbalance of the turbine rotor (Ref.para.6.C.).

SUB-ASSEMBLY

**72-52-02**

Page 525

Nov 1/76

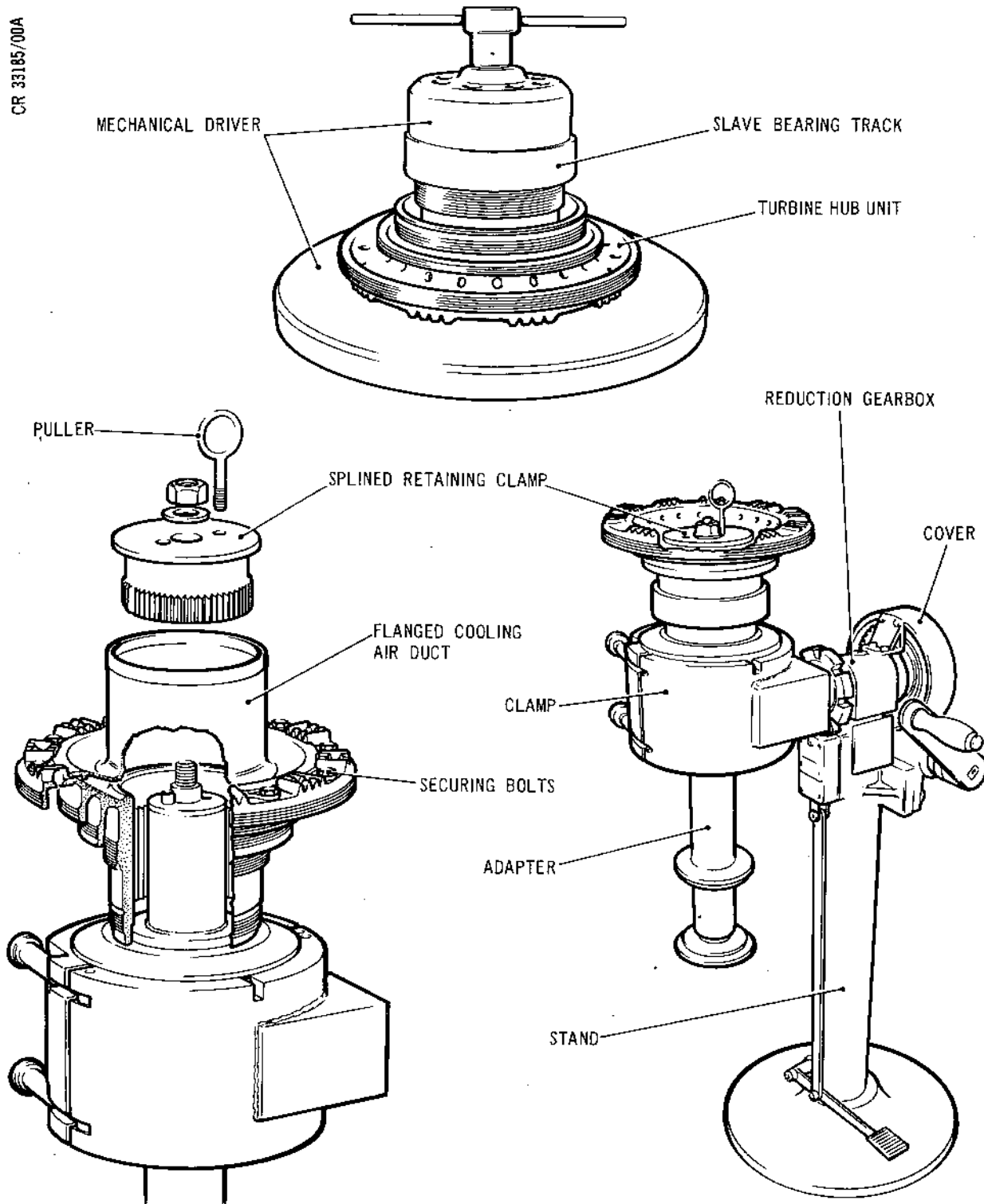


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 33185/00A



Assembling Slave Bearing Track, Hub and Air Duct  
Figure 509

SUB-ASSEMBLY  
**72-52-02**  
Page 526  
Nov 1/76

TN30113



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Check the acceptance limits (Ref.para.6.D.).
- (5) Numerically identify the turbine blades and lock the tabs and check end-float (Ref.para.6.E.).

## 7. Assembly of Hub Unit and Labyrinths to LP Turbine Rotor

### A. Assemble Slave Bearing Track to Turbine Hub Unit (Ref.Fig.509).

- (1) Ensure thorough cleanliness of all components.
- (2) Place the hub unit (1-210) into the mechanical driver (Tool 1136) and place the slave bearing track (Tool 850) squarely on the hub. Assemble the detachable section of the assembly fixture over the slave bearing. Screw the handle in position and carefully apply sufficient load to press the slave bearing fully into position on the hub unit. Remove the hub unit from the assembly fixture.

### B. Assemble Air Duct to Hub Unit (Ref.Fig.509).

- (1) Prepare the stand assembly (Tool 873).
  - (a) Ensure that the reduction gearbox is securely attached to the stand, and check that the gear cover is in position on the gearbox. Ensure that the clamp is secured to the reduction gearbox and that the adapter is securely assembled to the clamp.
- (2) Check the operation and safety of the stand assembly.
  - (a) In conjunction with the foot pedal release/brake, rotate the assembly by turning the handle. Check for free rotation, positive locking and release operation. Return the assembly to the vertical position in readiness for the turbine hub installation.
- (3) Assemble the hub unit/slave bearing assembly to the stand adapter.
  - (a) Remove the splined retaining clamp from the adapter and place the hub unit in position on the adapter.

PRINTED IN ENGLAND

TN11035

SUB-ASSEMBLY

**72-52-02**

Page 527

Nov 1/76

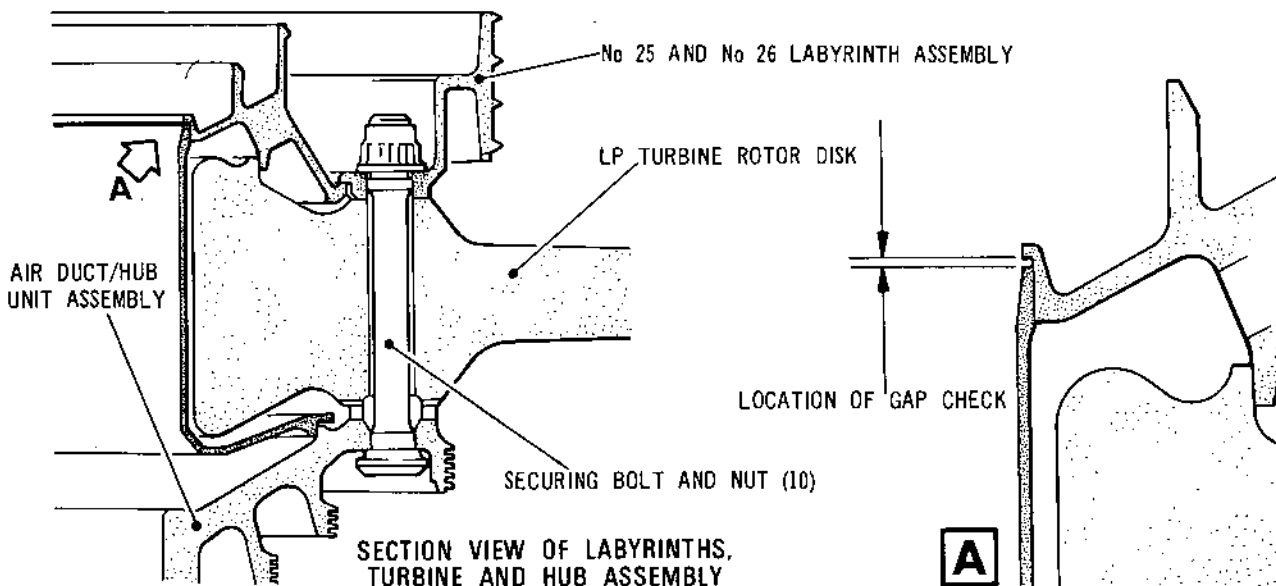
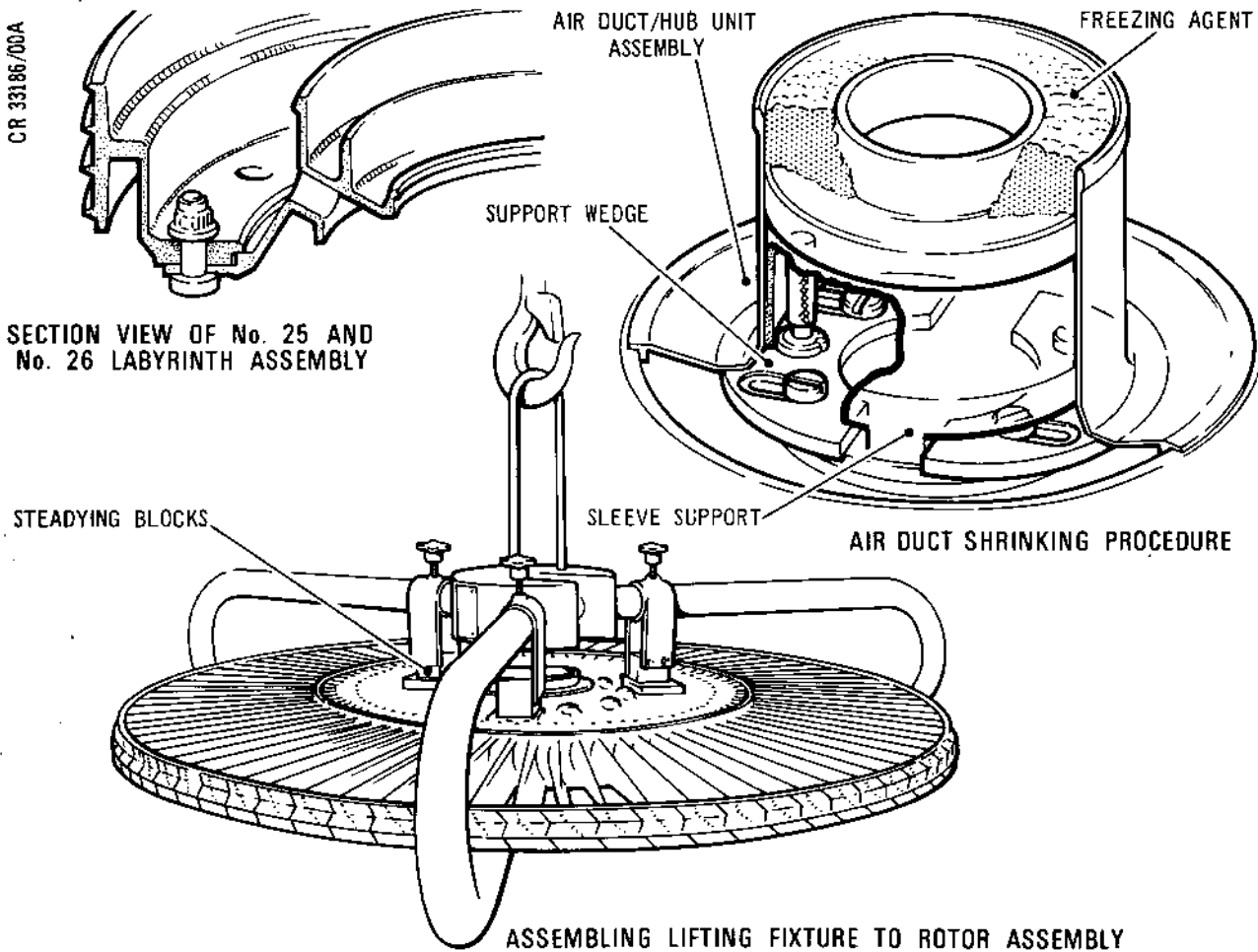


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33186/00A



Assembling Labyrinths and Turbine Rotor to Hub  
Figure 510

SUB-ASSEMBLY  
**72-52-02**

Page 528  
Nov 1/76

TN30114



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (b) Install the splined retaining clamp to hold the hub unit in position. Secure the clamp with the retaining nut. Unscrew and remove the puller from the splined clamp.
- (4) Install the flanged cooling air duct (1-200).
  - (a) Shrink the air duct by use of a suitable freezing agent. Ensure that suitable protective gloves are worn when handling the frozen component. Align the bolt holes in the air duct with the holes in the hub unit. Press the air duct fully into the hub unit.
  - (b) Apply lubricant 'C' to securing items. Secure the hub and duct together with bolts (1-190), nuts (1-150) and washers (1-180).
  - (c) Ensure that the nuts have a minimum locking (run-down) torque of 6.5 lbf in. (0,73 N.m). Torque-tighten the nuts to 210 lbf in. (24 N.m). After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 2.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref.SB.72-8444-225).
- C. Assemble Turbine Rotor to Hub Unit (Ref.Fig.510).
  - (1) Assemble the No.25 labyrinth ring to the No.26 labyrinth housing.
    - (a) Ensure thorough cleanliness of components. Apply lubricant 'C' to securing items. Align the datum mark 0 on the labyrinth and housing. Secure the labyrinths together with nuts (1-20) bolts (1-90) and washers (1-80). Tighten the nuts and bolts sufficiently to hold the labyrinth ring and housing together. The final torque-tightening will be detailed later.

SUB-ASSEMBLY

**72-52-02**

Page 529  
Dec 31/01



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (2) Place the labyrinth assembly in an oven and heat it to 150 deg C.
- (3) Shrink the air duct.
  - (a) Position the support wedge (Tool 3072) in the bottom of the air duct/hub unit assembly. Place the sleeve support (Tool 944) inside the air duct. Pack the sleeve support with a suitable freezing agent.
- (4) Position the turbine rotor on the hub unit.
  - (a) Secure the lifting ring (Tool 1121) to the studs on the end of the mandrel in the mobile stand. Attach a crane hoist to the lifting ring secured to the end of the mandrel, open the adjacent clamp and raise the mandrel slightly.

**CAUTION: TURBINE BLADES MUST NOT CONTACT CLAMP SUPPORT TUBE. DAMAGE TO BLADES COULD RESULT.**
  - (b) Remove the pin securing the angled support tube to the clamp support tube. Carefully swivel the clamp tube forward to provide clearance for the turbine blades when raising the assembly. Swivel the mandrel to the vertical position so that the turbine rotor is horizontally positioned with the serrations on the under surface. Ensure that the mandrel clamp is secure.
  - (c) Attach a crane hoist to the lifting fixture (Tool 998) and position the fixture concentrically on the turbine rotor disk. Raise the fixture sufficiently to establish contact with the bottom surface of the rotor disk. Adjust the steadying blocks on the top of the fixture by slackening the handnuts. Tighten the handnuts before lifting the rotor assembly.



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (d) Remove the nuts that secure the mandrel disk to the rotor disk. Carefully raise the turbine rotor assembly away from the mandrel and position the rotor in preparation for assembly to the hub unit.
- (e) Ensure that the serrations on the hub and turbine disk are thoroughly clean and damage free. Align the datum mark 0 on the turbine disk with the datum mark 0 on the hub. Lower the turbine rotor carefully on to the hub. Ensure that the turbine rotor locates correctly on the hub. Remove the lifting fixture from the rotor.
- (5) Assemble the No.25 and No.26 labyrinth to the turbine rotor and air duct.
- (a) Ensure that the datum marks align on the rotor disk and labyrinth assembly. Slide the heated labyrinth assembly over the air duct and ensure that the bolt-holes in the rotor disk align with the holes in the labyrinth. Temporarily secure the labyrinth assembly to the rotor disk with ten bolts (1-120) and nuts (1-10) lubricated with lubricant 'C'.
- (b) Measure the gap between the top edge of the air duct and the edge of the labyrinth. The clearance must be between 0.011 and 0.039 in. (0,279 and 0,990 mm).
- (c) Identify the securing bolt positions 1 to 10 for torque sequence purposes. Commencing at No.1, torque-tighten the nuts to 10 lbf ft (13,6 N.m) in the following sequence 1, 6, 4, 9, 2, 7, 5, 10, 3 and 8. Use the torque wrench (Tool 1658).

SUB-ASSEMBLY

72-52-02

Page 530A

Dec 31/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



This page left blank intentionally





OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

- (d) Comply with the numerical torque sequence and increase the torque loading in three stages until between 50 and 55 lbf ft (67,8 and 74,6 N.m) is applied. After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 2.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref. SB.72-8444-225).
- (e) Remove the sleeve support and support wedges from the air duct unit.
- (6) Tighten the nuts securing the No.25 labyrinth ring to No.26 labyrinth housing. Ensure that the nuts have a minimum locking (run-down) torque of 6.5 lbf in. (0,73 N.m). Torque-tighten the nuts to 210 lbf in. (24 N.m). After torque-tightening, check each bolt for protrusion through its nut. If protrusion is less than 2.5 thread pitches beyond nut chamfer, the bolt must be renewed (Ref. SB. 72-8444-225).

#### 8. LP Turbine Rotor Swash Checks

##### A. Prepare for Checks (Ref.Fig.511).

- (1) Ensure that the balancing mandrel (Tool 1271) is securely clamped and bolted in the mobile stand (Tool 1147) with the lifting adapters (Tool 1143) and (Tool 1144).
- (2) Turn the assembly stand until the turbine rotor is in the vertical position in readiness for assembly to the balancing mandrel.
- (3) Attach a crane hoist to the lifting fixture (Tool 1141) and securely attach the lifting fixture to the disk section of the rotor assembly.



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (4) Remove the turbine rotor from the adapter.
  - (a) Screw the extractor into the splined clamp located inside the rotor hub. Unscrew and remove the retaining nut securing the splined clamp. Ensure that the crane hoist and lifting fixture supports the turbine rotor. Carefully withdraw the splined clamp.
  - (b) Carefully remove the turbine rotor from the adapter. Secure the splined clamp to the adapter.
- (5) Assemble the turbine rotor to the balancing mandrel.
  - (a) Ensure thorough cleanliness of components especially the splined sections. Align the master spline on the mandrel with the master spline in the turbine hub, carefully slide the turbine rotor assembly on to the mandrel. Use the mechanical driver (Tool 1146) to fully press the turbine on the shaft.
  - (b) Apply lubricant 'A' to the turbine hub threads. Screw the bearing track retaining nut (1-130) on to the hub and tighten it with spanner (Tool 1596).
  - (c) Place the cupwasher (2-20) over the mandrel and ensure that it engages into a castellation on the slave track retaining nut. Screw the turbine retaining nut (2-10) on to the mandrel as far as possible by hand. Ensure that the cupwasher does not become dislodged.
  - (d) Assemble the immobiliser (Tool 1243) to the end of the mandrel. Ensure that it locates fully in position. Place the wrench spanner (Tool 1580) over the immobiliser and engage it with the LP turbine retaining nut. Engage the hand adapter (Tool 1660) with the wrench spanner. Tighten the retaining nut as far as possible by hand, then remove the hand adapter.
  - (e) Attach a crane hoist to the torque multiplier (Tool 1647) and engage the multiplier with the splines on the immobiliser and wrench spanner.

**WARNING:** CRANE HOIST MUST SUPPORT TORQUE MULTIPLIER DURING TORQUE PROCEDURE.

SUB-ASSEMBLY

**72-52-02**

Page 532

Dec 1/96

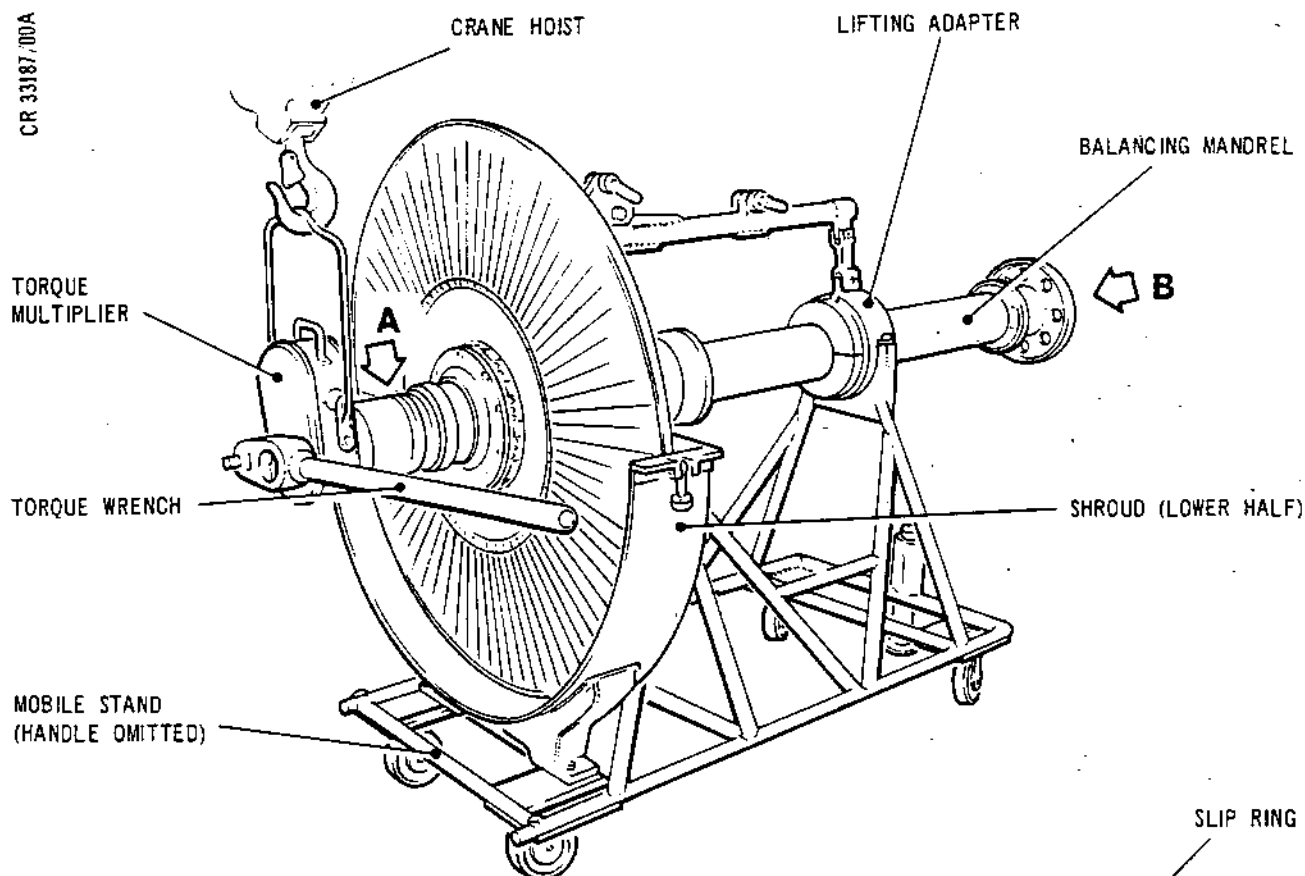


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33187/00A



WRENCH SPANNER

CUPWASHER

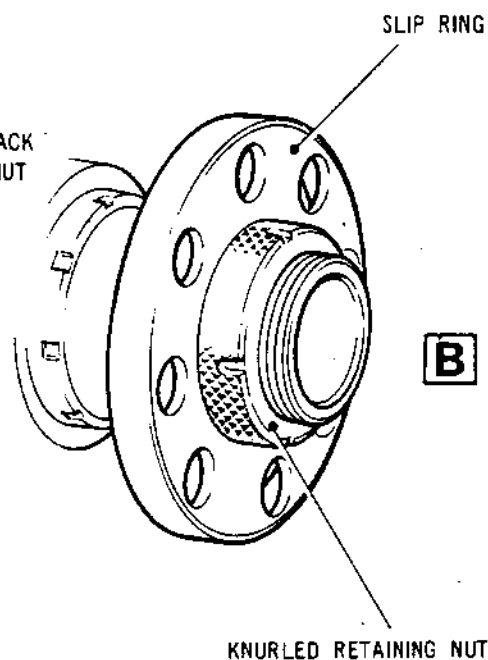
BEARING TRACK  
RETAINING NUT

IMMOBILISER

TURBINE RETAINING NUT

**A**

SECTION THROUGH END  
OF MANDREL ASSEMBLY



**B**

Assembling Turbine Rotor to Balancing Mandrel  
Figure 511

SUB-ASSEMBLY  
**72-52-02**

Page 533  
Nov 1/76



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (f) In conjunction with the torque multiplier, use the torque wrench (Tool 1658) and apply a torque load of 1450 lbf ft (1965,9 N.m) to the retaining nut.

NOTE: The torque multiplier has a ratio of 10 to 1 and the input from the torque wrench must therefore be 145 lbf ft (196,6 N.m).

- (g) Remove the equipment. Do not lock the cupwasher.
- (h) Ensure that the slip ring is assembled to the opposite end of the mandrel. Use the spanner (Tool 1567) to check the slip ring knurled retaining nut for tightness.
- (j) Assemble the shroud (Tool 1258) to the mobile stand.

## B. Position Turbine Rotor for Swash Check (Ref.Fig.512).

- (1) Ensure thorough cleanliness of all components.
- (2) Assemble the equipment to the inspection table.
  - (a) Place two mandrel supports (Tool 1073) on the inspection table and temporarily secure them to the table with retaining bolts and plates.
  - (b) Assemble the adjustable bearing (Tool 966) to a support and secure it with retaining plates and bolts.
  - (c) Assemble the adapter (Tool 1074) to the second mandrel support and secure it with bolts and retaining plates.
  - (d) Place the lower half of the bearing adapter (Tool 1650) in the support adapter and secure it with retaining plates and bolts.
- (3) Set the adjustable bearing to the slave bearing diameter.

NOTE: This setting procedure is similar to that described and illustrated previously (Ref.Para.6).

SUB-ASSEMBLY

## 72-52-02

Page 534

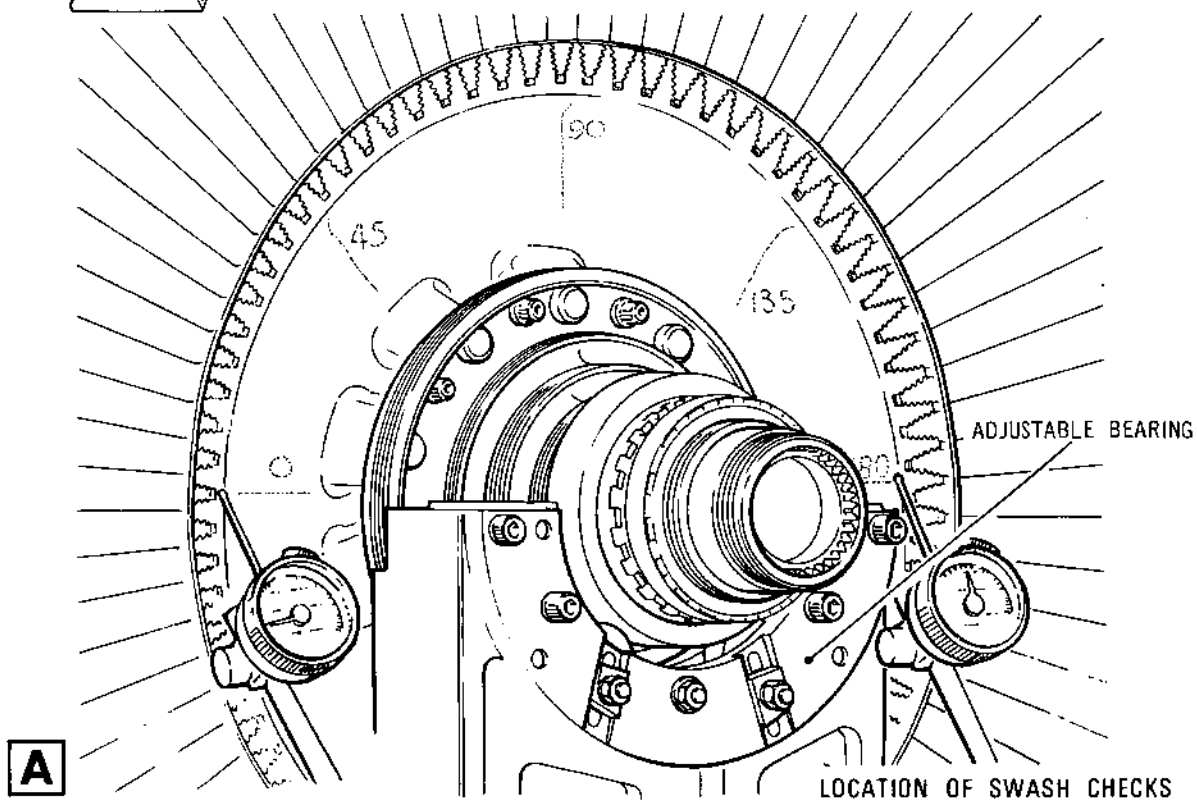
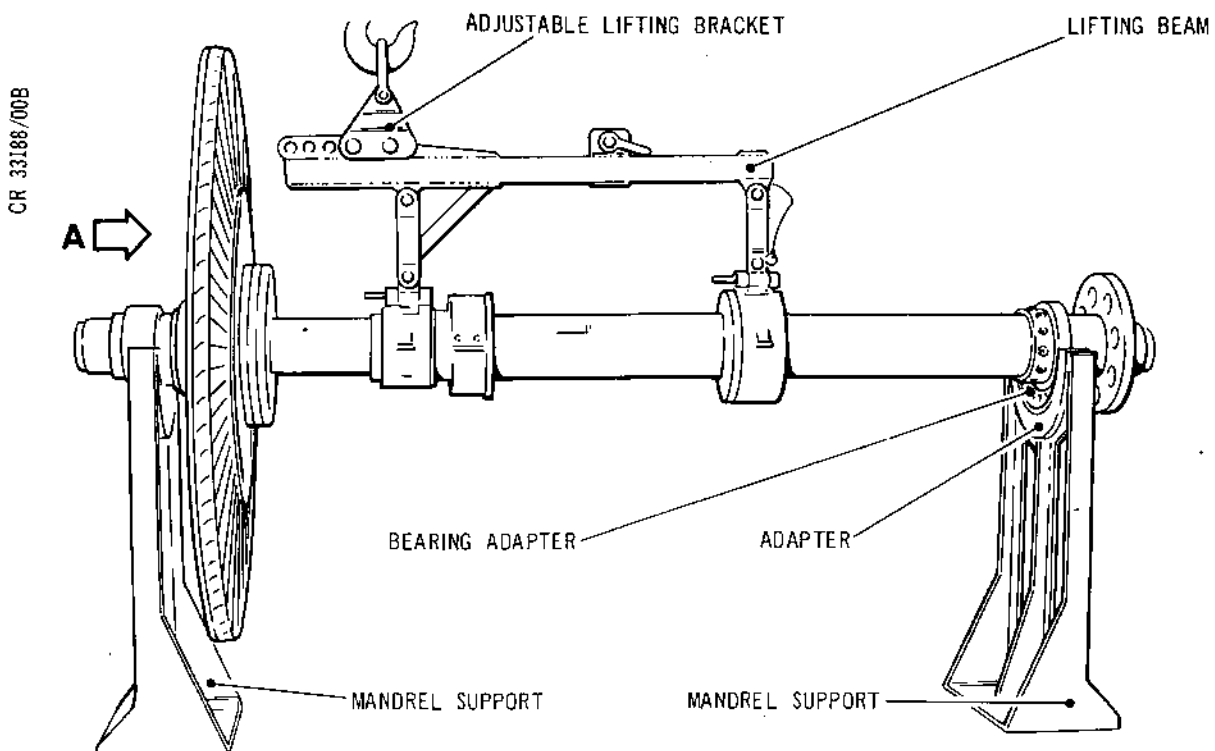
Dec 1/96



OLYMPUS 593

MK.610-14-28

OVERHAUL



Checking LP Turbine Swash  
Figure 512

SUB-ASSEMBLY  
**72-52-02**

Page 535

Jul 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (a) Use the adjustable setting gauge (Tool 32) to measure the outside diameter of the slave bearing inner track assembled to the turbine hub. Carefully lock the setting gauge and check that the setting has not been disturbed.
  - (b) Place the setting gauge on the adjustable bearing housing. Slacken the bolt securing the bearing roller positioned nearest the adjustment point on the setting gauge.
  - (c) Carefully move the roller until it is in contact with the adjustment point on the setting gauge. Tighten the roller securing bolt and check to ensure that the roller remains in contact with the setting gauge.
  - (d) Remove the setting gauge and re-position for adjustment of the opposite roller. Set and lock the roller in accordance with the previously described procedure. Remove the setting gauge.
- (4) Position the turbine rotor and mandrel on the supports.
- (a) Assemble the lifting beam (Tool 1145) to the lifting adapters on the balancing mandrel ensuring that the adjustable lifting bracket is positioned near the turbine rotor.
  - (b) Assemble the adjustable bracket to the holes provided for lifting the turbine and mandrel assembly.
  - (c) Remove the top section of the turbine shroud.
  - (d) Remove the bolts securing the adapters to the mobile stand. Carefully raise the mandrel and rotor and position it in readiness to be lowered on to the supports.
  - (e) Position the supports so that the slave bearing inner track on the turbine rotor hub will locate on the adjustable bearing, and the mandrel bearing assembly will locate in the bearing adapter.

NOTE: Ensure that enough space for inspection equipment is available in front of the turbine rotor.

TN11167

SUB-ASSEMBLY  
**72-52-02**

Page 536  
Nov 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (f) Tighten the bolts securing the supports to the table. Carefully lower the mandrel into position. Remove the lifting beam and carefully check the rotor and mandrel assembly for free rotation.

C. Swash Check Procedure (Ref.Fig.512).

- (1) Commencing at No.1 blade position mark the rotor disk at 45 degree intervals in the clockwise direction. Use an approved non permanent marking substance.
- (2) Position the No.1 blade (0 station) horizontally and prepare the inspection equipment to commence the check. The point of measurement is at the blade root location near the outer rim of the rotor disk.
  - (a) Position two dial indicator gauges 180 deg apart on the horizontal centre line of the turbine disk.
  - (b) Check and record the maximum variation (Total dial indicator reading) measured by each dial indicator gauge, also note the angle of occurrence. The final maximum swash is obtained by calculating the average variation of these readings.
- (3) Acceptance limits.
  - (a) The maximum permissible swash measured by total dial indicator reading must be within 0.005 in. (0,1270 mm).
- (4) On completion of a satisfactory swash check procedure, assemble the lifting beam (Tool 1145) to the lifting adapters on the balancing mandrel. Carefully raise the assembly clear of the supports on the inspection table.
- (5) Lower the assembly on to the mobile stand and secure the lifting adapters with bolts.

PRINTED IN ENGLAND

TN11168

SUB-ASSEMBLY

72-52-02

Page 537

Jul 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (6) Assemble the shroud to protect the turbine rotor blades. The lifting beam can remain attached to the mandrel pending transfer to the dynamic balancing machine.

## 9. Dynamically Balance LP Turbine Rotor

WARNING: ISOLATE BALANCING MACHINE FROM ELECTRICITY SUPPLY BEFORE COMMENCING PREPARATION, INSTALLATION OR TURBINE REMOVAL PROCEDURES.

### A. Prepare Equipment (Ref.Fig.513).

- (1) Refer to the balancing machine manufacturers information for details of machine operation calibration and adjustment (Avery 72N 55).
- (2) Disengage the drive shaft located at the top position.
- (3) Assemble the adjustable bearing (Tool 966) to the pedestal support on which the turbine slave bearing will rest. Secure the bearing with retaining plates and bolts.
- (4) Assemble the adapter (Tool 1074) and hinged filler bush (Tool 1638) to the second support and secure it with bolts and retaining plates.
- (5) Place the lower section of the bearing adapter (Tool 1650) in the hinged filler bush.
- (6) Adjust the balancing machine pedestal supports to accommodate the turbine/shaft assembly correctly.
- (7) Ensure that the driving belt guard (Tool 1988) is correctly assembled and securely bolted to the balancing machine.

TN44565

SUB-ASSEMBLY

**72-52-02**

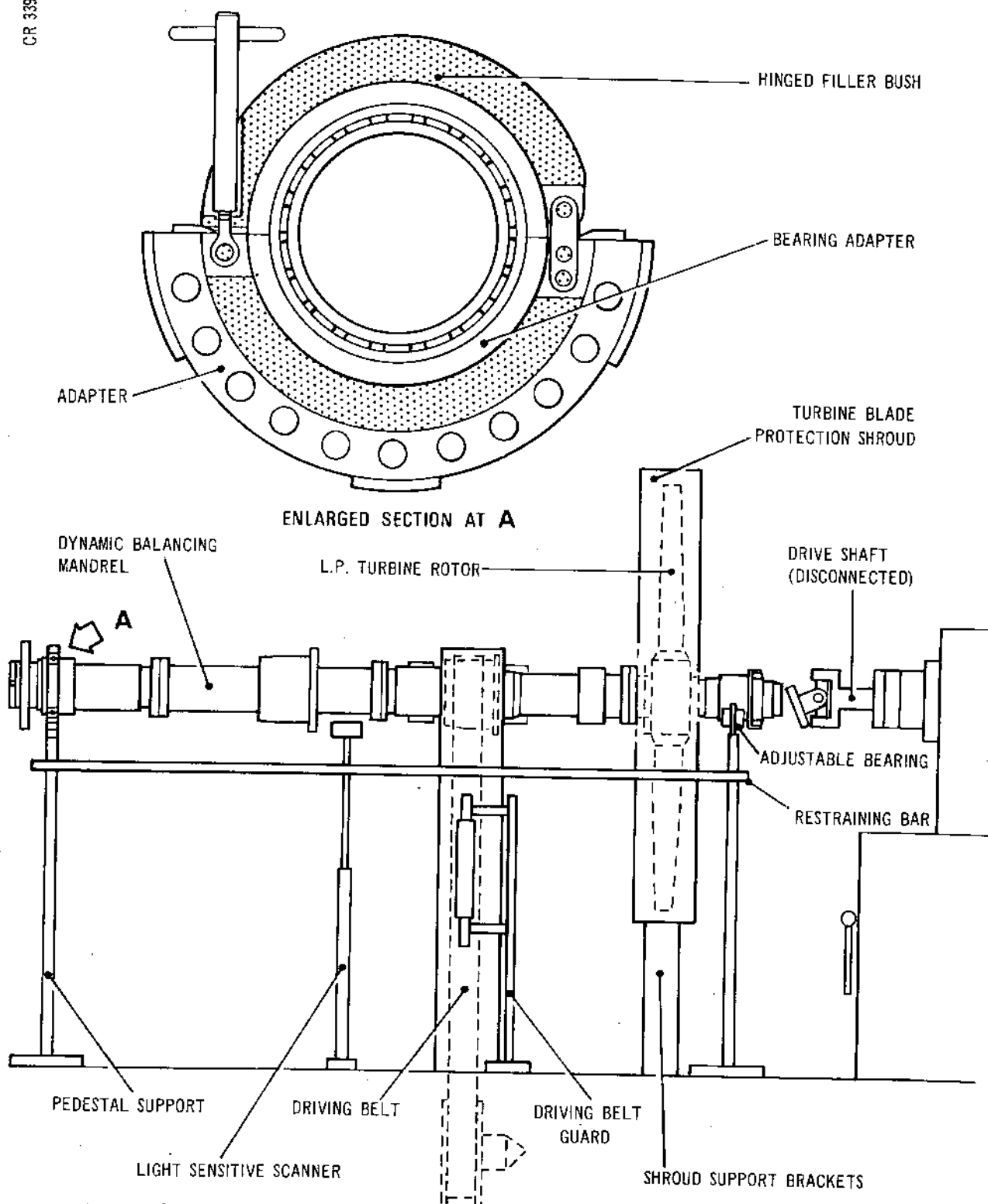
Page 538

Nov 1/78





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



Installing Turbine Rotor in Dynamic Balancing Machine  
Figure 513



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (8) Set the adjustable bearing to the slave bearing diameter.

NOTE: This setting procedure is similar to that described and illustrated previously (Ref.Para.6).

- (a) Use the adjustable setting gauge (Tool 32) to measure the outside diameter of the slave bearing inner track assembled to the turbine hub.
  - (b) Carefully lock the setting gauge and check that the setting has not been disturbed.
  - (c) Place the setting gauge on the adjustable bearing housing.
  - (d) Slacken the bolt securing the bearing roller positioned nearest the adjustment point on the setting gauge.
  - (e) Carefully move the roller until it is in contact with the adjustment point on the setting gauge.
  - (f) Tighten the roller securing bolt and check to ensure that the roller remains in contact with the setting gauge.
  - (g) Remove the setting gauge and re-position for adjustment of the opposite roller.
  - (h) Set and lock the roller in accordance with the previously described procedure.
  - (j) Remove the setting gauge.
- (9) Install the turbine blade protection shroud (Tool 1303).
- (a) Assemble the shroud support brackets (Tool 1291) to the lower section of the shroud and secure each bracket with nuts, bolts and washers.

TN11169



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Position the shroud on the balancing machine between the belt drive and adjustable bearing support. Loosely retain the shroud brackets with the retaining bolts, nuts and washers. The retaining bolts locate in the channel section of the balancing machine base plate.
- (10) Assemble the restraining bars to the pedestal supports.
- (a) Secure the support brackets (Tool 109) to the pedestal supports with bolts evenly tightened. Assemble the restraining bars to the support brackets. Do not tighten at this stage.
- (11) Install the turbine and balancing mandrel in the balancing machine.
- (a) Apply lubricant 'A' to the turbine mandrel bearing surfaces on the balancing machine. Maintain lubrication throughout the balancing procedure.
- (b) Ensure that the lifting beam is securely attached to the mandrel adapters. Attach a crane hoist to the lifting beam, remove the bolts securing the adapters to the mobile stand, then remove the upper section of the blade protection shroud. Carefully transfer the turbine assembly to the balancing machine.
- (c) Align the slave bearing with the adjustable roller and the opposite end accordingly. Place the driving belt over the mandrel and lower the turbine assembly into position. Adjust the shroud section to allow sufficient clearance around the blades.
- (d) Remove the lifting beam and adapters. Carefully rotate the assembly by hand and ensure freedom of movement.
- (e) Secure the shroud support brackets to the balancing machine base. Assemble the top section of the shroud to the lower section.

SUB-ASSEMBLY

72-52-02

Page 541

Jul 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



SEE TR

- (f) Place the upper section of the bearing adapter (Tool 1650) over the mandrel bearing. Close the hinged filler bush and secure the bolt with the integral wrench.
- (g) Re-check rotation of the assembly by hand. Connect the driving belt to the mandrel and the machine. The tension of the belt is adjusted by operating the air valve positioned on the base of the machine. Finally tighten the bolts securing the driving belt guard. Secure the restraining bars to the support brackets.

B. Check Dynamic Unbalance of Turbine Rotor (Ref.Fig.514).

- (1) Set the balancing machine to rotate the turbine assembly at a speed of 600 revolutions per minute.
- (2) Mechanically rotate the turbine assembly for five minutes continuously and thereafter for three minute periods until two consecutive readings of amount and angle are the same. This check is essential in order to minimise thermal effects caused by the turbine rotor assembly standing static prior to the unbalance check.

NOTE: In the following procedure the correction applied at position FM and at the rear of the mandrel is the correction for mandrel unbalance. The correction applied at FS and at RT is a measure of the turbine assembly initial unbalance. All angles are to be taken from the datum mark on the turbine assembly viewed in a clockwise direction from the rear.

- (3) Using plasticine balance out position FS and RT to within 1 drn in.
- (4) Turn the turbine assembly and slip ring 180 deg in relation to the mandrel.
  - (a) Switch off the electricity supply and isolate the balancing machine.

TN1171

SUB-ASSEMBLY

72-52-02

Page 542

Jul 1/76

# British airways

## CONCORDE

### OLYMPUS 593 OVERHAUL MANUAL

Temporary Revision No. 72-540  
Insert in 72-52-02 after page 542

#### REASON

1. To give a revised procedure for balancing the L.P. turbine rotor that simplifies the corrections for mandrel unbalance.
2. To correct an error defining plane FS in Fig. 514.

#### ACTION

1. Replace existing Para.9.B. to read as follows:-

B. Check dynamic unbalance of turbine rotor (Ref. Fig. 514).

- (1) Set the balancing machine to rotate the turbine assembly at a speed of 600 revolutions per minute. (Minimum)
- (2) Rotate the turbine assembly and monitor in one minute periods until two consecutive readings of amount and angle are the same. This check is essential in order to minimise thermal effects caused by the turbine rotor assembly standing static prior to the unbalance check.
- (3) Plane separate and calibrate through planes FS and RT (Fig. 514).
- (4) With machine selection to 'Balance' record the unbalance by a chinagraph pencil on the machine's polar diagram display for both the FS plane and the RT plane, i.e. FS1 and RT1.
- (5) Turn the turbine assembly 180° in relation to the mandrel.  
NOTE: The slip ring, although removable, is not to be disturbed and is to be regarded as part of the mandrel.

(a) Assemble the lifting adapters (Tool 1143) and (Tool 1144) to the mandrel and assemble the lifting beam (Tool 1145) to the adapters.

(b) Remove the top section of the blade protection shroud, slacken the driving belt and release the bearing clamps. Attach a crane hoist to the lifting beam, transfer the turbine/mandrel to the mobile stand and secure the adapters to the stand with bolts. Remove the lifting beam.

# British airways

## CONCORDE

TR.NO. 72-540 (cont'd)

- (c) Assemble the immobilizer (Tool 1243) to the turbine end of the mandrel. Ensure that it locates fully in position.
- (d) Place the wrench spanner (Tool 1580) over the immobilizer and engage it with the L.P. turbine retaining nut.
- (e) Attach a crane hoist to the torque multiplier (Tool 1647) and engage the multiplier with the splines on the immobilizer and wrench spanner.

WARNING: CRANE HOIST MUST SUPPORT TORQUE MULTIPLIER DURING DE-TORQUEING PROCEDURE.

- (f) In conjunction with the torque multiplier, use the torque wrench (Tool 1658) to slacken the retaining nut. Do not remove the retaining nut at this stage. Remove the equipment.
- (g) Attach a crane hoist to the lifting fixture (Tool 1141) and securely attach the lifting fixture to the disc section of the turbine rotor assembly.
- (h) Remove the turbine retaining nut and cupwasher. Carefully screw the lifting/extractor tool (Tool 1142) onto the turbine shaft. Withdraw the turbine from the shaft by turning the tool handle.
- (j) Slacken the lifting adapters on the mandrel in preparation for the mandrel to be turned 180°.
- (k) Note the position of the mandrel in the mobile stand and turn the mandrel 180° exactly. Tighten the lifting adapters.
- (l) Ensure thorough cleanliness of components especially the splined sections. Carefully slide the turbine rotor assembly on to the mandrel and press it fully in position using mechanical driver (Tool 1146).
- (m) Apply lubricant 'B' to threads. Place the cupwasher over the mandrel and ensure that it engages into a castellation on the slave bearing track retaining nut. Screw the turbine retaining nut on to the mandrel as far as possible by hand. Ensure that the cupwasher does not become dislodged.

# British airways

CONCORDE

TR.NO. 72-540 (cont'd)

(n) Assemble the immobilizer (Tool 1243) to the end of the mandrel. Place the wrench spanner (Tool 1580) over the immobilizer and tighten the retaining nut by hand using hand adapter (Tool 1660).

(p) Attach a crane hoist to the torque multiplier (Tool 1647) and engage the multiplier with the splines on the immobilizer and wrench spanner.

WARNING: CRANE HOIST MUST SUPPORT TORQUE MULTIPLIER DURING TORQUE PROCEDURE.

(q) In conjunction with the torque multiplier use the torque wrench (Tool 1658) and apply a torque load of 1000 lbf ft (1358,8 N.m) to the retaining nut.

NOTE: The torque multiplier has a ratio of 10 to 1 the input from the torque wrench must therefore be 100 lbf ft (135,6 N.m).

(r) Remove the torque equipment. Do not lock the cupwasher.

(6) Install the turbine and mandrel in the balancing machine (Ref: para. 9.A. (11)).

(7) Rotate the turbine to minimise thermal effects (Ref: Para.(2)).

(8) With machine selected to 'balance' record the unbalance in planes FS and RT as in Para.4, i.e. FS2 and RT2.

(9) On the polar displays for both FS and RT, join by a straight line FS1 to FS2 and RT1 to RT2. Bisect those lines and join the bisection points to the polar origins. Complete parallelograms for display FS and RT. The bisection points to origins represent the mandrel out of balance error, whilst the line FS2 to bisection point when transferred to origin represents the initial unbalance for FS and similarly RT2 transferred to origin represents initial unbalance for RT. (See diagram over.).

1 May 1981

TR.72-540

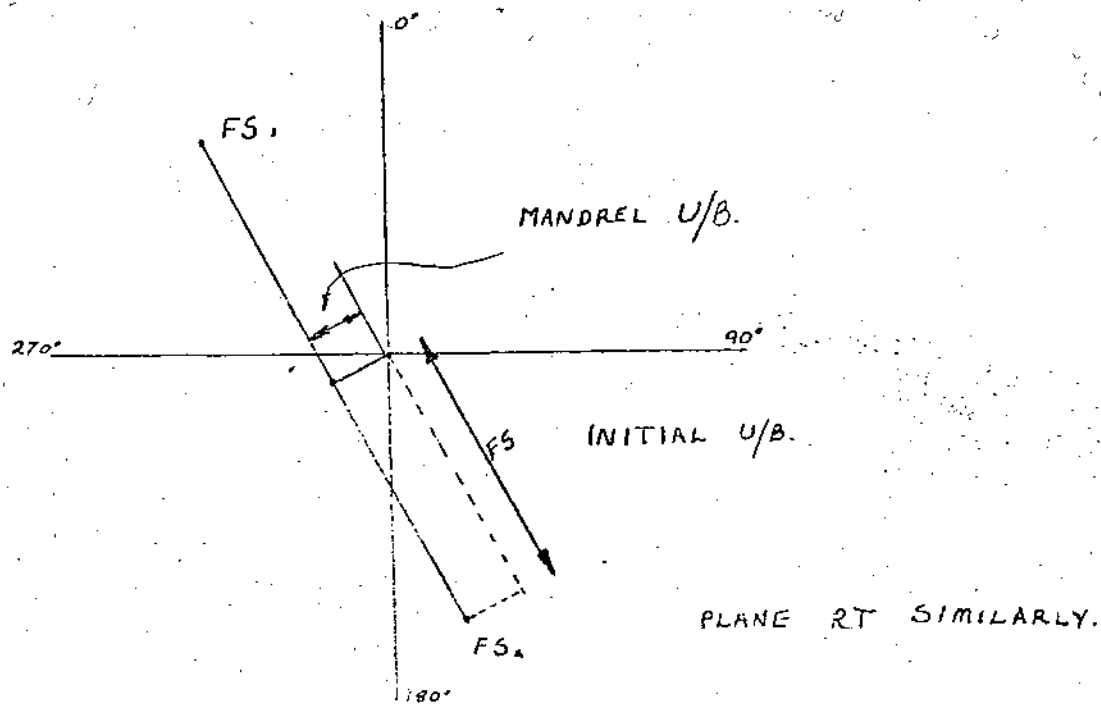
72-52-02

TR.Page 3 of 10

# British airways

## CONCORDE

TR.NO. 72-540 (cont'd)



- (10) If the initial turbine unbalance is greater than 0.9 oz ins. in plane FS or 18 oz ins. in plane RT, check the assembly for installation errors. If an error is located and rectified, repeat Operations (1) to (10). If initial unbalance is acceptable proceed to final balance as in Para. (16).
- (11) If the initial unbalance is outside of the acceptance limits, reposition the turbine hub 180° from the present position on the turbine disc.
  - (a) Assemble the lifting adapters (Tool 1143) and (Tool 1144) to the mandrel and assemble the lifting beam (Tool 1145) to the adapters.
  - (b) Remove the top section of the blade protection shroud, release the driving belt and bearing clamps. Attach a crane hoist to the lifting beam, transfer the turbine/mandrel to the mobile stand and secure the adapters to the stand with bolts. Remove the lifting beam.



# British airways

CONCORDE

TR.NO. 72-540 (cont'd)

- (c) Assemble the immobilizer (Tool 1243) to the turbine end of the mandrel. Ensure that it locates fully in position.
- (d) Place the wrench spanner (Tool 1580) over the immobilizer and engage it with the LP turbine retaining nut.
- (e) Attach a crane hoist to the torque multiplier (Tool 1647) and engage the multiplier with the splines on the mobilizer and wrench spanner.

WARNING: CRANE HOIST MUST SUPPORT TORQUE MULTIPLIER DURING DE-TORQUEING PROCEDURE.

- (f) In conjunction with the torque multiplier, use the torque wrench (Tool 1658) to slacken the retaining nut. Do not remove the retaining nut at this stage. Remove the equipment.
- (g) Attach a crane hoist to the lifting fixture (Tool 1141) and securely attach the lifting fixture to the disc section of the turbine rotor assembly.
- (h) Remove the turbine retaining nut and cupwasher and carefully withdraw the turbine rotor from the mandrel.
- (j) Remove the splined retaining clamp from the adapter on assembly stand (Tool 873) and turn the adapter to the horizontal position to accept the turbine assembly.
- (k) Carefully slide the turbine rotor hub first on to the adapter and install the splined clamp to hold the turbine in position. Secure the clamp with the retaining nut. Remove the puller from the splined clamp.
- (l) Remove the lifting fixture from the turbine disc. Adjust the adapter to position the turbine rotor at top position horizontally. Slacken the locknuts on the main bolts securing the turbine and hub assembly.

WARNING: DO NOT REMOVE NUTS UNLESS ABSOLUTELY NECESSARY. TURBINE WILL BE UNSECURED WHEN NUTS ARE REMOVED.

- (m) Using mechanical puller (Tool 1015) remove No. 25 and 26 labyrinth assembly (Ref: Fig. 515).

1 May 1981

TR.72-540  
72-52-02  
TR. Page 5 of 10

# British airways

CONCORDE

TR.NO. 72-540 (cont'd)

- (i) Unscrew the locking screws and withdraw the locating pins. Finger tighten the locking screws. Position the puller on the labyrinth and align the locating pins with the extraction holes in the labyrinth housing.
- (ii) Release the locking screws and insert the locating pins into the holes in the labyrinth housing. Tighten the locking screws.
- (iii) Commence removal of the labyrinth, remove the turbine securing nuts but ensure that the nuts are loosely reassembled to secure the turbine rotor immediately after removal of the labyrinth.
- (iv) Remove the labyrinth and disassemble it from the mechanical puller.
- (v) Slacken the nuts securing No. 25 and 26 labyrinth assembly.

NOTE: These nuts will be finally tightened after the turbine nuts and bolts have been torque-tightened.

- (n) Assemble the lifting fixture (Tool 998) to the turbine rotor (Ref: Fig. 510).
  - (i) Attach a crane hoist to the lifting fixture and position the fixture concentrically on the turbine rotor disc.
  - (ii) Raise the fixture sufficiently to establish contact with the bottom surface of the rotor disc. Adjust the steadying blocks on the top of the fixture by slackening the headnuts. Tighten the handnuts before lifting the rotor assembly.
  - (iii) Remove the turbine securing nuts and carefully raise the turbine rotor from the hub. Turn the rotor through 180° and lower it on to the hub. Temporarily secure the rotor with the nuts and bolts. Remove the lifting fixture.
- (p) Assemble No. 25 and 26 labyrinth assembly to the turbine rotor and air duct (Ref: Fig. 510).

# British airways

## CONCORDE

TR.NO. 72-540 (cont'd)

- (i) Place the labyrinth assembly in an oven and heat it to 150°C.
- (ii) Position the support wedge (Tool 3072) in the bottom of the air duct/hub unit assembly. Place the sleeve support (Tool 944) inside the air duct and pack the sleeve support with a freezing agent.
- (iii) Remove the nuts and bolts securing the turbine rotor. Ensure that the datum marks align on the rotor disc and labyrinth assembly. Slide the heated labyrinth assembly over the air duct and ensure that the bolt-holes in the rotor disc align with the holes in the labyrinth.
- (iv) Temporarily secure the labyrinth assembly to the turbine rotor disc with the nuts and bolts lubricated with lubricant 'B'.
- (v) Measure the gap between the top edge of the air duct and the edge of the labyrinth. The clearance must be between 0.011 and 0.039" (0,279 and 0,990 mm).
- (vi) Identify the securing bolt positions 1 to 10 for torque sequence purposes. Commencing at No. 1, torque-tighten the nuts to 10 lbf ft (13,6 N.m) in the following sequence 1, 6, 4, 9, 2, 7, 5, 10, 3 and 8. Use the torque wrench (Tool 1658).
- (vii) Comply with the numerical torque sequence and increase the torque loading in three stages until between 50 and 55 lbf ft (67,8 and 74,6 N.m) is applied.
- (viii) Remove the sleeve support and support wedges from the air duct unit.
- (ix) Apply lubricant 'B' to the nuts securing No. 25 and 26 labyrinth assembly. Ensure that the nuts have a minimum locking (rundown) torque of 6.5 lbf in. (0,73 N.m). Torque-tighten the nuts between 135 and 145 lbf in. (15,3 and 16,4 N.m).
- (q) Check the turbine rotor for swash.

1 May 1981

TR.72-540  
72-52-02

TR. Page 7 of 10

# British airways

## CONCORDE

TR.NO. 72-540 (cont'd)

(r) Recheck initial dynamic unbalance. If the unbalance check is satisfactory, carefully vibro-etch a datum mark on the hub in line with that on the turbine rotor and labyrinth assembly. Render the original datum mark on the hub illegible.

(12) If the initial unbalance remains outside of the acceptance limits after turning the turbine 180° relative to the hub, it will be necessary to recheck the static unbalance of the turbine rotor assembly.

(a) Transfer the turbine rotor assembly from the balancing machine to the adapter on the assembly stand (Tool 873) and remove No. 25 and 26 labyrinth assembly (Ref: Para. B. (5) (a) to (n)).

(b) Transfer the turbine rotor to the mandrel (Tool 1132) and mobile stand (Tool 1111) in preparation for static unbalance check.

(i) Ensure that the mandrel is correctly secured to the mobile stand. Secure the lifting ring (Tool 1121) to the end of the mandrel and swivel the mandrel to the vertical position. Ensure thorough cleanliness of the Hirth serrations. Remove the nuts from the mandrel disc.

(ii) Assemble the lifting fixture (Tool 998) to the turbine disc, attach a crane hoist to the lifting fixture and remove the rotor assembly from the hub.

NOTE: The hub assembly can remain in the adapter.

(iii) Align the datum marks O on the turbine disc and mandrel and carefully lower the turbine on to the mandrel. Secure the turbine rotor with the mandrel nuts.

(iv) Attach a crane hoist to the lifting fixture assembled to the end of the mandrel.

(v) Remove the pin securing the angled clamp support tube on the mobile stand and carefully swivel the support tube forward.

CAUTION: TURBINE BLADES MUST NOT CONTACT CLAMP TUBE.  
DAMAGE TO BLADES COULD RESULT.

(vi) Swivel the mandrel into the horizontal position on the stand and secure the clamps and angled support tube. Remove the lifting ring from the end of the mandrel and convey the assembly to the appropriate area for static unbalance checks.

# British airways

## CONCORDE

TR.NO. 72-540 (cont'd)

(c) Recheck static unbalance of the L.P. turbine rotor (Ref. Para.6).

(13) Assemble the turbine rotor to the hub assembly (Ref: Para.7.C.).

NOTE: If the hub assembly has been removed from the adapter, reassemble it to the adapter and secure with the splined clamp and retaining nut (Ref: Fig.509). No. 25 labyrinth ring and No. 26 labyrinth housing have not been disassembled.

(14) Check the turbine rotor for swash.

(15) On completion of satisfactory swash check, transfer the turbine rotor assembly to the dynamic balancing machine and repeat the dynamic balancing procedure. If the initial unbalance is now satisfactory, correct as in (16) etc.

(16) With the machine switched to 'set', nullify the mandrel unbalance error by adjustment of the 'V' and 'H' controls, i.e. bring the unbalance 'spot' indication from FS2 and RT2 along the parallel-ograms to remove the mandrel error indication only. The FS and RT planes will interact and the 'V' controls for both polar displays should be adjusted simultaneously and similarly the 'H' controls.

(17) Correct the unbalance in FS first by fitting 20 times the indicated unbalance to FT from the range (1-30 to 65). Apply lubricant 'B' to the both threads. Do not assemble flat washers to the weight position. Ensure that the securing nuts have a minimum run down torque of 6.3 lbf ins. and torque tighten to 135 - 145 lbf ins.

(18) Correct the unbalance in RT by using weights from the range (1-160 to 169). Use procedures as in 17 above except that correction is one for one.

The planes interact and it may be necessary to adjust the size or position of weights to achieve the allowed unbalance of

FS	0.1 oz inch.
RT	0.3 oz inches.

(19) When satisfactory switch to 'balance' and check that indicated unbalance corresponds to the mandrel unbalance as found graphically in Para. 9.B.9.

(20) If the mandrel unbalance exceeds 0.3 oz inches in FS and 0.7 oz inches in RT make a permanent correction reducing the unbalance to about half.

1 May 1981

TR.72-540  
72-52-02

TR. Page 9 of 10

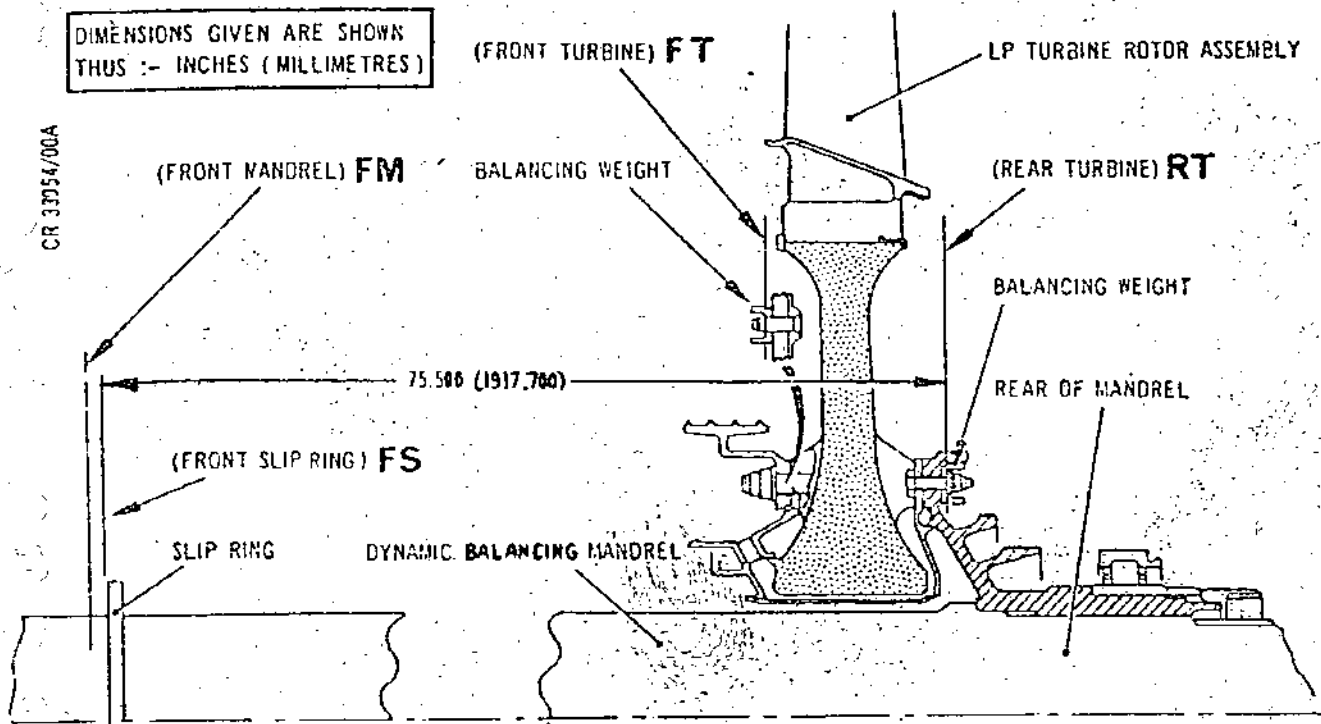
# British airways

CONCORDE

TR.NO. 72-540 (cont'd)

- (21) On completion of satisfactory dynamic unbalance check, transfer the turbine assembly to the balancing mandrel mobile stand.

2. Amend Fig. 514 as shown:



LP Turbine Dynamic Balancing Diagram  
Figure 514



**OLYMPUS 593**

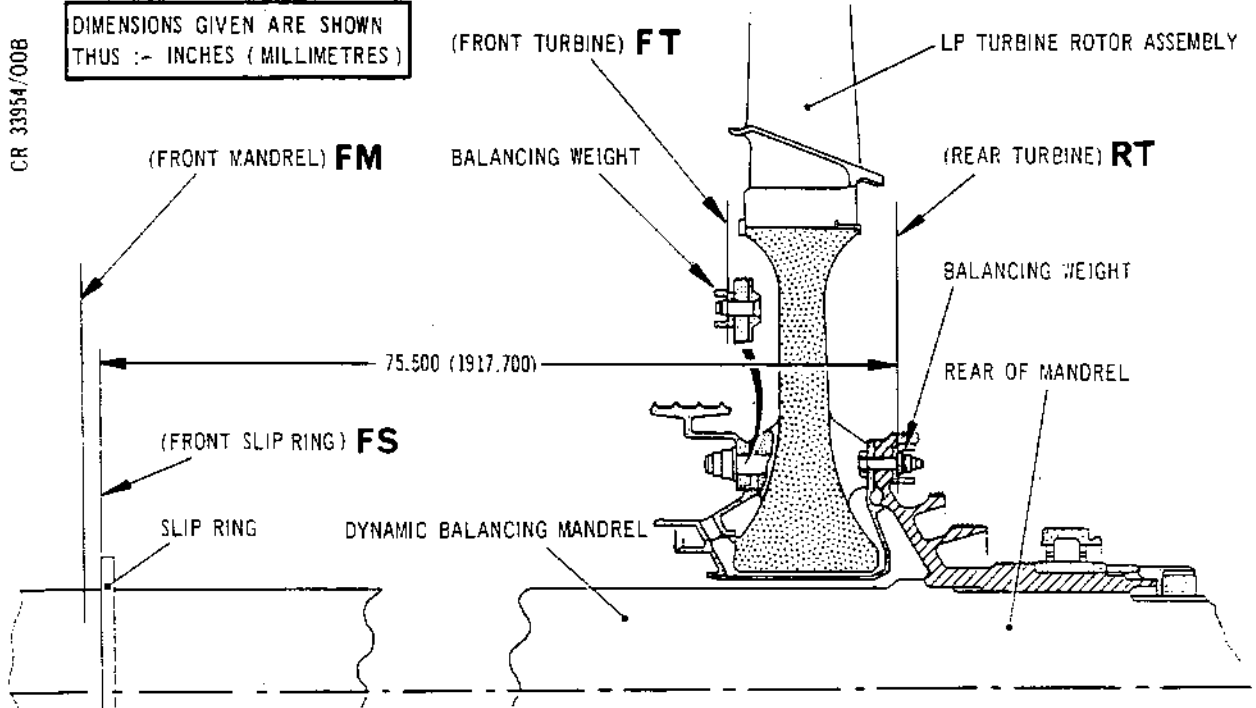
MK.610-14-28

OVERHAUL



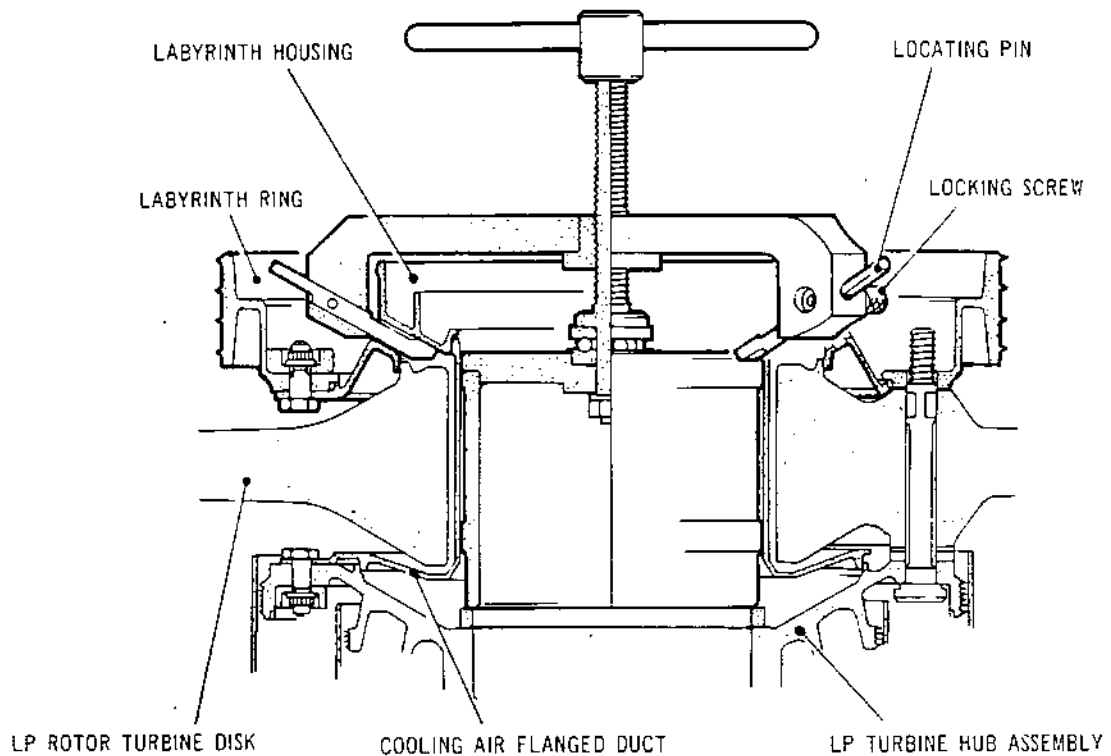
CR 33954/00B

DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)



LP Turbine Dynamic Balancing Diagram  
Figure 514

CR 33958/00A



Removing No.25 and 26 Labyrinth Assembly  
Figure 515

SUB-ASSEMBLY

**72-52-02**

Page 543

Jan 4/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Assemble the lifting adapters (Tool 1143) and (Tool 1144) to the mandrel and assemble the lifting beam (Tool 1145) to the adapters.
- (c) Remove the top section of the blade protection shroud, slacken the driving belt and release the bearing clamps. Attach a crane hoist to the lifting beam, transfer the turbine/mandrel to the mobile stand and secure the adapters to the stand with bolts. Remove the lifting beam.
- (d) Using the spanner (Tool 1567) unscrew and remove the slip ring knurled nut. Carefully remove the slip ring and assemble it to the mandrel 180 deg from its original position. Tighten the slip ring.
- (e) Assemble the immobilizer (Tool 1243) to the turbine end of the mandrel. Ensure that it locates fully in position.
- (f) Place the wrench spanner (Tool 1580) over the immobilizer and engage it with the LP turbine retaining nut.
- (g) Attach a crane hoist to the torque multiplier (Tool 1647) and engage the multiplier with the splines on the immobilizer and wrench spanner.

WARNING: CRANE HOIST MUST SUPPORT TORQUE MULTIPLIER DURING DE-TORQUEING PROCEDURE.

- (h) In conjunction with the torque multiplier, use the torque wrench (Tool 1658) to slacken the retaining nut. Do not remove the retaining nut at this stage. Remove the equipment.
- (j) Attach a crane hoist to the lifting fixture (Tool 1141) and securely attach the lifting fixture to the disk section of the turbine rotor assembly.
- (k) Remove the turbine retaining nut and cupwasher. Carefully screw the lifting/extractor tool (Tool 1142) onto the turbine shaft. Withdraw the turbine from the shaft by turning the tool handle.

SUB-ASSEMBLY

**72-52-02**

Page 544

Jun 1/77





# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (l) Slacken the lifting adapters on the mandrel in preparation for the mandrel to be turned 180 deg.
- (m) Note the position of the mandrel in the mobile stand and turn the mandrel 180 deg. exactly. Tighten the lifting adapters.
- (n) Ensure thorough cleanliness of components especially the splined sections. Carefully slide the turbine rotor assembly on to the mandrel and press it fully in position using mechanical driver (Tool 1146).
- (p) Apply lubricant 'A' to threads. Place the cupwasher over the mandrel and ensure that it engages into a castellation on the slave bearing track retaining nut. Screw the turbine retaining nut on to the mandrel as far as possible by hand. Ensure that the cupwasher does not become dislodged.
- (q) Assemble the immobilizer (Tool 1243) to the end of the mandrel. Place the wrench spanner (Tool 1580) over the immobilizer and tighten the retaining nut by hand using hand adapter (Tool 1660).
- (r) Attach a crane hoist to the torque multiplier (Tool 1647) and engage the multiplier with the splines on the immobilizer and wrench spanner.

**WARNING:** CRANE HOIST MUST SUPPORT TORQUE MULTIPLIER DURING TORQUE PROCEDURE.

- (s) In conjunction with the torque multiplier use the torque wrench (Tool 1658) and apply a torque load of 1450 lbf ft (1965,9 N.m) to the retaining nut.

**NOTE:** The torque multiplier has a ratio of 10 to 1 the input from the torque wrench must therefore be 145 lbf ft (196,6 N.m).



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (t) Remove the torque equipment. Do not lock the cupwasher.
- (5) Install the turbine and mandrel in the balancing machine (Ref. para. 9.A.(11)).
- (6) Mechanically rotate the turbine to minimise thermal effects (Ref. para. (2)).
- (7) Measure the assembly unbalance at position FS and RT. Acceptance limits are as follows:
  - (a) Unbalance at FS must not exceed 4 drn in.
  - (b) Unbalance at RT must not exceed 10 drn in.
  - (c) If the unbalance is within limits, proceed with para.(8).
  - (d) If the unbalance is in excess of limits at FS correct this by applying to the slip ring (FS) at the known angle of error, a quantity of plasticine which equals one half of the recorded unbalance at FS. Apply the remaining half to the front of the mandrel (FM) also at the known angle of error.
  - (e) If the unbalance is in excess of limits at RT correct this by applying to the rear of the turbine (RT) at the known angle of error, a quantity of plasticine which equals one half of the recorded unbalance at RT. To the mandrel rear RT at the known angle of error, apply a quantity of plasticine which will be equal to the value of one half of the recorded unbalance at RT. The radial difference between RT and adjacent point on the mandrel must be considered.

SUB-ASSEMBLY

72-52-02

Page 546

Oct 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (f) Turn the turbine assembly and slip ring 180 deg to the original position on the mandrel (Ref. para. (11)).
- (g) Measure the unbalance of the assembly at position FS and RT. Acceptance limits are as follows:
- (i) Unbalance at FS must not exceed 4 drin in.
  - (ii) Unbalance at RT must not exceed 10 drin in.
- (8) Having achieved the unbalance limits at FS and RT, the correction required to compensate for that unbalance is as follows:
- (a) Remove all plasticine applied to the slip ring and measure the unbalance at FS.
  - (b) Apply to FT at the same angle of error as FS a quantity of plasticine calculated as follows:  
$$20 \times \text{unbalance at FS}$$
  - (c) Remove all plasticine from RT.
  - (d) Adjust the plasticine at position FT and RT to achieve the following acceptance limits:  
$$\begin{aligned} \text{FS} &= 1 \text{ drin in. (maximum)} \\ \text{RT} &= 4 \text{ drin in. (maximum)} \end{aligned}$$

This represents the initial unbalance at FT and RT.
  - (e) If the initial unbalance is within limits proceed with para. (15).
- (9) If the total correction to be applied to FT or RT exceeds 300 drin in. check the turbine/mandrel assembly for installation error. Repeat the initial unbalance check if the error is located and rectified.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (10) If the initial unbalance remains outside of the acceptance limits, reposition the turbine hub 180 deg from the present position on the turbine disk.
- (a) Switch off the electricity supply and isolate the balancing machine.
  - (b) Assemble the lifting adapters (Tool 1143) and (Tool 1144) to the mandrel and assemble the lifting beam (Tool 1145) to the adapters.
  - (c) Remove the top section of the blade protection shroud, release the driving belt and bearing clamps. Attach a crane hoist to the lifting beam, transfer the turbine/mandrel to the mobile stand and secure the adapters to the stand with bolts. Remove the lifting beam.
  - (d) Assemble the immobilizer (Tool 1243) to the turbine end of the mandrel. Ensure that it locates fully in position.
  - (e) Place the wrench spanner (Tool 1580) over the immobilizer and engage it with the LP turbine retaining nut.
  - (f) Attach a crane hoist to the torque multiplier (Tool 1647) and engage the multiplier with the splines on the immobilizer and wrench spanner.
- WARNING:** CRANE HOIST MUST SUPPORT TORQUE MULTIPLIER DURING DE-TORQUEING PROCEDURE.
- (g) In conjunction with the torque multiplier, use the torque wrench (Tool 1658) to slacken the retaining nut. Do not remove the retaining nut at this stage. Remove the equipment.

IN45004

SUB-ASSEMBLY

**72-52-02**

Page 548

Jul 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (h) Attach a crane hoist to the lifting fixture (Tool 1141) and securely attach the lifting fixture to the disk section of the turbine rotor assembly.
- (j) Remove the turbine retaining nut and cupwasher and carefully withdraw the turbine rotor from the mandrel.
- (k) Remove the splined retaining clamp from the adapter on assembly stand (Tool 873) and turn the adapter to the horizontal position to accept the turbine assembly.
- (l) Carefully slide the turbine rotor hub first on to the adapter and install the splined clamp to hold the turbine in position. Secure the clamp with the retaining nut. Remove the puller from the splined clamp.
- (m) Remove the lifting fixture from the turbine disk. Adjust the adapter to position the turbine rotor at top position horizontally. Slacken the locknuts on the main bolts securing the turbine and hub assembly.

WARNING: DO NOT REMOVE NUTS UNLESS ABSOLUTELY NECESSARY TURBINE WILL BE UNSECURED WHEN NUTS ARE REMOVED.

- (n) Using mechanical puller (Tool 1015) remove No.25 and 26 labyrinth assembly (Ref.Fig.515).
  - (i) Unscrew the locking screws and withdraw the locating pins. Finger tighten the locking screws. Position the puller on the labyrinth and align the locating pins with the extraction holes in the labyrinth housing.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (ii) Release the locking screws and insert the locating pins into the holes in the labyrinth housing. Tighten the locking screws.
- (iii) Commence removal of the labyrinth, remove the turbine securing nuts but ensure that the nuts are loosely reassembled to secure the turbine rotor immediately after removal of the labyrinth.
- (iv) Remove the labyrinth and disassemble it from the mechanical puller.
- (v) Slacken the nuts securing No.25 and 26 labyrinth assembly.

NOTE: These nuts will be finally tightened after the turbine nuts and bolts have been torque-tightened.

- (p) Assemble the lifting fixture (Tool 998) to the turbine rotor (Ref.Fig.510).
  - (i) Attach a crane hoist to the lifting fixture and position the fixture concentrically on the turbine rotor disk.
  - (ii) Raise the fixture sufficiently to establish contact with the bottom surface of the rotor disk. Adjust the steadying blocks on the top of the fixture by slackening the handnuts. Tighten the handnuts before lifting the rotor assembly.
  - (iii) Remove the turbine securing nuts and carefully raise the turbine rotor from the hub. Turn the rotor through 180 deg and lower it on to the hub. Temporarily secure the rotor with the nuts and bolts. Remove the lifting fixture.

TN44861

SUB-ASSEMBLY

**72-52-02**

Page 550

Jul 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (q) Assemble No.25 and 26 labyrinth assembly to the turbine rotor and air duct (Ref.Fig.510).
- (i) Place the labyrinth assembly in an oven and heat it to 150 deg C.
  - (ii) Position the support wedge (Tool 3072) in the bottom of the air duct/hub unit assembly. Place the sleeve support (Tool 944) inside the air duct and pack the sleeve support with a freezing agent.
  - (iii) Remove the nuts and bolts securing the turbine rotor. Ensure that the datum marks align on the rotor disk and labyrinth assembly. Slide the heated labyrinth assembly over the air duct and ensure that the bolt-holes in the rotor disk align with the holes in the labyrinth.
  - (iv) Temporarily secure the labyrinth assembly to the turbine rotor disk with the nuts and bolts lubricated with lubricant 'A'.
  - (v) Measure the gap between the top edge of the air duct and the edge of the labyrinth. The clearance must be between 0.011 and 0.039 in. (0,279 and 0,990 mm).
  - (vi) Identify the securing bolt positions 1 to 10 for torque sequence purposes. Commencing at No.1, torque-tighten the nuts to 10 lbf ft (13,6 N.m) in the following sequence 1, 6, 4, 9, 2, 7, 5, 10, 3 and 8. Use the torque wrench (Tool 1658).
  - (vii) Comply with the numerical torque sequence and increase the torque loading in three stages until between 50 and 55 lbf ft (67,8 and 74,6 N.m) is applied.
  - (viii) Remove the sleeve support and support wedges from the air duct unit.



OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

- (ix) Apply lubricant 'C' to the nuts securing No.25 and 26 labyrinth assembly. Ensure that the nuts have a minimum locking (run-down) torque of 6.5 lbf in. (0,73 N.m). Torque-tighten the nuts to 210 lbf in. (24 N.m).
  - (r) Check the turbine rotor for swash (Ref.para.8).
  - (s) Recheck initial dynamic unbalance (Ref.para.9). If the unbalance check is satisfactory carefully vibro-etch a datum mark on the hub in line with that on the turbine rotor and labyrinth assembly. Render the original datum mark on the hub illegible.
- (11) If the initial unbalance remains outside of the acceptance limits after turning the turbine 180 deg relative to the hub, it will be necessary to recheck the static unbalance of the turbine rotor assembly.
- (a) Transfer the turbine rotor assembly from the balancing machine to the adapter on the assembly stand (Tool 873) and remove No.25 and 26 labyrinth assembly (Ref.para.B.(5)(a) to (n)).
  - (b) Transfer the turbine rotor to the mandrel (Tool 1132) and mobile stand (Tool 1111) in preparation for static unbalance check.
    - (i) Ensure that the mandrel is correctly secured to the mobile stand. Secure the lifting ring (Tool 1121) to the end of the mandrel and swivel the mandrel to the vertical position. Ensure thorough cleanliness of the Hirth serrations. Remove the nuts from the mandrel disk.
    - (ii) Assemble the lifting fixture (Tool 998) to the turbine disk attach a crane hoist to the lifting fixture and remove the rotor assembly from the hub.

NOTE: The hub assembly can remain in the adapter.





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



(iii) Align the datum marks O on the turbine disk and mandrel and carefully lower the turbine on to the mandrel. Secure the turbine rotor with the mandrel nuts.

(iv) Attach a crane hoist to the lifting fixture assembled to the end of the mandrel.

(v) Remove the pin securing the angled clamp support tube on the mobile stand and carefully swivel the support tube forward.

CAUTION: TURBINE BLADES MUST NOT CONTACT CLAMP TUBE. DAMAGE TO BLADES COULD RESULT.

(vi) Swivel the mandrel into the horizontal position on the stand and secure the clamps and angled support tube. Remove the lifting ring from the end of the mandrel and convey the assembly to the appropriate area for static unbalance checks.

(c) Recheck static unbalance of the LP turbine rotor (Ref.para.6).

(12) Assemble the turbine rotor to the hub assembly (Ref.para.7.C.).

NOTE: If the hub assembly has been removed from the adapter, reassemble it to the adapter and secure with the splined clamp and retaining nut (Ref.Fig.509). No.25 labyrinth ring and No.26 labyrinth housing have not been disassembled.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



shecma

- (13) Check the turbine rotor for swash (Ref.para.8).
- (14) On completion of satisfactory swash check, transfer the turbine rotor assembly to the dynamic balancing machine and repeat the dynamic balancing procedure.
- (15) Assemble weights to position FT and RT (Ref.Fig.514).
  - (a) Select weights of previously calculated value from the range (1-30 to 65) in preparation for assembly to position FT.
  - (b) Select weights of previously calculated value from the range (1-160 to 169) in preparation for assembly to position RT.
  - (c) Remove the nuts and washers from the known angle of error at FT and RT. Apply lubricant 'C' to the bolt threads.
  - (d) Assemble weights to the appropriate positions. Do not assemble flat washers to the weight positions. Ensure that the securing nuts (1-20 and 1-150) have a minimum locking (run-down) torque of 6.5 lbf in. (0,73 N.m). Torque-tighten the nuts to 210 lbf in. (24 N.m).
  - (e) Recheck dynamic unbalance of turbine assembly.
- (16) On completion of satisfactory dynamic unbalance check, transfer the turbine assembly to the balancing mandrel mobile stand.



OLYMPUS 593

MK.610-14-28

OVERHAUL



## 10. Removal of Slave Bearing

### A. Remove Retaining Nuts.

- (1) Assemble the immobiliser (Tool 1243) to the end of the mandrel, ensuring that it locates fully in position.
- (2) Place the wrench spanner (Tool 1580) over the immobiliser and engage it with the LP turbine retaining nut.
- (3) Attach a crane hoist to the torque multiplier (Tool 1647) and engage the multiplier with the splines on the immobiliser and wrench spanner.

WARNING: CRANE HOIST MUST SUPPORT TORQUE MULTIPLIER DURING DE-TORQUEING PROCEDURE.

- (4) In conjunction with the torque multiplier, use the torque wrench (Tool 1658) to slacken the retaining nut.
- (5) Remove the equipment. Unscrew and remove the retaining nut and cupwasher.
- (6) Remove the bearing track retaining nut with the hand spanner (Tool 1596).
- (7) Attach a crane hoist to the lifting fixture (Tool 1141) and securely attach the lifting fixture to the disk section of the rotor assembly.

### B. Remove Slave Bearing.

- (1) Assemble the mechanical puller (Tool 1137) to the slave bearing and mandrel.
  - (a) Unscrew the puller handle as far as possible. Place the tool on the end of the mandrel and engage the claws with the slave bearing. Evenly tighten the knurled nuts to hold the claws in position.

PRINTED IN ENGLAND

TN11172



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (b) Carefully tighten the puller handle to remove the slave bearing.

#### 11. LP Turbine Main Securing Bolts Stretch Procedure

##### A. Transfer Rotor From Mandrel to Stand Assembly (Tool 873).

- (1) Ensure that the lifting fixture (Tool 1141) attached to the turbine disk is secure.
- (2) Position the adapter horizontally in readiness to accept the turbine rotor. Remove the splined retaining disk from the adapter.
- (3) Carefully withdraw the turbine rotor from the mandrel and slide it hub first on to the adapter.
- (4) Install the splined clamp to hold the turbine rotor in position. Secure the clamp with the retaining nut.
- (5) Remove the lifting equipment from the turbine disk. Adjust the adapter to position the turbine rotor horizontally.

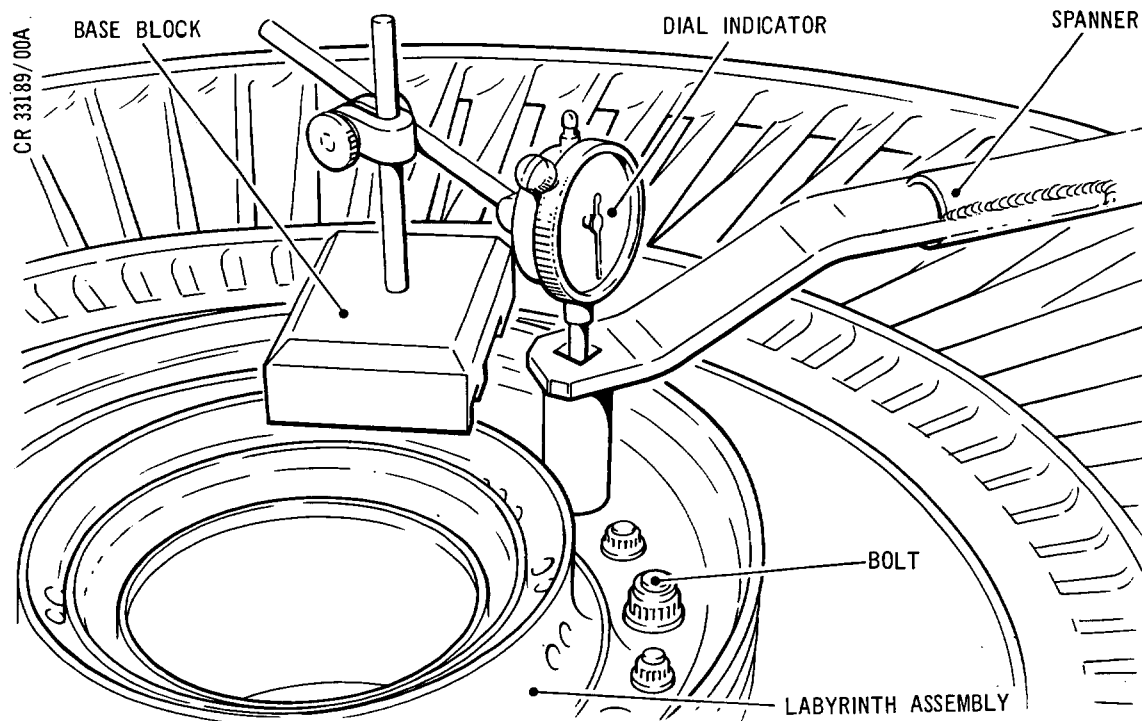
##### B. Stretch Turbine Bolts (Ref.Fig.516).

- (1) Slacken the locknuts on the main securing bolts.
- (2) Identify the securing bolt positions 1 to 10, then torque-tighten the nuts to 10 lbf ft (13,6 N.m) using the wrench (Tool 1658) in the following sequence, 1, 6, 4, 9, 2, 7, 5, 10, 3 and 8.
- (3) Commence the stretching procedure at No.1 position as follows:
  - (a) Place the spanner (Tool 1492) on the nut.
  - (b) Place dial indicator base block (Tool 34) near the spanner. Set the dial indicator at 0 with the stylus in contact with end of the bolt.

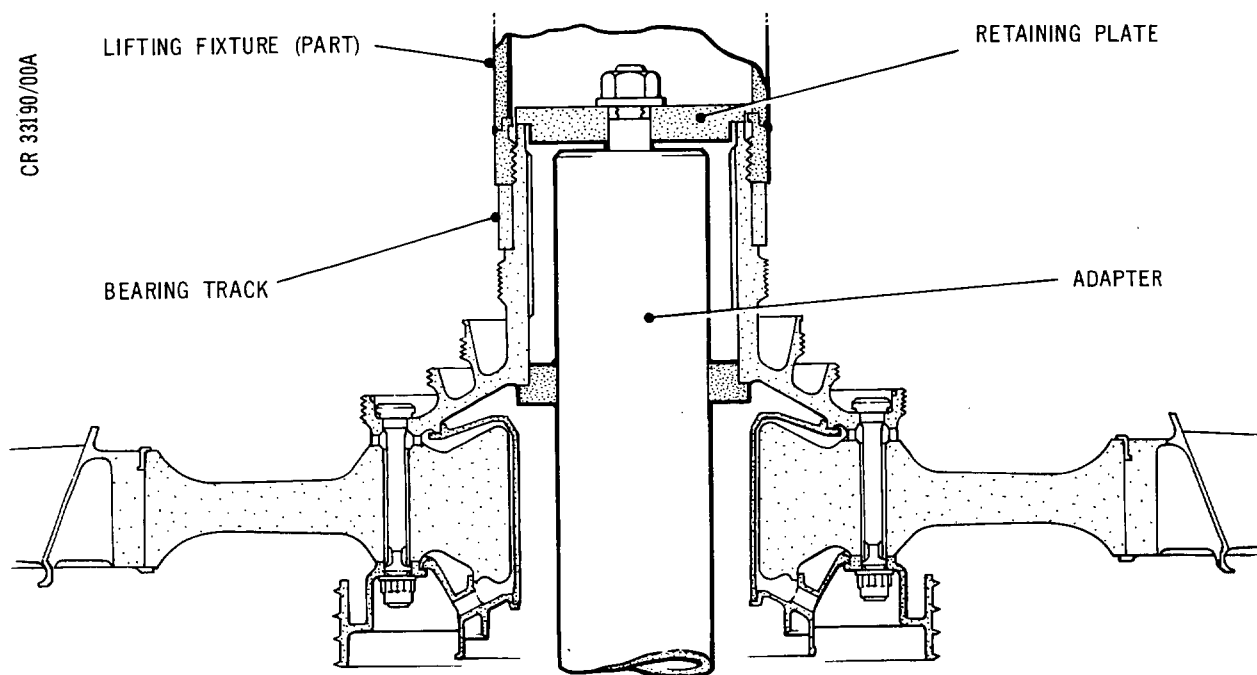
FN48462



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



Main Securing Bolts Stretching Procedure  
Figure 516



Assembling Turbine Bearing Inner Track  
Figure 517

SUB-ASSEMBLY  
**72-52-02**  
Page 557  
Jul 1/76



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (c) Carefully tighten the nut until the dial indicator shows a bolt stretch reading of 0.004 in. (0,10 mm).
- (4) Complying with the torque-tightening sequence, repeat the described stretching procedure and stretch each bolt.
- (5) Repeat the stretching procedure to the value of a further 0.004 in. (0,10 mm) at all positions.
- (6) Finally stretch the bolts in sequence a further 0.002 in. (0,05 mm) achieving a total stretch of 0.010 in. (0,25 mm) for each bolt. Maximum permissible total bolt stretch = 0.012 in. (0,30 mm).

## 12. Install LP Turbine Bearing Inner Track

### A. Prepare Turbine Rotor.

- (1) Turn the assembly stand until the turbine rotor is in the vertical position.
- (2) Attach a crane hoist to the lifting fixture (Tool 1141) and securely attach the lifting fixture to the disk section of the rotor assembly.
- (3) Unscrew and remove the retaining nut securing the splined retaining clamp located inside the rotor hub. Ensure that the crane hoist and the lifting fixture support the turbine rotor. Carefully withdraw the retaining clamp.
- (4) Carefully remove the turbine rotor from the adapter. Turn the rotor in order to assemble the labyrinth to the opposite end of the adapter.
- (5) Remove the retaining plate from the opposite end of the adapter. Assemble the turbine rotor to the adapter and secure it with the retaining plate and nut.
- (6) Turn the assembly stand to position the turbine rotor horizontally in readiness for the installation of the bearing track.

SUB-ASSEMBLY

72-52-02

Page 558

Dec 31/01



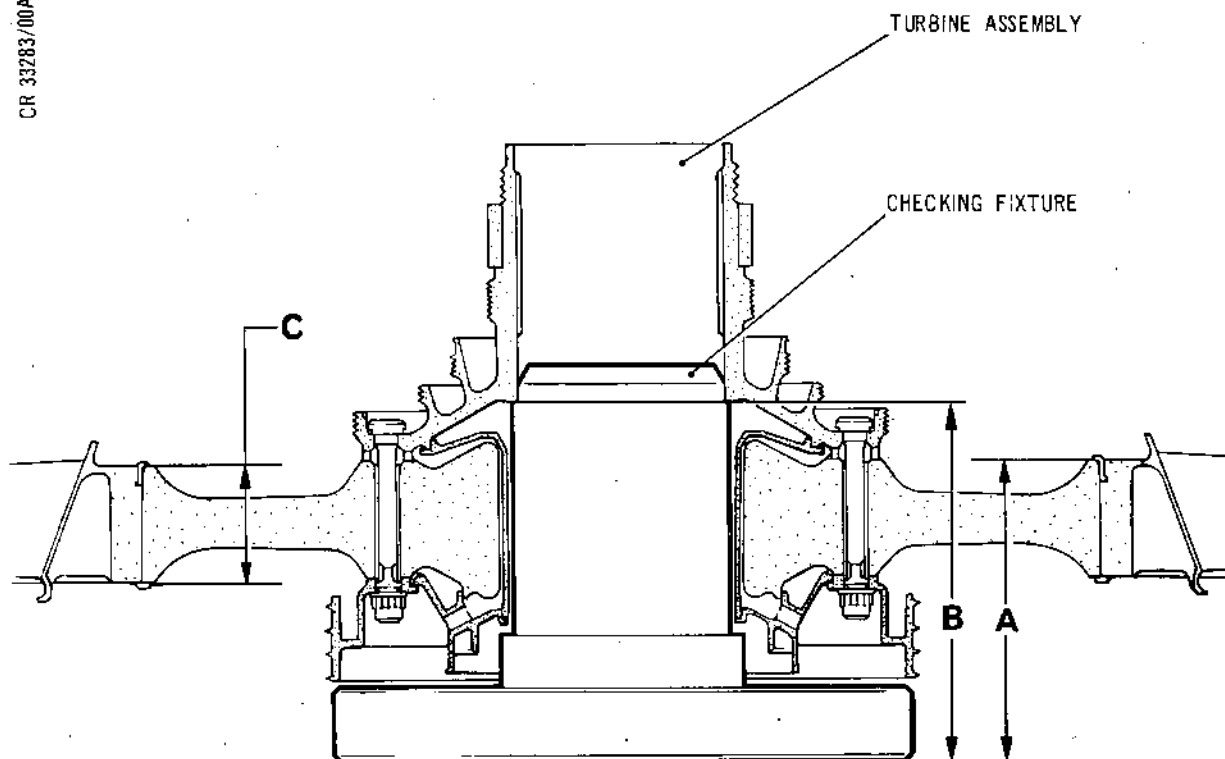
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 33283/00A



TN11186

Turbine Rotor Dimensional Check  
Figure 518

SUB-ASSEMBLY

72-52-02

Page 559  
Jul 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



B. Install Bearing Track (Ref.Fig.517).

- (1) Ensure thorough cleanliness of the hub and inner track. Heat the bearing track to 100 deg C.
- (2) Position the heated bearing track on the turbine hub so that the edge carrying the identification markings is visible. Ensure that the track locates fully in position.
- (3) When the bearing track has cooled, remove the retaining plate securing the rotor to the adapter. Assemble the lifting fixture (Tool 1142) to the turbine hub and attach a crane hoist to the fixture in readiness for removal of the assembly for dimensional checks.

13. Turbine Rotor Dimensional Checks and Final Inspection

A. Prepare for Dimensional Checks (Ref.Fig.518).

- (1) Place the checking fixture (Tool 1156) on a suitable measuring surface in readiness to accept the turbine rotor assembly.
- (2) Remove the turbine assembly from the stand adapter and carefully lower the assembly on to the checking fixture.

B. Dimensional Check Procedure (Ref.Fig.518).

- (1) Measure the distance from the base of the checking fixture to the top surface of the LP turbine disk. Record as dimension 'A'.
- (2) Deduct dimension A from the checking fixture set dimension B. Set dimension = 7.250 in. (184,15 mm). Record the result as dimension D on the sub-assembly record.
- (3) Measure the thickness of the LP turbine disk dimension C. Record the result on the sub-assembly record.

TN48463





OLYMPUS 593

MK.610-14-28  
OVERHAUL



C. Final Inspection.

- (1) Thoroughly inspect the sub-assembly for cleanliness and freedom from damage.
- (2) Remove the turbine from the checking fixture. Assemble the protectors (Tool 1134) and (Tool 1138) to the labyrinths.
- (3) Place the turbine on support (Tool 1012) and remove the lifting fixture from the hub.
- (4) Ensure that the module identification plate is marked with the correct details.
- (5) Secure the module plate to the turbine and despatch the turbine (on the pallet) to engine assembly (72-00-00 Assembly).

PRINTED IN ENGLAND

TN21734

SUB-ASSEMBLY

**72-52-02**

Page 561  
Jul 1/76

**OLYMPUS 593**

MK.610-14-28

OVERHAUL

LP TURBINE BEARING SUPPORT - SUB-ASSEMBLYTABLE OF CONTENTS

Para.	Page
1. General ... ..	501
2. Assemble Items to the Bearing Housing ... ..	502
A. Assemble the Outer Labyrinth Housing to the Bearing Housing ... ..	502
B. Assemble the Sockets and Seal Housings to the Cover and Sleeve Assemblies ... ..	504
C. Assemble the Cover and Sleeve Assembly to the Bearing Housing ... ..	506
D. Determine the Correct Thickness Bearing Retaining Ring ... ..	508
E. Assemble Locking Plates to the Vent and Air Feed Sockets ... ..	510
3. Assemble Items to the Rear Cover ... ..	511
A. Assemble the Rear Cover to the Holding Fixture ...	511
B. Assemble the Pin and Oil Tube to the Rear Cover ...	511
C. Assemble the Insulation Blankets to the Rear Cover.	513
D. Assemble the LP Shaft Signal Actuating System to the Rear Cover ... ..	513
4. Assemble Items to the (End) Cover ... ..	517
A. Assemble the Oil Tube and Transfer Block to the (End) Cover ... ..	517

TABLE OF ILLUSTRATIONS

Fig.No.	Page
501	Assembling Labyrinth Housing to Bearing Housing ... 503
502	Assembling Vent Sockets and Seal Housings to Sleeve and Cover Assembly ... .. 505
503	Assembling Sleeve/Cover Assembly to Bearing Housing ... .. 507
504	Bearing Retaining Ring Dimensional Check ... .. 509
505	Assembling Locking Plates to Vent and Air Feed Sockets ... .. 509
506	Assembling Oil Tube and Insulation Blanket Assembly to Rear Cover... .. 512
507	Assembling Signal System Items to Rear Cover ... 514
508	Assembling Oil Tube and Transfer Block to (End) Cover ... .. 516

SUB-ASSEMBLY

**72-52-03**

Contents 1

Oct 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



LP TURBINE BEARING SUPPORT - SUB-ASSEMBLY

1. General

- A. Prior to commencing the sub-assembly, refer to 72-09-00 Assembly for general information.
- B. During the sub-assembly procedure, reference will be made to the Illustrated Parts Catalogue (I.P.C.) to identify those items where the nomenclature does not positively identify them, due to duplication of the titles e.g. nuts, bolts, washers, bearings, gears, housings, tubes etc. When the item is a part of the breakdown of the text concerned, the item will be identified e.g. bolt (1-10), the 1 referring to the I.P.C. Fig.No., and the 10 referring to the Item No. Where items from a different breakdown are introduced, then the breakdown number will be quoted in addition e.g. bolt (72-32-00/1-10), unless otherwise stated.
- C. Throughout the text special tools are quoted by their Ref. No. e.g. (Tool 1234). For a complete list of tooling required for the assembly, and for the Manufacturers Part No., refer to Special Tools, Fixtures and Equipment Table 1002.
- D. This chapter deals with the assembly of the turbine bearing support into three small assemblies, the bearing housing, the rear cover and the (end) cover. These three assemblies and their loose items are passed to the Turbine Exhaust Diffuser (72-53-00 Assembly) for inclusion in its build. The three assemblies could be assembled together with the bearing and retaining ring, if required, but would require disassembling prior to assembly to the Turbine Exhaust Diffuser.
- E. The bearing support assembly will have its angular positions defined in this text as the exhaust diffuser vane number to which it will be assembled. There are 10 vanes, numbered 1-10 in a clockwise direction as viewed from the rear, with No.1 being the first vane from the vertical top position.

PRINTED IN ENGLAND

TN15376

SUB-ASSEMBLY

**72-52-03**

Page 501

Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## 2. Assemble Items to the Bearing Housing

### A. Assemble the Outer Labyrinth Housing to the Bearing Housing (Ref.Fig.501).

NOTE: If the bearing housing is a new item, examine the circumference of its front (larger diameter) flange for the word TØP. If the word is not present, examine the rear (smaller diameter) flange for the locating pin position, between two of the attachment bolt holes, then in line with the pin or pin hole, etch TØP on the circumference of the front flange.

- (1) Place the bearing housing in an oven at (approx.) 150 deg C for (approx.) 30 min. If the locating pin (2-150) is not assembled to the bearing housing rear (smaller diameter) flange, place the pin in Cardice for (approx.) 20 min or liquid nitrogen for (approx.) 2 to 3 min, its removal time to coincide with the removal time of the bearing housing.

NOTE: Bearing housings to SB.72-40 Part 1 standard will have this dowel swaged in position.

- (2) Using protective gloves, remove the bearing housing from the oven. If the locating pin is not assembled to the rear flange, place the housing on a clean flat surface with its rear flange uppermost, then assemble the pin to its recessed hole (in line with the TØP position marked on the front flange circumference). With the pin assembled, offer the bearing housing to the locating fixture (Tool 412) (Ref.Fig.501) with its front flange uppermost and assembled over the guide pins of the fixture.
- (3) Examine the outer labyrinth housing outside circumference in line with one of the eight bolt-holes for the word TØP. Align the positions marked TØP on the outer labyrinth housing and bearing housing, then offer the labyrinth housing over the fixture guide pins, and locate the labyrinth outer spigot into the bearing housing. Ensure the labyrinth abuts the bearing housing at the attachment bolt-hole position.

NOTE: If the word TØP cannot be found, the outer labyrinth housing may be assembled in any one of its eight rotational positions.

TN15377

SUB-ASSEMBLY  
**72-52-03**

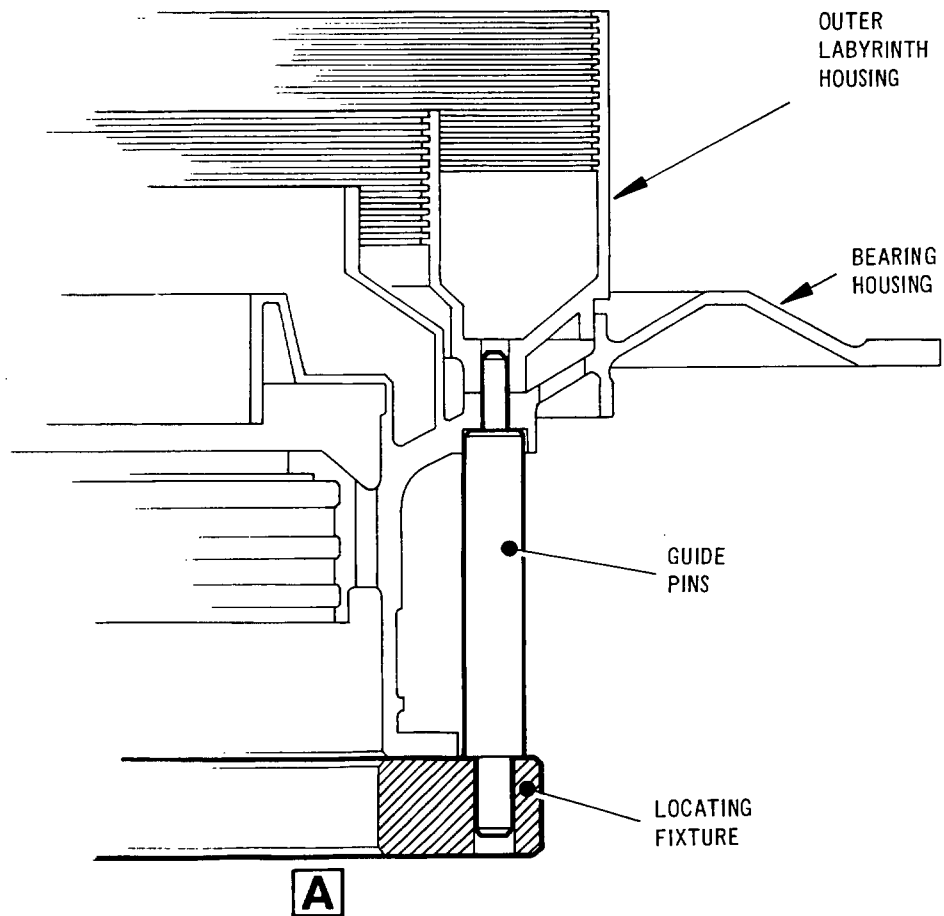
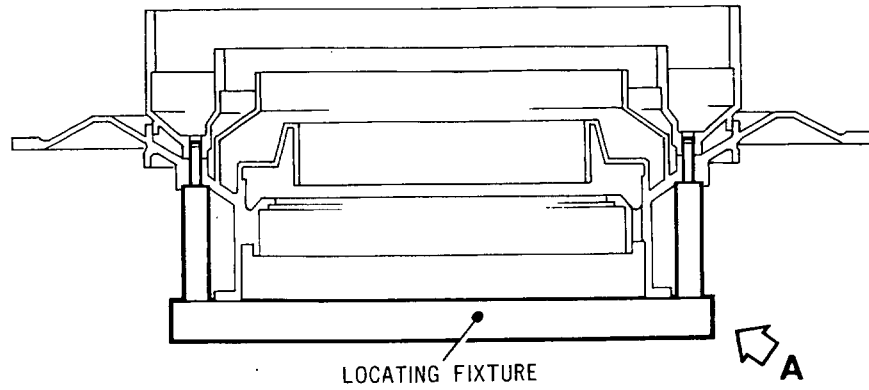
Page 502  
Jun 1/78

CR 31952/00A



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Assembling Labyrinth Housing to Bearing Housing  
Figure 501



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

(4) Lubricate the eight bolts (2-170) with lubricant 'A', then offer six of the bolts (from the top) through the labyrinth and bearing housings and screw nuts (2-160) onto the bolts. Check that the run-down torque is not less than 3.5 lbf in. (0,4 N.m), then torque-tighten the nuts to 100 lbf in. (11,5 N.m). Remove the housing assembly from the fixture, then assemble the remaining two nuts and bolts. Check that the run-down torque is not less than 3.5 lbf in. (0,4 N.m), then torque-tighten the nuts to 100 lbf in. (11,5 N.m).

(5) Screw the protector (Tool 971) into the bearing housing oil feed boss at the No.6 vane position (bottom left-hand side, viewed from rear).

**B. Assemble the Sockets and Seal Housings to the Cover and Sleeve Assemblies (Ref.Fig.502).**

(1) Locate the front face (larger diameter) of the sleeve assembly (2-130) on the positioning fixture (Tool 446), then locate the front face (larger diameter) of the cover assembly (2-110) on the positioning fixture. Align the three openings in the sleeve with three of the openings in the cover.

(2) Place the positioning fixture with the sleeve and cover in a pre heated oven at (approx.) 150 deg C for (approx.) 30 min, and the air feed socket (2-20), two seal housings (2-100) and two vent sockets (2-40) in a container with Cardice for (approx.) 30 min, or liquid nitrogen for (approx.) 2 to 3 min. The removal time of the housings and sockets to coincide with the removal time of the sleeve and cover.

**NOTE:** The positioning fixture (Tool 446) is heated to maintain the temperature of the sleeve and cover for as long as possible.

(3) Using protective gloves, remove the positioning fixture/sleeve/cover from the oven, then remove the air feed socket from the Cardice or nitrogen container and slide it into the cover and sleeve at the No.2 vane position. Align the bolt holes in the socket with the captive nuts in the cover, then (temporarily) secure the socket by screwing two bolts (2-10) into the captive nuts.

SUB-ASSEMBLY

## 72-52-03

Page 504

Dec 31/01



OLYMPUS 593

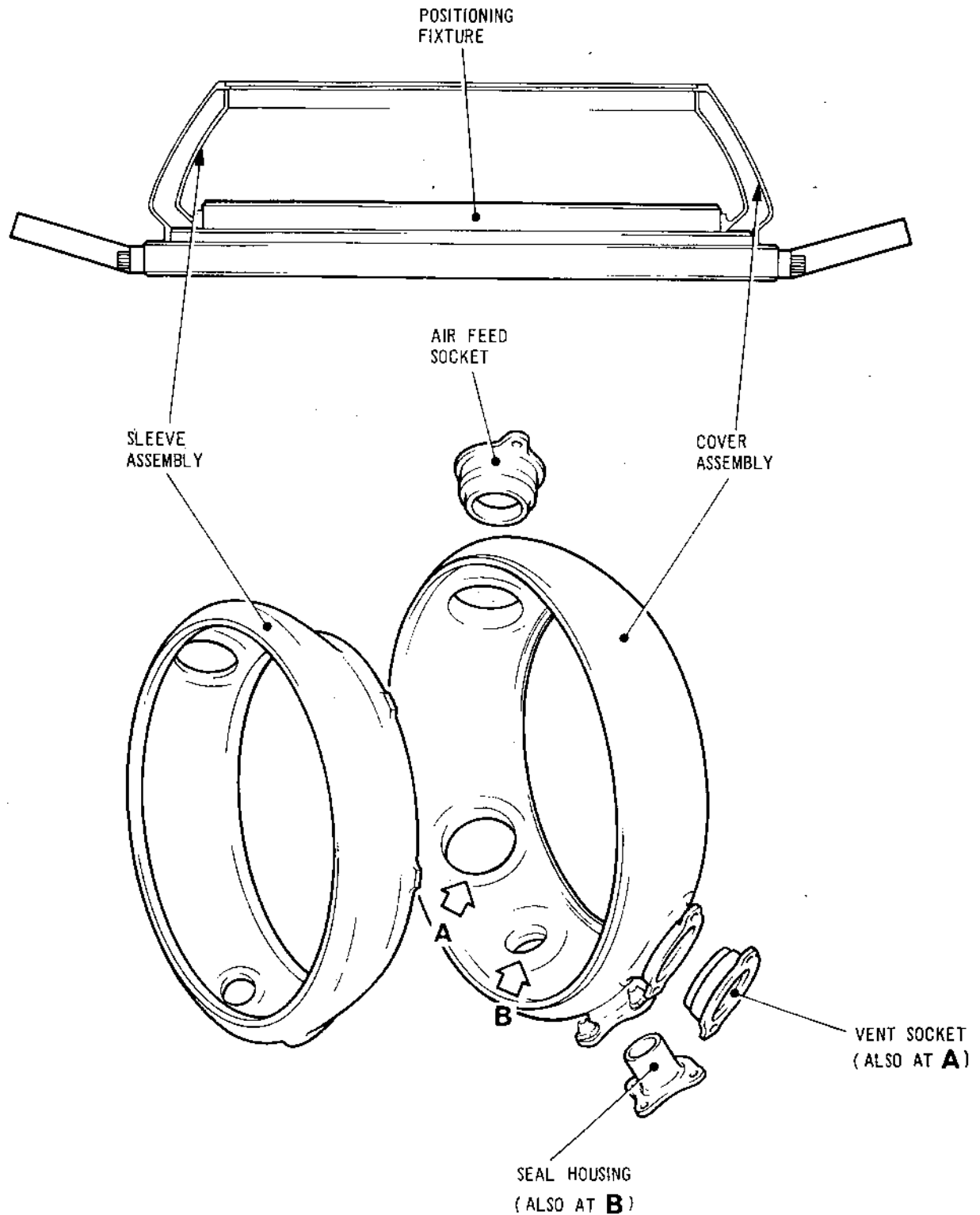
MK.610-14-28  
OVERHAUL



CR 31953/00A

PRINTED IN ENGLAND

TN27220



Assembling Vent Sockets and Seal Housings to  
Sleeve and Cover Assembly  
Figure 502

SUB-ASSEMBLY  
**72-52-03**  
Page 505  
Aug 28/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Using protective gloves, remove the two seal housings from the Cardice or nitrogen container and slide them into the cover and sleeve at the No.5 and 6 vane positions. Align the bolt holes in the housings with the captive nuts in the cover, then (temporarily) secure each housing by screwing two bolts (2-80) into the captive nuts.
  - (5) Using protective gloves, remove the two vent sockets from the Cardice or nitrogen container and slide them into the cover at the No.4 and 7 vane positions. Align the bolt holes in the sockets with the captive nuts in the covers, then (temporarily) secure each socket by screwing two bolts (2-30) into the captive nuts.
- C. Assemble the Cover and Sleeve Assembly to the Bearing Housing (Ref.Fig.503).
- (1) Place the positioning fixture/sleeve/cover assembly into a pre-heated oven at (approx.) 150 deg C for (approx.) 30 min.
  - (2) With the labyrinth facing downwards locate the bearing housing on the four pillars of the support plate (Tool 1256). Remove the protector (Tool 971) from the bearing housing feed boss at No.6 vane.
  - (3) Assemble the 27 D-headed bolts (1-180) into the rear (top) flange of the bearing housing.
    - (a) Align the flat on the head of each bolt with the step on the housing.
    - (b) Push each bolt upwards so that the flat on the head passes the step.
    - (c) Rotate the bolt to trap the head between the step and the flange, ensuring that the flat is flush with the flange outer diameter.
  - (4) Using protective gloves, remove the fixture/sleeve/cover from the oven. Remove the sleeve/cover assembly from the fixture and locate it over the bearing housing assembly, aligning the seal locations (at No.5 and 6 vane position) of the two assemblies. Slide the sleeve/cover assembly over the housing until the rear of the cover abuts the rear flange of the housing (Ref.Fig.503). Fully align the items by inserting

TN34468

SUB-ASSEMBLY  
**72-52-03**

Page 506  
Aug 1/76





OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 31954/00A

BEARING HOUSING

SLEEVE/COVER ASSEMBLY

LOCATING PIN

SEAL HOUSING

SUPPORT PLATE

SEAL HOUSING

AIR FEED SOCKET

LOCATING PIN

COVER ASSEMBLY

COVER ASSEMBLY

OUTER LABYRINTH HOUSING

BEARING HOUSING

BEARING HOUSING

Assembling Sleeve/Cover Assembly to Bearing Housing  
Figure 503

SUB-ASSEMBLY  
**72-52-03**

Page 507  
Aug 28/75

PRINTED IN ENGLAND

TN27221



OLYMPUS 593

MK.610-14-28  
OVERHAUL



the two locating pins (Tool 445) through the two seal housings and screwing them into the bearing housing. The sleeve/cover assembly is correctly positioned on the bearing housing only if the pins can be easily assembled and removed.

NOTE: If the sleeve/cover assembly will not slide over the bearing housing rear flange, check that the flats on the 27 rear cover bolts (1-180) are flush with the flange outer diameter.

D. Determine the Correct Thickness Bearing Retaining Ring (Ref.Fig.504).

NOTE: To achieve the correct fit for the bearing at its running temperature, a clearance between 0.0005 and 0.0015 in. (0,013 and 0,038 mm) must exist between the rear face of the bearing outer race and its retaining ring. On engines to pre SB.72-17 standard only, this clearance must be checked by the following procedure.

- (1) If the roller bearing (2-140) is a new item, remove the protective wrapping and grease (Ref.72-09-00, Assembly). If the roller bearing is the original item, assemble the cage and rollers to the outer race.

NOTE: The procedure should be carried out in an approved 'clean' room.

- (a) Position the cage inside the inner race, then press the rollers by hand into the cage.
  - (b) Ensure that the cage and rollers rotate freely. Apply temporary protection if required (Ref. 72-09-00, Inspection/Check, para.4).
- (2) With the bearing housing resting on the support fixture, offer the bearing outer race/rollers (2-140) into the bearing housing locating the bearing dogs into the slots in the housing.
  - (3) Measure the depth from the inner abutment face of the bearing housing to the face of the bearing outer race, dimension 'A'.
  - (4) Measure the length of the spigot of the retaining ring, dimension 'B'.

IN34470



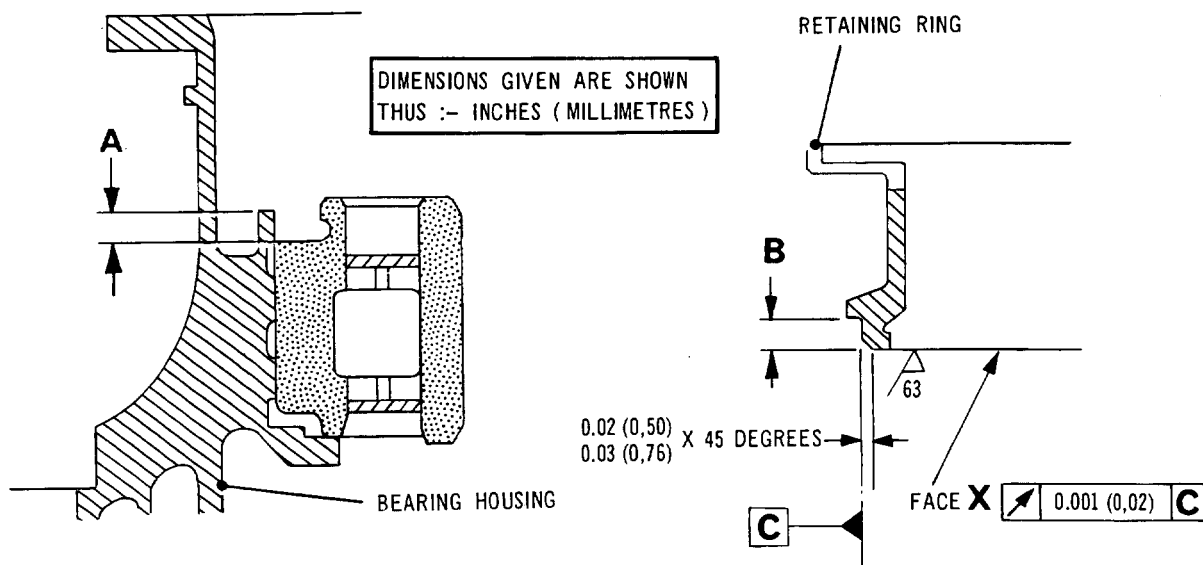
OLYMPUS 593

MK.610-14-28  
OVERHAUL



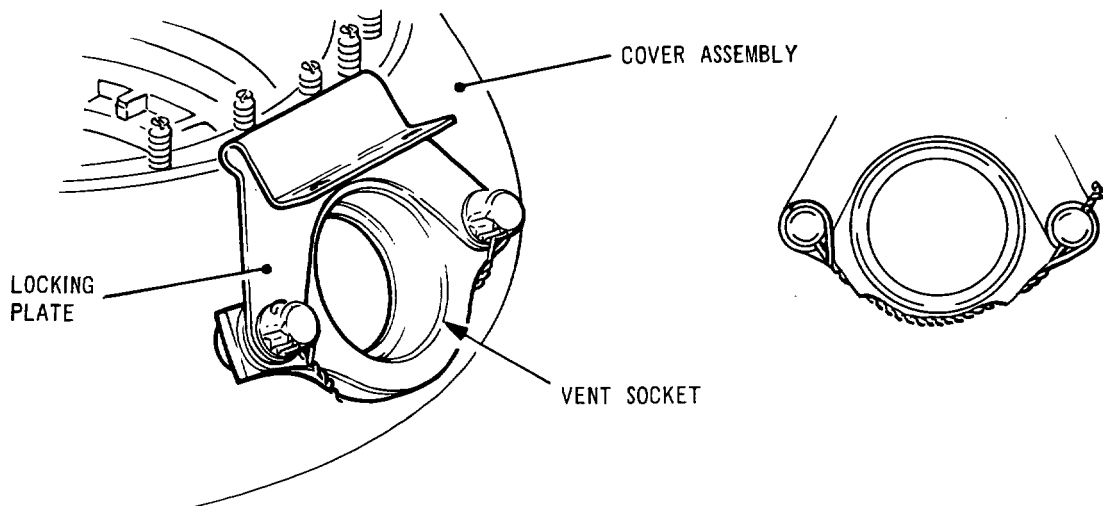
PRINTED IN ENGLAND

CR 31956/000



Bearing Retaining Ring Dimensional Check  
Figure 504

CR 31957/00A



Assembling Locking Plates to Vent and Air Feed Sockets  
Figure 505

TN27222



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (5) Dimension 'A' must exceed dimension 'B' by between 0.0005 in. and 0.0015 in. (0,013 and 0,038 mm). If the difference is greater than 0.0015 in. a new retaining ring must be used. If the difference is less than 0.0005 in. finish turn the front face of the ring (face X) to achieve the required dimension. Re-machine the chamfer then subject the retaining ring to fluorescent dye penetrant inspection (Ref. 72-52-03 Inspection/Check).
- (6) On completion of the check, remove the bearing outer race/rollers from the bearing housing and place the bearing in its container.

E. Assemble Locking Plates to the Vent and Air Feed Sockets (Ref.Fig.505).

- (1) Unscrew and remove the bolts securing the air feed socket to the cover assembly at No.2 vane, then apply lubricant 'C' to the bolts. Position a locking plate (72-53-00/1-120) on the air feed socket so that the plate extends rearwards (upwards), then secure the plate to the socket with the two bolts (2-10) just removed. With the plate pulled rearwards, torque-tighten the bolts to 100 lbf in. (11,5 N.m).
- (2) Unscrew and remove the bolts securing the vent socket to the cover assembly at No.4 vane, and apply lubricant 'C' to the bolts. Position a locking plate (72-53-00/1-290) on the vent socket so that the plate extends rearwards (upwards), then secure the plate to the socket with the two bolts (2-30) just removed. With the plate pulled rearwards, torque-tighten the bolts to 100 lbf in. (11,5 N.m).
- (3) Unscrew and remove the bolts securing the vent socket to the cover assembly at No.7 vane and apply lubricant 'C' to the bolts. Position a locking plate (72-53-00/2-190) on the vent socket so that the plate extends rearwards (upwards), then secure the plate to the socket with the two bolts (2-30) just removed. With the plate pulled rearwards, torque-tighten the bolts to 100 lbf in. (11,5 N.m).
- (4) Lock the two bolts securing each of the two vent sockets and the air feed socket by wire-locking each pair of bolts (Ref.Fig.505).

SUB-ASSEMBLY

72-52-03

Page 510

Dec 31/01



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England

### 3. Assemble Items to the Rear Cover

#### A. Assemble the Rear Cover to the Holding Fixture.

NOTE: During the assembly of items to the rear cover, the following text details the use of a flat surface and the bearing housing. If preferred, the holding fixture (Tool 847) may be used for any or all of the assembly, and mention in the text of the bearing housing and flat surface ignored.

- (1) If the holding fixture (Tool 847) is to be used, bolt the fixture to a Hydraclamp so that the clamps are uppermost. With the clamps drawn outwards, locate the front end of the rear cover in the fixture, then position the clamps over the rear cover flange and lock the clamps by tightening the securing nuts.

#### B. Assemble the Pin and Oil Tube to the Rear Cover.

NOTE: The oil tube assembly (1-120) must be to the same SB. standard as the bearing housing (2-190) defined in SB.72-40.

NOTE: Unless the oil tube assembly (1-120) incorporates SB.72-52, some setting may be required when assembling the rear cover (1-160) to the bearing housing (Ref.para.C.(1)) and the (end) cover (1-70) to the rear cover (Ref.para.4.A.(2)).

- (1) If the locating pin (1-150) is not assembled to the (smaller diameter) rear flange of the rear cover (1-160), place the locating pin in a container with Cardice for (approx.) 20 min or liquid nitrogen for (approx.) 2 to 3 min. Rest the front face of the rear cover on a flat clean surface, then remove the pin from the Cardice or nitrogen container, and assemble it to its stepped hole in the rear (top) flange between two of the bolt holes.
- (2) Invert the rear cover so that its front end is uppermost, then assemble to the bracket on the inside of the cover, the oil tube assembly (1-120) so that its jet end extends upwards above the cover (Ref.Fig.506). Apply lubricant 'A' to the two bolts (1-140), then assemble the bolts to the oil tube and bracket and screw nuts (1-130) onto the bolts. Check that the locking (run-down) torque is a minimum of 3.5 lbf in. (0,4 N.m), then torque-tighten the nuts to 100 lbf in. (11,5 N.m).

SUB-ASSEMBLY

**72-52-03**

Page 511

Dec 31/01

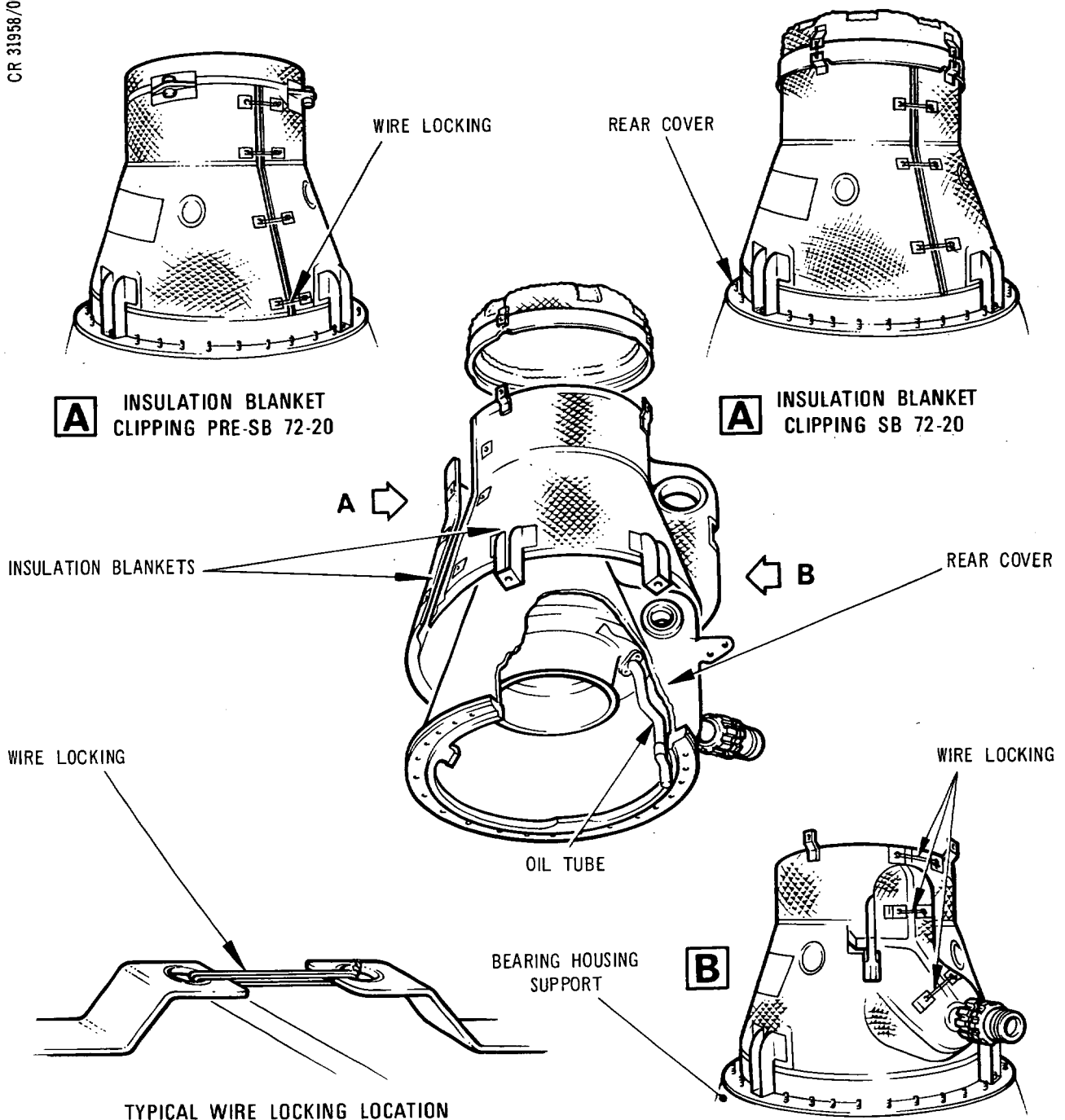


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31958/00C



Assembling Oil Tube and Insulation Blanket  
Assembly to Rear Cover  
Figure 506

SUB-ASSEMBLY  
**72-52-03**

Page 512  
Aug 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



C. Assemble the Insulation Blankets to the Rear Cover (Ref.Fig.506).

- (1) With the bearing housing resting on the support fixture (Tool 1256), offer the front face of the rear cover to the rear face of the bearing housing, aligning the locating pin in the housing with the hole in the cover. Locate the cover over the securing bolts and pin, and by viewing into the cover, ensure that the oil tube locates in the oil hole in the bearing housing. Some resetting may be necessary if the tube assembly is pre SB.72-52 standard. Ensure the rear cover locates correctly in the cover (2-110) and abuts the bearing housing, if necessary by using a light alloy drift and hammer.
- (2) Locate the insulation blanket (1-50) around the right-hand side of the rear cover, and the insulation blanket (1-40) around the left-hand side, assembling them around the oil scavenge pipe and sump, and locating the two brackets on each blanket over the bearing housing bolts.
- (3) Ensure that the blankets overlap one another correctly, then position the (rear) insulation blanket (1-10) on top of the other blankets aligning the securing holes in the brackets, and temporarily secure together with four nuts (1-20) and bolts (1-30) pre SB.72-20 standard or by wiring SB.72-20 standard.
- (4) Temporarily secure the blanket brackets to the bearing housing bolts with nuts (1-170) to prevent movement, then fasten the two (side) blankets together by wire-locking at the seven eyelet positions pre SB.72-20 standard or six positions SB.72-20 standard.
- (5) With the (side) blankets wire-locked together, release and remove the (end) blanket.

D. Assemble the LP Shaft Signal Actuating System to the Rear Cover (Ref.Fig.507).

NOTE: The figure and item numbers following the names of parts of the LP shaft and signal system relate to section 76-21-02 of the IPC.

SUB-ASSEMBLY

**72-52-03**

Page 513

Aug 1/76

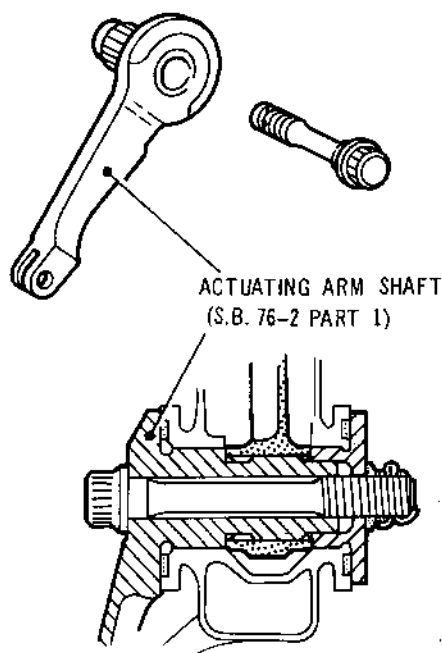
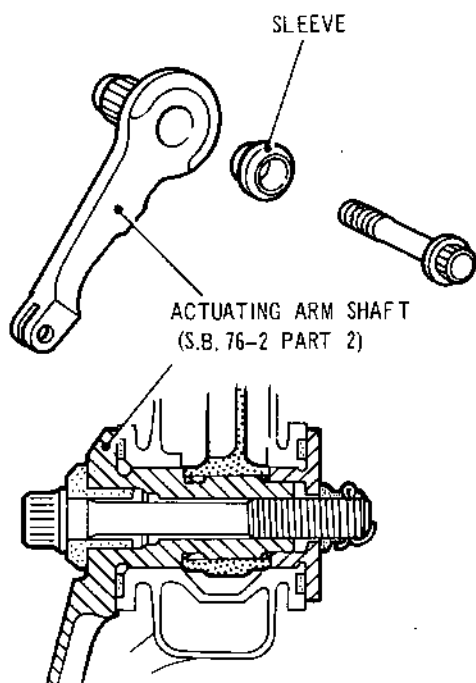
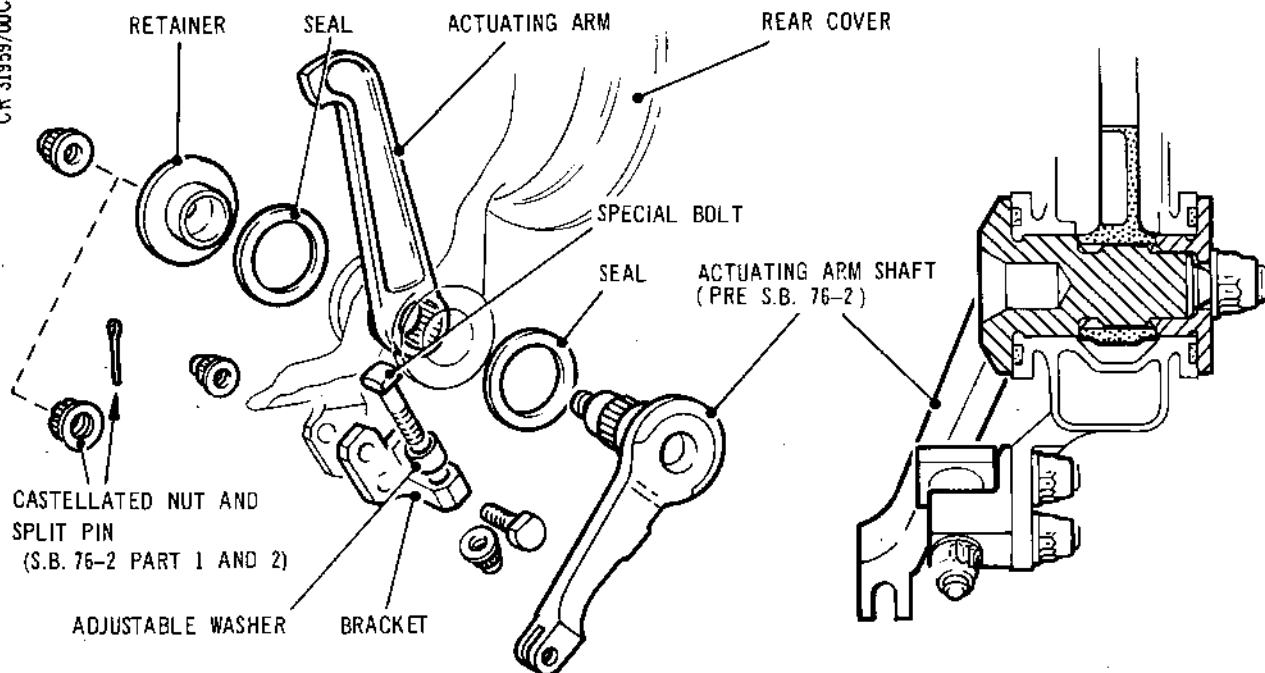


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31959/00C



Assembling Signal System Items to Rear Cover  
Figure 507

SUB-ASSEMBLY  
**72-52-03**

Page 514  
Aug 1/76

TN27224





# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England

- (1) Apply lubricant 'C' to the splines of the actuating arm (1-580) and to the nut (1-510). View the rear cover from the rear end (top) with the sump taken as being at the bottom position. Offer the actuator arm into the sump, locate a seal (1-530) in the groove on the left-hand side of the sump, then insert the actuating arm shaft (1-570) into the left-hand side of the sump and through the actuating arm, having aligned the master splines. Ensure the seal is located in its groove and the actuating arm shaft abuts it, holding it in position.
- (2) Locate a seal (1-530) in the groove on the right-hand side of the sump, then slide the retainer (1-520) over the actuating arm shaft and into the sump ensuring the seal is held in its groove. Enter the bolt (1A-540) through the shaft, from the left-hand side, and screw the castellated nut (1A-510B) onto the protruding end of the bolt having applied lubricant 'C'. Torque-tighten the nut to 180 lbf in. (20,1 N.m) and lock the nut with a split pin (1A-500). The castellated nut must be further tightened if necessary to align the next cut-out with the split pin hole. On engines embodying SB.76-2 (Part 2) with a longer bolt (1A-550) and sleeve (1A-560) used with a reworked pre SB.76-2 standard shaft, insert the sleeve into the actuating arm shaft and insert the bolt through the sleeve and the shaft, so that the head of the bolt draws up onto the outer face of the sleeve. Apply lubricant 'C', then screw the castellated nut (1A-510B) onto the bolt and torque-tighten the nut to 180 lbf in. (20,1 N.m). Lock the nut with a split pin (1A-500). The castellated nut must be further tightened if necessary to align the next cut-out with the split pin hole.
- (3) Apply lubricant 'C' to the two bracket bolts (1-170). Offer the bracket (1-190) to the left-hand side of the bracket on the bottom of the sump, so that the bracket extends downwards. Offer the two bolts into the brackets from the left-hand side, then screw nuts

SUB-ASSEMBLY

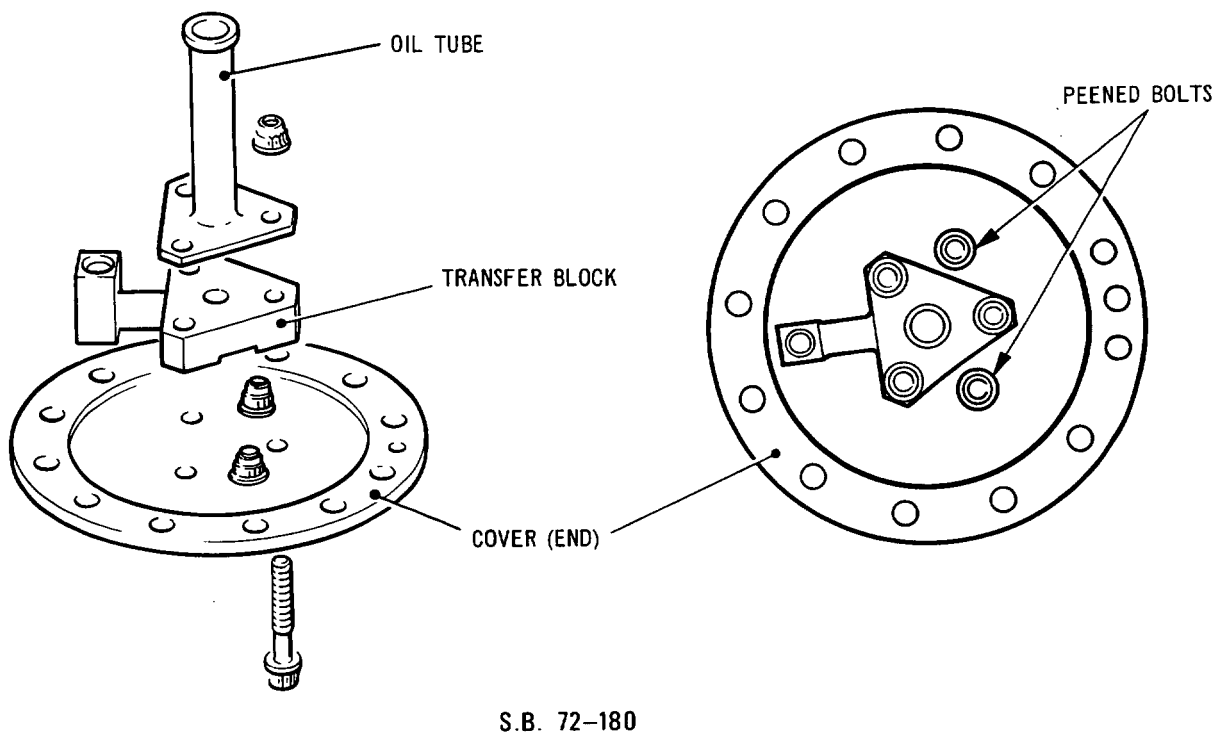
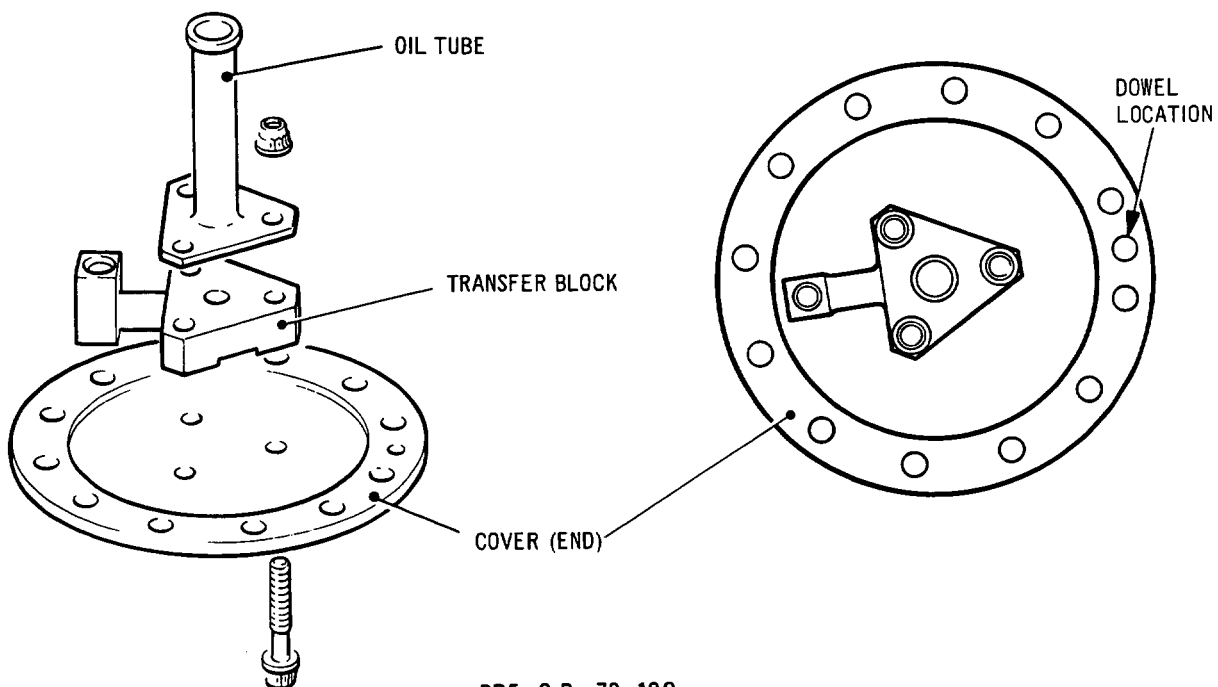
## 72-52-03

Page 515

Dec 31/01



**OLYMPUS 593**  
MK.610-14-28  
OVERHAUL



Assembling Oil Tube Transfer Block to (End) Cover  
Figure 508

SUB-ASSEMBLY  
**72-52-03**



# OLYMPUS 593



MK.610-14-28

SNECMA

OVERHAUL

1-160) onto the bolts and check that there is a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the nuts to 100 lbf in. (11,5 N.m) using a suitable tool between the two flats to facilitate the tightening of the nuts.

- (4) Assemble the adjusting washer (1-200) to the special bolt (1-490), then assemble the bolt to its bracket (1-190) with the bolt head uppermost. Screw the nut (1-180) onto the bolt but do not torque-tighten.

NOTE: The thickness of the adjusting washer is determined during engine build (Ref.71-00-01), where any adjustment to its thickness will be rectified by assembling a different thickness washer.

#### 4. Assemble Items to the (End) Cover

- A. Assemble the Oil Tube and Transfer Block to the (End) Cover (Ref.Fig.508).

- (1) Position the transfer block (1-80) on the recessed face of the (end) cover (1-70) with the feed hole projection 180° from the dowel hole in the cover, then position the oil tube on the block with the offset holes aligned. On engines to SB 72-180 standard, two bolts with nuts torqued-tightened and peened are already assembled to the end cover (1-70B) to prevent incorrect assembly of the transfer block. Apply lubricant 'A' to the three bolts (1-100), then assemble the bolts through the cover, oil transfer block and oil tube. Screw nuts (1-90) onto the bolts and check that the locking (run-down) torque is a minimum of 10 lbf in. (1,1 N.m), then torque-tighten the nuts to 100 lbf in. (11,3 N.m).
- (2) Trial assemble the (end) cover to the rear cover, ensuring that the oil tube slides freely over the oil tube in the rear cover, and that the pin hole locates over the locating pin in the rear cover, with the (end) cover abutting the rear cover flange. If the faces do not abut correctly, the oil tube (1-120) in the rear cover may have to be reset, or an oil tube to SB.72-52 standard used to permit the correct assembly of the (end) cover. Remove the (end) cover from the rear cover on completion of a satisfactory assembly.

SUB-ASSEMBLY

## 72-52-03

Page 517

Dec 31/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Remove the nuts securing the rear cover to the bearing housing, then withdraw the rear cover from the bearing housing.
- (4) Place the bearing housing, rear cover and (end) cover assemblies on a suitable pallet, together with the bearing and its retaining ring. The items of the LP turbine bearing support are now ready for assembling into the Turbine Exhaust Diffuser (Ref.72-53-00 Assembly).

SUB-ASSEMBLY

**72-52-03**

Page 518

Aug 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL

TURBINE EXHAUST DIFFUSER - SUB-ASSEMBLYTABLE OF CONTENTS

Para.		Page
1.	General	501
2.	Assemble the Turbine Exhaust Diffuser	502
	A. Assemble the Inner and Outer Cases to the Stand	502
	B. Assemble the Containment Shield to the Outer Case	507
	C. Assemble the Locating Pins and Eccentric Bolts to the Outer Case	507
	D. Attach the Inner Case to the Outer Case	510
	E. Prepare the Cooling Air Feed and Hot Air Vent Duct Assemblies for Assembly to No.2, 4 and 7 Vane Positions	512
	F. Assemble the Cooling Air Feed and Hot Air Vent Duct Assemblies to No.2, 4 and 7 Vane Positions...	513
	G. Assemble Seal Housings to Cooling Air Feed and Hot Air Vent Duct Assemblies	515
	H. Assemble the Bearing Housing to the Inner Case	515
	J. Assemble the Hot and Cold Air Ducts to the Bearing Housing Cover	516
	K. Assemble the Oil Feed Tube Assembly to No.6 Vane Position	519
	L. Assemble the Cold Air Vent Tube Assembly to No.5 Vane Position	523
	M. Assemble the Bearing and Rear Cover Assembly to the Bearing Housing	525
	N. Assemble the Oil Scavenge Tube Assembly to No.5 Vane Position	526
3.	Pressure Test and Oil Flow Check the LP Turbine Bearing Support	527
	A. Description of the Oil Supply Equipment	527
	B. Assemble the Pressure Test Equipment to the Turbine Exhaust Diffuser	529
	C. Pressure Test the LP Turbine Bearing Support	532
	D. Rectification of Pressure Test Oil Leakage	533
	E. Flow Check the LP Turbine Bearing Support	537
	F. Rectification of Incorrect Oil Flow	537
	G. Remove the Pressure Test Equipment	539
	H. Assemble Insulation Blankets	540
4.	Assemble Items to the Turbine Exhaust Diffuser...	542
	A. On Engines to Pre S.B.76-26 Standard, Assemble and Install LP Shaft Signal System Pulley and Rear Cable	542
	B. On Engines to S.B.76-26 Standard, Install LP Shaft Signal System Rear Cable, Rear Block and Support Bracket	545

SUB-ASSEMBLY

**72-53-00**

Contents 1

Dec 1/80

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

Para.	Page
C. Assemble Blanking Covers and Plugs to the Inner and Outer Cases...	546
D. Assemble the Spherical Joint Flange to the Outer Case ...	548
5. Assemble Items to the Spherical Joint Flange ...	548
A. Assemble the Pneumatic Nozzle Control Signal Pitot and Reheat Pressure Detector Connector ...	548
B. Assemble Jet Pipe Thermocouple Blanking Covers ...	549
C. Assemble the Flanged Connection ...	551
D. Assemble the Engine Power Pitots ...	551
6. Assemble the Heat Shields to the Assembly ...	555
A. Assemble Heat Shield Mounting Brackets to the Containment Shield ...	555
B. Assemble Heat Shield Mounting Brackets to the Spherical Joint Flange ...	556
C. Assemble the Heat Shields to the Outer Case, Containment Shield and Spherical Flanged Joint ...	557
7. Assemble Remaining Items to the Turbine Exhaust Diffuser ...	561
A. Assemble the Air Supply and Vent Elbows ...	561
B. Assemble the Fuel Drain Assembly and Attach it to the Outer Case ...	562
8. Remove the Turbine Exhaust Diffuser from the Build Stand ...	566
A. Attach the Lifting Fixture to the Diffuser...	566
B. Remove the Diffuser from the Stand ...	566

#### TABLE OF ILLUSTRATIONS

Fig.No.	Page
501	Assembling Jacking Fixture to Stand Mounting Plate. 503
502	Assembling Inner and Outer Case to Stand ... 504
503	Positioning Bolts in Outer Case Front Flange ... 506
504	Attachment of Inner and Outer Cases and Positioning of Pins and Bolts... 509
505	Assembling Ducts to Vanes No.2, 4 and 7 ... 511
506	Assembling Ducts to Bearing Housing ... 514
507	Assembling Tubes to Vanes No.5 and 6... 518
508	Assembling Barrel Nuts on Air and Oil Tubes ... 521
509	Assembling Rear Cover to Bearing Housing ... 524
510	Scavenge Tube Positioned in Vane ... 528
511	DELETED

**OLYMPUS 593**

MK.610-14-28

sneema

OVERHAUL

Fig.No.

Page

512	Assembling Oil Pressure Test Equipment	...	...	530
513	Assembling Insulation Blankets	...	...	541
514	LP Shaft Signal System Rear Cable Installation			
	Details	...	...	543
515	Positioning Blanks and Plugs on Inner and Outer			
	Cases...	...	...	544
516	Positioning Brackets and Bolts on Flange of			
	Spherical Joint Flange	...	...	547
517	Assembling Items to Spherical Joint Flange...	...	...	550
518	Positioning and Attachment of Heat Shield Brackets.			554
519	Assembling Heat Shields	...	...	559
520	Assembling Drain Valve to Outer Case...	...	...	563
521	Assembling Drain Valve to Outer Case...	...	...	564

LIST OF TABLES

Table No.

Page

501	Flange Bolt Positions for Containment Shield			
	Slave Brackets	...	...	507
502	Outer Case Eccentric Bolts and Retaining Rings	...	...	508
503	I.P.C. Ref. No. of Heat Shield Attaching Parts	...	...	560

SUB-ASSEMBLY

**72-53-00**

Contents 3

Jun 1/98



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

## TURBINE EXHAUST DIFFUSER - SUB-ASSEMBLY

### 1. General

- A. Prior to commencing the sub-assembly, refer to 72-09-00 Assembly for general information.
- B. During the sub-assembly procedure, reference will be made to the Illustrated Parts Catalogue (I.P.C.) to identify those items where the nomenclature does not positively identify them, due to duplication of the titles e.g. nuts, bolts, washers, bearings, gears, housings, tubes etc. When the item is a part of the breakdown of the text concerned, the item will be identified e.g. bolt (1-10), the 1 referring to the I.P.C. Fig.No., and the 10 referring to the Item No. Where items from a different breakdown are introduced, then the breakdown number will be quoted in addition e.g. bolt (72-32-00/1-10), unless otherwise stated.
- C. Throughout the text special tools are quoted by their Ref.No. e.g. (Tool 1234). For a complete list of tooling required for the assembly, and for the Manufacturers Part No., refer to the Special Tools, Fixtures and Equipment Table 1002.
- D. Although this chapter deals with the assembly of the turbine exhaust diffuser, items from the following breakdowns are also used in the assembly.

72-52-03	LP Turbine Bearing Support
76-21-02	LP Signal Shaft System
71-32-02	Engine Heat Shields
72-54-01	Spherical Joint Flange
76-13-03	PNC Signal Pitot
77-12-03	Engine Power Pitot
75-03-02	Flanged Connection
71-73-06	Fuel Drain Assembly

The components of the LP Turbine Bearing Support are supplied as three sub-assemblies and some loose items. All other components are supplied as loose items on pallets or in containers.

- E. Throughout this text angular position is defined by relationship to the vanes, of which there are 10, five having oil or air tubes passing through them. The vanes are numbered 1 to 10 in a clockwise direction as viewed from the rear, with No.1 being the first vane from the vertical top position.

SUB-ASSEMBLY

## 72-53-00

Page 501

Sep 30/94





OLYMPUS 593



MK.610-14-28 snecma  
OVERHAUL

## 2. Assemble the Turbine Exhaust Diffuser

### A. Assemble the Inner and Outer Cases to the Stand.

- (1) Ensure that the mounting plate (Tool 309) is bolted to the stand (Tool 832) and that the stand arms are extended upwards. Attach a hoist to the lifting ring of the jacking fixture (Tool 299) (Ref.Fig.501), then position the hoist over the stand with the clamps of the jacking fixture pulled outwards. Lower the fixture onto the stand mounting plate with the fixture bridge piece at right angles to the stand arms, and located in the cutaway parts of the mounting plate. Push the fixture clamps in under the mounting plate, then tighten the clamp securing nuts. Disconnect the hoist from the jacking fixture. Release the stand lock, turn the mounting plate over so that the fixture is underneath, then apply the stand lock.

NOTE: As an alternative to using a hoist, the jacking fixture (Tool 299) may be left on its mobile stand (Tool 811) with the fixture lifting eye lowermost, the fixture positioned under the stand, ensuring the stand arms are extending downwards, then the fixture lifted up and clamped onto the stand (Ref.Fig.501).

- (2) Attach the lifting fixture to the inner diffuser.

NOTE: A revised standard of diffuser inner case was introduced by SB.72-8038-181 having caged bolts in place of caged nuts. This modified inner case requires a revised lifting fixture (Tool 1953) which can be used also for unmodified cases. The original lifting fixture (Tool 305) can be used only on unmodified inner cases.

- (a) Lower the lifting fixture (Tool 305) onto the rear (smaller diameter) face of the inner case to pre SB.72-8038-181 standard, and screw the captive bolts of the fixture into the caged nuts of the diffuser.
- (b) Completely slacken the seven thumbnuts on the lifting fixture (Tool 1953) and turn the seven latches so that the pins on their heads point inwards towards the word 'FREE'. Lower the fixture onto the rear (smaller diameter) face of the inner case to post or pre SB.72-8038-181 standard, so that the latches enter

SUB-ASSEMBLY

72-53-00

Page 502

Sep 30/94



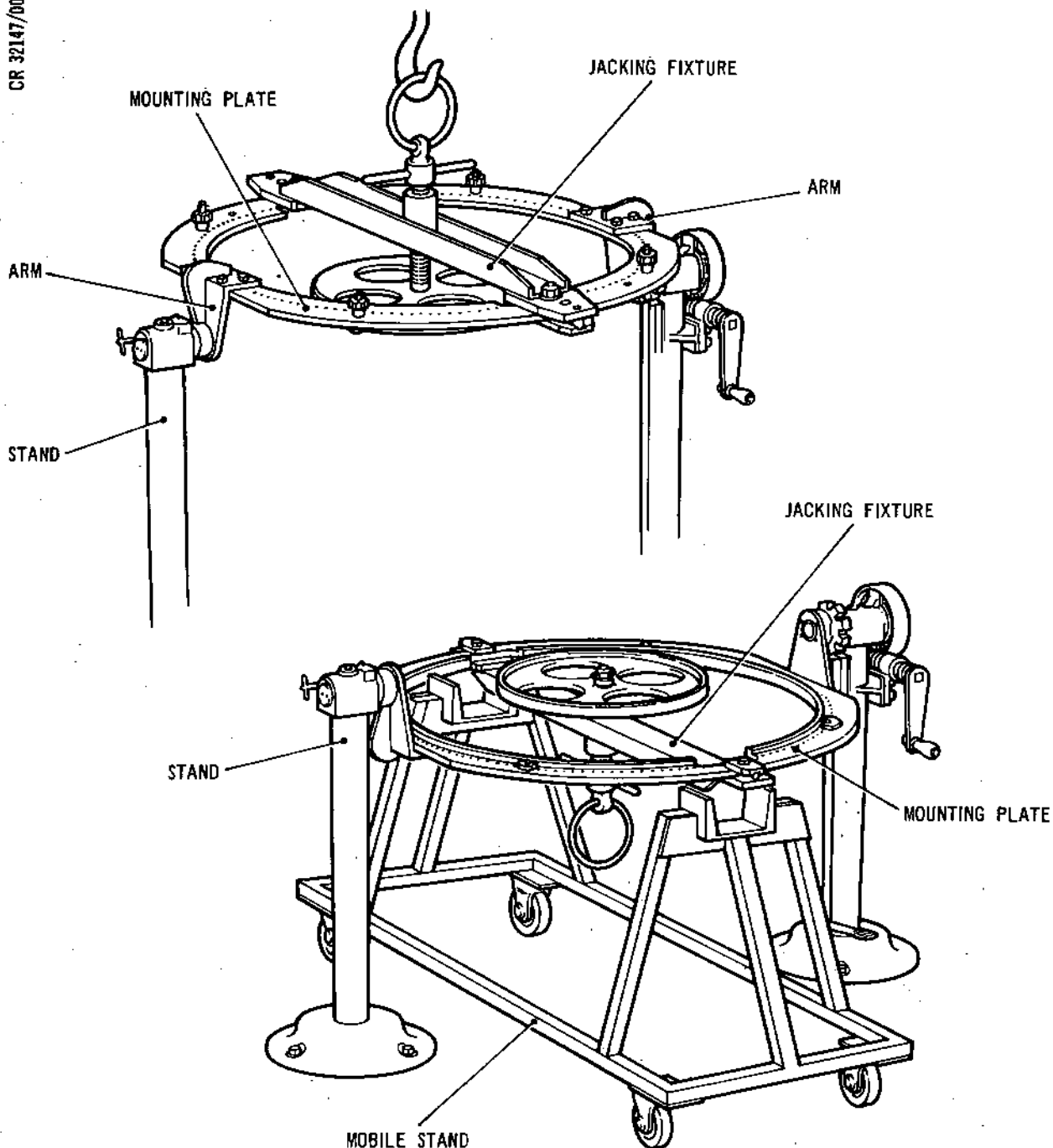
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32147/00A

PRINTED IN ENGLAND



TN42697

Assembling Jacking Fixture to Stand Mounting Plate  
Figure 501

SUB-ASSEMBLY  
**72-53-00**  
Page 503  
Aug 14/75



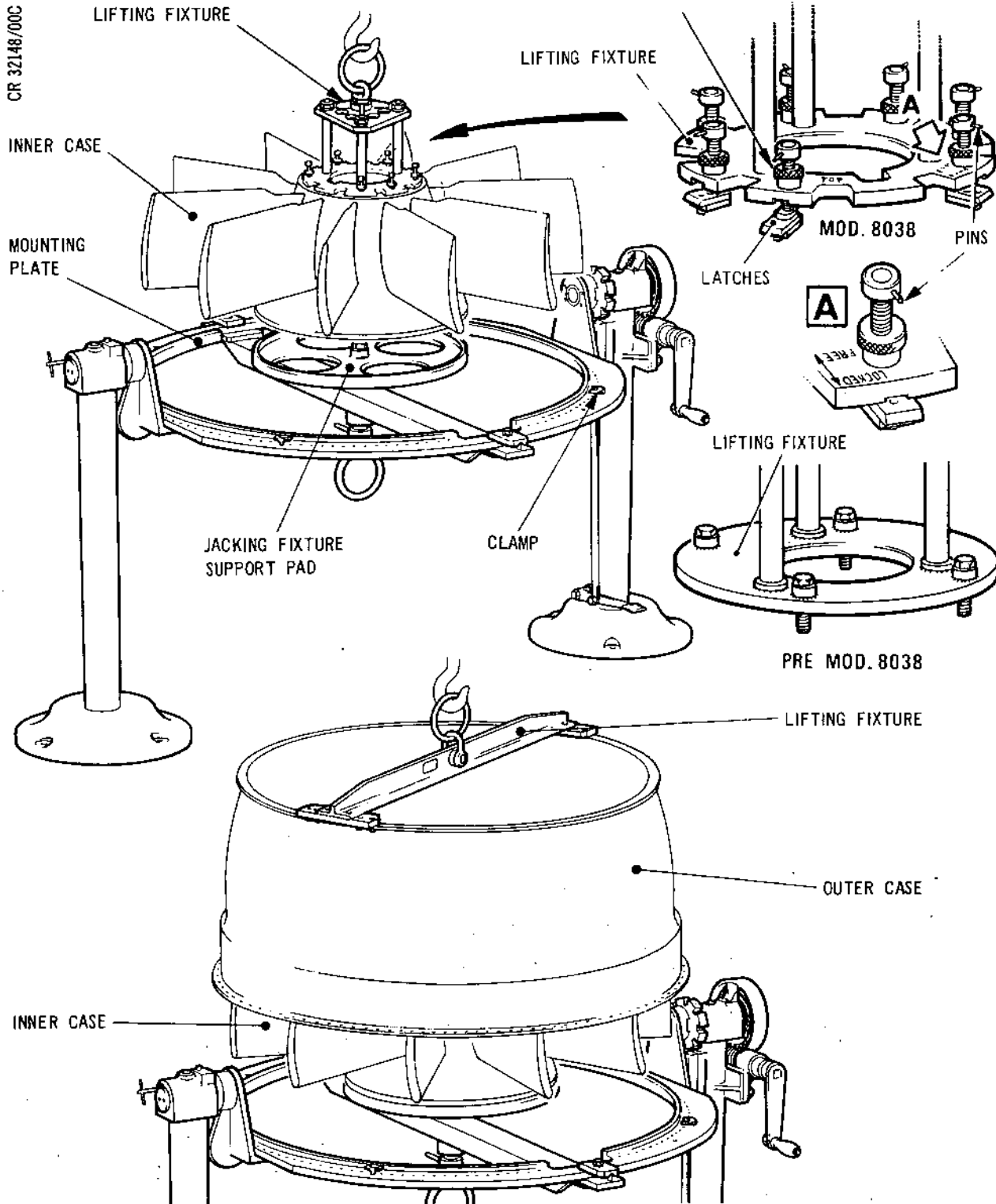
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 32148/00C



Assembling Inner and Outer Case to Stand  
Figure 502

SUB-ASSEMBLY  
**72-53-00**  
Page 504  
Aug 1/77

TN42698



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

the inner case. Position the fixture with the word 'TOP' between vanes No.1 and No.10, then rotate the latches to the 'LOCKED' position (i.e. with the pins outwards) and tighten the thumbnuts.

- (3) Attach a hoist to the lifting fixture ring, then raise the hoist and position the inner case over the jacking fixture support pad. Steadily lower the hoist and locate the lower flange of the inner case on the support pad spigot. Remove the hoist, then release and remove the lifting fixture. Screw the jacking fixture to its lowest position to ensure clearance when the outer case is assembled.
- (4) On inner cases to pre SB.72-8038-181 standard, use slave bolts lubricated with lubricant 'A' and ensure that the locking (run-down) torque of the caged nuts in the rear flange are not less than 3.5 lbf in. (0,4 N.m).

**CAUTION:** DO NOT ROTATE STAND AS INNER CASE IS NOT SECURED.

- (5) Remove the nuts and washers from the lifting fixture (Tool 298). With the rear face (smaller diameter) of the outer case uppermost, lower the fixture centrally on the case locating the studs in the flange bolt-holes (Ref.Fig.502). Secure the fixture with the slave nuts and washers.
- (6) Attach a hoist to the ring of the lifting fixture, then raise the hoist and position the outer case over the stand mounting plate. Ensure that the four mounting plate clamps are positioned out of the way, then rotate the outer case until the dowel hole in the front flange is aligned with the middle of one of the cutaways in the mounting plate. Lower the case on to the mounting plate, aligning the bolt-holes. Secure the outer case with the mounting plate clamps. Release and remove the lifting fixture, then remove the hoist from the fixture.
- (7) Assemble the D-head bolts in the front flange of the outer case ensuring that the appropriate bolts are in their correct location (Ref.Fig.503). No.1 bolt-hole is counter-clockwise of the dowel hole when viewed from the rear.

**NOTE:** These bolts will be trapped by the containment shield and used on final engine assembly.

SUB-ASSEMBLY

72-53-00

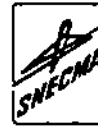
Page 505

Jun 30/97

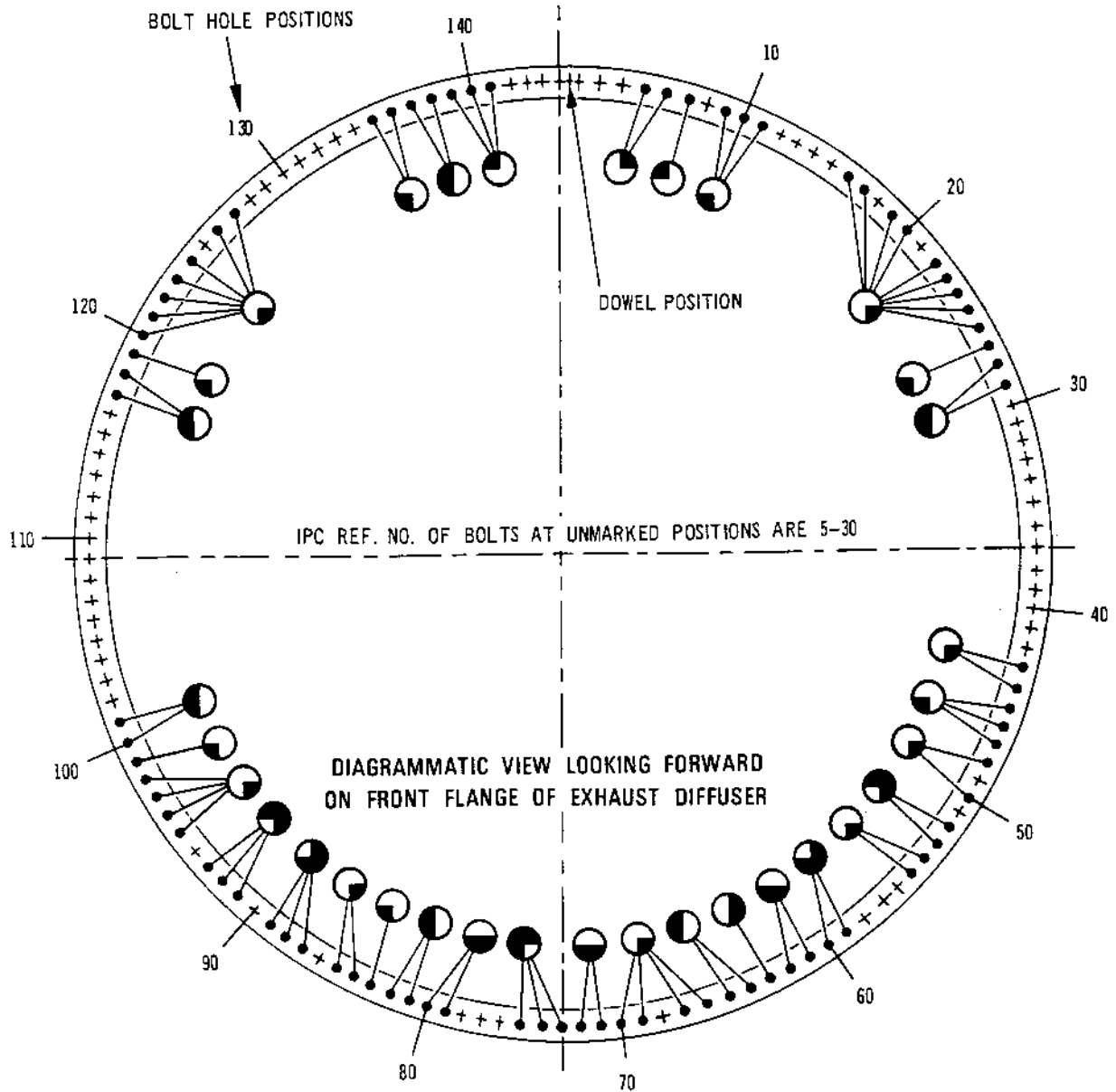


# OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32149/00C



5-100

5-110

5-140 7-360  
5-330 8-80  
6-100 8-260  
7-130



5-170 6-360  
5-230 6-420  
5-260 7-160  
6-70 7-290  
6-130 8-120  
6-190 8-180

5-340 7-370  
6-330 8-90  
7-140 8-270

6-160  
7-260

6-300  
7-230

6-310  
6-450  
7-90

6-320

7-60

IPC REF. NO. OF BOLTS AT POSITIONS INDICATED

Positioning Bolts in Outer Case Front Flange  
Figure 503

SUB-ASSEMBLY  
**72-53-00**

Page 506

Jun 1/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



B. Assemble the Containment Shield to the Outer Case.

- (1) Examine the containment shield and ensure that the eight locating grooved pins are fitted to the centre holes in each of the eight attachment bracket positions (Ref.Fig.504). If the locating pins (3-20) are not assembled, place the pins in a container with Cardice for (approx.) 30 min. or liquid nitrogen for (approx.) 2 to 3 min. Remove the pins from the Cardice or nitrogen container, then assemble them to the containment shield.
- (2) Screw the lifting handles (Tool 1966) into four equally spaced threaded holes in the containment shield, then lower the containment shield over the outer case and rest the flared end on the boltheads assembled to the case front flange. Turn the shield to position it relative to the outer case with the two small adjacent scallops in the shield aligned with No.7 vane (Ref.Fig.504), then remove the lifting handles.
- (3) Assemble a slave bracket (Tool 297) to every other attachment bracket position, attaching each bracket to a locating pin, with the bracket extending to the flared end of the shield. At the same time insert the three cut-outs under the boltheads in the appropriate position on the front flange (Ref. Table 501). Secure each slave bracket to the containment shield with its captive bolts.

BRACKET NO.	1	2	3	4		1	2	3	4
BOLT-HOLE	( 9	45	81	117 )		( 27	63	99	135
POSITION	( 10	46	82	118 )	or	( 28	64	100	136
	( 11	47	83	119 )		( 29	65	101	137

Flange Bolt Positions for Containment  
Shield Slave Brackets  
Table 501

C. Assemble the Locating Pins and Eccentric Bolts to the Outer Case (Ref.Fig.504).

SUB-ASSEMBLY

**72-53-00**

Page 507

Aug 1/76

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

- (1) Examine the rear flange of the outer case and ensure that the shouldered pin (4-150) is assembled, then examine the outside of the case at No.6 vane position and ensure that the two shouldered pins (76-21-02/1-110) for the signal system pulley shroud are assembled. If the pins are not fitted, place them in a container with Cardice for (approx.) 30 min. or liquid nitrogen for (approx.) two to three min. Remove the shouldered pin (4-150) from the Cardice or nitrogen and assemble it to its hole in between two of the bolt-holes at the normal top position of the case rear flange. Remove the two shouldered pins (76-21-02/1-110) from the Cardice or liquid nitrogen and assemble them to the pin holes from the outside of the case at the No.6 vane position.
- (2) Assemble the eccentric bolts in their respective vane positions (Ref.Table 502), by inserting the bolts into their holes from inside the case and locating their heads in the eccentric bores in the case. Secure the bolts by assembling retaining rings to the grooves in the bolts from the outside of the case.

VANE NO.	BOLT		QTY.	RETAINING RING	
	I.P.C.	REF.NO.		I.P.C.	REF.NO.
					QTY.
2		1-30	6		1-20
4		1-190	6		1-180
5		1-370	3		1-360
5		1-400	4		1-390
6		2-70	3		2-60
6		4-220	5		4-210
7		2-100	6		2-90

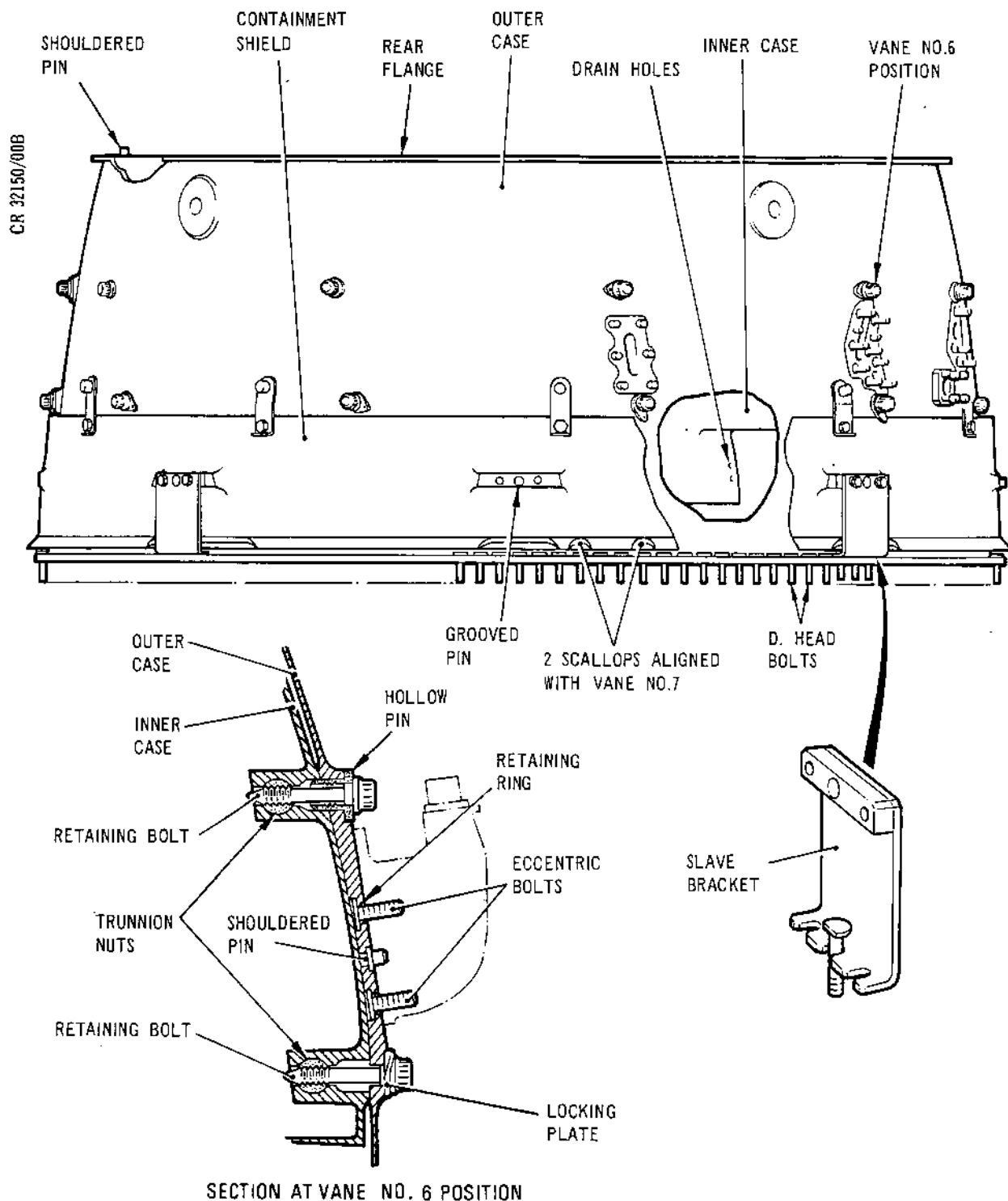
Outer Case Eccentric Bolts and Retaining Rings  
Table 502

TN35505



OLYMPUS 593

MK.610-14-28  
OVERHAUL



SECTION AT VANE NO. 6 POSITION  
Attachment of Inner and Outer Cases and Positioning  
of Pins and Bolts  
Figure 504





OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

D. Attach the Inner Case to the Outer Case (Ref.Fig.504).

- (1) Turn the inner diffuser so that the pair of small drain holes between vanes No.5 and 6 are positioned 180 deg from the shouldered pin on the rear flange of the outer case. Screw up the jacking fixture until the locating pin positions in the inner and outer cases are aligned. Insert the 10 (slave) locating pins (Tool 300) in the rear (upper) ring of holes through the outer case and into the vanes of the inner case.
- (2) Lightly smear the diameters of the hollow pins (4-180) with lubricant 'A'. In sequence remove the slave locating pins from the rear holes and insert a hollow pin ensuring that the flat engages with the corresponding flat on the case. For vanes No.5 and 6, apply jointing compound 'A' to the casing flange under the head of the hollow pin.
- (3) Apply lubricant 'A' to the 20 trunnion nuts (4-190), then insert two trunnion nuts into the two holes in each vane and align the tapped hole in each nut with the holes in the outer casing.
- (4) Apply lubricant 'A' to 10 of the retaining bolts (4-160), then insert the bolts through the hollow pins and screw the bolts into the trunnion nuts.
- (5) Apply lubricant 'A' to the remaining 10 bolts and assemble a locking plate (4-170) to each bolt. Insert the bolts into the front (lower) hole at each vane station and screw them into the trunnion nuts, ensuring that the flats of the locking washers engage with the corresponding flats on the case. At vanes No.5 and 6, apply sealing compound 'A' to the case flange under the locking washer.
- (6) Torque-tighten the 20 retaining bolts between 330 and 370 lbf in. (37,3 and 41,8 N.m).
- (7) Wire-lock each bolt to either its locking plate or hollow pin.

SUB-ASSEMBLY

72-53-00

Page 510

Sep 30/94



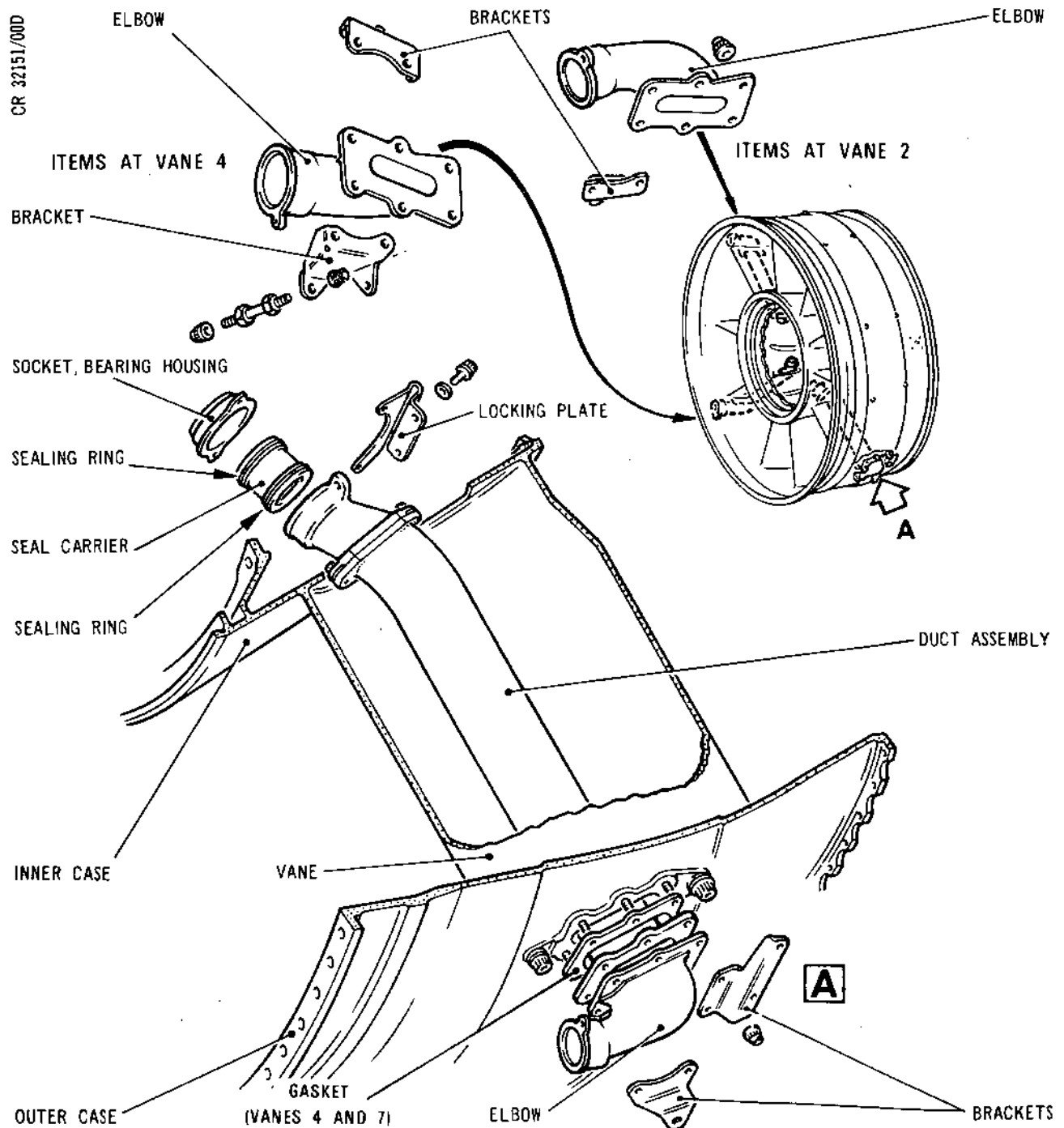
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

TN4767



Assembling Ducts to Vanes No.2, 4 and 7  
Figure 505

SUB-ASSEMBLY  
**72-53-00**  
Page 511  
Jan 1/77



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (8) Position the mobile stand (Tool 811) under the jacking fixture (Tool 299). Take the weight of the fixture, release the fixture nuts and withdraw the clamps, then lower the fixture onto the mobile stand. Remove the stand/fixture from under the mounting plate.

E. Prepare the Cooling Air Feed and Hot Air Vent Duct Assemblies for Assembly to No.2, 4 and 7 Vane Positions (Ref.Fig.505).

- (1) Check that the sealing ring gaps are within the limits specified in the Fits and Clearance Schedule F.C.S.254.
  - (a) Assemble the sealing rings (1-130, 1-300 and 2-200) into their respective seal housings (1-90, 1-260 and 2-160) and air feed and vent sockets (72-52-03/2-20 and 2-40).
  - (b) Measure the sealing ring gaps and compare the result with the Fits and Clearance Schedule F.C.S.254.
  - (c) Remove the sealing rings from the items and note the positions at which they were checked.
- (2) Lubricate the six sealing rings (1-130, 1-300 and 2-200) with lubricant 'B', then assemble them to the grooves at each end of the seal carriers (1-140, 1-310 and 2-210). Trial assemble each seal carrier to its seal housing (1-90, 1-260 and 2-160) and to the air feed socket (72-52-03/2-20) or vent socket (72-52-03/2-40), on the bearing housing, as applicable. Compress the sealing rings and ease the carrier/ring into the housing and socket, ensure that the sealing rings are assembled to the positions at which they were gap checked (Ref.(1), (c)). Leave the carriers assembled to the air feed and vent sockets, but withdraw them slightly from full engagement to facilitate alignment when the seal housings are assembled.

TN21013

SUB-ASSEMBLY  
**72-53-00**

Page 512  
Dec 1/79



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

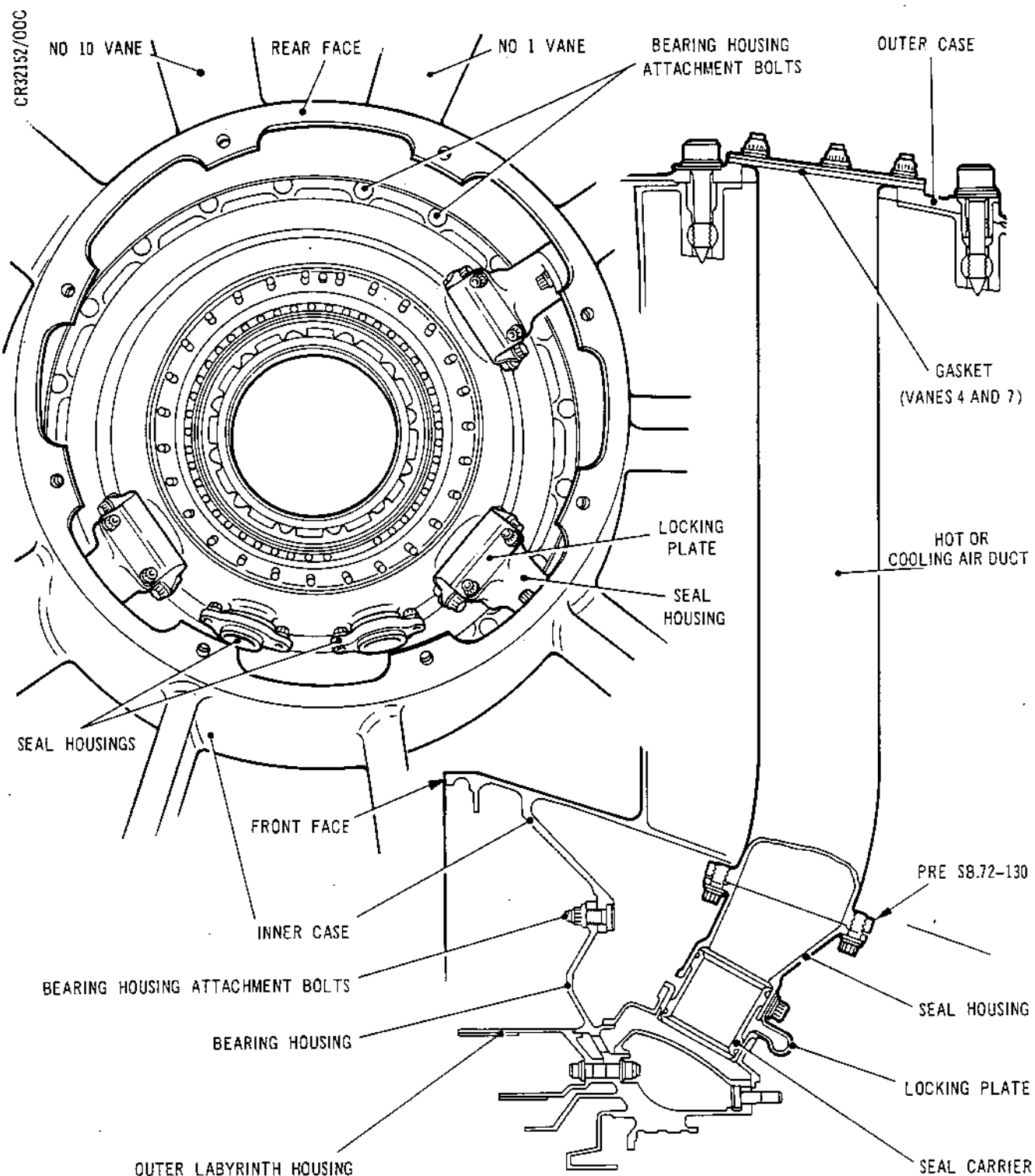
- (3) If the air duct assemblies are to SB.72-130 standard (1-60C, 1-230C and 2-130C), assemble two bolts (1A-80B, 1A-250B and 2-150B), as applicable, with lubricant 'A' applied, to the inner flange of each duct. Enter the bolts through the duct flanges towards the centre of the exhaust diffuser and ensure that the bolt threads pass fully through the threads in the flange.

F. Assemble the Cooling Air Feed and Hot Air Vent Duct Assemblies to No.2, 4 and 7 Vane Positions (Ref.Fig.505).

- (1) Install the air duct (1-60) into the No.2 vane.
- (a) On pre-SB.72-129 air ducts (1-60A), insert the air duct assembly into the hole in the outer case in line with No.2 vane, then guide the duct through the vane and locate the outer flange over the six bolts which protrude through the outer case. Temporarily secure the outer flange with four (slave) nuts (1-10). Examine the inner end of the duct to ensure that a clearance of not less than 0.070 in. (1,77 mm) exists between each side of the duct and the vane.
  - (b) On SB.72-129 standard air ducts (1-60B), insert the air duct assembly into the hole in the outer case in line with No.2 vane. Ensure that the off-set portion of the duct is positioned towards the convex outer surface of the vane, then guide the duct through the vane and locate the outer flange over the six bolts which protrude through the outer case. Temporarily secure the outer flange with four (slave) nuts (1-10). Examine the inner end of the duct to ensure that the following clearances are present.
    - (i) A minimum clearance of 0.010 in. (0,254 mm) between the duct and the vane on the off-set side of the duct.
    - (ii) A minimum clearance of 0.150 in. (3,81 mm) between the duct and the vane throughout the off-set length of the other side of the duct.
- (2) Install the air ducts (1-230 and 2-130) into the No.4 and 7 vanes.



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



ATTACHMENT OF DUCTING AT VANES 2, 4 AND 7  
Assembling Ducts to Bearing Housing  
Figure 506

SUB-ASSEMBLY  
**72-53-00**  
Page 514  
Aug 1/77



OLYMPUS 593

MK.610-14-18  
OVERHAUL



PRINTED IN ENGLAND

- (a) Assemble a gasket (1-225) over the end of the air duct (1-230) and rest it on the duct flange, ensuring that the contour of the gasket outer edge aligns with the outer edge of the duct flange. Assemble a gasket (2-125) to the air duct (2-130) ensuring that outer edge contours align.
  - (b) Assemble the air ducts (1-230 and 2-130) into the vanes as detailed in para.(1)(a) or (b), ensuring that each gasket is carefully located over the outer case bolts. Use the (slave) nuts (1-170 and 2-80) to secure the outer flanges temporarily, then ensure that the clearances given in (1)(a) or (b)(i) and (ii) (as applicable) exist.
- G. Assemble Seal Housings to Cooling Air Feed and Hot Air Vent Duct Assemblies (Ref.Fig.505).
- (1) Assemble the seal housings (1-90, 1-260 and 2-160) to the inner ends of their respective ducts, ensuring that the locking plate attachment flange on each housing faces rearward.
    - (a) On pre-SB.72-130 ducts, apply lubricant 'A' to the bolts (1-80, 1-250 and 2-150), then assemble two bolts to each housing and screw them into the threaded inserts in each duct flange.
    - (b) On SB.72-130 standard ducts, secure each seal housing to its duct with two nuts (1A-75, 1A-245 and 2-145), using the cranked ring wrench (Tool 1992) to immobilize the bolts when torque-tightening the nuts.
    - (c) Ensure that the locking (run-down) torque of the nuts or bolts is not less than 3.5 lbf in. (0,4 Nm), then torque-tighten to 100 lbf in. (11,5 N.m). Release the outer end of each duct, withdraw the ducts as far as the seal housings will allow, then rest each duct in that position.
- H. Assemble the Bearing Housing to the Inner Case (Ref. Fig.506).

SUB-ASSEMBLY  
**72-53-00**

Page 515  
Dec 1/86



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (1) Prepare the two seal housings in the bearing housing as follows:
  - (a) Unscrew and remove the locating pin.
  - (b) Apply lubricant 'C' to the bolt (72-52-03/2-70), screw the bolt into the vacant hole and torque-tighten it to 100 lbf in. (11,5 N.m).
  - (c) Attach two pieces of locking wire to the bolt just assembled in preparation for locking to the other two bolts.
  - (d) Remove the other two bolts and position the locking wire clear of the flange.
- (2) Turn the stand so that diffuser mounting flange is vertical, with No.1 and 10 vanes uppermost. From the forward end of the diffuser offer the bearing housing, with its 'TOP' position uppermost and cover assembly leading, so that the bearing housing flange locates against the internal flange of the diffuser.

NOTE: The bearing housing must be supported until the bolts are assembled.
- (3) Apply lubricant 'C' to the 20 bolts (72-52-03/2-210), then insert the bolts from the rear of the inner case, through the case and bearing housing flanges locating the bolthead flats against the step. Screw nuts (72-52-03/2-200) onto the bolts, ensuring that the locking (run-down) torque is not less than 6.5 lbf in. (0,7 N.m), then torque-tighten the nuts to 210 lbf in. (24 N.m).

J. Assemble the Hot and Cold Air Ducts to the Bearing Housing Cover (Ref.Fig.505 and 506).

- (1) Assemble the cooling air feed duct in No.2 vane.
  - (a) Move the cooling air feed duct assembly into No.2 vane so that the seal housing at its inner end engages the seal carrier (1-140) resting in the air feed socket on the bearing housing.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

- (b) Ease the seal housing under the locking plate (1-120), then push the duct fully home so that the seal carrier enters the seal housing, and the flange on the outer end of the duct engages the six trapped bolts in the outer case.
  - (c) Lubricate the two bolts (1-100) with lubricant 'A' and assemble a washer (1-110) onto each bolt. Align the tapped holes in the duct seal housing with the locking plate holes, and screw in the bolts.
  - (d) Temporarily secure the outer end of the duct with four (slave) nuts (1-10), then torque-tighten the locking plate bolts to 100 lbf in. (11,5 N.m). Wire-lock the bolts to each other.
- (2) Assemble the hot air vent duct in No.4 vane.
- (a) Move the hot air vent duct assembly into No.4 vane so that the seal housing at its inner end engages the seal carrier (1-310) resting in the vent socket on the bearing housing.
  - (b) Ease the seal housing under the locking plate (1-290), then push the duct fully home so that the seal carrier enters the seal housing, and the flange and gasket on the outer end of the duct engage the six trapped bolts in the outer case.
  - (c) Lubricate the two bolts (1-270) with lubricant 'A' and assemble a washer (1-280) onto each bolt. Align the tapped holes in the duct seal housing with the locking plate holes and screw in the bolts.
  - (d) Temporarily secure the outer end of the duct with four (slave) nuts (1-170), then torque-tighten the locking plate bolts to 100 lbf in. (11,5 N.m). Wire-lock the bolts to each other.



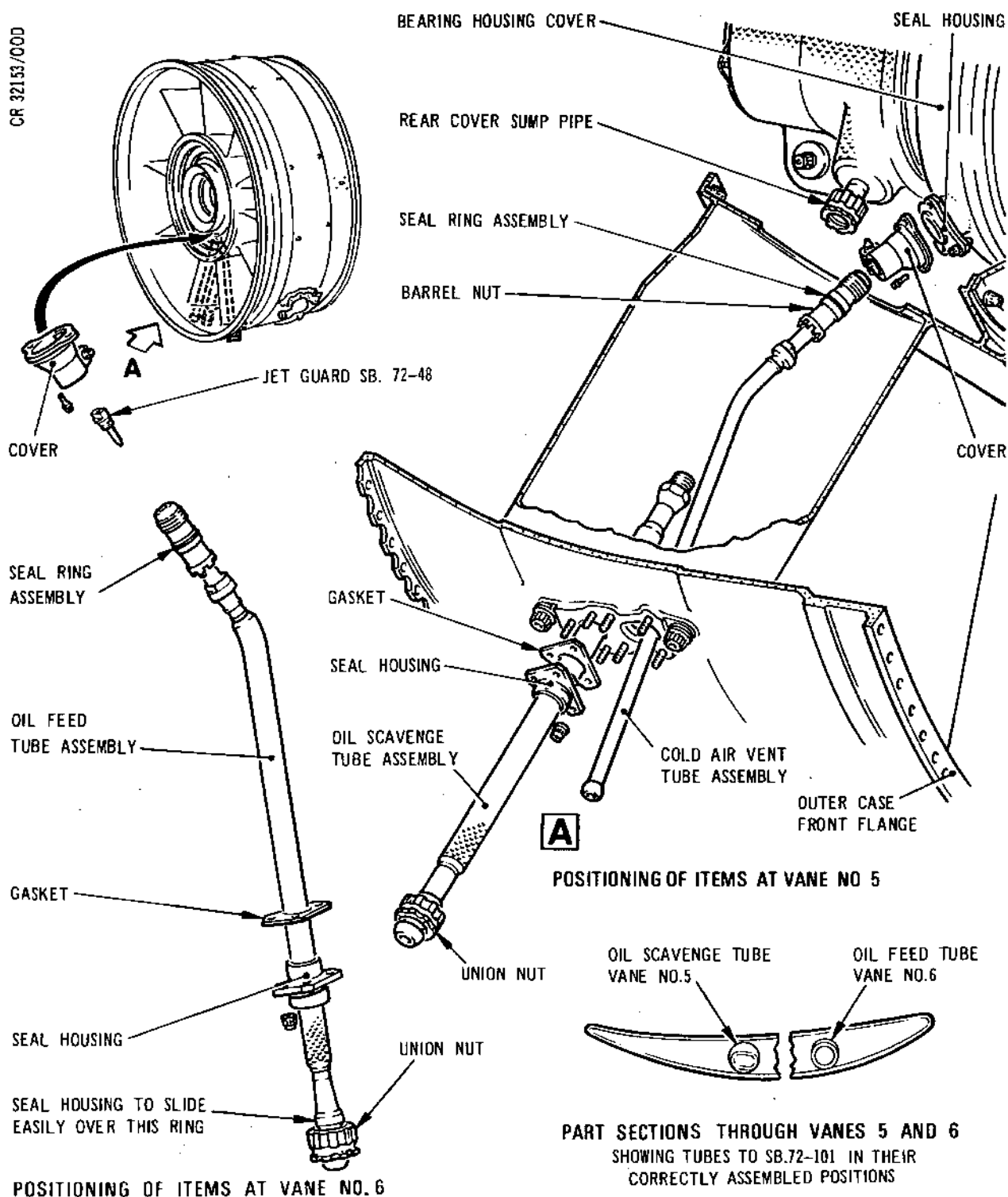


# OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32153/000



Assembling Tubes to Vanes No.5 and 6  
Figure 507

SUB-ASSEMBLY  
**72-53-00**  
Page 518  
Aug 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

(3) Assemble the hot air vent duct in No.7 vane.

- (a) Move the hot air vent duct assembly into No.7 vane so that the seal housing at its inner end engages the seal carrier (2-210) resting in the vent socket on the bearing housing.
- (b) Ease the seal housing under the locking plate (2-190), then push the duct fully home so that the seal carrier enters the seal housing and the flange and gasket on the outer end of the duct engage the six trapped bolts in the outer case.
- (c) Lubricate the two bolts (2-170) with lubricant 'A' and assemble a washer (2-180) to each bolt. Align the tapped holes in the duct seal housing with the locking plate holes and screw in the bolts.
- (d) Temporarily secure the outer end of the duct with four (slave) nuts (2-80), then torque-tighten the locking plate bolts to 100 lbf in. (11,5 N.m). Wire-lock the bolts to each other.

K. Assemble the Oil Feed Tube Assembly to No.6 Vane Position (Ref.Fig.507).

- (1) Ensure that the seal housing (2-40) and tube (2-30) are both to the same service bulletin standard, then trial assembly the housing over the tube to ensure that the housing slides easily over the mating part at the outside end of the tube.
- (2) On engines to pre SB.72-8588-218 standard ensure that the tube meets the requirements of SB.72-8712-119.
- (3) Apply lubricant 'A' to the jet guard (2-25) (SB.72-48 standard only), then screw it into the inner end of the oil tube assembly and torque-tighten to 30 lbf in. (3,4 N.m).
- (4) Slide the union nut (2-10), seal housing (2-40) and gasket (2-75) over the barrel nut end of the tube (2-30), and slide them to the other end of the tube.
- (5) Apply lubricant 'B' to each seal of the seal ring assembly (2-20).

SUB-ASSEMBLY

**72-53-00**

Page 519

Jun 1/99



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (6) With an outward spring assembled first, assemble the four seal rings to the groove in the barrel nut with the remaining inward and outward sprung rings in alternate sequence.
- (a) Screw the four rings, in turn, along the nut thread and ease them into the nut groove.
- (7) Apply lubricant 'C' to the cover bolt (72-52-03/2-60), insert the bolt through the clamp bolt-hole and screw the nut (72-52-03/2-50) onto the bolt. Do not tighten the nut.
- (8) Lubricate the barrel and threads with lubricant 'A'.
- (9) Insert the barrel nut end of the tube into the forward round hole through the outer case into No.6 vane, guide the tube through the vane and at the same time, locate the gasket (2-75) and seal housing (2-40) over the three bolts protruding through the outer case.
- (10) When the barrel nut protrudes through the inner end of the vane, position the cover (72-52-03/2-90) over the end of the nut, and feed the nut through the cover into the seal housing (2-40).
- (11) Position the tube in the vane.
- (a) Turn tube to align barrel nut with housing and, with a tube to SB.72-101 standard, turn so that tube bend contacts the inner edge of the vane convex face.
- NOTE: Tubes to SB.72-101 and SB.72-8588-218 standard are bent whereas tubes to pre SB.72-101 are straight and run centrally through the vane (Ref.Fig.507).
- (12) Pull the cover clear of the barrel nut, then push the tube into the vane so that the nut enters the seal housing.
- (13) Screw the barrel nut into the seal housing by hand then using the nut runner (Tool 1049) lightly tighten.
- (a) Assemble the nut runner to the barrel nut and insert the holder (Tool 846) between the runner and the tube shoulder to engage with the flats on the tube.

SUB-ASSEMBLY

## 72-53-00

Page 520

Dec 31/01



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 32104/00B

HOLDER ENGAGING TUBE  
ASSEMBLY COLLAR

BARREL NUT

BEARING HOUSING

SEAL HOUSING

COVER

TUBE ASSEMBLY

WRENCH ENGAGING  
BARREL NUT SLOTS

Assembling Barrel Nuts on Oil and Air Tubes  
Figure 508

SUB-ASSEMBLY  
**72-53-00**  
Page 521  
Aug 1/76



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (b) Use the holder to maintain the tube in the set position within the vane and with a suitable tommy bar to turn the runner, lightly tighten the nut.
- (14) With lubricant 'C' applied, screw the three nuts (2-50) on to the outer case bolts and torque-tighten to 100 lbf in. (11,5 N.m). Ensure the locking (run-down) torque is not less than 3,5 lbf in. (0,4 N.m).
- (15) Establish the tightening force to be applied that will result in a tightening torque of between 280 and 310 lbf in. (32 and 35 N.m) at the barrel nut. Position the spanner(s) and torque wrenches (Tool 1046, 1047) on the torque adapter (Tool 871) to the checking fixture in accordance with 72-09-00 assembly with the same angle and manner of application as to be used on the nut. Note the load applied on the torque wrench that gives the required nut torque-tightening.
- (16) Retain the tube in position with the holder (Tool 846) engaged with the flats at the inner end of the tube and with the spanners, to be used alternately as required and torque wrench apply the pre-determined torque load required to tighten the nut to between 280 and 310 lbf in. (32 and 35 N.m).
- (17) Wire-lock the nut to one of the three holes in the inner lip of the seal housing. Position the locking wire to allow the cover to slide over the tube and abut the seal housing.
- (18) Insert locking wire through the locking wire hole in the seal housing rear bolt, of sufficient length, to wire-lock the two securing bolts at a later stage.
- (19) Slide the cover over the tube and into abutment with the seal housing and, with the clamp nut and bolt to the rear, align the attachment bolt-holes.
- (20) With lubricant 'B' applied, secure the cover with two bolts (72-53-03/2-80) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m). Wire-lock the bolts to the rear bolt in the seal housing using the locking wire already attached.
- (21) Torque-tighten the clamp nut and bolt to between 67 and 73 lbf in. (7,6 and 8,2 N.m). Ensure the locking (run-down) torque is not less than 3.5 lbf in. (0,4 N.m).

SUB-ASSEMBLY

## 72-53-00

Page 522

Dec 31/01



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

L. Assemble the Cold Air Vent Tube Assembly to No.5 Vane Position (Ref.Fig.507 and 508).

- (1) Apply lubricant 'B' to each seal of the seal assembly (1-410), then assemble the seal ring assembly to the groove in the barrel nut by screwing the four rings (in turn) along the nut thread, then easing them into the nut groove. Ensure that outward sprung rings alternate with inward sprung rings with an outward sprung ring assembled first.
- (2) Apply lubricant 'C' to the cover bolt (72-52-03/2-60), then insert the bolt through the cover clamp bolt hole and screw the nut (72-52-03/2-50) onto the bolt but do not tighten the nut. Lubricate the barrel nut threads with lubricant 'A', then insert the barrel nut end of the tube into the forward hole through the outer case into No.5 vane and guide the tube through the vane. When the barrel nut protrudes through the inner end of the vane, position the cover (72-52-03/2-90) over the end of the nut, and feed the nut through the cover into the seal housing (72-52-03/2-100). Turn the tube as required to align the barrel nut with the housing and position the tube centrally within the vane. Pull the cover clear of the nut, push the nut into the seal housing and screw the nut into the bearing housing by hand.
- (3) Assemble the nut runner (Tool 1049) to the barrel nut, with the holder (Tool 846) between the runner and the tube shoulder engaged with the flats on the tube. Ensure that the outer end of the tube is central in the hole, then tighten the nut using a suitable tommy bar to turn the runner. Confirm the correct positioning of the outer end of the tube by assembling the adapter (Tool 1957) to the four bolts in the outer case. If necessary loosen the barrel nut, move the tube assembly until correctly positioned and retighten the nut. Remove the holder and runner. Using adapter (Tool 871), check the torque setting of the open end wrench (Tool 625, 626), then using the wrench and holder (Tool 846), torque-tighten the nut between 280 and 310 lbf in. (31,6 and 35,0 N.m). Re-assemble the adapter to the outer case and confirm that the tube assembly is correctly positioned. Rectify as necessary by repositioning. Wire-lock the barrel nut to a locking hole in the seal housing, then remove the adapter and blank the end of the tube.

SUB-ASSEMBLY

## 72-53-00

Page 523

Dec 31/01



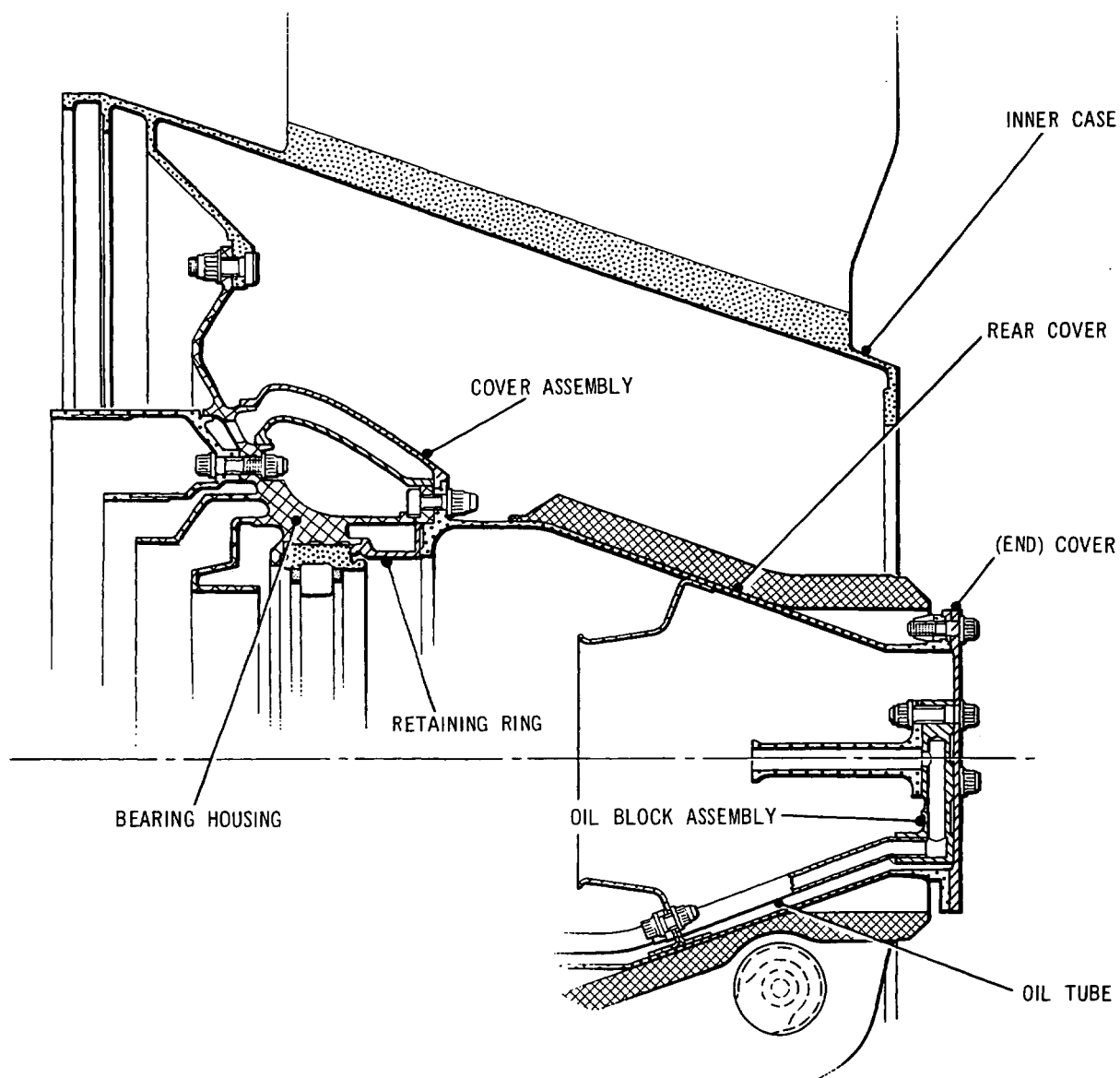
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 32154/00B



Assembling Rear Cover to Bearing Housing  
Figure 509

SUB-ASSEMBLY  
**72-53-00**

Page 524  
Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

- (4) Ensure that the locking wire attached to the seal housing rear bolt is clear of the flange, then slide the cover along the tube and engage it with the seal housing, ensuring that the bolt holes align and the clamp nut and bolt face the rear. Lubricate the two bolts (72-52-03/2-80) with lubricant 'C', then insert the bolts into the cover and screw them into the anchor nuts of the cover assembly. Torque-tighten the bolts to 100 lbf in. (11,5 N.m), then wire-lock to the rear bolt using the locking wire already attached. Torque-tighten the clamp nut and bolt to 100 lbf in. (11,5 N.m) ensuring that the locking (run-down) torque is not less than 3.5 lbf in. (0,4 N.m).

M. Assemble the Bearing and Rear Cover Assembly to the Bearing Housing (Ref.Fig.509).

- (1) Slide the LP turbine bearing outer race/rollers (72-52-03/2-140) into the bearing housing locating the bearing dogs into the slots in the housing. Offer the retaining ring (72-52-03/2-220) whose clamping dimension was previously determined in 72-52-03 Assembly, to abut the bearing with its smaller diameter entering first, then align a cutaway in the retaining ring with the oil passage hole at the No.6 vane position in the bearing housing.
- (2) Apply jointing compound 'C' or 'D' thinly to the front face of the rear cover (72-52-03/1-160). Locate the rear cover front face over the securing bolts of the bearing housing with the locating pin on the housing aligned with the hole in the cover flange, and ensure by viewing into the cover that the oil tube enters the oil hole in the bearing housing. Ensure that the rear cover flange locates correctly within the cover assembly rear flange and abuts the bearing housing, if necessary, by using a light alloy drift and hammer. Apply lubricant 'A' to the nuts (72-52-03/1-170) screw the nuts onto the bolts, then using the cranked ring wrench (Tool 1584), torque-tighten the nuts to 100 lbf in. (11,5 N.m), ensuring that the locking (run-down) torque is not less than 3.5 lbf in. (0,4 N.m).

SUB-ASSEMBLY

72-53-00

Page 525

Dec 31/01





# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (3) Apply lubricant 'C' to the 12 securing bolts (72-52-03/1-60) and apply jointing compound 'C' or 'D' thinly to the flange face of the (end) cover. Assemble the (end) cover to the rear cover locating the oil block assembly over the oil tube assembly and the (end) cover locating pin hole over the locating pin. Ensure that the end cover abuts the rear cover flange, then insert the securing bolts into the (end) cover and screw them into the captive nuts. Torque-tighten the bolts to 100 lbf in. (11,5 N.m) using the cranked ring wrench (Tool 1584), ensuring that the locking (run-down) torque is not less than 3.5 lbf in. (0,4 N.m).

NOTE: The (end) cover is removed at final build for setting up the actuator arm, but the torque-tightening of the bolts at this stage enables the oil pressure test to be carried out.

- N. Assemble the Oil Scavenge Tube Assembly to No.5 vane Position (Ref.Fig.507).

NOTE: If seal housing and tube are new items ensure that housing and tube are both to the same service bulletin standard, then trial assemble the housing over the tube to ensure that the housing slides easily over the mating part at the outside end of the tube.

- (1) On engines to pre SB.72-8588-218 standard ensure that the tube meets the requirements of SB.72-/119.
- (2) Place the union nut (1-320) seal housing (1-340) and gasket (1-375) over the threaded end of the tube.
- (3) Apply lubricant 'A' to the tube threads.

SUB-ASSEMBLY

## 72-53-00

Page 526

Dec 31/01



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (4) Insert the tube into the rear hole in the outer case in line with No.5 vane and if tube ends are marked 'REAR' or have a machined flat, ensure that these markings remain facing rearward when guiding the tube through the vane.

NOTE: Dependent on Service Bulletin standard, tube ends will be either unmarked, marked 'REAR' at both ends, or 'REAR' at the inner end with a machined flat at the outer end.

- (5) Engage the ferrule of the rear cover sump pipe (72-52-03/1-210) and at the same time locate the gasket and the seal housing at the other end of the tube over the three bolts protruding through the outer case.
- (6) Screw the sump pipe union nut onto the tube but do not tighten at this stage.
- (7) With lubricant 'C' applied, screw the three nuts (1-350) onto the outer case bolts and torque-tighten to 100 lbf in. (11,5 N.m). Ensure the locking (run-down) torque is not less than 3.5 lbf in. (0,4 N.m).
- (8) Establish the tightening force to be applied that will result in a tightening torque of between 310 and 340 lbf in. (35 and 38 N.m) at the nut. Position the spanner and torque wrench (Tool 872) on the torque adapter (Tool 322) to the checking fixture with the same angle and manner of application as to be used on the nut, note the load applied on the torque wrench that gives the required nut torque-tightening.
- (9) On engines to SB.72-101, 72-8440-194, 72-8588-218 or 72-8790-306 standard, position the tube in the vane (Ref.Fig.510).

CAUTION: POSITION TUBE STRICTLY AS SHOWN WITH 'REAR' MARKINGS OR MACHINED FLAT FACING REARWARD. HEAVY FRETTING COULD OCCUR ON TUBES THAT ARE INCORRECTLY POSITIONED.

SUB-ASSEMBLY

72-53-00

Page 526A

Dec 31/01



OLYMPUS 593

MK.610-14-28

OVERHAUL



This page left blank intentionally



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (a) Turn the tube so that its bend contacts the inner edge of the vane convex face and verify that the 'REAR' markings or machined flat (if incorporated on the tube ends) remain facing rearward.

NOTE: Tubes to SB.72-101, 72-8440-194, 72-8588-218 and 72-8790-306 standard are bent whereas tubes to pre SB.72-101 are straight and run centrally through the vane.

- (10) Retain the tube in position with open ended wrench (Tool 906) engaged with the flats at the inner end of the tube and with the torque wrench (Tool 872) apply the predetermined torque load required to tighten the nut to between 310 and 340 lbf in. (35,0 and 38,4 N.m).

- (11) Wire-lock the union nut to the tube.

- (12) Blank off the external end of the tube.

### 3. Pressure Test and Oil Flow Check the LP Turbine Bearing Support

#### A. Description of the Oil Supply Equipment.

- (1) A mobile oil pressure test rig (Tool 1926), associated pipes (Tool 3073), and a flow check unit (Tool 3074) will be required, or if not available, a test rig that contains, and is capable of producing the following facilities will be required.

SUB-ASSEMBLY

**72-53-00**

Page 527.

Dec 1/83



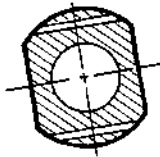
OLYMPUS 593

MK.610-14-28

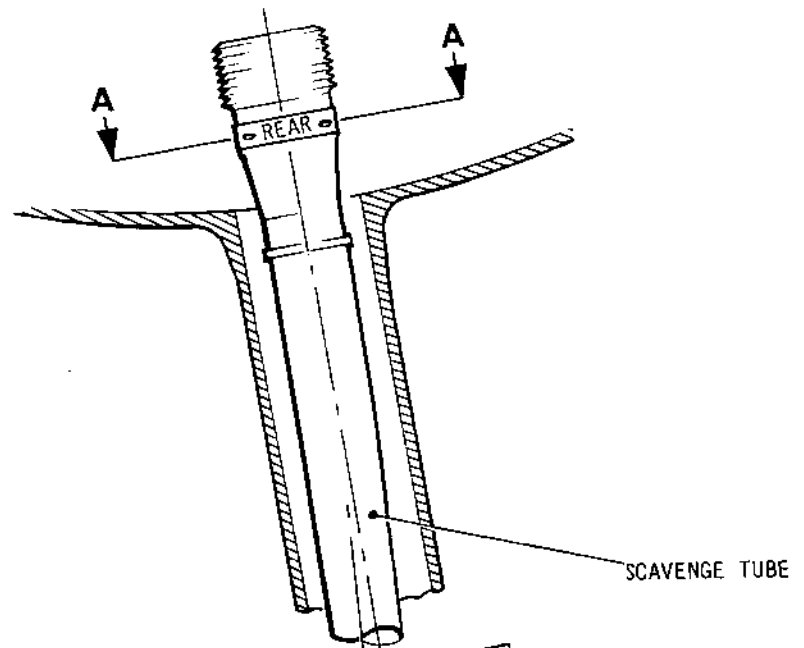
OVERHAUL



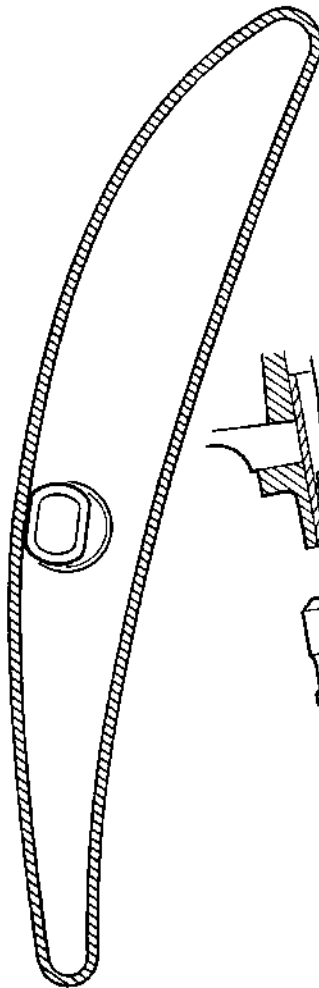
CR 35075/00C



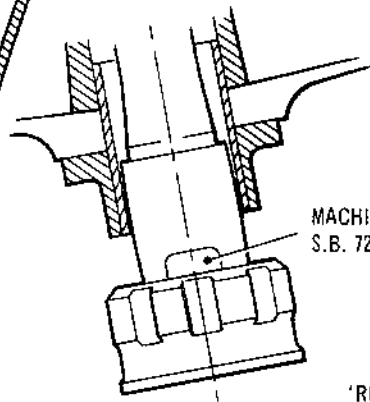
SECTION A-A



SCAVENGE TUBE



SECTION B-B

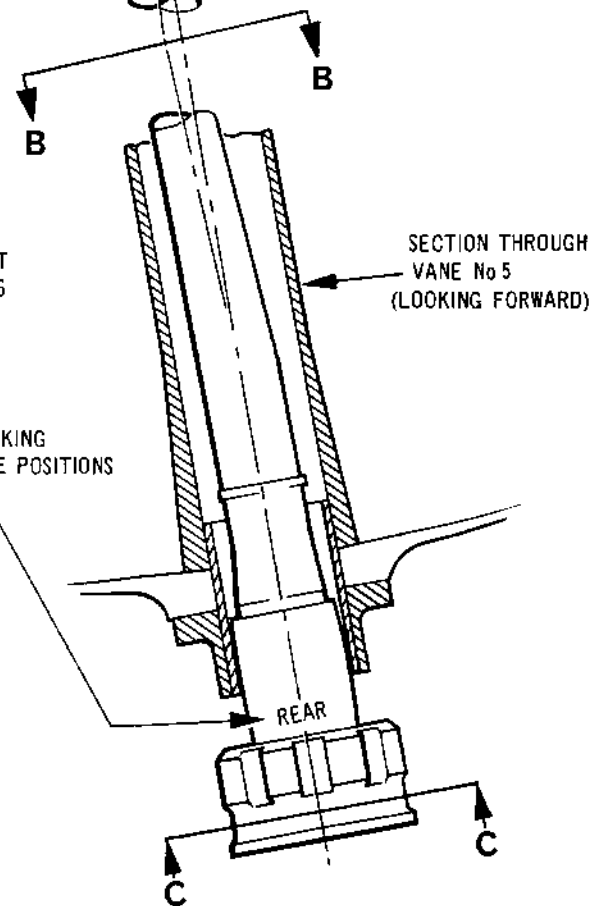


MACHINED FLAT  
S.B. 72-8790-306

'REAR' MARKING  
ALTERNATIVE POSITIONS



SECTION C-C



SECTION THROUGH  
VANE No 5  
(LOOKING FORWARD)

Scavenge Tube Positioned in Vane  
Figure 510

SUB-ASSEMBLY

72-53-00

Page 528

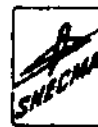
Dec 1/83



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (a) An oil heater capable of heating the oil in excess of 120 deg C and a temperature gauge capable of registering the temperature.
- (b) A pump capable of flowing 85 gal/h (Imp.) (368 l/h) of oil at a pressure of 50 psi (345 kPa), and a means of checking the rate of flow.
- (c) A pressure control valve, flow and return connections and stop valves.
- (d) A method to prevent the spread of hot oil noxious fumes into the work area.

B. Assemble the Pressure Test Equipment to the Turbine Exhaust Diffuser (Ref.Fig.512).

- (1) Assemble the pressure test blank to the bearing housing (Ref.Fig.512).

NOTE: Two alternative blanks are available, and two standards of support, with and without a bolting flange. The procedure for using blank (Tool 295) is detailed in para.(a), (c) and (d), and for blank (Tool 1958) in para.(b), (c) and (e).

- (a) Check that the sealing ring assembled between the two pads of blank (Tool 295) is in a serviceable condition (70-80 Shore hardness rubber ring, 0.250 in. (6,35 mm) diameter cross section, 5 in. (127 mm) inside diameter). Slacken the three nuts, then insert the blank into the inner (No.30) labyrinth in the front of the bearing housing.
- (b) Check that the sealing ring assembled in the recess of blank (Tool 1958) is in a serviceable condition (Standard O-seal, FBS-68-E7-8-9). Insert the blank into the inner (No.30) labyrinth in the front of the bearing housing so that the sealing ring abuts the front face of the labyrinth.
- (c) Assemble the pressure test blank support (Tool 296) to the mounting plate, screwing the two captive bolts into the two tapped holes near the cutaways on the mounting plate.

SUB-ASSEMBLY

72-53-00

Page 529

Jun 1/78

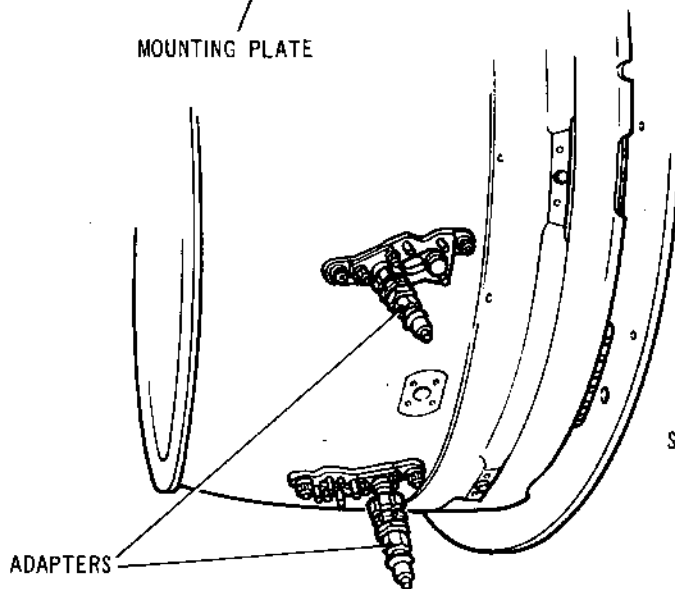
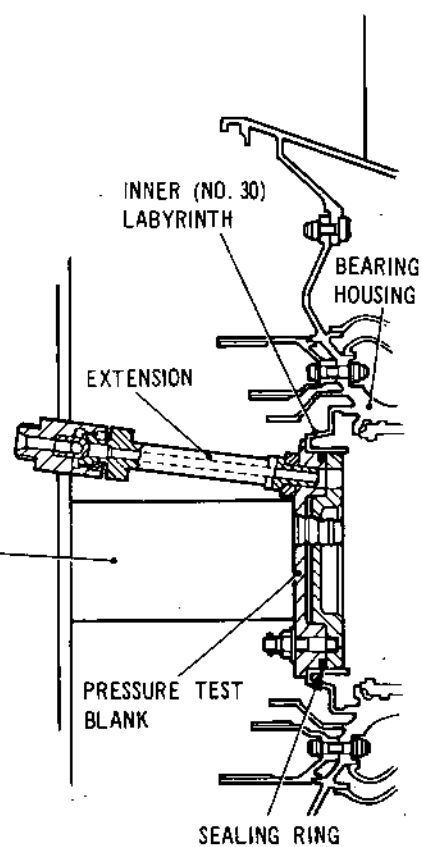
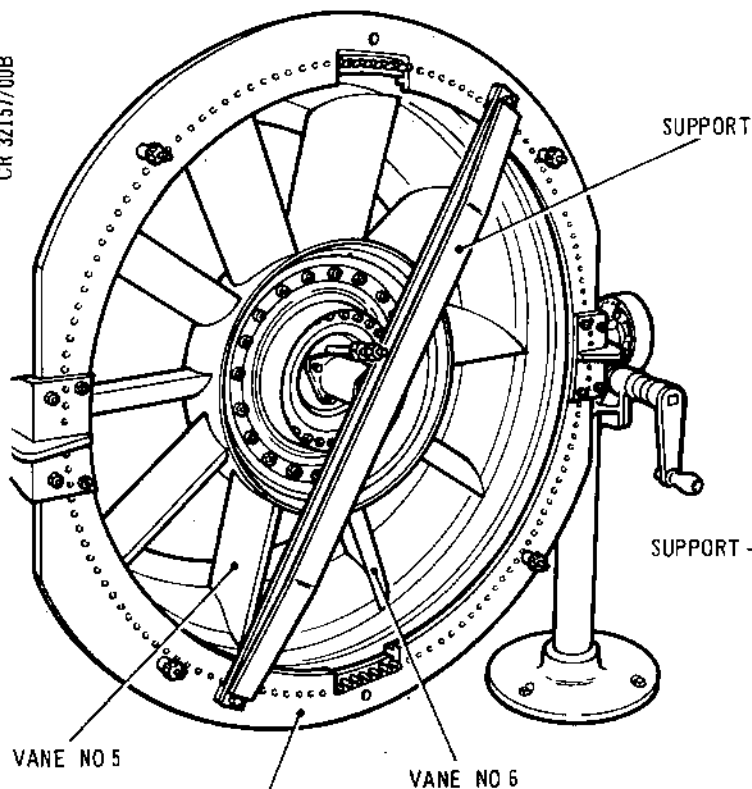


OLYMPUS 593

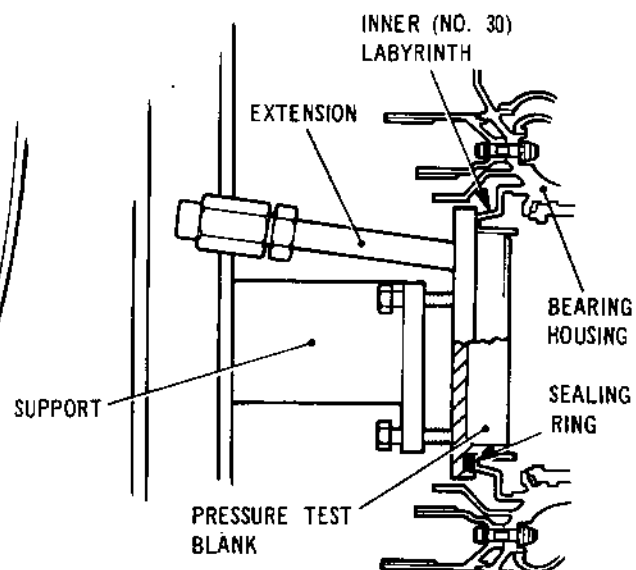
MK. 610-14-28  
OVERHAUL



CR 32157/00B



ADAPTERS AT VANE NO 5 AND 6



SECTIONS THROUGH BEARING ASSEMBLY  
SHOWING ALTERNATIVE BLANKS AND SUPPORTS

Assembling Oil Pressure Test Equipment  
Figure 512

SUB-ASSEMBLY  
**72-53-00**  
Page 530  
Aug 1/76

IN 4773



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (d) Withdraw the blank (Tool 295) until it rests against the central stop of the support, or against the three bolts of the flanged support. Rotate the blank until the extension tube is uppermost, then tighten the three nuts of the blank to expand the seal against the labyrinth. Ensure that the three bolts of the flanged blank are set to hold the blank squarely within the labyrinth with the seal adequately engaged.
- (e) Rotate the blank (Tool 1958) so that the extension pipe is uppermost, then tighten the three bolts of the flanged support to compress the blank seal against the front face of the labyrinth.

NOTE: The support without a bolted flange cannot be used with the blank (Tool 1958).

NOTE: It is essential that no leak occurs from the blank, otherwise it will drain into the space between the labyrinth and into the cold vent tubing, giving the false indication that the bearing housing is defective and leaking. It is suggested that a sheet of blotting paper (or similar absorbent material, the marking of which is readily noticeable), be inserted between the labyrinths under the blank and examined for evidence of leaks from the blank during the pressure testing.

- (2) Remove the blanks from the oil pressure tube in No.6 vane and the oil scavenge (rear) tube in No.5 vane, screw an adapter (Tool 703) into each tube, and tighten the tube union nuts using a crowfoot wrench (Tool 1534).
- (3) Connect the test rig delivery pipe to the adapter or tube in No.6 vane, then connect the return pipe to the adapter or (rear) tube in No.5 vane. Ensure that the connections are tightened fully.





OLYMPUS 593

MK.610-14-28  
OVERHAUL



C. Pressure Test the LP Turbine Bearing Support.

- (1) Connect the test rig to the mains power supply, then switch on the rig heater and allow the oil to heat to 120 deg C.
- (2) Loosen the bleed connection on the extension tube of the blank, and position a suitable container to ensure that oil from the bleed will not run down the extension tube onto the bearing housing.
- (3) With the return stop valve open, flow oil through the assembly. When the oil flowing from the bleed is free of air, close the bleed and continue flowing oil until the assembly has warmed to the required oil temperature of 120 deg C.
- (4) Close the stop valve in the return line and set the pressure to 10 psig (69 kPa). Check that there is no leak from the pressure test blank, by examining for witness on the paper (if used), and rectify if necessary. Maintain the pressure at 10 psig (69 kPa) for 30 minutes, occasionally opening the stop valve in the return line to circulate hot oil to maintain the assembly at not less than 80 deg C.

NOTE: The period of 30 minutes is necessary to ensure that any defect in the bearing housing will develop into a leak from the cold air vent in No.5 vane.

- (5) During the (30 min) period of the pressure test, check for evidence of oil leaks. These could be external leaks from the oil tubes, the bolted flanges at either end of the rear cover (or from the actuating arm shaft), or internal leaks which will appear as oil between the labyrinths or at the outlet from the cold air vent tube at No.5 vane. No leakage is permitted, but slight seepage is allowed (see NOTE). If no leaks occur after 30 minutes, proceed with the oil flow check (Ref. para.E). If oil leaks are evident, shut down the rig and release the pressure, then rectify the defect (Ref. para.D).

NOTE: An oil leak is considered as drops or globules of oil forming within 15 min. of the assembly being subjected to the test pressure, and a seepage is considered a dampness that does not form a droplet or globule until the assembly has been subjected to the test pressure for more than 15 min.

TN18974

SUB-ASSEMBLY

**72-53-00**

Page 532  
Aug 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



D. Rectification of Pressure Test Oil Leakage.

- (1) If leakage occurs from the actuating arm shaft (Ref. Fig.514) proceed as follows:
  - (a) On engines to pre SB.76-2 standard, torque-tighten the nut on the actuating arm shaft to its top limit value of 145 lbf in. (16,4 N.m). On engines to SB.76-2 standard, remove the split pin and torque-tighten the nut to 130 lbf in. (14,7 N.m), further tighten to align the castellated nut with the split pin hole and assemble a new split pin. Repeat the pressure test to check if the leak is still present.
  - (b) If the shaft nut was already fully tightened, or leakage persists after tightening, disconnect the rig return pipe from the adapter or oil scavenge tube and allow the oil to drain from the rear cover (into a container), opening the bleed on the blank extension to allow air to enter.
  - (c) If the leakage is only from the shaft retaining nut side of the sump, support the shaft, then unscrew and remove the nut having removed the split pin on engines to SB.76-2 standard. Withdraw the retainer and seal, then assemble a new (serviceable) seal to the retainer and assemble them into the cover and onto the shaft ensuring that the seal locates correctly in the groove in the sump. On engines to pre SB.76-2 standard, screw the nut onto the shaft, having applied lubricant 'B', then torque-tighten the nut between 135 and 145 lbf in. (15,3 and 16,4 N.m) ensuring that the locking (run-down) torque is not less than 6.5 lbf in. (0,7 N.m). On engines to SB.76-2 standard, screw the nut onto the bolt, having applied lubricant 'B', then torque-tighten the nut between 120 and 130 lbf in. (13,6 and 14,7 N.m). Further tighten the nut to align the castellations with the split pin hole, then lock the nut with a split pin (76-21-02/1A-500).



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (d) If the leakage occurs from both sides, or from the actuating arm side, proceed as follows:
- (i) Release and remove the (end) cover. Supporting the actuating arm, release and remove the shaft nut, remove the retainer and seal from one side and the shaft and seal from the other side and in addition, the bolt if SB.76-2 (Part 1) is embodied, or the bolt and sleeve if SB.76-2 (Part 2) is embodied. Discard the leaking seal or seals.
  - (ii) Offer the shaft, with a serviceable seal assembled, into the sump and engage it with the arm, aligning the master splines. Locate the seal in the sump groove with the shaft holding it in place, then assemble the retainer to hold a serviceable seal in the groove on the other side of the sump. On engines to pre SB.76-2 standard, screw the nut onto the shaft, having applied lubricant 'B', then torque-tighten between 135 and 145 lbf in. (15,3 and 16,4 N.m) ensuring that the locking (run-down) torque is not less than 6.5 lbf in. (0,7 N.m). On engines to SB.76-2 standard enter the bolt through the shaft if Part 1 is embodied, or through the sleeve and shaft if Part 2 is embodied, then screw the castellated nut onto the bolt having applied lubricant 'B'. Torque-tighten the nut between 120 and 130 lbf in. (13,6 and 14,7 N.m), then further tighten the nut if necessary to align it with the split pin hole. Lock the nut with a split pin.
  - (iii) Using sealing compound 'C', assemble the (end) cover to the rear cover, locating the oil block assembly over the oil tube assembly in the rear cover, and the locating pin in its hole in the (end) cover. Ensure that the end cover abuts the rear cover flange, then with lubricant 'C' applied, secure with the 12 bolts (72-52-03/1-60). Torque-tighten the bolts to 100 lbf in. (11,5 N.m), ensuring that the locking (run-down) torque is not less than 3.5 lbf in. (0,4 N.m).

SUB-ASSEMBLY

## 72-53-00

Page 534

Dec 31/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (e) Having replaced the seal(s), connect the test rig return line to the adapter or oil scavenge tube, then repeat the pressure test procedure of para.C.
- (2) Leakage may occur from the flanged joints at the forward or rear end of the rear cover. At the forward end this may result in oil witness at the flange, or as oil in the spaces between No.27, 28 or 29 labyrinths. At the rear end, leakage will appear as an oil witness at the flange. After draining the assembly (Ref. para.(1)(b)), disassemble to uncover the leaking joint, remove the sealing compound 'C', then clean and examine both sealing faces. If clear of damage, remake the joint, reassemble (Ref. para.2.M), and retest. If leakage persists, repeat the disassembly procedure, and check the flange faces for flatness. Rectify or replace faulty components, reassemble and retest.
- (3) Leakage from the oil scavenge tube joint may be detected by examining the tube close to the rear cover. To rectify leakage from the scavenge oil tube joint, drain the oil from the bearing housing (Ref. para.(1)(b)), remove the tube, clean and examine the sealing faces, then reassemble the tube. Repeat the pressure test.
- (4) Leakage from the cold air vent tube may be due to a leak from the blank into the space between No.29 and 30 labyrinths, a leak at the oil pressure feed tube/bearing housing joint, or a faulty bearing housing.
- (a) To determine whether the blank is leaking, drain the oil from the housing (Ref. para.(1)(b)), remove the blank and vent tube, dry the items and between the labyrinths and reassemble the blank. Repeat the pressure test, ensuring that spillage does not drain into the space between No.29 and 30 labyrinths.

PRINTED IN ENGLAND

TN21468

SUB-ASSEMBLY

**72-53-00**

Page 535  
Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) To determine whether the leak originates at the oil pressure tube joint, drain the oil from the bearing housing assembly (Ref. para. (1)(b)). Remove the blankets (72-52-03/2-43, 47), if the assembly is to SB.72-20 standard, by cutting and removing the wire-locking on the upper locations only and folding the blankets open using the lower wire-locking as a hinge. Loosen the clamp bolt, remove the two bolts (72-52-03/2-80), and slide the seal housing back along the tube. If oil is present in the seal housing, unscrew the barrel nut, release the three nuts (2-50) at the outer case, and withdraw the oil tube. Clean and examine the sealing face of the tube, then reassemble (Ref. para. 2.K) and repeat the pressure test.
- (c) If leakage from the cold vent tube is still present, in situ rectification is not possible as the LP turbine bearing housing is faulty and must be changed as follows:
- (i) Drain the oil from the housing (Ref. para. (1)(b)).
  - (ii) Disconnect the test rig from the diffuser and remove the blank (Ref. para. G).
  - (iii) With reference to the appropriate para., remove the LP turbine bearing support from the turbine exhaust diffuser (Ref. 72-53-00 Disassembly).
  - (iv) Disassemble the LP turbine bearing support (Ref. 72-52-03 Disassembly).
  - (v) Assemble the LP turbine bearing support (Ref. 72-52-03 Assembly), using a replacement bearing housing.
  - (vi) Assemble the items of the LP turbine bearing support to the turbine exhaust diffuser in accordance with the appropriate parts in this Chapter.
  - (vii) On completion of the assembly to the stage required, carry out an oil pressure test.

TN21469



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (5) Having carried out the appropriate rectification and achieved a satisfactory oil pressure test with no leaks, carry out a flow check.

E. Flow Check the LP Turbine Bearing Support.

- (1) With the test rig delivery and return pipes connected to the diffuser oil scavenge and pressure tubes, and the oil at a temperature of 120 deg C., open the stop valves in the delivery and return lines and circulate the oil through the bearing housing assembly at 48 psi (330 kPa) delivery pressure for (approx.) 15 min.
- (2) Disconnect the rig return pipe at the rig, and collect the return oil for an accurately timed period of one min. in a suitable (measuring) container. Reconnect the return pipe to the rig, then shut down the rig and release the pressure.

NOTE: The disconnection of the return pipe may be made at the adapter or oil tube if it is not convenient to disconnect at the test rig, which is quoted because of the convenience of collecting spillage during the disconnection.

- (3) Check the quantity of oil collected in the container. The oil flow must be between 53 and 63 gal/h (Imp.) (241 and 287 l/h) on engines to pre SB.72-40 standard, or between 73 and 83 gal/h (Imp.) (332 and 377 l/h) on engines to SB.72-40 standard. If the oil flow is incorrect, carry out a further oil flow check and ensure that the oil is at a temperature of 120 deg C. and that the delivery pressure is 48 psi (330 kPa). If the oil flow is still incorrect, refer to para.F.

F. Rectification of Incorrect Oil Flow.

- (1) If the oil flow is incorrect, check that the rear cover oil tube jet is the correct size for the SB. standard incorporated, then check the bearing housing jet holes (Ref.para.(2)).
  - (a) Disconnect the rig return pipe from the adapter or oil scavenge tube, and allow the oil to drain from the rear cover (into a container), opening the blank bleed to admit air.

SUB-ASSEMBLY

72-53-00

Page 537

Aug 1/76



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

- (b) Release and disconnect the oil scavenge tube in No.5 vane from the sump of the rear cover.
  - (c) Unscrew and remove the nuts securing the rear cover, using the cranked ring wrench (Tool 1584), then withdraw the cover from the bearing housing, lightly tapping the edge of the rear cover rear flange (if necessary) to release the cover.
  - (d) Withdraw the bearing retaining ring and bearing from the bearing housing.
  - (e) Check the jet size of the oil tube in the rear cover. On engines to pre SB.72-40 standard, the diameter should be 0.077 to 0.079 in. (1,96 to 2,01 mm), and on engines to SB.72-40 standard, the diameter should be 0.104 to 0.106 in. (2,64 to 2,69 mm). If incorrect, remove the two retaining nuts and bolts and withdraw the oil tube, then release and remove the (end) cover. Insert a serviceable new oil tube (72-52-03/1-120) and secure with two bolts and nuts (72-52-03/1-140 and 130) lubricated with lubricant 'A', then torque-tighten to 100 lbf in. (11,5 N.m) ensuring that the locking (run-down) torque is not less than 3.5 lbf in. (0,4 N.m).
- (2) Having checked the jet size in the rear cover oil tube, check that the size of the jet holes in the bearing housing are correct for the SB. standard incorporated (Ref. SB.72-40).
- (a) Withdraw the bearing retaining ring and bearing from the bearing housing.
  - (b) Check the size of the two jet holes into the bearing bore. The diameter of the forward hole should be 0.072 to 0.074 in. (1,83 to 1,88 mm) and the rearward hole 0.125 to 0.127 in. (3,18 to 3,23 mm).
  - (c) Disconnect the test rig delivery pipe from the diffuser, then release and withdraw the oil feed tube assembly (Ref. para.D.(4)(b)).

SUB-ASSEMBLY

## 72-53-00

Page 538

Dec 31/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (d) Check the size of the jet hole from the feed tube. On engines to pre SB.72-40 standard, the diameter should be 0.085 to 0.087 in. (2,16 to 2,21 mm), and on engines to SB.72-40 standard, the diameter should be 0.097 to 0.099 in. (2,46 to 2,51 mm).
  - (e) If the jet sizes are correct, reassemble the items to the diffuser (Ref.para.(4)). If incorrect, disassemble the bearing housing (Ref.para.(3)).
- (3) If the jet sizes in the bearing housing are incorrect, assemble a replacement bearing housing as follows, ensuring that it is to the same SB. standard as the rear cover oil tube (Ref.SB.72-40).
- (a) Remove the tubes and ducts, then the LP turbine bearing support from the turbine exhaust diffuser (Ref.72-53-00 Disassembly).
  - (b) Disassemble the LP bearing support (Ref. 72-52-03 Disassembly).
  - (c) Assemble the LP bearing support using a replacement bearing housing (Ref.72-52-03 Assembly).
  - (d) Assemble the LP bearing support, and the tubes and ducts through the vanes (Ref.para.2.H.J.K. and L.).
- (4) Having ensured that the oil jets are the correct size, assemble the items to the exhaust diffuser (Ref.para.2.M. and N.). Reassemble the pressure test equipment (Ref.para.3.B.) and repeat the pressure test and flow check.

G. Remove the Pressure Test Equipment.

- (1) On completion of a satisfactory pressure test and flow check, remove the pressure test equipment.

SUB-ASSEMBLY  
**72-53-00**

Page 539  
Aug 1/76





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (a) Ensure that the heater is turned off, the oil pressure released and the rig turned off. Disconnect the test rig from the mains power supply and stow the cable on the test rig.
- (b) Open the air bleed on the blank, disconnect the test rig delivery and return pipes from the adapters or the oil tubes, and collect the oil drainage in a clean container returning it to the test rig. Stow the oil pipes on the test rig.
- (c) Unscrew and remove the adapters (if used) from the oil pressure and scavenge tubes using the crow-foot wrench (Tool 1534).
- (d) Release and remove the test blank support from the mounting plate. Release the nuts and withdraw the blank from the labyrinth, or release the three bolts on the test blank support, then release and remove the test blank support from the mounting flange and remove the blank. Turn the stand mounting plate to the horizontal position.

H. Assemble Insulation Blankets (Ref.Fig.513).

NOTE: This paragraph applies only if engine incorporates SB.72-20.

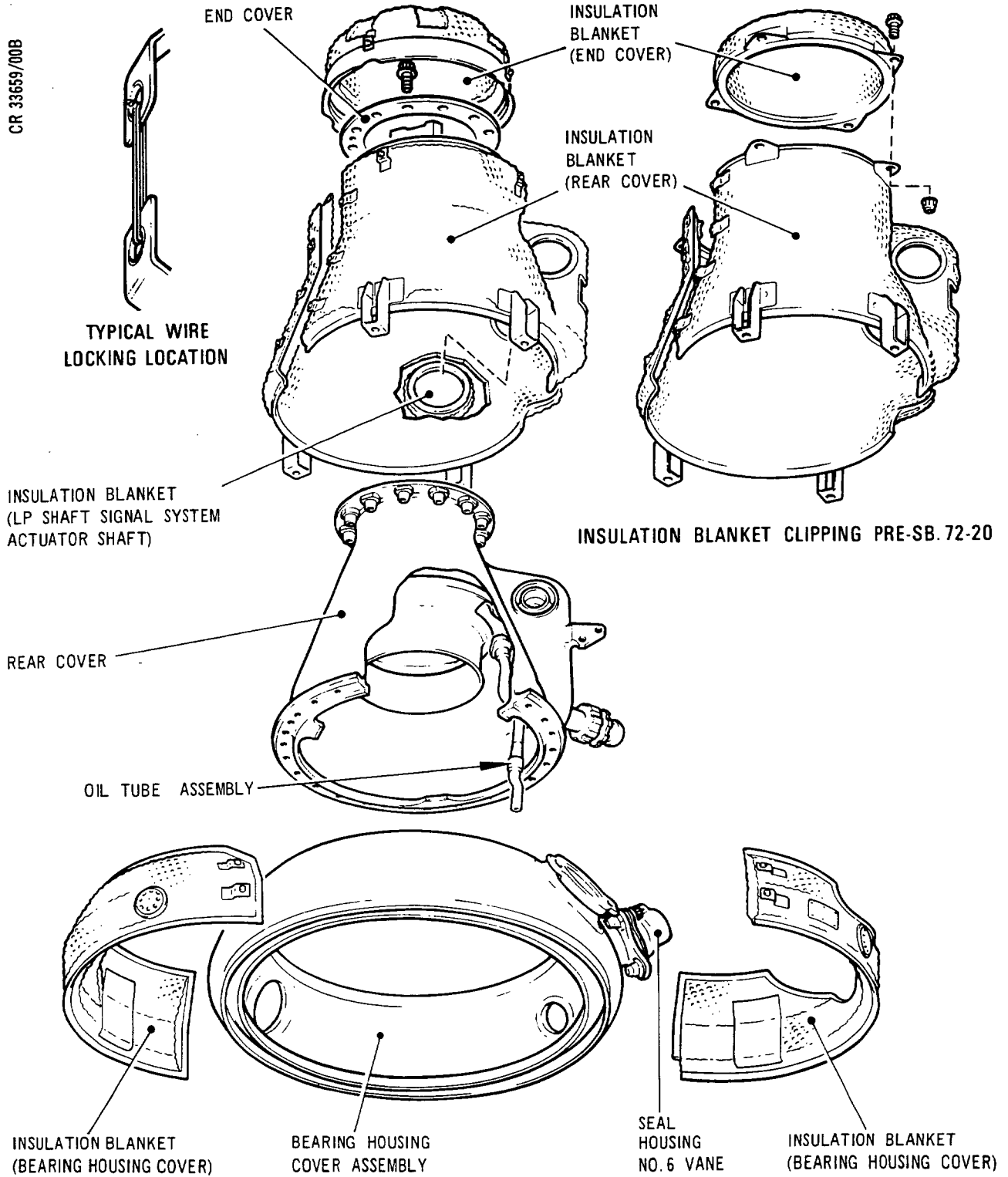
- (1) Assemble the insulation blanket (72-52-03/1A-32) to the socket in the right-hand insulation blanket (72-52-03/50-B) to cover the nut end of the LP shaft signal actuating arm. Wire-lock the two blankets together at the two eyelet positions.
- (2) Assemble the insulation blankets (72-52-03/1A-36 and 38) over the forward flange of the rear cover, and wire-lock at the four eyelet positions.

TN35518

CR 33659/00B



**OLYMPUS 593**  
MK.610-14-28  
OVERHAUL



Assembling Insulation Blankets  
Figure 513

SUB-ASSEMBLY  
**72-53-00**



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

#### 4. Assemble Items to the Turbine Exhaust Diffuser

##### A. Install LP Shaft Signal System Rear Cable, Rear Block and Support Bracket (Ref. Fig.514).

- (1) Immerse the rear cable (76-21-02/1-150B) in lubricant T, allow to soak, then drip dry.
- (2) Apply a thin film of jointing compound A to both surfaces of the gasket (76-21-02/1-55B).
- (3) Assemble the gasket, followed by the rear mounting bracket (76-21-02/1-45) over the shoulder pins and bolts protruding from the exhaust diffuser outer case at vane No.6.
- (4) Retain the bracket and gasket with five nuts (72-53-00/4-200) with lubricant 'C' applied. Torque-tighten the nuts to 100 lbf in. (11,5 N.m).
- (5) Feed the rear cable through the large hole in the rear of the bracket then connect the cable end to the actuator arm shaft with the shoulder pin, flat washer and split pin (76-21-02/1-140, 130, 120). Bend the split pin legs.
- (6) Assemble the split guide bush.
  - (a) Pre-SB.0L.593-76-9043-72. Assemble the split guide bush (76-21-01/2-580) to its location in the rear bracket.
  - (b) SB.0L.593-76-9043-72. Ensure the locating pin is installed in the rear bracket and assemble the split guide bush (76-21-01/2-580B) to its location in the rear bracket. Install the retaining plate (76-21-02/1-56A) and the attachment bolt.
- (7) Apply lubricant G liberally by brush to the length of rear cable where it is in contact with the rear block and guide bush.
- (8) Temporarily assemble the rear block (76-21-01/2-570) to the right-hand side (looking forward) of the rear support bracket and retain it with two nuts and bolts (76-21-02/1-20, 30B) with lubricant B applied. Lightly tighten the nuts.

SUB-ASSEMBLY

**72-53-00**

Page 542  
Dec 31/01

CR 32158/00E  
BS00000189/1

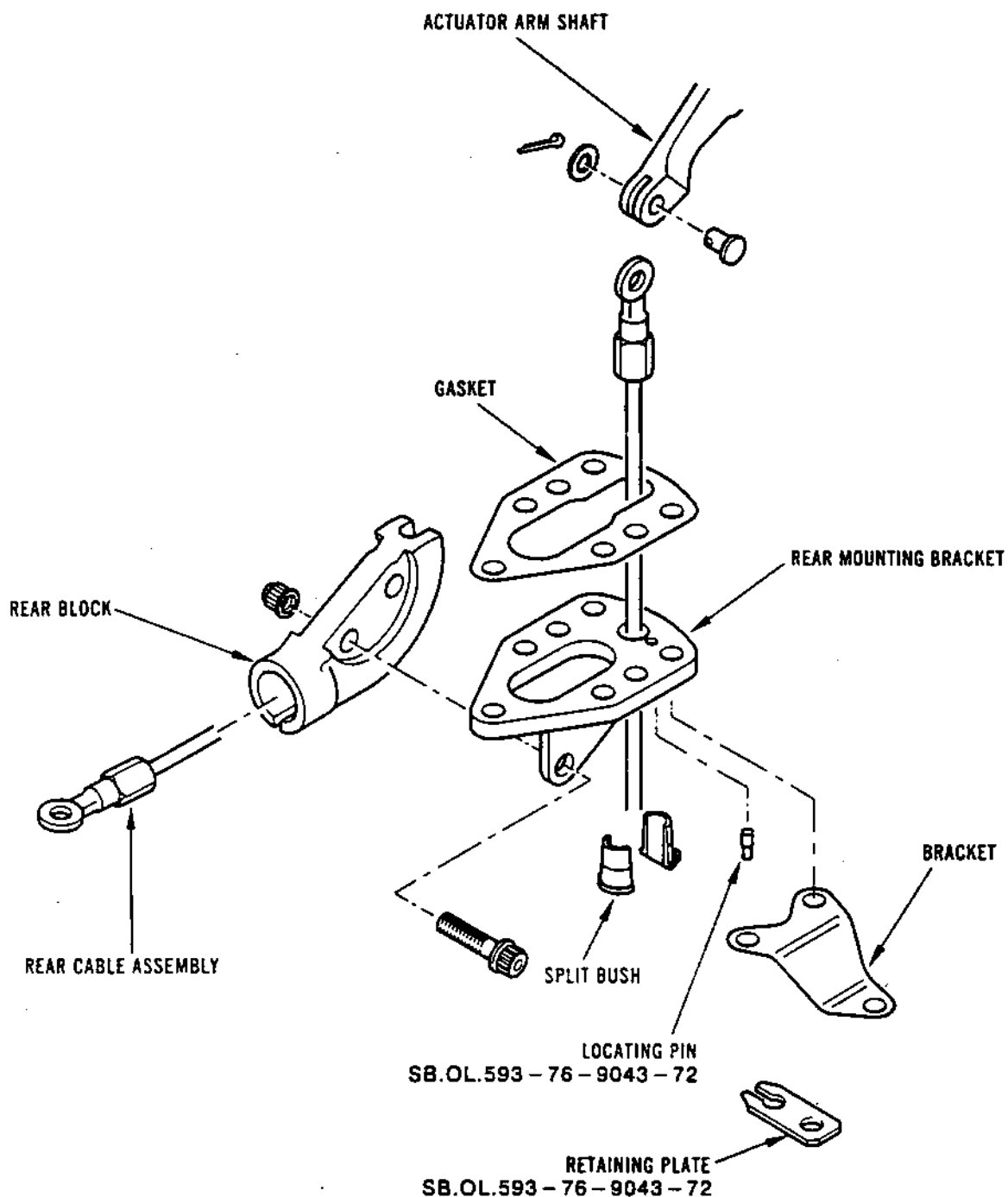


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



LP Shaft Signal System Rear Cable Installation Details  
Figure 514



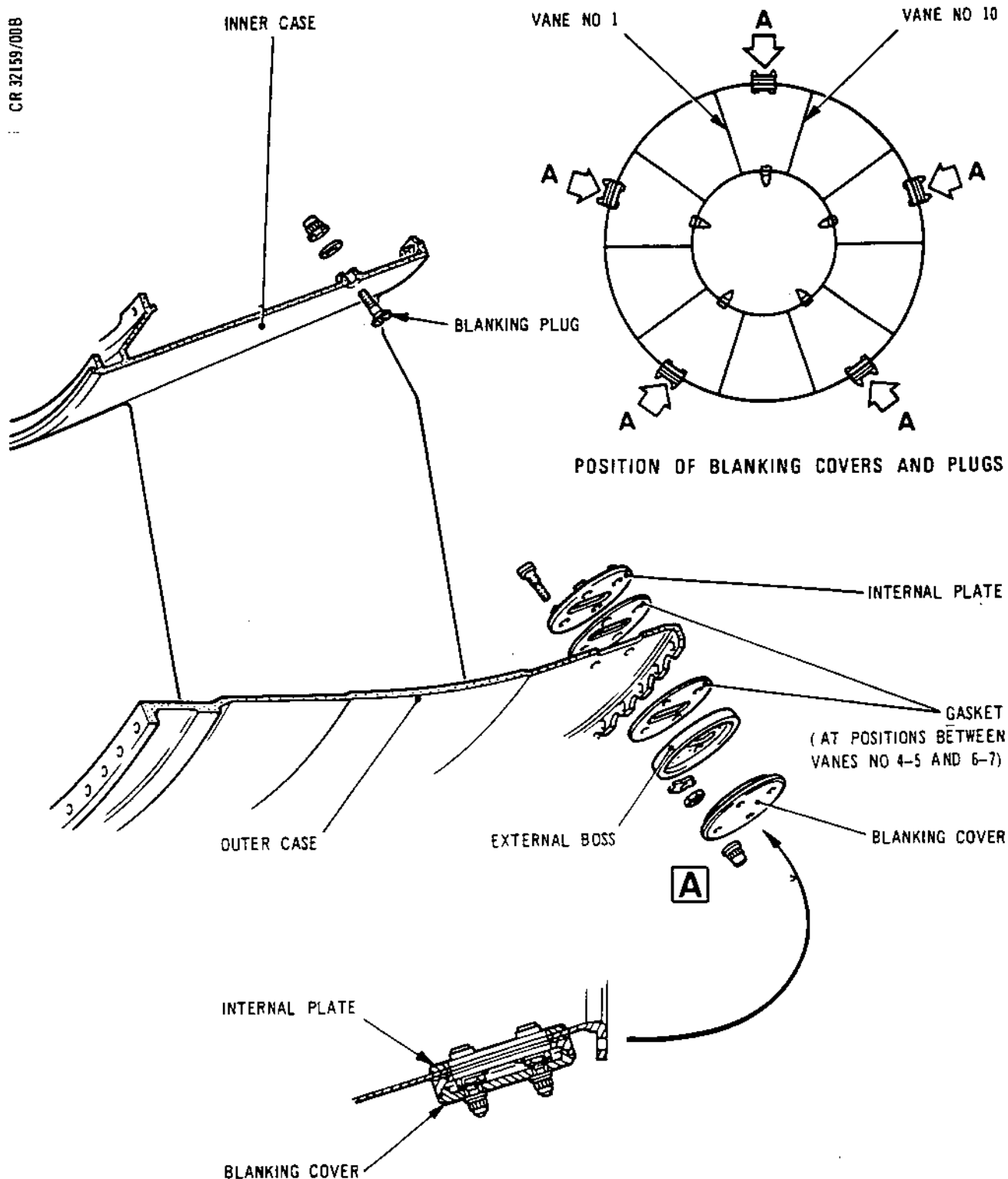
# OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 32159/00B



Positioning Blanks and Plugs on Inner and Outer Cases  
(Pre SB.72-31 Standard)  
Figure 515

SUB-ASSEMBLY  
**72-53-00**  
Page 544  
Aug 1/76



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- B. Assemble Blanking Covers and Plugs to the Inner and Outer Cases (Ref.Fig.515).

NOTE: Para.B. is only applicable to engines to pre SB.72-31 standard.

- (1) Position a gasket (4-130) and an internal plate on the inside face of the outer case surrounding the aperture between vanes No.6 and 7 ensuring that the bolt locking spigots of the plate are facing away from the case. Apply lubricant 'C' to the four bolts (4-110), and insert the bolts through the plate, assemble a gasket (4-130) and external boss to the bolts on the outside of the case, with the boss spigot facing away from the case, then assemble a keywasher (4-90) and plain nut (4-80) to each bolt.
- (2) Assemble an internal plate and gasket (4-130) to the inside of the case, and a gasket (4-130) and external boss to the outside of the case at the aperture between vanes No.4 and 5, and secure with four bolts (4-100), keywashers (4-90) and plain nuts (4-80).
- (3) Assemble an internal plate and external boss to each of the remaining three apertures and secure with bolts (4-100), keywashers (4-90) and plain nuts (4-80).



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (4) Torque-tighten the four plain nuts securing each plate to 100 lbf in. (11,5 N.m), then lock the nuts with the tabwashers.
- (5) Assemble a blanking cover (4-70) to each of the five external bosses, so that they locate in the boss spigots and on the bolts, then screw a locknut (4-50 or 4-60) on to each of the bolts. Torque-tighten the nuts to 100 lbf in. (11,5 N.m) ensuring that the locking (run-down) torque is not less than 3.5 lbf in. (0,4 N.m).
- (6) Lubricate the five blanking plugs (9-30) with lubricant 'B', then offer a plug into one of the holes in the inner case. From inside the case, assemble a flat washer (9-20) and nut (9-10) to the plug, then torque-tighten the plug between 60 and 65 lbf in. (6,8 and 7,3 N.m) ensuring that the locking (run-down) torque is not less than 3.5 lbf in. (0,4 N.m). Assemble the remaining four blanking plugs to the inner case in the same manner.

C. Assemble the Spherical Joint Flange to the Outer Case.

NOTE: The spherical joint flange and attachment items are under 72-54-01 and the I.P.C. references in this paragraph are from 72-54-01.

- (1) Ensure that the fuel drain pipe (plate) (6-10) is assembled to the rear bottom position of the spherical joint flange, and is secured to a bracket on the flange with a bolt (6-20) and washer (6-30), and that the bolt is wire-locked to a hole in the plate.
- (2) Raise the spherical joint flange either by hand or using a hoist and the lifting fixture (Tool 1965) bolted onto the bracket support and the opposite blanking positions (Ref.Fig.517). Align the locating pin hole in the front face of the spherical joint flange with the locating pin in the outer case rear flange (at the normal top position), then, with the mounting plate horizontal, assemble the joint flange to the outer case, engaging the locating pin in the joint flange with the locating pin hole and aligning the bolt holes using the set of four locating pins (Tool 700).

SUB-ASSEMBLY

## 72-53-00

Page 546

Dec 31/01



OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

- (4) Torque-tighten the four plain nuts securing each plate between 100 and 110 lbf in. (11,3 and 12,4 N.m), then lock the nuts with the tabwashers.
- (5) Assemble a blanking cover (4-70) to each of the five external bosses, so that they locate in the boss spigots and on the bolts, then screw a locknut (4-50 or 4-60) on to each of the bolts. Torque-tighten the nuts between 25 and 30 lbf in. (2,8 and 3,4 N.m) ensuring that the locking (run-down) torque is not less than 3.5 lbf in. (0,4 N.m).
- (6) Lubricate the five blanking plugs (9-30) with lubricant 'B', then offer a plug into one of the holes in the inner case. From inside the case, assemble a flat washer (9-20) and nut (9-10) to the plug, then torque-tighten the plug between 60 and 65 lbf in. (6,8 and 7,3 N.m) ensuring that the locking (run-down) torque is not less than 3.5 lbf in. (0,4 N.m). Assemble the remaining four blanking plugs to the inner case in the same manner.

D. Assemble the Spherical Joint Flange to the Outer Case.

NOTE: The spherical joint flange and attachment items are under 72-54-01 and the I.P.C. references in this paragraph are from 72-54-01.

- (1) Ensure that the fuel drain pipe (plate) (6-10) is assembled to the rear bottom position of the spherical joint flange, and is secured to a bracket on the flange with a bolt (6-20) and washer (6-30), and that the bolt is wire-locked to a hole in the plate.

SUB-ASSEMBLY  
**72-53-00**

Page 546 A  
Dec 1/86





OLYMPUS 593

MK.610-14-28  
OVERHAUL



This page left blank intentionally



# OLYMPUS 593

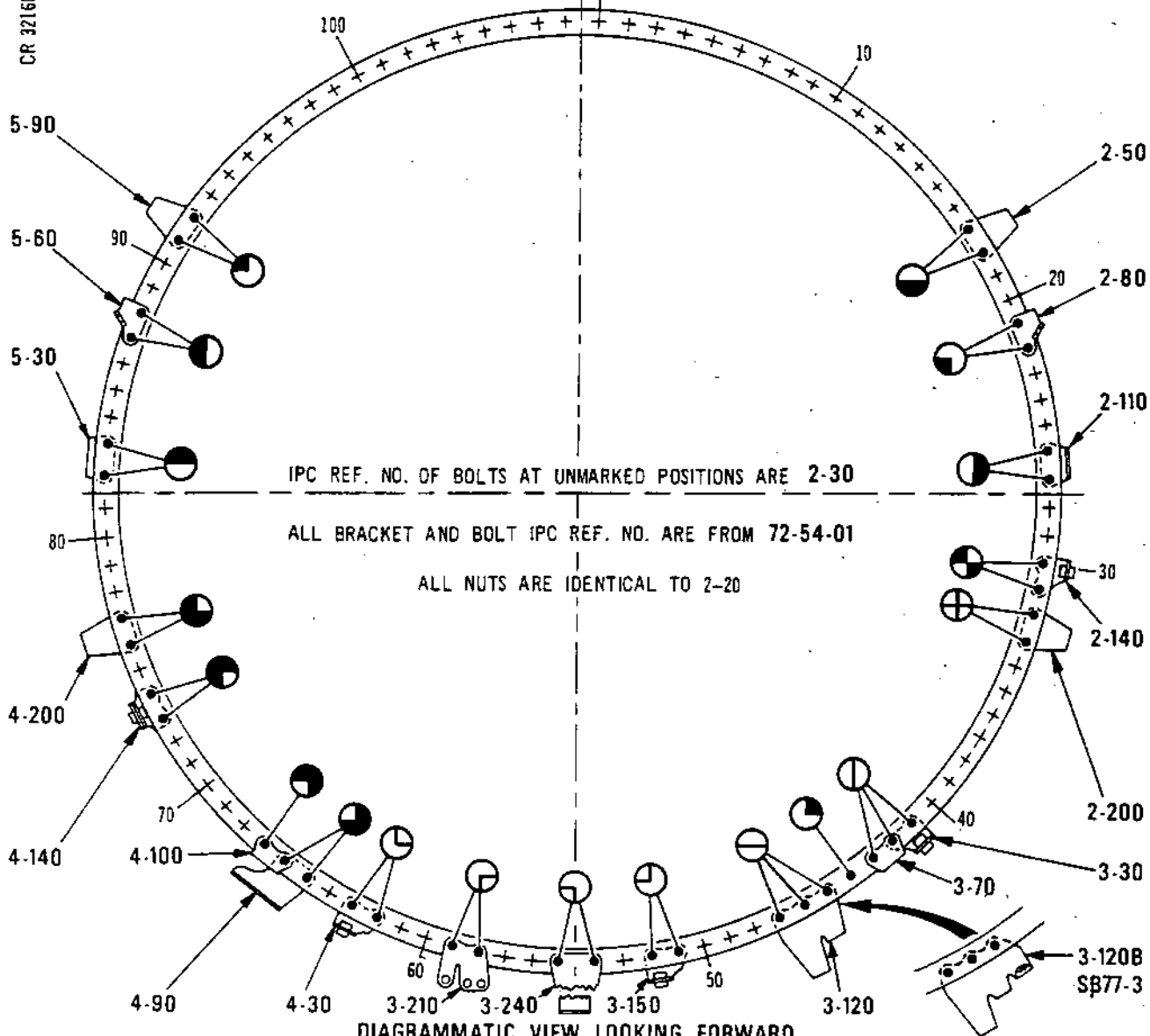
MK. 610-14-28

OVERHAUL



CR 32160/00A

BOLT HOLE POSITIONS



DIAGRAMMATIC VIEW LOOKING FORWARD  
ON REAR FLANGE OF EXHAUST DIFFUSER

	5-100		4-180		3-220		3-100		2-120
	5-70		4-120		3-250		3-80		2-90
	5-40		4-110		3-190		2-210		2-60
	4-210		4-70		3-130		2-180		

IPC REF. NO. OF BOLTS AT POSITIONS INDICATED

Positioning Brackets and Bolts on Flange of Spherical  
Joint Flange  
Figure 516

SUB-ASSEMBLY  
**72-53-00**

Page 547  
Aug 1/76

PRINTED IN ENGLAND

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

- (3) Referring to Fig.516 for the position of the various brackets, nuts and bolts, apply lubricant 'A' to the bolts, then assemble the brackets and bolts to their correct position and screw a nut on to each bolt. Check that the locking (run-down) torque is not less than 3.5 lbf in. (0,4 N.m), then torque-tighten the nuts to 100 lbf in. (11,5 N.m).

5. Assemble Items to the Spherical Joint Flange (Ref.Fig.517).

NOTE: The PNC pitot and the thermocouple are assembled in the positions quoted in the following text unless the nacelle position to which the engine is to be fitted is known, and requires their reversal.

NOTE: If blanks are assembled to the apertures in the joint flange, remove the blanks as required prior to assembling the items.

- A. Assemble the Pneumatic Nozzle Control Signal Pitot and Reheat Pressure Detector Connector.

NOTE: The removal and installation of the PNC pitot and reheat pressure detector connector is also detailed in 76-13-03 and the IPC references in this para. are from 76-13-03.

- (1) Assemble the spring compressor (Tool 1963) with its thumbnut unscrewed through the pitot union (1-20) from the threaded side, through the spring (1-70) and screw it into the spring plate from the spring spigot side. Tighten the thumbnut to compress the spring. Invert the union, then assemble a filter disc (1-60), restrictor (1-40) and another filter disc on top of the plate. With a retaining ring in the tapered guide (Tool 1968) place the guide over the union, and supporting the union on its flanges, tap the retaining ring into its groove using punch (Tool 1967). Remove the spring compressor by unscrewing the thumbnut to release the spring tension, then unscrew the centre screw from the spring plate.

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

snecma

- (2) If the stepped pin (1-90) is not assembled to the pitot, place the pin in Cardice for approx. 20 min, or liquid nitrogen for 2 to 3 min, then remove the pin from the cooling agent and assemble to the hole in the pitot flange at the pitot side.
- (3) Apply lubricant 'C' to new bolts (1-10 or 1-100). Insert the pitot into the aperture in the spherical joint flange between No.8 and 9 vane and locate the stepped pin in the pitot flange in the hole in the joint flange.
- (4) Position the pitot union on top of the pitot, then insert the two new bolts (1-10 or 1-100) into the pitot and screw them into the joint flange. Torque-tighten the bolts to 100 lbf in. (11,5 N.m), then wire-lock the bolts together.
- (5) Assemble the reheat pressure detector connector (1-110) to the aperture between No.2 and 3 vane and secure with two bolts (1-100). Torque-tighten the bolts to 100 lbf in. (11,5 N.m), then wire-lock the bolts together.

#### B. Assemble Jet Pipe Thermocouple Blanking Covers.

NOTE: The jet pipe thermocouple blanking covers are under the breakdown 77-21-02 and the IPC references in this para. are from 77-21-02.

- (1) Apply lubricant 'C' to the 16 bolts (2-10, 60, 30). Assemble the blanking cover (2-20) to the aperture in the spherical joint flange in line with No.3 vane, and secure with the bolts (2-10).
- (2) Assemble the bracket support (2-70) to the aperture in the spherical joint flange in line with No.8 vane with the three holes aligned fore and aft and secure with the bolts (2-60).

NOTE: The bracket support (2-70) and the blanking cover (2-20) may be interchanged depending on nacelle installation.

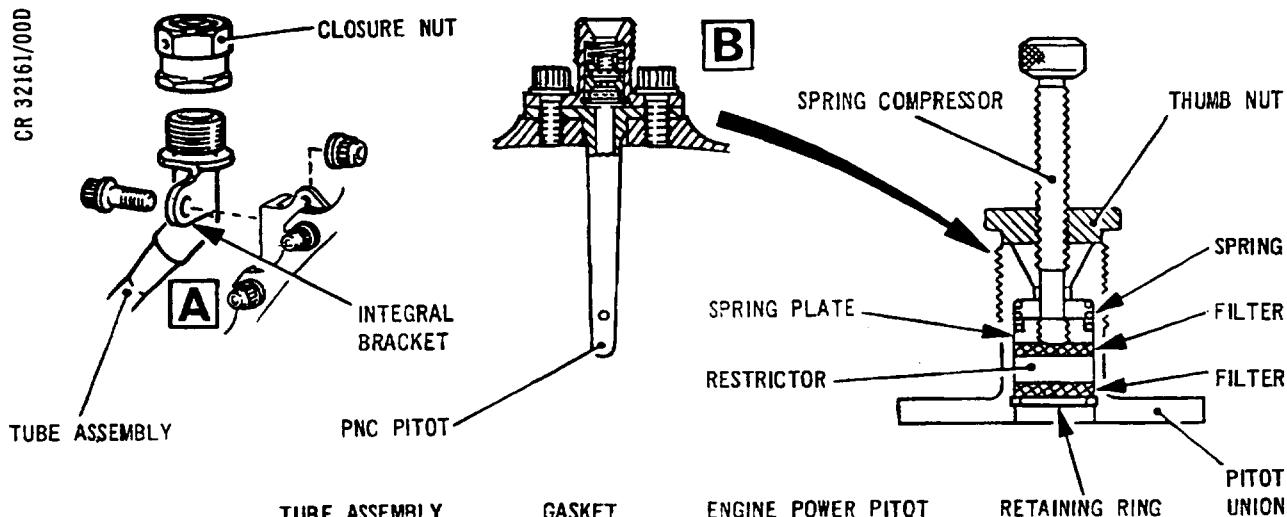
SUB-ASSEMBLY

**72-53-00**

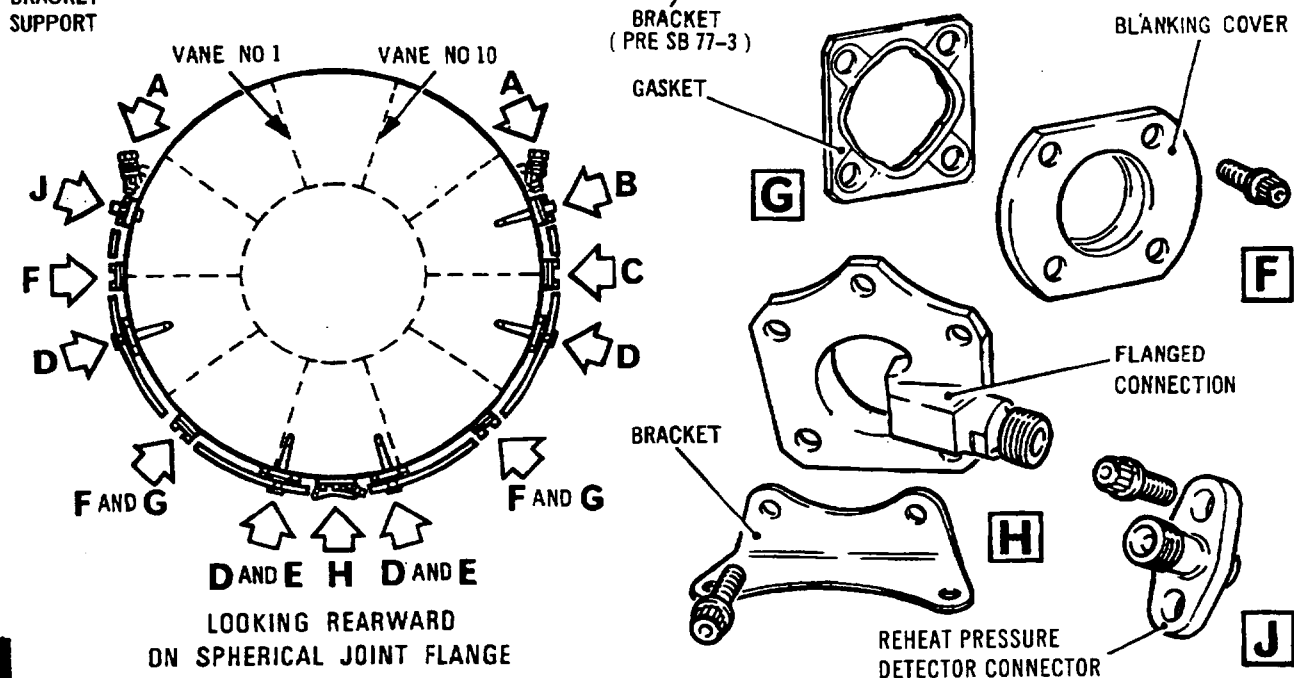
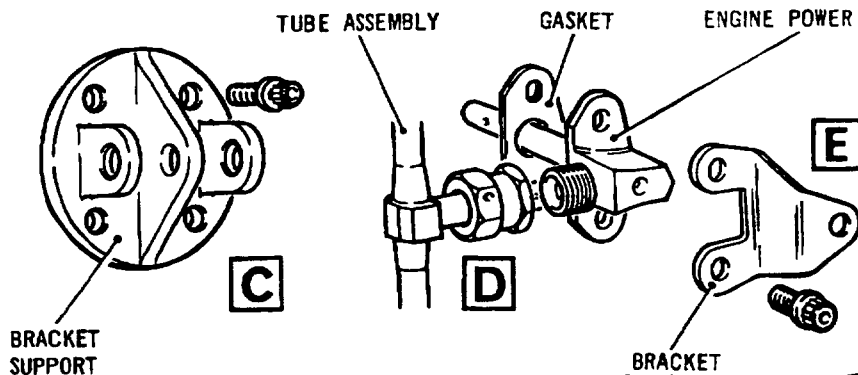
Page 549

Dec 31/01

CR 32161/00D



DISASSEMBLY OF PNC PITOT



Assembling Items to Spherical Joint Flange  
Figure 517



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (3) Assemble a gasket (2-50) and blanking cover (2-40) to the aperture in the spherical joint flange just below No.4 and 7 vanes and secure each cover with bolts (2-30).
- (4) Ensure that the locking (run-down) torque is not less than 3.5 lbf in. (0,4 N.m), then torque-tighten the cover and bracket support bolts to 100 lbf in. (11,5 N.m).

C. Assemble the Flanged Connection.

NOTE: The flanged connection is under the breakdown 75-03-02 and the IPC references in this para. are from 75-03-02.

- (1) Apply lubricant 'C' to the five bolts (1-450 and 1-460). Assemble the flange connection (1-480) to the bottom aperture in the spherical joint flange, then insert the three bolts (1-450) into the lower (front) holes in the connection and screw them into the joint flange. Position the bracket (1-470) on the rear of the connection, then insert the two bolts (1-460) through the bracket and connection and screw them into the joint flange.
- (2) Torque-tighten the bolts to 210 lbf in. (24,0 N.m), then wire-lock the bracket bolts together, and the remaining three bolts together.
- (3) Ensure that rubber blanks (72-54-01/6-140 or 230) are assembled to the five apertures in the spherical joint flange below the horizontal centre line.

D. Assemble the Engine Power Pitots.

NOTE: The EP pitots are under the breakdown 77-12-03 and the IPC references in this para. are from 77-12-03.

- (1) Assemble a gasket (1-240) to each of the four pitots, then assemble the pitots to the apertures in the spherical joint flange between No.7 and 8, and No.3 and 4 vanes, and in line with No.5 and 6 vanes, with the unions of the pitots facing downwards (forward).



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (2) Apply lubricant 'C' to bolts (1-220 and 1-225). On engines to pre-SB.77-3 standard, position a bracket (1-230) on top of the pitots at No.5 and 6 vanes so that the brackets extend upwards, then insert bolts (1-220) through the brackets, pitots and gaskets and screw them into the joint flange. With the heat shield support bracket (71-32-02/5-110) positioned on the pitot located between No.3 and 4 vanes, secure the remaining two pitots with bolts (1-220 and 1-225). On engines to SB.77-3 standard, position the heat shield support bracket (71-32-02/5-110) on the pitot located between No.3 and 4 vanes, then secure the four pitots with bolts (1-220B and 1-225). Torque-tighten all the bolts to 100 lbf in. (11,5 N.m) and wire-lock each pair of bolts. Apply lubricant 'A' to the threads of the four pitot unions.

NOTE: The heat shield support bracket (71-32-02/5-110) may be transferred to the pitot located between No.7 and 8 vanes, to suit the nacelle installation.

- (3) Position the tube assembly (1-180) around the joint flange, and screw the tube union nuts onto the four pitots. Torque-tighten the union nuts to between 190 and 210 lbf in. (21,5 and 23,7 N.m), then wire-lock the nuts to the pitot bolts.
- (4) Apply lubricant 'A' to bolts (1-160) then insert a bolt through the (integral) bracket at one end of the tube and the bracket bolted to the spherical joint flange and screw a nut (1-55) onto the bolt. Assemble a bolt (1-160) and nut (1-155) to the brackets at the other end of the tube. Ensure that the minimum locking (run-down) torque is 3.5 lbf in. (0,4 N.m), then torque-tighten the nuts to 100 lbf in. (11,5 N.m). If a closure nut (1-70) is not assembled to each end of tube, lubricate the nuts with lubricant 'A', then screw a nut onto each end of the tube. Torque-tighten the nuts between 220 and 240 lbf in. (24,9 and 27,1 N.m).
- (5) Assemble to the tube in line with No.7 vane, the bush assembly (1-80), and the inner and outer clamps (1-60 and 1-70). Lubricate the bolts (1-30), or bolt (1-30) and bolt (1-40) (SB.77-7) with lubricant 'A', then insert bolt (1-30) or bolt (1-40) (SB.77-7) through the clamps and bracket at bolt positions 66 and 67 of the diffuser rear flange, and assemble a

SUB-ASSEMBLY

## 72-53-00

Page 552

Dec 31/01



# OLYMPUS 593



MK.610-14-28 *sneema*

## OVERHAUL

washer (1-50) and nut (1-20) to the bolt. Assemble another bush/clamp assembly to the tube in line with No.4 vane and bolt it to the bracket at bolt positions 42 and 43 with a bolt (1-30), washer (1-50) and nut (1-20). Torque-tighten the bolts to 100 lbf in. (11,5 N.m) ensuring that the locking (run-down) torque is not less than 3.5 lbf in. (0,4 N.m).

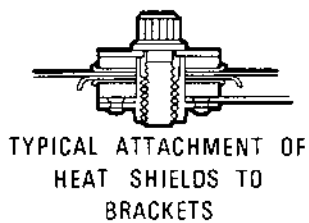
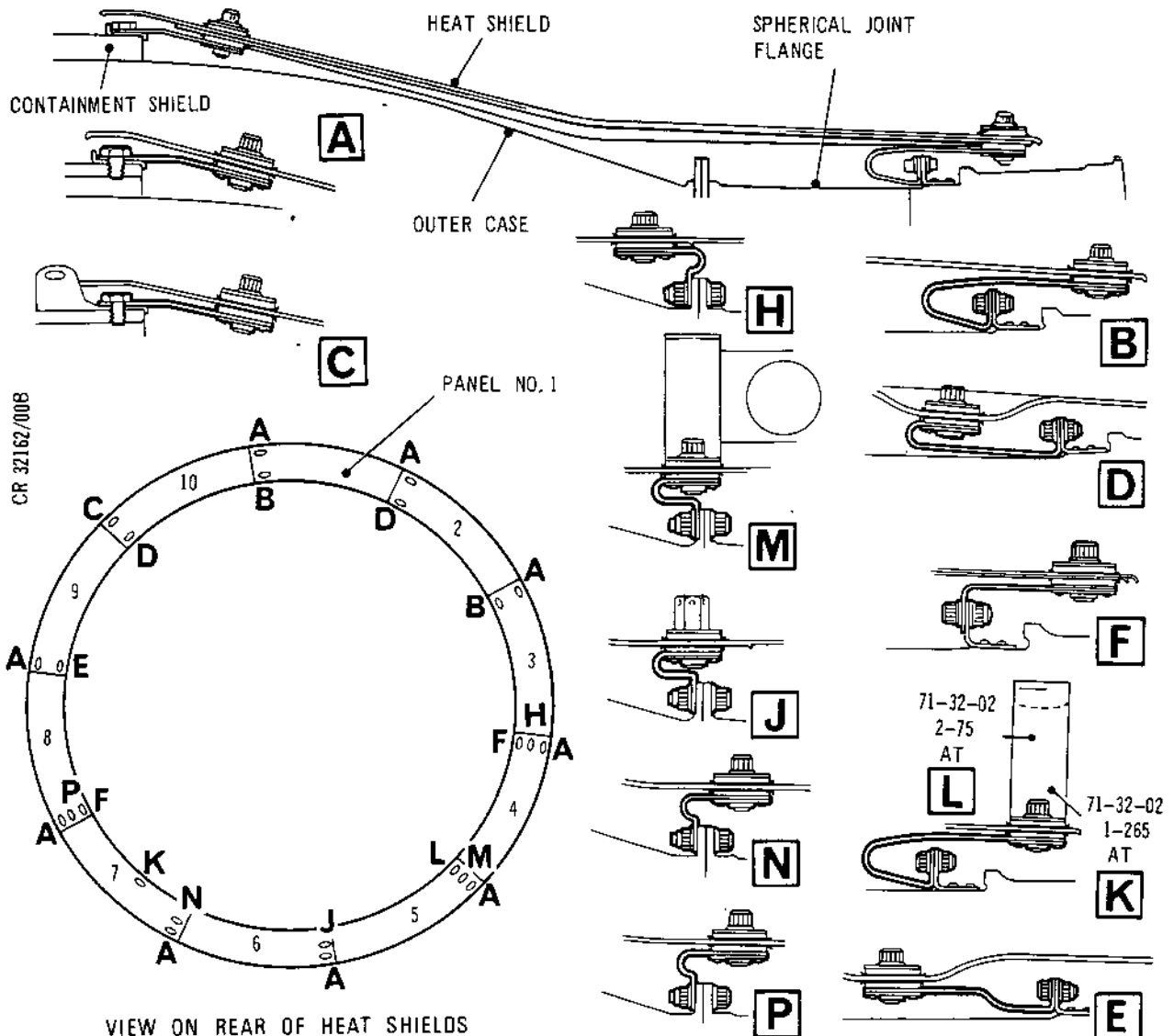
- (6) Assemble a bush assembly (1-140) and the inner and outer clamps (1-120 and 1-130) to the tube at the bottom position. On engines to pre-SB.77-3 standard apply lubricant 'A' to the pillar bolt (1-110), then assemble it into the right-hand hole in the top face of the bracket at the bottom position of the spherical joint flange. Locate the clamps on the pillar bolt then screw the nut (1-100) onto the bolt. On engines to SB.77-3 standard, apply lubricant 'A' to the bolt (1-110B), then insert the bolt through the clamps, the right-hand hole of the bracket, and into the nut (1-100). Ensure that the locking (run-down) torque is not less than 3.5 lbf in. (0,4 N.m), then torque-tighten the nut to 100 lbf in. (11,5 N.m).
- (7) Assemble the bolt (71-32-02/4-110) and nut (71-32-02/4-100) to the left-hand hole of the bracket (75-03-02/1-470) and temporarily tighten.
- (8) Check the complete length of the tube and ensure that no part of the tube is within 0.150 in. (3,81 mm) of any part of the spherical joint flange.
- (9) On engines to SB.77-11 standard, position the bush 1-150, outer clamp 1-148, inner clamp 1-149, over the tube between vanes 3 and 4 to align with the bracket attached to the reheat flame detector mounting flange. Apply lubricant 'A' to the bolt threads 1-142, place a washer 1-143 over the bolt and insert in the clip to bring into contact with the self locking clipnut 1-144 attached to the bracket and lightly tighten. At the position between No.7 and 8 vanes assemble bush 1-10, outer clamp 1-8, inner clamp 1-9. Apply lubricant 'A' to threads of bolt 1-3, place a washer 1-4 over the locking nut 1-5 attached to the bracket at the reheat spray ring bush and temporarily tighten.





# OLYMPUS 593

MK.610-14-28  
OVERHAUL



TYPICAL ATTACHMENT OF  
HEAT SHIELDS TO  
BRACKETS

IDENT. AND NO. OFF	IPC REF. NO.		
	BRACKET	BOLT	NUT
A (9)	3-10	3-20	—
B (2)	3-270 3-370	3-290 3-390	3-280 3-380
C (1)	3-70	3-80	—
D (2)	3-170 3-420	3-190 3-440	3-180 3-430
E (1)	3-220	3-240	3-230
F (2)	3-120 3-320	3-140 3-340	3-130 3-330

IDENT. AND NO. OFF	IPC REF. NO.		
	BRACKET	BOLT	NUT
K (1)	3-270	3-290	3-280
L (1)	3-270	3-290	3-280
H (1)	2-140	2-180	2-130
J (1)	3-150	3-190	3-140
M (1)	3-30	3-80	3-20
N (1)	4-30	4-70	4-20
P (1)	4-140	4-180	4-130

Positioning and Attachment of Heat Shield Brackets  
Figure 518

SUB-ASSEMBLY  
**72-53-00**

Page 554  
Aug 1/76

**OLYMPUS 593**MK.610-14-28 SNECMA  
OVERHAUL

After ensuring no part of the tube is within 0.150 in. (3,81 mm) of any part of the spherical joint flange, torque-tighten the bolts to 100 lbf in. (11,5 N.m) ensuring that the locking (Run-down) torque is not less than 3.5 lbf in. (0,4 N.m.).

6. Assemble the Heat Shields to the Assembly

- A. Assemble Heat Shield Mounting Brackets to the Containment Shield (Ref.Fig.518).

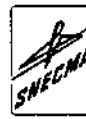
NOTE: The heat shields are under the breakdown 71-32-02 and the IPC references in this para. are from 71-32-02.

- (1) Apply lubricant 'B' to the attachment bolts (3-20 and 3-80) of the heat shield bottom (front) brackets. Examine the front brackets (3-10) for a small right-angled plate riveted to the end of the bracket. If the angled plate is not attached, a locating distance piece (3-30) must be used with each bracket. Assemble the 10 brackets (in turn), to the rear (top) end of the containment shield (Ref.Fig.518, detail A and C) as follows:
- (a) Position the bracket (3-70) on the shield (at approx. No.9 vane location) and locate the plate on the end of the shield, then insert the bolt (3-80) and screw it into the shield. Torque-tighten the bolt between 60 and 65 lbf in. (6,8 and 7,3 N.m), then wire-lock the bolt to the hole in the bracket.
  - (b) If distance pieces are to be used, insert a bolt (3-20) through the bracket and distance piece so that the locking hole is adjacent to the bolt head, and the anchor nut boss protrudes outwards through the bracket and screw the bolt into the shield. Torque-tighten the bolt between 60 and 65 lbf in. (6,8 and 7,3 N.m), then wire-lock the bolt to the hole in the distance piece. Assemble the remaining eight brackets in the same manner.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) If the plate is riveted to the bracket, insert a bolt into the bracket with the locking hole adjacent to the bolt head and screw the bolt into the shield. Torque-tighten the bolt between 60 and 65 lbf in. (6,8 and 7,3 N.m), then wire-lock the bolt to the hole in the plate tag. Assemble the remaining eight brackets in the same manner.

B. Assemble Heat Shield Mounting Brackets to the Spherical Joint Flange (Ref.Fig.518).

NOTE: The heat shields are under the breakdown 71-32-02 and the IPC references in this para. are from 71-32-02.

- (1) Apply lubricant 'B' to the attachment bolts (3-140, 190, 240, 290, 340, 390 and 440) of the heat shield top (rear) brackets. Position a bracket (3-270) under the bracket riveted to the spherical joint flange at the (normal) top position, so that the bracket extends upwards (rearwards). Insert two bolts (3-290) through the brackets and screw nuts (3-280) onto them. Assemble the remaining brackets (3-270 (2 off) and 3-370 (1 off)) to their positions at (approx.) vane 2, 5 and 6 and secure with bolts (3-290 (4 off) and 3-390 (2 off)) and nuts (3-280 (4 off) and 3-380 (2 off)). Ensure that the locking (run-down) torque is not less than 2.0 lbf in. (0,23 N.m), then torque-tighten the nuts between 28 and 32 lbf in. (3,16 and 3,62 N.m).
- (2) Position brackets (3-170 and 420) under the brackets riveted to the joint flange at (approx.) vane 1 and 10 position, so that the brackets extend downwards (forwards). Insert two bolts (3-190 and 440) through each of the brackets and screw nuts (3-180 and 430) onto them. Ensure that the locking (run-down) torque is not less than 2.0 lbf in. (0,23 N.m), then torque-tighten the nuts of the two brackets between 28 and 32 lbf in. (3,16 and 3,62 N.m).

SUB-ASSEMBLY

72-53-00

Page 556

Aug 1/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (3) Position the brackets (3-320 and 120) under the brackets riveted to the joint flange at (approx.) vane 3 or 7 position, so that the brackets extend upwards. Insert two bolts (3-340 and 140) through each bracket and screw nuts (3-330 and 130) onto them. Ensure that the locking (run-down) torque is not less than 2.0 lbf in. (0,23 N.m), then torque-tighten the nuts between 28 and 32 lbf in. (3,16 and 3,62 N.m).
- (4) Position the bracket (3-220) under the bracket riveted to the joint flange at (approx.) vane 8 position, so that the bracket extends downward. Insert two bolts (3-240) through the brackets and screw nuts (3-230) onto them. Ensure that the locking (run-down) torque is not less than 2.0 lbf in. (0,23 N.m), then torque-tighten the nuts between 28 and 32 lbf in. (3,16 and 3,62 N.m).

NOTE: The remaining heat shield brackets will have been assembled during assembly of the spherical joint flange (Ref. para. 4.D.).

- C. Assemble the Heat Shields to the Outer Case, Containment Shield and Spherical Flanged Joint (Ref. Fig. 519).

NOTE: The engine heat shields are under breakdown 71-32-02 and the IPC references in this para. are from 71-32-02.

- (1) Apply lubricant 'G' to the inside faces of each panel to cover the area of overlap of the panels when assembled to each other. Apply lubricant 'B' to the heat shield attachment bolts.

NOTE: Although not essential it is recommended that the heat shields are assembled in sequence starting with the panel joint near No. 1 vane.

SUB-ASSEMBLY

72-53-00

Page 557

Aug 1/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Slot No.1 panel into No.2 panel, then locate the joint mounting holes over the bosses of the front and rear brackets near to vane No.1. Ease the top (rear) mounting hole clear of the boss, feed a knitmesh damper (2-250) onto the boss, then a thin washer (2-240) with its cupped side towards the damper and press the panels back onto the boss. Assemble a thin washer, cupped side out, and a damper onto the boss, then, with a flat washer (2-220) assembled to the bolt (2-210), screw the bolt into the boss ensuring that the thin washer and damper do not prevent the flat washer being clamped onto the boss. Secure the bottom (front) point of the No.1/2 panel joint using the same procedure as the top (rear) attachment, and components itemised in Table 503.

NOTE: If difficulty is found in locating the panels on the bracket bosses, (which is more likely to be apparent when several panels are assembled), it may be due to the containment shield being incorrectly positioned, requiring it to be turned. To turn the containment shield, the support brackets (Tool 297) will have to be removed.

- (3) Ease the No.2 panel off the bracket bosses, then slide the No.3 panel onto No.2 panel ensuring that No.2 panel engages in the overlap and the holes align. Bolt the panel 3/2 joint to its front and rear brackets following the procedure of para.2, and the components of Table 503.
- (4) Continue to assemble in sequence, noting the following special features.
- (a) For the three positions shown in Fig.519 a (strengthening) flat washer (Ref.Table 503) is assembled to the bracket boss before the first knitmesh damper and thin washer.
  - (b) At the rear position of panel 7, a bracket (1-265) is assembled under the bolthead in place of a flat washer and positioned with its open end towards the (normal) bottom of the engine.

FN19718

SUB-ASSEMBLY

**72-53-00**

Page 558

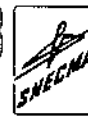
Aug 1/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 32163/00C

EXTRA FLAT WASHERS AT  
POSITIONS MARKED \*

FUEL DRAIN PIPE (PLATE)

PANEL NO 1

SPHERICAL JOINT FLANGE

CONTAINMENT SHIELD

PILLAR BOLT

THIN WASHER

FLAT WASHER

DAMPER

BOSS

BRACKET

TYPICAL ATTACHMENT OF  
HEAT SHIELDS TO BRACKETS

ADDITIONAL HEAT SHIELD BRACKET

ADDITIONAL HEAT SHIELD  
CHANNEL ASSEMBLY

PANELS

APPLICATION OF LUBRICANT 'G'

ENGAGEMENT OF ADJOINING PANELS

Assembling Heat Shields  
Figure 519

SUB-ASSEMBLY  
**72-53-00**

Page 559

Aug 1/81

PRINTED IN ENGLAND

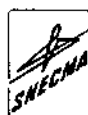
TN20858



# OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

PANEL JOINT POSITION	10/9	9/8	8/7	7/6	6/5	5/4	4/3	3/2	2/1	1/10
BOLT	1-20	1-80	1-140	1-210	1-280 1-285	2-20	2-90	2-150	2-210	2-270
FLAT WASHER	1-30	1-90	1-150	1-220 *1-265	1-290	2-30 +2-75	2-100	2-160	2-220	2-280
KNIT- MESH DAMPER	1-40	1-100	1-160	1-230	1-300	2-40	2-110	2-170	2-230	2-290
THIN WASHER	1-50	1-110	1-170	1-240	1-310	2-50	2-120	2-180	2-240	2-300
PANELS	1-10 1-70	1-70 1-130	1-130 1-200	1-200 1-270	1-270 2-10	2-10 2-80	2-80 2-140	2-140 2-200	2-200 2-260	2-260 1-10
THIN WASHER	1-50	1-110	1-170	1-240	1-310	2-50	2-120	2-180	2-240	2-300
KNIT- MESH DAMPER	1-60	1-120	1-180	1-250	1-320	2-60	2-130	2-190	2-250	2-310
FLAT WASHER			1-190	1-260		2-70				

\*Bracket (Ref. para. (4), (b)).      +Bracket (Ref. para. (4), (c)).

## I.P.C. Ref. No. of Heat Shield Attaching Parts Table 503

- (c) At the rear and central positions of panel 5/4 a channel assembly (2-75) is mounted under the boltheads in place of the flat washers, positioned with the channel towards the engine (normal) bottom.
- (d) At the rear of panel 6/5 a pillar bolt (1-285) is installed in place of a normal bolt.

SUB-ASSEMBLY  
**72-53-00**  
Page 560  
Aug 1/81

TN21883



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (5) Ensure that the locking (run-down) torque on each of the bolts is not less than 3.5 lbf in. (0,4 N.m) and that they are torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m). Assemble bolt (1-330) onto the pillar bolt and temporarily tighten.
- (6) Remove the four slave brackets from the containment shield by releasing the eight mounting bolts then pulling the brackets radially outwards to release them from their locating pins.

7. Assemble Remaining Items to the Turbine Exhaust Diffuser

- A. Assemble the Air Supply and Vent Elbows (Ref.Fig.505 and 507).

NOTE: The elbows and brackets will be released and/or removed during final engine build for the assembly of the air tubes, and are only temporarily assembled at this stage.

- (1) Release and remove the four (slave) nuts securing the outer end of the cooling air feed duct at the No.2 vane. Assemble the elbow (1-50) to the protruding bolts, then assemble the bracket (1-40) to the front two bolts on the right-hand side. Screw six nuts (1-10) onto the bolts and tighten the nuts.
- (2) Release and remove the four (slave) nuts securing the outer end of the hot air vent duct at No.4 vane. Assemble the elbow (1-220) to the protruding bolts, then assemble a bracket (1-210) to the two rear upper (normal attitude) bolts, and bracket (1-200) to the two rear lower (normal attitude) bolts. Screw six nuts (1-170) onto the bolts and tighten the nuts.
- (3) Release and remove the four (slave) nuts securing the outer end of the hot air vent duct at No.7 vane. Assemble the elbow (2-120) to the protruding bolts, then assemble a bracket (2-110) to the two rear bolts, and bracket (2-115) to the two lower (normal attitude) bolts. Screw six nuts (2-80) onto the bolts with lubricant 'C' applied to the threads. Torque-tighten the nuts (2-80) to 100 lbf in. (11,5 N.m).

SUB-ASSEMBLY

72-53-00

Page 561

Dec 31/01





# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- B. Assemble the Fuel Drain Assembly and Attach it to the Outer Case (Ref.Fig.520 or 521).

NOTE: The fuel drain assembly is under breakdown 71-73-06 and the IPC references in this para. are from 71-73-06.

There are two alternative procedures for assembling the drain valve to the outer case. The procedure is dependant on whether an internal boss or a saddle plate assembly is used at the drains block mounting location on the outer case.

- (1) Place the two washers (1-120) in a container with Cardice for (approx.) 20 min. or liquid nitrogen for (approx.) 2 to 3 min. Remove the washers from the Cardice or nitrogen container, then assemble one of the washers to its seating in the lower drain body, and the remaining washer to its seating in the upper drain body.
- (2) Holding the lower drain body with its apertures uppermost, rest a spring on the assembled washer, then rest a valve on top of the spring. Position a valve in the remaining orifice, then rest a spring on top of the valve. Lower the upper drain body over the valve and spring, ensuring that the spring is correctly positioned on the washer in the upper drain body. Apply lubricant 'C' to two bolts (1-30) and nuts (1-20). Compress the springs and abut the upper and lower bodies, then insert the bolts through the flange of the lower body and into the upper body flange and secure with the nuts. Ensure that the locking (run-down) torque is not less than 3.5 lbf in. (0,4 N.m), then torque-tighten the nuts to 100 lbf in. (11,5 N.m).
- (3) On engines with internal boss (Ref.Fig.520).
  - (a) Apply lubricant 'C' to the four bolts (1-10).
  - (b) Position the gasket (1-150) on the upper drain body, then position the gasket/drain assembly on its mounting face at the bottom of the outer case, and secure with the four bolts.
  - (c) On engines to SB.71-8494-27 standard, install a wire locking plate (1-65) under the head of the left-hand forward bolt (1-10).

SUB-ASSEMBLY

## 72-53-00

Page 562

Dec 31/01



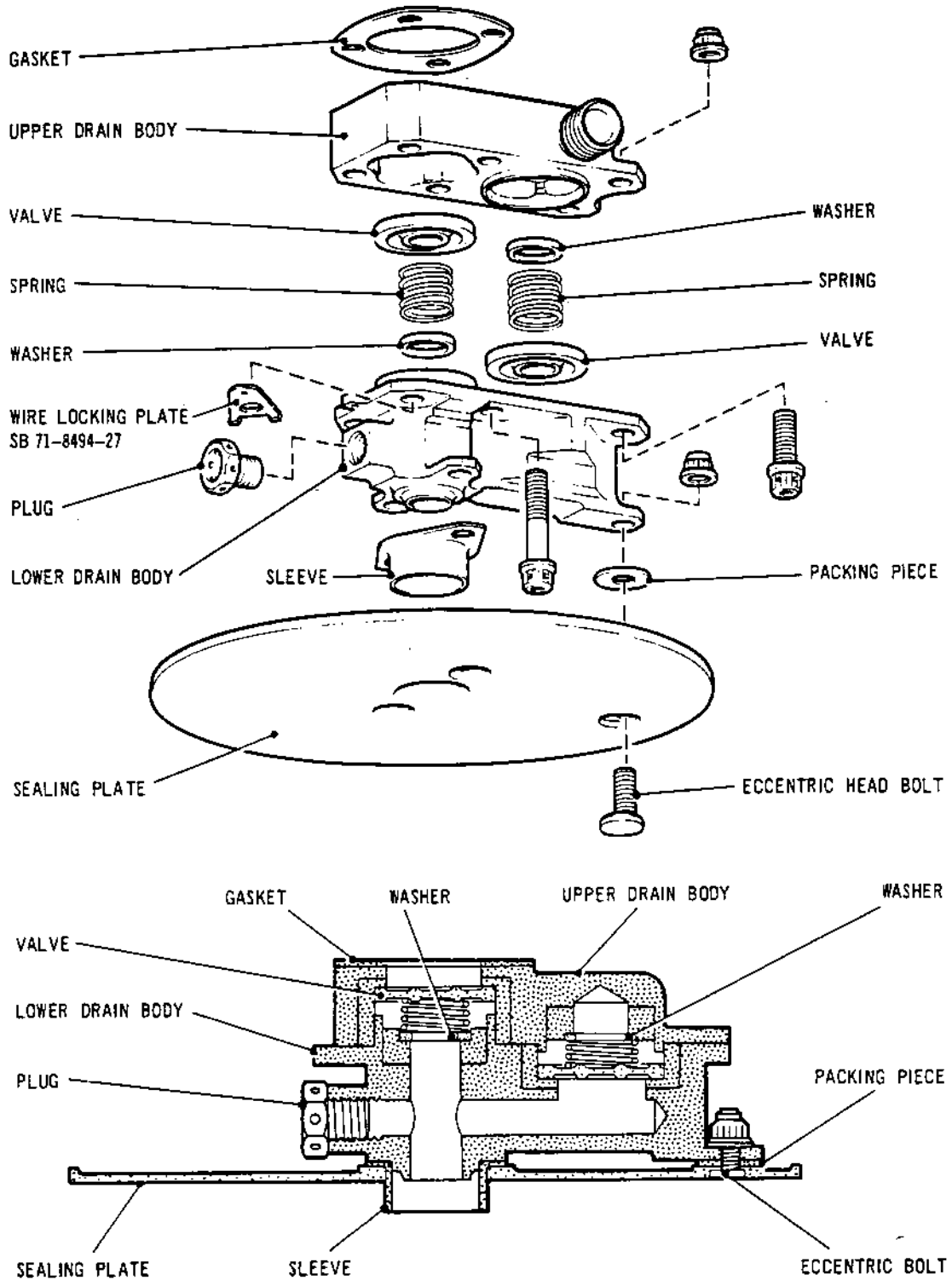
OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 32164/00B

PRINTED IN ENGLAND

TN37411



Assembling Drain Valve to Outer Case  
Figure 520

SUB-ASSEMBLY  
**72-53-00**

Page 563  
Aug 1/81

BS00021557/1



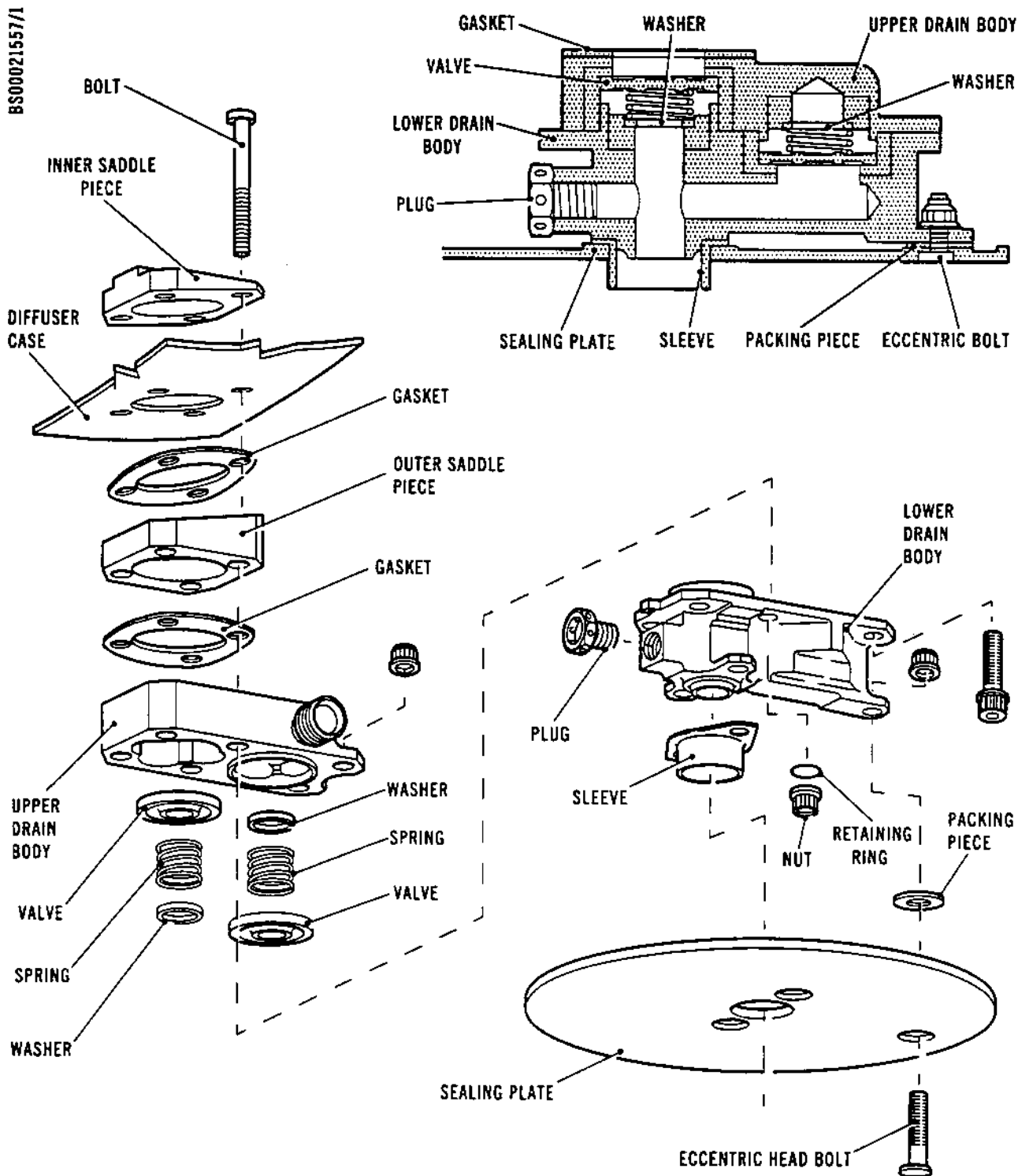
OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema



Assembling Drain Valve to Outer Case  
Figure 521

SUB-ASSEMBLY

72-53-00

Page 564

Dec 30/98

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

- (d) Torque-tighten the bolts to 100 lbf in. (11,5 N.m), then wire-lock the bolts at each side of the valve together in pairs.
- (e) Examine the inside of the outer case and ensure that the bolts do not protrude above the surface of the case.
- (4) On engines with saddle plate assembly (Ref.Fig.521).
- (a) Position the inner saddle piece (1A-170) on the inner surface of the outer case.
- (b) Apply lubricant 'C' to the four bolts (1A-160) and install the four bolts from the inside of the outer case.
- (c) Position the gasket (1A-150) and the outer saddle piece (1A-180) on the four bolts. Install four retaining rings (1A-190) over the four bolts.
- (d) Position the gasket (1A-150)/drain assembly on the four bolts and secure with four nuts (1A-200). On engines to SB.71-8494-27 standard, install a wire locking plate (1A-65) under the forward left hand nut.
- (e) Torque-tighten the nuts to 100 lbf in. (11,5 N.m).
- (5) Apply lubricant 'C' to the three eccentric headed bolts (1-60) and nuts (1-50). Position the sleeve either over the aperture of the lower drain body, or in the sealing plate aligning the securing holes, then position the sealing plate on the lower drain body and insert the packing piece between the body and plate at the rear securing hole. Insert the three eccentric headed bolts into the sealing plate locating the heads in the plate, and secure with the nuts. Check that the run-down torque is not less than 3.5 lbf in. (0,4 N.m), then torque-tighten the nuts to 135 lbf in. (15,2 N.m). Ensure that the heads of the bolts are 0.005 to 0.015 in. (0,127 to 0,381 mm) below the surface of the sealing plate.

SUB-ASSEMBLY

**72-53-00**

Page 565

Dec 31/01



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

- (6) Apply lubricant 'C' to the plug (1-110), then screw the plug into the front of the lower drain body. Torque-tighten the plug to 100 lbf in. (11,5 N.m).
- (7) On engines to pre-SB.71-8494-27 standard, wire-lock the plug to the lower drain body.
- (8) On engines to SB.71-8494-27 standard, wire-lock the plug to the wire-locking plate (1-65).
- (9) Assemble the cover blank (1-250) or protector (Tool 961) to the sealing plate.

8. Remove the Turbine Exhaust Diffuser from the Build Stand

A. Attach the Lifting Fixture to the Diffuser (Ref.Fig.502).

- (1) Completely slacken the seven thumbnuts on the lifting fixture (Tool 1953), then turn the latches so that the pins on their heads point inwards towards 'FREE'.
- (2) Operate the build stand (if necessary) to position the diffuser with its rear face uppermost.
- (3) Lower the fixture (Tool 1953 or Tool 305 for pre-SB.72-181 standard engines only) onto the rear face of the diffuser inner case.
- (4) With fixture (Tool 1953), rotate the latches inside the inner case (outwards) to the 'LOCKED' position, then tighten the thumbnuts (Tool 1953), or with fixture (Tool 305), on pre SB.72-181 standard engines, screw the captive bolts of the fixture (Tool 305) into the caged nuts of the inner case.

B. Remove the Diffuser from the Stand.

- (1) Attach a hoist to the lifting fixture ring. Release the nuts on the mounting clamps on the mounting plate and slide the clamps clear of the flange.
- (2) Lift the diffuser clear of the stand, then lower the diffuser onto the fixture (Tool 1230) positioned on a pallet (Tool 1428), ensuring that the diffuser rests in the recesses in the uprights of the fixture.

SUB-ASSEMBLY

72-53-00

Page 566

Dec 31/01



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (3) Disconnect the hoist, then release the lifting fixture by unscrewing the captive bolts, or by releasing the thumbnuts and turning the latches inwards towards 'FREE'. Remove the fixture.
- (4) Release the six wingnuts on the clamps of the protector (Tool 437) then pull the clamps outwards. Place the protector on the rear flange of the spherical joint flange with the word 'TOP' on the protector aligned with the normal top position of the diffuser. Pull the clamps inwards to grip under the flange, then tighten the wingnuts.

SUB-ASSEMBLY

72-53-00

Page 567

Jun 1/98



OLYMPUS 593

MK.610-14-28  
OVERHAUL



SPHERICAL JOINT FLANGE - SUB-ASSEMBLY

PRINTED IN ENGLAND

For information on the assembly of the Spherical  
Joint Flange, refer to 72-53-00 Assembly.

TN29897

SUB-ASSEMBLY

**72-54-01**

Page 501

Jan 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



INTERNAL ACCESSORY DRIVES - SUB-ASSEMBLY

For information on the assembly of the Internal  
Accessory Drives, refer to 72-32-00 Assembly.

PRINTED IN ENGLAND

TN29899

SUB-ASSEMBLY

**72-61-00**

Page 501

Jan 1/76





# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

## LEFT-HAND ACCESSORY GEARBOX - SUB-ASSEMBLY

### TABLE OF CONTENTS

Para.		Page
1.	General ... ..	501
2.	Assemble Components to Cases for Initial Oil Flow Test ... ..	502
	A. Prepare for Assembly ... ..	502
	B. Assemble Components to Front Cover ... ..	502
	C. Assemble Components to Gearbox Case... ..	505
3.	Temporarily Assemble Cases Together ... ..	514
	A. Assemble Diaphragm to Gearbox Case ... ..	514
	B. Assemble Front Cover to Gearbox Case ... ..	514
4.	Oil Flow Check ... ..	515
	A. Prepare for Flow Check ... ..	515
	B. Oil Flow Check Procedure ... ..	518
5.	Disassemble Cases and Examine Oil Filters ... ..	518
	A. Remove Front Cover ... ..	518
	B. Examine Front Cover Oil Filters ... ..	518
	C. Examine Gearbox Case Oil Filters ... ..	519
6.	Assemble Bearing Components to Gearbox Case ... ..	521
	A. Assemble Bearing Journal to Position A ... ..	521
	B. Assemble Bearing Journal to Position B ... ..	521
	C. Assemble Bearing Journal to Position C ... ..	523
	D. Assemble Bearing Journal to Position D ... ..	523
	E. Assemble Bearings to Oil Pump Drive Position ... ..	523
	F. Assemble Bolt to Position E ... ..	524
7.	Assemble Bearings to Diaphragm ... ..	525
	A. Assemble Diaphragm to Hydraclamp ... ..	525
	B. Assemble Bearing to Position A ... ..	525
	C. Assemble Bearing to Position B ... ..	525
	D. Assemble Bearing to Position C ... ..	527
	E. Assemble Bearing Journal to Position D ... ..	527
8.	Bevel Gears Adjusting Washers Thickness Measuring Procedures ... ..	528
	A. Assemble Setting Gauge to Oil Pump Bevel Pinion Position ... ..	528
	B. Assemble Setting Gauge to Main Drive Bevel Pinion Position (Pre SB.72-383) ... ..	528
	C. Assemble Setting Gauge to Main Drive Bevel Pinion Position (SB.72-383)... ..	529
	D. Assemble Setting Gauges to Diaphragm Position A and C ... ..	529
	E. Assemble Diaphragm and Setting Gauges to Gearbox Case... ..	532
	F. Checking Procedure for Oil Pump Bevel Pinion ... ..	533
	G. Checking Procedure for Bevel Gear at Diaphragm Position A ... ..	533
	H. Checking Procedure for Main Drive Bevel Pinion ... ..	534

SUB-ASSEMBLY

# 72-62-00

Contents 1

Jan 31/94



OLYMPUS 593



MK.610-14-28 snecma

OVERHAUL

Para.

Page

J.	Checking Procedure for Bevel Gear at Diaphragm Position C	...	...	...	...	...	534
K.	Remove Setting Gauges	...	...	...	...	...	534A
9.	Assemble Bevel Pinions to Gearbox...	...	...	...	...	...	534B
A.	Assemble Oil Pump Bevel Pinion	...	...	...	...	...	534B
B.	Assemble Main Drive Spiral Bevel Pinion (Pre SB.72-383)...	...	...	...	...	...	537
C.	Assemble Main Drive Spiral Bevel Pinion/Roller Bearing Matched Assembly (SB.72-383)	...	...	...	...	...	540A
10.	Assemble Fuel Control Unit/Main Oil Pump Driving Shaft to Diaphragm	...	...	...	...	...	540C
A.	Prepare for Assembly	...	...	...	...	...	540C
B.	Assemble Roller Bearing to Driving Shaft	...	...	...	...	...	540C
C.	Assemble Gearshaft to Driving Shaft and Secure to Diaphragm	...	...	...	...	...	542
11.	Assemble Main Drive Gear Shaft to Diaphragm	...	...	...	...	...	545
A.	Assemble Roller Bearing to Gear Shaft	...	...	...	...	...	545
B.	Assemble Spiral Bevel Gear to Gear Shaft and Secure to Diaphragm (Pre SB.72-383)...	...	...	...	...	...	546
C.	Assemble the Spiral Bevel Gear and Secure to Diaphragm (SB.72-383)...	...	...	...	...	...	549
12.	Bevel Gear Backlash and Engagement Checks	...	...	...	...	...	550
A.	Assemble Diaphragm and Gear Shafts in Gearbox Case	...	...	...	...	...	550
B.	Backlash Checking Procedure	...	...	...	...	...	551
C.	Bevel Gear Teeth Engagement Checking Procedure	...	...	...	...	...	552
13.	Assemble Stage 1 Fuel Pump Drive Gear Shaft to Diaphragm	...	...	...	...	...	552A
A.	Assemble Roller Bearing to Gear Shaft	...	...	...	...	...	552A
B.	Assemble Gear Shaft to Diaphragm	...	...	...	...	...	555
14.	Assemble Roller Bearings to Idler Spur Gear	...	...	...	...	...	556
A.	Assemble Large Bearing to Gear Shaft	...	...	...	...	...	556
B.	Assemble Small Bearing to Gear Shaft	...	...	...	...	...	557
15.	Check Backlash of Spur Gears	...	...	...	...	...	558
A.	Assemble Diaphragm/Gear Shafts to Gearbox Case	...	...	...	...	...	558
B.	Backlash Checking Procedure	...	...	...	...	...	560
16.	Assemble Quillshaft to FCU/Main Oil Pump Driving Shaft	...	...	...	...	...	561
A.	Assemble Oil Feed Sleeve to Quillshaft	...	...	...	...	...	561
B.	Assemble Quillshaft to Driving Shaft	...	...	...	...	...	563
17.	Assemble Diaphragm and Front Cover to Gearbox Case	...	...	...	...	...	564
A.	Assemble Diaphragm and Gear Shafts	...	...	...	...	...	564
B.	Assemble Front Cover Unit	...	...	...	...	...	566
18.	Assemble Rear Cover and QAD Couplings	...	...	...	...	...	567
A.	Assemble Rear Cover	...	...	...	...	...	567
B.	Assemble Fuel Control Unit QAD Coupling to Rear of Gearbox Case	...	...	...	...	...	567
C.	Assemble Stage 1 Fuel Pump QAD Coupling to Front Cover	...	...	...	...	...	569

SUB-ASSEMBLY

72-62-00

Contents 2

Jan 31/94



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



Para.		Page
19.	Assemble Main Oil Pump and Pulse Probe to Gearbox Case ... ..	570
A.	Assemble Oil Pump... ..	570
B.	Assemble Pulse Probe ... ..	574
20.	Oil Flow Test and Pressure Test Gearbox Assembly ...	576
A.	Test Equipment Required... ..	576
B.	Assemble Pressure Test Equipment to Gearbox Assembly ... ..	576
C.	Prepare Pressure Test/Flow Check Mobile Equipment. ...	578
D.	Flow Check Gearbox Assembly ... ..	579
E.	Pressure Test Gearbox Assembly.. ...	580
F.	Remove Equipment after Satisfactory Flow/Pressure Test ... ..	581
21.	Investigate and Rectify Unsatisfactory Oil Flow ...	581
A.	Prepare for Investigation and Rectification ...	581
B.	Rectification Procedure... ..	582
C.	Repeat Flow Check ... ..	590
22.	Investigate and Rectify Oil Leakage ... ..	590
A.	Prepare for Investigation and Rectification ...	590
B.	Rectify Oil Leakage from QAD Couplings ...	590
C.	Rectify Oil Leakage from Front Cover Joint ...	591
D.	Rectify Oil Leakage from Rear Cover Joint... ..	592
E.	Rectify Oil Leakage from Oil Pump/Gearbox Joint... ..	593
F.	Rectify Oil Leakage from Pulse Probe/Gearbox Case Joint ... ..	594
G.	Repeat Pressure Test ... ..	594
23.	Prepare Gearbox Assembly for Despatch ... ..	594
A.	Prepare Gearbox Assembly ... ..	594
B.	Remove the Gearbox Assembly from the Stand ...	597
C.	Final Inspection and Despatch... ..	597

## TABLE OF ILLUSTRATIONS

Fig.No.		Page
501	Assembling Components to Front Cover ... ..	503
502	Assembling Shrink Fit Components to Gearbox Case ... ..	506
503	Assembling Gearbox to Assembly Stand ... ..	509
504	Assembling Oil Jets to Gearbox ... ..	511
505	Assembling Diaphragm and Front Cover ... ..	513
506	Assembling Oil Flow Check Equipment... ..	516
507	Layout of Electrical and Hydraulic Systems of the Oil Pressure Test Rig ... ..	517
508	Assembling Bearing Components to Gearbox Case ...	522
509	Assembling Bearings to Diaphragm ... ..	526

SUB-ASSEMBLY

# 72-62-00

Contents 3  
Apr 1/76



# OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

Fig.No.		Page
510	Assembling Checking Gauges for Bevel Gear Adjustment ... ..	530
511	Assembling Oil Pump Drive Bevel Pinion ... ..	535
512	Assembling Main Drive Spiral Bevel Pinion... ..	538
513	Assembling Roller Bearing to Driving Shaft ... ..	541
514	Assembling Bevel Gear and Driving Shaft to Diaphragm... ..	543
515	Assembling Spiral Bevel Gear and Dimensional Checking Procedure ... ..	546B
516	Assembling Bevel Gear Backlash Checking Equipment... ..	550A
516A	Main Drive Bevel Gear Engagement - Contact Pattern ... ..	553
517	Assembling Stage 1 Fuel Pump Drive Shaft to Diaphragm... ..	554
518	Installing Spur Gear Backlash Checking Equipment..	559
519	Assembling Oil Feed Sleeve to Quillshaft ... ..	562
520	Assembling Diaphragm and Front Cover to Gearbox ... ..	565
521	Assembling QAD Couplings and Rear Cover ... ..	568
522	Assembling Main Oil Pump to Gearbox... ..	571
523	Assembling Pulse Probe ... ..	575
524	Assembling Pressure Test Equipment ... ..	577
525	Removing Main Drive Spiral Bevel Pinion ... ..	585
526	Assembling Protectors and Lifting Fixture to Gearbox ... ..	595



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## LEFT-HAND ACCESSORY GEARBOX - SUB-ASSEMBLY

### 1. General

- A. Prior to commencing assembly, refer to 72-09-00, Assembly for general information.
- B. Throughout the text special tools are quoted by their Ref.No. e.g. (Tool 1234). For a complete list of tooling required for the assembly, and for the Manufacturers Part No. refer to the Special Tools, Fixtures and Equipment Table 1002.
- C. During the sub-assembly procedure reference will be made to the Illustrated Parts Catalogue (I.P.C.) to identify those items where the nomenclature does not positively identify them due to duplication of title e.g. nuts, bolts, washers etc. Where the item is part of this text it will be identified as e.g. bolt (1-10), the 1 referring to the I.P.C. Fig.No. and the 10 referring to the Item No. Where items from any other breakdown are introduced, then the breakdown number will be quoted in addition e.g. bolt (72-32-01/1-10).
- D. During the sub-assembly procedure, where the thickness of adjusting washers has to be determined, the words 'select' or 'select from the range' are used. If a range of washers is not available, it may be necessary to machine the washer to achieve the desired thickness. The information for machining washers is given under chapter 72-09-21 Repair. During the assembly procedure, the machining procedure reference will be given immediately after each adjusting washer I.P.C. Ref. No. in the appropriate part of the text e.g. select from the range the correct thickness adjusting washer (3-70) (72-09-21 Repair, Fig.401).
- E. The left-hand gearbox sub-assembly is basically composed of three units, gearbox case, diaphragm/gearshaft assembly and front cover. With one exception, the gearshafts are assembled to the diaphragm which locates inside the gearbox. Two bevel gear pinions are installed in the gearbox case, these engage with the diaphragm/gearshaft assembly. Oil jets are installed inside the gearbox case and front cover. The front cover and joint washer form an oil tight joint with the gearbox case. Although it is a separate sub-assembly, the main oil pump is assembled to the gearbox case and subjected to oil pressure test and functional test with the gearbox assembly.

SUB-ASSEMBLY

**72-62-00**

Page 501

Dec 1/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



## 2. Assemble Components to Cases for Initial Oil Flow Test

### A. Prepare for Assembly.

- (1) Ensure that all components are thoroughly clean and damage free. Particular attention must be given to the cleanliness of oilways and bores. Remove protectors from the cases only when it is necessary to do so.

### B. Assemble Components to Front Cover (Ref.Fig.501).

NOTE: The text is written to SB.72-9 Parts 1 and 2 standard and does not include the assembly of the bearing outer tracks to the front cover.

- (1) Remove the protector from the cover.
- (2) Use a suitable freezing agent, shrink the following items:
  - (a) Stepped pins (72-62-01/2-160).
  - (b) Stepped pin (72-62-01/3-320).
- (3) Assemble holding fixture (Tool 151) to the front cover and secure the assembly in the Hydraclamp (Tool 1643).
- (4) Using the driver (Tool 1524), assemble the stepped pins (72-62-01/2-160) to the quick attach/detach (QAD) coupling location, and the stepped pin (72-62-01/3-320) to the QAD bracket location. Replace the protector (Tool 146) to the QAD mounting face.
- (5) Assemble the short flanged pins (72-62-01/3-120) to position A, and long flanged pin (72-62-01/3-140) to position B on the front cover.
  - (a) Ensure the thorough cleanliness of tools. Place the mechanical puller (Tool 272) in position at a flanged pin location. Place the flanged pin in position and retain it with a nut (Tool 269). Ensure that the flanged pin is aligned correctly with the hole in the cover flange. Tighten the nut to insert the flanged pin into the cover flange. Ensure that the mechanical puller is restrained to prevent rotational movement, which could cause damage to the sealing surface of the flange.
- (6) Assemble the oil jet (72-62-01/3-470) to position C on the inner surface of the cover. Screw the jet fully into position and carefully tighten it.
- (7) Assemble the plug (72-62-01/3-350) to position D (Ref. Fig.501) on the inner surface of the cover. Screw the plug fully into position and carefully tighten it.

SUB-ASSEMBLY

**72-62-00**

Page 502

Jun 1/77

TN20215

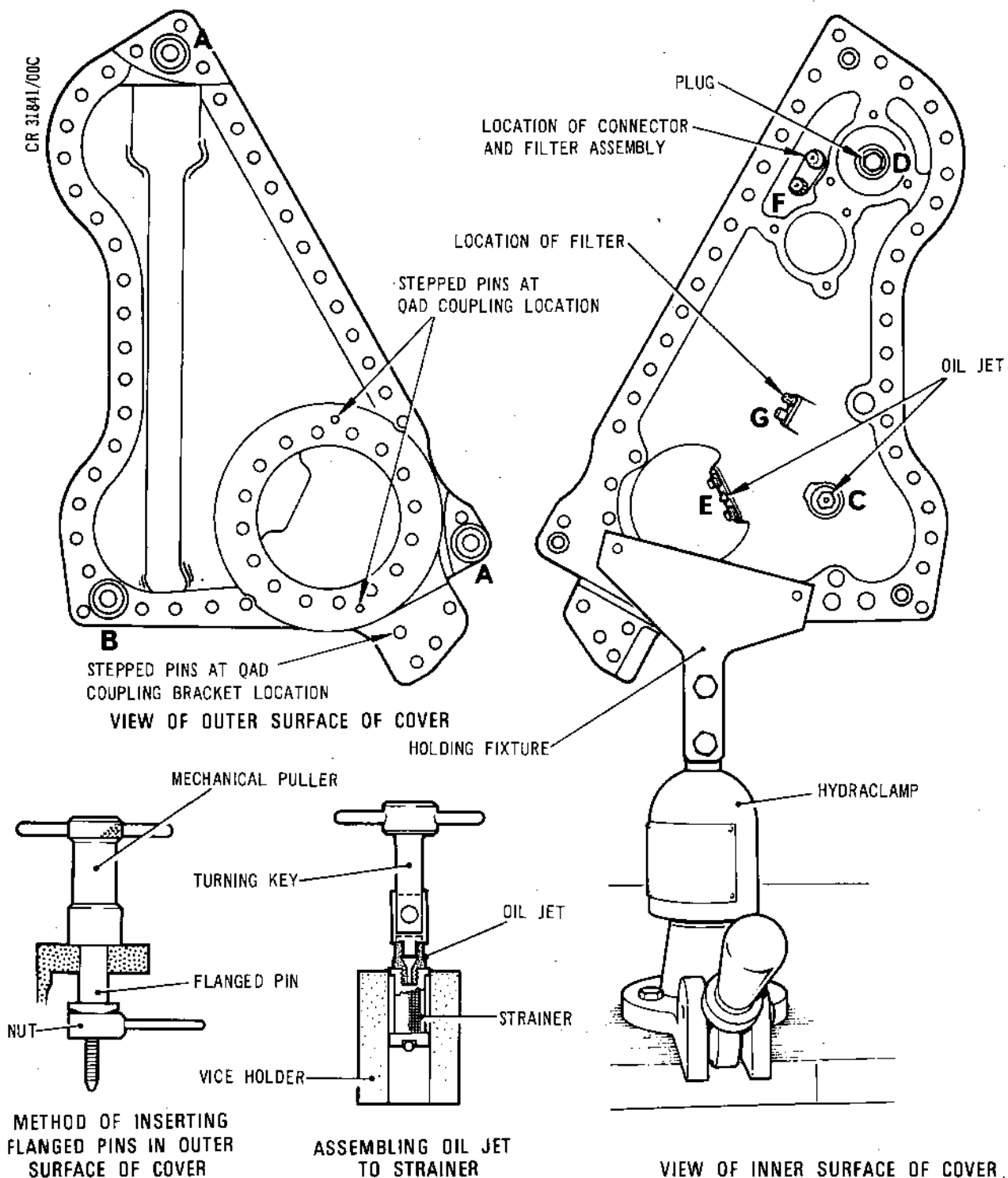


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



Assembling Components to Front Cover  
Figure 501

SUB-ASSEMBLY  
**72-62-00**

Page 503  
Sep 1/75

TN12612



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (8) Assemble the oil jet (72-62-01/3-490) to position E on the angled section of the cover. Apply lubricant 'A' to securing bolts (72-62-01/3-480). Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Secure the jet with the bolts torque-tightened between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (9) Assemble the connector (72-62-01/3-380) to the filter (72-62-01/3-390), then insert the assembly into the inner surface of the cover at position F.
- (a) Insert the assembly into the bore on the inner surface of the cover at the small end. Secure the filter assembly to the cover with retaining cap (72-62-01/3-370). Assemble the driver (Tool 1484) to the cap and press the cap into position.
- (b) Apply lubricant 'A' to the retaining bolt (72-62-01/3-360). Ensure that the bolt has a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Secure the cap with the bolt torque-tightened between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (10) On engines to Pre-SB.72-12 assemble the oil jet (72-62-01/3-450A) to filter assembly (72-62-01/3-460A) and secure the assembly to the bore in the front cover with the retaining cap (72-62-01/3-440A) and bolt (72-62-01/3-420A).
- (a) Place the filter in the vice holder (Tool 159) and ensure that the slot in the end of the filter engages with the pin in the bore of the tool. Screw the oil jet into the end of the filter and carefully tighten it with the turning key (Tool 1485).
- (b) Remove the assembly and insert it filter first into the bore in the front cover at position G.
- (c) Assemble driver (Tool 1484) to the retaining cap and press the cap in position over the filter assembly.

FN20216

SUB-ASSEMBLY

**72-62-00**

Page 504

Apr 1/77





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (d) Apply lubricant 'A' to the retaining bolt and secure the cap to the cover. Ensure that the bolt has a locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the bolt between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (11) On engines to SB.72-12 assemble the oil jet sealing plug (72-62-01/3-450B) to the filter assembly (72-62-01/3-460) and secure the assembly to the bore in the front cover with the bolt (72-62-01/3-420B) and flat washer (72-62-01/3-430A).
- (a) Place the filter in the vice holder (Tool 159) and ensure that the slot in the end of the filter engages with the pin in the bore of the tool.
- (b) Screw the oil jet sealing plug into the end of the filter and carefully tighten it with the turning key (Tool 1485).
- (c) Assemble driver (Tool 1484) to the sealing plug and carefully press the assembly into the bore in the front cover at position G (Ref.Fig.501).
- (d) Apply lubricant 'A' to the retaining bolt and secure the sealing plug to the cover with the bolt and flat washer. Ensure that the retaining bolt has a locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the bolt between 67 and 73 lbf in. (7,6 and 8,2 N.m).

(12) Assemble the protectors (Tool 146 and 140) to the cover.

C. Assemble Components to Gearbox Case.

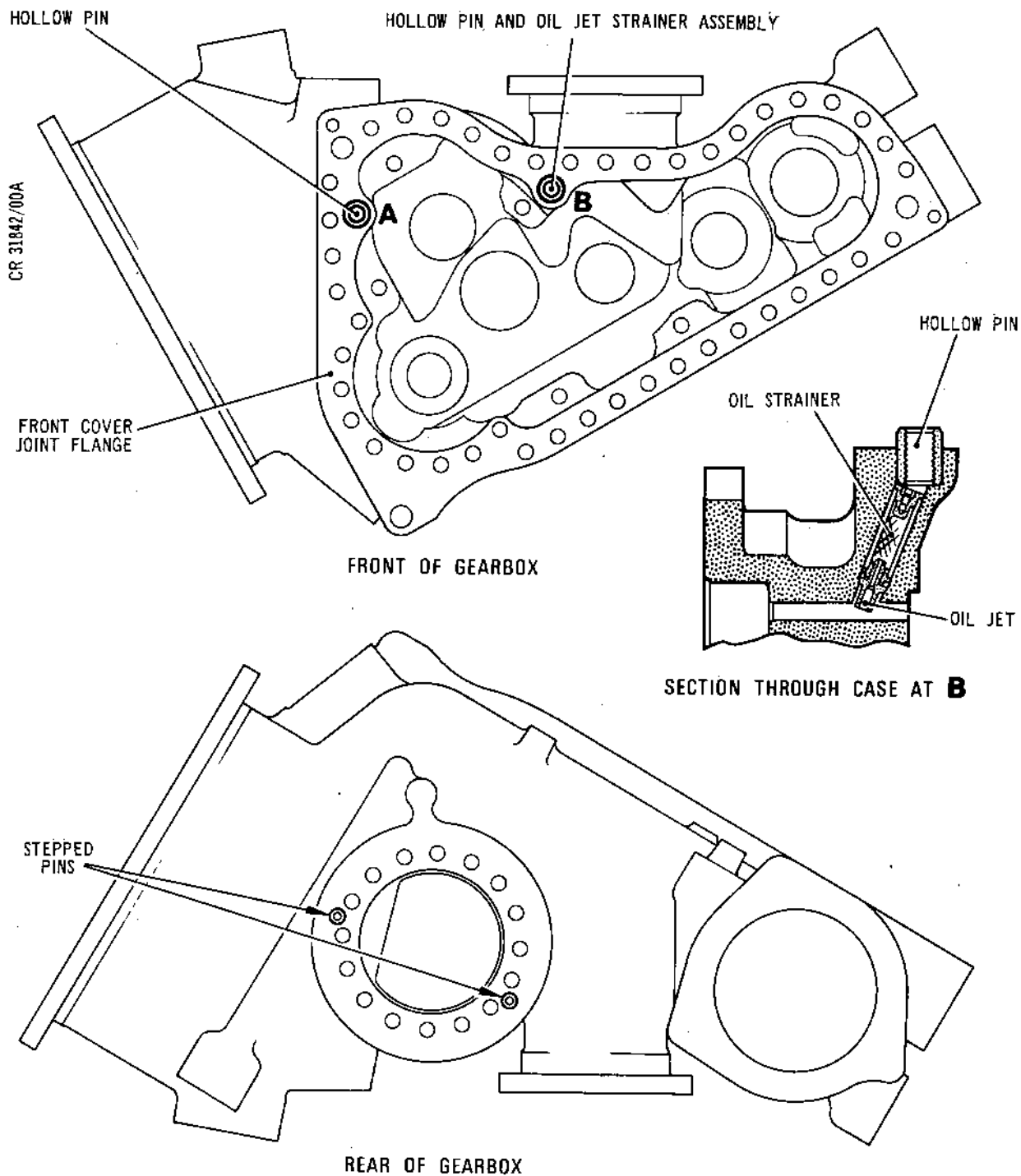
- (1) Remove the protectors from the gearbox case.
- (2) Use a suitable freezing agent, shrink the following items:
- (a) Hollow pins (72-62-01/5-180A) Pre-SB.72-18 or (72-62-01/5-180B) SB.72-18.
- (b) Stepped pins (72-62-01/6-160).
- (3) Place the case on a suitable surface which will not cause damage to the machined surfaces of the cover.

NOTE: Stepped pins and hollow pins are assembled to opposite surfaces of the case. When turning the case in the following procedures the projection of pins must be considered.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Assembling Shrink Fit Components to Gearbox Case  
Figure 502

SUB-ASSEMBLY  
**72-62-00**

Page 506  
Sep 1/75

TN20918



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (4) Use driver (Tool 1524) to assemble the stepped pins to the QAD coupling location on the rear of the case (Ref.Fig.502).
- (5) Assemble the following items to the cover location flange on the front of the case (Ref.Fig.502).
- (a) Assemble the hollow pin (72-62-01/5-180) to position A. Use driver (Tool 153) to assemble the pin.
  - (b) On engines to Pre-SB.72-32 insert the oil strainer assembly (72-62-01/5-10A) into the gearbox case. The open end of the strainer must locate in the bottom of the bore at position B. Ensure that the strainer is fully in position, then assemble the hollow pin (72-62-01/5-180) to the bore to retain the strainer assembly. Use driver (Tool 153) to assemble the pin.
  - (c) On engines to SB.72-32 screw the oil jet (72-62-01/5-20) into the oil strainer assembly (72-62-01/5-10B) and insert the assembly into the gearbox using puller (Tool 156) if required. The oil jet must locate in the bottom of the bore at position B. Ensure that the assembly is fully in position, then using driver (Tool 153) assemble the hollow pin into the bore to retain the strainer assembly.
- (6) Prepare the assembly stand (Tool 875) to accept the gearbox case (Ref.Fig.503).
- (a) Unscrew the locking pin attached to the vertical support and rotate the gearbox mounting adapter until it is in the vertical position. Screw the locking pin into position to lock the adapter.
  - (b) Assemble the main drive location adapter (Tool 867) to the gearbox mounting adapter and secure it with nuts.
  - (c) Assemble the pressure test adapter (Tool 868) to the adjustable angled bracket on the mounting adapter and secure it with the nut.
- NOTE: The angled bracket may be loosened to assist alignment when the gearbox is installed in the assembly stand.
- (7) Transfer the gearbox case to the assembly stand (Ref.Fig.503).
- (a) Remove the protector (Tool 146), then assemble the lifting fixture (Tool 313) to the gearbox case and secure it with captive bolts.

SUB-ASSEMBLY

72-62-00

Page 507

Nov 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Attach a crane hoist to the lifting fixture and transfer the assembly to the build stand.
  - (c) Align the gearbox with the mounting locations on the build stand mounting adapter, then secure the gearbox with the assembly stand bolts.
  - (d) Ensure that the angled bracket and pressure test adapter are in position and secure.
- (8) Remove the lifting fixture from the gearbox and re-assemble the protector (Tool 146).
- (9) Install the oil jet and oil strainer (Ref.Fig.503).

CAUTION: END OF STRAINER PROTRUDES FROM BORE WHEN FULLY INSERTED. EXERCISE CARE TO PREVENT FILTER COLLAPSING DURING INSERTION.

- (a) Screw the oil jet (72-62-01/5-90A) Pre-SB.72-12 or oil jet (72-62-01/5-90B) SB.72-12 into the oil strainer (72-62-01/5-80).
  - (b) Insert the assembly into the gearbox case so that the oil jet locates in the bottom of the bore.
  - (c) Assemble the driver (Tool 1481) to the end of the oil strainer and carefully press the assembly into position.
  - (d) Secure the oil jet strainer assembly with a gasket (72-62-01/5-70) SB.72-15, end plate (72-62-01/5-60) bracket (72-62-01/5-50) and bolts (72-62-01/5-40).
  - (e) Apply lubricant 'A' to the bolts, ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Place the components in position, then torque-tighten the bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (10) Assemble the oil jet (72-62-01/5-110) to the QAD coupling position (Ref.Fig.503).
- (a) Apply lubricant 'A' to the securing items.
  - (b) Place the oil jet in position and secure it with a bolt (72-62-01/5-100). Ensure that the bolt has a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the bolt between 67 and 73 lbf in. (7,6 and 8,2 N.m).

SUB-ASSEMBLY

**72-62-00**

Page 508

Apr 1/76

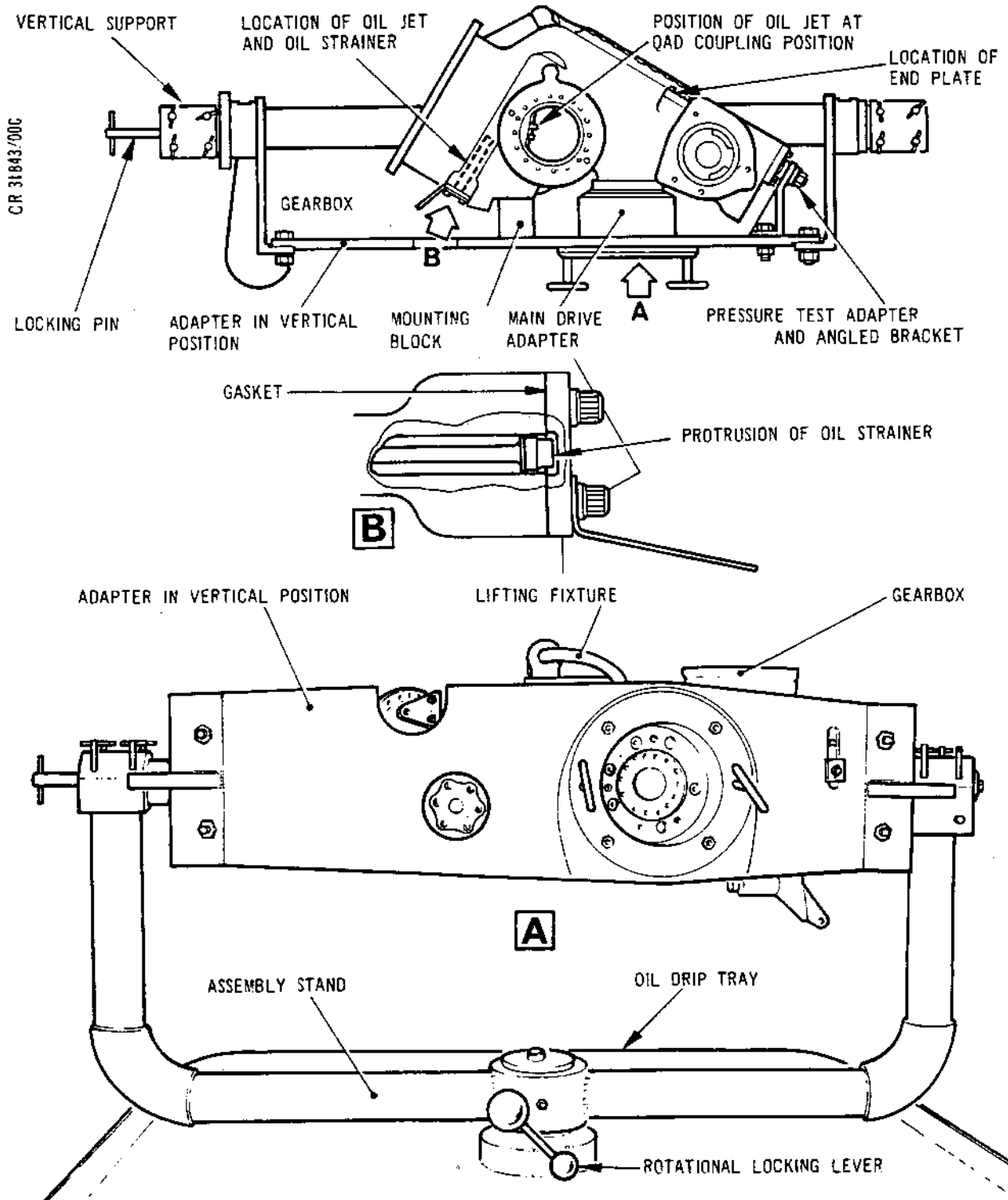
IN20218



OLYMPUS 593

MK.610-14-28

OVERHAUL



Assembling Gearbox to Assembly Stand  
Figure 503

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



SNECMA

(11) Assemble the end plate (72-62-01/7-270) (Ref.Fig.503).

- (a) Apply lubricant 'A' to the bolts (72-62-01/7-260) and ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).
- (b) Assemble the gasket (72-62-01/7-280) SB.72-15 end plate and bolts to the case. Torque-tighten the bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m).

(12) Assemble the oil jet (72-62-01/5-30) to the inner surface of the case (Ref.Fig.504 position A). Screw the jet fully into position and carefully tighten it.

(13) Assemble the bolts (72-62-01/4-340) and load spreading blocks (72-62-01/4-350) to position B (Ref.Fig.504), then secure the bolts with retaining rings (72-62-01/4-330). Use guide sleeve (Tool 271) and driver (Tool 1959) to assemble the retaining rings.

(14) Assemble the bolt (72-62-01/4-90) and load spreading washer (72-62-01/4-80) to position C (Ref.Fig.504), then secure the bolt with a retaining ring (72-62-01/4-70).

(15) On engines Post SB.72-7510-166 standard, assemble the integral bearing (72-62-02/1A-260B) SB.72-7510-166, or (72-62-02/1A-260C) SB.72-8651-246, or ball and roller bearing assembly (72-62-02/1B-140A or B) SB.72-8990-383 and oil jet (72-62-02/1-230) to the main drive position (Ref.Fig.504).

**NOTE:** Protective material must be removed from the bearing before assembly. The bearing must also be lubricated (Ref.72-09-00, Assembly).

- (a) Apply lubricant 'A' to the bolts. Ensure thorough cleanliness of all components and the main drive location.

SUB-ASSEMBLY

**72-62-00**

Page 510

Dec 31/00



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (b) Remove the parallel roller assembly from the integral bearing, identify it for later reference and place it in a container.
- (c) Place the integral bearing in the main drive shaft bore inserting it from the inside of the gearbox case.
- (d) Support the bearing and place the oil jet (72-62-02/1-230) on to the outer side of the main drive bore. Ensure that the oil jet spigot locates in the oil feed hole.
- (e) Continue to support the bearing. Position the lubricating nozzle (72-62-02/1A-250B) SB.72-7510-166, or (72-62-02/1A-250C) SB.72-32 inside the gearbox and align it with the previously installed oil jet. Insert two bolts (72-62-02/1A-240) through the inner jet to secure both oil jet and lubricating nozzle, then temporarily retain the assembly with two nuts (72-62-02/1A-210).
- (f) Insert the three bolts (72-62-02/1A-240) through the remaining bearing locations. Secure each bolt with a load spreading plate (72-62-02/1A-220) and nut (72-62-02/1A-210) positioned on the outer side of the main drive bore.

SUB-ASSEMBLY

**72-62-00**

Page 510A

Dec 1/96



**OLYMPUS 593**



**MK.610-14-28  
OVERHAUL**

*sneema*

**This Page Left Blank Intentionally**

**SUB-ASSEMBLY**

**72-62-00**

**Page 510B  
Dec 1/96**



CR 31844/00E



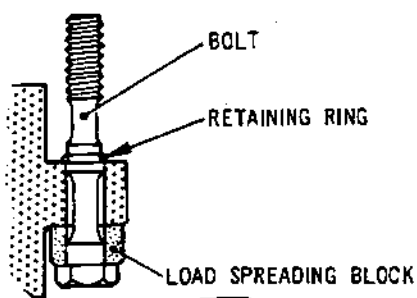
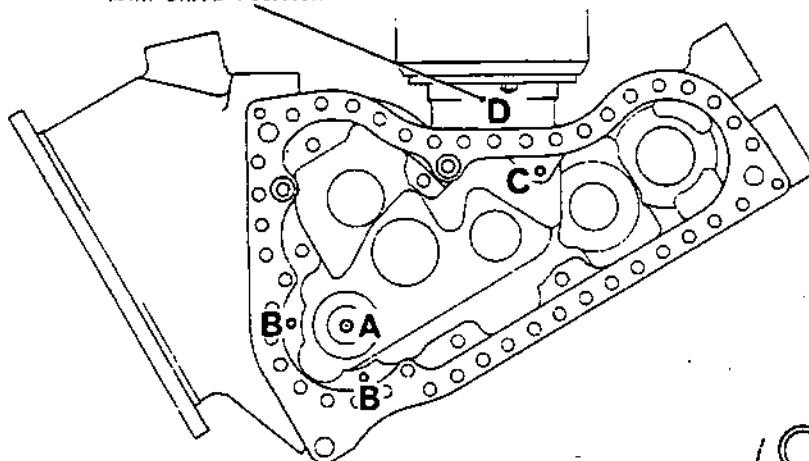
OLYMPUS 593



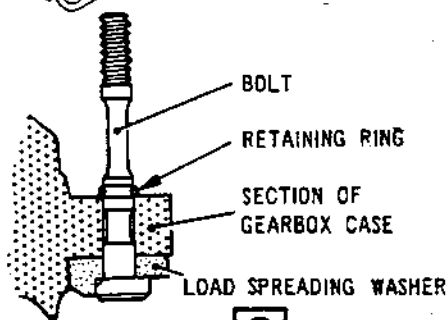
MK.610-14-28  
OVERHAUL

sneema

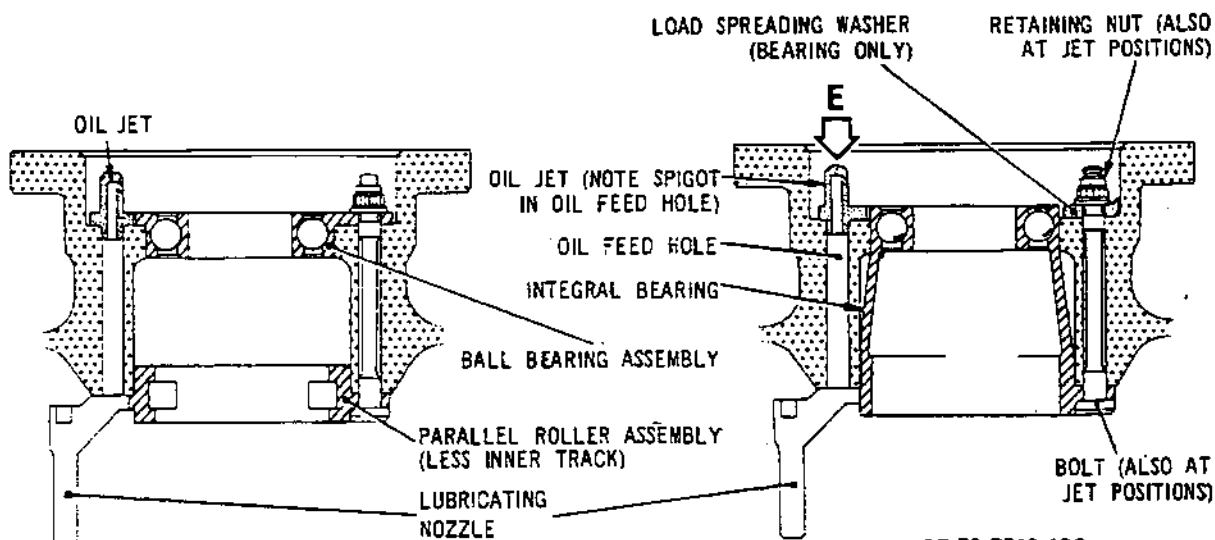
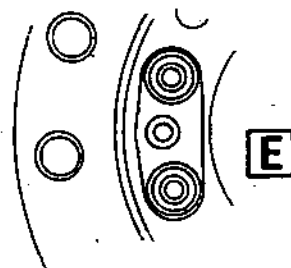
MAIN DRIVE POSITION



DETAIL AT **B**



DETAIL AT **C**



PRE SB 72-7510-166  
SB 72-8990-383

SB 72-7510-166  
SB 72-8651-246

DETAIL OF MAIN BORE ASSEMBLY AT **D**

Assembling Oil Jets to Gearbox  
Figure 504



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

- (g) Ensure that the nuts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the oil jet nuts and bearing nuts between 67 and 73 lbf in. (7,6 and 8,2 N.m).

**NOTE:** To prevent bearing outer track distortion, it is desirable that a clearance exists between the flat of the bolt dee head and the adjacent edge of the bearing outer race, particularly at the lubricating nozzle location, on completion of the torque tightening procedure.

To achieve this, a feeler or some similar device may be temporarily inserted into the bolt dee head gap during torque tightening, and removed on completion.

- (16) On engines to Pre SB.72-7510-166 assemble the ball bearing assembly (72-62-02/1-260A) parallel roller bearing journal (72-62-02/1-360A) and oil jets to the main drive position.

**NOTE:** Protective material must be removed from the bearing before assembly. The bearing must also be lubricated (Ref.72-09-00, Assembly).

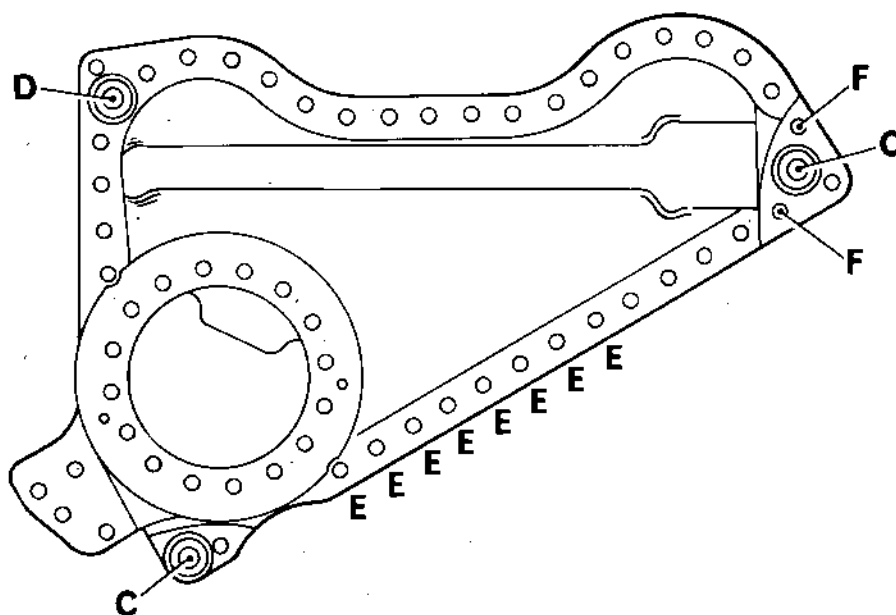
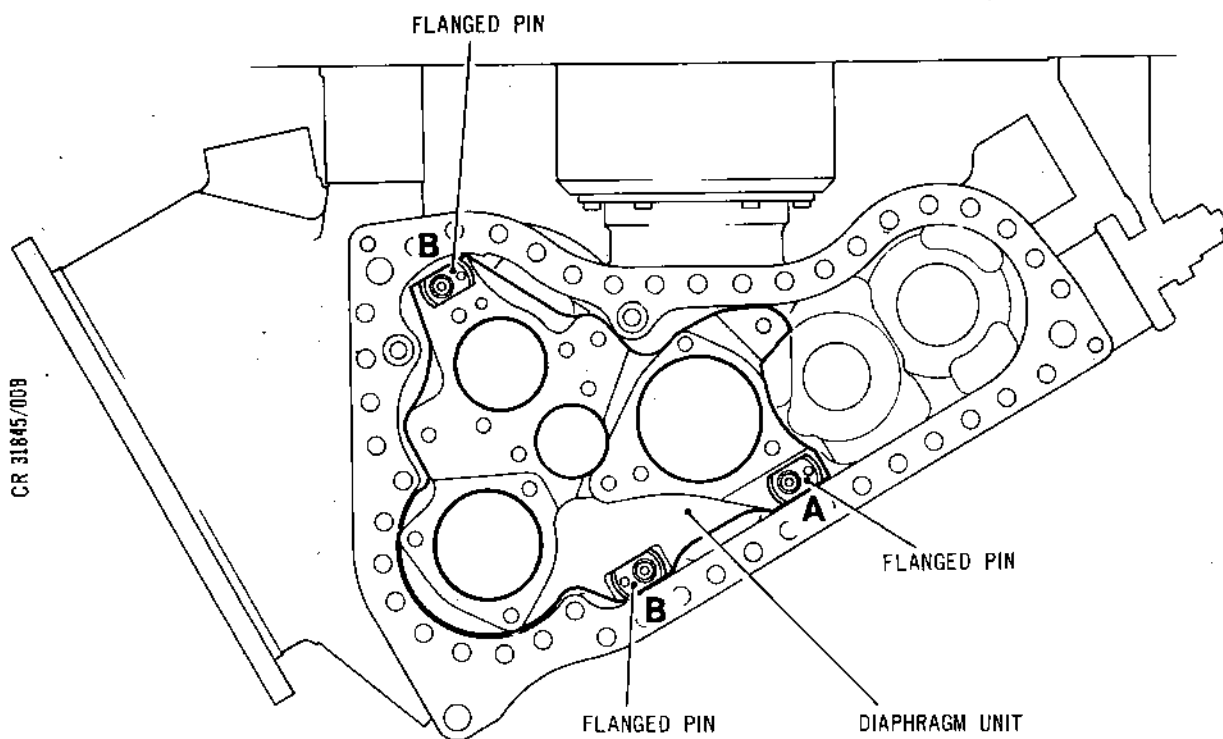
- (a) Apply Lubricant 'A' to securing items.
- (b) Place the oil jet (72-62-02/1-230) on to the outer side of the main drive bore. Ensure that the oil jet spigot locates in the oil feed hole (Ref.Fig.504).
- (c) Position the oil jet (72-62-02/1-250A) inside the gearbox and align it with the previously installed oil jet. Insert two bolts (72-62-02/1-240) through the inner jet to secure both jets. Retain the bolts with nuts (72-62-02/1-210).
- (d) Place the ball bearing journal (72-62-02/1-260A) on the outer side of the main bore, ensure that it locates correctly into the bore.

SUB-ASSEMBLY

## 72-62-00

Page 512  
Dec 1/96

CR 31845/008



### Assembling Diaphragm and Front Cover

Figure 505

SUB-ASSEMBLY  
**72-62-00**

Page 513  
Sep 1/75

TN20933



OLYMPUS 598

MK.610-14-28  
OVERHAUL



- (e) Remove the inner track from the parallel bearing journal (72-62-02/1-360) identify the track and place it in a protective container. Place the roller assembly on the inner side of the main drive bore.
- (f) Align the bolt-holes in both bearing assemblies then insert the retaining bolts (72-62-02/1-240) through the inner bearing and secure the assemblies with nuts (72-62-02/1-210).
- (g) Ensure that the nuts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the bearing and oil jet nuts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

### 3. Temporarily Assemble Cases Together

#### A. Assemble Diaphragm to Gearbox Case (Ref.Fig.505).

- (1) Ensure thorough cleanliness of components.
- (2) Place the diaphragm in the gearbox case. Assemble three flanged pins (72-62-01/4-20-40) to the diaphragm. Temporarily retain the pin at position A (Ref.Fig.505) with a bolt (72-62-01/4-10). Secure the pins at position B with bolts (72-62-01/4-30).

#### B. Assemble Front Cover to Gearbox Case (Ref.Fig.505).

- (1) Ensure thorough cleanliness of the cover especially oilways. Apply lubricant 'A' to securing items.
- (2) Place the cover in position over the diaphragm and gearbox case, ensuring that the pins locate correctly in the gearbox flange.
- (3) Temporarily secure the cover with the following items.
  - (a) At the previously installed pin locations at position C with bolts (72-62-01/3-110) and at position D with bolt (72-62-01/3-130).
  - (b) At position E with load spreading washers (72-62-01/3-80) and bolts (72-62-01/3-70).
  - (c) At position F with load spreading washers (72-62-01/3-100) and bolts (72-62-01/3-90).
  - (d) At the remaining bolt locations with load spreading washers (72-62-01/3-60) and bolts (72-62-01/3-50).

SUB-ASSEMBLY

**72-62-00**

Page 514  
Dec 1/76

FN20221



OLYMPUS 593

MK.610-14-28

OVERHAUL



#### 4. Oil Flow Check

A. Prepare for Flow Check (Ref.Fig.506 and Fig.507).

**NOTE:** For details of mobile pressure test rig (Tool 1926) refer to the manufacturers information. Oil specification lubricant 'A'.

- (1) Ensure thorough cleanliness of blanks, adapters and equipment.
- (2) Assemble pressure test adapter (Tool 704) to the cover unit. This adapter is stored in container (Tool 799).
- (3) Assemble the pressure test adapter (Tool 149) to the transfer tube location on the oil pump face of the casing.
  - (a) Ensure that the ring seal on the bobbin is in good condition, then insert the bobbin in the case.
  - (b) Assemble the joint washer and plate over the bobbin, and secure the assembly to the tube location flange with nuts and washers.
- (4) Assemble the pressure test blank (Tool 150) to the gearbox case and secure it with six bolts and washers. This blank is stored in container (Tool 799).
- (5) Connect the oil pressure test rig (Tool 583) to the gearbox case assembly.
  - (a) Connect the oil feed hose to the pressure test adapter (Tool 149).
  - (b) Connect the oil scavenge hose to the pressure test adapter (Tool 704).
- (6) Ensure that an adequate amount of oil is contained in the mobile pressure test equipment. Suitable protective clothing must be worn to minimise personnel contact with oil.
- (7) Check that the oil drip tray on the assembly stand is in position and that a suitable oil drainage container is available.
- (8) Place the transparent protection cover (Tool 797) over the gearbox.

SUB-ASSEMBLY

**72-62-00**

Page 515

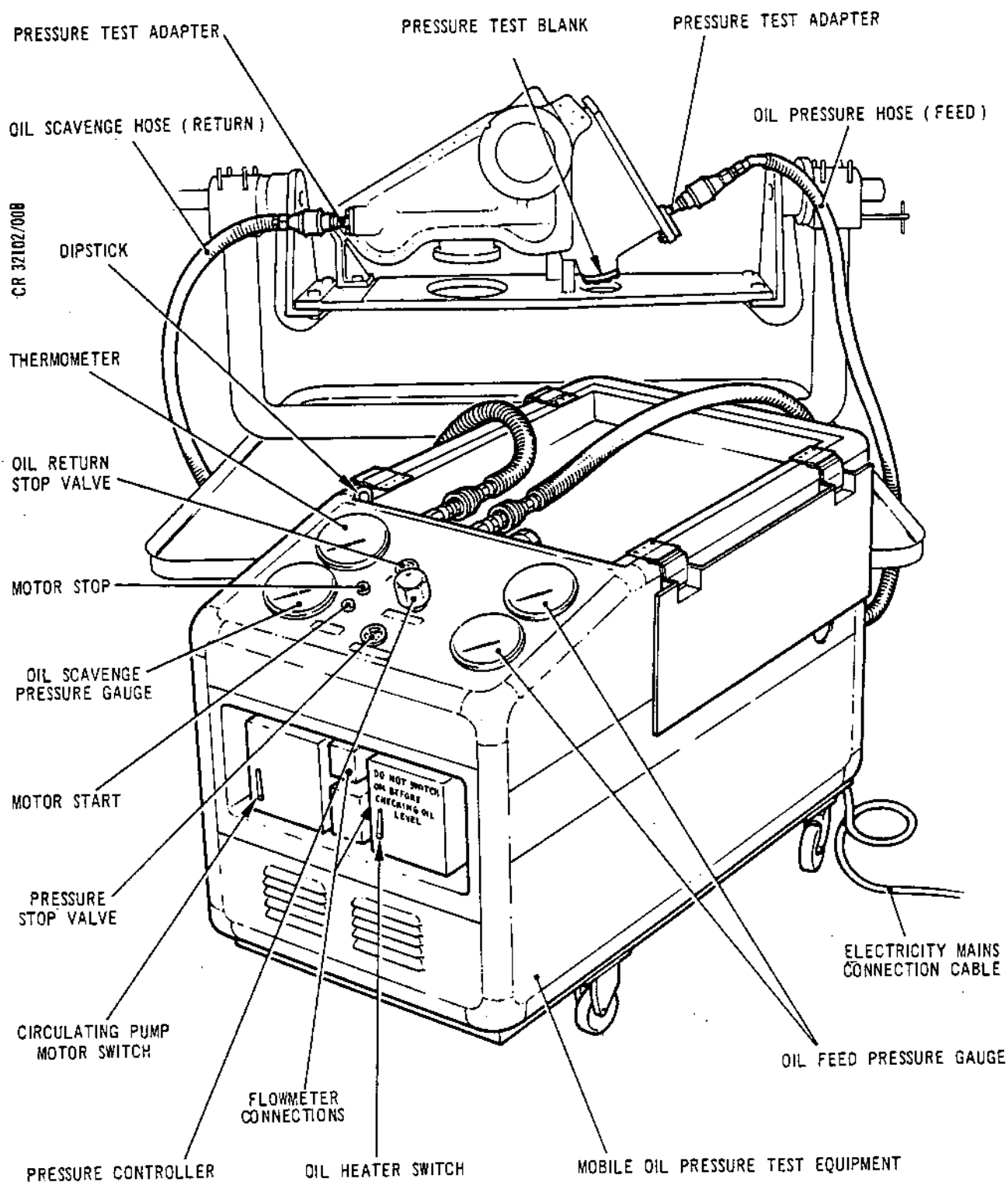
Dec 1/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



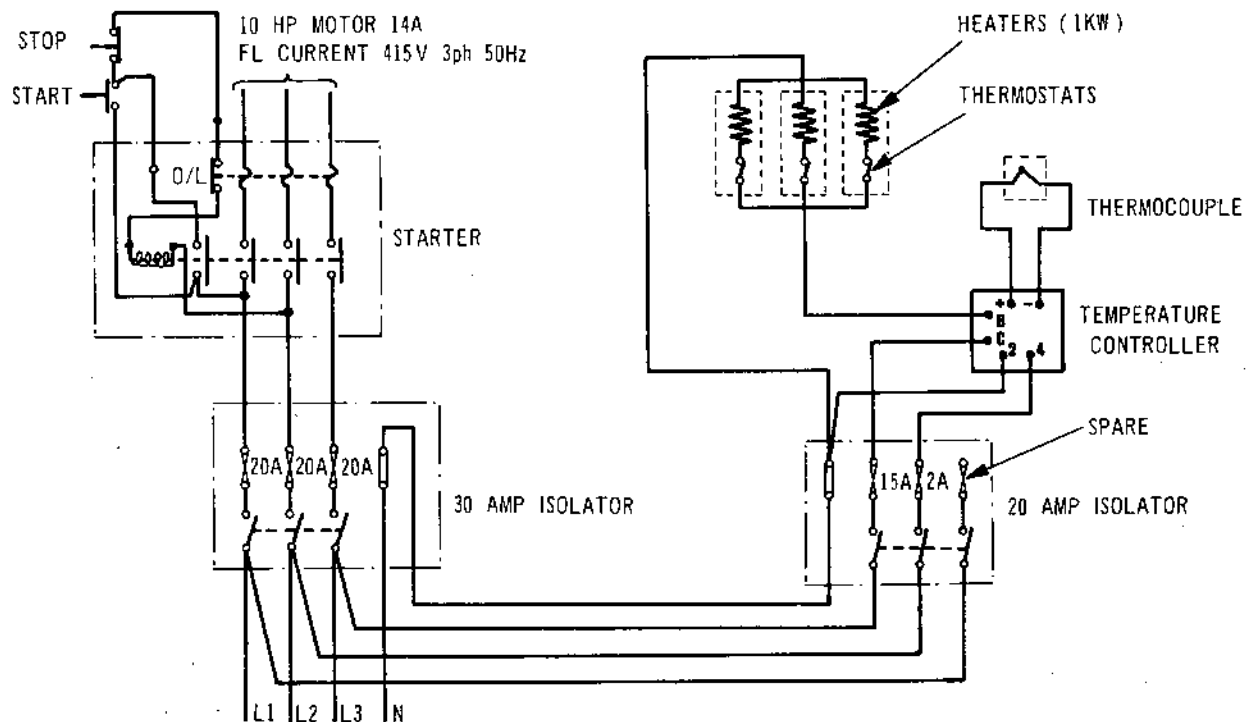
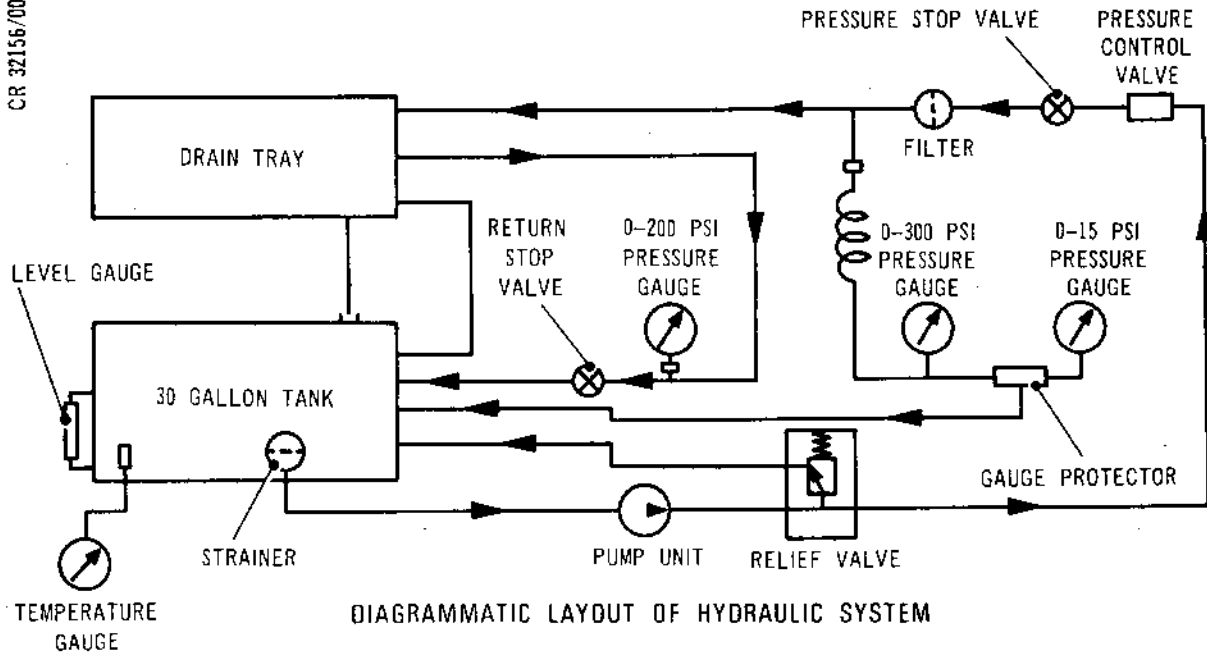
Assembling Oil Flow Check Equipment  
Figure 506

SUB-ASSEMBLY  
**72-62-00**  
Page 516  
Sep 1/75

TN20934

CR 32156/00A

**PRINTED IN ENGLAND**



Layout of Electrical and Hydraulic Systems of the Oil  
Pressure Test Rig  
Figure 507

SUB-ASSEMBLY  
72-62-00

Page 517  
Sep 1/75

TN29398



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (9) Connect the test equipment to the mains electricity supply of 30 A 600 V a.c. Ensure that the circulating pump and oil heater is switched OFF.

- (10) Open the oil return stop valve on the test equipment.

B. Oil Flow Check Procedure.

- (1) Switch ON the circulating pump motor and regulate the oil flow between 3 and 5 psi until a discharge of oil is evident from the gearbox and cover jets.
- (2) Examine each oil jet to ascertain that it is flowing oil freely.
- (3) On satisfactory completion of visual flow check, switch off the mains electricity supply and disconnect the pressure test equipment from the gearbox.
- (4) Remove the pressure test adapters and blank from the gearbox. Return the adapter (Tool 704) and blank (Tool 150) to the container (Tool 799).
- (5) Return clean drainage oil to the mobile pressure test equipment.

5. Disassemble Cases and Examine Oil Filters

A. Remove Front Cover.

- (1) Remove the bolts securing the front cover to the gearbox case at the flanged pin positions.
- (2) Remove the remaining bolts and load spreading washers from the flange. Carefully separate the joint flanges by using puller (Tool 1021). Ensure that residual oil drains into the drip tray.
- (3) Assemble the holding fixture (Tool 151) to the front cover and secure the assembly in the Hydraclamp (Tool 1643).

B. Examine Front Cover Oil Filters.

- (1) Remove the filter/connector assembly from position F (Ref.Fig.501).
  - (a) Release the bolt securing the retaining cap and withdraw the retaining cap.

TN20222

SUB-ASSEMBLY

72-62-00

Page 518

Sep 1/75





OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Screw the puller (Tool 158) into the connector and withdraw the assembly from the bore.
  - (c) Examine the filter assembly and bore for cleanliness. Remove all deposits of foreign matter.
- (2) Assemble the filter/connector assembly.
- (a) Insert the assembly into the bore and secure it with the retaining cap and bolt.
  - (b) Apply lubricant 'A' to the bolt and ensure that it has a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the bolt between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (3) Remove the filter from position G (Ref.Fig.501).
- (a) Release the bolt and washer securing the retaining cap, then remove the retaining cap.
  - (b) Screw the puller (Tool 158) into the filter and withdraw the assembly from the bore.
  - (c) Examine the filter assembly and bore for cleanliness. Remove all deposits of foreign matter.
- (4) Install the filter.
- (a) Insert the filter into the bore and secure it with the retaining cap washer and bolt.
  - (b) Apply lubricant 'A' to the bolt and ensure that it has a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the bolt between 67 and 73 lbf in. (7,6 and 8,2 N.m).

C. Examine Gearbox Case Oil Filters.

- (1) Remove the diaphragm (Ref.Fig.505).
  - (a) Release the bolts, securing the diaphragm to the gearbox case. Withdraw the flanged pins from the diaphragm using the puller (Tool 177).
  - (b) Withdraw the diaphragm. Place the diaphragm in a suitable container.

SUB-ASSEMBLY

72-62-00

Page 519

Apr 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Remove the oil strainer retained by the hollow pin on the gearbox case/cover flange (Ref.Fig.502).
  - (a) Use puller (Tool 154) with impact puller (Tool 1653) to remove the hollow pin.
  - (b) Use puller (Tool 156) with impact puller (Tool 1653) to remove the oil strainer assembly from the bore.
  - (c) Examine the oil strainer assembly and bore for cleanliness. Remove all deposits of foreign matter.
- (3) Install the oil strainer assembly.
  - (a) Shrink the hollow pin with a suitable freezing agent.
  - (b) Insert the oil strainer assembly so that the oil jet locates in the bottom of the bore. Ensure that the assembly is fully in position.
  - (c) Assemble the hollow pin to the bore to hold the assembly in position.
- (4) Disassemble the cover and bracket from the oilway near the QAD coupling location on the rear of the gearbox case. Remove the oil jet and strainer assembly (Ref.Fig.503).
  - (a) Screw the puller (Tool 155) into the end of the filter and withdraw the assembly. The puller can be used in conjunction with impact puller (Tool 1653).
  - (b) Examine the oil strainer assembly and bore for cleanliness. Remove all deposits of foreign matter.
- (5) Install the oil strainer assembly into the bore.

**CAUTION:** END OF STRAINER PROTRUDES FROM BORE WHEN FULLY INSERTED. EXERCISE CARE TO PREVENT FILTER COLLAPSING DURING INSERTION.

- (a) Insert the assembly so that the oil jet locates in the bottom of the bore.

IN20224



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Assemble the driver (Tool 1481) to the end of the oil strainer and carefully press the assembly fully into the bore.
- (c) Secure the strainer assembly with a joint washer end plate, bracket and bolts.
- (d) Apply lubricant 'A' to the bolts, and ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Place the components in position and torque-tighten the bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m).

#### 6. Assemble Bearing Components to Gearbox Case

NOTE: The protective material must be removed from bearings before assembly. Bearings must also be lubricated with lubricant 'A' and protected (Ref.72-09-00, Assembly). Remove each roller assembly from its journal and suitably identify for future assembly.

##### A. Assemble Bearing Journal to Position A (Ref.Fig.508).

- (1) Place the roller assembly in a container.
- (2) Insert the parallel roller bearing journal (72-62-04/1-240) into the bore in the case. The journal is inserted from the outside of the case through the QAD coupling location.
- (3) Apply lubricant 'A' to the bolts. Assemble the load spreading washers (72-62-04/1-220) to the bolts (72-62-04/1-230).
- (4) Retain the journal with the bolts, load spreading washers and nuts (72-62-04/1-210).
  - (a) Insert the bolts from the inside of the case ensuring that the load spreading washers locate correctly under the bolt heads.
  - (b) Ensure that the nuts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Assemble the nuts to the bolts and torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).

##### B. Assemble Bearing Journal to Position B (Ref.Fig.508).

- (1) Place the roller assembly in a container.
- (2) Place the parallel roller bearing journal (72-62-03/1-130) on the inner surface of the gearbox case.

SUB-ASSEMBLY

**72-62-00**

Page 521

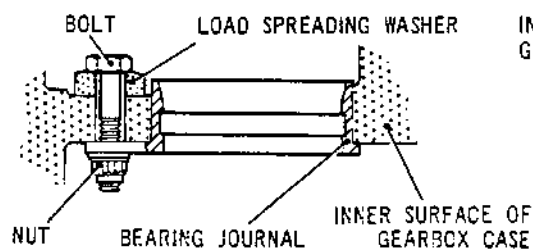
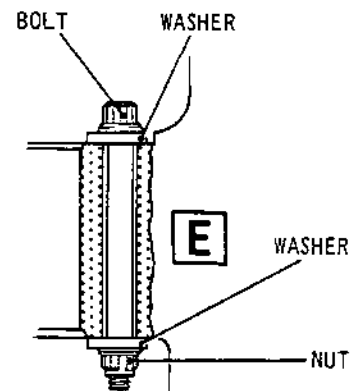
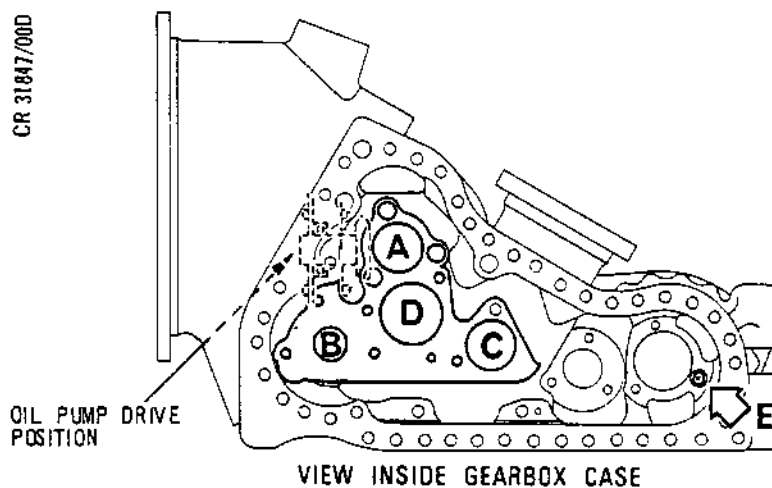
Apr 1/76



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL

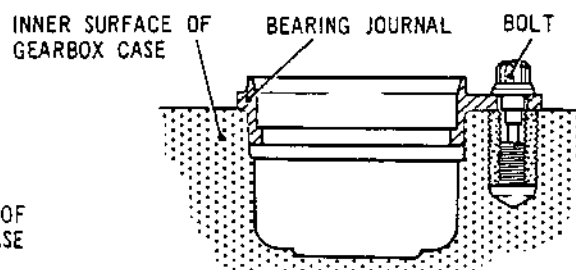


CR 31847/000



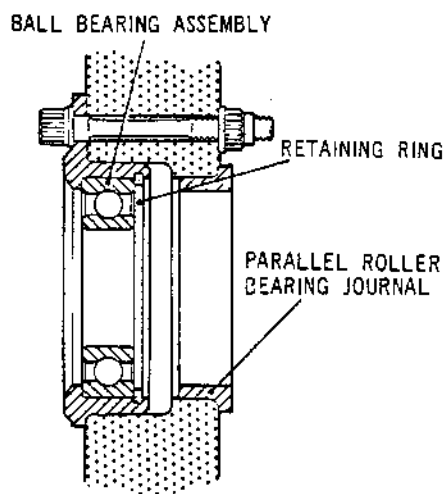
ASSEMBLY OF BEARING  
JOURNAL AT POSITION

**A**

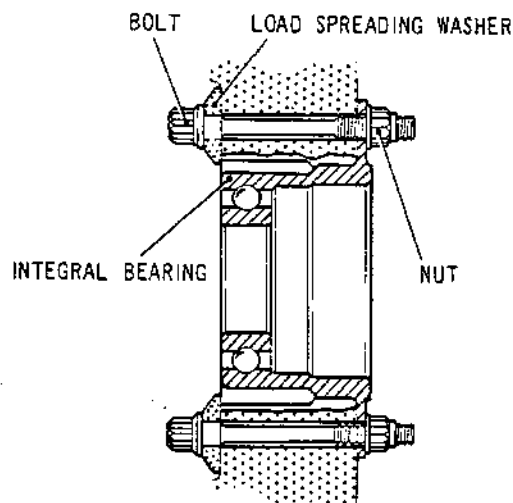


TYPICAL ASSEMBLY OF BEARING  
JOURNALS AT POSITIONS

**B C D**



PRE-SB 72-7510-166



SB 72-7510-166  
SB 72-8651-246

ARRANGEMENT OF INTEGRAL BEARING AT OIL PUMP DRIVE LOCATION

Assembling Bearing Components to Gearbox Case  
Figure 508

SUB-ASSEMBLY  
**72-62-00**

Page 522  
Dec 1/80

IN20936



# OLYMPUS 593



MK.610-14-28 SNECMA

## OVERHAUL

- (3) Apply lubricant 'A' to the bolts (72-62-03/1-110). Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Secure the journal to the case with the bolts torque-tightened between 67 and 73 lbf in. (7,6 and 8,2 N.m).

### C. Assemble Bearing Journal to Position C (Ref.Fig.508).

- (1) Place the roller assembly in a container.
- (2) Place the parallel roller bearing journal (72-62-02/1-160) on the inner surface of the gearbox case.
- (3) Apply lubricant 'A' to the bolts (72-62-02/1-148). Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Secure the journal to the case with the bolts torque-tightened between 67 and 73 lbf in. (7,6 and 8,2 N.m).

### D. Assemble Bearing Journal to Position D (Ref.Fig.508).

- (1) Place the roller assembly in a container.
- (2) Place the parallel roller bearing journal (72-62-03/1-50) on the inner surface of the gearbox case.
- (3) Apply lubricant 'A' to bolts (72-62-03/1-30). Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Secure the journal to the case with the bolts torque-tightened between 67 and 73 lbf in. (7,6 and 8,2 N.m).

### E. Assemble Bearings to Oil Pump Drive Position (Ref.Fig.508).

- (1) On engines to SB.72-7510-166 and SB.72-8651-246 assemble the integral bearing (72-62-04/1-380B) to the oil pump drive position.
  - (a) Remove the parallel roller assembly from the integral bearing, identify it for later reference and place it in a container.
  - (b) Place the integral bearing in the oil pump drive shaft bore inserting it from inside the gearbox case.
  - (c) Apply lubricant 'A' to the bolts (72-62-04/1-280B), then place a load spreading washer (72-62-04/1-285A) under the head of each bolt.
  - (d) Insert the bolts through the case so that the bolt heads and washers are positioned in the oil pump section.

SUB-ASSEMBLY

## 72-62-00

Page 523  
Sep 30/94



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (e) Ensure that the nuts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Secure the bolts with nuts (72-62-04/1-270) torque-tightened between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (2) On engines to Pre SB.72-7510-166 assemble the ball bearing housing (72-62-04/1-420) and parallel roller bearing journal (72-62-04/1-380A) to the oil pump drive position.
- (a) Remove the parallel roller assembly from the bearing journal, identify the roller assembly and place it in a container.
  - (b) Ensure that the ball bearing journal (72-62-04/1-410) is fully pressed into the ball bearing housing and secured with a retaining ring (72-62-04/1-400).
  - (c) Apply lubricant 'A' to securing items, position the parallel roller bearing journal inside the gearbox case in the oil pump drive bore. Place the ball bearing housing on the opposite end of the bore in the oil pump chamber. Ensure that both assemblies locate correctly in the respective bore recess.
  - (d) Secure the bearings together with bolts (72-62-04/1-280A) inserted so that the boltheads are positioned on the oil pump side of the bore.
  - (e) Secure the bolts with nuts (72-62-04/1-270), ensure that the nuts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the nuts between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- F. Assemble Bolt to Position E (Ref.Fig.508).
- (1) Apply lubricant 'A' to the bolt (72-62-01/5-150). Position the washer (72-62-01/5-140) under the bolt, then insert the bolt into the hole so that the bolt-head and washer locates on the upper surface of the case.
  - (2) Place a washer (72-62-01/5-130) over the protruding bolt thread and secure the bolt with a nut (72-62-01/5-120). Ensure that the nut has a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the nut between 67 and 73 lbf in. (7,6 and 8,2 N.m).

SUB-ASSEMBLY

**72-62-00**

Page 524

Dec 1/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## 7. Assemble Bearings to Diaphragm

NOTE: Protective material must be removed from bearings before assembly. Bearings must also be lubricated (Ref.72-09-00, Assembly).

### A. Assemble Diaphragm to Hydraclamp (Ref.Fig.509).

- (1) Assemble the diaphragm to the holding fixture (Tool 152) and secure it to Hydraclamp (Tool 1643).

### B. Assemble Bearing to Position A (Ref.Fig.509).

- (1) Insert the bearing (72-62-04/1-40) into the bottom surface of the diaphragm.
- (2) Secure the bearing as follows:
  - (a) Apply lubricant 'A' to the bolts. Ensure that the nuts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).
  - (b) Position the load spreading washer assembly (72-62-01/4-190) on the top surface of the diaphragm. Ensure that the pin locates fully into the diaphragm.
  - (c) Insert a bolt (72-62-01/4-200) through the load spreading washer, then secure the bolt with a nut (72-62-01/4-180) torque-tightened between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (d) Position the load spreading washers (72-62-01/4-130) and (72-62-01/4-170) at the remaining two holes.
  - (e) Insert a bolt (72-62-01/4-160-120) through the hole nearest the bearing in each load spreading plate.
  - (f) Secure the bolts with nuts (72-62-01/4-110-150) torque-tightened between 67 and 73 lbf in. (7,6 and 8,2 N.m).

### C. Assemble Bearing to Position B (Ref.Fig.509).

- (1) Assemble the bearing (72-62-03/1-100) into the top surface of the diaphragm.

SUB-ASSEMBLY

**72-62-00**

Page 525  
Dec 1/79

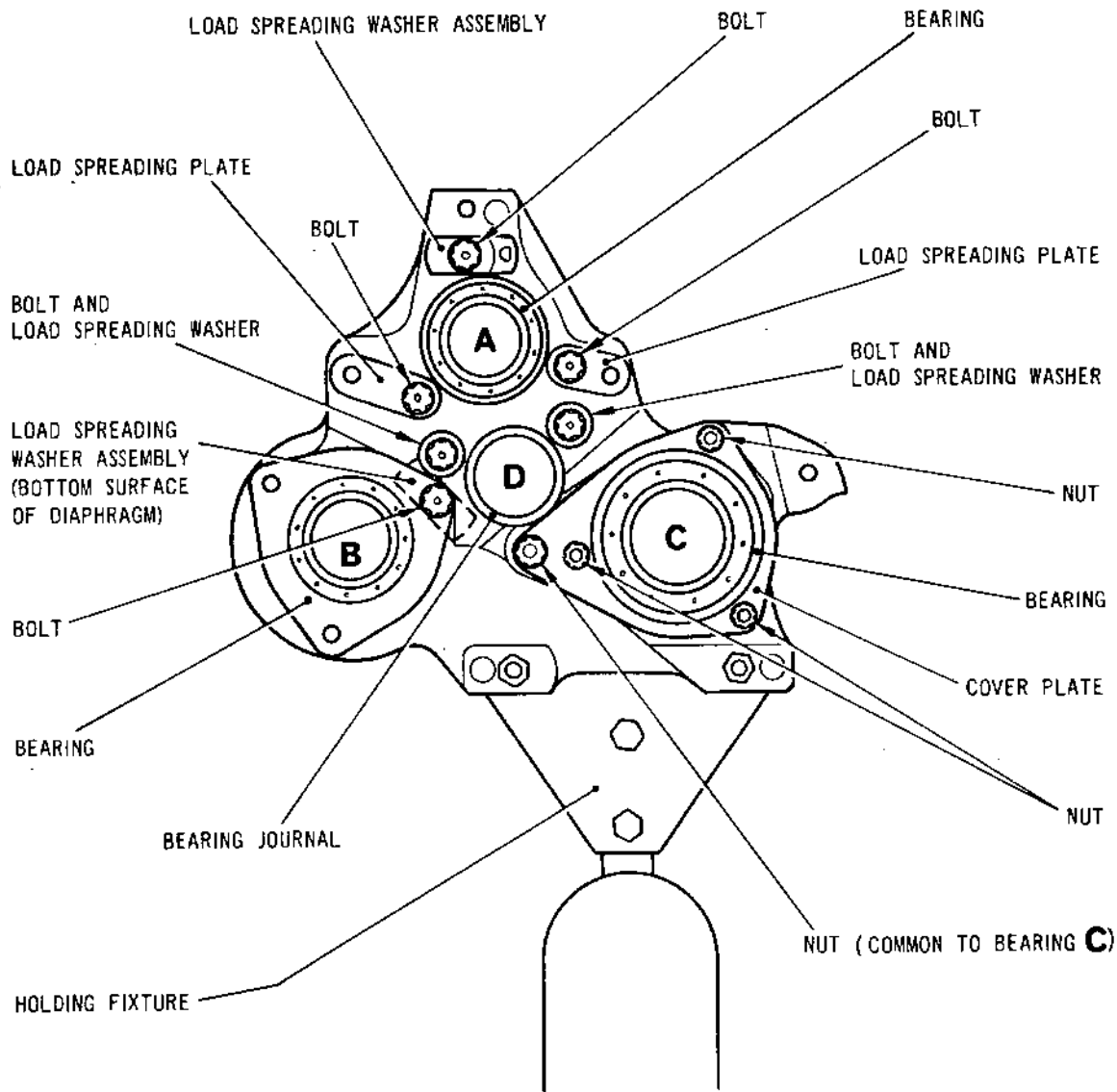


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31848/00B



VIEW ON TOP SURFACE OF DIAPHRAGM

Assembling Bearings to Diaphragm  
Figure 509

SUB-ASSEMBLY  
**72-62-00**

Page 526  
Sep 1/75

TN20937





OLYMPUS 593

MK.610-14-28  
OVERHAUL

- (2) Secure the bearing as follows:
  - (a) Apply lubricant 'A' to bolts.
  - (b) Position the load spreading washer assembly (72-62-01/4-300) on the bottom surface of the diaphragm ensuring that the pin locates fully into the diaphragm.
  - (c) Insert a bolt (72-62-01/4-310) through the bearing journal flange. Secure the bolt with a nut (72-62-01/4-290) located on the load spreading washer.
  - (d) Ensure that the nut has a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the nut between 67 and 73 lbf in. (7,6 and 8,2 N.m).

#### D. Assemble Bearing to Position C (Ref.Fig.509).

- (1) Assemble the bearing (72-62-02/1-30) into the bottom surface of the diaphragm.
- (2) Apply lubricant 'A' to bolts (72-62-01/4-230). Insert the bolts through the bottom surface of the assembly. Place the cover plate (72-62-01/4-220) over the protruding bolt threads, then secure the assembly with nuts (72-62-01/4-210).
- (3) Ensure that the nuts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the nuts between 67 and 73 lbf in. (7,6 and 8,2 N.m).

#### E. Assemble Bearing Journal to Position D (Ref.Fig.509).

- (1) Remove the roller assembly from the journal (72-62-03/1-20) and identify it D. Place the roller assembly in a container. Insert the bearing journal into the bottom surface of the diaphragm.
- (2) Secure the journal as follows:
  - (a) Apply lubricant 'A' to securing items.
  - (b) Insert the bolt (72-62-01/4-280) into the hole that is common to bearing C. The bolt head locates on the bottom surface of the diaphragm assembly. Secure the bolt with a nut (72-62-01/4-270).



# OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

- (c) Place a load spreading washer (72-62-01/4-250) under the head of each bolt (72-62-01/4-260). Insert the bolts through the two remaining bolt locations in the bearing journal. Secure the bolts with nuts (72-62-01/4-240).
- (d) Ensure that the nuts have a minimum locking (run-down torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the three nuts between 67 and 73 lbf in. (7,6 and 8,2 N.m).

## 8. Bevel Gears Adjusting Washers Thickness Measuring Procedures

### A. Assemble Setting Gauge to Oil Pump Bevel Pinion Position (Ref. Fig.510).

NOTE: The setting gauges are stored in containers (Tools 160 and 161).

- (1) Remove the knurled nut from setting gauge (Tool 7), then assemble the parallel roller assembly (72-62-04/1-380) followed by spacer sleeve (72-62-04/1-390) to the gauge. The parallel roller assembly was previously removed from the oil pump bearing assembly.
- (2) Insert the setting gauge into the oil pump bevel pinion position so that the knurled end of the plunger protrudes into the oil pump location.
- (3) Ensure that the bearing and spacer fully engages with the integral bearing.
- (4) Screw the knurled nut onto the gauge to retain the assembly.

### B. Assemble Setting Gauge to Main Drive Bevel Pinion Position (Pre SB.72-8990-383) (Ref. Fig.510).

- (1) Remove the knurled nut from setting gauge (Tool 8), then assemble the parallel roller assembly (72-62-02/1-360) and spacer sleeve (72-62-02/1-350) to the gauge. The roller assembly was previously removed from the main drive bearing assembly.
- (2) Insert the setting gauge into the main drive bearing location so that the knurled end of the plunger protrudes outward.
- (3) Ensure that the bearing track and spacer fully engages with the integral bearing.



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (4) Screw the knurled nut onto the gauge to retain the assembly.

C. Assemble Setting Gauge to Main Drive Bevel Pinion Position (SB.72-8990-383) (Ref. Fig.510).

- (1) Remove the knurled shouldered nut from setting gauge (Tool 3144) and back-off the knurled locknut and centreing nut at opposite end of gauge.
- (2) Insert the setting gauge into the main drive bearing location so that the knurled end of the plunger protrudes outwards, ensuring the gauge is fully engaged with ball bearing inner face.
- (3) Screw the knurled shouldered nut onto the gauge and tighten to retain assembly.

NOTE: This operation should be carried out in conjunction with next operation, to ensure the setting gauge is centrally located and fully engaged in the main drive bearing location before final tightening of the knurled shouldered nut.

- (4) Tighten the centreing nut in roller bearing outer track to centre plunger.

NOTE: It may be necessary to slightly release knurled shouldered nut to allow centreing of plunger. If so, ensure shouldered nut re-tightened.

- (5) Tighten the knurled lock-nut against centreing nut.
- (6) Ensure all nuts tightened sufficiently to allow no lateral movement in the setting gauge body.

D. Assemble Setting Gauges to Diaphragm Position A and C (Ref. Fig.510).

- (1) Ensure that the diaphragm is securely attached to the holding fixture and the Hydraclamp.
- (2) Remove the knurled nut from the end of setting gauge (Tool 6), then assemble the roller assembly of bearing A (72-62-04/1-240) to the setting gauge and secure it with the knurled nut.



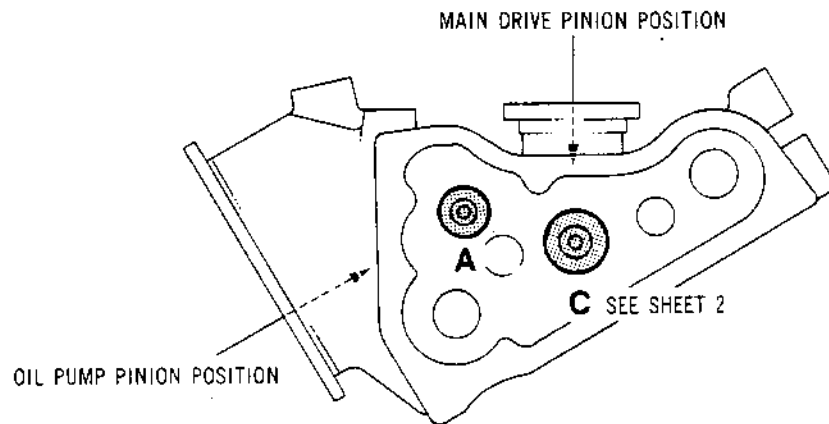
# OLYMPUS 593



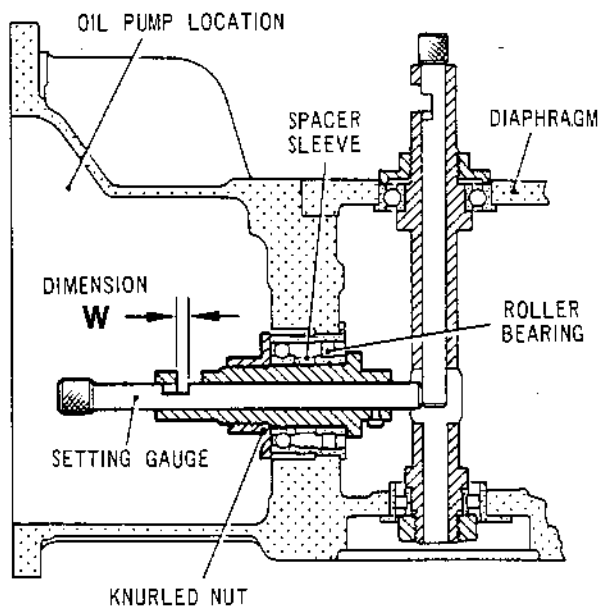
MK.610-14-28  
OVERHAUL

sneema

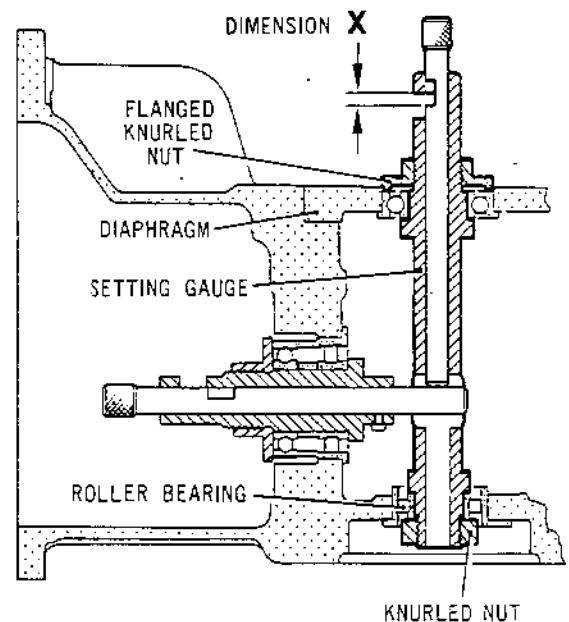
CR 31849/00B



FRONT OF GEARBOX



OIL PUMP BEVEL PINION POSITION



DIAPHRAGM POSITION A

Assembling Checking Gauges for Bevel Gear Adjustment  
Figure 510 (Sheet 1 of 2)

SUB-ASSEMBLY  
**72-62-00**  
Page 530  
Jan 31/94



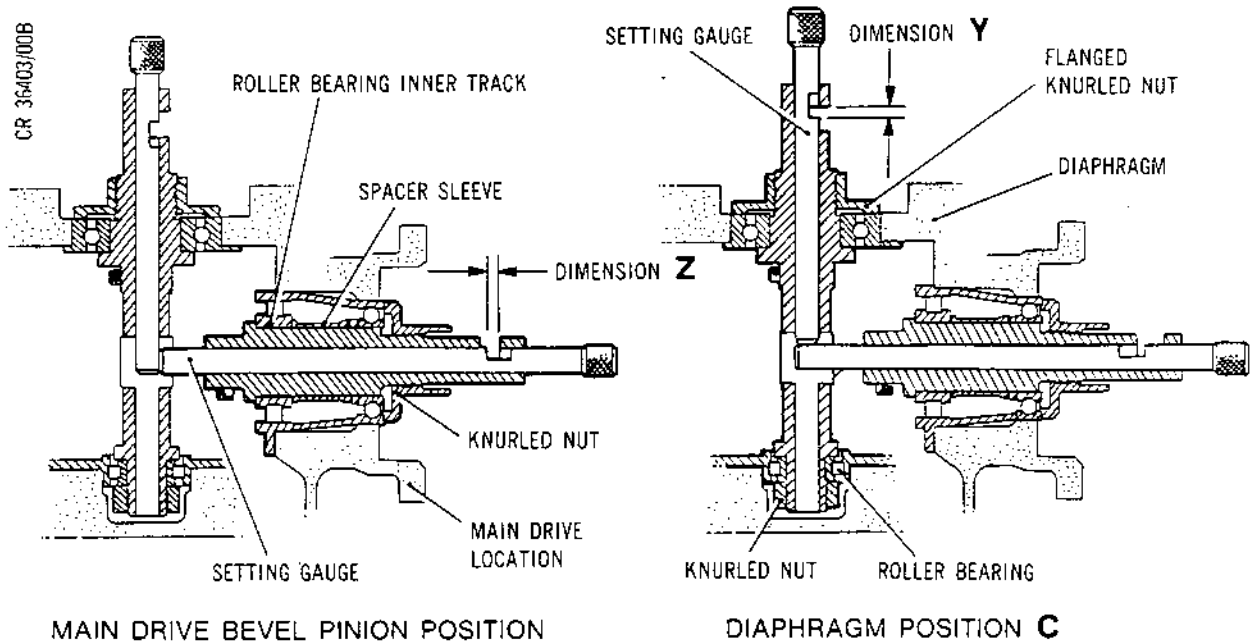
# OLYMPUS 593



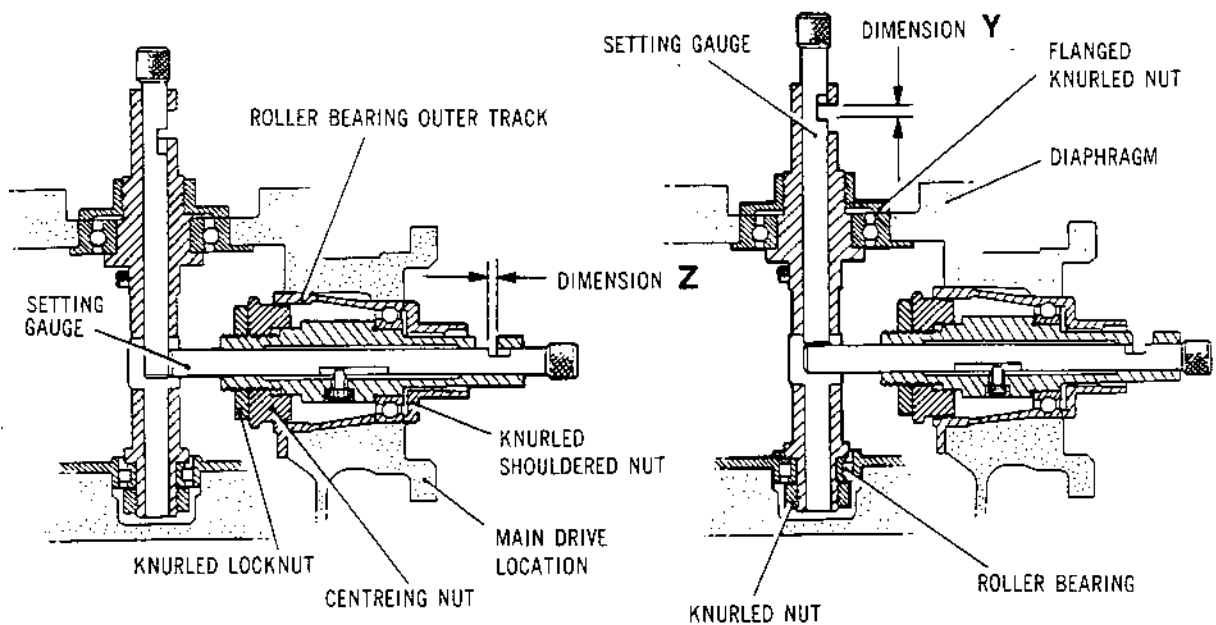
MK.610-14-28  
OVERHAUL

sneema

Printed in England



PRE SB 72-8990-383 STANDARD



SB 72-8990-383 STANDARD

Assembling Checking Gauges for Bevel Gear Adjustment  
Figure 510 (Sheet 2)

SUB-ASSEMBLY  
**72-62-00**  
Page 531  
Sep 30/94



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (3) Remove the flanged knurled nut from the opposite end of the setting gauge and insert that end of the gauge into the bearing assembled to position A on the diaphragm. The gauge is inserted through the bottom surface of the diaphragm.
- (4) Secure the gauge with the flanged knurled nut.
- (5) Remove the knurled nut from the end of setting gauge (Tool 9). Assemble the roller assembly of bearing C (72-62-02/1-160) to the setting gauge and secure it with the knurled nut.
- (6) Remove the flanged knurled nut from the opposite end of the setting gauge and insert that end of the gauge into the bearing assembled to position C on the diaphragm. The gauge is inserted through the bottom surface of the diaphragm.
- (7) Secure the gauge with the flanged knurled nut.

E. Assemble Diaphragm and Setting Gauges to Gearbox Case (Ref. Fig.510).

- (1) Fully withdraw the plungers of the setting gauges assembled to the main drive and oil pump bevel pinion locations.
- (2) Remove the diaphragm from the holding fixture secured to the Hydraclamp.
- (3) Carefully assemble the diaphragm and setting gauges to the gearbox case.
  - (a) Ensure thorough cleanliness of all parts especially the bearings.
  - (b) Place the diaphragm in position on the gearbox case and exercise great care when entering the bearing tracks into the bearing journals. To assist roller bearing retention, lubricant 'E' may be used. Ensure that the diaphragm locates fully on the gearbox.
  - (c) Assemble the three flanged pins (72-62-01/4-40-20) to the diaphragm. Temporarily retain the pin nearest position C on the diaphragm with a bolt (72-62-01/4-10). Secure the remaining pins with bolts (72-62-01/4-30).

SUB-ASSEMBLY

**72-62-00**

Page 532

Sep 30/94



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (4) Ensure that the plungers of the setting gauges at the main drive and oil pump drive positions will freely engage with the slots in the settings gauges assembled to the diaphragm. The setting gauges can be turned by hand for alignment purposes.

F. Checking Procedure for Oil Pump Bevel Pinion (Ref. Fig.510).

- (1) Fully withdraw the plunger of the setting gauge at the oil pump bevel pinion position.
- (2) Press the setting gauge plunger assembled to diaphragm position A fully inward.
- (3) Press the oil pump drive plunger fully inwards until it is in contact with the side of the diaphragm plunger. Measure and record as dimension W the resultant gap between the plunger and the cut out section of the sleeve.
- (4) Examine the bevel pinion (72-62-04/1-141) to ascertain the dimension engraved DM or MD.
- (5) Calculation to obtain thickness of adjusting washer =  $\text{Dimension W} + 1.650 \text{ in. (41,91 mm)} - \text{MD}$ .
- (6) Record the calculated thickness of an adjusting washer.
- (7) Select an adjusting washer from the appropriate range of the thickness calculated as follows:
  - (a) On engines pre SB.72-7510-166 (72-62-04/1-290A to 365A) (72-09-21 Repair, Fig.433 Sheet 1).
  - (b) On engines SB.72-8651-246 (72-62-04/1-290B to 365B) (72-09-21 Repair, Fig.433 Sheet 2).

G. Checking Procedure for Gearshaft at Diaphragm Position A (Ref. Fig.510).

- (1) Fully withdraw the plunger of the setting gauge assembled to the diaphragm at position A.
- (2) Press the plunger of the gauge assembled to the oil pump bevel pinion fully into the sleeve of the diaphragm plunger.

SUB-ASSEMBLY

## 72-62-00

Page 533

Sep 30/94



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (3) Press the diaphragm plunger fully inwards until it is in contact with the oil pump plunger. Measure and record as dimension X the resultant gap between the plunger and the cut out section of the sleeve.
- (4) Examine the gearshaft (72-62-04/1-142) to ascertain the dimension engraved DM or MD.
- (5) Calculated the thickness of the adjusting washer.  
Adjusting washer = Dimension X + 3.297 in. (83,74 mm) - MD - length of locating sleeve (72-62-04/1-130).
- (6) Select an adjusting washer from the range (72-62-04/1-50 to 120) (72-09-21 Repair, Fig.432) of the thickness calculated.

H. Checking Procedure for Main Drive Bevel Pinion (Ref. Fig.510).

- (1) Fully withdraw the plunger of the setting gauge at the main drive bevel pinion position.
- (2) Press the setting gauge plunger assembled to the diaphragm at position C fully inwards.
- (3) Press the main drive plunger fully inward until it is in contact with the side of the diaphragm plunger. Measure and record as dimension Z the resultant gap between the plunger and the cut out section of the sleeve.
- (4) Examine the bevel pinion (72-62-02/1-33) to ascertain the dimension engraved DM or MD.
- (5) Calculate the thickness of the adjusting washer:

Pre SB.72-8990-383, Adjusting washer =  
Dimension Z + 2.220 in. (56,38 mm) - MD.  
SB.72-8990-383, Adjusting washer =  
Dimension Z + 3.911 in. (99,339 mm) - MD.

- (6) Select an adjusting washer from the appropriate range of the thickness calculated as follows:
  - (a) On engines pre SB.72-7510-166 (72-62-02/1-270A to 335A) (72-09-21 Repair, Fig.431 (Sheet 1)).
  - (b) On engines SB.72-8651-246 (72-62-02/1-270B to 335B and 337A to 341A) (72-09-21 Repair, Fig.431 (Sheet 2)).





# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

J. Checking Procedure for Bevel Gear at Diaphragm Position C (Ref. Fig.510).

- (1) Fully withdraw the plunger of the setting gauge assembled to the diaphragm at position C.
- (2) Press the plunger of the gauge assembled to the main drive bevel pinion fully into the sleeve of the diaphragm plunger.
- (3) Press the diaphragm plunger fully inwards until it is in contact with main drive plunger. Measure and record as dimension Y the resultant gap between the plunger and the cut out section of the sleeve.
- (4) Examine the bevel gear (72-62-02/1-132) to ascertain the dimension engraved DM or MD.
- (5) Calculate the thickness of the adjusting washer.
  - (a) On engines to Pre SB.72-90 the adjusting washer =  
Dimension Y + 2.447 in. (62,15 mm) - MD - length  
of locating sleeve (72-62-02/1-120).
  - (b) On engines to SB.72-90 the adjusting washer =  
Dimension Y + 2.447 in. (62,15 mm) - MD.
- (6) Select an adjusting washer from the appropriate range as follows:
  - (a) On engines to Pre SB.72-90 (72-62-02/1-40A to 110A) (72-09-21 Repair, Fig.430 (Sheet 1)).
  - (b) On engines to SB.72-90 (72-62-02/1-40B to 110B and 111A to 114A) (72-09-21 Repair, Fig.430 (Sheet 2)).
  - (c) On engines to SB.72-8990-383 (72-62-02/1-40 to 1-95) (72-09-21 Repair, Fig.430 (Sheet 3)).

K. Remove Setting Gauges.

- (1) Remove the bolts securing the diaphragm flanged pins, then using the puller (Tool 177) withdraw the flanged pins.
- (2) Carefully withdraw the diaphragm and setting gauges from the gearbox case. Secure the diaphragm to the holding fixture attached to the Hydraclamp.

SUB-ASSEMBLY

## 72-62-00

Page 534A  
Sep 30/94



# OLYMPUS 593



MK.610-14-28 *sneema*

## OVERHAUL

- (3) Remove each roller bearing from the diaphragm setting gauges. Ensure that each roller bearing is identified according to position A or C. Place the bearings in the appropriate protectors.
- (4) Carefully remove the setting gauges from the diaphragm. Ensure that the knurled nuts are screwed in position. Place the setting gauges in the storage container.

NOTE: The diaphragm can remain in the Hydraclamp to await the next stage of assembly.

- (5) Remove the setting gauges from the bevel pinion locations in the gearbox case. Carefully remove each bearing track and spacer sleeve from the gauges. Ensure that the bearing tracks are identified and protected.
- (6) Ensure that the knurled nuts are assembled to the setting gauges, then place the gauges in their storage containers.

## 9. Assemble Bevel Pinions to Gearbox

### A. Assemble Oil Pump Bevel Pinion (Ref. Fig.511).

CAUTION: EACH BEVEL PINION IS MATCHED WITH A CORRESPONDING GEAR AND MUST BE INTERCHANGED WITH SIMILAR COMPONENTS.

- (1) Ensure that all components are clean and damage free.
- (2) Select an adjusting washer of the previously calculated thickness from the range (72-62-04/1-290B to 365B) (72-09-21 Repair, Fig.433 Sheet 2).
- (3) Place the washer on the bevel pinion shaft (72-62-04/1-141).
- (4) Assemble the parallel roller assembly (72-62-04/1-380A) Pre SB.72-7510-166 or (72-62-04/1-380B) SB.72-7510-166 to the bevel pinion.
  - (a) Press the bearing squarely onto the shaft as far as possible by hand.
  - (b) Place the support (Tool 162) on the base plate of a suitable vertical hand press tool.

NOTE: A scalloped base plate is suitable, as the hole in the base (Tool 162) must be clear to allow the pinion shaft to pass through.

SUB-ASSEMBLY

# 72-62-00

Page 534B  
Sep 30/94



# OLYMPUS 593

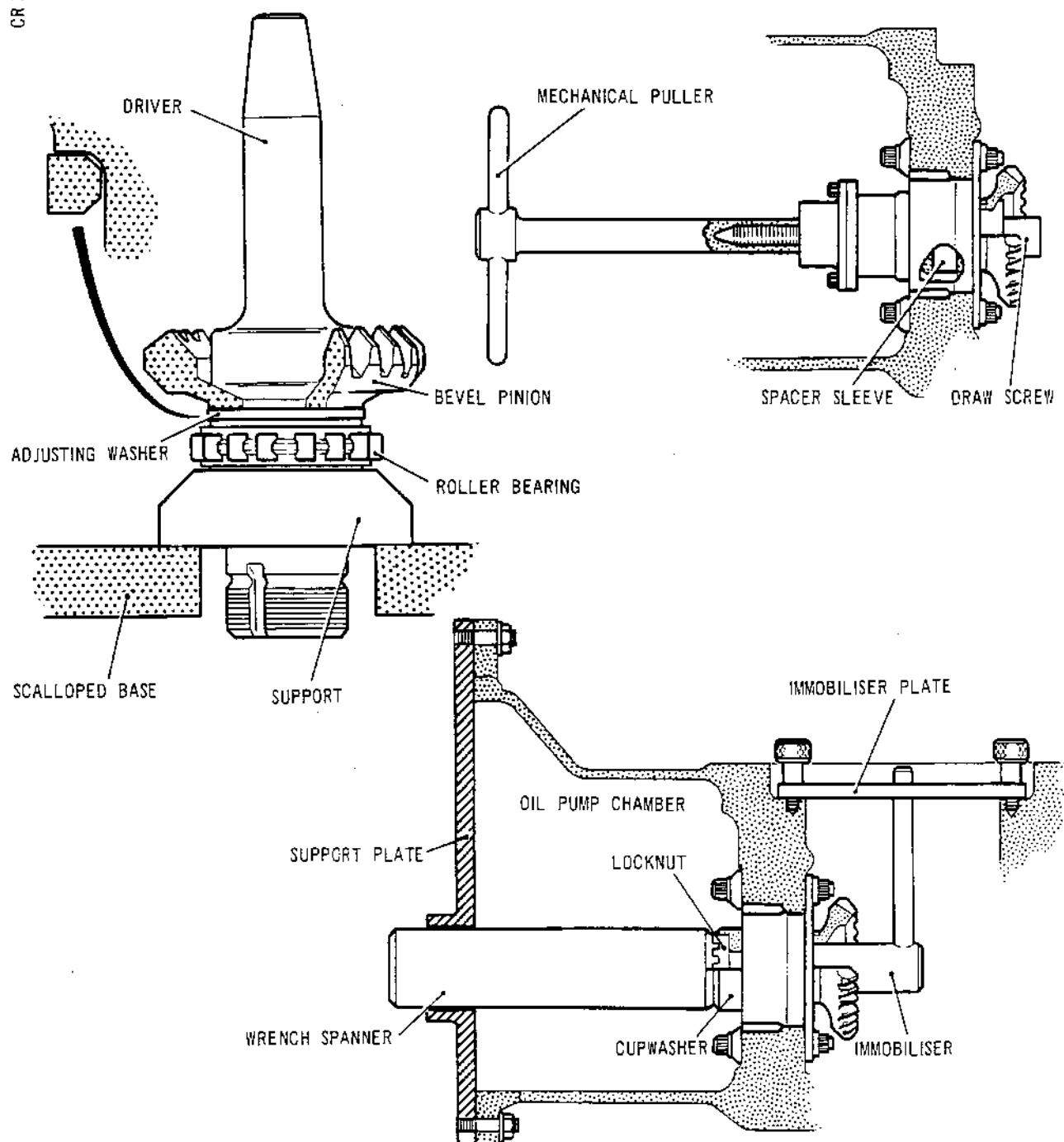


MK.610-14-28  
OVERHAUL

sneema

CR 31850/00C

Printed in England



Assembling Oil Pump Drive Bevel Pinion  
Figure 511

SUB-ASSEMBLY  
**72-62-00**

Page 535  
Jan 31/94



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) Place the bevel pinion vertically on the base. Ensure that the bearing and adjusting washer remain in position as the pinion must be positioned with the gear teeth uppermost.
  - (d) Support the assembly. Place the driver (Tool 1510) in the centre of the bevel gear section.
  - (e) Carefully apply sufficient load to the driver with the hand press to fully assemble the roller bearing to the bevel pinion shaft.
  - (f) Ensure that the bearing abuts with the adjusting washer and the adjusting washer abuts with the bevel gear rear face.
  - (g) Remove the bevel pinion and tools. Check components for cleanliness.
- (5) Place the spacer sleeve (72-62-04/1-390) on the bevel pinion shaft.
- (6) Assemble the bevel pinion to the oil pump drive location.
- (a) Position the bevel pinion in the gearbox case and enter the shaft as far as possible by hand into the integral bearing.
  - (b) Insert the draw screw (Tool 164) through the bevel pinion so that the threaded section of the tool protrudes into the oil pump chamber.
  - (c) Carefully screw the mechanical puller (Tool 163) on to the draw screw thread until it abuts the end of the bevel pinion.
  - (d) Ensure that the bevel pinion is parallel with the bearing in the case, and that the tools are correctly assembled.
  - (e) Carefully turn the handle of the mechanical puller to pull the bevel pinion fully into position.
  - (f) Check the bevel pinion for freedom of rotation when it is fully in position. Remove the puller and draw screw.
- (7) Assemble the cupwasher (72-62-04/1-260) and plain round nut (72-62-04/1-250) to the bevel pinion.
- (a) Apply lubricant 'A' to the bevel pinion thread.

SUB-ASSEMBLY

**72-62-00**

Page 536  
Dec 1/80



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (b) Insert the immobiliser (Tool 331) into the bevel pinion ensuring the full engagement of splines.
- (c) Engage the immobiliser bar with the hole in the immobiliser plate (Tool 332), then secure the plate to the gearbox case.
- (d) Place the cupwasher over the bevel pinion followed by the locknut tightened as far as possible by hand.
- (e) Assemble support plate (Tool 800) to the oil pump chamber flange.
- (f) Use wrench spanner (Tool 1486) and torque wrench (Tool 1656) to torque-tighten the locknut to between 110 and 120 lbf ft (149,1 and 162,7 N.m).
- (g) Remove the assembly tools and check the bevel pinion for freedom of rotation. Do not lock the cupwasher at this stage.

## B. Assemble Main Drive Spiral Bevel Pinion (Pre SB.72-8990-383) (Ref. Fig.512).

- (1) Assemble the previously removed parallel roller assembly (72-62-02/1A-260B) SB.72-7510-166 and (72-62-02/1A-260C) SB.72-8651-246 or the parallel roller bearing inner track only Pre SB.72-7510-166 to the spiral bevel pinion (72-62-02/1-133).

- (a) Apply locking compound 'B' to the bearing location on the spiral bevel pinion.
- (b) Press the bearing track squarely on the shaft as far as possible by hand.
- (c) Place the support (Tool 175) on the base plate of a suitable hand press tool.

**NOTE:** A scalloped base plate is suitable as the hole in the support (Tool 175) must be clear to allow the pinion shaft to pass through.

- (d) Place the bevel pinion vertically on the base. The gear teeth must be uppermost.
- (e) Support the assembly. Place the driver (Tool 1489) in the centre of the bevel gear section.

SUB-ASSEMBLY

## 72-62-00

Page 537

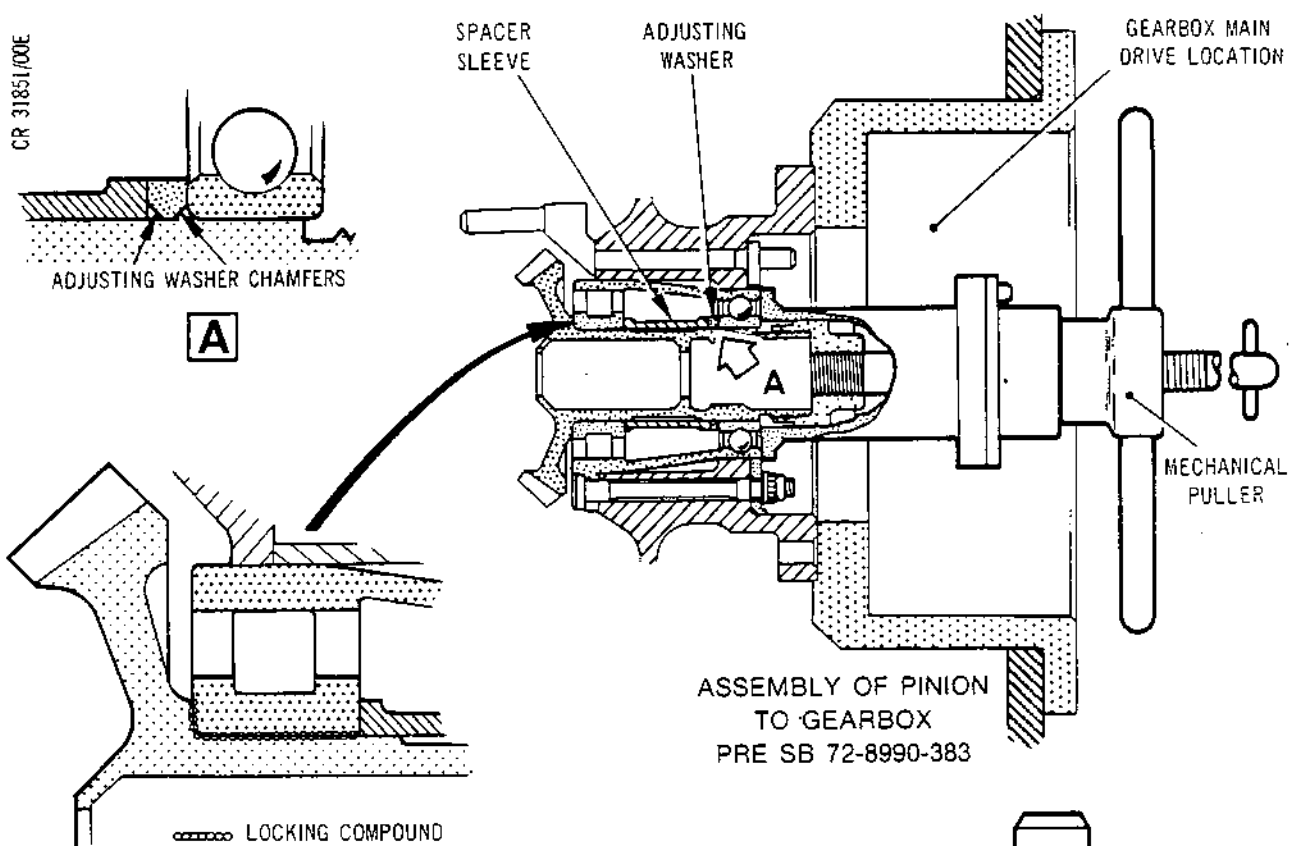
Sep 30/94



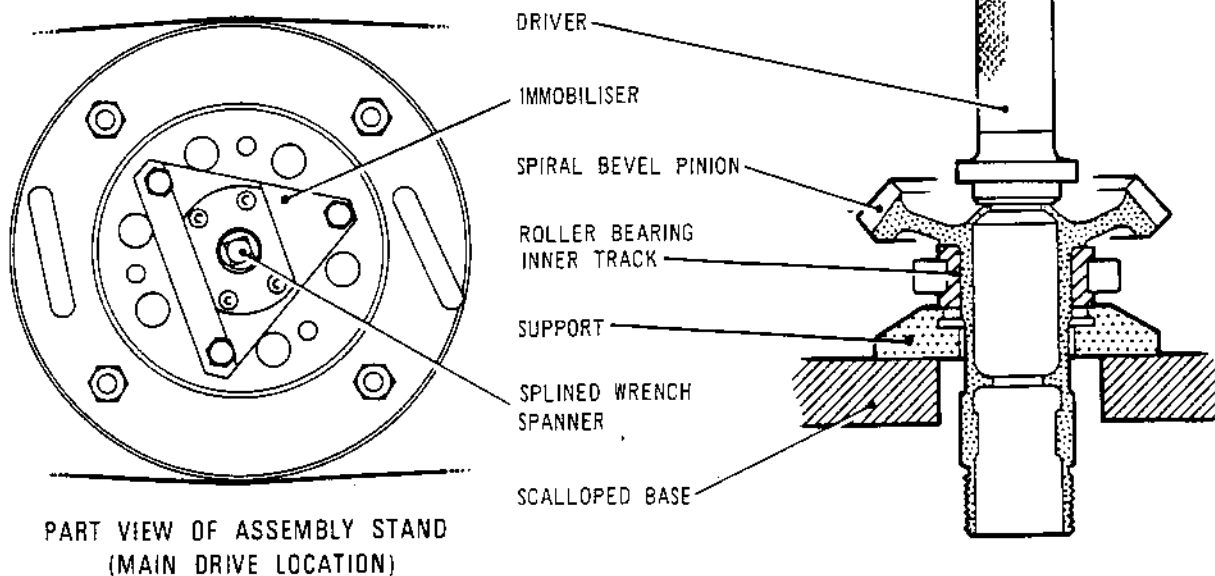
# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL



APPLICATION OF LOCKING COMPOUND



Assembling Main Drive Spiral Bevel Pinion  
Figure 512 (Sheet 1 of 2)

SUB-ASSEMBLY  
**72-62-00**  
Page 538  
Sep 30/94



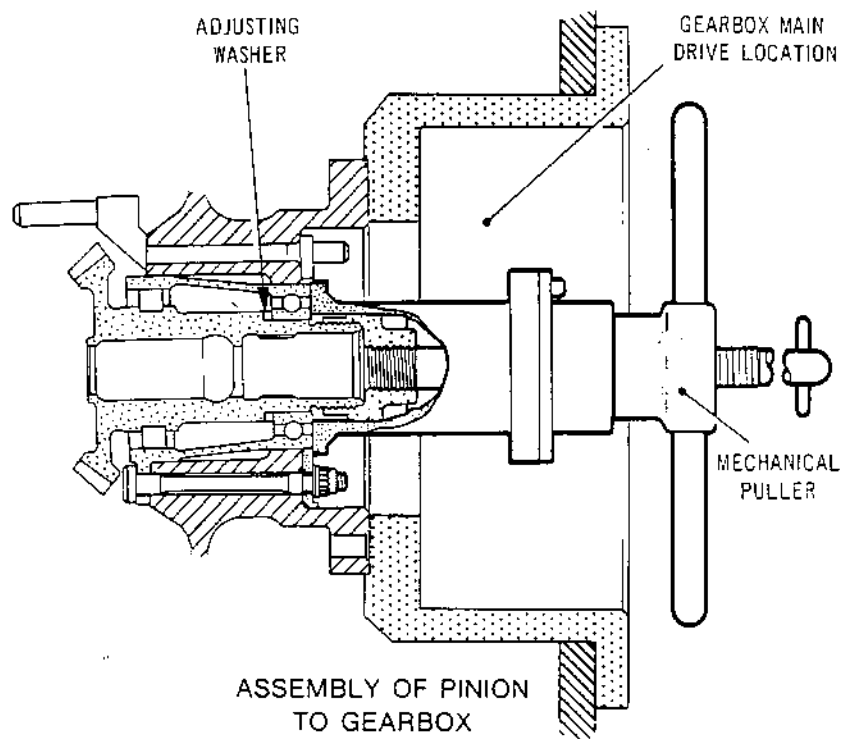
OLYMPUS 593



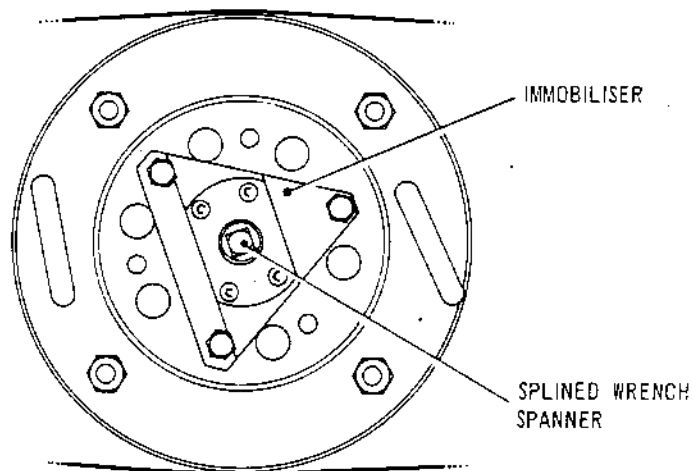
MK.610-14-28 sheema  
OVERHAUL

CR 36401/00B

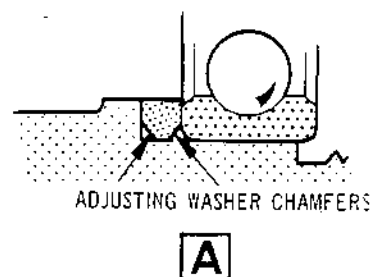
Printed in England



ASSEMBLY OF PINION  
TO GEARBOX  
SB 72-8990-383



PART VIEW OF ASSEMBLY STAND  
(MAIN DRIVE LOCATION)



Assembling Main Drive Spiral Bevel Pinion  
Figure 512 (Sheet 2)

SUB-ASSEMBLY  
**72-62-00**  
Page 539  
Sep 30/94



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

- (f) Carefully apply sufficient load to the driver with the hand press to fully assemble the bearing inner track to the pinion shaft.
  - (g) Remove the bevel pinion and tools. Remove all surplus locking compound and check components for cleanliness.
- (2) Place the spacer sleeve (72-62-02/1-350) next to the bearing track on the pinion shaft.
  - (3) Select an adjusting washer of the previously calculated thickness from the range (72-62-02/1-270 to 341) (72-09-21 Repair, Fig.431 (Sheet 2). Place the washer next to the spacer sleeve on the pinion shaft.
  - (4) Assemble the spiral bevel pinion to the main drive location.
    - (a) Ensure that the adjusting washer and spacer sleeve remain in position. Carefully insert the bevel shaft from the inside of the gearbox case into the main drive bearing.
    - (b) Support the bevel pinion and carefully engage the shaft thread with the mechanical puller (Tool 176) by turning the small handle of the tool.
    - (c) Ensure that the bevel pinion is parallel with the bearing in the case and that the tool is correctly assembled.
    - (d) Carefully turn the large handle of the mechanical puller to pull the bevel pinion fully into position.
    - (e) Remove the mechanical puller and check the bevel pinion for freedom of rotation.
  - (5) Assemble the locknut (72-62-02/1-200) to the pinion shaft, ensuring that the self-locking feature of the nut is elliptical and not four lobed (Ref.SB.72-105).
    - (a) Apply lubricant 'A' to the pinion thread. Restrained the pinion by hand whilst screwing the locknut as far as possible by hand on the bevel pinion thread.

SUB-ASSEMBLY

72-62-00

Page 540

Jan 31/94





OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (6) Assemble the immobiliser (Tool 168) to the gearbox main drive mounting location on the assembly stand.
- (a) Engage the holder section of the tool with the bevel gear retaining nut.
- (b) Secure the immobiliser plate to the main drive adapter.
- (7) Insert the splined wrench spanner (Tool 1558) through the centre of the immobiliser and engage the splines with the bevel pinion.
- (8) Torque-tighten the retaining nut.

- (a) Using the torque wrench (Tool 1656) in conjunction with the assembled splined wrench spanner, check that the locking (run-down) torque of the locknut is between 80 and 340 lbf in. (9,0 and 38,4 N.m).

NOTE: The splined wrench spanner must be turned counter-clockwise to tighten the shaft.

- (b) Torque-tighten the locknut between 110 and 120 lbf ft (149,1 and 162,7 N.m) plus the measured run-down torque figure. Release the nut until a clearance is visible at the clamping face then repeat the torquing operation. Again release the nut until a clearance is visible at the clamping face then repeat the torquing operation without pausing before reaching the required clamping torque value.
- (c) Remove the tools and check the bevel pinion for free rotation.

C. Assemble Main Drive Spiral Bevel Pinion/Roller Bearing Matched Assembly (SB.72-8990-383) (Ref. Fig.512).

- (1) Select an adjusting washer of the previously calculated thickness from the range (72-62-02/1-270 to 341) (72-09-21 Repair, Fig.431 (Sheet 2)). Place the washer on the pinion shaft.

SUB-ASSEMBLY

**72-62-00**

Page 540A

Sep 30/94



OLYMPUS 593



MK.610-14-28 snecma

OVERHAUL

- (2) Assemble the spiral bevel pinion to the main drive location.
  - (a) Ensure that the adjusting washer remains in position. Carefully insert the bevel shaft from the inside of the gearbox case into the main drive bearing.
  - (b) Support the bevel pinion and carefully engage the shaft thread with the mechanical puller (Tool 176) by turning the small handle of the tool.
  - (c) Ensure that the bevel pinion is parallel with the bearing in the case and that the tool is correctly assembled.
  - (d) Carefully turn the large handle of the mechanical puller to pull the bevel pinion fully into position.
  - (e) Remove the mechanical puller and check the bevel pinion for freedom of rotation.
- (3) Assemble the locknut (72-62-02/1-200) to the pinion shaft, ensuring that the self-locking feature of the nut is elliptical and not four lobed (Ref. SB.72-105).
  - (a) Apply lubricant 'A' to the pinion thread. Restrain the pinion by hand whilst screwing the locknut as far as possible by hand on the bevel pinion thread.
- (4) Assemble the immobiliser (Tool 168) to the gearbox main drive mounting location on the assembly stand.
  - (a) Engage the holder section of the tool with the bevel gear retaining nut.
  - (b) Secure the immobiliser plate to the main drive adapter.
- (5) Insert the splined wrench spanner (Tool 1558) through the centre of the immobiliser and engage the splines with the bevel pinion.

SUB-ASSEMBLY

**72-62-00**

Page 5408

Jan 31/94



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (6) Torque-tighten the retaining nut.
  - (a) Using the torque wrench (Tool 1656) in conjunction with the assembled splined wrench spanner, check that the locking (run-down) torque of the locknut is between 80 and 340 lbf in. (9,0 and 38,4 N.m).
  - NOTE: The splined wrench spanner must be turned counter-clockwise to tighten the shaft.
  - (b) Torque-tighten the locknut between 110 and 120 lbf ft (149,1 and 162,7 N.m) plus the measured run-down torque figure.
  - (c) Remove the tools and check the bevel pinion for free rotation.

10. Assemble Fuel Control Unit/Main Oil Pump Driving Shaft to Diaphragm

A. Prepare for Assembly.

- (1) Ensure that the diaphragm is securely attached to the holding fixture and Hydraclamp.
- (2) Check all components for cleanliness.

B. Assemble Roller Bearing to Driving Shaft (Ref. Fig.513).

NOTE: The roller bearing was previously removed from the gearbox parallel roller bearing journal at position A.

- (1) Secure the draw screw (Tool 307) vertically in a bench vice.



OLYMPUS 593



MK.610-14-28 *sneema*

OVERHAUL

- (2) Press the roller bearing (72-62-04/1-240) squarely on the driving shaft (72-62-04/1-200) as far as possible by hand.
- (3) Carefully place the driving shaft over the draw screw with the roller bearing uppermost.

SUB-ASSEMBLY

**72-62-00**

Page 540D

Jan 31/94



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

CR 31852/00B

MECHANICAL PULLER

ROLLER BEARING

DRAW SCREW

WRENCH SPANNER

LOCKNUT

VICE HOLDER

Assembling Roller Bearing to Driving Shaft  
Figure 513

SUB-ASSEMBLY  
**72-62-00**  
Page 541  
Jun 30/95



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Screw the mechanical puller (Tool 306) on to the draw screw until it is in contact with the roller bearing track. Turn the puller tool handle until the roller bearing is pressed fully into position.
- (5) Remove the mechanical driver and driving shaft from the draw screw, then remove the draw screw from the vice.
- (6) Secure the roller bearing with the locknut (72-62-04/1-150), ensuring that the self-locking feature of the nut is elliptical and not four lobed (Ref.SB.72-105).
  - (a) Secure the vice holder (Tool 167) vertically in a bench vice and place the driving shaft on the holder.
  - (b) Apply lubricant 'A' to the locknut threads and screw the locknut onto the shaft as far as possible by hand.
  - (c) Using the wrench spanner (Tool 1487) in conjunction with torque wrench (Tool 1648), check that the locking (run-down) torque of the locknut is between 6 and 50 lbf ft (8,1 and 67,8 N.m).
  - (d) Use the torque wrench (Tool 1656) to torque-tighten the locknut between 65 and 70 lbf ft (88,1 and 94,9 N.m) plus the measured run-down torque figure.
  - (e) Remove the spanners from the locknut, withdraw the driving shaft from the vice holder and remove the vice holder from the bench vice.

C. Assemble Gearshaft to Driving Shaft and Secure to Diaphragm (Ref.Fig.514).

- (1) Slide the gearshaft (72-62-04/1-142) over the splined section of the driving shaft, ensuring that the bevelled section of the gear abuts the driving shaft.
- (2) Slide the locating sleeve (72-62-04/1-130) on the driving shaft. Ensure that the sleeve locates fully in the recess at the end of the gearshaft.
- (3) Select an adjusting washer of the previously calculated thickness from the range (72-62-04/1-50 to 120). Place the adjusting washer next to the locating sleeve on the driving shaft.

SUB-ASSEMBLY

**72-62-00**

Page 542

Aug 1/81



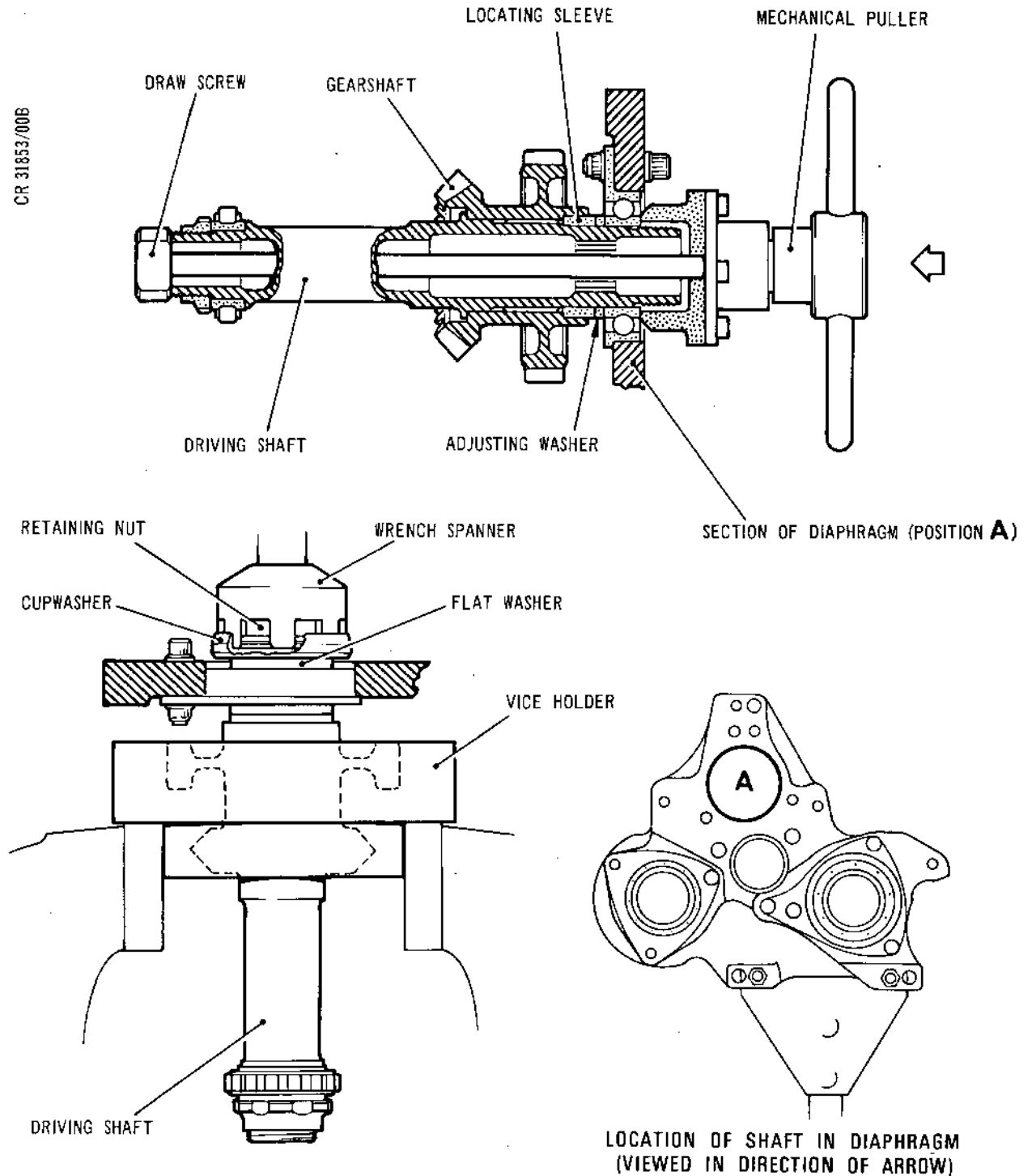
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 31853/00B



TN12520

Assembling Gearshaft and Driving Shaft to Diaphragm  
Figure 514

SUB-ASSEMBLY  
**72-62-00**  
Page 543  
Oct 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (4) Install the shaft assembly in the diaphragm.
  - (a) Ensure that the adjusting washer and locating sleeve are not dislodged from the shaft assembly.
  - (b) Carefully enter the shaft as far as possible by hand into the bearing at position A (Ref. Fig.514). The shaft is inserted through the bottom surface of the diaphragm. Support the shaft during the following procedures.
  - (c) Insert the draw screw (Tool 165) into the drive shaft ensuring that the threaded end protrudes through the diaphragm end of the shaft. Support the assembly.
  - (d) Screw the mechanical puller (Tool 203) on to the draw screw until it is in contact with the diaphragm ball bearing track.
  - (e) Carefully turn the puller tool handle until the shaft is pulled fully into the bearing.
  - (f) Remove the draw screw and puller. Check the shaft for free rotation in the diaphragm.
- (5) Assemble the retaining nut to the shaft assembly.
  - (a) Secure the vice holder (Tool 166) in a bench vice.
  - (b) Support the driving shaft during transfer of the assembly to the vice holder. Remove the diaphragm from the holding fixture and place the gear shaft in the vice holder.
  - (c) Apply lubricant 'A' to the threads. Assemble a flat washer (72-62-04/1-30), cupwasher (72-62-04/1-20) and retaining nut (72-62-04/1-10) to the driving shaft.
  - (d) Using the wrench spanner (Tool 1511) in conjunction with the torque wrench (Tool 1656), torque-tighten the retaining nut between 110 and 120 lbf ft (149,1 and 162,7 N.m).

TN20210





OLYMPUS 593

MK.610-14-28 *sneema*  
OVERHAUL

- (e) Remove the spanners from the locknut.
- (f) Assemble the diaphragm to the Hydraclamp in preparation for the assembly of the main drive gear shaft to position C.
- (g) Remove the vice holder from the bench vice.

# 11. Assemble Main Drive Gear Shaft to Diaphragm

## A. Assemble Roller Bearing to Gear Shaft.

NOTE: The roller bearing was previously removed from the gearbox position C parallel roller bearing journal. For basic similarity of assembly (Ref.Fig.513).

- (1) Check all components for cleanliness.
- (2) Secure the draw screw (Tool 180) vertically in a bench vice.
- (3) Press the roller bearing (72-62-02/1-160) on the gear shaft (72-62-02/1-170 pre SB.72-90 or 1-138 SB.72-90) as far as possible by hand. Carefully place the gear shaft on the draw screw ensuring that the roller bearing is uppermost.
- (4) Screw the mechanical puller (Tool 185) on to the draw screw until it is in contact with the roller bearing.
- (5) Carefully turn the puller tool handle to press the bearing fully into position. Disassemble the tools and remove the gear shaft.
- (6) Secure the roller bearing with the locknut (72-62-02/1-150), ensuring that the self-locking feature of the nut is elliptical and not four lobed (Ref.SB.72-105).
  - (a) Secure the vice holder (Tool 303) to a bench vice and place the gear shaft in the holder ensuring that the roller bearing is uppermost.
  - (b) Apply lubricant 'A' to the locknut threads and screw the locknut onto the shaft as far as possible by hand.

SUB-ASSEMBLY

**72-62-00**

Page 545

Jan 31/94



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (c) Using the wrench spanner (Tool 1509) in conjunction with the torque wrench (Tool 1648), check that the locking (run-down) torque of the locknut is between 4 and 18.3 lbf ft (5,4 and 24,8 N.m).
  - (d) Using the torque wrench (Tool 1656) to torque-tighten the locknut between 45 and 50 lbf ft (61,0 and 67,8 N.m) plus the measured run-down torque figure.
  - (e) Remove the spanners from the locknut. Invert the gear shaft in the vice holder to assist the following dimensional check.
- B. Assemble Spiral Bevel Gear to Gear Shaft and Secure to Diaphragm (Pre SB.72-8990-383) (Ref. Fig.515).
- (1) Measure the distance from the end of the shaft to the edge of the bearing location and record as dimension A. This dimension will be included in a later dimensional calculation.
  - (2) On engines to pre SB.72-90 apply locking compound 'B' to the gear shaft (Ref.Fig.515). Wear protective gloves to prevent contact with the locking compound.
    - (a) Ensure that components are thoroughly clean, dry and free from grease then apply the locking compound to the surfaces indicated.
- NOTE: The locknut (72-62-02/1-10) detailed in the following operations must be torque-tightened within fifteen minutes of applying locking compound to the gear shaft.
- (b) Slide the spiral bevel gear (72-62-02/1-132) over the splined section of the gear shaft ensuring that the bevelled section of the gear abuts the gear shaft.
  - (c) Slide the locating sleeve (72-62-02/1-120) onto the gear shaft. Ensure that the sleeve locates fully in the recess at the end of the spiral bevel gear. Remove surplus locking compound.
  - (d) Remove the gear shaft from the vice holder in preparation for assembly to the diaphragm. Ensure that the adjusting washer locating sleeve and spiral bevel gear are not dislodged. The vice holder can remain in the bench vice for later use.

SUB-ASSEMBLY

**72-62-00**

Page 546  
Sep 30/94



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (e) Ensure that bearing surfaces are free of locking compound.

NOTE: On engines to SB.72-90 the spiral bevel gear and centering ring will already be assembled to the gear shaft.

- (3) Assemble the gear shaft assembly to the diaphragm for dimensional check.
  - (a) On engines to pre SB.72-90 place the adjusting washer of previously calculated thickness next to the locating sleeve on the gear shaft. The washer was selected from the range (72-62-02/1-40A to 110A) (72-09-21 Repair, Fig.430 sheet 1).
  - (b) On engines to SB.72-90 place the adjusting washer of previously calculated thickness next to the spiral bevel gear on the gearshaft assembly (72-62-02/1-130B). The washer was selected from the range (72-62-02/1-40B to 110B and 111A to 114A) (72-09-21 Repair, Fig.430 sheet 2).

SUB-ASSEMBLY

**72-62-00**

Page 546A

Jan 31/94

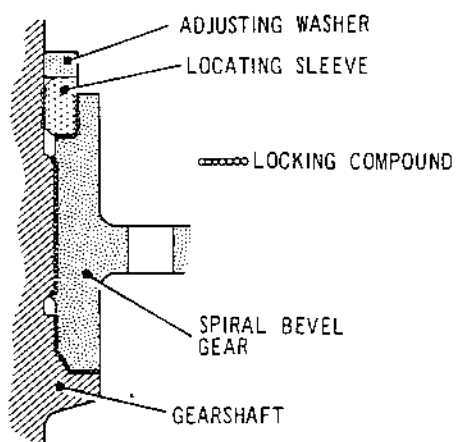


# OLYMPUS 593

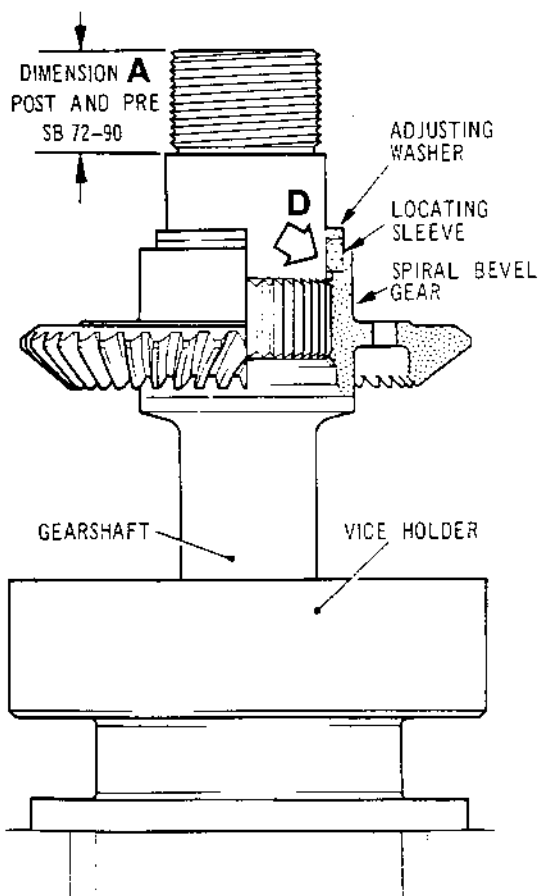


MK.610-14-28 *sneema*  
OVERHAUL

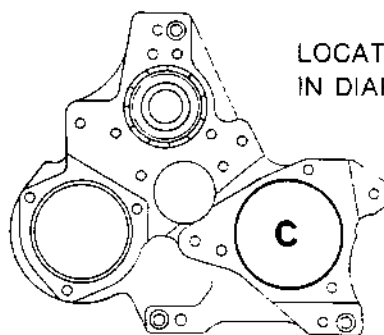
CR 33660/00D



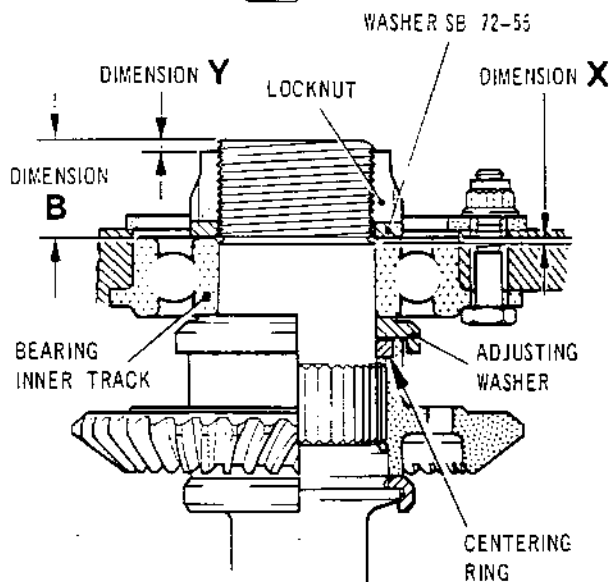
APPLICATION OF LOCKING  
COMPOUND AT **D**



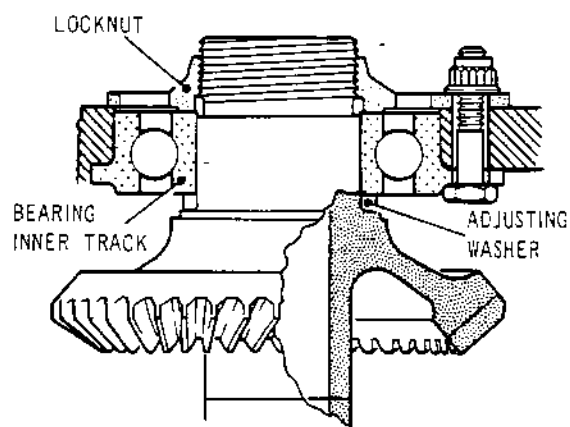
SPIRAL BEVEL GEAR ASSEMBLY  
PRE SB 72-90



LOCATION OF GEARSHAFT  
IN DIAPHRAGM



SPIRAL BEVEL GEAR ASSEMBLY SB 72-90  
PRE SB 72-8990-383



SPIRAL BEVEL GEAR ASSEMBLY  
POST SB 72-8990-383

Assembling Spiral Bevel Gear and Dimensional Checking Procedure  
Figure 515

SUB-ASSEMBLY  
**72-62-00**  
Page 546B  
Sep 30/94



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (c) Enter the shaft as far as possible by hand into the bearing at position C (Ref.Fig.515) on the diaphragm. Support the assembly.
  - (d) Insert the draw screw (Tool 180) into the drive shaft ensuring that the screw section protrudes through the diaphragm end of the shaft. Support the assembly.
  - (e) Screw the mechanical puller (Tool 179) on to the draw screw until it is in contact with the diaphragm roller bearing track. Carefully turn the puller tool handle to pull the gear shaft assembly fully into position. Remove the draw screw and puller tool. Check the shaft for free rotation.
  - (f) Support the shaft during transfer of the assembly to the vice holder. Remove the diaphragm from the holding fixture and place the gear shaft in the previously used vice holder (Tool 303).
- (4) Check the clearance gap between the end of the bearing location on the gear shaft and the edge of the diaphragm bearing inner track.
- (a) Measure the distance from the end of the shaft to the edge of the bearing inner track. Record as dimension B.
  - (b) The clearance gap = Dimension A - Dimension B. The clearance gap must be not less than 0.0105 in. (0,27 mm), Dimension X.
- NOTE: Dimension A was recorded earlier (Ref.para.B.(1)).
- (c) Investigate and rectify insufficient clearance gap.

SUB-ASSEMBLY

**72-62-00**

Page 547

Jan 31/94



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (5) Secure the gear shaft to the diaphragm with the locknut (72-62-02/1-10) and washer (72-62-02/1-20) SB.72-55, ensuring that the self-locking feature of the nut is elliptical and not four lobed (Ref. SB. 72-105).
  - (a) Apply lubricant 'A' to the locknut threads. Place the washer on the shaft followed by the locknut.
- (6) Torque-tighten the locknut.
  - (a) Support the assembly and using the wrench spanner (Tool 1491) in conjunction with the torque wrench (Tool 1648) check that the locking (run-down) torque of the locknut is between 80 and 373 lbf ins (9.0 and 42,1 N.m).
  - (b) Torque-tighten the locknut between 110 and 120 lbf ft (149,1 and 162,7 N.m) plus the measured run-down torque figure. Release the nut until a clearance is visible at the clamping face then repeat the torquing operation. Again release the nut until a clearance is visible at the clamping face then repeat the torquing operation without pausing before reaching the required clamping torque value.
- (7) Measure and record dimension Y which is the distance from the end of the shaft to the end of the locknut, SB.72-55. The minimum distance permissible is 0.0555 in. (0,41 mm).
- (8) Withdraw the gear shaft from the vice holder and place the diaphragm/gear shaft assembly in a protective container. Remove the vice holder from the bench vice.

NOTE: The text is written to SB.72-9 Part 3 standard and does not include the assembly of the spur gear to the bevel gear.



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

C. Assemble Spiral Bevel Gear and Secure to Diaphragm  
(SB.72-8990-383) (Ref. Fig.515).

(1) Assemble bevel gear to the diaphragm.

- (a) Place the adjusting washer of previously calculated thickness next to the spiral bevel gear (72-62-02/1-143). The washer was selected from the range (72-62-02/1-40 to 1-95) (72-09-21 Repair, Fig.430 Sheet 3).
- (b) Enter the shaft as far as possible by hand into the bearing at position C (Ref. Fig.515) on the diaphragm. Support the assembly.
- (c) Insert the draw screw (Tool 180) into the drive shaft ensuring that the screw section protrudes through the diaphragm end of the shaft. Support the assembly.
- (d) Screw the mechanical puller (Tool 179) on to the draw screw until it is in contact with the diaphragm roller bearing track. Carefully turn the puller tool handle to pull the gear shaft assembly fully into position. Remove the draw screw and puller tool. Check the shaft for free rotation.
- (e) Support the shaft during transfer of the assembly to the vice holder. Remove the diaphragm from the holding fixture and place the gear shaft in the previously used vice holder (Tool 303).

(2) Secure the gearshaft to the diaphragm with the locknut (72-62-02/1-10) SB.72-55, ensuring that the self-locking feature of the nut is elliptical and not four lobed (Ref. SB.72-105).

- (a) Apply lubricant 'A' to the locknut threads and place the locknut on the shaft.

(3) Torque-tighten the locknut.

- (a) Support the assembly and using the wrench spanner (Tool 1491) in conjunction with the torque wrench (Tool 1648) check that the locking (run-down) torque of the locknut is between 8.3 and 34.0 lbf ft. (11,3 and 46,0 Nm).



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (b) Torque-tighten the locknut between 120 and 130 lbf ft (162,7 and 176,3 N.m) plus the measured run-down torque figure.
- (4) Withdraw the gear shaft from the vice holder and place the diaphragm/bevel gear assembly in a protective container. Remove the vice holder from the bench vice.

## 12. Bevel Gear Backlash and Engagement Checks

### A. Assemble Diaphragm and Gear Shafts in Gearbox Case (Ref. Fig.516).

- (1) Ensure that all bearing assemblies and bevel gears are clean.
- (2) Apply a thin coating of engineers marking blue to the teeth of the bevel gears attached to the diaphragm.
- (3) Place the diaphragm assembly in the gearbox and ensure that the roller bearings locate fully in the bearing journals. To assist roller bearing retention, lubricant 'E' may be used. Carefully press the diaphragm into the gearbox to ensure that it is fully located.
- (4) Rotate the oil pump drive and main drive bevel pinions to prove engagement with the gear shafts.



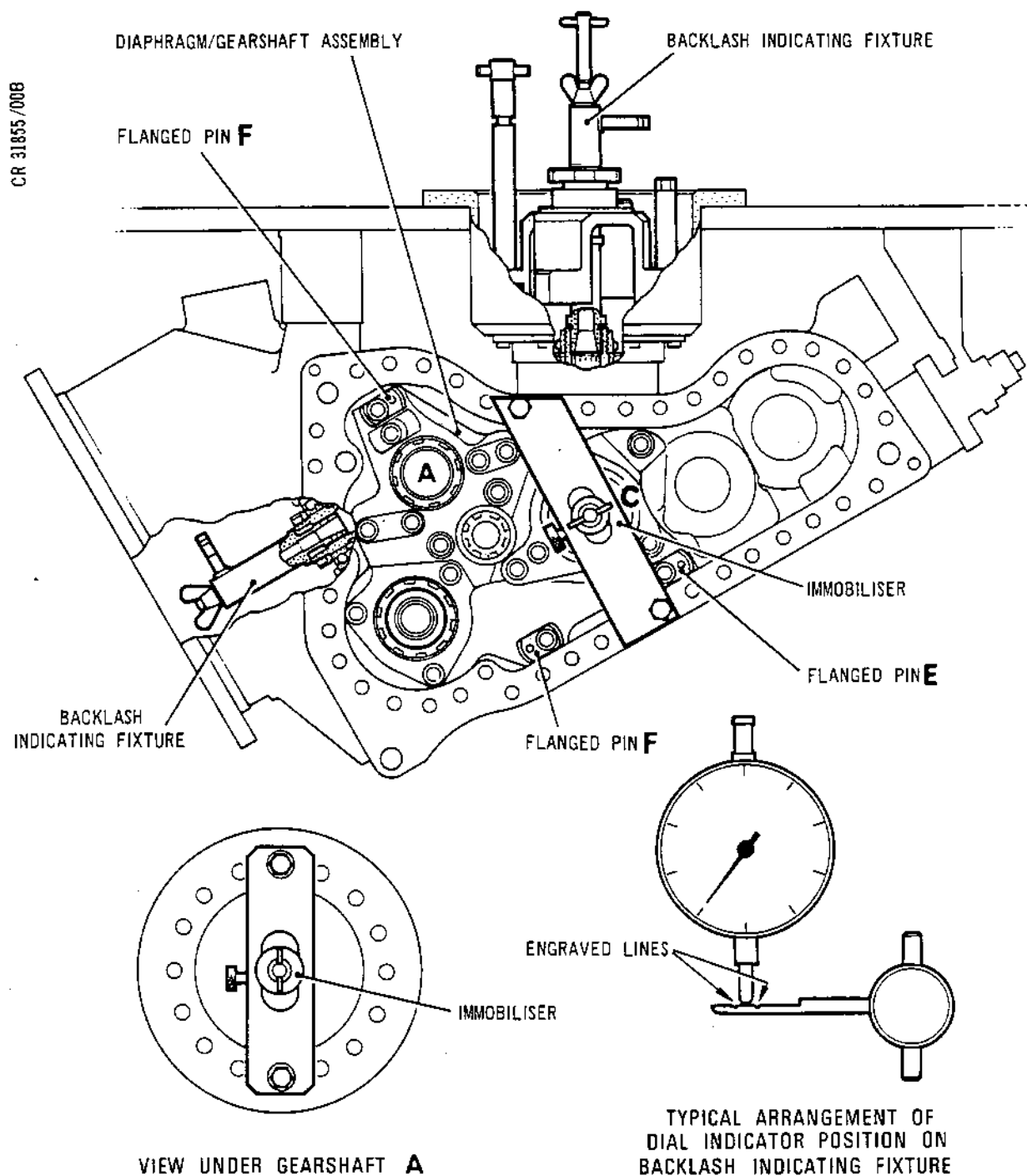


OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema



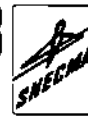
Assembling Bevel Gear Backlash Checking Equipment  
Figure 516

SUB-ASSEMBLY  
**72-62-00**  
Page 550A  
Jan 31/94



OLYMPUS 593

MK.610-14-28  
OVERHAUL



This page left blank intentionally

SUB-ASSEMBLY

**72-62-00**

Page 550B

Dec 1/90



# OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

- (5) Assemble the three flanged pins (72-62-01/4-20-40) to the diaphragm. Temporarily retain the pin at position E with a bolt (72-62-01/4-10). Secure the pins at position F with bolts (72-62-01/4-30).
- (6) Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m).

## B. Backlash Checking Procedure (Ref. Fig.516).

- (1) Assemble the immobiliser (Tool 189) to the Fuel Control Unit (FCU) driving end of gear shaft A. This is located under gear shaft A.
  - (a) Secure the immobiliser to the flange at the QAD coupling location. Enter the expander section of the tool into the gear shaft.
  - (b) Turn the wingnut until the expander immobilises the shaft, then lock the knurled nut located on the side of the tool.
- (2) Assemble the immobiliser (Tool 188) to the main drive gear shaft at position C on the diaphragm.
  - (a) Secure the immobiliser to the gearbox case/cover unit flange. Enter the expander section of the tool into the gear shaft.

**CAUTION:** IT IS IMPORTANT THAT THE KNURLED NUT IS NOT LOCKED IN POSITION UNTIL THE GEARWHEEL IS FULLY LOADED INTO MESH.

- (b) Turn the wingnut until the shaft is immobilised with the gearwheel loaded into mesh, then lock the knurled nut.
- (3) Assemble the backlash indicating fixture (Tool 190) to the oil pump bevel pinion and the backlash indicating fixture (Tool 953) to the main drive bevel pinion shaft.
  - (a) Insert the expander section of each tool into the respective bevel pinion shaft, then secure the tools by tightening the wingnuts.

**NOTE:** These tools can be assembled and set in conjunction with the dial indicator gauges in the following sequences.

SUB-ASSEMBLY

## 72-62-00

Page 551  
Sep 30/94



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (4) Install the dial indicator gauges at the oil pump and main drive locations to check the backlash of the bevel pinions.
  - (a) Secure a dial indicator gauge with 0.001 in. (0,025 mm) graduations to the fixture at each position. The stylus of the gauge must locate between the two engraved lines on the arm of each backlash indicating fixture.
  - (b) With the main drive bevel pinion loaded out of mesh, check and record the total dial indicator movement of the main drive bevel. Check that the backlash figures obtained are within the limits quoted in the Fits and Clearances Schedule (FCS-278).
  - (c) Check and record the total dial indicator movement of the oil pump drive bevel. Check that the backlash figures obtained are within the limits quoted in the Fits and Clearances Schedule (FCS-316).
  - (d) Investigate incorrect backlash and rectify.
- (5) On satisfactory completion of the checks, remove the immobilisers and indicating fixtures.

C. Bevel Gear Teeth Engagement Checking Procedure.

- (1) Rotate each bevel pinion in turn to ensure that all teeth have been in contact with the blue coated gear shaft bevels.

NOTE: When implementing the procedure detailed in para.(1) for the main drive bevels, the procedure detailed in para.(2) is used.
- (2) With the main drive gearshaft (wheel) loaded out of mesh and the main drive bevel (pinion) loaded into mesh, using Tool Kit 3145, rotate the pinion anti-clockwise such that the pinion convex flank drives the wheel concave flank.
- (3) Remove the bolts and flanged pins securing the diaphragm to the gearbox. Use the puller (Tool 177) and withdraw the pins. Carefully withdraw the diaphragm and gear shafts from the gearbox.



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

- (4) Inspect the teeth of both bevel pinions to ascertain the amount of engagement with the corresponding gear shaft bevels.
- (5) Acceptance limits for oil pump drive bevel gear engagement.
  - (a) Not less than 30 per cent surface contact on each gear tooth must be evident.
  - (b) Investigate and rectify insufficient gear teeth engagement.
- (6) Acceptance limits for main drive bevel gear engagement.
  - (a) The contact pattern must conform to that shown in Fig.516A. If the contact pattern is not acceptable, refer to sub-paras (6)(b) and (6)(c) for rectification procedures.
  - (b) Rectify unacceptable contact pattern.

**CAUTION:** IT IS IMPORTANT TO ENSURE THAT THE PROCEDURE DETAILED IN PARA.(2) HAS BEEN STRICTLY ADHERED TO BEFORE CARRYING OUT ANY CORRECTIVE ACTION.

- (i) Contact pattern run off the toe end of the pinion: move the pinion out of mesh by reducing the pinion adjusting washer thickness until the contact pattern is wholly on the tooth. Check that in doing this, the tip margin on the wheel is still acceptable.
- (ii) Toe contact high on the pinion and low on the wheel (Ref, Fig.516A): move the pinion out of mesh by reducing the pinion adjusting washer thickness in increments of approximately 0.003 in (0.076 mm) until the tip margin is equal on both gears.
- (iii) Toe contact low on the pinion and high on the wheel (Ref Fig.516A): move the wheel out of mesh by reducing the wheel adjusting washer thickness in increments of approximately 0.003 in. (0.076 mm) until the tip margin is equal on both gears.

SUB-ASSEMBLY

**72-62-00**

Page 552A  
Jun 30/95



OLYMPUS 593



MK.610-14-28 *sneema*

OVERHAUL

(c) Re-check the backlash to ensure that it is in excess of the minimum specified in the fits and clearance 72-62-00 (601-278). If backlash unacceptable, investigate and rectify.

(7) Remove the marking blue on completion of satisfactory bevel gear engagement checks. Do not lock the cup-washers at this stage.

(8) Assemble the diaphragm/gear shaft assembly to the holding fixture (Tool 152) and secure the fixture to the Hydraclamp.

13. Assemble Stage 1 Fuel Pump Drive Gear Shaft to Diaphragm

A. Assemble Roller Bearing to Gear Shaft (Ref. Fig.517).

NOTE: The roller bearing was previously removed from the gearbox bearing journal at position B.

- (1) Check all components for cleanliness.
- (2) Secure the draw screw (Tool 182) vertically in a bench vice.
- (3) Press the roller bearing (72-62-03/1-130) squarely on the gear shaft (72-62-03/1-180) as far as possible by hand.
- (4) Carefully place the gear shaft on the draw screw ensuring that the roller bearing is uppermost.
- (5) Screw the mechanical puller (Tool 181) onto the draw screw until it is in contact with the roller bearing track.
- (6) Carefully turn the puller tool handle to press the bearing fully into position.
- (7) Remove the mechanical puller and gear shaft from the draw screw, then remove the draw screw from the vice.



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (8) Secure the roller bearing with locknut (72-62-03/1-120), ensuring that the self-locking feature of the nut is elliptical and not four lobed (Ref.SB.72-105).
- (a) Secure the vice holder (Tool 178) vertically in a bench vice and place the gear shaft on the holder with the roller bearing uppermost.
  - (b) Apply lubricant 'A' to the locknut threads and screw the locknut on the shaft as far as possible by hand.
  - (c) Using the wrench spanner (Tool 1566) in conjunction with the torque wrench (Tool 1648) check that the locking (run-down) torque of the locknut is between 80 and 340 lbf in. (9,0 and 38,4 N.m).



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

THIS PAGE LEFT BLANK INTENTIONALLY

SUB-ASSEMBLY

**72-62-00**

Page 552D

Jun 30/95





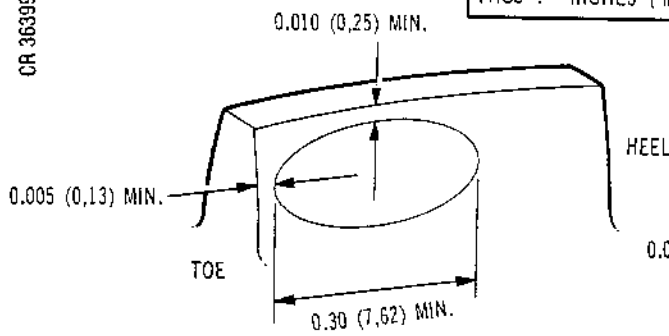
OLYMPUS 593



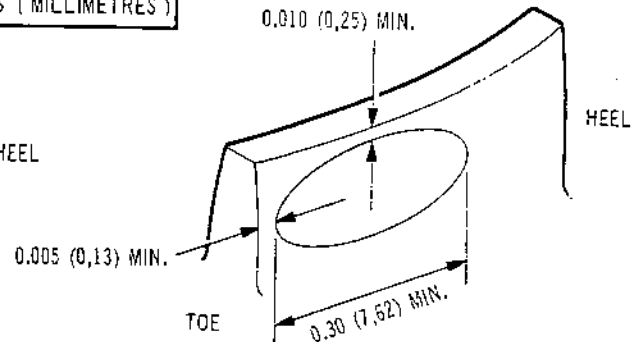
MK.610-14-28 sheema  
OVERHAUL

CR 36399/00B

DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)

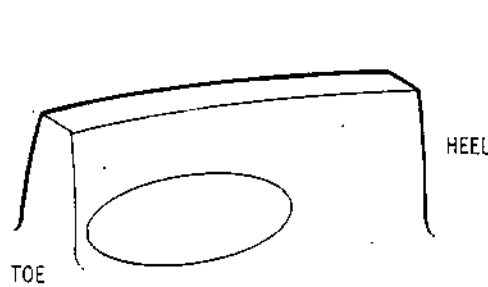


WHEEL CONCAVE FLANK

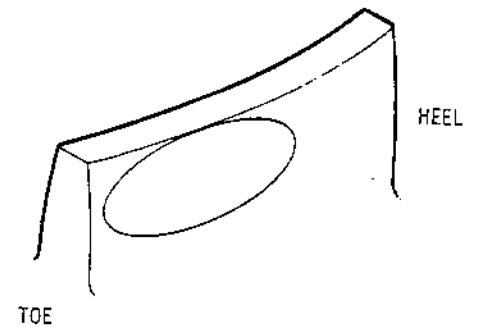


PINION CONVEX FLANK

ACCEPTABLE CONTACT PATTERN

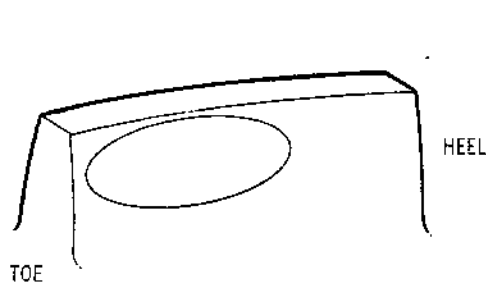


WHEEL CONCAVE FLANK

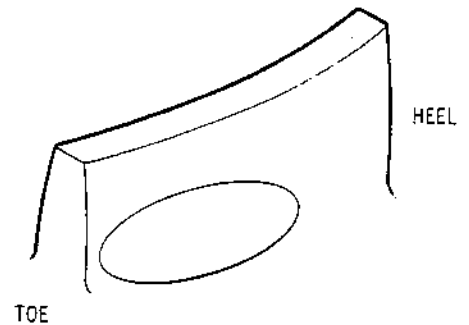


PINION CONVEX FLANK

TOE CONTACT HIGH ON PINION, LOW ON WHEEL-UNACCEPTABLE



WHEEL CONCAVE FLANK



PINION CONVEX FLANK

TOE CONTACT LOW ON PINION, HIGH ON WHEEL-UNACCEPTABLE

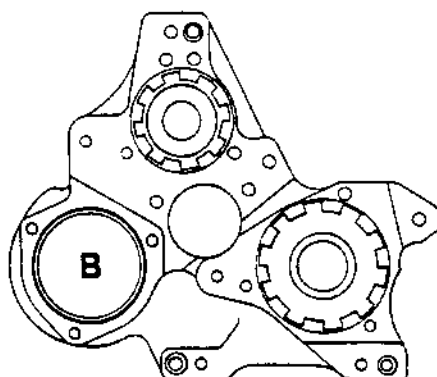
Main Drive Bevel Gear Engagement - Contact Pattern  
Figure 516A

CR 31856/00B

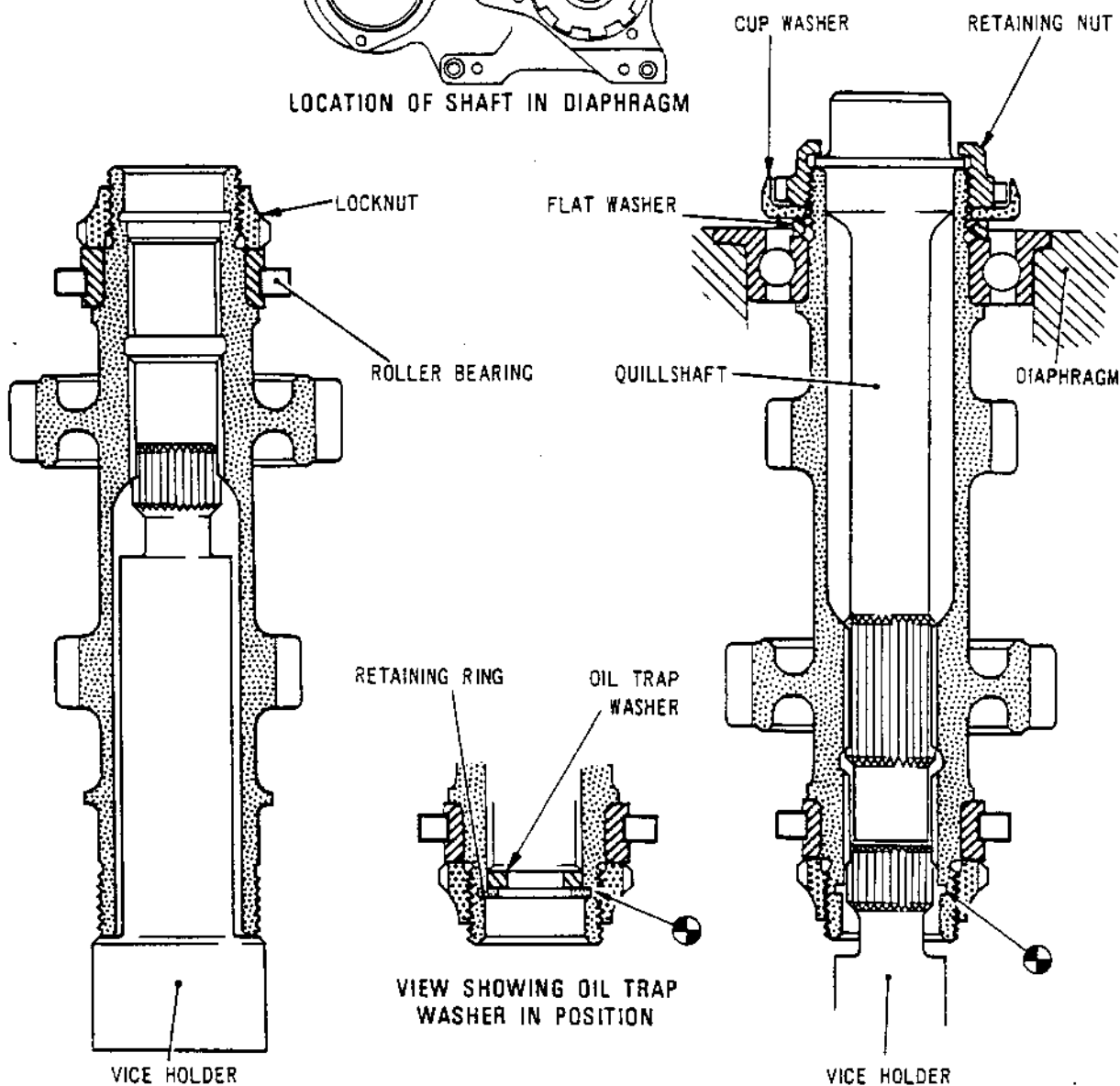


OLYMPUS 593

MK.610-14-28  
OVERHAUL



LOCATION OF SHAFT IN DIAPHRAGM



Assembling Stage 1 Fuel Pump Drive Shaft to Diaphragm  
Figure 517

SUB-ASSEMBLY  
**72-62-00**

Page 554  
Sep 1/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



(d) Using the torque wrench (Tool 1656) torque-tighten the locknut between 110 and 120 lbf ft (149,1 and 162,7 N.m) plus the measured run-down torque figure.

(9) Ensure that the diaphragm is secured to the holding fixture (Tool 152) and Hydraclamp.

(10) Remove the gear shaft from the vice holder in preparation for assembly to the diaphragm. The vice holder can remain in the vice for later use.

B. Assemble Gear Shaft to Diaphragm (Ref.Fig.517).

- (1) Enter the shaft as far as possible into the bearing at diaphragm position B. Support the assembly.
- (2) Insert the draw screw (Tool 180) into the gear shaft ensuring that the screw section protrudes through the diaphragm end of the shaft. Support the assembly.
- (3) Screw the mechanical puller (Tool 179) on to the draw screw until it is in contact with the diaphragm ball bearing track.
- (4) Carefully turn the puller tool handle to pull the shaft fully into position.
- (5) Remove the draw screw and puller tool. Check the gear shaft for free rotation in the diaphragm.
- (6) Insert the quillshaft (72-62-03/1-140) fully into the gear shaft.
- (7) Secure the shaft assembly to the diaphragm.
  - (a) Apply lubricant 'A' to the retaining nut (72-62-03/1-70).
  - (b) Place the flat washer (72-62-03/1-90) over the end of the shaft. The washer abuts the bearing.
  - (c) Place the cupwasher (72-62-03/1-80) on the flat washer.
  - (d) Screw the retaining nut hand-tight onto the shaft thread.

PRINTED IN ENGLAND

TN20304

SUB-ASSEMBLY  
**72-62-00**

Page 555  
Aug 1/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (8) Remove the diaphragm from the Hydraclamp adapter. Place the gear shaft in the previously used vice holder (Tool 178). Support the assembly.
- (9) Use the wrench spanner (Tool 1490) in conjunction with torque wrench (Tool 1648) to torque-tighten the retaining nut between 110 and 120 lbf ft (149,1 and 162,7 N.m). Do not lock the cupwasher.
- (10) Remove the spanners from the gear shaft. Suitably protect the diaphragm and gear shafts assembly. Remove the vice holder from the bench vice.
- (11) Assemble oil trap washer (72-62-03/1-170) to the recess inside the gear shaft at the end to which the roller bearing has been assembled. Secure the oil trap washer with retaining ring (72-62-03/1-160).

#### 14. Assemble Roller Bearings to Idler Spur Gear

##### A. Assemble Large Bearing to Gear Shaft.

NOTE: This roller bearing was previously removed from the gearbox bearing journal at position D.

- (1) Secure the draw screw (Tool 182) vertically in a bench vice.
- (2) Press the roller bearing (72-62-03/1-50) squarely on the gear shaft as far as possible by hand.
- (3) Carefully place the gear shaft on the draw screw with the roller bearing uppermost.
- (4) Screw the mechanical puller (Tool 181) on to the draw screw until it is in contact with the roller bearing track.
- (5) Carefully turn the puller tool handle to press the bearing fully into position.
- (6) Remove the puller tool and gear shaft from the draw screw then remove the draw screw from the bench vice.
- (7) Secure the vice holder (Tool 304) to a bench vice and place the gear shaft in the holder with the roller bearing uppermost.

IN20305

SUB-ASSEMBLY

72-62-00

Page 556

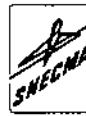
Apr 1/76



# OLYMPUS 593

MK.610-14-28

OVERHAUL



- (8) Apply lubricant 'A' to the locknut (72-62-03/1-40) threads and screw the locknut onto the shaft as far as possible by hand. Ensure that the self-locking feature of the nut is elliptical and not four lobed (Ref.SB.72-105).
- (9) Using the wrench spanner (Tool 1566) in conjunction with torque wrench (Tool 1648) check that the locking (run-down) torque of the locknut is between 80 and 340 lbf in. (9,0 and 38,4 N.m).
- (10) Using the torque wrench (Tool 1656), torque-tighten the locknut between 110 and 120 lbf ft (149,1 and 162,7 N.m) plus the measured run-down torque figure.
- (11) Remove the spanners and gear shaft from the vice holder. Remove the vice holder from the bench vice.

## B. Assemble Small Bearing to Gear Shaft.

NOTE: This roller bearing was previously removed from the diaphragm bearing journal at position D.

- (1) Secure the draw screw (Tool 184) vertically in a bench vice.
- (2) Press the roller bearing (72-62-03/1-20) squarely on the shaft as far as possible by hand.
- (3) Carefully place the gear shaft over the draw screw with the roller bearing uppermost.
- (4) Screw the mechanical puller (Tool 185) on to the draw screw until it is in contact with the roller bearing track.
- (5) Carefully turn the puller tool handle to press the bearing fully into position.
- (6) Remove the puller tool and gear shaft from the draw screw then remove the draw screw from the bench vice.
- (7) Secure the vice holder (Tool 304) to a bench vice and place the gear shaft in the holder with the roller bearing uppermost.
- (8) Apply lubricant 'A' to the locknut (72-62-03/1-10) and screw the locknut onto the shaft as far as possible by hand. Ensure that the self-locking feature of the nut is elliptical and not four lobed (Ref.SB.72-105).

SUB-ASSEMBLY

# 72-62-00

Page 557

Aug 1/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (9) Using the wrench spanner (Tool 1509) in conjunction with torque wrench (Tool 1648) check that the locking (run-down) torque of the locknut is between 4 and 35 lbf ft (5,4 and 47,5 N.m).
- (10) Using the torque wrench (Tool 1656), torque-tighten the locknut between 45 and 50 lbf ft (6,1 and 67,8 N.m) plus the measured run-down torque figure.
- (11) Remove the spanners and gear shaft from the vice holder, then remove the vice holder from the bench vice.
- (12) Assemble protectors (Tool 191 and 192) to the bearings and place the gear shaft in the tray (Tool 1229).

#### 15. Check Backlash of Spur Gears

##### A. Assemble Diaphragm/Gear Shafts to Gearbox Case (Ref. Fig.518).

- (1) Ensure thorough cleanliness of all components especially the bearings. Also ensure that each roller bearing assembly is complete.
- (2) Place the idler spur gear shaft (72-62-03/1-60) in the gearbox case. Ensure that the large roller bearing fully locates in the bearing journal at position D.
- (3) Assemble the diaphragm and gear shafts to the gearbox case.
  - (a) Place the diaphragm/gear shaft assembly into the gearbox case. Turn the gear shafts as necessary to engage the gear train. To assist roller bearing retention, lubricant 'E' may be used. Ensure that the roller bearings fully engage with the bearing journals and that the diaphragm locates fully in the gearbox case.
- (4) Assemble the three flanged pins (72-62-01/4-20 and 40) to the diaphragm and temporarily retain the pin at position E with a bolt (72-62-01/4-10). Secure the pins at position F with bolts (72-62-01/4-30).
- (5) Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m).

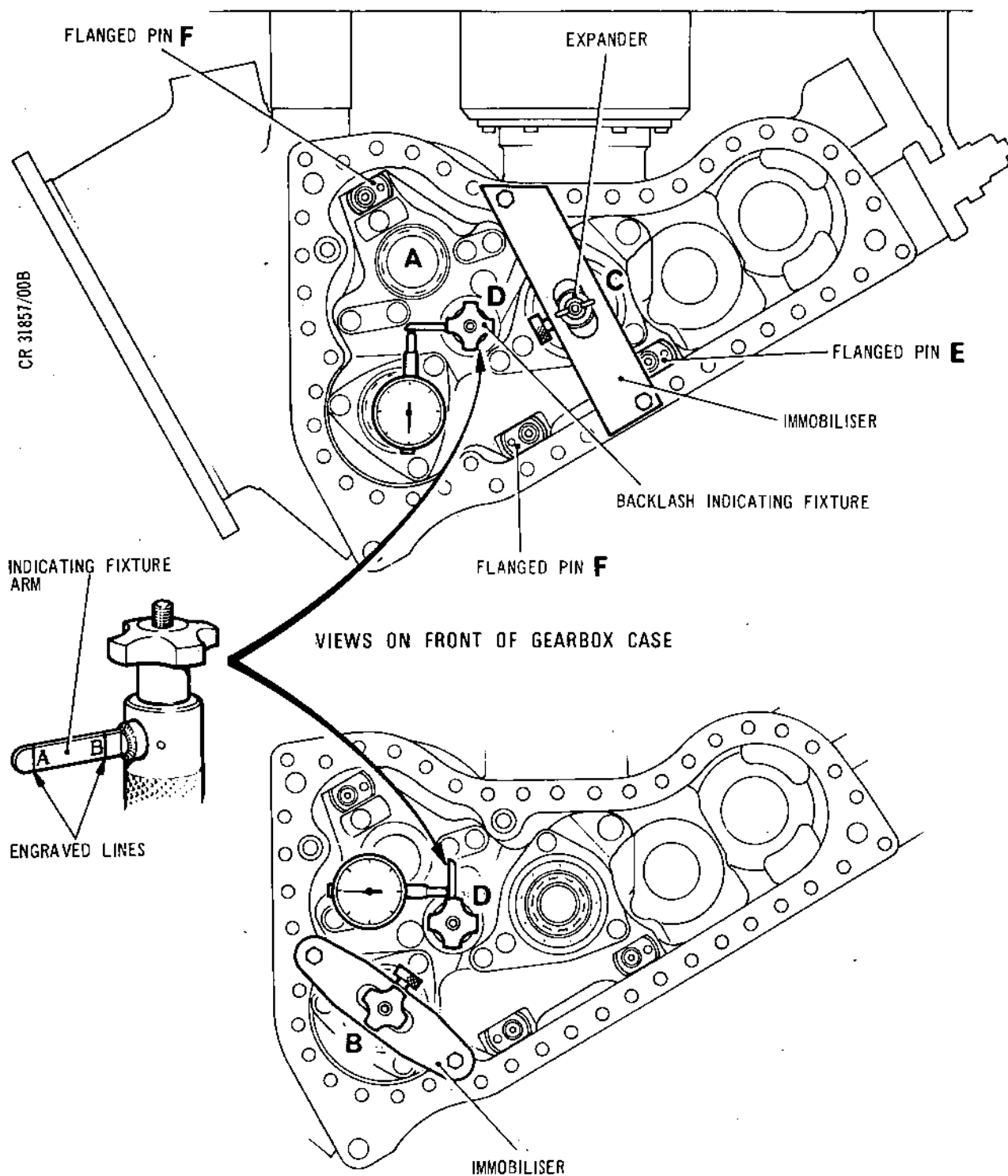
SUB-ASSEMBLY  
**72-62-00**

Page 558  
Jun 1/91



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Installing Spur Gear Backlash Checking Equipment  
Figure 518

SUB-ASSEMBLY  
**72-62-00**

Page 559  
Sep 1/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



B. Backlash Checking Procedure (Ref.Fig.518).

- (1) Assemble the immobiliser (Tool 188) to the main drive gear shaft on the diaphragm at position C.
  - (a) Secure the immobiliser to the gearbox case/cover unit flange. Enter the expander section of the tool into the gear shaft.
  - (b) Turn the wingnut until the expander immobilises the shaft, then lock the knurled nut.
- (2) Assemble the backlash indicating fixture (Tool 911) to the idler spur gear shaft that protrudes through the diaphragm at position D.
  - (a) Insert the expander section of the tool into the gear shaft, then secure the tool by tightening the wingnut.
- (3) Install a dial indicator gauge and check the spur gear backlash.
  - (a) Secure a dial indicator with (0.001 in. (0,025 mm) graduations) to the fixture so that the stylus locates on the engraved line 'A' on the backlash indicating fixture arm.
  - (b) Check and record the total dial indicator movement. Check that the backlash figures obtained are within the limits quoted in the Fits and Clearances Schedule (FCS-304).
- (4) Remove the immobiliser from the main drive gear shaft at position C.

NOTE: The backlash indicating fixture and dial indicator must remain in position for the following backlash checks.
- (5) Assemble the immobiliser (Tool 912) to the stage 1 fuel pump drive gear shaft on the diaphragm at position B.
  - (a) Secure the immobiliser to the gearbox case/cover unit flange. Enter the expander section of the immobiliser into the gear shaft.
  - (b) Turn the wingnut until the shaft is immobilised, then lock the knurled nut.
- (6) Adjust the dial indicator so that the stylus locates on the engraved line 'B' on the backlash indicating fixture arm.

TN20308

SUB-ASSEMBLY

72-62-00

Page 560

Apr 1/76





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (7) Check and record the total dial indicator movement. Check that the backlash figures obtained are within the limits quoted in the Fits and Clearances Schedule (FCS-282).
- (8) Remove the immobiliser from the drive gear shaft at position B.
- (9) Assemble the immobiliser (Tool 189) to the FCU driving end of gear shaft A. This is located under gear shaft A (Ref.Fig.516).
  - (a) Secure the immobiliser to the flange at the QAD coupling location. Enter the expander section of the tool into the gear shaft.
  - (b) Turn the wingnut until the expander immobilises the shaft, then lock the knurled nut located on the side of the tool.
- (10) Check and record the total dial indicator movement. Check that the backlash figures obtained are within the limits quoted in the Fits and Clearances Schedule (FCS-290).
- (11) On completion of the check remove the immobiliser, dial indicator and backlash indicating fixture.

#### 16. Assemble Quillshaft to FCU/Main Oil Pump Driving Shaft

##### A. Assemble Oil Feed Sleeve to Quillshaft (Ref.Fig.519).

- (1) Assemble the oil trap sleeve (72-62-04/1-170) to the oil feed sleeve (72-62-04/1-180).
  - (a) Ensure thorough cleanliness of components.
  - (b) Assemble the oil trap sleeve to the driver (Tool 1505).
  - (c) Press the oil trap sleeve into the oil feed sleeve and ensure that it locates fully in position. Remove the driver tool.
- (2) Assemble the oil feed sleeve to the quillshaft (72-62-04/1-190).
  - (a) Place the support tool (Tool 194) on a support plate so that the flange section is supported. Place the quillshaft in the support tool.

SUB-ASSEMBLY

**72-62-00**

Page 561

Apr 1/76

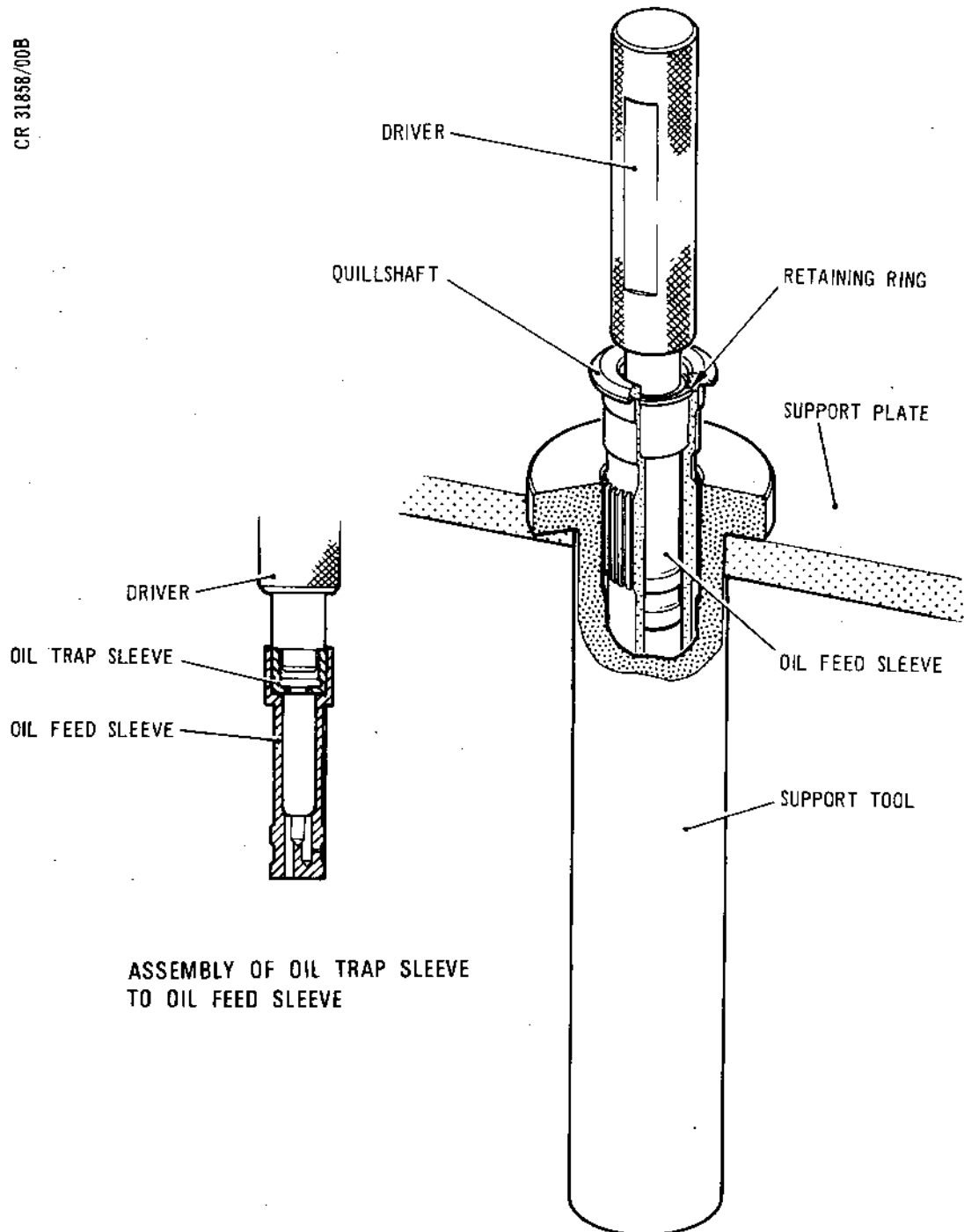


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31858/00B



TN31796

Assembling Oil Feed Sleeve to Quillshaft  
Figure 519

SUB-ASSEMBLY  
**72-62-00**

Page 562  
Sep 1/75



OLYMPUS 593

MK. 610-14-28  
OVERHAUL



- (b) Insert the oil feed sleeve into the quillshaft and press it fully into position with the driver (Tool 193).
- (c) Secure the oil feed sleeve to the quillshaft with a retaining ring (72-62-04/1-160).
- (d) Remove the quillshaft from the holder and remove the holder from the support plate.

B. Assemble Quillshaft to Driving Shaft.

- (1) Remove the diaphragm/gear shaft assembly from the gearbox case.
  - (a) Remove the bolts securing the diaphragm to the gearbox case. Using the puller (Tool 177) remove the flanged pins.
  - (b) Carefully withdraw the diaphragm and gear shafts from the gearbox case. Ensure that the loose idler gear is not accidentally dislodged.

NOTE: The idler gear can remain in position in the gearbox case.

- (c) Protect the gearbox from ingress of dirt.
- (2) Secure the vice holder (Tool 166) in a bench vice and place the drive shaft A with the diaphragm attached, in the vice holder. Ensure that the diaphragm does not rotate during the following sequences.

CAUTION: HOLD DRIVING SHAFT TO PREVENT IT FALLING FREE WHEN RETAINING NUT IS REMOVED.

- (3) Use the wrench spanner (Tool 1511), remove the driving shaft locknut from the diaphragm location. Support the gear shaft when the locknut is removed.
- (4) Insert the quillshaft into the driving shaft and ensure that it locates fully in position.
- (5) Apply lubricant 'A' to the locknut threads. Ensure that the flat washer (72-62-04/1-30) and cupwasher (72-62-04/1-20) are in position on the driving shaft, then assemble the locknut (72-62-04/1-10) to the driving shaft.

SUB-ASSEMBLY

**72-62-00**

Page 563

Sep 1/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

- (6) Using the wrench spanner (Tool 1511) in conjunction with torque wrench (Tool 1656), torque-tighten the locknut between 110 and 120 lbf ft (149,1 and 162,7 N.m), then remove the spanners from the locknut.

#### 17. Assemble Diaphragm and Front Cover to Gearbox Case

##### A. Assemble Diaphragm and Gear Shafts (Ref.Fig.520).

- (1) Ensure thorough cleanliness of all components. Apply lubricant 'A' to securing items. Ensure that each roller bearing assembly is complete.
- (2) Ensure that the idler spur gear is correctly installed in the gearbox.
- (3) Assemble the diaphragm and gear shafts to the gearbox case.
  - (a) Place the diaphragm/gear shaft assembly into the gearbox case. Turn the gear shafts as necessary to engage the gear train. To assist roller bearing retention, lubricant 'E' may be used. Ensure that the roller bearings fully engage with the bearing journals and that the diaphragm locates fully in the gearbox case.
- (4) Check the rotational movement of the gear train by turning the main drive bevel pinion.

##### Note ...

Gear train movement should be smooth with no evidence of tight spots. Tight spots may indicate distortion of bearing outer races and must be investigated. Possible causes of such distortion are dee-head bolt contact, (Ref. Note in Para.2.B.(15) (g), and uneven fretting of gearcase bearing location faces.

- (5) Secure the diaphragm to the gearbox case with the three flanged pins (72-62-01/4-20 and 40) and bolts positioned as follows:
  - (a) Near the gear shaft at position A secure the flanged pin with a bolt (72-62-01/4-30).
  - (b) Between the gear shafts at positions B and C secure the flanged pin with a bolt (72-62-01/4-30).

SUB-ASSEMBLY

**72-62-00**

Page 564

Dec 31/00



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 31859/00A

FLANGED PIN AND BOLT

LOAD SPREADING PLATE

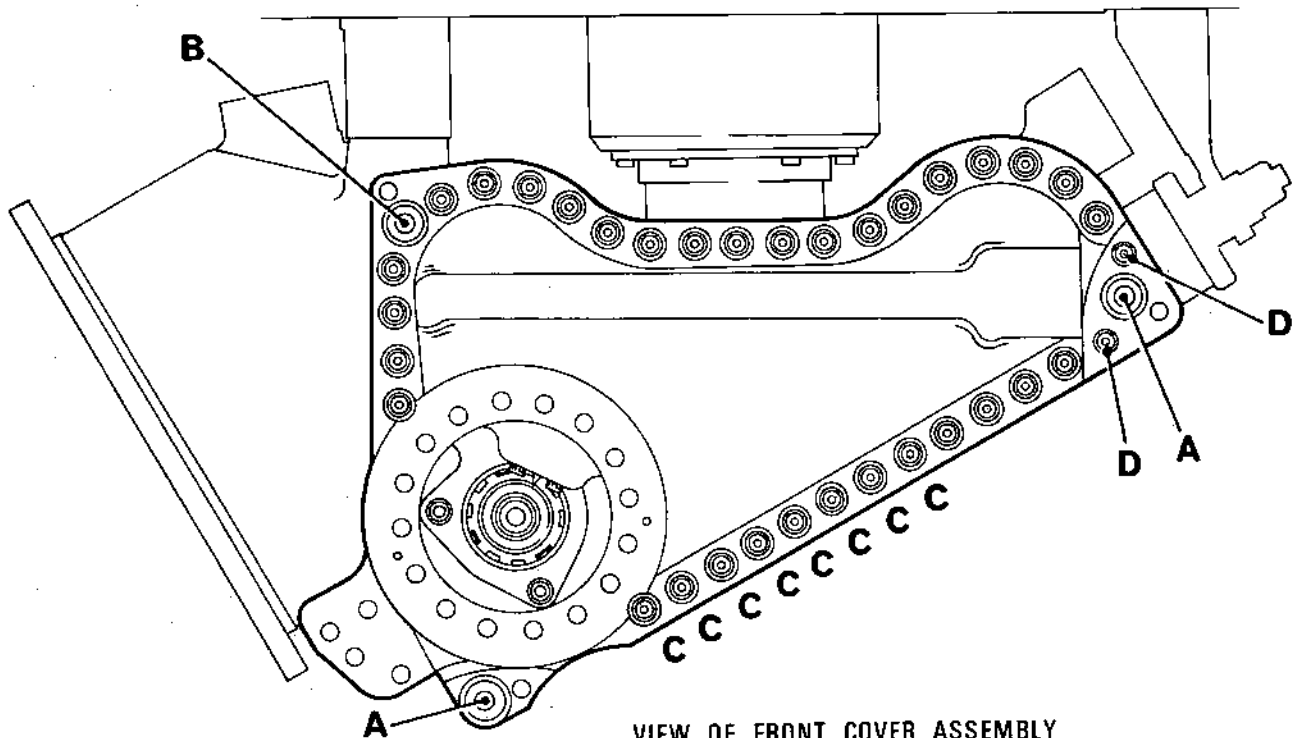
LOAD SPREADING WASHER AND LOCKNUT

LOAD SPREADING PLATE

LOCK NUTS

FLANGED PINS AND BOLTS

INSTALLATION OF DIAPHRAGM/GEAR SHAFT ASSEMBLY



VIEW OF FRONT COVER ASSEMBLY

Assembling Diaphragm and Front Cover to Gearbox  
Figure 520

SUB-ASSEMBLY  
**72-62-00**

Page 565  
Sep 1/75

TN31797



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (c) Near the gear shaft at position C secure the flanged pin with a bolt (72-62-01/4-10).
- (6) Ensure that the bolts have a minimum locking (run-down torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (7) Secure the diaphragm at the remaining positions.
  - (a) Ensure that the nuts and bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).
  - (b) Secure the load spreading plates positioned near the gear shaft at position A with bolts (72-62-01/4-140 and 100). Torque-tighten the bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (c) Assemble the locknuts (72-62-01/4-320) to the bolts near the gear shaft at position B. Torque-tighten the nuts between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (d) Secure the assembly near the gear shaft at position C with a load spreading washer (72-62-01/4-60) and nut (72-62-01/4-50). Torque-tighten the nut between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (8) Lock the gear shaft cupwashers at positions A, B and at the oil pump location.
  - (a) Carefully lock each cupwasher at three equal positions into the retaining nuts.

B. Assemble Front Cover Unit (Ref.Fig.520).

**NOTE:** Refer to SB.72-9 for provisions attached to use of front cover (72-62-01/3-40C).

- (1) Examine components for cleanliness and ensure that all sealing surfaces are damage free. Apply lubricant 'A' to the securing bolts.

SUB-ASSEMBLY

**72-62-00**

Page 566  
Dec 31/00



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (2) Place the gasket (72-62-01/3-310) on the gearbox flange and carefully place the cover unit into position. Secure the cover with the following items at the specified positions.
  - (a) At the previously installed flanged pin locations at position A with bolts (72-62-01/3-110) and at position B with a bolt (72-62-01/3-130).
  - (b) At position C with load spreading washers (72-62-01/3-80) and bolts (72-62-01/3-70).
  - (c) At position D with load spreading washers (72-62-01/3-100) and bolts (72-62-01/3-90).
  - (d) At the remaining bolt positions, with load spreading washers (72-62-01/3-60) and bolts (72-62-01/3-50).
- (3) Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the securing bolts between 90 and 100 lbf in. (10,2 and 11,3 N.m).
- (4) Ensure that the gear train rotates freely.
- (5) Assemble protectors to all open ports.

#### 18. Assemble Rear Cover and QAD Couplings

##### A. Assemble Rear Cover (Ref.Fig.521).

- (1) Examine all components for cleanliness. Ensure that all joint surfaces are free of damage. Apply lubricant 'A' to all securing items.
- (2) Place a gasket (72-62-01/7-210) in position on the gearbox flange and place the cover (72-62-01/7-120) over the joint flange.
- (3) Insert the three flanged pins (72-62-01/7-140) into the cover and secure each pin with a bolt (72-62-01/7-130).
- (4) Assemble the bolts (72-62-01/7-150) and load spreading washers (72-62-01/7-160) to the remaining positions.

SUB-ASSEMBLY

**72-62-00**

Page 567

Dec 31/00

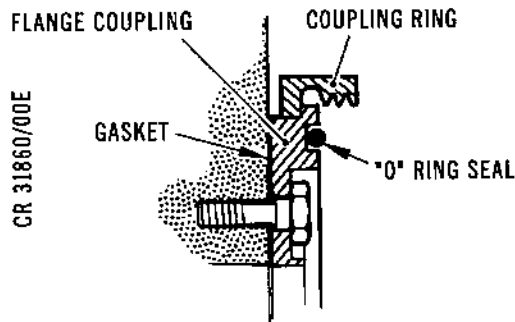


# OLYMPUS 593

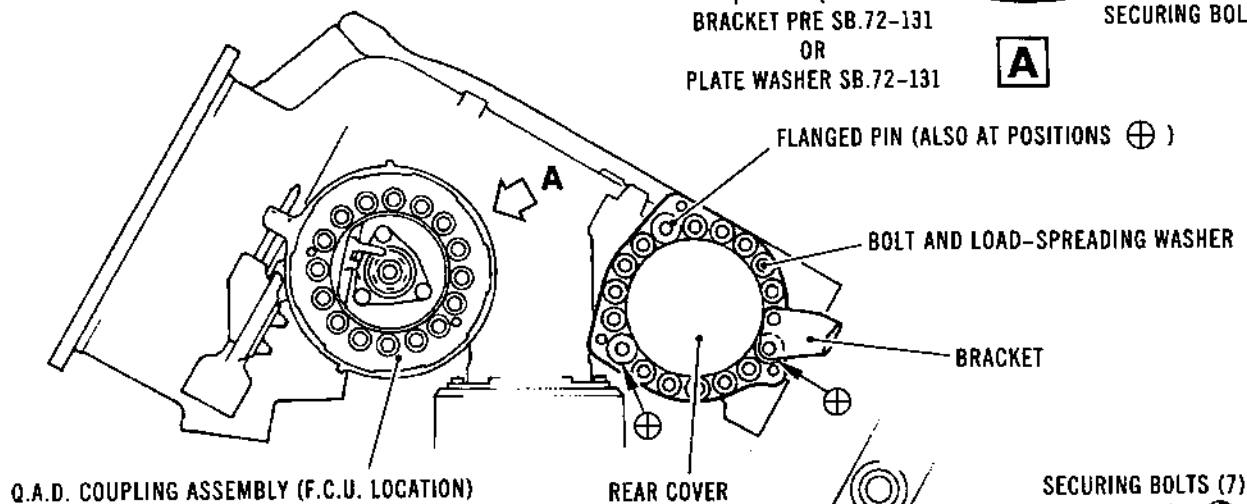
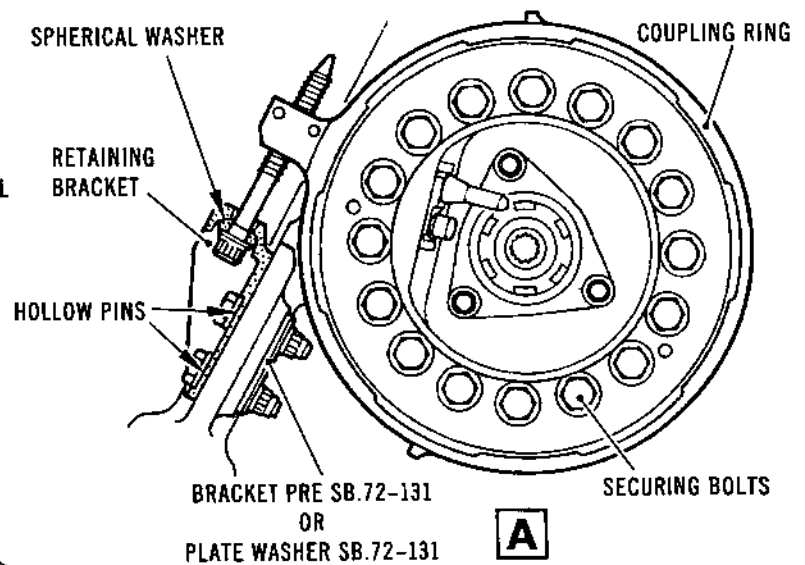


MK.610-14-28  
OVERHAUL

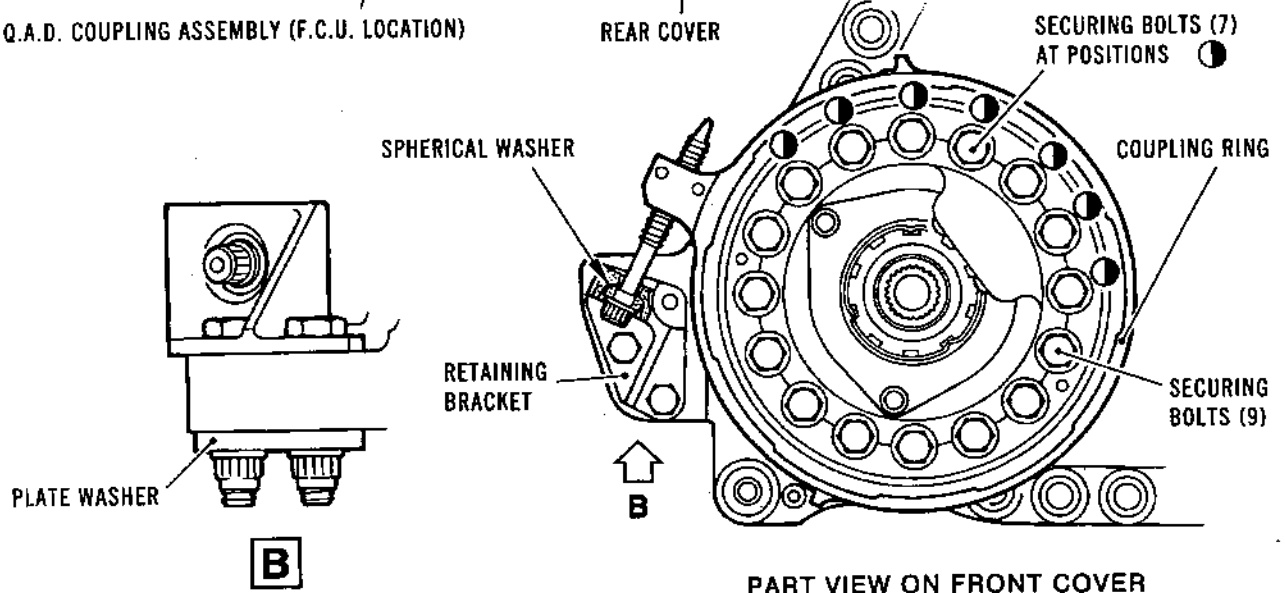
sheema



PART SECTION THROUGH  
Q.A.D. COUPLING



Q.A.D. COUPLING ASSEMBLY (F.C.U. LOCATION)



PART VIEW ON FRONT COVER

Assembling QAD Couplings and Rear Cover  
Figure 521





OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (5) Assemble the bracket (72-62-01/7-190) to the cover bolt locations.
  - (6) Ensure that the bolts have a minimum locking (run-down torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the bolts between 90 and 100 lbf in. (10,2 and 11,3 N.m).
- B. Assemble Fuel Control Unit QAD Coupling to Rear of Gearbox Case (Ref.Fig.521, detail A).
- (1) Apply lubricant 'A' to the securing bolts. Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).
  - (2) Assemble the seal ring (72-62-01/6-90) (SB.0L593-72-8995-401) and coupling ring (72-62-01/6-50) to the flange coupling (72-62-01/6-40).
  - (3) Ensuring correct location on the dowels, assemble the gasket (72-62-01/6-100) and coupling assembly to the rear of the gearbox case.
  - (4) Secure the coupling ring assembly to the case with bolts (72-62-01/6-30). Torque-tighten the bolts to 100 lbf in. (11,5 N.m).
  - (5) Assemble the retaining bracket (72-62-01/6-150).
    - (a) Place the bracket in position near the QAD coupling.
    - (b) Secure the bracket with two hollow pins (72-62-01/6-120) bolts (72-62-01/6-130) bracket (72-62-01/6-140A) Pre SB.72-131 or plate washer (72-62-01/6-140B) SB.72-131 and locknuts (72-62-01/6-110).
    - (c) Torque-tighten the nuts between 85 and 95 lbf in. (9,6 and 10,7 N.m).
  - (6) Assemble a spherical washer (72-62-01/6-20) to the bolt (72-62-01/6-10), then loosely assemble the bolt and washer to the retaining bracket.
  - (7) Assemble the protector (Tool 222) to the QAD coupling location.

SUB-ASSEMBLY

**72-62-00**

Page 568A

Dec 31/00



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

THIS PAGE LEFT BLANK INTENTIONALLY



OLYMPUS 593



MK.610-14-28 *snecma*  
OVERHAUL

C. Assemble Stage 1 Fuel Pump QAD Coupling to Front Cover  
(Ref.Fig.521, detail B).

- (1) Apply lubricant 'A' to the securing bolts. Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).
- (2) Assemble the 'O' ring (72-62-01/2-100) (SB.0L.593-72-8995-401) and coupling ring (72-62-01/2-60) to the flange coupling (72-62-01/2-50).
- (3) Ensuring correct location on the dowels, assemble the gasket (72-62-01/2-110) and coupling ring to the front cover.
- (4) Secure the coupling ring assembly to the cover unit with seven bolts (72-62-01/2-40) and nine bolts (72-62-01/2-30). Use torque wrench (Tool 1664) to torque-tighten the bolts to 100 lbf in. (11,5 N.m).
- (5) Assemble the retaining bracket (72-62-01/2-150).
  - (a) Position the bracket at the location on the end of the cover near the QAD coupling.

SUB-ASSEMBLY

**72-62-00**

Page 569

Dec 1/95



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Secure the bracket with bolts (72-62-01/2-140) plate washer (72-62-01/2-130) and locknuts (72-62-01/2-120).
- (c) Torque-tighten the nuts between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (6) Assemble the spherical washer (72-62-01/2-20) to the bolt (72-62-01/2-10), then loosely assemble the bolt and washer to the retaining bracket.
- (7) Assemble the protector (Tool 222) to the QAD coupling location.

#### 19. Assemble Main Oil Pump and Pulse Probe to Gearbox Case

##### A. Assemble Oil Pump (Ref.Fig.522).

- (1) Examine all components for cleanliness and ensure that all joint surfaces are damage free. Remove protectors as necessary.
- (2) Place the gasket (72-65-00/1-470) on the gearbox flange.
- (3) Remove the cover and bracket from the lifting fixture location on the oil pump and note the position of the bracket. Assemble the lifting fixture (Tool 93) to the pump, ensuring that the securing bolts are evenly tightened.
- (4) Position the oil pump in readiness for assembly to the gearbox case.
- (5) Insert the quillshaft (72-65-00/3-120) fully into the pump.
- (6) Assemble the oil pump to the gearbox, ensuring that the quillshaft and oil transfer hollow pin locate correctly into the gearbox. Secure the oil pump to the gearbox case as follows:

NOTE: Bolt holes position numbers are shown on sheet 2 (Ref.Fig.522).

- (a) Apply lubricant 'A' to bolt threads.
- (b) Insert a flanged pin (72-65-00/1-150-280-410) into the gearbox flange at positions 9, 25 and 35.
- (c) Secure the pump at position 9 with a bolt (72-65-00/1-140).

SUB-ASSEMBLY  
**72-62-00**

Page 570  
Sep 1/75



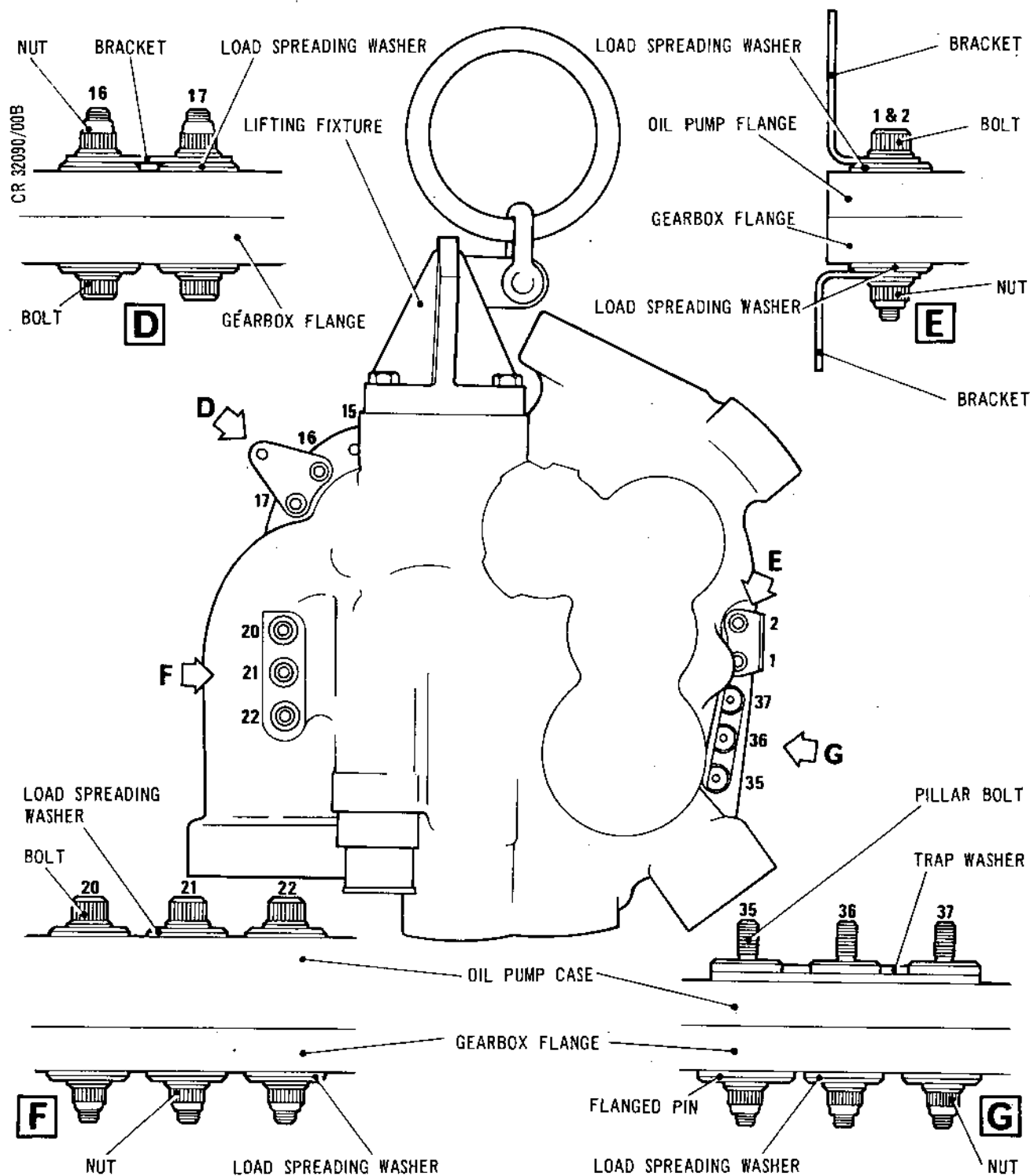
OLYMPUS 593

MK. 610-14-28  
OVERHAUL



PRINTED IN ENGLAND

TN31799



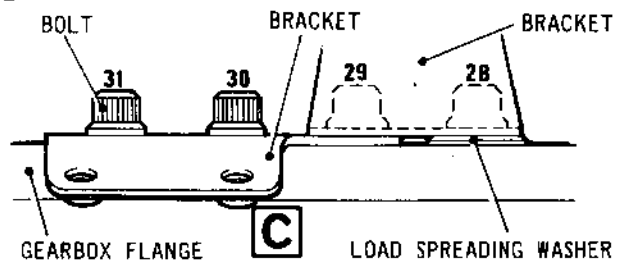
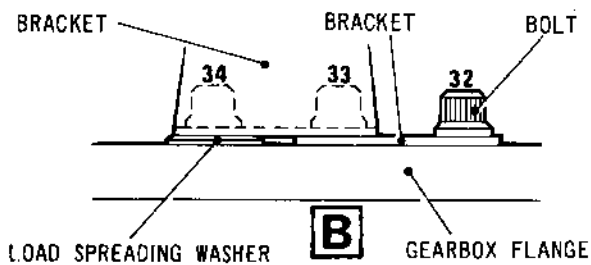
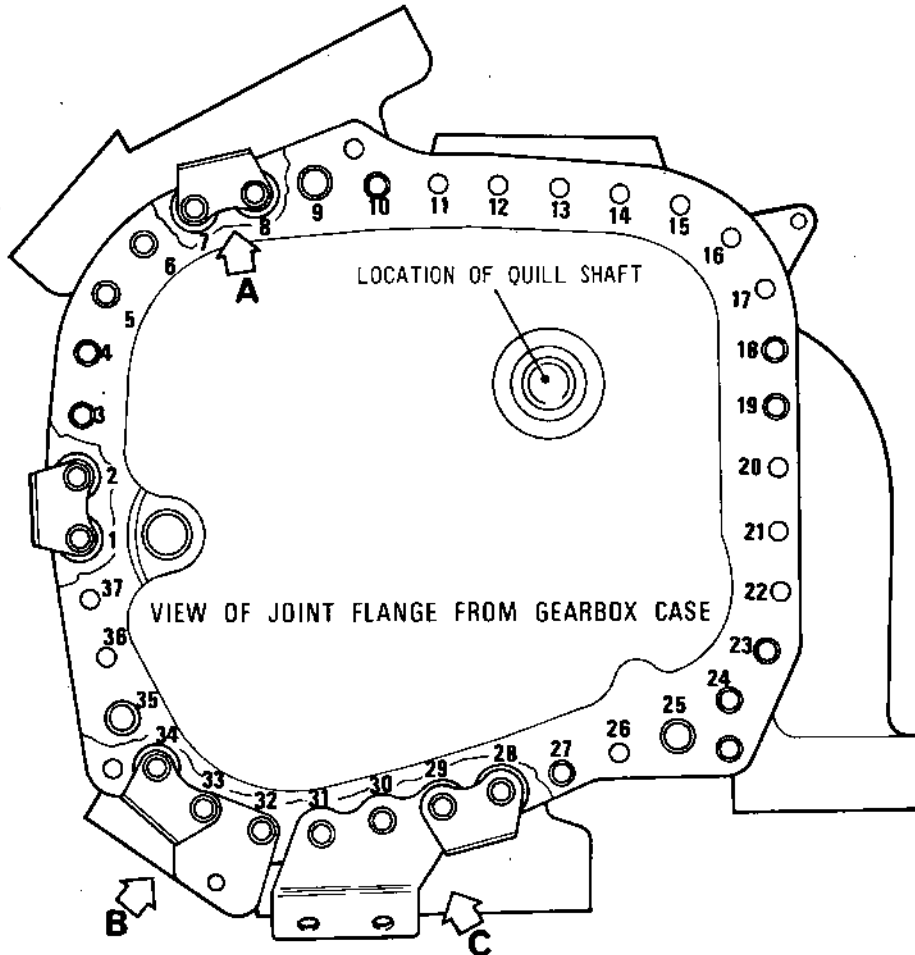
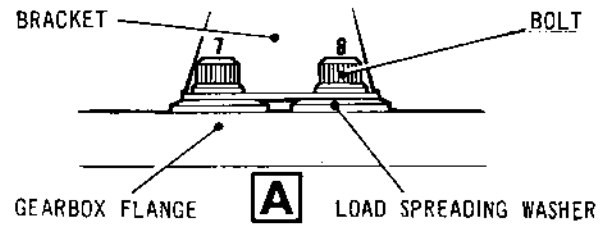
Assembling Main Oil Pump to Gearbox  
Figure 522 (Sheet 1 of 2)

SUB-ASSEMBLY  
**72-62-00**

Page 571  
Sep 1/75



**OLYMPUS 593**  
MK.610-14-28  
OVERHAUL



Assembling Main Oil Pump to Gearbox  
Figure 522 (Sheet 2 of 2)



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (d) Insert a bolt (72-65-00/1-290) through the gearbox flange at position 25. Secure the bolt with a load spreading washer (72-65-00/1-270) and locknut (72-65-00/1-260).
- (e) Place the trap washer (72-65-00/1-420) on the pillar bolt (72-65-00/1-430) then insert the pillar bolt through the pump flange at position 35 and secure it with a locknut (72-65-00/1-400) (Ref.Fig.522 sheet 1 inset G).
- (f) Insert the pillar bolts (72-65-00/1-460) through the trap washer and pump flange at positions 36 and 37 and secure each bolt with a load spreading washer (72-65-00/1-450) and locknut (72-65-00/1-440) (Ref.Fig.522 sheet 1 inset G).
- (g) Place a load spreading washer (72-65-00/1-170) under the head of each bolt (72-65-00/1-180), then insert the bolts through the gearbox flange at positions 5, 6, 11, 12, 13, 14, 15 and 26 and secure with load spreading washers and locknuts (72-65-00/1-170-160).
- (h) Place a load spreading washer (72-65-00/1-240) under the head of each bolt (72-65-00/1-250A) Pre-Mod.7608 or (72-65-00/1-250B) Mod.7608, then insert the bolts through the pump case at positions 20, 21 and 22 and secure with load spreading washers and locknuts (72-65-00/1-240-230) (Ref.Fig.522 sheet 1 inset F).
- (j) Place bracket (72-65-00/1-60) followed by load spreading washers (72-65-00/1-40) on bolts (72-65-00/1-50). Insert the bolts through the oil pump flange at positions 1 and 2. Place load spreading washers (72-65-00/1-40) on the bolts followed by the bracket (72-65-00/1-70A) Pre-SB.72-47 or (72-65-00/1-70B) SB.72-47 and locknuts (72-65-00/1-30) (Ref.Fig.522 sheets 1 and 2 inset E).
- (k) Place a load spreading washer (72-65-00/1-20) under the head of each bolt (72-65-00/1-10) then insert the bolts through the gearbox flange at positions 3, 4, 10, 18, 19, 23, 24 and 27 and screw in hand-tight.
- (l) Place the bracket (72-65-00/1-130A) Pre-SB.72-47 or (72-65-00/1-130B) SB.72-47 followed by load spreading washer (72-65-00/1-120) on the bolts (72-65-00/1-110). Insert the bolts through the gearbox flange at positions 7 and 8 and screw in hand-tight (Ref.Fig.522 sheet 2 inset A).

SUB-ASSEMBLY

72-62-00

Page 573

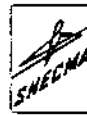
Apr 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (m) Place a flat washer (72-65-00/1-200) on each bolt (72-65-00/1-210) then insert the bolts through the gearbox case flange at positions 16 and 17 and place a load spreading washer over the protruding threads. Place the bracket (72-65-00/1-220) over the bolt threads and secure with two nuts (72-65-00/1-190) (Ref.Fig.522 sheets 1 and 2 inset D).
- (n) Place the bracket (72-65-00/1-330) on the bolts (72-65-00/1-300) then screw the bolts into the gearbox flange at positions 30 and 31 (Ref.Fig.522 sheet 2 inset C).
- (p) Insert bolts (72-65-00/1-300) through the bracket (72-65-00/1-320). Assemble the bracket to positions 28 and 29. Insert a load spreading washer (72-65-00/1-310) between the bracket and the gearbox flange at position 28. Screw the bolts into position hand-tight (Ref.Fig.522 sheet 2 inset C).
- (q) Place the bracket (72-65-00/1-390) on the bolt (72-65-00/1-360) then screw the bolt into the gearbox flange at position 32 (Ref.Fig.522 sheet 2 inset B).
- (r) Insert bolts (72-65-00/1-360) through the bracket (72-65-00/1-380). Assemble the bracket to positions 33 and 34. Insert a load spreading washer (72-65-00/1-370) between the bracket and the gearbox flange at position 34. Screw the bolts into position hand-tight (Ref.Fig.522 sheet 2 inset B).
- (7) Ensure that the nuts and bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the nuts and bolts between 90 and 100 lbf in. (10,2 and 11,3 N.m).
- (8) Remove the lifting fixture from the oil pump and assemble the previously removed cover and bracket.
  - (a) Ensure that the gasket (72-65-00/5-120) is in position.
  - (b) Apply lubricant 'A' to the bolts (72-65-00/5-90). Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Secure the cover and bracket with the bolts torque-tightened between 67 and 73 lbf in. (7,6 and 8,2 N.m).

B. Assemble Pulse Probe (Ref.Fig.523).

- (1) Check the clearance gap between the phonic wheel in the gearbox and the pulse probe.

IN20315

SUB-ASSEMBLY

72-62-00

Page 574

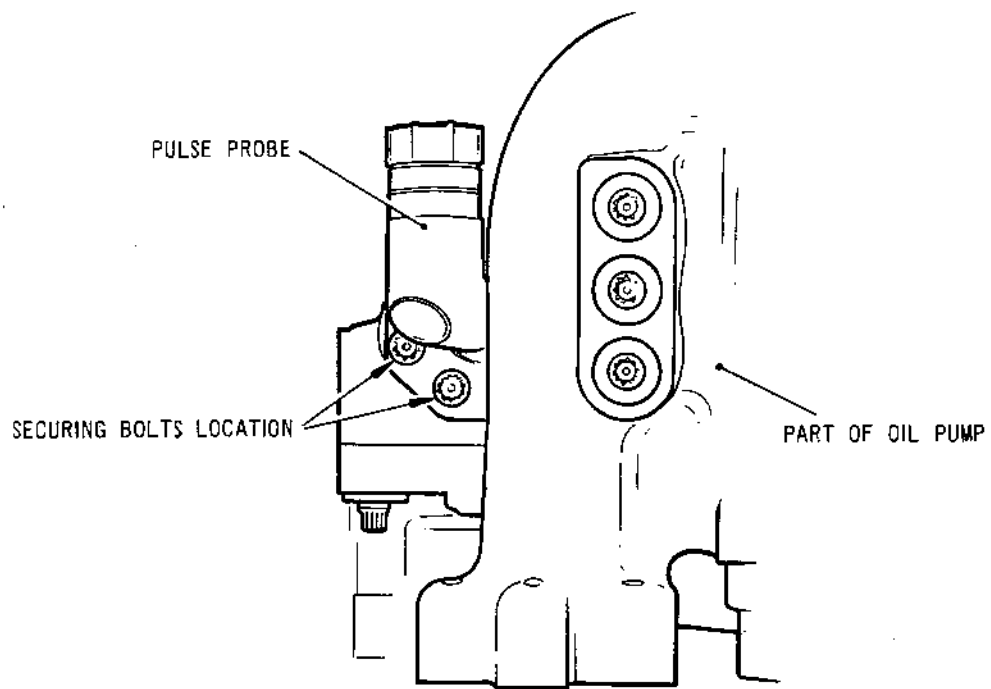
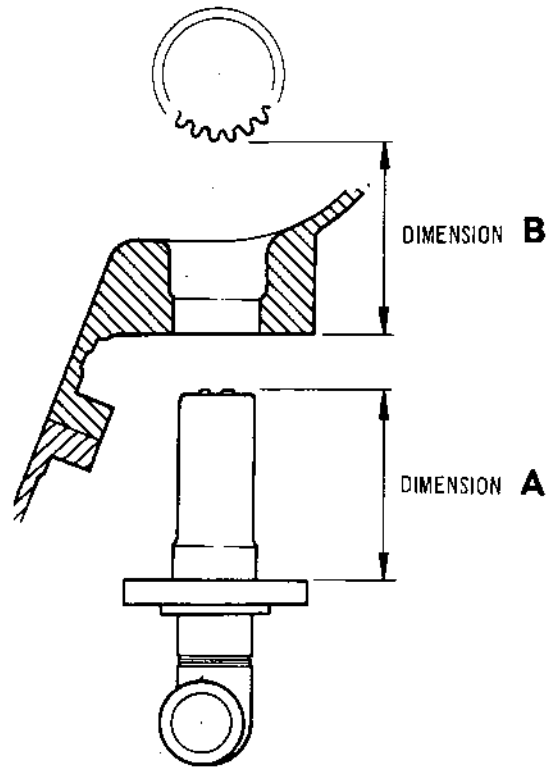
Aug 1/81



CR 31862/00A



**OLYMPUS 593**  
MK. 610-14-28  
OVERHAUL



Assembling Pulse Probe  
Figure 523



- (a) Measure the distance from the locating face of the pulse probe flange to the tip of the pulse probe. Record as dimension A.
  - (b) Measure the distance from the locating face of the pulse probe flange on the gearbox case to the phonic wheel teeth in the gearbox. The measuring instrument must span two teeth of the phonic wheel. Record as dimension B.
  - (c) Deduct dimension A from B. The result must be within 0.009 and 0.021 in. (0,2286 and 0,5334 mm).
- (2) Assemble the pulse probe.
- (a) Assemble the seal (76-12-02/1-50) to the probe (76-12-02/1-10A) Pre SB.76-10 or (76-12-02/1-10B) SB.76-10, then assemble the probe/seal to the gearbox engaging the probe pin in its hole.
  - (b) Apply lubricant 'A' to the securing bolts (76-12-02/1-20), then secure the probe with the bolts, ensuring that they have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m).

## 20. Oil Flow Test and Pressure Test Gearbox Assembly

### A. Test Equipment Required.

- (1) Capable of a flow rate up to 110 gal/h (Imp.) (500 litres/hour) of oil at a temperature of 120 deg C with a delivery pressure up to 50 psig (344 Kpa) to the gearbox.
- (2) Oil specification Lubricant A.

### B. Assemble Pressure Test Equipment to Gearbox Assembly (Ref.Fig.524). Components indicated thus \* are stored in container (Tool 799).

- (1) Remove protectors and assemble items to the following oil pump locations. Ensure thorough cleanliness of all components before assembly.
  - (a) Position A, blank adapter (Tool 705).\*
  - (b) Position B, blank (Tool 218).\*

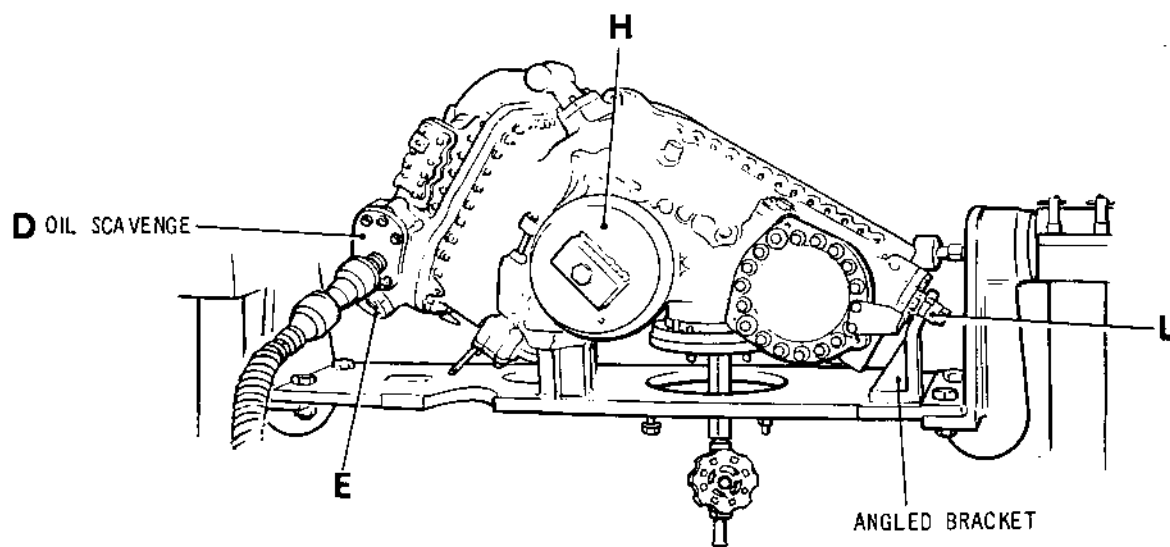
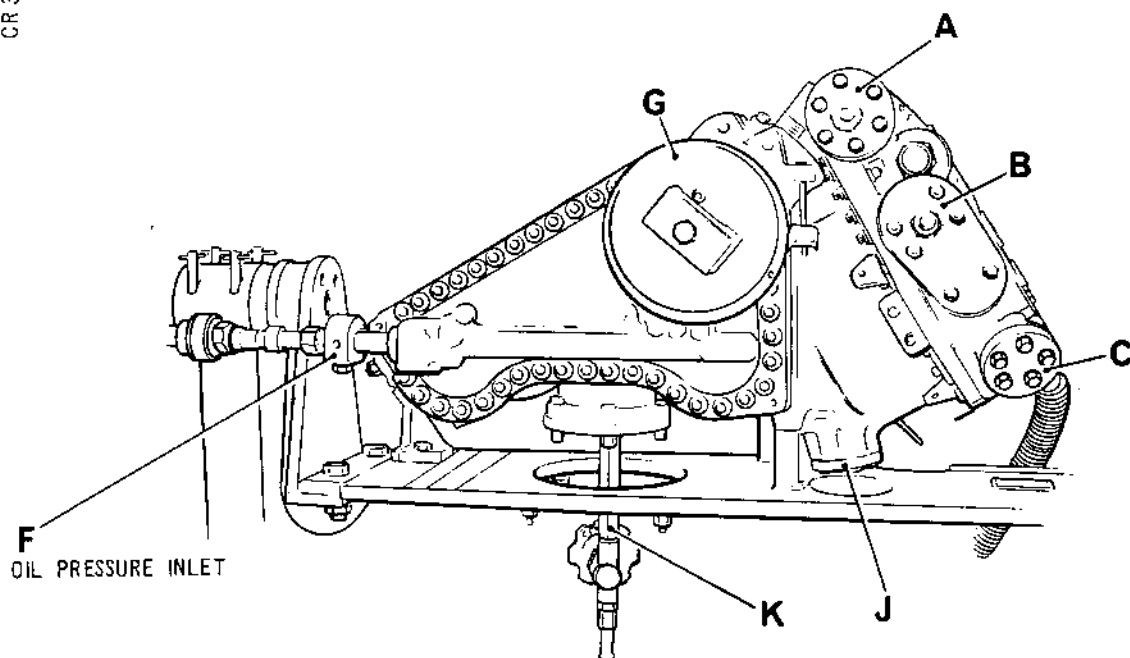


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33111/00A



Assembling Pressure Test Equipment  
Figure 524

SUB-ASSEMBLY  
**72-62-00**

Page 577  
Sep 1/75

PRINTED IN ENGLAND

TN30601



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (c) Position C, blank (Tool 219).\*
  - (d) Position D, adapter oil scavenge (Tool 217).\*
  - (e) Position E, blank (Tool 281).\*
- (2) Remove protectors and assemble items to the following front cover and gearbox locations.
- (a) Position F, oil pressure adapter (Tool 704).\*
  - (b) Position G, QAD coupling location blank (Tool 650) and seal (FBS 1254).
  - (c) Position H, QAD coupling location blank (Tool 650).

NOTE: Ensure that the QAD coupling ring engages freely with each blank. An eight ounce (226.796 g) hammer and soft metal driver is recommended for tightening the coupling ring.

- (d) Position J blank (Tool 150).\*
- (3) Assemble the drain valve adapter assembly (Tool 915) to position K main drive location.
- (a) Remove the adapter (Tool 867) from the main drive location.
  - (b) Assemble the drain valve adapter assembly to the main drive location and secure it with bolts (Tool 86). Ensure that the drain valve is closed.
- C. Prepare Pressure Test/Flow Check Mobile Equipment (Ref.Fig.506 and 507).
- (1) Ensure that an adequate amount of oil is contained in the pressure test equipment. Suitable protective clothing must be worn to minimise personal contact with the oil.
  - (2) Connect the flowmeter electrical plug and instrumentation plug to the respective locations on the mobile pressure test equipment.
  - (3) Connect the oil pressure hose to the adapter on the front cover.

SUB-ASSEMBLY

**72-62-00**

Page 578

Dec 1/82



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (4) Connect the oil scavenge hose to the adapter on the oil pump case.
- (5) Connect the pressure test equipment to a mains electricity supply of 30 A 600 V a.c. Ensure that the circulating pump is switched OFF.

D. Flow Check Gearbox Assembly.

- (1) Open the return stop valve on the mobile pressure test equipment, switch ON the circulating pump and adjust the pressure controller to give a delivery oil pressure of not more than 5 psig (34 Kpa) for circulating and venting purposes. Ensure that the flowmeter is functioning.
- (2) Carefully release trapped air from the gearbox by opening the vent tap on the oil pump at position A (Ref.Fig.524). Close the vent tap when all air has been expelled.
- (3) Place the transparent protection cover (Tool 797) over the gearbox assembly and check to ensure that the gearbox assembly is clearly visible from all angles. Check the assembly for leakage.

**WARNING:** TRANSPARENT PROTECTION COVER MUST NOT BE REMOVED WHILST GEARBOX IS PRESSURIZED WITH OIL. ADEQUATE VENTILATION IS ESSENTIAL. PROTECTIVE CLOTHING MUST BE WORN.

- (4) Switch on the oil heater and heat the oil to a convenient temperature between 20 and 120 deg C. When the circulating oil is at the required temperature allow approximately 5 minutes for stabilization of gearbox case temperature then switch OFF the circulating pump. Carefully release trapped air from the gearbox.
- (5) On completion of venting, switch ON the circulating pump and adjust the oil pressure to give a differential of 30 psig (207 Kpa) between the oil inlet and outlet pressures.
- (6) Maintain the oil flow pressure level and record the oil flow rate indicated by the flowmeter.

SUB-ASSEMBLY

72-62-00

Page 579

Dec 1/82



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (7) To be acceptable, the total flow through the gearbox must be within the limits shown in the graph relevant to the Service Bulletin standard of the engine as follows:
- (a) Engines incorporating Service Bulletins 72-9, 72-12 and 72-7851-32 (preferred standard) - refer to Fig.525.
  - (b) Engines incorporating Service Bulletins 72-9 and 72-12 (controlled flow standard) - refer to fig.526.
  - (c) Engines incorporating Service Bulletins 72-9 and 72-7851-32 (reduced flow standard) - refer to Fig.527.
- (8) On completion of satisfactory flow test switch OFF the oil heater and circulating pump. Switch off the electricity supply to the equipment and disconnect the oil flowmeter. Ensure that the flowmeter is safely stored.

SUB-ASSEMBLY

**72-62-00**

Page 580  
Dec 1/82

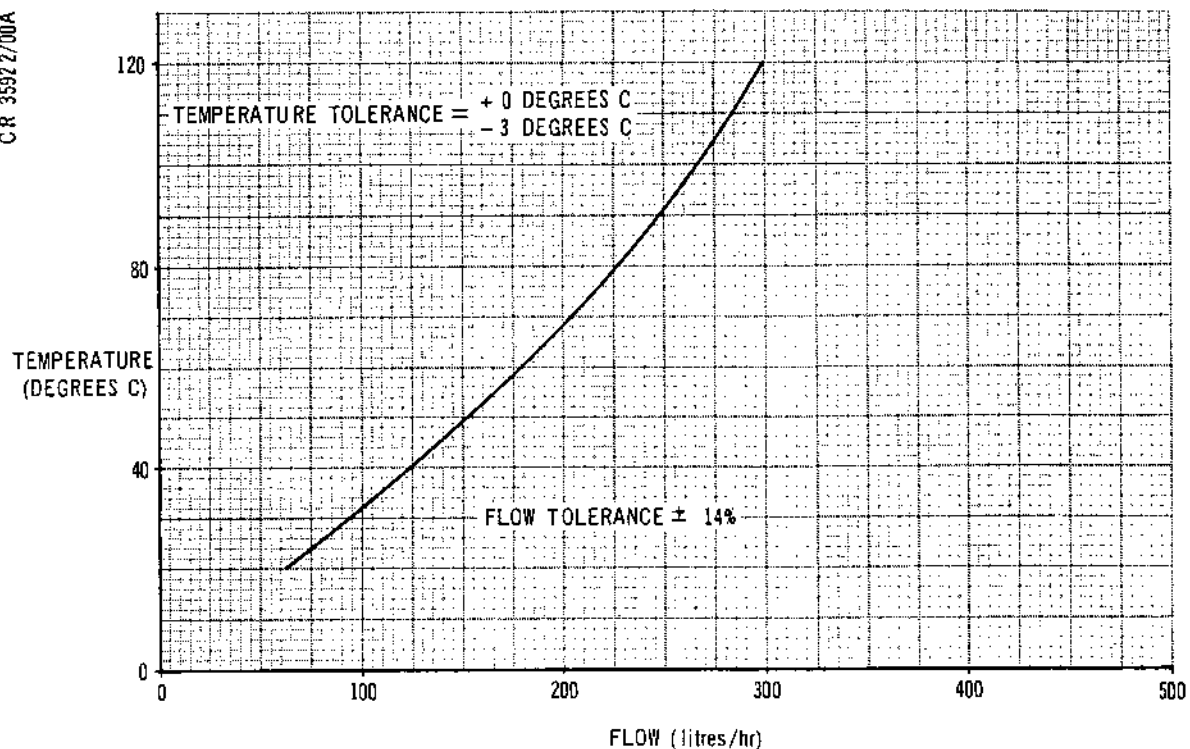
CR 95922/00A



OLYMPUS 593

MK.610-14-28

OVERHAUL



NOTE:- DIFFERENTIAL OIL PRESSURE = 30 PSIG  $\left( \begin{smallmatrix} +0 \\ -1 \end{smallmatrix} \right)$  PSIG

L.H. Gearbox (Preferred Standard) Oil Flow Test Limits  
Figure 525

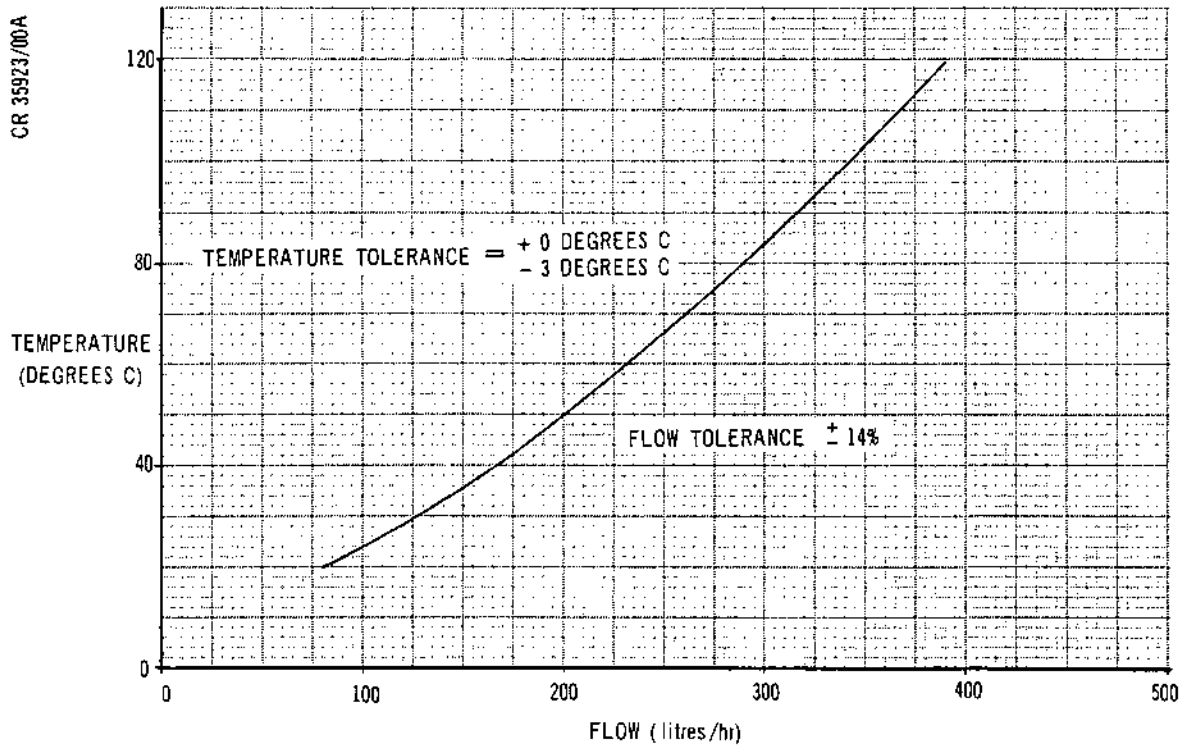


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 35923/00A



NOTE:- DIFFERENTIAL OIL PRESSURE = 30 PSIG  $\left( \begin{matrix} + 0 \text{ lb} \\ - 1 \text{ lb} \end{matrix} \right)$  PSIG

L.H. Gearbox (Controlled Flow Standard) Oil Flow Test Limits  
Figure 526

SUB-ASSEMBLY  
**72-62-00**

Page 580B  
Dec 1/82





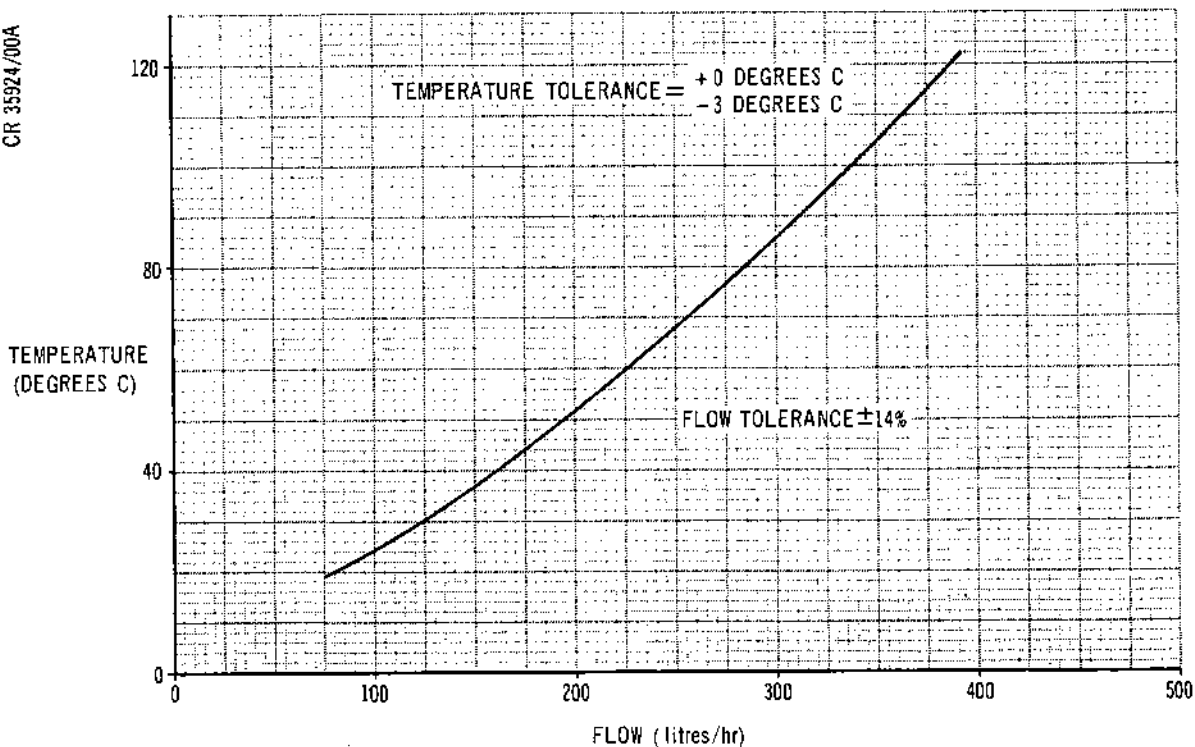
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 35924/00A



NOTE:- DIFFERENTIAL OIL PRESSURE = 30 PSIG  $\left( \begin{smallmatrix} +0 \\ -1 \end{smallmatrix} \right)$  PSIG

L.H. Gearbox (Reduced Flow Standard) Oil Flow Test Limits  
Figure 527

SUB-ASSEMBLY  
**72-62-00**

Page 580c  
Dec 1/82



OLYMPUS 593

MK.610-14-28  
OVERHAUL



E. Pressure Test Gearbox Assembly.

- (1) Open the return stop valve on the mobile pressure test equipment, switch ON the electricity supply and circulating pump and adjust the pressure controller to give a delivery pressure of not more than 5 psig (35 Kpa) for circulating and venting purposes.

**WARNING:** TRANSPARENT PROTECTION COVER MUST NOT BE REMOVED WHILST GEARBOX IS PRESSURIZED WITH OIL. ADEQUATE VENTILATION IS ESSENTIAL. PROTECTIVE CLOTHING MUST BE WORN.

- (2) Ensure that the transparent protection cover is correctly positioned over the gearbox. Switch ON the oil heater to raise the oil temperature to 120 deg C.
- (3) Switch OFF the circulating pump and carefully release trapped air from the gearbox by opening the vent tap on the oil pump at position A (Ref.Fig.524).
- (4) Close the vent tap when all air has been expelled and switch ON the circulating pump.
- (5) Maintain the oil temperature at 120 deg C plus or minus 5 deg C. Adjust the pressure controller to give a delivery pressure of 50 psig (345 Kpa). Adjust the return stop valve to achieve a pressure differential of 40 psig (276 Kpa) in the gearbox assembly.
- (6) Maintain the pressure test condition for 15 minutes and examine the gearbox for oil leakage or seepage.
- (7) Oil leakage is unacceptable, but slight seepage of oil can be accepted.

**NOTE:** An oil leak is considered as drops or globules of oil forming within the specified time and conditions of the pressure test. Oil seepage is considered as oil dampness which may spread but does not form a droplet or globule within the specified time and conditions of the pressure test.

- (8) Any disturbance of oil carrying components after pressure test will necessitate complete pressure test.



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



F. Remove Equipment After Satisfactory Flow/Pressure Test.

- (1) Switch OFF the circulating pump and oil heater. Disconnect the pressure test equipment electrical plug from the mains supply.
- (2) Open the return stop valve.
- (3) Allow sufficient time for the assembly to cool to a safe handling temperature, then drain the oil from the gearbox into a clean receptacle by opening the drain valve at position K, and the vent tap at position A (Ref.Fig.524). Return the drained oil to the mobile pressure test equipment.
- (4) Disconnect the oil pressure and scavenge hoses from the assembly and remove pressure test blanks and adapters.
- (5) Remove external deposits of oil from the gearbox, ensure thorough cleanliness of components. Place pressure test components in the appropriate container.

21. Investigate and Rectify Unsatisfactory Oil Flow

NOTE: Before commencing disassembly of gearbox components for examination of oil jets, examine the mobile pressure test equipment and associated items for possible malfunction.

A. Prepare for Investigation and Rectification.

- (1) Ensure that the pressure test equipment is switched OFF and isolated from the electricity supply.
- (2) Allow sufficient time for the assembly to cool to a safe handling temperature, then drain the oil from the gearbox into a clean receptacle by opening the drain valve at position K, and the vent tap at position A (Ref.Fig.524). Return the drained oil to the mobile pressure test equipment.
- (3) Disconnect the oil pressure and scavenge hoses from the gearbox assembly and remove pressure test blanks and adapters from the gearbox and front cover as necessary. Reassemble the protectors.

SUB-ASSEMBLY

72-62-00

Page 581

Sep 1/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Position the gearbox assembly so that the front cover is in the horizontal position and uppermost in readiness for removal.

**B. Rectification Procedure.**

- (1) Remove the oil strainer located at B (Ref.Fig.503).

- (a) Remove the cover and bracket from the oilway then screw the puller (Tool 155) into the end of the strainer and withdraw the assembly.

- (b) Examine the strainer assembly and bore for obstruction. Clean as necessary.

- (2) Install the oil strainer assembly.

CAUTION: END OF STRAINER PROTRUDES FROM BORE WHEN FULLY INSERTED. EXERCISE CARE TO PREVENT STRAINER COLLAPSING DURING INSERTION.

- (a) Insert the assembly so that the oil jet locates in the bottom of the bore.

- (b) Assemble the driver (Tool 1481) to the end of the oil strainer and carefully press the assembly fully into the bore.

- (c) Secure the strainer assembly with the previously removed items. Apply lubricant A to the bolts, and ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Place the components in position and torque-tighten the bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m).

- (3) Examine the oil jets located in the bores near the QAD couplings.

- (4) Remove front cover for examination of oil filters and jets.

- (a) Remove the QAD coupling ring retaining bolt and spherical washer, then remove the bolts securing the coupling to the front cover and carefully remove the coupling flange and seal from the front cover.

- (b) Remove the bolts and load spreading washers securing the front cover to the gearbox. Carefully separate the joint flanges by using puller (Tool 1021).

TN31521

SUB-ASSEMBLY

**72-62-00**

Page 582

Apr 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (5) Examine the hollow pin and oil jet strainer assembly located at position B (Ref.Fig.502). If necessary remove the strainer assembly as follows:
- (a) Use puller (Tool 154) with impact puller (Tool 1653) to remove the hollow pin.
  - (b) Use puller (Tool 156) with impact puller (Tool 1653) to remove the oil strainer assembly from the bore.
  - (c) Examine the oil strainer assembly and bore for obstruction and clean as necessary.
- (6) Install the oil strainer assembly.
- (a) Shrink the hollow pin with a freezing agent.
  - (b) Insert the oil strainer so that the oil jet locates in the bottom of the bore. Ensure that the assembly is fully in position.
  - (c) Assemble the hollow pin to the bore to hold the assembly in position. Use driver (Tool 153) to assemble the hollow pin.
- (7) Examine the hollow pin bore located at position A (Ref.Fig.502).
- (8) Examine the oil jets assembled to the cover. If it is necessary to remove oil jets or filters, assemble the front cover to the Hydraclamp and holding fixture (Tool 151) before commencing removal (Ref.Fig.501).
- (9) On completion of investigation re-assemble the appropriate items to the front cover (Ref.para.2.B.).
- NOTE: If the cause of restricted oil flow is not revealed continue the investigation procedure. If the cause of flow restriction has been removed assemble the front cover to the gearbox (Ref.para.17.B.) and repeat the flow test procedure (Ref.para.20).
- (10) Gain access to the gearbox oil jets for investigation by removing the nuts and bolts securing the diaphragm to the gearbox at the following positions (Ref.Fig.520).
- (a) Near gear shaft A, remove the outer bolts only from the two load spreading plates. Do not remove the bolts positioned near the gear shaft.

SUB-ASSEMBLY

**72-62-00**

Page 583

Apr 1/76

- (b) Near gear shaft B, remove the two outer locknuts.
  - (c) Near gear shaft C, remove the locknut and load spreading washer.
  - (d) Remove the bolts securing the three flanged pins and use the puller (Tool 177) to withdraw the pins from the diaphragm. Note the positions of the bolts for re-assembly.
- (11) Carefully withdraw the diaphragm and attached gears from the gearbox. Place the assembly in a protective container.
- (12) Carefully remove the idler gear from the gearbox and place it in the tray (Tool 1229).
- (13) Examine the oil jets assembled to the gearbox. Remove the jets from the gearbox if necessary.
- (a) Unscrew and remove the oil jet located in the bottom of the gearbox case. If the jet and bore are satisfactory screw the jet fully in position and tighten it.
  - (b) Remove the bolt securing the oil jet to the bore at the QAD coupling location on the rear face of the gearbox case. If the jet and bore are satisfactory secure the jet to the gearbox with the bolt lubricated with lubricant A.
  - (c) Ensure that the bolt has a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m), then torque-tighten it between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (14) Examine the jets assembled to the main drive location of the gearbox. If it is necessary to remove the jets proceed as follows commencing with the removal of the main drive spiral bevel pinion (Ref.Fig.528).
- (a) Assemble the main drive adapter (Tool 867) to the gearbox mounting adapter and secure it with nuts.
  - (b) Assemble the immobiliser (Tool 168) to the gearbox main drive mounting location on the assembly stand mounting plate. Engage the tool with the bevel pinion retaining nut and secure the immobiliser plate to the mounting plate.



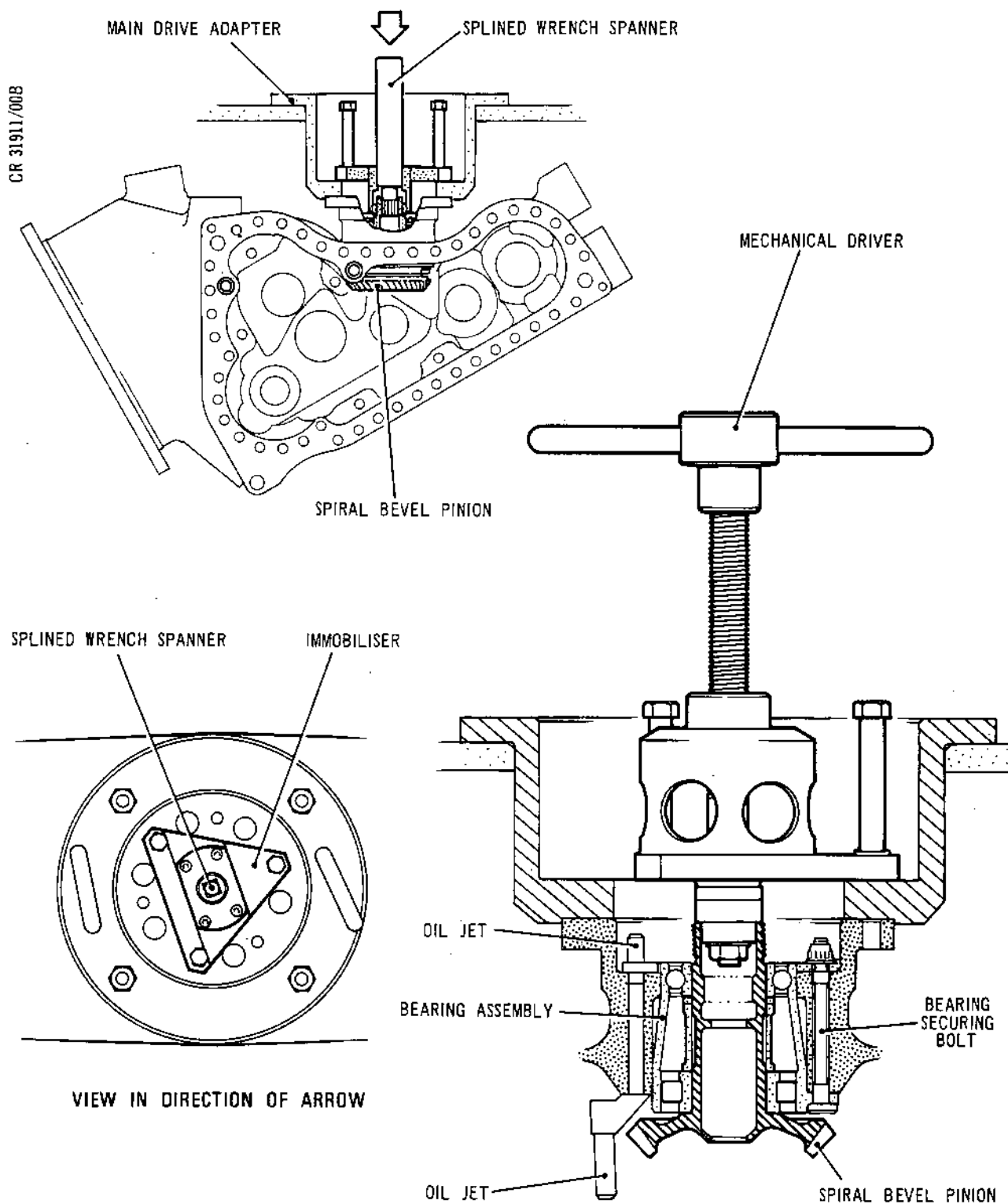
OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND



Removing Main Drive Spiral Bevel Pinion  
Figure 528

SUB-ASSEMBLY  
**72-62-00**

Page 585  
Dec 1/82



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (c) Insert the splined wrench spanner (Tool 1558) through the centre of the immobiliser and engage the splines with the bevel pinion.
  - (d) Turn the splined wrench spanner in a clockwise direction to unscrew and release the bevel pinion.
  - (e) Remove the splined wrench spanner and immobiliser from the gearbox case.
  - (f) Assemble the mechanical driver (Tool 220) to the location from which the immobiliser was removed. Turn the handle of the tool until the bevel pinion is completely removed from the bearing. Ensure that the spacer sleeve and adjusting washer are not removed from the pinion shaft. Place the assembly in the tray (Tool 1229).
  - (g) Remove the nuts and bolts securing the oil jets to the main drive location, remove the oil jets. Do not disturb the nuts and bolts securing the bearing. Note the positions of both jets.
  - (h) Examine the oil jets and bore for evidence of obstruction. Rectify as necessary.
- (15) Assemble the jets to the main drive location (Ref.Fig.528).
- (a) Apply lubricant A to the bolts and ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Place the oil jets in position and secure with nuts and bolts torque-tightened between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (16) Assemble the spiral bevel pinion to the main drive location (Ref.Fig.512).
- (a) Ensure thorough cleanliness of components. Check to ensure that the spacer sleeve and adjusting washer are assembled to the pinion shaft. The adjusting washer chamfer must face toward the threaded end of the shaft.
  - (b) Carefully insert the bevel shaft from the inside of the gearbox case into the main drive bearing. Engage the shaft thread with the mechanical puller (Tool 176) by turning the small handle of the tool.

SUB-ASSEMBLY

**72-62-00**

Page 586

Dec 1/82





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) Ensure that the bevel pinion is parallel with the bearing in the case and that the tool is correctly assembled. Carefully turn the large handle of the mechanical puller to pull the bevel pinion fully into position.
- (d) Remove the tool and check the bevel pinion for freedom of rotation.
- (17) Assemble the locknut to the pinion shaft.
  - (a) Apply lubricant A to the pinion thread. Restrain the pinion by hand whilst screwing the locknut as far as possible by hand on the bevel pinion thread.
- (18) Assemble the immobiliser (Tool 168) to the gearbox main drive mounting location on the assembly stand.
  - (a) Engage the holder section of the tool with the bevel gear retaining nut.
  - (b) Secure the immobiliser plate to the main drive adapter.
- (19) Insert the splined wrench spanner (Tool 1558) through the centre of the immobiliser and engage the splines with the bevel pinion.
- (20) Torque-tighten the retaining nut.
  - (a) Using the torque wrench (Tool 1656) in conjunction with the assembled splined wrench spanner, check that the locking (run-down) torque of the locknut is between 80 and 340 lbf ins (9,0 and 38,4 N.m).

NOTE: The splined wrench spanner must be turned counter-clockwise to tighten the shaft.

- (b) Torque-tighten the locknut between 110 and 120 lbf ft (149,1 and 162,7 N.m) plus the measured locking (rundown) torque. Release the nut until a clearance is visible at the clamping face then repeat the torquing operation. Again release the nut until a clearance is visible at the clamping face then repeat the torquing operation without pausing before reaching the required clamping torque value. Remove the tools and check the bevel pinion for free rotation.



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (c) Insert the checking gauge (Tool 10) into the bevel pinion splines to ascertain that no distortion has occurred.
- (21) Assemble diaphragm gear shafts to gearbox case (Ref.Fig.520).
- (a) Ensure thorough cleanliness of all components especially the bearings. Also ensure that each roller bearing assembly is complete. Check that the minimum locking (run-down) torque of the nuts and bolts is 3.5 lbf in. (0,4 N.m).
- (b) Place the idler spur gear in the gearbox case. Ensure that the large roller bearing fully locates in the bearing journal at position D.
- (c) Place the diaphragm/gear shaft assembly into the gearbox case. Turn the gear shafts as necessary to engage the gear train. To assist roller bearing retention, lubricant 'E' may be used. Ensure that the roller bearings fully engage with the bearing journals and that the diaphragm locates fully in the gearbox case.
- (d) Check the rotational movement of the gear train by turning the main drive bevel pinion.
- (e) Assemble the flanged pins to the diaphragm, apply lubricant A to the securing bolts and secure the flanged pins with the bolts at positions noted during removal. Torque-tighten the bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (f) Secure the load spreading plates positioned near the gear shaft at position A with bolts (72-62-01/4-140 and 100). Torque-tighten the bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (g) Assemble the locknuts (72-62-01/4-320) to the bolts near the gear shaft at position B. Torque-tighten the nuts between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (h) Secure the assembly near the gear shaft at position C with a load spreading washer (72-62-01/4-60) and nut (72-62-01/4-50). Torque-tighten the nut between 67 and 73 lbf in. (7,6 and 8,2 N.m).

SUB-ASSEMBLY

**72-62-00**

Page 588

Jun 1/91



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(22) Assemble front cover to gearbox (Ref.Fig.520).

- (a) Examine components for cleanliness and ensure that all sealing surfaces are damage free. Apply lubricant A to the securing bolts.
- (b) Place the gasket (72-62-01/3-310) on the gearbox flange and carefully place the cover into position.
- (c) At the flanged pin positions A secure the cover with bolts (72-62-01/3-110) and at position B with a bolt (72-62-01/3-130).
- (d) At positions C secure the cover with load spreading washers (72-62-01/3-80) and bolts (72-62-01/3-70).
- (e) At positions D secure the cover with load spreading washers (72-62-01/3-100) and bolts (72-62-01/3-90).
- (f) At the remaining bolt positions secure the cover with load spreading washers (72-62-01/3-60) and bolts (72-62-01/3-50).
- (g) Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the securing bolts between 90 and 100 lbf in. (10,2 and 11,3 N.m). Ensure that the gear train rotates freely.

(23) Assemble QAD coupling to front cover (Ref.Fig.521, detail B).

- (a) Apply lubricant A to securing items. Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).
- (b) Assemble Corruplus seal (72-62-01/2-100) and coupling ring to the flange coupling. Place the gasket (72-62-01/2-110) in position on the front cover then place the coupling ring assembly over it ensuring correct location on the dowels.
- (c) Secure the coupling ring assembly with seven bolts (72-62-01/2-40) and nine bolts (72-62-01/2-30). Torque-tighten the bolts to 100 lbf in. (11,5 N.m) using torque wrench (Tool 1664).
- (d) Assemble the spherical washer to the bolt, then loosely assemble the bolt and washer to the retaining bracket.

SUB-ASSEMBLY

**72-62-00**

Page 589

Dec 1/79



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



C. Repeat Flow Check.

- (1) Assemble the previously removed pressure test blanks and adapters to the gearbox and front cover and connect the oil pressure and scavenge hoses to the respective locations (Ref.Fig.524).
- (2) Repeat the flow test procedure (Ref.Para.20.D).

22. Investigate and Rectify Oil Leakage

A. Prepare for Investigation and Rectification.

- (1) Ensure that the pressure test equipment is switched OFF and isolated from the electricity supply.
- (2) Allow sufficient time for the assembly to cool to a safe handling temperature, then drain the oil from the gearbox into a clean receptacle by opening the drain valve at position K, and the vent tap at position A (Ref.Fig.524). Return the drained oil to the mobile pressure test equipment.
- (3) Disconnect the oil pressure and scavenge hoses from the gearbox assembly and remove pressure test equipment from the gearbox and front cover as necessary.
- (4) If leakage between joint faces is attributed to insufficient tightness of bolts, re-check the torque values in accordance with the tightening procedures detailed in the appropriate sections of this sub-assembly.
- (5) If leakage between joint faces cannot be rectified by torque-tightening checks, it will be necessary to separate the appropriate flange joints for further investigation.

B. Rectify Oil Leakage From QAD Couplings (Ref.Fig.521).

- (1) Remove QAD couplings.

NOTE: This procedure applies to the couplings assembled to the gearbox front cover or gearbox case.

- (a) Remove the coupling ring retaining bolt and spherical washer, then remove the bolts securing the coupling to the gearbox or front cover and carefully remove the coupling flange and seal.

FN31531



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (b) Examine all components and sealing surfaces, especially gaskets and seal rings for cause of leakage. Thoroughly clean all components.
- (2) Renew defective components and assemble the coupling to the rear face of the gearbox.
  - (a) Apply lubricant A to the securing bolts. Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).
  - (b) Assemble a seal ring (72-62-01/6-90) and coupling ring to the flange coupling ring.
  - (c) Place a gasket (72-62-01/6-100) in position on the rear of the gearbox case and place the coupling assembly over it ensuring correct location on the dowels. Secure the coupling ring assembly with bolts (72-62-01/6-30). Torque-tighten the bolts to 100 lbf in. (11,5 N.m).
  - (d) Assemble the spherical washer to the bolt then loosely assemble the bolt and washer to the retaining bracket.
- (3) Renew defective components and assemble the coupling to the gearbox front cover.
  - (a) Apply lubricant A to the securing items. Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).
  - (b) Assemble a Corruplus seal (72-62-01/2-100) and coupling ring to the flange coupling ring.
  - (c) Place a gasket (72-62-01/2-110) in position on the front cover and place the coupling ring assembly over it ensuring correct location on the dowels. Secure the coupling ring with seven bolts (72-62-01/2-40) and nine bolts (72-62-01/2-30). Torque-tighten the bolts to 100 lbf in. (11,5 N.m).
  - (d) Assemble the spherical washer to the bolt then loosely assemble the bolt and washer to the retaining bracket.

C. Rectify Oil Leakage From Front Cover Joint.

- (1) Remove QAD coupling (Ref.B.(1)).

SUB-ASSEMBLY  
**72-62-00**

Page 591  
Dec 1/79



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Remove the bolts and load spreading washers securing the front cover to the gearbox. Note the positions of bolts removed. Carefully separate the joint flanges by using puller (Tool 1021).
- (3) Examine sealing surfaces and gasket for cause of leakage. Thoroughly clean all components and replace the gasket if necessary.
- (4) Assemble the front cover to the gearbox (Ref.Fig.520).
  - (a) Apply lubricant A to the securing bolts. Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).
  - (b) Place the gasket (72-62-01/3-310) on the gearbox flange and carefully place the cover into position.
  - (c) Secure the cover with bolts at the positions noted during removal of cover. Torque-tighten the bolts between 90 and 100 lbf in. (10,2 and 11,3 N.m).
- (5) Assemble the QAD coupling to the front cover (Ref.B.(3)).

D. Rectify Oil Leakage From Rear Cover Joint.

- (1) Remove the bolts and load spreading washers securing the cover, then separate the joint flanges by use of puller (Tool 1021). Note the position of the bracket.
- (2) Examine sealing surfaces and gasket for cause of leakage. Thoroughly clean all components and replace the gasket if necessary.
- (3) Assemble the rear cover to the gearbox with the previously removed bolts and load spreading washers. Ensure that the bracket is positioned as noted during removal.
  - (a) Apply lubricant A to the bolts. Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).
  - (b) Torque-tighten the bolts between 90 and 100 lbf in. (10,2 and 11,3 N.m).

TN31533

SUB-ASSEMBLY

**72-62-00**

Page 592

Apr 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



E. Rectify Oil Leakage From Oil Pump/Gearbox Joint.

- (1) Assemble the lifting fixture (Tool 93) to the oil pump in preparation for removal of the oil pump (Ref.Fig.522 sheet 1).
  - (a) Remove the cover and bracket from the lifting fixture location on the oil pump. Note the position of the bracket. Assemble the lifting fixture to the oil pump and attach a crane hoist to the fixture.
- (2) Remove the nuts, bolts and load spreading washers securing the pump flange to the gearbox flange. Note the position of securing items and brackets removed.
- (3) Separate the flange joints by use of puller (Tool 1021) which can be screwed into the tappings near the flanged pins positions. Ensure that residual oil drains into the drip tray.
- (4) Carefully withdraw the oil pump and ensure that the quillshaft does not fall free. Remove the quillshaft and place it in a protective container.
- (5) Examine sealing surfaces and gasket for cause of leakage. Thoroughly clean all components and replace the gasket if necessary.
- (6) Assemble the oil pump to the gearbox (Ref.Fig.522).
  - (a) Insert the quillshaft fully into the pump.
  - (b) Apply lubricant 'A' to securing items.
  - (c) Place the gasket (72-65-00/1-470) on the gearbox flange then carefully secure the oil pump to the gearbox ensuring that the quillshaft and oil transfer hollow pin locate correctly into the gearbox.
  - (d) Secure the oil pump to the gearbox with securing items in the positions noted during removal. Ensure that the brackets are correctly positioned.
  - (e) Ensure that the nuts and bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten the nuts and bolts to between 90 and 100 lbf in. (10,2 and 11,3 N.m).

SUB-ASSEMBLY

72-62-00

Page 593

Apr 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (7) Remove the lifting fixture from the oil pump and assemble the previously removed cover and bracket.
  - (a) Ensure that the gasket (72-65-00/5-120) is in position.
  - (b) Apply lubricant 'A' to the bolts (72-65-00/5-90). Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Secure the cover and bracket with the bolts torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

F. Rectify Oil Leakage From Pulse Probe/Gearbox Case Joint.

- (1) Remove the bolts securing the pulse probe to the gearbox then carefully withdraw the probe.
- (2) Examine the sealing surfaces for cause of leakage. Thoroughly clean the sealing surfaces.
- (3) Assemble the pulse probe.

NOTE: If the pulse probe is to be replaced, check the clearance gap between the phonic wheel in the gearbox and the replacement probe (Para.19.B.).

- (a) Apply lubricant 'A' to the securing bolts and ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Secure the probe to the gearbox with the bolts torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

G. Repeat Pressure Test (Ref.Fig.524).

- (1) Assemble the previously removed pressure test blanks and adapters to the gearbox and front cover and connect the oil pressure and scavenge hoses to the respective locations (Ref.Fig.524).
- (2) Repeat the pressure test procedure and remove the equipment (Ref.Para.20.E. and F).

23. Prepare Gearbox Assembly for Despatch

A. Prepare Gearbox Assembly.

- (1) Thoroughly examine the assembly for cleanliness and completion of all operations to this stage.

SUB-ASSEMBLY  
**72-62-00**  
Page 594  
Apr 1/76

IN31482





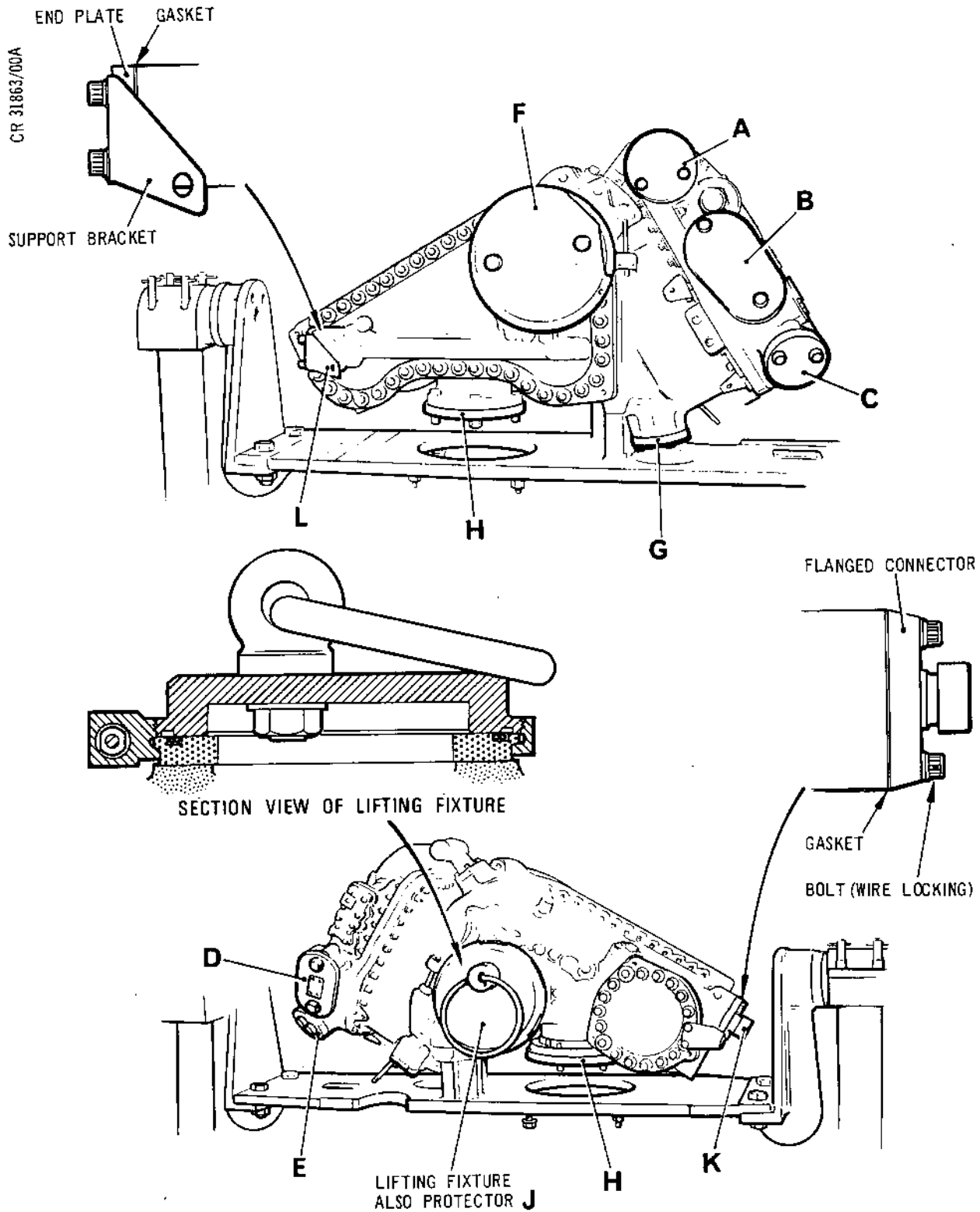
# OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND



Assembling Protectors and Lifting Fixture to Gearbox  
Figure 529

SUB-ASSEMBLY  
**72-62-00**

Page 595  
Dec 1/82



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Examine the driving shaft for cleanliness and freedom from damage.
- (3) Assemble the retaining ring (72-62-02/1-190A) Pre-SB.72-36 or (72-62-02/1-190B) SB.72-36 to the driving shaft.
- (4) Assemble protectors to the following oil pump locations (Ref.Fig.529). Protectors are stored in container (Tool 279).
  - (a) Position A, protector (Tool 124).
  - (b) Position B, protector (Tool 122).
  - (c) Position C, protector (Tool 123).
  - (d) Position D, protector (Tool 120).
  - (e) Position E, protector (Tool 282).
- (5) Assemble protectors to the following gearbox locations (Ref.Fig.529). Protectors are stored in container (Tool 279).
  - (a) Position F, protector (Tool 222).
  - (b) Position G, protector (Tool 201).
  - (c) Position H, protector (Tool 199).
  - (d) Position J, protector (Tool 222).
- (6) Slacken the bolts securing the angled bracket to the mounting adapter. Withdraw the pressure test adapter from the gearbox and assemble the following items to the location from which the pressure test adapter has been withdrawn (Ref.Fig.529, inset view K).
  - (a) Apply lubricant 'A' to the securing bolts. Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).
  - (b) Place the gasket (72-62-01/7-250) in position followed by the flanged connector (72-62-01/7-240).
  - (c) Secure the assembly with five bolts (72-62-01/7-220) and one bolt (72-62-01/7-230) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

SUB-ASSEMBLY

**72-62-00**

Page 596

Dec 1/82

- (d) Assemble a protector to the connector.
- (7) Assemble the following items oil inlet flange on the front cover (Ref.Fig.529, inset view L).
  - (a) Apply lubricant 'A' to the securing bolts (72-62-01/3-10). Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m).
  - (b) Place the gasket (72-62-01/3-35) SB.72-15 on the flange face followed by the end plate (72-62-01/3-30) and support bracket (72-62-01/3-20).
  - (c) Secure the assembly with bolts torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

**B. Remove the Gearbox Assembly from the Stand.**

- (1) Assemble the lifting fixture (Tool 285) to position J on the gearbox (Ref.Fig.529).
  - (a) Adjust the assembly stand so that the rear face of the gearbox is uppermost. Ensure that the lifting fixture is thoroughly clean.
  - (b) Remove the protector from the QAD coupling location.
  - (c) Slacken the QAD coupling ring bolt and place the lifting fixture in position on the QAD coupling location.
  - (d) Engage the QAD coupling ring with the lifting fixture and tighten the bolt.
- (2) Carefully transfer the gearbox from the assembly stand to a transport pallet.
- (3) Remove the lifting fixture from the gearbox and install the protector (Tool 222) to the QAD coupling location.

**C. Final Inspection and Despatch.**

- (1) Ensure that the identification plate (72-00-04/1-90) is marked with the engine serial number. For details of marking procedure (Ref.72-09-00, Assembly).



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (2) Secure the identification plate to the gearbox with bolts (72-00-04/1-70) and washers (72-00-04/1-80). Use tri-wing bit (Tool 1911) and holder (Tool 1912) to assemble the plate (Ref.72-09-00, Assembly).
- (3) Ensure that all operations have been completed satisfactorily and that the gearbox assembly is correctly blanked with protectors (Ref.Para.23). Ensure that the drive shaft is also protected.
- (4) Transfer the gearbox assembly and drive shaft to the appropriate area in readiness for assembly to an engine (Ref.72-00-00, Assembly).



OLYMPUS 593

MK. 610-14-28  
OVERHAUL



LEFT-HAND ACCESSORY GEARBOX CASE ASSEMBLY - SUB-ASSEMBLY

PRINTED IN ENGLAND

For information on the assembly of the Left-hand Accessory Gearbox Case Assembly, refer to 72-62-00 Assembly.

TN32360

SUB-ASSEMBLY

**72-62-01**

Page 501  
Jan 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



LEFT-HAND ACCESSORY GEARBOX MAIN DRIVES - SUB-ASSEMBLY

PRINTED IN ENGLAND

For information on the assembly of the Left-hand Accessory Gearbox Main Drives, refer to 72-62-00 Assembly.

TN32362

SUB-ASSEMBLY

**72-62-02**

Page 501

Jan 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



FIRST STAGE FUEL PUMP DRIVE AND IDLER GEAR - SUB-ASSEMBLY

PRINTED IN ENGLAND

For information on the assembly of the First Stage Fuel Pump and Idler Gear, refer to 72-62-00 Assembly.

TN32364

SUB-ASSEMBLY

**72-62-03**

Page 501

Jan 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



FUEL CONTROL UNIT DRIVE AND MAIN OIL PUMP DRIVE - SUB-ASSEMBLY

PRINTED IN ENGLAND

For information on the Fuel Control Unit Drive and Main Oil Pump Drive, refer to 72-62-00 Assembly.

TN32366

SUB-ASSEMBLY

**72-62-04**

Page 501

Jan 1/76





# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

## RIGHT-HAND ACCESSORY GEARBOX - SUB-ASSEMBLY

### TABLE OF CONTENTS

Para.	Page
1. General	501
2. Assemble Right-Hand Gearbox...	501
A. Assemble the Shrink Fit Items to the Right-Hand Gearbox Case	501
B. Assemble the Shrink Fit Items to the Gearbox Front Cover, Oil Filter Adapters, Inclined Bevel Gear Drive Bearing Housing, Hydraulic Pump Adapters, Scavenge Pump Case and Flexible Coupling Shaft	508
C. Assemble the Oil Jets, Bearings and Quick Attach/Detach Coupling to the Front Cover..	512
D. Assemble the Oil Pump to the Front Cover	513
E. Assemble the Relief Valve Blank to the Front Cover	517
F. Assemble the Starter QAD Adapter to the Front Cover	518
G. Assemble the Gearbox Case to the Build Stand	518
H. Assemble the Oil Jet and Strainer	519
J. Assemble the Pressure Filter and Nut Assembly to the Gearbox Case	520
K. Assemble the Scavenge Filter and Nut Assembly to the Gearbox Case	524B
L. Oil Flow Check of the Skeleton Gearbox Case.	527
M. Assemble the Bearings and the Inclined Bevel Gear Drive Segment Assemblies to the Gearbox Case	528
N. Determining the Adjusting Washers for the Bevel Gear Bearing Housings...	530
P. Determine the Adjusting Washers for the Bevel Gears	533
Q. Assemble the Sealol Seal to the Stand-by Hydraulic Pump Adapter for Working Length Checks	538
R. Assemble the Gearshaft and Sealol Seal Assembly to the Stand-by Hydraulic Pump Adapter Assembly	539
S. Assemble the Oil Pump Drive and Idler Gears to the Gearbox Case..	541
T. Assemble the Stand-by Hydraulic Pump Adapter Assembly and Main Hydraulic Pump Adapter to the Gearbox Case to Check the Sealol Seal Adjusting Washer Size	546
U. Assemble the Vertical Bevel Gear, Driving Spur Gear Assemblies to the Gearbox Case	552

Printed in England

SUB-ASSEMBLY

# 72-63-00

Contents 1  
Dec 1/96

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

Para.		Page
V.	Assemble the Inclined Bevel Gear Assembly to the Gearbox Case ... ..	557
W.	Backlash Checks on Gear Assemblies and Bevel Gear Teeth Engagement... ..	558
X.	Assemble the Oil Transfer Assembly and the Seal Ring to the Gearbox ... ..	582
Y.	Assemble the Main Coupling Shaft, the QAD Coupling Ring Assembly and the Mounting Bracket.	583
Z.	Assemble the IDG QAD Coupling Ring Assembly and the Mounting Bracket ... ..	588
AA.	Prepare the Gearbox for Oil Flow Test and Pressure Test ... ..	592
AB.	Oil Flow and Pressure Test the Gearbox ... ..	595
AC.	Remove the Oil Flow Test and Pressure Test Equipment from the Gearbox ... ..	598.2
AD.	Assemble the Oil Pressure Transmitter and Switch to the Front Cover (Pre SB.72-96)... ..	598.3
AE.	Assemble Blanks to the Hand Turning Equipment Mounting Face, Oil Pressure Transmitter and Switch Mounting Faces on the Front Cover (SB.72-96) ... ..	598.4
AF.	Assemble the Main Hydraulic Pump Rim Clenching Clamp ... ..	598.4
AG.	Assemble the Stand-by Hydraulic Pump Rim Clenching Clamp... ..	598.5
AH.	Bedding Check on the Stand-by and Main Hydraulic Pump Clenching Clamps... ..	598.5
AJ.	Assemble Protectors to the Gearbox ... ..	598.6
AK.	Assemble the Gearbox Module Identification Plate ... ..	598.9

TABLE OF ILLUSTRATION

Fig.No.		Page
501	Location of Shrink Fit Items in the Gearbox Case..	503
502	Assembly of Stepped Pins at the Inclined Bevel Gear Location ... ..	507
503	Location of Shrink Fit Items to the Front Cover, Housings and Adapters... ..	509
504	Location of Front Cover Attaching Parts ... ..	514
505	Oil Pump Spur Gear Dimensional Checks ... ..	516
506	Location of Bearings, Strainer Assembly, Oil Jet and Segment Assemblies to the Gearbox Case ... ..	521
507	Assembly of Pressure and Scavenge Filters (Pre SB.0L.593-72-9036-419)... ..	523
507A	Assembly of Pressure and Scavenge Filters (SB.0L.593-72-9036-419) ... ..	524A

SUB-ASSEMBLY

**72-63-00**Contents 2  
Dec 1/96

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



Fig.No.

Page

508	Oil Flow Check of the Gearbox Case ... ..	526
509	Calculating Adjusting Washer Dimensions for Bevel Gear Assemblies... ..	531
510	Calculating Adjusting Washer Dimensions for Bevel Gear Assemblies... ..	534
511	Calculating the Working Length of the Sealol Seal...	537
512	Assembly of the Oil Pump Driving Spur Gear ...	540
513	Assembly of Idler Gear and Idler Shaft ...	543
514	Tightening the Idler Shaft Retaining Nut ...	545
515	Assembly of Main and Stand-by Hydraulic Pump Adapters ... ..	548
516	Calculating the Sealol Seal Adjusting Washer ...	549
517	Peening Keywashers on Hydraulic Pumps Driving Spur Gear Shaft... ..	551
518	Tightening the Nut on the Vertical Bevel Gear Drive Shaft ... ..	554
519	Assembly of Immobilizer to the Vertical Bevel Gear Drive Shaft ... ..	556
520	Checking Backlash between Inclined and Vertical Bevel Gears ... ..	559
521	Assembly of the Starter/IDG Spur Gear ...	563
522	Tightening the Retaining Nut on the Starter/IDG Spur Gear ... ..	565
523	Checking Backlash between Starter/IDG Spur Gear and Vertical Bevel Gear Drive Assembly ... ..	567
524	Checking Backlash between the Hydraulic Pumps Spur Gear Drive and Idler Spur Gear ... ..	568
525	Checking Backlash between Starter/IDG Spur Gear and Idler Spur Gear... ..	570
526	Checking Backlash between Oil Pump Drive Spur Gear and Idler Spur Gear ... ..	572
527	Removing the Starter/IDG Spur Gear Drive Shaft ...	574
528	Correct Bevel Gear Teeth Engagement... ..	576
529	Peening of Keywasher on Starter/IDG Spur Gear Drive Shaft ... ..	578
530	Assembly of Gearbox Front Cover ... ..	579
531	Oil Transfer Assembly ... ..	581
532	Installation of Bearing Housing Assembly (Pre SB.72-8689-272) ... ..	585
533	Installation of Bearing Housing Assembly (SB.72-8689-272) ... ..	587
534	Lifting the Gearbox ... ..	589
535	Gearbox Prepared for Oil Flow and Pressure Test...	591
536	Location of Gearbox Protectors ... ..	598.7

PRINTED IN ENGLAND

TN42150

SUB-ASSEMBLY

**72-63-00**

Contents 3

Sep 1/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



LIST OF TABLES

Table No.		Page
501	Assembly of Shrink Fit Items to the Gearbox Case ... ..	502
502	Assembly of the Shrink Fit Items to the Front Cover, Oil Filter Adapters, Hydraulic Pump Adapters and Scavenge Pump Case ... ..	510
503	Oil Flow Check ... ..	527
504	Assembly of Pressure Test Blanks to the Gearbox for the Flow and Pressure Test ... ..	594
505	Removal of Pressure Test Blanks from the Gearbox ... ..	598.3

TN42148

SUB-ASSEMBLY

**72-63-00**

Contents 4

Sep 1/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



RIGHT-HAND ACCESSORY GEARBOX - SUB-ASSEMBLY

1. General

- A. Prior to commencing assembly, refer to 72-09-00 Assembly for general information.
- B. During the sub-assembly procedure reference will be made to the Illustrated Parts Catalogue (I.P.C.) to identify those items where the nomenclature does not positively identify them, due to the duplication of the title e.g. nuts, bolts, washers, bearings, gears, housings, tubes etc. The item will be identified as follows: e.g. bolt (1-10), the 1 referring to the I.P.C. Fig.No. and the 10 referring to the item No. In order to shorten reference numbers both Fig. and item number will be prefixed only by their Right-Hand Gearbox breakdown number e.g. (01/1-10) and shall be deemed as being 72-63-(01/1-10). Where items from a different breakdown are introduced, the breakdown number will be quoted in full e.g. bolt (79-34-01/1-10).
- C. Throughout the text special tools are quoted by their Ref.No. e.g. (Tool 1234). For a complete list of tooling required for the assembly and for the Manufacturer's Part No., refer to Special Tools, Fixtures and Equipment Table 1002.
- D. Apply lubricant 'A' to all nuts and bolts etc. employed in the retaining of items in the Sub-assembly procedure prior to torque-tightening.
- E. During the sub-assembly procedure, where the thickness of adjusting washers has to be determined, the words 'select' or 'select from the range' are used. If a range of washers is not available, it may be necessary to machine the washer to achieve the desired thickness. The information for machining washers is given under chapter 72-09-21 Repair. During the assembly procedure, the machining procedure reference will be given immediately after each adjusting washer I.P.C. Ref.No. in the appropriate part of the text e.g. select from the range the correct thickness adjusting washer (3-70) (72-09-21 Repair, Fig.401).
- F. On the completion of the gearbox build, relevant oil flow and pressure checks, the gearbox is assembled to the intermediate case in order to select adjusting plates for the mounting brackets. After removal from the intermediate case the gearbox is returned for assembly of the module identification plate.

SUB-ASSEMBLY

**72-63-00**

Page 501

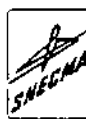
Jun 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



## 2. Assemble the Right-Hand Gearbox

### A. Assemble Shrink Fit Items to Right-Hand Gearbox Case (Ref.Fig.501).

NOTE: The following procedure is required to be carried out only if the gearbox case is a new item.

- (1) Place the gearbox case in a preheated oven controlled at 150 deg C for approx. 30 minutes.
- (2) On engines Pre.SB.72-83 assemble the two jet strainer ends (01/9-30) to the strainer element (01/9-60).
- (3) On engines embodying SB.72-83 Parts 1, 2 and 3 assemble the strainer extension (01/9-40) to the strainer element (01/9-60).

NOTE: Strainers element/strainers extension (SB.72-83 Parts 1,2 and 3) must only be embodied in a Pre SB.72-83 standard gearbox case, while SB.72-83 Part 4 introduces a new strainer element which must be assembled to an SB.72-83 standard case.

- (4) Place the items listed in Table 501 into an approved freezing agent (10 to 15 minutes approx. in Cardice or 2 to 3 minutes approx. in liquid nitrogen), the removal time to coincide with the removal of the gearbox case from the oven.
- (5) Using protective gloves remove the gearbox case from the oven on completion of its heating period, and place on a suitable working surface.
- (6) Using protective gloves remove the frozen item from the freezing agent. Assemble to their specified locations with appropriate tools, as detailed in Table 501.

NOTE: Hollow pins, which have a thread tapped in them to facilitate removal, must be assembled with the threaded portion uppermost.

ITEM	LOCATION	TOOL
Hollow pin (01/9-140 or 140B SB.72-24)	Front cover mounting face	Driver (514)
Scavenge hollow pin (01/4-370 or 370B SB.72-24)	Front cover mounting face	Driver (517)
Pressure hollow pin (01/4-300 or 300B SB.72-24)	Front cover mounting face	Driver (516)

Assembly of Shrink Fit Items to the Gearbox Case  
Table 501 (Continued)

SUB-ASSEMBLY  
**72-63-00**  
Page 502  
Aug 1/81

TN21751



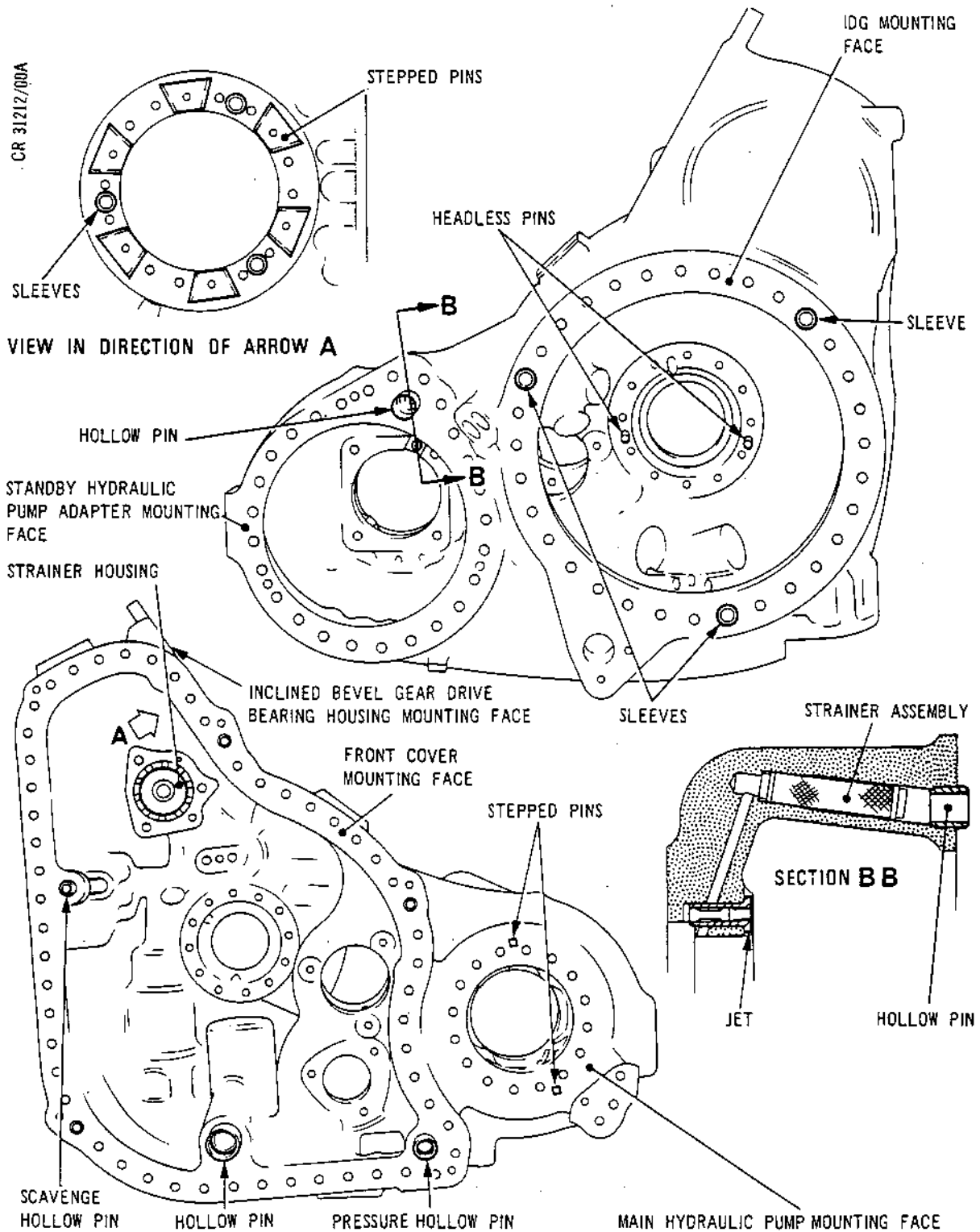
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

TN24567



Location of Shrink Fit Items in the Gearbox Case  
Figure 501

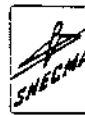
SUB-ASSEMBLY  
**72-63-00**  
Page 503  
Aug 14/75



# OLYMPUS 593

MK.610-14-28

OVERHAUL



ITEM	LOCATION	TOOL
Three sleeves (01/8-120)	Integrated drive generator mounting face.  <u>NOTE:</u> Ensure that the sleeves are flush with or slightly below the casing surface.	
Two shouldered headless pins (03/1-130)	IDG support bearing mounting face.  <u>NOTE:</u> Ensure the larger diameter of the pins are flush with or slightly below the casing surface.	
Strainer assembly (01/9-60)	Stand-by hydraulic pump mounting face.	
Hollow pin (01/9-20 or 20B SB.72-24)	Stand-by hydraulic pump mounting face.  <u>NOTE:</u> The hollow pin retains the strainer assembly.	Driver (517)
Three sleeves (02/1-370)	Inclined bevel gear drive bearing housing mounting face.	
Front sleeve (Pre. SB.72-83) (01/9-10)	Rear of main hydraulic pump mounting face.	Driver (518)
JET SB.72-83 PART 2 or 4 (01/9 -50A) PART 3 or 4 (01/9-50B)	Rear of main hydraulic pump mounting face.	Driver (518)
Pins stepped (01/7-110)	Main hydraulic pump adapter mounting face.	Gauge (42) Driver (665)
Strainer housing (01/9-120)	Base of vertical bevel gear.	Guide (491) Driver (492)
Pins stepped (02/1-390)	Underside of inclined bevel gear drive bearing housing mounting face.	Driver (952)

Assembly of Shrink Fit Items to the Gearbox Case  
Table 501 (Concluded)

SUB-ASSEMBLY

## 72-63-00

Page 504

Aug 1/81

TN42031

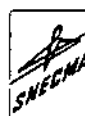




OLYMPUS 593

MK.610-14-28

OVERHAUL



- (7) On engines Pre. SB.72-83 remove the front sleeve (01/9-10) on engines embodying SB.72-83 remove the jet (01/9-50) from the freezing agent. Assemble the front sleeve or jet to its location in rear of the main hydraulic pump mounting face.

- (a) Assemble the rear sleeve or jet into the holder and fully engage the thread of the driver (Tool 518) into the sleeve or jet, ensuring that the flat on the head is aligned with the corresponding flat on the inside diameter of the holder.

NOTE: Jet (01/9-50A) SB.72-83 part 2 must only be assembled to a pre SB.72-83 case and jet (01/9-50B) SB.72.83 part 3 or 4 must only be assembled to a SB.72-83 standard case.

- (b) Position the step on the holder into the cut-away in the rear face of the adapter, and drift the oil sleeve or jet into its location. Ensure that the head of the sleeve is flush with, or just below the cut-away lip.

- (8) Remove the two stepped pins (01/7-110) from the freezing agent and using the gauge (Tool 42) to correctly align the flats on the pins square to the bore of the main hydraulic pump drive orifice, drift the pins into their locations with the driver (Tool 665).

- (9) Remove the strainer housing (01/9-120) from the freezing agent and assemble it to its location at the base of the main vertical bevel gear drive, using the guide (Tool 491) and driver (Tool 492) as follows.

- (a) Assemble the guide (Tool 491) to the strainer housing location and secure with three bolts.

NOTE: Due to the flat on the guide it will only fit in one position.

- (b) Assemble the driver (Tool 492) to the strainer housing, align the lugs to their corresponding castellations and driver pin on the locator to the oilway in the strainer housing. Retain by screwing the threaded holder into the strainer housing.

PRINTED IN ENGLAND

TN42339

SUB-ASSEMBLY

72-63-00

Page 505

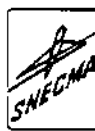
Aug 1/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (c) Assemble the locating tool/strainer housing to the guide, ensuring that the pin in the locator aligns with the slot in the guide. Drift the holder/strainer housing into its location ensuring that the strainer housing contacts the bottom of the case location.
  - (d) Release and remove the guide and driver.
- (10) Using protective gloves, remove a stepped pin (O2/l-390) from the freezing agent and assemble to its location in the underside of the inclined bevel gear bearing housing mounting face using the mechanical driver (Tool 952) (Ref.Fig.502) as follows.

- (a) Assemble the stepped pin to the location pin at the base of the clamp body, ensuring that the tapered head on the stepped pin is directed towards the clamp guide of the mechanical driver.

NOTE: The thrust screw should be sufficiently unscrewed so as to allow the mechanical driver and assembled stepped pin sufficient clearance when positioning the stepped pin in its location.

- (b) Position the mechanical driver on the inclined bevel gear bearing mounting face and locate the locating pin diametrically opposite to the location to which the stepped pin is to be assembled.
- (c) Screw in the thrust screw to draw the clamp body up the guide and the stepped pin into its location. Ensure that the pin is fully inserted.

NOTE: The alignment of the pin to its location in the gearbox case, must be visually checked prior to the operation of the thrust screw.

IN42340

SUB-ASSEMBLY

72-63-00

Page 506

Feb 2/76



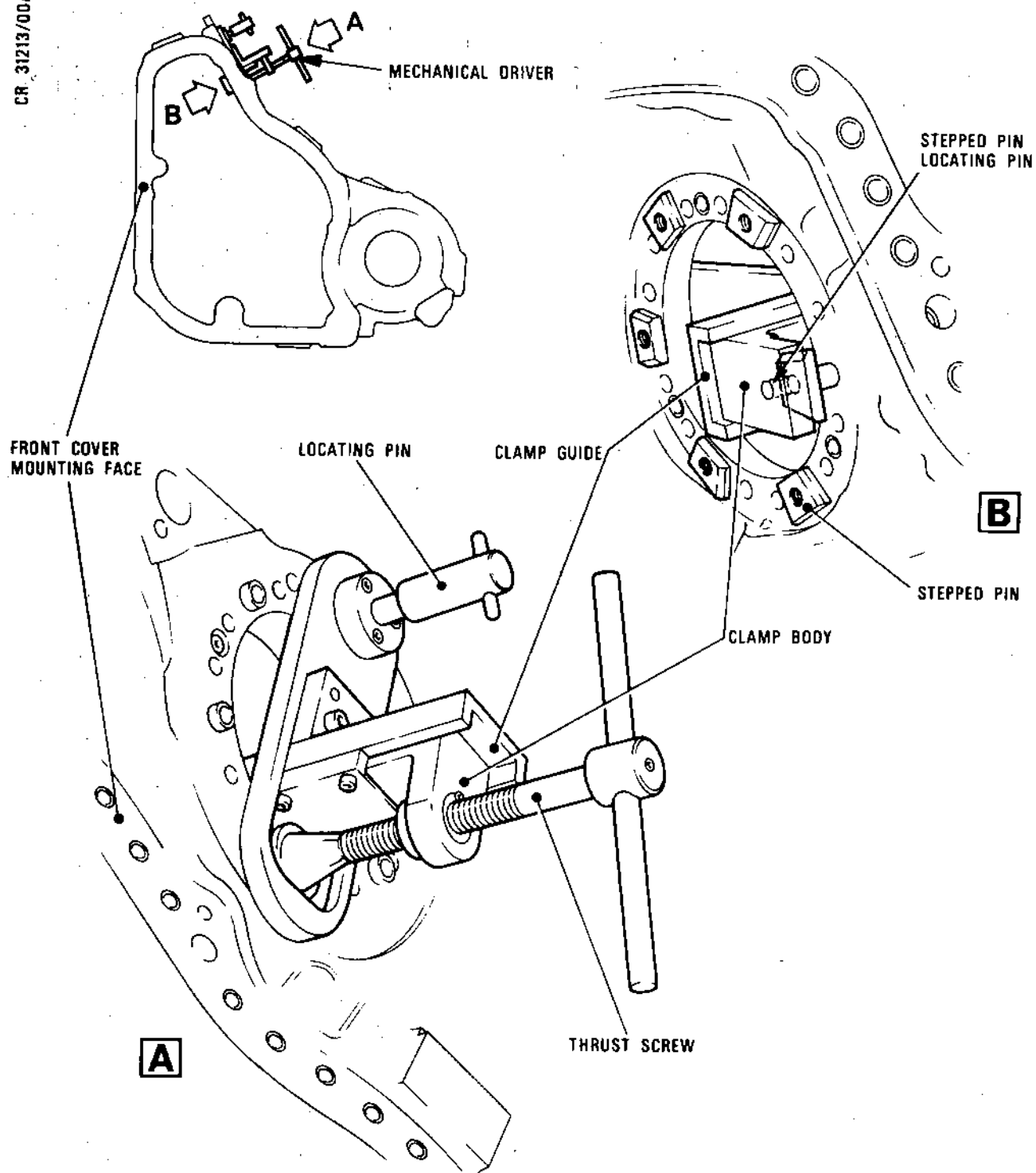
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31213/00A

PRINTED IN ENGLAND



TN16106

Assembly of Stepped Pins at the Inclined Bevel Gear Location  
Figure 502

SUB-ASSEMBLY  
**72-63-00**

Page 507

Aug 14/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (d) Release and remove the mechanical driver and repeat sub para.(a), (b) and (c) for the remaining five pins.

NOTE: If a pin has previously been assembled to the location required for the positioning of the locating pin on the mechanical driver, the locating pin should be withdrawn and the mechanical driver located on the protruding stepped pin.

- B. Assemble the Shrink Fit Items to the Gearbox Front Cover, Oil Filter Adapters, Inclined Bevel Gear Drive Bearing Housing, Hydraulic Pump Adapters, Scavenge Pump Case and Flexible Coupling Shaft (Ref.Fig.503).

NOTE: The following procedure is required to be carried out only if the front cover, oil filter adapters, bearing housing, hydraulic pump adapters and scavenge pump case are new items.

- (1) Place the front cover (01/4-90), oil filter adapters (01/2-140) (01/2-330), hydraulic pump adapters main (01/7-60), stand-by (01/7-150), stand-by hydraulic pump adapter assembly (01/7-180), scavenge pump case (01/5-120) and flexible coupling shaft (02/1-40) in a preheated oven controlled at 100 deg C for approx. 30 minutes.

NOTE: The inclined bevel gear drive bearing housing (02/1-320) is not heated.

- (2) Place the items listed in Table 502 into an approved freezing agent (10 to 15 minutes approx. in Cardice or 2 to 3 approx. minutes in liquid nitrogen), the removal time to coincide with the removal of the heated items from the oven.
- (3) On the completion of their heating period, use protective gloves and remove the front cover, oil filter adapters, hydraulic pump adapters, scavenge pump case and flexible coupling shaft from the oven and place on a suitable working surface.
- (4) Using protective gloves, remove the hollow pins, shouldered pins, stepped pins and plug from the freezing agent and assemble to specified locations with appropriate tools, as detailed in Table 502.

TN42341

SUB-ASSEMBLY  
**72-63-00**

Page 508  
Dec 1/79



OLYMPUS 593

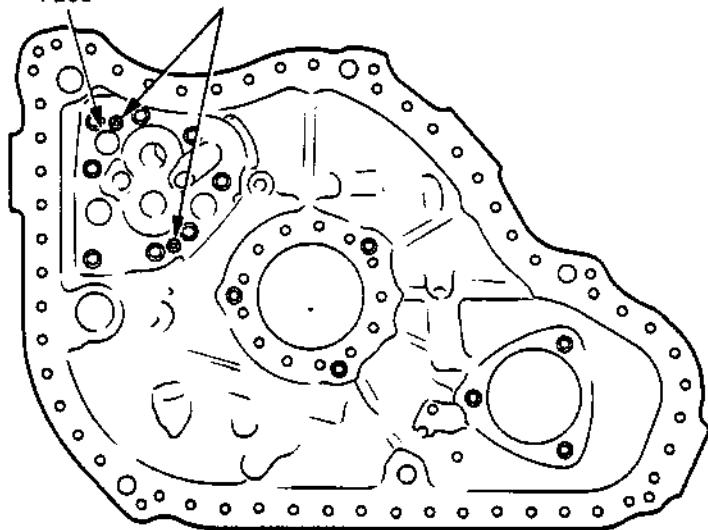
MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

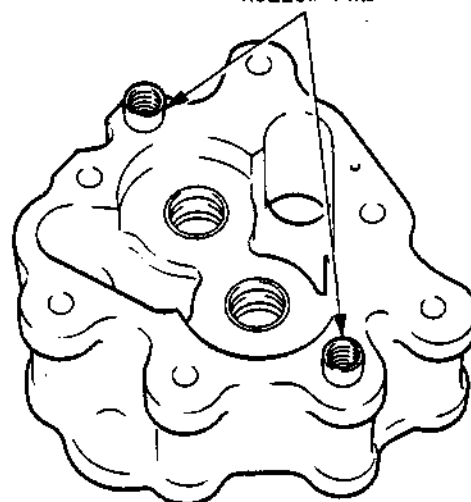
CR 31214/00A

PLUG  
HOLLOW PINS



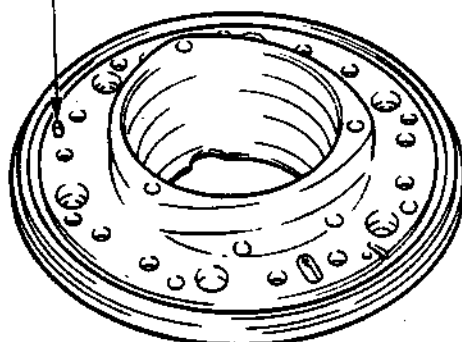
FRONT COVER

HOLLOW PINS



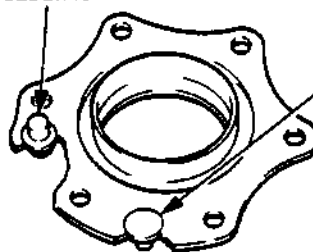
SCAVENGE PUMP CASE

HEADLESS PIN



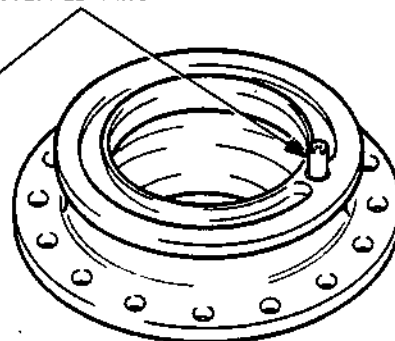
INCLINED BEVEL GEAR  
DRIVE BEARING HOUSING

SHOULDERED PIN



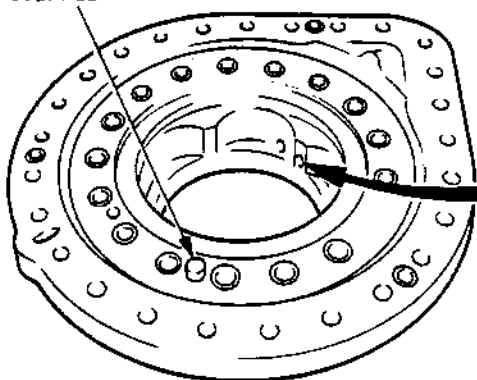
OIL PRESSURE AND  
SCAVENGE FILTER ADAPTER

STEPPED PINS

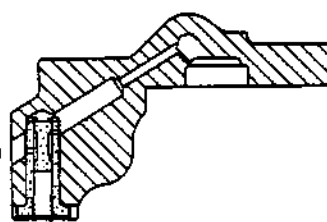


STANDBY HYDRAULIC  
PUMP ADAPTER

STEPPED PIN

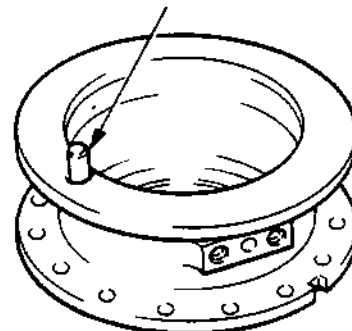


STANDBY HYDRAULIC PUMP  
ADAPTER ASSEMBLY



JET

STEPPED PIN



MAIN HYDRAULIC PUMP ADAPTER

Location of Shrink Fit Items to the Front Cover,  
Housings and Adapters  
Figure 503

TH16107

SUB-ASSEMBLY  
**72-63-00**

Page 509  
Aug 14/75



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



ITEM	LOCATION	TOOL
Two hollow pins (01/5-170)	Interior of front cover, oil pump mounting face.	Driver (429)
Two shouldered pins (01/2-130) (01/2-320)	Oil pressure and scavenge filter adapters.  <u>NOTE:</u> The larger diameter of the pins should be flush with, or slightly below, both faces of the adapter.	
Two stepped pins (01/2-160) (01/2-350)	Oil pressure and scavenge filter adapters.  <u>NOTE:</u> The larger diameter of the pins should be flush with, or slightly below, both faces of the adapters.	
Straight headless pin (02/1-380) Pre SB.72-8689-272 (02/1A-325) SB.72-8689-272	Inclined bevel gear drive bearing housing.	
Stepped pin (01/7-50)	Main hydraulic pump adapter.  <u>NOTE:</u> The larger diameter of the stepped pin should be flush with or slightly below the adapter face.	Driver (515)
Stepped pin (01/7-170)	Stand-by hydraulic pump adapter/assembly.  <u>NOTE:</u> The larger diameter of the stepped pin should be flush with or slightly below the adapter face.	Driver (539)

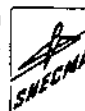
Assembly of the Shrink Fit Items to the Front Cover, Oil Filter  
Adapters, Hydraulic Pump Adapters and Scavenge Pump Case  
Table 502 (Continued)

SUB-ASSEMBLY

72-63-00

Page 510  
Sep 1/80

7N42343

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

ITEM	LOCATION	TOOL
Stepped pin (01/7-130)	Front face of the stand-by hydraulic pump adapter.	Driver (515)
<u>NOTE:</u> The larger diameter of the stepped pin should be flush with or slightly below the adapter face.		
Two hollow pins (01/5-100)	Scavenge pump case.	Driver (428)
Rear sleeve (01/7-300) Pre. SB.72-83	Stand-by hydraulic pump adapter assembly.	Driver (538)
Jets SB.72-83 (01/7-310A) Part 2, 3 or 4 (01/7-310B) Part 1. or 4	Stand-by hydraulic pump adapter assembly.	Driver (538)

Assembly of the Shrink Fit Items to the Front Cover, Oil Filter Adapters, Hydraulic Pump Adapters and Scavenge Pump Case  
Table 502 (Concluded)

- (5) Using protective gloves, remove from the freezing agent the rear sleeve (01/7-300) on engines Pre. SB.72-83 or the oil jet (01/7-310) on engines embodying SB.72-83. Assemble the rear sleeve or jet to its location in the rear face of the stand-by hydraulic pump adapter assembly, using the driver (538).
- (a) Assemble the rear sleeve or jet into the holder and fully engage the thread of the driver into the sleeve or jet, ensuring the flat on the head is aligned with the corresponding flat on the inside diameter of the holder.
- NOTE: Jet (01/7-310A SB.72-83) Part 2, 3 or 4 must be assembled to a pre SB.72-83 adapter and jet (01/7-310B) SB.72-83 Part 1 or 4 must be assembled to an SB.72-83 standard adaptor.
- (b) Position the step on the holder into the cut-away in the rear face of the adapter, and drift the oil sleeve or jet into its location. Ensure that the head of the sleeve or jet is flush with, or just below the cut-away lip.

SUB-ASSEMBLY

**72-63-00**

Page 511

Aug 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (6) Assemble the spacer sleeve (O2/1-50) to the flexible coupling shaft (O2/1-40).
  - (a) Position the support (Tool 709), with the larger bore uppermost, on a suitable base.
  - (b) Pass the smaller diameter splined end of the shaft through the support and locate the flange on the shaft into the recess in the support.
  - (c) Using protective gloves, remove the sleeve from the freezing agent and insert the smaller diameter end into the shaft, then with the driver (Tool 710) located in the sleeve, press in the sleeve until it abuts the step within the shaft.
- C. Assemble the Oil Jets, Bearings and Quick Attach/Detach Coupling to the Front Cover (Ref.Fig.504).
  - (1) Assemble the holding fixture (Tool 430) to a Hydraclamp and secure the fixture with the two captive bolts. Rotate the fixture into a horizontal position.
  - (2) Assemble the front cover to the holding fixture engaging the oil pressure transmitter and oil pressure switch mounting faces with the fixture and secure with 14 captive bolts.
  - (3) Assemble the oil jet (O1/4-360) to the location near the vertical bevel gear drive bearing location and secure with the bolt (O1/4-350). Ensure the bolt has a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m) torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (4) Assemble the outer ring of the roller bearing (O1/4-420) to the starter drive location (inner face). Secure the bearing ring with the retaining ring (O1/4-400) and the three bolts (O1/4-390). Ensure the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m) torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (5) Position the outer ring of roller bearing (O1/4-440) to the vertical bevel gear drive shaft location. Secure with three bolts (O1/4-430). Ensure the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m) torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).

SUB-ASSEMBLY

72-63-00

Page 512

Feb 2/76

TN42345





OLYMPUS 593

MK.610-14-28

OVERHAUL



- (6) On engines Pre. SB.72-23 assemble the oil jet (01/4-320) and filter assembly (01/4-340) to the front cover.

- (a) Locate and secure the support (Tool 431) in a bench vice.
- (b) Position the filter assembly into the support and engage the castellations on the filter with those in the support.
- (c) Engage the jet in the filter and screw in using wrench (Tool 456).
- (d) Remove the jet/filter assembly from the support and insert the assembly into the orifice in the oil pump mounting face in the front cover.

- (7) On engines embodying SB.72-23 assemble the plug (01/4-330), into the orifice in the oil pump mounting face in the front cover.

D. Assemble the Oil Pump to the Front Cover (Ref.Fig.504).

- (1) With the front cover holding fixture secured to the Hydraclamp locate the oil pressure transmitter and switch mounting faces on the holding plate and secure the cover to the plate with the 14 captive bolts.
- (2) On engines Pre. SB.72-23 position the two pressure pump spur gears (01/5-160) into the oil pump location in the front cover.
- (3) On engines embodying SB.72-23 position the two gear blanks (01/5-160) into the oil pump location on the front cover.
- (4) Locate the scavenge pump case (01/5-120) on the two pins in the front cover mounting face and assemble to the front cover. Ensure that the pump mounting face is in full contact with the corresponding front cover mounting face.

SUB-ASSEMBLY

**72-63-00**

Page 513

Feb 2/76

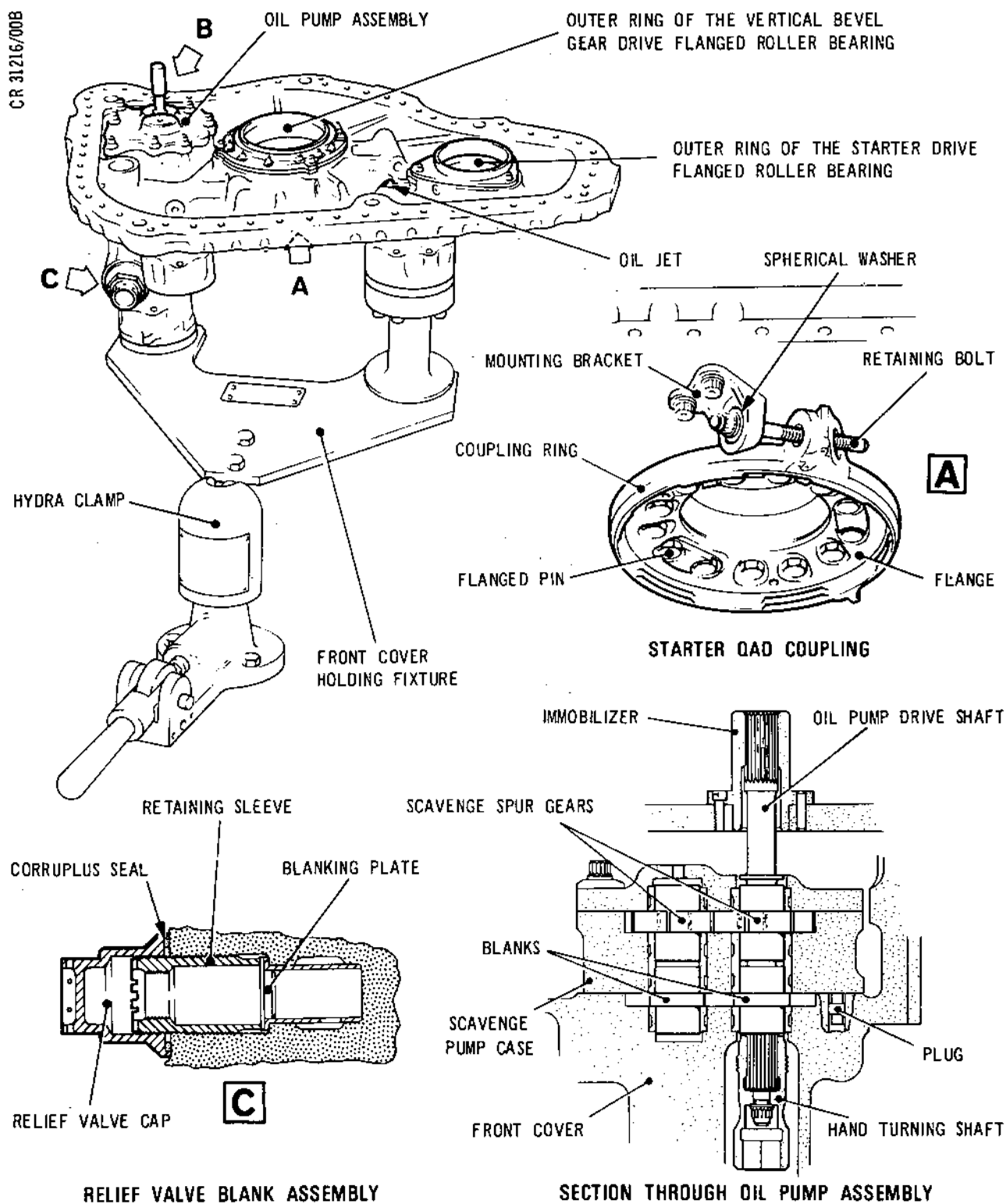


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31216/00B



Location of Front Cover Attaching Parts  
Figure 504

SUB-ASSEMBLY  
**72-63-00**  
Page 514  
Feb 2/76

TN24568



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (5) Position the two scavenge spur gears (01/5-110) into their locations in the scavenge pump case.

NOTE: The driving gear of the scavenge pump rotates counter-clockwise, viewed from above the installed gears. If the gears are the original, ensure that they are assembled in their original attitude as shown by the gear teeth engagement markings.

- (6) Check the end-float with a straight edge and feeler gauges, then check the backlash and radial clearances with feeler gauges (Ref.Fig.505). Take measurement at several positions to obtain mean clearances, then check that the figures obtained are within the limits quoted in (Fits and Clearance Schedule 72-63-00 407, 410 and 408).
- (7) Assemble the scavenge pump cover (01/5-60) to the scavenge pump case, locating it on the two hollow pins.
- (8) Secure the cover and the case to the front cover with eight washers (01/5-20) and bolts (01/5-10). Ensure the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m) and torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (9) Insert the drive shaft (01/5-50) through its location in the scavenge pump cover, scavenge spur gear driver, scavenge pump case, pressure spur gear driver (Pre. SB.72-23) or blank (SB.72-23) and gearbox front cover. Turn the drive shaft to ensure the splines are engaged with the scavenge pump spur gear, and that the scavenge gears have freedom of rotation.
- (10) Assemble the hand turning shaft (01/5-40) to the drive shaft in its location in the gearbox front cover.
- (11) Immobilize the drive shaft with immobilizer (Tool 787).
- (a) Locate the immobilizer on the oil pump drive shaft.

SUB-ASSEMBLY

**72-63-00**

Page 515

Feb 2/76

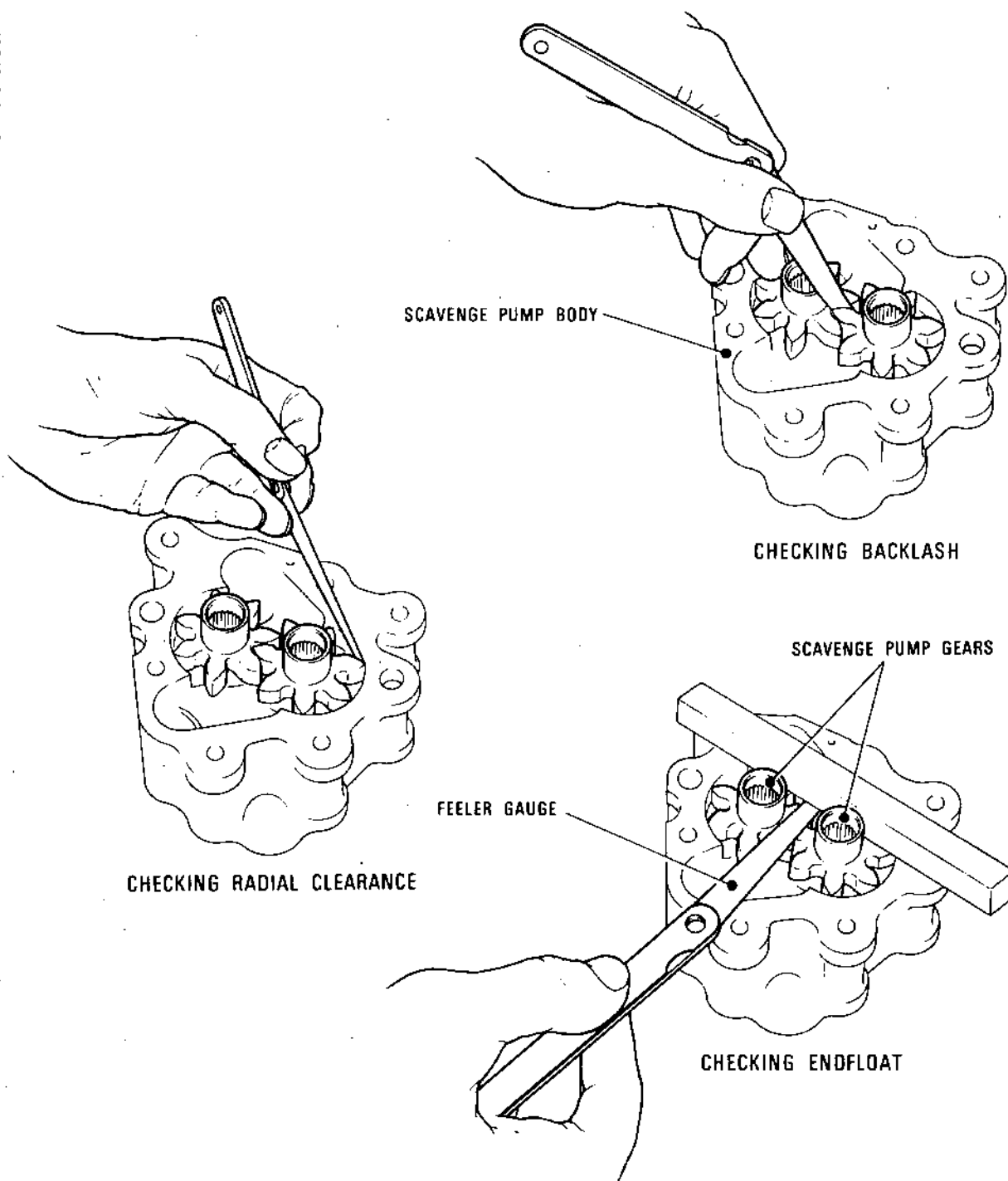


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31215/00A



TN8503

Oil Pump Spur Gear Dimensional Checks  
Figure 505

SUB-ASSEMBLY  
**72-63-00**  
Page 516  
Aug 14/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Position both blocks of the immobilizer on the front cover mounting face and secure the immobilizer to the cover with the two captive bolts.

- (12) Secure the hand turning shaft to the drive shaft and the drive shaft to the oil pump and front cover assembly with the self-locking nut (01/5-30). Ensure the nut has a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m) then torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m), unscrew the captive bolts and remove the immobilizer.

E. Assemble the Relief Valve Blank to the Front Cover (Ref.Fig.504).

- (1) Insert the blanking plate (01/4-40) into the relief valve location in the front cover, ensuring that the lip on the blanking plate is located in the step in the front cover case.
- (2) Position the retaining sleeve (01/4-30) into the relief valve location and using the wrench (Tool 1477) screw in the sleeve to abut the blanking plate. Torque-tighten the sleeve between 290 and 310 lbf in. (32,8 and 35,0 N.m).
- (3) Assemble the Corruplus seal (01/4-20) to the relief valve cap (01/4-10) and assemble the relief valve cap/Corruplus seal to the front cover. Using adapter (Tool 1587) check the torque loading of the crowfoot wrench (Tool 1579 Pre SB.72-8 or Tool 1972 SB.72-8) for 170 to 190 lbf in. (19,2 and 21,5 N.m) in accordance with 72-09-00 Assembly. Having determined the correct torque figure, use the wrench and torque-tighten the relief valve cap between 170 and 190 lbf in. (19,2 and 21,5 N.m). Wire-lock the cap to the front cover.

SUB-ASSEMBLY

**72-63-00**

Page 517  
Apr 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



F. Assemble the Starter QAD Adapter to the Front Cover  
(Ref.Fig.504).

- (1) Assemble the front cover holding fixture (Tool 430) to a Hydraclamp and secure with the two bolts.
- (2) Assemble the front cover to the holding fixture engaging it at the oil pressure transmitter and oil pressure switch mounting faces, secure with the 14 captive bolts.
- (3) Insert the flange (01/3-50) into the coupling ring (01/3-70) and position the flange/coupling ring onto the starter drive location on the front cover, interposing the gasket (01/3-60) between the flange and case faces. Insert the three flanged pins (01/3-40) into their locations in the flange and gearbox case. Retain the gasket, retaining ring, flange and the pins with the 13 bolts (01/3-30). Ensure the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m) torque-tighten to 100 lbf in. (11,5 N.m).
- (4) Position the mounting bracket (01/3-120) on the mounting boss close to the starter drive location and secure it to the case with the two bolts (01/3-110). Ensure the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m) torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (5) Locate the spherical washer (01/3-20) on the locking bolt (01/3-10), then insert the bolt through the mounting bracket and engage the thread in the coupling ring. Temporarily tighten the bolt.
- (6) Release and remove the front cover from the holding fixture (Tool 430).
- (7) Assemble the protector (Tool 778) to the location of the starter QAD coupling and place the front cover into the container (Tool 510).

G. Assemble the Gearbox Case to the Build Stand (Ref.Fig.532).

- (1) Assemble and secure the lifting adapter (Tool 794) to its location on the gearbox case close to the main and stand-by hydraulic pump mounting locations.

TN30856

SUB-ASSEMBLY  
**72-63-00**

Page 518  
Feb 2/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Assemble and secure the lifting adapter (Tool 793) to its location on the gearbox case close to the inclined bevel gear drive assembly mounting location.
- (3) Assemble the lifting fixture (Tool 827) to the centre of the top slot in the lifting fixture (Tool 795) and secure the two fixtures together with the captive bolt, washer and nut.
- (4) Attach a hoist to the lifting fixture and position the fixture close to the adapters assembled to the gearbox case. Ensure the lifting plate with the locking pin and fulcrum pin (part of fixture (Tool 795)) is next to the adapter (Tool 793). Unscrew and remove the locking pin then screw both fulcrum pins in to their respective adapters.
- (5) Raise the hoist until the gearbox is supported, then turn the gearbox so that the IDG mounting face is at the bottom. Engage and screw the locking pin through the lifting fixture in to the adapter (Tool 793).
- (6) Raise the hoist and position the IDG mounting face to the build stand (Tool 494) such that on the assembly of the immobilizer (Tool 540) to the triangularly spaced tapped holes in the build stand, the splined shaft of the immobilizer will lie on the centre line of the hydraulic pumps drive shaft in the gearbox case. Locate and secure the gearbox case to the build stand with the 32 captive bolts.
- (7) Release and remove the lifting fixture from the adapters and hoist then release and remove the two adapters from the gearbox.

#### H. Assemble the Oil Jet and Strainer.

- (1) Check the oil jet assembly (01/9-70) thoroughly for cleanliness and freedom from obstruction. Position the jet assembly in the interior of the gearbox case at the location close to the IDG drive shaft bearing location (Ref.Fig.506). Secure the jet to the case with the two bolts (01/9-80). Ensure the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m) torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).

SUB-ASSEMBLY

**72-63-00**

Page 519

Feb 2/76

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

- (2) Check the strainer body (01/9-90) for its run-down torque and sufficient insertion into the strainer housing (01/9-120) located in the interior of the gearbox case (Ref.Fig.506).
    - (a) Position the retainer (Tool 493) on the strainer housing aligning the lugs on the retainer with the castellations on the housing, and the flat on the retainer with the projection on the gearbox case.
    - (b) Insert the strainer body into the housing, and screw in the body until the measurement from the body head to the top of the housing is between 0.260 and 0.300 in. (6,6 and 7,6 mm) (Ref.Fig.506 dimension X). Measure and record the locking (run-down) torque.
    - (c) Unscrew and remove the strainer body from the strainer housing.
  - (3) Check the strainer (01/9-110) for damage and freedom from obstruction, then insert the strainer into the strainer sleeve (01/9-100).
  - (4) Insert the strainer/sleeve into the strainer body (01/9-90) and position the body/strainer/sleeve into the strainer housing.
  - (5) Torque-tighten the strainer body between 50 and 70 lbf in. (5,6 and 7,9 N.m) plus the measured locking torque.
  - (6) Unscrew the retainer captive bolts and remove the retainer from the gearbox case.
  - (7) Assemble the gasket (01/10-25) and cover (01/10-20) to the location on the exterior of the gearbox case near the IDG mounting face. Secure the cover to the case with the five bolts (01/10-18). Ensure the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m) torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- J. Assemble the Pressure Filter and Nut Assembly to the Gearbox Case (Ref.Fig.507 and 507A).
- (1) Locate the restrictor plug (01/2-390) in the valve body assembly (01/2-380) and insert the restrictor

SUB-ASSEMBLY

**72-63-00**

Page 520

Dec 1/96





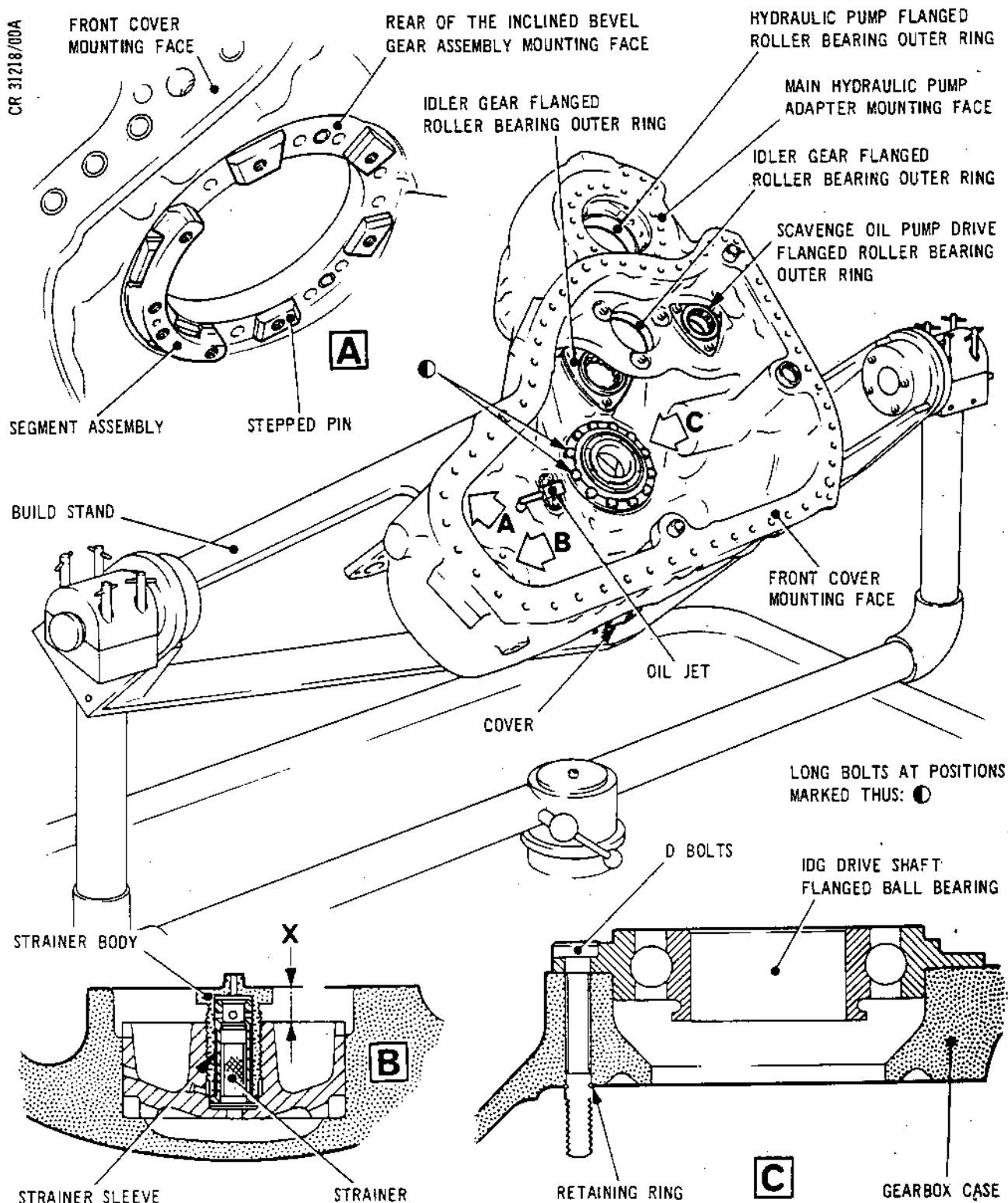
# OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 31218/00A



Location of Bearings, Strainer Assembly, Oil Jet and Segment Assemblies to the Gearbox Case  
Figure 506

SUB-ASSEMBLY  
**72-63-00**

Page 521  
Aug 14/75

**OLYMPUS 593**

MK.610-14-28

SNECMA

OVERHAUL

plug/valve body assembly into its location in the pressure filter orifice in the gearbox case. Torque-tighten the valve body between 50 and 55 lbf ft (67,8 and 74,6 N.m).

- (2) Assemble a Corruplus seal (Pre SB.72-8312-189) or toroidal sealing ring (SB.72-8312-189) to the filter adapter (01/2-330,340) then, with the stepped pin aligned with its location, assemble the adapter to the pressure filter location in the gearbox case.
- (3) Locate the bracket (01/2-310) on the two stepped pins on the adapter and secure the bracket and adapter to the gearbox case with six bolts (01/2-300). Ensure the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m) torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (4) Assemble the pressure filter.
  - (a) Check the strainer element (01/2-370) for cleanliness and freedom from obstructions.
  - (b) Position the spring (01/2-360) on the cover (01/2-270) and engage the thread on the cover with the thread in the strainer element, screw both units together until the threads disengage, allowing the strainer element to float under the action of the spring, on the cover.
- (5) On engines Pre SB.0L.593-72-9036-419, position the sealing ring (01/2-290) in the oil filter adapter and insert the cover/spring/strainer element into the filter adapter ensuring that slots in the cover engage the lugs on adapter.

**NOTE:** Ensure the Metaflex seal and oil filter adapter are to the same Service Bulletin standard. Metaflex seals to SB.72-7 standard incorporate one and a half loose turns of stainless steel wrapper positioned around the outer circumference. This area is not laminated with asbestos and is not spot welded. Seals of this type must not be mistaken for unserviceable seals which are rejected because of spot weld failure.

SUB-ASSEMBLY

**72-63-00**

Page 522

Dec 1/96

CR 31217/00C  
BS00000027/4

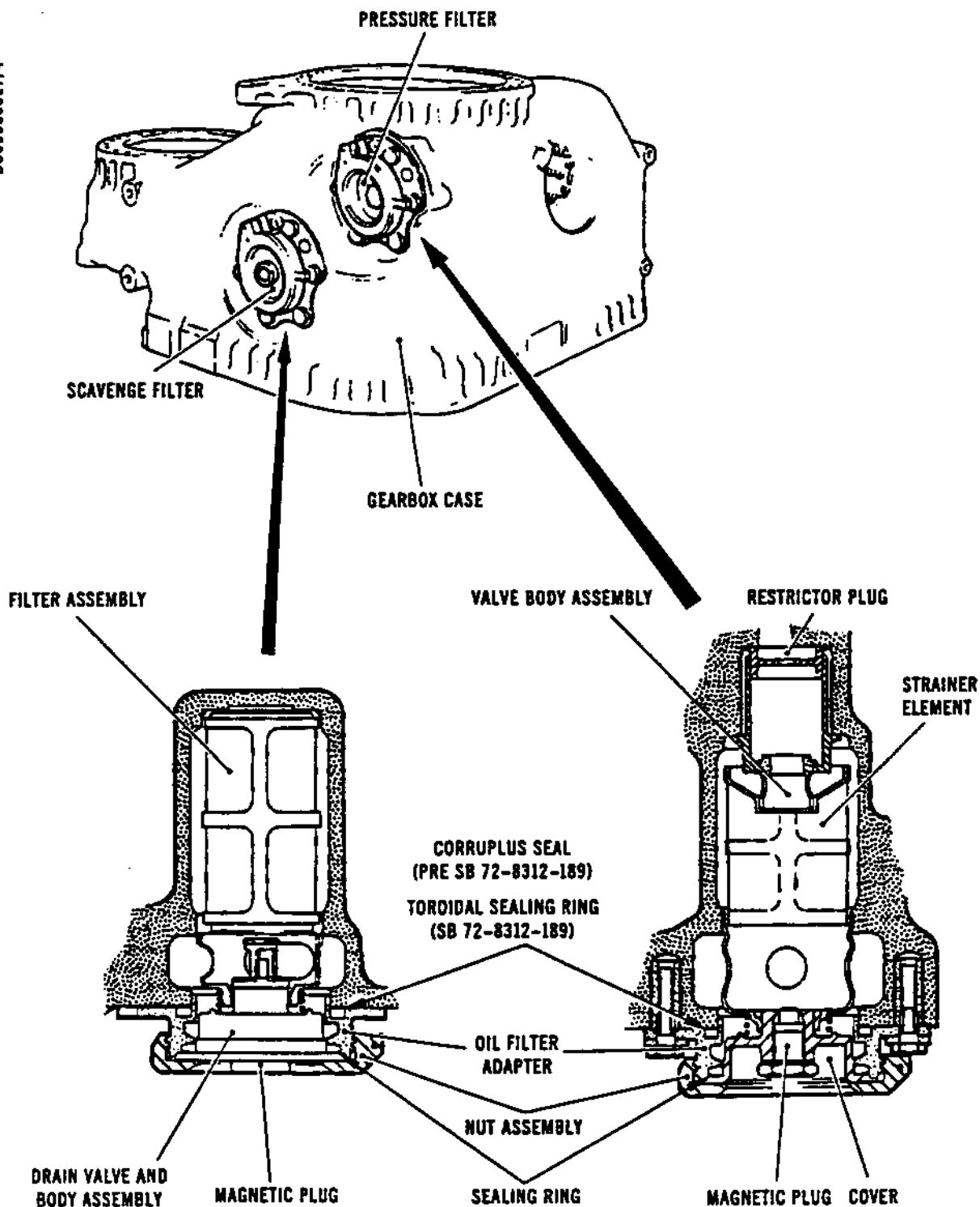


**OLYMPUS 593**

MK.610-14-28  
OVERHAUL



SNECMA



Assembly of Pressure and Scavenge Filters  
(Pre SB.0L.593-72-9036-419)  
Figure 507

SUB-ASSEMBLY  
**72-63-00**

Page 523  
Dec 1/97



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (6) On engines to SB.OL.593-72-9036-419, position the sealing rings (02-2900) on the cover and insert the cover/spring/strainer element into the filter adapter ensuring that slots in the cover engage the lugs on adapter.

NOTE: Ensure the Metaflex seal and oil filter adapter are to the same Service Bulletin standard. Metaflex seals to SB.72-7 standard incorporate one and a half loose turns of stainless steel wrapper positioned around the outer circumference. This area is not laminated with asbestos and is not spot welded. Seals of this type must not be mistaken for unserviceable seals which are rejected because of spot weld failure.

- (7) Assemble the nut assembly (01/2-210) to the filter adapter and hold the cover, through the nut, hard against its sealing ring. Engage the threads of the nut then turn clockwise by hand, as far as possible.

CAUTION: ENSURE THAT THREADS HAVE ENGAGED FREELY BEFORE APPLYING TIGHTENING FORCE TO NUT ASSEMBLY.

- (8) Position the spherical washer (01/2-200) on the locking bolt (01/2-190) and insert the bolt through the bracket and engage the spherical nut of the nut assembly. Screw in the bolt and check that the locking (run-down) torque is within 3 to 10 lbf in. (0,3 and 1,1 N.m).

- (9) Ensure the nut assembly is hand tight then torque-tighten the locking bolt to 60 lbf in. (6,8 N.m).

- (10) Finally tighten locking bolt.

(a) Slacken locking bolt, retighten and ensure locking (run-down) torque is still within the limits 3 to 10 lbf in. (0,3 and 1,1 N.m).

(b) Torque-tighten bolt to 60 lbf in. (6,8 N.m).

SUB-ASSEMBLY

72-63-00

Page 524

Dec 1/96

CR 36660/00A

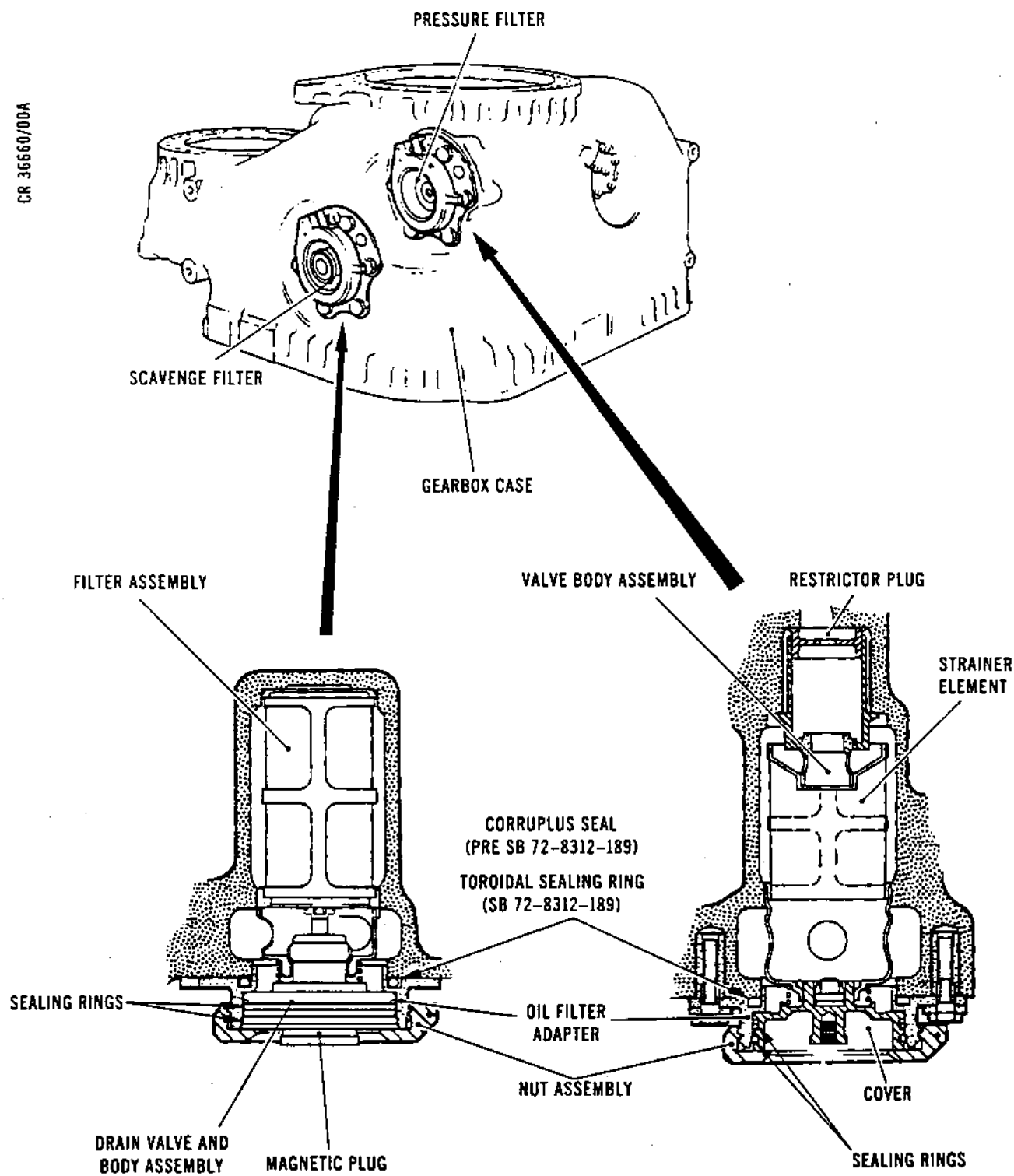


**OLYMPUS 593**

MK.61D-14-28  
OVERHAUL



sneema



Assembly of Pressure and Scavenge Filters  
(SB.OL.593-72-9036-419)  
Figure 507A

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

- (11) On engines Pre SB.0L.593-72-9036-419 only, assemble the Corrujoint seal (01/2-260) to the plug (01/2-250) and locate the seal/plug into its location in the pressure filter cover assembly. Torque-tighten the plug between 230 and 250 lbf in. (26,0 and 28,2 N.m).

**K. Assemble the Scavenge Filter and Nut Assembly to the Gear-box Case (Ref. Fig.507 and 507A).**

- (1) Assemble a Corruplus seal (Pre SB.72-8312-189) or toroidal sealing ring (SB.72-8312-189) to the filter adapter (01/2-140,-50) then, with the stepped pin and its location aligned, assemble the adapter to the scavenge filter location in the gearbox case.
- (2) Locate the bracket (01/2-120) on the two stepped pins in the adapter and secure the bracket and adapter to the gearbox case with six bolts (01/2-110). Ensure the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m) torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (3) Assemble the scavenge filter.
  - (a) Check the filter assembly (01/2-180) for cleanliness and freedom from obstructions.
  - (b) Position the spring (01/2-170) on the drain valve and body assembly (01/2-90). Engage the thread on the filter with the thread on the drain valve body. Screw both units together until the threads disengage, allowing the filter to float under the action of the spring on the drain valve body.
- (4) On engines Pre SB.0L.593-72-9036-419, assemble the sealing ring (01/2-100) to the oil filter adapter and insert the drain valve body/spring/filter assembly into the scavenge filter location in the gearbox case ensuring that the slots in the drain valve flange engage the lugs on the adapter.

**NOTE:** Ensure the Metaflex seal and oil filter adapter are to the same Service Bulletin standard.

SUB-ASSEMBLY

**72-63-00**

Page 524B

Dec 1/96



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (5) On engines to SB.0L.593-72-9036-419, assemble the sealing ring (01/2-100) to the drain valve body and insert the drain valve body/spring/filter assembly into the scavenge filter location in the gearbox case ensuring that the slots in the drain valve flange engage the lugs on the adapter.

NOTE: Ensure the Metaflex seal and oil filter adapter are to the same Service Bulletin standard.

- (6) Assemble the nut (01/2-30) to the filter adapter and hold the drain valve body, through the nut, hard against its sealing ring. Engage the threads of the nut then turn clockwise, by hand, as far as possible.

CAUTION: ENSURE THAT THREADS HAVE ENGAGED FREELY BEFORE APPLYING TIGHTENING FORCE TO NUT ASSEMBLY.

- (7) Position the spherical washer (01/2-20) on the locking bolt (01/2-10) and insert the bolt through the bracket and engage the spherical nut of the nut assembly. Screw in the bolt and check that the locking (run-down) torque is within 3 to 10 lbf in. (0,3 and 1,1 N.m).
- (8) Ensure the nut assembly is hand-tight then torque-tighten the locking bolt to 60 lbf in. (6,8 N.m).
- (9) Finally tighten locking bolt.
  - (a) Slacken locking bolt, retighten and ensure locking (run-down) torque is still within limits 3 to 10 lbf in. (0,3 and 1,1 N.m).
  - (b) Torque-tighten bolt to 60 lbf in. (6,8 N.m).
- (10) On engines Pre SB.0L.593-72-9036-419, insert the magnetic plug (01/2-80) into its location in the scavenge filter assembly torque-tightening the plug to 30 lbf ft (40,6 N.m).

SUB-ASSEMBLY

72-63-00

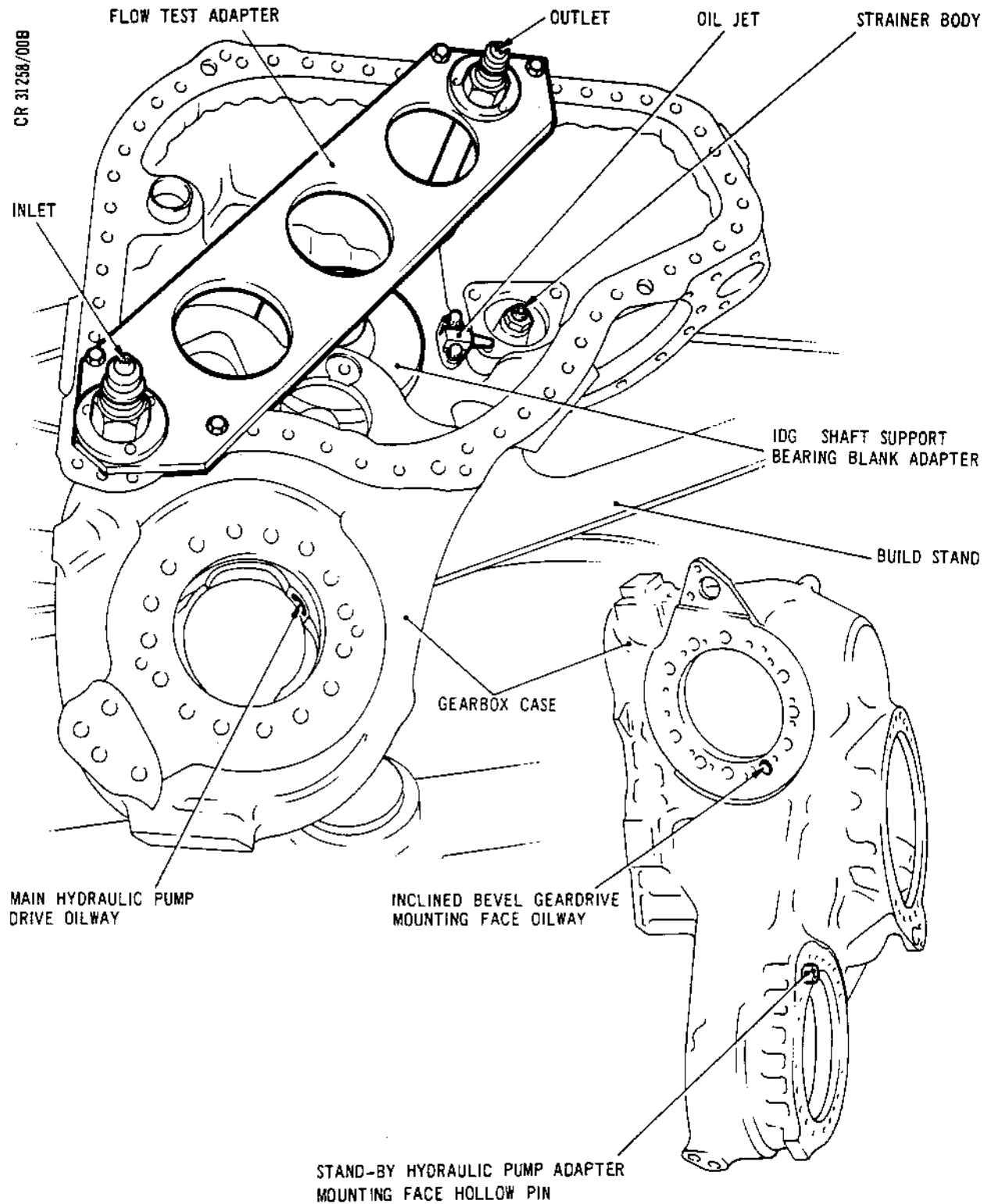
Page 525

Dec 30/98



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Oil Flow Check of the Gearbox Case  
Figure 508





OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

CAUTION: IT IS OF THE UTMOST IMPORTANCE TO ENSURE THAT ALL MAGNETIC PLUG ASSEMBLIES ARE FULLY TORQUE TIGHTENED ON ASSEMBLY, ALSO, WHEN FITTING ASSEMBLIES MODIFIED TO SB.OL.593-72-9036-419 STANDARD A SERVICEABLE 'O' SEAL MUST BE FITTED. FAILURE TO DO THIS CAN RESULT IN OIL LEAKAGE IN FLIGHT WHICH MAY NOT BE APPARENT DURING GROUND CHECKS/RUNNING.

- (11) On engines to SB.OL.593-72-9036-419, assemble the sealing ring (02-105) to the magnetic plug (02-80B) and insert the magnetic plug into its location in the scavenge filter assembly torque-tightening the plug to 30 lbf ft (40,6 Nm).

SUB-ASSEMBLY

72-63-00

Page 526A

Dec 30/98

Printed in England



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

THIS PAGE LEFT BLANK INTENTIONALLY

SUB-ASSEMBLY

72-63-00

Page 526B

Dec 30/98



## L. Oil Flow Check of the Skeleton Gearbox Case (Ref.Fig.508).

- (1) Rotate the case in the build stand until the gearbox front cover mounting face is uppermost.
- (2) Ensure the presence of the sealing ring in the inlet connection on the adapter (Tool 644) and the presence of the flow restrictor and the sealing ring in the outlet connection on the adapter.
- (3) Assemble the flow test adapter to the gearbox front cover mounting face, ensuring that the adapter locates correctly on the two hollow pins. Secure the adapter to the case with the four captive bolts and washers.
- (4) Assemble the flow check blank adapter (Tool 997) to the location of the IDG shaft support bearing.
  - (a) Unscrew the captive nut on the blank to disassemble the adapter.
  - (b) Assemble the seal/blank, with its captive bolt uppermost, from beneath the gearbox case to the IDG shaft support bearing location, ensuring it is located on the two pins.
  - (c) Assemble the seal/blank, with its captive nut, from above to the bearing location and secure both blanks together with the nut.
- (5) Assemble the supply line from the oil rig (Tool 1926) to the flow test adapter and the return line to the outlet adapter. Temporarily tighten the supply and return line union nuts.
- (6) Circulate oil through the gearbox and ensure the presence of an oil flow from the following.

ITEM	LOCATION
Oil jet (01/9-70)	Close to the IDG shaft support bearing
Strainer body (01/9-90)	Interior of gearbox case at the strainer housing

Oil Flow Check  
Table 503 (Continued)

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

ITEM	LOCATION
Oilway	Inclined bevel gear drive mounting face
Oilway	The bore of the main hydraulic pump drive
Hollow pin (01/9-20)	Stand-by hydraulic pump adapter assembly mounting face

Oil Flow Check  
Table 503 (Concluded)

- (7) Release and remove the supply and return lines from the flow test adapter.
- (8) Release and remove the flow test adapter from the gearbox case.
- (9) Release and remove the flow check blank from the location of the IDG shaft support bearing mounting face.
- (10) Place the flow test adapter into the container (Tool 727).

M. Assemble the Bearings and the Inclined Bevel Gear Drive Segment Assemblies to the Gearbox Case (Ref.Fig.506).

- (1) On engines Pre. SB.72-4 assemble the outer ring of the flanged roller bearing (04/1-170) to the rear location of the scavenge oil pump drive in the gearbox case as viewed from the front cover mounting face.
- (2) Assemble the outer ring and rollers of the flanged roller bearing (04/1-160) to the front location of the scavenge oil pump drive in the gearbox case.
- (3) Secure the two bearings to the gearbox case with the three bolts (04/1-150) (inserted from the bottom to top), and nuts (04/1-130). Ensure the nuts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m) torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).

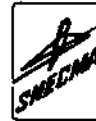
SUB-ASSEMBLY

**72-63-00**Page 528  
Feb 2/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) On engine embodying SB.72-4 assemble the common outer bearing ring (04/1-160) and rollers to the rear location of the scavenge oil pump drive (insert from bottom to top) as viewed from the front cover mounting face (Ref.Fig.512).
- (5) Locate the plate washer (04/1-140) to front bearing location of the pump drive and secure outer ring and washer with bolts (04/1-150) and self-locking nuts (04/1-130). Ensure the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m) torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (6) Assemble the outer race of the flanged roller bearing (05/1-110) to the underside of the main hydraulic pump mounting face. Secure the bearing to the case with the four bolts (05/1-100). Ensure the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m) torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (7) Assemble the outer ring of the flanged roller bearing (04/1-100) to the upper of the two locations of the idler gear shaft drive.
- (a) Insert the bearing outer race through the bottom of its location as viewed from the front cover mounting face.
- (b) Secure the bearing outer ring to the gearbox case with the three bolts (04/1-90) (inserted from the bottom), flat washers (04/1-80) and nuts (04/1-70). Ensure the nuts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m) torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (8) Assemble the outer ring and rollers of the roller bearing (04/1-50) in the lower of the two locations of the idler gear shaft drive. Secure with the three bolts (04/1-40) inserted through the outer bearing ring and the gearbox case (top to bottom as viewed from front cover location), washers (04/1-30) and nuts (04/1-20). Ensure the nuts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m) torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).

SUB-ASSEMBLY

**72-63-00**

Page 529

Feb 2/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (9) Assemble the flanged ball bearing (03/1-190) to the rear of the IDG mounting face, as viewed from the front cover mounting face. Insert the two Dee headed bolts (03/1-180) through the bearing housing and the gearbox case at the locations each side of the oilway as viewed from the IDG mounting face. Insert the 10 (shorter) Dee headed bolts (03/1-170) through the other 10 locations in the bearing housing and the gearbox case. Secure the 12 Dee headed bolts to the case with 12 retaining rings (03/1-160) assembling the rings to the grooves in the shanks of the Dee headed bolts with the guide sleeve (Tool 513). Ensure that the retaining rings seat correctly in their location grooves.

NOTE: The flats on the Dee headed bolts must locate to the step on the flanged ball bearing housing.

- (10) Assemble the three segment assemblies (02/1-330) to the stepped pins on the underside of the inclined bevel gear drive bearing housing mounting face. Secure each segment to its location by inserting a bolt (02/1-340) through each of the three sleeves (02/1-370), in the bearing housing mounting face, and engaging the threaded inserts in the segments. Ensure the bolts have a minimum locking (run-down) torque of 2 lbf in. (0,23 N.m) torque-tighten between 36 and 40 lbf in. (4,1 and 4,5 N.m).
- N. Determining the Adjusting Washers for the Bevel Gear Bearing Housings (Ref.Fig.509).
- (1) Position the flanged roller bearing (02/1-430) on a surface table. Assemble the ball bearing (02/1-500) into the bearing housing (02/1-510) and position the bearing housing/ball bearing on to the top of the roller bearing, ensuring full contact between bearing faces by applying a light pressure. Using suitable measuring gauges, determine the dimension between the flange on the bearing housing and the flange on the roller bearing outer ring, record as dimension 'C'. Using this dimension select the required adjusting plate for the vertical bevel gear drive bearing housing from the range of adjusting plates (02/1-440) (Ref.72-09-21 Repair, Fig.440). On completion, identify the adjusting plate, the two bearings and bearing housing and retain them for use in a later assembly procedure.

TN4167

SUB-ASSEMBLY

**72-63-00**

Page 530

Apr 1/77

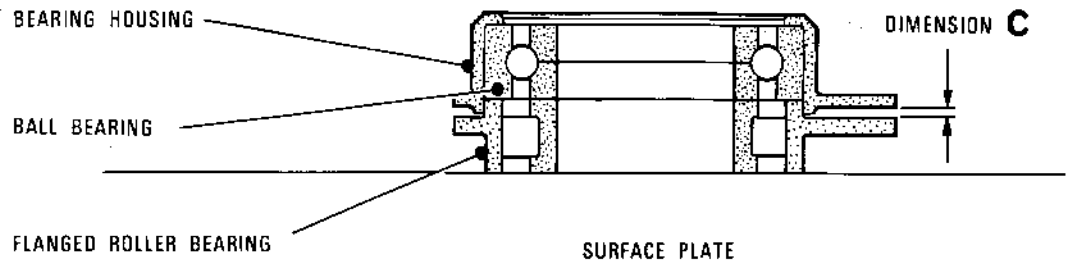


OLYMPUS 593

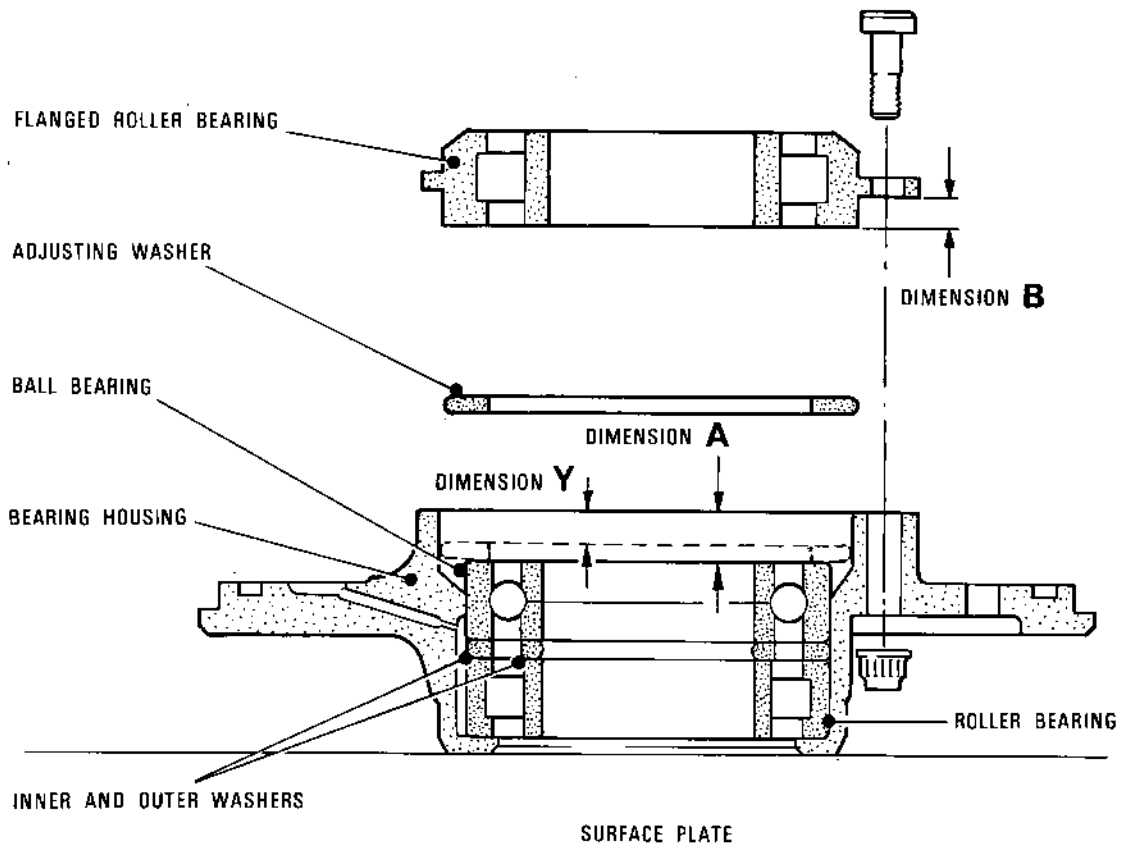
MK.610-14-28  
OVERHAUL



CR 31259/00B



### VERTICAL BEVEL GEAR DRIVE DIMENSIONAL CHECK



### INCLINED BEVEL GEAR DRIVE DIMENSIONAL CHECK

Calculating Adjusting Washer Dimensions for  
Bevel Gear Assemblies  
Figure 509

SUB-ASSEMBLY  
**72-63-00**  
Page 531  
Aug 14/75

PRINTED IN ENGLAND

TN8511



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Insert the roller bearing (02/1-300) into the bearing housing (02/1-320) using the support (Tool 500) and driver (Tool 501).
- (3) Insert the inner washer (02/1-280) and the outer washer (02/1-290) into the bearing housing.
- (4) Insert the ball bearing (02/1-270) into the bearing housing ensure that the faces of both bearings and washers are in contact with each other.
- (5) Place the housing and installed bearings on to a surface table and by using suitable measuring gauges determine the dimension between the end face of the ball bearing and the housing, record as dimension 'A'.
- (6) Place the flanged roller bearing (02/1-90) on a surface table and by using suitable gauges determine the dimension between the flange on the roller bearing and its end face, record as dimension 'B'.
- (7) The adjusting washer for the inclined bevel gear drive bearing housing =  $(\text{Dim. A} - \text{Dim. B}) - 0.002 \text{ in.}$  (0,050 mm). Select the adjusting washer from the range (02/1-180) (Ref.72-09-21 Repair, Fig.439).
- (8) Position the selected adjusting washer into the bearing housing and using suitable measuring gauges determine the dimension from the lip of the bearing housing to the face of the adjusting washer, record as dimension 'Y'.
- (9) The end-float on the flanged roller bearing =  $(\text{Dim. Y} - \text{Dim. B})$ . The desired amount of end-float is between 0.001 and 0.003 in. (0,025 and 0,075 mm).
- (10) Using the driver (Tool 502) and support (Tool 500) assemble the flanged roller bearing to the bearing housing. Secure the flanged roller bearing, adjusting washer, ball bearing, inner and outer washers and roller bearing in the bearing housing with the three Dee headed bolts (02/1-80) and nuts (02/1-70), ensure that the flats on the boltheads locate to the step of the flanged roller bearing. Ensure the nuts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m) torque-tighten between 85 and 95 lbf in. (9,6 and 10,7 N.m).

TN4168

SUB-ASSEMBLY

**72-63-00**

Page 532

Apr 1/77

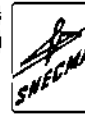




OLYMPUS 593

MK.610-14-28

OVERHAUL



- P. Determine the Adjusting Washers for the Bevel Gears  
(Ref.Fig.510).

NOTE: The following procedure is required only if new bevel gears, ball bearings or driving shaft are fitted, or if the thickness of the adjusting washers are in doubt.

- (1) Assemble checking gauge (Tool 37) to vertical bevel gear drive shaft location in the gearbox case.
  - (a) Unscrew and remove the (small) hand nut (Tool 498) from the gauge. Insert the end of the gauge sleeve through the bearing housing assembly previously assembled (Ref.para.N.(1)) abutting the step on the gauge sleeve with the inner ring of the ball bearing. Retain the assembled items with hand nut (Tool 498).
  - (b) Assemble the gauge and bearing assembly to the gearbox case at the location of the vertical bevel gear drive shaft. Temporarily retain the gauge and bearing assembly in the gearbox case with the three bolts (02/1-410) lightly tightened.
  - (c) Assemble the front cover fixture (Tool 3077) to the front cover mounting face of the gearbox case, locating it on the checking gauge and the two hollow pins. Secure the fixture to the gearbox case with three captive bolts. Secure the checking gauge to the fixture with the hand nut (Tool 495).
- (2) Assemble the checking gauge (Tool 38) to the inclined bevel gear drive shaft location in the gearbox case.
  - (a) Position the bearing housing (02/1-320), with its previously assembled bearings and washers (Ref.Para.N.(10)), on the gauge, abutting the step on the gauge with the inner roller bearing ring. Secure the assembly to the gauge with the spacer ring (Tool 496) and hand nut (Tool 497).

PRINTED IN ENGLAND

TN4169

SUB-ASSEMBLY

72-63-00

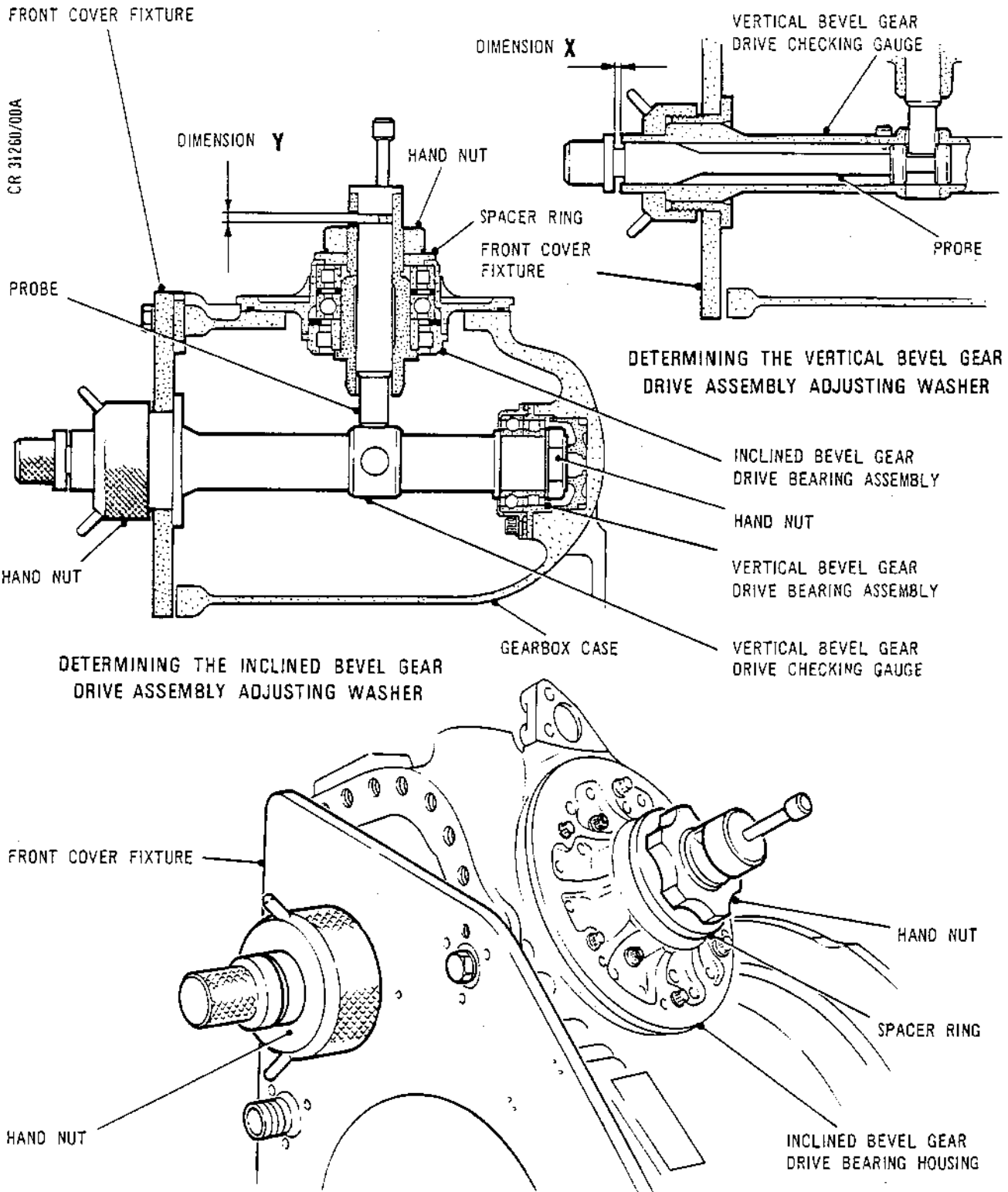
Page 533

Aug 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Calculating Adjusting Washer Dimensions for  
Bevel Gear Assemblies  
Figure 510

SUB-ASSEMBLY  
**72-63-00**

Page 534  
Aug 14/75

TN4175



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Assemble the complete bearing and gauge assembly to the gearbox case at the location of the inclined bevel gear drive shaft mounting face, temporarily retain with six equispaced bolts (02/1-10), lightly tightened.
- (3) Carry out checking gauge checks.
- (a) Insert the probe of the inclined bevel gear drive checking gauge (Tool 38) so that it abuts the outside diameter of the vertical bevel gear drive checking gauge (Tool 37).
- (b) Insert the slip gauges and determine the dimension between the end of the inclined bevel gear drive checking gauge probe and the gauge body. Record the dimension 'Y'.
- (c) Rotate the vertical bevel gear drive checking gauge until the hole in its body is aligned with the probe of the inclined bevel gear drive checking gauge.
- (d) Insert the probe of the inclined bevel gear drive checking gauge in the hole so that it abuts the smaller diameter of the probe of the vertical bevel gear drive checking gauge.
- (e) Withdraw the probe on the vertical bevel gear drive checking gauge, insert slip gauges and determine the dimension between the end of the vertical bevel gear drive gauge probe and the gauge body. Record the dimension 'X'.
- (4) Remove the inclined bevel gear drive checking gauge.
- (a) Unscrew and remove the six bolts retaining the checking gauge and the inclined bevel gear drive bearing housing to the gearbox case. Remove the assembly from the gearbox case.
- (b) Unscrew and remove the hand nut and spacer ring from the gauge and the gauge from the bearing assembly. Protect the bearing assembly for a later assembly procedure.

PRINTED IN ENGLAND

TN4170

SUB-ASSEMBLY

72-63-00

Page 535

Feb 2/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (5) Remove the vertical bevel gear drive checking gauge.
  - (a) Unscrew and remove the hand nut (Tool 495) from the checking gauge.
  - (b) Unscrew the three captive bolts retaining the front cover fixture to the gearbox case, remove the fixture from the case.
  - (c) Unscrew and remove the three bolts securing the gauge and bearing assembly to the gearbox case, remove the gauge and bearing assembly from the case.
  - (d) Unscrew the hand nut (Tool 498) from the checking gauge and remove the checking gauge from the bearing assembly. Protect the bearing assembly for a later assembly procedure.
- (6) Replace all the checking gauges, hand nuts and the front cover fixture into the container (Tool 499).
- (7) Calculate the thickness of the vertical bevel gear drive adjusting washer.
  - (a) Examine the vertical bevel gear wheel and note the (actual) mounting distance (MD), as etched on the bevel gear wheel.
  - (b) Adjusting washer thickness required for vertical bevel gear drive = Dimension 'X' + 3.060 in. - MD, where 3.060 in. is the theoretical MD.
- (8) Select the calculated adjusting washer for the vertical bevel gear drive from the range of adjusting washers (02/1-520) (Ref.72-09-21 Repair, Fig.441) and place with the appropriate bearing assembly.
- (9) Calculate the thickness of the inclined bevel gear drive adjusting washer.
  - (a) Examine the inclined bevel gear wheel and note the (actual) mounting distance MD), as etched on the bevel gear wheel.
  - (b) Adjusting washer thickness required for inclined bevel gear drive = Dimension 'Y' + 2.700 in. - MD, where 2.700 in. is the theoretical MD.

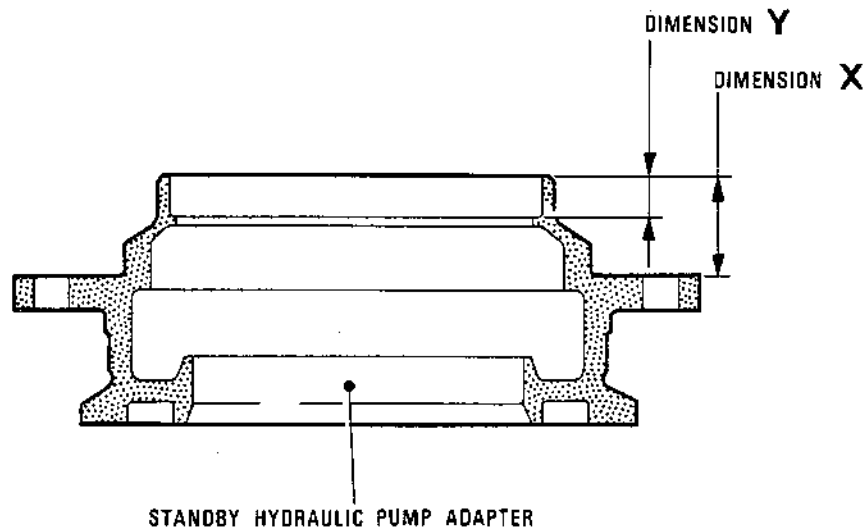
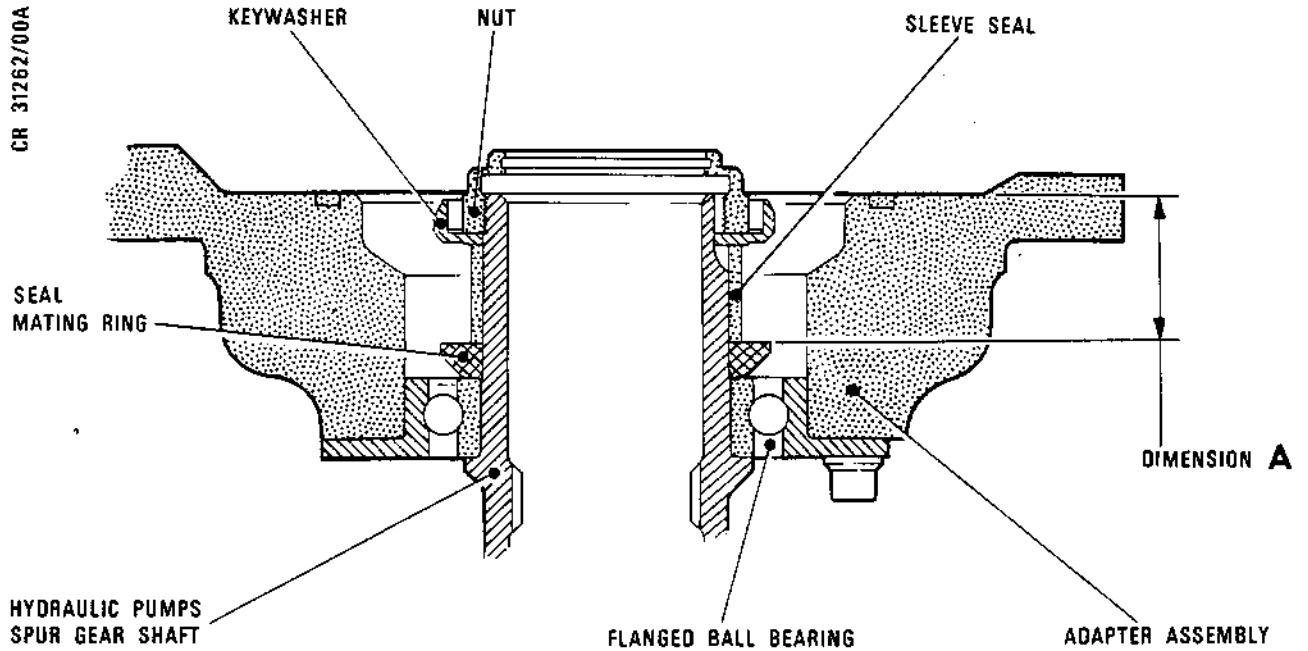
FN4171

CR 31262/00A



OLYMPUS 593

MK.610-14-28  
OVERHAUL



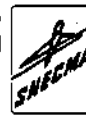
Calculating the Working Length of the Sealol Seal  
Figure 511



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (10) Select the calculated adjusting washer for the inclined bevel gear drive from the range of adjusting washers (02/1-100) (Ref. 72-09-21 Repair, Fig.438) and place with appropriate bearing assembly.

- Q. Assemble the Sealol Seal to the Stand-by Hydraulic Pump Adapter for Working Length Checks (Fig.511).

NOTE: It is essential that care is taken during assembly of the Sealol seal and its mating parts to avoid damage or distortion. The seal and mating ring are a matched set, and must be assembled at the same location.

- (1) Ensure that the following mating faces are free from burrs, surface damage and distortion likely to prevent proper seating of the Sealol seal:

- (a) flanged ball bearing (05/1-90) with seal mating ring (05/1-170).
- (b) seal mating ring with seal sleeve (05/1-160).
- (c) Sealol seal (05/1-150) with adapter (01/7-150).

Raised surface damage (including part number marking) may be lightly stoned down (Ref. 72-09-22 Repair).

- (2) Assemble the flanged ball bearing (05/1-190) to its location in the rear of the stand-by pump adapter assembly (01/7-180), then secure it with three bolts (05/1-180). Ensure the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m) torque-tightened between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (3) Position the adapter assembly/ball bearing on the support (Tool 483) with the bearing uppermost, then using the driver (Tool 490), press the spur gear shaft (05/1-200) into the bearing until the step on the shaft contacts the inner ring of the bearing.

SUB-ASSEMBLY

**72-63-00**

Page 538

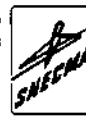
Dec 1/88



OLYMPUS 593

MK.610-14-28

OVERHAUL



**NOTE:** The shank distance between the step and spur gear is greater on the stand-by hydraulic pump side.

- (4) Support the inner ring and rollers of the flanged roller bearing (05/1-110) on the support (Tool 483), then using the driver (Tool 490), press the spur gear shaft, main hydraulic pump end, into the bearing inner ring until the step on the shaft contacts the ring.
- (5) Check that the seal mating ring (05/1-170) and sleeve seal (05/1-160) are bedding satisfactorily by trial assembly using engineers blue.
- (6) Assemble the seal mating ring with its chamfered side toward the spur gear, sleeve seal, keywasher (05/1-140) and nut (05/1-130) to the spur gear shaft located in the stand-by hydraulic pump adapter assembly. Using the holder (Tool 512) and wrench (Tool 1525) temporarily tighten the nut.
- (7) Calculate the working length of the Sealol seal.
  - (a) Using suitable gauges measure the distance of the mating ring from the grooved face of the adapter assembly. Care must be taken not to scratch the ring. Record as dimension 'A'.
  - (b) Place the stand-by hydraulic pump adapter (01/7-150) on a surface table. Using suitable gauges measure, and record, the dimensions 'X' and 'Y'.
  - (c) Working length of Sealol seal = Dimension 'A' - Dimension 'X' + Dimension 'Y'. The desired working length is between 0.530 and 0.590 in. (13,46 and 14,98 mm).

**NOTE:** If the desired working length is not achieved the items which effect the seals working length must be renewed e.g. stand-by hydraulic pump adapter assembly, seal mating ring or adapter.

SUB-ASSEMBLY  
**72-63-00**

Page 538A  
Dec 1/88



OLYMPUS 593

MK.610-14-28  
OVERHAUL



This page left blank intentionally

SUB-ASSEMBLY

**72-63-00**

Page 538B

Dec 1/88





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (8) Using the holder (Tool 512) and wrench (Tool 1525) unscrew and remove the nut, keywasher, the sleeve seal and the mating ring from the spur gear shaft.
  - (9) Lap the Sealol seal and mating ring (Ref.72-09-00 Inspection/Check).
  - (10) Assemble the seal mating ring on the spur gear shaft with its chamfered side toward the spur gear. Assemble the sleeve seal on the spur gear shaft.
  - (11) Assemble the adapter (01/7-150) face, with stepped pin, to the smaller diameter of the support (Tool 503).
  - (12) Lubricate the outside diameter of the Sealol seal (05/1-150) with lubricant A, position the seal with its carbon face uppermost in the adapter and using the driver (Tool 504) press in the seal. Ensure that the seal is squarely inserted and fully seated in the adapter. Lubricate the carbon seal face with lubricant A.
- R. Assemble the Gearshaft and Sealol Seal Assembly to the Stand-by Hydraulic Pump Adapter Assembly.
- (1) Assemble the Corruplus seal (01/7-160) to the groove in the stand-by adapter assembly (01/7-180).
  - (2) Assemble the adapter (01/7-150) to the adapter assembly (01/7-180) ensuring that the orifice in the adapter is aligned with the corresponding stepped pin in the adapter assembly. Abut the mounting face of the adapter with that of the adapter assembly and secure with seventeen bolts (01/7-140). Ensure the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m) torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (3) Assemble the retaining ring (05/1-120) to the nut (05/1-130) then locate the keywasher (05/1-140) and the nut on the spur gear shaft.

SUB-ASSEMBLY  
**72-63-00**

Page 539  
Dec 1/88

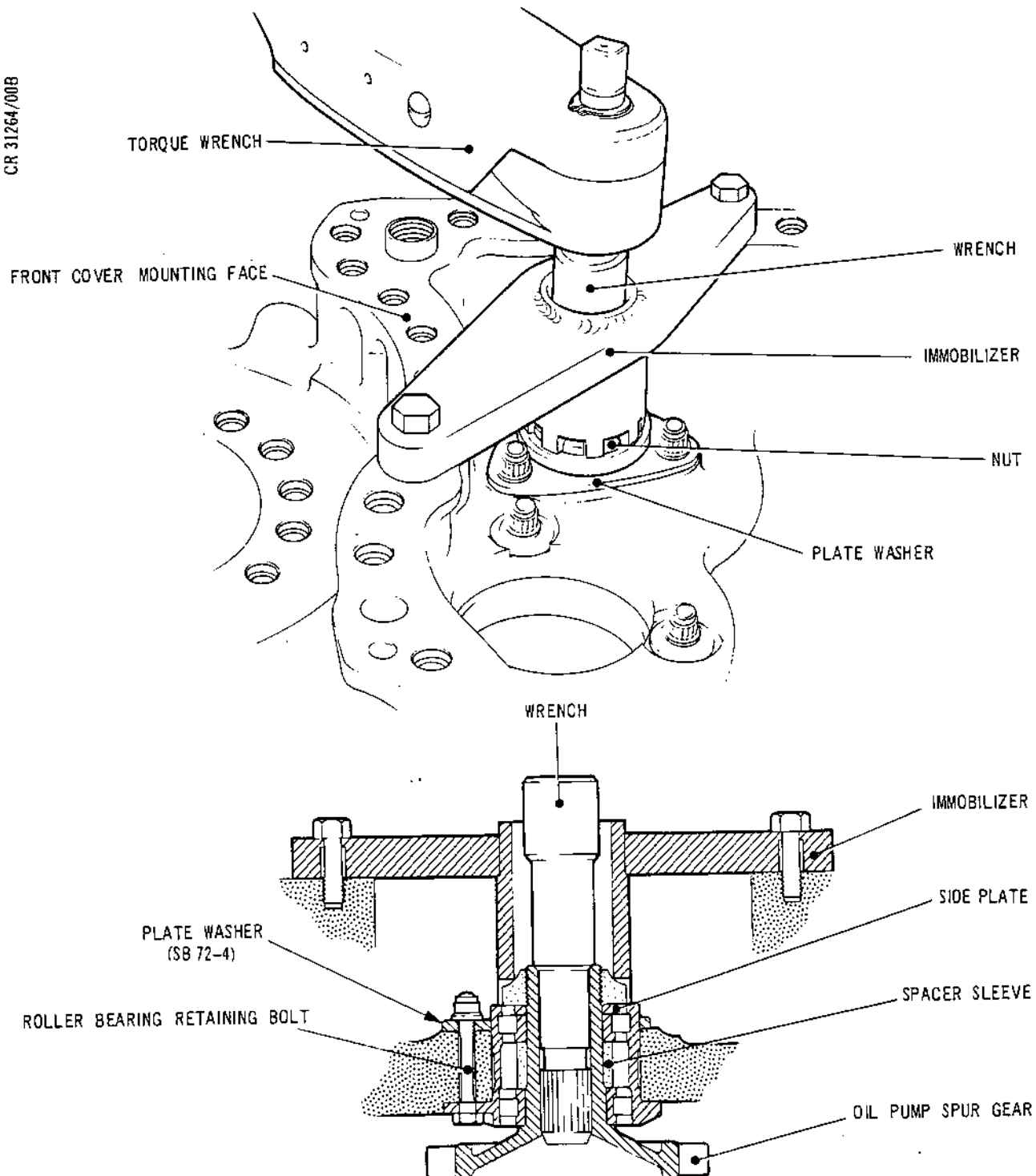


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31264/008



Assembly of the Oil Pump Driving Spur Gear  
Figure 512

SUB-ASSEMBLY  
**72-63-00**  
Page 540  
Apr 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (4) Torque-tighten the nut on the spur gear shaft, using the vice holder (Tool 512) and the wrench (Tool 1525).
- (a) Assemble the vice holder into a bench vice.
- (b) Locating the splines on the holder with the splines on the interior circumference of the shaft, position the shaft and its assembled items into the holder.
- (c) Position the wrench (Tool 1525) on the nut and torque-tighten to 190 lbf ft (258,0 N.m).

NOTE: Do not peen the keywasher at this stage in the gearbox assembly.

S. Assemble the Oil Pump Drive and Idler Gears to the Gearbox Case (Ref.Fig.512 and 513).

- (1) On engines Pre. SB.72-4 assemble the inner ring and rollers of the flanged roller bearing (O4/l-170) and on engines embodying SB.72-4 assemble the inner ring and rollers of the flanged roller bearing (O4/l-160B) to the oil pump spur gear drive (O4/l-190).
- (a) Position the spur gear on the support (Tool 672).
- (b) Using the driver (Tool 671), press the inner ring and rollers of the bearing onto the spur gear, ensuring the inner ring is abutting the step on the spur gear.
- (2) Using the support (Tool 672) and driver (Tool 671), assemble the spacer sleeve (O4/l-180) to the spur gear.
- (3) Using the support (Tool 672) and driver (Tool 671), on engines Pre. SB.72-4 assemble the inner ring of the flanged roller bearing (O4/l-160) and on engines embodying SB.72-4 the inner ring of bearing (O4/l-160B) to the spur gear.

NOTE: Do not assemble the side plate, part of the bearing inner ring, at this stage.

- (4) Assemble the spur gear and assembled inner bearing rings to their location in the gearbox case.

SUB-ASSEMBLY

72-63-00

Page 541

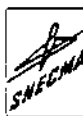
Apr 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (5) Assemble the side plate to the roller bearing and secure the spur gear to the gearbox case with the self-locking nut (04/1-120) ensuring that the self-locking fixture of the nut is elliptical and not four lobed (Ref.SB.72-105). Tighten the nut using the immobilizer (Tool 652) and the wrench (Tool 651).
- (a) Engage the lugs on the immobilizer with the corresponding castellations on the nut and secure the immobilizer, with the two captive bolts, to the front cover mounting face.
  - (b) Pass the wrench through the immobilizer and engage the splines in the spur gear with the wrench.
  - (c) Turn the wrench and the spur gear to tighten the self-locking nut. Ensure the nut has a locking (run-down) torque of between 6 and 23 lbf ft (8,1 and 67,8 N.m), then torque-tighten it to 60 lbf ft (81,3 N.m) plus the measured locking (run-down) torque figure.
  - (d) Unscrew and release the captive bolts and remove the immobilizer and the wrench.
- (6) Assemble the inner ring and rollers of the bearing (04/1-100) to the idler shaft (04/1-110).
- (a) Position the inner ring in the support (Tool 529).
  - (b) Locate the driver (Tool 530) in the idler shaft, and press the idler shaft into the bearing inner ring. Ensure that the inner ring abuts the step on the idler shaft.
  - (c) Remove the driver and the support.
- (7) Locate the inner ring of roller bearing (04/1-50) into its outer ring in the gearbox case.
- NOTE: The side plate of the bearing (04/1-50) must not be fitted at this stage in the procedure.
- (8) Support the idler gear assembly (04/1-60) so that its centre line lies on the centre line of the two roller bearings within the gearbox case. Ensure the teeth of the idler gear are meshed with the teeth of the oil pump spur gear.

IN4178

SUB-ASSEMBLY

72-63-00

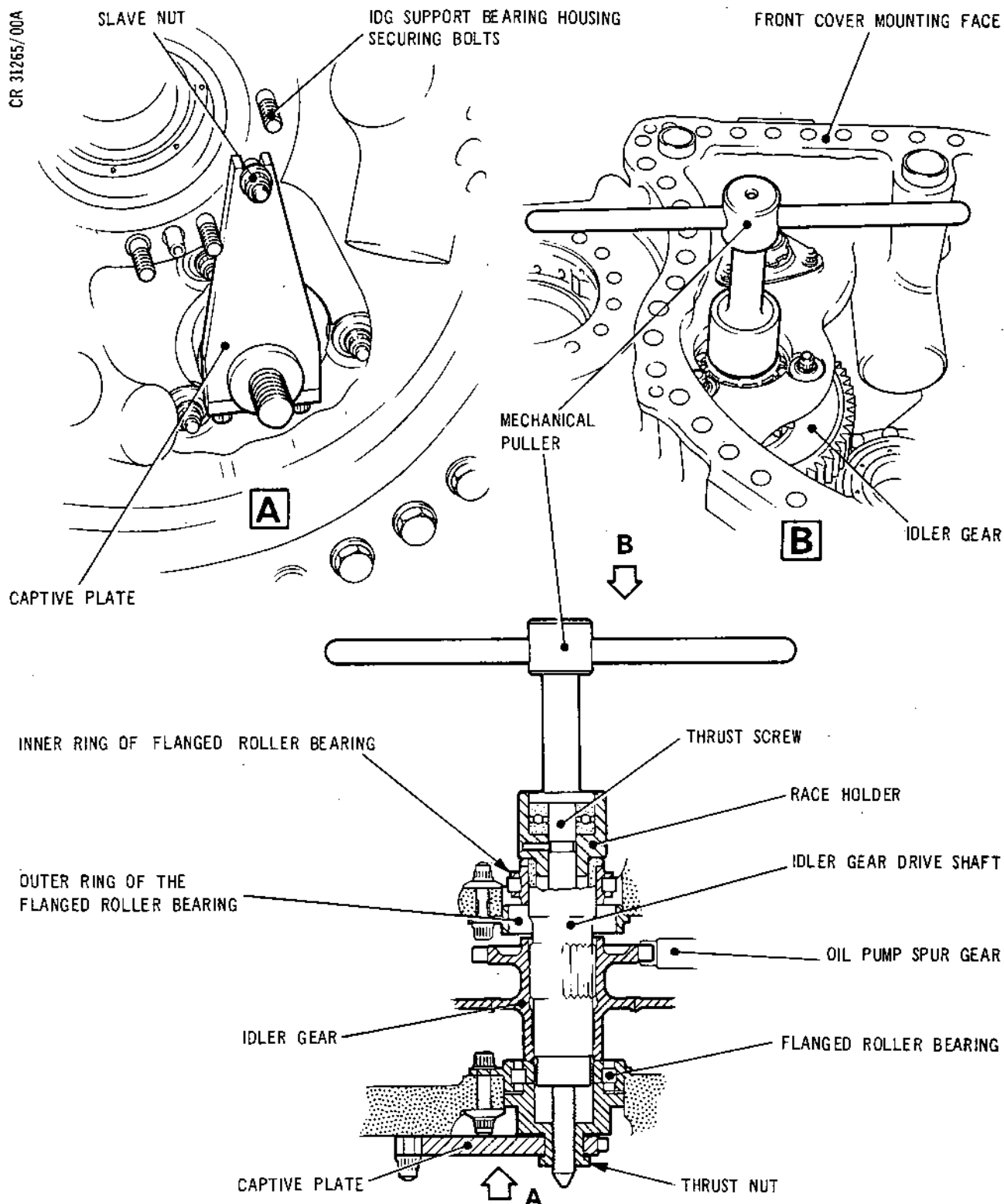
Page 542

Aug 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Assembly of Idler Gear and Idler Shaft  
Figure 513



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (9) Using the mechanical puller (Tool 541) (Ref.Fig.513), insert the idler shaft through the roller bearing (04/1-100), gear (04/1-60) and roller bearing (04/1-50).
- (a) Support the thrust nut in the location normally occupied by the side plate in the bearing (04/1-50), as viewed through the mounting location of the IDG assembly in the gearbox case.
- (b) Locate the captive plate to the thrust nut and to one of the IDG support bearing housing securing bolts, retain the plate to the bolt with a slave nut.
- (c) Insert the thrust screw through the idler shaft, as viewed from the front cover mounting face. Engage the thread of the thrust screw in the thrust nut, operate the thrust screw until the step on the race holder is inserted into the end of the idler shaft.
- (d) Ensure the splines on the idler shaft engage the splines in the idler gear, then screw in the thrust screw pressing the idler shaft into its location.
- (e) Unscrew and remove the puller, thrust screw and captive plate.
- (10) Assemble the side plate to the roller bearing (04/1-50).
- (11) Secure the gear and shaft into the bearing assemblies with the self-locking nut (04/1-10) ensuring that the self-locking fixture of the nut is elliptical and not four lobed (Ref.SB.72-105) (Ref.Fig.514).
- (a) Engage and screw the nut (04/1-10) onto the shaft. Locate the lugs on the immobilizer (Tool 642) with the corresponding castellation in the nut and the holes in the captive plate with four of the IDG support bearing housing securing Dee headed bolts and the headless pin. Secure the holder with four slave nuts.
- (b) Locate the spigot of the wrench (Tool 643) in the bore of the idler shaft and engage the three equi-spaced lugs on the wrench into the cutaways in the shaft.

TN1867

SUB-ASSEMBLY

**72-63-00**

Page 544

Jul 1/79



OLYMPUS 593

MK. 610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 31266/00A  
FRONT COVER  
MOUNTING FACE

WRENCH

IDLER SPUR GEAR

**A**

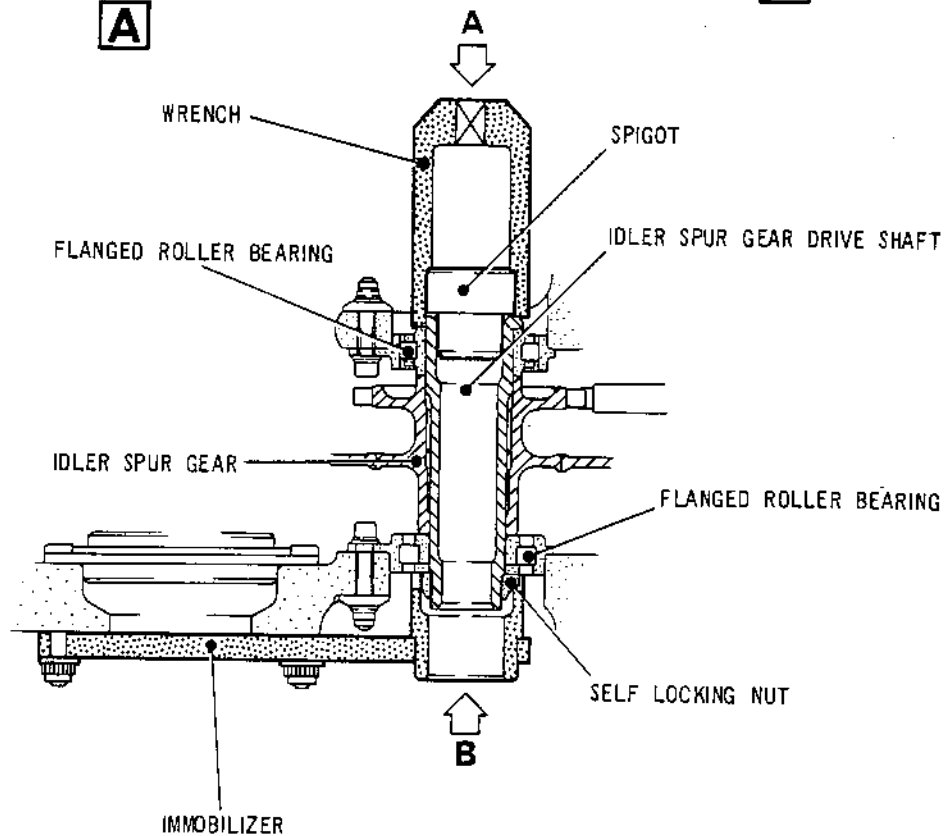
IMMOBILIZER

IDG SUPPORT BEARING  
HOUSING SECURING BOLT

SLAVE NUT

HEADLESS PIN

**B**

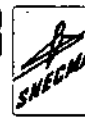


Tightening the Idler Shaft Retaining Nut  
Figure 514

SUB-ASSEMBLY  
**72-63-00**  
Page 545  
Feb 2/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (c) Turning the idler shaft with the wrench, torque-tighten the self-locking nut. Ensure that the nut has a locking (run-down) torque of between 7 and 28 lbf ft (9,0 and 38,4 N.m), then torque-tighten it to 80 lbf ft (108,5 N.m) plus the measured locking torque figure then remove the wrench and the immobilizer.
- T. Assemble the Stand-by Hydraulic Pump Adapter Assembly and Main Hydraulic Pump Adapter to the Gearbox Case to Check the Sealol Seal Adjusting Washer Size (Ref.Fig.515).
- NOTE:** It is essential that care is taken during assembly of the Sealol seal and its mating parts to avoid damage or distortion. The seal and mating ring are a matched set, and must be assembled at the same location.
- (1) Ensure that the following mating faces are free from burrs, surface damage and distortion likely to prevent proper seating of the Sealol seal:
- (a) flanged roller bearing (05/1-110) with seal mating ring (05/1-90).
  - (b) seal mating ring with sleeve seal (05/1-80).
  - (c) Sealol seal (05/1-70) with adapter (01/7-60).
- Raised surface damage (including part number marking) may be lightly stoned down (Ref.72-09-22 Repair).
- (2) Assemble the gasket (01/7-320) to the stand-by hydraulic pump adapter assembly location on the gearbox case. Locate the adapter assembly on the hollow pin in its mounting face and engage the teeth of the hydraulic pumps spur gear with those of the oil pump idler gear.
- (3) Position the gasket (01/7-290), drain elbow (01/7-280) and bracket (01/7-270) to their locations on the stand-by adapter assembly.





OLYMPUS 593

MK.610-14-28

OVERHAUL



- (4) Secure the drain elbow, bracket, adapter assembly and gasket to the gearbox case with the 26 bolts (01/7-190) and 24 washers (01/7-200). Locate two of the bolts through the drain elbow, and 24 bolts and washers to the remaining locations. Ensure the 26 bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m) torque-tighten between 90 and 100 lbf in. (10,2 and 11,3 N.m).
- (5) Check that the seal mating ring (05/1-90) and the sleeve seal (05/1-80) are bedding satisfactorily by trial assembly using engineers blue.
- (6) Assemble the seal mating ring with its chamfered side toward the spur gear, sleeve seal, keywasher (05/1-30) and nut (05/1-20) on the spur gear shaft at the main hydraulic pump location. Using the immobilizer (Tool 540), wrench (Tool 1525), temporarily tighten the nut.
  - (a) Insert the splined shaft of the immobilizer in the spur gear shaft and engage the splines. Locate the three triangularly spaced holes in the plate with the corresponding tapped holes in the build stand (Tool 494). Retain the immobilizer to the build stand with the three captive bolts.
  - (b) Temporarily tighten the nut on the spur gear shaft, main hydraulic pump end, using the wrench (Tool 1525).

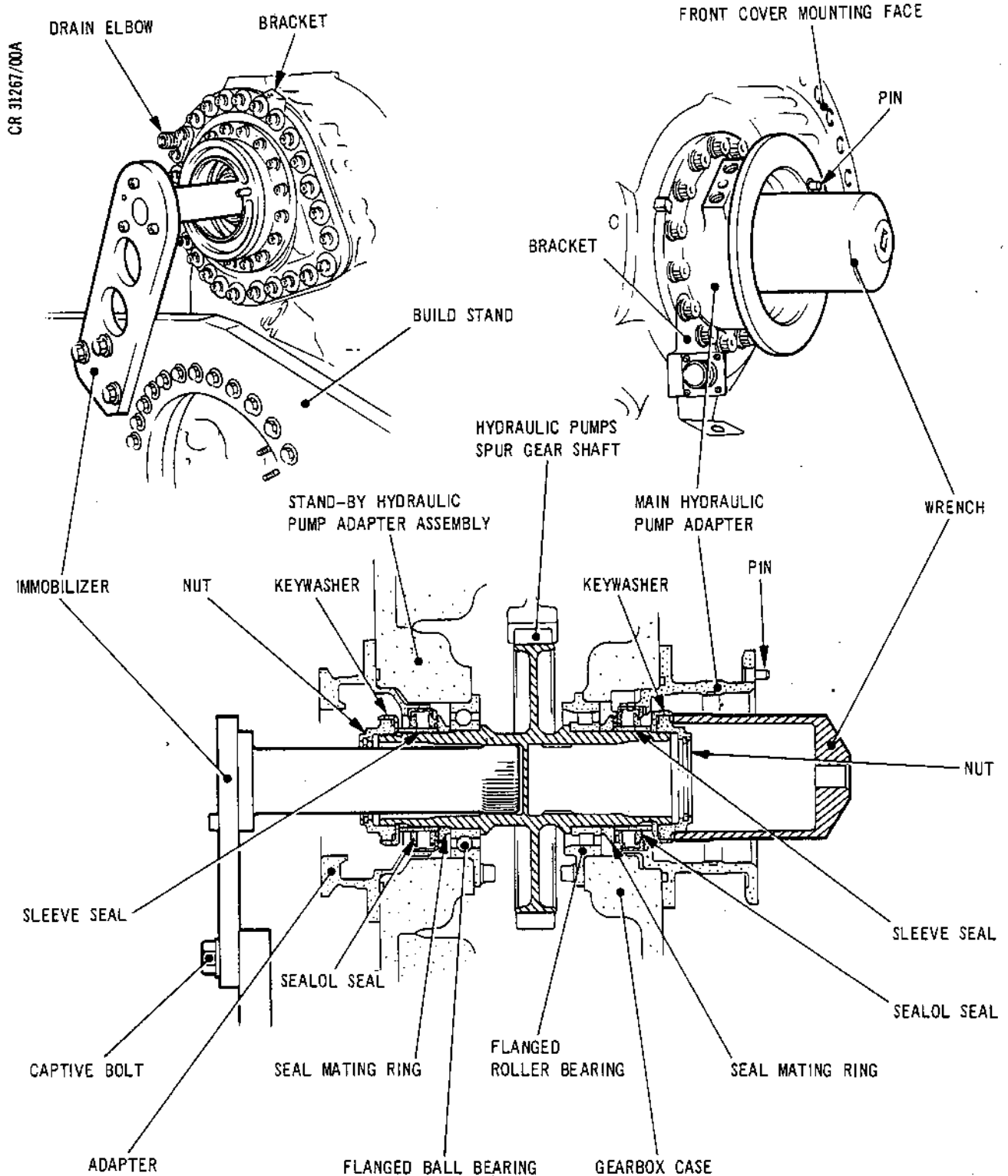
NOTE: Do not peen the keywasher at this stage.

- (7) Calculate the Sealol seal adjusting washer (Ref. Fig.516).
  - (a) Using suitable gauges measure the distance of the mating ring face below the surface of the gearbox case. Care must be taken not to scratch the ring. Record as dimension 'C'.
  - (b) Place the main hydraulic pump adapter (01/7-60) on a surface table and using suitable gauges measure and record the dimensions 'W' and 'Z'.



OLYMPUS 593

MK. 610-14-28  
OVERHAUL



Assembly of Main and Stand-by Hydraulic Pump Adapters  
Figure 515

SUB-ASSEMBLY  
**72-63-00**  
Page 548  
Feb 2/76



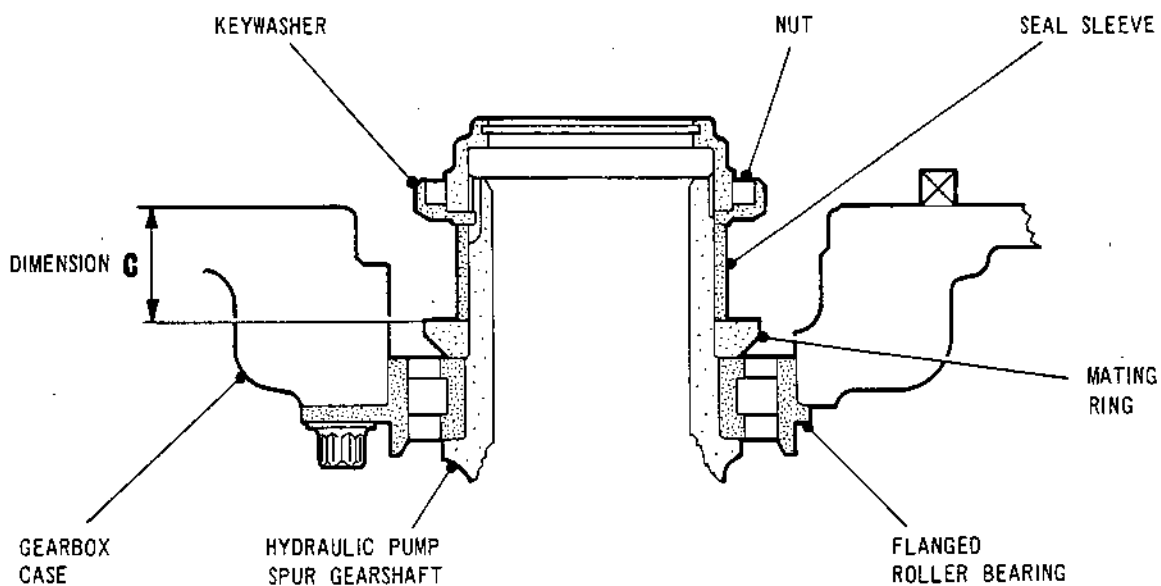
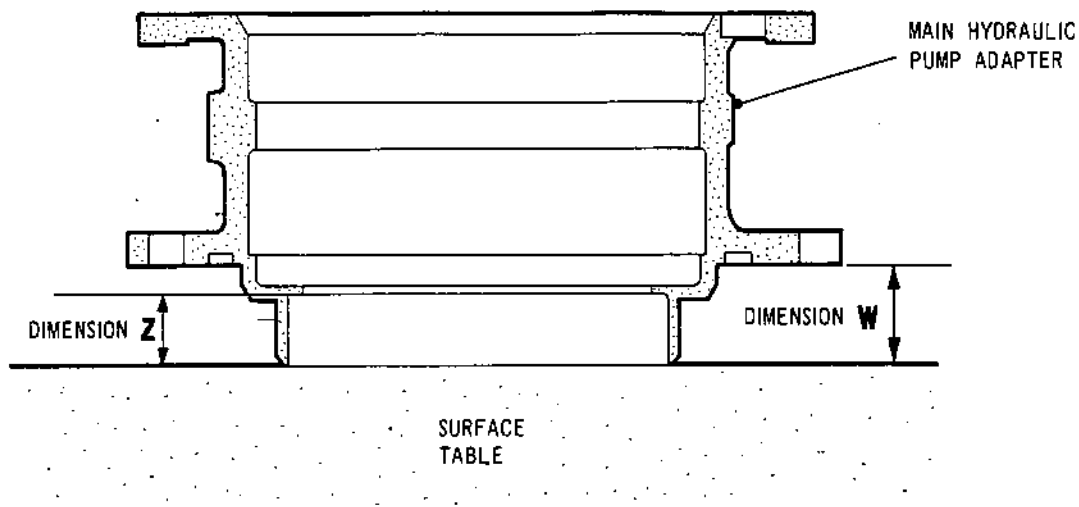
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31263/00A

PRINTED IN ENGLAND



Calculating the Seal Seal Adjusting Washer  
Figure 516

SUB-ASSEMBLY  
**72-63-00**

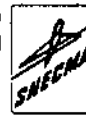
Page 549  
Feb 2/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (c) Length of Sealol seal adjusting washer =  
Dimension 'C' - Dimension 'W' + Dimension 'Z' -  
0.550 in. (13,97 mm).
- (d) Select the calculated adjusting washer from the  
range of adjusting washers (05/1-40) (Ref.72-09-21  
Repair, Fig.442).
- (8) Using the immobiliser (Tool 540) and wrench (Tool  
1525), unscrew and remove the nut, keywasher, sleeve  
seal and mating ring from the spur gear shaft.
- (9) Lap the Sealol seal and mating ring (Ref.72-09-00  
Inspection/Check).
- (10) Assemble the seal mating ring on the spur gear shaft  
with its chamfered side toward the spur gear.  
Assemble the sleeve seal on the spur gear shaft.
- (11) Using the support (Tool 503) and the driver (Tool 504),  
assemble the selected adjusting washer and the Sealol  
seal (05/1-70) in the main hydraulic pump adapter.
  - (a) Assemble the adapter to the support, locating  
the stepped pin on the adapter with the slot in  
the support.
  - (b) Position the adjusting washer (05/1-40) in the  
adapter. Lubricate the outside diameter of the  
Sealol seal (05/1-70) with lubricant A then  
position the seal with its carbon face upper-  
most in the adapter. Using the driver (Tool  
504) press seal and washer into the adapter  
until they abut the step in the adapter.
  - (c) Ensure that the seal is squarely and fully  
seated in the adapter.
  - (d) Remove the driver and the support.
  - (e) Lubricate the carbon seal face with lubricant A.
- (12) Locate the Corruplus seal (01/7-90) in the groove in  
the mounting face of the main hydraulic pump adapter.

SUB-ASSEMBLY

**72-63-00**

Page 550

Dec 1/88



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

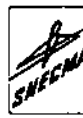
- (13) Locate the adapter, and assembled items, on the two stepped pins in the gearbox case, with the pin in its uppermost face toward the front cover mounting face.
- (14) Position the receptacle (01/7-30) on the bracket (01/7-100) and retain with the four screws (01/7-20) and nuts (01/7-10).
- (15) Position the bracket and receptacle on the main hydraulic pump adapter mounting flange and retain the adapter to the gearbox case with the 16 bolts (01/7-70). Using the cranked wrench (Tool 645) ensure the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0.4 N.m) torque-tighten between 67--and 73 lbf in. (7.6 and 8.2 N.m).
- (16) Assemble the retaining ring (05/1-10) to the nut (05/1-20), locate the keywasher (05/1-30) and nut onto the spur gear shaft then using the wrench (Tool 1525) torque-tighten the nut to 190 lbf ft (258.0 N.m).
- (17) Unscrew the three captive bolts on the immobilizer, remove the immobilizer wrench and guide from the build assembly.
- (18) Using the peening tool (Tool 666), adapter (Tool 667) and peening fixture (Tool 233), peen the keywashers on each end of the spur gear shaft (Ref.Fig.517).
  - (a) Locate the spigot of the peening tool (Tool 666) into the bore of the spur gear shaft and locate the sprung rectangular locator into one of the ten equi-spaced detents around the circumference of the nut.
  - (b) Position and support the adapter (Tool 667) onto the nut, at the opposite end of the spur gear shaft to the keywasher being peened.
  - (c) Position the peening fixture relative to the main and stand-by hydraulic pump adapters.



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (d) Engage the adapter into the peening fixture, then screw in the thrust screw until the locating bush engages the peening tool and slight resistance is felt. Continue to screw in the thrust screw for approximately two and one half turns.
- (e) Unscrew the thrust screw and remove the fixture, peening tool and adapter from the gearbox.
- (f) Repeat operation (18)(a) to (18)(e), for the key-washer at the opposite end to the one peened.

SUB-ASSEMBLY

**72-63-00**

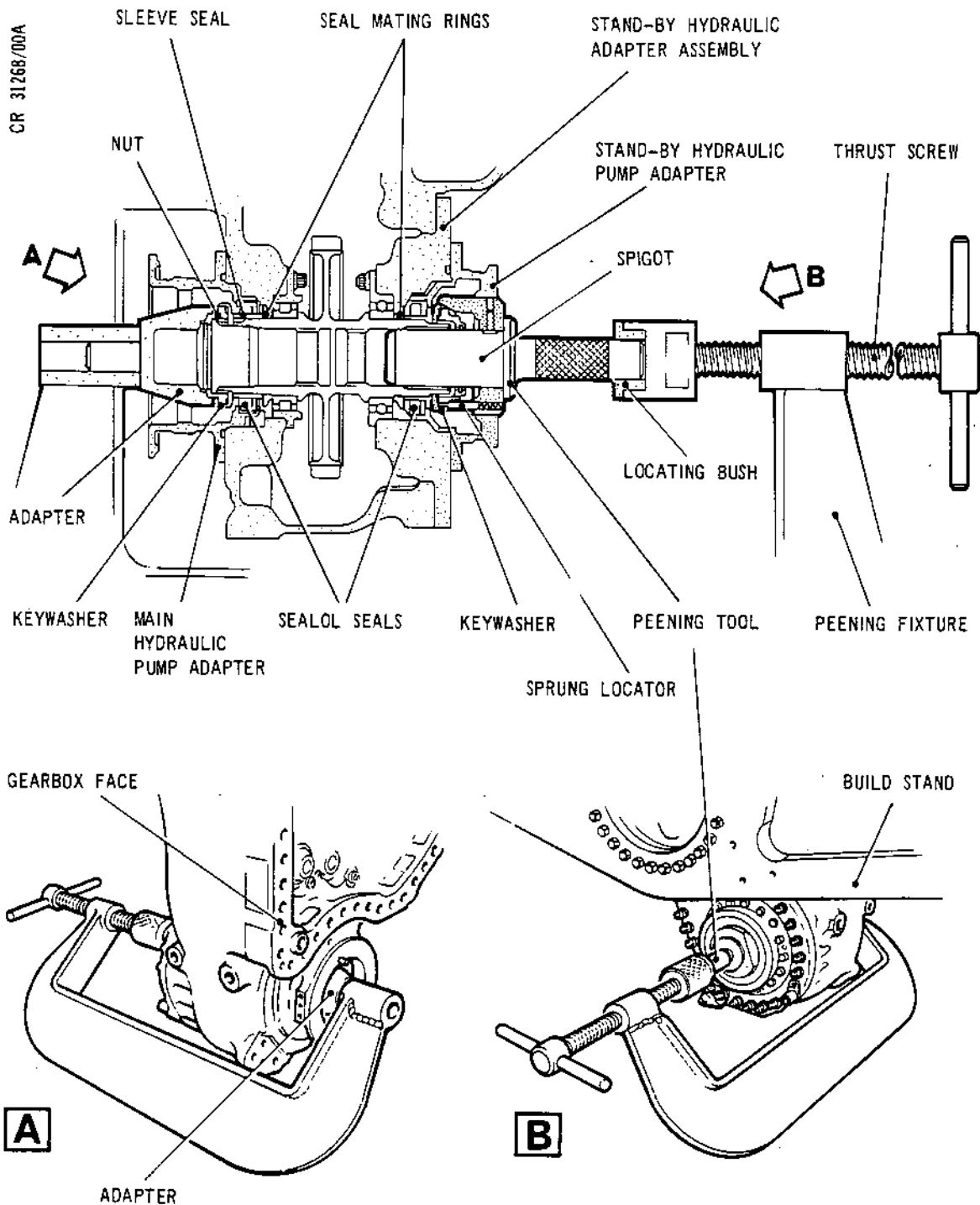
Page 5508

Dec 1/88



OLYMPUS 593

MK. 610-14-28  
OVERHAUL



Peening Keywashers on Hydraulic Pumps Driving Spur Gear Shaft  
Figure 517

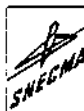
SUB-ASSEMBLY  
**72-63-00**



OLYMPUS 593

MK.610-14-28

OVERHAUL



U. Assemble the Vertical Bevel Gear, Driving Spur Gear Assemblies to the Gearbox Case.

- (1) Using the support (Tool 533) and driver (Tool 534), assemble the bevel gear to the driving spur gear.
  - (a) Position the bevel gear (02/1-610), teeth uppermost, over the smaller bore in the support.
  - (b) Insert the splined end of the spur gear shaft (02/1-640) into the bevel gear. With the wrench access holes in spur and bevel gear aligned, engage the splines.
  - (c) Assemble the driver to the shaft and press the shaft into the bevel gear, ensure contact between the bevel gear and the lip on the spur gear shaft.
- (2) Assemble the bearing inner ring and rollers (02/1-630) on the vertical bevel gear and drive shaft.
  - (a) Position the bearing inner ring in the larger bore of the support (Tool 533).
  - (b) Insert the spur gear end of the shaft (02/1-640) in the inner ring and using the driver (Tool 534) press in the shaft until the lip, on the shaft, and the ring are in contact with each other.
- (3) Secure the bearing to the shaft with the nut (02/1-620) ensuring that the self-locking fixture of the nut is elliptical and not four lobed (Ref.SB. 72-105).
  - (a) Position the holder (Tool 646) into a bench vice. Locating the pin in the holder with one of the three access holes in the bevel gear wheel, position the vertical bevel gear drive shaft into the holder.
  - (b) Locate the lugs on the wrench (Tool 647) with the corresponding castellations in the nut.
  - (c) Ensure the nut has a locking (run-down) torque of between 80 and 445 lbf in. (9 and 50,3 N.m) and torque-tighten to 1440 lbf in. (163 N.m) plus the measured rundown torque figure.

IN2001

SUB-ASSEMBLY

**72-63-00**

Page 552

Dec 1/81





OLYMPUS 593

MK.610-14-28

OVERHAUL



- (d) Remove the holder and the wrench.
- (4) Assemble the selected adjusting washer (02-1/520) onto the spur gear shaft, bevel gear end.
- (5) Using the driver (Tool 534) and support (Tool 533), assemble the bearing housing (02/1-510) ball bearing (02/1-500) and the inner ring and rollers of the flanged roller bearing (02/1-430) to the spur gear shaft, bevel gear end.
- (a) Locate the housing with assembled bearings in the larger bore of the support, ball bearing uppermost.
- (b) Insert the spur gear shaft into the bearing and using the driver (Tool 534) press in the shaft until the bevel gear, adjusting washer and bearings contact each other.
- (6) Secure the bearings, housing and adjusting washer to the vertical bevel gear drive shaft with the nut (02/1-420) ensuring that the self-locking fixture of the nut is elliptical and not four lobed (Ref.SB. 72-105) (Ref.Fig.518).
- (a) Position the holder (Tool 658) in a bench vice.
- (b) Position the driving spur gear as assembled to the vertical bevel gear drive shaft, into the holder, locating the pin on the holder through one of the three access holes in the driving spur gear.
- (c) Retain the gear to the holder with the two clamp plates, locked with their respective thumbnuts.
- (d) Locate the ten lugs on the wrench (Tool 657) with the corresponding castellations on the nut.
- (e) Ensure the nut has a rundown torque of between 100 and 410 lbf in. (11,3 and 46,3 N.m) and torque-tighten it to 1560 lbf in. (176 N.m) plus the measured run-down torque figure.
- (f) Release and remove the wrench and holder.
- (7) Assemble the outer ring of roller bearing (02/1-430) and the selected adjusting plate (02/1-440) to the gearbox case at the location of the vertical bevel gear drive.

SUB-ASSEMBLY

**72-63-00**

Page 553

Mar 1/84

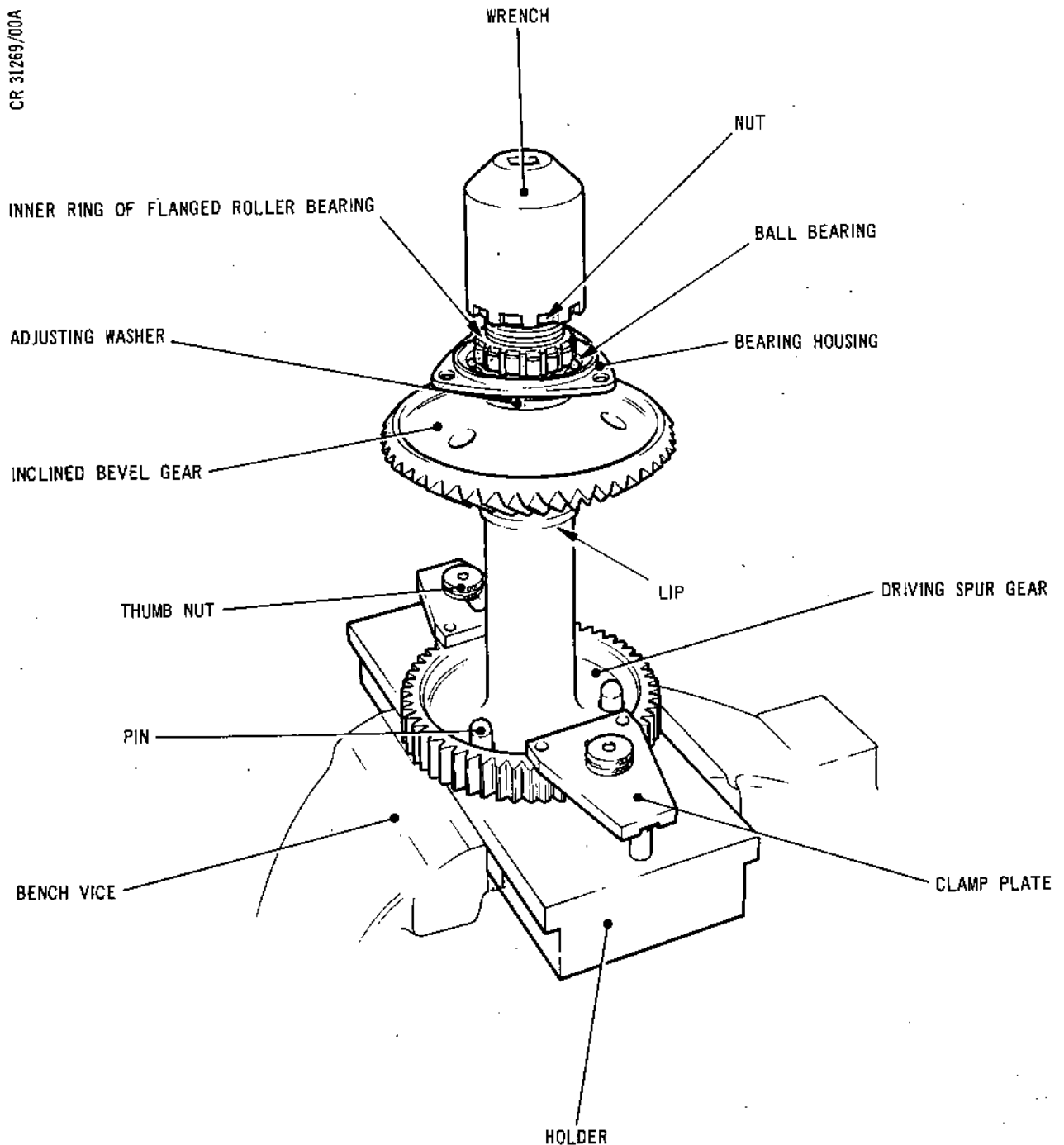


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31269/00A



TN16328

Tightening the Nut on the Vertical Bevel Gear Drive Shaft  
Figure 518

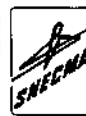
SUB-ASSEMBLY  
**72-63-00**  
Page 554  
Feb 2/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (8) Assemble the vertical bevel gear drive and the bearing assemblies into the adjusting washer and the outer ring, as assembled to the gearbox case. Secure all the assembled items with the three bolts (02/1-410). Ensure the bolts have a minimum locking torque of 3.5 lbf in. (0,4 N.m) and torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).

**NOTE:** Access to the bolts is gained through the aligned holes in the bevel and driving spur gears.

- (9) Position the immobilizer (Tool 965) on the vertical bevel gear drive shaft, locating the two jaws of the immobilizer with the oil transfer tube and the vertical bevel gear drive shaft, lock the two jaws together by locating the captive 'C' washer on the stud and lightly tightening the nut (Ref.Fig.519).
- (10) Using the support (Tool 648) and driver (Tool 649), assemble the inner ring of the flanged roller bearing (03/1-260) to the starter and IDG spur gear drive assembly (03/1-240).
- (a) Position the inner roller bearing ring into the support.
- (b) Locate the spur gear drive assembly (large spur gear wheel end) into the inner bearing ring and using the driver press the gear drive assembly into the inner ring. Ensure that the inner ring face abuts the step on the gear drive assembly.
- (11) Secure the bearing inner ring to the spur gear drive assembly with the keywasher (03/1-230) and nut (03/1-220), torque-tighten the nut with the wrench (Tool 653) and holder (Tool 654).
- (a) Position the holder into a bench vice.
- (b) Ensuring the correct engagement of the splines on the holder with the splines on the internal circumference of the drive assembly, locate the spur gear drive assembly (opposite end to that of the nut to be tightened) onto the holder.
- (c) Locate the lugs on the wrench with the corresponding castellations on the nut. Torque-tighten the nut to 130 lbf ft (176,0 N.m).

SUB-ASSEMBLY

**72-63-00**

Page 555

Mar 1/84

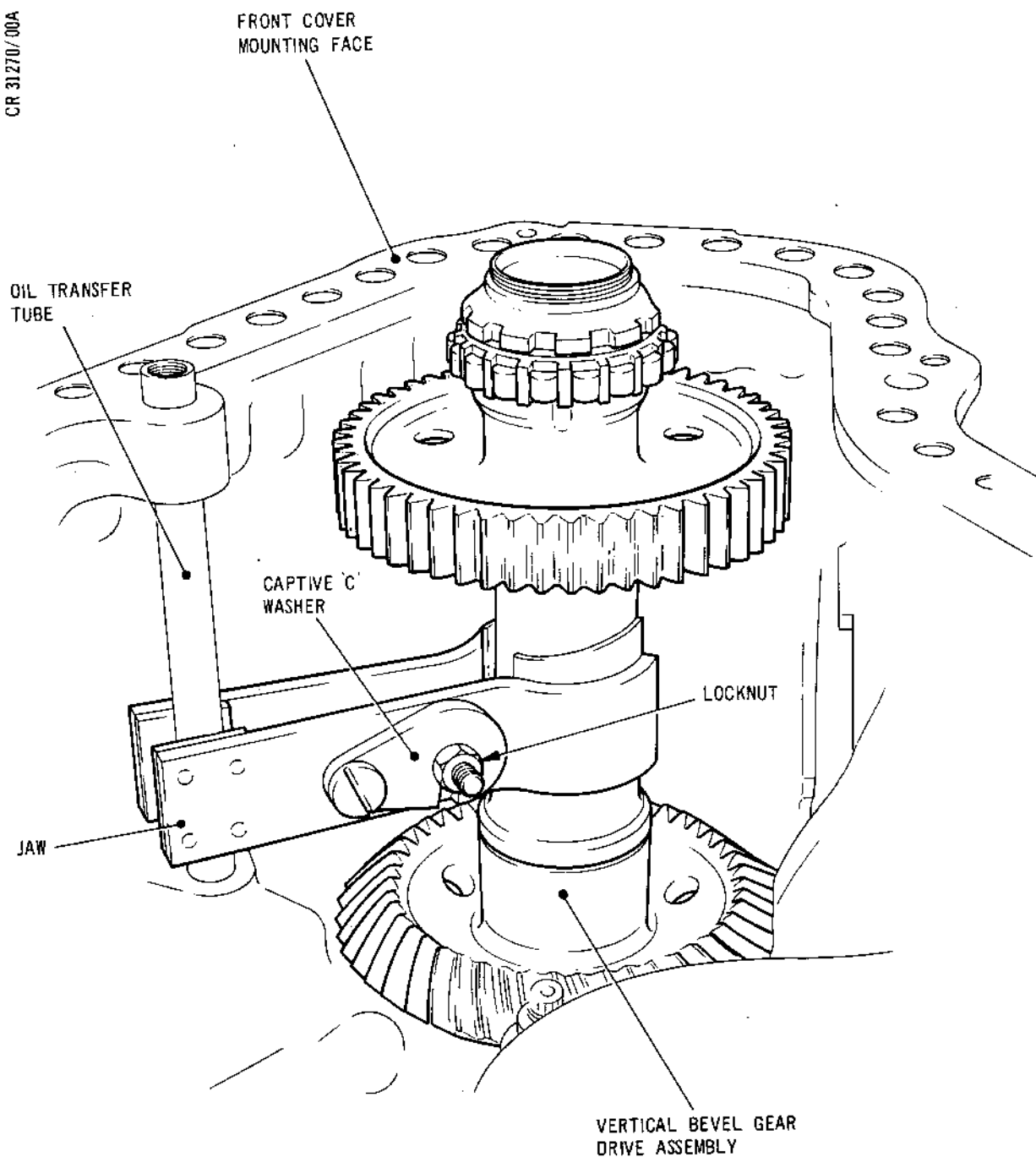


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31270/00A



TN16329

Assembly of Immobilizer to the Vertical Bevel Gear Drive Shaft  
Figure 519

SUB-ASSEMBLY

**72-63-00**

Page 556

Feb 2/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (d) Remove the wrench and holder.
- (e) Peen the keywasher into the nut at three locations, using a suitable radiused punch. If the keywasher has been peened previously, peening must be at least twice the width of one nut slot away.

V. Assemble the Inclined Bevel Gear Assembly to the Gearbox Case.

- (1) Assemble the inner ring of the flanged roller bearing (02/1-90), selected adjusting washer (02/1-100) and bearing housing assembly with its previously assembled items, (Ref. para.N.(10)) onto the inclined bevel gear (02/1-60) using the support (Tool 531) and the driver (Tool 532).
  - (a) With the teeth of the bevel gear located over the step in the support face position the gear on the support.
  - (b) Assemble the bearing inner ring and adjusting washer to the bevel gear shaft.
  - (c) Assemble the bearing housing to the bevel gear shaft as shown in Fig.520.
  - (d) Locate the driver on the inner ring of the roller bearing and press the assembly onto the shaft until the inner ring of the bearing abuts the step in the shaft.
- (2) Retain the inner bearing ring, adjusting washer and bevel gear to the bearing housing assembly with the slave nut (Tool 728).
  - (a) Position the immobilizer (Tool 536) in a bench vice.



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Position the bevel gear assembly into the immobilizer locating the bevel gear teeth with the teeth in the immobilizer and the three studs on the immobilizer with the corresponding holes in the bearing housing assembly. Retain the bearing housing assembly to the three studs with the three nuts (Tool 537).
- (c) Locate the lugs of the wrench (Tool 535) with the corresponding castellations in the slave nut and torque-tighten it to 170 lbf ft (230,5 N.m).
- (d) Unscrew the three nuts and remove the wrench and immobilizer.
- (3) Apply marking blue to the inclined bevel gear teeth.
- (4) Assemble the bearing housing/bevel gear assembly to the gearbox case at the inclined bevel gear drive location.
  - (a) On engines to SB.72-8689-272 standard, assemble a slave gasket (02/1A-310) to the bearing housing.
  - (b) Locate the assembly in the gearbox and engage the bearing housing headless pin with its location in the gearbox case.
- (5) Retain the bearing housing assembly to the gearbox case with six bolts (02/1-10) equi-spaced around the bearing housing assembly circumference. Lightly tighten the bolts.
- (6) Temporarily assemble the front cover to the gearbox.
  - (a) Assemble the three locating pins (Tools 526, 527 and 528) to the hollow pin locations in the gearbox front cover mounting face (Ref.Fig.530).
  - (b) Locate and screw the two captive bolts of the lifting fixture (Tool 1867) into the extraction holes in the front cover.

SUB-ASSEMBLY

72-63-00

Page 558

Sep 1/84



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (c) Attach a hoist to the fixture then raise and position the front cover above the gearbox case. Align the hollow pin holes in the front cover with the locating pins then lower the cover onto the pins. Release and remove the hoist.
- (d) Unscrew and remove the locating pins, then with the driver (Tool 766) assemble the three hollow pins (01/4-150) to the vacated positions.
- (e) Screw a bolt (01/4-140) through each hollow pin and lightly tighten to secure the front cover.
- W. Backlash Checks on Gear Assemblies and Bevel Gear Teeth Engagement.
- (1) Check the backlash between the inclined bevel gear and the vertical bevel gear with indicating fixture (Tool 714) (Fig.520).
- (a) Locate the fixed collar on the quill in the internal circumference of the bevel gear drive shaft.
- (b) Tighten the nut on the end of the fixture to withdraw the draw bolt and wedge, locking the quill in the internal circumference of the bevel gear drive shaft.

SUB-ASSEMBLY

72-63-00

Page 558A

Sep 1/84



OLYMPUS 593

MK.610-14-28  
OVERHAUL



This page left blank intentionally

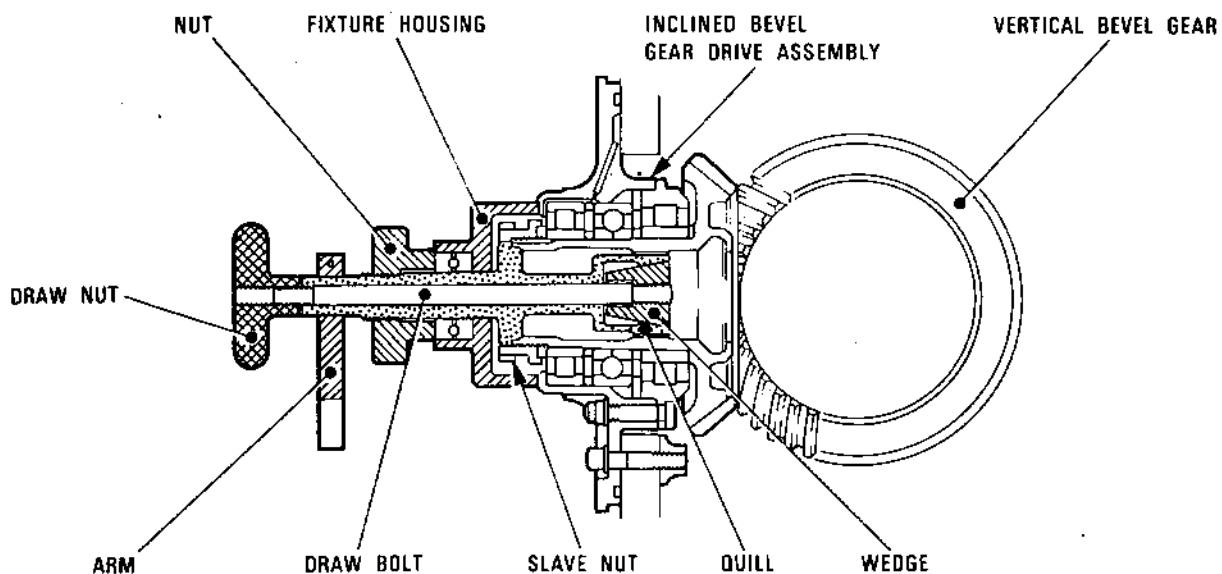
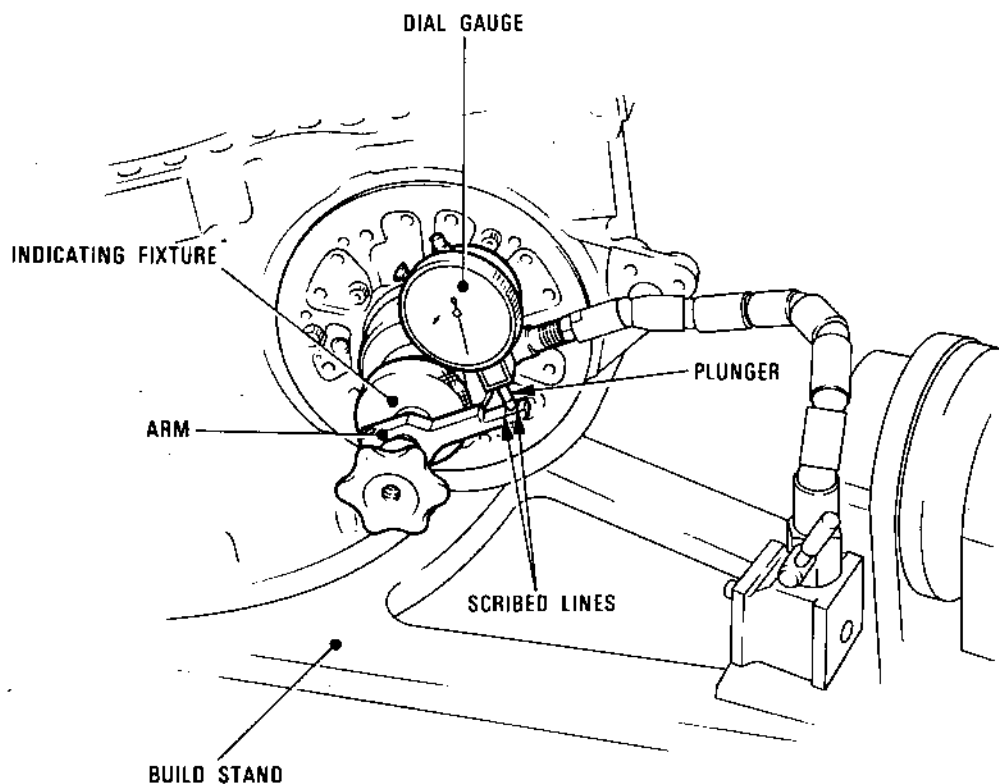


CR 31273/00A



OLYMPUS 593

MK. 610-14-28  
OVERHAUL



Checking Backlash between Inclined and Vertical Bevel Gears  
Figure 520

SUB-ASSEMBLY  
**72-63-00**

Page 559  
Feb 2/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (c) Position the fixture housing around the slave nut and tighten the large nut on the fixture stem, this takes up the end-float of the three bearings in the bearing housing assembly.
- (d) Attach the dial gauge to a suitable support assembly so that the plunger on the gauge is in contact with the arm on the fixture between the two scribed lines.
- (e) Set the dial gauge and read off the amount of backlash. For the desired amount of backlash refer to the Fits and Clearance Schedule 72-63-00 322.

NOTE: If the backlash is within the limits quoted remove the indicating fixture and gearbox front cover (Ref.W.(2)(j),(k)) then proceed to para.W.(4).

- (2) Insufficient backlash of main bevel gears.

NOTE: To rectify insufficient backlash reduce the thickness of the vertical bevel gear drive assembly adjusting washer (02/1-520), and the inclined bevel gear drive adjusting washer (02/1-100) an equal amount.

- (a) Release and remove the indicating fixture.
- (b) Release the six bolts securing the bearing housing/ inclined bevel gear to the gearbox case and remove the assembly from the gearbox case.
- (c) Assemble the bearing housing/inclined bevel gear into the immobilizer (Tool 536) (Ref.para.V.(2)(a) to (c)) and using wrench (Tool 535) remove the slave nut. Remove the bearing housing/ inclined bevel gear from the immobilizer.
- (d) Assemble the bearing housing/inclined bevel gear into the support (Tool 717) and, using the driver (Tool 716), press the inclined bevel gear, inner ring of roller bearing (02/1-90) adjusting washer (02/1-100) and one half of the inner ring of ball bearing (02/1-270) from the housing.

TN17967

SUB-ASSEMBLY

**72-63-00**

Page 560

Feb 2/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (e) Remove the two inner rings and the adjusting washer by locating the claws of the mechanical puller (Tool 723) under the inner ring of bearing (02/1-90), lock the claws by tightening the adjusting nut. Locate the pad into the internal circumference of the bevel gear drive and rotate the thrust screw and remove the inner rings and adjusting washer.
- (f) Assemble the inner ring of the ball bearing to its location in the bearing housing.
- (g) Assemble the inner ring of the roller bearing (02/1-90) and the adjusting washer (02/1-100) of the correct (amended) thickness to the bevel gear with driver (Tool 532) and support (Tool 531).
- (h) Assemble the retaining slave nut to the bevel gear (Ref. para.V.(2)(a) to (c)).
- (j) Unscrew the three bolts (01/4-140) securing the front cover to the gearbox case. Insert the quill of the mechanical puller (Tool 715), into the hollow pins, tighten the spindle and, by unscrewing the extractor screw, withdraw the pins from the gearbox case and the front cover.
- (k) Screw the three locating pins (Tool 526, 527, 528) into the holes vacated by the hollow pins and using pullers (Tool 1668) withdraw the front cover. Remove the pullers, attach the lifting fixture (Tool 1867) to the cover and using a hoist remove the front cover from the gearbox.
- (l) Unscrew the three bolts (02/1-410) securing the vertical bevel gear drive bearing assembly to the gearbox case at the location of the strainer housing.
- (m) Unscrew the nut on the immobilizer (Tool 965) disengage the captive 'C' washer from the stud and remove the immobilizer then remove the bevel gear drive/bearing assemblies from the gearbox.
- (n) Remove the nut (02/1-420) (bevel gear end) with the wrench (Tool 657) and holder (Tool 658) (Ref. para.U.(5) (a) to (d)).

SUB-ASSEMBLY

**72-63-00**

Page 561

Feb 2/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (p) Remove the adjusting washer (02/1-520), ball bearing (02/1-500), inner ring and rollers of the roller bearing (02/1-430) and bearing housing (02/1-510) from the vertical bevel gear drive assembly by locating the three claws of the mechanical puller (Tool 736) under the bearing assemblies, locking them by tightening the locking nut. Locate the pad in the internal circumference of the vertical bevel gear drive assembly and operate the thrust screw.
  - (q) Re-assemble the adjusting washer (02/1-520) of the correct (amended) thickness, bearing housing (02/1-510), the ball bearing (02/1-500) and the inner ring of the roller bearing (02/1-430) to the vertical bevel gear drive assembly, retain with the nut (02/1-420) (Ref. para. U(4)(a) and (b) (5)(a) to (f)).
  - (r) Assemble the vertical bevel gear drive assembly to the gearbox case (Ref. para. U(6) and (7)).
  - (s) Assemble the immobilizer (Tool 965) (Ref. para. U(8)).
  - (t) Temporarily assemble the front cover to the gearbox case (Ref. para. V.(6)).
  - (u) Assemble the inclined bevel gear drive/bearing housing to the gearbox case (Ref. para. V.(4) and (5)).
  - (v) Recheck backlash; refer to para. W.(1).
- (3) Excessive backlash.
- NOTE: To rectify excessive backlash increase the thickness of the vertical bevel gear drive assembly, adjusting washer (02/1-520) and the inclined bevel gear drive adjusting washer (02/1-100) an equal amount.
- (a) Refer to para. W.(2) for procedure on removal and assembly of bevel gear drives.
- (4) Assemble the starter IDG spur gear drive into the previously installed flanged ball bearing (03/1-190) in the gearbox case (Ref. Fig. 521).
- (a) Support the spur gear drive assembly in the gearbox, on the centre line relative to its final location in the gearbox.

TN3694

SUB-ASSEMBLY

72-63-00

Page 562

Feb 2/76



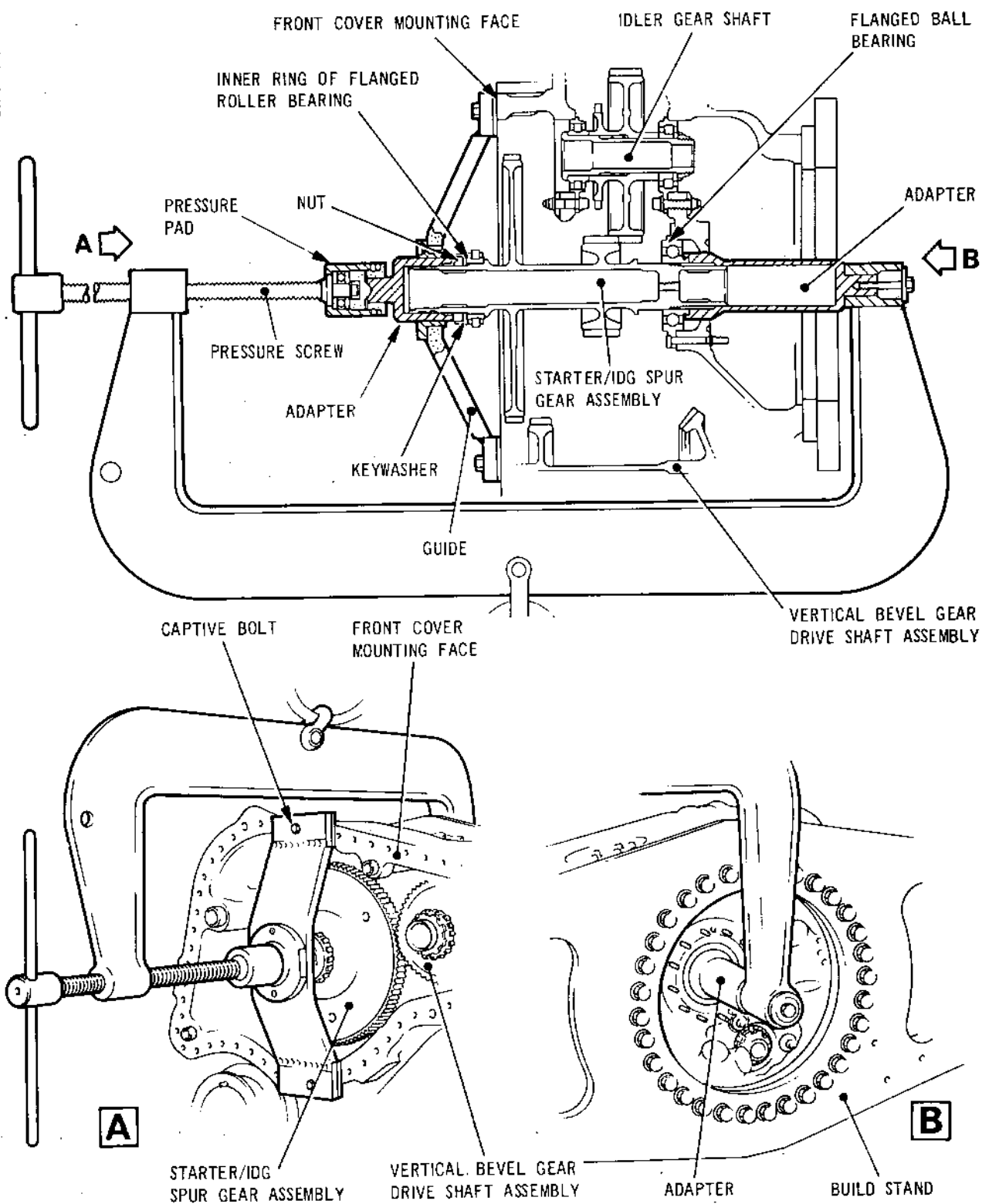
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31271/00A

PRINTED IN ENGLAND



Assembly of the Starter/IDG Spur Gear  
Figure 521

SUB-ASSEMBLY  
**72-63-00**

Page 563  
Feb 2/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Assemble the guide (Tool 719) to the front cover mounting face on the gearbox case and secure with the two captive bolts.
  - (c) Insert the adapter (Tool 720) through the bush in the guide and locate it to the spur gear drive assembly.
  - (d) Insert the adapter (Tool 721) into its location in the mechanical driver (Tool 718), secure it to the mechanical driver with the washer and bolt.
  - (e) Position the mechanical driver to the gearbox case locating the adapter (Tool 721) into the location of the IDG spur gear shaft support bearing, and the pressure pad on the mechanical driver onto the adapter (Tool 720).
  - (f) Screw in the pressure screw on the mechanical driver and press the spur gear drive assembly into its location in the gearbox. Ensure that the spur gear teeth engage correctly with their corresponding teeth on the driving spur gear (vertical bevel gear drive shaft) and the idler gear, by turning both shafts to align them.
  - (g) Unscrew the pressure screw and remove the mechanical driver and adapters. Unscrew the two captive bolts and remove the guide.
- (5) Assemble the keywasher (03/1-150) and nut (03/1-140) to the IDG end of the spur gear drive assembly.
- (6) Secure the nut to the spur gear drive assembly by tightening it with wrench (Tool 670) and immobilizer (Tool 669) (Ref.Fig.522).
- (a) Locate the splined spigot on the immobilizer with the corresponding splines on the internal circumference of the starter end of the spur gear drive shaft. Secure the immobilizer to the front cover mounting face with the two captive bolts.
  - (b) Locate the lugs on the wrench with the corresponding castellations on the nut.
  - (c) Torque-tighten the nut to 110 lbf ft (149,0 N.m).
  - (d) Unscrew the captive bolts and remove the immobilizer and the wrench from the gearbox.

NOTE: Do not peen the keywasher at this stage in the gearbox build.

SUB-ASSEMBLY  
**72-63-00**  
Page 564  
Feb 2/76

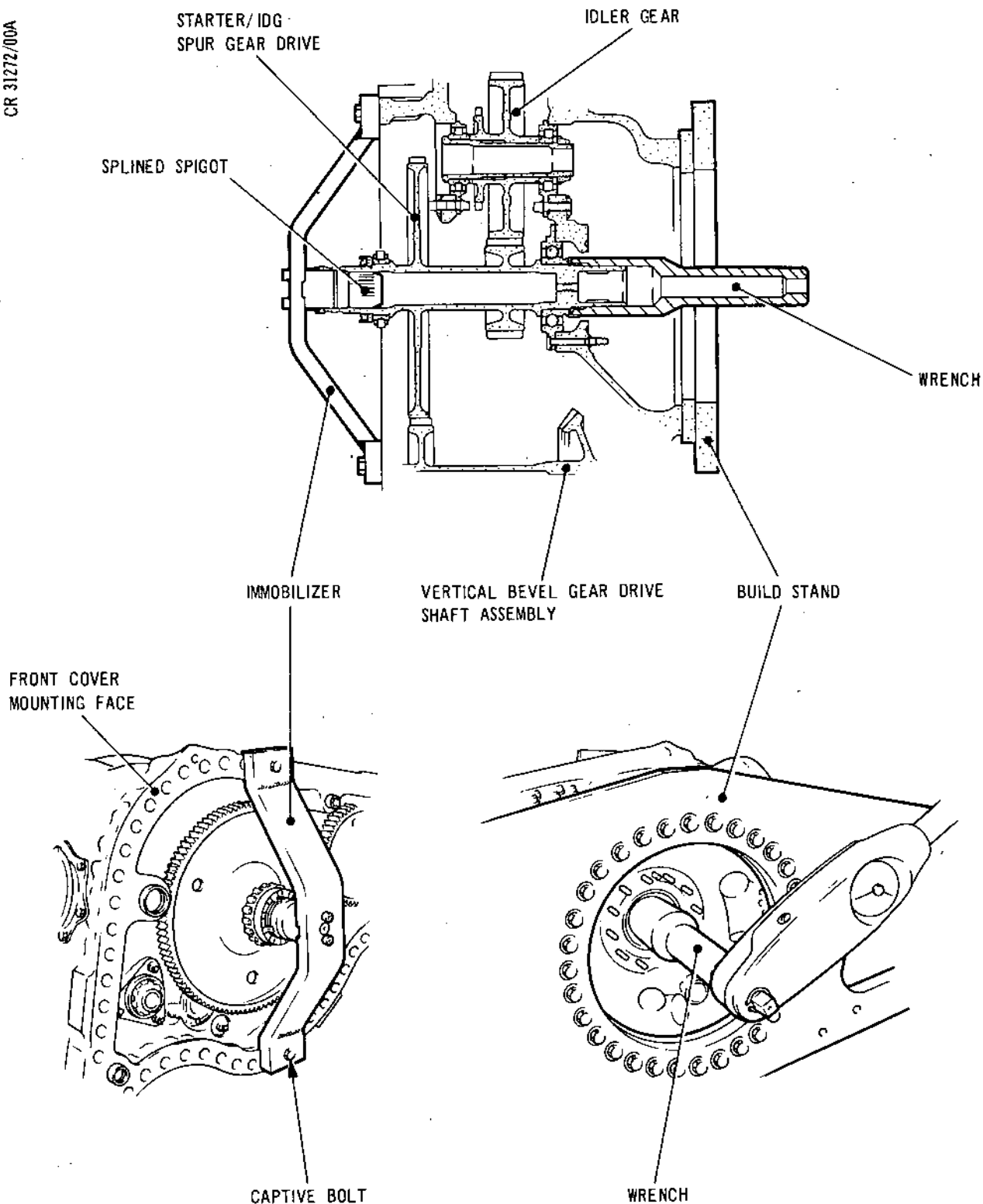
IN3695

CR 31272/00A



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Tightening the Retaining Nut on the Starter/IDG Spur Gear  
Figure 522

SUB-ASSEMBLY  
**72-63-00**



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (7) Assemble the front cover (Ref.para.V.(6)).
- (8) Check the backlash between the starter/IDG spur gear drive and the vertical bevel gear drive assembly with the indicating fixture (Tool 711) (Ref.Fig.523).

NOTE: On an assembly using new spur gears the backlash check is an audible rattle check between the contacting teeth of the two gear wheels.

- (a) Locate the quill in the internal circumference of the starter/IDG spur gear drive at the starter location on the spur gear drive.
- (b) Tighten the nut on the end of the fixture to withdraw the draw bolt and wedge, locking the quill into the starter/IDG spur gear drive.
- (c) Assemble the adapter (Tool 748) to two of the front cover securing bolt locations close to the starter/IDG spur gear drive retain with two captive bolts. Assemble the dial indicator to the adapter so that the plunger on the gauge is in contact with the arm on the fixture between the two scribed lines.
- (d) Set the dial gauge and read off the amount of backlash. For the desired amount of backlash refer to the Fits and Clearance Schedule 72-63-00 338.

NOTE: If the backlash is not within the specified limits, one or both of the spur gears must be renewed.

- (e) Unscrew the nut on the fixture, release the wedge and remove the fixture.
- (9) Check the backlash between the standby/main hydraulic pumps spur gear drive and the idler spur gear with the indicating fixture (Tool 726), and immobilizer (Tool 712) (Ref.Fig.524).

NOTE: On an assembly using new spur gears the backlash check is an audible rattle check between the contacting teeth of the two gear wheels.

- (a) Locate the quill of the indicating fixture in the spur gear drive at the location of the main hydraulic pump mounting adapter.

FN3696



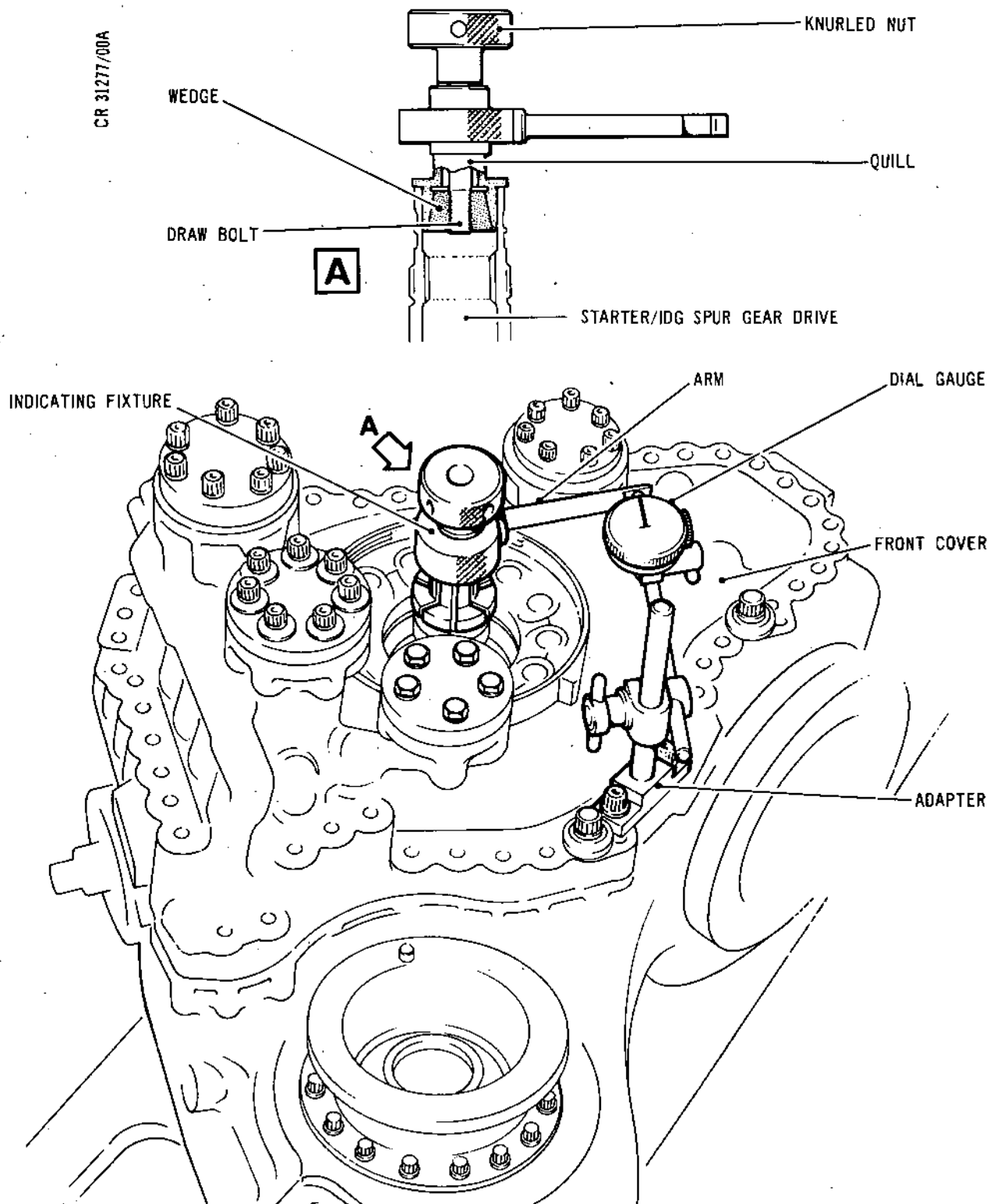


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31277/00A



Checking Backlash between Starter/IDG Spur Gear and  
Vertical Bevel Gear Drive Assembly  
Figure 523

SUB-ASSEMBLY  
**72-63-00**

Page 567  
Feb 2/76

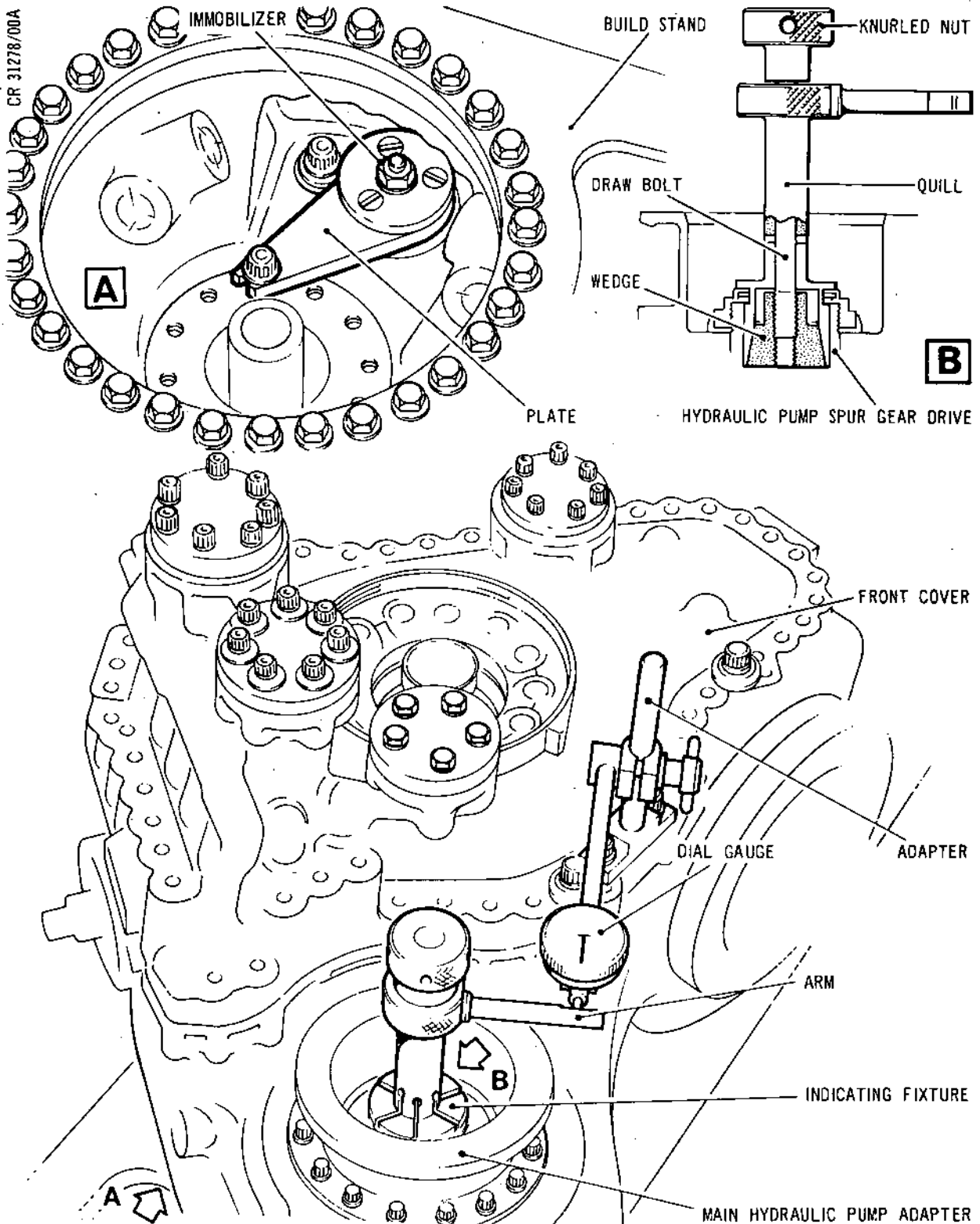


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31278/00A



Checking Backlash between the Hydraulic Pumps Spur  
Gear Drive and Idler Spur Gear  
Figure 524

SUB-ASSEMBLY  
**72-63-00**

Page 568  
Feb 2/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Tighten the nut on the end of the fixture to withdraw the draw bolt and wedge, locking the quill into the main/standby hydraulic pumps spur gear drive.
- (c) Assemble the adapter (Tool 748) to the front cover and secure with the two captive bolts, assemble the dial gauge so that the plunger on the gauge is in contact with the arm on the fixture between the two scribed lines.
- (d) Insert the quill of the immobilizer (Tool 712) into the idler gear shaft as viewed through the location of the IDG mounting position, engage the slot on the plate with one of the IDG shaft support bearing retaining bolts.
- (e) Tighten the nut on the end of the immobilizer to withdraw the draw bolt and wedge, locking the quill into the idler shaft.
- (f) Set the dial gauge and read off the amount of backlash. For the desired amount of backlash refer to the Fits and Clearance Schedule 72-63-00 348.
- (g) Unscrew the nut on the fixture, release the wedge and remove the fixture. Unscrew the two captive bolts and remove the adapter and dial gauge.

NOTE: The immobilizer (Tool 712) is not removed at this stage in the procedure.

NOTE: If the backlash is not within the specified limits, one or both of the spur gears must be renewed.

- (10) Check the backlash between the starter/IDG spur gear drive and the idler gear with the indicating fixture (Tool 725) (Ref.Fig.525).

NOTE: On an assembly using new spur gears the backlash check is an audible rattle check between the contacting teeth of the two gear wheels.

- (a) Insert the quill of the indicating fixture into the starter/IDG spur gear drive at the location of the starter mounting position in the gearbox case.

SUB-ASSEMBLY

**72-63-00**

Page 569

Feb 2/76

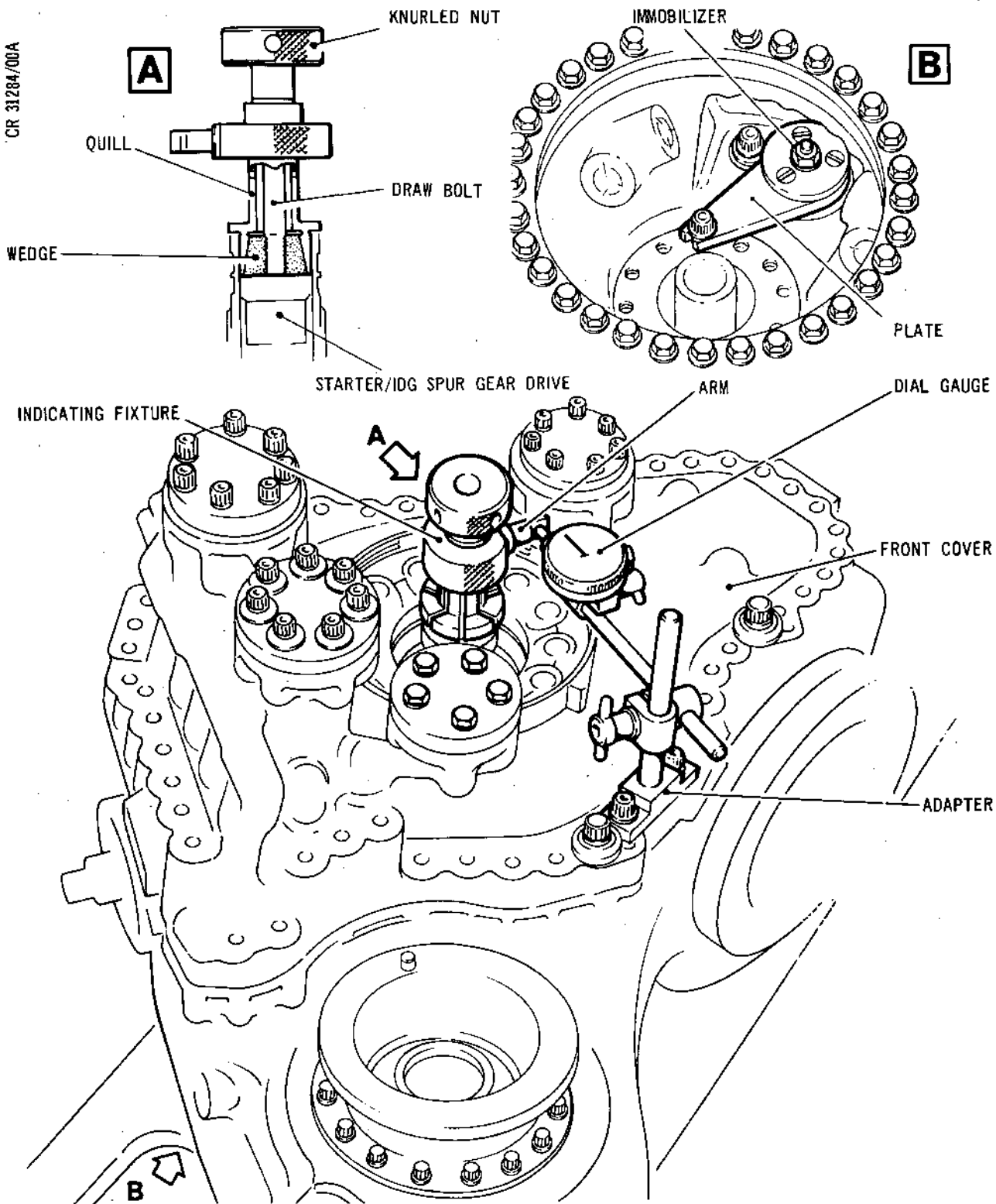


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31284/00A



Checking Backlash between Starter/IDG Spur Gear and  
Idler Spur Gear  
Figure 525

SUB-ASSEMBLY  
**72-63-00**

Page 570  
Feb 2/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Tighten the nut on the end of the fixture to withdraw the draw bolt and wedge, locking the quill into the starter/IDG spur gear drive.
- (c) Assemble the adapter (Tool 748) to the two front cover securing bolt locations which do not contain bolts, secure the adapter to the gearbox with the two captive bolts. Assemble the dial gauge to the adapter so that the plunger on the gauge is in contact with the arm on the fixture between the two scribed lines.
- (d) Set the dial gauge and read off the amount of backlash. For the desired amount of backlash refer to the Fits and Clearance Schedule 72-63-00 342.

NOTE: If the backlash is not within the specified limits, one or both of the spur gears must be renewed.

- (e) Unscrew the nut on the fixture, release the wedge and remove the fixture.
- (11) Remove the front cover (Ref.paras.(2)(j) and (k)).

NOTE: The immobilizer (Tool 712) is not removed at this stage in the procedure.

- (12) Check the backlash between the oil pump drive spur gear and idler gear with the indicating fixture (Tool 713) (Ref.Fig.526).

NOTE: On an assembly using new spur gears the backlash check is an audible rattle check between the contacting teeth of the two gear wheels.

- (a) Insert the quill of the fixture into the internal circumference of the oil pump drive spur gear at the location of the retaining nut.
- (b) Tighten the nut on the end of the fixture to withdraw the draw bolt and wedge, locking the quill into the spur gear.

PRINTED IN ENGLAND

TN3698

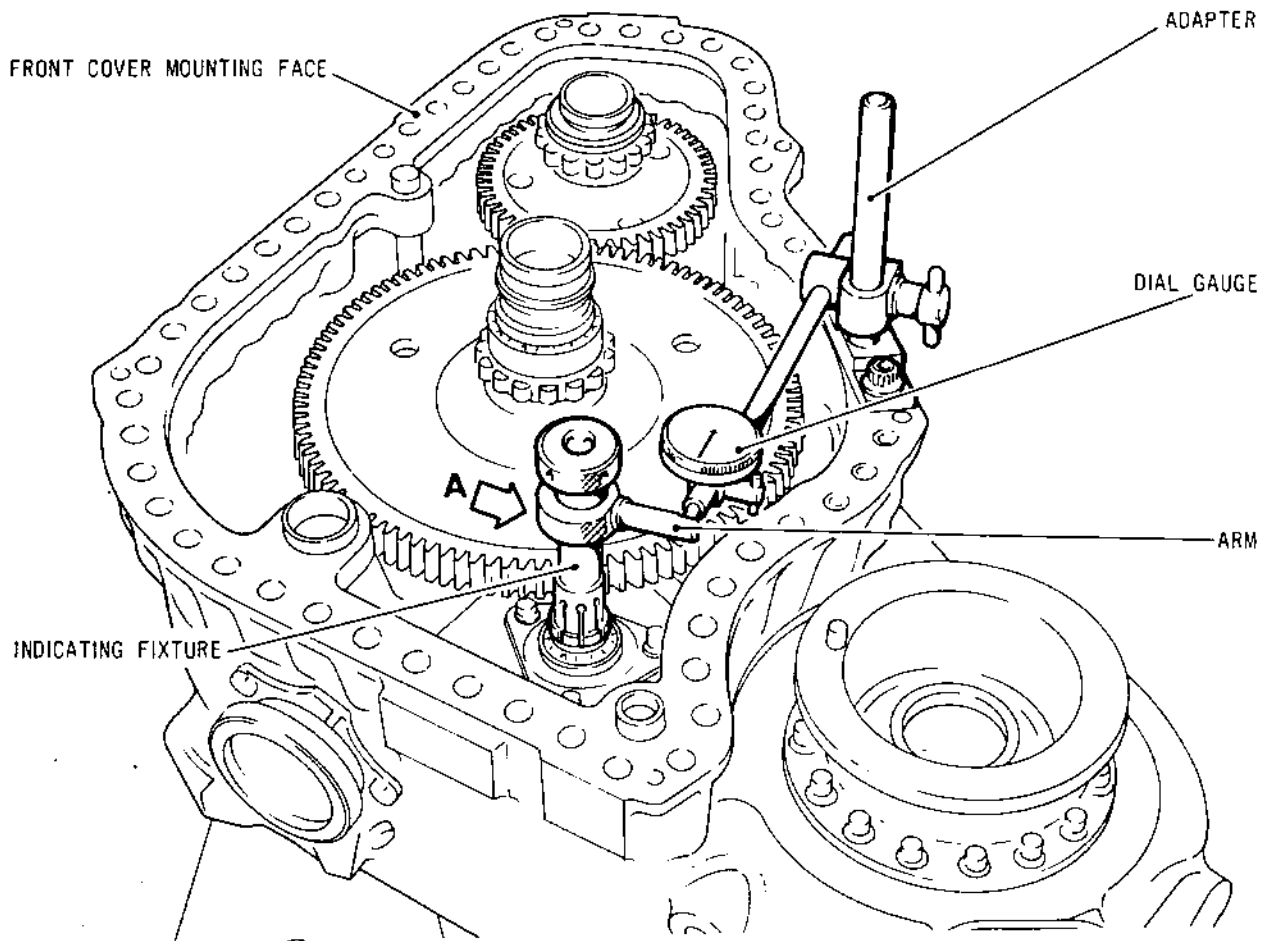
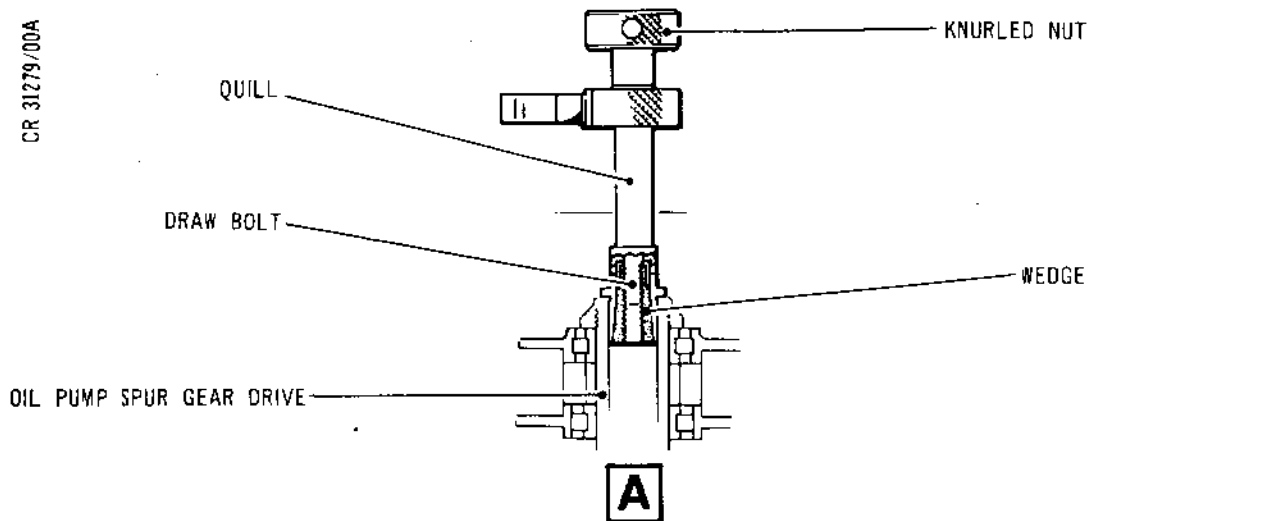


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31279/00A



Checking Backlash between Oil Pump Drive Spur  
Gear and Idler Spur Gear  
Figure 526

SUB-ASSEMBLY  
**72-63-00**

Page 572  
Feb 2/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) Position the adapter (Tool 748) to two of the front cover securing bolt locations, retain with two captive bolts. Assemble the dial gauge to the adapter so that the plunger on the gauge is in contact with the arm on the fixture between the two scribed lines.
- (d) Set the dial gauge and read off the amount of backlash. For the desired amount of backlash refer to the Fits and Clearance Schedule 72-63-00 388.

NOTE: If the backlash is not within the specified limits, one or both of the spur gears must be renewed.

- (e) Unscrew the nut on the indicating fixture, release the wedge and remove the fixture. Unscrew the two captive bolts and remove the adapter and dial gauge.
  - (f) Unscrew and remove the nut securing the immobilizer (Tool 712) to the IDG support bearing location, release the wedge and remove the immobilizer.
- (13) Assemble the immobilizer (Tool 669) and wrench (Tool 670) to the starter/IDG spur gear drive (Ref. para.U.(6)(a)(b) and (d)) and remove the nut (03/1-140) and the keywasher (03/1-150) from the spur gear drive.
- (14) Remove the starter/IDG spur gear drive from the ball bearing (03/1-190) using the mechanical puller (Tool 724) (Ref.Fig.527).
- (a) Locate the three claws of the puller to the lip on the ball bearing outer ring, as viewed through the IDG mounting location in the gearbox.
  - (b) Lock the claws into their location by tightening the adjusting nut on the puller.
  - (c) Screw in the thrust screw, ensure the pad is located in the internal circumference of the spur gear drive and press the spur gear drive out of the ball bearing.
  - (d) Remove the spur gear drive from the gearbox.
  - (e) Unlock the three claws and remove the mechanical puller.

SUB-ASSEMBLY

**72-63-00**

Page 573

Feb 2/76

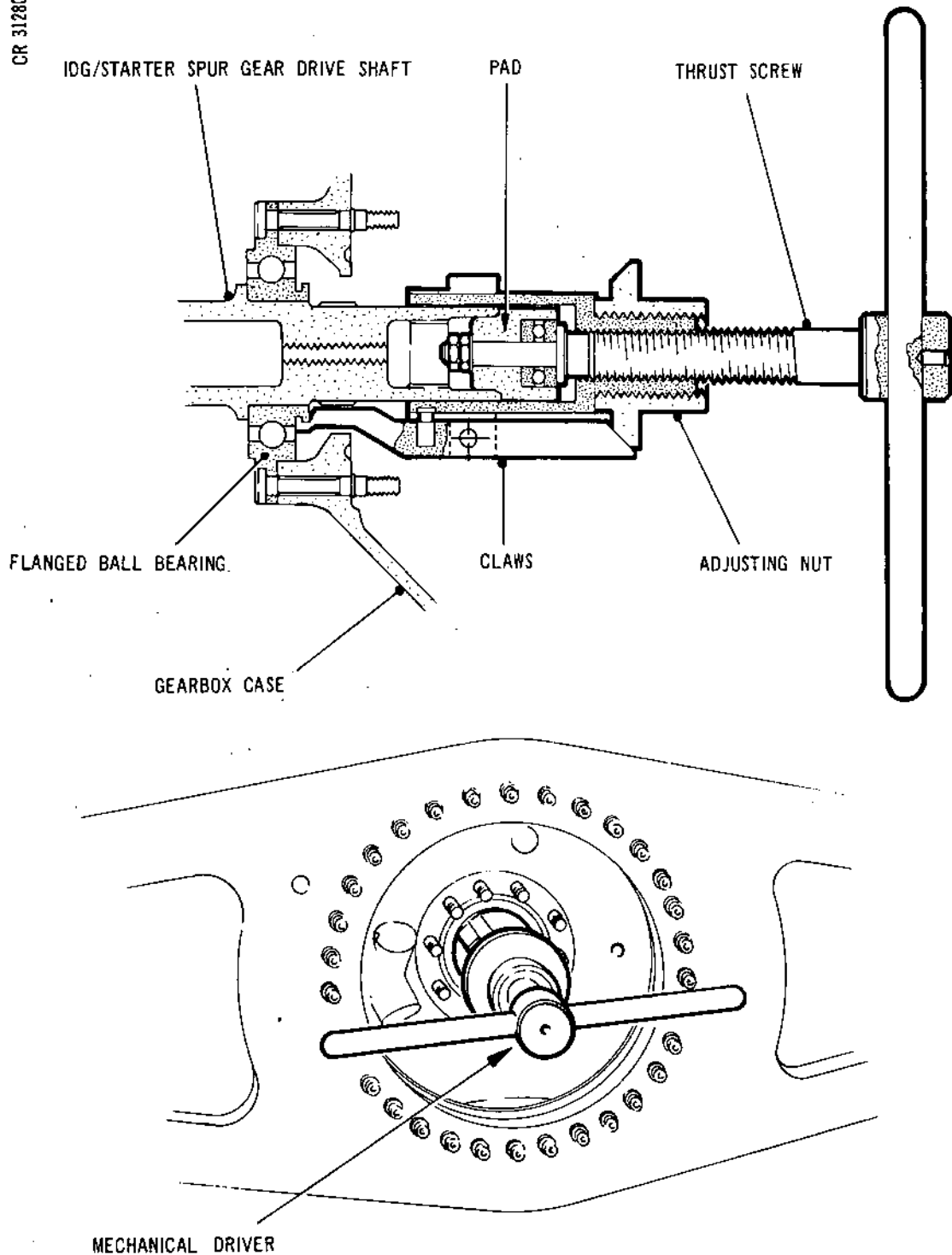


OLYMPUS 593

MK.610-14-28  
OVERHAUL.



CR 31280/00A



Removing the Starter/IDG Spur Gear Drive Shaft  
Figure 527

SUB-ASSEMBLY  
**72-63-00**

Page 574  
Feb 2/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



(f) Remove the immobilizer (Tool 965) from the vertical bevel gear drive shaft.

(15) Temporarily assemble the front cover to the gearbox case (Ref.paras.V.(6)).

(16) Rotate the inclined bevel gear drive in both directions to obtain the blue marking on the engaging teeth.

(17) Check the engagement of the bevel gear teeth.

NOTE: Following any adjustment for bevel gear teeth engagement, a backlash check must be carried out to ensure the backlash remains correct. If satisfactory teeth engagement cannot be achieved then one or both bevel gears must be renewed.

NOTE: Refer to paras.W.(2)(a) to (r) for the removal and installation of the bevel gear drive assemblies.

(a) Visually examine both sides of the bevel gear teeth to ensure satisfactory engagement; refer to Fig.528 for the indication of the correct engagement.

NOTE: The engagement will be towards the toes, allowing for central engagement under normal running conditions.

(b) Remove all the traces of the marking blue from the bevel gears.

NOTE: If the correct engagement of the teeth is achieved proceed to para.W.(18).

(c) If the engagement of the teeth varies from the toe to the heel, reposition the gears in relation to each other by engaging a high point on one gear with a low point on the other.

(d) If the engagement of the teeth is on the toes withdraw both of the bevel gears out of engagement by decreasing the inclined bevel gear adjusting washer (02/l-100) thickness and increasing the vertical bevel gear adjusting washer (02/l-520) thickness equal amounts.

SUB-ASSEMBLY

**72-63-00**

Page 575

Feb 2/76

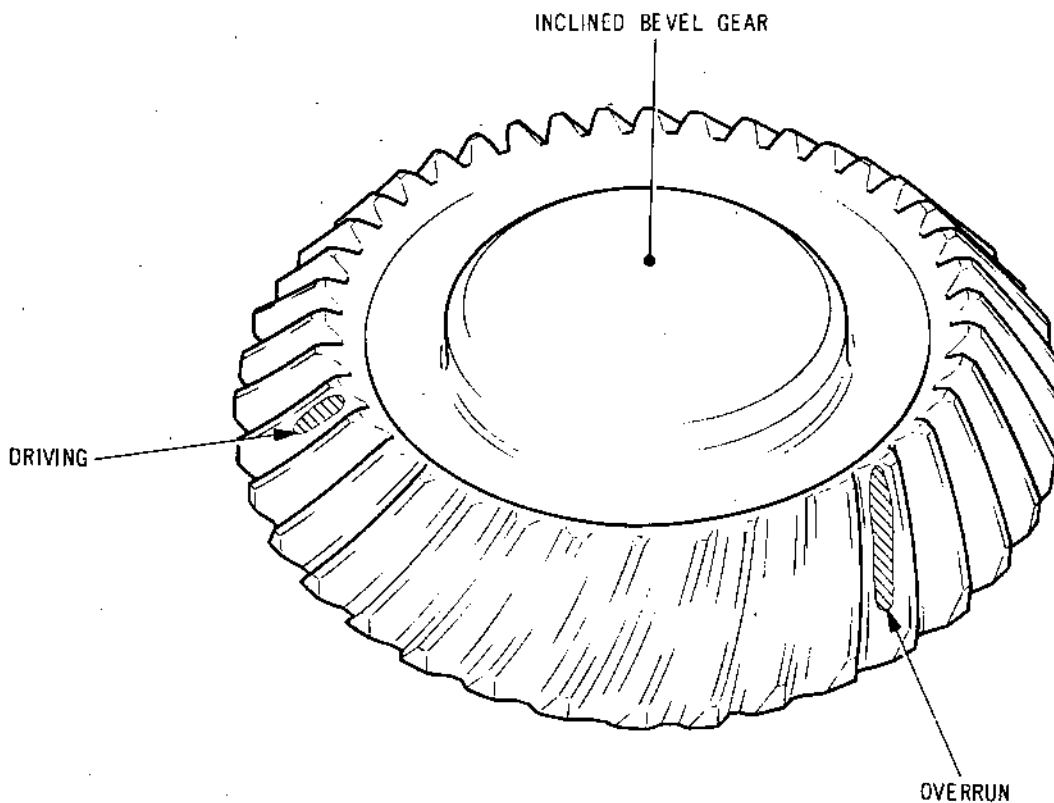
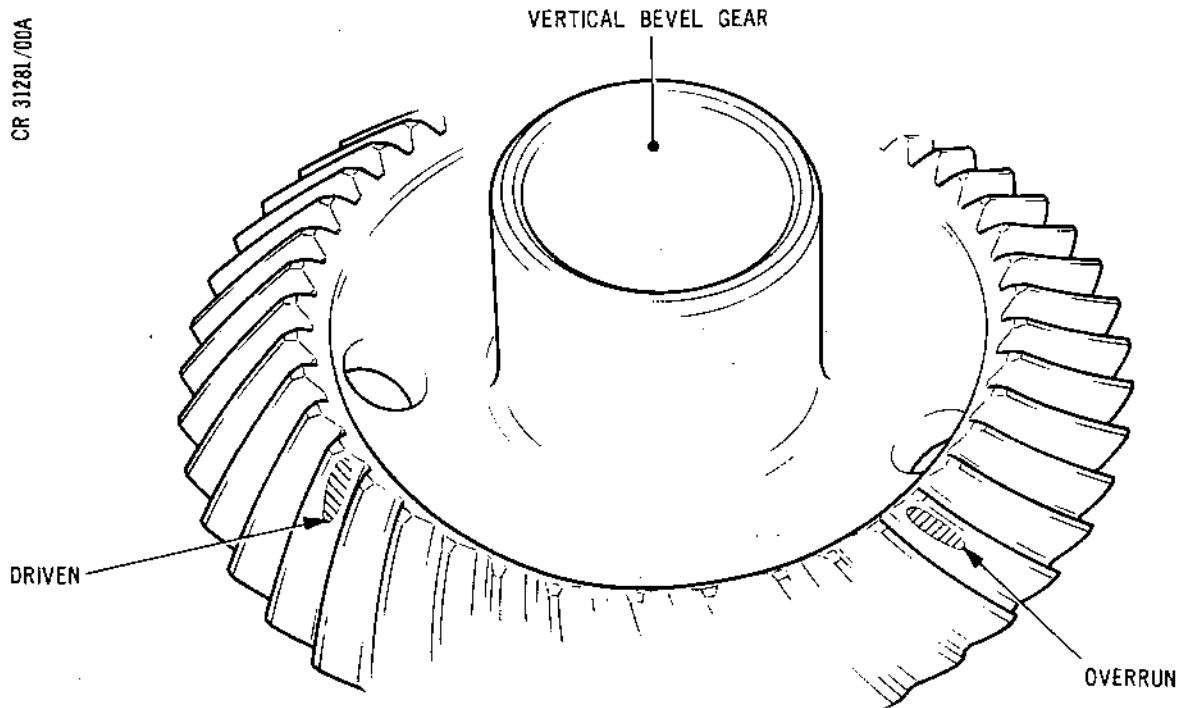


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31281/00A



Correct Bevel Gear Teeth Engagement  
Figure 528

SUB-ASSEMBLY  
**72-63-00**

Page 576  
Feb 2/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (e) If the engagement of the teeth is on the heels, increase the engagement of the bevel gears by increasing the inclined bevel gear adjusting washer thickness and decreasing the vertical bevel gear adjusting washer thickness equal amounts.
- (f) If the engagement of the teeth on one gear is towards the tip (addendum) that gear must be withdrawn and the other gear inserted an equal amount.
- (g) If the engagement of the teeth on one gear is towards the root (dedendum) that gear must be inserted and the other gear withdrawn an equal amount.
- (18) Assemble the starter/IDG spur gear drive assembly into the previously installed ball bearing (03/1-190) in the gearbox case (Ref. para.W.(4), (5) and (6).
- (19) Peen the keywasher (03/1-150) (IDG end) as assembled to the starter/IDG spur gear drive (Ref.Fig.529).
- (a) Assemble the guide (Tool 719) to the front cover mounting face on the gearbox case. Using the two captive bolts, lightly tightened, secure the guide to the face.
- (b) Insert the adapter (Tool 720) through the bush in the guide and locate it to the spur gear drive.
- (c) Insert the peening tool (Tool 786) into its location in the mechanical driver (Tool 718), retain with the washer and bolt.
- (d) Assemble the mechanical driver to the gearbox case, locating the pressure pad on the mechanical driver to the adapter (Tool 720) and the peening tool around the protruding spur gear drive, ensuring that the sprung locator on the peening tool is positioned in one of the 10 detents in the nut (03/1-140).
- (e) Screw in the pressure screw until resistance is felt, then screw in approx. two and one half turns.

SUB-ASSEMBLY

**72-63-00**

Page 577  
Feb 2/76

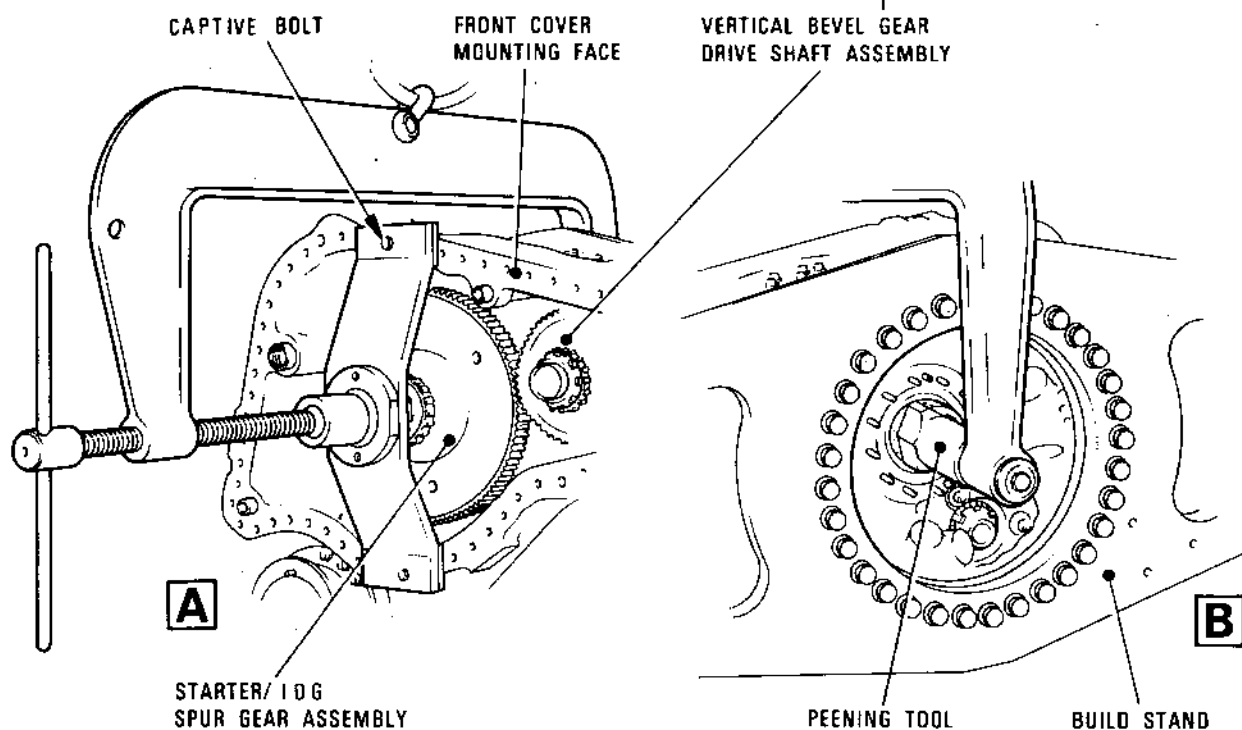
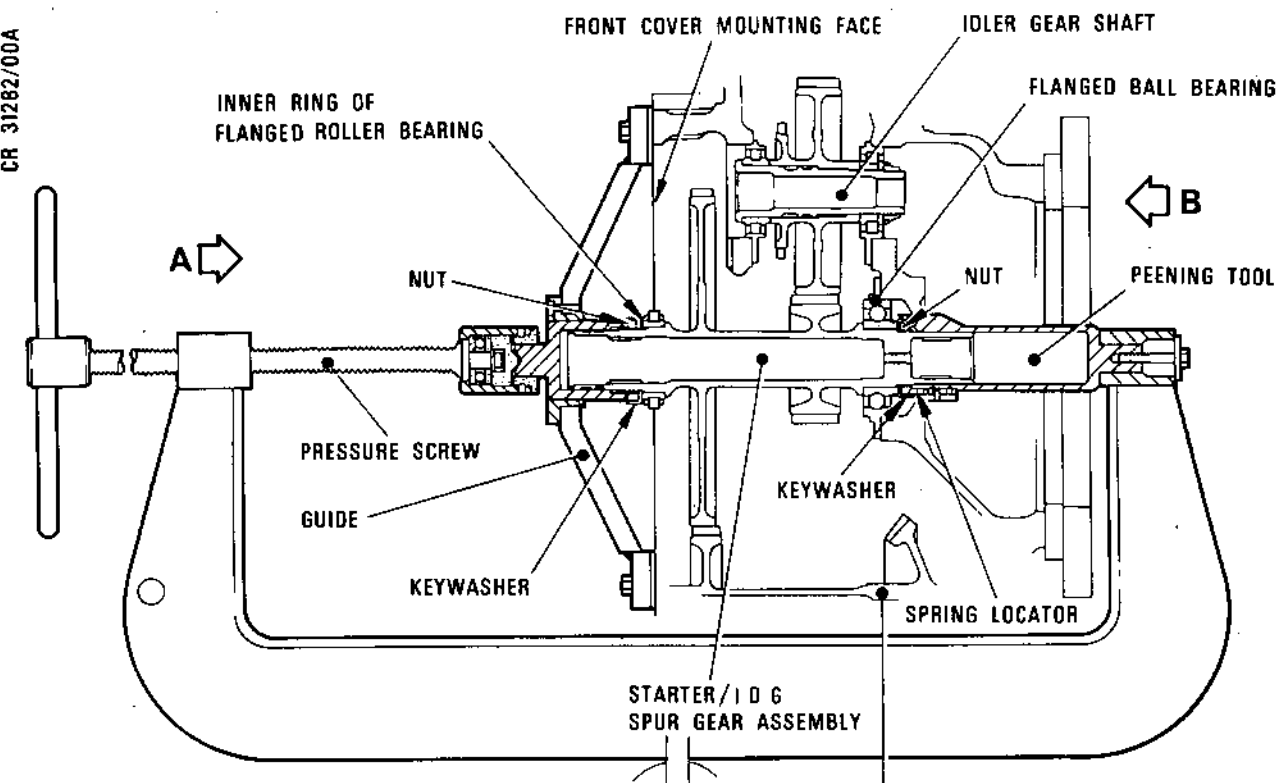


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31282/00A



Peening of Keywasher on Starter/IDG Spur  
Gear Drive Shaft  
Figure 529

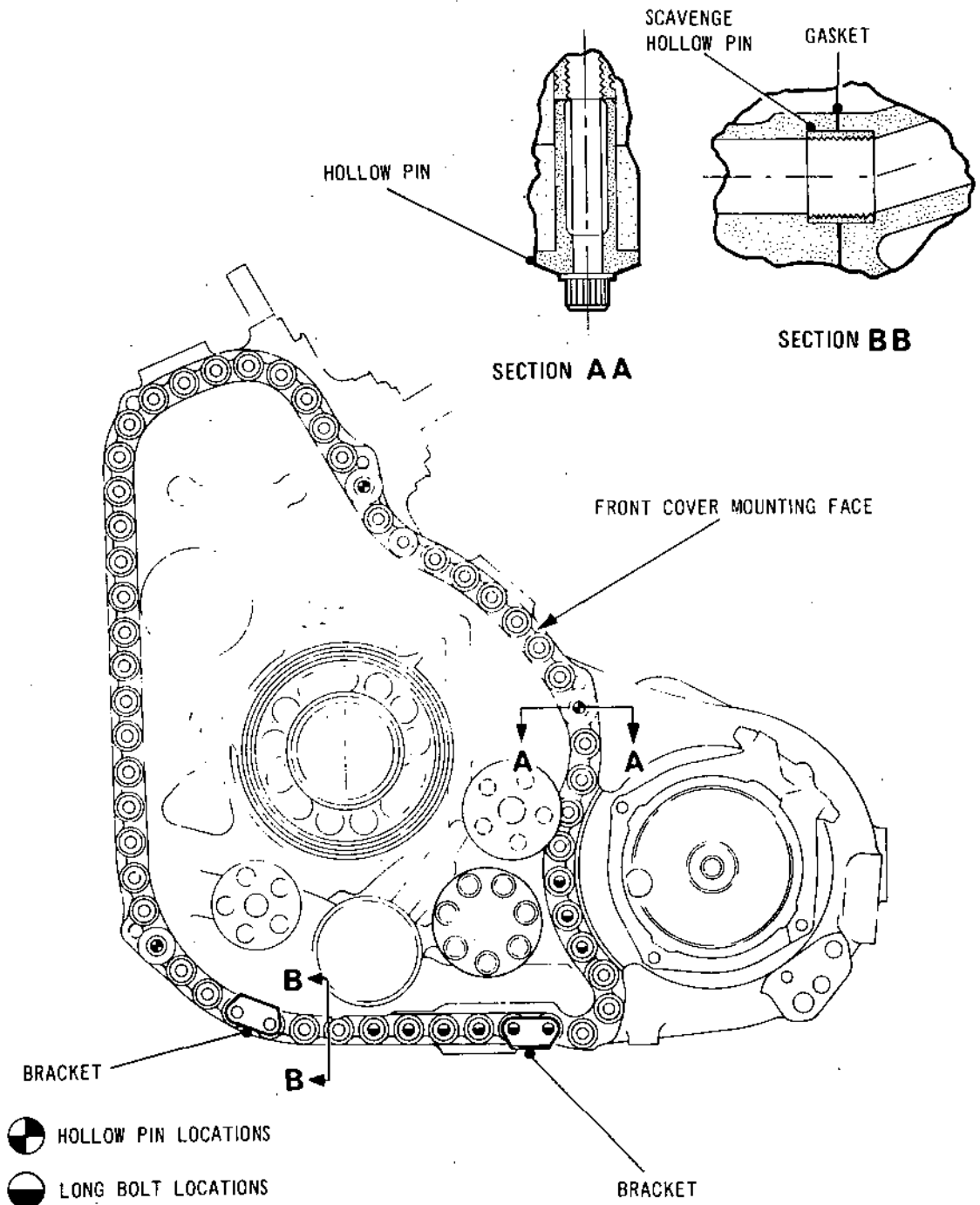
SUB-ASSEMBLY  
**72-63-00**

Page 578  
Feb 2/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Assembly of Gearbox Front Cover  
Figure 530



OLYMPUS 598

MK.610-14-28

OVERHAUL



- (f) Unscrew the pressure screw and remove the mechanical driver, peening tool and the adapter. Unscrew the captive bolts and remove the guide.
- (20) Assemble the two ring seals (03/1-30) to the two grooves in the splined shaft (03/1-40).
- (21) Assemble the splined shaft/ring seals to the location in the end of the starter/IDG spur gear drive as viewed from the IDG mounting location, refer to Fig.531.
- (22) Assemble the retaining sleeve (03/1-20) into the splined shaft and retain the sleeve and the splined shaft to the spur gear drive assembly with the bolt (03/1-10). Ensure the bolt has a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten between 67 and 73 lbf in. (7,6 and 8,3 N.m).
- (23) Assemble the front cover to the gearbox case (Ref.Fig.530).
- (a) Assemble the gasket (01/4-380) to the hollow pin (01/9-140) at the front cover mounting face on the gearbox case.
- (b) Assemble the gasket (01/4-310) to the gearbox front cover mounting face.
- (c) Assemble the locating pins (Tools 526, 527 and 528) to the hollow pin locations in the gearbox case.
- (d) Locate and screw the two captive bolts of the lifting fixture (Tool 1867) into the extraction holes in the front cover.
- (e) Attach a hoist to the fixture then raise and position the front cover above the gearbox case. Align the hollow pin holes in the front cover with the locating pins then lower the cover onto the pins. Release and remove the hoist.
- (f) Remove the locating pins and to the vacated positions assemble the three hollow pins (01/4-150) with the driver (Tool 766).
- (g) Insert a bolt (01/4-140) into each hollow pin and secure the front cover to the gearbox case.

TN3702

SUB-ASSEMBLY

**72-63-00**

Page 580

Feb 2/76



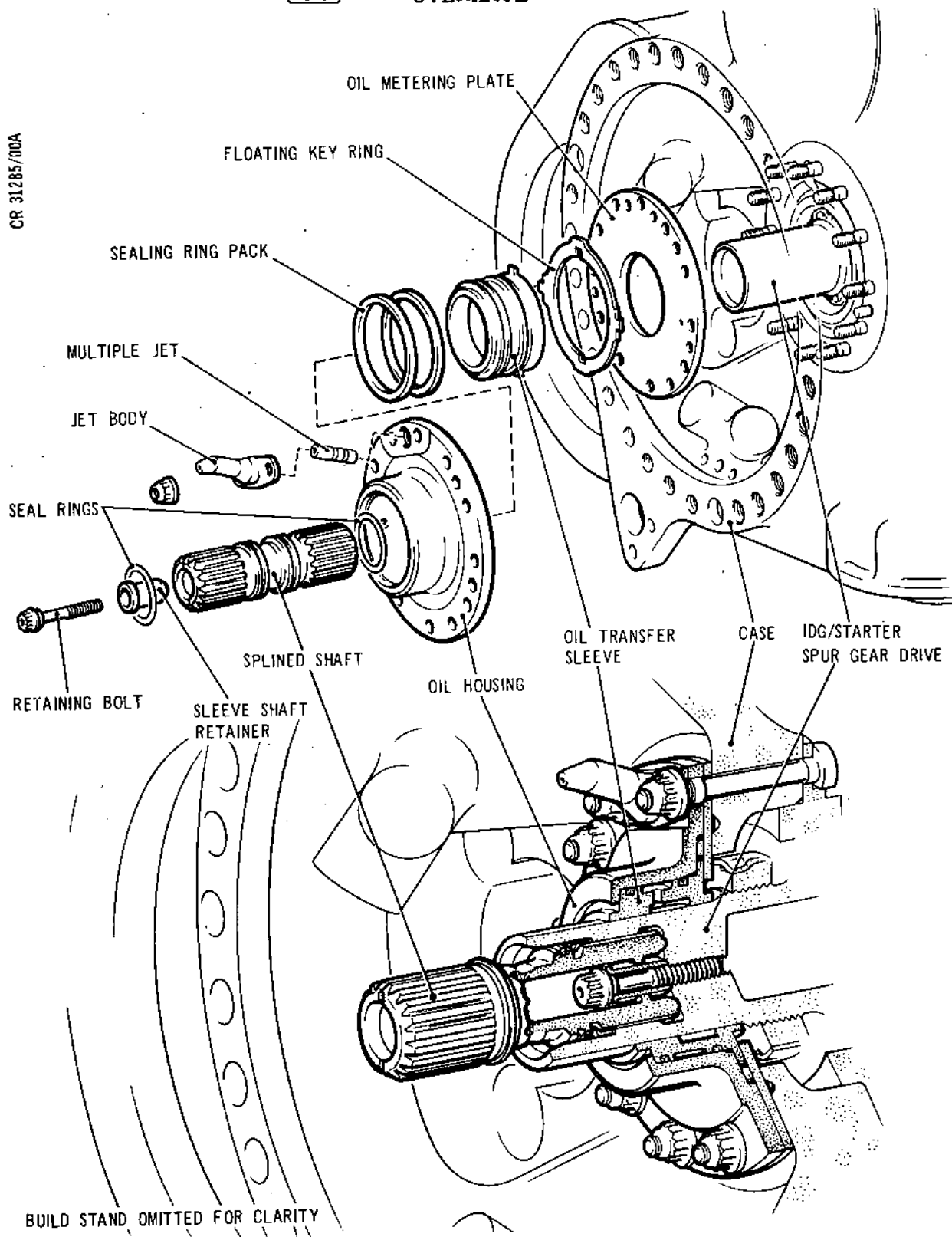
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 31285/00A



Oil Transfer Assembly  
Figure 531

SUB-ASSEMBLY  
**72-63-00**

Page 581  
Feb 2/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (h) Assemble the nine long bolts (01/4-120) nine washers (01/4-130) and bracket (01/4-290) to their appropriate positions then assemble the remaining 44 bolts (01/4-100) 44 washers (01/4-110) and bracket (01/4-280). Ensure all 56 bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten between 90 and 100 lbf in. (10,2 and 11,3 N.m).
- X. Assemble the Oil Transfer Assembly and the Seal Ring to the Gearbox (Ref.Fig.531).
- (1) Assemble the two sealing rings (03/1-100) to the grooves in the oil transfer sleeve (03/1-110).
  - (2) Assemble the sleeve and the floating keyring (03/1-90) to the oil housing (03/1-80), ensuring that the lugs and cutaways on the keyring align with the corresponding lugs and cutaways on the sleeve and housing.
  - (3) Assemble the oil metering plate (03/1-120) to the location around the starter/IDG spur gear drive, as viewed through the IDG mounting location. Locate the 12 holes in the metering plate to the 12 D-headed bolts protruding through the IDG gear shaft support mounting face and the two smaller holes in the metering plate with the two headless pins.
  - (4) Assemble the oil transfer ring/floating keyring/oil housing to abut the metering plate and locate the oil housing on the 12 bolts and two headless pins.
  - (5) Assemble the multiple jet (03/1-70) to the jet body (03/1-60).
  - (6) Assemble the multiple jet/jet body to the recess in the oil housing, locating the jet body on the two bolts.
  - (7) Retain the jet body and the oil housing to the gearbox case with 12 nuts (03/1-50). Ensure the nuts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten between 67 and 73 lbf in. (7,6 and 8,3 N.m).
  - (8) Using a 0.0015 in. (0,0381 mm) feeler gauge check that the mating faces of the oil housing and metering plate are in full contact.

TN3703





# OLYMPUS 593



MK.610-14-28 *shecma*  
OVERHAUL

- (9) Assemble the sealing ring (03/1-210) to the groove in the internal circumference of the starter/IDG spur gear drive, starter end. Retain the sealing ring in the groove with the retaining ring (03/1-200).

**Y. Assemble the Coupling Shaft and Bearing Housing Assembly.**

- (1) Unscrew and remove the six bolts (02/1-10) retaining the bearing housing/inclined bevel gear to the gearbox case. Remove the bearing housing/inclined bevel gear.
- (2) Remove the slave nut (Tool 728) from the inclined bevel gear.
  - (a) Position the immobilizer (Tool 536) in a bench vice.
  - (b) Position the bevel gear assembly into the immobilizer locating the bevel gear teeth with the teeth in the immobilizer and the three studs on the immobilizer with the corresponding holes in the bearing housing assembly. Retain the bearing housing assembly to the three studs with the three nuts (Tool 537).
  - (c) Locate the 10 lugs of the wrench (Tool 535) with the corresponding castellation in the slave nut, unscrew and remove the nut.
  - (d) Unscrew the three nuts (Tool 537) and remove the wrench and the immobilizer.
- (3) Assemble the coupling shaft/spacer sleeve (02/1-40, 50) to the inclined bevel gear.
- (4) Assemble the keywasher (02/1-30) and the nut (02/1-20) retaining the inclined bevel gear, and the coupling shaft/spacer sleeve.
  - (a) Position the immobilizer (Tool 536) in a bench vice.



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (b) Position the bevel gear assembly into the immobilizer, locate the bevel gear teeth with the teeth in the immobilizer and the three studs on the immobilizer with the corresponding holes in the bearing housing assembly. Retain the bearing housing assembly to the three studs with the three nuts (Tool 537).
  - (c) Locate the 10 lugs of the wrench (Tool 535) with the corresponding castellations in the nut. Torque-tighten the nut to 170 lbf ft (230 N.m).
  - (d) Unscrew the three nuts (Tool 537) and remove the wrench and the immobilizer.
- (5) Using the peening tool (Tool 1708) peen the keywasher.
- (6) Install flexible coupling shaft and bearing housing assembly (Ref.Fig.533).
- (a) Assemble six headed pins (01/10A-28) to their locations in the bearing housing.
  - (b) Assemble gasket (02/1A-310) to the bearing housing.
  - (c) Assemble 18 bolts (01/10A-27) to the outer row of holes in the bearing housing, then locate the assembly in the gearbox and with the headless pin aligned with its location, engage the bevel gears.
  - (d) Secure the bearing housing to the gearbox with 12 bolts (02/1A-15) and six bolts (02/1A-10) with lubricant 'A' applied. Ensure that each bolt has a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m) then torque-tighten to 100 lbf in. (11,3 N.m).

SUB-ASSEMBLY

72-63-00

Page 584

Sep 30/94



OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

Printed in England

FIGURE 532 DELETED

SUB-ASSEMBLY

**72-63-00**

Page 585

Sep 30/94



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

Left blank intentionally

SUB-ASSEMBLY

**72-63-00**

Page 586

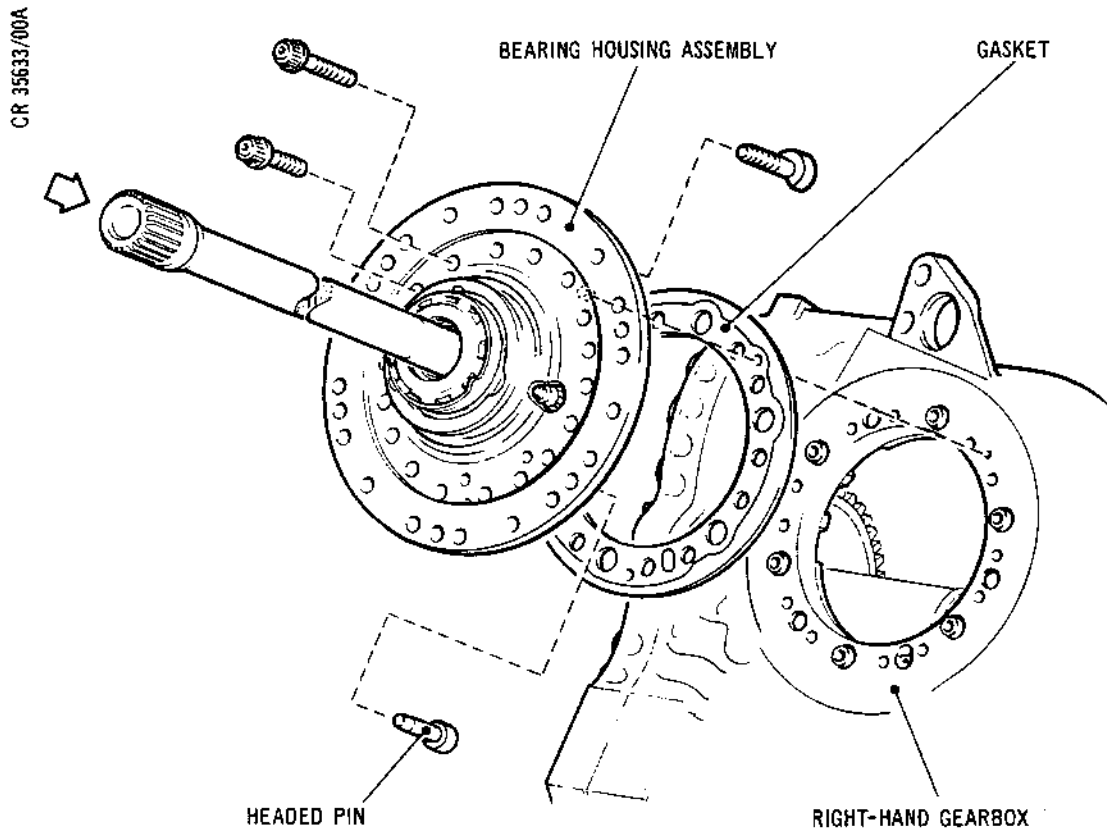
Sep 30/94







OLYMPUS 593

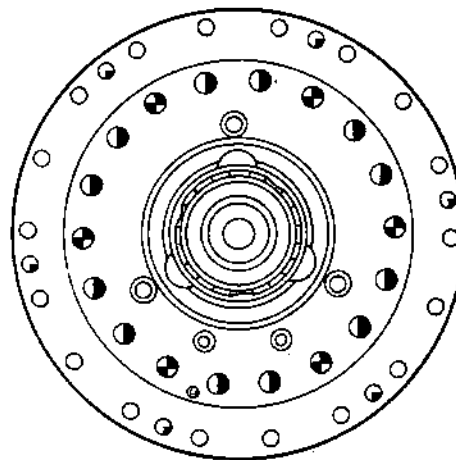


PRINTED IN ENGLAND



IPC REF

-  72-63-02/1A-10B
-  72-63-02/1A-15
-  72-63-01/10A-28
-  72-63-01/10A-27



VIEW IN DIRECTION OF ARROW

Installation of Bearing Housing Assembly (SB.72-8689-272)  
Figure 533

TN6734

SUB-ASSEMBLY  
**72-63-00**

Page 587  
Sep 1/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



2. Assemble the IDG QAD Coupling Ring Assembly and the Mounting Bracket.

- (1) Remove the gearbox from the build stand to a suitable workbench, using lifting fixture (Tool 795), lifting fixture (Tool 827), lifting adapter (Tool 793), lifting adapter (Tool 794) and a suitable lifting mechanism (Ref.Fig.534).
  - (a) Assemble and secure the lifting adapter (Tool 794) to its location on the gearbox case close to the main and stand-by hydraulic pump mounting locations.
  - (b) Assemble and secure the lifting adapter (Tool 793) to its location on the gearbox case close to the inclined bevel gear drive assembly mounting location.
  - (c) Assemble the lifting fixture (Tool 827) to the centre of the top slot in the lifting fixture (Tool 795) and secure the two fixtures together with the captive bolt, washer and nut.
  - (d) Attach a hoist to the lifting fixture and position the fixture close to the adapters assembled to the gearbox case. Ensure the lifting plate with the locking pin and fulcrum pin (part of fixture (Tool 795)) is next to the adapter (Tool 793). Unscrew and remove the locking pin. Screw both fulcrum pins into their respective adapters then screw in the locking pin.
  - (e) Raise the hoist so as to take up the weight of the gearbox. Unscrew the 32 captive bolts securing the gearbox case to the build stand (Tool 494) then remove the gearbox from the stand.
  - (f) Position the gearbox above a suitable work surface. Hold the gearbox, to prevent rotation, then remove the locking pin and rotate the gearbox 90 degrees to gain access to the IDG mounting face. Lower the hoist and position the gearbox on the work surface.

NOTE: The lifting equipment must be left attached to the gearbox.

IN3707

SUB-ASSEMBLY  
**72-63-00**

Page 588  
Sep 1/80



OLYMPUS 593

MK.610-14-28

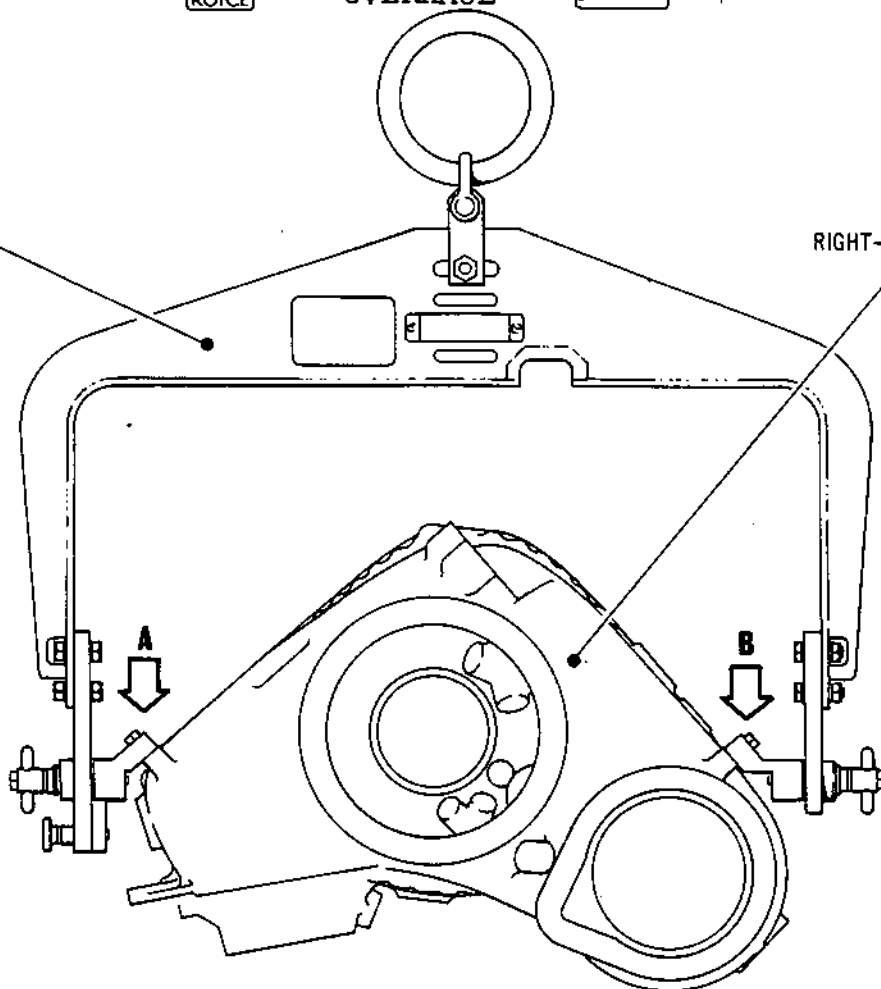
OVERHAUL



CR 31286/DDA

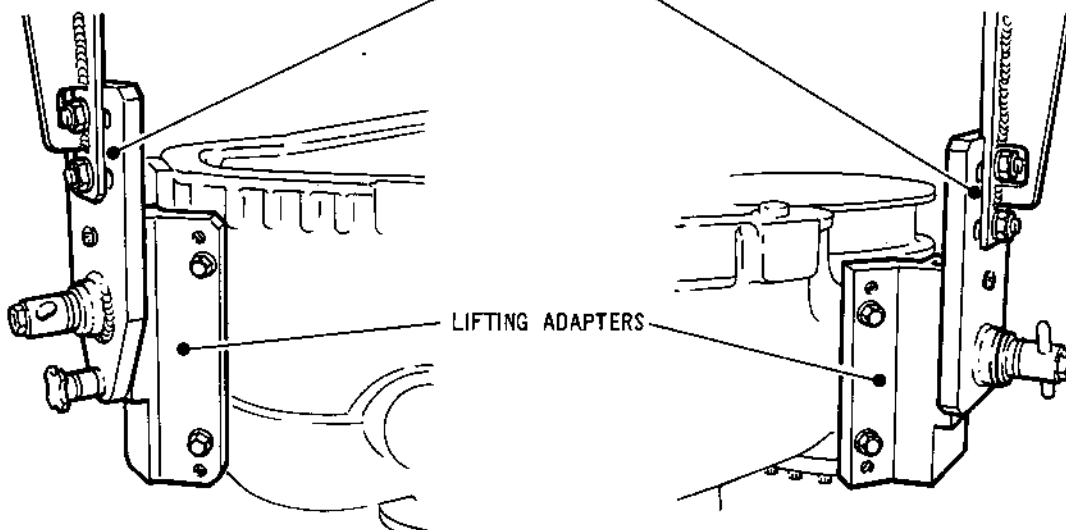
LIFTING FIXTURE

RIGHT-HAND GEARBOX



LIFTING FIXTURE

LIFTING ADAPTERS



**A**

**B**

Lifting the Gearbox  
Figure 534

SUB-ASSEMBLY  
**72-63-00**

Page 589  
Sep 1/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Assemble the plain flange (01/8-60) to the coupling ring (01/8-80) (Ref.Fig.535).

NOTE: If difficulty is experienced in assembling the plain flange to the coupling ring/gearbox case, incorporate SB.72-118.

- (3) Assemble the flange/coupling ring to the IDG assembly location on the gearbox case, interpose the gasket (01/8-70) between the mating faces of the flange and the gearbox case. Align the three eccentric holes in the flange with the three larger holes in the gasket and gearbox case.
- (4) Assemble the three hollow pins (01/8-50) to the flange, secure the flange to the case using the 32 bolts (01/8-40). Ensure the bolts have a minimum locking (run-down) torque of 3-5 lbf in. (0,4 N.m). Torque-tighten to 100 lbf in. (11,5 N.m).
- (5) Assemble the mounting bracket (01/8-160) to the location in the gearbox case close to the IDG mounting location. Locate the boss on the bracket to the hole in the gearbox case and align the two retaining bolt holes in the bracket with the corresponding holes in the gearbox case.
- (6) Assemble the bracket (01/8-170) to the rear of the location on the gearbox case to which the mounting bracket is assembled.
- (7) Insert the two bolts (01/8-150) through the holes in the mounting bracket, gearbox case mounting location, and bracket. Assemble the two load spreading washers (01/8-140) and nuts (01/8-130) to the bolts. Ensure the nuts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m). Torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (8) Assemble the spherical washer (01/8-20) to the locking bolt (01/8-10). Insert the spherical washer/bolt through the mounting bracket and engage the threads in the coupling ring, temporarily tighten the bolt.

TN3708





# OLYMPUS 593

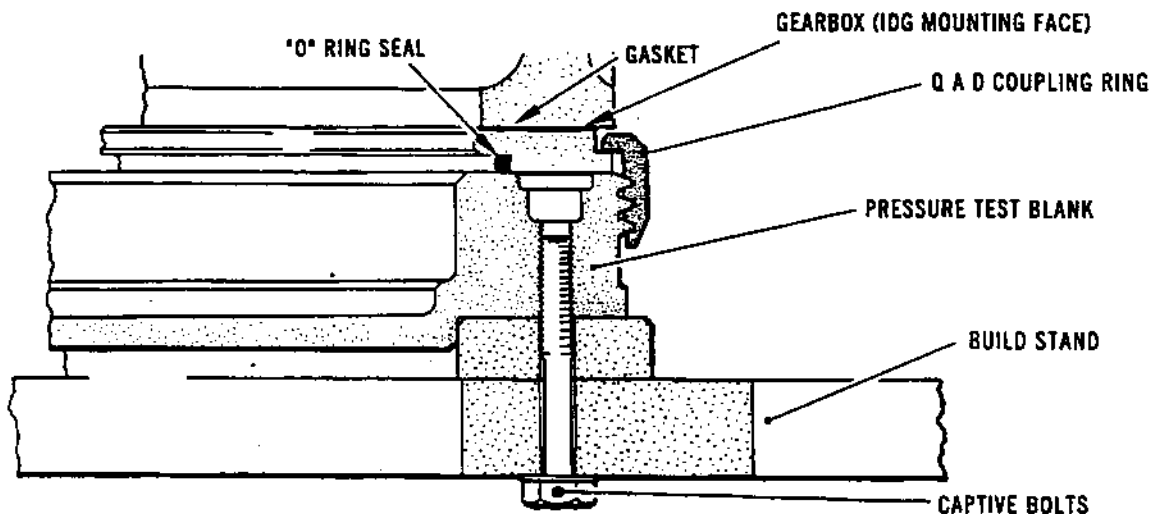
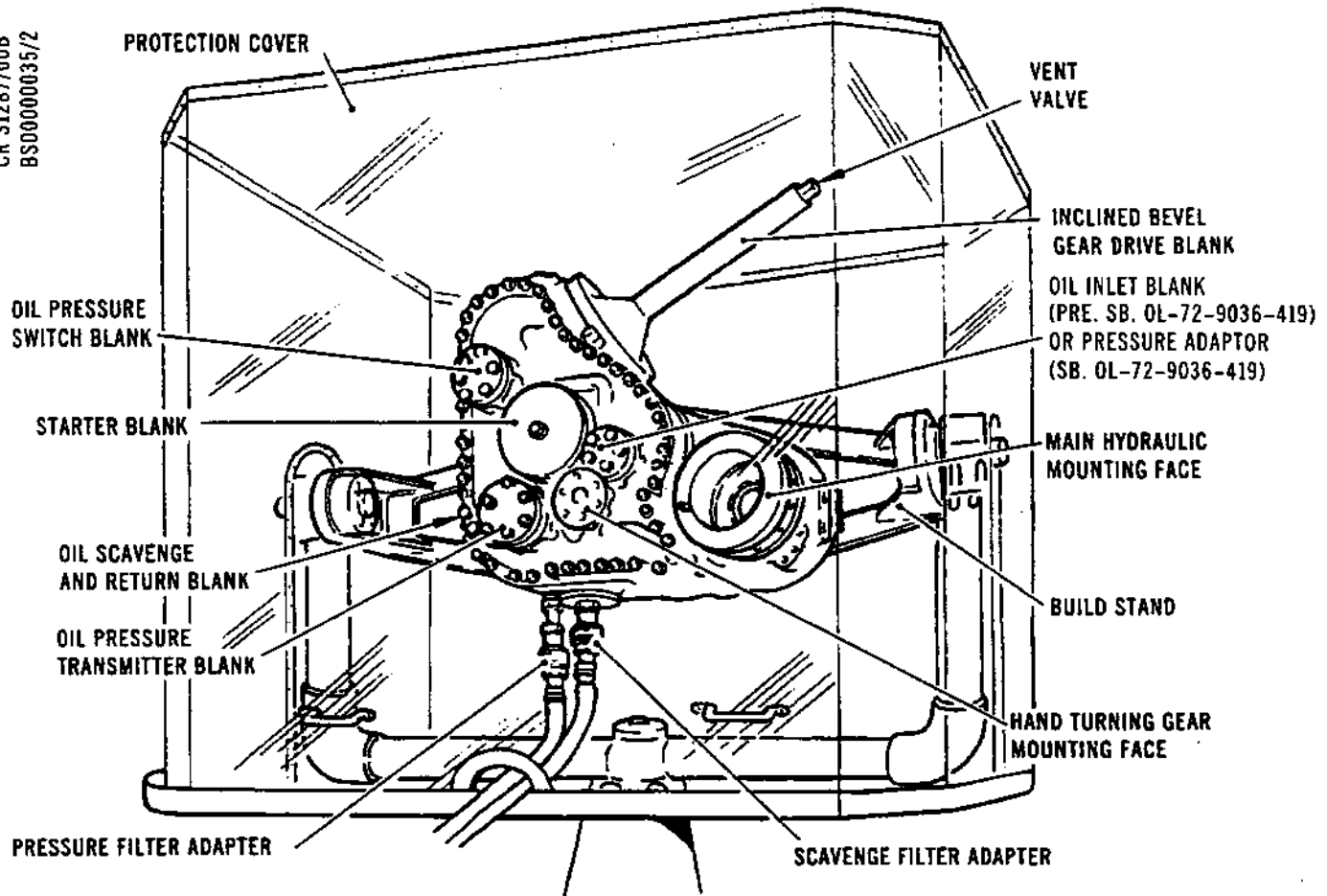
MK.610-14-28  
OVERHAUL



SNECMA

Printed in England

CR 31287/00B  
BS00000035/2



SECTION THROUGH IDG MOUNTING FACE

Gearbox Prepared for Oil Flow and Pressure Test  
Figure 535

SUB-ASSEMBLY

## 72-63-00

Page 591

Dec 31/99



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

AA. Prepare the Gearbox for Oil Flow Test and Pressure Test (Ref.Fig.535).

- (1) Assemble the 'O' ring (01/8-30) (SB.0L.593-72-8995-401) into the plain flange (01/8-60) assembled to the IDG mounting location.
- (2) Assemble the test blank (Tool 740) to the gearbox at the location of the IDG mounting position. Locate the interrupted threads of the blank in the coupling ring, rotate the blank through 30 deg to lock.
- (3) Ensure the coupling ring locking bolt has a locking (run-down) torque between 6 and 20 lbf in. (0,68 and 2,26 N.m) torque-tighten between 170 and 190 lbf in. (19,2 and 21,5 N.m) (Ref.72-09-00 Assembly).
- (4) Re-position the gearbox to the build stand (Tool 494).
  - (a) Attach a hoist to the lifting fixture then raise the hoist to take up the weight of the gearbox. Rotate the gearbox until the IDG mounting location is positioned at the bottom then screw in the locking pin.
  - (b) Lift the gearbox to its location on the build stand. Locate 29 captive bolts into the test blank and lightly tighten them.
  - (c) Remove both fulcrum and locking pins from the two adapters (Tool 793 and 794) then raise the hoist and lift the lifting fixtures clear of the gearbox, position them on a suitable support.
  - (d) Unscrew the two captive bolts in each of the adapters and remove the adapters from the gearbox.
- (5) Assemble the slave seal (FBS 68-C39) to the pressure test blank (Tool 722) and assemble the blank to the gearbox front cover at the location of the starter mounting position.

SUB-ASSEMBLY

72-63-00

Page 592

Dec 1/95



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (6) Engage the interrupted threads of the test blank in the coupling ring, rotate the blank through 30 deg to lock. Ensure the coupling ring locking bolt has a locking (run-down) torque between 6 and 20 lbf in. (0,68 and 2,26 N.m) torque-tighten between 170 and 190 lbf in. (19,2 and 21,5 N.m) (Ref.72-09-00 Assembly).
- (7) Install blank at inclined bevel gear location.
- (a) Ensure that a serviceable sealing ring is assembled to the test blank (Tool 3125).
  - (b) Assemble the blank over the drive shaft and engage the pins and bolts protruding through the gearbox flange.
  - (c) Secure the blank with the 18 bolts.

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

SNECMA

- (8) Assemble the remaining test blanks to the gearbox as detailed in Table 504.

---

**Pressure Test Blanks****Location**

---

(Tool 771)	Oil inlet facing on the front cover (engines Pre.SB.0L.72-9036-419)
(Tool 773)	Oil scavenge facing on the front cover
(Tool 772)	Oil pressure transmitter facing
(Tool 772)	Oil pressure switch facing

---

**Assembly of Pressure Test Blanks to the Gearbox for the Flow and Pressure Test**  
**Table 504**

- (9) Remove the magnetic plug (01/2-80) from the scavenge filter. Ensure a serviceable sealing ring (FBS 70-B5) is fitted to the test adapter (Tool 789) then assemble the adapter to the vacated location.
- (10) On engines Pre.SB.0L.72-9036-419, remove the plug (01/2-250) from the pressure filter and assemble the adapter (Tool 790) to the vacated location.
- (11) On engines to SB.0L.72-9036-419 Standard, assemble the adaptor (Tool 3151) to the oil inlet flange on the front cover assembly.
- (12) Remove the locking pin from the build stand and rotate the gearbox to a position where the valve in the test blank, at the inclined bevel gear drive, is at the highest point of the gearbox assembly. Re-engage the locking pin.

SUB-ASSEMBLY

**72-63-00**

Page 594

Dec 31/99



OLYMPUS 593



MK.610-14-28  
OVERHAUL

shecma

## AB. Oil Flow and Pressure Test the Gearbox.

### (1) Test equipment required.

- (a) Capable of a flow rate up to 120 gal/h (Imp.) (545 litres/hour) of oil at a temperature of 120 deg C with a delivery pressure up to 50 psig (345 Kpa) to the gearbox.
- (b) Oil specification lubricant A.

### (2) Prepare oil flow test/pressure test equipment.

- (a) Ensure that the correct amount of oil is contained in the test equipment.
- (b) Connect the flowmeter electrical plug and instrumentation plugs to their respective locations on the mobile test equipment.
- (c) Connect the rig oil pressure hose to the gearbox adapter (Tool 790) for engines Pre.SB.0L.72-9036-419 or (Tool 3151) for engines SB.0L.72-9036-419.

**NOTE:** Tool 790 is fitted at the pressure filter location. Tool 3151 is fitted to the oil inlet flange on the front cover assembly.

- (d) Connect the rig oil return hose to the gearbox adapter (Tool 555) at the scavenge filter location for engines Pre.72-9036-419 or (Tool 3149) for SB.72-9036-419.
- (e) Ensure that the circulating pump is switched 'OFF' then connect the test equipment to an earthed electricity supply.
- (f) Open the oil return stop valve on the test equipment.

### (3) Oil flow test the gearbox.

- (a) Switch 'ON' the circulating pump and adjust the pressure controller to give a delivery oil pressure of not more than 5 psig (34,5 Kpa) for circulating and venting purposes. Ensure the flowmeter is working.

SUB-ASSEMBLY

72-63-00

Page 595

Dec 31/99



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

(b) Release trapped air from the gearbox by opening the vent valve on the blank (Tool 939). Close the valve when all air has been expelled.

(c) Place the transparent protection cover (Tool 797) over the gearbox assembly and ensure the vent valve and hand turning point are in line with the access ports in the cover and the gearbox assembly is clearly visible from all angles.

**WARNING:** TRANSPARENT PROTECTION COVER MUST NOT BE REMOVED WHILST GEARBOX IS PRESSURIZED WITH OIL. ADEQUATE VENTILATION IS ESSENTIAL. PROTECTIVE CLOTHING MUST BE WORN.

(d) Switch on the oil heater and raise the oil temperature to  $120 \text{ deg C} \pm 5 \text{ deg C}$ . When the circulating oil is at the required temperature allow approximately 15 minutes for stabilization of the gearbox case temperature, then switch 'OFF' the circulating pump. Carefully release any trapped air from the gearbox through the vent valve.

(e) On completion of venting, tighten the vent valve and remove the wrench. Switch 'ON' the circulating pump and adjust the oil pressure to give a differential between the oil pressure and scavenge of 30 psig (207 Kpa).

(f) Maintain the oil flow pressure rate and record the oil flow rate indicated by the flowmeter.

(i) The oil flow for engines Pre.SB.0L.72-9036-419 must be within the acceptance limits of 75-100 gal/h (Imp.) (340 to 454 litres/hour).

(ii) The oil flow for engines SB.0L.72-9036-419 Standard must be within the acceptance limits of 90-120 gal/h (Imp.) (409 - 545 litres/hour).

(g) On completion of a satisfactory flow test proceed with the pressure testing of the gearbox (para.AB.(5)(e)).



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

(h) Should the oil flow rate be below the acceptance figure quoted, switch 'OFF' the oil heater, circulating pump and electrical supply to the equipment. Disconnect, and safely store the oil flowmeter.

(4) Investigate and rectify unsatisfactory oil flow limit.

NOTE: Before commencing disassembly of the gearbox components for examination of oil jets, examine the mobile pressure test equipment and associated items for possible malfunction.

(a) Prepare for investigation.

CAUTION: ENSURE THAT THE PRESSURE TEST EQUIPMENT IS SWITCHED 'OFF' AND ISOLATED FROM THE ELECTRICITY SUPPLY.

(b) Open the vent valve to release the pressure within the gearbox.

(c) Allow sufficient time for the assembly to cool to a safe handling temperature.

(d) Remove the protection cover then disconnect the oil pressure and scavenge hoses.

(e) Withdraw the build stand locking pin and rotate the gearbox until the vent valve is at the lowest point of the gearbox assembly. Allow the oil in the gearbox to drain and return such oil to the mobile test equipment.

(f) Rectify the cause of inadequate or excessive oil flow and carry out a further oil flow check.

(5) Oil pressure test gearbox assembly.

(a) Open the return stop valve on the mobile pressure test equipment, switch 'ON' the electricity supply and circulating pump and adjust the pressure controller to give a delivery pressure of not more than 5 psig (34,5 Kpa) for circulating and venting purposes.

WARNING: TRANSPARENT PROTECTION COVER MUST NOT BE REMOVED WHILST GEARBOX IS PRESSURIZED WITH OIL. ADEQUATE VENTILATION IS ESSENTIAL. PROTECTION CLOTHING MUST BE WORN.

SUB-ASSEMBLY

72-63-00

Page 597

Dec 31/99



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (b) Ensure that the transparent protection cover (Tool 797) is correctly positioned over the gearbox. Switch 'ON' the oil heater to raise the oil temperature to 120 deg C.
  - (c) Switch 'OFF' the oil circulating pump and carefully release trapped air from the gearbox by opening the vent valve in the blank (Tool 939).
  - (d) Tighten the vent valve when all air has been expelled then switch 'ON' the oil circulating pump.
  - (e) Maintain the oil temperature at 120 deg C  $\pm$  5 deg C. Gradually increase the oil inlet pressure to 50 psig (345 Kpa) and adjust the return stop valve to 40 psig (276 Kpa).
  - (f) Maintain the pressure test conditions for 15 minutes and observe the gearbox for oil leakage from QAD couplings, flange joints, main and stand-by hydraulic pump Sealol seals.
  - (g) During the pressure test, rotate the gears using the hand turning equipment (Ref.72-09-01, Sub-Assembly) in order to fully test the Sealol seals. If necessary, extend the test time to ensure the seals seat correctly and any leakage of oil ceases.
  - (h) Oil leakage is unacceptable, but slight seepage of oil can be accepted.
- NOTE:** An oil leak is considered as drops or globules of oil forming within the specified time and conditions of the pressure test. Oil seepage is considered as oil dampness which may spread but does not form a droplet or globule within the specified time and conditions for the pressure test.
- (j) On completion of satisfactory pressure test, or to rectify oil leakage, ensure the test equipment is switched 'OFF' and isolated from the electricity supply.





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (k) Open the vent valve to release pressure within the gearbox.
  - (l) Allow sufficient time for the assembly to cool to a safe handling temperature.
  - (m) Remove the protection cover, then disconnect the oil pressure and scavenge hoses.
  - (n) Withdraw the build stand locking pin and rotate the gearbox until the vent valve is at the lowest point of the gearbox assembly. Allow the oil in the gearbox to drain into a suitable container and return such oil to the mobile test equipment.
- (6) Rectify oil leakage from joint faces.
- (a) If leakage between joint faces is attributed to insufficient tightness of bolts, re-check the torque values in accordance with the tightening procedures detailed in the appropriate sections of this sub-assembly.
  - (b) If leakage between joint faces cannot be rectified by torque-tightening checks, it will be necessary to separate the appropriate flange joints for further investigation.
- (7) Rectify oil leakage from QAD couplings.
- (a) Remove QAD couplings.

NOTE: This procedure applies to the gearbox front cover or gearbox case.

- (i) Remove the protector.
- (ii) Remove the coupling ring locking bolt and spherical washer, then remove the bolts securing the coupling to the gearbox or front cover and carefully remove the coupling flange and seal.
- (iii) Examine all components and sealing surfaces, especially gaskets and seal rings for cause of leakage. Thoroughly clean all components and re-assemble in accordance with the appropriate assembly procedure.

SUB-ASSEMBLY

**72-63-00**

Page 598.1

Sep 1/80



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (8) Oil leakage from the Sealol seals of the hydraulic pumps will necessitate the removal and replacement of the seals.
- (9) After carrying out any rectification, a further pressure test of the gearbox will be necessary until a satisfactory test is achieved.

AC. Remove the Oil Flow Test and Pressure Test Equipment from the Gearbox.

- (1) Remove the pressure test adapter (Tool 790 or 3151) from the the gearbox. For engines Pre.SB.0L.72-9036-419, assemble the plug (72-63-01/2-250) and Corrujoint seal (72-63-01/2-260) to the vacated location and torque-tighten between 230 and 250 lbf in. (26,0 and 28,2 N.m). Wire-lock the plug to the nut assembly.
- (2) Remove the pressure test adapter (Tool 555 or 3149) from the location of the scavenge filter in the gearbox. Assemble the magnetic plug (01/2-80) to the vacated location and torque-tighten to 30 lbf ft (40,7 N.m). Wire-lock the plug to the nut assembly.
- (3) Remove test blank from inclined bevel gear location.
  - (a) Unscrew the 18 retaining bolts and remove the blank.
- (4) Unscrew the coupling ring locking bolt (01/3-10) at the location of the starter mounting position, unlock the coupling ring (01/3-70) (Ref.72-09-00 Disassembly). Rotate the test blank (Tool 722) through 30 deg, remove the blank.
- (5) Remove the remaining test blanks from the gearbox as detailed in Table 505.
- (6) Place all test blanks into the container (Tool 791).

SUB-ASSEMBLY

72-63-00

Page 598.2

Dec 31/99



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

## Pressure Test Blank

## Location

(Tool 771)	Oil inlet facing on the front cover (engines Pre.SB.0L.72-9036-419)
(Tool 773)	Oil scavenge facing on the front cover
(Tool 772)	Oil pressure transmitter facing
(Tool 772)	Oil pressure switch facing

Removal of Pressure Test Blanks from the Gearbox  
Table 505

AD. Assemble the Oil Pressure Transmitter and Switch to the Front Cover (Pre SB.72-96).

- (1) Ensure two Corruplus seals are fitted to the grooves in the base of the oil pressure transmitter (79-34-01/1-10).
- (2) Assemble the transmitter to its location on the front cover. Locating the two fouling pegs on the transmitter with the corresponding holes in the front cover.
- (3) Retain the transmitter to the front cover with the seven bolts (79-34-01/1-20), torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).

**NOTE:** The spacing of the two fouling pins on the base of the oil pressure transmitter are such that the transmitter can only be assembled to its correct location.

- (4) Ensure two Corruplus seals are fitted to the grooves in the base of the oil pressure switch.

SUB-ASSEMBLY

72-63-00

Page 598.3

Dec 31/99



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (5) Assemble the switch to the location on the front cover, locating the two fouling pegs on the switch with the corresponding holes in the front cover.
- (6) Retain the switch to the front cover with seven bolts (79-34-02/1-20), torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).

AE. Assemble Blanks to the Hand Turning Equipment Mounting Face, Oil Pressure Transmitter and Switch Mounting Faces on the Front Cover (SB.72-96).

- (1) Assemble the gasket (01/4-80) to the cover blank (01/4-70) (Ref.SB.72-41), then assemble the cover blank/gasket to the hand turning equipment mounting face. Secure the blank with seven washers (01/4-60) and bolts (01/4-50). Ensure that the bolts have a minimum locking (run-down) torque of 3.5 lbf in. (0,4 N.m), then torque-tighten the bolts between 90 and 100 lbf in. (10,2 and 11,3 N.m).
- (2) Assemble two Corruplus seals (01/4-470 and 480) to each of the two blanking covers (01/4-460). Assemble a cover to both the oil pressure transmitter and oil pressure switch mounting faces on the front cover.
- (3) Secure each cover with seven bolts (01/4-450) torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).

AF. Assemble the Main Hydraulic Pump Rim Clenching Clamp.

- (1) Select the two nuts (01/6-20) and two eye-bolts (01/6-80) such that the torque required to overcome screw thread friction only is between 6 and 20 lbf in. (0,7 and 2,3 N.m). Identify the selected nuts and eye-bolts for reassembly.
- (2) Assemble the two plain segments (01/6-110), bossed segment (01/6-90) and bossed segment (01/6-100) in a circular position. Retain all the segments together with the three straight headed pins (01/6-70), flat washers (01/6-60) and split cotter pins (01/6-50). Locate the pins through the aligning holes in the respective segments, assemble the flat washer to the pin, insert the split cotter pin into the hole in the headed pin and lock it (Ref.72-09-00 Assembly).

SUB-ASSEMBLY

**72-63-00**

Page 598.4

Sep 1/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Assemble the two eye-bolts (01/6-80) to the locations in the bossed segments, retain them with the two straight headed pins (01/6-70), flat washers (01/6-60) and split cotter pins (01/6-50). Locate the pins through the aligning holes in the respective segments and eye-bolts, assemble the flat washers to the pins and insert a split cotter pin into the hole in each pin and lock it. (Ref.72-09-00 Assembly).

AG. Assemble the Stand-by Hydraulic Pump Rim Clenching Clamp.

- (1) Select the two nuts (01/6-140) and two eye-bolts (01/6-200) such that the torque required to overcome screw thread friction only is between 6 and 20 lbf in. (0,7 and 2,3 N.m). Identify the selected nuts and eye-bolts for reassembly.
- (2) Assemble the two plain segments (01/6-230), bossed segment (01/6-210) and bossed segment (01/6-220) in a circular position. Retain all the segments together with the three straight headed pins (01/6-190), flat washers (01/6-180) and split cotter pins (01/6-170). Locate the straight pins through the aligning holes in the respective segments, assemble the flat washer to the pin, insert the split cotter pin into the hole in the straight headed pin and lock it (Ref.72-09-00 Assembly).
- (3) Assemble the two eye-bolts (01/6-200) to the two locations in the bossed segment, retain them with the two straight headed pins (01/6-190), flat washers (01/6-180) and split cotter pins (01/6-170). Locate the pins through the aligning holes in the respective segments and eye-bolts, assemble the flat washers and insert the split cotter pin into the hole in the straight headed pin and lock it (Ref.72-09-00 Assembly).

AH. Bedding Check on the Stand-by and Main Hydraulic Pump Clenching Clamps.

- (1) After completing assembly of main and stand-by hydraulic pump clenching clamps carry out a bedding check (Ref.72-09-00 Inspection/Check).



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

AJ. Assemble Protectors to the Gearbox (Ref.Fig.536).

- (1) Assemble protector at inclined bevel gear location.
  - (a) Assemble the protector (Tool 3126) over the shaft, engage the bolts protruding from the gearbox flange, then secure the protector with the hook bolts and knurled nuts.
- (2) Assemble the protector (Tool 778) to the gearbox at the location of the starter mounting position, ensure the three clips on the protector are located around the coupling ring.
- (3) Assemble the protectors (Tools 505 and 506) to the gearbox at the location of the oil inlet and scavenge facings.
- (4) Assemble the sealing ring (01/7-40) to the groove in the blank assembly (01/6-120).
- (5) Assemble the blank assembly/sealing ring to the gearbox at the location of the main hydraulic pump mounting position. Locate the stepped pin in the pump adapter with the corresponding hole in the blank assembly. Retain the blank assembly to the adapter with the clenching clamp (01/6-10) (Ref. 72-09-00 Assembly).
  - (a) Locate the two eye-bolts through their respective locations in the bossed segments.
  - (b) Assemble the spherical washer, lockwasher and selected nut to the inner eye-bolt, torque-tighten it between 55 and 60 lbf in. (6,2 and 6,8 N.m). Slacken the nut and retorque-tighten it between 55 and 60 lbf in. (6,2 and 6,8 N.m).
  - (c) Assemble the spherical washer, lockwasher and selected nut to the outer eye-bolt, torque-tighten it to between 55 and 60 lbf in. (6,2 and 6,8 N.m). Slacken the nut and retorque-tighten it to between 55 and 60 lbf in. (6,2 and 6,8 N.m).

SUB-ASSEMBLY

**72-63-00**

Page 598.6

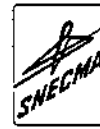
Sep 30/94



OLYMPUS 593

MK.610-14-28

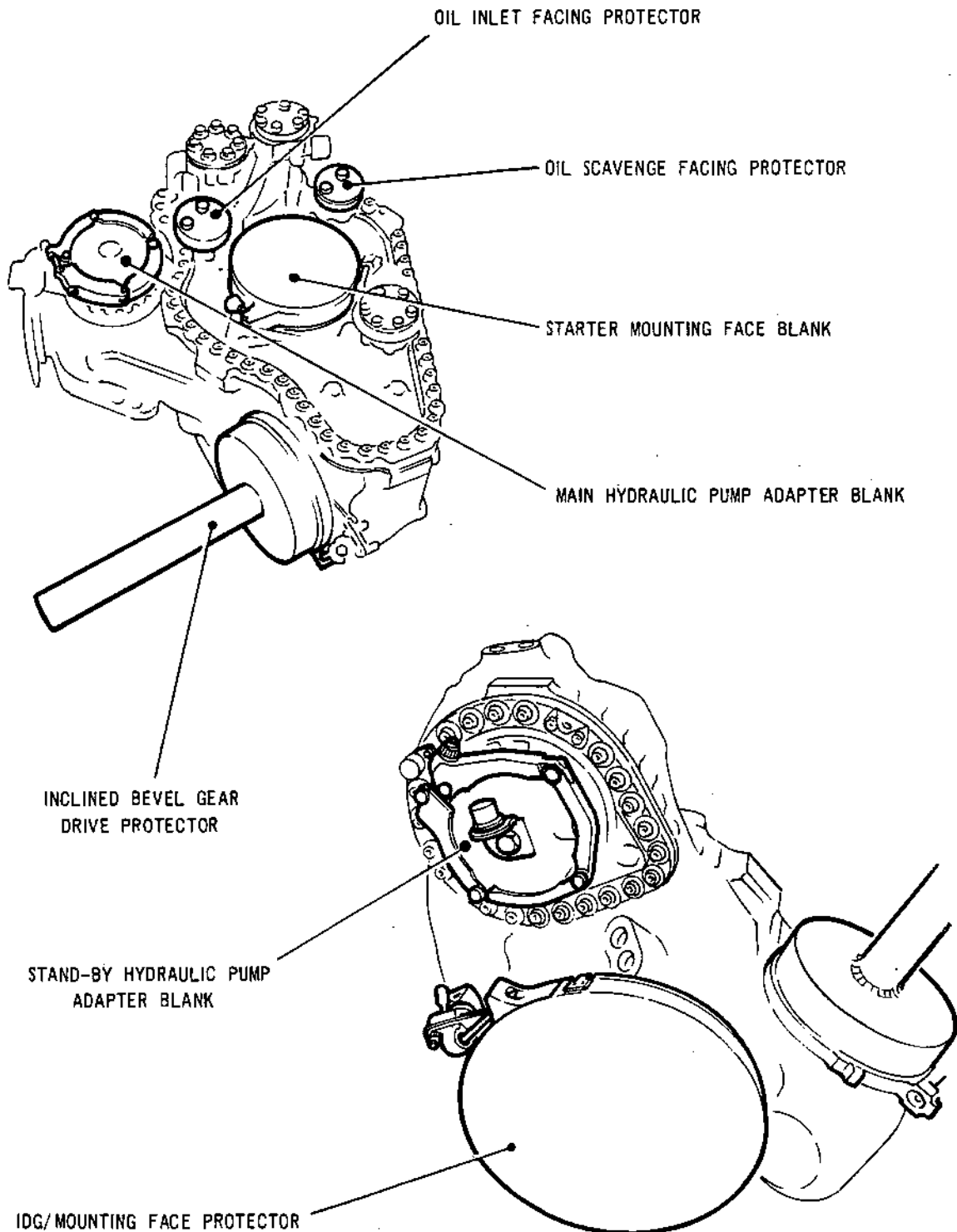
OVERHAUL



CR 31289/00A

PRINTED IN ENGLAND

TN16370



Location of Gearbox Protectors  
Figure 536

SUB-ASSEMBLY

**72-63-00**

Page 598.7

Sep 1/80



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (6) Assemble the sealing ring (01/7-120) to the groove in the blank assembly (01/6-270).
- (7) Assemble the blank assembly to the gearbox at the location of the stand-by hydraulic pump mounting position. Locate the stepped pin in the pump adapter with the corresponding hole in the blank assembly. Retain the blank assembly to the adapter with the clenching clamp (01/6-130) (Ref.72-09-00 Assembly).
  - (a) Locate the two eye-bolts through their respective locations in the bossed segments.
  - (b) Assemble the spherical washer, lockwasher and selected nut to the inner eye-bolt and torque-tighten it to between 55 and 60 lbf in. (6,2 and 6,8 N.m). Slacken the nut and retorquerighten it to between 55 and 60 lbf in. (6,2 and 6,8 N.m).
  - (c) Assemble the spherical washer, lockwasher and selected nut to the outer eye-bolt and torque-tighten it to between 55 and 60 lbf in. (6,2 and 6,8 N.m). Slacken the nut and retorquerighten it to between 55 and 60 lbf in. (6,2 and 6,8 N.m).
- (8) Unscrew the 29 captive bolts securing the test blank (Tool 740) to the stand and remove the gearbox from the build stand to a suitable working surface, using the lifting fixtures (Tools 795 and 827), lifting adapters (Tools 793 and 794) and a suitable lifting mechanism (Ref. para.2. sub-para.(1)(a) to (f)).
- (9) Unscrew the coupling ring locking bolt and unlock the coupling ring (Ref.72-09-00 Disassembly). Remove the test blank (Tool 740) from the IDG mounting face.
- (10) Assemble the protector (Tool 792) to the gearbox at the location of the IDG mounting position, ensure the three clips on the protector are located around the coupling ring.

FN12795





OLYMPUS 593

MK.610-14-28

OVERHAUL



- (11) Using the lifting mechanism position the gearbox into a pallet. Remove the fulcrum pins and locking pin from the two adapters (Tool 793 and 794) and remove the lifting fixture from the gearbox. Unscrew the two captive bolts in each of the adapters and remove the adapters from the gearbox.
- (12) Despatch the gearbox to the intermediate case section for selection of mounting bracket adjusting plates.

AK. Assemble the Gearbox Module Identification Plate.

- (1) On return of the gearbox from the intermediate case section remove the protector (Tool 778) from the gearbox at the location of the starter mounting position.
- (2) Ensure the identification plate (72-00-05/1-90) is marked with the engine serial number. For details of marking procedure (Ref.72-09-00 Assembly).
- (3) Secure the plate to the starter mounting face on the gearbox with two washers (72-00-05/1-80) and bolts (72-00-05/1-70). Use tri-wing bit (Tool 1911) and tri-wing bit holder (Tool 1912) to tighten the bolts (Ref.72-09-00 Assembly).
- (4) Assemble the protector (Tool 778) to the starter mounting location, ensure the three clips on the protector are located around the coupling ring.

NOTE: The assembly is now ready to be transferred to engine build 72-00-00 Assembly.

SUB-ASSEMBLY

**72-63-00**

Page 598.9

Sep 1/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



RIGHT-HAND ACCESSORY GEARBOX CASE ASSEMBLY - SUB-ASSEMBLY

PRINTED IN ENGLAND

For information on the Right-hand Accessory Gearbox Case Assembly, refer to 72-63-00 Assembly.

TN32368

SUB-ASSEMBLY  
**72-63-01**  
Page 501  
Jan 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



RIGHT-HAND ACCESSORY GEARBOX MAIN DRIVES - SUB-ASSEMBLY

PRINTED IN ENGLAND

For information on the Right-hand Accessory Gearbox  
Main Drives, refer to 72-63-00 Assembly.

TN32370

SUB-ASSEMBLY

**72-63-02**

Page 501

Jan 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



AIR STARTER DRIVE AND IDG DRIVE - SUB-ASSEMBLY

PRINTED IN ENGLAND

For information on the Air Starter Drive and  
IDG Drive, refer to 72-63-00 Assembly.

TN32372

SUB-ASSEMBLY

**72-63-03**

Page 501

Jan 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



SCAVENGE OIL PUMP DRIVE AND IDLER SHAFT - SUB-ASSEMBLY

PRINTED IN ENGLAND

For information on the assembly of the Scavenge Oil Pump and Idler Shaft, refer to 72-63-00 Assembly.

TN29201

SUB-ASSEMBLY

**72-63-04**

Page 501

Jan 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



MAIN AND STAND-BY HYDRAULIC PUMP DRIVES - SUB-ASSEMBLY

For information on the assembly of the Main and Stand-by Hydraulic Pump Drives, refer to 72-63-00 Assembly.

PRINTED IN ENGLAND

TN29903

SUB-ASSEMBLY

**72-63-05**

Page 501

Jan 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



DRAIN VALVE AND MAGNETIC PLUG ASSEMBLIES - SUB-ASSEMBLY

PRINTED IN ENGLAND

For information on the assembly of the Drain Valve and  
Magnetic Plug Assemblies, refer to 72-63-00 Assembly.

TN29905

SUB-ASSEMBLY

**72-63-06**

Page 501

Jan 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



DRIVE, PULSE PROBE AND HOUSING - SUB-ASSEMBLY

PRINTED IN ENGLAND

For information on the assembly of the Drive, Pulse  
Probe and Housing, refer to 72-32-00 Assembly.

TN32358

SUB-ASSEMBLY

**72-64-00**

Page 501

Jan 1/76





# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

## MAIN OIL PUMP - SUB-ASSEMBLY

### TABLE OF CONTENTS

Para.		Page
1.	General ... ..	501
2.	Prepare the Pump Cases for Assembly ... ..	501
	A. Check Flatness and Condition of Pump Case Faces ... ..	501
	B. Assemble the Pins to the Pump Cases... ..	503
3.	Check Bush Alignment ... ..	504
	A. Check Bush Alignment of Scavenge Pump Cases ... ..	504
	B. Check Bush Alignment of Pressure Pump Case ... ..	507
4.	Assemble the Oil Pump ... ..	507
	A. Assemble No.4 Bearing Scavenge Pump... ..	509
	B. Assemble No.5 Bearing Scavenge Pump... ..	509
	C. Assemble No.2/3 Bearing Scavenge Pump ... ..	512
	D. Assemble No.1 Bearing Scavenge Pump... ..	512
	E. Assemble the CB Scavenge and Pressure Pumps ... ..	514
	F. Assemble the Scavenge Pumps to the Pressure Pump ... ..	519
	G. Assemble the Sediment Strainer ... ..	519
	H. Assemble the Check Valve ... ..	521
	I. Secure the Pump Casings ... ..	521
	J. Assemble the Relief Valve... ..	524
	K. Assemble the Scavenge Filters and Magnetic Plugs ... ..	527
	L. Install the Pressure Filter ... ..	528
	M. Prepare for Despatch ... ..	530

### TABLE OF ILLUSTRATIONS

Fig.No.		Page
501	Assembling Pins to Scavenge Pump Cases ... ..	502
502	Assembling No.4 Scavenge Pump Case to Holding Fixture ... ..	505
503	Bush Alignment Check for Scavenge Pumps ... ..	505
504	Bush Alignment Check for Pressure Pumps ... ..	508
505	Assembling No.4 Scavenge Pump Case to Holding Fixture ... ..	508
506	Checking Oil Pump Clearances ... ..	510
507	Assembling No.5 Scavenge Pump ... ..	511
508	Assembling No.2/3 Scavenge Pump ... ..	513
509	Assembling No.1 Scavenge Pump ... ..	515
510	Assembling Pressure Pump Case to Holding Fixture ... ..	516
511	Assembling Scavenge Pumps to Pressure Pump ... ..	518
512	Assembling and Installing Sediment Strainer ... ..	520
513	Assembling Check Valve ... ..	520

SUB-ASSEMBLY

# 72-65-00

Contents 1

Dec 1/96

**OLYMPUS 593****MK.610-14-28  
OVERHAUL****sneema**

Fig.No.		Page
514	Locating Bolts and Washers, and Torque-Tightening Sequence ... ..	522
515	Assembling Relief Valve ... ..	523
516	Assembling Scavenge and Pressure Pump Filters (Pre SB.0L.593-72-9036-419) ... ..	525
517	Assembling Scavenge and Pressure Pump Filters (SB.0L.593-72-9036-419) ... ..	526

LIST OF TABLES

Table No.		Page
501	Location of Fixing Bolts and Washers ....	521

SUB-ASSEMBLY  
**72-65-00**  
Contents 2  
Dec 1/96



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## MAIN OIL PUMP - SUB-ASSEMBLY

### 1. General

- A. Prior to commencing assembly, refer to 72-09-00 Assembly for general assembly information.
- B. During the sub-assembly procedure, reference will be made to the Illustrated Parts Catalogue (I.P.C.) to identify those items where the nomenclature does not positively identify them, due to duplication of the title, e.g. nuts, bolts, washers, bearings, gears, housings, tubes, etc. When the item is a part of the breakdown of the text concerned, the item will be identified as bolt (1-10), the 1 referring to the I.P.C. Fig.No., and the 10 referring to the Item No. Where items from a different breakdown are introduced, then the breakdown number will be quoted in addition e.g. bolt (72-32-01/1-10).
- C. Throughout the text special tools are quoted by their Ref.No. e.g. (Tool 1234). For a complete list of tooling required for the assembly and for the Manufacturers Part No., refer to Special Tools, Fixtures and Equipment Table 1002.
- D. Do not lubricate pump gears until the necessary backlash checks have been completed.
- E. During the assembly procedure, the oil scavenge pumps have been designated as No.1, No.2 and 3, No.4 and No.5. These refer to the LP compressor front bearing, the LP and HP compressor thrust bearings, the LP turbine and the HP turbine scavenge pumps.

### 2. Prepare the Pump Cases for Assembly

- A. Check Flatness and Condition of Pump Case Faces.
  - (1) If a new pump case (or cases) is being assembled remove the protector(s) and carry out a blueing check for flatness of the mating faces. Rectify as necessary to produce 85% blueing, then remove all traces of blue and replace the protector(s).
  - (2) If the original pump case (or cases) is being assembled remove the protector(s) and inspect for nicks, burrs, etc. Rectify as necessary, then replace the protectors.
  - (3) Check that all the threaded inserts are in a serviceable condition in accordance with 72-09-00 Assembly.

SUB-ASSEMBLY

**72-65-00**

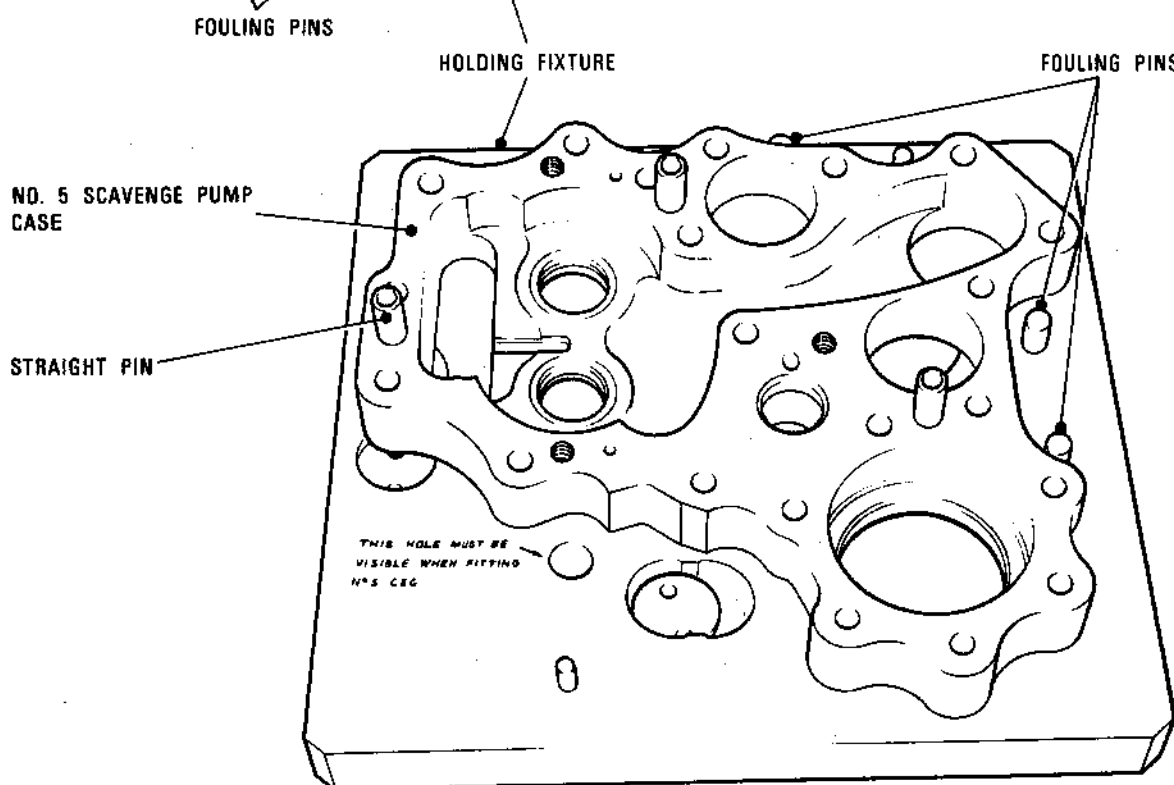
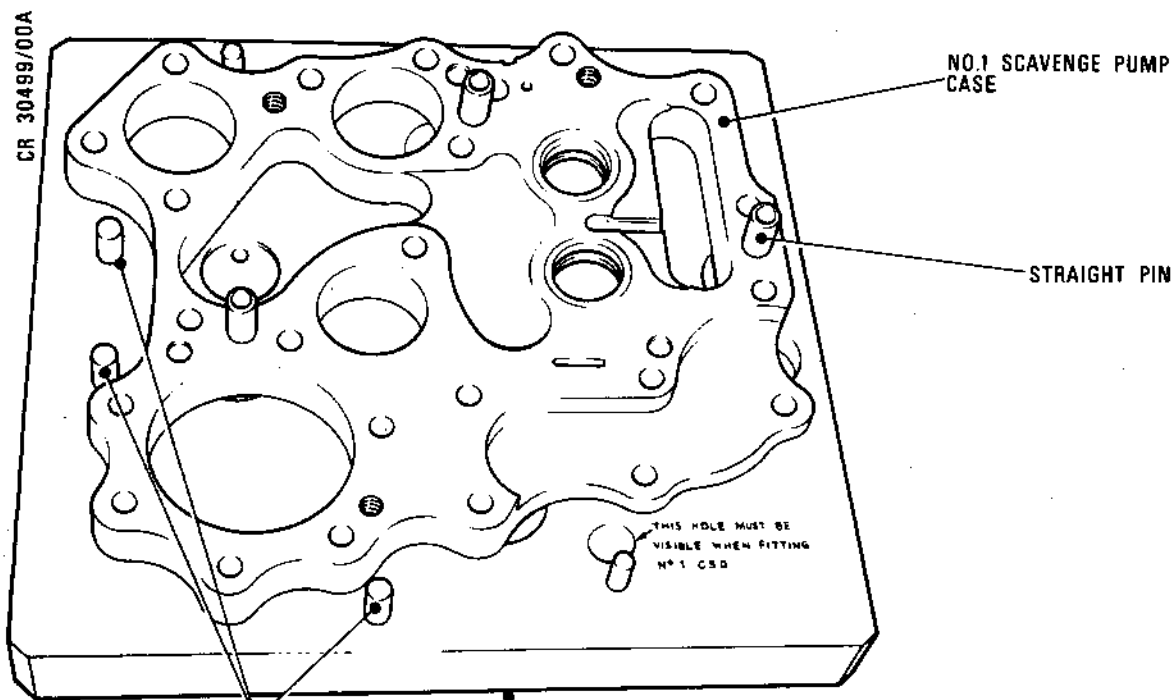
Page 501

Jul 1/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Assembling Pins to Scavenge Pump Cases  
Figure 501

SUB-ASSEMBLY  
**72-65-00**

Page 502  
Jul 1/75

TN13214



OLYMPUS 593

MK.610-14-28  
OVERHAUL



B. Assemble the Pins to the Pump Cases (Ref.Fig.501).

NOTE: This procedure is only applicable if No.1 or No.5 scavenge pump cases or the pressure pump case are new items. If the original cases are used the pins will be in position.

(1) Assemble the Pins to the Scavenge Pump Cases.

- (a) Remove the protector(s) and place No.1 and/or No.5 scavenge pump case(s) in an oven, pre-heated to 180 deg.C., for 30 minutes.
- (b) Place the straight pins (4-190) and/or (3-510) in a freezing agent for 10 minutes, the removal time to coincide with the removal of the case(s) from the oven.
- (c) Place the holding fixture (Tool 857) on the anvil of a hand press.
- (d) Using protective gloves remove No.5 scavenge pump case (if applicable) from the oven and place it over the location dowels (marked No.5) in the holding fixture, with its gear pockets uppermost (Ref.Fig.501). Remove the three longest pins (3-510) from the freezing agent and assemble them through the case to the stops in the fixture then remove the case from the fixture.
- (e) Still using the protective gloves, remove No.1 scavenge pump case (if applicable) from the oven and place it over the location dowels (marked No.1) in the holding fixture, with its gear pockets downwards (Ref.Fig.501). Remove the three shorter pins (4-190) from the freezing agent and assemble them through the case to the stops in the fixture, then remove the case from the fixture.
- (f) Allow the scavenge pump case(s) to cool then re-assemble the protector (Tool 126) to No.5 pump case and/or the protector (Tool 127) to No.1 pump case.

(2) Assemble the pins to the pressure pump case.

- (a) Place the straight pins (5-150) into a freezing agent for 10 minutes.

SUB-ASSEMBLY

**72-65-00**

Page 503

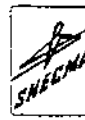
Jul 1/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



(b) Place the pressure pump case on the bench, then remove the pins from the freezing agent and tap the pins into the locations in the case. Ensure the pins are assembled to the full depth of the holes in the case.

(c) Remove the protector, from the pressure pump case flange, then screw the hollow pin (5-140) onto the driver (Tool 128, pre SB.72-18 or Tool 1971, SB.72-18) and tap the pin into the location in the pressure pump case flange.

NOTE: If the pin cannot be assembled in this manner, it may be necessary to shrink the pin in a freezing agent for approx. 5 minutes.

(d) Remove the driver from pin and re-assemble the protector to the pressure pump case flange.

### 3. Check Bush Alignment

NOTE: This procedure is only applicable if one or more of the pump cases are new items or if repair work has been carried out on the bushes.

#### A. Check Bush Alignment of Scavenge Pump Cases.

(1) Assemble the holding fixture (Tool 112) to a Hydra-clamp and secure with two slave bolts.

NOTE: The illustrations show fixtures (Tool 112) with either four or two assembly studs. No difference in the assembly sequence is involved, and where reference is made to four spacers etc., the use of two is similarly implied.

(2) Remove the protector from No.4 scavenge pump case, then assemble the case to the fixture (Ref. Fig.502).

(3) Remove the protector from No.5 scavenge pump case, then assemble the case to No.4 scavenge pump case so that its gear pockets are uppermost and in line.

NOTE: The build sequence is shown in Fig.503 in the inverted state.

(4) Remove the protector from No.2/3 scavenge pump case, then assemble the case to No.5 scavenge pump case, with its gear pockets uppermost and in line.

(5) Remove the protector from No.1 scavenge pump case, then assemble the case to No.2/3 scavenge pump case with its gear pockets uppermost and in line.

TN26240

SUB-ASSEMBLY  
**72-65-00**

Page 504

Aug 1/81

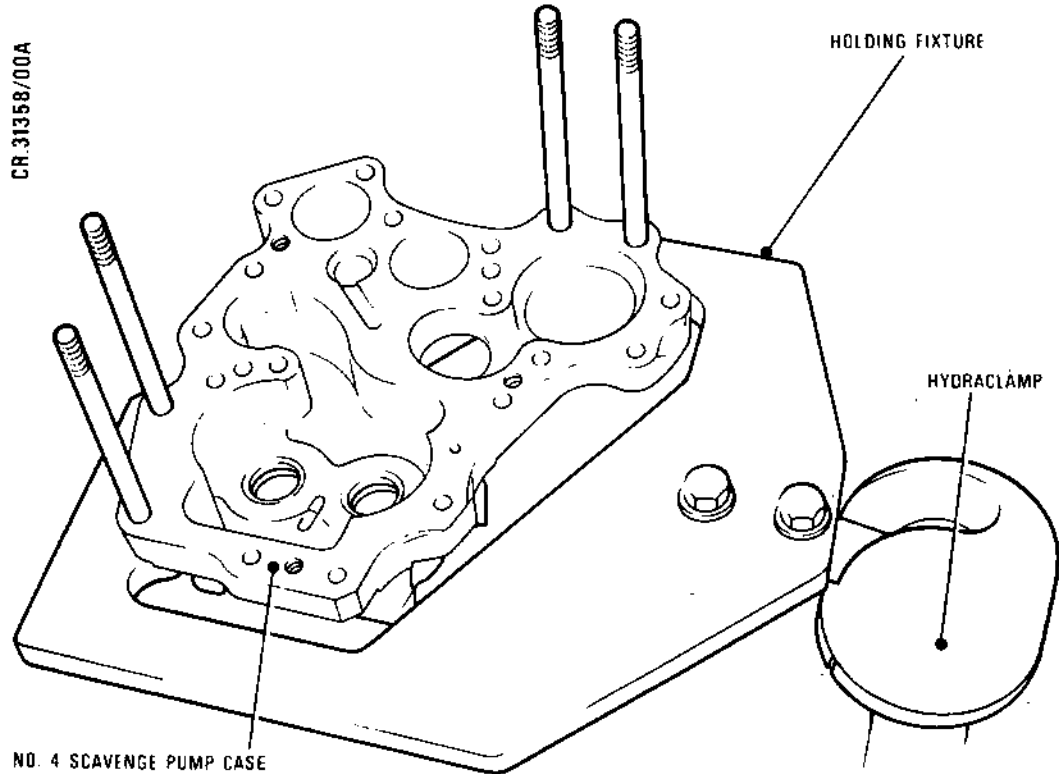


OLYMPUS 593

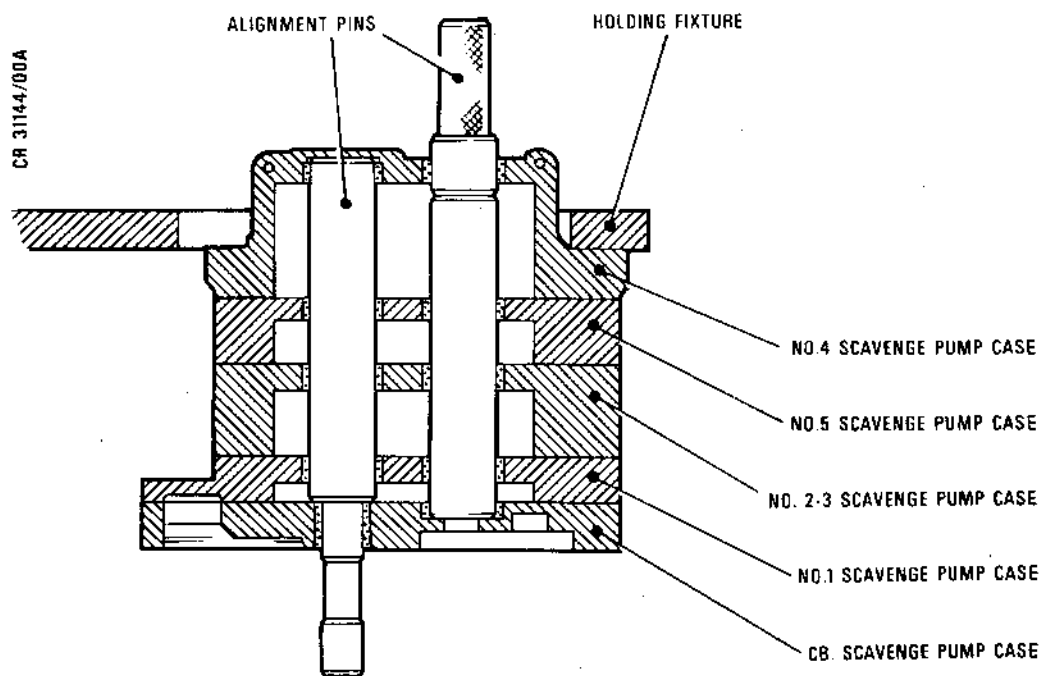
MK. 610-14-28  
OVERHAUL



PRINTED IN ENGLAND



Assembling No.4 Scavenge Pump Case to Holding Fixture  
Figure 502



Bush Alignment Check for Scavenge Pumps  
Figure 503

TN13215



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (6) Remove the alignment pin (Tool 4) from its container (Tool 114) and insert the alignment pin so that its larger diameter is located in the bushes, nearest to the Hydraclamp, of the four scavenge pump cases (Ref. Fig.503).
- (7) Remove the protector from the CB scavenge pump case, then assemble the case over the alignment pin, to No.1 scavenge pump case.
- (8) Secure the cases to the fixture with four spacers (Tool 117), washers and nuts.
- (9) Invert the unit, then insert the alignment pin (Tool 3) through the bush in No.4 scavenge pump case to locate in the bushes of all of the scavenge pump cases.
- (10) Ensure that both alignment pins rotate freely.
- (11) Withdraw the alignment pin (Tool 3) and invert the unit.
- (12) Remove the nuts, washers and spacers securing the scavenge pump cases to the holding fixture, then remove the cases, as a unit, from the fixture.

NOTE: The holding fixture may be left in position on the Hydraclamp for use during the assembly of the scavenge pumps.

- (13) Screw three mechanical pullers (Tool 1021) through the threaded extraction holes in No.4 scavenge pump case to lift the case from over the dowels of the scavenge pumps.

CAUTION: WHEN USING THE PULLERS TO DISMANTLE THE PUMP CASES, ALWAYS START AT NO.4 SCAVENGE PUMP CASE AND WORK THROUGH TO THE CB SCAVENGE PUMP CASE. DAMAGE WOULD BE CAUSED TO THE FACES OF THE PUMP CASES IF THE REVERSE SEQUENCE WERE USED.

- (14) Withdraw the remaining alignment pin from the pump cases and return both alignment pins to the container.
- (15) Using the pullers, disassemble No.5, No.2/3 and No.1 scavenge pump cases.

SUB-ASSEMBLY

72-65-00

Page 506

Jul 1/75

TN13219





OLYMPUS 593

MK.610-14-28  
OVERHAUL



(16) Assemble the protectors to the scavenge pump cases.

- (a) Assemble the protector (Tool 119) to No.4 scavenge pump case.
- (b) Assemble the protector (Tool 126) to No.5 scavenge pump case.
- (c) Assemble the protector (Tool 125) to No.2/3 scavenge pump case.
- (d) Assemble the protector (Tool 127) to both No.1 and CB scavenge pump cases.

NOTE: If the procedure under para.4.B. is to be carried out it is not necessary to assemble the protector to the CB case.

B. Check Bush Alignment of Pressure Pump Case.

- (1) Place the pressure pump case on the bench with its flange face uppermost, then assemble the CB scavenge pump case to the pressure pump case over the dowels.
- (2) Remove the alignment pin (Tool 4) from the container (Tool 114), then insert the alignment pin, smaller diameter first, through the pressure pump driving gear bush into the corresponding bush in the pressure pump case (Ref. Fig.504).
- (3) Ensure the alignment pin rotates freely, then withdraw the alignment pin and return it to the container.
- (4) Screw three mechanical pullers (Tool 1021) through the threaded extraction holes in the CB scavenge pump case and lift the case from the pressure pump case.
- (5) Assemble the protector (Tool 127) to the CB scavenge pump case.

4. Assemble the Oil Pump

NOTE: The driving gears of No's.4, 5, 2/3 and CB scavenge pumps rotate clockwise as viewed from the top of No.4 scavenge pump casing and the driving gears of No.1 scavenge and the pressure pump rotate counter-clockwise, viewed from the same direction. On assembly of the gears to the casings, ensure that the gears are assembled in their original attitude as shown by the gear teeth engagement markings.

SUB-ASSEMBLY

**72-65-00**

Page 507

Jul 1/75

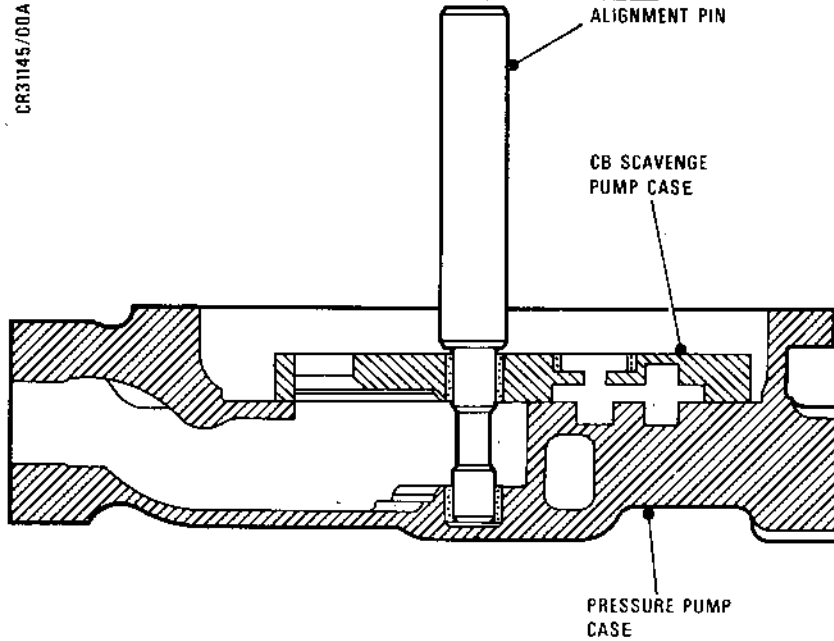


OLYMPUS 593

MK.610-14-28  
OVERHAUL

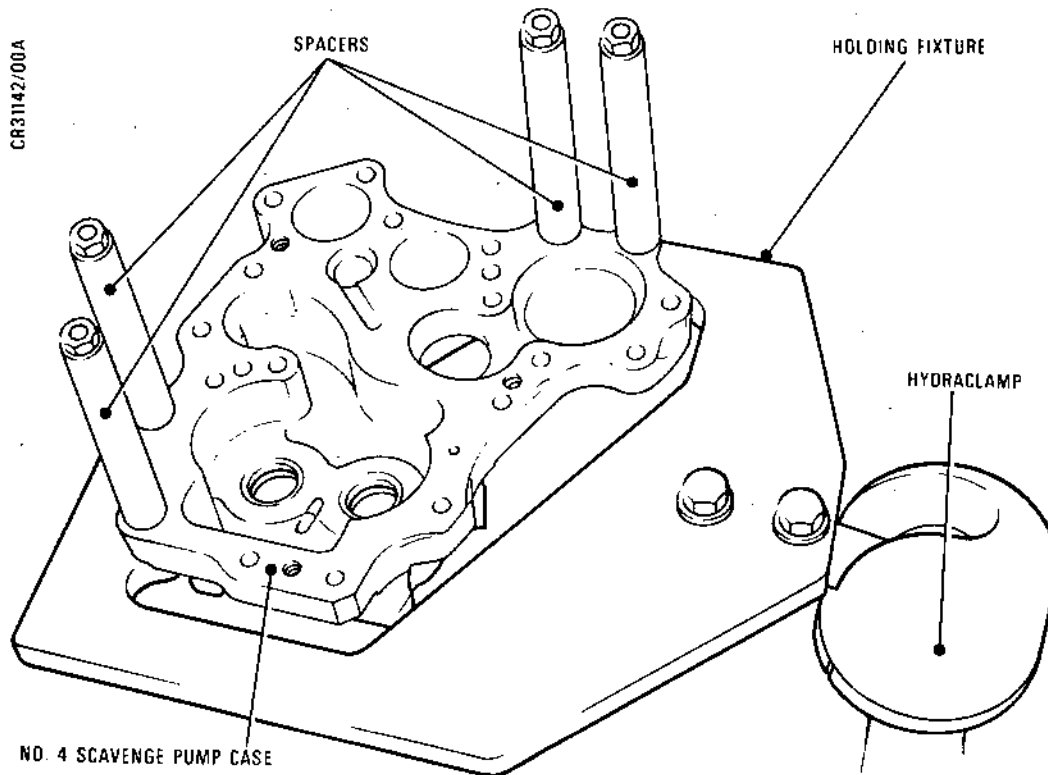


CR31145/00A



Bush Alignment Check for Pressure Pumps  
Figure 504

CR31142/00A



Assembling No.4 Scavenge Pump Case to Holding Fixture  
Figure 505

SUB-ASSEMBLY  
**72-65-00**  
Page 508  
Jul 1/75

IN26237



OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

A. Assemble No.4 Bearing Scavenge Pump.

- (1) Assemble the holding fixture (Tool 112) to a Hydra-clamp and secure with two slave bolts.
- (2) Remove the protector from No.4 scavenge pump case, then assemble the case to the holding fixture (Ref. Fig.505) and secure with four spacers (Tool 115), washers and nuts.
- (3) Install the driving gear (3-410) with its longer journal uppermost, then install the driven gear (3-400) (Ref. Fig.506).
- (4) Remove the slave spindle (Tool 118) from its container (Tool 338), then insert the slave spindle through the driven gear, into the bush in the case.
- (5) Check the endfloat with a straight edge and feeler gauges, then check the backlash and radial clearance with feeler gauges (Ref. Fig.506). Take measurements at several positions to obtain mean clearances, then check the figures obtained are within the limits quoted in the Fits and Clearances (FCS-469/479, 475, 470/480).
- (6) Remove the slave spindle and return it to the container, then remove the gears and apply lubricant 'A' to the gear teeth, end faces and journals. Reposition the gears in their original attitudes.
- (7) Remove the spacers, washers and nuts securing the case to the holding fixture.

B. Assemble No.5 Bearing Scavenge Pump.

- (1) Remove the protector from No.5 scavenge pump case, then assemble the case to No.4 scavenge pump case with its gear pockets uppermost and in line.
- (2) Secure with four of each of the spacers (Tools 111, 116 and 117), washers and nuts.
- (3) Install the driving gear (3-490) over the journal of No.4 scavenge pump driving gear, then install the driven gear (3-480) so that its journal locates No.4 scavenge pump driven gear (Ref. Fig.507).

TN13220

SUB-ASSEMBLY

**72-65-00**

Page 509

Jul 1/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



NARROW FEELER GAUGES

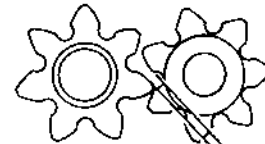
CR31143/00A

NO. 4 SCAVENGE  
PUMP CASE

DRIVING GEAR

DRIVEN GEAR

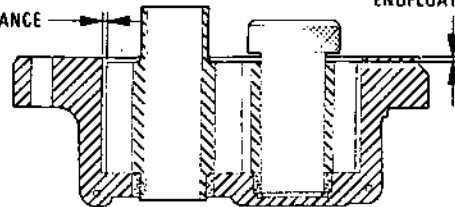
SLAVE SPINDLE



BACKLASH

RADIAL CLEARANCE

ENDFLOAT



Checking Oil Pump Clearances  
Figure 506

SUB-ASSEMBLY  
**72-65-00**  
Page 510  
Jul 1/75

TN13222



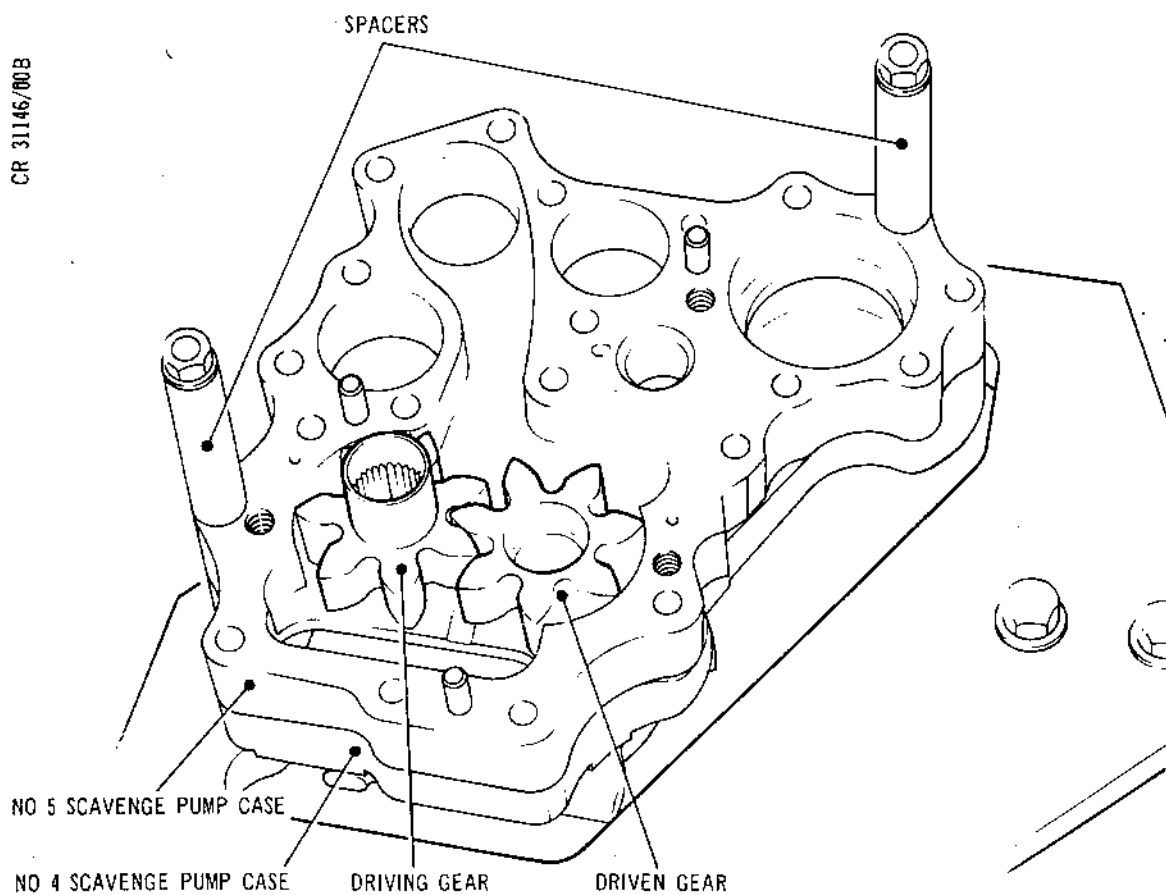
OLYMPUS 598

MK.610-14-28

OVERHAUL



CR 31146/00B



Assembling No.5 Scavenge Pump  
Figure 507

SUB-ASSEMBLY  
**72-65-00**

Page 511  
Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Check the endfloat with a straight edge and feeler gauges, then check the backlash and radial clearance with feeler gauges (Ref. Fig.506). Take measurements at several positions to obtain mean clearances, then check that the figures obtained are within the limits quoted in the Fits and Clearances (FCS-487/517, 483, 486/518).
- (5) Remove the gears and apply lubricant A to the gear teeth, end faces and journals, then replace the gears in their original attitudes.
- (6) Remove the nuts, washers and spacers securing the pump cases.

C. Assemble No.2/3 Bearing Scavenge Pump.

- (1) Remove the protector from No.2/3 scavenge pump case, then assemble the case to No.5 scavenge pump case with its gear pockets uppermost and in line.
- (2) Secure with four spacers (Tool 116), washers and nuts.
- (3) Install the driving gear (4-110A) over the journal of No.5 scavenge pump driving gear, then install the driven gear (4-100) journal through the bush (Ref. Fig.508).

NOTE: The gears are similar in shape, but the driving gear is distinguishable by its slightly longer journal.

- (4) Check the endfloat with a straight edge and feeler gauges, then check the backlash and radial clearance with feeler gauges (Ref. Fig.506). Take measurements at several positions to obtain mean clearances, then check that the figures obtained are within the limits quoted in the Fits and Clearances (FCS-493/512, 503, 491/514).
- (5) Remove the gears and apply lubricant 'A' to the gear teeth, end faces and journals, then replace the gears in their original attitudes.
- (6) Remove the nuts, washers and spacers securing the pump cases.

D. Assemble No.1 Bearing Scavenge Pump.

- (1) Remove the protector from No.1 scavenge pump case, then assemble the case to No.2/3 scavenge pump case, with its gear pockets uppermost and in line.

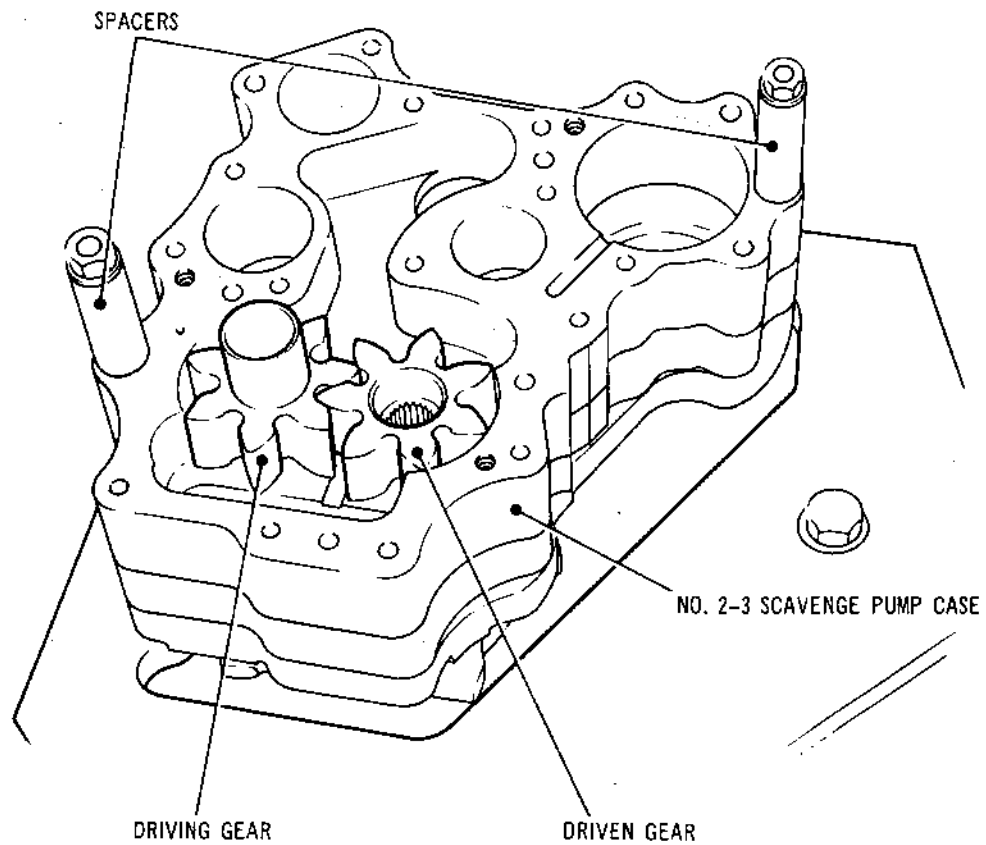


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31147/00B



Assembling No.2/3 Scavenge Pump  
Figure 508

SUB-ASSEMBLY

**72-65-00**

Page 513

Aug 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (2) Secure with spacers (Tool 111), washers and nuts.
- (3) Install the driving gear (4-170) so that its splined shaft locates in the driven gear of No.2/3 scavenge pump, then install the driven gear (4-180) over the journal of No.2/3 scavenge pump driving gear (Ref. Fig.509).

NOTE: The position of the driving and driven gears has now been reversed to direct the drive to the pressure pump gears.

- (4) Check the endfloat with a straight edge and feeler gauges, then check the backlash and radial clearance using feeler gauges (Ref. Fig.506). Take measurements at several positions to obtain mean clearances, then check that the figures obtained are within the limits quoted in the Fits and Clearances (FCS-497/507, 502, 495/509).
- (5) Remove the gears and apply lubricant A to the gear teeth, end faces and journals, then replace the gears in their original attitudes.
- (6) Remove the nuts, washers and spacers, then carefully remove the scavenge pump assembly from the holding fixture and place it to one side on the bench.
- (7) Remove the holding fixture from the Hydraclamp.

E. Assemble the CB Scavenge and Pressure Pumps.

- (1) Assemble the holding fixture (Tool 852) to the Hydraclamp and secure it with two slave bolts.
- (2) Assemble the pressure pump case to the holding fixture (Ref. Fig.510) leaving the flange protector in position. Secure the case to the fixture with slave nuts and washers.
- (3) Install the driving gear (4-300) in the pressure pump case with the splines upwards, then install the driven gear (4-280) and insert the headed pin (4-200) through the driven gear into the bush of the case.
- (4) Check the endfloat using a straight edge and feeler gauges, then check the backlash and radial clearance using feeler gauges (Ref. Fig.506). Take measurements at several positions to obtain mean clearances, then check that the figures obtained are within the limits quoted in the Fits and Clearances (FCS-465/468, 462, 459/464).

SUB-ASSEMBLY

**72-65-00**

Page 514

Aug 1/76

TN3893



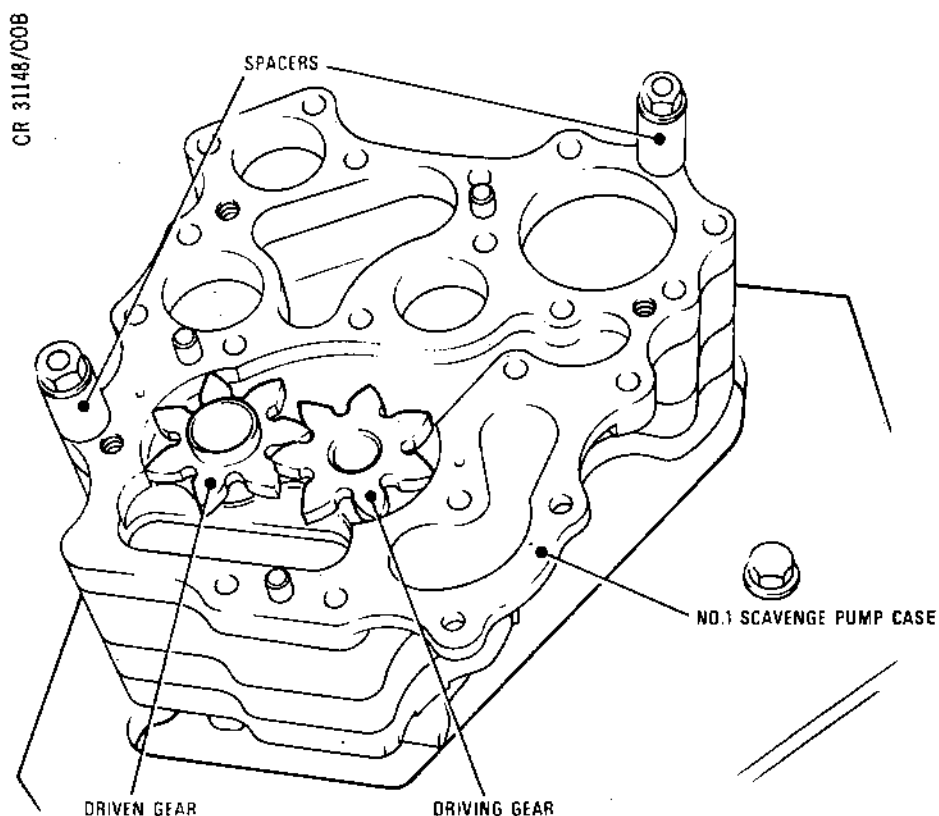
PRINTED IN ENGLAND

TN3150



OLYMPUS 593

MK.610-14-28  
OVERHAUL



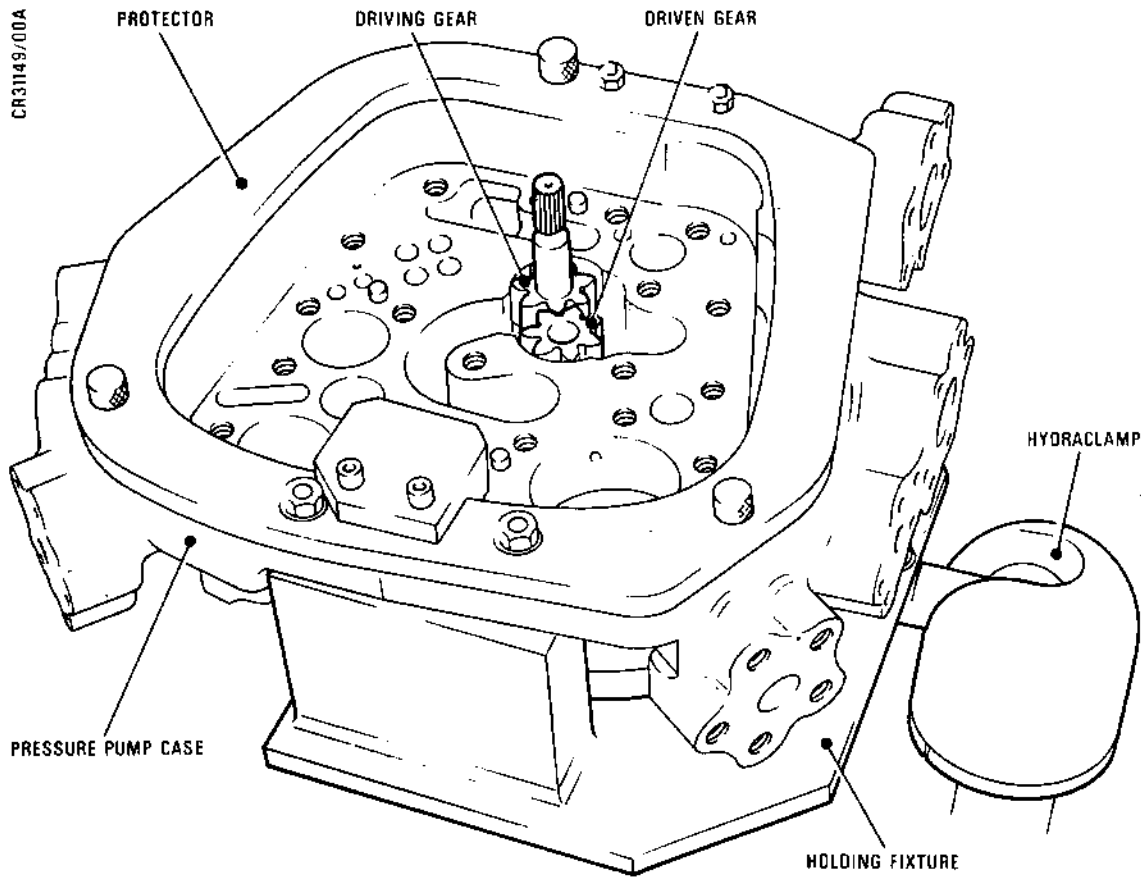
Assembling No.1 Scavenge Pump  
Figure 509

SUB-ASSEMBLY  
**72-65-00**  
Page 515  
Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Assembling Pressure Pump Case to Holding Fixture  
Figure 510

SUB-ASSEMBLY

72-65-00

Page 516

Jul 1/75

IN19893



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (5) Withdraw the pin from the driven gear, then remove the gears and apply lubricant 'A' to the gear teeth, end faces and journals. Replace the gears in their original attitudes.
- (6) Remove the protector from the CB scavenge pump case, then place the case on a clean, flat, surface, with its gear pockets uppermost.
- (7) Install the gears (5-130) in the CB scavenge pump case.

NOTE: The two gears are identical, but should be assembled in their original attitude as shown by the gear teeth engagement markings. The driving gear rotates counter-clockwise as viewed on top of the gear pockets.

- (8) Check the endfloat using a straight edge and feeler gauges then check the backlash and radial clearance using feeler gauges (Ref. Fig.506). Take measurements at several positions to obtain mean clearances, then check the figures obtained are within the limits quoted in the Fits and Clearances (FCS-448/454, 452, 449/453).
- (9) Remove the gears from the CB scavenge pump case, apply lubricant A to the gear teeth, end faces and journals, then transfer the gears, in their original attitude to the locations in the pressure pump case.
- (10) Assemble the CB scavenge pump case to the pressure pump case to locate the pressure pump and CB scavenge pump gear journals in the bushes.

NOTE: Figure 511 shows the CB scavenge pump case assembled to the pressure pump case with the headed pin in position.

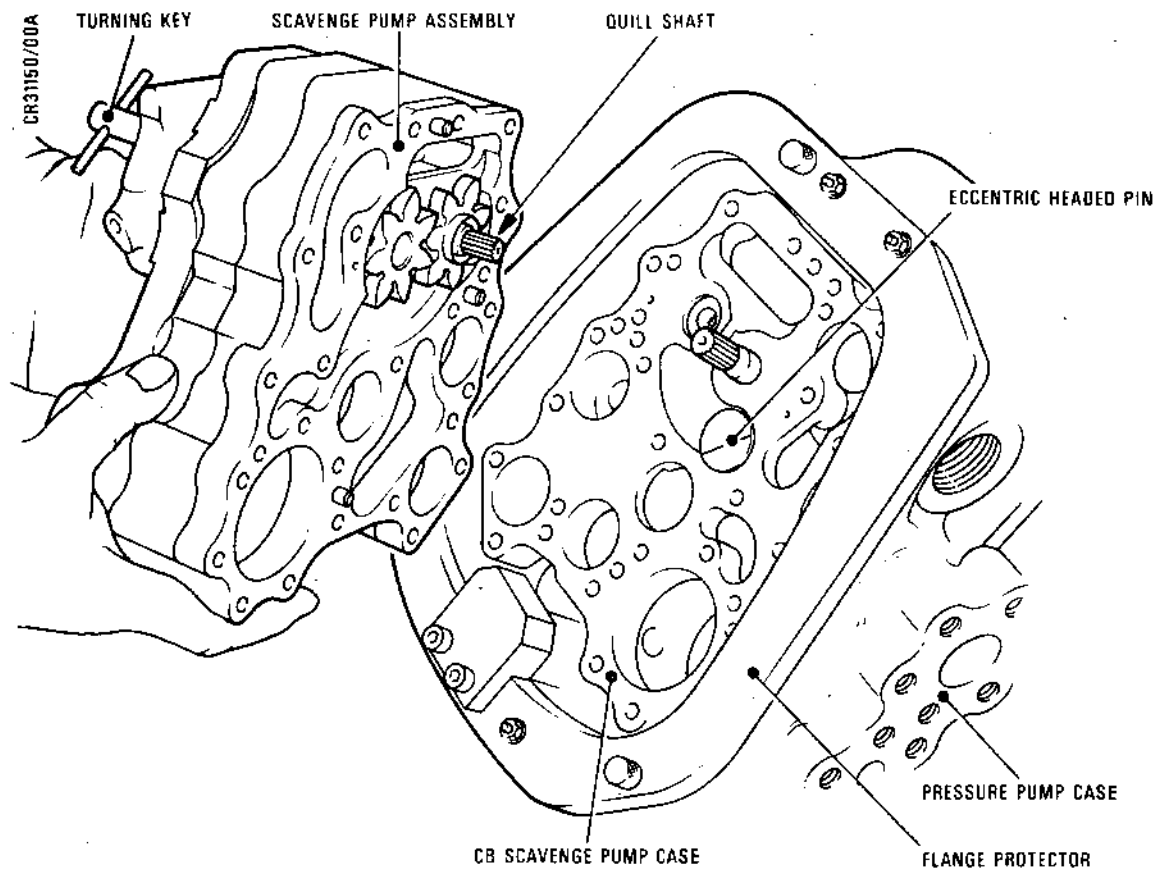
- (11) Insert the headed pin (4-200) through the CB scavenge pump case and pressure pump driven gear into the bush in the pressure pump case. Locate the eccentric head of the pin into the location in the CB scavenge pump case.

NOTE: If the pin is a tight fit it may be necessary to shrink it in a freezing agent for approx 5 minutes prior to assembly.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Assembling Scavenge Pumps to Pressure Pump  
Figure 511

SUB-ASSEMBLY  
**72-65-00**

Page 518  
Jul 1/75

IN29823



OLYMPUS 593

MK.610-14-28

OVERHAUL



F. Assemble the Scavenge Pumps to the Pressure Pump (Ref. Fig.511).

- (1) Rotate the Hydraclamp to position the pressure pump case in a vertical plane, then insert the quill shaft (3-500) to line up the splines of the scavenge pump driving gears, so that the smaller end of the quill shaft protrudes from No.1 scavenge pump gear.
- (2) Insert the turning key (Tool 131) through No.4 scavenge pump driving gear, then carefully offer the scavenge pump cases to the pressure pump and CB cases so that the splines of the pressure pump driving gear enter the driving gear of No.1 scavenge pump and the splines of the quill shaft enter the driving gear of the CB scavenge pump. Rotate the turning key to engage the splines, then push the scavenge pump assembly fully home.

NOTE: The turning key must be fully engaged to ensure that the quill shaft engages the CB scavenge pump gear.

- (3) Return the unit to a horizontal position and, using the turning key, rotate the gears to ensure freedom of rotation, then remove the turning key.

NOTE: Do not invert the unit as the quill shaft will fall out of engagement.

G. Assemble the Sediment Strainer (Ref. Fig.512).

- (1) Assemble the holder (Tool 132) to a vice, then assemble the sediment strainer (3-60) to the sleeve (3-50) and insert them into the holder to locate the peg of the holder into the slots in the strainer.
- (2) Screw the jet (3-40) into the strainer and tighten using a tommy bar (Tool 1969).
- (3) Insert the strainer assembly into its location in No.4 scavenge pump case with the jet uppermost. If necessary tap into position using the driver (Tool 1479).
- (4) Place the cover (3-30) over the strainer, apply lubricant 'A' to the two short bolts (3-10) and the externally relieved bolt (3-20), then install the bolts to secure the cover. The bolts should only be hand-tight at this stage.

SUB-ASSEMBLY

**72-65-00**

Page 519

Aug 1/76

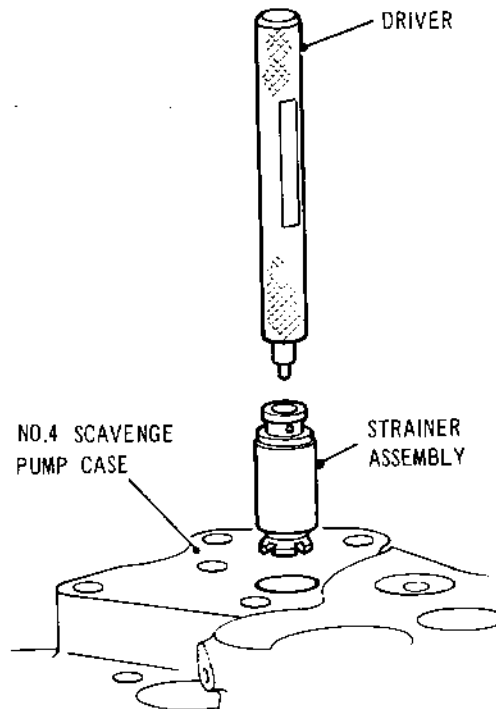
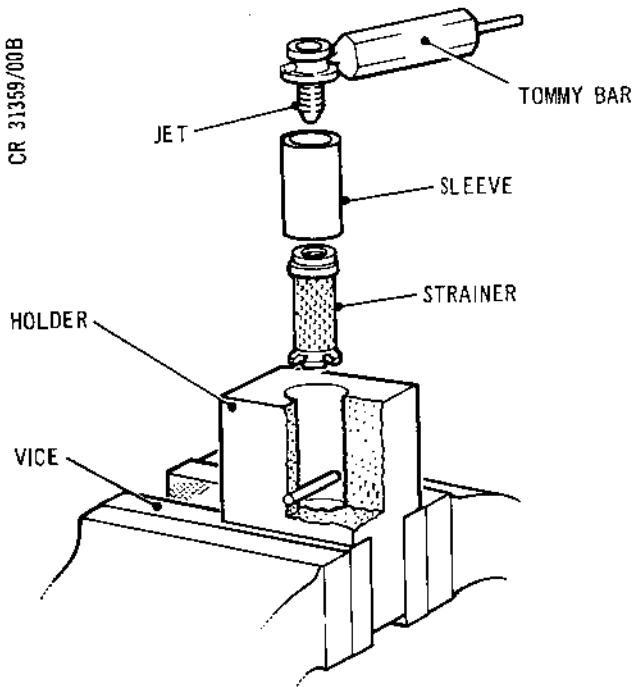


OLYMPUS 593

MK.610-14-28  
OVERHAUL

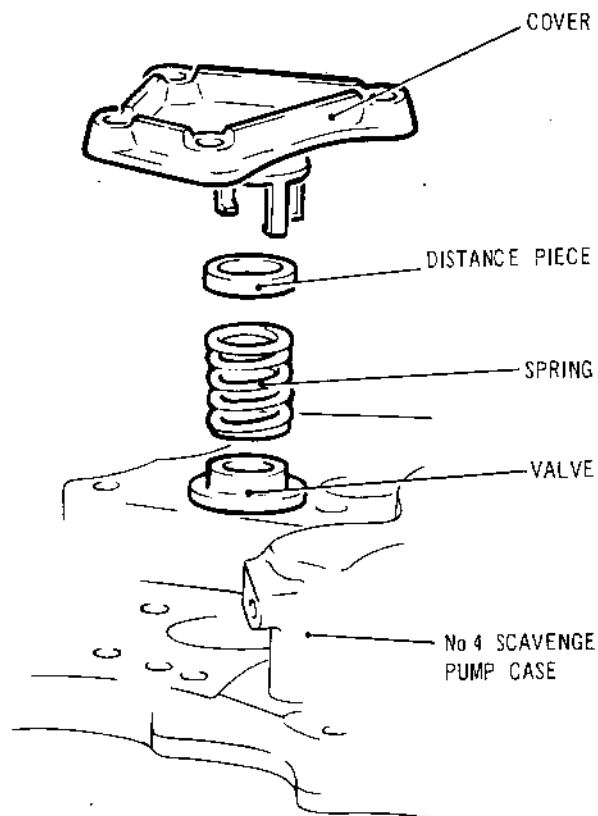


CR 31359/00B



Assembling and Installing Sediment Strainer  
Figure 512

CR 31361/00A



Assembling Check Valve  
Figure 513

SUB-ASSEMBLY  
**72-65-00**  
Page 520  
Aug 1/76

96861N1



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



H. Assemble the Check Valve (Ref. Fig.513).

- (1) Assemble the spring (3-100) to the boss of the check valve (3-110), then assemble these to the cover (3-80). If a distance piece (3-90) was previously used, this should be inserted between the spring and the cover.
- (2) Offer the check valve assembly to its location in No.4 scavenge pump case, then apply lubricant 'A' to the four bolts (3-70) and install the bolts to secure the cover. The bolts should only be hand-tight at this stage.

I. Secure the Pump Casings.

NOTE: The identification and location of the retaining bolts and washers is given in Table 501. The positions for installing the bolts and washers, also the torque-tightening sequence, is shown in Fig.514.

- (1) Position the load spreading washers as shown, then apply lubricant 'A' to the bolts and install the bolts to secure the pump cases.
- (2) Torque-tighten the bolts in the sequence shown (Ref. Fig.514) between 67 and 73 lbf in. (7,6 and 8,2 N.m), checking that the run-down torque is not less than 3,5 lbf in. (0,4 N.m).
- (3) Using the turning key, rotate the gears to ensure freedom of rotation.

LOCATION ON FIG.514	WASHER ITEM NO.	LOCATION ON FIG.514	BOLT ITEM NO.
21, 22, 23	4-20, 40	5, 8, 10, 11,	3-150, 170,
6	3-140	12, 14, 16,	190, 210
10	3-180	17, 18	
8/12, 16/18	3-160	6, 7, 9, 13,	3-130, 250,
5/14	3-200	15	270
11/17	3-220	2	3-230
2	3-240	21	4-10
7/15	3-260	22, 23	4-30
9/13	3-280		

Location of Fixing Bolts and Washers  
Table 501

SUB-ASSEMBLY

72-65-00

Page 521

Aug 1/76

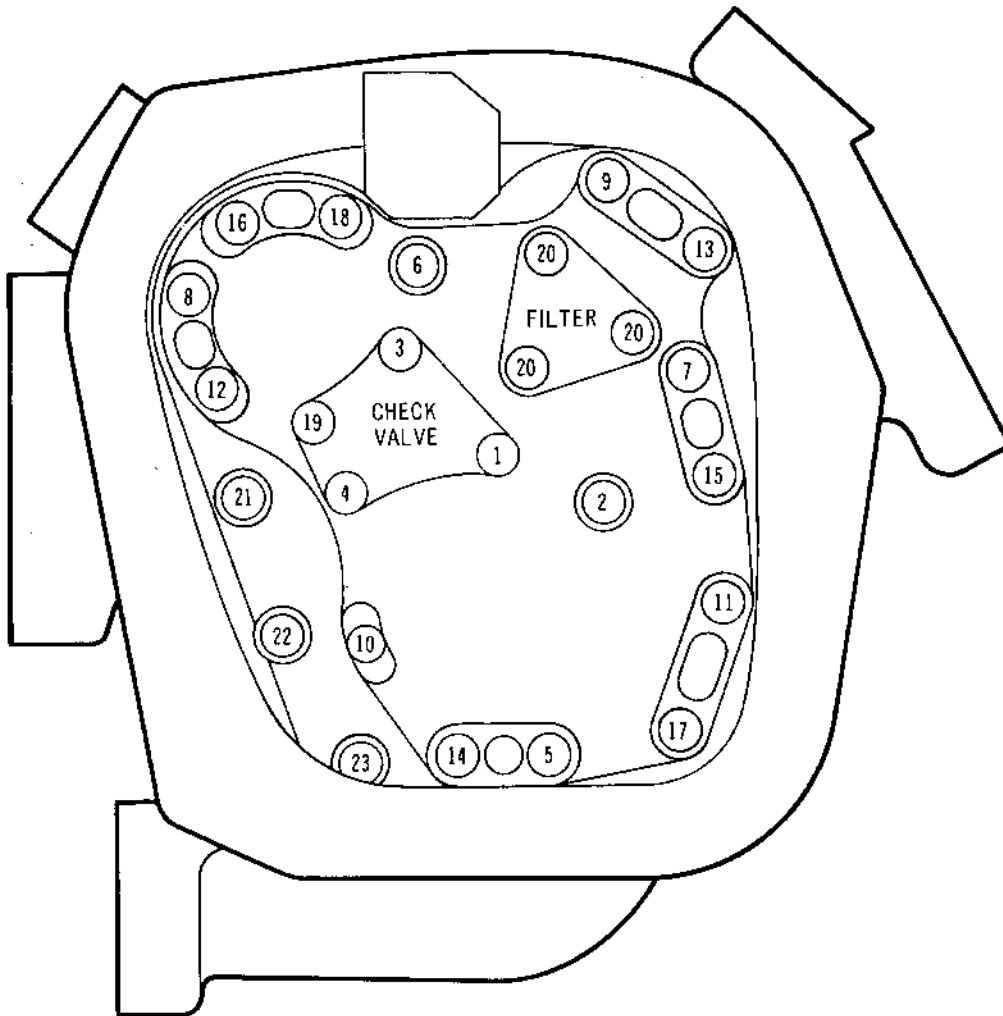


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 31349/00A



8686TNT

Locating Bolts and Washers, and Torque-  
Tightening Sequence  
Figure 514

SUB-ASSEMBLY  
**72-65-00**  
Page 522  
Jul 1/75

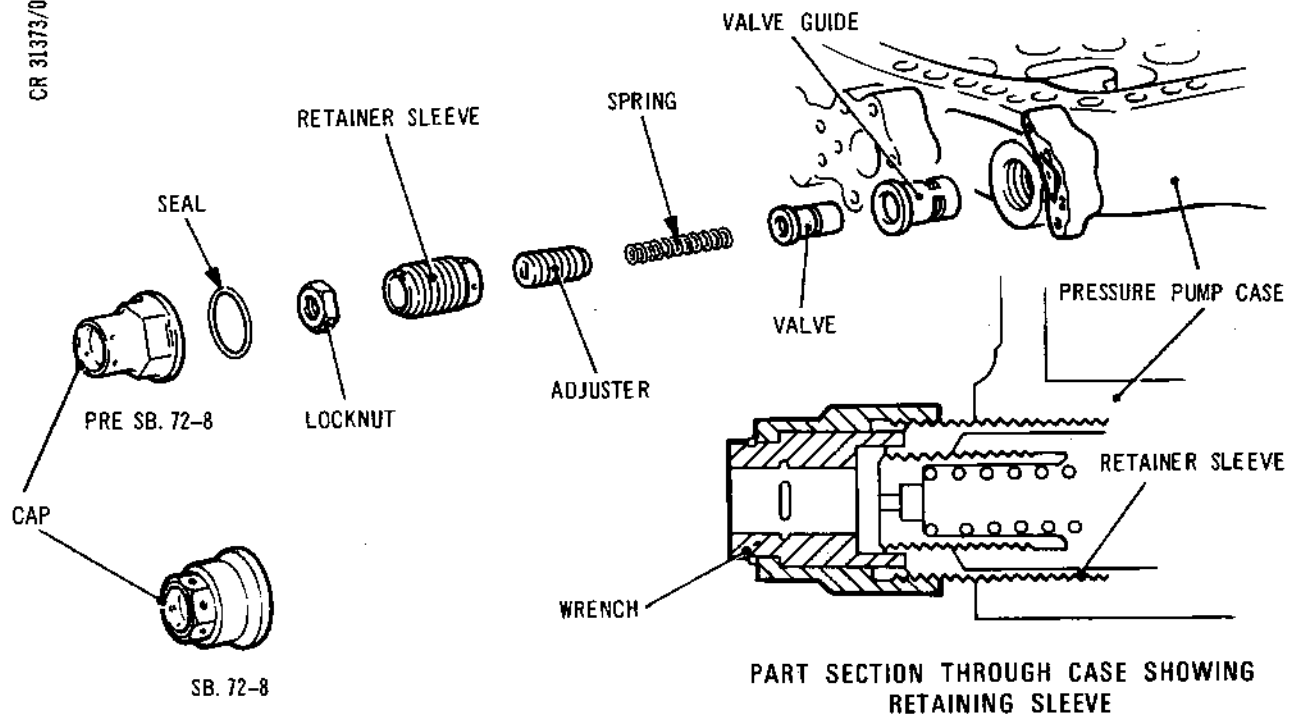




OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 31373/00B



Assembling Relief Valve  
Figure 515

SUB-ASSEMBLY  
**72-65-00**  
Page 523  
Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

## J. Assemble the Relief Valve (Ref. Fig.515).

- (1) Check that the valve (5-70) is a free sliding fit in the valve guide (5-80), then remove the valve.
- (2) Apply lubricant 'A' to the inside and outside diameters of the valve guide, place it headed end first on the drift (Tool 1970), then insert the guide into the relief valve location in the pressure pump casing, lightly tapping the drift if necessary.
- (3) Apply lubricant 'A' to the outside diameter of the valve (5-70), then insert the valve into the valve guide.
- (4) Apply lubricant 'A' to the threads of the adjuster, (5-40), then screw the adjuster through the retainer sleeve (5-60) until the threads of the adjuster protrude.
- (5) Apply lubricant 'A' to the threads of the retainer sleeve, then install the torque adaptor assembly (Tool 3155) over the sleeve so that it locates in the slots.

NOTE: The torque adaptor set (Tool 3155) contains a tap plug which may be used to clean the threads of the retainer sleeve prior to assembly. If this is used, care must be taken to ensure that no metallic particles enter the relief valve.

- (6) Insert the spring (5-50) into the adjuster, then screw the adjuster and retainer sleeve into the relief valve location, ensuring that the spring is located in the valve. Torque-tighten the retainer sleeve between 290 and 310 lbf in. (33 and 35 N.m), then unscrew and remove the torque adaptor assembly (Tool 3155).
- (7) Screw the locknut (5-30) onto the adjuster, then using the adjuster tool (Tool 1593), screw the adjuster so that two threads are showing beyond the locknut. Torque-tighten the locknut between 170 and 190 lbf in. (19,2 and 21,5 N.m).

SUB-ASSEMBLY

72-65-00

Page 524  
Jun 30/00

CR 31350/00C  
BS00000039/5

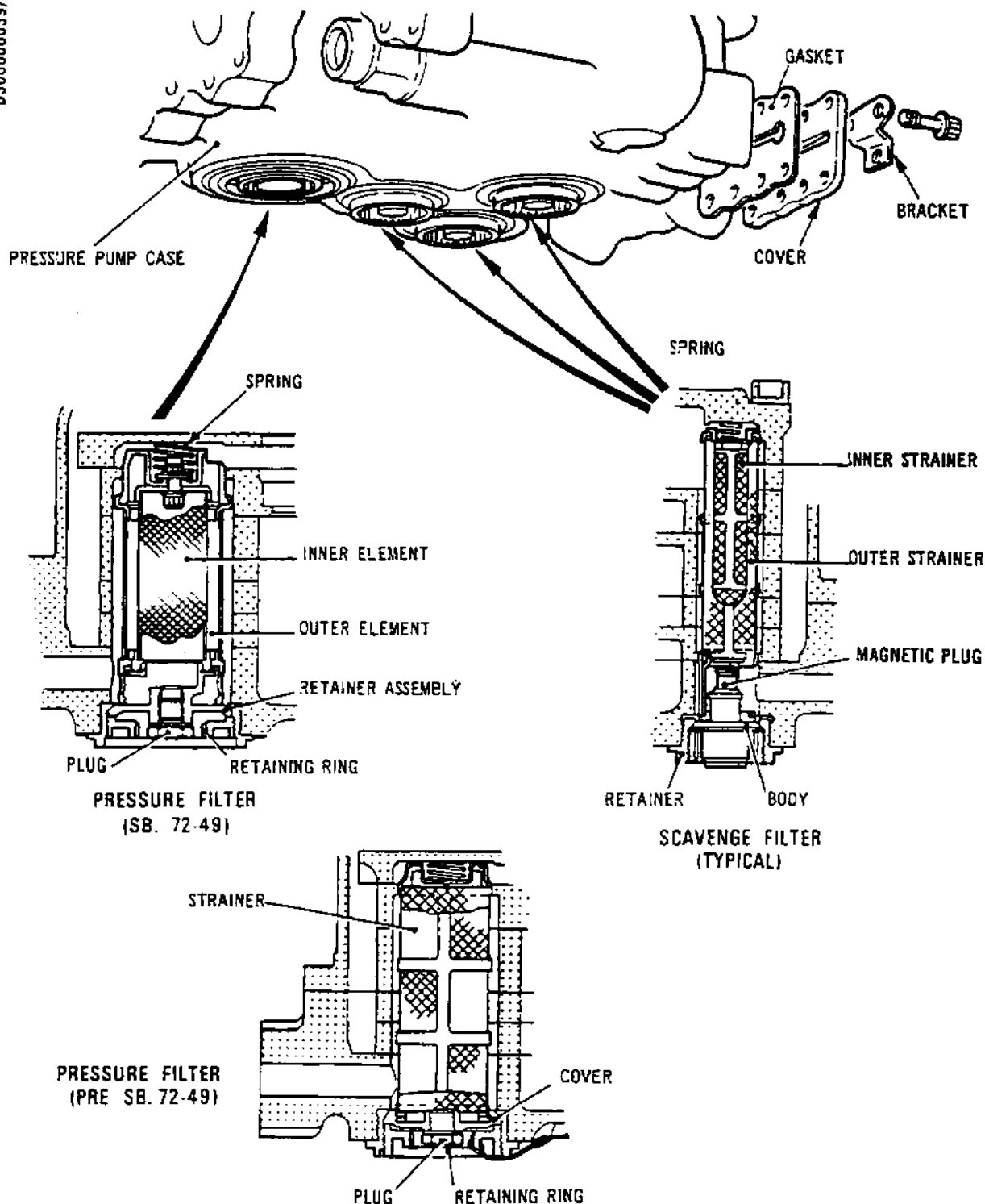


OLYMPUS 593

MK.610-14-28  
OVERHAUL



SNECMA



Assembly of Pressure and Scavenge Filters  
(Pre SB.OL.593-72-9036-419)  
Figure 516

CR 36652/00A  
BS00002646/4

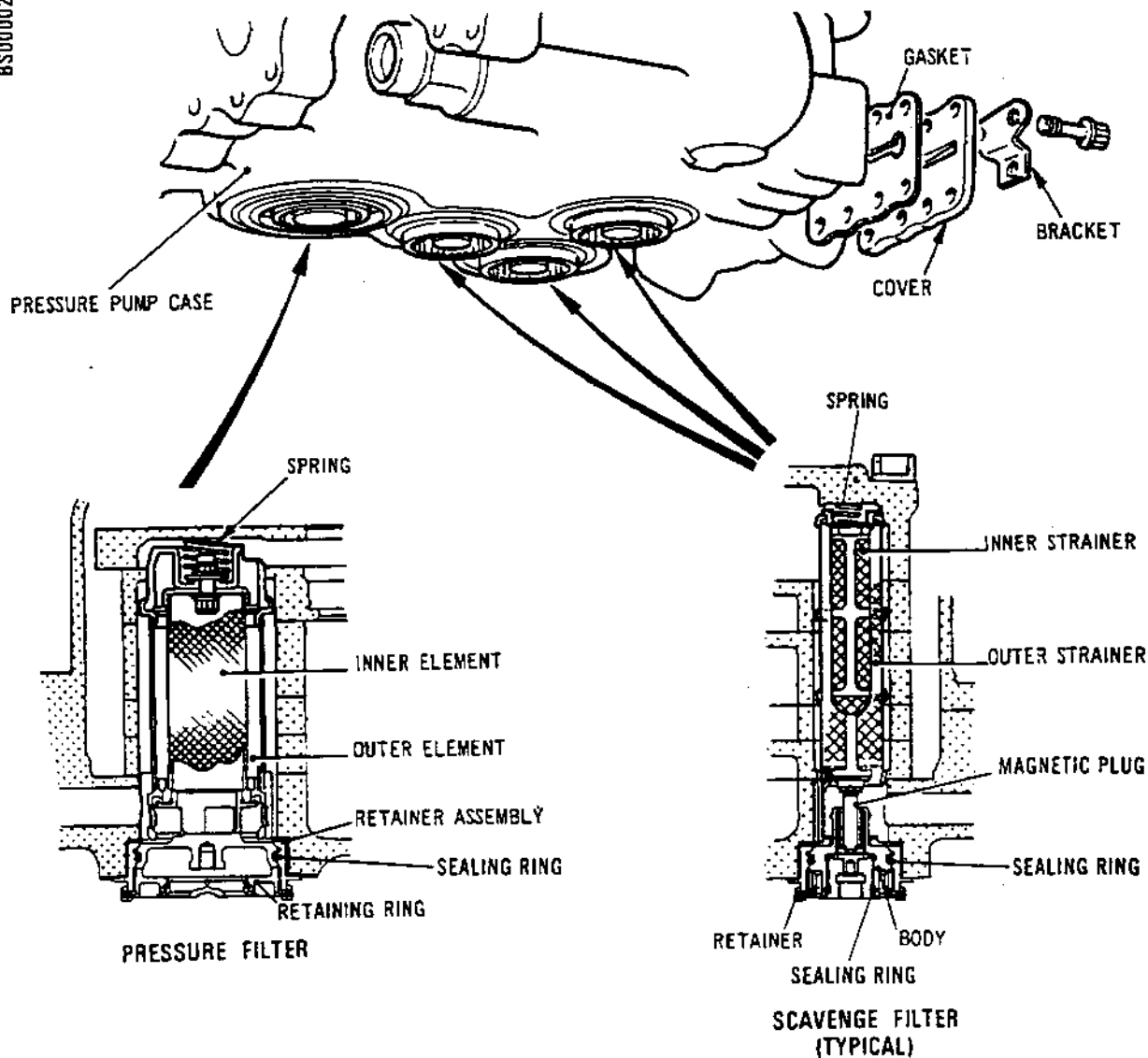


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Assembling Scavenge and Pressure Pump Filters  
(SB.OL.593-72-9036-419)  
Figure 517



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (8) Insert corruplus seal (5-20) to the groove in the cap (5-10). Screw the cap onto the retainer sleeve and torque-tighten between 170 and 190 lbf in. (19,2 and 21,5 N.m) using the crowfoot wrench (Tool 1579 pre-SB.72-8 or Tool 1972, SB.72-8).

NOTE: This cap will be wire-locked after engine test.

- K. Install the Scavenge Filters and Magnetic Plugs (Ref. Fig.516 and 517).

NOTE: There are three scavenge filters, each incorporating a magnetic plug. The following procedure for assembly and installation is identical for each filter.

- (1) Assemble the scavenge filters and magnetic plugs (Pre SB.0L.593-72-9036-419) (Ref.Fig.516).
- (a) Assemble the spring (2-120) to the inner strainer (2-100) so that the end coil of the spring enters the location groove in the strainer.
- (b) Assemble the inner strainer to the outer strainer (2-110), then screw the body (2-90) into the strainer unit until the threads disengage.
- (c) Apply lubricant 'A' to the threads of the strainer body, then assemble the magnetic plug (2-70) where applicable, to the strainer body.
- (d) Assemble the two remaining scavenge filters in the same manner.

CAUTION: IT IS OF THE UTMOST IMPORTANCE TO ENSURE THAT ALL MAGNETIC PLUG ASSEMBLIES ARE FULLY TORQUE TIGHTENED ON ASSEMBLY, ALSO, WHEN FITTING ASSEMBLIES MODIFIED TO SB.0L.593-72-9036-419 STANDARD A SERVICEABLE 'O' SEAL MUST BE FITTED. FAILURE TO DO THIS CAN RESULT IN OIL LEAKAGE IN FLIGHT WHICH MAY NOT BE APPARENT DURING GROUND CHECKS/RUNNING.

- (2) Assemble the scavenge filters and magnetic plugs (SB.0L.593-72-9036-419) (Ref.Fig.517).
- (a) Assemble the spring (2-120) to the inner strainer (2-100) so that the end coil of the spring enters the location groove in the strainer.

SUB-ASSEMBLY

72-65-00

Page 527

Dec 31/99



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (b) Assemble the inner strainer to the outer strainer (2-110), then screw the body (2-90) into the strainer unit until the threads disengage.
  - (c) Apply lubricant 'A' to the threads of the strainer body. Install a sealing ring (2-34) on the magnetic plug (2-70B), then assemble the magnetic plug to the strainer body.
  - (d) Assemble a sealing ring (2-36) to the strainer body.
  - (e) Assemble the two remaining scavenge filters in the same manner.
- (3) Install the scavenge filters (Ref. Fig.516).

- (a) Rotate the oil pump on the Hydraclamp so that it is almost vertical.

NOTE: Do not turn the oil pump further than the vertical position or the quill shaft will fall out of engagement.

- (b) Enter the strainer into the location in the base of the pressure pump case, then press the strainer unit in to compress the spring.
- (c) Apply lubricant 'A' to the threads of the retaining ring (2-80), then screw in the retaining ring, with the wire-lock holes outwards, to secure the strainer unit.
- (d) Using the wrench (Tool 1478) torque-tighten the retaining ring to between 60 and 70 lbf ft (82 and 94 N.m), then torque-tighten the magnetic probe/plug to 30 lbf ft (40,7 N.m).
- (e) Install the two remaining scavenge filters in the same manner, torque-tightening the retaining rings between 60 and 70 lbf ft (82 and 94 Nm), and the magnetic probes/plugs to 30 lbf ft (40,7 Nm).

NOTE: The retaining rings will be wire-locked after engine test.



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

L. Install the Pressure Filter (Ref.Fig.516 and 517).

**NOTE:** Para.(1) applies only if fine mesh filters to SB.72-49 are not supplied already assembled.

(1) Assemble the pressure filter (SB.72-49 only).

- (a) Insert the closed end of the inner filter element (2A-59) into the outer filter element, and insert the bolt (2A-55), lubricated with lubricant A, through the two elements from the inside.
- (b) Feed the spring (2A-54) with the closed coil towards the element over the bolt, and retain with a washer (2A-53) and nut (2A-52).
- (c) Check that the run-down torque is not less than 3.5 lbf in. (0,4 N.m), then torque-tighten the nut between 67 and 73 lbf in. (7,6 and 8,2 N.m).

(2) Assemble the filter to the case.

**NOTE:** If the strainer (2-50) is pre-SB.72-49 standard, ensure the maximum overall length is within 5.400 in.  $\pm$  0.010 in. (137,16 mm  $\pm$  0,25 mm). For those strainers in excess of this length refer to SB.72-112.

- (a) Screw the cover (2-40) onto the strainer (2-50) until the threads disengage (pre-SB.72-49), or screw the retainer assembly (2A-45) into the filter element until the threads disengage (SB.72-49).
- (b) On engines to SB.0L.593-72-9036-419, assemble a sealing ring (2B-32) to the cover (2B-45B).
- (c) Insert the filter assembly into the location in the base of the pressure pump case.
- (d) Apply lubricant 'A' to the threads of the retaining ring (2-30) or (2-30B) SB.72-27. Apply pressure to the filter, to compress the spring, and secure with the retaining ring. On pumps pre-SB.72-27 ensure the angled locking-wire holes face outward.

SUB-ASSEMBLY

72-65-00

Page 529

Dec 30/98



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (e) Using the wrench (Tool 1478) torque-tighten the retaining ring between 125 and 135 lbf ft (170 and 183 Nm).
- (f) On engines Pre SB.0L.593-72-9036-419 only, apply lubricant 'A' to the threads of the plug (2-10) then assemble the plug with the seal (2-20) to the filter assembly and torque-tighten between 230 and 250 lbf in. (26 and 28 Nm) checking that for SB.72-49 standard only, that the run-down torque is between 14 and 120 lbf in. (1,6 and 14 Nm).

NOTE: The retaining ring and plug will be wire-locked after engine test.

- (g) Return the oil pump to a horizontal position.

M. Prepare for Despatch.

- (1) Assemble the cover to the negative G bleed location (Ref.Fig.516).
  - (a) Apply lubricant 'A' to the eight bolts (5-90) insert two of them through the bracket (5-100), then screw the eight bolts through the cover (5-110) and gasket (5-120) into the negative G bleed location in the pressure pump casing.
  - (b) Check that the run-down torque is not less than 3.5 lbf in. (0,4 N.m), then torque-tighten the bolts between 67 and 73 lbf in. (7,6 and 8,2 Nm).
- (2) Insert the quillshaft (3-120) into the driving gear of No.4 scavenge pump.
- (3) Remove the oil pump from the holding fixture and place it in a suitable tray, then remove the holding fixture from the Hydraclamp.
- (4) The oil pump is now ready for assembling to the left-hand gearbox (Ref.72-62-00 Assembly).

SUB-ASSEMBLY

72-65-00

Page 530

Dec 30/98



**CHAPTER**

**5**

**TIME  
LIMITS**

**OLYMPUS 593****MK.610-14-28  
OVERHAUL****sneema****CHAPTER 5****TIME LIMITS****LIST OF EFFECTIVE PAGES**

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
List of Effective Pages	1	Dec 31/00			
Table of Contents	1	Jul 1/77			
5-10-01	1	Jul 1/77			
	2	Jul 1/77			
	3	Jul 1/77			
	4	Jul 1/77			
5-10-03	1	Jun 1/96			
	2	Jun 1/96			
	2A	Dec 1/97			
	2B	Jun 1/96			
	3	Dec 1/97			
	4	Dec 1/97			
	5	Jun 1/99			
	6	Dec 31/00			
	7	Dec 31/00			
	8	Dec 30/98			
	9	Dec 30/98			
	10	Dec 30/98			
	11	Dec 30/98			
	12	Dec 30/98			
	13	Dec 1/96			
	14	Dec 30/98			
	15	Dec 1/97			
	16	Dec 1/96			



OLYMPUS 593

MK.610-14-28

OVERHAUL



CHAPTER 5

TIME LIMITS/MAINTENANCE CHECKS

TABLE OF CONTENTS

CH/SEC/SUB

■ Flight Profiles and Operational Monitoring -	
■ Engine Group 'A' Parts	5-10-01
■ Lives of Group 'A' Parts	5-10-03

PRINTED IN ENGLAND

TN32138



OLYMPUS 593

MK.610-14-28

OVERHAUL



FLIGHT PROFILES AND OPERATIONAL MONITORING -  
ENGINE GROUP 'A' PARTS

1. General

Certain engine parts, mainly those of the rotating assemblies, are subject to cyclic fatigue and a failure could hazard the safety of the aircraft. These are defined as group 'A' parts, identified by a serial number and subject to a mandatory life control procedure. The life limitations of the group 'A' parts are established by cyclic rig testing and examination of new and service-run parts and these limits must not be exceeded.

A. Datum Flight Profile.

The life limits are converted into equivalent flight cycles based on the rate of fatigue life usage determined from the datum flight profile shown in Figures 1 and 2.

The initial accounting factor for both subsonic and supersonic flight is taken as 1.0, and for touch and go is taken as 0.4 of the datum flight cycle.

B. Flight Profile Monitoring.

It will be the operators responsibility to define the flight profile which is representative of actual service operations over his entire route structure and to provide Rolls-Royce with the results in the form used for the flight datum profile in Figures 1 and 2.

This information should be provided at the completion of the first six months of operations and will contribute to any required changes in authorized lives, or the accounting factors for supersonic, sub-sonic and touch and go flights.

Periodically, at intervals not exceeding one year from the date of the first return, operators will repeat the check and provide Rolls-Royce with the updated information. Additionally, the check should be repeated at any time within this period if it is considered that the actual flight profile is no longer representative of the operation.

PRINTED IN ENGLAND

TN32139

5-10-01

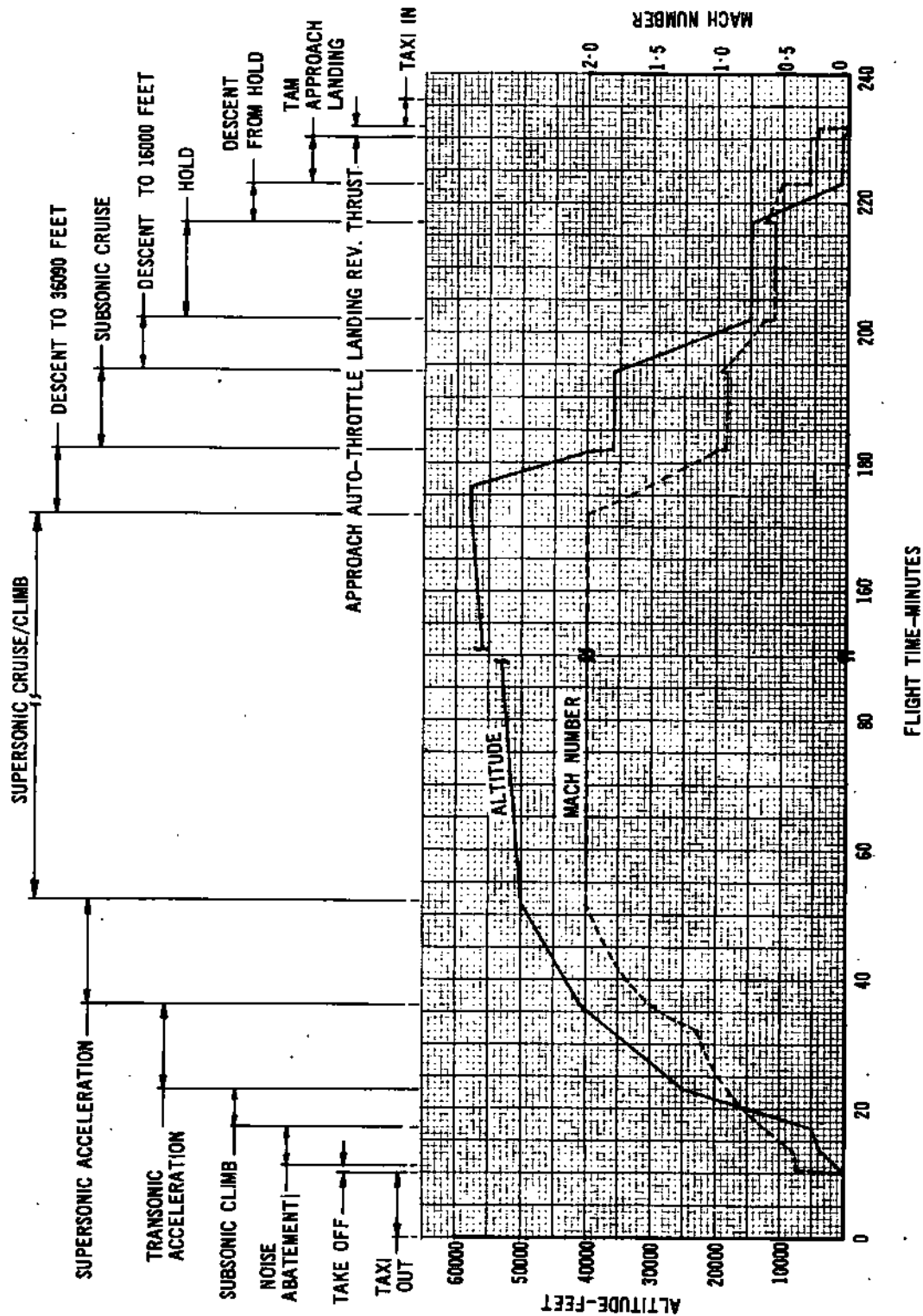
Page 1  
Jul 1/77



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 34354/00A



Typical Supersonic Service Flight - Altitude and Mach No.  
Figure 1

5-10-01

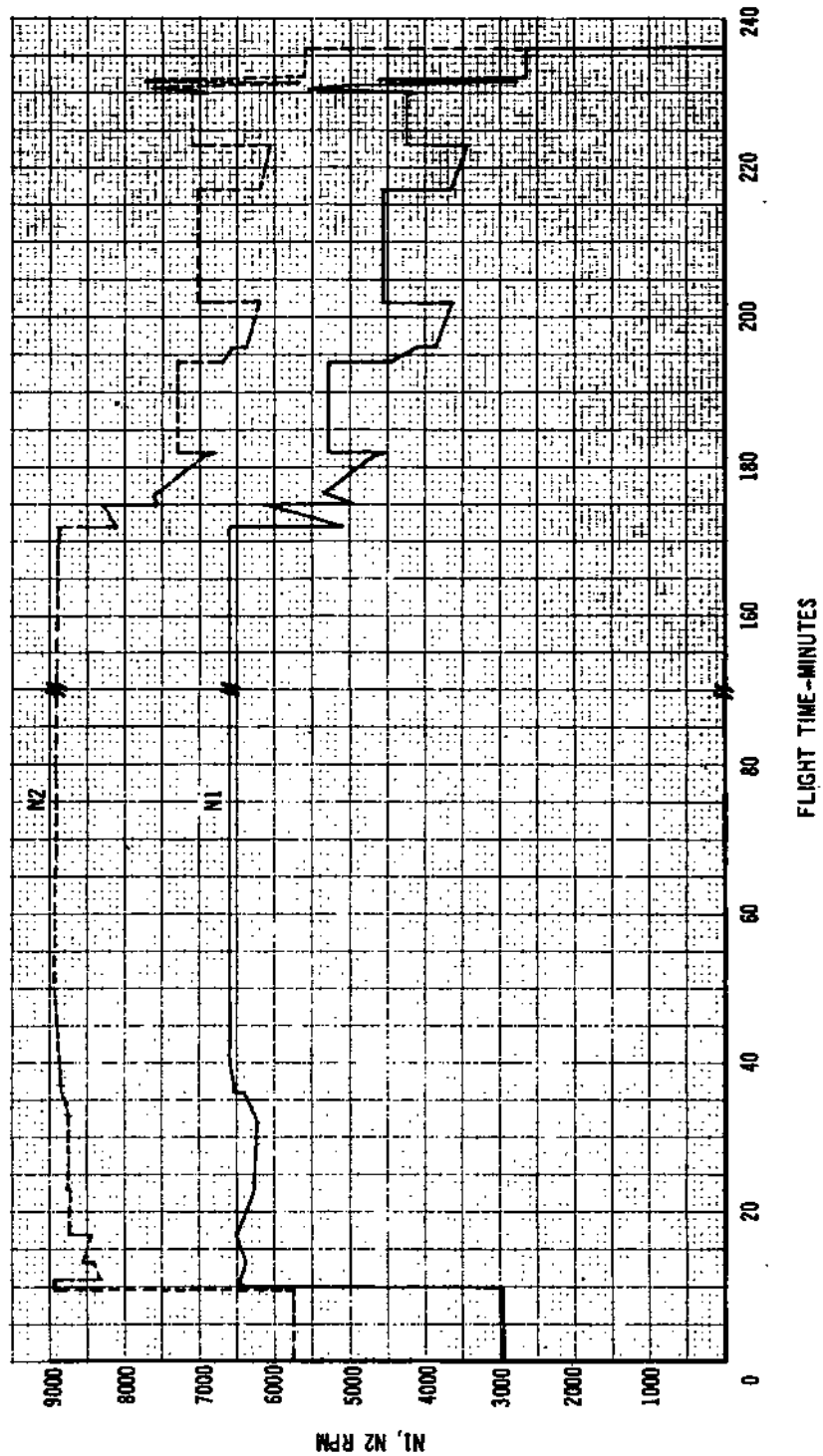
Page 2  
Jul 1/77

TN32140

TN32141

PRINTED IN ENGLAND

CR 34353/00A



Typical Supersonic Service Flight - Rotating Assembly Speeds  
Figure 2

5-10-01

Page 3  
Jul 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



## 2. Life Control Procedures

Rolls-Royce will identify the group 'A' parts and provide the relevant cyclic lives in Chapter 5-10-03.

It is the responsibility of the operator to monitor service lives of group 'A' parts and ensure that the approved life limits are not exceeded. When an engine, module or part is returned to a repair facility, it is the responsibility of the operator to record on the relevant documentation the total flying hours and number of flight cycles accruing to the engine, module or part. The Repair Agency will take responsibility for identifying the parts life situation in respect of engines, modules, returned to the Operator after overhaul, or re-work.

TN32142

5-10-01

Page 4

Jul 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

LIVES OF GROUP 'A' PARTS1. General

Group 'A' parts have maximum approved lives which are mandatory and must not therefore be exceeded in service.

**CAUTION:** IT IS POSSIBLE TO REACH THE MAXIMUM APPROVED LIFE OF A PART IN AN ENGINE/MODULE BETWEEN REWORKS OR BEFORE SOME OTHER REASON REQUIRES REMOVAL OF AN ENGINE/MODULE. IT IS THE OPERATOR'S RESPONSIBILITY TO ENSURE THESE APPROVED PART LIVES ARE NOT EXCEEDED.

The lives are expressed in terms of "flight cycles" based on a Datum Flight Profile. The definition of a "flight cycle" is: A normal take-off to landing according to the Datum Flight Profile for the engine type, see Chapter 5-10-01.

2. Life Limits

An asterisk (\*) will be positioned against a limit to denote a finite life. Lives not so marked are likely to be increased as testing and service experience permits and should not therefore be used for long term provisioning or budget purposes.

3. Group 'A' Parts Lives

<u>Component</u>	<u>Part No.</u>	<u>Declared Life</u> <u>(Flight Cycles)</u>
------------------	-----------------	--

## LP Compressor Disk:

**NOTE:** Items marked thus ++ should be examined for any other identification markings or numbers and the details relayed to C.E.S.O. Rolls-Royce plc, Bristol, for the purpose of possible life extension.

Stage 1	B.902963, B.916430, B.922796,	9450
72-31-03/1-160	B.929440, B.929477, B.930006,	
	B.930175, B.930651, B.930652,	
	B.936916, B.936917, B.936918,	
	B.516358	

**NOTE:** LPC St.1 disks identified within SB.72-8974-368 as being manufactured from early batch IMI material (Pre-cast F7054) are to be withdrawn from service at the next exposure or in any case not later than 31 December 1995.

Table 1 (Continued)

5-10-03

 Page 1  
 Jun 1/96



**OLYMPUS 593**

MK.610-14-28

OVERHAUL



sneema

<u>Component</u>	<u>Part No.</u>	<u>Declared Life</u> <u>(Flight Cycles)</u>
Stage 2 72-31-03/1-250	B.902964, B.916431, B.922799, B.929442, B.929478, B.930177, B.930654, B.932723, B.932724, B.513773, B.513774, B.516359	12200 See NOTE
	B.514389, B.514390	4700

**NOTE:** Any disks identified within SB.72-8973-367 as being manufactured from early batch IMI material (Pre cast F7054) are to be withdrawn from service at the next exposure or in any case not later than 31 December 1995. Affected disks may be inspected and modified in accordance with this Service Bulletin and returned to service with total lives of 4700 flight cycles finite.

Stage 3 72-31-03/1-360	B.902965, B.916432, B.922801, B.929444, B.929479, B.930179, B.930655, B.932725, B.932726, B.513775, B.513776, B.516360	9600 See NOTE
	B.514391, B.514392	4700

**NOTE:** Any disks identified within SB.72-8973-367 as being manufactured from early batch IMI material (Pre cast F7054) are to be withdrawn from service at the next exposure or in any case not later than 31 December 1995. Affected disks may be inspected and modified in accordance with this Service Bulletin and returned to service with total lives of 4700 flight cycles finite.

Table 1 (Continued)

**5-10-03**Page 2  
Jun 1/96

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

SNECMA

Printed in England

<u>Component</u>	<u>Part No.</u>	<u>Declared Life</u> <u>(Flight Cycles)</u>
------------------	-----------------	--

Stage 4	B.902966, B.916433, B.922803	9000
72-31-03/2-60	B.929446, B.929480, B.930181, B.930656, B.932727, B.932728, B.513777, B.513778, B.516361	See NOTE

B.514393, B.514394	4200
--------------------	------

Except Serial No.

++ C015 (Batch No.060AV) 2200\*

++ C016 (Batch No.061AV)

**NOTE:** Any disks identified within SB.72-8973-367 as being manufactured from early batch IMI material (Pre cast F7054) are to be withdrawn from service at the next exposure or in any case not later than 31 December 1995. Affected disks may be inspected and modified in accordance with this Service Bulletin and returned to service with total lives of 4200 flight cycles finite.

Stage 5	B.902967, B.916434, B.922805,	12000
72-31-03/2-120	B.929448, B.929481, B.930183, B.930657, B.932729, B.932730, B.513779, B.513780, B.516362	See NOTE

B.514395, B.514396	3200
--------------------	------

**NOTE:** Any disks identified within SB.72-8973-367 as being manufactured from early batch IMI material (Pre cast F7054) are to be withdrawn from service at the next exposure or in any case not later than 31 December 1995. Affected disks may be inspected and modified in accordance with this Service Bulletin and returned to service with total lives of 3200 flight cycles finite.

Table 1 (Continued)

5-10-03

Page 2A  
Dec 1/97

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



SNECMA

<u>Component</u>	<u>Part No.</u>	<u>Declared Life</u> <u>(Flight Cycles)</u>
Stage 6 72-31-03/2-180	B.902968, B.916435, B.922807, B.929450, B.929482, B.930185, B.930658, B.932731, B.932732, B.513781, B.513782, B.516363	23000 See NOTE
	B.514397, B.514398	4700
	Except Serial No. ++ C0029 (Batch No.393FX)	2200*
<b>NOTE:</b> Any disks identified within SB.72-8973-367 as being manufactured from early batch IMI material (Pre cast F7054) are to be withdrawn from service at the next exposure or in any case not later than 31 December 1995. Affected disks may be inspected and modified in accordance with this Service Bulletin and returned to service with total lives of 4700 flight cycles finite.		
Stage 7 72-31-03/3-340	B.904570, B.916436, B.925080, B.929452, B.929453, B.930187, B.930659, B.932733, B.932734 B.513783, B.513784, B.516364	14250 See NOTE
	B.514399, B.514400	4700
	Except Serial No. CE001 (Batch No.181AQ) CE019 (Batch No.70THB)	2200*

**NOTE:** Any disks identified within SB.72-8973-367 as being manufactured from early batch IMI material (Pre cast F7054) are to be withdrawn from service at the next exposure or in any case not later than 31 December 1995. Affected disks may be inspected and modified in accordance with this Service Bulletin and returned to service with total lives of 4700 flight cycles finite.

Table 1 (Continued)

**5-10-03**Page 28  
Jun 1/96

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

SNECMA

Printed in England

<u>Component</u>	<u>Part No.</u>	<u>Declared Life</u> <u>(Flight Cycles)</u>
LP Compressor Spacer:		
Stage 1-2	B.429872, B.444610, B.922798,	9950
72-31-03/1-190	B.929441, B.930176, B.516352	See NOTE
<u>NOTE:</u> Any spacers identified within SB.72-8974-368 as being manufactured from early batch IMI material (Pre-cast F7054) are to be withdrawn from Service at the next exposure or in any case not later than 31 December 1995. Affected spacers may be inspected and modified in accordance with this Service Bulletin and returned to Service with total lives of 4700 flight cycles finite.		
	B.514361, B.514362, B.514363	4700
Stage 2-3	B.429873, B.444611, B.922800,	9950
72-31-03/1-280	B.929443, B.930178, B.516353	See NOTE
<u>NOTE:</u> Any spacers identified within SB.72-8974-368 as being manufactured from early batch IMI material (Pre-cast F7054) are to be withdrawn from Service at the next exposure or in any case not later than 31 December 1995. Affected spacers may be inspected and modified in accordance with this Service Bulletin and returned to Service with total lives of 4700 flight cycles finite.		
	B.514365, B.514366, B.514367	4700

Table 1 (Continued)

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

<u>Component</u>	<u>Part No.</u>	<u>Declared Life</u> <u>(Flight Cycles)</u>
Stage 3-4 72-31-03/2-30	B.429874, B.922802, B.929445, B.930180, B.516354	9950 See NOTE
<b>NOTE:</b> Any spacers identified within SB.72-8974-368 as being manufactured from early batch IMI material (Pre-cast F7054) are to be withdrawn from Service at the next exposure or in any case not later than 31 December 1995. Affected spacers may be inspected and modified in accordance with this Service Bulletin and returned to Service with total lives of 4700 flight cycles finite.		
	B.514369, B.514370	4700
Stage 4-5 72-31-03/2-90	B.423303, B.922804, B.929447, B.930182, B.516355	9950 See NOTE
<b>NOTE:</b> Any spacers identified within SB.72-8974-368 as being manufactured from early batch IMI material (Pre-cast F7054) are to be withdrawn from Service at the next exposure or in any case not later than 31 December 1995. Affected spacers may be inspected and modified in accordance with this Service Bulletin and returned to Service with total lives of 4700 flight cycles finite.		
	B.514371, B.514372	4700
Stage 5-6 72-31-03/2-150	B.423304, B.922806, B.929449, B.930184, B.516356	9950 See NOTE
<b>NOTE:</b> Any spacers identified within SB.72-8974-368 as being manufactured from early batch IMI material (Pre-cast F7054) are to be withdrawn from Service at the next exposure or in any case not later than 31 December 1995. Affected spacers may be inspected and modified in accordance with this Service Bulletin and returned to Service with total lives of 4700 flight cycles finite.		
	B.514373, B.514374, B.514375	4700

Table 1 (Continued)

**5-10-03**Page 4  
Dec 1/97



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

Printed in England

<u>Component</u>	<u>Part No.</u>	<u>Declared Life</u> <u>(Flight Cycles)</u>
Stage 6-7 72-31-03/3-270	B.423305, B.922808, B.929451, B.930186, B.516357	9950 See NOTE
<b>NOTE:</b> Any spacers identified within SB.72-8974-368 as being manufactured from early batch IMI material (Pre-cast F7054) are to be withdrawn from Service at the next exposure or in any case not later than 31 December 1995. Affected spacers may be inspected and modified in accordance with this Service Bulletin and returned to Service with total lives of 4700 flight cycles finite.		
	B.514376, B.514377	4700
LP Rotor Shaft Assembly, Rear 72-31-03/3-230	B.509533, B.922515, B.930085 B.935731, B.936864	11200
LP Drive Shaft Assembly, Front 72-31-04/1-110	B.922580 (Assy. of B.922582) B.922581 (Assy. of B.922583) B.922585 (Assy. of B.922587) B.922586 (Assy. of B.922588) B.922592 (Assy. of B.922593) B.927114 (Assy. of B.922593) B.927118 (Assy. of B.926912) B.930086 (Assy. of B.922583)	3600
	B.933250 (Assy. of B.933251) B.933253 (Assy. of B.933259) B.933254 (Assy. of B.933259) B.933255 (Assy. of B.933260) B.933256 (Assy. of B.933261) B.933257 (Assy. of B.933262) B.933258 (Assy. of B.933263)	11600 See NOTE 1
	B.517095 (Assy. of B.517098)	4800 See NOTE 2
	B.517096 (Assy. of B.517099)	4800
<b>NOTE 1:</b> The above declared life only applies if SB.72-8625-230 is accomplished before 1850 flight cycles; otherwise, the declared life is 3600 flight cycles.		

Table 1 (Continued)

5-10-03

Page 5  
Jun 1/99



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England

<u>Component</u>	<u>Part No.</u>	<u>Declared Life (Flight Cycles)</u>
<p><b>NOTE 2:</b> The above declared life only applies if SB.72-8625-230 is accomplished after 1850 flight cycles and before 3050 flight cycles.</p>		
LP Drive Shaft Rear 72-31-04/2-120	B.922348, B.926914	8400
HP Compressor Disk:		
Stage 1 72-33-02/1-230	B.506873, B.506874, B.506875, B.506876, B.506877, B.506878, B.506879, B.506880, B.506881, B.506882, B.506883, B.506917, B.506918, B.506920, B.506922, B.506923, B.904642, B.904645, B.904696, B.916373, B.916374, B.916382, B.919943, B.919944, B.919945, B.922266, B.922267, B.929301, B.929302, B.929303, B.929304, B.929305, B.929306, B.929307, B.929459, B.930190, B.930191, B.930693, B.930694	5200* See Note 2
	B.513649	10450
<p><b>NOTE 1:</b> HPC St.1 disks identified within SB.72-8974-368 as being manufactured from early batch IMI material (Pre-cast F7054) are to be withdrawn from service at the next exposure or in any case not later than 31 December 1995.</p>		

Table 1 (Continued)

5-10-03

Page 6  
Dec 31/00

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sheema

Printed in England

<u>Component</u>	<u>Part No.</u>	<u>Declared Life</u> <u>(Flight Cycles)</u>
<b>NOTE 2:</b> Ref. Mandatory Service Bulletin 72-8843-323. Unless individually identified below, all other double melt titanium (pre Service Bulletin 72-8955-369) HP1 disks are finite lived at 5200 flight cycles. The disks listed below are cleared to the full declared life of 10450 flight cycles.		
	JB02C (Batch No.J001D)	10450
	JB03C (Batch No.J001D)	
	JB28G (Batch No.J001D)	
	JB31G (Batch No.J001D)	
	JB55D (Batch No.J994C)	
	JB68L (Batch No.J137D)	
	JB69L (Batch No.J137D)	
	JB70L (Batch No.J137D)	
	JB72L (Batch No.J137D)	
	JB81S (Batch No.J510D)	
	JB82S (Batch No.J510D)	
	JB84S (Batch No.J510D)	
	JB98B (Batch No.J994C)	
Stage 2 72-33-02/1-300	B.509592, B.509593, B.512567, B.512570, B.512723, B.512724, B.512725, B.512726, B.512740, B.512741, B.512742, B.512743, B.516997, B.516998, B.516999, B.517000, B.517001, B.517002, B.904643, B.916375, B.919889, B.919946, B.922268, B.922269, B.929380, B.929381, B.929382, B.930695, B.930696	6350 See NOTE

**NOTE:** The above declared life is subject to S.B.72-8951-364 every 1200 flight cycles. The full declared lives may only be achieved by components which remain within the defined corrosion acceptance limits.

Table 1 (Continued)

5-10-03

Page 7  
Dec 31/00



**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

<u>Component</u>	<u>Part No.</u>	<u>Declared Life</u> <u>(Flight Cycles)</u>
Stage 3 72-33-02/1-350	B.509596, B.509597, B.512568, B.512571, B.512730, B.512731, B.512732, B.512733, B.512734, B.512735, B.512736, B.512737, B.512746, B.512747, B.512748, B.512749, B.512750, B.512751, B.512752, B.512753, B.517003, B.517004, B.517005, B.517006, B.517007, B.517008, B.517009, B.517010, B.517011, B.517012, B.922857, B.922858, B.925081, B.925082, B.929392, B.929393, B.929395, B.929396, B.930697, B.930698	4100 See NOTE

**NOTE:** The above declared life is subject to S.B.72-8951-364 every 1200 flight cycles. The full declared lives may only be achieved by components which remain within the defined corrosion acceptance limits.

Stage 4 72-33-02/2-20	B.922861, B.922862, B.930779, B.930780	5000
	Except Serial No. J94R5 (Batch No. J349V) J37R3 (Batch No. J299U)	3050* 2950*

Stage 5 72-33-02/2-70	B.922865, B.922866, B.922867, B.922868, B.930781, B.930782, B.930783, B.930784	2180
--------------------------	--	------

B.510909, B.510910, B.510911, B.510912, B.510913, B.510914, B.510915, B.510916	1200 See NOTE 3
--	--------------------

Except Serial No.  
JZJ67 (Batch No. J090T)(See NOTE 1 2000\*  
below)  
J89E0 (Batch No. J351U)(See NOTE 2  
below)

**NOTE 1:** SB 72-8907-344 must NOT be applied.

**NOTE 2:** SB 72-8907-344 may be applied.

**NOTE 3:** To qualify for full 1200 flight cycle life disks serial Nos.J14CA and JZJ66 are to be crack checked after 200 and before 958 and 931 flight cycles respectively (Refer to SB 0L.593-72-9051-428).

Table 1 (Continued)

**5-10-03**Page 8  
Dec 30/98



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

snecma

Printed in England

<u>Component</u>	<u>Part No.</u>	<u>Declared Life (Flight Cycles)</u>
Stage 6 72-33-02/2-120	B.922871, B.922872, B.922873, B.922874, B.930785, B.930786, B.930787, B.930788	1650
	B.509174, B.509175, B.509176, B.509177, B.509178, B.509179, B.509180, B.509181	See NOTE 1 below.
	Except Serial No. J71E2 (Batch No. J221U) (See NOTE 2 below)	1400*

**NOTE 1:** These discs are released for a life of 1100 flights after re-broaching, subject to an overall declared service life of 2700 flights. After 31/12/99 the overall life limit is reduced to 2500 flights.

## Air France Category 1

Serial No.	Part No.	Max post rebroach life up to end 1999	Max post rebroach life 1/1/2000 onwards
J3C75	B509177	691 Flt Cycles	491 Flt Cycles
J73CG	B509177	1100 Flt Cycles	1100 Flt Cycles
JJ324	B509176	1100 Flt Cycles	1100 Flt Cycles
JJ326	B509176	1100 Flt Cycles	1100 Flt Cycles
JZL59	B509177	953 Flt Cycles	753 Flt Cycles

Table 1 (Continued)

5-10-03

Page 9  
Dec 30/98

**OLYMPUS 593**

MK.610-14-28

sneema

OVERHAUL

ComponentPart No.Declared Life  
(Flight Cycles)**British Airways Category 1**

Serial No.	Part No.	Max post rebroach life up to end 1999	Max post rebroach life 1/1/2000 onwards
J10CN	B509181	1100 Flt Cycles	1100 Flt Cycles
J16CL	B509181	1100 Flt Cycles	1100 Flt Cycles
J40CA	B509181	1100 Flt Cycles	1100 Flt Cycles
J51CJ	B509180	1100 Flt Cycles	1100 Flt Cycles
J61CC	B509181	1100 Flt Cycles	1100 Flt Cycles
J62CC	B509181	1100 Flt Cycles	1100 Flt Cycles
J63CC	B509177	1100 Flt Cycles	1100 Flt Cycles
J6P87	B509177	1081 Flt Cycles	881 Flt Cycles
J6P89	B509177	1100 Flt Cycles	1100 Flt Cycles
J6P94	B509177	441 Flt Cycles	Scrapped
J70CL	B509181	1100 Flt Cycles	1100 Flt Cycles
J74CG	B509181	1100 Flt Cycles	1100 Flt Cycles
J92CP	B509181	1100 Flt Cycles	1100 Flt Cycles
JB70E	B509176	764 Flt Cycles	564 Flt Cycles
JB74E	B509176	1100 Flt Cycles	951 Flt Cycles
JB83F	B509176	927 Flt Cycles	727 Flt Cycles
JB86F	B509180	1100 Flt Cycles	1100 Flt Cycles
JC3W6	B509176	718 Flt Cycles	518 Flt Cycles
J85CP	B509181	1100 Flt Cycles	1100 Flt Cycles
J83CP	B509181	1100 Flt Cycles	1100 Flt Cycles

**Air France Discs in Category 2 to 4**

Serial No.	Part No.	Post rebroach inspection required at	Max post rebroach life up to end 1999	Max post rebroach life 1/1/2000 onwards
J54K2	B509176	200-700 Cycles	1100 Flt Cycles	1100 Flt Cycles
J58U8	B509177	N/A	1100 Flt Cycles	1100 Flt Cycles
J59U1	B509177	N/A	1100 Flt Cycles	1100 Flt Cycles
J60CC	B509181	200-700 Cycles	1100 Flt Cycles	1100 Flt Cycles
J6J30	B509176	N/A	1100 Flt Cycles	1100 Flt Cycles
J96E9	B509176	200-700 Cycles	1100 Flt Cycles	1100 Flt Cycles
J9W29	B509177	200-700 Cycles	1100 Flt Cycles	1100 Flt Cycles
JB46B	B509176	200-700 Cycles	1100 Flt Cycles	1100 Flt Cycles
JB76E	B509176	200-700 Cycles	1100 Flt Cycles	1100 Flt Cycles
JB87F	B509176	200-700 Cycles	1100 Flt Cycles	1100 Flt Cycles
J42U5	B509177	N/A	870 Flt Cycles	730 Flt Cycles
J54K0	B509176	N/A	916 Flt Cycles	Scrapped
J93R6	B509177	N/A	778 Flt Cycles	778 Flt Cycles
J94R3	B509177	N/A	721 Flt Cycles	Scrapped
J96EB	B509176	N/A	844 Flt Cycles	Scrapped
J42V3	B509177	200-500 Cycles	850 Flt Cycles	Scrapped
J6P92	B509177	200-500 Cycles	500 Flt Cycles	500 Flt Cycles
J97E4	B509176	200-450 Cycles	500 Flt Cycles	500 Flt Cycles

Table 1 (Continued)

**5-10-03**

**OLYMPUS 593**

MK.610-14-28

SNECMA

OVERHAUL

ComponentPart No.Declared Life  
(Flight Cycles)**British Airways Discs in Category 2 to 4**

Serial No.	Part No.	Post rebroach inspection required at	Max post rebroach Life up to end 1999	Max post rebroach Life 1/1/2000 onwards
J12CL	B509180	200-700 Cycles	1100 Flt Cycles	1100 Flt Cycles
J14CL	B509180	N/A	1100 Flt Cycles	1100 Flt Cycles
J18CL	B509181	200-700 Cycles	1100 Flt Cycles	1100 Flt Cycles
J74CP	B509181	200-700 Cycles	1100 Flt Cycles	1100 Flt Cycles
J84CP	B509181	200-700 Cycles	1100 Flt Cycles	1100 Flt Cycles
J90CP	B509181	N/A	1100 Flt Cycles	1100 Flt Cycles
JB72E	B509176	N/A	731 Flt Cycles	531 Flt Cycles
J42U6	B509177	200-500 Cycles	700 Flt Cycles	630 Flt Cycles
J58U9	B509177	200-500 Cycles	850 Flt Cycles	850 Flt Cycles
J81K8	B509177	200-450 Cycles	500 Flt Cycles	500 Flt Cycles
J93R4	B509177	200-500 Cycles	578 Flt Cycles	378 Flt Cycles
J97E5	B509176	200-500 Cycles	480 Flt Cycles	280 Flt Cycles
JB47B	B509176	200-500 Cycles	700 Flt Cycles	632 Flt Cycles
J94CQ	B509181	N/A	1100 Flt Cycles	1089 Flt Cycles

**NOTE 2:** SB 72-8895-314 must NOT be applied.

Stage 7 72-33-02/3-370	B.922610, B.925085, B.925086, B.925089, B.930789, B.930790, B.930791, B.934925	1200*
HP Rotor Shaft Front 72-33-02/1-260	B.922639, B.922640, B.922905, B.922906, B.922907, B.922908, B.927125, B.927126, B.927129, B.927130, B.927131, B.927132, B.930066, B.930067, B.930068, B.930069, B.930070, B.930071, B.930072, B.930073, B.930074, B.930075, B.930076, B.930077, B.930192, B.930193, B.513748, B.513749	13400 See NOTE

**NOTE:** HPC rotor shaft fronts identified within SB.72-8974-368 as being manufactured from early batch IMI material (Pre-cast F7054) are to be withdrawn from service at next exposure or in any case not later than 31 December 1995.

Table 1 (Continued)

**5-10-03**Page 11  
Dec 30/98



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

Printed in England

<u>Component</u>	<u>Part No.</u>	<u>Declared Life</u> <u>(Flight Cycles)</u>
HP Compressor Spacer:		
Stage 2-3 72-33-02/1-330	B.509594, B.509595, B.922835, B.922836	5650 See NOTE
<u>NOTE:</u> The above declared life is subject to S.B.72-8951-364 every 1200 flight cycles.		
Stage 3-4 72-33-02/1-380	B.922839, B.922840	6300
Stage 4-5 72-33-02/2-50	B.922843, B.922844	3450
Stage 5-6 72-33-02/2-100	B.922847, B.922848	3050
Stage 6-7 72-33-02/3-390	B.922851, B.922852, B.922853, B.922854, B.922855, B.922856	4100
HP Drive Shaft 72-33-02/3-330	B.923990, B.923991, B.925461, B.925462, B.935451, B.935452, B.935454, B.935455, B.517189, B.517190, B.517191, B.517192, B.517193, B.517194, B.517201, B.517202, B.517203, B.517204, B.517205, B.517206	4250
	B.512232, B.512233, B.512234, B.512235, B.512236, B.512237, B.512238, B.512239, B.517195, B.517196, B.517197, B.517198, B.517199, B.517200, B.517207, B.517208, B.517209, B.517210, B.517211, B.517212	700 See NOTE

NOTE: The above declared life only applies  
if SB.72-8923-363 is accomplished.

Table 1 (Continued)

5-10-03

Page 12  
Dec 30/98



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

Printed in England

<u>Component</u>	<u>Part No.</u>	<u>Declared Life</u> <u>(Flight Cycles)</u>
HP Turbine Disk 72-51-03/1-70	B.903093, B.903094, B.904584, B.904585, B.922628, B.922629, B.923984, B.923985, B.923986, B.923987, B.923988, B.925341, B.925342, B.925345, B.925346, B.925348, B.925349, B.925350, B.925894, B.925897, B.926922, B.926923, B.927113, B.929375, B.929398, B.929399, B.931796	1400*
	B.931800, B.931801, B.931802, B.931803, B.931804, B.931805, B.931806, B.931807, B.931808, B.931809, B.931810, B.931811, B.931812, B.931813, B.931814, B.931815, B.931816, B.931817, B.931838, B.931839, B.931840, B.931841, B.931842, B.931844, B.931845, B.931846, B.931847, B.931848, B.931849, B.931850, B.931851, B.931852, B.931853, B.931854, B.931855, B.933165, B.933166, B.933167, B.933168, B.933178	10550
	Except Serial No. CE033 (Batch No. 366JW) CE005 (Batch No. 235HY) CE039 (Batch No. 362JW)	2500* 4100* 4100*
HP Turbine Hub Assy. 72-51-04/1-300	B.439926, B.922102, B.514134 B.514136	7500 see NOTE

NOTE: The above declared life is subject to S.B.72-8983-378  
at not more than 1200 flight cycle intervals.

Table 1 (Continued)

5-10-03

Page 13  
Dec 1/96



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

Printed in England

<u>Component</u>	<u>Part No.</u>	<u>Declared Life</u> <u>(Flight Cycles)</u>
LP Turbine Disk 72-52-02/1-250	B.922251, B.922633, B.922634, B.922635, B.922968, B.922969, B.922970, B.925895, B.927170, B.927171, B.927172, B.927173, B.927802, B.927803	2500* See NOTE
<u>NOTE:</u> Pre SB 72-8483-145 or SB 72-8524-242.		
	B.930745, B.930747, B.930748, B.930749, B.930750, B.930751, B.930752, B.930753, B.930754, B.931818, B.931820, B.931821, B.931822, B.931823, B.931824, B.931825, B.931826, B.931827, B.933172, B.933174, B.933185	6600 See NOTE
	B.933182, B.938047, B.938185	6400 See NOTE
<u>NOTE:</u> This increased life is applied to disks which have been proof tested and crack inspected to SB 72-8483-145 or SB 72-8524-242.		
	Except Serial No. CE008 (Batch No. 593GG) CE016 (Batch No. 792JA) C0026 (Batch No. 020EL)	5600* 4350* 2500* See NOTE
<u>NOTE:</u> May be increased when disc is identified/found, Ref. BSM/PH/596.		
LP Turbine Hub Assy. 72-52-02/1-210	B.918605, B.922296, B.922662, B.922663	5000 See NOTE
<u>NOTE:</u> The above declared life is subject to S.B.72-8673-240 between 500 and 1800 flight cycles.		

Table 1 (Continued)

5-10-03

Page 14  
Dec 30/98

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

SNECMA

Printed in England

<u>Component</u>	<u>Part No.</u>	<u>Declared Life</u> <u>(Flight Cycles)</u>
Trunnion 71-20-00/1-60	B.480959, B.507464	8200
Combustion Chamber Outer Case Assembly 72-41-02/2-410	B.919216, B.919217, B.927196, B.928174, B.928176, B.927190, B.919240, B.516595, B.516597, B.516598, B.516599, B.516601, B.516777, B.516779, B.516780, B.516781, B.516783	12150 See NOTE
The above declared life is subject to S.B.72-8657-220 and 72-8861-330 before 2500 flight cycles are exceeded (See below).		
	B.919218, B.928171, B.928173, B.928175, B.919244, B.925806, B.516594, B.516596, B.516600, B.516602, B.516776, B.516778, B.516782, B.516784	7500 See NOTE
The above declared life is subject to S.B.72-8657-220 and 72-8861-330 before 2500 flight cycles are exceeded (See below).		
	B.919204, B.919207, B.919208, B.919671, B.919672, B.919673, B.919674, B.516606, B.516607, B.516608, B.516612, B.516613, B.516614, B.516615, B.516788, B.516789, B.516790, B.516794, B.516795, B.516796, B.516797	7700 See NOTE
The above declared life is subject to S.B.72-8657-220 and 72-8861-330 before 2500 flight cycles are exceeded (See below).		
	B.919206, B.919239, B.928172, B.928178, B.933211, B.516603, B.516604, B.516605, B.516785, B.516786, B.516787	20100

Table 1 (Continued)

**5-10-03**Page 15  
Dec 1/97



**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

<u>Component</u>	<u>Part No.</u>	<u>Declared Life</u> <u>(Flight Cycles)</u>			
<b>LIVES APPROPRIATE TO VARIOUS STANDARDS OF CCOC WITH BOSS WELD MISMATCHES</b>					
<b>CCOC Std</b>	<b>Snecma hand welded</b>	<b>Bolted igniter boss</b>	<b>Welded Igniter boss</b>		
	B919207-8	B919216-7	B919218	B919244	B925806
	B919671-4	B919240	B928173	B928175	B928171
	B919204	B927190			
		B927196			
		B928174			
		B928176			
<b>Measured boss Offset inches</b>	<b>Intrascopes and similar bosses Life-flight cycles</b>	<b>Intrascopes similar bosses Life-flight cycles</b>	<b>Intrascopes similar bosses Life-flight cycles</b>	<b>Igniter Life-flight cycles</b>	
Below .016	7700	12150	7500	7500	
.016 to .0169	7700	11800	7500	7100	
.017 to .0179	7700	10900	7500	6800	
.018 to .0189	7700	10200	7500	6500	
.019 to .0199	7700	9550	7500	6200	
.020 to .0209	7700	8900	7500	5900	
.021 to .0219	7700	8350	7500	5650	
.022 to .0229	7700	7800	7500	5400	
.023 to .0239	7300	7300	7300	5200	
.024 to .0249	6850	6850	6850	5000	
.025 to .0259	6400	6400	6400	4800	
.026 to .0269	6000	6000	6000	4600	
.027 to .0279	5600	5600	5600	4400	
.028 to .0289	5250	5250	5250	4250	
.029 to .0299	4900	4900	4900	4100	
.030 to .0309	4600	4600	4600	3950	
.031 to .0319	4300	4300	4300	3800	
.032 to .045	2500	2500	2500	2500	
above .045	Quarantine	Quarantine	Quarantine	Quarantine	
			Where a CCOC has offsets in the igniter and intrascopes bosses select the lowest life from the table above.		

Table 1 (Concluded)

**NOTE:** For conversion engines (CBX series), the accumulated cyclic life must be carried forward.

**5-10-03**Page 16  
Dec 1/96

**CHAPTER**

**70**

**STANDARD  
PRACTICES-  
ENGINE**

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

CHAPTER 70STANDARD PRACTICESLIST OF EFFECTIVE PAGES

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
List of Effective Pages	1	Jun 30/01			
Table of Contents	1	Jun 30/01			
70	1	Jun 1/96			
	2	Jun 1/96			
	3	Jun 1/96			
	4	Jun 1/96			
70-00-01	1	Dec 1/87			
	2	Dec 1/87			
	3	Dec 1/87			
	4	Dec 1/87			
70-00-02	1	Jun 30/01			
	2	Jun 30/01			

**OLYMPUS 593****MK.610-14-28  
OVERHAUL****sneema****CHAPTER 70****STANDARD PRACTICES****TABLE OF CONTENTS**

	<b>§</b>	<b><u>CH/SEC/SUB</u></b>	<b><u>PAGE</u></b>
General...	...	70	1
References to T.S.D.594	...	70	1
Life Limitations and Storage Conditions for Flexible Rings, Hoses and Rubber Components	...	70-00-01	1
Inspection/Check Policy - Reporting of Potential Safety Issues...	...	70-00-02	1

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



sneema

CHAPTER 70STANDARD PRACTICES

## 1. General.

- A. Standard practices applicable to a particular engine topic, e.g. Disassembly, Cleaning, or Assembly, are included in Chapter 72-09-00 of the topic.
- B. Standard practices for Power Plant disassembly and assembly are included in Chapter 71-09-00.
- C. Standard practices contained in Chapter 70 are general in nature and apply to all topics.

## 2. References to T.S.D.594.

- A. The Rolls-Royce Overhaul Process Manual T.S.D.594 has been deleted from service and replaced by the Rolls-Royce Overhaul Process Manual T.S.D.594-J. This manual contains the same information but is compiled to meet the requirements in ATA 100 section 2-13-4.
- B. The processes in T.S.D.594 were compiled as follows:
  - (1) General
  - (2) Processing
  - (3) Details and Control of Solutions
  - (4) Materials
  - (5) Safety Precautions
- C. The processes in T.S.D.594-J are compiled as follows:
  - (1) Materials
  - (2) Details of Control of Solutions
  - (3) Safety Precautions
  - (4) General
  - (5) Processing



OLYMPUS 593

MK.610-14-28

OVERHAUL



snecma

D. Application of Task Numbering System (Ref. Fig.1).

- (1) The TASK numbering system used in T.S.D.594-J is based on the Jet Engine Maintenance Task Oriented Support System (J.E.M.T.O.S.S.) requirement specified in ATA100 Specification, Section 2-13-4. The TASK and SUBTASK numbers of the manual are formulated for electronic data processing use; the format still allows the manual to be used in hard copy form.
- (2) The system uses an expansion of the existing ATA100, 3-element numbering system, to which fourth, fifth and sixth elements have been added. The content of this manual is considered to be Standard Practices, therefore the ATA100, 3-element number used is 70-00-00. The fourth element numerically defines the function being performed, the fifth element defines the Overhaul Process, the sixth element is provided to create a unique number for SUBTASKS of the TASK. The sixth element is also used alpha-numerically to identify differences between methods and techniques of the Overhaul Process, TASK/SUBTASK accomplishment (see Fig.1).

E. Appendices and Supplements.

- (1) An appendix will be allocated the alpha-numeric sixth element at TASK level e.g. 70-00-00-300-302-A01 is an appendix to TASK 70-00-00-300-302.
- (2) A supplement will be allocated the alpha-numeric sixth element at TASK level, e.g. 70-00-00-300-301-S01 is a supplement to TASK 70-00-00-300-301.



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

F. How to refer from T.S.D.594 to T.S.D.594-J.

(1) When a reference to T.S.D.594 is made, the reference is either the complete Overhaul Process, i.e. O.P.110, or to a specific paragraph to be actioned, i.e. O.P.101 Para.2.B. When this occurs refer to T.S.D.594-J as follows:

(a) When the complete Overhaul Process is called out refer to the TASK (TASK means complete process) in T.S.D.594-J as follows:

T.S.D.594 O.P.101 =  
TASK 70-00-00-100-101 (T.S.D.594-J O.P.101)

(b) When a specific paragraph is to be actioned refer to the SUBTASK (SUBTASK means part of process) in T.S.D.594-J as follows:

T.S.D.594 O.P.101 Para.2.B. =  
SUBTASK 70-00-00-110-101-001 (T.S.D.594-J O.P.101)

(c) When a reference is made to an appendix of an Overhaul Process, refer to the TASK in T.S.D.594-J as follows:

T.S.D.594 O.P.409 App.2 =  
TASK 70-00-00-300-409-A02 (T.S.D.594-J O.P.101)

(d) When a reference is made to a supplement of an Overhaul Process, refer to the TASK in T.S.D.594-J as follows:

T.S.D.594 O.P.409 Supp.12 =  
TASK 70-00-00-300-409-S12 (T.S.D.594-J O.P.101)

(e) A full reference list from T.S.D.594 Overhaul Process and paragraph to T.S.D.594-J TASK and SUBTASK is contained in the 'HOW TO USE' section of T.S.D.594-J Engine Overhaul Processes Manual.



# OLYMPUS 593

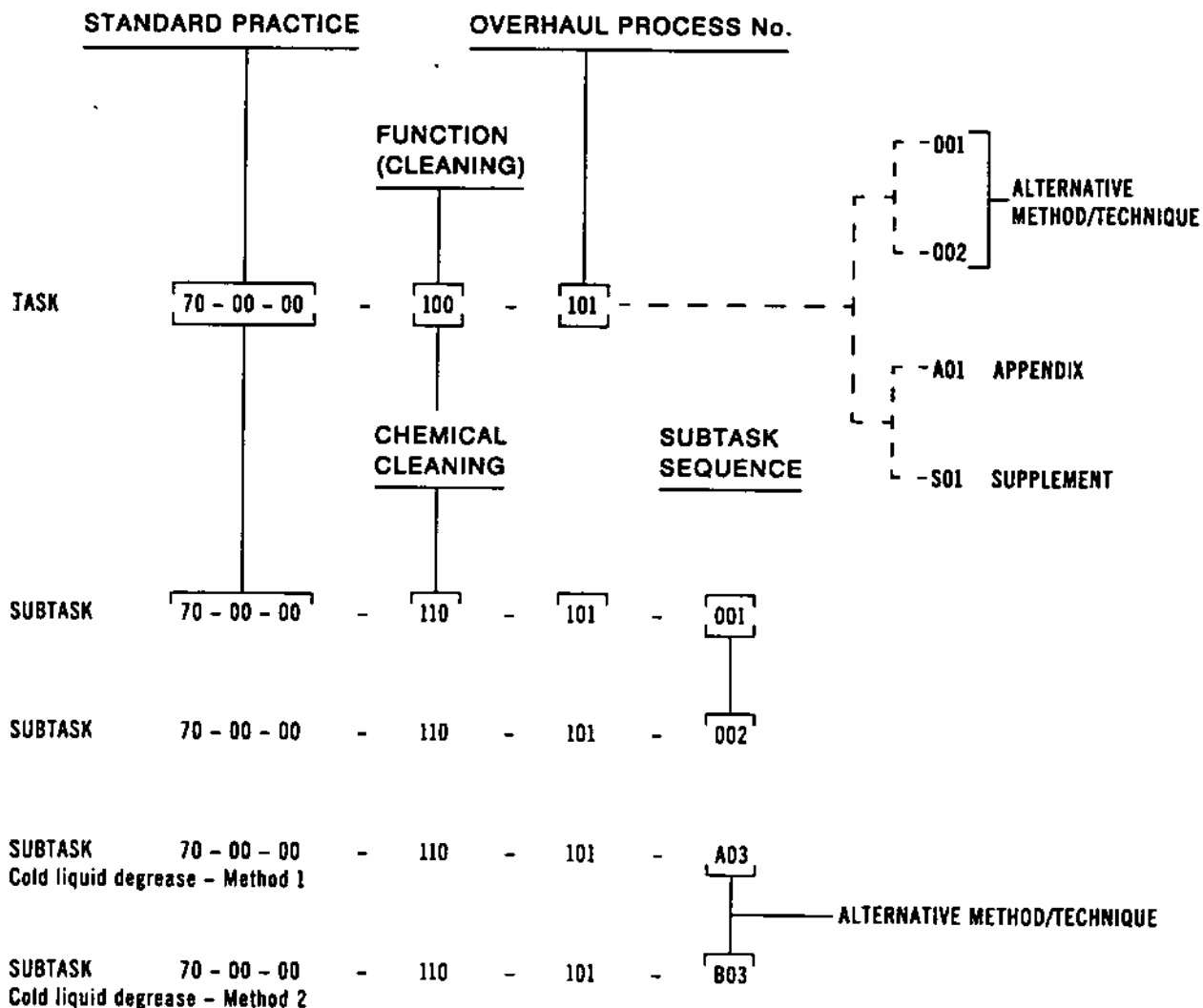
MK.610-14-28

OVERHAUL



sneema

CR 36645/00A



The elements of a TASK/SUBTASK number in T.S.D.594-J  
Figure 1



**OLYMPUS 593**MK.610-14-28  
OVERHAUL

LIFE LIMITATIONS AND STORAGE CONDITIONS FOR FLEXIBLE  
RINGS, HOSES AND RUBBER COMPONENTS

1. General

- A. Vulcanised rubber components made to well controlled specifications, properly packaged and stored under good conditions, will remain in a serviceable condition for many years. However, some rubbers are more susceptible to degradation by such factors as heat, light, ozone, oxygen, humidity etc., and therefore a system of storage control is necessary to ensure serviceability of components.
- B. Components are marked or labelled with the following information:
- (1) Part number.
  - (2) Material specification and/or polymer description.
  - (3) Cure date.
  - (4) Life grouping.
  - (5) Quantity in package.
  - (6) Batch number.
  - (7) Manufacturer's identity.
- C. The shelf life quoted applies only to new and uninstalled parts stored under the specified conditions.
- D. The age of the component is calculated from the end of the three-month period (quarter) in which it was manufactured (cured).
- E. The cure date is marked on the component or on its label with the quarter and year of manufacture. For example, a cure date marked 2Q87 indicates the second quarter (April, May, June) of 1987.

In addition, hoses may be marked with an extra four figures indicating the length or batch number. For example, 01012Q87 indicates the 101st length or batch cured in the second quarter of 1987.

- F. Components must be inspected and/or tested immediately before final assembly.

PRINTED IN ENGLAND

STANDARD PRACTICES

**70-00-01**

Page 1

Dec 1/87



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## 2. Component Life

A. Components are divided into three Life groups according to material specification.

(1) Group A - moderate susceptibility to deterioration by ageing:

natural rubber  
polybutadiene  
polyisoprene  
polyurethane  
styrene-butadiene

Initial life from the cure date is 5 years. The subsequent life is unlimited, subject to satisfactory inspection (Ref. paragraph 4.) of a sample of the oldest stock at least every 2 years.

(2) Group B - low susceptibility to deterioration by ageing:

acrylonitrile-butadiene (nitrile)  
blend of acrylonitrile-butadiene and  
polyvinyl chloride (nitrile/PVC)  
epichlorhydrin  
polyacrylate  
polychloroprene (neoprene)  
polyisobutylene-isoprene (butyl)

Initial life from the cure date is 7 years. The subsequent life is unlimited, subject to satisfactory inspection (Ref. paragraph 4.) of a sample of the oldest stock at least every 3 years.

(3) Group X - no periodic inspection required:

chlorosulphonated polyethylene  
ethylene-propylene  
fluorocarbon  
fluorosilicone  
silicone

There is no life limit, but a cure date may be marked to assist stock monitoring.

STANDARD PRACTICES

70-00-01

Page 2

Dec 1/87

**OLYMPUS 593**

MK.610-14-28

OVERHAUL

PRINTED IN ENGLAND

### 3. Storage Conditions

- A. Maintain rubber and synthetic rubber parts in good condition and ensure maximum shelf life by careful attention to storage conditions. Store parts under conditions which provide the maximum possible protection against the effects of strain, direct sunlight, ozone, moisture, excessive circulation of air, extremes of temperature, physical damage and contamination by fuels, oils, greases, or solvents. If the parts are supplied packed in envelopes, plastic bags or cartons, they should be kept in this condition until required for service. Do not allow direct contact between rubber parts and metals (especially containers made from copper).
- B. Store parts in a relaxed position free from tension and, wherever possible, in their normal shape. Avoid excessive vertical stacking of parts as this can cause permanent distortion of the lower layers. Store flexible hoses in straight lengths, wherever possible, as 'coiling' produces tension in the outside of each coil and increases the risk of ozone cracking.
- C. Provide sufficient ventilation to prevent condensation, but prevent currents of air from coming into contact with the stored parts. Avoid, as much as possible, sources of ozone such as mercury vapour lamps, electrical machinery and an excess of outdoor air which, in temperate climates, always contains ozone. Ensure that parts are shielded from direct sunlight.
- D. Store lip-type seals in such a manner that damage and distortion to the sealing edge is avoided, and do not tie labels directly to the seals. Do not fit sealing rings to ferrules or bobbins until immediately before installation into an engine or unit as stretching and exposure to light can cause deterioration.
- E. Maintain storage temperature within the preferred range of 15 to 21 deg.C. (59 to 70 deg.F.) with a minimum of 5 deg.C. (41 deg.F.) and a maximum of 25 deg.C. (77 deg.F.), and an air relative humidity below 75 per cent. Store parts at least 3 feet from any unscreened source of heat.
- F. Avoid excessive shelf storage time by relating level of stocks to rate of use and by issuing parts on an 'age' basis, that is, oldest items, as shown by cure date, first.

STANDARD PRACTICES

**70-00-01**Page 3  
Dec 1/87



**OLYMPUS 593**



MK.610-14-28  
OVERHAUL

4. Inspection of Parts

- A. Examine parts for signs of 'ageing' or degradation due to oxidation; this is shown by surface cracks and deterioration. To check, flex the part gently and discard if cracks are present before or after flexing.
- B. Do not automatically discard parts due to the presence of a white or coloured 'bloom' on their surface. Such blooms are often desirable anti-ageing layers and originate from the anti-oxidants used in high-grade rubber.
- C. Examine all parts for the following; discard if faulty:
  - (1) Permanent distortion, flats and other obvious defects.
  - (2) Tackiness or surface hardening or softening.
  - (3) Blistering, peeling or cracks when rubber is extended or flexed.
  - (4) Chafing of outer coverings and corrosion of, or damage to, end fittings of hose assemblies and cable harnesses.
  - (5) Corrosion of metal elements in bonded rubber-to-metal assemblies.
  - (6) Obstruction of the bore (flexible hoses).
- D. Pressure test flexible hoses as instructed in Chapter 71-70-00 Testing. If it is essential to fit a flexible hose when no facilities for pressure testing exist, then the hose must be removed for testing at the first available opportunity. On completion of pressure testing, drain the hose, blow through with clean air and seal the ends with blanks.
- E. All samples withdrawn for testing and/or inspection and found to be satisfactory, must be repackaged to the original specification before being returned to stores.

STANDARD PRACTICES

**70-00-01**

Page 4  
Dec 1/87

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

**INSPECTION/CHECK POLICY - REPORTING OF POTENTIAL SAFETY ISSUES****1. Potential Safety Issues Found During Engine Overhaul**

A. The following list is intended to provide guidance during engine overhaul for the reporting of potential safety issues. The list may not cover all potential safety issues for a given engine type and consideration should also be given to any condition which the overhaul organisation believes may be safety significant.

- (1) Failure, cracking, burning, distortion or excessive heat discolouration of any disc, spacer, main engine shaft or engine mount.
- (2) Corrosion, wear or damage, resulting in rejection to manual limits and which is outside existing experience, on any disc, spacer, main engine shaft or engine mount.
- (3) Any holing, cracking, burning, corrosion or bulging of engine cases.
- (4) Failure or cracking of major parts of the engine structure.
- (5) Evidence of fire, or a condition which is likely to result in fire (for example, failure or major distress to a fuel or oil pipe).
- (6) Failure or excessive blockage of fuel spray nozzles.
- (7) Conditions which have resulted, or may result in, distortion, loss or separation of major parts of the combustion system.
- (8) Failure or seizure of a mechanical emergency shut down device.
- (9) Any test failure producing any of the conditions listed above.
- (10) Damage to electrical harnesses, connectors and EECU mountings.

STANDARD PRACTICES

**70-00-02**

Page 1

Jun 30/01



**OLYMPUS 593**

MK.610-14-28  
OVERHAUL



*sneema*

(11) Engine conditions which do not match mandatory requirements, for example:

- Installed Time Limited Parts beyond their declared lives
- Inconsistency between engine hardware and engine records

(12) Failure to implement mandated modifications.

(13) Any other engine condition found during overhaul, build or test which the overhaul organisation consider may adversely affect safety or have safety implications for other engines.

(14) The discovery of any unapproved parts.

(15) Evidence of any previous miss-assembly.

STANDARD PRACTICES

**70-00-02**

Page 2

Jun 30/01

**CHAPTER**

**71**

**POWER PLANT**

**GENERAL**



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

## CHAPTER 71

### POWER PLANT

#### LIST OF EFFECTIVE PAGES

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
List of Effective Pages			71-00-01	110	Feb 1/78
			(Cont'd.)	111	Feb 2/76
	1	Dec 31/01		112	Dec 1/95
	2	Dec 31/01		112A	Jun 1/86
	3	Dec 31/01		112B	Dec 1/81
	4	Dec 31/01		113	Feb 1/78
	5	Dec 31/01		114	Feb 2/76
	6	Jun 30/01		115	Feb 2/76
	7	Dec 31/00		116	Feb 2/76
	8	Dec 31/01		117	Feb 2/76
	9	Dec 31/01		118	Feb 2/76
	10	Dec 31/00		119	Feb 2/76
	11	Dec 31/00		120	Feb 2/76
Table of Contents	12	Dec 31/00		121	Jun 1/94
	13	Jun 1/99		122	Jun 1/94
				123	Jun 1/94
	1	Jun 1/91		124	Jun 1/94
	2	Dec 1/89		124A	Jun 1/94
				124B	Jun 1/94
				125	Jun 1/94
Table of Approved Repair Schemes				126	Jun 1/94
	1	Jan 31/95		127	Feb 2/76
71-00-01 Disassembly Contents				128	Feb 2/76
				129	Jan 1/77
				130	Jan 1/77
	1	Dec 30/98		131	Jun 1/94
	2	Jun 1/94		132	Dec 1/81
	3	Feb 2/76		133	Dec 1/81
	4	Feb 2/76		134	Dec 1/81
	5	Apr 1/78		134A	Dec 1/81
	6	Feb 2/76		134B	Dec 1/81
	101	Jun 30/00		135	Feb 2/76
	102	Jun 30/00		136	Jun 1/94
	102A	Jun 30/00		137	Feb 2/76
	102B	Jun 30/00		138	Jun 1/94
	103	Feb 2/76		139	Feb 2/76
	104	Feb 2/76		140	Jun 1/94
	105	Feb 2/76		141	Jun 1/94
	106	Feb 2/76		142	Apr 1/78
	107	Feb 2/76		143	Apr 1/78
	108	Dec 1/95		144	Jun 1/94
	109	Dec 1/95		144A	Dec 1/81
				144B	Dec 1/81





# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
71-00-01	145	Jun 1/94	71-00-01		
(Cont'd.)	146	Jun 1/94	(Cont'd.)		
	147	Feb 2/76	Stage 2	501	Jan 2/80
	148	Feb 2/76		502	Jan 2/80
	149	Feb 2/76		503	Jan 2/80
	150	Feb 2/76		504	Jan 2/80
	151	Dec 1/81		505	Dec 1/97
	152	Jan 1/77		506	Dec 1/97
	153	Jul 1/76		507	Jan 2/80
	154	Dec 1/81		508	Jan 2/80
	155	Dec 1/81		509	Jun 30/00
	156	Jun 30/97		510	Jun 30/00
	156A	Dec 1/81		510A	Jun 30/00
	156B	Dec 1/81		510B	Jun 30/00
	157	Dec 1/97		511	Jan 2/80
	158	Jul 1/76		512	Dec 1/97
	159	Jul 1/76		513	Dec 1/97
	160	Feb 2/76		514	Oct 1/82
	161	Feb 2/76		515	Jun 1/98
	162	Sep 30/94		516	Jan 2/80
	163	Jun 1/94		517	Oct 1/82
	164	Jul 1/76		518	Jan 2/80
	165/166	Feb 2/76		519	Jan 2/80
	167/168	Feb 2/76		520	Jan 2/80
	169/170	Feb 2/76		521	Jan 2/80
				522	Dec 31/01
				523	Jan 2/80
Assembly				524	Dec 31/01
Contents	1	Jan 2/80		525	Jun 1/98
Contents	2	Jan 2/80		526	Jan 2/80
Contents	3	Jun 1/94		527	Jan 2/80
Contents	4	Jan 2/80		528	Jan 2/80
Contents	5	Jun 1/86		529	Jan 2/80
Contents	6	Dec 1/91		530	Jan 2/80
Contents	7	Jun 30/01		531	Jan 2/80
Contents	8	Jan 2/80		532	Jan 2/80
Contents	9	Jan 2/80		533	Jan 2/80
Contents	10	Jun 1/86		534	Jan 2/80
Contents	11	Jan 2/80		535	Jan 2/80
Stage 1				536	Sep 30/94
	501	Jun 1/91		537	Jan 2/80
	502	Jan 2/80		538	Sep 30/94
	503/504	Jan 2/80		539	Sep 30/94
	505/506	Jan 2/80		540	Jan 2/80
	507/508	Jan 2/80		541	Jan 2/80
				542	Jan 2/80
				543	Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

Printed in England

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
71-00-01 (Cont'd.)	544	Jan 2/80	71-00-01 (Cont'd.)	531	Jan 2/80
	545	Jan 2/80		532	Jan 2/80
	546	Dec 1/91		533	Jan 2/80
	547	Jun 1/94		534	Jan 2/80
	548	Jan 2/80		535	Jan 2/80
	549	Jan 2/80		536	Jan 2/80
	550	Jan 2/80		537	Dec 31/01
	551	Jan 2/80		538	Jan 2/80
	552	Jun 1/94		539	Dec 31/01
	553	Jan 2/80		540	Dec 31/01
	554	Jan 2/80		541	Jan 2/80
	555	Jan 2/80		542	Dec 31/01
				543	Jan 2/80
				544	Jan 2/80
Stage 3	501	Jun 1/96	Stage 4	545	Jan 2/80
	502	Jun 1/96		546	Jan 2/80
	503	Jan 2/80		547	Jan 2/80
	504	Jan 2/80		548	Jun 1/94
	505	Jun 1/89		549	Jan 2/80
	506	Jan 2/80		550	Jan 2/80
	507	Jan 2/80		551	Jan 2/80
	508	Jan 2/80		552	Jan 2/80
	509	Jun 1/94		553	Jan 2/80
	510	Jun 1/94		554	Jan 2/80
	511	Jan 2/80		555	Jan 2/80
	512	Jun 1/94		556	Jan 2/80
	513	Jan 2/80		557	Jan 2/80
	514	Jun 1/94		558	Jan 2/80
	515	Jun 1/94		559	Jan 2/80
	516	Jan 2/80		560	Jan 2/80
	517	Dec 1/91		561	Jan 2/80
	518	Jan 2/80		562	Jan 2/80
	519	Jan 2/80		563	Jan 2/80
	520	Jan 2/80		564	Jan 2/80
	521	Jan 2/80		565	Jan 2/80
	522	Jan 2/80			
	523	Jan 2/80		501	Dec 31/01
	524	Jan 2/80		502	Jan 2/80
	525	Jun 1/94		503	Jun 30/01
	526	Jan 2/80		504	Jun 30/01
	527	Jan 2/80		505	Jun 30/01
	528	Jan 2/80		506	Jan 2/80
	529	Jan 2/80		507	Dec 31/01
	530	Jan 2/80			



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
71-00-01	508	Dec 31/01	71-00-01		
(Cont'd.)	509	Jan 2/80	(Cont'd.)		
	510	Jan 2/80	Stage 5		
	511	Dec 31/01		501	Jan 2/80
	512	Jan 2/80		502	Jan 2/80
	513	Dec 31/01		503	Jun 1/94
	514	Jan 2/80		504	Dec 31/01
	515	Dec 31/01		505	Jan 2/80
	516	Jan 2/80		506	Dec 1/86
	517	Jan 2/80		507	Jan 2/80
	518	Jan 2/80		508	Jun 1/94
	519	Jan 2/80		509	Jan 2/80
	520	Jan 2/80		510	Jan 2/80
	521	Jan 2/80		511	Dec 31/01
	522	Jan 2/80		512	Jun 1/94
	523	Jan 2/80		513	Jan 2/80
	524	Jan 2/80		514	Dec 31/01
	525	Jan 2/80		515	Jan 2/80
	526	Jan 2/80		516	Dec 1/86
	527	Jan 2/80		517	Jun 1/94
	528	Jan 2/80		518	Jan 2/80
	529	Jan 2/80		519	Dec 31/01
	530	Jan 2/80		520	Dec 1/86
	531	Jan 2/80		521	Jun 1/94
	532	Jan 2/80		522	Jan 2/80
	533	Jan 2/80		523	Jan 2/80
	534	Jan 2/80		524	Jan 2/80
	535	Jan 2/80		525	Jan 2/80
	536	Jan 2/80		526	Jan 2/80
	537	Jan 2/80		527	Jan 2/80
	538	Jan 2/80		528	Jan 2/80
	539	Jun 1/94		529	Jan 2/80
	540	Jan 2/80		530	Jan 2/80
	541	Jun 1/94		531	Jan 2/80
	542	Dec 31/01		532	Jan 2/80
	543	Jan 2/80		533	Jan 2/80
	544	Dec 31/01		534	Jun 1/99
	545	Jun 1/94		536	Jan 2/80
	546	Jun 1/94		537	Jan 2/80
	547	Jan 2/80		538	Jun 30/95
	548	Jun 1/94		539	Jan 2/80
	549	Jun 1/94		540	Jan 2/80
	550	Jan 2/80		541	Jan 2/80
	551	Jun 1/94		542	Jan 2/80
	552	Jan 2/80		543	Dec 31/01
	553	Jun 1/94			



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
71-00-01	544	Dec 31/01	71-00-01	529	Dec 1/91
(Cont'd.)	545	Jan 2/80	(Cont'd.)	530	Jan 2/80
	546	Jan 2/80		531	Jan 2/80
	547	Jan 2/80		532	Jan 2/80
	548	Jun 30/95		533	Jan 2/80
	549	Jan 2/80		534	Jan 2/80
	550	Jun 30/95		535	Jan 2/80
	551	Jan 2/80		536	Jan 2/80
	552	Jun 30/95		537	Jan 2/80
	553	Jan 2/80		538	Jan 2/80
	554	Jan 2/80		539	Jan 2/80
	555	Jan 2/80		540	Jan 2/80
	556	Jan 2/80		541	Jan 2/80
	557	Jan 2/80		542	Jan 2/80
				543	Jan 2/80
				544	Jan 2/80
Stage 6				545	Jan 2/80
	501	Jan 2/80		546	Jan 2/80
	502	Jan 2/80		547	Jan 2/80
	503	Sep 30/94		548	Jan 2/80
	504	Jan 2/80		549	Jan 2/80
	505	Jan 2/80		550	Jan 2/80
	506	Jan 2/80		551	Jan 2/80
	507	Dec 31/01		552	Jan 2/80
	508	Jan 2/80		553	Jan 2/80
	509	Jan 2/80		554	Jan 2/80
	510	Dec 31/01		555	Jan 2/80
	511	Jan 2/80		556	Sep 30/94
	512	Jan 2/80		557	Jan 2/80
	513	Jan 2/80		558	Jan 2/80
	514	Jan 2/80		559	Jan 2/80
	515	Dec 31/01		560	Jan 2/80
	516	Feb 1/81		561	Jan 2/80
	517	Feb 1/81			
	518	Jan 2/80	Stage 7		
	519	Jan 2/80		501	Jun 1/86
	520	Dec 31/01		502	Jun 1/86
	521	Dec 30/98		503	Jan 2/80
	522	Jan 2/80		504	Jan 2/80
	523	Dec 31/01		505	Jan 2/80
	524	Jan 2/80		506	Jan 2/80
	525	Jan 2/80		507	Jan 2/80
	526	Jan 2/80		508	Jan 2/80
	527	Jun 1/96		509	Jan 2/80
	528	Jan 2/80		510	Jan 2/80



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
71-00-01	511	Jan 2/80	71-00-02	117	Jun 1/94
(Cont'd.)	512	Jan 2/80	(Cont'd.)	118	Jun 1/94
	513	Jan 2/80		119	Jun 1/94
	514	Dec 1/97		120	Jun 1/94
	515	Jun 1/86		121	Jun 1/94
	516	Dec 1/97		122	Jun 1/94
	517	Dec 31/99		123	Jun 1/94
	518	Jan 2/80		124	Jun 1/94
	519	Jun 30/95		125	Jun 1/94
	520	Jan 2/80		126	Jun 1/94
521/522		Jun 30/95		127	Jun 1/94
				128	Jun 1/94
				129	Jun 1/94
Stage 8				130	Jun 1/94
	501	Jun 30/01		131	Jun 1/94
	502	Jan 2/80		132	Jun 1/94
	503	Jan 2/80		133	Jun 1/94
	504	Jan 2/80		134	Jun 1/94
	505	Jan 2/80		135	Jun 1/94
	506	Jan 2/80		136	Jun 1/94
Special				137	Jun 1/94
Tools etc.				138	Jun 1/94
	1001	Dec 1/81		139	Jun 1/94
	1002	Dec 1/81		140	Jun 1/94
	1003	Jan 2/80		141	Jun 1/94
	1004	Jan 2/80		142	Jun 1/94
	1005	Jun 30/01		143	Jun 1/94
71-00-02				144	Jun 1/94
Disassembly				145	Jun 1/94
Contents	1	Jun 1/86		146	Jun 1/94
Contents	2	Jun 1/94		147	Jun 1/94
	101	Jun 1/86		148	Jun 1/94
	102	Aug 27/75		149	Dec 31/00
	103	Jun 1/94		150	Dec 31/00
	104	Aug 27/75		151	Dec 31/00
	105	Jun 1/86		152	Dec 31/00
	106	Jun 1/94		153	Dec 31/00
	107	Jun 1/94		154	Dec 31/00
	108	Jun 1/94		154A	Dec 31/00
109/110		Jun 1/94		154B	Dec 31/00
	111	Jun 1/94		155	Dec 31/00
	112	Jun 1/94		156	Dec 31/00
	113	Jun 1/99		157	Dec 31/00
	114	Jun 1/99		158	Dec 31/00
	115	Jun 1/94		159	Dec 31/00
	116	Jun 1/94		160	Dec 31/00



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
71-00-02			71-00-02	545	Jun 1/94
(Cont'd.)			(Cont'd.)	546	Jun 1/94
Assembly				547	Jun 1/94
Contents	1	Jun 1/94		548	Jun 1/99
Contents	2	Jun 1/94		549	Jun 1/94
	501	Jan 2/80		550	Jun 1/94
	502	Aug 28/75		551	Jun 1/94
	503	Jun 1/96		552	Jun 1/94
	504	Jun 1/94		553	Jun 1/94
	505	Jun 1/99		554	Jun 1/94
	506	Jun 1/99		555	Jun 1/94
	507	Jun 1/94		556	Dec 31/00
	508	Jun 1/94		557	Dec 31/00
509/510		Jun 1/94		558	Dec 31/00
	511	Jun 1/99		559	Dec 31/00
	512	Jun 1/99		560	Dec 31/00
	513	Jun 1/94		561	Dec 31/00
	514	Jun 1/94		562	Dec 31/00
	515	Jun 1/94		562A	Dec 31/00
	516	Jun 1/94		562B	Dec 31/00
	517	Jun 1/94		563	Dec 31/00
	518	Jun 1/94		564	Dec 31/00
	519	Jun 1/94		565	Dec 31/00
	520	Jun 1/94		566	Dec 31/00
	521	Jun 1/99			
	522	Jun 1/94	Testing		
	523	Jun 1/94	Contents	1	Dec 1/76
	524	Jun 1/94		701	Dec 1/76
	525	Jun 1/94		702	Dec 1/76
	526	Jun 1/94		703	Sep 1/78
	527	Jun 1/94		704	Dec 1/76
	528	Jun 1/94		705	Jan 2/80
	529	Jun 1/94		706	Dec 1/76
	530	Jun 1/94		707	Dec 1/76
	531	Jun 1/94		708	Dec 1/76
	532	Jun 1/94		709	Dec 1/76
	533	Jun 1/94		710	Dec 1/76
	534	Jun 1/94		711	Dec 1/76
	535	Jun 1/94		712	Dec 1/86
	536	Jun 1/94		713	Dec 1/76
	537	Jun 1/94		714	Dec 1/86
	538	Jun 1/94		715	Sep 1/78
	539	Jun 1/94		716	Feb 1/79
	540	Jun 1/94		717	Sep 1/78
	541	Jun 1/94		718	Sep 1/78
	542	Jun 1/94		719	Dec 1/86
	543	Jun 1/94		720	Dec 1/76
	544	Jun 1/94		721	Sep 1/78



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
71-00-02	722	Sep 30/94	71-00-03	522	Jan 2/80
(Cont'd.)	723	Dec 1/76	(Cont'd.)	523	Jan 2/80
	724	Jun 1/86		524	Dec 31/01
	725	Dec 1/76		525	Jan 2/80
	726	Dec 1/76		526	Jan 2/80
	727	Dec 1/76		527	Jan 2/80
	728	Dec 1/76		528	Jan 2/80
	729	Dec 1/76		529	Jan 2/80
	730	Dec 1/76		530	Jan 2/80
	731	Dec 1/86		531/532	Jan 2/80
	732	Dec 1/76		533	Jan 2/80
	733	Dec 1/76		534	Jan 2/80
	734	Dec 1/76		535	Jan 2/80
	735	Dec 1/76		536	Jan 2/80
	736	Dec 1/76		537	Jan 2/80
				538	Jan 2/80
Special				539	Jan 2/80
Tools etc.				540	Jan 2/80
	1001	Jan 2/80		541	Jan 2/80
	1002	Jan 2/80		542	Jun 1/86
				543	Jan 2/80
71-00-03				544	Jun 1/86
Engine				545	Jan 2/80
Despatch				546	Jan 2/80
Contents	1	Jan 2/80		547	Jan 2/80
Contents	2	Jan 2/80		548	Jan 2/80
Contents	3	Jan 2/80		549	Dec 1/86
	501	Aug 11/75		550	Jan 2/80
	502	Jun 30/01		551	Jan 2/80
	503	Aug 11/75		552	Sep 30/94
	504	Aug 11/75		553	Jan 2/80
	505	Jan 2/80		554	Jun 1/86
	506	Aug 11/75		555	Jan 2/80
	507	Aug 11/75		556	Jan 2/80
	508	Jan 2/80		557	Jan 2/80
	509	Jan 2/80		558	Jan 2/80
	510	Aug 11/75		559	Sep 30/94
	511	Jun 30/01		560	Jan 2/80
	512	Jan 2/80		561	Dec 1/86
	513	Jan 2/80		562	Jan 2/80
	514	Jan 2/80		563	Jan 2/80
	515	Aug 11/75		564	Jan 2/80
	516	Aug 11/75		565	Jan 2/80
	517	Jan 2/80		566	Jan 2/80
	518	Jan 2/80		567	Jan 2/80
	519	Jan 2/80		568	Sep 30/94
	520	Jan 2/80		569	Jan 2/80
	521	Jan 2/80			



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

Printed in England

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
71-00-03	570	Jan 2/80	71-09-00	506A	Jun 1/99
(Cont'd.)	571	Jan 2/80	(Cont'd.)	506B	Jun 1/99
	572	Jan 2/80		507	Nov 1/78
	573	Jan 2/80		508	Nov 1/78
	574	Jan 2/80		509	Jul 1/81
	575	Jan 2/80		510	Nov 1/78
	576	Jun 30/01		511	Nov 1/78
	577	Jan 2/80		512	Nov 1/78
	578	Jan 2/80		513	Nov 1/78
	579	Jan 2/80		514	Mar 1/76
	580	Jan 2/80		515	Mar 1/76
	581	Jan 2/80		516	Mar 1/76
				517	May 1/79
Storage				518	Mar 1/76
Instructions				519	Mar 1/76
Contents	1	Jun 30/01		520	Mar 1/76
	901	Jun 30/01		521	Mar 1/76
	902	Aug 27/75		522	Jun 1/98
	903	Jun 30/01		523	Jun 1/98
	904	Aug 27/75		524	Dec 1/97
	905	Aug 27/75		525	Jun 1/96
	906	Aug 27/75		526	Jun 1/96
Special			71-20-00		
Tools etc.			Cleaning	201	Dec 1/76
	1001	Jun 30/01		202	Dec 1/76
	1002	Jun 30/01		203	Apr 1/76
71-09-00			Inspection/		
Disassembly			Check		
Contents	1	Mar 1/76	Contents	1	Dec 31/99
	101	Nov 1/78		301	Dec 31/99
	102	Sep 1/80		302	Dec 31/99
	103	Sep 1/80		303	Jun 1/76
				304	Dec 1/75
Assembly				305	Dec 31/99
Contents	1	Jun 1/96		306	Dec 31/99
Contents	2	Nov 1/78		307	May 1/80
	501	Jun 30/97		308	Dec 31/99
	502	Jun 30/97		309	Dec 31/99
	503	Dec 31/01	Repair		
	504	Dec 31/00	Contents	1	Jan 31/95
	504A	Dec 31/00	Repair No.1	401	Dec 1/89
	504B	Dec 31/00		402	Dec 1/89
	504C	Dec 31/00		403	Dec 1/89
	504D	Dec 31/00		404	Dec 1/89
	505	Jun 1/99		405	Dec 1/89
	506	Dec 31/99		406	Dec 1/89





# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
71-20-00 (Cont'd.) Repair No.2	401	Jul 31/93	71-32-02 Cleaning	201	Dec 1/76
	402	Jul 31/93		202	Dec 1/76
	403	Jul 31/93		203	Aug 28/75
	404	Jul 31/93		204	Aug 28/75
	405	Jul 31/93		205	Jun 30/00
	406	Jul 31/93		206	Aug 28/75
				207	Aug 28/75
Repair No.3	401	Jan 31/95	Repair Contents	1	Jun 1/91
	402	Jan 31/95	Repair No.1	401	Jun 1/91
	403	Jan 31/95		402	Jun 1/91
	404	Jan 31/95		403	Jun 1/91
	405	Jan 31/95		404	Jun 1/91
	406	Jan 31/95		405	Jun 1/91
				406	Jun 1/91
71-32-00 Inspection/ Check Contents	1	May 1/79	71-51-01 Disassembly Contents	1	Dec 31/00
	301	Apr 1/77		101	Jun 1/98
	302	Dec 1/75		102	Jun 1/86
	303	May 1/79		103	Mar 1/76
	304	Dec 1/75		104	Dec 31/00
	305	May 1/79		105	Dec 31/00
	306	May 1/79		106	Feb 1/77
	307	Dec 1/75		106A	Dec 31/00
	308	Dec 1/75		106B	Dec 31/00
	309	Dec 1/75		107	Dec 31/00
	310	Dec 1/75		108	Dec 31/00
	311	Dec 1/75		109	Jun 1/99
	312	Jun 30/00		110	Dec 31/00
	313	Dec 1/75		111	Dec 31/00
	314	Jun 30/00		112	Dec 31/00
71-32-01 Cleaning	201	Dec 1/76	Cleaning	201	Dec 1/81
	202	Dec 1/76		202	Jun 1/99
	203	Apr 1/76		203	Dec 1/76
	204	Dec 1/76		204	Jun 1/99
				204A	Jun 1/99
				204B	Jun 1/99
Repair Contents	1	Jun 1/91		205	Jun 1/86
Repair No.1	401	Jun 1/91		206	Dec 1/76
	402	Jun 1/91		207	Dec 1/76
	403	Jun 1/91		208	Apr 1/76
	404	Jun 1/91		209	Apr 1/76
	405	Jun 1/91		210	Apr 1/76



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

Printed in England

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
71-51-01			71-51-01		
(Cont'd.)			(Cont'd.)		
Cleaning	211	Apr 1/76	Repair		
	212	Jun 1/86	Contents	1	Feb 1/78
	213	Dec 1/76			
	214	Apr 1/76	Repair No.1	401	Feb 1/78
	215	Jun 1/99		402	Feb 1/78
	216	Apr 1/76		403	Jun 1/99
	217	Jun 1/99		404	Feb 1/78
	218	Jun 1/99		405	Feb 1/78
	219	Apr 1/76		406	Feb 1/78
	220	Jun 1/99		407	Feb 1/78
				408	Feb 1/78
Inspection/				409	Feb 1/78
Check				410	Feb 1/78
Contents	1	Jun 1/86		411	Feb 1/78
Contents	2	Jun 1/99		412	Feb 1/78
	301	Apr 1/77		413	Feb 1/78
	302	Dec 1/75		414	Feb 1/78
	303	Dec 1/75		415	Feb 1/78
	304	Dec 1/75		416	Feb 1/78
	305	Dec 1/75		417	Feb 1/78
	306	Jun 1/86		418	Feb 1/78
	307	Jun 1/86		419	Feb 1/78
	308	Jun 1/99		420	Jun 1/98
	309	Jun 1/99		421	Jun 1/98
	310	Jun 1/99		422	Feb 1/78
	311	Jun 1/99		423	Feb 1/78
	312	Jun 1/99		424	Feb 1/78
	312A	Jun 1/99		425	Jun 1/98
	312B	Jun 1/99		426	Feb 1/78
	313	Dec 1/75		427	Feb 1/78
	314	Dec 1/75		428	Feb 1/78
	315	Dec 1/75		429	Feb 1/78
	316	Dec 1/75		430	Feb 1/78
	317	Dec 1/75		431	Feb 1/78
	318	Dec 1/75		432	Feb 1/78
	319	Jun 1/86		433	Feb 1/78
	320	Dec 1/75		434	Feb 1/78
	321	Dec 1/75		435	Feb 1/78
	322	Jun 1/99		436	Feb 1/78
	323	Jun 1/99		437	Feb 1/78
	324	Jun 1/99		438	Feb 1/78
	325	Jun 1/99		439	Jun 1/98
	326	Dec 1/75		440	Jun 1/98
	327	Jun 1/99		441	Jun 1/98

LIST OF EFFECTIVE PAGES - 71

Page 11

Dec 31/00



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

Printed in England

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
71-51-01			71-51-01		
(Cont'd.)			(Cont'd)		
Repair No.1	443	Feb 1/78	Assembly	541	Jun 1/99
	444	Feb 1/78		542	Jun 1/99
Assembly				543	Jun 1/99
Contents	1	Dec 31/00		544	Jun 1/99
Contents	2	Dec 31/00		545	Feb 1/79
Contents	3	Jun 1/99		546	Jun 1/99
	501	Feb 1/79		547	Jun 1/99
	502	Feb 1/79		548	Jun 1/86
	503	Feb 1/79		549	Feb 1/79
	504	Jun 1/99		550	Dec 31/00
	505	Feb 1/79		551	Dec 31/00
	506	Jun 1/98		552	Feb 1/79
	507	Jun 1/98		553	Feb 1/79
	508	Feb 1/79		554	Feb 1/79
	509	Feb 1/79		555	Jun 1/99
	510	Feb 1/79		556	Feb 1/79
	511	Feb 1/79		557	Dec 31/00
	512	Jun 1/99		558	Jun 1/99
	513	Feb 1/79		559	Jun 1/99
	514	Feb 1/79		560	Jun 1/99
	515	Jun 1/99		561	Feb 1/79
	516	Jun 1/99		562	Feb 1/79
	517	Jun 1/99		563	Jun 1/98
	518	Feb 1/79		564	Feb 1/79
	519	Dec 31/00		565	Jun 1/86
	520	Dec 31/00		566	Jun 1/99
	521	Dec 31/00			
	522	Dec 31/00	Special		
	523	Jun 1/86	Tools etc.		
	524	Jun 1/86		1001	Oct 1/76
	525	Dec 31/00		1002	Oct 1/76
	526	Dec 31/00			
	527	Dec 31/00	71-70-00		
	528	Dec 31/00	Inspection/		
	529	Dec 31/00	Check		
	530	Feb 1/79	Contents	1	Jun 1/78
	531	Dec 31/00	Contents	2	Jun 1/78
	532	Feb 1/79	Contents	3	Jun 1/78
	533	Feb 1/79		301	Apr 1/77
	534	Feb 1/79		302	Jun 1/78
	535	Feb 1/79		303	Apr 1/76
	536	Feb 1/79		304	Jun 1/78
	537	Jun 1/99		305	Jun 1/78
	538	Dec 31/00		306	Jun 1/78
	539	Jun 1/99		307	Jun 1/78
	540	Jun 1/99		308	Jun 1/78



OLYMPUS 593



MK.610-14-28

SNECMA

OVERHAUL

Printed in England

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
71-70-00			71-73-02		
(Cont'd.)			(Cont'd)	205	Aug 28/75
Inspection/	309	Aug 1/76	Cleaning	206	Aug 28/75
Check	310	Jun 1/78		207	Aug 28/75
	311	Aug 1/76		208	Aug 28/75
	312	Jun 1/99			
	313	Jun 1/78	71-73-03		
	314	Jun 1/78	Cleaning	201	Dec 1/76
	315	Jun 1/78		202	Dec 1/76
	316	Jun 1/78		203	Aug 28/75
	317	Dec 1/81			
	318	Aug 1/76	71-73-04		
	319	Aug 1/76	Cleaning	201	Dec 1/76
	320	Aug 1/76		202	Dec 1/76
	321	Aug 1/76		203	Aug 28/75
	322	Aug 1/76			
	323	Aug 1/76	71-73-05		
	324	Aug 1/76	Cleaning	201	Dec 1/76
	325	Aug 1/76		202	Dec 1/76
	326	Aug 1/76		203	Aug 28/75
	327	Aug 1/76			
	328	Aug 1/76	71-73-06		
	329	Aug 1/76	Disassembly	101	Jan 1/76
	330	Aug 1/76			
	331	Aug 1/76	Cleaning	201	Dec 1/76
				202	Dec 1/76
				203	Aug 28/75
Testing					
Contents	1	Jul 1/76			
	701	Aug 14/75	Assembly	501	Jan 1/76
	702	Dec 1/81			
	703	Dec 1/81	71-79-01		
	704	Jul 1/76	Cleaning	201	Dec 1/76
	705	Aug 1/76		202	Dec 1/76
	706	Dec 1/81		203	Aug 28/75
71-73-01			71-79-02		
Cleaning	201	Dec 1/76	Cleaning	201	Dec 1/76
	202	Dec 1/76		202	Dec 1/76
	203	Dec 1/76		203	Jun 1/94
	204	Dec 1/76			
			Repair		
			Contents	1	Jun 1/92
71-73-02			Repair No.1	401	Jun 1/92
Cleaning	201	Dec 1/76		402	Jun 1/92
	202	Dec 1/76			
	203	Aug 28/75			
	204	Aug 28/75			



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



## CHAPTER 71

### POWER PLANT

#### TABLE OF CONTENTS

	CH/SEC/SUB	PAGE
List of Effective Pages ... ..	71	-
Table of Contents ... ..	71	-
Table of Approved Repair Schemes ... ..	71	-
Tubes and Accessories... ..	71-00-01	101
		501
		1001
Electrical Harness, Ignition Leads and Vibration Transducer Cable ... ..	71-00-02	101
		501
		701
		1001
Prepare Engine for Despatch... ..	71-00-03	501
Installation of Engine in Moisture and Vapour Proof Bag and Transportation Stand ... ..	71-00-03	901
Standard Practices ... ..	71-09-00	101
		501
Engine Mountings ... ..	71-20-00	201
		301
		401
Engine Heat Shields (Containing SEC/SUB 71-32-01 and 71-32-02)... ..	71-32-00	301
Combustion Chamber Outer Case ... ..	71-32-01	201
		401
Turbine Exhaust Diffuser Heat Shield ... ..	71-32-02	201
		401
Engine Electrical Cables ... ..	71-51-01	101
		201
		301
		401
		501
		1001
Engine Drains (Containing SEC/SUB 71-73-01 to 06, 71-79-01 and 71-79-02) ... ..	71-70-00	301
Engine Drains ... ..	71-70-00	701
Drains Tank ... ..	71-73-01	201
Component Connection to Overboard Spill Tubes... ..	71-73-02	201
Second Stage Pump to Drain Tank Tube ... ..	71-73-03	201
First Stage Pump and FCU to Connection at Second Stage Pump Tubes ... ..	71-73-04	201
Distribution and Pump Valve to Drain Tank Tubes ... ..	71-73-05	201



OLYMPUS 593

MK.610-14-28  
OVERHAUL



CHAPTER 71

POWER PLANT

TABLE OF CONTENTS (Cont'd)

	<u>CH/SEC/SUB</u>	<u>PAGE</u>
Engine Drain Assembly at Exhaust Diffuser		
Case ... ..	71-73-06	101
		201
		501
CSD to Overboard Spill at Drains Tank Tubes ...	71-79-01	201
Hydraulic Pump to Overboard Spill Connection		
Tubes ... ..	71-79-02	201

**OLYMPUS 593**MK.610-14-28 *sneema*  
OVERHAULCHAPTER 71POWER PLANTTABLE OF APPROVED REPAIR SCHEMES

The following Repair Schemes have been approved by CAA/DGAC.

<u>Chapter/Section</u>	<u>Repair No.</u>	<u>Title</u>	<u>Salvage No.</u>
71-20-00	1	Engine mounting trunnions. Removal of cracks in flange by blending and polishing.	B.510768
	2	Engine Mounting Trunnions - Removal of corrosion from front and rear flange mounting holes.	B.513506
	3	Trunnion, Mounting. Restoration of mounting trunnion holes by nickel plating.	B.516368
71-32-01	1	Heat Shields, CCOC. Repair of fretting and cracking by welding and patching.	B.513550
71-32-02	1	Heat Shields, Exhaust Diffuser. Repair of fretting and cracking by welding and patching.	B.513551
71-51-01	1	Electrical Cables. Damaged areas repaired by splicing wrapping and shrink sleeving.	B.493642A-N
71-79-02	1	Tubes, oil drain. Repair of fretting/damage by inert gas arc welding.	B.514566

TABLE OF APPROVED REPAIR SCHEMES - 71

Page 1

Jan 31/95



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

## TUBES AND ACCESSORIES - DISASSEMBLY

### TABLE OF CONTENTS

Para.	Page
1. General ... ..	101
2. Transfer the Engine from the Transit Trolley to Horizontal Stand ... ..	106
3. Drain the Oil System... ..	106
A. Drain Oil Tank ... ..	106
B. Left-hand Gearbox ... ..	107
C. Right-hand Gearbox ... ..	107
4. Drain the Fuel System ... ..	107
5. Remove the Air Intake Fairing and Damper Spring ... ..	108
6. Remove the Vibration Transducer ... ..	108
7. Remove the LP Rotor Shaft Front Cover and Bearing Housing Cover ... ..	108
8. Remove the Exhaust Diffuser Heatshield - Lower Panel ... ..	109
9. Remove the Reheat Igniter ... ..	109
10. Remove the Reheat Flame Detector... ..	109
11. Remove the Reheat Injection System ... ..	112
12. Remove the Jet Pipe Thermocouple Harness and Lead-out ... ..	112A
13. Remove the Rear Insulation Blanket and End Cover in the Exhaust Diffuser ... ..	113
14. Remove the Engine from the Horizontal Stand and Install in the Vertical Build Stand ... ..	113
15. Remove the Air Starter Air Venting Tubes ... ..	114
16. Remove the HE Ignition Unit.. ... ..	114
17. Remove the Front Bearing Centre and Rear Vent Tubes..	115
18. Remove the Air Overheat Warning Thermocouples ... ..	115
A. Thermocouple and Lead-out, HP Compressor Delivery Air ... ..	115
B. Remove the Thermocouples and Junction Boxes, Intermediate Case Bearing and HP Compressor Rear Labyrinth Seal ... ..	115
C. Remove Turbine Cooling Air Thermocouples and Lead-outs ... ..	116
D. Remove the Thermocouple, LP and HP Turbine Bearing Vent CCOC Elbow ... ..	116
E. Remove the Thermocouple, LP Turbine Bearing ... ..	116
F. Remove the Termination Junction Box and Brackets ... ..	116

DISASSEMBLY

# 71-00-01

Contents 1  
Dec 30/98





# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

Para.	Page
19. Remove the Fuel Drain Tubes Overboard Spill ...	117
20. Remove the Engine Fuel System Seal Drains Tubes ...	117
21. Remove the Fuel Drains Tube, Dump Valve to Drains Tank ...	120
22. Remove the Anti-icing System ...	121
A. Pressure Switch and Tube ...	121
B. Air Valve and Associated Tubes ...	121
23. Remove the Electrical Tray... ...	122
24. Remove the Reheat Fuel Feed Tube... ...	122
25. Remove Air Ducts and Vent Tubes ...	122
A. Ducts and Tubes, CCOC to Exhaust Diffuser Right-hand Bottom of Engine ...	122
B. Ducts and Tubes, CCOC to Exhaust Diffuser Left-hand Bottom of Engine ...	122
26. Remove the Cooling Air Tubes, LP and HP Turbine Bearings ...	123
A. Rear Tube, Turbine Shroud Elbow to Right-hand HP Casing ...	123
B. Forward Tubes, Intermediate Casing to Exhaust Diffuser Right-hand Side ...	123
27. Remove Oil Tubes, Pump to LP and HP Compressor Thrust Bearings, Oil Failure Warning... ...	124
28. Remove the Oil Scavenge and Feed Tubes, LP and HP Thrust Bearings, Bearings to Pump ...	124
A. Scavenge Tube ...	124
B. Feed Tube ...	124
29. Remove the Hydraulic Pump Drain Tubes, Seal Space to Oil Tank Overboard Vent ...	125
30. Remove the Electrical Harness Support Bracket ...	125
31. Remove Oil Scavenge Tubes, Oil Pump Housing to HP Compressor Diffuser Case, LP and HP Turbine Bearings ...	126
A. LP Turbine Bearing to Pump Tubes ...	126
B. HP Turbine Bearing to Pump Tubes ...	126
32. Remove Fuel Tubes ...	127
A. Fuel Outlet, Distribution and Dump Valve to FCU Tube Union ...	127
B. Fuel Feed, Adapter Block and Engine Flowmeter to Distribution and Dump Valve ...	127
33. Remove Fuel Return Tube - Drains Tank to the First Stage Pump/Recirculation Valve ...	128
34. Remove the First Stage Pump and Control Unit Gland Drain Tube to the Second Stage Pump Drain ...	129
35. Remove the Second Stage Pump Air/Fuel Drain Tube ...	129
36. Remove the Fuel Tube, FCU and Reheat Control Unit Return to First Stage Pump Inlet Elbow ...	129
37. Remove the Fuel Tube FCU and Reheat Control Unit to Three-way Connector ...	129

DISASSEMBLY

## 71-00-01

Contents 2

Jun 1/94



# OLYMPUS 593

MK.610-14-28

OVERHAUL



Para.	Page
38. Remove the Fuel Tube, Second Stage Pump to Recirculation Valve ...	130
39. Remove the Fuel Tubes, FCU to Distribution and Dump Valve Rear Face ...	130
40. Remove the Fuel Tube, FCU to Manifold Dump Valve ...	130
41. Remove the Reheat Purge Solenoid Valve and Air Tubes.	130
A. Remove the Tubes, Purge Valve to Exhaust Diffuser...	130
B. Remove the Tubes, Purge Valve to Solenoid Valve ...	131
C. Remove the Tube, Solenoid Valve to Delivery Case Air Duct...	131
D. Remove the Solenoid Valve ...	131
42. Remove the Reheat Control Unit Servo Supply Tubes ...	131
43. Remove the Cylinder/Piston Unit, LP Shaft Signal System...	131
44. Remove the Fuel Tubes, Oil Cooler to Air Bleed Valve ...	132
45. Remove the Fuel Tubes, Distribution and Dump Valve to Pilot Nozzles ...	133
46. Remove the Fuel Tubes, Starter Pump to Distribution and Dump Valve ...	134
47. Remove the Reheat Flowmeter ...	134
48. Remove the Fuel Tubes ...	134
A. Starting Pump to FCU ...	134
B. Second Stage Pump to Starter Pump ...	134
49. Remove the Starter Pump ...	135
50. Disconnect the Fuel Manifold Tubes to Distribution and Dump Valve ...	135
51. Remove the Oil Tank Overboard Rear Vent Tube and Support Bracket ...	135
52. Remove the Reheat Controller/Distribution and Dump Valve ...	135
53. Remove the Reheat Controller and FCU to First Stage Pump Inlet Elbow Fuel Return Tube ...	136
54. Remove the LP and HP Turbine Bearing Cold Vent Tubes and Connector Assembly ...	136
55. Remove the HP and LP Turbine Oil Feed Tubes ...	136
56. Remove the Fuel Tube, Oil Cooler to Second Stage Pump ...	137
57. Remove the Fuel Tubes, Fuel Filter to Oil Cooler ...	137
58. Remove the Reheat Fuel Tube, First Stage Pump to Reheat Fuel Flowmeter ...	138
59. Remove the Electrical Harness Support Tray and Fuel and Hydraulic Pressurization Tube...	138
60. Remove Oil Tubes ...	139
A. Right-hand Gearbox to Oil Tank ...	139

PRINTED IN ENGLAND

TN42336

DISASSEMBLY

## 71-00-01

Contents 3

Feb 2/76



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



Para.	Page
B. Anti-syphon Tube, Main Oil Feed to Return Tube...	139
C. Oil Tank to Main Oil Pump ... ..	139
61. Remove the Fuel Recirculation Valve ... ..	140
62. Remove Vent Tubes, Intermediate Case Sump to Tube Connection ... ..	140
63. Remove Vent Tubes, Intermediate Case Adapter to Aircraft Connection ... ..	140
64. Remove the Air Tubes, Fuel Heater System ... ..	140
A. Heater Overboard Duct ... ..	140
B. Elbow and Vertical Tube from Valve Rear Face ...	141
C. Engine, Below Left-hand Trunnion Mount to Valve..	141
D. Heater, Elbow Assembly and Forward Vertical Tube ... ..	141
E. Horizontal Tube Assembly, HP Case to CCOC ...	144
65. Remove the Air Supply Ducts from the Second Stage Pump ... ..	144
66. Remove the Oil Scavenge Tubes, Pump to Cooler ...	144
67. Remove the Vent Tubes ... ..	145
A. Left-hand Gearbox ... ..	145
B. Oil Tank Front and Centre Vent Tubes ... ..	145
C. Sump Vent Tubes, Sump to Oil Return Tube... ..	145
68. Remove the Oil Scavenge Tube, Oil Cooler to Oil Tank.	146
69. Remove the Oil Feed and Return Tubes, Oil Cooler to IDG ... ..	146
70. Remove the Oil Cooler ... ..	146
71. Removal of Fuel Manifolds and Feed Tubes ... ..	149
A. Lower Fuel Tube ... ..	149
B. Upper Fuel Tube ... ..	149
C. Fuel Manifold ... ..	149
72. Remove the LP Compressor Bearing Vent Tubes ... ..	150
A. Loosen the Tubes Union Nuts ... ..	150
B. Remove the Tubes and Connector ... ..	150
73. Remove the LP Compressor Bearing Oil Feed and Scavenge Tubes ... ..	150
A. Pillar Bolt ... ..	150
B. Filter from Oil Scavenge Tube ... ..	150
C. Scavenge Oil Tubes ... ..	151
D. Feed Tube ... ..	151
74. Remove the HP Cooling Air Ducts ... ..	151
A. Top Ducts ... ..	151
B. Lower Ducts ... ..	152
75. Remove the Drains Tank ... ..	152
A. Drains Tank ... ..	152
B. Mounting Brackets ... ..	152
C. Disassemble the Drains Tank ... ..	154

AN42337



OLYMPUS 593

MK.610-14-28

OVERHAUL



Para.		Page
76.	Remove the Support Tubes from the CCOC...	155
A.	Centre Tube ...	155
B.	Right-hand and Left-hand Tubes ...	155
77.	Remove the First Stage Fuel Pump and Heater Assembly.	155
78.	Remove the Actuator Gearbox (TV)...	157
79.	Remove the FCU/Second Stage Pump...	157
A.	Remove Combined Units ...	157
80.	Remove the FCU/Second Stage Fuel Pump Lifting Bracket ...	158
81.	Remove the Left-hand Gearbox ...	158
A.	Assemble the Lifting Equipment ...	158
B.	Remove the Gearbox ...	159
82.	Remove the Right-hand Gearbox ...	159
A.	Assemble Lifting Equipment ...	159
B.	Remove the Gearbox ...	162
83.	Removal of the Pressurizing Air Supply Tubes...	163
84.	Remove the Oil Tank ...	163
A.	Disconnect the Brackets Securing the Tank to the Engine ...	163
85.	Remove the Heatshield Covers ...	164
A.	Heatshield Covers ...	164

### TABLE OF ILLUSTRATIONS

Fig.No.		Page
101	Blanking of Engine, Accessories and Tubes ...	104
102	Engine Sling and Trolley ...	106
103	Reheat Injection System and Thermocouple Harness(Sheet 1 of 2) ...	110
103	Reheat Injection System and Thermocouple Harness (Sheet 2 of 2) ...	111
104	Engine Fuel System Seal Drain Tubes ...	118
105	Fuel Heater Air Valve and Associated Tubes ...	142
106	Oil Cooler and Mounting ...	147
107	Fuel Manifolds and Feed Tubes ...	148
108	Fuel Drains Tank... ...	153
109	FCU and Second Stage Pump Lifting Equipment ...	156

DISASSEMBLY

71-00-01

Contents 5

Apr 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Fig.No.		Page
110	Left-hand Gearbox Lifting Equipment ...	160
111	Right-hand Gearbox Lifting Equipment ...	161
112	Location of Tubes and Accessories Left-hand Side of Engine... ..	165
113	Location of Tubes and Accessories Bottom of Engine ... ..	166
114	Location of Tubes and Accessories Right-hand Side of Engine ... ..	167

LIST OF TABLES

Table No.		Page
101	Blanking for Engine, Accessories and Tubes ...	102

TN29720

DISASSEMBLY  
**71-00-01**  
Contents 6  
Feb 2/76

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

**TUBES AND ACCESSORIES - DISASSEMBLY****1. General**

**WARNING:** IF CONTAMINATION OF THE ENGINE BY DANGEROUS SUBSTANCES IS SUSPECTED, HEALTH AND SAFETY PRECAUTIONS MUST BE OBSERVED. THAT IS, DISASSEMBLY OF THE ENGINE MUST BE CARRIED OUT IN A CONTROLLED ENVIRONMENT WITH AIR EXTRACTION/FILTRATION AND PERSONNEL WEARING SUITABLE PROTECTIVE CLOTHING/ APPARATUS.

- A. Prior to commencing the disassembly contained in this Chapter, ensure that the electrical harness, ignition lead-out etc. have been removed (Ref.71-00-02 Disassembly), and that the Standard Practices detailed in 71-09-00 are adhered to.
- B. Throughout the text special tools are quoted by their Ref. No. e.g. (Tool 1234). For a complete list of tooling required for the disassembly and for the Manufacturers Part No., refer to Special Tools, Fixtures and Equipment Table 1001.
- C. This chapter details the procedures for draining the oil and fuel systems, the removal of the engine from the transport stand to the horizontal stand, and finally to the vertical build stand. Then follows the detailed procedures for the removal of all the tubes and accessories including the left and right-hand gearboxes.
- D. Throughout the text reference is made to Fig.112, 113 and 114 for the location of the accessories and tubes. Detailed illustrations of the clipping are not contained in this chapter, but if required, refer to 71-00-01 Assembly.
- E. On receipt of the engine it will be found that transportation blanks will be assembled to the engine as illustrated in Fig.101. These blanks must remain assembled, unless their removal is required for the disassembly of a tube or accessory. On removal of a tube or accessory, ensure that suitable blanks are assembled to the items, mounting faces etc. Suitable blanking as well as transportation blanks are listed in Table 101.
- F. During the removal of the magnetic plugs and filters, care must be taken that any particles or flakes are retained, and a thorough examination of them carried out by the inspection department to determine their source, and what future investigation and action is required.

DISASSEMBLY

**71-00-01**

Page 101

Jun 30/00



**OLYMPUS 593**



MK.610-14-28  
OVERHAUL

*sneema*

- G. During the disassembly suitable trays, containers, pallets etc. must be provided to store the tubes, accessories and smaller items i.e. nuts, bolts, washers, clamps etc.

Printed in England

DISASSEMBLY

**71-00-01**

Page 102

Jun 30/00

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

SNECMA

DESPATCH BLANK NO.	LOCATION	QTY	SHOP BLANK NO.
B.435207	CSD Oil Feed and Return Tubes	2	Standard Redcap
AQ.270-4	Aircraft Fuel Pipe Failure		
	Drains	2	Standard Redcap
GT.13609-5	Front Mounting Points	4	Wire-lock to Secure Bushes
GT.13609-30	Jet Pipe Link Anchorage	1	Standard Redcap
AQ.330-8	Spherical Bearing Y Mounting		
	Bracket	2	Standard Redcap
B.412051	LP and HP Turbine Bearings		
	Cold Vent Outlet	1	Standard Redcap
B.469167	CSD Oil Drain Tubes	1	P3C.1234409
B.462854	Air Starter Drain Tubes	1	Standard Redcap
B.485890	Hydraulic Pumps Seal Space		
	Drain Tube, Front	2	Standard Redcap
B.485279	Hydraulic Pumps Seal Space		
	Drain Tube, Rear	2	Standard Redcap
B.485890	( Hydraulic Pumps Seal Space		
B.485279	( Drain Tube, Centre	1	Standard Redcap
B.462856	Air Starter Position on		
	Starboard Gearbox	1	P3C.1089415
B.485870	Main Fuel Inlet	1	P3C.1094772
BAS.7169-277	Main Fuel Inlet, above Plunger	1	P3C.1094772
B.480913	Drains Tank Overboard Outlet	1	P3C.1089464
B.477057	Fuel Heater Overboard Duct	1	P3C.1212156
B.484211	Air Intake	1	P3C.1089124
B.470564	Oil Tank Overboard Vent	1	P3C.1229331
B.480822	IDG Position on Right-hand		
	Gearbox	1	P3C.1089432
AQ.270-4	Fuel Recirculation Valve	1	Standard Redcap
B.472129	Exhaust Diffuser	1	P3C.1086733
B.470504	Labyrinth Overboard Vents		
	Left and Right-hand	2	P3C.1234408
B.470653	LP and HP Thrust Bearings		
	Overboard Vent	1	P3C.1234409
B.469052	Exhaust Diffuser Hot Drain	1	P3C.1234405
B.469167	Aircraft Fuel and Hydraulic		
	Tank Pressurization Tube	1	Standard Redcap
B.486801	FCU HP Cock Connection	2	Standard Redcap
B.488406	Second Stage Fuel Pump Exhaust	1	P3C.1262681
	Starter Mounting	1	P3C.1089415
	Emergency Dump Valve	1	PJ.1224675

Blanking for Engine, Accessories and Tubes  
Table 101 (Continued)

DISASSEMBLY

**71-00-01**

Page 102A

Jun 30/00



Printed in England



OLYMPUS 593

MK.610-14-28  
OVERHAUL



SNECMA

This page is left blank intentionally

DISASSEMBLY

71-00-01

Page 102B

Jun 30/00



OLYMPUS 598

MK.610-14-28

OVERHAUL

DESPATCH  
BLANK NO.

LOCATION

QTY

SHOP BLANK NO.

Manifold Inlet, Anti-icing System	1	P3C.1212222
Sump - Scavenge Face	1	PJ.1085038
Sump - Failure Probe	1	PJ.1085039
Pump, Scavenge Oil Thrust Bearings	1	P3C.1063668
Pump, Accessory Oil, Feed	1	P3C.1086861
Pump, Scavenge Oil LP Turbine Bearing	1	P3C.1073104
Pump, Scavenge Oil HP Turbine Bearing	1	P3C.1063668
Left-hand Gearbox, Oil Feed	1	P3C.1065895
Second Stage Fuel Pump	1	P3C.1244701
Pump Accessory Oil	1	P3C.1086862
Pump, Main Oil	1	P3C.1063670
Oil Tank, Feed	1	P3C.1089236
Pump, Scavenge Oil, Left-hand Gearbox to Oil Cooler	1	P3C.1063672
Oil Tank, Vent	1	P5J.1262697
Sump Vent	1	P3C.1089039
Oil Tank, Return	1	P3C.1223098
Left-hand Gearbox, Vent	1	P3C.1065892
Pump, Scavenge Oil, LP Compressor	1	P3C.1063670
Pump, Feed Oil, LP Compressor	1	P3C.1063671
HP and Delivery Case, Turbine Cooling Air	2	P3C.1083280
First Stage Fuel Pump/Heater	1	P3C.1094771
Left-hand Gearbox, Fuel Pump Mounting	1	P3C.1065934
Left-hand Gearbox, FCU/Second Stage Fuel Pump	1	P3C.1065934
Second Stage Pump	1	PJ.
Intermediate Case, Left-hand Gearbox Adapter	1	P3C.1089041
Intermediate Case, Nut Protector	1	P3C.1089042
Right-hand Gearbox	1	P3C.1089415
Intermediate Case, Right-hand Gearbox Adapter	1	P3C.1089280
Right-hand Gearbox Drive Shaft	1	P3C.1089424

Blanking for Engine, Accessories and Tubes  
Table 101 (Concluded)DISASSEMBLY  
**71-00-01**  
Page 103  
Feb 2/76

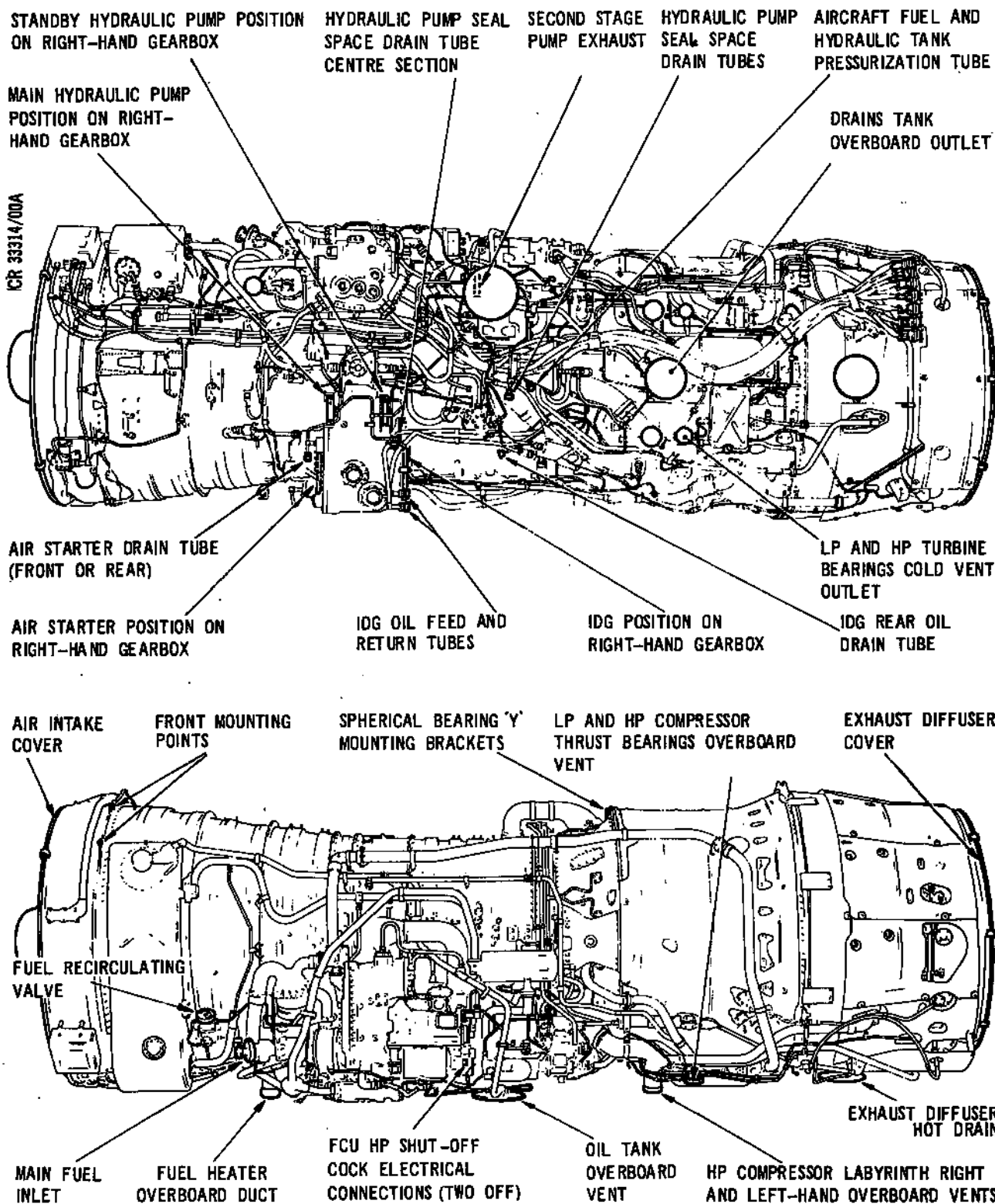
PRINTED IN ENGLAND

TN46612



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



Blanking of Engine, Accessories and Tubes  
Figure 101

DISASSEMBLY  
**71-00-01**  
Page 104  
Feb 2/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



2. Transfer the Engine from the Transit Trolley to Horizontal Stand

- A. Assemble the beam type sling (Tool 1248) to the top lifting points of the engine, intermediate casing/HP casing flange and the delivery case/CCOC flange (Ref. Fig.102).
- B. Support the weight of the engine with the crane and lifting sling.
- C. Remove the front engine supports from the LP case.
- D. Remove the pedestal clamps from the trunnion adapters.
- E. Lift the engine from the trolley.
- F. Adjust the engine lifting sling to ensure that the engine is hanging square in the horizontal and vertical planes.
- G. Position the horizontal stand (Tools 1265, 261, 808) under the engine.
- H. Lower the engine into the stand.
- J. Secure the trunnions with the pedestal clamps and the front supports to the LP case.
- K. Remove the lifting equipment.

3. Drain the Oil System

- A. Drain Oil Tank.
  - (1) Position a suitable container with a minimum capacity of 30 litres below the drain coupling.
  - (2) Detach the fill/drain coupling pressure cap, turn the locking ring and pull it downward to release the locking balls of the quick release couplings.

PRINTED IN ENGLAND

TN46613

DISASSEMBLY

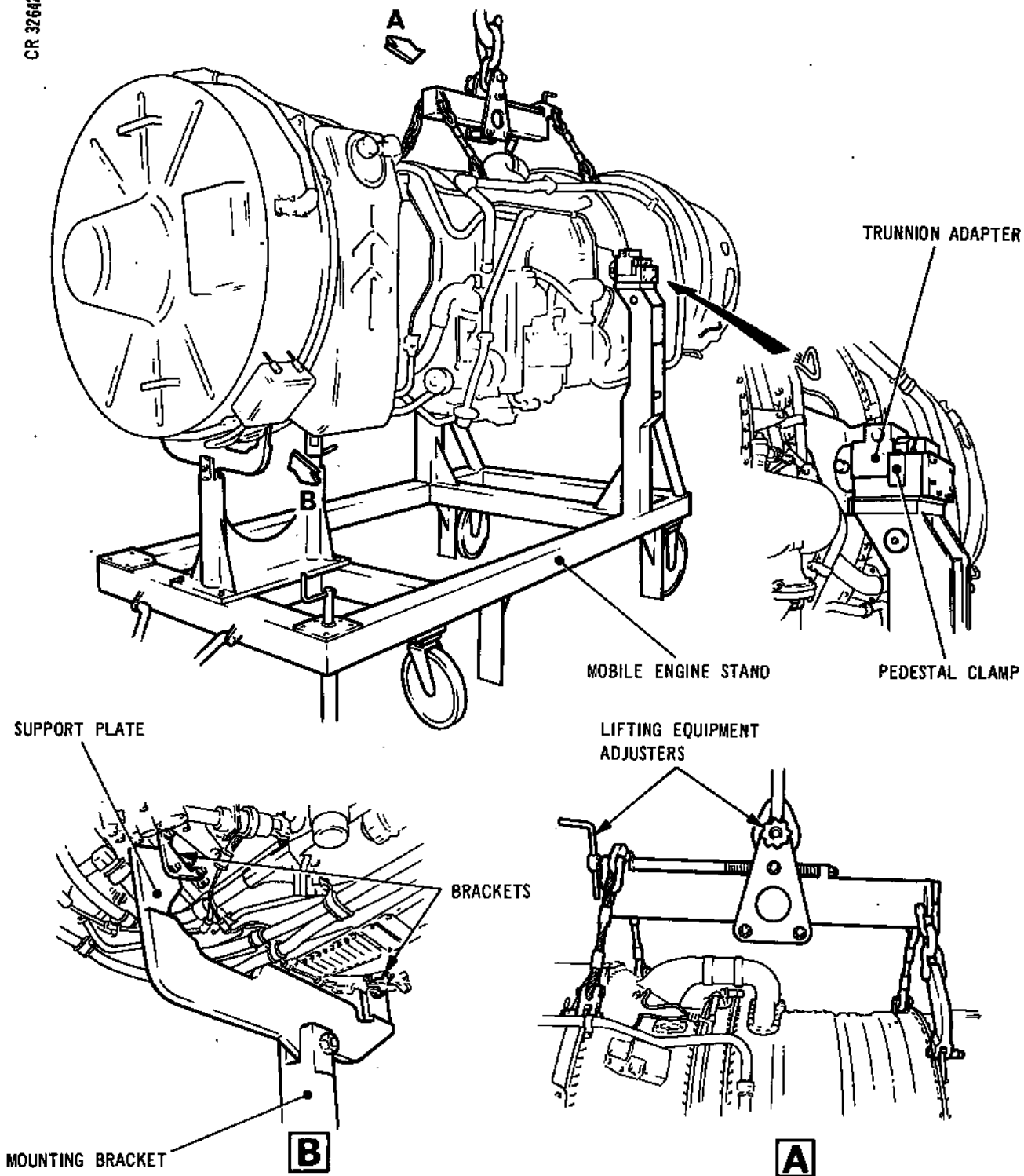
71-00-01

Page 105  
Feb 2/76



OLYMPUS 593

MK. 610-14-28  
OVERHAUL



Engine Sling and Trolley  
Figure 102



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Arrange the tube end of the drain tube (Tool 1782) to deliver into the container. Engage the tube adapter with the coupling, this action opens the drain valve.
- (4) When oil ceases to drain from the tank disconnect the drain tool and replace the pressure cap.

B. Left-hand Gearbox.

- (1) Position a suitable container below the main oil pump.
- (2) Remove the screwed magnetic plug assembly from the drain valve and body assembly installed at the LP and HP compressor thrust bearings and gearbox scavenge filter location.
- (3) Arrange the tube end of the drain tube (Tool 1782) to deliver into the container. Remove the cap from the tube adapter and screw the tube adapter into the drain valve and body assembly, this action opens the drain valve.
- (4) When oil ceases to drain from the tank disconnect the drain tube and replace the magnetic plug.

C. Right-hand Gearbox.

- (1) Position a suitable container below the gearbox oil scavenge filter location.
- (2) Remove the screwed magnetic plug assembly from the drain valve and body assembly installed at the right-hand gearbox oil scavenge filter location.
- (3) Arrange the tube end of the drain tube (Tool 1782) to deliver into the container, remove the cap from the tube adapter and screw the adapter into the drain valve and body assembly, this action opens the valve.
- (4) When oil ceases to drain remove the drain tube, replace cap on the tube adapter and replace the magnetic plug. Remove oil containers.

4. Drain the Fuel System

- A. Position a suitable container under the fuel filter drain valve.

DISASSEMBLY  
**71-00-01**  
Page 107  
Feb 2/76



OLYMPUS 593



MK.61D-14-28 snecma  
OVERHAUL

- B. Remove filter drain valve pressure cap. Assemble bleed tube (Tool 1783) to drain valve and drain fuel. Replace pressure cap.
  - C. Remove the container and dispose of the fluid.
5. Remove the Air Intake Fairing and Damper Spring  
(Ref.Fig.113 Item 94)
- A. Remove the Air Intake Fairing.
    - (1) Remove blanking cover from front of air intake.
    - (2) Slacken and remove the nuts securing the fairing using Tool 1629.
    - (3) Remove the air intake fairing.
  - B. Remove the Damper Spring (Ref.SB.72-8746-284).
    - (1) Unscrew the tapered end of the damper spring.
    - (2) Remove the damper spring from around the hollow of the air intake fairing plunged hole.
  - C. Remove the Damper Spring (Ref.SB.72-9005-409).
    - (1) Unscrew the tapered end of the damper spring.
    - (2) Remove the damper spring from around the hollow of the air intake fairing plunged hole.
    - (3) Remove and discard existing glass cloth tape.
6. Remove the Vibration Transducer (Ref.Fig.113 Item 93)
- A. Slacken and remove the nuts and bolts securing the transducer to the mounting.
  - B. Remove the transducer.
  - C. Remove the nuts, bolts and loop clamps securing the cable in the front bearing housing cover and to the intake flange assembly bracket.
  - D. Cut the cable and remove the wall mounting receptacle (Ref.77-33-01 Disassembly).

**OLYMPUS 593**MK.610-14-28 *sneema*

OVERHAUL

Printed in England

E. Remove the bracket and gland assembly securing the cable in the intake flange assembly.

F. Remove the inner connector and cable from the bearing housing cover assembly (Ref.77-33-01 Disassembly).

7. Remove the LP Rotor Shaft Front Cover and Bearing Housing Cover (Ref.Fig.113 Item 92)

A. Slacken and remove the bolts retaining the bearing housing cover and bracket.

B. Remove the bracket and bearing housing cover using extractors (Tool 1668).

C. Slacken and remove the bolts securing the shaft cover.

D. Remove the shaft cover.

E. Assemble the jacking adapter (Tool 319) to the LP rotor shaft front.

(1) Remove the bolts securing the shaft cover in the LP rotor shaft.

(2) Remove the blanking plate.

(3) Install the adapter and secure in the LP shaft using the bolts retained in the adapter.

8. Remove the Exhaust Diffuser Heat Shield - Lower Panel

A. Slacken and remove the nuts, bolts, distance pieces, washers and mesh dampers securing the heat shield to the brackets.

B. Remove the heat shield from the engine.

C. Remove the bracket and tie from the brackets on the exhaust diffuser adapter flange and adapter flange connection.

9. Remove the Reheat Igniter (Ref.Fig.112 Item 91)

CAUTION : UNDER NO CIRCUMSTANCES MUST THE CABLE BE DISCONNECTED FROM THE IGNITION PLUG BODY.

A. Remove the bolts and keywashers securing igniter flange and shim to spherical joint flange.

DISASSEMBLY

**71-00-01**

Page 109

Dec 1/95





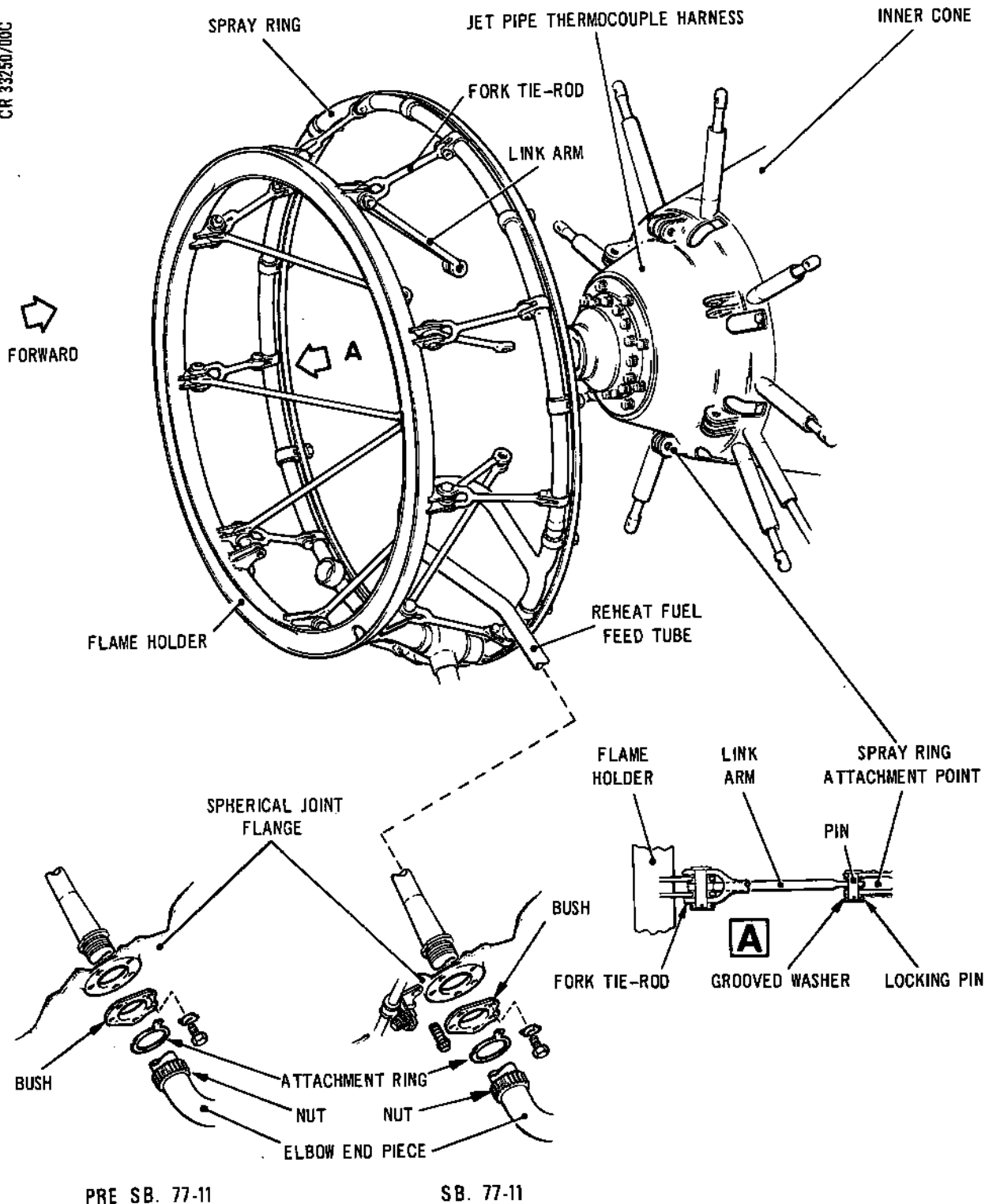
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 33250/00C



Reheat Injection System and Thermocouple Harness  
Figure 103 (Sheet 1 of 2)

DISASSEMBLY  
**71-00-01**

Page 110  
Feb 1/78

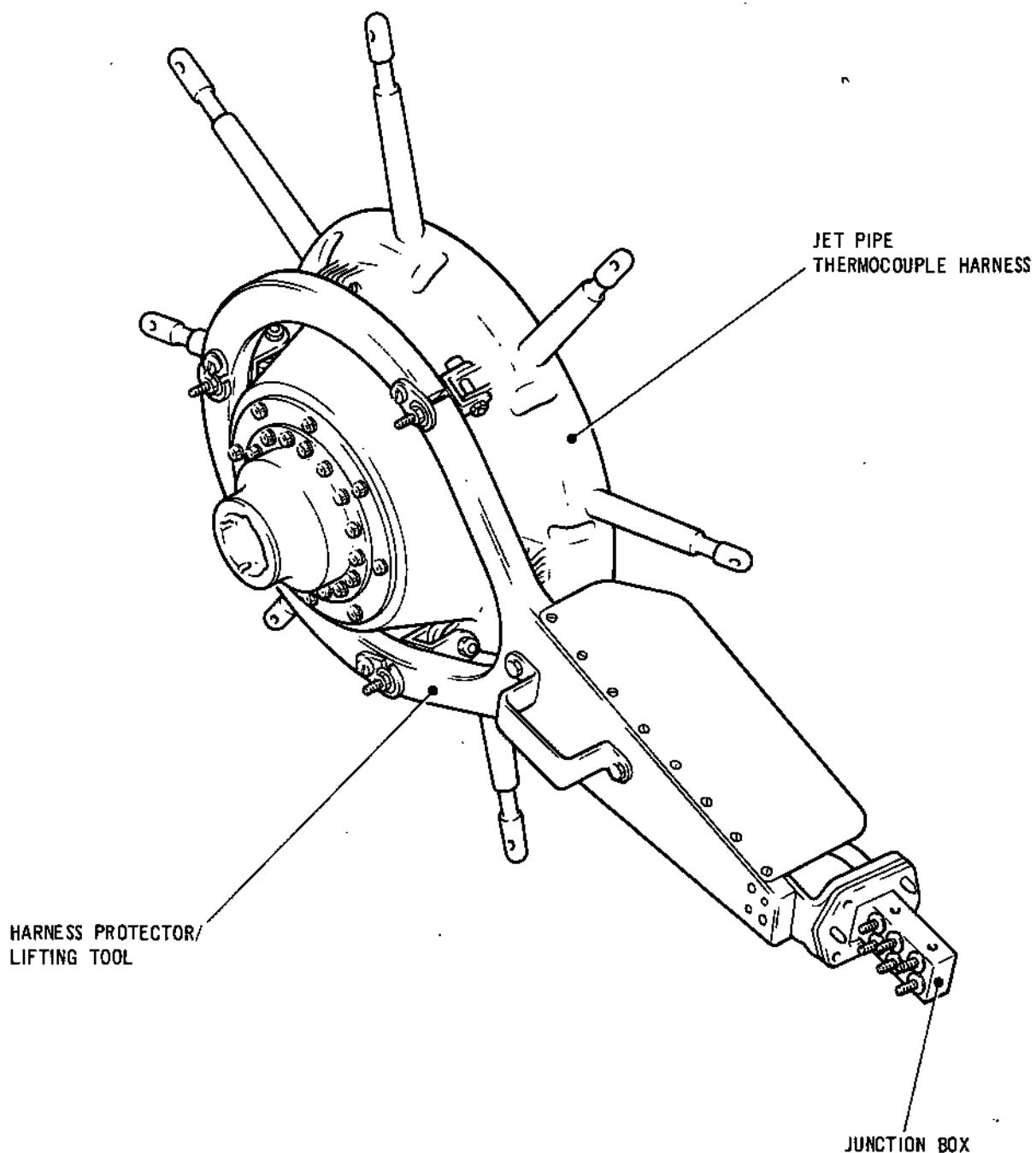
CR 33248/00A



OLYMPUS 593

MK.610-14-28

OVERHAUL



Reheat Injection System and Thermocouple Harness  
Figure 103 (Sheet 2 of 2)

DISASSEMBLY  
**71-00-01**

Page 111  
Feb 2/76



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- B. On engines to SB.74-3 standard remove the nut and bolt securing the igniter lead to the attachment bracket.
- C. Carefully withdraw igniter from reheat injection system and remove igniter and lead from engine.

10. Remove the Reheat Flame Detector (Ref.Fig.112 Item 90)

- A. Remove the nut and bolt retaining the loop clamp to the bracket at vane seven of the exhaust diffuser casing. Remove the loop clamp.
- B. Remove the nuts and bolts retaining the detector lead to the bracket on the CCOC/exhaust diffuser flange.
- C. On engines to pre S.B.77-10 and 77-11 standard, support flame detector, remove the four securing bolts and withdraw detector from the spherical joint flange.
- D. On engines to S.B.77-10 and 77-11 standard, slacken the pitot tube clamp assembly bolt and four bolts securing the flame detector. Support the detector, remove securing bolts and move the pitot tube bracket clear of the flange, then withdraw the detector.

11. Remove the Reheat Injection System (Ref.Fig.113 Item 89 and Fig.103)

- A. Disconnect the fuel supply tube from the spray ring elbow (Tool 1529).
- B. Slacken and remove the nut (Tool 1568).
- C. Remove the attachment ring from the end piece.
- D. On engines to pre S.B.77-10 and 77-11 standard, slacken and remove the bolts and keywashers retaining the bush to the spherical joint flange.
- E. On engines to S.B.77-10 and 77-11 standard, remove bush.
  - (1) Slacken the pitot tube clamp assembly bolt.
  - (2) Remove the bolts securing the bush and support bracket to the spherical joint flange.
  - (3) Move the clamp assembly and the support bracket clear of the flange and detach bush.

DISASSEMBLY

71-00-01

Page 112

Dec 1/95



OLYMPUS 593

MK.610-14-28  
OVERHAUL



F. Remove the locking pins, grooved washers and pins securing the spray ring to the exhaust cone and remove the injection system.

G. Temporarily assemble the nut to the manifold end fitting.

12. Remove the Jet Pipe Thermocouple Harness and Lead-Out (Ref. Fig.113 Item 88 and 82)

A. Remove Lead-out.

- (1) Remove the bolts from the harness junction box cover at the lower left-hand side of the exhaust diffuser case, and detach cover.
- (2) Remove two nuts, lockwasher and plain washer from each junction box terminal post.
- (3) Remove two bolts and washers securing lead-out terminal block to junction box.
- (4) Remove cover from termination junction box cover on underside of CCOC case.
- (5) Remove the four bolts securing forward end of lead-out and test plug at junction box base.
- (6) Detach the pillar bolt and the two loop clamps securing lead-out to engine and carefully withdraw lead-out from junction box terminal posts.

NOTE: Retain the special nuts and bolts with the thermocouple junction box.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



This page left blank intentionally

DISASSEMBLY

**71-00-01**

Page 112B

Dec 1/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



B. Remove Thermocouple Harness.

- (1) Remove the nuts and bolts securing the saddle, gasket and junction box to the diffuser case.
- (2) Remove the bolt securing the harness assembly to the exhaust diffuser inner flange.
- (3) Install the harness protector (Tool 1769) (Ref. Fig.103).

CAUTION: DO NOT SUPPORT THE HARNESS BY THE LEAD-OUT.

- (4) Remove the eight bolts securing harness to diffuser inner case and carefully remove the harness from engine.
- (5) Place the harness in the transportation container (Tool 1769). Remove the harness protector and secure container.

13. Remove the Rear Insulation Blanket and End Cover in the Exhaust Diffuser (Ref.Fig.113 Item 87)

- A. Remove the nuts and bolts securing the blanket and cover pre S.B.72-20 or remove the wire securing the blanket end cover S.B.72-20. Remove the end cover from the blanket halves.
- B. Remove the bolts securing the cover to the rear cover, then remove the cover complete with oil tube and transfer block.

14. Remove the Engine from the Horizontal Stand and Install in the Vertical Build Stand

- A. Release and remove the stand pedestal clamps from the left and right-hand trunnion brackets, ensure the trunnion bracket retaining pins are in position.
- B. Assemble the lifting sling (Tool 1175) to the front lifting points of the lifting beam (Tool 1176). Attach the beam to an overhead crane.
- C. Raise the beam and position over the engine, attach the two front shackles of the beam to the lifting points on the intermediate case/HP case flange.

DISASSEMBLY

71-00-01

Page 113

Feb 1/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



- D. Remove the two retaining pins from the beam arms and assemble the arms to the left and right-hand trunnion brackets and secure with the retaining pins.
  - E. Support the engine weight with the crane and remove the horizontal stand front support from the LP case.
  - F. Assemble the lifting sling (Tool 1174) to a second crane and the lifting points of the lifting beam at the trunnion bracket locations.
  - G. Carefully manipulate the two cranes to lower the front and raise the rear of the engine until it hangs in the vertical position.
  - H. Check that the jacking pad of the build base (Tool 1244) is down out of position.
  - J. Lower the engine onto the base and clamp securely into position.
  - K. Remove all the lifting equipment and store on a mobile trolley (Tool 1314).
  - L. Adjust the jacking pad to support the LP shaft, turn the adjusting wheel on the build base raising the pad sufficiently to butt and support the adapter on the LP shaft.
  - M. Remove the left and right-hand trunnions from the engine mountings, refit to the stillage and secure with the pedestal clamps.
15. Remove the Air Starter Air Venting Tubes (Two rear tubes only) (Ref.Fig.113 Item 86)
- NOTE: The front tube which connects to the starter, will be loosely assembled or attached to the engine.
- A. Loosen the tubes union nuts of the centre and rear tube.
  - B. Remove the loop clamps securing the tubes.
  - C. Unscrew the tube union nuts and remove the two tubes.
16. Remove the HE Ignition Unit (Ref.Fig.113 Item 85)
- A. Remove the HE ignition leads from the unit.
  - B. Detach bonding lead lug from stud on unit.

TN46619

DISASSEMBLY

71-00-01

Page 114

Feb 2/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. Remove the bolts, bonding lead and distance pieces and remove the ignition unit.

17. Remove the Front Bearing Centre and Rear Vent Tubes  
(Ref.Fig.113 Item 84)

- A. Loosen the centre tube union nut from the connector on the bottom of the engine near the engine identification plate.
- B. Loosen the union nuts of the rear tube which connects with the oil tank overboard vent.
- C. Remove the nuts, bolts and loop clamps securing the two tubes.
- D. Unscrew the tube unions and remove the tubes.

18. Remove the Air Overheat Warning Thermocouples

- A. Thermocouple and Lead-out, HP Compressor Delivery Air (Ref.Fig.113 Item 83).
  - (1) Loosen the thermocouple union in the delivery casing.
  - (2) Remove the termination junction box mounting cover.
  - (3) Remove the bolts securing the lead-out to the junction box.
  - (4) Remove the nuts, bolts and loop clamps securing the lead-out.
  - (5) Unscrew the thermocouple union nut and remove the unit from the engine.
- B. Remove the Thermocouples and Junction Boxes, Intermediate Case Bearings and HP Compressor Rear Labyrinth Seal (Ref. Fig.113 Items 80 and 81).
  - (1) Loosen the bolts securing the lead-outs, junction boxes and the thermocouple union nuts.
  - (2) Remove the nuts, bolts and loop clamps securing the HP compressor rear labyrinth seal lead-out.
  - (3) Remove the nuts, bolts and grooved clamps securing the HP compressor rear labyrinth seal and intermediate bearing thermocouples lead-outs.

DISASSEMBLY

71-00-01

Page 115

Feb 2/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Unscrew the HP compressor rear labyrinth seal thermocouple union nut and lead-out securing bolts and remove the thermocouple.
  - (5) Unscrew the intermediate bearings thermocouple union nut and lead-out securing bolts and remove the thermocouple.
- C. Remove the Turbine Cooling Air Thermocouples and Lead-outs (Ref.Fig.113 Item 79).
- (1) Remove the covers from the lead-out junction boxes.
  - (2) Remove the nuts and washers connecting the thermocouple leads to the lead-out junction boxes.
  - (3) Remove the bolts securing the thermocouples to the junction box and withdraw the thermocouples.
  - (4) Remove the bolts securing the lead-outs to the termination junction box and the pillar bolts securing lead-out junction boxes to the CCOC.
  - (5) Remove the clamps securing the lead-outs and remove lead-outs.
  - (6) Loosely assemble the covers to the lead-outs.
- D. Remove the Thermocouple, LP and HP Turbine Bearing Vent, CCOC Elbow (Ref.Fig.113 Item 78).
- (1) Remove the thermocouple union nut and junction box bolts.
  - (2) Remove the thermocouple.
- E. Remove the Thermocouple, LP Turbine Bearing (Ref.Fig.113 Item 77).
- (1) Remove the loop clamp securing the lead-out.
  - (2) Remove the bolts securing the lead-out to the termination junction box.
  - (3) Remove the thermocouple union nut and withdraw thermocouple.
- F. Remove the Termination Junction Box and Brackets (Ref. Fig.113 Item 76).
- (1) Remove the junction box from the support brackets.

TN46763

DISASSEMBLY  
**71-00-01**  
Page 116  
Feb 2/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Remove the brackets from the centre and right-hand support tube.

9. Remove the Fuel Drain Tubes, Overboard Spill (Ref.Fig.113 Item 75)

- A. Loosen the tubes union nuts, from the adapter on the LP case rear blow-off flange rearwards to the drains tank connection.
- B. Remove the nuts, bolts, clipnuts and loop clamps retaining the tubes.
- C. Unscrew the tube union nuts and remove the tubes.
- D. Remove the pipe closure nut from the adapter and the adapter from the bracket mounted to the LP case rear blow-off flange using spanner (Tool 1480).

20. Remove the Engine Fuel System Seal Drain Tubes (Ref.Fig.113 Item 74 and Fig.104)

- A. Loosen the tube union nuts, remove the loop clamps, unscrew the tube union nuts and withdraw the following tubes:
  - (1) Between the T-piece and the drains tank outlet elbow.
  - (2) Between the emergency dump valve and oil cooler.
  - (3) Between the T-piece and the emergency dump valve.
  - (4) Between the two T-pieces.
  - (5) Between the reheat flowmeter and starting pump.
  - (6) Between the T-piece and the reheat flowmeter.
  - (7) Between the second stage pump and T-piece.
  - (8) Between the three-way multiple connection and the second stage pump.
  - (9) Between the three-way multiple connection and the reheat flowmeter fuel filter.
  - (10) Between the fuel filter and the three-way multiple connection.
  - (11) Between the first stage pump and fuel filter.

PRINTED IN ENGLAND

TN46764

DISASSEMBLY

71-00-01

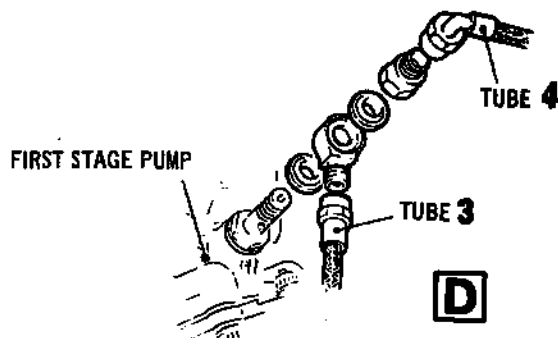
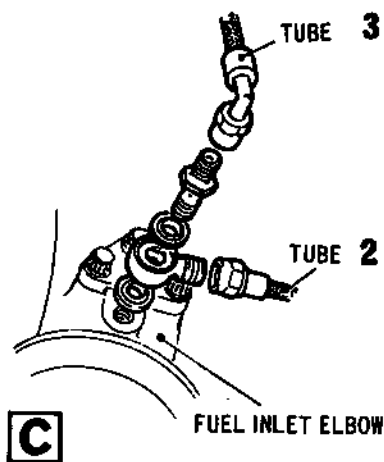
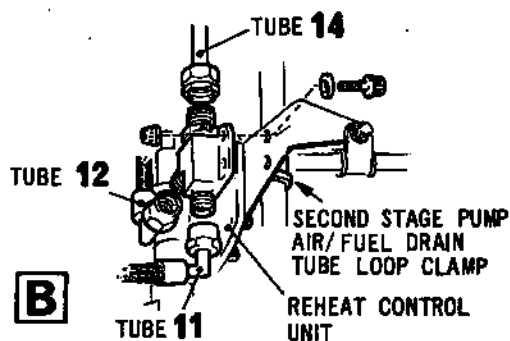
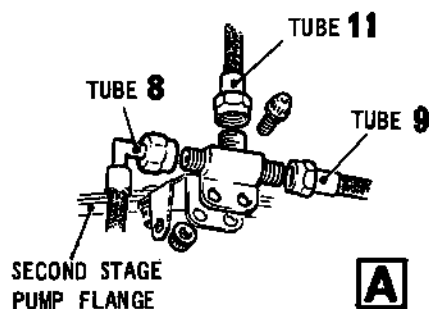
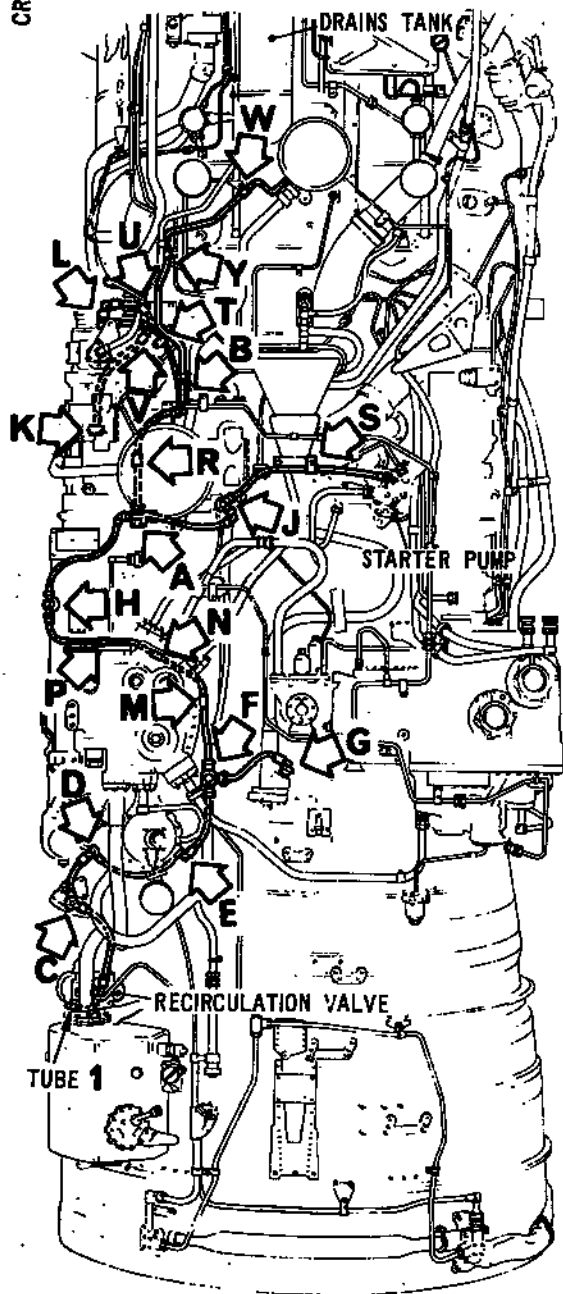
Page 117

Feb 2/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Engine Fuel System Seal Drain Tubes  
Figure 104 (Sheet 1 of 2)

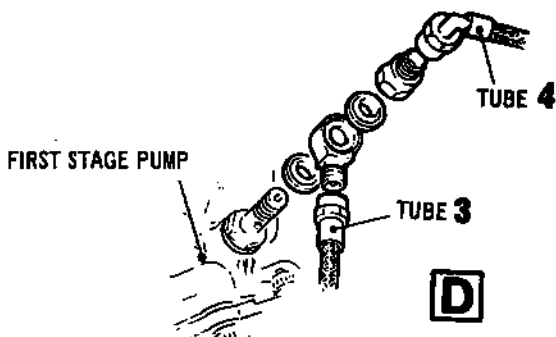
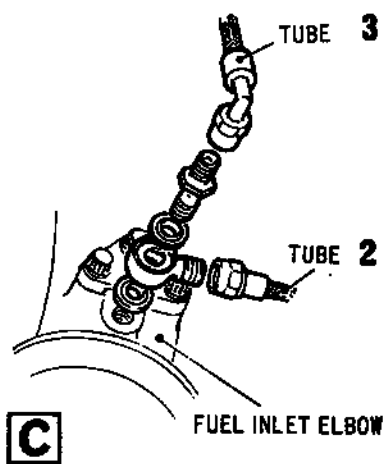
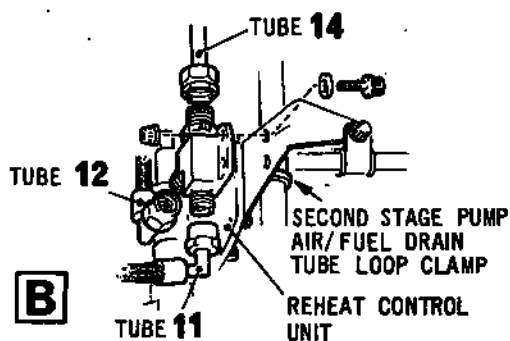
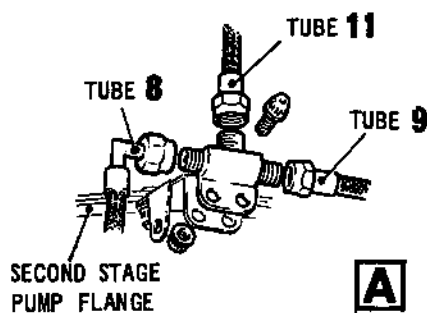
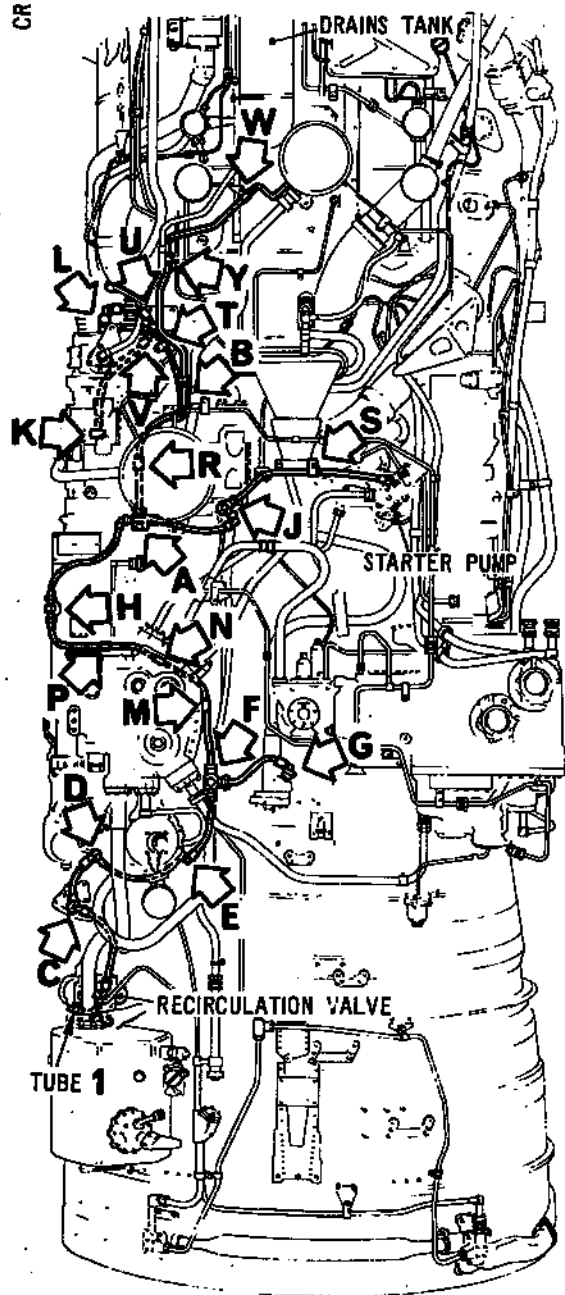
DISASSEMBLY  
71-00-01

Page 118  
Feb 2/76

TN32158



OLYMPUS 593

MK.610-14-28  
OVERHAUL

Engine Fuel System Seal Drain Tubes  
Figure 104 (Sheet 1 of 2)

DISASSEMBLY  
71-00-01Page 118  
Feb 2/76

TN32158



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (12) Between the fuel inlet connection and the first stage pump.
- (13) Between the recirculation valve and the fuel inlet connection.
- (14) Between the two connections on the recirculation valve.

B. Remove the following connectors and T-pieces:

- (1) The multiple connector from the emergency dump valve drain location.
- (2) The union adapter to the oil cooler drain location.
- (3) The multiple connector to the throttle valve actuator drain location.
- (4) The adapter to the drain location in the reheat fuel feed pipe filter housing.
- (5) The connector from the drain location at the main feed tube joint.
- (6) The connector on the fuel heater and filter.
- (7) The connector on the first stage pump drain location.
- (8) The connector on the first stage pump fuel inlet elbow.
- (9) The T-piece on the bracket mounted on the reheat control unit elbow.
- (10) The T-piece on the bracket mounted on the second stage pump exhaust duct flange.

21. Remove the Fuel Drains Tube, Dump Valve to Drains Tank (Ref. Fig.113 Item 73)

- A. Using spanner (Tool 1565) loosen the ringnut securing the tube to the drains tank.
- B. Remove the nut, bolt and loop clamp securing the tube.
- C. Remove the bolts and bracket from the tube flange, dump valve connection on the distribution and dump valve.
- D. Unscrew the ringnut and remove the tube.
- E. Remove seal ring from tube.

TN46765

DISASSEMBLY  
**71-00-01**  
Page 120  
Feb 2/76



OLYMPUS 593

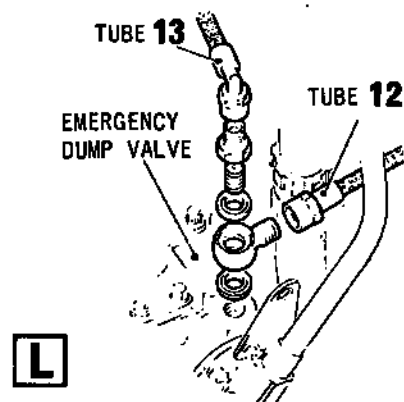
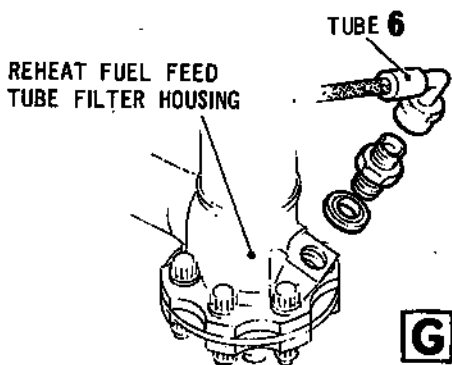
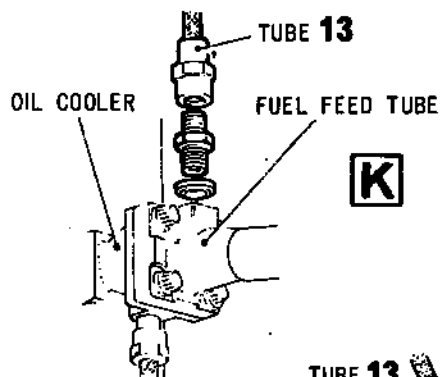
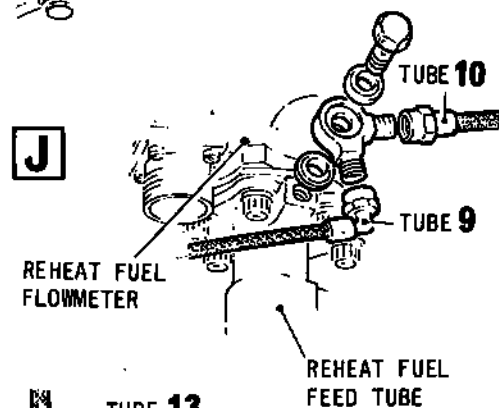
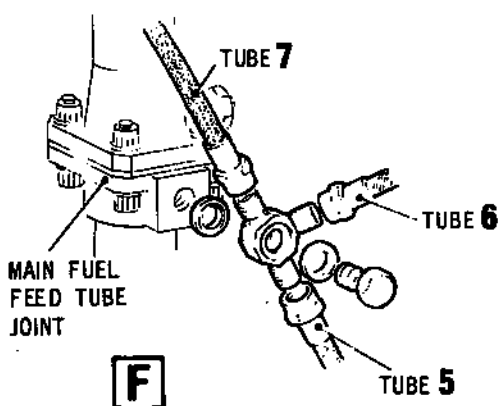
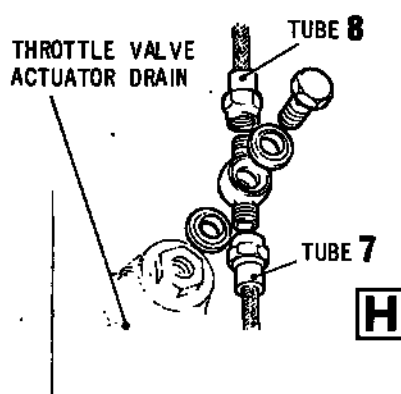
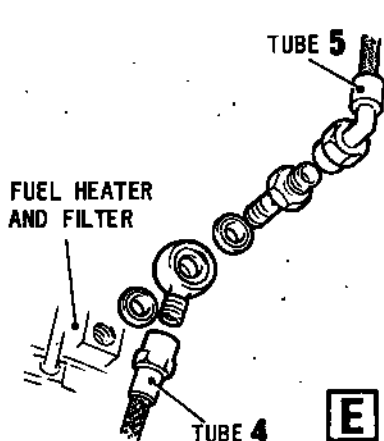
MK.610-14-28

OVERHAUL



CR 33230/00A

PRINTED IN ENGLAND



Engine Fuel System Seal Drain Tubes  
Figure 104 (Sheet 2 of 2)

DISASSEMBLY  
**71-00-01**  
Page 119  
Feb 2/76

TN32159

**OLYMPUS 593****MK.610-14-28 SNECMA  
OVERHAUL****22. Remove the Anti-icing System****A. Pressure Switch and Tube (Ref.Fig.114 Item 72).**

- (1) Disconnect air tube from switch.
- (2) Remove the nuts and bolts securing the switch.
- (3) Remove the pressure switch.
- (4) Unscrew the tube union nut from the anti-icing supply tube connection (Tool 1480).
- (5) Remove the nuts, bolts, loop clamps and half clamp shells (SB.0L.593-75-8972-27 standard), securing the tube and detach tube from engine.

**B. Air Valve and Associated Tubes (Ref.Fig.114 Item 71).**

- (1) Remove the ferrule assembly from the rear tube connection forward of the air valve.
- (2) Remove the nuts and bolts securing the air valve to the elbow and rear tube flanges, remove the air valve.
- (3) Unscrew the bolts securing the elbow and remove.
- (4) Remove electrical harness tray support brackets.
- (5) Remove the screws retaining the strainer and remove the strainer from the CCOC casing.
- (6) Remove the nuts, bolts, loop clamps and the half clamp shells (SB.0L.593-75-8972-27 standard), retaining the rear tube.
- (7) Remove the nuts, bolts, retaining plate and bracket from the front tube rear flange.
- (8) Slide the rear tube to the rear and disconnect from the front tube.
- (9) Remove the nut, bolt and retaining plate securing the forward tube in the duct.
- (10) Remove the nut, bolt, loop clamp and the half clamp shells (SB.0L.593-75-8972-27 standard), retaining the front tube and remove the tube.



**OLYMPUS 593**



MK.610-14-28 *sneema*  
OVERHAUL

**23. Remove the Electrical Tray (Ref.Fig.113 Item 70)**

- A. Remove the nuts, bolts and loop clamps from the electrical tray mounted between the LP turbine and the reheat purge air and fuel feed tubes at the bottom of the engine.
- B. Unscrew the nut securing the tray to the pillar bolt and remove the tray.

**24. Remove the Reheat Fuel Feed Tube (Ref.Fig.113 Item 69)**

- A. Slacken the serrated union nuts securing the fuel feed tube to the reheat control unit and spray ring tube (Tool 1529).
- B. Remove the nuts, bolts and loop clamps securing the tube along the bottom of the engine.
- C. Unscrew the tube nuts and remove the tube.

**25. Remove Air Ducts and Vent Tubes (Ref.Fig.112 and 113 Item 68)**

- A. Ducts and Tubes, CCOC to Exhaust Diffuser Right-hand Bottom of Engine.
  - (1) Remove the nuts, bolts and retaining plates retaining the tube, duct and elbow joints.
  - (2) Remove the nut, bolt, loop clamp and the half clamp shells (SB.0L.593-75-8972-27 standard), securing the tube to a bracket mounted on the CCOC/exhaust diffuser case flange.
  - (3) Remove the nuts securing the elbow and brackets to the exhaust diffuser casing.
  - (4) Withdraw the elbow from the tube and the tube from the duct.
  - (5) Temporarily replace elbow on exhaust diffuser.
  - (6) Remove the nuts and bolts securing the duct to the support tube, withdraw the duct from the elbow.
- B. Ducts and Tubes, CCOC to Exhaust Diffuser Left-hand Bottom of Engine.
  - (1) Remove the nuts, bolts and retaining plates retaining the tube, duct and elbow joints.

DISASSEMBLY

**71-00-01**

Page 122  
Jun 1/94



**OLYMPUS 593****MK.610-14-28    snecma  
OVERHAUL**

Printed in England

- (2) Remove the nut, bolt, loop clamp and the half clamp shells (SB.0L.593-75-8972-27 standard), securing the tube to the bracket mounted on the CCOC/exhaust diffuser case flange.
- (3) Remove the nuts securing the elbow and brackets to the exhaust diffuser case.
- (4) Withdraw the elbow from the tube and the tube from the duct.
- (5) Temporarily replace elbow on exhaust diffuser.
- (6) Remove the nuts, bolts and support link supporting the duct and the bracket mounted on the support tube.

**26. Remove the Cooling Air Tubes, LP and HP Turbine Bearings****A. Rear Tube, Turbine Shroud Elbow to Right-hand HP Casing (Ref.Fig.114 Item 67).**

- (1) Remove the bolt and retaining plate retaining the tube in the elbow.
- (2) Using spanner (Tool 1529) loosen the serrated union nut securing the forward end of the rear tube to the forward tube.
- (3) Remove the nuts, bolts, loop clamps and the half clamp shells (SB.0L.593-75-8972-27 standard), securing the tube to brackets mounted at either end of the CCOC.
- (4) Remove the tube from the elbow.

**B. Forward Tubes, Intermediate Casing to Exhaust Diffuser, Right-hand Side (Ref.Fig.114 Item 66).**

- (1) Loosen the bolts securing the forward flanged end of the upper tube and the support bracket.
- (2) Remove the nut, bolt, loop clamp and the half clamp shells (SB.0L.593-75-8972-27 standard), securing the tube to a bracket mounted on the HP case rear flange.
- (3) Remove the bolts from the tube flange and the tube.
- (4) Remove the nut, bolt and retaining plate securing the lower tube and elbow mounted on the CCOC.

DISASSEMBLY

**71-00-01**

Page 123

Jun 1/94



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (5) Loosen the bolts securing the forward flanged end of the tube.
- (6) Remove the nut, bolt, loop clamp and the half clamp shells (SB.0L.593-75-8972-27 standard), securing the tube to a bracket mounted on the HP case.
- (7) Remove the bolts and bracket from the tube flange and the tube.
- (8) Remove the nuts and bolts securing the make-up piece to the elbow on the intermediate case.
- (9) Remove the make-up piece.

**27. Remove Oil Tubes, Pump to LP and HP Compressor Thrust Bearings , Oil Failure Warning (Ref.Fig.113 Item 65)**

- A. Loosen the tube union nuts at the intermediate case union and at the two tube section.
- B. Remove the bolts securing the lower tube to the pulse probe drive housing.
- C. Remove the nuts, bolts, loop clamps and the half clamp shells (SB.0L.593-75-8972-27 standard), securing the tube to brackets mounted on the intermediate/HP case flange.
- D. Unscrew the tube union nut and remove the tube.
- E. Remove the bolt, clipnut, loop clamps and the half clamp shells (SB.0L.593-75-8972-27 standard), securing the remaining tube to a bracket mounted on the intermediate/HP case flange and remove the tube.

**28. Remove the Oil Scavenge and Feed Tubes, LP and HP Thrust Bearings, Bearings to Pump**

- A. Scavenge Tube (Ref.Fig.113 Item 64).
  - (1) Loosen the bolts securing the tube flanges to the main oil pump housing and pulse probe drive housing.
  - (2) Unscrew the bolts, remove the bracket and withdraw the tube from the mounting faces.
  - (3) Remove the nuts, bolts and bracket secured to the lug on the tube.

DISASSEMBLY

**71-00-01**

Page 124

Jun 1/94



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

Printed in England

B. Feed Tube (Ref.Fig.113 and 114 Item 63).

- (1) Loosen the tubes union connections (Tools 1565, 1528).
  - (a) Between the lower tube and the oil pump housing.
  - (b) Between the upper tube and the connection at the vane two position on the intermediate case.
  - (c) Between the two tubes.
  - (d) Between the upper tube and the tube connected to the right-hand gearbox.
  - (e) The tube flange bolts to the right-hand gearbox.
  - (f) Remove the nuts, bolts and loop clamps.
- (2) Remove the tube flange bolts, unscrew the tube union nut and remove the tube.
- (3) Unscrew the union nuts retaining the upper tube and remove the tube.
- (4) Unscrew the union nut securing the lower tube to the oil pump housing and remove the tube.

29. Remove the Hydraulic Pump Drain Tubes, Seal Space to Oil Tank Overboard Vent (Ref.Fig.113 Item 62)

A. Loosen the tubes unions and connection:

- (1) Bolts securing forward tube flange to hydraulic pump adapter.
- (2) Union nut securing the forward tube to the standby pump adapter.
- (3) The centre tube union nut to the front tube.
- (4) The rear tube union nut to the centre tube.
- (5) The rear tube union nut to the oil tank overboard vent.

- B. Remove the nuts, bolts, spacer (SB.0L.593-71-8988-32 standard), loop clamps and the half clamp shells (SB.0L.593-75-8972-27 standard), securing the rear tube.

DISASSEMBLY

71-00-01

Page 124A

Jun 1/94



**OLYMPUS 593**



**MK.610-14-28** *sneema*  
**OVERHAUL**

**This page left blank intentionally**

**DISASSEMBLY**

**71-00-01**

**Page 124B**

**Jun 1/94**

**OLYMPUS 593****MK.610-14-28 shecma  
OVERHAUL**

Printed in England

- C. Unscrew the rear tube union nuts and remove the tube.
  - D. Remove the nuts, bolts, loop clamps and the half clamp shells (SB.0L.593-75-8972-27 standard), securing the centre tube.
  - E. Unscrew the centre tubes union nut and remove the tube.
  - F. Remove the nuts, bolts, loop clamp and the half clamp shells (SB.0L.593-75-8972-27 standard), securing the forward tube.
  - G. Unscrew the forward tube union nut to standby pump adapter and the bolts retaining the flange to the hydraulic pump adapter and remove the tube.
30. Remove the Electrical Harness Support Bracket (Ref.Fig.113 Item 61)
- A. Remove the nut and loop clamp retaining the CSD oil tube to a pillar bolt mounted on the bracket rear face.
  - B. Remove the nut and loop clamp retaining the purge air tube to a pillar bolt mounted on the bracket rear face.
  - C. Remove the pillar bolt, bolt and nuts securing the rear of the bracket to the bracket mounted on the HP case flange.
  - D. Remove the bolts securing the bracket to the tray Pre-SB.71-18. Remove the nut and bolt securing the bracket to the tray SB.71-18 standard.
  - E. Remove the pillar bolt from the bracket.
  - F. Remove the bolts and block from the tray.

**DISASSEMBLY****71-00-01**

Page 125

Jun 1/94



OLYMPUS 593



MK.61D-14-28 *sneema*  
OVERHAUL

**31. Remove Oil Scavenge Tubes, Oil Pump Housing to HP Compressor Diffuser Case, LP and HP Turbine Bearings**

**A. LP Turbine Bearing to Pump Tubes (Ref.Fig.113 Item 60).**

- (1) Loosen the unions and connection (Tools 1526, 1528):
  - (a) The forward tubes flange bolts securing the tube to the oil pump mounting face.
  - (b) The union nut connecting the tubes.
  - (c) The union nut securing the rear tube at the exhaust diffuser case.
- (2) Remove the nut, bolt, loop clamp and the half clamp shells (SB.0L.593-75-8972-27 standard), securing the rear tube.
- (3) Unscrew the union nuts securing the rear tube and remove the rear tube.
- (4) Remove the nuts, bolts, loop clamps and the half clamp shells (SB.0L.593-75-8972-27 standard), securing the forward tube.
- (5) Unscrew the bolts securing the tube flange and bracket, remove the bracket and tube.

**B. HP Turbine Bearing to Pump Tubes (Ref.Fig.113 Item 59).**

- (1) Remove the bolts securing the thermometer in the tube, withdraw the thermometer.
- (2) Loosen the unions and connection (Tools 1526, 1528):
  - (a) The forward tubes flange bolts securing the tube to the oil pump mounting face.

DISASSEMBLY

**71-00-01**

Page 126

Jun 1/94



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) The tubes connecting union nut.
- (c) The rear tube union at the delivery case.
- (3) Remove the bolts securing the front tube flange, unscrew the union nut and remove the tube.
- (4) Remove the bolt, clipnut and loop clamp securing the rear tube.
- (5) Unscrew the tube union nut from the delivery case union and remove the rear tube.

### 32. Remove Fuel Tubes

#### A. Fuel Outlet, Distribution and Dump Valve to FCU Tube Union (Ref.Fig.112 Item 58).

- (1) Loosen the tube union nut at the FCU tube union.
- (2) Loosen the bolts retaining the tube flange to the distribution and dump valve.
- (3) Remove the bolt, clipnut and loop clamp securing the tube.
- (4) Unscrew the flange bolts and union nut and remove the tube.

#### B. Fuel Feed, Adapter Block and Engine Flowmeter to Distribution and Dump Valve (Ref.Fig.112 Item 57).

- (1) Remove the ferrule assembly from the tube rear connection.
- (2) Remove the nut, bolt and loop clamp securing the tube.
- (3) Remove the nuts and bolts securing the tube rear flange to the oil tank overboard vent pipe support bracket.
- (4) Remove the bolts, nuts and nutplate retaining the tube rear flange and the seal plate between the mating faces.
- (5) Remove the nuts and bolts retaining the tube front flange and remove the tube and seal plate.



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (6) Remove the nuts and bolts securing the flowmeter to the distribution and dump valve, remove the flowmeter and seal plate.

NOTE: A make-up piece (transit) may be fitted in lieu of the flowmeter, remove at this stage as for flowmeter.

- (7) Remove the bolts securing the adapter to the FCU mating face, remove the adapter and seal plate.

33. Remove Fuel Return Tube - Drains Tank to the First Stage Pump/Recirculation Valve (Ref.Figs.113 and 112 Item 56)

- A. Remove the pipe closure nut from the tube forward of the first stage pump.
- B. Loosen the tubes unions between the recirculation valve and the first stage pump.
- C. Remove the bolt, clipnut and loop clamp retaining the rear tube.
- D. Unscrew the union nuts securing the rear tube and remove the tube.
- E. Remove the bolt, clipnut and loop clamp retaining the forward tube.
- F. Unscrew the forward tube front union nut and remove the tube.
- G. Loosen the tube unions between the first stage pump and the drains tank.
- H. Unscrew the union nuts securing the front tube and remove the tube.
- J. Remove the nuts, bolts and loop clamps, unscrew the union nuts securing the next three tubes toward the rear and remove the tubes.
- K. Remove the nuts, bolt, pillar bolt, spacer and loop clamps retaining the rear tube.
- L. Unscrew the union nut securing the tube and remove the tube.

TN46466

DISASSEMBLY

71-00-01

Page 128

Feb 2/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (6) Remove the nuts and bolts securing the flowmeter to the distribution and dump valve, remove the flowmeter and seal plate.

NOTE: A make-up piece (transit) may be fitted in lieu of the flowmeter, remove at this stage as for flowmeter.

- (7) Remove the bolts securing the adapter to the FCU mating face, remove the adapter and seal plate.

33. Remove Fuel Return Tube - Drains Tank to the First Stage Pump/Recirculation Valve (Ref.Figs.113 and 112 Item 56)

- A. Remove the pipe closure nut from the tube forward of the first stage pump.
- B. Loosen the tubes unions between the recirculation valve and the first stage pump.
- C. Remove the bolt, clipnut and loop clamp retaining the rear tube.
- D. Unscrew the union nuts securing the rear tube and remove the tube.
- E. Remove the bolt, clipnut and loop clamp retaining the forward tube.
- F. Unscrew the forward tube front union nut and remove the tube.
- G. Loosen the tube unions between the first stage pump and the drains tank.
- H. Unscrew the union nuts securing the front tube and remove the tube.
- J. Remove the nuts, bolts and loop clamps, unscrew the union nuts securing the next three tubes toward the rear and remove the tubes.
- K. Remove the nuts, bolt, pillar bolt, spacer and loop clamps retaining the rear tube.
- L. Unscrew the union nut securing the tube and remove the tube.

TN46466

DISASSEMBLY

71-00-01

Page 128  
Feb 2/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



34. Remove the First Stage Pump and FCU Gland Drain Tube to the Second Stage Pump Drain (Ref.Fig.112 Item 55)
- A. Loosen the tube union nuts and the fluid passage bolt.
  - B. Remove the nut, bolt and loop clamp retaining the tube to a bracket.
  - C. Unscrew the tube union nut and the fluid passage bolt, remove the fluid passage bolt, washers and tube.
35. Remove the Second Stage Pump Air/Fuel Drain Tube (Ref.Fig.113 Item 54)
- A. Loosen the tube union nuts at the second stage pump elbow and the drains tank (Tool 1529).
  - B. Remove the nut, bolt and loop clamp retaining the tube.
  - C. Unscrew the tube union nuts and remove the tube.
  - D. Remove the bolts and bracket from the reheat fuel control unit flange.
  - E. Unscrew the bolts securing the bracket and elbow to the pump mounting face, remove the bolts, bracket elbow and seal plate.
36. Remove the Fuel Tube, FCU and Reheat Fuel Controller Return to First Stage Pump Inlet Elbow (Ref.Fig.112 Item 53)
- A. Loosen the tube flange bolts at the first stage pump and the two tube union nuts (Tool 1528) securing the first two tubes to each other and to the multi-connection tube secured to the FCU.
  - B. Remove the nut, bolts, clip nut and loop clamps retaining the second tube.
  - C. Unscrew the union nuts and remove the second tube.
  - D. Unscrew the bolts from the flange of the front tube and remove the tube and seal plate.
37. Remove the Fuel Tube, FCU and Reheat Fuel Controller to Three-way Connector (Ref.Fig.113 Item 52)
- A. Loosen the tube union nuts at the FCU and the three-way connector on the reheat control unit.



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- B. Remove the nut, washer, spacer, bolt and loop clamp retaining the tube.
  - C. Unscrew the tube unions and remove the tube.
38. Remove the Fuel Tube, Second Stage Pump to Recirculation Valve (Ref.Fig.113 Item 51)
- A. Loosen the bolts securing the tube flange and the union nut.
  - B. Remove the nuts, bolts and loop clamps retaining the tube.
  - C. Unscrew the tube union nut and flange retaining bolts and remove the tube.
39. Remove the Fuel Tubes, FCU to Distribution and Dump Valve Rear Face (Ref.Fig.112 Item 50)
- A. Loosen the bolts securing the tubes flanges and union nut.
  - B. Remove the nut, bolt and loop clamp retaining the forward tube to the oil tank vent pipe support bracket.
  - C. Unscrew the tube flange bolts and union nut and remove the forward tube.
  - D. Remove the nut, bolt and loop clamp retaining the rear tube to the loop clamp on the FCU to dump valve tube and the bracket on the HP case front/rear joint flange.
  - E. Unscrew the tube flange bolts and remove the tube.
40. Remove the Fuel Tube, FCU to Manifold Dump Valve (Ref.Fig.112 Item 49)
- A. Remove the tube closure ferrule from the union on the tube rear flange.
  - B. Loosen and remove the bolts securing the tube flanges and remove the tube.
41. Remove the Reheat Purge Solenoid Valve and Air Tubes (Ref. Fig.113 and 114 Items 47 and 48)
- A. Remove the Tubes, Purge Valve to Exhaust Diffuser.
    - (1) Loosen the tubes union nuts between the purge valve and the exhaust diffuser connector and between the tubes.

TN46769

DISASSEMBLY  
**71-00-01**

Page 130  
Jan 1/77



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (2) Remove the nuts, bolts, loop clamps and the half clamp shells (SB.0L.593-75-8972-27 standard) retaining the tubes.
  - (3) Unscrew the union nuts and remove the tubes.
- B. Remove the Tubes, Purge Valve to Solenoid Valve.
- (1) Loosen the tubes union nuts between the valve and solenoid and between the tubes.
  - (2) Remove the nuts, bolts and loop clamps retaining the tubes.
  - (3) Unscrew the union nuts and remove the tubes.
- C. Remove the Tube, Solenoid Valve to Delivery Case Air Duct.
- (1) Loosen the tube union nuts.
  - (2) Remove the nut, bolt and loop clamp retaining the tube.
  - (3) Unscrew the union nuts and remove the tube.
- D. Remove the Solenoid Valve.
- (1) Remove the nuts and bolts securing the valve to the bracket.
  - (2) Remove the valve.
42. Remove the Reheat Fuel Controller Servo Supply Tubes (Ref. Fig.113 Item 46)
- A. Loosen the flange bolts and tubes union nuts of the tubes between the fuel heater filter and the reheat control unit.
  - B. Unscrew the union nut, and the tube flange bolts to the fuel heater filter, remove the tube.
  - C. Remove the nuts, bolts and loop clamps retaining the tubes.
  - D. Unscrew the tubes union nuts and remove the tubes.

DISASSEMBLY

71-00-01

Page 131  
Jun 1/94



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



43. Remove the Cylinder/Piston Unit, LP Shaft Signal System (Ref. Fig.112 Item 45)

**WARNING:** WASH HANDS AFTER CONTACT WITH LUBRICANT G ON SIGNAL SYSTEM COMPONENTS. LUBRICANT G IS TOXIC AND CONTAINS COPPER AND LEAD.

- A. Remove the nuts, screws, saddles, straps and conduits from the cable assembly.
- B. Disconnect centre cable from rear cable.
- C. Disconnect front cable from valve plunger mechanism.
  - (1) Remove nuts and bolts securing shield front adapter to shroud, turn shroud until withdrawal slots are aligned and withdraw reset plunger.
  - (2) Move retaining ring rearward and leave in position on shield adapter.
  - (3) Slacken clamp bolt and slide shield rearward.
  - (4) Disengage cable and turn shield to clear attachment flange.
- D. On engines to pre-SB.76-8582-28 standard detach piston and cylinder assembly.
  - (1) Remove straps and conduit from cable between front roller block and cylinder assembly.
  - (2) Release cable from front and rear roller blocks. Remove pins and washers with the outer roller of pre-SB.76-17 assemblies.
- E. On engines to SB.76-8582-28 standard.
  - (1) Remove nuts and bolts securing rear block to bracket.
  - (2) Compress slotted conduit and press rear block towards centre block.
  - (3) Remove guard plate at centre block.



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (4) Turn slots of conduits to align with slots of rear and centre block.
  - (5) Refit the nuts, bolts and plunger (Tool 1298) to the dump valve.
  - (6) Remove nuts and bolts securing air vent tube support bracket and rear end of cylinder assembly to mounting bracket.
  - (7) Remove nuts securing baseplate to HP compressor rear flange.
  - (8) Compress end of slotted conduit and disengage assembly.
  - (9) Guide centre cable through conduit slots and remove assembly complete.
  - (10) Refit the nuts and bolts to the dump valve.
44. Remove the Fuel Tubes, Oil Cooler to Air Bleed Valve (Ref. Fig.112 Item 44)
- A. Remove the capnut, key-ring, chain and anchor ring assembly from the tube and bracket on the primary sprayer tube flange.
  - B. Unscrew the valve from the tube housing.
  - C. Loosen the tubes union nuts and the nuts and bolts securing the upper tube lug to the bracket on the primary sprayer tube flange.
  - D. Remove the nut, bolt and loop clamp retaining the upper tube.
  - E. Remove the nuts and bolts securing the tube lug and the bracket mounted to the tube lug.
  - F. Unscrew the tubes union nuts and remove the tubes.
45. Remove the Fuel Tubes, Distribution and Dump Valve to Pilot Nozzles (Ref.Fig.113 Item 43)
- A. Loosen the tubes union nuts and the tube flange securing bolts at the distribution block dump valve mounting.

DISASSEMBLY

71-00-01

Page 133

Dec 1/81



OLYMPUS 593

MK. 610-14-28

OVERHAUL



- B. Remove the Tube, Left-hand Nozzle to T-Joint.
- (1) Remove the nut, bolt and loop clamp securing the tube.
  - (2) Unscrew the tube union nuts and remove the tube.
- C. Remove the Tube, Right-hand Nozzle to T-Joint.
- (1) Remove the nuts, bolts and loop clamp securing the tube.
  - (2) Unscrew the tube union nuts and remove the tube.
- D. Remove the Tube, Distribution and Dump Valve to Delivery Case, Five Vane.
- (1) Remove the nuts, bolts and loop clamps securing the tube.
  - (2) Remove the nuts and bolts retaining the T-joint end of the pipe from the bracket mounted at number five vane on the delivery case.
  - (3) Unscrew the bolts securing the bracket and the tube flange, remove the bracket and tube.
46. Remove the Fuel Tubes, Starter Pump to Distribution and Dump Valve (Ref.Fig.113 Item 42)
- A. Remove the bolts securing the tube flange to the distribution and dump valve, remove the gasket.
  - B. Loosen and unscrew the tube union nuts.
  - C. Remove the nuts, bolts and loop clamps and remove the tubes.
47. Remove the Reheat Flowmeter (Ref.Fig.113 Item 41)
- A. Remove the nuts, washers and bolts securing the flowmeter to the control unit flange (Tool 1862).
  - B. Remove the nuts, washers and bolts securing the flowmeter to the supply pipe flange.



OLYMPUS 593

MK.610-14-28

OVERHAUL



C. Remove the flowmeter and seal plates.

**NOTE:** A make-up piece (transit) may be fitted in lieu of the flowmeter, remove at this stage as for flowmeter.

48. Remove the Fuel Tubes

A. Starter Pump to FCU (Ref.Fig.113 Item 37).

- (1) Loosen the tube union nuts and the bolts securing the filter housing assembly.
- (2) Remove the nuts, bolts and loop clamps retaining the lower tube.
- (3) Unscrew the tube union nuts and remove the tubes.
- (4) Unscrew the bolts securing the filter housing assembly. Remove the assembly and seal plate, withdraw the filter and seal plate (Pre SB.73-8311-62 standard).

B. Second Stage Pump to Starter Pump (Ref.Fig.113 Item 39).

- (1) Loosen the tube union nuts at the starter pump and feed tube (Tool 1565).
- (2) Remove the nut, bolt and loop clamp retaining the tube.
- (3) Unscrew the tube union nuts and remove the tube.





OLYMPUS 593

MK.610-14-28

OVERHAUL



This page left blank intentionally

DISASSEMBLY

**71-00-01**

Page 134B

Dec 1/81

**OLYMPUS 593**MK.610-14-28 SNECMA  
OVERHAUL

Printed in England

49. Remove the Starter Pump (Ref.Fig.113 Item 34)
- A. Remove the nut, washer and bolt retaining the pump to the front bracket.
  - B. Remove the bolts and flanged pins retaining the pump to the rear bracket and withdraw the pump.
50. Disconnect the Fuel Manifold Tubes to Distribution and Dump Valve (Ref.Fig.112 Item 40)
- A. Remove the ferrule assemblies from the tubes (Tool 1529).
  - B. Remove the bolts securing the tubes flanges to the distribution and dump valve.
  - C. Withdraw the seal plates from between the tubes flanges and distribution and dump valve faces.
  - D. Loosen the tubes union nuts (Tool 1529).
51. Remove the Oil Tank Overboard Rear Vent Tube and Support Bracket (Ref.Fig.113 Item 38)
- A. Remove the nut and bolt securing the tube and seal plate to the bracket.
  - B. Remove the flange nuts and bolts securing the rear tube and remove the tube assembly and the bracket.
  - C. Remove the nuts and bolts securing the seal plate to the tube.
  - D. Remove the nuts and washers retaining the bracket to the pillar bolts and distribution and dump valve front mounting bracket.
  - E. Remove the nuts, washers and pillar bolts from the reheat control unit support cone.
52. Remove the Reheat Controller/Distribution and Dump Valve (Ref. Fig.112 Item 36)
- A. SB.OL.593-71-8988-32. Remove the nut, spacer, bolt and loop clamp securing the flylead of the reheat controller to the bracket on the reheat flowmeter.
  - B. Remove the bolt, washer, distance piece and nut securing the support cone to the bracket on the HP case.

DISASSEMBLY

**71-00-01**Page 135  
Feb 2/76



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- C. Remove the bolts and pins securing the reheat controller/distribution and dump valve to the support bracket on the HP case/delivery case flange, withdraw the unit.
53. Remove the Reheat Controller and FCU to First Stage Pump Inlet Elbow Fuel Return Tube (Ref.Fig.113 Item 35)
- A. Loosen the tube union nuts (Tool 1752).
  - B. Remove the bolt, clip nut and loop clamp retaining the tube.
  - C. Unscrew the union nuts and remove the tube.
  - D. Remove the ferrule assembly from the connector block.
  - E. Remove the nuts, bolt and pillar bolt securing the connector block from the mounting on the reheat fuel controller.
54. Remove the LP and HP Turbine Bearing Cold Vent Tubes and Connector Assembly (Ref.Fig.113 Item 33)
- A. Remove the blanking ferrule assemblies from the tubes, bottom of engine, HP compressor diffuser case to exhaust diffuser case.
  - B. Loosen the tubes union nuts (Tool 1565).
  - C. Loosen the rear tubes flange bolts.
  - D. Remove the nuts, bolts and loop clamps retaining the tubes.
  - E. Unscrew the forward tube union nuts and remove the tube.
  - F. Unscrew the centre tube union nuts and remove the tube.
  - G. Unscrew the bolts retaining the rear tube flange and remove the tube.
  - H. Remove the bolts securing the connector to the bracket on the right-hand support tube and withdraw the connector.
55. Remove the HP and LP Turbine Oil Feed Tubes (Ref.Fig.113 Items 32 and 31)
- A. Loosen the tubes union nuts, bottom of the engine, left-hand gearbox to exhaust diffuser case (Tools 1565 and 1528).
  - B. Loosen the bolts securing the elbow to the left-hand gearbox.

DISASSEMBLY

## 71-00-01

Page 136  
Jun 1/94



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. Loosen the tube connection to the exhaust diffuser case (Tool 1526).
- D. Remove the nuts, washers, bolts, pillar bolt and loop clamps retaining the tubes.
- E. Unscrew the union nuts and tube connection securing the rear tubes, remove the tubes.
- F. Unscrew the front tube union nuts and remove the tube.
- G. Remove the bolts securing the elbow, withdraw the bracket and elbow.
- H. Remove the bolts securing the thermometer in the housing of the front tube, withdraw the thermometer.
56. Remove the Fuel Tube, Oil Cooler to Second Stage Pump (Ref. Fig.112 Item 30)
- A. Remove the nut, bolt and loop clamp retaining the tube.
- B. Loosen the bolts retaining the tube flanges.
- C. Remove the bolts securing the tube flange to the pump and the seal plate from between the mating faces.
- D. Remove the bolts securing the tube flange to the oil cooler, brackets, wire-locking washer and the seal plate from between the mating faces, remove the tube.
57. Remove the Fuel Tubes, Fuel Filter to Oil Cooler (Ref.Fig.112 Item 29)
- A. Remove the tube closure ferrules from the rear tube.
- B. Loosen the bolts retaining the tubes flanges.
- C. Remove the nut, bolt, washer, spacer and loop clamp retaining the tubes.
- D. Remove the nuts and bolts securing the tubes flanges together, bracket secured to the flange and the seal plate from between the flanges.
- E. Remove the bolts securing the forward tube flange to the fuel filter, withdraw the tube and seal plate.

DISASSEMBLY

71-00-01

Page 137

Feb 2/76



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- F. Remove the bolts securing the rear tube flange to the oil cooler, bracket, washers and wire-locking washer retained to the tube flange, withdraw the tube and seal plate.
58. Remove the Reheat Fuel Tube, First Stage Pump to Reheat Fuel Flowmeter (Ref.Fig.113 Item 28)
- A. Remove the tube closure ferrule from the filter blank plate.
  - B. Loosen the bolts securing the tube flanges.
  - C. Remove the nuts, bolts and loop clamps retaining the tubes.
  - D. Remove the bolts securing the tube to the first stage pump, withdraw the tube and seal plate.
  - E. Disassemble the Filter Assembly.
    - (1) Remove the nuts and bolts securing the blanking plate to the filter housing and the bracket secured to the housing flange.
    - (2) Remove the blank plate and seal plate.
    - (3) Withdraw the filter.
59. Remove the Electrical Harness Support Tray and Fuel and Hydraulic Pressurization Tube (Ref.Fig.113 Item 27)
- A. Electrical Support Tray.
    - (1) Remove the nuts, pillar bolt, loop clamp and the half clamp shells (SB.0L.593-75-8972-27 standard) retaining the tube to the tray.
    - (2) Remove the bolts securing the tray to the support bracket, remove the tray.
    - (3) Remove the bolts securing the bracket to the support bracket on the stage five duct, remove the bracket.
  - B. Pressurization Tube.
    - (1) Loosen and unscrew the tube union nut from the union on the duct mounted to the lower rear of the HP case, remove the tube.

DISASSEMBLY

71-00-01

Page 138  
Jun 1/94



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## 60. Remove Oil Tubes

### A. Right-hand Gearbox to Oil Tank (Ref.Fig.112 Item 26).

- (1) Loosen the tubes unions between the oil return tube on the upper left side of the engine to the right-hand gearbox.
- (2) Loosen the bolts securing the tube flange to the mounting face.
- (3) Remove the nuts, bolts, clipnut and loop clamps retaining the tubes.
- (4) Unscrew the union nuts of the tube on the left-hand side of the engine and remove the tube.
- (5) Unscrew the bolts securing the bottom tube flange to gearbox and remove the tube.

### B. Anti-syphon Tube, Main Oil Feed to Return Tube (Ref. Fig.112 Item 25).

- (1) Loosen the tube union nut and the bolts retaining the flange.
- (2) Remove the nut, bolt and loop clamp retaining the tube.
- (3) Unscrew the bolts from the tube flange and the union nut, remove the tube.
- (4) Unscrew the strainer from the tube flanged end and discard the keywasher.

### C. Oil Tank to Main Oil Pump (Ref.Fig.112 Item 24).

- (1) Loosen the bolts securing the tubes flanges to the oil tank mounting from each other and the oil pump mounting face.
- (2) Unscrew the bolts securing the rear tube flanges, remove the brackets from the flanges and remove the tube.
- (3) Unscrew the bolts securing the forward tube flange to the oil tank, remove the tube.
- (4) Remove the retaining rings from the bolts and the bolts from the tube flange.

DISASSEMBLY

**71-00-01**

Page 139

Feb 2/76



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

D. Inlet Thermometer.

- (1) Loosen the bolts securing the thermometer flange to mating flange.
- (2) Unscrew the bolts, then remove the bracket and thermometer from the tube.

61. Remove the Fuel Recirculation Valve (Ref.Fig.112 Item 23)

- A. Cut the lockwire and remove the bolts securing the valve brackets to the mounting brackets front and rear, remove the valve.
- B. Remove the bolts and brackets secured to the valve.
- C. Release the clamp ring and remove the plunger assembly from valve.

62. Remove Vent Tubes, Intermediate Case Sump to Tube Connection (Ref.Fig.113 Item 22)

- A. Loosen the tubes union nuts (Tool 1565).
- B. Remove the nuts, bolts, loop clamps and the half clamp shells (SB.OL.593-75-8972-27 standard) retaining the tubes.
- C. Unscrew the union nuts securing the rear tube and remove the tube.
- D. Unscrew the union nut securing the front tube and remove the tube.

63. Remove Vent Tubes, Intermediate Case Adapter to Aircraft Connection (Ref.Fig.112 Item 21)

- A. Loosen the tubes union nuts (Tool 1528).
- B. Remove the nuts, bolts, loop clamps and the half clamp shells (SB.OL.593-75-8972-27 standard) retaining the tubes.
- C. Unscrew the union nuts securing the front tube and remove the tube.
- D. Unscrew the union nut securing the rear tube and remove the tube.

DISASSEMBLY

71-00-01

Page 140

Jun 1/94



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

Printed in England

- E. Remove the nuts and bolts securing the tube end fitting to the bracket and the bracket to the support tube, remove the end fitting and the bracket.
- F. Remove the nuts and bolts securing the bracket to the LP shaft signal system base plate, remove the bracket.

64. Remove the Air Tubes, Fuel Heater System (Ref.Fig.112 Item 20 and Fig.105)

A. Heater Overboard Duct.

- (1) Remove the bolt securing the tube in the heater outlet elbow.
- (2) Remove the nuts and bolts securing the support strut and support lugs to the flange on the tube and the bracket mounted on the LP case front blow-off flange. Withdraw the support strut, support lugs and the tube.

B. Elbow and Vertical Tube from Valve Rear Face.

- (1) Remove the nuts, bolts and retaining plate at the rear top tube joint.
- (2) Remove the bolts securing the elbow to the valve, and the nuts and bolts securing the elbow to the vertical rear tube, remove the bracket and the elbow.
- (3) Remove the nuts, bolts, loop clamps and the half clamp shells (SB.0L.593-75-8972-27 standard) securing the tube and withdraw the tube.

C. Engine, Below Left-hand Trunnion Mount to Valve.

- (1) Remove the nuts, bolts, hollow pin and keep plate from the tube and elbow on the engine delivery case.
- (2) Remove the nuts and bolts securing the lower tube to the bracket.
- (3) Remove the bolts securing the tube lower flange to the valve and remove the valve.
- (4) Remove the nut, bolt and loop clamp retaining the lower tube.
- (5) Remove the tubes from the engine and separate them from each other.

DISASSEMBLY

71-00-01

Page 141  
Jun 1/94

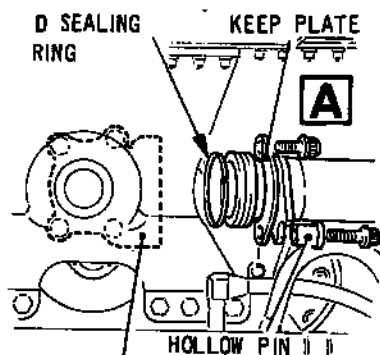




# OLYMPUS 593

MK.610-14-28

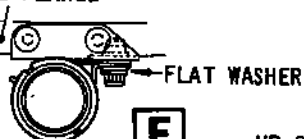
OVERHAUL



CR 32934/00B

DIFFUSER CASE  
ELBOW

EXIT GUIDE VANE/INTERMEDIATE  
CASE FLANGE



HP COMPRESSOR  
CASE

INTERMEDIATE  
CASE

LP COMPRESSOR  
CASE

RETAINING  
PLATE

SEALING  
RING

ELBOW

**E**

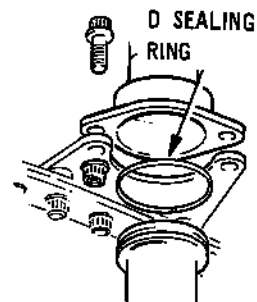
SEALING  
RING

SEAL RING  
CARRIER

PLATE  
RETAINING

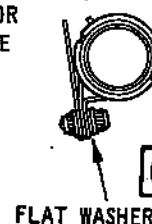
SEALING  
RING

**B**



AIR VALVE

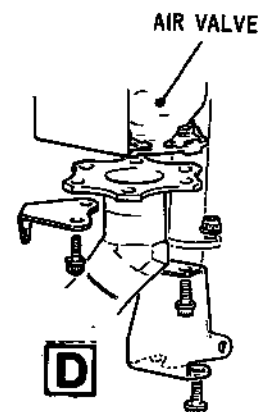
HP COMPRESSOR  
DIFFUSER CASE



FLAT WASHER

FUEL  
HEATER

AIR VALVE



**D**

Fuel Heater Air Valve and Associated Tubes  
Figure 105 (Sheet 1 of 2)

DISASSEMBLY  
**71-00-01**  
Page 142  
Apr 1/78



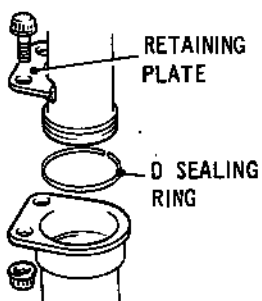
OLYMPUS 593

MK.610-14-28

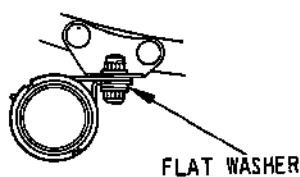
OVERHAUL



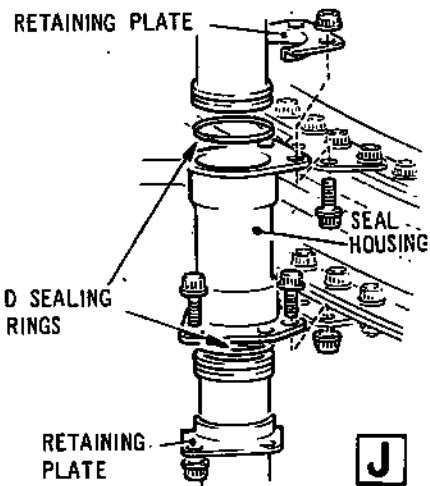
CR 32935/00B



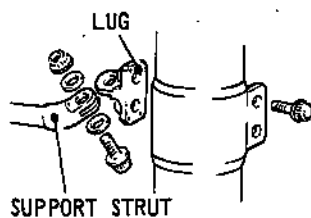
**G** SIMILAR AT **L**



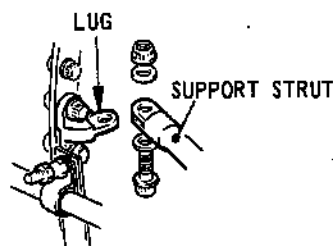
**H**



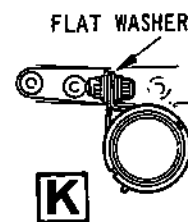
**J**



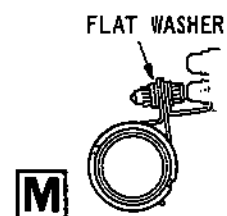
**S**



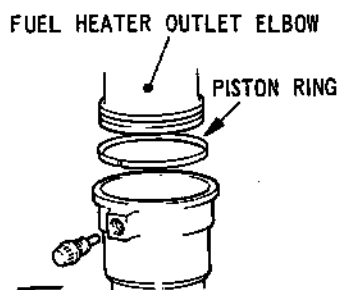
**T**



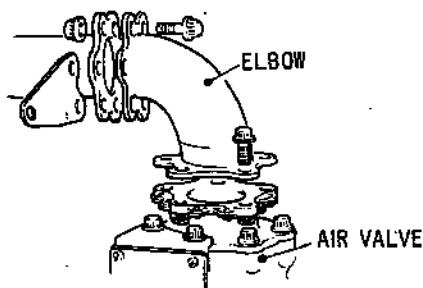
**K**



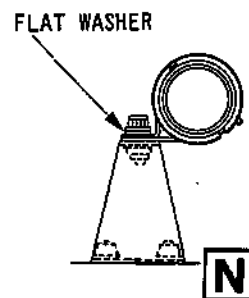
**M**



**R**



**P**



**N**

Fuel Heater Air Valve and Associated Tubes  
Figure 105 (Sheet 2 of 2)



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

D. Heater, Elbow Assembly and Forward Vertical Tube.

- (1) Remove the nuts, bolts and retaining plates from:
  - (a) The vertical tube top and bottom joints.
  - (b) The forward facing elbow joint.
- (2) Remove the nut, bolt, loop clamp and the half clamp shells (SB.0L.593-75-8972-27 standard) from the top of the vertical tube and lift the tube away.
- (3) Remove the elbow and ring carrier seal from the heater joint and separate them from each other.

E. Horizontal Tube Assembly, HP Case to CCOC.

- (1) Remove the nuts, bolts and retaining plate from the front tube to the housing.
- (2) Remove the nut, bolt, loop clamp and the half clamp shells (SB.0L.593-75-8972-27 standard) retaining the front tube and withdraw the tube from the housing.
- (3) Remove the nuts and bolts securing the housing to the bracket mounted on the LP compressor/intermediate case flange.
- (4) Remove the nuts, bolts and retaining plate from the housing rear joint and withdraw the housing from the tube.
- (5) Remove the nut, bolt, loop clamp and the half clamp shells (SB.0L.593-75-8972-27 standard) retaining the tube and remove the tube.

65. Remove the Air Supply Ducts from the Second Stage Pump (Ref. Fig.112 Item 19)

A. Loosen the nuts and bolts securing:

- (1) Intermediate case elbow and elbow duct flanges.
- (2) Elbow duct to duct flanges.
- (3) Duct to pump flanges.

B. Remove the bolt securing the elbow duct to the bracket.

DISASSEMBLY

71-00-01

Page 144  
Jun 1/94



OLYMPUS 593

MK.610-14-28

OVERHAUL



- C. Unscrew and remove the nuts and bolts securing the elbow flanges and the nut securing the duct to the pump.  
On engines incorporating SB.75-8578-17 remove the flange joint retaining plate.
- D. Remove the elbow duct and duct and separate the items.
- E. Remove the nut and double ended D-bolt from the duct flange.
66. Remove the Oil Scavenge Tubes, Pump to Cooler (Ref.Fig.113 Item 18)
- A. Remove the magnetic plug from the container body assembly.
- B. Remove the nuts and bolts securing the drain valve assembly to the container lower flange, remove the assembly.
- C. Remove the bolts securing the tube flange, to the container body upper flange and remove the bracket.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



This page left blank intentionally

DISASSEMBLY

**71-00-01**

Page 144B

Dec 1/81

**OLYMPUS 593****MK.610-14-28    snecma  
OVERHAUL**

Printed in England

- D. Remove the bolts securing the tube rear flange to the oil cooler.
- E. Remove the nuts, bolts and loop clamps retaining the tube, withdraw the tube.
- F. Remove the bolts securing the container rear flange to the pump mounting face, withdraw the container.

**67. Remove the Vent Tubes**

**A. Left-hand Gearbox (Ref.Fig.112 Item 17).**

- (1) Loosen the tube union nuts (Tool 1529).
- (2) Remove the nut, bolt, loop clamp and the half clamp shells (SB.OL.593-75-8972-27 standard) retaining the tube.
- (3) Unscrew the tube union nuts and remove the tube.

**B. Oil Tank Front and Centre Vent Tubes (Ref.Fig.112 Item 16).**

- (1) Loosen the tubes union.
- (2) Remove the bolts and retaining plate from the oil tank vent valve housing assembly.
- (3) Remove the nuts, bolts and loop clamps retaining the centre tube.
- (4) Unscrew the tube union nut and remove the centre tube.
- (5) Remove the nuts, bolts and loop clamps retaining the front tube and withdraw the tube from the oil tank housing.

**C. Sump Vent Tubes, Sump to Oil Return Tube (Ref.Fig.112 Item 15).**

- (1) Loosen the tubes union nuts and the bolts securing the lower tube flange to the sump (Tool 908).
- (2) Remove the nut, bolts, loop clamps and clipnut retaining the lower tube.
- (3) Unscrew the bolts securing the lower tube flange and the tube union nut, remove the tube.
- (4) Unscrew the top tube union and remove the tube.

DISASSEMBLY

**71-00-01**

Page 145  
Jun 1/94



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

68. Remove the Oil Scavenge Tube, Oil Cooler to Oil Tank (Ref. Fig.112 Item 14)
- A. Remove the bolts securing the tube flanges to the oil cooler and the oil tank.
  - B. Remove the nuts, bolts, loop clamps and the half clamp shells (SB.0L.593-75-8972-27 standard) retaining the tube, remove the tube.
69. Remove the Oil Feed and Return Tubes, Oil Cooler to IDG (Ref. Fig.113 Item 13)
- A. Loosen the tubes union nuts and the bolts securing the tubes flanges (Tool 1528).
  - B. Remove the nut, bolts, clipnuts and 'paired' loop clamps retaining the feed and return tubes, IDG to tubes unions. Unscrew the union nuts securing the tubes and remove the tubes.
  - C. Remove the nuts, pillar bolts and loop clamps retaining the bottom left-hand forward tube, unscrew the flange retaining bolts and withdraw the bracket and tube.
  - D. Remove the nuts, bolts and loop clamps retaining the bottom left-hand rear tube, unscrew the flange retaining bolts and withdraw the tube.
70. Remove the Oil Cooler (Ref.Fig.112 Item 12 and Fig.106)
- A. Link.
    - (1) Remove the bolt retaining the link to the oil cooler upper bracket.
    - (2) Withdraw the flanged pin.
  - B. Lower Rear Bracket.
    - (1) Remove the nut, washer and bolt retaining the cooler to the bracket.
    - (2) Withdraw the flanged pin.
  - C. Lower Front Bracket.
    - (1) Remove the bolt and washer retaining the cooler to the lower front bracket.
    - (2) Withdraw the flanged pin and the shim.

DISASSEMBLY

## 71-00-01

Page 146  
Jun 1/94

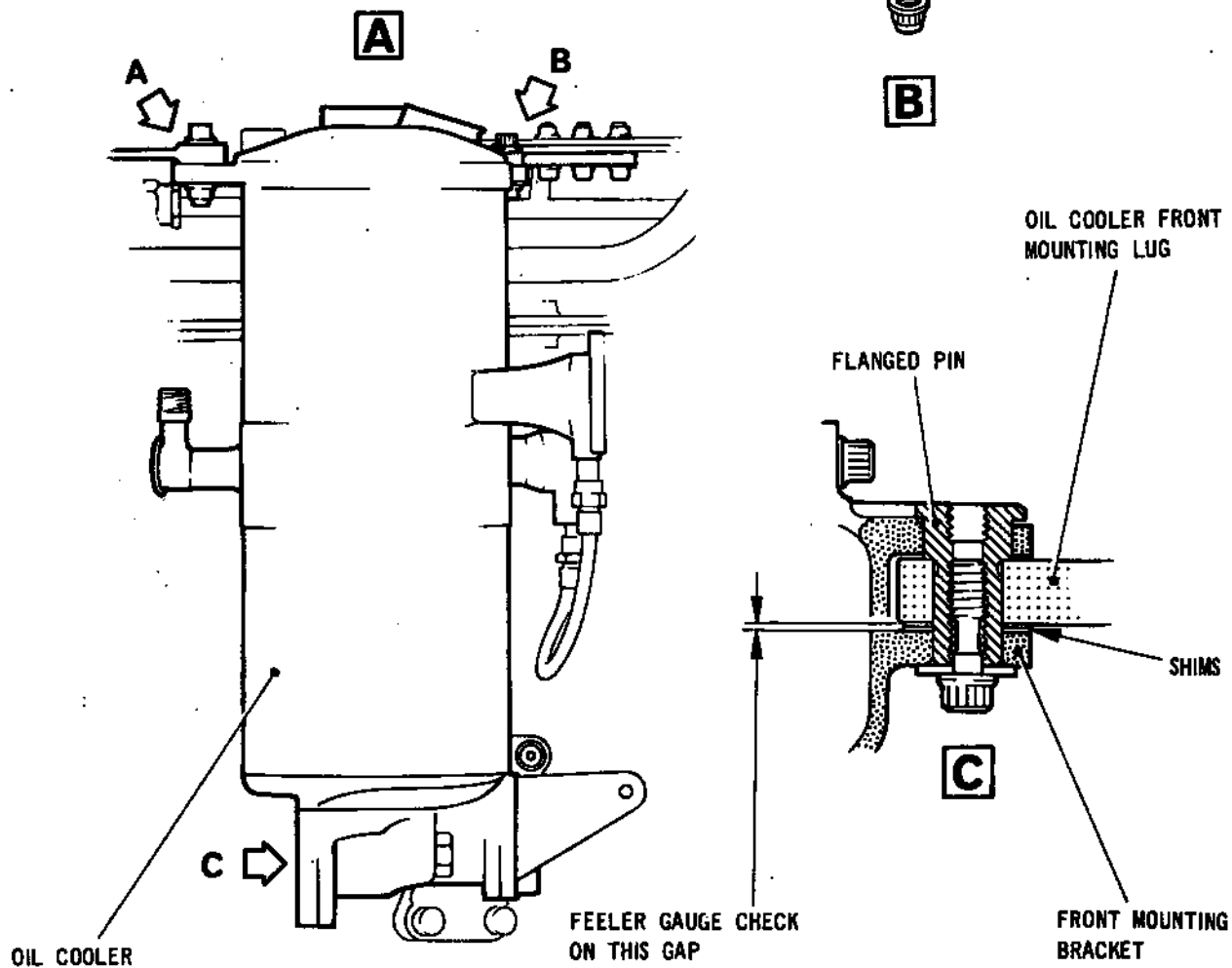
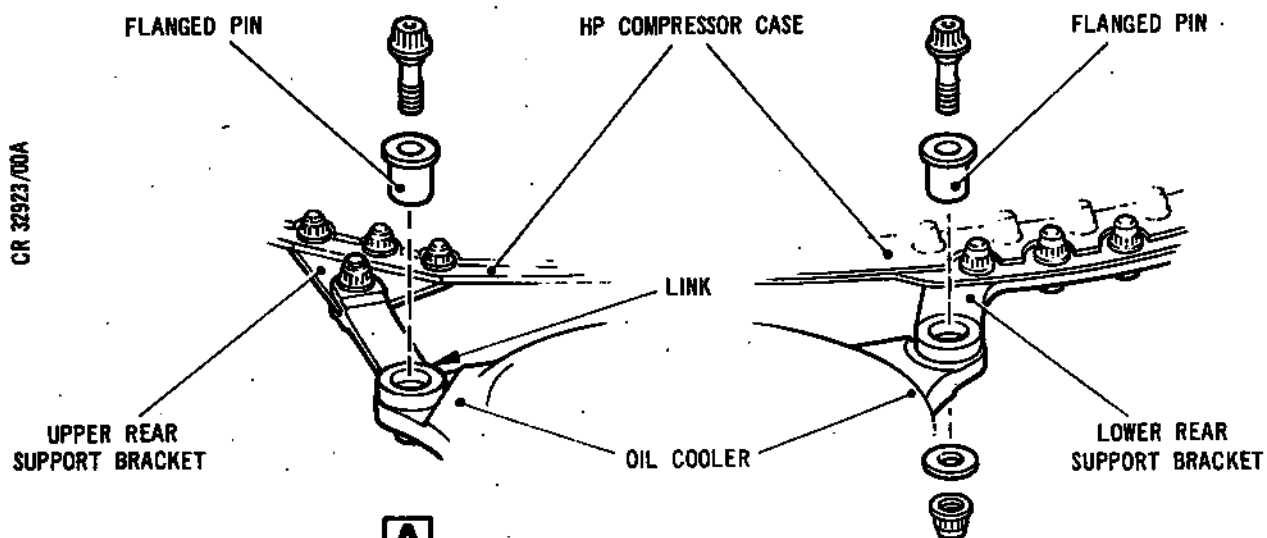


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



Oil Cooler and Mounting  
Figure 106

DISASSEMBLY  
71-00-01  
Page 147  
Feb 2/76

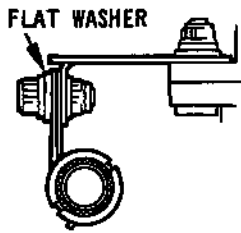
TN32163



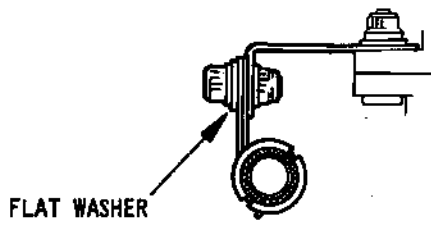


OLYMPUS 593

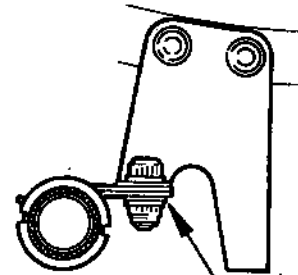
MK.610-14-28  
OVERHAUL



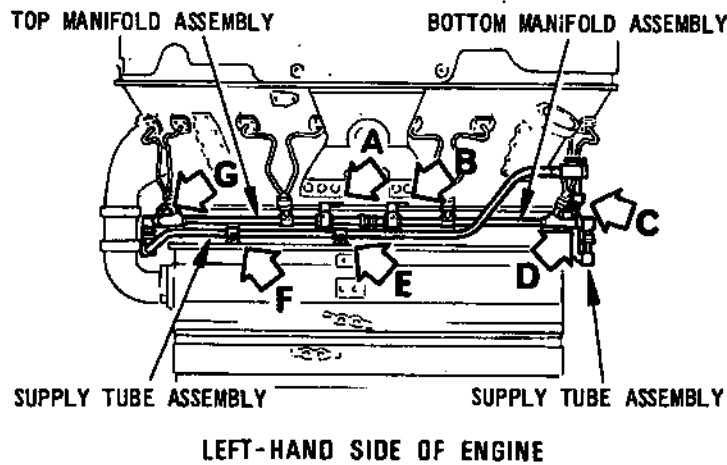
**A**



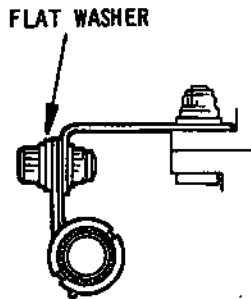
**B**



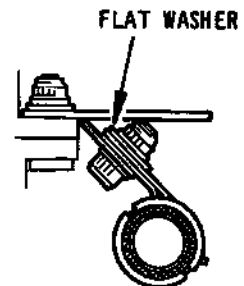
**C**



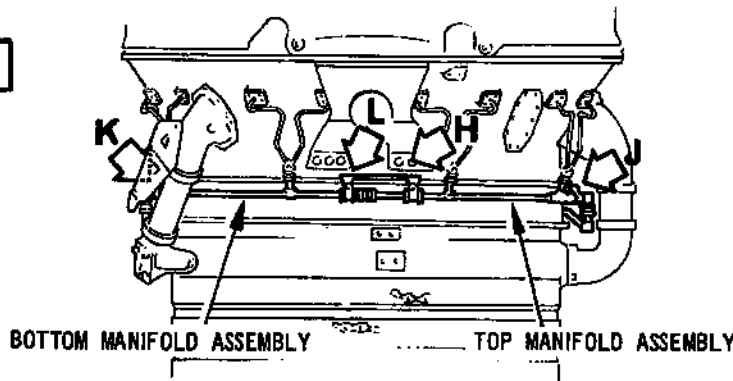
LEFT-HAND SIDE OF ENGINE



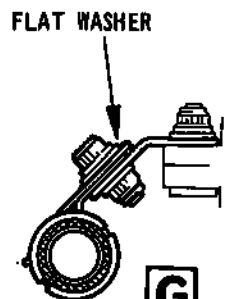
**H** SIMILAR AT **L**



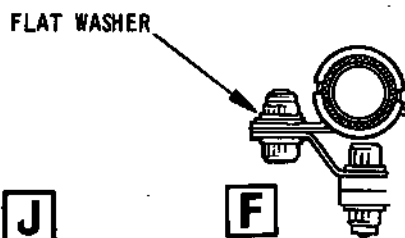
**D** SIMILAR AT **K**



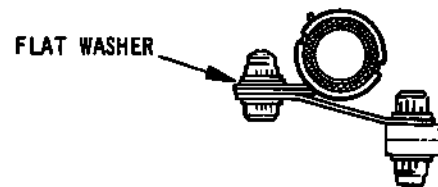
RIGHT-HAND SIDE OF ENGINE



**G** SIMILAR AT **J**



**F**



**E**

Fuel Manifolds and Feed Tubes  
Figure 107

TN32164

DISASSEMBLY  
**71-00-01**

Page 148  
Feb 2/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(3) Remove the oil cooler.

D. Remove the Brackets.

- (1) Remove the nut and D-headed bolt retaining the link to the upper rear bracket, remove the link.
- (2) Remove the nuts and D-headed bolts retaining the rear bracket to the HP case, withdraw the bracket.
- (3) Remove the bolts securing the front bracket to the HP case, withdraw the bracket.

71. Removal of Fuel Manifolds and Feed Tubes (Ref.Fig.112 and 114 Item 11 and Fig.107)

A. Lower Fuel Tube.

- (1) Unscrew the tube union nut from the bottom manifold (Tool 1528).
- (2) Remove the nut, bolt and loop clamp retaining the tube, withdraw the tube.

B. Upper Fuel Tube.

- (1) Unscrew the tube union nut from the top manifold (Tool 1528).
- (2) Remove the nuts, bolts and loop clamps retaining the tube, withdraw the tube.

C. Fuel Manifold.

- (1) Loosen the union nuts securing the manifold tube halves.
- (2) Loosen and unscrew the union nuts securing the manifold tubes to the pairs of sprayer unions.
- (3) Remove the nuts, bolts and loop clamps retaining the bottom manifold tube to brackets secured to the HP case/delivery case flange.
- (4) Unscrew the union nuts securing the bottom manifold tube to the top tube and withdraw the bottom tube.
- (5) Remove the nuts, bolts and loop clamps retaining the upper manifold tube to brackets secured to the HP case/delivery case and withdraw the tube.

DISASSEMBLY

71-00-01

Page 149

Feb 2/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



72. Remove the LP Compressor Bearing Vent Tubes (Ref.Fig.113 Item 10)

A. Loosen the Tubes Union Nuts:

- (1) At the flanged connector, LP case front blow-off flange, both tubes.
- (2) At the adapters on the left and right-hand bottom intake case adapters.

B. Remove the Tubes and Connector.

- (1) Remove the nut, bolt and loop clamp retaining the left-hand tube.
- (2) Unscrew the tube union nuts and withdraw the tube.
- (3) Remove the nuts, bolts and loop clamps retaining the right-hand tube.
- (4) Unscrew the tube union nuts and withdraw the tube.
- (5) Remove the nuts and bolts securing the connector to the LP front blow-off flange and withdraw the connector.

73. Remove the LP Compressor Bearings Oil Feed and Scavenge Tubes

A. Pillar Bolt (Ref.Fig.113 Item 9).

- (1) Remove the nut and pillar bolt mounted to the bracket on the LP case rear blow-off flange below and to the rear of the oil tank.
- (2) Remove the loop clamps from the tube which were secured by the nut and pillar bolt.

B. Filter from Oil Scavenge Tube (Ref.Fig.113 Item 9).

- (1) Remove the union nut and blanking ferrule retaining the filter in the scavenge oil tube below the oil tank (Tool 1526).
- (2) Withdraw the filter from the tube carefully to retain any metal flakes etc to the filter and place in a plastic bag.

TN46777



**OLYMPUS 593**  
MK.610-14-28  
OVERHAUL



C. Scavenge Oil Tubes (Ref.Fig.113 Item 9).

- (1) Loosen the tubes union nuts (Tool 1565) securing the front tube to the adapter on the intake case and the rear and front tubes.
- (2) Loosen the bolts securing the rear tube flange to the oil pump housing mounting face.
- (3) Remove the nuts, bolts and bracket secured to the bracket at the forward end of the tube.
- (4) Remove the nut, bolt, distance piece and loop clamp retaining the rear tube to the bracket mounted on the LP case.
- (5) Unscrew the rear tube union nut and bolts securing the flange, withdraw the tube.
- (6) Remove the bolts, bracket and blank secured to the front tube mounting face.
- (7) Remove the nut, bolt and loop clamp securing the front tube to the bracket mounted on the LP case.
- (8) Unscrew the front tube union nut and withdraw the tube.

D. Feed Tube (Ref.Fig.113 Item 8).

- (1) Loosen the tube union nut (Tool 1528) to the air intake flange assembly and the bolts securing the flange to the oil pump housing mounting face.
- (2) Remove the nuts, bolts, bracket and loop clamps retaining the tube to the brackets mounted to the bottom of the LP case.
- (3) Unscrew the bolts retaining the tube flange to the oil pump housing and the union nut at the intake elbow and remove the tube.
- (4) Remove the filter assembly from the flange assembly.

74. Remove the HP Cooling Air Ducts (Ref.Fig.114 Item 7)

A. Top Ducts.

- (1) Unlock the keywashers (Pre-SB.75-2) or cut the wire-locking (SB.75-2) from bolts securing the forward duct to the HP compressor case and remove the bolts.

DISASSEMBLY  
**71-00-01**

Page 151  
Dec 1/81



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (2) Withdraw the duct from the pipe.
- (3) Withdraw the pipe from the rear duct.
- (4) Remove the bolts securing the rear duct to the diffuser case and withdraw the duct.

B. Lower Ducts.

- (1) Remove the bolts securing the mounting bracket to the forward duct mounted to the HP compressor case, withdraw the bracket.
- (2) Remove the bolts securing the duct and the bracket mounted on the duct flange, withdraw the bracket and duct from the central duct.
- (3) Withdraw the central duct from the rear duct.
- (4) Remove the nuts and bolts retaining the brackets to the rear duct lugs, withdraw the brackets and clip-nuts from the brackets.
- (5) Remove the bolts securing the rear duct flange and bracket to the diffuser case, withdraw the bracket and duct.

75. Remove the Drains Tank. (Ref.Fig.113 Item 6)

A. Drains Tank.

- (1) Remove the nuts and bolts securing the tank to:
  - (a) The left-hand bracket.
  - (b) The right-hand link.
- (2) Remove the nut and bolt Pre-SB.71-14 securing the rear of the tank to the mounting bracket. Remove the nut SB.71-14 securing the rear of the tank to the mounting bracket. Withdraw the tank.

B. Mounting Brackets.

- (1) Remove the nut, bolt and bracket secured to the bracket attached to the bottom inspection port on the CCOC.
- (2) Remove the nut, bolt and mounting link secured to the bracket on the left-hand CCOC support tube.

DISASSEMBLY

71-00-01

Page 152

Jan 1/77

TN46779



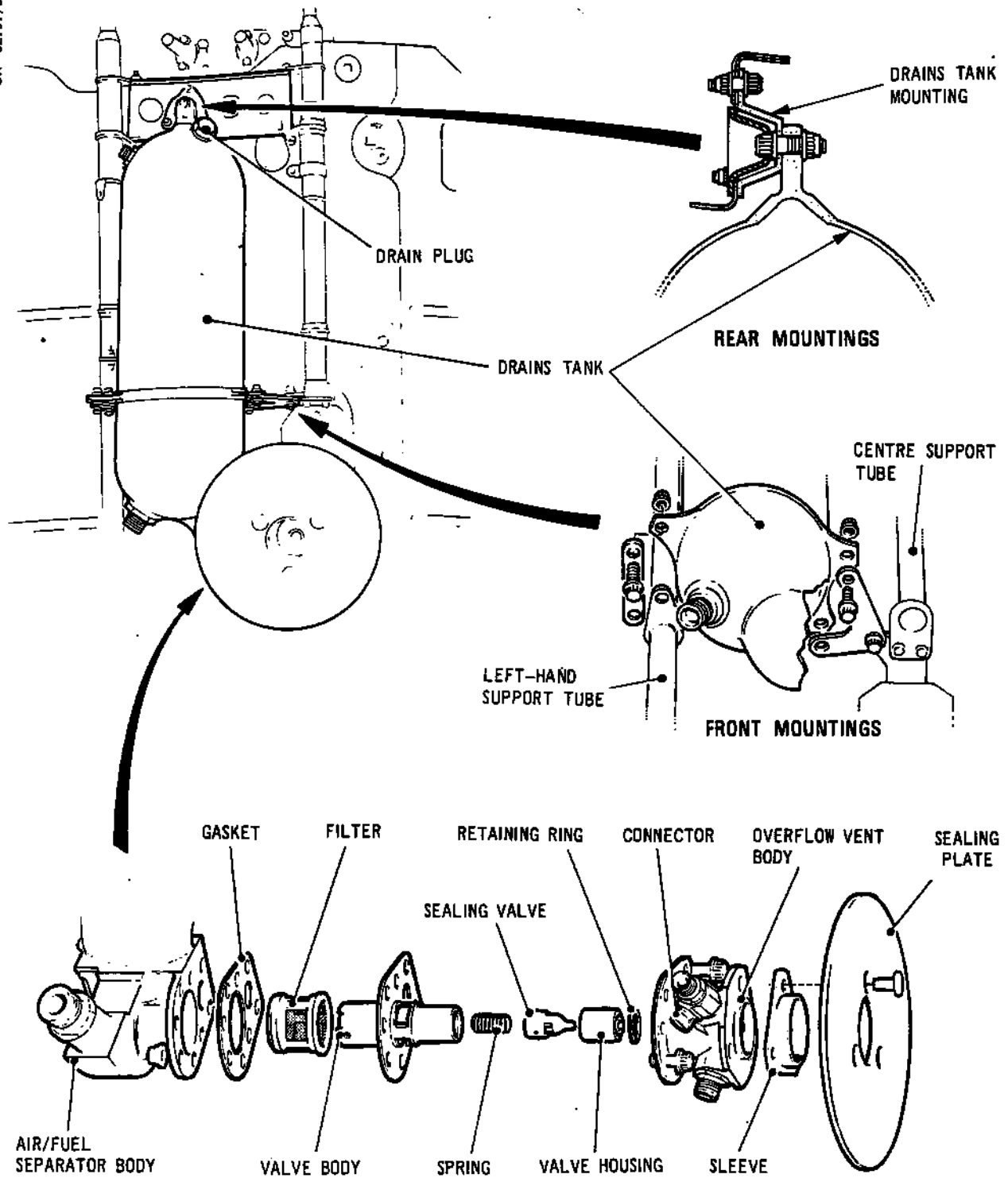
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32797/000

PRINTED IN ENGLAND



Fuel Drains Tank  
Figure 108

DISASSEMBLY  
71-00-01

Page 153  
Jul 1/76

TN32165



**OLYMPUS 593**  
MK.610-14-28  
OVERHAUL



- (3) Remove the nuts, bolts and drains tank mounting bracket secured to the bracket mounted between the centre and left-hand CCOC support tubes. Remove the bolt head trap and bolt SB.71-14.
- (4) Remove the nuts, bolts and bracket secured to the CCOC support tubes.

**C. Disassemble the Drains Tank.**

- (1) Drains plug.
  - (a) Unscrew the drains plug and withdraw the plug and sealing washer from the tank.
- (2) Seal plate.
  - (a) Position the restraining fixture (Tool 940) to the seal plate to hold the special bolts.
  - (b) Remove the nuts securing the seal plate bolts.
  - (c) Remove the seal plate and sleeve from the overflow valve body.
  - (d) Remove the restraining fixture from the seal plate and withdraw the bolts.
- (3) Multiple connector.
  - (a) Unscrew the adapter.
  - (b) Withdraw the adapter and the connector.
- (4) Overflow valve.
  - (a) Remove the adapter union from the overflow vent body.
  - (b) Depress the valve and remove the retaining ring securing the sealing valve assembly in the overflow vent body.



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (c) Carefully withdraw the sealing valve, spring and valve housing from the overflow vent body.
- (d) Remove the nuts and bolts securing the overflow vent body to the separator body and withdraw the overflow vent body and valve body.
- (e) Withdraw the filter from the separator body.

76. Remove the Support Tubes from the CCOC (Ref.Fig.113 Item 5)

A. Centre Tube.

- (1) Remove the pillar bolt from its location on the rear of the tube.
- (2) Remove the nuts and bolts securing the tube and bracket to the rear face of the inspection port bracket.
- (3) Withdraw the tube from the retaining bracket mounted to the CCOC/exhaust diffuser flange.
- (4) Remove the nuts and bolts securing the brackets to the tube.

B. Right-hand and Left-hand Tubes.

- (1) Remove the nuts securing the tube brackets to the pillar bolts on the CCOC/HP compressor diffuser case flange.
- (2) Remove the tubes from the pillar bolts and withdraw from the retaining brackets mounted to the CCOC/exhaust diffuser flange.

77. Remove the First Stage Fuel Pump and Heater Assembly (Ref. Fig.112 Item 4)

- A. Remove the bolts securing the assembly bracket to the bracket mounted on the main oil pump.
- B. Release the QAD coupling and remove the assembly from the gearbox, place on clean workbench and support.

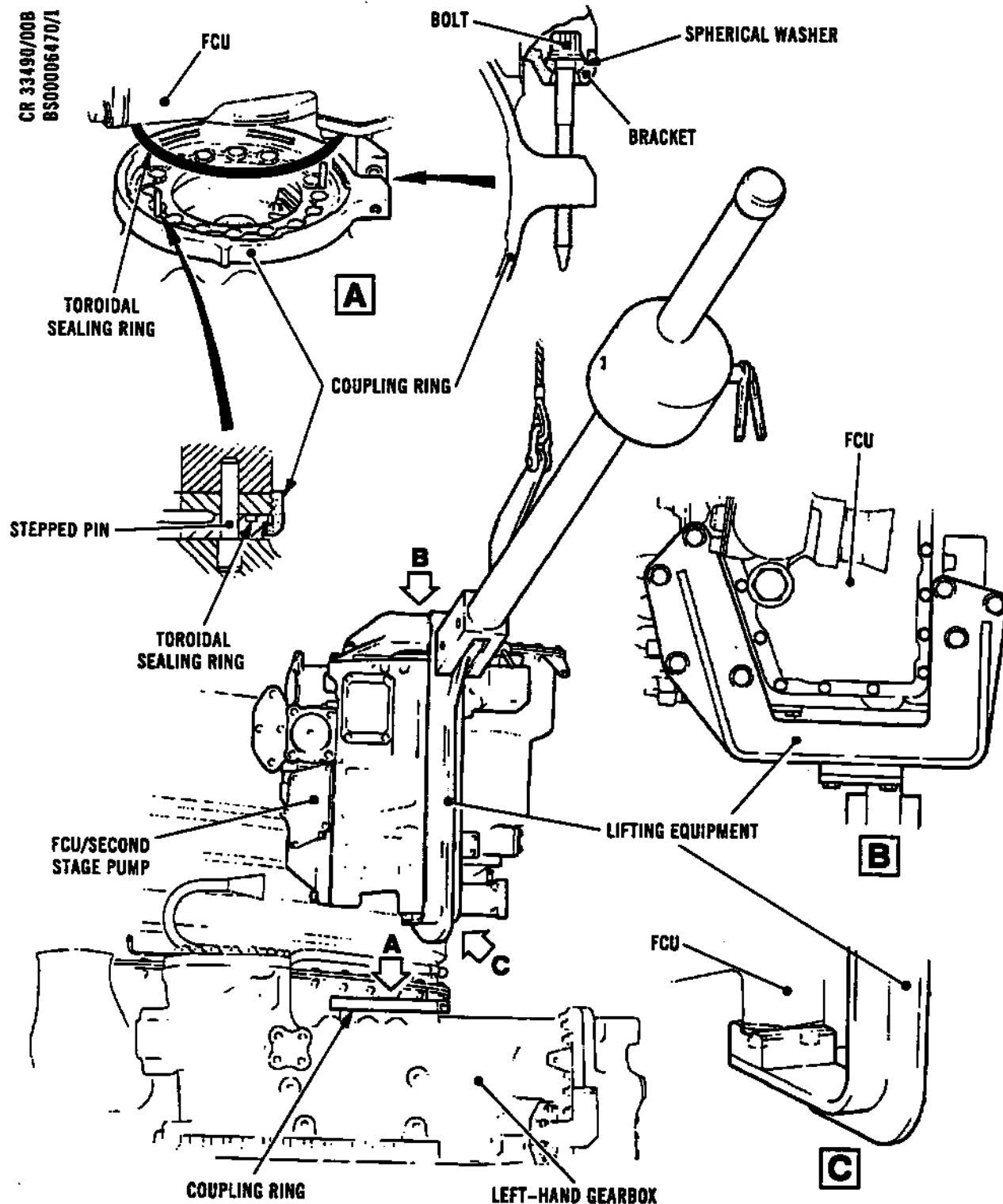




OLYMPUS 593



SNECMA



FCU and Second Stage Pump Lifting Equipment  
Figure 109

DISASSEMBLY  
71-00-01  
Page 156  
Jun 30/97



OLYMPUS 593

MK.610-14-28

OVERHAUL



- C. Separate the pump and heater assemblies.
- (1) Loosen the nuts and bolts securing the three support links.
  - (2) Remove the nuts and bolts securing the links to the pump.
  - (3) Remove the bolts securing the heater and pump flanges, separate the units and remove the locating plate (Pre-S8.73-37) or distance piece (SB.73-37).
  - (4) Retain the bushes, shims, nuts and bolts in their support link ends and the links and assembly bracket to the heater assembly.
- D. Remove the fuel elbow and seal plate from the first stage pump.



OLYMPUS 593

MK-610-14-28

OVERHAUL



This page left blank intentionally

DISASSEMBLY

**71-00-01**

Page 156B

Dec 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

78. Remove the Actuator Gearbox (TV) (Ref.Fig.112 Item 3)

- A. Remove the bolts and washers securing the actuator to FCU and withdraw actuator.
- B. Remove the countersunk screws and seal plate from the actuator.

79. Remove the FCU/Second Stage Fuel Pump (Ref.Fig.112 Item 2 and Fig.109)

## A. Remove Combined Units.

- (1) Assemble the lifting equipment (Tools 1854 and 854) to the FCU.
  - (a) Hook the lifting tools (Tool 1854) to the two bolts securing a blank plate on the FCU forward face, locating the bolts in the holes of the tools recessed face.
  - (b) Withdraw the bolts and retain so they do not protrude below the tools mating faces.
  - (c) Pivot the tool on the FCU bolts, align the tools mating faces to the mounting faces at the rear of the FCU, locate the bolts and tighten.
  - (d) Install the counterbalanced lifting arm (Tool 854) to the lifting tool and carefully take the weight of the assembly with a crane.

**CAUTION:** HANDLE THE COUNTERBALANCED LIFTING EQUIPMENT WITH CARE ESPECIALLY WHEN REMOVING IT FROM AN INSTALLED ITEM.

## (2) Remove the QAD coupling.

- (a) Remove the bolt and nut securing the coupling to the bracket.
- (b) Release the QAD coupling (Ref.72-09-00 Disassembly).
- (3) Carefully raise the assembly, maintain the mating faces parallel until the locating dowels are disengaged, remove the assembly.
- (4) Refit the bolt, washer and nut to the QAD coupling.
- (5) Remove the lifting equipment from the FCU.

DISASSEMBLY

71-00-01

Page 157  
Dec 1/97



OLYMPUS 593

MK. 610-14-28

OVERHAUL



- (6) Remove the bracket.
  - (a) Remove the nuts and bolts securing the tube to the FCU.
  - (b) Remove the bolts securing the bracket to the FCU, withdraw the bracket.
- (7) Remove the FCU tube.
  - (a) Remove the bolts securing the tube.
  - (b) Withdraw the tube and seal plate.
- (8) Separate the FCU and second stage pump.
  - (a) Remove the bolt and washer from the tie bar attachment point. Withdraw the eccentric bush and cupwasher from the tie bar.
  - (b) Remove the nut and bolt from the connecting rod spherical bearing.
  - (c) Remove the bolts and washers securing FCU to the second stage pump.
  - (d) Withdraw the FCU from the second stage pump and remove the seal plate.
  - (e) Remove the butterfly lever assembly.

80. Remove the FCU/Second Stage Fuel Pump Lifting Bracket (Ref. Fig.112 Item 1)

- A. Remove the nuts, bolts, washers, spacer and loop clamps retaining the tube section of the lifting bracket to the bracket mounted on the left-hand gearbox.
- B. Remove the bolts securing the lifting bracket flange to the gearbox, withdraw the lifting bracket.
- C. Replace the bolts and spacer washers to the gearbox, torque-tighten the bolts between 60 and 65 lbf in. (6,8 and 7,3 N.m).

81. Remove the Left-hand Gearbox (Ref.Fig.110)

- A. Assemble the Lifting Equipment (Tool 197).
  - (1) Remove the pin securing the gearbox attachment from the lifting arm.



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Assemble the gearbox attachment to the FCU/second stage pump mounting face, secure with the QAD coupling.
- (3) Position a hoist over the lifting arm, position the hook in the ring.

NOTE: The arm has a counterbalance weight to balance the weight of the gearbox during assembly/disassembly of the gearbox. Care is essential when lifting the arm with the hoist to attach to the gearbox attachment.

- (4) Lift the arm and position over the gearbox.
- (5) Support the arm and align to the gearbox attachment, refit the pin securing the gearbox attachment to the arm.
- (6) Adjust the hoist until the arm is in the horizontal position.

B. Remove the Gearbox (Tool 197).

- (1) Remove the nuts (Tool 1530) and load spreading washers from the bolts retaining the gearbox to the plate adapter mounted to the bracket secured to the intermediate case.

NOTE: The bolts are retained to the plate adapter by retaining rings.

- (2) Remove the bolts from the rear gearbox mounting bracket securing the bracket to the intermediate case.
- (3) Disconnect the air pressurization tube from the gearbox.
- (4) Remove the bolts from the front gearbox mounting bracket securing the bracket to the intermediate case.
- (5) Loosen the gearbox and carefully withdraw from the engine, support the drive shaft and remove when the gearbox is clear of the engine.
- (6) Place the gearbox on a pallet and remove the lifting equipment.

82. Remove the Right-hand Gearbox (Ref.Fig.111)

- A. Assemble the Lifting Equipment (Tools 793, 794, 795, 798 and 1302).

DISASSEMBLY

71-00-01

Page 159

Jul 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33372/00A

MAIN MOUNTING  
BRACKET LOCATION

ENGINE FLANGE

REAR MOUNTING BRACKET

ADJUSTING SHIMS

**A**

LOAD SPREADING WASHER  
(2 OTHERS SIMILAR)

REAR MOUNTING  
BRACKET RETAINER  
PLATE LOCATED  
BEHIND BRACKET  
FACE

**B**

LOAD SPREADING BLOCK

TURNBUCKLE

LIFTING FIXTURE

GEARBOX ATTACHMENT SECTION

ADJUSTING SHIM

RETAINING PLATE

**C**

FRONT MOUNTING BRACKET

ADJUSTING SHIM

ENGINE FLANGE

Left-hand Gearbox Lifting Equipment  
Figure 110

DISASSEMBLY

71-00-01

Page 160

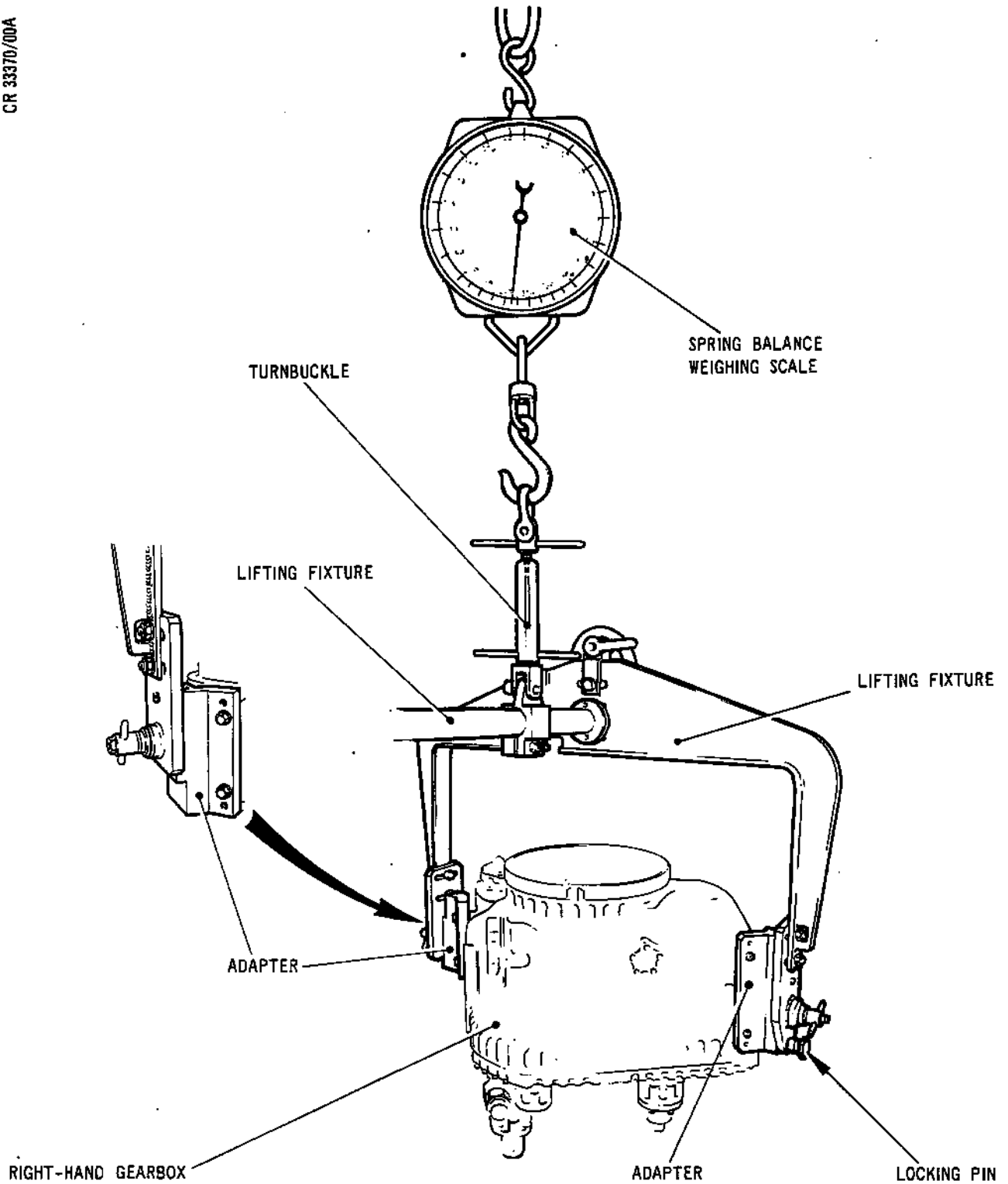
Feb 2/76

TN32295



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Right-hand Gearbox Lifting Equipment  
Figure 111





OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (1) Assemble the right and left-hand trunnions to the lifting beam, secure to the studs with washers and nuts.

NOTE: The arm has a counterbalance weight to balance the weight of the gearbox during assembly/disassembly of the gearbox. Care is essential when lifting the arm and beam assembly with the hoist to attach to the gearbox.

- (2) Lift the arm and counterbalance weight on a hoist, position to the lifting beam.
- (3) Assemble the lifting beam to the lifting arm.
- (4) Position the hoist and lifting arm over the right-hand gearbox.
- (5) Secure the trunnions to the left and right-hand lifting positions with bolts and washers.
- (6) Adjust the hoist until the arm is in the horizontal position using the turnbuckle (Tool 1302) for fine adjustment.

WARNING: AT ALL TIMES ENSURE THE LOCK PIN IS ENGAGED IN THE TRUNNION. WHEN TURNING THE GEARBOX IN THE HOIST KEEP FINGERS CLEAR FROM BETWEEN THE GEARBOX AND HOIST AS THE GEARBOX IS NOT BALANCED ABOUT ITS PIVOT AND CAN SPIN IN THE HOIST.

**B. Remove the Gearbox.**

- (1) Release gearbox from intermediate case at flexible coupling shaft location.
  - (a) Remove the nuts from the flange securing bolts using the swivel wrench (Tool 3132).
- (2) Remove the bolts and dowels securing the front mounting bracket.
- (3) Disconnect the air pressurizing tube from the gearbox.
- (4) Remove the bolts and nuts securing the rear mounting bracket to the intermediate case/HP case flange.

DISASSEMBLY

71-00-01

Page 162  
Sep 30/94



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

- (5) Remove the bolts securing the rear mounting bracket to the gearbox.

**CAUTION:** DO NOT ALLOW THE GEARBOX TO SWING ON REMOVAL AS THE DRIVE SHAFT IS INTEGRAL WITH THE GEARBOX AND COULD BE DAMAGED.

- (6) Loosen the gearbox and mounting brackets, withdraw from the dowels. Balancing the lifting equipment and gearbox by the arm withdraw the gearbox from the engine.
- (7) Lower the gearbox on a pallet, remove the lifting equipment.

### 83. Removal of the Pressurizing Air Supply Tubes

- A. Loosen the tubes union nuts at the stage three HP compressor, right-hand gearbox and pulse probe housing on the left-hand side of the engine.
- B. Remove the nuts, bolts, washers, loop clamps, half clamp shells (SB.0L.593-75-8972-27 standard) and clipnuts retaining the tubes to brackets mounted on the LP compressor case rear flange.
- C. Unscrew the tube union nuts securing the right-hand tube, HP compressor to right-hand gearbox and remove the tube.
- D. Unscrew the tube union nuts securing the bottom tube, right-hand gearbox to intermediate case sump and remove the tube.

### 84. Remove the Oil Tank

- A. Disconnect the Brackets Securing the Tank to the Engine.
- (1) Support the tank.
- (2) Remove the nut and bolt securing the front lower bracket to the bracket mounted on the intake/LP case flange.
- (3) Remove the nut and bolt securing the rear lower bracket to the stiffener plate mounted to the LP case front blow-off flange.

DISASSEMBLY

71-00-01

Page 163  
Jun 1/94



OLYMPUS 593

MK. 610-14-28  
OVERHAUL



- (4) Remove the bolts securing the rear upper bracket to the LP case front blow-off flange.
- (5) Withdraw the oil tank from the engine.

85. Remove the Heat Shield Covers

A. Heat Shield Covers.

- (1) Remove the nut and washer securing the heat shield covers at the top position.
- (2) Remove the bolts and washers securing the left and right-hand heat shield covers and withdraw the covers.

NOTE: With the removal of the tubes and accessories, the bare engine is now in a condition to be disassembled into a number of sub-assemblies/modules. Refer to 72-00-00 Disassembly for the disassembly of the engine.

This space left blank intentionally

DISASSEMBLY

**71-00-01**

Page 164  
Jul 1/76

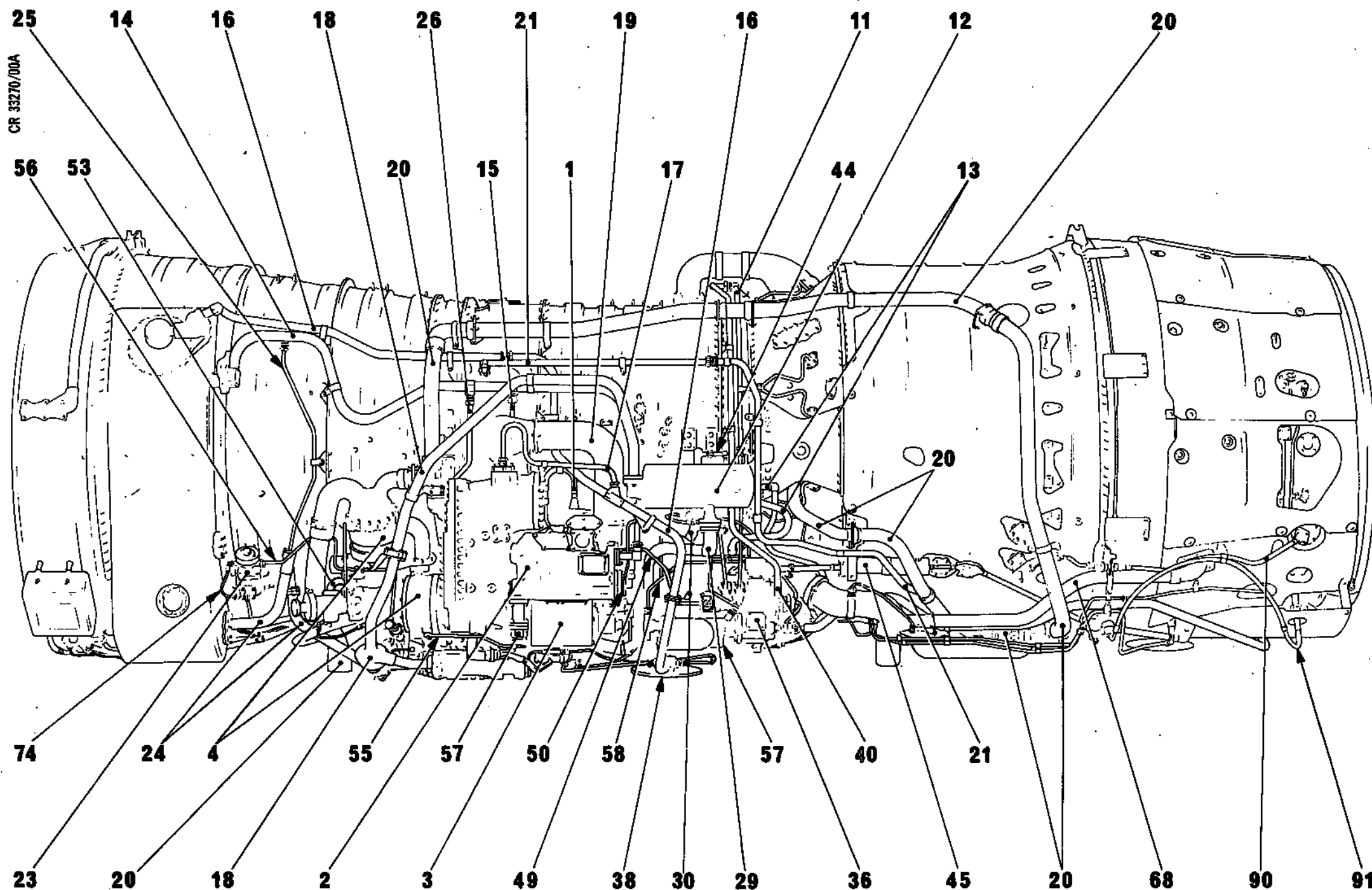


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



Location of Tubes and Accessories Left-hand Side of Engine  
Figure 112

DISASSEMBLY  
71-00-01  
Page 165/166  
Feb 2/76

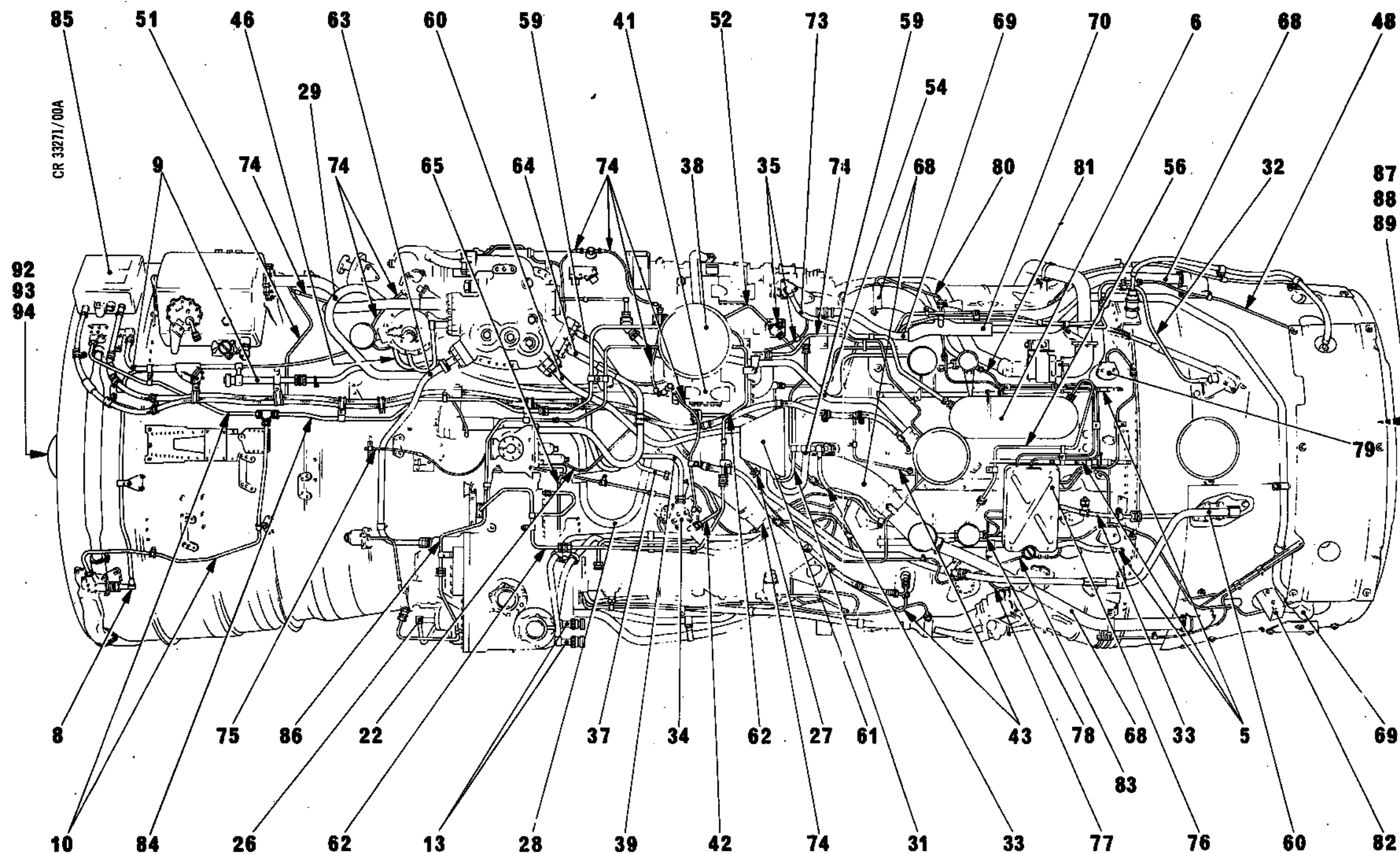


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



Location of Tubes and Accessories Bottom of Engine  
Figure 113

DISASSEMBLY  
**71-00-01**

Page 167/168  
Feb 2/76



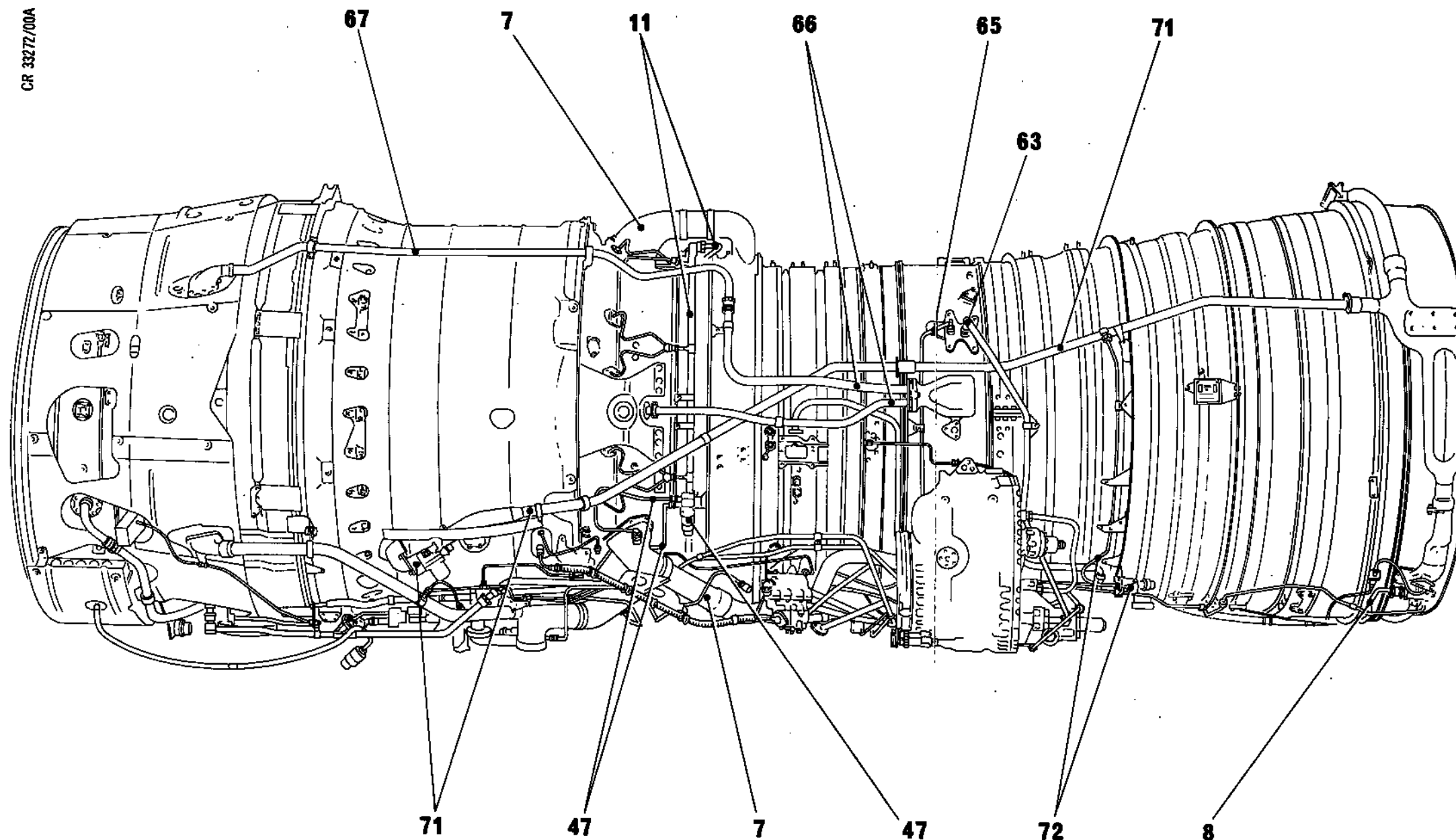
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 33272/00A



Location of Tubes and Accessories Right-hand Side of Engine  
Figure 114

DISASSEMBLY  
**71-00-01**  
Page 169/170  
Feb 2/76

**OLYMPUS 593**MK.610-14-28  
OVERHAULTUBES AND ACCESSORIES - ASSEMBLYTABLE OF CONTENTSSTAGE 1

Para.	Page
1. General ... ..	501

STAGE 2

Para.	Page
1. Assemble Lifting Bracket for FCU/Second Stage Pump...	501
2. Install the FCU/Second Stage Pump ... ..	501
3. Assemble Actuator Gearbox to FCU... ..	507
4. Install First Stage Fuel Pump and Fuel Heater Assembly ... ..	511
5. Assemble the Support Tubes to Lower Section of CCOC ... ..	514
6. Install Fuel Drains Tank ... ..	517
7. Install HP Turbine Cooling Air Ducts to HP Compressor Diffuser Case and HP Compressor Case... ..	522
8. Installation of LP Compressor Bearing Oil Feed and Scavenge Tubes ... ..	525
9. Installation of LP Compressor Bearing Vent Tubes (Front Sections Only) ... ..	531
10. Installation of Fuel Manifolds and Feed Tubes ...	533
11. Install Oil Cooler and Mounting ... ..	536
12. Install the Oil Feed and Return Tubes ... ..	539
13. Assemble the Oil Return Tube from the Oil Cooler to the Oil Tank... ..	545
14. Assemble the Sump Vent, Sump to Oil Return Tube ...	547
15. Assemble the Oil Tank Front and Centre Overboard Vents ... ..	550
16. Assemble the Left-hand Gearbox Vent Tube ... ..	552
17. Assemble the Oil Container and Oil Scavenge Tube from the Main Oil Pump to the Oil Cooler ... ..	553

PRINTED IN ENGLAND

TN8848

ASSEMBLY

**71-00-01**

Contents 1

Jan 2/80



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



## STAGE 3

Para.	Page
1. Assemble the Air Supply Ducts to the Second Stage Fuel Pump ... ..	501
2. Install the Air Valve and Fuel Heating Tubes... ..	504
3. Install Tubes from the Fuel Heater Inlet Elbow to the Air Valve ... ..	508
4. Install Vent Tubes, Intermediate Case Adapter to Aircraft Connection ... ..	511
5. Install the Air Venting Tube, Intermediate Case Sump to Tube Connection ... ..	514
6. Install the Fuel Recirculation Valve ... ..	517
7. Install Oil Feed Tubes, Oil Tank to the Main Oil Pump ... ..	517
8. Install Anti-drain Tube, Connection on Tube, Oil Cooler to Oil Tank... ..	520
9. Install Oil Scavenge Tubes, Right-hand Gearbox to Oil Return Tube ... ..	522
10. Install the Aircraft Fuel and Hydraulic Tanks Pressurization Tube and Electrical Harness Support Tray... ..	525
11. Assemble the Reheat Fuel Supply Tube from First Stage Pump to the Engine... ..	527
12. Install the Fuel Feed Tube, Filter to Oil Cooler ... ..	530
13. Install the Fuel Feed Tube, Oil Cooler to Second Stage Pump ... ..	533
14. Install the HP Turbine Bearing Oil Feed Tube... ..	535
15. Install the LP Turbine Bearing Oil Feed Tube... ..	537
16. Install the LP and HP Turbine Bearings Cold Vent Tubes and Connector Assembly ... ..	540
17. Install the Starter Pump ... ..	542
18. Assemble the Connector and Servo Return Tube to the Reheat Fuel Controller ... ..	543
19. Install the Reheat Fuel Controller/Distribution and Dump Valve ... ..	546
20. Install the Fuel Tubes, Starter Pump to FCU ... ..	548
21. Install the Oil Tank Overboard Rear Vent Tube and Support Bracket ... ..	550
22. Install the Fuel Tube, Second Stage Pump to Starter Pump ... ..	552
23. Complete the Installation of the Main Fuel Tubes, Manifold to Distribution and Dump Valve ... ..	554
24. Assemble the Reheat Flowmeter to the Reheat Supply Tube and Reheat Fuel Controller ... ..	556
25. Install Fuel Tubes, Starter Pump to Distribution and Dump Valve ... ..	558
26. Install Fuel Tubes, Distribution and Dump Valve to Pilot Nozzles ... ..	559
27. Install Fuel System Air Bleed Tubes ... ..	563

TN8849

ASSEMBLY

# 71-00-01

Contents 2

Jan 2/80





# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

## STAGE 4

Para.	Page
1. Install LP Shaft Signal System Cylinder/Piston Unit Complete with Front and Centre Cables...	501
2. Install the Reheat Fuel Controller Servo Supply Tubes ...	509
3. Install the Reheat Purge Valve Solenoid and Air Tubes ...	511
4. Install the Reheat Purge Air Tubes, Purge Valve to the Exhaust Diffuser ...	513
5. Install the Fuel Tube, FCU to the Distribution and Dump Valve ...	516
6. Install the Fuel Tubes, FCU to Distribution and Dump Valve Rear Face ...	518
7. Install the Fuel Tube, Second Stage Pump Inlet Elbow to Recirculation Valve ...	519
8. Install the Fuel Tube, Reheat Fuel Controller to Three-way Connector...	521
9. Install the Fuel Tube, Reheat Fuel Controller and FCU to First Stage Pump Inlet Elbow ...	524
10. Install the Second Stage Pump Air/Fuel Drain Tube ...	525
11. Install the First Stage Pump and FCU Gland Drain Tube to the Second Stage Pump Drain ...	525
12. Install the Drains Tank Re-ingestion Tube from the Recirculation Valve to the First Stage Pump...	528
13. Install the Fuel Feed Tube, Adapter Block and Engine Flowmeter - FCU to Distribution and Dump Valve ...	533
14. Install Fuel Outlet Tube, Distribution and Dump Valve to FCU Tube Union. Emergency Dump Valve Servo ...	537
15. Install Oil Scavenge Tubes, Oil Pump Housing to HP Compressor Diffuser Casing, HP Turbine Bearing ...	537
16. Install Oil Scavenge Tube, Oil Pump Housing to LP Turbine Bearing ...	539
17. Install the Electrical Harness Support Bracket and Clamping of IDG Oil Tube ...	542
18. Assemble the Hydraulic Pump Seal Drain Tubes, Adapters Seal Space to Oil Tank Overboard Vent ...	544
19. Install the Oil Feed Tubes, LP and HP Thrust Bearings, Right-hand Gearbox Accessory Pump ...	548
20. Install Scavenge Oil Tube, LP and HP Thrust Bearings..	549
21. Assemble the Oil Feed Tubes, Pump to Bearing, LP and HP Compressor Thrust Oil Failure Warning ...	551

Printed in England

ASSEMBLY

# 71-00-01

Contents 3  
Jun 1/94



# OLYMPUS 593

MK.610-14-28

OVERHAUL



## STAGE 5

Para.

Page

1. Install Cooling Air Tubes, HP Turbine Bearing and LP Turbine Bearing Front Tube ... ..	501
2. Install Cooling Air Tubes, LP Turbine Bearing Rear Tube ... ..	504
3. Install Air Ducts and Tubes, Venting ... ..	506
4. Positional Checks of the Fuel-Air-Oil Overboard Vents and Ducts ... ..	512
5. Assemble the Reheat Fuel Tube, Reheat Fuel Controller to Spray Ring to the Engine ... ..	514
6. Install the Electrical Tray ... ..	516
7. Install the Air Valve and Anti-icing Tubes ... ..	516
8. Install the Anti-icing Air Pressure Switch and Tube..	521
9. Install the Fuel Drain Tube, Dump Valve to Drains Tank ... ..	521
10. Install Engine Fuel System Seal Drain Tubes ... ..	523
11. Install Fuel Drain Tubes, Overboard Spill ... ..	531
12. Install the Mounting Brackets, Thermocouples and Leads, Junction Boxes and Thermocouple Harness ...	536
13. Install the Front Bearing Vent Tubes to Overboard Outlet... ..	552
14. Install the High Energy (HE) Ignition Unit ... ..	554
15. Install the Air Venting Tubes, Starter Break Point to Outlet Seal Plate ... ..	555

## STAGE 6

Para.

Page

1. Transfer the Engine from the Vertical Build Stand to the Horizontal Stillage Stand ... ..	501
2. Install the LP Compressor Shaft Cover ... ..	502
3. Check and Adjust Position of LP Shaft Signal System Actuator Arm and Install Rear Insulation Blanket...	502
4. Check and Adjust the LP Shaft Signal System ... ..	509
5. Install the Jet Pipe Thermocouple Harness ... ..	518
6. Install the Reheat Injection System ... ..	524
7. Fuel System Pressure Test ... ..	531
8. Install Reheat Flame Detector ... ..	555
9. Install Reheat Igniter ... ..	557
10. Install the LP Rotor Shaft Bearing Housing Cover ...	559

ASSEMBLY

# 71-00-01

Contents 4

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## STAGE 7

Para.	Page
1. Install the Vibration Transducer on the LP Compressor Bearing Cover ... ..	501
2. Assemble/Install and Test Engine Vibration Transducer Cable ... ..	501
3. Install the Air Intake Fairing and Damping Spring ...	514
4. Paragraph Deleted	
5. Install the Engine Electrical Looms, Connectors and Supports ... ..	516
6. Check the Clearances Between the Tubes and Accessories and the Engine ... ..	516

## STAGE 8

Para.	Page
1. Transfer the Engine from the Horizontal Stillage to the Transport Trolley ... ..	501
2. Assemble the Blanks to the Engine ... ..	503

## TABLE OF ILLUSTRATIONS

### STAGE 1

Fig.No.	Page
501 Location of Tubes and Accessories (Sheet 1 of 3) ... ..	503
501 Location of Tubes and Accessories (Sheet 2 of 3) ... ..	505
501 Location of Tubes and Accessories (Sheet 3 of 3) ... ..	507



# OLYMPUS 593

MK.610-14-28

OVERHAUL



## STAGE 2

Fig.No.		Page
501	FCU/Second Stage Pump Lifting Bracket ... ..	502
502	Assembling Tube to FCU/Second Stage Pump... ..	503
503	FCU/Second Stage Pump Lifting Equipment ... ..	506
504	Actuator Gearbox Preparation (Sheet 1 of 2) ... ..	508
504	Actuator Gearbox Preparation (Sheet 2 of 2) ... ..	509
505	First Stage Fuel Pump and Fuel Heater Assembly Installation ... ..	512
506	Lower CCOC Support Tubes ... ..	516
507	Fuel Drains Tank... ..	518
508	Cooling Air Ducts, HP Turbine to HP Diffuser and HP Compressor Cases ... ..	523
509	Oil Feed Tube, LP Compressor Bearing ... ..	526
510	Oil Scavenge Tube, LP Compressor Bearing... ..	529
511	LP Compressor Bearing Vent Tubes ... ..	532
512	Fuel Manifolds and Feed Tubes ... ..	534
513	Oil Cooler and Mounting ... ..	537
514	Oil Feed and Return Tubes, IDG to Oil Cooler (Sheet 1 of 2) ... ..	540
514	Oil Feed and Return Tubes, IDG to Oil Cooler (Sheet 2 of 2) ... ..	541
515	Oil Return Tube Oil Cooler to Oil Tank ... ..	546
516	Oil Sump Vent Tube, Sump to Oil Return Tube ... ..	549
517	Oil Vent Tubes, Oil Tank to Centre Overboard Vent Left-hand Gearbox Vent Tube... ..	551
518	Oil Scavenge Tubes, Oil Pump to the Oil Cooler... ..	554

## STAGE 3

Fig.No.		Page
501	Second Stage Pump Air Supply Duct ... ..	502
502	Fuel Heater Air Valve and Associated Tubes (Sheet 1 of 2)... ..	505
502	Fuel Heater Air Valve and Associated Tubes (Sheet 2 of 2)... ..	506
503	Vent Tubes, Intermediate Case Adapter to Aircraft Connection ... ..	513
504	Air Venting Tube... ..	516
505	Fuel Recirculation Valve ... ..	518



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

Printed in England

Fig.No.		Page
506	Oil Feed Tubes, Oil Tank to Main Oil Pump ...	521
507	Anti-drain Tube ... ..	523
508	Oil Scavenge Tube, Right-hand Gearbox to Oil Return Tube ... ..	524
509	Fuel and Hydraulic Tank Pressurization Tube and Electrical Harness Support Tray ... ..	526
510	Checking Filter Assembly Clearance... ..	528
511	Fuel Reheat Supply Tube from First Stage Pump ...	529
512	Main Fuel Feed Tube, Filter to the Oil Cooler ...	532
513	Main Fuel Feed Tube, Oil Cooler to Second Stage Pump ... ..	534
514	Oil Feed Tube, HP Turbine Bearing ... ..	536
515	Oil Feed Tube, LP Turbine Bearing ... ..	538
516	Cold Vent Tubes LP and HP Turbine Bearings and Connector Assembly ... ..	541
517	Starter Pump ... ..	544
518	Reheat Fuel Controller Connector and Servo Return Tube ... ..	545
519	Reheat Controller/Distribution and Dump and Valve ... ..	547
520	Fuel Tubes, Starter Pump to FCU ... ..	549
521	Oil Tank Overboard Rear Vent Tube ... ..	551
522	Fuel Tube, Second Stage Pump to Starter Pump ...	553
523	Fuel Tube, Manifold to Distribution Block ...	555
524	Reheat Flowmeter... ..	557
525	Fuel Tubes, Starter Pump to Distribution and Dump Valve ... ..	560
526	Fuel Tubes, Distribution and Dump Valve to Pilot Nozzles ... ..	561
527	Fuel System Air Bleed Tubes ... ..	564

## STAGE 4

Fig.No.		Page
501	Signal System, LP Shaft, Cylinder/Piston Section ... ..	502
502	Deleted	
503	LP Shaft Signal System Operating Cable (S.B.76-26) ... ..	506
504	Fuel Tube, Filter Heater Outlet to Reheat ...	510

ASSEMBLY

# 71-00-01

Contents 7  
Jun 30/01



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



Fig.No.

Page

505	Reheat Fuel Purging Air Tubes	512
506	Reheat Purge Air Tubes Purge Valve to Exhaust Diffuser	514
507	Fuel Tubes, FCU to Distribution and Dump Valve, Manifold Dump Valve	517
508	Fuel Tube, Second Stage Pump Inlet Elbow to Recirculation Valve	520
509	Fuel Tubes, Reheat Fuel Controller and FCU to First Stage Pump (Sheet 1 of 2)	522
509	Fuel Tubes, Reheat Fuel Controller and FCU to First Stage Pump (Sheet 2 of 2)	523
510	Air/Fuel Drain Tube Second Stage Pump	526
511	Gland Drain First Stage Pump, FCU to Second Stage Pump	527
512	Drains Tank Re-Ingestion Tube (Sheet 1 of 2)	529
512	Drains Tank Re-Ingestion Tube (Sheet 2 of 2)	530
513	Fuel Feed Tube, Adapter Block and Engine Flowmeter - FCU to Distribution and Dump Valve	534
514	Fuel Outlet Tube, Emergency Dump Valve Servo Outlet Tube	536
515	Oil Scavenge Tubes, Oil Pump Housing to HP Compressor Diffuser Case	538
516	Oil Scavenge Tubes, Oil Pump Housing to LP Turbine Bearing	540
517	Electrical Harness Support Bracket Clamping of the IDG Oil Tube	543
518	Hydraulic Pump Seal Drain Tubes, Space Drain Tubes to the Oil Tank Overboard Vent	545
519	Oil Feed Tubes, LP and HP Thrust Bearings Pump to Bearings	547
520	Scavenge Oil Tube, LP and HP Thrust Bearings	550
521	Oil Feed Tubes, LP and HP Thrust Bearings Oil Failure Warning	552

## STAGE 5

Fig.No.

Page

501	Cooling Air Tubes, Intermediate Case to HP Turbine Bearing and Intermediate Case to Exhaust Diffuser	502
502	Venting Air Ducts, HP Compressor Diffuser Case LH	505

ASSEMBLY

# 71-00-01

Contents 8  
Jan 2/80

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

PRINTED IN ENGLAND

Fig.No.		Page
503	Venting Air Ducts, Exhaust Diffuser to Left-hand Duct ... ..	507
504	Venting Air Ducts, HP Compressor Diffuser Case RH ... ..	509
505	Venting Air Tubes, Exhaust Diffuser to Right-hand Duct ... ..	510
506	Reheat Fuel Tubes, Reheat Fuel Controller to the Spray Ring ... ..	515
507	Air Valve and Anti-icing Tubes ... ..	518
508	Fuel Drain Tube, Emergency Dump Valve to Drains Tank ... ..	522
509	Engine Fuel System Seal Drain Tubes (Sheet 1 of 3) ... ..	524
509	Engine Fuel System Seal Drain Tubes (Sheet 2 of 3) ... ..	525
509	Engine Fuel System Seal Drain Tubes (Sheet 3 of 3) ... ..	526
510	Fuel Drain Tube, Overboard Spill (Sheet 1 of 2) ..	532
510	Fuel Drain Tube, Overboard Spill (Sheet 2 of 2) ..	533
511	Support Tube Mounting Brackets and Thermocouple Junction Box Mounting Plate ... ..	537
512	Thermocouple, LP Turbine Bearing Hot Vent ... ..	539
513	Thermocouple, LP and HP Turbine Bearing Vent ... ..	541
514	Thermocouples - Turbine Cooling Air ... ..	542
515	HP Compressor Rear Labyrinth Seal ... ..	545
516	Thermocouple - Intermediate Case Bearings ... ..	546
517	Leads - Jet Pipe Thermocouple ... ..	549
518	Thermocouple, HP Compressor Delivery Air ... ..	551
519	LP Compressor Front Bearing Vent Tube ... ..	553
520	Air Starter Air Venting Tubes ... ..	556

**STAGE 6**

Fig.No.		Page
501	Rear Cover Blanket Assembly ... ..	504
502	LP Signal Shaft Lever Adjustment ... ..	505
503	LP Shaft System Piston Check and Adjustment ... ..	508
504	Re-arm Details and Alignment Check of Pull-off Plungers ... ..	511
505	Jet Pipe Thermocouple Harness and Protector ... ..	519
506	Jet Pipe Thermocouple Harness Positioning and Installation (Sheet 1 of 2) ... ..	521

ASSEMBLY

**71-00-01**

Contents 9

Jan 2/80



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

Fig.No.		Page
506	Jet Pipe Thermocouple Harness Positioning and Installation (Sheet 2 of 2) ... ..	522
507	Positioning the Reheat System on the Rest Stand..	525
508	Spray Ring Pipe Elbow - Wax Plug Installation ...	526
509	Reheat Injection System ... ..	528
510	Fuel Pressure Test Schematic Arrangements of Sections and Components ... ..	532
511	Installation of Test Equipment in Section 1 (Sheet 1 of 2)... ..	536
511	Installation of Test Equipment in Section 1 (Sheet 2 of 2)... ..	537
512	Installation of Test Equipment in Section 2 ...	540
513	Installation of Test Equipment in Section 3 (Reheat System) ... ..	543
514	Seal Failure Drains System Connections ... ..	545
515	Reheat Flame Detector Installation... ..	556
516	Reheat Igniter Installation ... ..	558
517	LP Rotor Shaft Bearing Housing Cover ... ..	560

## STAGE 7

Fig.No.		Page
501	Assembling Vibration Transducer and Cable Assembly to Intake Case ... ..	502
502	Preparation of Cable for Assembly of Contacts (Pre S.B.77-8661-28 standard) ... ..	505
503	Preparation of Cable for Assembly of Contacts (S.B.77-8661-28 standard) ... ..	507
504	Assembly of Wall Mounting Receptacle to Cable End ... ..	509
505	Cable Length Dimension... ..	511
506	Cancelled	
507	Engine Tube and Accessory Clearances (Sheet 1 of 2) ... ..	520
507	Engine Tube and Accessory Clearances (Sheet 2 of 2) ... ..	521/522

ASSEMBLY  
**71-00-01**  
Contents 10  
Jun 1/86





OLYMPUS 593

MK.610-14-28  
OVERHAUL



STAGE 8

Fig.No.		Page
501	Engine Sling and Trolley ... ..	502
502	Assembled Engine Blanked for Despatch ... ..	506

LIST OF TABLES

STAGE 7

Table No.		Page
501	Engine Tube and Accessory Clearances ... ..	518

STAGE 8

Table No.		Page
501	Engine Tube and Accessory Blanks ... ..	503

PRINTED IN ENGLAND

TN8940

ASSEMBLY  
**71-00-01**  
Contents 11  
Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBES AND ACCESSORIES - ASSEMBLY

1. General

- A. Prior to commencing the installation of the accessories and tubes, refer to 71-09-00 Assembly for general information.
- B. Where a part is named in the assembly procedure, the Illustrated Parts Catalogue (I.P.C.) item number is given to identify the part from those of similar appearance and description. For example, an item quoted as bolt (72-01-03/1-30) would be found in I.P.C. topic 72-01-03, Figure 1, as item 30.
- C. Throughout the text each special tool is identified by a separate tool reference number e.g. (Tool 1234). For a complete list of tooling required for all stages of assembly and for the Manufacturer's Part No. refer to Special Tools, Fixtures and Equipment, Table 1001.
- D. This chapter/topic is divided into 7 sequential stages. The location of tubes and accessories is shown in Figure 501 of this assembly stage and each item reference is given in the relevant stage of procedure.
- E. It may be necessary to turn the gearbox to engage the drive shafts of some accessories during installation. To turn the gearboxes, hand turning equipment must be used. Details of the installation and operation of the equipment is given in 72-09-01 Assembly.
- F. Installed clearances of tubes and components must be checked concurrent with their installation and conform to the limits stated in ASSEMBLY, STAGE 7, paragraph 6.

PRINTED IN ENGLAND



OLYMPUS 593

MK.610-14-28  
OVERHAUL



This page left blank intentionally

ASSEMBLY  
**71-00-01**  
STAGE 1  
Page 502  
Jan 2/80



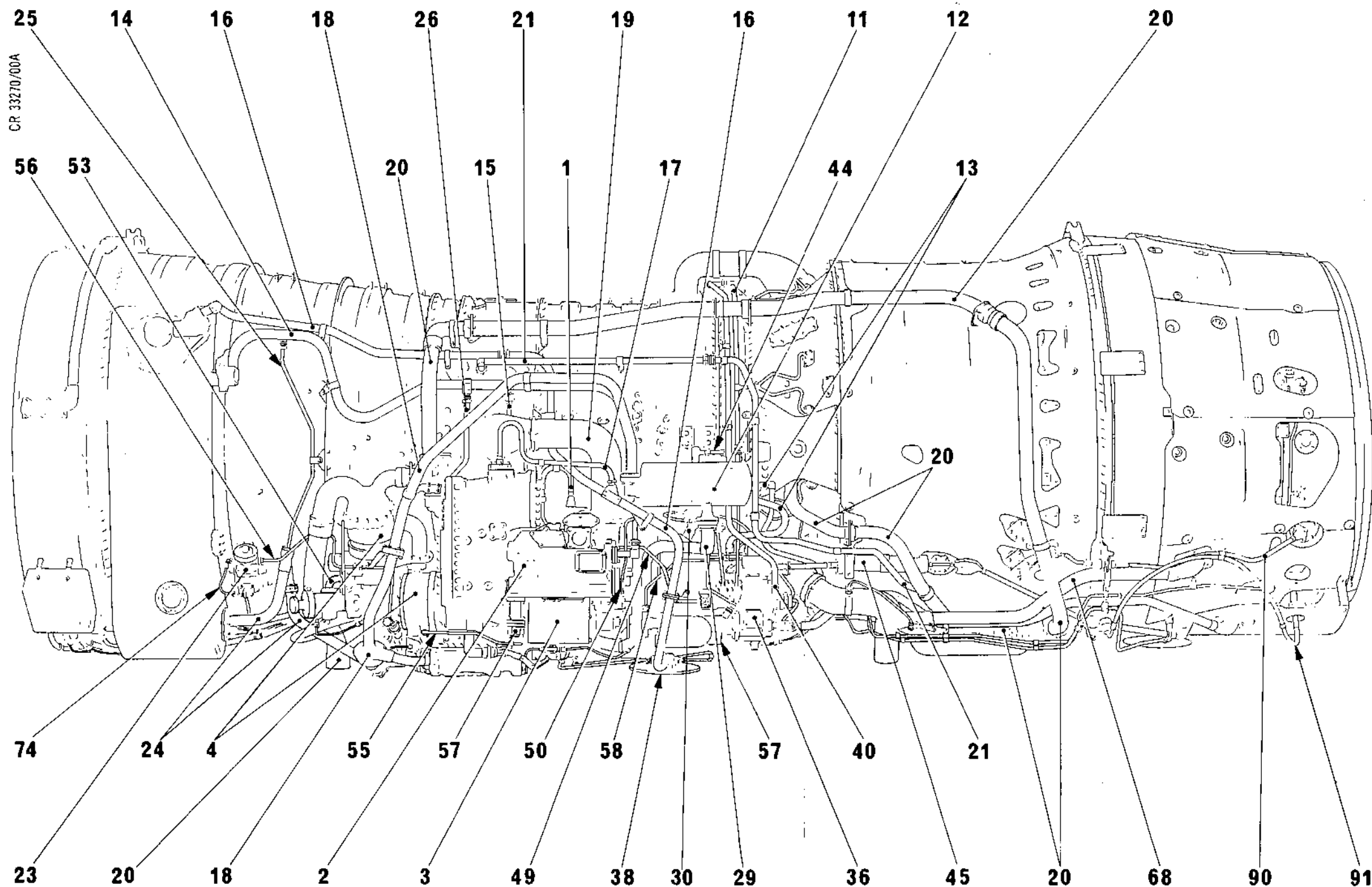
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

TN31059



Location of Tubes and Accessories  
Figure 501 (Sheet 1 of 3)

ASSEMBLY

71-00-01

STAGE 1

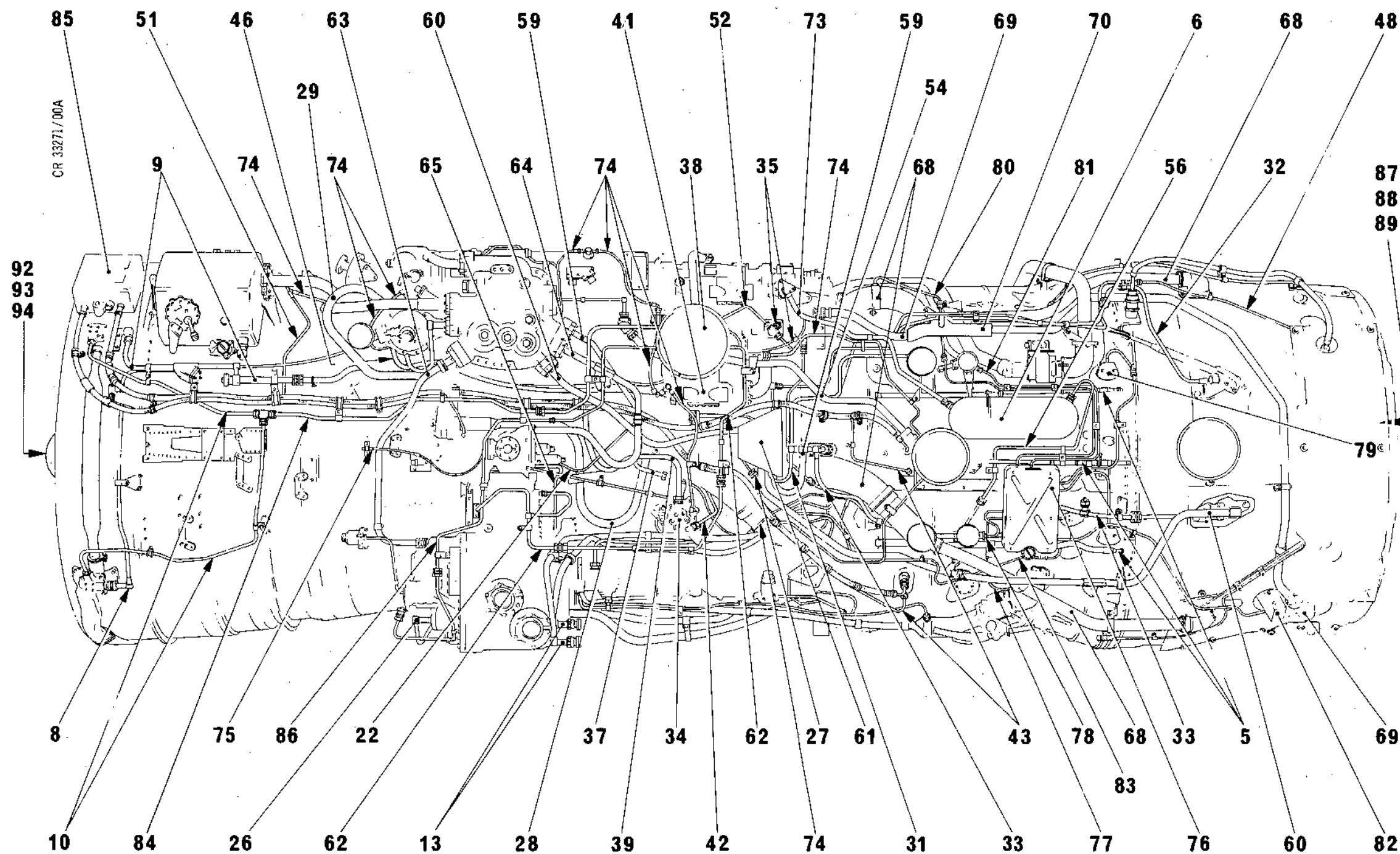
Page 503/504

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Location of Tubes and Accessories  
Figure 501 (Sheet 2 of 3)

ASSEMBLY  
71-00-01

STAGE 1  
Page 505/506  
Jan 2/80

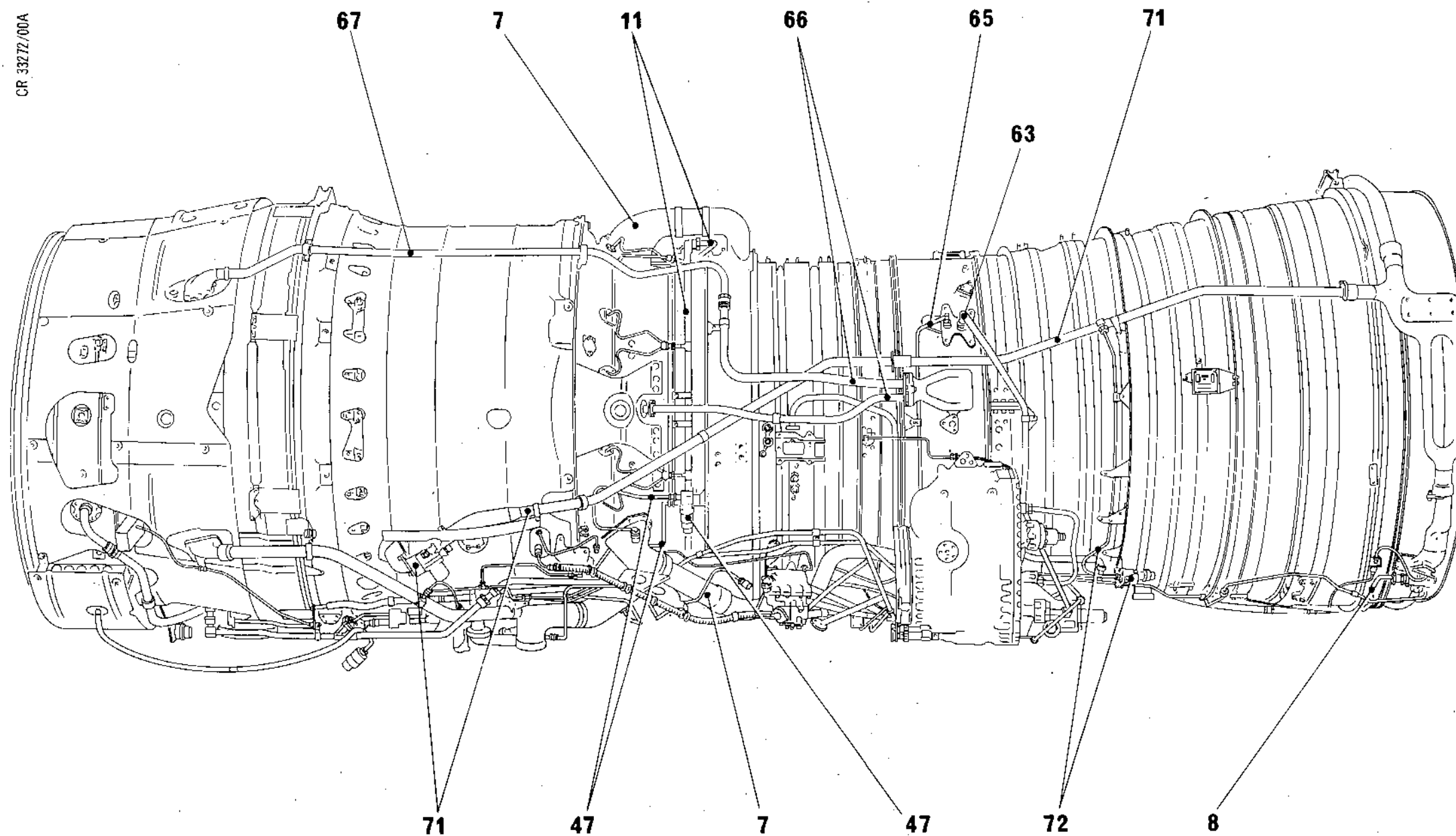


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33272/00A



Location of Tubes and Accessories  
Figure 501 (Sheet 3 of 3)

ASSEMBLY  
**71-00-01**  
STAGE 1  
Page 507/508  
Jan 2/80

PRINTED IN ENGLAND

TN29595



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBES AND ACCESSORIES - ASSEMBLY

1. Assemble Lifting Bracket (72-62-01/7-200) for FCU/Second Stage Pump (Ref. Item 1, Fig.501 of Stage 1)

A. Prepare for Installation.

(1) Remove the three bolts at the positions indicated in detail A, from the flange on the rear face of the left-hand gearbox.

(2) Apply lubricant 'B' to the bolts.

B. Install the Lifting Bracket (72-62-01/7-200) (Ref.Fig.501).

(1) Position the bracket on the left-hand gearbox and secure with the previously removed bolts torque-tightened to between 90 and 100 lbf in. (10,2 and 11,3 N.m).

(2) Secure the tube section to the bracket (72-33-01/6-300) located near the left-hand gearbox rear mounting bracket.

(a) Secure the tube to the bracket at position X with a loop-clamp, bolt, flat washer and nut (72-62-01/7-10-40-30-20). Torque-tighten the nut to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(b) Attach the tube to the bracket at position Y with a loop-clamp (72-62-01/7-10); bolt, nut and washers and distance piece (72-01-03/5-50-20-30-40) lightly tightened. Additional tubes are assembled to this position at a later stage.

2. Install the FCU/Second Stage Pump (Ref. Item 2, Fig.501 of Stage 1).

A. Prepare for Installation.

(1) Record the type and serial numbers of the FCU and second stage pump on the accessory sheet.

PRINTED IN ENGLAND

TN20398

ASSEMBLY

71-00-01

STAGE 2

Page 501

Jan 2/80

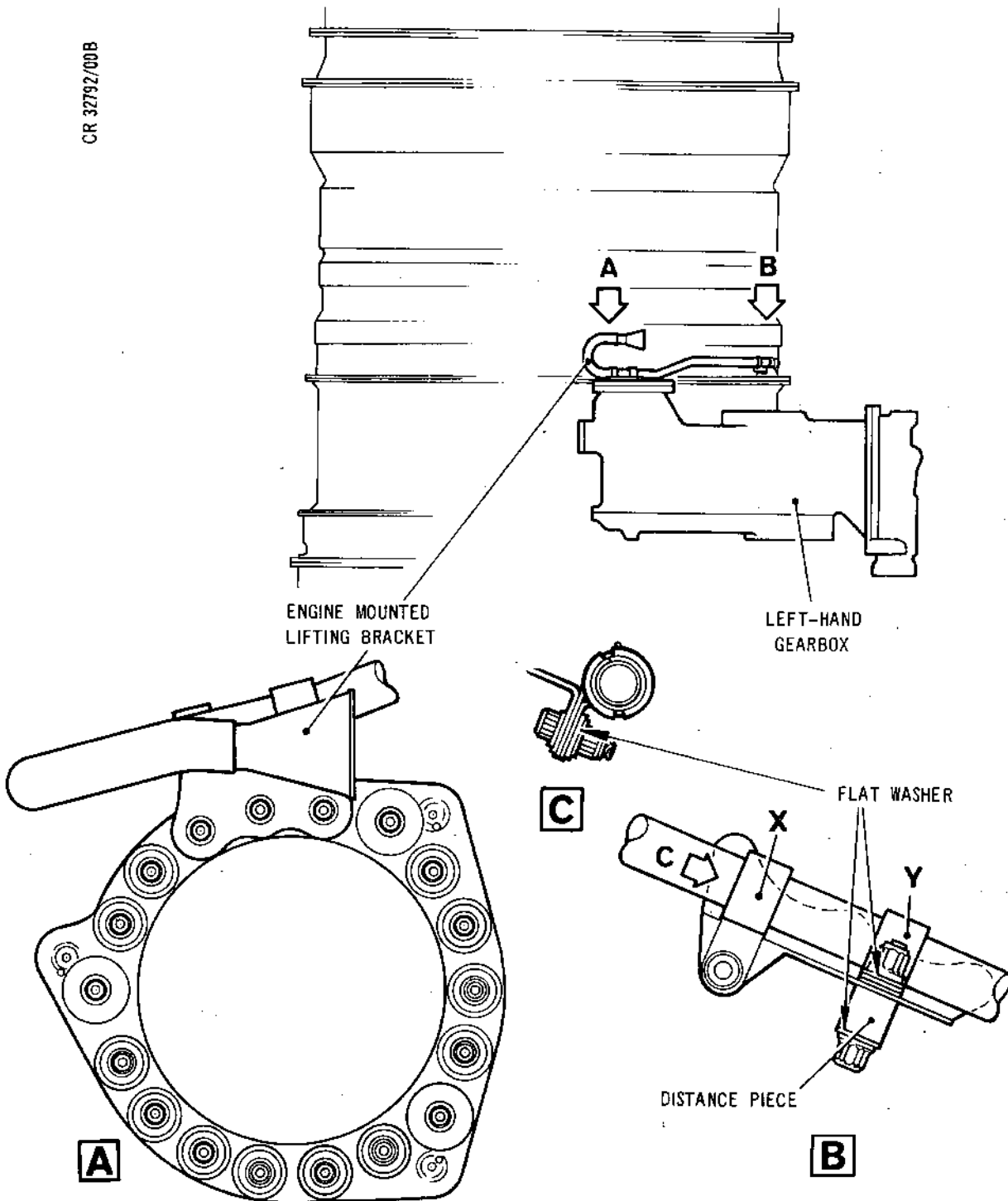


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 32792/00B



TN10507

FCU/Second Stage Pump Lifting Bracket  
Figure 501

ASSEMBLY  
**71-00-01**  
STAGE 2  
Page 502  
Jan 2/80





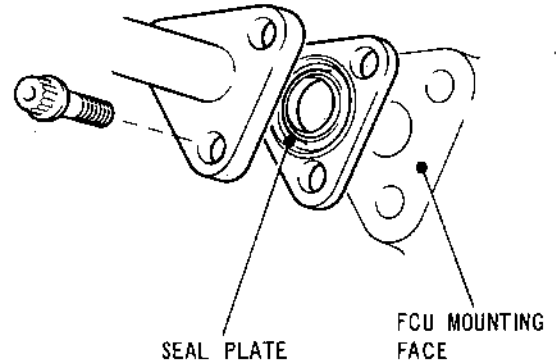
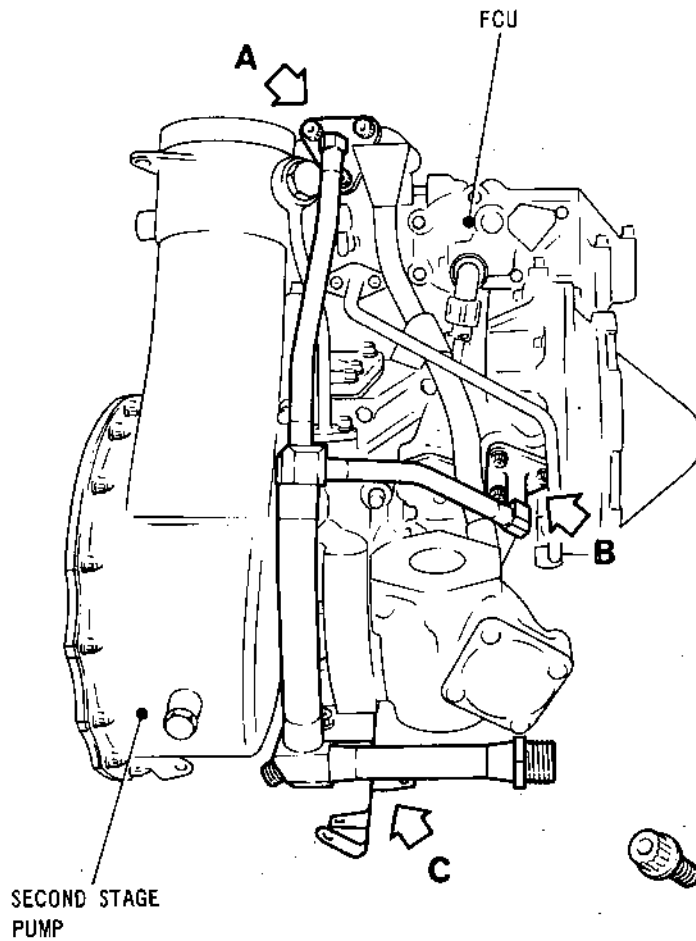
OLYMPUS 593

MK. 610-14-28  
OVERHAUL

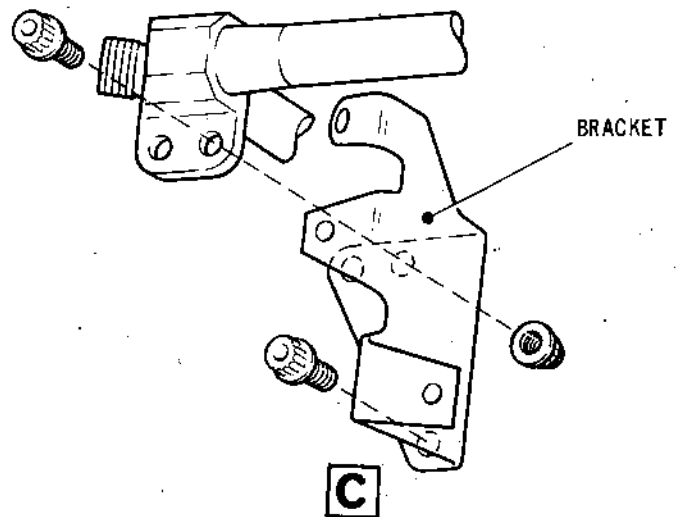


CR 32793/00A

PRINTED IN ENGLAND



**A** SIMILAR AT **B**



Assembling Tube to FCU/Second Stage Pump  
Figure 502

ASSEMBLY

71-00-01

STAGE 2

Page 503

Jan 2/80

TN12969



OLYMPUS 593

MK.610-14-28  
OVERHAUL



B. Installation (Ref.Fig.502).

- (1) Assemble the tube (73-13-08/1-230) to the FCU.
  - (a) Apply lubricant 'B' to the tube attachment bolts.
  - (b) Position the tube on the FCU, insert seal plates (73-13-08/1-290) between the tube flanges and the FCU mounting faces, secure the flanges with bolts (73-13-08/1-240).
  - (c) Torque-tighten the bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (d) Ensure that there is a minimum clearance of 0.100 in. (2,54 mm) between the installed tube and adjacent parts on the FCU.
- (2) Assemble the bracket (73-13-08/1-280) to the FCU.
  - (a) Apply lubricant 'B' to the bolts (73-13-08/1-270).
  - (b) Position the bracket on the FCU and tube flange and insert the attachment bolts.
  - (c) Torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (3) Secure the tube to the bracket.
  - (a) Apply lubricant 'B' to the bolts and nuts (73-13-08/1-250-260).
  - (b) Secure the tube to the bracket with bolts and nuts torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
  - (c) Check that there is a minimum clearance of 0.100 in. (2,54 mm) between the funnel section of the mini-hoist tube and the fuel tube on the second stage pump and a minimum clearance of 0.070 in. (1,75 mm) between the mini-hoist tube and the fluid passage bolt on the second stage pump.

TN8367



OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

C. Install the FCU/Second Stage Pump (Ref.Fig.503).

- (1) For details of the quick attach/detach QAD coupling preparation and assembly, with lubrication of the toroidal sealing ring, refer to 71-09-00/Assembly.
- (2) Install the lifting equipment (Tools 1854 and 854).
  - (a) Assemble the lifting equipment to the FCU attachment points as shown in Figure 503.
  - (b) Install the counterbalanced lifting arm to the lifting tool and carefully hoist the assembly with a crane.
  - (c) Locate a toroidal sealing ring (72-62-01/6-90) in the groove of coupling ring retaining flange.

**CAUTION:** HANDLE THE COUNTERBALANCED LIFTING EQUIPMENT WITH CARE ESPECIALLY WHEN REMOVING IT FROM AN INSTALLED ITEM.

- (d) Align the FCU drive shaft and mounting face to the right-hand gearbox location.
- (e) Engage the drive splines and lower the unit keeping the mating faces parallel. Turn the engine to align the mating splines if necessary using the hand-turning equipment.
- (f) Ensure that sealing ring is not displaced, press assembly squarely in position until joint faces abut.
- (g) Turn coupling ring in direction to bring trunnions together, and engage threads of ring with those of threaded flange as far as possible by hand.

**CAUTION:** ENSURE THAT THREADS HAVE ENGAGED FREELY BEFORE APPLYING TIGHTENING FORCE TO RING.



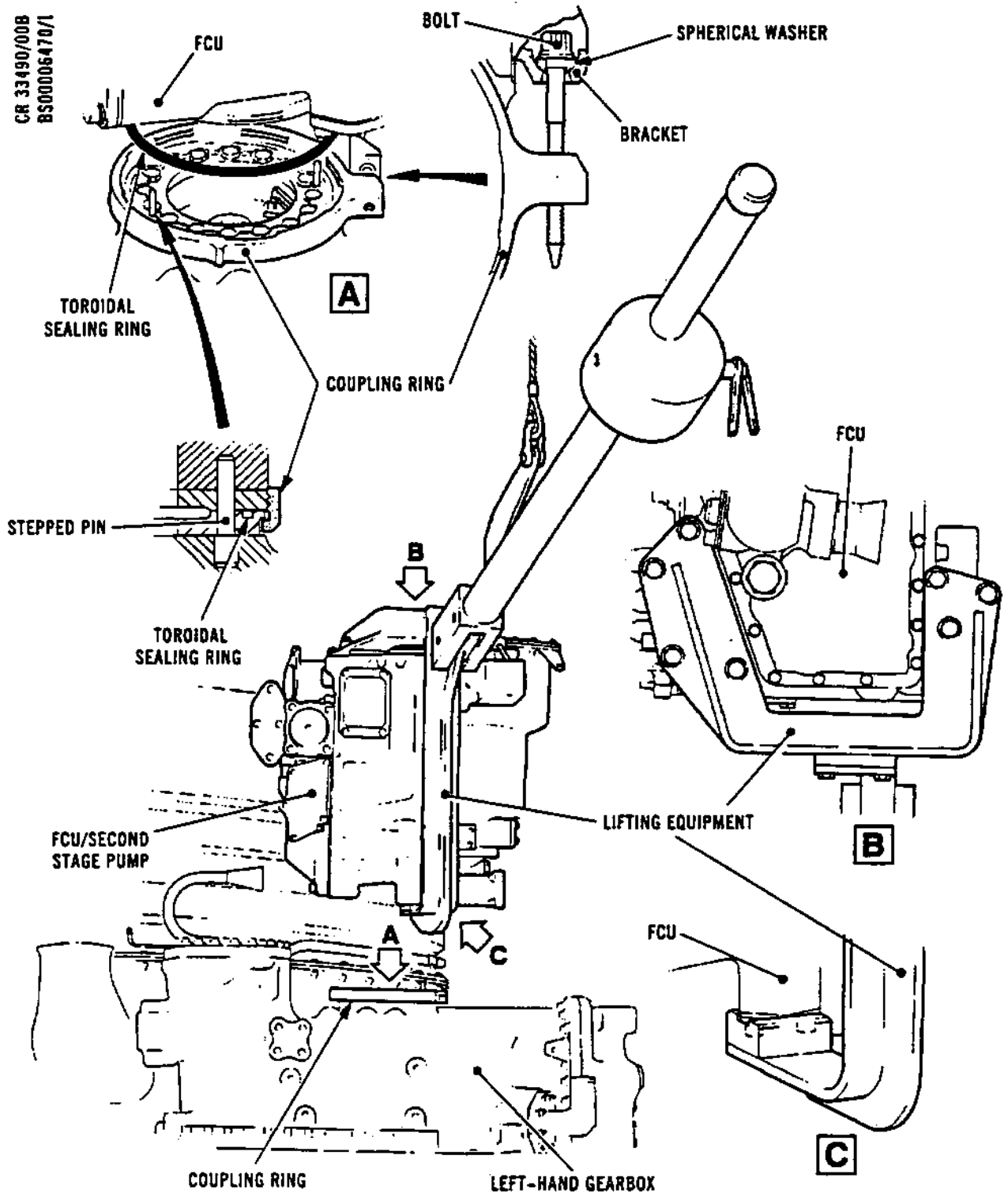
# OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

CR 33490/00B  
BS00006470/1



FCU/Second Stage Pump Lifting Equipment  
Figure 503

ASSEMBLY

71-00-01

STAGE 2

Page 506

Dec 1/97



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (h) Position spherical washer on clamping bolt, then insert bolt through fixed locking trunnion to engage threads of spherical nut of coupling ring trunnion by hand.
- (3) Tighten the coupling ring in accordance with the procedure given in 72-09-00, QAD Coupling - Installation. Use the following locking (run-down) torque and torque-tightening values for the clamping bolt.
  - (a) Locking (run-down) torque to be within the limit 6.0 to 20 lbf in. (0,68 to 2,26 N.m).
  - (b) Nominal tightening torque between 170 and 190 lbf in. (19,2 and 21,5 N.m).
- (4) Remove the lifting equipment from the FCU.
- (5) Remove the hand-turning tool and loosely assemble the cover to the right-hand gearbox, secure using bolts and washers.

3. Assemble Actuator Gearbox to FCU (Ref. Item 3, Fig.501 of Stage 1)

A. Prepare for Assembly.

- (1) Ensure that the type and serial number are recorded on the accessory sheet.
- (2) Ensure that inhibiting fluid has been drained from the gearbox.
- (3) Carry out a torque check on the actuator gearbox drive (Ref.Fig.504, Sheet 1).
  - (a) Remove seal drains connection union and strainer assembly and sealing washer and expose indicator scale.
  - (b) Assemble adapter (Tool 1750) and torque wrench to gearbox quillshaft.

PRINTED IN ENGLAND

TN10509

ASSEMBLY

71-00-01

STAGE 2

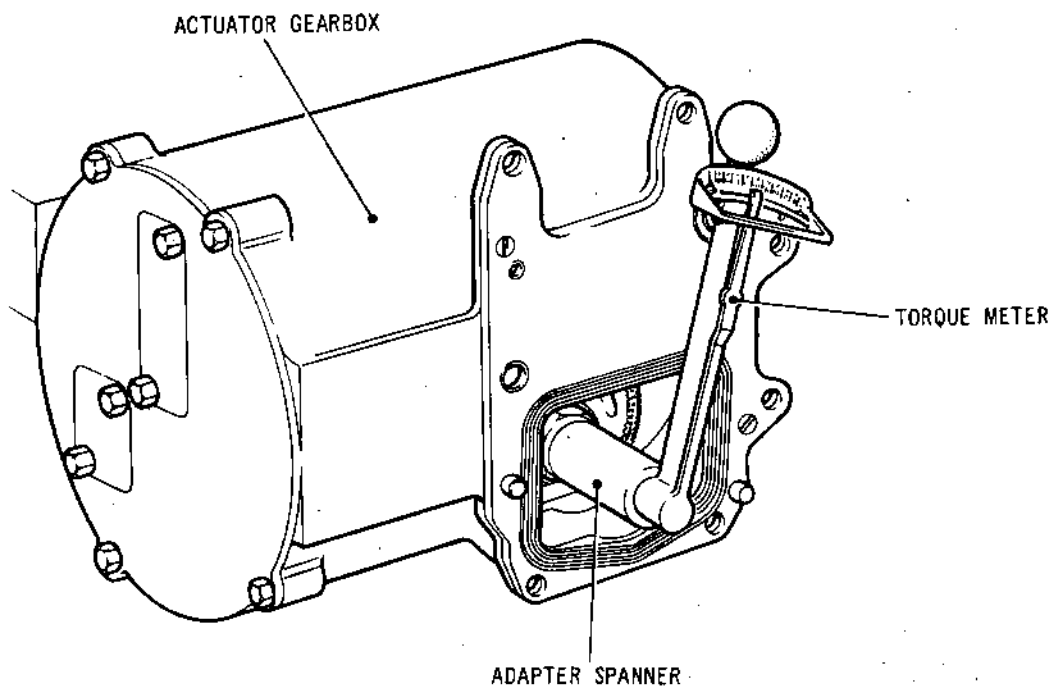
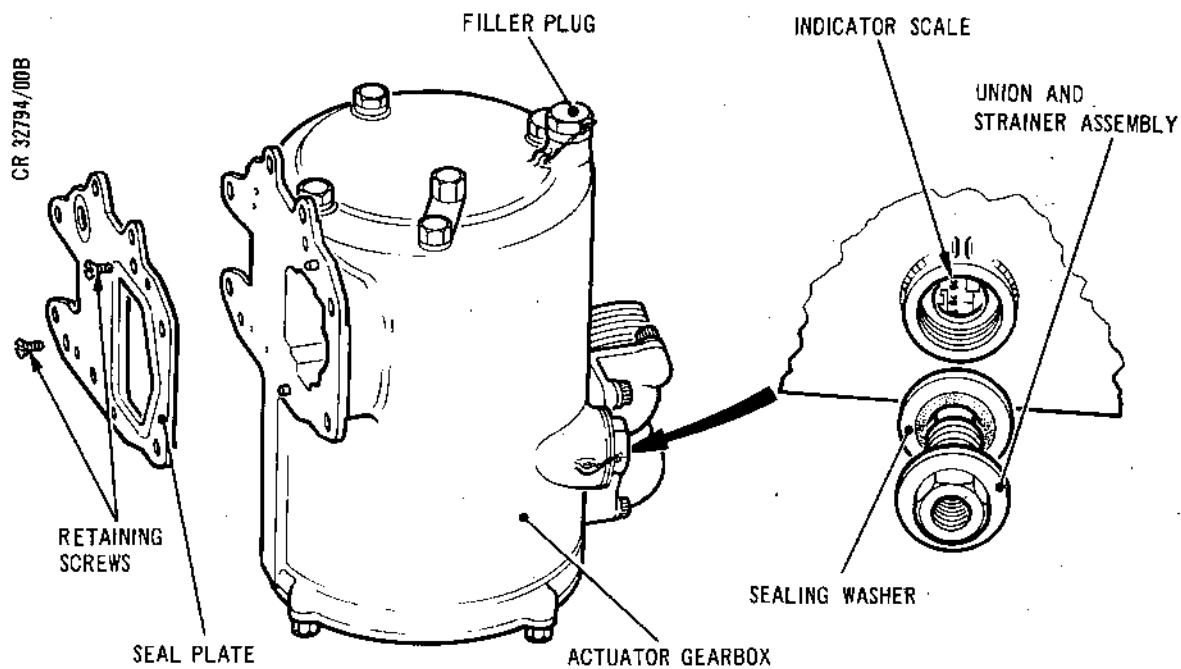
Page 507

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Actuator Gearbox Preparation  
Figure 504 (Sheet 1 of 2)

ASSEMBLY  
**71-00-01**  
STAGE 2  
Page 508  
Jan 2/80

TN32230

CR 31567/008  
BS00028337/1

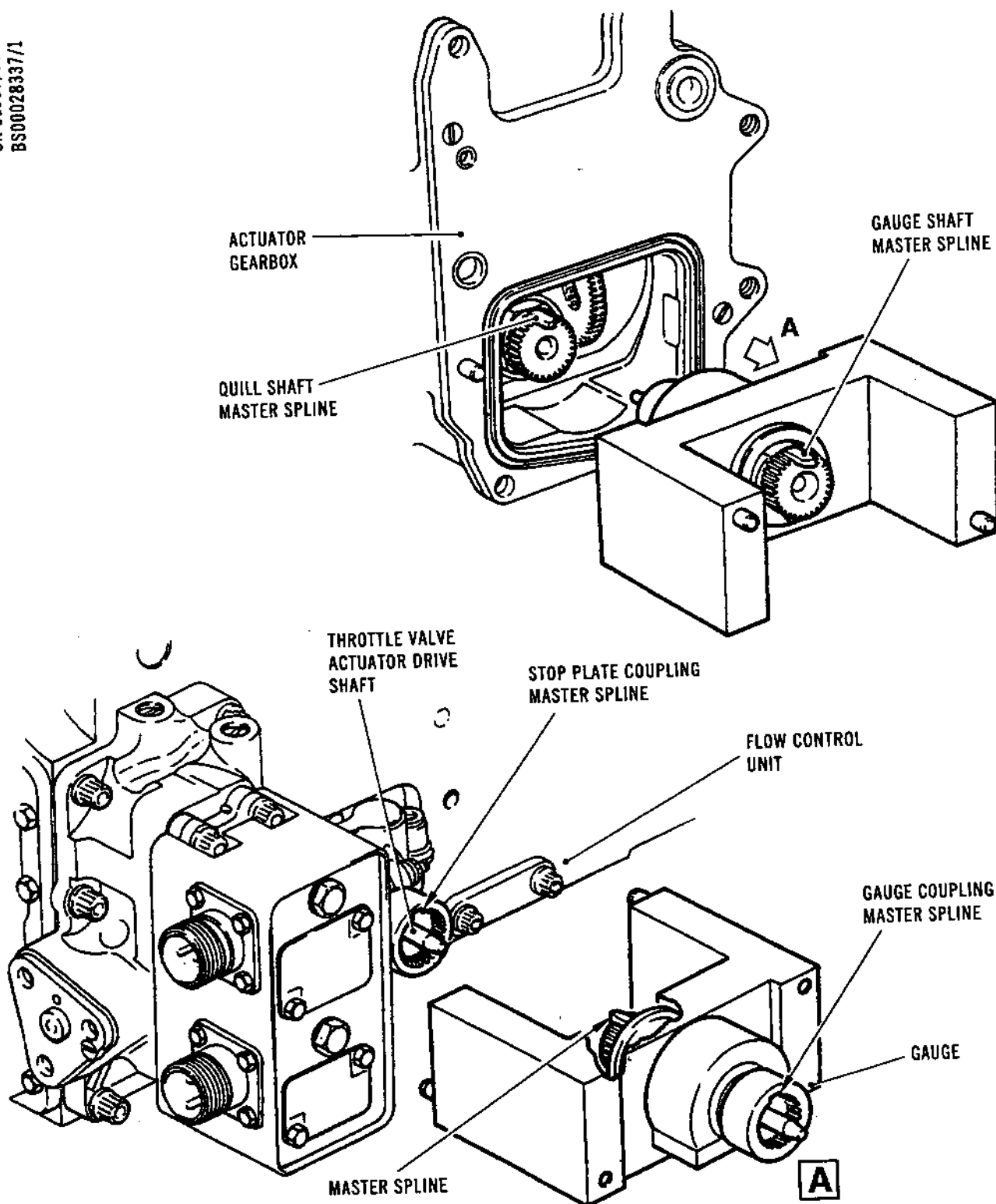


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Actuator Gearbox Preparation  
Figure 504 (Sheet 2 of 2)



OLYMPUS 593



MK.610-14-28

SNECMA

OVERHAUL

- (c) Note the drive setting as indicated by the scale. The quillshaft is turned clockwise (looking on drive) to move indicator scale from zero to open.
  - (d) Within a limit of 4 lbf in., progressively apply a torque load to the drive shaft and turn the gearbox through its full range as indicated on the scale, 0 to 130 deg. Full movement must be obtained within the limit for the unit to be acceptable.
  - (e) Install the union and strainer assembly temporarily to the actuator gearbox.
- (4) Assemble serviceable seal plate (77244694) to actuator gearbox mounting face and secure it with two screws (77244690). Ensure that screws do not project above seal plate face.

#### B. Install Actuator Gearbox.

**CAUTION:** IT IS OF UTMOST IMPORTANCE THAT THE SHAFT STRAIGHTNESS AND SPLINE ALIGNMENT CHECKS (REF. Para.B(1) and (2)) ARE CARRIED OUT BEFORE INSTALLATION OF THE ACTUATOR GEARBOX TO THE FCU. SERIOUS OPERATIONAL PROBLEMS MAY OCCUR IF THESE CHECKS ARE NOT CARRIED OUT.

- (1) Check shaft straightness (Ref. Fig.504, Sheet 2).
  - (a) Using the dial test indicator (DTI), check the run-out of the throttle actuator drive shaft when it is rotated from "stop to stop". The maximum allowable run-out of the shaft is 0.003 in. (0.0762 mm).
  - (b) If the run-out is more than the allowable value, the fuel control unit must be rejected.

ASSEMBLY

71-00-01

STAGE 2

Page 510

Jun 30/00





OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (2) Align actuator gearbox and FCU drive shafts (Ref. Fig.504, Sheet 2).
- (a) Turn actuator gearbox quillshaft with adapter spanner (Tool 1750) and align master spline with gauge (Tool 1751) coupling master spline.
- CAUTION: DO NOT FORCE GAUGE COUPLING INTO ENGAGEMENT WITH ACTUATOR GEARBOX QUILLSHAFT.
- (b) Locate gauge dowel holes with actuator gearbox dowels and ensure that gauge coupling readily engages with actuator gearbox quillshaft. If difficulty is experienced, remove gauge, recheck alignment of master splines and re-attempt engagement. Repeat this operation as necessary.
- (c) Remove gauge from actuator gearbox.

Printed in England



OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

This page is left blank intentionally

ASSEMBLY

71-00-01

STAGE 2

Page 510B

Jun 30/00



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (d) Turn FCU stop plate coupling to align master spline with gauge shaft master spline.

CAUTION: DO NOT FORCE GAUGE SHAFT INTO ENGAGEMENT WITH THE FCU STOP PLATE COUPLING.

- (e) Locate gauge dowels with FCU dowel holes and ensure that gauge shaft readily engages with FCU stop plate coupling. If difficulty is experienced, remove gauge, re-check alignment of master splines and re-attempt engagement. Repeat this operation as necessary.

- (f) Remove gauge from FCU.

- (2) Carefully engage splines and dowels and press actuator gearbox into position on FCU by hand pressure. If difficulty is experienced in engagement repeat the alignment procedure detailed in paragraph (1).
- (3) Hold actuator gearbox in position with FCU mating face and seal plate in full contact and retain in position with six bolts lightly tightened.
- (4) Secure actuator gearbox with six bolts (GTS 209-8 and washers GTS 51-8H) torque-tightened to 86 lbf in. (9,7 N.m). Ensure bolts are progressively tightened to avoid seal distortion.

4. Install First Stage Fuel Pump and Fuel Heater Assembly  
(Ref. Item 4, Fig.501 of Stage 1)

A. General.

The following procedure relates to an assembly of first stage fuel pump (73-11-01/1-10) and fuel heater (73-14-01/1-10), together with fuel inlet elbow, pressure switches and servo fuel tube section.

B. Prepare for Installation.

- (1) Ensure that the type and serial number are recorded on the accessory sheet.

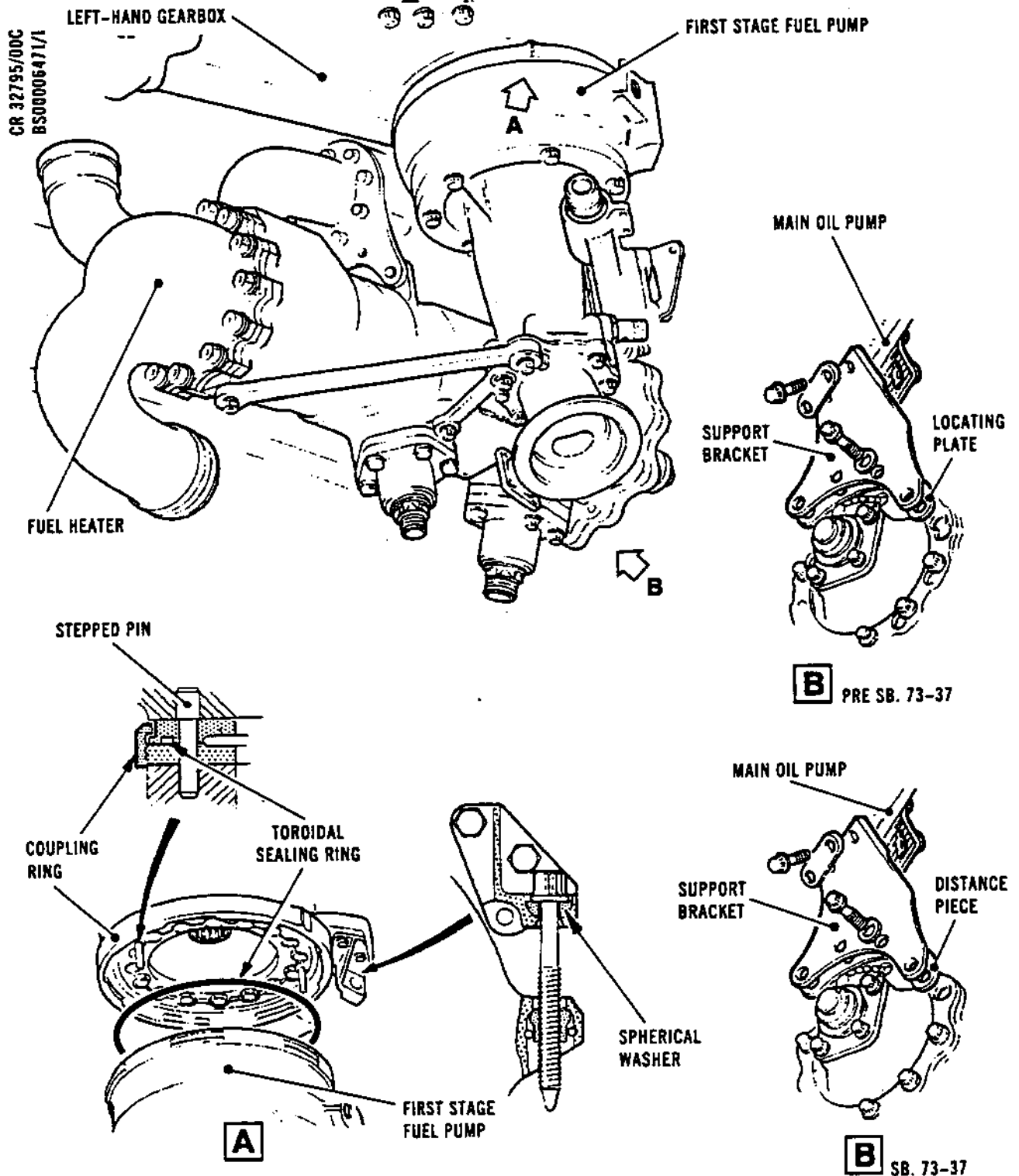


# OLYMPUS 593

MK.610-14-28  
OVERHAUL



SNECMA



First Stage Fuel Pump and Fuel Heater Assembly Installation  
Figure 505

ASSEMBLY  
**71-00-01**  
STAGE 2  
Page 512  
Dec 1/97



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

- (2) Prepare the quick attach/detach coupling and its bolt and spherical washer (72-62-01/2-10-20). For details of preparation and assembly with lubrication of toroidal sealing ring, refer to 71-09-00 Assembly.

C. Install the Assembly (Ref.Fig.505).

- (1) Locate a serviceable toroidal sealing ring (72-62-01/2-100) in the groove of the coupling ring retaining flange on the left-hand gearbox.
- (2) Raise assembly into position on gearbox. Align assembly pins with their locations and dispose coupling ring with its thread sections facing slots on threaded flange. Position the spherical nut trunnion to tighten to the clamping bolt trunnion when threads are engaged.
- (3) Align driving shaft splines, ensure that sealing ring is not displaced, and press assembly squarely in position until joint faces abut.
- (4) Turn coupling ring counter-clockwise, in direction to bring trunnions together, and engage threads of ring with those of threaded flange as far as possible by hand.

**CAUTION:** ENSURE THAT THE THREADS HAVE ENGAGED FREELY BEFORE APPLYING TIGHTENING FORCE TO THE RING.

- (5) Position spherical washer on clamping bolt, then insert bolt through fixed locking trunnion to engage threads of spherical nut of coupling ring trunnion by hand.
- (6) Tighten the coupling ring in accordance with the procedure given in 72-09-00, Assembly, QAD Coupling Installation. Use the following locking (run-down) torque and torque-tightening values for the clamping bolt.
  - (a) Locking (run-down) torque to be within the limit 6.0 to 20 lbf in. (0,68 to 2,26 N.m).

ASSEMBLY

71-00-01

STAGE 2

Page 513

Dec 1/97



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (b) Nominal tightening torque between 170 and 190 lbf in. (19,2 and 21,5 N.m).

- (7) Install heater and filter support bracket.

**CAUTION:** ENSURE ATTACHMENT BOLTS AND THEIR CORRESPONDING THREADED HOLES ARE TO THE SAME SERVICE BULLETIN STANDARD.

- (a) Apply lubricant 'B' to the bolts.
- (b) On engine to pre SB.73-37 standard (Ref.Fig.505), assemble bracket (73-14-01/1-170) and locatig plate (73-14-01/1-60) to heater and filter and secure with bols (73-14-01/1-40) and washers (73-14-01/1-50) lightly tightened.
- (c) On engines to SB.73-37 standard (RefFig.5) assemble bracket (73-14-01/1-170) and distance piece (73-14-01/1-77) to heater and filter and secure with bolts (73-14-01/1-73) and washers (73-14-01/1-75) lightly tightened.
- (d) Secure support bracket, together with plate (73-14-01/1-160), to bracket on main oil pump, with bolts (73-14-01/1-150) lightly tightened.

**NOTE:** If bracket serrations do not align, loosen bracket retaining bolts, manipulate bracket until serrations align.

- (e) Torque-tighten the bolts, between 85 and 95 lbf in. (9,6 and 10,7 N.m).

5. Assemble the Support Tubes to Lower Section of CCOC  
(Ref. Item 5, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to securing bolts.
- (2) Ensure that the minimum locking (run-down) torque of the nuts is 10 lbf in. (1,1 N.m).



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

B. Install the Tubes (Ref.Fig.506).

- (1) Insert each tube in turn into the respective plate mounting (72-53-00/6-260-440 and /7-80) on the diffuser, turbine exhaust outer case flange.
- (2) Secure the left-hand position tube (72-42-01/1-290) to the pillar bolts on the CC0C/HP compressor diffuser case flange with nuts (72-42-01/1-300). Torque-tighten the nuts to 100 lbf in. (11,5 N.m).
- (3) Secure the right-hand position tube (72-42-01/1-270) to the pillar bolts on the CC0C/HP compressor diffuser case flange with nuts (72-42-01/1-280). Torque-tighten the nuts to 100 lbf in. (11,5 N.m).
- (4) Secure the centre position tube (72-42-01/1-230) to the bracket (72-42-02-190) attached to the internal inspection port.
  - (a) Place the bracket (72-42-01/1-260) on the rear face of the inspection port bracket.
  - (b) Secure the brackets and tube with bolts and nuts (72-42-01/1-250-240).
  - (c) Torque-tighten the nuts to 100 lbf in. (11,5 N.m).
- (5) Assemble the pillar bolt (72-42-01/1-220) to the lug located near the rear of the bottom tube.
  - (a) Position the bolt so that it protrudes outward.
  - (b) Secure it with a nut (72-42-01/1-210).

ASSEMBLY

71-00-01

STAGE 2

Page 515

Jun 1/98

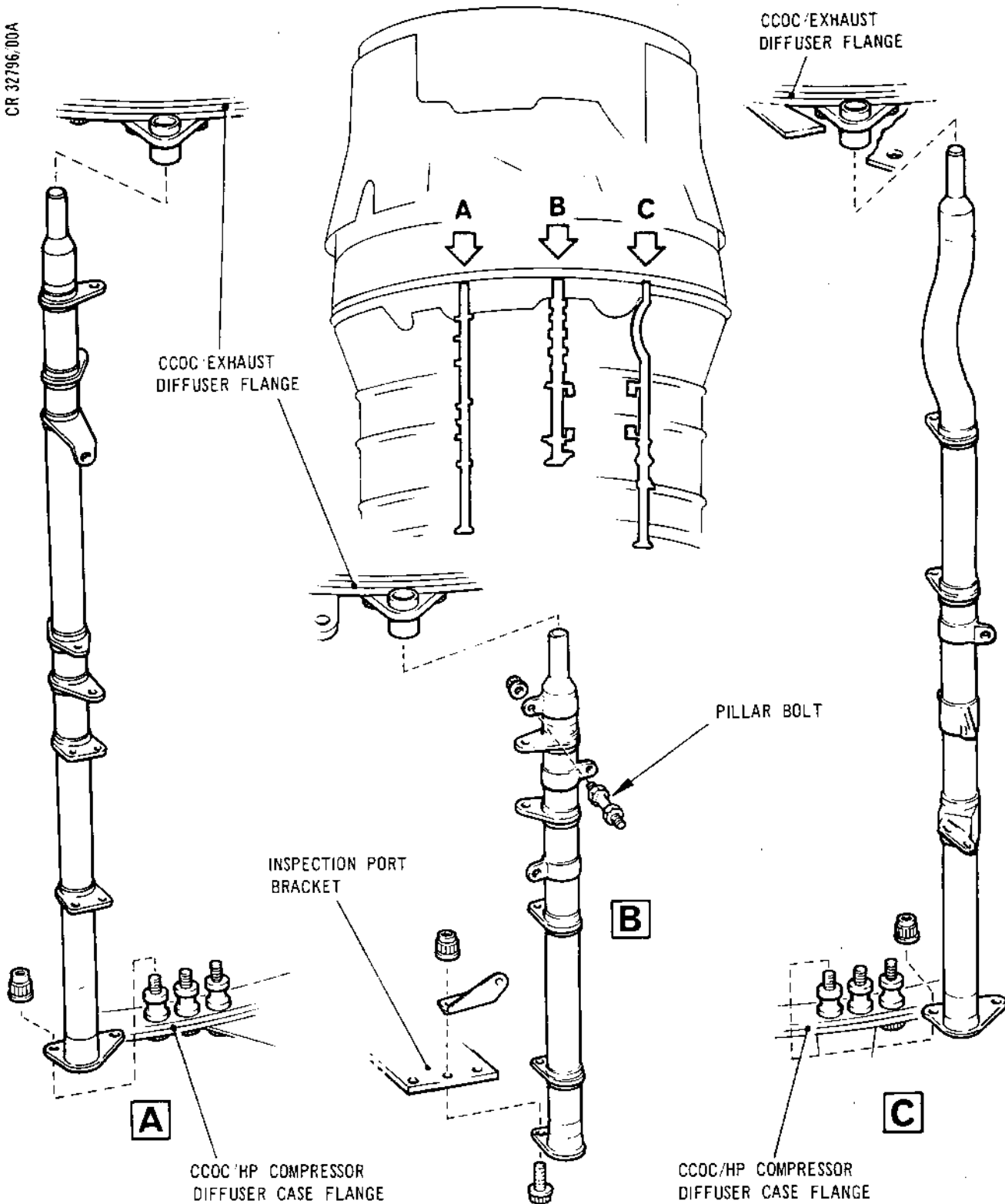


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32796, 00A



Lower CCOC Support Tubes  
Figure 506

ASSEMBLY

71-00-01

STAGE 2

Page 516

Jan 2/80

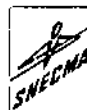




OLYMPUS 593

MK.610-14-28

OVERHAUL



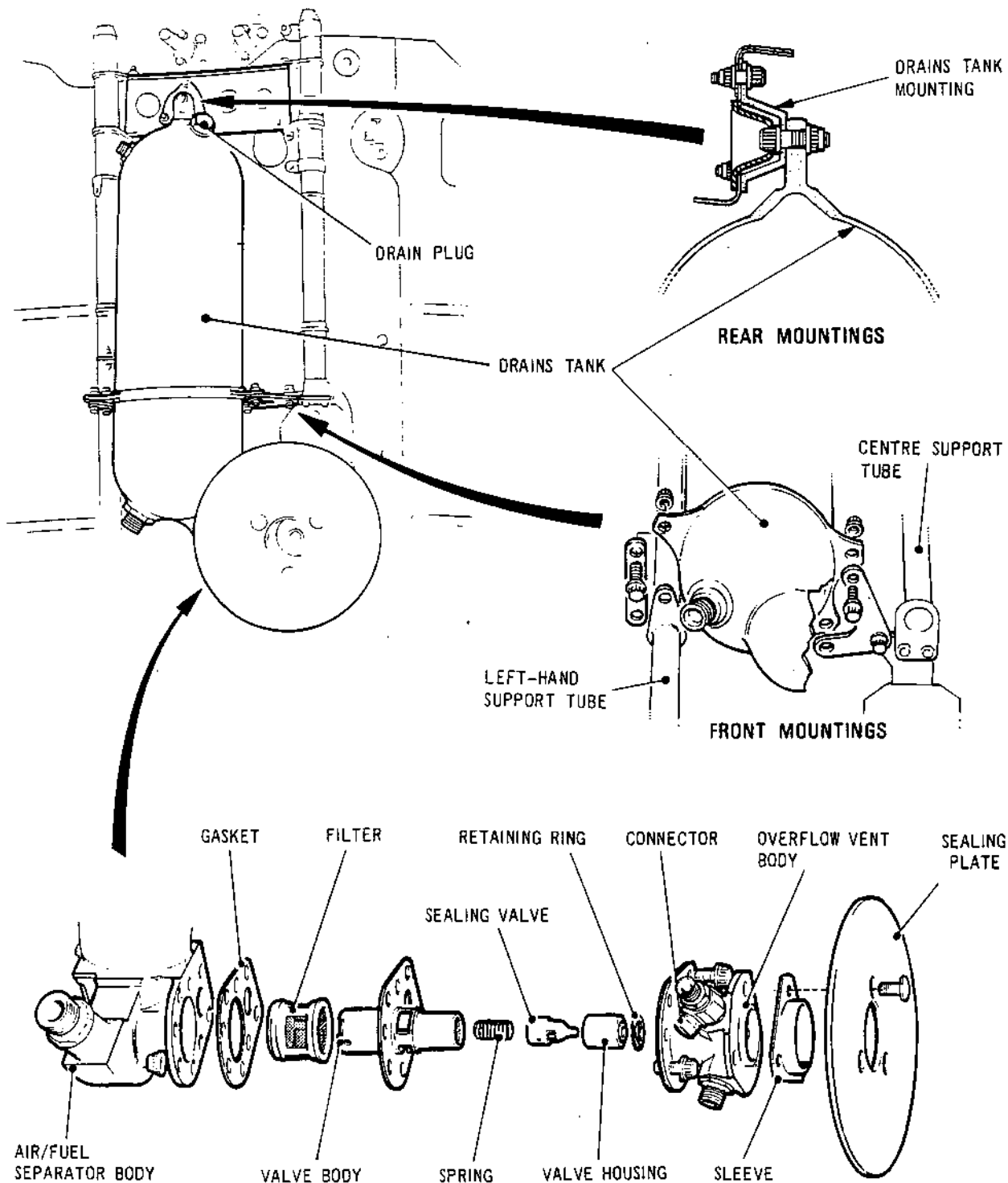
- (c) Torque-tighten the nut to 100 lbf in.  
(11,5 N.m).

6. Install Fuel Drains Tank (Ref. Item 6, Fig.501 of Stage 1)

A. Assemble Overflow Valve to Air/Fuel Separator Body  
(Ref.Fig.507).

- (1) Apply lubricant 'A' to the valve housing (71-73-01/2-115).
- (2) Insert the sealing valve and spring into the valve housing (71-73-01/2-130B-110-115).
- (3) Assemble the spring, sealing valve and valve housing in the valve body (71-73-01/2-135).
- (4) Depress the valve and secure the assembly with the retaining ring (71-73-01/2-95) in the valve body.
- (5) Assemble the valve body into the overflow vent body (71-73-01/2-80B).
- (6) Apply lubricant 'B' to the bolts.
- (7) Assemble the overflow vent body.
  - (a) Install the filter (71-73-01/2-120) into the separator body.
  - (b) Position the gasket (71-73-01/2-85) to the separator body joint face.
  - (c) Position and secure the overflow vent body (71-73-01/2-80B) to the separator body ensuring the gasket is correctly positioned between the joint faces.
  - (d) Retain the overflow vent body to the separator body with three bolts (71-73-01/2-70B) lightly tightened.

CR 32797/000



Fuel Drains Tank  
Figure 507

ASSEMBLY  
71-00-01  
STAGE 2  
Page 518  
Jan 2/80

TN24613



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (8) Secure the remaining positions on the flanges with the bolts and nuts (71-73-01/2-60B-50).
- (9) Torque-tighten the bolts and nuts to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (10) Wire-lock the three bolts together.
- (11) Assemble the adapter union (71-73-01/2-140) to the overflow vent body.
  - (a) Apply lubricant 'A' to the union threads.
  - (b) Screw the union in position and torque-tighten to between 300 and 330 lbf in. (33,9 and 37,3 N.m).
- (12) Assemble the connector (71-73-02/5-590) adapter (71-73-02/5-580) and seal washers (71-73-02/5-600) to the overflow vent body.
  - (a) Apply lubricant 'A' to the connector fitting and adapter.
  - (b) Position a seal washer each side of the connector fitting, align and secure the assembly to the valve body with the adapter bolt.
  - (c) Torque-tighten the bolt to between 240 and 260 lbf in. (27,1 and 29,4 N.m).
- (13) Assemble the seal plate (71-73-01/2-30) to the overflow valve body.
  - (a) Apply lubricant 'B' to the bolts (71-73-01/2-20).
  - (b) Position the sleeve (71-73-01/2-40) and the seal plate on the valve body and loosely retain the plate with the bolts and nuts (71-73-01/2-10).



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) Assemble the restraining fixture (Tool 940) to the seal plate to hold the bolts in position.
- (d) Torque-tighten the nuts to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (e) Check each bolt head to ensure that it is 0.005 to 0.015 in. (0,127 to 0,381 mm) below the surface of the seal plate.

B. Assemble Mounting Brackets to Engine.

- (1) Apply lubricant 'B' to securing bolts.
- (2) Position the bracket (71-73-01/1-150) between the centre and left-hand support tubes on the CCOC. Secure the bracket to the two brackets located at the rear end of each support tube with bolts and nuts (71-73-01/1-170-160).
- (3) Torque-tighten the nuts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (4) Position the fuel drains tank mounting bracket (71-73-01/1-140) to the bracket and secure with bolts and nuts (71-73-01/1-130-120), install the bolt (71-73-01/1-80) in the mounting bracket pre-SB.71-14. Position the bolthead trap (71-73-01/1-135) to the bracket upper face, position the bolt in the mounting bracket (71-73-01/1-80-140) and the mounting bracket to the lower face of the bracket locating the bolt-head in the bolthead trap SB.71-14. Secure the assembly with bolts and nuts (71-73-01/1-130-120).
- (5) Torque-tighten the nuts to between 36 and 40 lbf in. (4,1 and 4,5 N.m), locking (run-down) torque 2.0 lbf in. (0,23 N.m).
- (6) Loosely assemble the mounting link (71-73-01/1-60) to the bracket attached to the left-hand support tube.
  - (a) Retain the bracket with a bolt and nut (71-73-01/1-50-40).

IN10517



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (7) Loosely assemble the bracket (71-73-01/1-30) to the bracket on the centre CCOC support tube.

- (a) Retain the link with a bolt and nut (71-73-01/1-20-10).

C. Install Fuel Drains Tank.

- (1) Apply lubricant 'B' to the securing bolts.
- (2) Position the tank on the engine and secure as follows.
  - (a) Secure the rear position of the tank to the mounting with a bolt and nut (71-73-01/1-80-70). On pre-SB.71-14 position the nut on the underside of the mounting after inserting the bolt.
  - (b) Secure the left-hand position of the tank to the link with a bolt and nut (71-73-01/1-55-40).
  - (c) Secure the bottom position of the tank to the bracket with two bolts and nuts (71-73-01/1-20-10).
  - (d) Torque-tighten the nuts (securing the tank and brackets) to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (3) Assemble the drain plug and sealing washer (71-73-01/1-100-110) to the tank.
  - (a) Apply lubricant 'A' to the plug. Screw the plug and washer in position on the tank. Torque-tighten the plug to between 230 and 250 lbf in. (26,0 and 28,2 N.m). Use torque wrench (Tool 1648). Wire-lock the plug.
- (4) Assemble protector (71-73-01/2-240) to the overboard vent flange.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

7. INSTALL HP Turbine Cooling Air Ducts to HP compressor Diffuser Case and HP Compressor Case (Ref. Item 7, Fig.501 of Stage 1)

A. Install Ducts at Bottom Position (Ref.Fig.508).

- (1) Apply lubricant 'C' to all bolts unless stated otherwise.
- (2) Assemble a seal ring (75-01-04/1-190) to each end of duct (75-01-04/180). Insert the duct into the duct assembled to the diffuser case.
- (3) Slide the duct (75-01-04/1-10) over the seal ring on the connecting duct and align the flange with the location on the HP compressor case.
- (4) Assemble the brackets.
  - (a) Secure the bracket (75-01-04/1-50) with the bolts (75-01-04/1-30-40) to the left forward side of the duct flange.
  - (b) Secure the bracket (75-01-04/1-60) with the bolts (75-01-04/1-20) to the right forward side of the duct flange.
  - (c) Secure the mounting bracket (75-01-04/1-70) with the bolts (75-01-04/1-80) to the duct flange.

ASSEMBLY

71-00-01

STAGE 2

Page 522

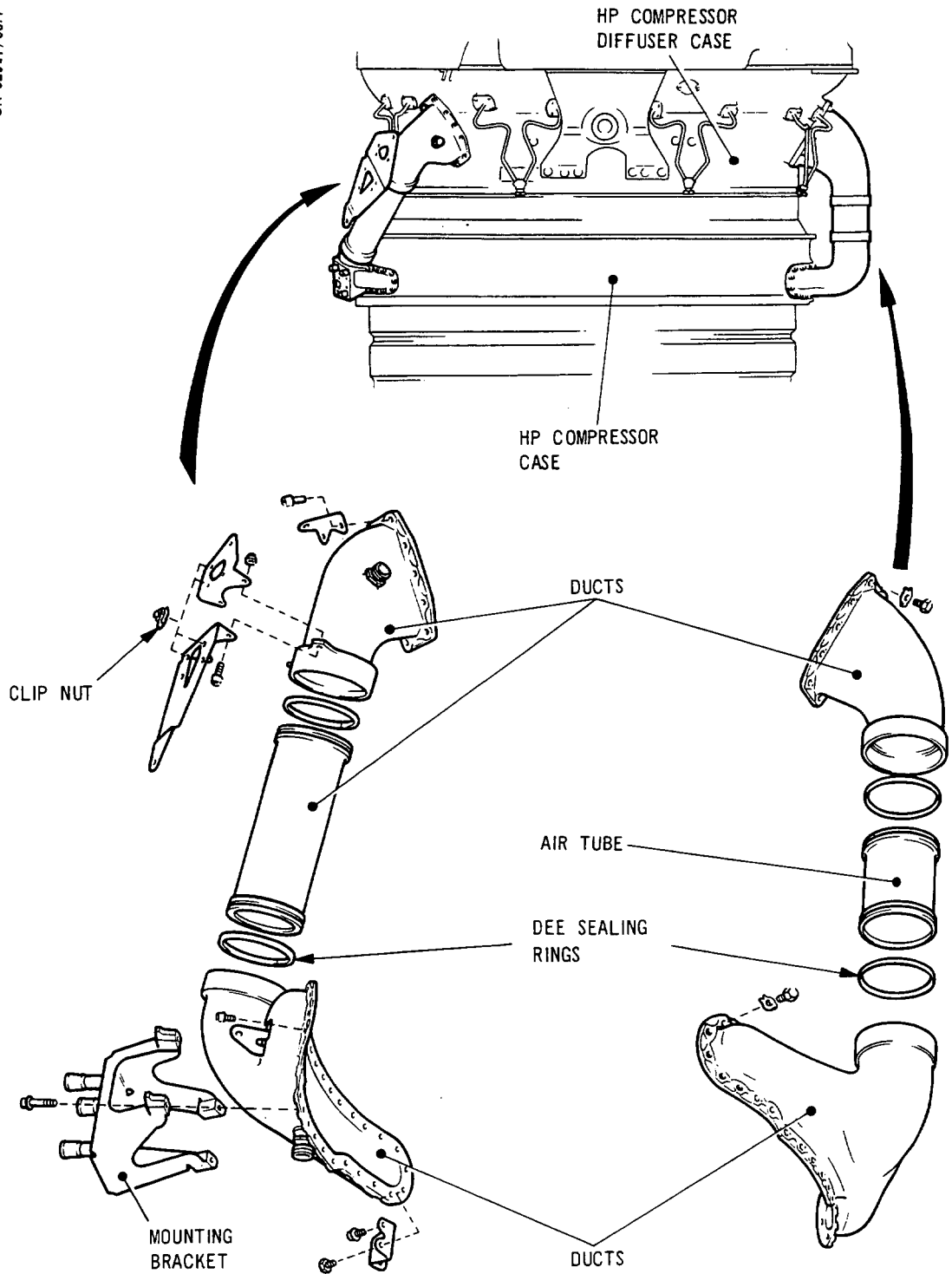
Dec 31/01

CR 32917/00A



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Cooling Air Ducts  
HP Turbine to HP Diffuser and HP Compressor Cases  
Figure 508

ASSEMBLY

71-00-01

STAGE 2

Page 523

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (5) Assemble the bolts (75-01-04/1-20) to the remaining locations on the flange.
  - (6) Torque-tighten the bolts (75-01-04/1-20-30-40-80) to 100 lbf in. (11,5 N.m).
  - (7) Wire-lock the flange bolts together in pairs.
  - (8) Wire-lock each bolt on bracket (75-01-4/1-70) to the holes in the bracket.
  - (9) Assemble brackets (75-01-04/1-160) and (75-01-04/1-170) to the lugs on the diffuser case duct.
    - (a) Secure the brackets with the bolts and nuts (75-01-04/1-150-140), torque-tightened to a 100 lbf in. (11,5 N.m).
  - (10) Assemble clip nuts (75-01-04/1-130) to the brackets.
- B. Install Ducts at Top Position (Ref.Fig.508).
- (1) Apply lubricant 'C' to the bolts.
  - (2) Assemble a seal ring to each end of the connecting grooved pipe (75-01-03/1-50-40). Insert the pipe into the duct assembled to the diffuser case.

ASSEMBLY

71-00-01

STAGE 2

Page 524

Dec 31/01





OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

Printed in England

- (3) Slide the duct (75-01-03/1-10) over the seal ring on the connecting grooved pipe and align the duct flange with the location on the HP compressor case.
  - (4) Secure the duct flange with the bolts and key washers (75-01-03/1-20A-30A) (Pre-SB.75-2) or bolts (75-01-03/1-20B) (SB.75-2).
  - (5) Torque-tighten the bolts to 100 lbf in. (11,5 N.m).
  - (6) Lock the keywashers and bolts (Pre-SB.75-2). Wire-lock the bolts (SB.75-2) together in pairs.
8. Installation of LP Compressor Bearing Oil Feed and Scavene Tubes (Ref. Items 8 and 9, Fig.501 of Stage 1)
- A. Prepare for Installation.
- (1) Apply lubricant 'A' to the tube union threads and lubricant 'B' to the bolts.
- B. Install Feed Tube (72-01-03/1-270) (Ref.Fig.509).
- (1) Assemble clipnuts (72-01-03/1-40-110) to the bracket (72-22-01/4-170) on LP compressor case/intake case flange ndhe bracket (72-22-01/4-240) near the main oil tank.
  - (2) Ensure that the filter assembly is in position in the adapter on the intake case.
  - (3) Position the tube on the engine and loosely engage the union nut with the adapte.
  - (4) Insert a gasket (72-01-03/1-310) between the tube flange and the oil pump and position the bracket (72-01-03/1-300) to the tube flange. Loosely secure the flange, bracket and joint washer with bolts (72-0-03/1-290-280).

ASSEMBLY

71-00-01

STAGE 2

Page 525

Jun 1/98

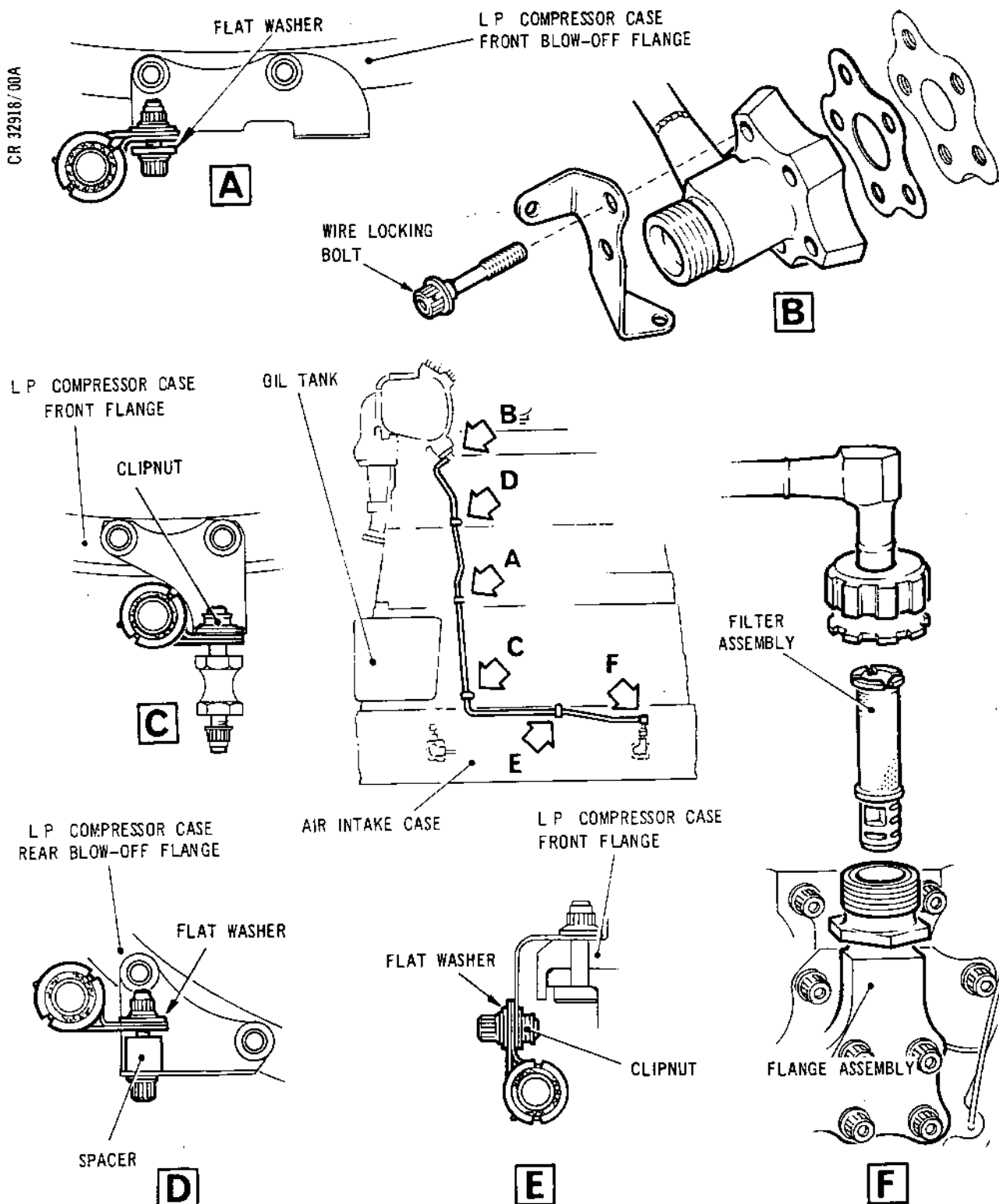


# OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32918/30A



Oil Feed Tube, LP Compressor Bearing  
Figure 509

ASSEMBLY  
**71-00-01**  
STAGE 2  
Page 526  
Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (5) Assemble the loop-clamps to the brackets and tube as follows.
- (a) Secure the loop-clamp (72-01-03/1-10).
- (i) Assemble the loop-clamp to the tube align with the clipnut (72-01-03/1-40) and bracket (72-22-01/4-170) mounted on the LP front case blow-off flange.
- (ii) Secure the loop-clamp to the nut using bolt and washer (72-01-03/1-20-30).
- (iii) Torque-tighten the bolts to between 85 and 95 lbf in. (9,6 and 10,2 N.m).
- (b) Retain the loop-clamp and bracket (72-01-03/1-80) and (72-22-01/4-240) using the pillar bolt and clipnut (72-01-03/1-90-110) to the bracket mounted on the LP case front blow-off flange. Install a nut to the pillar bolts outer end and lightly tighten the nuts.
- (c) Retain the loop-clamp (72-01-03/1-150) with the existing nut, bolt and washer to the bracket mounted on the LP casing rear of the oil tank, and lightly tighten.
- (d) Retain the loop-clamp (72-01-03/1-190) to the bracket (72-31-01/5-410) mounted on the LP case near the main oil pump using the bolt, distance piece, washer and nut (72-01-03/1-230-220-210-200) and lightly tighten the nut.
- (6) Torque-tighten the tube flange securing bolts to between 67 and 73 lbf in. (7,6 and 8,3 N.m).
- (7) Torque-tighten the tube union nut to between 400 and 440 lbf in. (45,2 and 49,7 N.m). (Tools 1528, 1648 and 947).
- (8) Wire-lock the tube union.

PRINTED IN ENGLAND

TN10520

ASSEMBLY

71-00-01

STAGE 2

Page 527

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



C. Install Scavenge Tube Front Section (72-01-04/1-160)  
(Ref.Fig.510).

- (1) Position the tube on the engine and engage the union nut with the scavenge flange adapter.
- (2) Assemble the loop-clamps to the brackets (72-22-01/4-240) mounted to the lower section of the air intake case flange and (72-31-01/4-430) mounted to the LP compressor case front blow-off flange and to the tube.
  - (a) At the front position common to the oil feed tube, temporarily secure the oil scavenge tube with loop-clamp (72-01-04/1-10) and lightly tighten.
  - (b) At the rear position common to the oil feed tube, secure the oil scavenge tube with loop-clamp (72-01-04/1-90). Torque-tighten the nut to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (3) Assemble the blank (72-01-04/1-80).
  - (a) Position the gasket (72-01-04/1-85) and blank to the tube flange.
  - (b) Position the bracket (72-01-04/1-70) on the flange blank.
  - (c) Secure the bracket, gasket and flange with the bolts (72-01-04/1-50-60), torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m) and wire-lock.

D. Install Scavenge Tube Rear Section (72-01-04/1-240)  
(Ref.Fig.510).

- (1) Position the tube on the engine and loosely engage the tube union nut with the front tube. Insert a gasket (72-01-04/1-255) between the tube flange and pump. Loosely secure the flanges together with bolts (72-01-04/1-250).

TN10526



OLYMPUS 593

MK.610-14-28

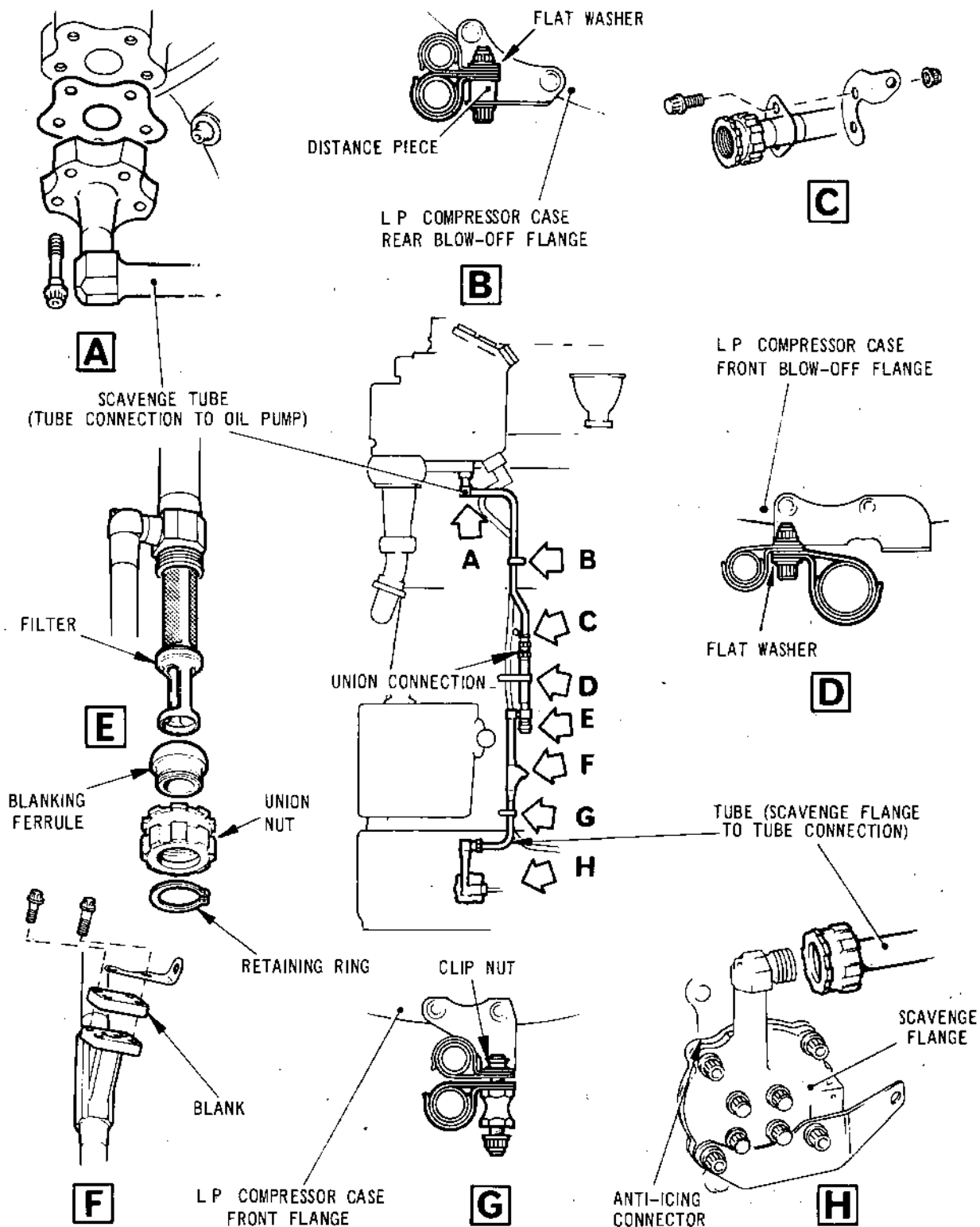
OVERHAUL



CR 32919/00A

PRINTED IN ENGLAND

TN24606



Oil Scavenge Tube, LP Compressor Bearing  
Figure 510

ASSEMBLY  
71-00-01

STAGE 2  
Page 529  
Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Assemble the loop-clamp (72-01-04/1-170) to the position common to the oil feed tube.
  - (a) Ensure that the distance piece (72-01-03/1-220) and existing loop-clamp are correctly positioned.
  - (b) Torque-tighten the nut to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (3) Torque-tighten the tube flange bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (4) Torque-tighten both tube union nuts to between 310 and 340 lbf in. (35,0 and 38,4 N.m). (Tools 1565, 1648 and 322). Wire-lock the unions.
- (5) Assemble the bracket (72-01-04/1-230) to the bracket on the forward end of the tube (72-01-04/1-240). Install the bolts and nuts (72-01-04/1-220-210). Torque-tighten the nuts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

E. Assemble Filter to Oil Scavenge Tube (Ref.Fig.510).

- (1) Assemble the blanking ferrule to the union nut and secure it with a circlip (72-01-01/1-40-30-20).
- (2) Insert the filter into the scavenge tube and retain it with the ferrule and union nut assembly. Torque-tighten the union nut to 500 lbf in. (56 N.m). (Tools 1526 and 946).
- (3) Wire-lock the union nut.

F. Assemble the Pillar Bolt.

- (1) Assemble the pillar bolt (71-51-01/4-110) to the bracket (72-31-01/5-410) on the LP case rear blow-off flange below and to the rear of the oil tank.

TN10527

ASSEMBLY

71-00-01

STAGE 2

Page 530

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

- (2) Install the nut (71-51-01/4-100) and torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

9. Installation of LP Compressor Bearing Vent Tubes (Front Sections Only) (Ref. Item 10, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to tube union threads and to bolts.

B. Connector.

- (1) Ensure the flanged connector (72-31-01/4-320) is bolted to LP compressor case front blow-off flange.

C. Install Right-hand Tube Section (Ref.Fig.511).

- (1) Position the tube (75-02-08/1-140) on the engine and loosely engage the tube union nuts with the three-way connector (72-31-01/4-320) on the LP case front blow-off flange and flange assembly (72-22-01/2-10) on the intake case.
- (2) Secure the tube to the bracket (72-22-01/4-110) on the intake case flange with a loop-clamp (75-02-08/1-10) pillar bolt and nut (75-02-08/1-30-20). Torque-tighten the nut to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (3) Secure the tube to the bracket (72-31-01/4-100) on the front blow-off flange with a loop-clamp (75-02-08/1-70) bolt, washer and nut (75-02-08/1-100-90-80). Torque-tighten the nut to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (4) Torque-tighten both tube union nuts to between 220 and 240 lbf in. (24,9 and 27,1 N.m). (Tools 1752, 1648).
- (5) Wire-lock the union nuts.

TN10528



OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32920/00A

CLIP NUT

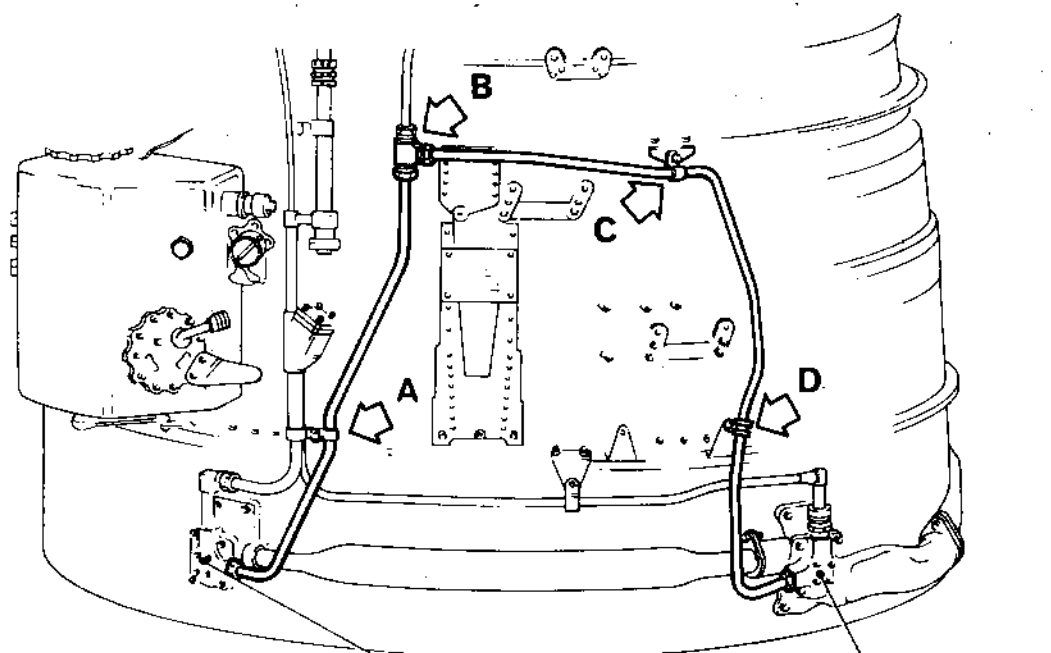
LP COMPRESSOR CASE  
FRONT BLOW-OFF FLANGE

LP COMPRESSOR CASE  
FRONT FLANGE

FLANGED CONNECTOR

**A**

**B**



FLAT WASHER

SCAVENGE FLANGE

FLANGE ASSEMBLY

LP COMPRESSOR CASE  
FRONT BLOW-OFF FLANGE

LP COMPRESSOR CASE  
FRONT FLANGE

**C**

**D**

LP Compressor Bearing Vent Tubes  
Figure 511

TN24607

ASSEMBLY  
**71-00-01**

STAGE 2  
Page 532  
Jan 2/80





OLYMPUS 593

MK.610-14-28  
OVERHAUL



D. Install Left-hand Tube Section.

- (1) Position the tube (75-02-09/1-50) on the engine and loosely engage the tube union nuts with the flanged connector and adapter on the intake case.
- (2) Assemble a loop-clamp (75-02-09/1-10) to the tube and secure the clamp to the LP Compressor Oil feed and scavenge pipe bracket (72-22-01/4-240) using the existing pillar bolt and clipnut (72-01-03/1-90-110).
- (3) Torque-tighten the nut to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (4) Torque-tighten the pipe union nuts to between 220 and 240 lbf in. (24,8 and 27,1 N.m).
- (5) Wire-lock the union nuts.

10. Installation of Fuel Manifolds and Feed Tubes (Ref. Item 11, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to the union threads and lubricant 'B' to the bolt threads.

B. Assemble the Fuel Manifold (Ref.Fig.512).

- (1) Position the top section of the manifold (73-12-04/1-150) and loosely secure to the four pair of sprayer unions.
- (2) Position the bottom section of the manifold (73-12-04/1-300) and loosely secure to the four lower pair of sprayer unions.
- (3) Assemble the manifold unions, top to bottom.
- (4) Assemble a loop-clamp (73-12-04/1-80) to each end of the top manifold. Secure the right-hand clamp to the upper position of the double bracket (72-33-01/8-200) and the left-hand clamp to the single bracket (72-33-01/8-380) on the HP case/delivery case flange with bolts, washers and nuts (73-12-04/1-110-100-90).

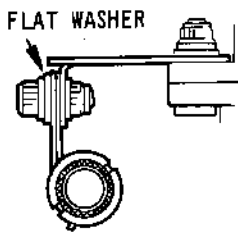
PRINTED IN ENGLAND

TN17854

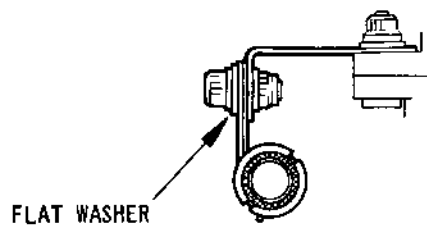


OLYMPUS 593

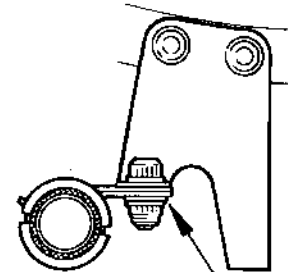
MK.610-14-28  
OVERHAUL



**A**

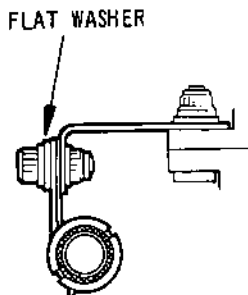
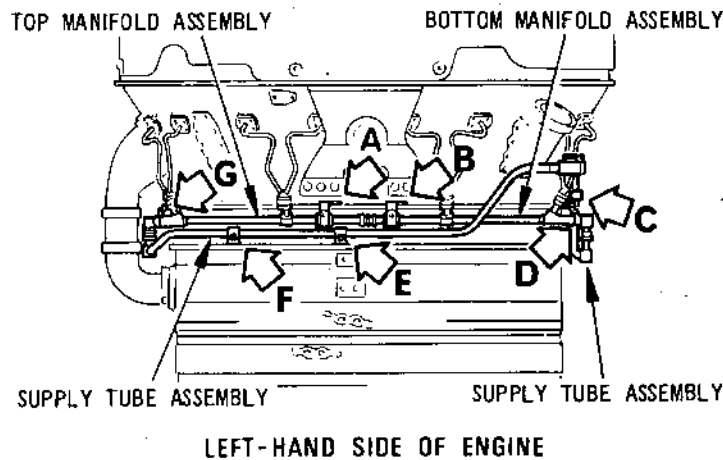


**B**

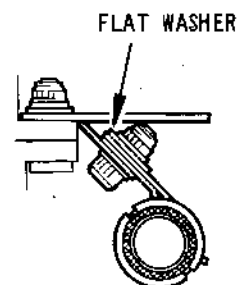


**C**

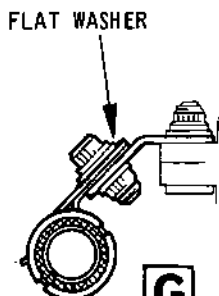
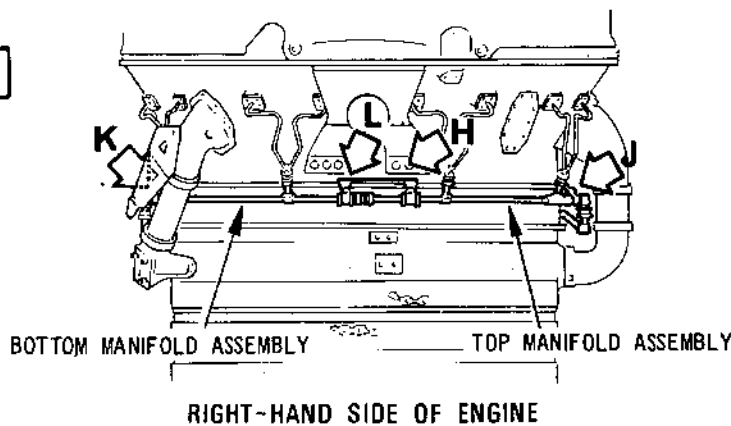
FLAT WASHER



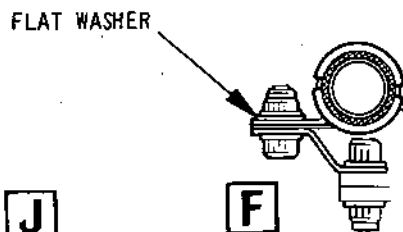
**H** SIMILAR AT **L**



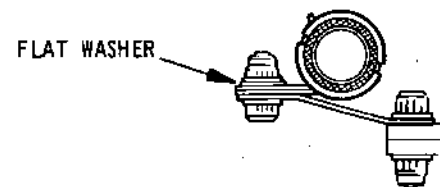
**D** SIMILAR AT **K**



**G** SIMILAR AT **J**



**F**



**E**

Fuel Manifolds and Feed Tubes  
Figure 512

ASSEMBLY  
**71-00-01**

STAGE 2  
Page 534  
Jan 2/80

TN24608



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (5) Torque-tighten the loop-clamp nuts and bolts to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
  - (6) Assemble two loop-clamps (73-12-04/1-10) at the top position of the top manifold and secure with bolts, washers and nuts (73-12-04/1-40-30-20) to the bracket (72-33-01/8-170) mounted on the HP casing/delivery casing flange.
  - (7) Assemble a loop-clamp (73-12-04/1-230) to each end of the bottom manifold. Secure the right-hand clamp to the lower position of the double bracket (72-33-01/8-200) and the left-hand clamp to the single bracket (72-33-01/8-350) on the HP casing/delivery casing flange with bolts, washers and nuts (73-12-04/1-260-250-240).
  - (8) Assemble the two loop-clamps (73-12-04/1-160) to the lower position of the bottom manifold and secure with bolts, washers and nuts (73-12-04/1-190-180-170) to the bracket (72-33-01/8-280) mounted on the HP case/delivery case flange.
  - (9) Torque-tighten the loop-clamps, nuts and bolts to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
  - (10) Torque-tighten the manifold to sprayer union nuts to between 250 and 280 lbf in. (28,2 and 32,0 N.m).
  - (11) Torque-tighten the manifold unions joining the top and bottom sections to between 280-310 lbf in. (31,6 and 35,0 N.m).
  - (12) Wire-lock all unions.
- C. Assemble Upper and Lower Main Feed Fuel Tubes.
- (1) Upper fuel tube (73-13-02/2-160).
    - (a) Position the tube to the left-hand side of the engine, connect the upper end to the union on the top of the top manifold assembly, hand-tighten only.

ASSEMBLY

71-00-01

STAGE 2

Page 535

Jan 2/80



OLYMPUS 593



MK.610-14-28 snecma  
OVERHAUL

- (b) Assemble two loop-clamps (73-13-02/2-10-80) to the tube and secure with bolts, washers and nuts (73-13-02/2-40-110-30-100-20-90) to the brackets (72-33-01/7-230-290) mounted on the HP casing/delivery casing flange.
  - (c) Torque-tighten the nuts to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (2) Lower fuel tube (73-13-02/2-270).
- (a) Position the tube to the bottom of the engine, connect the one end to the union at the lowest point of the bottom manifold, finger-tighten only.
  - (b) Assemble a loop-clamp (73-13-02/2-190) to the tube and secure with a bolt, washer and nut, (73-13-02/2-220-210-200) to a bracket (72-33-01/8-320) mounted on the HP case/delivery case flange.
  - (c) Torque-tighten the nut to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

NOTE: The tubes unions at the manifolds are tightened after installation of the distribution and dump valve, ref. para.41.

11. Install Oil Cooler and Mounting (Ref. Item 12, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to nuts and bolts (72-33-01/8-50-60-80-90) securing the brackets (72-33-01/8-70-100). Apply lubricant 'B' to the remaining bolt threads.
- (2) Record the type and serial number of the oil cooler on the accessory sheet.

B. Assemble Cooler Rear Brackets (Ref.Fig.513).

- (1) Position the bracket (72-33-01/8-70) to the HP case.
- (2) Install the D-headed bolts and nuts (72-33-01/8-60-50).

ASSEMBLY

71-00-01

STAGE 2

Page 536

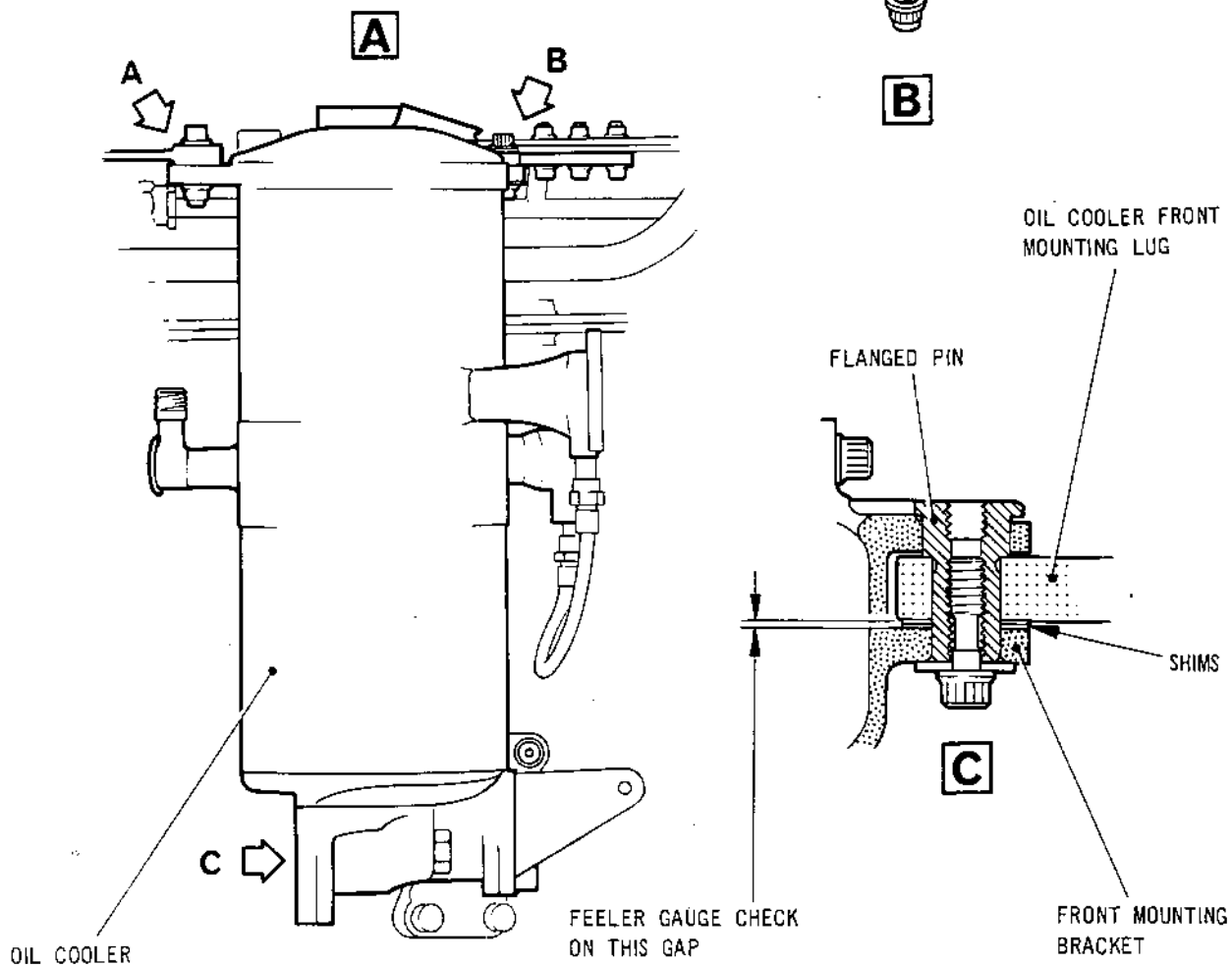
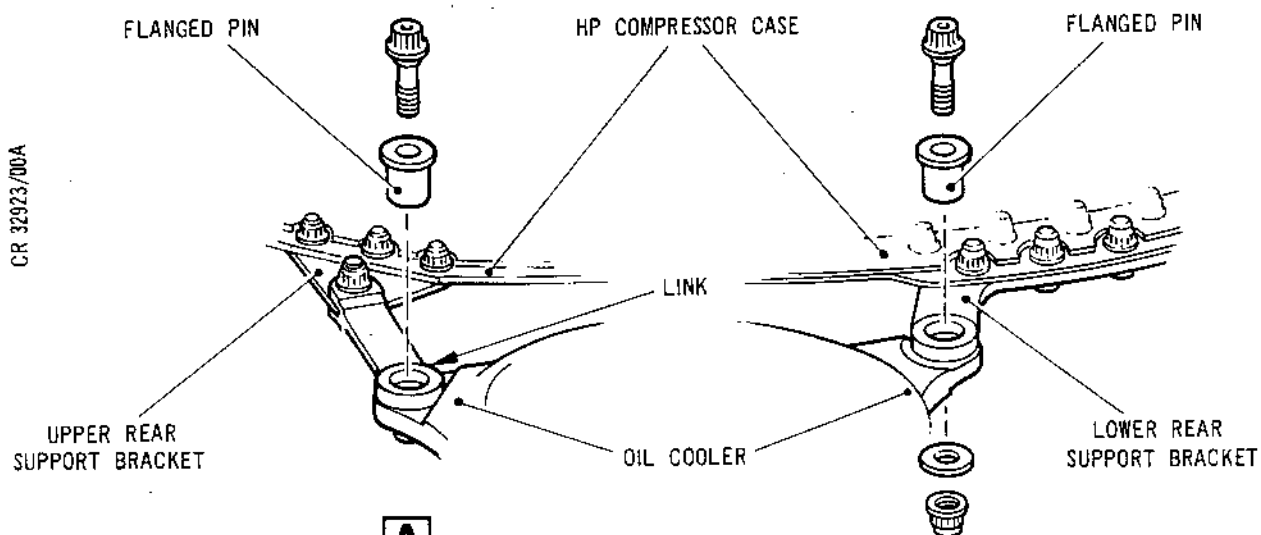
Sep 30/94



OLYMPUS 593

MK.610-14-28

OVERHAUL



Oil Cooler and Mounting  
Figure 513



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (3) Torque-tighten the nuts to 100 lbf in. (11,5 N.m).  
Locking (Run-down) torque 10 lbf in. (1,1 N.m).
- (4) Position the bracket (72-33-01/8-100) to the HP case.
- (5) Install the D-headed bolts and nuts (72-33-01/8-90-80).
- (6) Torque-tighten the nuts to 100 lbf in. (11,5 N.m).  
Locking (Run-down) torque 10 lbf in. (1,1 N.m).
- (7) Ensure there is a minimum clearance of 0.150 in. (3,75 mm) between the cooler lower rear mounting bracket and the fuel manifold stem.

C. Assemble the Oil Cooler.

- (1) Position the oil cooler on the engine.
- (2) Install the flanged pin (79-21-01/1-120) through the lower bracket on the HP case (from the rear) and the oil cooler lower rear mounting lug.
- (3) Insert the bolt (79-21-01/1-110) through the flanged pin from the rear and secure with a washer and nut (79-21-01/1-100-90).
- (4) Assemble the link.
  - (a) Position the link (79-21-01/1-250) to the upper bracket (72-33-01/8-100).
  - (b) Insert the D-headed bolt (79-21-01/1-240) and secure with nut (79-21-01/1-230).
  - (c) Install the flanged pin (79-21-01/1-80) to the link and oil cooler upper rear mounting lug.
  - (d) Insert the bolt (79-21-01/1-70) and secure.
  - (e) Torque-tighten the oil cooler rear securing bolts and nut to between 170-190 lbf in. (19,2 and 21,5 N.m). Locking (Run-down) torque 6.5 lbf in. (0,73 N.m).

ASSEMBLY

## 71-00-01

STAGE 2

Page 538

Sep 30/94



OLYMPUS 593



MK.610-14-28 *sneema*

OVERHAUL

- (5) Install the front mounting flanged pin.
- (a) Install the flanged pin (79-21-01/1-40) from the rear.
  - (b) Fit the washer to the retaining bolt (79-21-01/1-30-20).
  - (c) Install the bolt into the flanged pin and lightly tighten the bolt.
  - (d) With feeler gauges check the gap between the front of the oil cooler front mounting lug and the mounting bracket (72-33-01/4-60).
  - (e) Select a shim (79-21-01/1-60) of equivalent thickness.
  - (f) Remove the bolt and washer.
  - (g) Withdraw the flanged pin sufficiently to slide the selected shim between the front of the oil cooler front mounting lug and the mounting bracket. Push the flanged pin into the mounting.
  - (h) Refit the washer and bolt (79-21-01/1-30-20).
  - (j) Torque-tighten the bolt to between 85 and 95 lbf in. (9,6 and 10,7 N.m). Locking (Run-down) torque 3.5 lbf in. (0,4 N.m).

12. Install the Oil Feed and Return Tubes. IDG to Oil Cooler  
(Ref. Item 13, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Lubricate the tube union threads with lubricant 'A' and the bolts with lubricant 'B'.

B. Assemble the Setting Gauge to the IDG Mounting on the Right-hand Gearbox (Ref.Fig.514).

ASSEMBLY

71-00-01

STAGE 2

Page 539

Sep 30/94

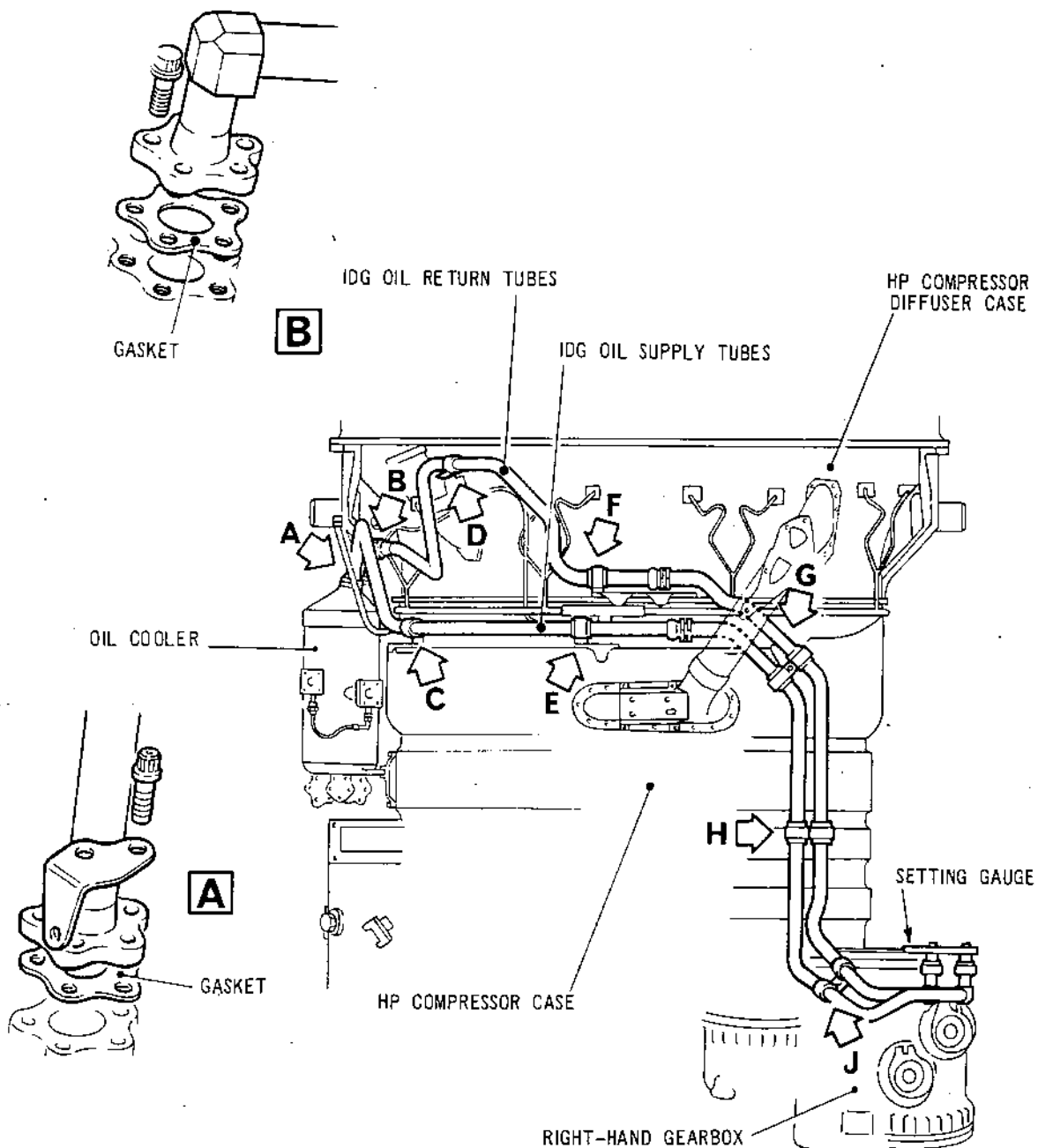


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32925/00A



Oil Feed and Return Tubes  
IDG to Oil Cooler  
Figure 514 (Sheet 1 of 2)

ASSEMBLY  
**71-00-01**  
STAGE 2  
Page 540  
Jan 2/80



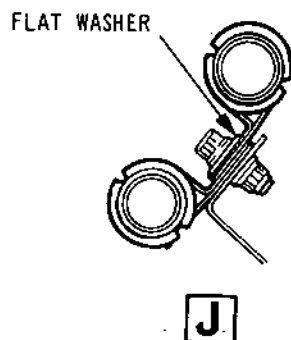
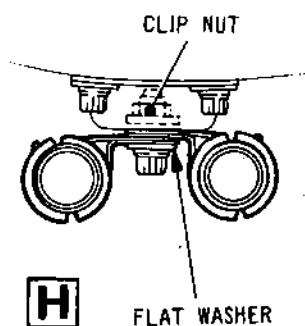
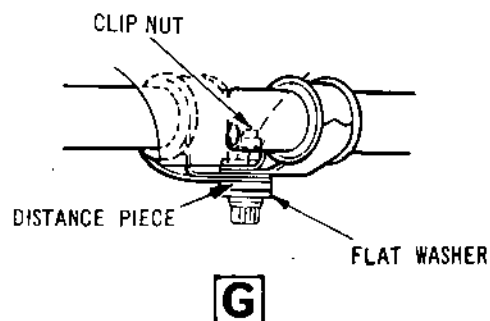
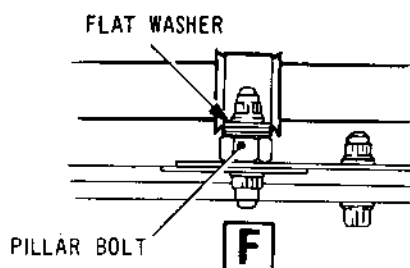
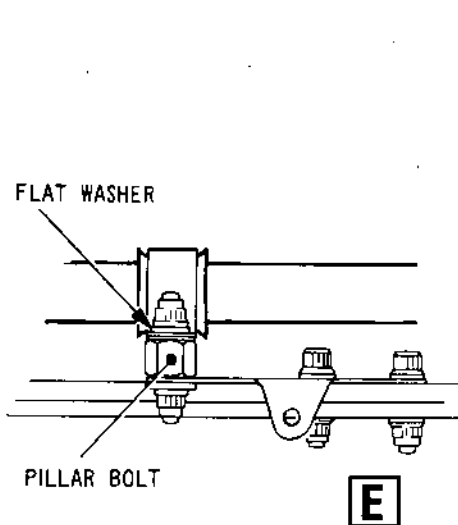
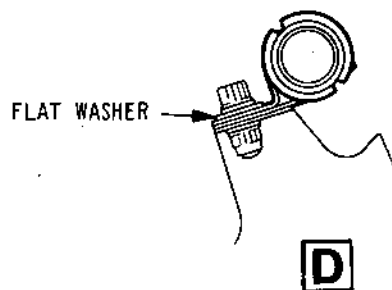
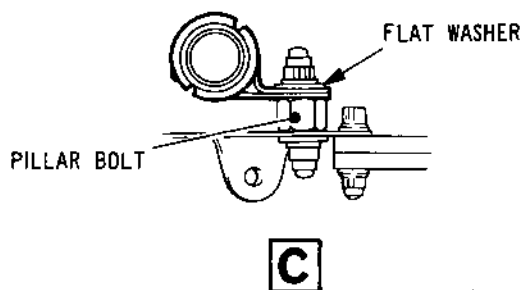


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 32926/00A



Oil Feed and Return Tubes  
IDG to Oil Cooler  
Figure 514 (Sheet 2 of 2)



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (1) Locate the setting gauge (Tool 58) on the IDG QAD coupling ensuring the dummy connectors are correctly orientated.
- (2) Secure gauge with the QAD coupling.

C. Assemble the Tubes.

- (1) Cooler upper rear tube.
  - (a) Position the gasket (79-22-04/2-350) and the tube (79-22-04/2-330) to the oil cooler upper rear mounting face.
  - (b) Install the bolts (79-22-04/2-340) and torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (2) Assemble the loop-clamp (79-22-04/2-260) to the tube and secure with a bolt, washer and nut (79-22-04/2-290-280-270) to the bracket (75-02-12/1-30) mounted to the venting air tube flange. Torque-tighten the nut and bolt to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (3) Assemble the loop-clamp (79-22-04/2-200) to the tube. Secure the clamp to the tube using pillar bolt (71-51-01/10-130), washer and nut (79-22-04/2-220-210) align with the bracket (72-33-01/8-280) mounted on the HP case/delivery case flange. Lightly tighten the nut and bolt.
- (4) Install a pillar bolt (79-22-04/2-40) to the rear face of the bracket (72-33-01/7-200) mounted to the lower left HP case rear joint flange. Secure the pillar bolt with a washer and nut (79-22-04/2-30-20), torque-tighten the nut to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (5) Install the pillar bolt (79-22-04/2-110) to the rear face of the bracket (72-33-01/7-170) mounted to the bottom HP case rear joint flange. Secure the pillar bolt with a washer and nut (79-22-04/2-100-90), torque-tighten the nut to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

IN17870

ASSEMBLY

71-00-01

STAGE 2

Page 542

Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (6) Cooler rear tube, lower.
- (a) Position the gasket (79-22-04/2-190) and the tube (79-22-04/2-150) to the oil cooler lower rear mounting face.
  - (b) Position the bracket (79-22-04/2-180) to the tube flange.
  - (c) Secure the bracket and tube with bolts (79-22-04/2-170-160), torque-tighten the bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (7) Assemble the two loop-clamps (79-22-04/2-10-80) to the tube align them with the pillar bolts previously fitted to the brackets mounted to the lower left HP casing rear joint flange (ref. para.4 and 5). Secure the loop-clamps to the pillar bolts with washers and nuts (79-22-04/2-30-100-20-90), torque-tighten the nuts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (8) IDG tubes to oil cooler tubes.
- (a) Position the tube (79-22-04/1-240) to the inner position on the setting gauge, mounted to the IDG QAD coupling and to the union of the forward tube secured to the oil cooler. Lightly tighten the unions.
  - (b) Position the tube (79-22-04/1-230) to the outer position on the setting gauge and to the union of the rear tube secured to the oil cooler. Lightly tighten the unions.
- (9) Assemble two loop-clamps (79-22-04/1-10) to the IDG tubes.
- (a) Align the clamps with the bracket (72-63-01/8-170) mounted on the rear of the right-hand gearbox.
  - (b) Secure the two loop-clamps to the bracket with the bolt, washer and nut (79-22-04/1-40-30-20).

PRINTED IN ENGLAND

TN17871

ASSEMBLY

71-00-01

STAGE 2

Page 543

Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (c) Torque-tighten the nut and bolt to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (10) Assemble two loop-clamps (79-22-04/1-80) to the IDG tubes.
  - (a) Align the clamps with the bracket (72-33-01/5-130) secured to the bottom centre of the HP casing.
  - (b) Install the clipnut (79-22-04/1-110) to the bracket.
  - (c) Secure the loop-clamps to the bracket with the washer and bolt (79-22-04/1-100-90) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (11) Assemble two loop-clamps (79-22-04/1-150) to the IDG tubes.
  - (a) Align the clamps with the bracket (72-33-01/7-140) mounted to the HP casing rear flange.
  - (b) Install the clipnut (79-22-04/1-190) to the bracket.
  - (c) Secure the loop-clamps to the bracket with the distance piece, washer and bolt (79-22-04/1-180-170-160). Lightly tighten the bolt.
- (12) Lightly tighten the union nuts to the setting gauge. Ensure a minimum clearance of 0.050 in. (1,25 mm) between the elbow of the pipe (79-22-04/1-240) and the gearbox casing.
- (13) Torque-tighten the tube unions to between 400 and 440 lbf in. (45,2 and 49,7 N.m). (Tools 948, 1753 and 1648). Wire-lock the union nuts.

TN17872



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (14) Release the tube union nuts from the setting gauge and remove the gauge from the gearbox.
- (15) Release and remove the bolt, sleeve, quillshaft and seal rings from the IDG drive shaft in the gearbox.
- (16) Assemble the seal (72-63-01/8-30) to the gearbox QAD flange.
- (17) Refit the bolt and sleeve to the IDG drive shaft, torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

NOTE: Ensure the quillshaft and seal rings are suitably protected and packed for transportation with the engine.

- (18) Blank the IDG location on the gearbox (Tool 650).
- (19) Assemble the QAD nut (Ref.71-09-00 Assembly), rotate to engage the threads and secure. Install spherical washer and bolt through the retaining bracket to the QAD nut. Torque-tighten the bolt to between 170 and 190 lbf in. (19,2 and 21,5 N.m). Locking (run-down) torque 6.5 and 60 lbf in. (0,68 and 6,8 N.m).

13. Assemble the Oil Return Tube from the Oil Cooler to the Oil Tank (Ref. Item 14, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'B' to the securing bolts.

B. Installation (Ref.Fig.515).

- (1) Position the gasket (79-22-02/3-200) and the oil tube (79-22-02/3-150) to the mounting flange at the top rear face of the oil tank.
- (2) Secure the oil tube and gasket with the bolts (79-22-02/3-160) torque-tightened to between 80 and 90 lbf in. (9,0 and 10,2 N.m).

ASSEMBLY

71-00-01

STAGE 2

Page 545

Jan 2/80

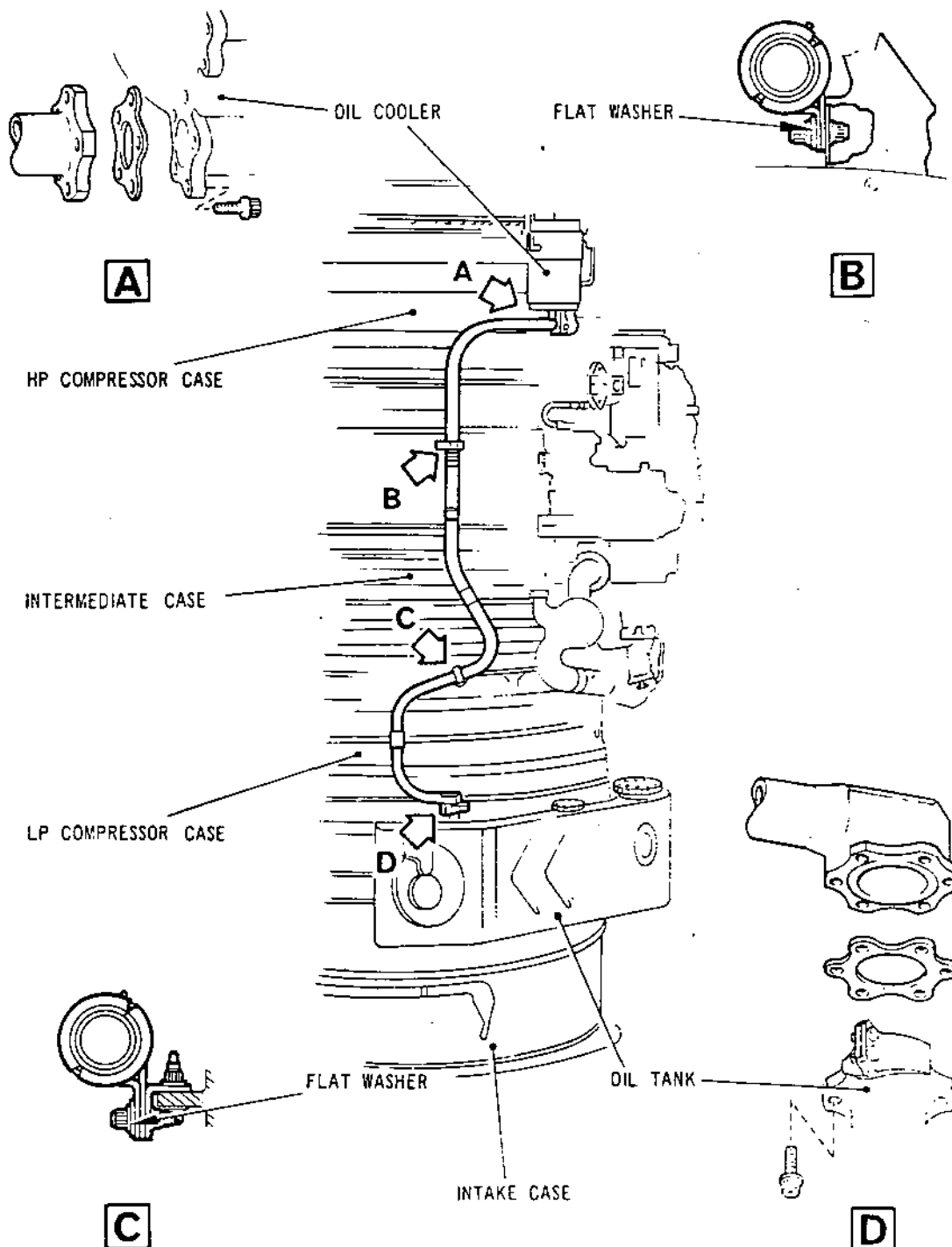


# OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32927/00A



Oil Return Tube Oil Cooler to Oil Tank  
Figure 515

ASSEMBLY  
**71-00-01**  
STAGE 2  
Page 546  
Dec 1/91



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (3) Position the gasket (79-22-02/3-210) and the oil tube to the inner front oil cooler mounting face.
- (4) Secure the oil tube and gasket with the bolts (79-22-02/3-170-180) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (5) Ensure there is a minimum clearance of 0.050 in. (1,25 mm) between the tube and the oil tank top rear mounting bracket
- (6) Assemble the loop-clamp (79-22-02/3-10) to the oil tube align with the bracket (72-31-01/5-530) mounted on the LP casing flange.
- (7) Secure the loop-clamp to the bracket with the bolt, washer and nut (72-22-02/3-40-3-20) torque-tightened to between 85 and 9 lbf in. (9,6 and 10,7 N.m).
- (8) Assemble the loop-clamp (79-22-02/3-80) and the half clamp shells (79-22-02/3-145) (SB.0L.593-75-8972-27 standard) to the oil tube align with the bracket (72-33-01/6-440) mounted on the HP compressor case.
- (9) Secure the loop-clamp to the bracket with the bolt, washer and nut (79-22-02/3-110-100-90) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

14. Assemble the Sump Vent Tube, Sump to Oil Return Tube  
(Ref. Item 15, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to the tube unions and lubricant 'B' to the bolt threads.

B. Installation (Ref.Fig.516).

- (1) Assemble the top tube (79-22-02/4-180) to the rear union of the oil return tube, oil tank to the oil cooler, above the LH gearbox, and tighten the tube union nut hand-tight.



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Assemble the bottom tube (79-22-02/4-80) between the top tube and the sump mounting face.
  - (a) Assemble tube union nut finger-tight.
  - (b) Position the gasket (79-22-02/4-100) between the bottom tube mating face and the sump mounting face.
  - (c) Secure the tube and gasket to the sump with bolts (79-22-02/4-90) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (3) Assemble the clipnut (79-22-02/4-40) to the bracket (72-32-00/6-55) on the intermediate case boss.
- (4) Assemble the loop-clamp (79-22-02/4-10) to the bottom tube aligning with the bracket (72-32-00/6-55) on the intermediate case boss.
- (5) Secure the loop-clamp to the bracket with the bolt and washer (79-22-02/4-20-30) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (6) Assemble the loop-clamp (79-22-02/4-110) to the top of the bottom tube, align with the bracket (72-33-01/6-380) on the intermediate/HP case flange.
- (7) Secure the loop-clamp to the bracket with the bolt washer and nut (79-22-02/4-140-130-120) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (8) Torque-tighten the tube union nuts to between 280 and 310 lbf in. (31,6 and 35,0 N.m) (Tool 1648 and 908) and wire-lock them.

ASSEMBLY

71-00-01

STAGE 2

Page 548

Jan 2/80



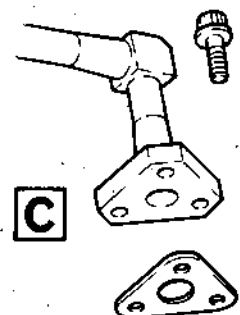
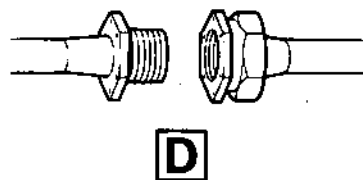
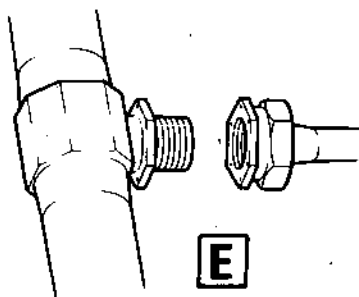
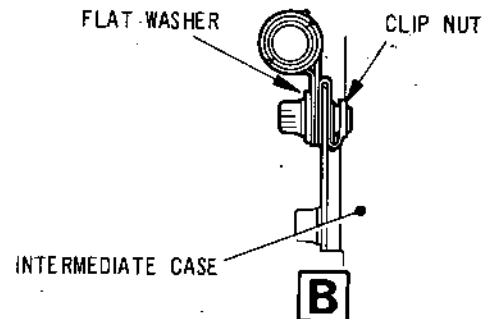
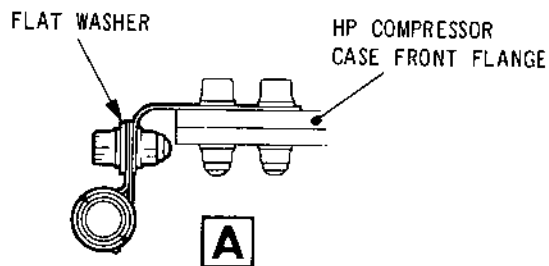
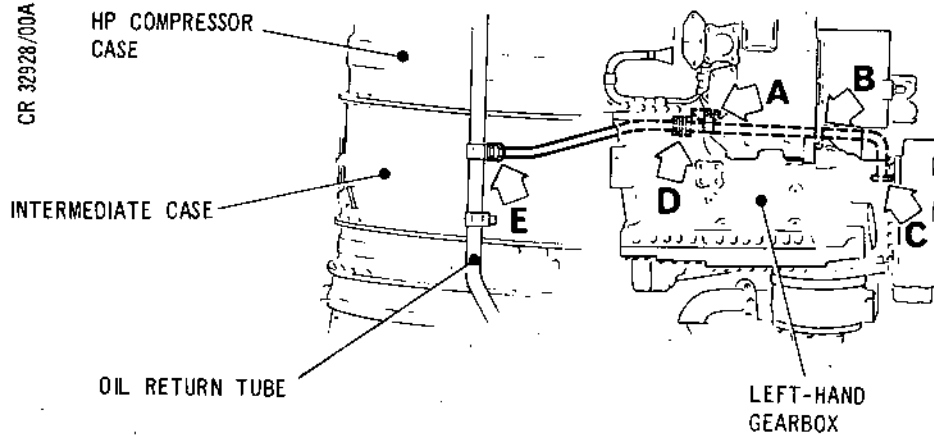


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32928/00A



Oil Sump Vent Tube  
Sump to Oil Return Tube  
Figure 516

ASSEMBLY

71-00-01

STAGE 2

Page 549

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



15. Assemble the Oil Tank Front and Centre Overboard Vents  
(Ref. Item 16, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to all the tube union threads and lubricant 'B' to all bolts except in the one case stated.

B. Installation (Ref.Fig.517).

- (1) Install the seal ring (75-02-02/1-460) to the front tube (75-02-02/1-450).
- (2) Position the front tube locating the seal in the vent housing mounted near the top of the tank.
- (3) Apply lubricant 'A' to the bolts (75-02-02/1-430).
- (4) Assemble the retaining plate (75-02-02/1-440) to the vent housing. Install the bolts and torque-tighten to between 36 and 40 lbf in. (4,1 and 4,5 N.m).
- (5) Wire-lock the bolts.
- (6) Assemble the loop-clamp (75-02-02/1-360) to the tube and attach to the bracket (72-31-01/5-560) mounted on the LP case rear blow-off elbow with bolt, washer and nut (75-02-02/1-390-380-370).
- (7) Assemble the loop-clamp (75-02-02/1-360) to the tube and attach to the bracket (72-31-02/2-210) mounted on the exit guide blade/intermediate case flange with bolt, washer and nut (75-02-02/1-390-380-370).
- (8) Remove two bolts from the oil cooler forward lower blanked flange. Assemble the bracket (79-21-01/1-220) and secure to the blanked flange with bolts (79-21-01/1-210). Torque-tighten the bolts to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

TN28710

ASSEMBLY

71-00-01

STAGE 2

Page 550

Jan 2/80



# OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 32929/00A

HP COMPRESSOR CASE

OIL TANK VENT TUBE

INTERMEDIATE CASE

LP COMPRESSOR CASE

GEARBOX VENT TUBE

LP COMPRESSOR CASE REAR BLOW-OFF FLANGE

EXIT GUIDE BLADE/ INTERMEDIATE CASE FLANGE

FLAT WASHER

LEFT-HAND GEARBOX

INTERMEDIATE CASE/ HP COMPRESSOR CASE FLANGE

FLAT WASHER

OIL COOLER FLANGE

RETAINING PLATE

FLAT WASHER

FLAT WASHER

LEFT-HAND GEARBOX

SEALING RING

VENT HOUSING

Oil Vent Tubes  
Oil Tank to Centre Overboard Vent  
Left-hand Gearbox Vent Tube

Figure 517

ASSEMBLY

## 71-00-01

STAGE 2

Page 551

Jan 2/80



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (9) Position the centre tube (75-02-02/1-270) to the engine secure the union between the front and centre tubes hand-tight.
  - (10) Assemble the loop clamp (75-02-02/1-200) to the centre tube and attach to the bracket (72-33-01/6-410) mounted on the intermediate case/HP case flange with bolt, washer and nut (75-02-02/1-230-20-210).
  - (11) Torque-tighten the loop-clamps bolts and nuts to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
  - (12) Assemble the loop-clamp (75-02-02/1-130) to the centre tube and attach to the bracket (79-21-01/1-220) fitted to the oil cooler with bolt, washer and nut (75-02-02/1-160-150-140). Lightly tighten the bolt and nut.
  - (13) Torque-tighten the tube union nut to between 50 and 55 lbf ft (68 and 74 N.m) and wire-lock the union. (Tools 948, 1529 and 1656).
16. Assemble the Left-hand Gearbox Vent Tube (Ref. Item 17, Fig.501 of Stage 1)
- A. Prepare for Installation.
    - (1) Apply lubricant 'A' to the union threads and lubricant 'B' to the bolt threads.
  - B. Installation (Ref.Fig.517)
    - (1) Position the tube (75-02-02/1-350) to the engine. Secure the forward tube union to the flanged connector at the top of the left-hand gearbox and the rear union to the elbow in the oil tank lower vent line forward of the oil cooler, finger-tighten the tube unions
    - (2) Assemble the loop-clamp (75-02-02/1-280) and the half clamp shells (75-02-02/1-345) (SB.OL.593-75-8972-27 standard) to the tube align with the bracket (72-62-01/7-190) mounted on the gearbox. Secure the loop-clamp to the bracket with bolt, washer and nut (75-02-02/1-310-300-290).

ASSEMBLY

## 71-00-01

STAGE 2

Page 552

Jun 1/94



OLYMPUS 593

MK.610-4-28

OVERHAUL



- (3) Torque-tighten the loop-clamp bolt and nut to between 85 and 95 lbf in. (9,6 and 10,7 N.m). Torque-tighten the union nuts to between 280 and 310 lbf in. (31,6 and 35,0 N.m) (Tools 908 and 1664).

- (4) Wire-lock the union nuts.

17. Assemble the Oil Container and Oil Scavenge Tube from the Main Oil Pump to the Oil Cooler (Ref. Item 18, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'B' to the bolt threads.

B. Installation (Ref.Fig.518).

- (1) Assemble the gasket and container (79-22-02/1-30-10) to pump housing mounting face.
- (2) Secure the container and gasket to the pump with bolts (79-22-02/1-20). Torque-tighten the bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (3) Identify the position of the tube on the engine and insert the bolts (79-22-02/1-240-250) in the bottom flange of the tube (79-22-02/1-190), the two longer bolts positioned in the forward two holes in the flange.
- (4) Secure the bolts in the flange with the retaining rings (79-22-02/1-230).
- (5) Position the gasket (79-22-02/1-40) on the upper mounting flange of the oil container.
- (6) Install the tube on the mounting flange. Position the bracket (79-22-02/1-270) on the two forward longer bolts under the container flange.
- (7) Locate the assembly with the nuts (79-22-02/1-220) lightly tightened.

PRINTED IN ENGLAND

TN8900

ASSEMBLY

71-00-01

STAGE 2

Page 553

Jan 2/80

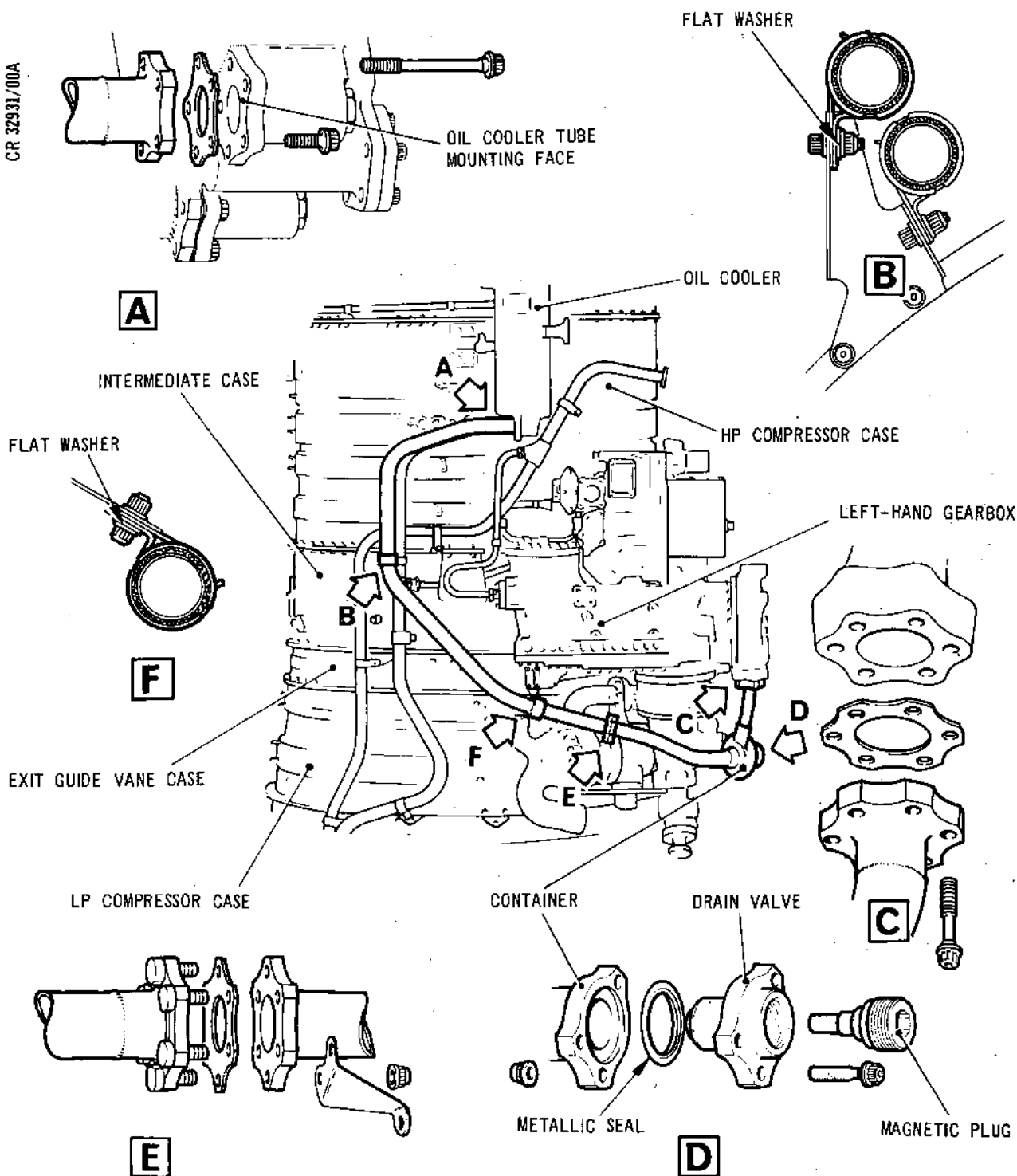


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32931/00A



Oil Scavenge Tubes  
Oil Pump to the Oil Cooler  
Figure 518

TN8892

ASSEMBLY  
**71-00-01**  
STAGE 2  
Page 554  
Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (8) Position the gasket (79-22-02/1-280) and the tube upper flange to the oil cooler mounting face and secure with bolts (79-22-02/1-200-210) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (9) Torque-tighten the bolts securing the tube lower flange and the oil container flange to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (10) Assemble a loop-clamp (79-22-02/1-50) to the tube align with the bracket (72-62-01/3-20) mounted at the top forward position on the LH gearbox with bolt, washer and nut (79-22-02/1-60-70-80) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (11) Assemble a loop-clamp (79-22-02/1-120) to the tube and secure to the bracket (72-33-01/6-440) mounted on the intermediate casing/HP casing flange with bolt, washer and nut (79-22-02/1-150-140-130) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (12) Assemble the seal to the container body (79-23-01/1-60-50).
- (13) Install the drain valve to the container lower flange, secure with bolts and nuts (79-23-01/1-30-20) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (14) Assemble the magnetic plug (79-23-01/1-40) to the valve body and torque-tighten to 30 lbf in. (40 N.m).



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

TUBES AND ACCESSORIES - ASSEMBLY1. Assemble the Air Supply Ducts to the Second Stage Fuel Pump  
(Ref. Item 19, Fig.501 of Stage 1)

## A. Prepare for Installation.

- (1) Apply lubricant 'B' to the bolts.

## B. Installation (Ref.Fig.501).

- (1) Ensure that the upper and lower ducts (75-05-01/1-10-100) are to the same Service Bulletin standard.

- (2) On engines to pre-SB.75-8578-17 standard, assemble upper duct to lower duct.

- (a) Assemble sealing ring (75-05-01/1-90) to SB.75-4 standard to upper duct.

- (b) Assemble upper duct to lower duct, align the holes of the retaining plate with lower duct flange bolt-holes and retain with two bolts and nuts (75-05-01/1-50-40) lightly tightened.

- (3) On engines to SB.75-8578-17 or SB.75-8765-22 or SB.75-9013-28 standard, assemble upper duct to lower duct.

- (a) Assemble sealing ring to corresponding Service Bulletin standard to upper duct.

- (b) Assemble upper duct to lower duct.

- (c) Assemble retaining plate (75-05-01/1A-55) to duct flanged joint and retain it with two nuts and bolts (75-05-01/1-40-50) lightly tightened.

## C. Install Duct Assembly.

- (1) Assemble the sealing ring (75-05-01/1-140) on second stage pump duct. Assemble double-ended bolts (75-05-01/1-130) to duct and secure with washer and nut (75-05-01/1-120-110).

- (2) Position duct assembly on engine.

- (3) Secure upper duct to intermediate case elbow with three bolts and nuts (75-05-01/1-30-20) lightly tightened.

ASSEMBLY

71-00-01

STAGE 3

Page 501

Jun 1/96



Second Stage Pump Air Supply Duct  
Figure 501

## ASSEMBLY

71-00-01

### STAGE 3

Page 502

Jun 1/96



OLYMPUS 503

MK.610-14-28

OVERHAUL



- (4) Slide lower duct downward over second stage pump duct and secure to double-ended bolts with two nuts (75-05-01/1-110) lightly tightened.
  - (5) Torque-tighten intermediate case elbow nuts and bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (6) Torque-tighten nuts securing lower duct to second stage pump duct to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
  - (7) Secure upper duct to support bracket.
    - (a) Check that duct to bracket attachment bolt-holes align. If necessary, remove bracket from HP compressor case, assemble flat washers between bracket and case and secure with two bolts. If flat washers are not required to align bolt-holes, assemble a washer under each bolthead and lightly tighten bolts.
    - (b) Measure gap between duct support flange and support bracket. Select required number of flat washers (75-05-01/1-74-76), from set of four to fill gap.
- NOTE: There are two thicknesses of flat washer supplied to facilitate this task.
- (c) Assemble any remaining flat washers under head of bolt (75-05-01/1-80) and insert bolt through support bracket, ensure bolt locates flat washer(s), previously selected, between adjacent faces. Assemble flat washer (75-05-01/1-70) (countersunk) and nut (75-05-01/1-60) to bolt and lightly tighten.
  - (d) Torque-tighten support bracket to HP compressor case bolts to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
  - (e) Torque-tighten support bracket bolt and nut to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (8) On engines to pre-SB.75-8578-17 standard, dispose flange joint retaining plate centrally about the upper duct.



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (a) Check that clearance between retaining plate and upper duct wall is equal all round.
  - (b) If necessary, slacken the attachment nuts and bolts, position retaining plate with upper duct central in the plate bore and lightly tighten attachment nuts and bolts.
  - (9) Torque-tighten retaining plate attachment nuts and bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
2. Install the Air Valve and Fuel Heating Tubes (Ref. Item 20, Fig.501 of Stage 1)
- A. Tubes, Delivery Casing to Air Valve.
- (1) Prepare for Installation.
    - (a) Apply lubricant 'B' to the bolts.
    - (b) Record the type and serial number of the air valve on the accessory sheet.
  - (2) Installation (Ref.Fig.502).
    - (a) Remove the temporarily assembled bolts, hollow pin and keep plate (75-03-01/3-250-260-270-280) from the elbow on the delivery case below the left-hand trunnion.
    - (b) Assemble the seal rings to each end of the tube (75-03-01/3-290-240).
    - (c) Position the tube in the elbow on the delivery casing.
    - (d) Secure the tube to the elbow with the keep plate, hollow pin and bolts. Torque-tighten the bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m).
    - (e) Position the lower tube (75-03-01/3-400) to the previous tube (75-03-01/3-240) and secure the tube flange to the bracket (72-42-01/4-370) with bolts and nuts (75-03-01/3-420-410), torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

IN8898

ASSEMBLY

71-00-01

STAGE 3

Page 504

Jan 2/80



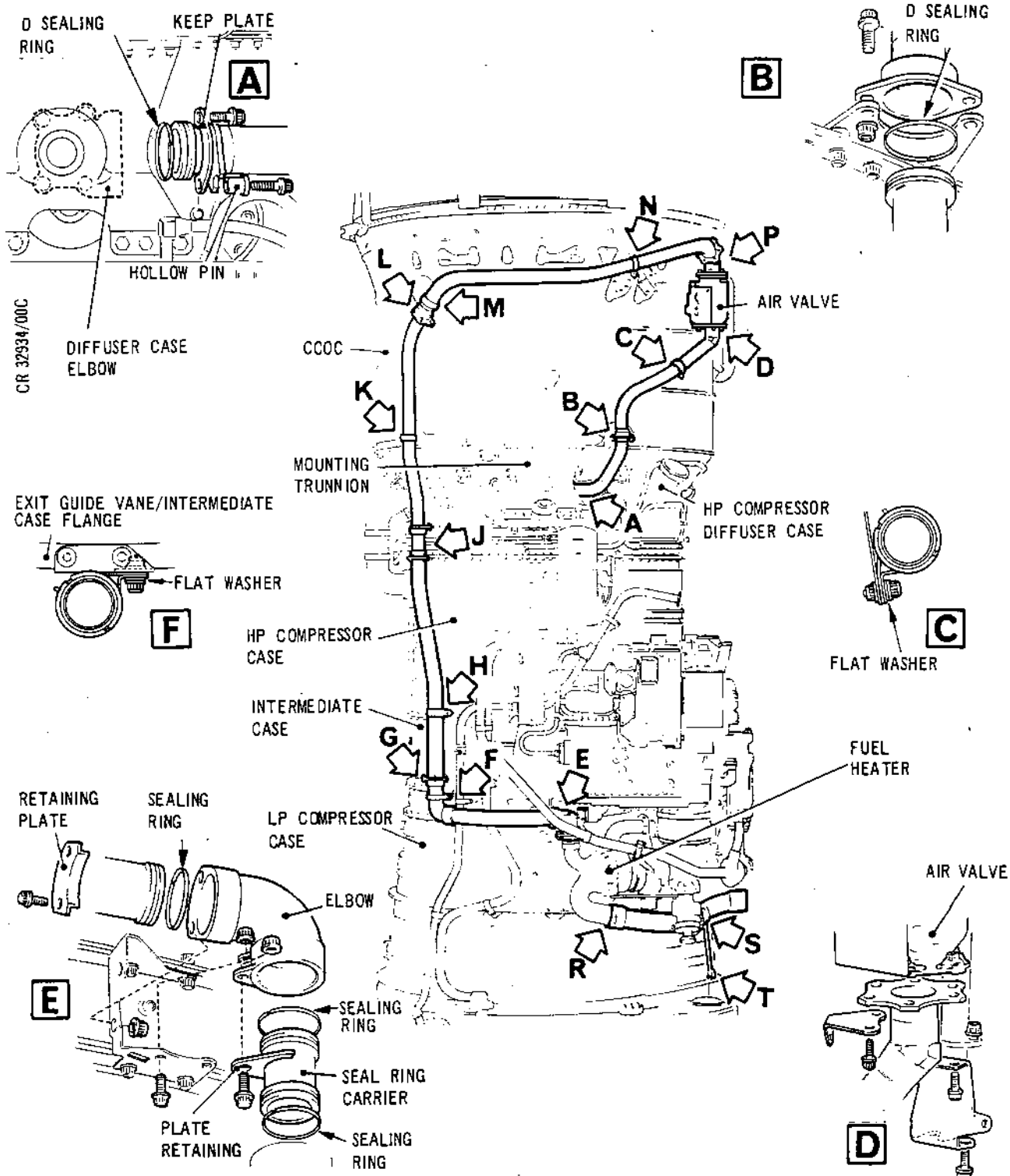
# OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND



Fuel Heater Air Valve and Associated Tubes  
Figure 502 (Sheet 1 of 2)

ASSEMBLY  
**71-00-01**  
STAGE 3  
Page 505  
Jun 1/89



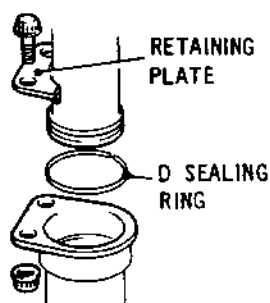
OLYMPUS 593

MK.610-14-28

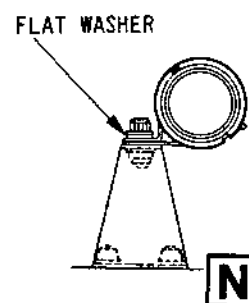
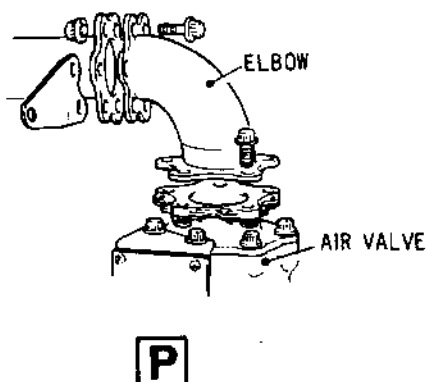
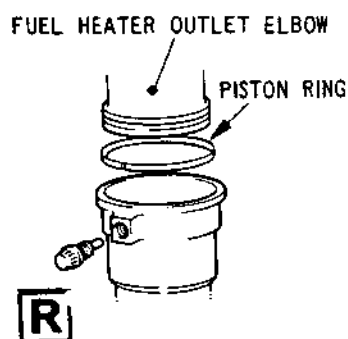
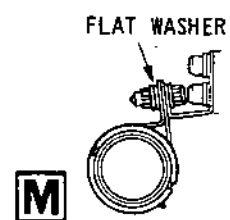
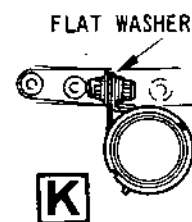
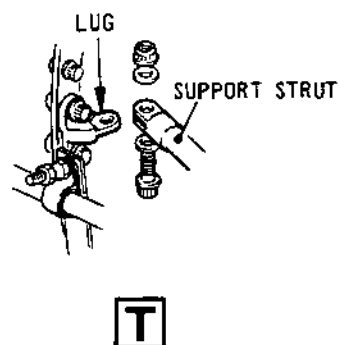
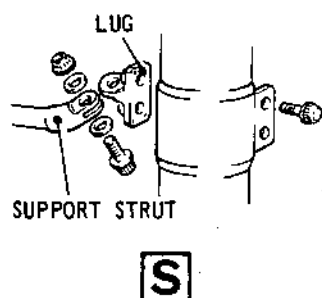
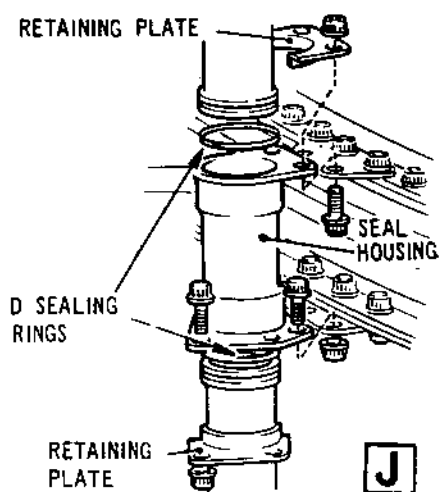
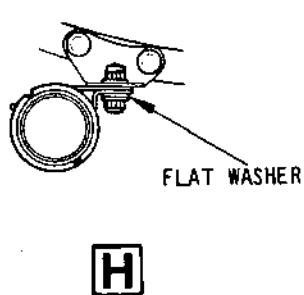
OVERHAUL



CR 32935/008



**G** SIMILAR AT **L**



Fuel Heater Air Valve and Associated Tubes  
Figure 502 (Sheet 2 of 2)

ASSEMBLY  
**71-00-01**  
STAGE 3  
Page 506  
Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (f) Assemble the loop-clamp (75-03-01/3-300).
- (i) Position the loop-clamp to the tube, and align to the CCOC lower left-hand intra-scope position.
  - (ii) Position the bracket (75-03-01/3-390) to the loop-clamp.
  - (iii) Secure the loop-clamp and bracket with bolt, washers and nut (75-03-01/3-330-320-310).
  - (iv) Lightly tighten the nut.
- (g) Install the air valve.
- (i) Position the air valve in line with the tube rear flange.
  - (ii) Position the mounting bracket (73-14-02/1-90) to the forward face of the tube flange.
  - (iii) Secure the bracket and tube flange to the air valve with bolts (73-14-02/1-20).
  - (iv) Secure the bracket (73-14-02/1-120) to the flange on the support tube (72-42-01/1-290) with bolt and nut (73-14-02/1-110-100).
  - (v) Secure the bracket (73-14-02/1-120) to the tubes rear flange with the bolts (73-14-02/1-20).
  - (vi) Install the remainder of the tube flange bolts (73-14-02/1-20).
  - (vii) Torque-tighten the bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m).



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (h) Ensure a clearance of 0.100 in. (2,54 mm) exists between the tube and the left-hand trunnion mounting.
- (j) Ensure a clearance of 0.100 in. (2,54 mm) exists between the upper tube and the number five and six sprayer tubes.

3. Install Tubes from the Fuel Heater Inlet Elbow to the Air Valve (Ref. Item 20, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'B' to all bolts.

B. Install Tubes (Ref.Fig.502).

- (1) Assemble the sealing rings to the seal ring carrier (75-03-01/1-100-90).
- (2) Locate the seal ring carrier into the heater inlet.
- (3) Assemble the elbow (75-03-01/1-130) to the seal ring carrier.
- (4) Assemble the sealing ring to the tube (75-03-01/1-250-210).
- (5) Assemble the tube to the elbow, positioning the elbow to the bracket (72-31-02/2-180).
- (6) Secure the tube retaining plate (75-03-01/1-240) and elbow to the bracket (72-31-02/2-180) with bolts and nuts (75-03-01/1-230-220). Torque-tighten the nuts and bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m)
- (7) Secure the sealing ring carrier retaining plate (75-03-01/1-80) to the elbow lug (72-31-02/2-180) with the bolt and nut (75-03-01/1-70-60). Secure the elbow to the bracket with bolt and nut (75-03-01/1-120-110). Torque-tighten the nut and bolt securing the retaining plate (and the nut and bolt securing the elbow and bracket) between 67 and 73 lbf in. (7,6 and 8,2 N.m).

TN8895



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (8) Assemble the loop-clamp (75-03-01/1-140) and the half clamp shells (75-03-01/1-205) (SB.0L.593-75-8972-27 standard) to the tube align with the bracket (72-31-02/2-240) mounted to the exit guide vane/intermediate case flange. Secure the clamp to the bracket with bolt, washer and nut (75-03-01/1-170-160-150). Torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (9) Assemble a D-sealing ring to each end of the tube (75-03-01/2-120-80).
- (10) Position the tube to the engine and locate the forward end in the tube (75-03-01/1-210). Support the rear end.
- (11) Install the retaining plate and secure with bolts and nuts (75-03-01/2-110-100-90). Torque-tighten the nuts and bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (12) Assemble the loop-clamp and the half clamp shells (75-03-01/2-75) (SB.0L.593-75-8972-27 standard) to the tube (75-03-01/2-10-80) and secure to the bracket (72-33-01/6-470) on the intermediate case/HP case flange with bolt, washers and nut (75-03-01/2-40-30-20) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (13) Install the seal housing to the tube (75-03-01/2-150-80).
  - (a) Position the seal housing forward end over the tube and seal.
  - (b) Secure the tube and housing with retainer, bolts and nuts (75-03-01/2-110-100-90).
  - (c) Secure the housing to the bracket (72-33-01/7-320) mounted to the HP case joint face with bolts and nuts (75-03-01/2-140-130).
  - (d) Torque-tighten the nuts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (14) Ensure a minimum clearance of 0.150 in. (3,75 mm) between the housing and the fuel manifold upper feed tube.

ASSEMBLY

71-00-01

STAGE 3

Page 509

Jun 1/94





OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

- (15) Install tube (75-03-01/2-230).
- (a) Assemble D-sealing rings to each end of the tube (75-03-01/2-270-230) and install the tube in the seal housing.
  - (b) Retain the tube in the housing with the retaining plate (75-03-01/2-260). Secure the housing to the bracket (72-33-01/8-410) with the bolts and nuts (75-03-01/2-250-240).
  - (c) Torque-tighten the nuts and bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (16) Assemble the loop-clamp (75-03-01/2-160) and the half clamp shells (75-03-01/2-225) (SB.0L.593-75-8972-27 standard) to the tube and attach it to the bracket (72-42-01/5-200) secured to the delivery case/CC0C flange. Secure the clamp to the bracket with bolt, washer and nut (75-03-01/2-190-180-170) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (17) Assemble the tube (75-03-01/3-150) to the tube (75-03-01/2-230). Install the retaining plate and secure with the bolts and nuts (75-03-01/2-260-250-240). Torque-tighten the nuts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (18) Assemble the loop-clamp (75-03-01/3-10) and the half clamp shells (75-03-01/3-75) (SB.0L.593-75-8972-27 standard) to the upper end of the tube and secure it to the bracket (75-03-01/3-180) mounted on the CC0C casing with bolt, washer and nut (75-03-01/3-40-30-20) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (19) Assemble the loop-clamp (75-03-01/3-80) and the half clamp shells (75-03-01/3-145) (SB.0L.593-75-8972-27 standard) to the lower end of the tube and secure it to the bracket (72-42-01/2-280) mounted on the CC0C casing with bolt, washer and nut (75-03-01/3-110-100-90) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (20) Assemble the elbow (75-03-01/3-190) to the valve rear mounting face and secure with bolts (73-14-02/1-20). Torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

ASSEMBLY

71-00-01

STAGE 3

Page 510

Jun 1/94



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (21) Assemble the bracket (75-03-01/3-230) to the lower flange of the tube (75-03-01/3-150). Secure the bracket to the tube flange and the tube to the elbow with bolts and nuts (75-03-01/3-220-210-200). Torque-tighten the nuts and bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m).

C. Fuel Heater Overboard Duct (Ref. Item 20, Fig.501 of Stage 1).

- (1) Prepare for Installation.

(a) Apply lubricant 'B' to the bolts.

- (2) Installation (Ref.Fig.503).

(a) Ensure the piston ring (75-03-01/1-50) has been fitted to the heater outlet elbow.

(b) Assemble the tube (75-03-01/1-10) to the fuel heater outlet elbow. Retain with the special bolt (75-03-01/1-20). Torque-tighten the bolt between 80 and 90 lbf in. (9,0 and 10,2 N.m).

(c) Secure the support lug (72-31-01/4-370) to the tube with bolts (75-03-01/1-30). Torque-tighten the bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m).

(d) Assemble the support strut (72-31-01/4-330) to the lug, mounted on the tube, with bolt, washers and nut (72-31-01/4-360-350-340). Secure the support strut to the lug (72-31-01/4-440) mounted on the LP case front blow-off flange with bolt, washers and nut (72-31-01/4-360-350-340). Torque-tighten the nuts and bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m).

4. Install Vent Tubes, Intermediate Case Adapter to Aircraft Connection (Ref. Item 21 Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to union threads and lubricant 'B' to bolt threads.



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

## B. Installation (Ref.Fig.503).

- (1) Assemble the bracket (75-02-01/1-290) to the lug on the lower left-hand support tube (72-42-01/1-290) and retain with bolts and nuts (75-02-01/1-280-270).
- (2) Assemble the end fitting (75-02-01/1-240) to the bracket and retain with bolts and nuts (75-02-01/1-260-250).
- (3) Assemble the bracket (75-02-01/1-180) to the LP shaft signal system baseplate (76-21-01/1-110) mounted to the left-hand lower delivery case/CC0C flange and retain with bolts and nuts (75-02-01/1-170-160).
- (4) Torque-tighten the nut and bolt between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (5) Position the tube (75-02-01/1-80) to the connection at vane six of the intermediate case, attach and finger-tighten the union.
- (6) Assemble the loop-clamp (75-02-01/1-10) and the half clamp shells (75-02-01/1-75) (SB.0L.593-75-8972-27 standard) to the tube and secure it to the bracket (72-33-01/4-30) on the HP case, with bolt, washer and nut (75-02-01/1-40-30- 20) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (7) Position tube (75-02-01/1-230) to the previous tube and end fitting, attach and lightly tighten the unions.
- (8) Assemble loop-clamps (75-02-01/1-90) and the half clamp shells (75-02-01/1-155) (SB.0L.593-75-8972-27 standard) to the tube align at the following positions:
  - (a) To the bracket (72-33-01/7-260) mounted on the HP case front/rear joint flange.
  - (b) To the bracket (72-33-01/8-380) mounted on the HP case/delivery case flange.
  - (c) To the bracket (79-22-04/2-180) mounted on the IDG oil tube and cooler flange.

ASSEMBLY

## 71-00-01

STAGE 3

Page 512

Jun 1/94

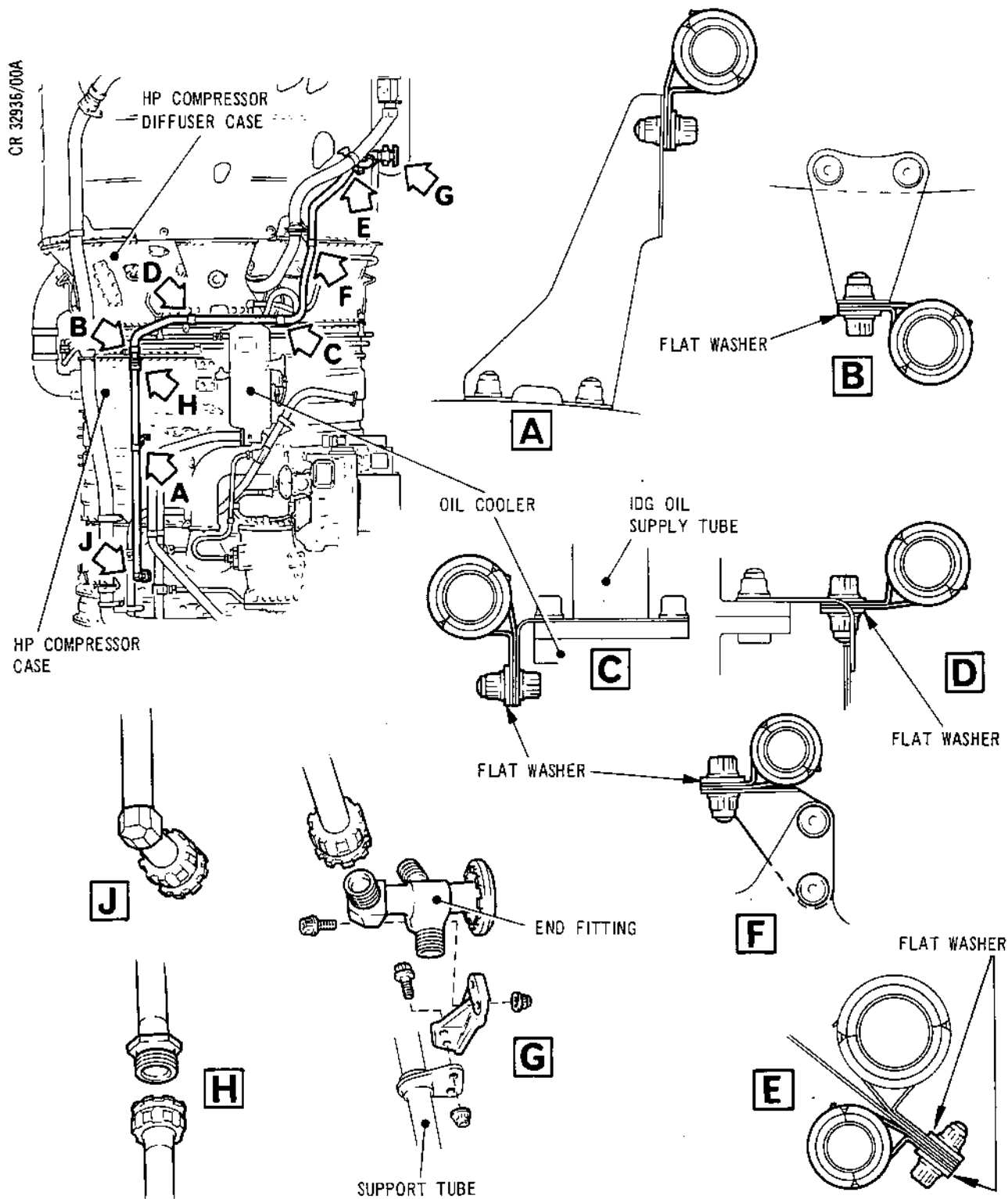


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



Vent Tubes,  
Intermediate Case Adapter to Aircraft Connection  
Figure 503

ASSEMBLY  
71-00-01  
STAGE 3  
Page 513  
Jan 2/80



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (d) To the brackets (75-02-01/1-180) and (76-21-01/2-110) mounted on the delivery case/CCOC flange.
  - (e) Attach each loop-clamp to the mounting bracket with bolts, washers and nuts (75-02-01/1-120-110-100). Torque-tighten the nuts and bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (9) Assemble the lower loop-clamp.
- (a) Remove the nut, washers and bolt (75-03-01/3-330-320-310) fitted loosely to the loop-clamp on the fuel heater pipe and bracket in front of the valve.
  - (b) Assemble the loop-clamp (75-02-01/1-190) and the half clamp shells (75-02-01/1-223) (SB.OL.593-75-8972-27 standard) to the lower end of the air venting tube align with the loop-clamp on the heater pipe.
  - (c) Attach the loop-clamps to the bracket (75-03-01/3-390) on the CCOC lower left-hand intrascope position with the bolt, washers and nuts (75-03-01/3-330-320-310) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (10) Torque-tighten all the pipe union nuts between 400 and 440 lbf in. (45,2 and 49,7 N.m). (Tools 1648, 947 and 1528).
- (11) Ensure the tube (75-02-01/1-230) has a minimum clearance of 0.100 in. (2,54 mm) with the oil cooler.
- (12) Wire-lock all the tube union nuts.
5. Install the Air Venting Tube, Intermediate Case Sump to Tube Connection (Ref. Item 22, Fig.501 of Stage 1)
- A. Prepare for Installation.
- (1) Apply lubricant 'A' to the union threads and lubricant 'B' to the bolts.

ASSEMBLY

## 71-00-01

STAGE 3

Page 514

Jun 1/94



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

B. Installation (Ref.Fig.504).

(1) Position the tubes.

- (a) Position the front tube (75-02-11/1-50) to the connection by the number four vane, intermediate case (pulse probe and drive housing), lightly tighten the tube front union nut to the connection.
- (b) Position the rear tube (75-02-11/1-100) to the LP and HP thrust bearings overboard end fitment, lightly tighten the tube rear union nut to the connection and the front union to the front tube.

(2) Assemble two loop-clamps (75-02-11/1-10) and the half clamp shells (75-02-11/1-45) (SB.OL.593-75-8972-27 standard) to the front tube aligning with:

- (a) The bracket (72-33-01/4-230) supporting the fuel reheat tube on the HP case. Retain the clamp to the bracket with the bolt, washer and nut (72-01-03/5-120-110-100) lightly tightened.
- (b) The bracket (72-33-01/7-170) on the HP case front/rear joint flange. Secure the clamp to the bracket with the existing bolt, washer and nut torque-tightened to between 85 and 95 lbf in.

(3) Assemble the loop-clamp (75-02-11/1-60) and the half clamp shells (75-02-11/1-95) (SB.OL.593-75-8972-27 standard) to the rear tube align with the bracket (72-42-01/4-280) mounted on the delivery case/CCOC flange. Retain the clamp to the bracket with bolt, washers and nut (72-01-03/ 4-290-280-270) lightly tightened.

(4) Torque-tighten the tube union nuts between 310 and 340 lbf in. (35,0 and 38,4 N.m) (Tools 1648, 322 and 1565).

(5) Wire-lock the tube unions.



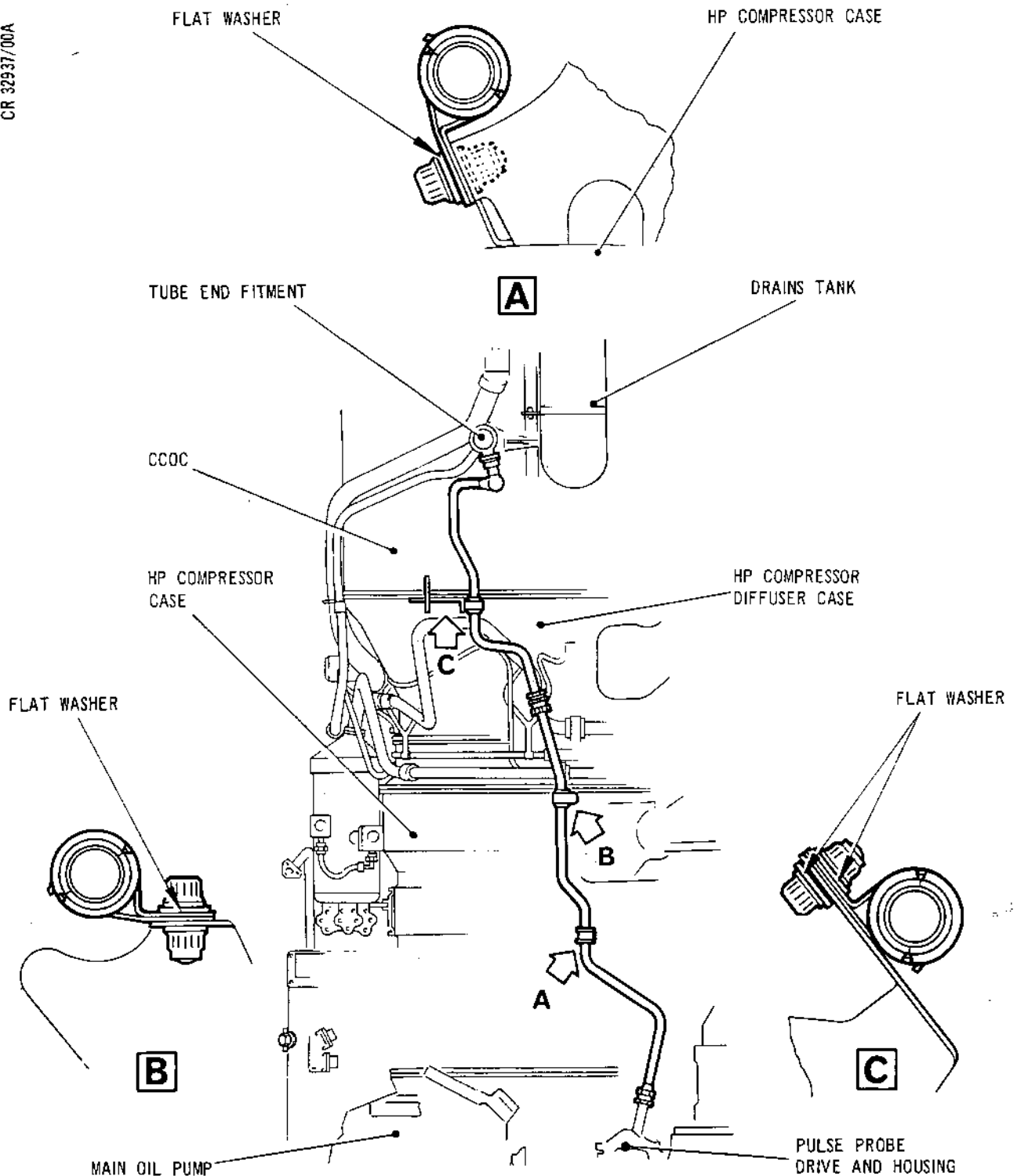
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 32937/00A



Air Venting Tube  
Figure 504

ASSEMBLY

71-00-01

STAGE 3

Page 516

Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



6. Install the Fuel Recirculation Valve (Ref. Item 23,  
Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'B' to the bolts.
- (2) Record the type and serial number of the 'Dunlop' recirculation valve on the accessory sheet.

B. Installation (Ref.Fig.505).

- (1) Position the valve between the brackets (72-31-01/5A-590) and (72-31-01/4-490) mounted on the left-hand side of the LP case front blow-off flange and the lug to the rear of the flange.
- (2) Retain the valve to the rear bracket with bolts and washers (73-12-01/1-40-50). Install a bolt and washer to the upper and lower positions of the bracket.
- (3) Secure the valve to the forward bracket with bolt, pillar bolt and washers (73-12-01/1-40-55-50). Install the bolt and washer to the upper position and pillar bolt and washer to the lower position of the bracket.
- (4) Torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (5) Wire-lock the bolts retaining the valve to the brackets.
- (6) Assemble the sealing ring (73-12-01/1-20) to the plunger assembly (73-12-01/1-10).
- (7) Install the plunger assembly to the valve and secure with the clamp ring.

7. Install Oil Feed Tubes, Oil Tank to the Main Oil Pump  
(Ref. Item 24, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'B' to the bolts.

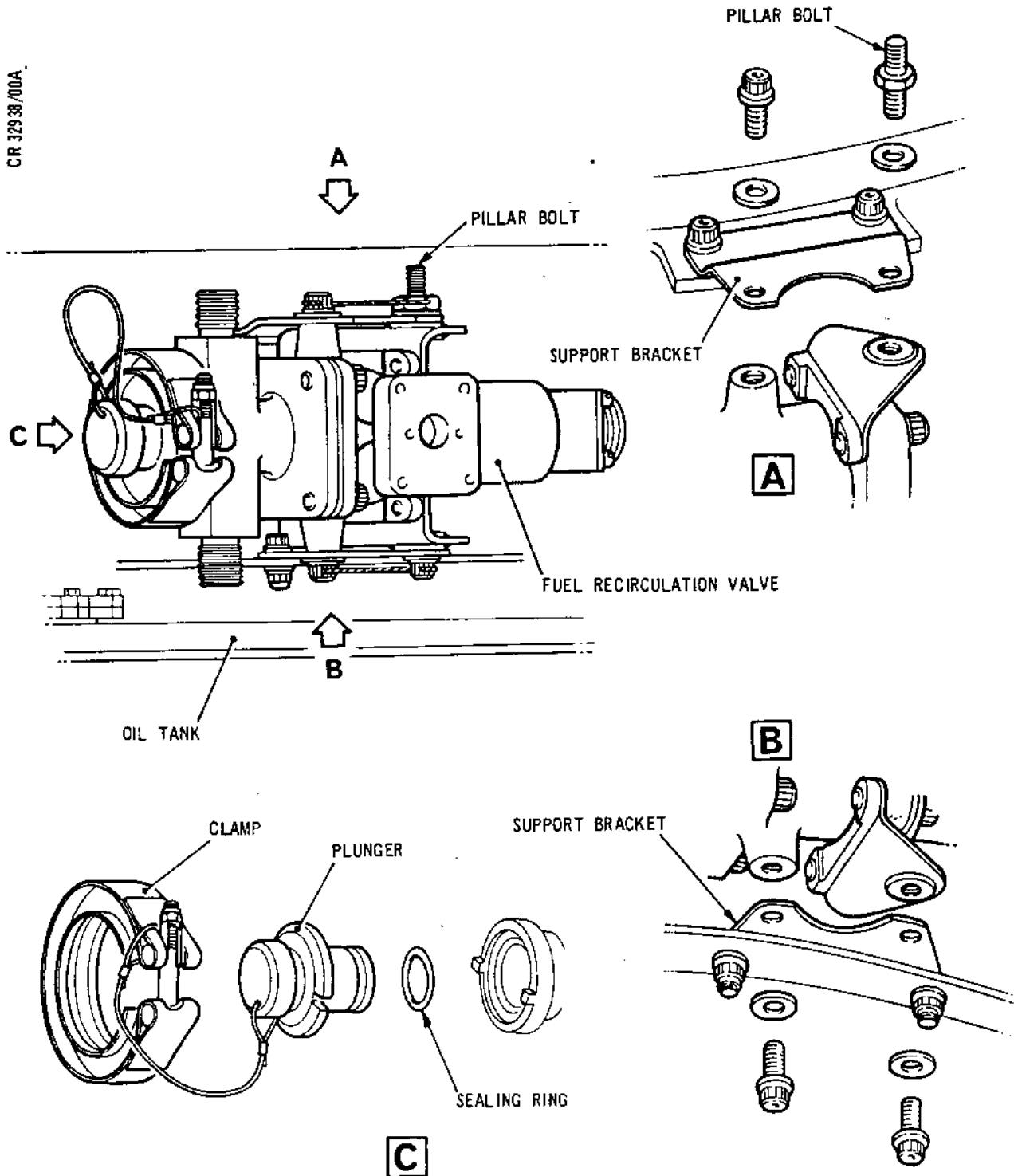




OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 32938/00A



JN8916

Fuel Recirculation Valve  
Figure 505

ASSEMBLY  
**71-00-01**  
STAGE 3  
Page 518  
Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



B. Installation (Ref.Fig.506).

- (1) Install the dee-headed bolts (79-22-01/1-50) to the tube (79-22-01/1-10) rear flange and secure with retaining rings (79-22-01/1-40).
- (2) Position the gasket (79-22-01/1-60) and the tube to the oil tank mounting face, retain with the bolts (79-22-01/1-20). Torque-tighten the bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (3) Position the gasket (79-22-01/1-70) to the rear flange of the tube over the securing bolts.
- (4) Position the gasket (79-22-01/1-120) and the tube (79-22-01/1-80) to the oil pump mounting face and the forward tube. Position the bracket (79-22-01/1-110) to the rear tubes rear flange and retain the bracket, tube flange and gasket to the oil pump mounting face with bolts (79-22-01/1-90), do not fully tighten at this stage.
- (5) Position the bracket (79-22-01/1-55) to the lower face of the tubes flange joint. Secure the bracket, tube flanges and gasket with nuts (79-22-01/1-30). Torque-tighten the nuts between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (6) Torque-tighten the bolts securing the rear tube to the oil pump mounting face between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (7) Install the inlet thermometer.
  - (a) Install the engine oil inlet thermometer and gasket (79-32-01/1-10-50) into the housing in the rear oil tube (79-22-01/1-80).
  - (b) Position the bracket (79-32-01/1-40) on the thermometer flange and retain the bracket and thermometer flange to the tube mating face with bolts (79-32-01/1-30).
  - (c) Install the bolts (79-32-01/1-20) in the thermometer flange to finally secure the flange and mating face.
  - (d) Torque-tighten the bolts between 60 and 65 lbf in. (6,8 and 7,3 N.m).



OLYMPUS 593

MK.610-14-28  
OVERHAUL



8. Install Anti-drain Tube, Connection on Tube Oil Cooler to Oil Tank (Ref. Item 25, Fig.501 of Stage 1)

A. Assemble Strainer to Tube (Ref.Fig.507).

- (1) Assemble the keywasher to the strainer assembly (79-22-03/1-110-100).
- (2) Screw the strainer into the tube (79-22-03/1-80) and locate the keywasher leg in the tube flange.
- (3) Tighten the strainer and lock it with the keywasher.

B. Install Tube (Ref.Fig.507).

- (1) Apply lubricant A to the union connection and lubricant B to attachment bolts.
- (2) Position the tube on the engine with a gasket (79-22-03/1-120) located between the tube flange and connecting tube.
- (3) Engage the union connection and lightly tighten the union nut.
- (4) Retain the tube flange with bolts (79-22-03/1-120) lightly tightened.
- (5) Assemble the loop lamp (79-22-03/1-10) to the tube and secure it to the bracket with a nut, two flat washers and bolt (79-22-03/1-20-30-40) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (6) Torque-tighten the tube flange retaining bolts to between 60 and 65 lbf in. (6,8 and 7,3 N.m).
- (7) Torque-tighten the union nut (Tools 1529 and 1648) to between 220 and 240 lbf in. (25 and 27 N.m).
- (8) Wire-lock the union nut.

TN8921



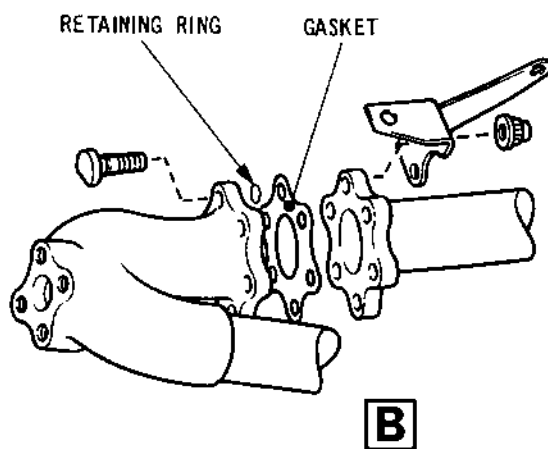
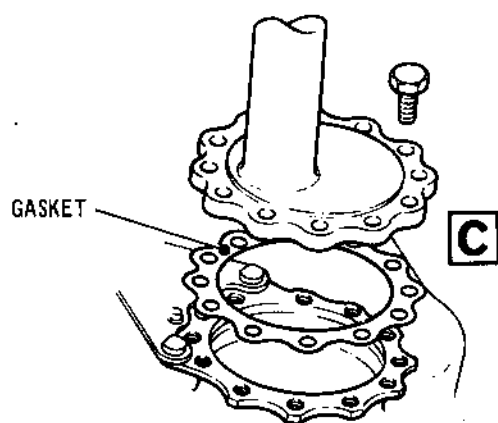
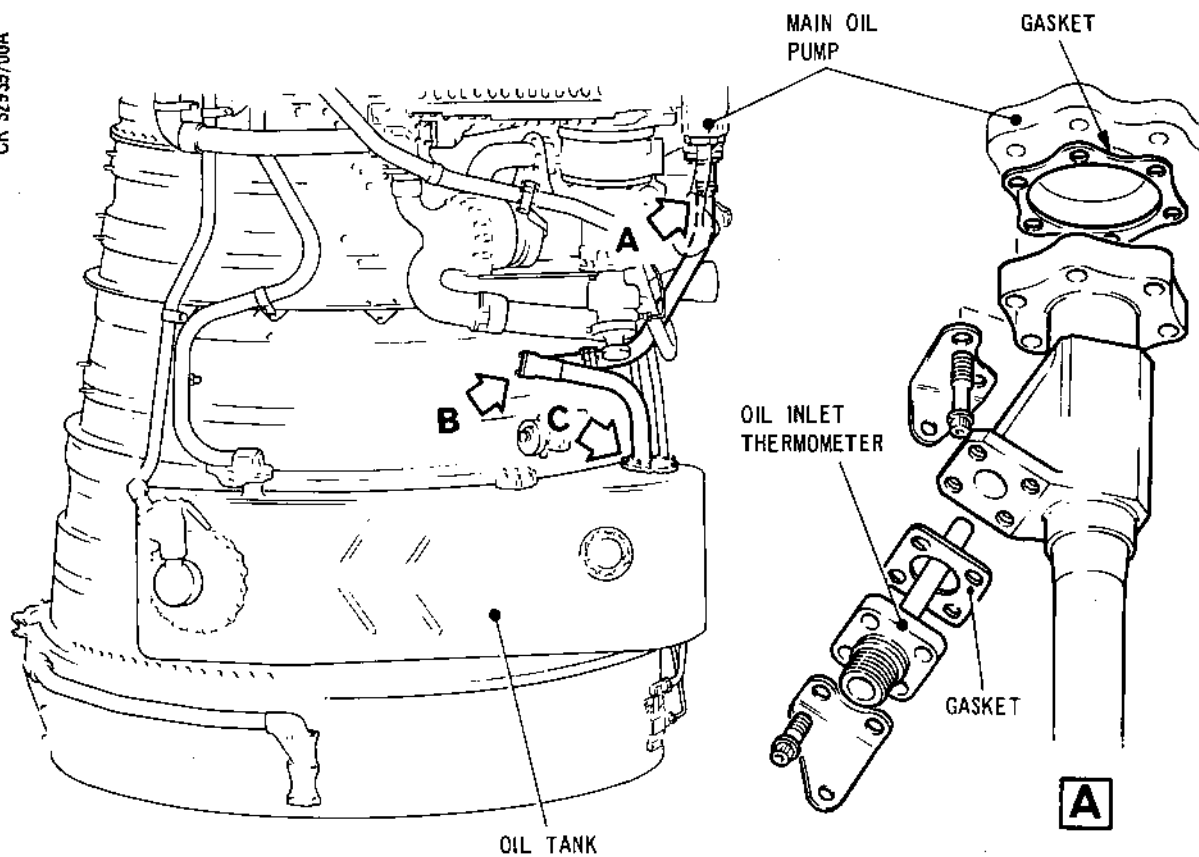
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 32939/00A



Oil Feed Tubes,  
Oil Tank to Main Oil Pump  
Figure 506

ASSEMBLY

71-00-01

STAGE 3

Page 521

Jan 2/80

TN8918



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



9. Install Oil Scavenge Tubes, Right-Hand Gearbox to Oil Return Tube (Ref. Item 26, Fig.501 of Stage 1)

A. Install Lower Tube (Ref.Fig.508).

- (1) Apply lubricant B to attachment bolts.
- (2) Position the tube (79-22-02/2-10) on the engine with the gasket (79-22-02/2-30) located between the tube flange and the right-hand gearbox.
- (3) Retain the tube flange with five bolts (79-22-02/2-20) lightly tightened.
- (4) Assemble the loop clamp (79-22-02/2-40) to the tube and the clipnut (2-70) to the bracket (Detail A) then attach the loop clamp with a flat washer and bolt (79-22-02/2-60-50) lightly tightened.
- (5) Assemble two loop clamps (79-22-02/2-110) to the tube and attach them to the brackets (Details B and C) with nuts, flat washers and bolts (79-22-02/2-120-130-140) lightly tightened.

B. Install Upper Tube (Fig.Ref.508).

- (1) Apply lubricant A to the union connections and lubricant B to attachment bolts.
- (2) Position the tube (79-22-02/2-250) on the engine, engage the union connections and lightly tighten the union nuts.
- (3) Assemble the loop clamp (79-22-02/2-180) to the tube and attach it to the bracket (Detail E) with a nut, flat washer and a bolt (79-22-02/2-190-200-210) lightly tightened.

C. Torque-tightened Attachment Bolts and Union Nuts.

- (1) Torque-tighten the loop clamp bolts, except at Detail B, to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

NOTE: The bolt at Detail B is torque-tightened later in the procedure.

TN43963

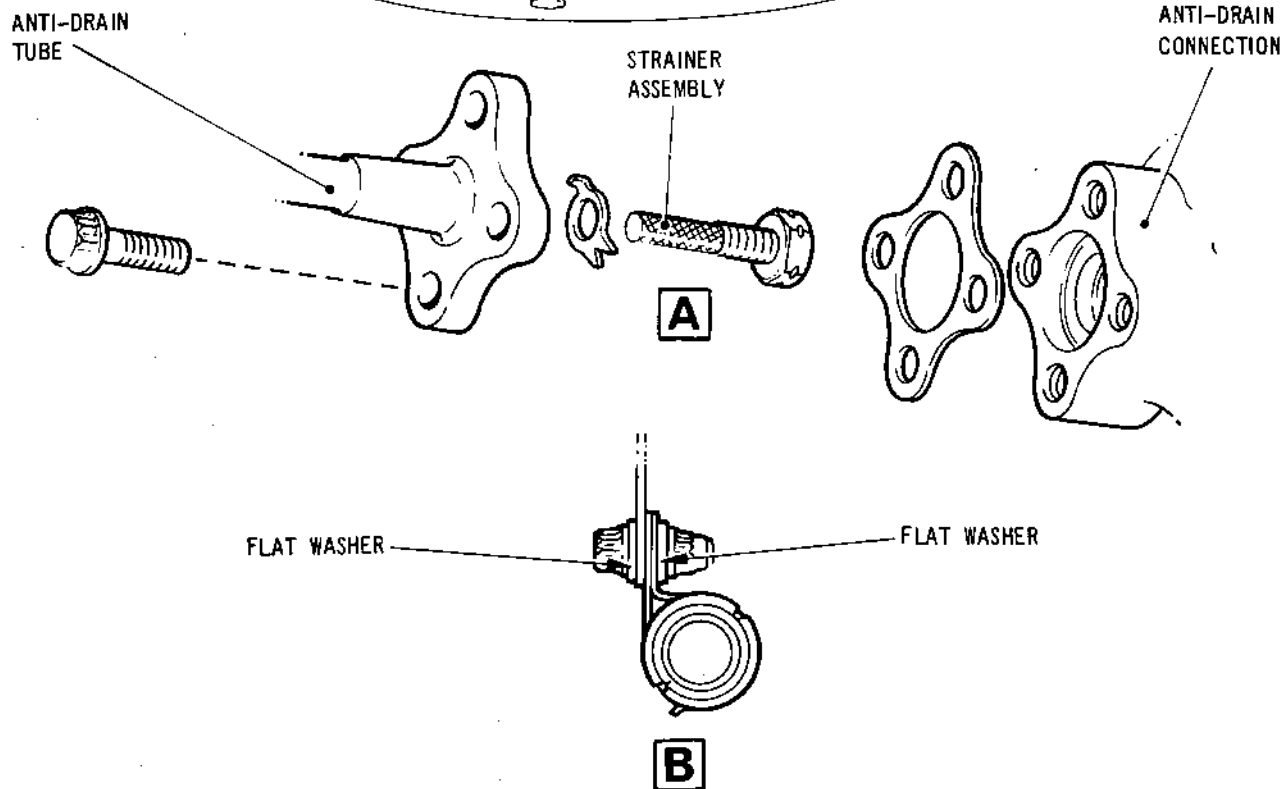
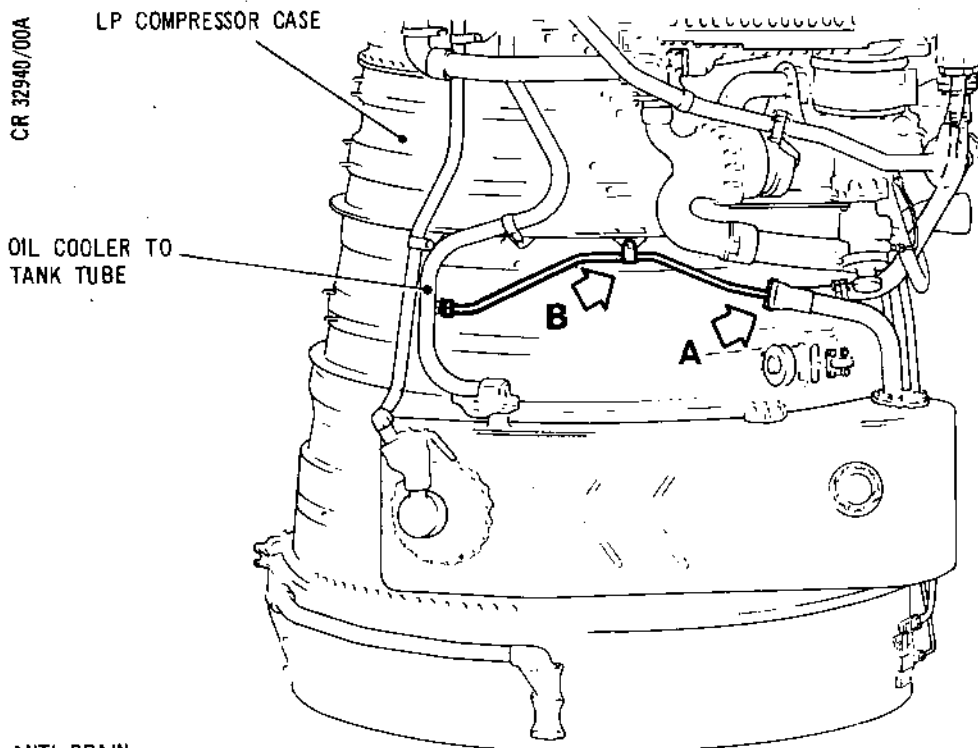
ASSEMBLY  
**71-00-01**  
STAGE 3  
Page 522  
Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



Anti-drain Tube  
Figure 507

ASSEMBLY  
**71-00-01**  
STAGE 3  
Page 523  
Jan 2/80



OLYMPUS 593

MK. 610-14-28

OVERHAUL



CR 32941/00A

CLIP NUT

RIGHT-HAND GEARBOX

FLAT WASHER

**A**

LEFT-HAND GEARBOX

VIEW IN DIRECTION OF ARROW X

LP COMPRESSOR CASE/EXIT  
GUIDE VANE CASE FLANGE

FLAT WASHER

**B**

SIMILAR AT

**C**

RIGHT-HAND  
GEARBOX

FLAT WASHER

**E**

**D**

Oil Scavenge Tube, Right-hand Gearbox to  
Oil Return Tube  
Figure 508

TN8922

ASSEMBLY  
**71-00-01**  
STAGE 3  
Page 524  
Jan 2/80



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

Printed in England

- (2) Torque-tighten the lower tube flange bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (3) Torque-tighten the union nuts to between 310 and 340 lbf in. (35 and 38,4 N.m) then wire-lock them.

10. Install the Aircraft Fuel and Hydraulic Tanks Pressurization Tube and Electrical Harness Support Tray (Ref. Item 27, Fig.501 of Stage 1)

A. Preparation for Installation.

- (1) Apply lubricant 'A' to the tube unions and lubricant 'B' to the bolts.

B. Installation (Ref.Fig.509).

- (1) Assemble the tube (75-05-03/1-80) to the duct at the lower rear of the HP compressor case, and lightly tighten the union nut.
- (2) Assemble the bracket (71-51-01/10-280) to the support bracket (75-01-04/1-70) on the HP compressor air cooling duct and retain with the bolts (71-51-01/10-290). Torque-tighten the bolts to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (3) Assemble the bottom block to the tray (71-51-01/10-90-200) and retain with bolts (71-51-01/10-80). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (4) Assemble the tray to the support bracket and secure with bolts (71-51-01/10-210), torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (5) Assemble the pillar bolt (75-05-03/1-40) to the upper face of the tray and secure with the nut (75-05-03/1-20) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (6) Assemble the loop-clamp (75-05-03/1-10) and the half clamp shells (75-05-03/1-75) (SB.0L.594-75-8972-27 standard) to the tube and attach it to the pillar bolt with the flat washer and nut (75-05-03/1-30-20). Torque-tighten the nut to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

ASSEMBLY

## 71-00-01

STAGE 3

Page 525

Jun 1/94





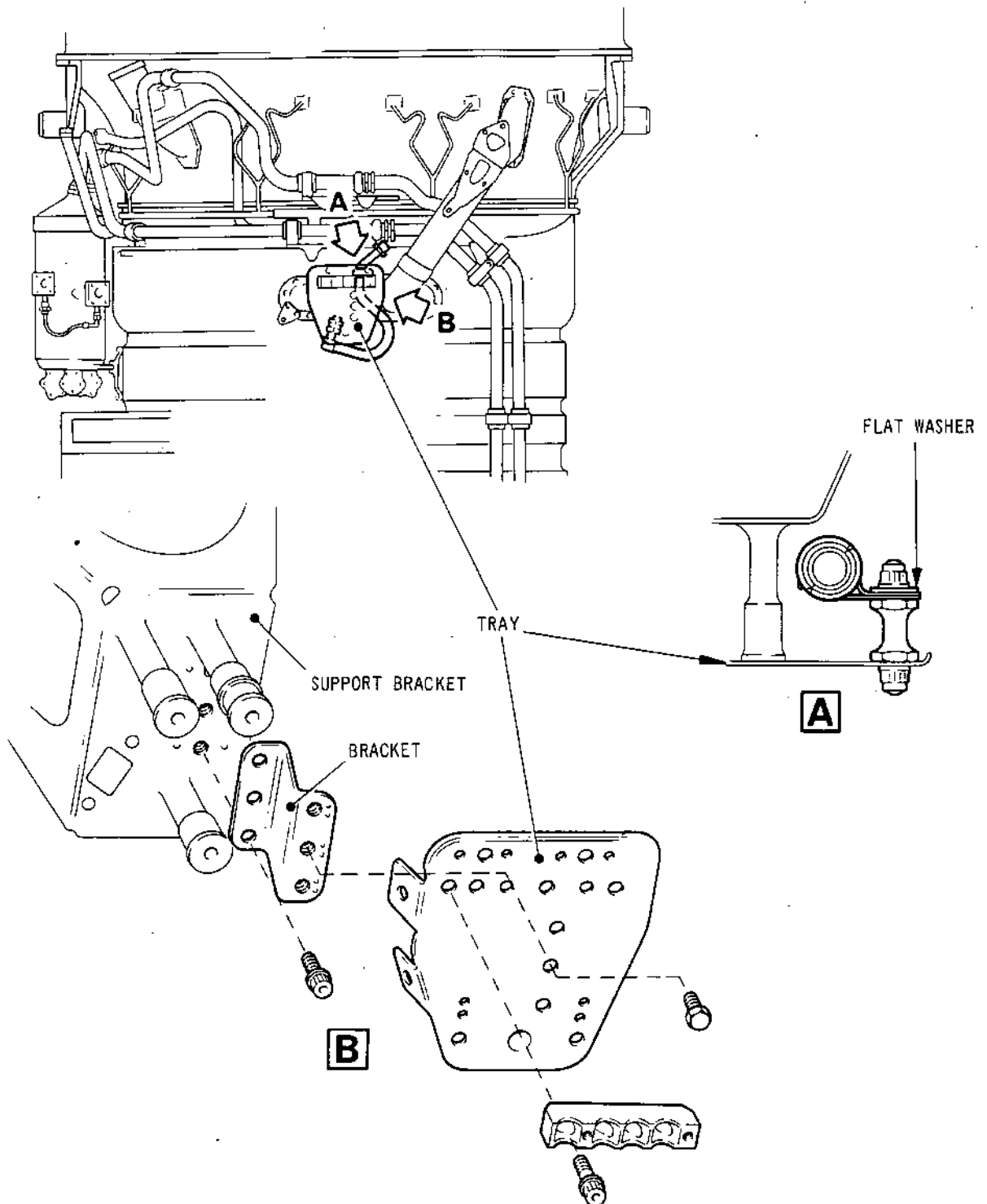
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 32942/00A



Fuel and Hydraulic Tank Pressurization Tube and  
Electrical Harness Support Tray  
Figure 509

ASSEMBLY  
**71-00-01**  
STAGE 3  
Page 526  
Jan 2/80



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (7) Torque-tighten the tube union nut to between 280 and 310 lbf in. (31,6 and 35,0 N.m) (Tools 908 and 1648). Wire-lock the tube union.

11. Assemble the Reheat Fuel Supply Tube from First Stage Pump to the Engine (Ref. Item 28, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to the tube unions and lubricant 'B' to the bolts.
- (2) Assemble the filter to the tube (73-13-03/1-310-320).
  - (a) Insert the filter in the tube. Ensure the filter goes fully home and the inlet hole in the filter body and the inlet tube are aligned.
  - (b) Check that when assembled, there will be a minimum clearance of 0.020 in. (0,50 mm) between the outer face of the filter and the face of the blanking plate spigot (Ref.Fig.510).
  - (c) Assemble a serviceable seal plate to the blanking plate spigot (73-13-03/1-300-290).
  - (d) Engage lug on blanking plate spigot within location slot on filter face and press plate and seal into position with attachment holes aligned.
  - (e) Position the bracket (73-13-03/1-230) on the filter body flange and retain with bolts and nuts (73-13-03/1-250-240) lightly tightened.
  - (f) Install bolt and nut (73-13-03/1-280-260) in the lower filter body flange next to the bracket.
  - (g) Install bolts and nuts (73-13-03/1-270-260) in the remaining holes of the filter, seal and blank plate flange.
  - (h) Torque-tighten all the nuts and bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (j) Assemble the closure ferrule (73-13-03/1-220) to the blanking plate union. Torque-tighten union nut to between 190 and 210 lbf in. (21,5 and 23,7 N.m) (Tool 909) and wire-lock it.

PRINTED IN ENGLAND

TN29719

ASSEMBLY

71-00-01

STAGE 3

Page 527

Jan 2/80

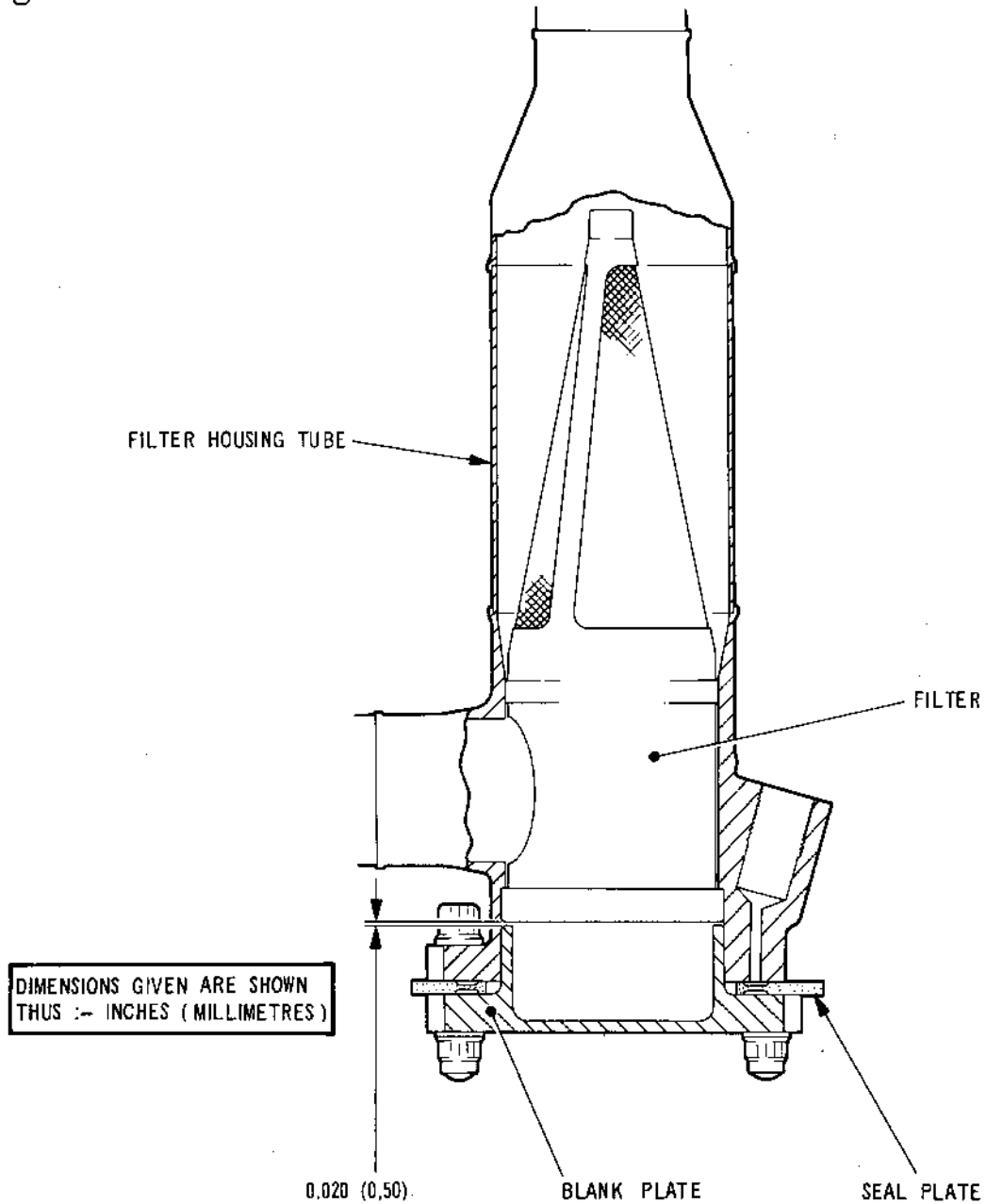


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32954/00A



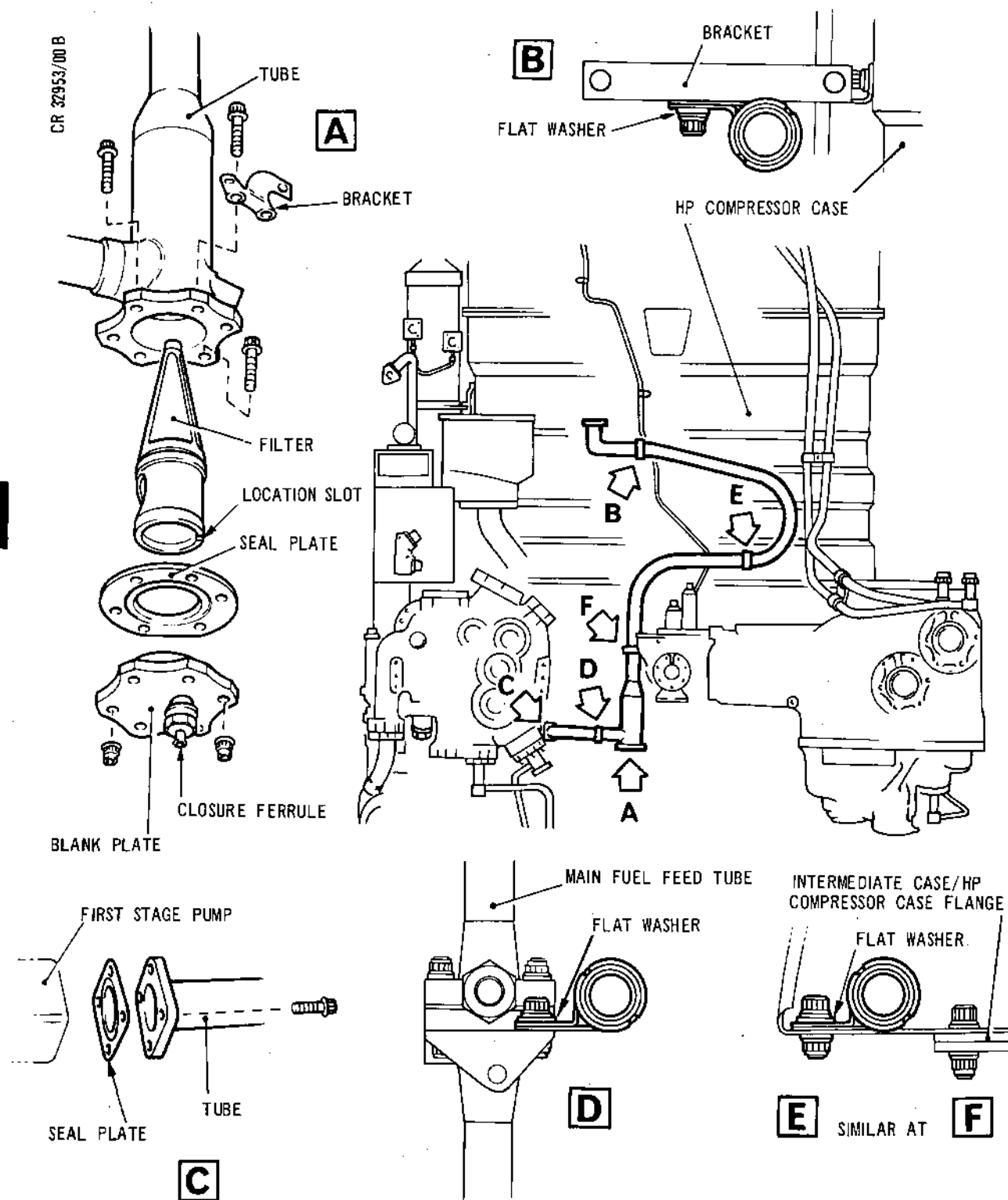
TN8929

Checking Filter Assembly Clearance  
Figure 510

ASSEMBLY  
**71-00-01**  
STAGE 3  
Page 528  
Jan 2/80



**OLYMPUS 593**  
MK.610-14-28  
OVERHAUL



Fuel Reheat Supply Tube from First Stage Pump  
Figure 511



OLYMPUS 593

MK.610-14-28

OVERHAUL



B. Installation (Ref.Fig.511).

- (1) Position the seal plate (73-13-03/1-420) on the first stage pump mounting face.
- (2) Position the tube (73-13-03/1-320) to the seal plate and pump mounting face and secure with bolts (73-13-03/1-330) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (3) Assemble the loop clamp (73-13-03/1-10) to the tube and align with the bracket (73-13-01/1-50) mounted on the HP casing stage three blow-off position. Secure the loop clamp and bracket with bolt, washers and nut (73-13-03/1-40-30-20), torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (4) Temporarily assemble the loop clamp (73-13-03/1-72) to the tube, position to the rear of the filter. Retain the clamp with the bolt, washer and nuts (75-02-09/1-220-200-190) lightly tightened.
- (5) Assemble the loop clamp (73-13-03/1-80) to the tube align with the bracket (72-33-01/6-220) mounted on the intermediate case/HP casing flange. Secure the loop clamp to the bracket with bolt, washer and nut (73-13-03/1-110-100-90), torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (6) Temporarily assemble the loop clamp (73-13-03/1-150) to the tube. Attach to the bracket (72-33-01/4-230) with the bolt, washer and nut (73-13-03/1-160-170-180) lightly tightened.

12. Install the Fuel Feed Tube, Filter to Oil Cooler (Ref. Item 29, Fig.501 of Stage 1)

A. Prepare for installation.

- (1) Apply lubricant 'A' to the blanking ferrule location threads, and lubricant 'B' to the bolt threads.

TN8933

ASSEMBLY  
**71-00-01**  
STAGE 3  
Page 530  
Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



B. Installation (Ref.Fig.512).

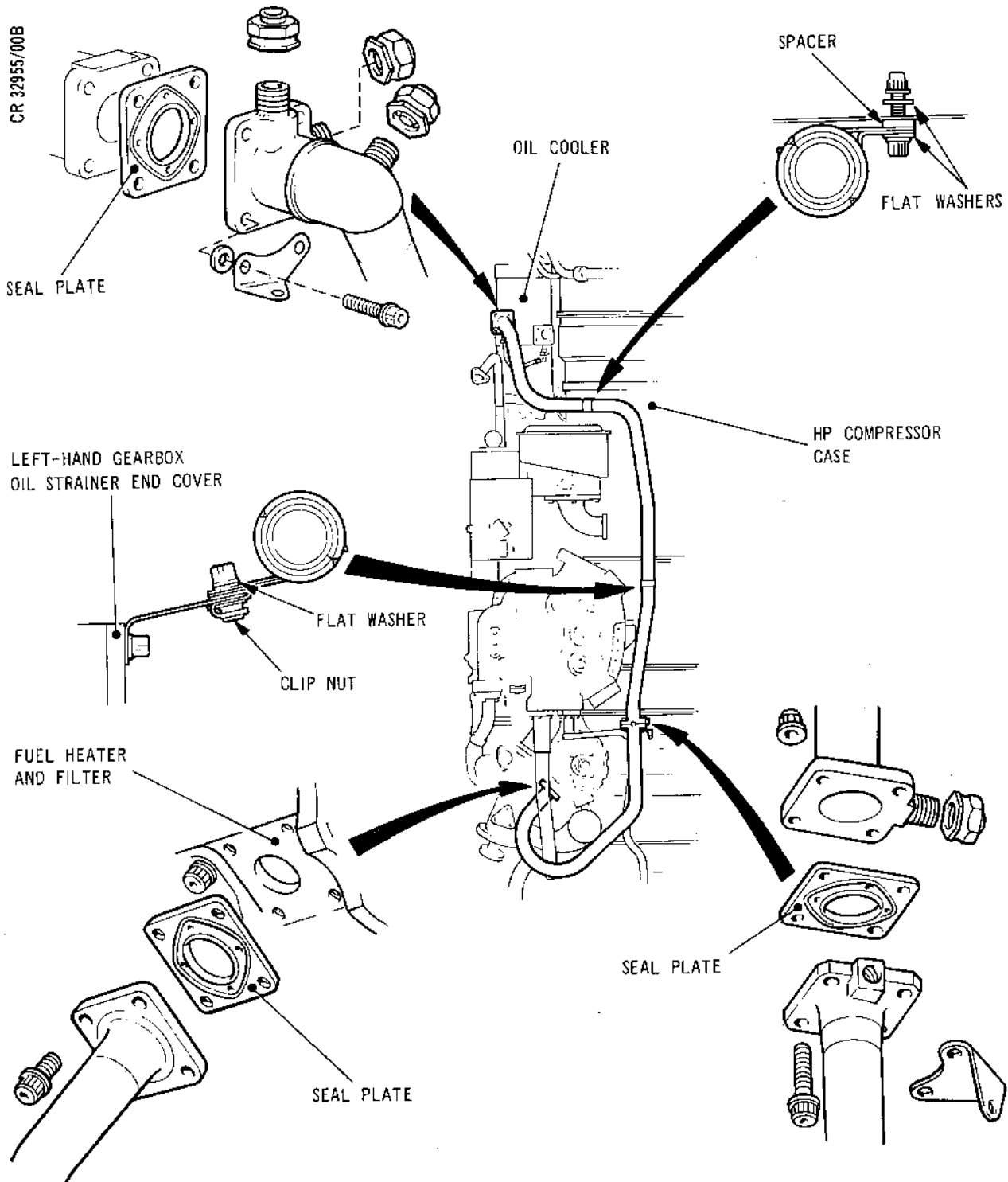
- (1) With the seal plate between the front tube section flange (73-13-01/1-60-10) and fuel filter outlet mounting face, retain tube in position with the bolts (73-13-01/1-20) lightly tightened.
- (2) Hold rear section of tube with the seal plate (73-13-01/1-270-230) between the mating faces on the oil cooler location, position the bracket and washers (73-13-01/1-260-250) on the tube flange and retain with bolts (73-13-01/1-240) lightly tightened.
- (3) With the seal plate (73-13-01/1-60) inserted between the front and rear tube section junction flanges and the bracket (73-13-01/1-50) positioned against the forward face of the front tube section, retain with bolts and nuts (73-13-01/1-40-30), lightly tightened.
- (4) Torque-tighten the tube flange bolts at each of the three locations to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (5) Install the loop clamps.
  - (a) Assemble the loop clamp (73-13-01/1-70) to the rear section of the tube near the gearbox.
  - (b) Assemble clipnut (73-13-01/1-90) to the bracket (72-62-01/5-50) on the left-hand gearbox oil strainer end cover.
  - (c) Secure clamp bracket with bolt, washer and clipnut (73-13-01/1-80-150-90) torque tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
  - (d) Assemble the loop clamp (73-13-01/1-130) to the rear tube section near the HP front case.
  - (e) Align clamp with bracket (72-33-01/4-280) mounted on the HP front case lower periphery and retain clamp with bolt, washer, spacer and nut (73-13-01/1-170-150-160-140) lightly tightened. (To be secured on installation of fuel feed tube, oil cooler to second stage pump Ref. para.13).



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 32955/00B



TN8932

Main Fuel Feed Tube, Filter to the Oil Cooler  
Figure 512

ASSEMBLY  
**71-00-01**  
STAGE 3  
Page 532  
Jan 2/80



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

- (6) Install the tube closure ferrules.
  - (a) Assemble the tube closure ferrules (73-13-01/1-220) to the rear tube section junction flange union and to the union in the tube elbow and torque-tighten to between 190 and 210 lbf in. (21,5 and 23,7 N.m).
  - (b) Assemble the tube closure ferrule (73-13-01/1-210) to the two unions in the rear tube flange at the oil cooler and torque-tighten to between 220 and 240 lbf in. (24,8 and 27,1 N.m). (Tools 1752 and 1648).
  - (c) Wire-lock all the tube closure ferrules.
- (7) Secure the loop clamp (73-13-03/1-150) previously assembled (Ref. para.4.B.(9)) torque-tighten the nut to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (8) Ensure a minimum clearance of 0.100 in. (2,54 mm) between the tube joint flanges and the reheat fuel feed tube.

13. Install the Fuel Feed Tube, Oil Cooler to Second Stage Pump (Ref. Item 30, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'B' to the attachment bolts.

B. Installation (Ref.Fig.513).

- (1) Position the tube (73-13-01/2-50) to the oil cooler and the second stage fuel pump.
- (2) Secure the tube flanges.
  - (a) With a seal plate (73-13-01/2-100) inserted between the mating faces, attach the tube flange to the oil cooler mounting face with bolts (73-13-01/2-70) lightly tightened.
  - (b) With a seal plate (73-13-01/2-100) inserted between the mating faces, attach the tube flange to the pump mounting face with bolts (73-13-01/2-60) lightly tightened.

TN8962

ASSEMBLY  
**71-00-01**  
STAGE 3  
Page 533  
Jan 2/80



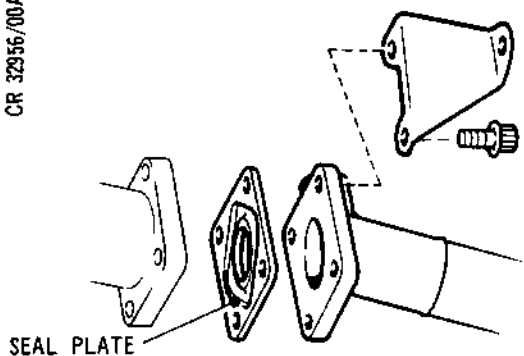


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32356/00A



SEAL PLATE

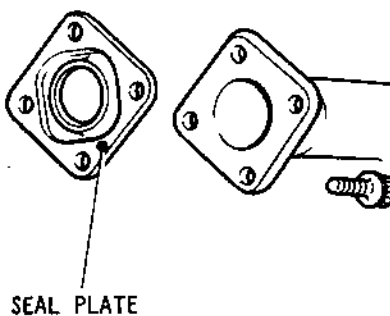
SPACER

FLAT  
WASHERS

OIL COOLER

HP COMPRESSOR  
CASE

SECOND STAGE  
PUMP



SEAL PLATE

Main Fuel Feed Tube,  
Oil Cooler to Second Stage Pump  
Figure 513

TN8934

ASSEMBLY

71-00-01

STAGE 3

Page 534

Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



(c) Torque-tighten the bolts at both flanges to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

(3) Assemble the loop clamp (73-13-01/2-10) to the tube and secure it to the bracket (72-33-01/4-280) mounted on the HP case lower periphery, using the existing loosely assembled bolt, spacer, washer and nut (Ref. Para.12.B.(5)) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

14. Install the HP Turbine Bearing Oil Feed Tube (Ref. Item 31 Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Ensure the thermometer is thoroughly clean and undamaged.
- (2) Apply lubricant 'A' to the tube unions and lubricant 'B' to the bolts.

B. Installation (Ref.Fig.514).

- (1) Install the elbow.
  - (a) Position the gasket, elbow and bracket (72-01-03/5-290-280-270) to the mounting face on the left-hand gearbox.
  - (b) Retain the bracket, elbow and gasket to the gearbox with bolts (72-01-03/5-250) each side of the threaded union and bolts (72-01-03/5-260) in the other positions.
  - (c) Torque-tighten the bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (2) Assemble the tube (72-01-03/5-230) to the elbow and the union on the delivery casing and lightly tighten the union nuts.



OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 32957/00A

OIL COOLER

LEFT-HAND GEARBOX

THERMOMETER

GASKET

HP COMPRESSOR CASE/DIFFUSER CASE FLANGE

FLAT WASHER

FLAT WASHER

FLAT WASHERS

DISTANCE PIECE

TN8935

Oil Feed Tube, HP Turbine Bearing  
Figure 514

ASSEMBLY  
71-00-01  
STAGE 3  
Page 536  
Jan 2/80



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (3) Assemble the loop clamp (72-01-03/5-10) to the tube and secure to the bracket (72-33-01/6-300) on the intermediate case HP case flange, using the existing bolt, distance piece, washers and nut (72-01-03/5-50-40-30-20) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (4) Assemble the loop clamp (72-01-03/5-90) to the tube and secure to the bracket (72-33-01/4-230) on the HP case lower periphery, using the existing bolt, washer and nut (72-01-03/5-120-110-100) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
  - (5) Assemble the loop clamp (72-01-03/5-160) to the tube and secure to the bracket (72-33-01/8-320) on the HP case/delivery casing flange, secure with the bolt, washer and nut (72-01-03/5-190-180-170) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (6) Torque-tighten the tube union nut to the delivery case to between 280 and 310 lbf in. (31,6 and 35,0 N.m) and the tube union nut to the gearbox elbow to between 310 and 340 lbf in. (35,0 and 38,4 N.m). (Tools 1565, 1528, 322, 947 and 1648). Wire-lock the tube unions.
  - (7) Assemble the gasket and thermometer (77-23-02/1-30-10) to the tube and secure with the bolts (77-23-02/1-20) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m). Wire-lock the bolts.
15. Install the LP Turbine Bearing Oil Feed Tube (Ref. Item 32, Fig.501 of Stage 1)
- A. Prepare for Installation.
    - (1) Apply lubricant 'A' to the tube unions and lubricant 'C' to all the bolts unless stated otherwise.
  - B. Installation (Ref.Fig.515).
    - (1) Position the tube (72-01-03/4-330) along the bottom of the engine, and hand tighten the front union nut to the HP turbine bearing oil tube (72-01-03/5-230).

ASSEMBLY

71-00-01

STAGE 3

Page 537

Dec 31/01

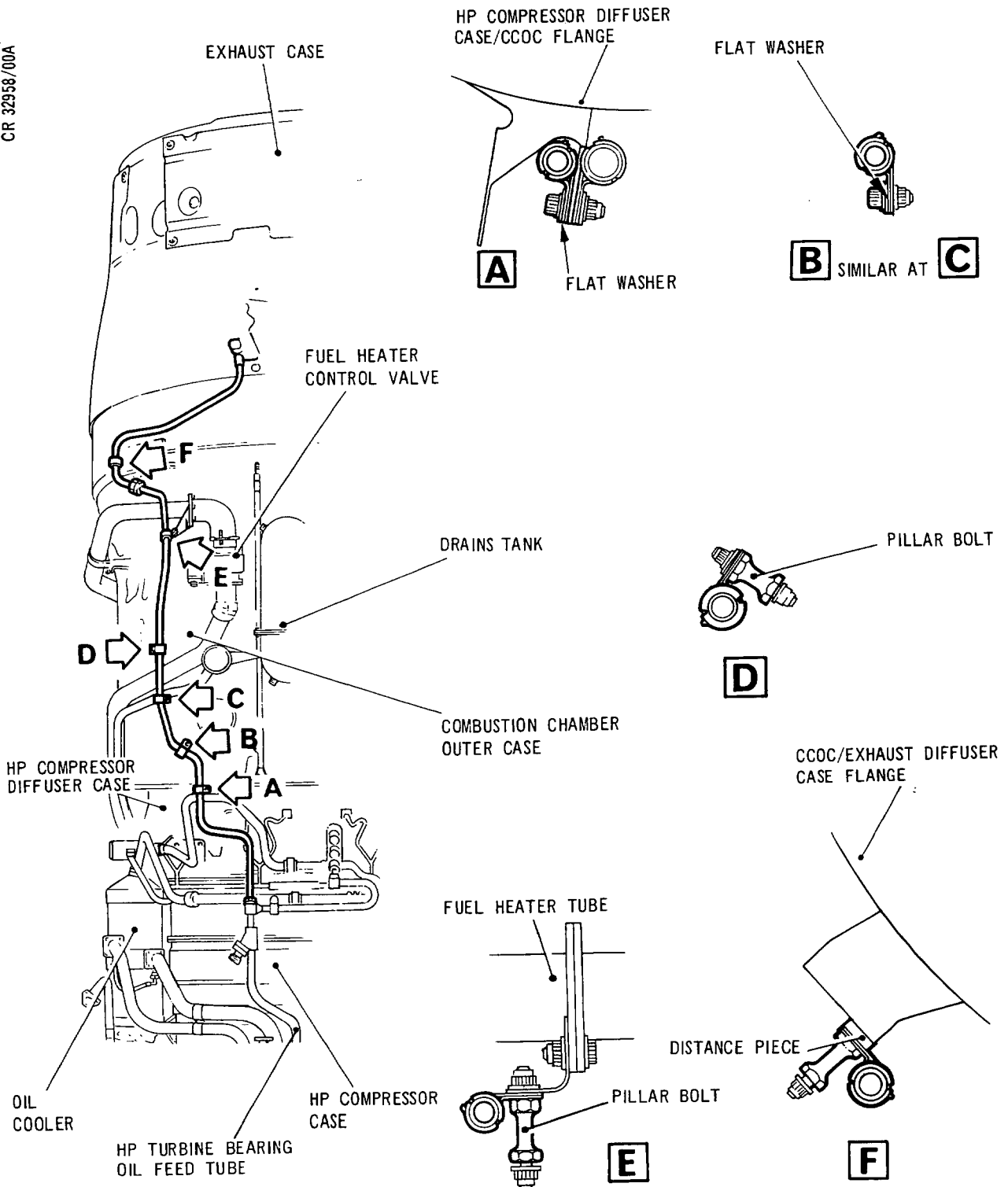


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32958/00A



Oil Feed Tube, LP Turbine Bearing  
Figure 515

ASSEMBLY  
**71-00-01**  
STAGE 3  
Page 538  
Jan 2/80



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (2) Assemble the loop clamps to the tube and attach as follows:
- (a) Attach the loop clamp (72-01-03/4-80) to the bracket (75-03-01/3-230) mounted on the air elbow flange secured to the fuel heater control valve with the pillar bolt, washer and nut (75-03-02/1-270-260-250), lightly tightened.
  - (b) Attach the loop clamp (72-01-03/4-260) together with the loop clamp (75-02-11/1-60), to the bracket (72-42-01/4-280) mounted on the front CCOC flange with bolt, washers and nut (72-01-03/4-290-280-270) lightly tightened with lubricant 'B' applied.
  - (c) Loosely assemble the loop clamp (72-01-03/4-120) to the tube, align with the rear of the drains tank and retain with the pillar bolt, washer and nut (72-01-03/4-150-140-130). Assemble a nut (4-130) to the free end of the pillar bolt and lightly tighten the nuts on the bolt with lubricant 'B' applied.
- (3) Position the rear tube (72-01-03/4-70) to the tube (72-10-03/4-80) and the union on the exhaust diffuser and hand tighten the unions.
- (4) Assemble the loop clamp (72-01-03/4-10) to the tube and attach to the bracket (72-53-00/7-250) mounted on the CCOC/exhaust diffuser case using the pillar bolt, distance piece and nut (75-03-02/1-200-195-190). Lightly tighten the nut.
- (5) Torque-tighten the tube union nut to HP turbine bearing and the tube union to between 280 and 310 lbf in. (31,6 and 35,0 N.m).
- (6) Torque-tighten the tube union nut to exhaust diffuser to between 490 and 550 lbf in. (55,4 and 61,0 N.m). (Tools 1648, 1526, 908 and 946).
- (7) Wire-lock all the tubes unions and nuts.

ASSEMBLY

71-00-01

STAGE 3

Page 539

Dec 31/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

16. Install the LP and HP Turbine Bearings Cold Vent Tubes and Connector Assembly (Ref. Item 33, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Before commencing installation ensure that the rear tube to be installed and the mating tube in the No.5 vane of the turbine exhaust diffuser (Ref.72-53-00 Sub-assembly) are to the same service bulletin standard.
- (2) Apply lubricant 'C' to the union threads and to the nuts and bolts (72-53-00/1-380-400) securing the tube flange (75-02-03/1-240). Apply lubricant 'B' to the remaining bolts.

B. Installation (Ref.Fig.516).

- (1) Assemble the connector and the bracket (75-02-03/1-100-90) to the right-hand support tube (72-42-01/1-270), and retain with bolts (75-02-03/1-80) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (2) Assemble the tube (75-02-03/1-120) between the connector and the delivery case connection, hand tighten the union nuts.
- (3) Assemble the loop clamp (75-02-03/1-10) to the tube and attach to the bracket (72-42-01/3-500) mounted on the delivery case/CC0C flange with the bracket with bolt, washer and nut (75-02-03/1-40-30-20), lightly tightened.
- (4) Torque-tighten the tube union nut/delivery case connection between 310 and 340 lbf in. (35,0 and 38,4 N.m). Torque-tighten the tube union nut on the multiple connector between 280 and 310 lbf in. (31,6 and 35,0 N.m). (Tools 1648, 1565, 322 and 908). Wire-lock the tube unions.
- (5) Install the closure ferrule, comprising of ferrule, union nut, washer and retaining ring (75-02-03/1-230-220-210-200), to the tube union. Torque-tighten the union nut to between 220 and 240 lbf in. (24,8 and 27,1 N.m) and wire-lock it.
- (6) Assemble the tube (75-02-03/1-235) to the rear union on the connector and hand tighten.

ASSEMBLY

71-00-01

STAGE 3

Page 540

Dec 31/01



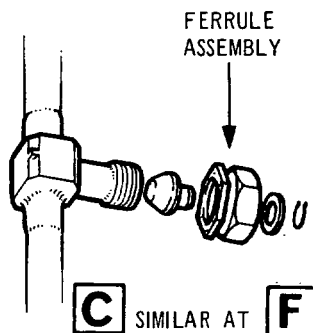
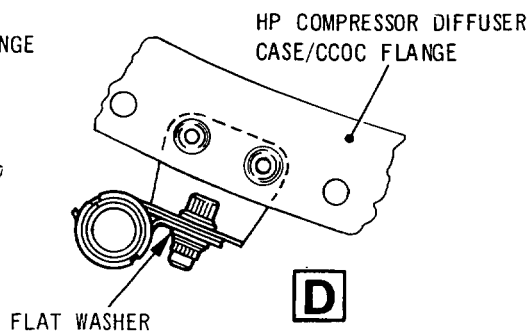
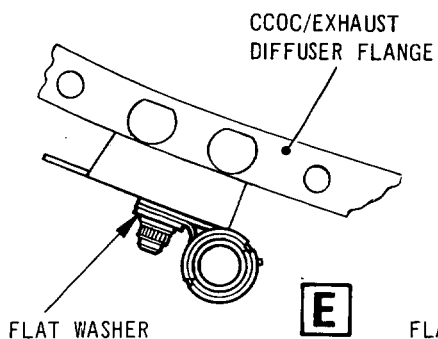
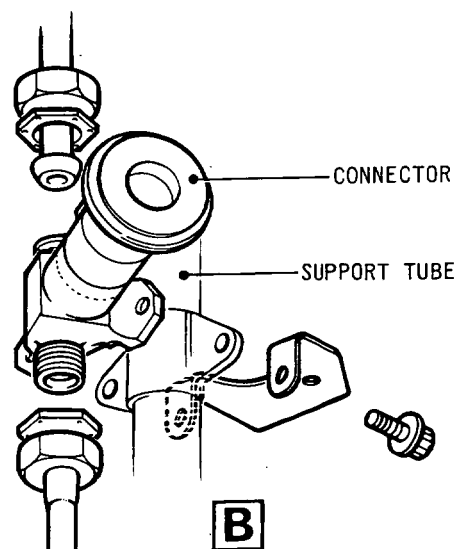
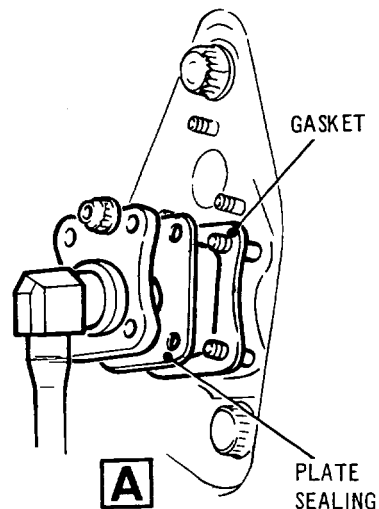
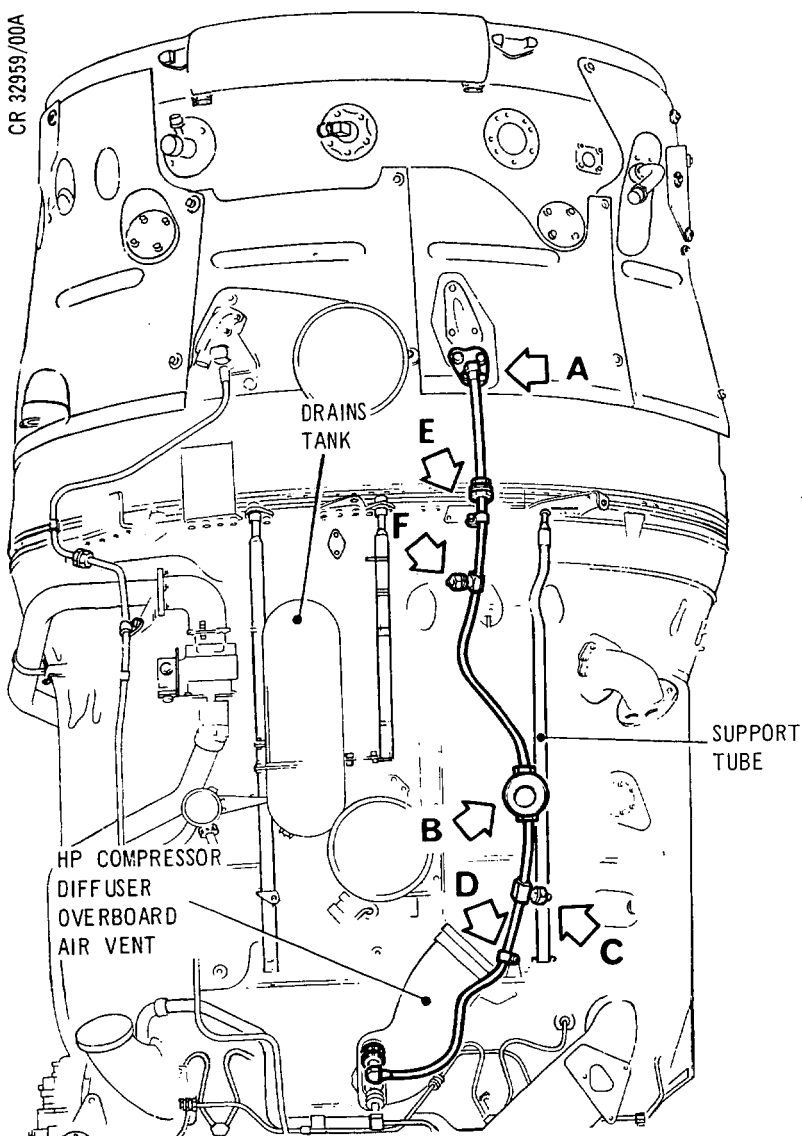
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 32959/00A



Cold Vent Tube,  
LP and HP Turbine Bearings and Connector Assembly  
Figure 516

ASSEMBLY

71-00-01

STAGE 3  
Page 541  
Jan 2/80





# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (7) Assemble the loop clamp (75-02-03/1-130) to the tube and secure it to the bracket (72-53-00/6-270) mounted on the CC0C/exhaust diffuser flanges with bolt, washer and nut (72-02-03/160-150-140) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (8) Assemble the tube (75-02-03/1-240).
  - (a) Remove the loosely assembled nuts (72-53-00/1-380) from the tube mounting face on the exhaust diffuser, and apply lubricant 'C' to the threads.
  - (b) Assemble the sealing plate and gasket (75-02-03/1-250-260) to the tube flange and locate on the mounting face on the exhaust diffuser. Retain with the nuts lightly tightened.
  - (c) Engage the tube union with the rear union of the installed tube mounted to the rear connector union and hand tighten the union nut.
  - (d) Ensure that the locking (run-down) torque is not less than 3.5 lbf in. (0,4 N.m), and torque-tighten the tube flange nuts to 100 lbf in. (11,5 N.m).
- (9) Assemble the closure ferrule, comprising ferrule, union nut, washer and retaining ring (75-02-03/1-230-220-210-200), to the tube union at the rear of the connector. Torque-tighten the union nut to between 220 and 240 lbf in. (24,8 and 27,1 N.m).
- (10) Torque-tighten the tube union nuts between 280 and 310 lbf in. (31,6 and 35,0 N.m).
- (11) Ensure a minimum clearance of 0.050 in. (1,25 mm) between the tube (75-02-03/1-120) forward of the connector and the lug on the right-hand support tube.
- (12) Wire-lock the closure ferrule and tube union nuts.

## 17. Install the Starter Pump (Ref. Item 34, Fig.501 of Stage 1)

### A. Prepare for Installation.

- (1) Apply lubricant 'B' to the bolts.
- (2) Record the type and serial number of the starter pump on the accessory sheet.

ASSEMBLY

## 71-00-01

STAGE 3

Page 542

Dec 31/01



OLYMPUS 593

MK.610-14-28

OVERHAUL



B. Installation (Ref.Fig.517).

- (1) Assemble the pump (73-11-03/1-10) between the mounting brackets (72-33-01/5-90, 360) mounted on the HP compressor case.
- (2) Retain the pump to the front bracket with the bolt, washer and nut (73-11-03/1-40-30-20). Lightly tighten the bolt and nut.
- (3) Retain the pump to the rear bracket with the flanged pins and bolts (73-11-03/1-60-50). Lightly tighten the bolts.
- (4) Torque-tighten all the bolts to between 170 and 190 lbf in. (19,2 and 21,5 N.m).

18. Assemble the Connector and Servo Return Tube to the Reheat Fuel Controller (Ref. Item 35, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to the tube union threads and lubricant 'B' to the bolts.

B. Installation (Ref.Fig.518).

- (1) Assemble the connector block (73-13-08/1-130) to the reheat fuel controller unit (73-23-01/1-10) and retain it with a bolt, pillar bolt and nut (73-13-08/1-110, 120, 100) as shown.
- (2) Torque-tighten the bolts to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (3) Install the ferrule-assembly (73-13-08/1-90) on the connector block at the position shown.
- (4) Position the tube (73-13-08/1-80) on the reheat fuel controller, engage the union connections and lightly tighten the union nuts.
- (5) Assemble the clipnut (73-13-08/1-40) to the bracket (73-23-01/1-10) attached to the reheat fuel controller.



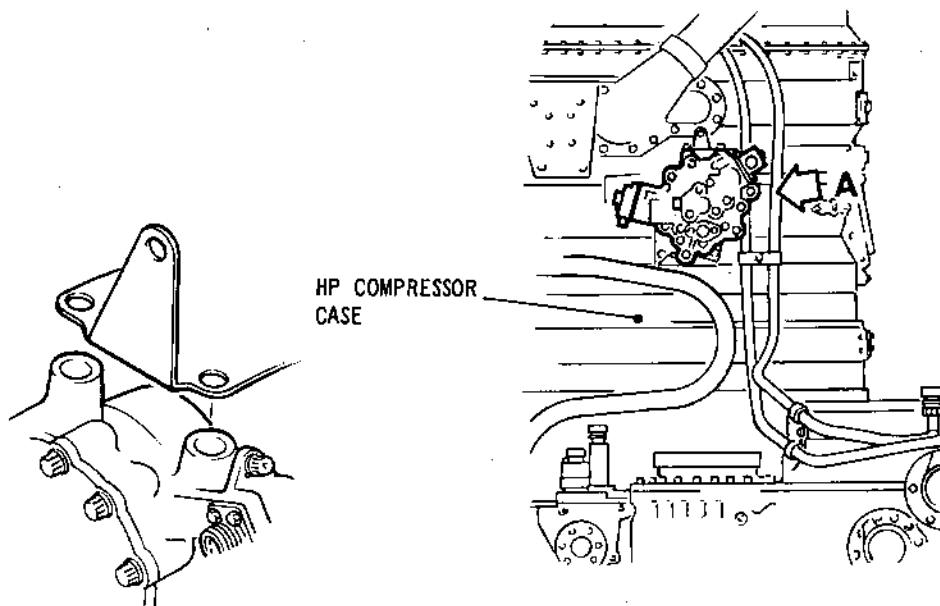
OLYMPUS 593

MK.610-14-28

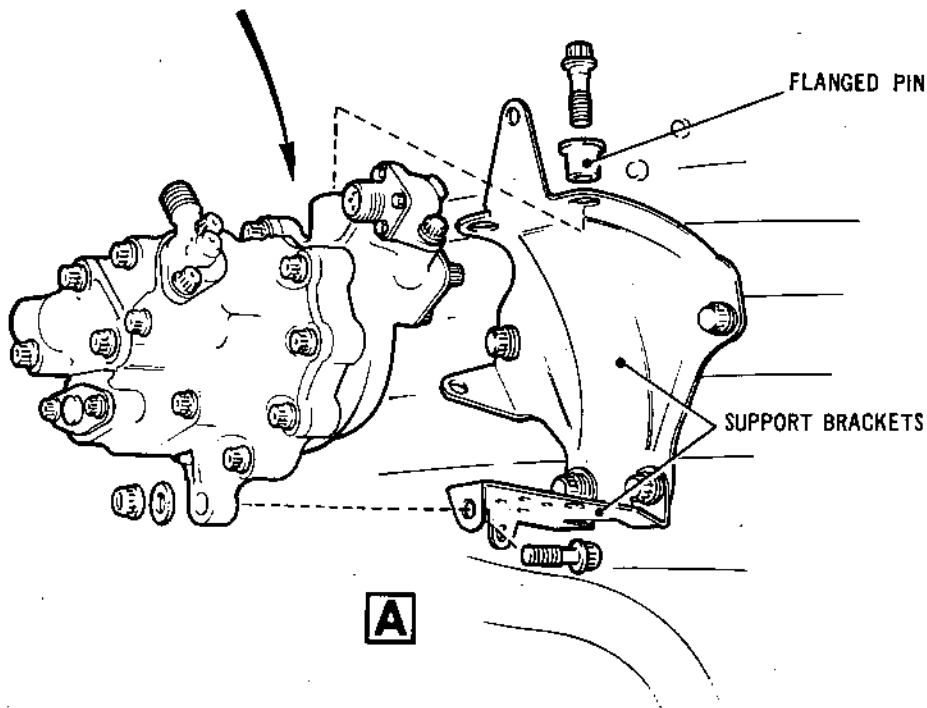
OVERHAUL



CR 32960/00A



VIEW IN DIRECTION OF ARROW



TN8969

Starter Pump  
Figure 517

ASSEMBLY  
**71-00-01**  
STAGE 3  
Page 544  
Jan 2/80



OLYMPUS 593

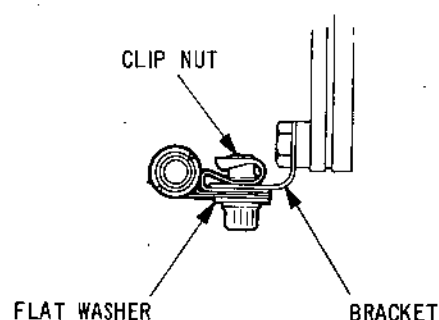
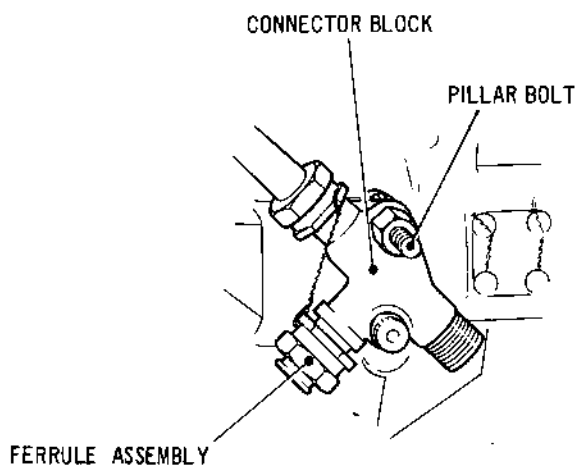
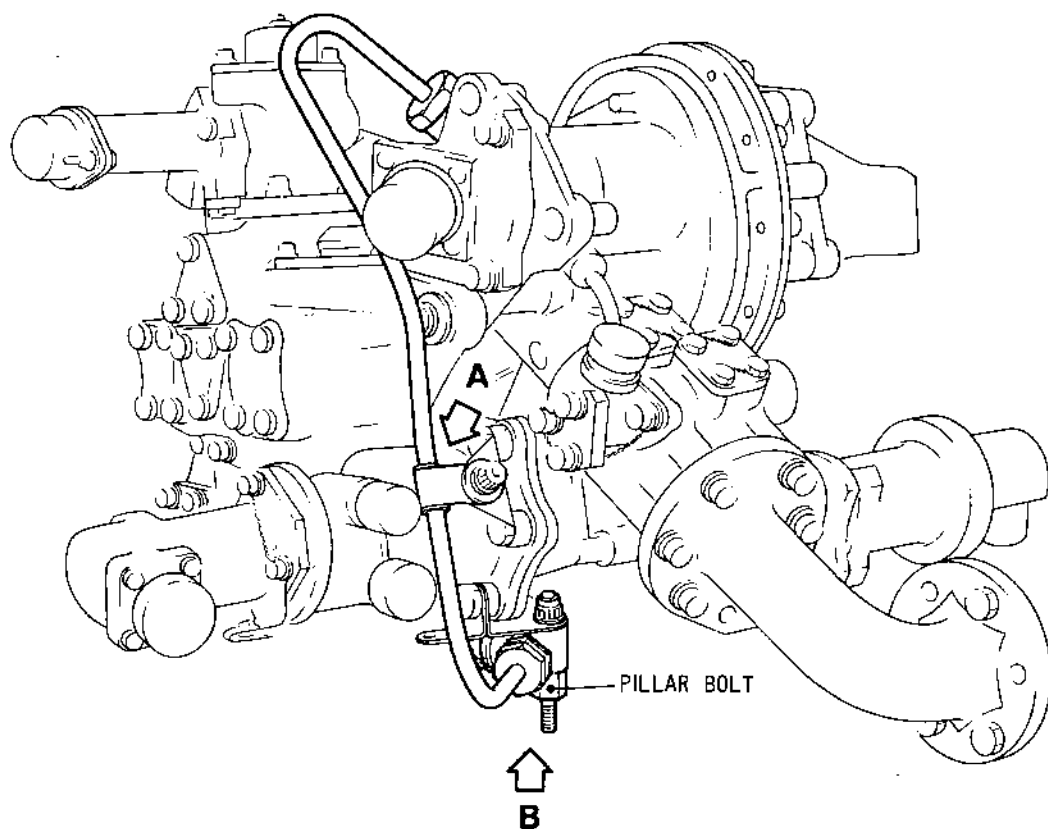
MK.610-14-28

OVERHAUL



CR 33500/00B

PRINTED IN ENGLAND



Reheat Fuel Controller  
Connector and Servo Return Tube  
Figure 518

TN8970



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (6) Assemble the loop clamp (73-13-08/1-10) to the tube and secure it to the bracket with the bolt and washer (73-13-08/1-20, 30) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (7) Torque-tighten union nuts as follows:
  - (a) Tube union nut at the reheat fuel controller to between 220 and 240 lbf in. (24,8 and 27,1 N.m).
  - (b) Tube union nut at the connector block to between 190 and 210 lbf in. (21,5 and 23,7 N.m).
  - (c) Closure ferrule to between 190 and 210 lbf in. (21,5 and 23,7 N.m). Use Tools 909, 1752 and 1648.
  - (d) Wire-lock the union nuts of the tube and closure ferrule.

19. Install the Reheat Fuel Controller/Distribution and Dump Valve (Ref. Item 36, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'B' to the bolts.
- (2) Record the type and serial numbers of the reheat fuel controller and the distribution and dump valve assembly on the accessory sheet.

B. Installation (Ref.Fig.519).

- (1) Support the assembly in position, with the reheat fuel controller mounting face against the mounting plate (72-33-01/8-30) and the support cone aligned with the bracket (72-33-01/4-280) at the lower left-hand side of the HP compressor case.
- (2) Assemble two flanged pins (73-23-01/1-50) to the mounting plate and engage them in the reheat fuel controller mounting face.
- (3) Insert bolts (73-23-01/1-40) through the flanged pins and lightly tighten.

TN8976

ASSEMBLY  
**71-00-01**  
STAGE 3  
Page 546  
Jan 2/80

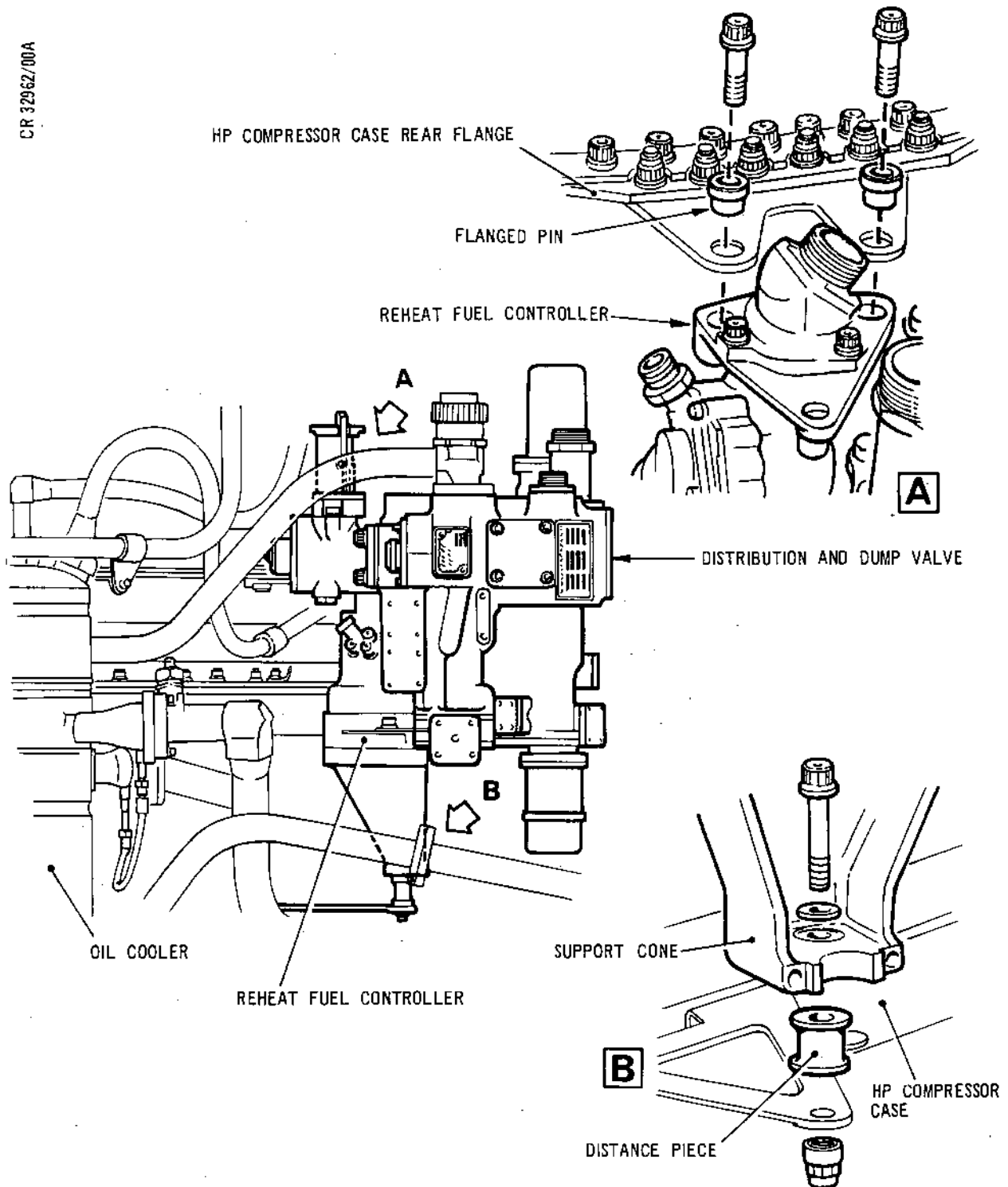


OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 32962/00A

PRINTED IN ENGLAND



Reheat Controller/Distribution and Dump Valve  
Figure 519

ASSEMBLY  
**71-00-01**  
STAGE 3  
Page 547  
Jan 2/80



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (4) Retain the support cone to the bracket with a bolt, flat washer, distance piece and nut (73-23-01/1-140, 130, 120, 110). Lightly tighten the nut and bolt.
- (5) Torque-tighten all bolts to between 170 and 190 lbf in. (19,2 and 21,5 N.m). Locking (run-down) torque 6.5 lbf in. (0,73 N.m).
- (6) SB.0L.593-71-8988-32. Assemble the loop clamp (27G) (71-51-01/6-150) to the reheat FCU flylead and secure to the bracket on the reheat flowmeter with the bolt, spacer and nut (71-51-01/6-170-190-180), torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

20. Install the Fuel Tubes, Starter Pump to FCU (Ref. Item 37, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to tube union connections and lubricant 'B' to the bolts.

B. Installation (Ref.Fig.520).

- (1) Install the housing (73-13-05/1-110).
  - (a) On engines to pre S.B.73-8311-62 standard, insert filter with interposed seal plate (73-13-05/1-120-130) into housing. Locate the assembly on the FCU location with a second seal plate between the mating faces and retain with three bolts (73-13-05/1-100A) lightly tightened.
  - (b) On engines to S.B.73-8311-62 standard, locate housing on the FCU location with the seal plate (73-13-05/1-120) between the mating faces and retain with three bolts (73-13-05/1-100B) lightly tightened.
  - (c) Torque-tighten bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (2) Assemble the tube (73-13-05/1-90) to the filter housing union, finger-tighten the union nut.
- (3) Position the tube (73-13-05/1-80) to the engine, engage the union nuts to the starter pump and to the tube fitted to the filter housing and hand tighten the union nuts.

ASSEMBLY

## 71-00-01

STAGE 3

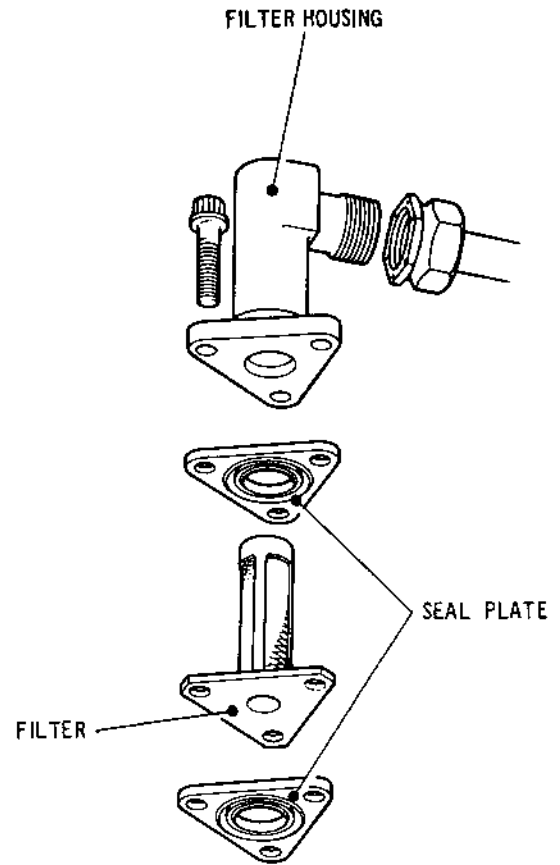
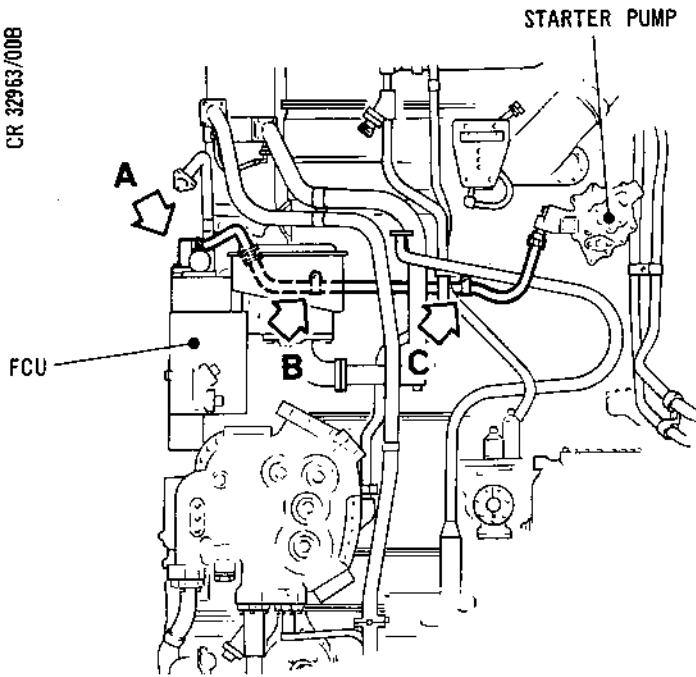
Page 548

Jun 1/94

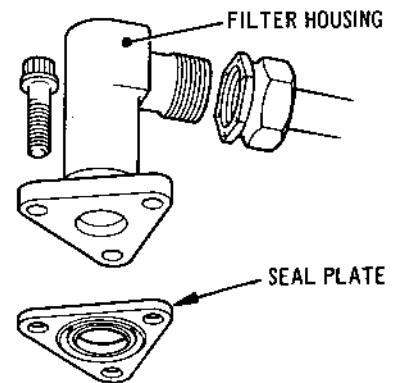
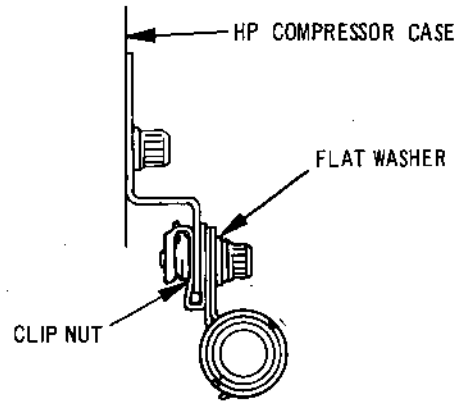
CR 32963/00B



**OLYMPUS 593**  
MK.610-14-28  
OVERHAUL



**A** PRE SB.73-8311-62



**A** SB. 73-8311-62

**B** SIMILAR AT **C**

Fuel Tubes, Starter Pump to FCU  
Figure 520





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Install the loop clamps (73-13-05/1-10).
  - (a) Assemble a loop clamp to the tube (73-13-05/1-80) and attach it to the bracket (72-33-01/4-110) mounted on the HP compressor case with bolt, washer and nut (73-13-05/1-20-30-40) lightly tightened.
  - (b) Assemble a loop clamp to the tube and attach it to the bracket (72-33-01/4-190) mounted on the HP compressor case with bolt, washer and nut (73-13-05/1-20-30-40) lightly tightened.
  - (c) Torque-tighten the nuts and bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (5) Torque-tighten the tube union nuts between 280 and 310 lbf in. (31,6 and 35,0 N.m) (Tool 908) and wire-lock them.

21. Install the Oil Tank Overboard Rear Vent Tube and Support Bracket (Ref. Item 38, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to the tube union connections and lubricant 'B' to the bolts except where stated.

B. Installation.

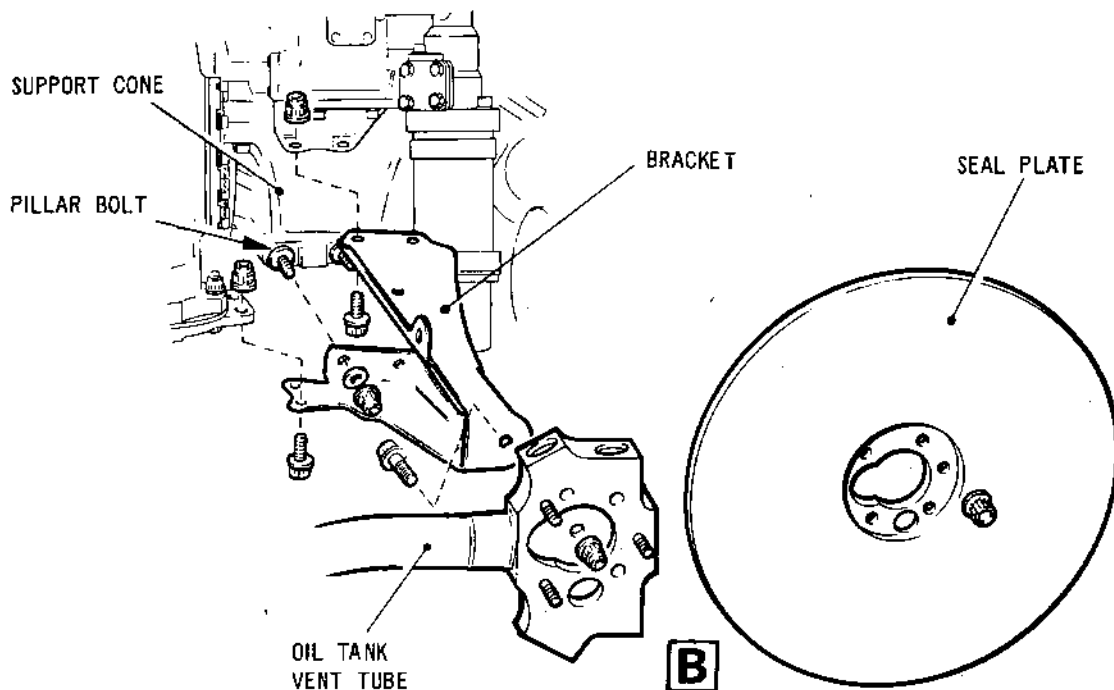
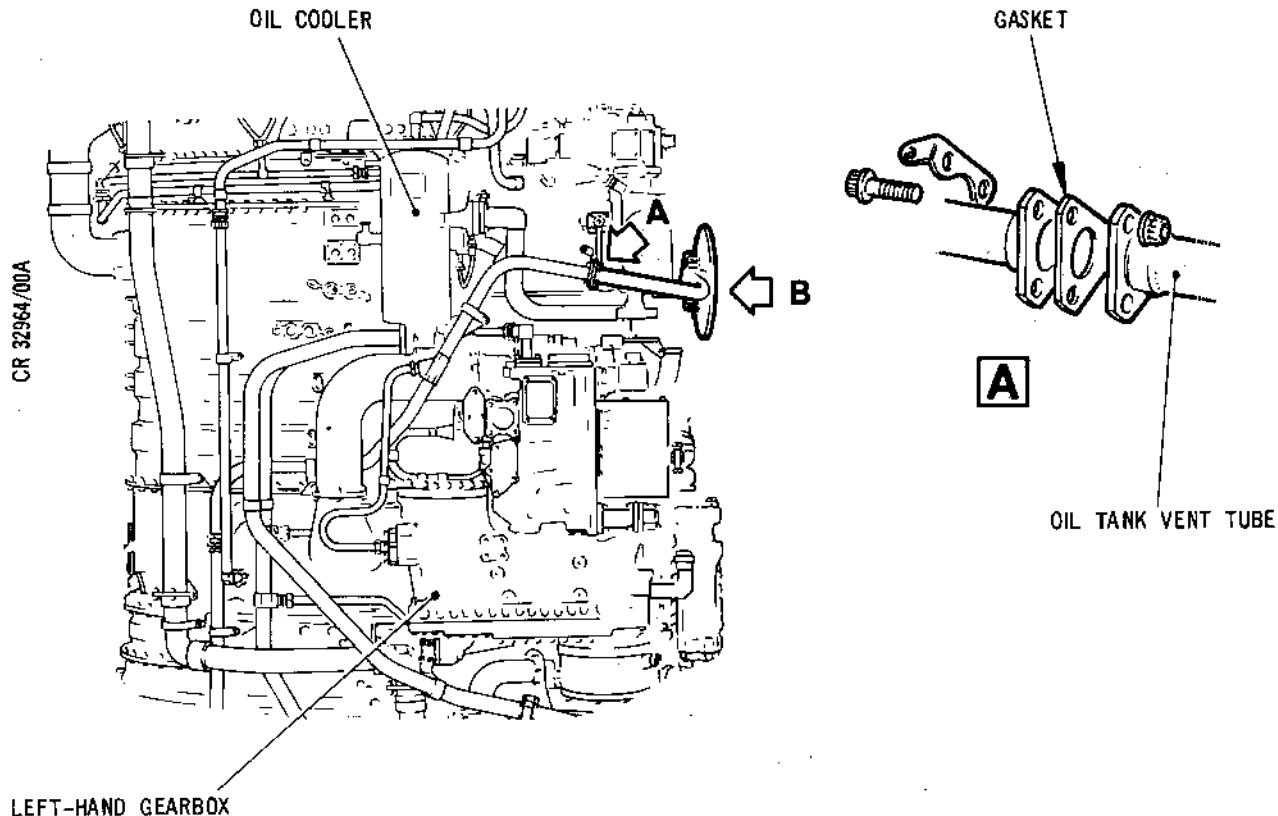
- (1) Assemble the pillar bolts, washers and nuts (73-23-01/1-100-90-80) to the reheat controller support cone. Torque-tighten the nuts and bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (2) Assemble the bracket (75-02-02/1-70) to the pillar bolts and secure with washers and nuts (73-23-01/1-90-80) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m). Secure the bracket to the distribution block front mounting bracket with bolts and nuts (75-02-02/1-60-50) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

TN32236



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Oil Tank Overboard Rear Vent Tube  
Figure 521

TN8977



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Apply lubricant 'A' to the bolts (75-02-02/1-20) (Ref. SB.72-115 Part 4). Position the seal plate to the tube (75-02-02/1-80-90) and secure with bolts and nuts (75-02-02/-20-10), torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m). Ensure the bolts do not protrude below the sealing face of the plate.
- (4) Install tube (75-02-02/1-90) and seal plate.
  - (a) Apply lubricant 'A' to the bolts (75-02-02/1-40-110).
  - (b) Attach the tube and seal plate to the bracket with bolt and nut (75-02-02/1-30) hand tightened.
  - (c) Assemble a gasket between the tube flanges (75-02-02/1-120-90-270) and position the bracket (75-02-02/1-115) to the flange of the upper tube.
  - (d) Secure the bracket, tube flanges and gasket with the bolts and nuts (75-02-02/1-110-100) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
  - (e) Torque-tighten the nut and bolt, securing the tube to the bracket to between 135 and 145 lbf in. (15,3 and 16,4 N.m). Locking (run-down) torque 6.5 lbf in. (0,73 N.m).

22. Install the Fuel Tube, Second Stage Pump to Starter Pump  
(Ref. Item 39, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to the tube union connections and lubricant 'B' to the bolts.

B. Installation (Ref.Fig.522)

- (1) Position the tube (73-13-04/1-50) between the starter pump and oil cooler to second stage pump fuel tube unions. Engage and hand tighten the union nuts.

FN8975

ASSEMBLY  
**71-00-01**  
STAGE 3  
Page 552  
Jan 2/80



OLYMPUS 593

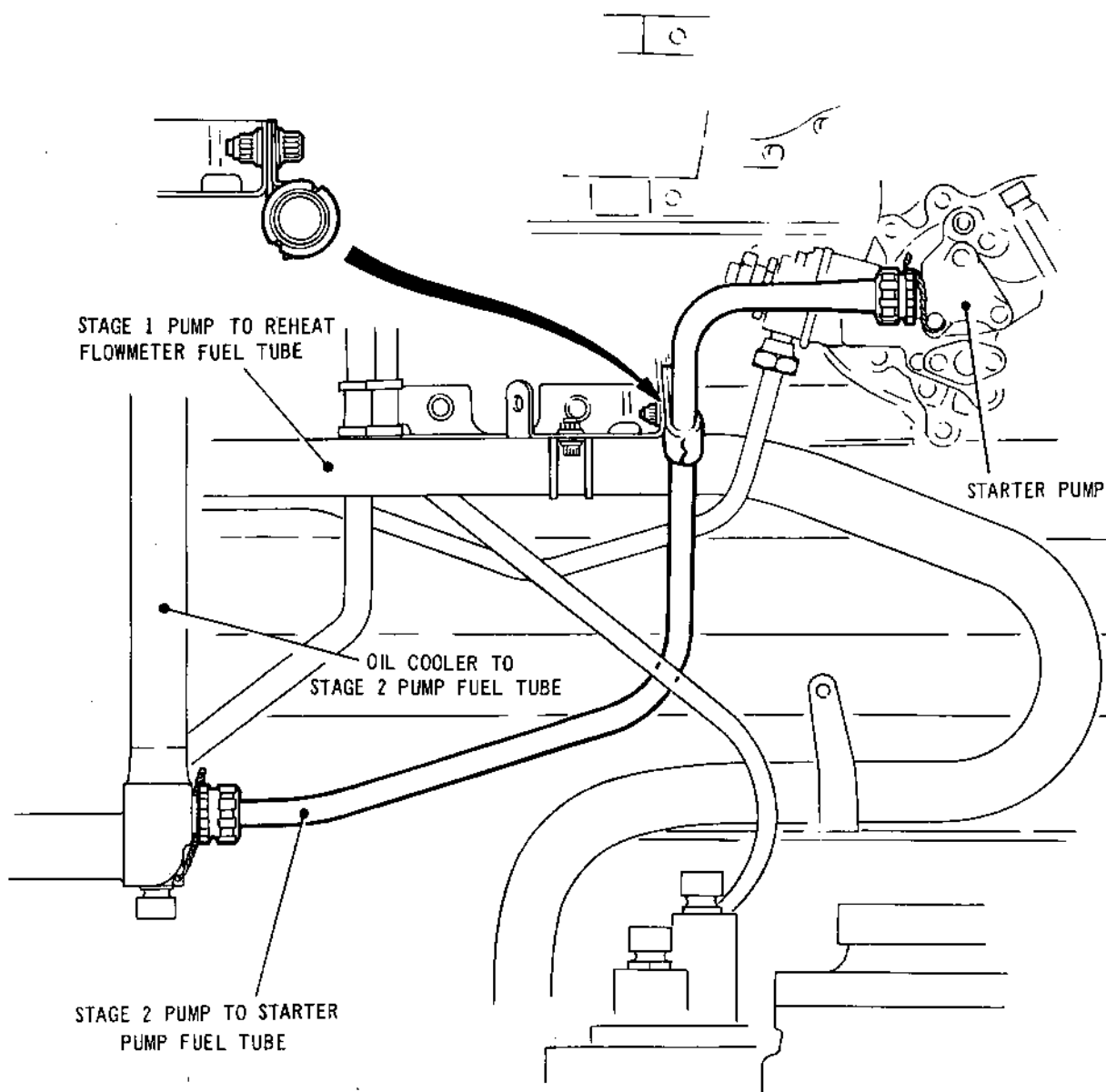
MK.610-14-28

OVERHAUL



CR 33196 00A

PRINTED IN ENGLAND



TN32237

Fuel Tube,  
Second Stage Pump to Starter Pump  
Figure 522

ASSEMBLY  
**71-00-01**  
STAGE 3  
Page 553  
Jan 2/80



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (2) Assemble the loop clamp (73-13-04/1-10) to the tube and attach it to the bracket (72-33-01/4-230) supporting the reheat feed tube to the HP case stage three blow-off position, using the nut and bolt (74-21-01/2-50-40) lightly tightened.
- (3) Torque-tighten the tube union nuts to between 310 and 340 lbf in. (35,0 and 38,4 N.m) (Tools 1648, 322 and 1565).
- (4) Wire-lock the tube union nuts.

23. Complete the Installation of the Main Fuel Tubes, Manifold to Distribution and Dump Valve (Ref. Item 40, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to the tube union connections and lubricant 'B' to the bolts.

B. Installation (Ref.Fig.523).

- (1) Secure the fuel inlet manifold feed tubes flanges to the distribution and dump valve.
  - (a) Insert a seal plate (73-13-02/2-180) between the upper fuel feed tube flange (73-13-02/2-160) and the distribution and dump valve mounting.
  - (b) Secure the tube flange and seal plate to the distribution and dump valve with bolts (73-13-02/2-170) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (c) Insert a seal plate (73-13-02/2-290) between the lower fuel feed tube flange (73-13-02/2-270) and the distributor mounting block.
  - (d) Secure the tube flange and seal plate to the distribution and dump valve with bolts (73-13-02/2-280) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

FN8851

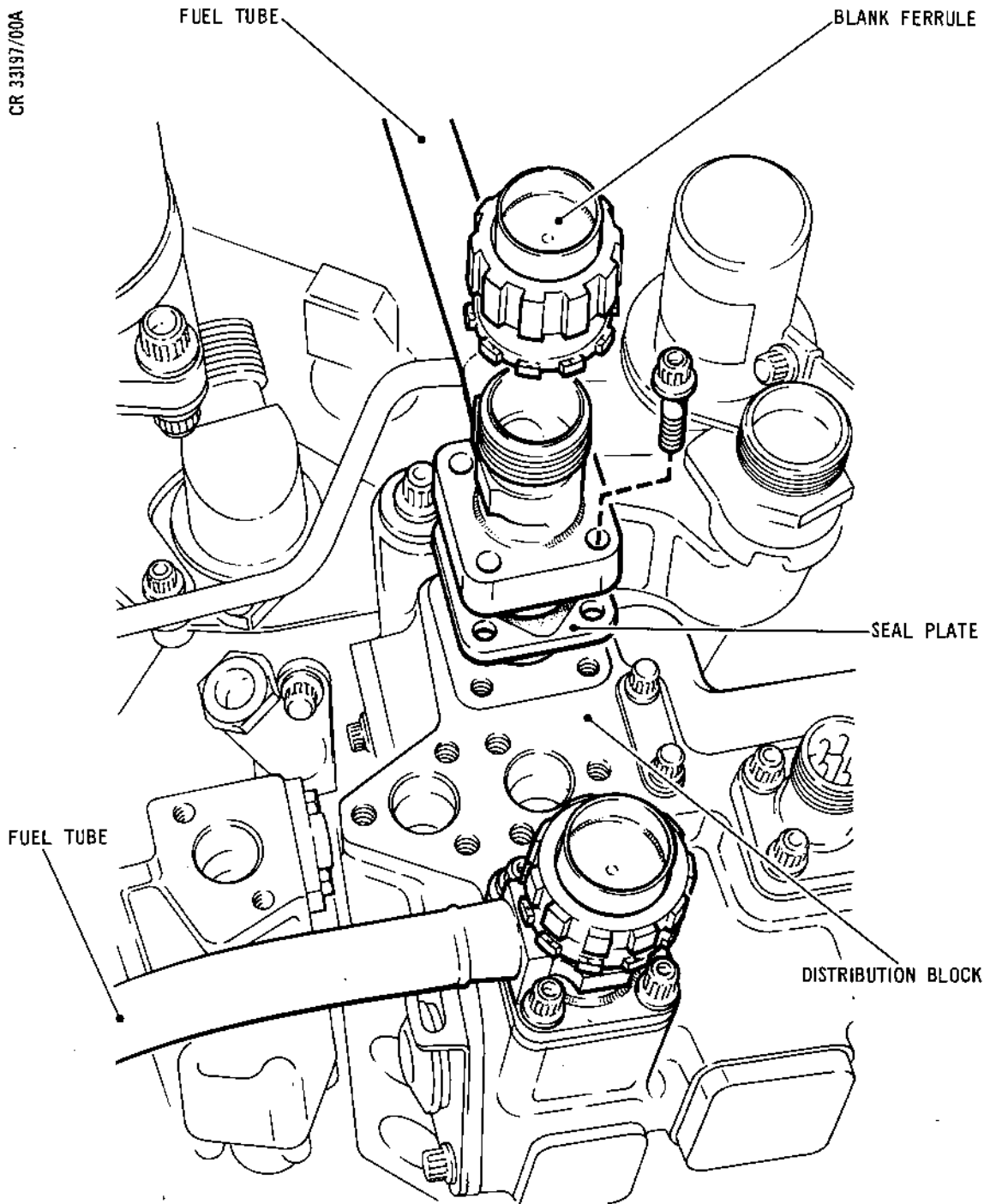


OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 33197/00A

PRINTED IN ENGLAND



TN8852

Fuel Tube,  
Manifold to Distribution Block  
Figure 523

ASSEMBLY  
**71-00-01**  
STAGE 3  
Page 555  
Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Torque-tighten the tube union nuts to the manifolds between 400 and 440 lbf in. (45,2 and 49,7 N.m) (Tools 1528, 947 and 1648).
- (3) Install closure ferrules (73-13-02/2-150-260) to the upper and lower tubes and torque-tighten to between 50 and 55 lbf in. (5,6 and 6,2 N.m) (Tools 1529, 948 and 1656).
- (4) Wire-lock the union nuts of the tube and closure ferrules.

24. Assemble the Reheat Flowmeter to the Reheat Supply Tube and Reheat Fuel Controller (Ref. Item 41, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'B' to the bolts.
- (2) Record the type and serial number of the reheat flowmeter on the accessory sheet.

B. Installation (Ref.Fig.524).

- (1) Connect flowmeter to fuel tube.
  - (a) Position flowmeter (73-33-02/1-10) on engine and carefully insert serviceable seal plate (73-13-03/1-430), ensuring that the flat of the plate is against the electrical connection position and bolt-holes are aligned. If necessary, turn seal plate to reverse faces and align bolt-holes.
  - (b) Assemble the two short bolts (73-13-03/1-340) at the threaded hole locations and lightly tighten.
  - (c) Position nut plate assembly (73-13-03/1-370) against flowmeter flange and secure at plain hole position with nut and bolt (73-13-03/1-350, 360) lightly tightened.
  - (d) Assemble three bolts (73-13-03/1-360) through fuel tube and flowmeter flanges to engage with the three nuts of the nut plate assembly. Lightly tighten bolts.

TN8853

ASSEMBLY  
**71-00-01**

STAGE 3  
Page 556  
Jan 2/80



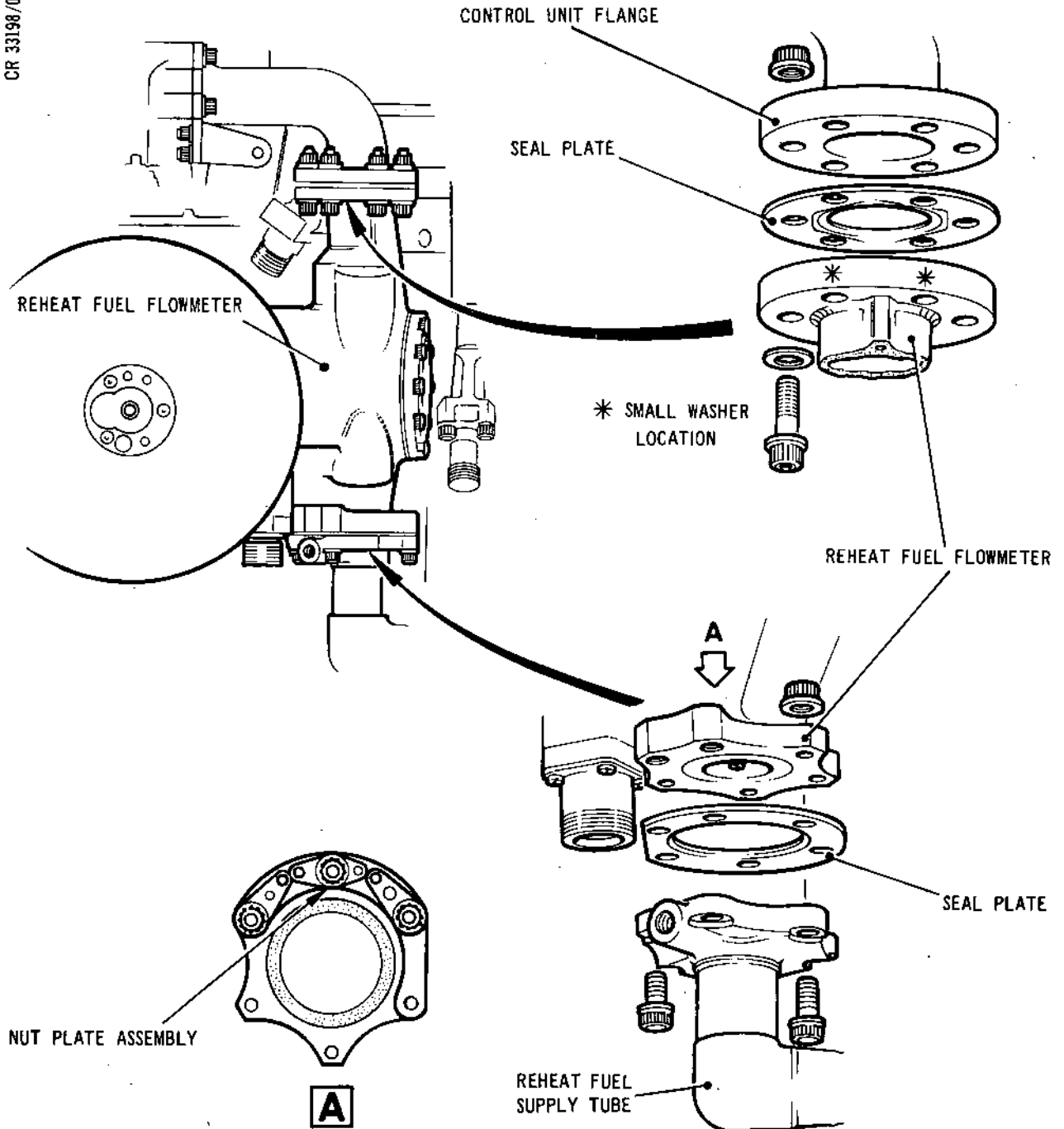
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 33198/00A



TN8854

Reheat Flowmeter  
Figure 524

ASSEMBLY  
**71-00-01**  
STAGE 3  
Page 557  
Jan 2/80





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Connect flowmeter to reheat fuel controller elbow.
  - (a) Carefully insert serviceable seal plate (73-33-02/1-100) between flowmeter flange and reheat fuel controller elbow.
  - (b) Install and lightly tighten the six bolts, washers and nuts (73-33-02/1-20, 30, 40, 15) securing the flanges, positioning the two smaller diameter washers under heads of bolts at each side of the protrusion on the flange, as indicated in Figure 524.
- (3) Torque-tighten nuts and bolts at both flanges to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

25. Install Fuel Tubes, Starter Pump to Distribution and Dump Valve (Ref. Item 42, Fig.501 of Stage 1)

A. Install Tube, Starter Pump to Union Connection (Ref. Fig.525).

- (1) Apply lubricant A to tube union connections and lubricant B to attachment bolts and nuts.
- (2) Assemble the clipnut (73-13-06/1-40) to the bracket (72-33-01/4-190) mounted on the HP compressor case (Detail C).
- (3) Assemble the clipnut (73-13-06/1-40) to the bracket (75-01-04/1-50) mounted on the cooling air duct (Detail D).
- (4) Assemble two loop clamps (73-13-06/1-10) to the tube (73-13-06/1-80) and while supporting the tube in position, engage the union connection at the starter pump and lightly tighten the union nut.
- (5) Attach the loop clamps to the support brackets with bolts and washers (73-13-06/1-20, 30) and clipnuts. Lightly tighten the bolts.

IN8856

ASSEMBLY  
**71-00-01**  
STAGE 3  
Page 558  
Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

B. Install Tube, Union Connection to Distribution and Dump Valve (Ref.Fig.525).

- (1) Apply lubricant A to the union connection. Apply lubricant B to tube flange attachment bolts and loop clamp attachment nuts and bolts.
- (2) Support the tube (73-13-06/1-160) on the engine, engage the union connection and lightly tighten the union nut.
- (3) Insert a seal plate (73-13-06/1-180) between the tube flange and the mounting face on the distribution and dump valve. Retain with bolts (73-13-06/1-170) lightly tightened.
- (4) Assemble the loop clamp (73-13-06/1-90) to the tube and attach it to the support bracket with a bolt, flatwasher and nut (73-13-06/1-120, 110, 100) lightly tightened.

C. Torque-tighten Attachment Bolts and Union Nuts.

- (1) Torque-tighten loop clamp attachment bolts to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (2) Torque-tighten tube flange attachment bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (3) Torque-tighten tube union nuts to between 190 and 210 lbf in. (21,5 and 23,7 N.m) with the torque setting adapter (Tool 909). Wire-lock both union nuts.

26. Install Fuel Tubes, Distribution and Dump Valve to Pilot Nozzles  
(Ref. Item 43, Fig.501 of Stage 1)

A. Install Tube, Distribution and Dump Valve to Tube Adapter (Ref.Fig.526).

- (1) Apply lubricant A to tube union connections and lubricant B to attachment bolts.
- (2) Position the tube (73-13-06/2-150) on the engine with a seal plate (73-13-06/2-210) located between the tube flange and dump valve.

TN8858

ASSEMBLY

71-00-01

STAGE 3

Page 559

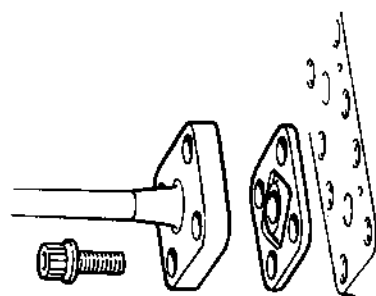
Jan 2/80



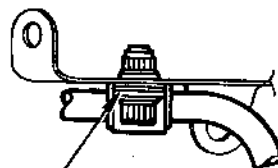
OLYMPUS 593

MK.610-14-28

OVERHAUL

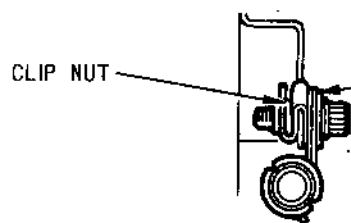
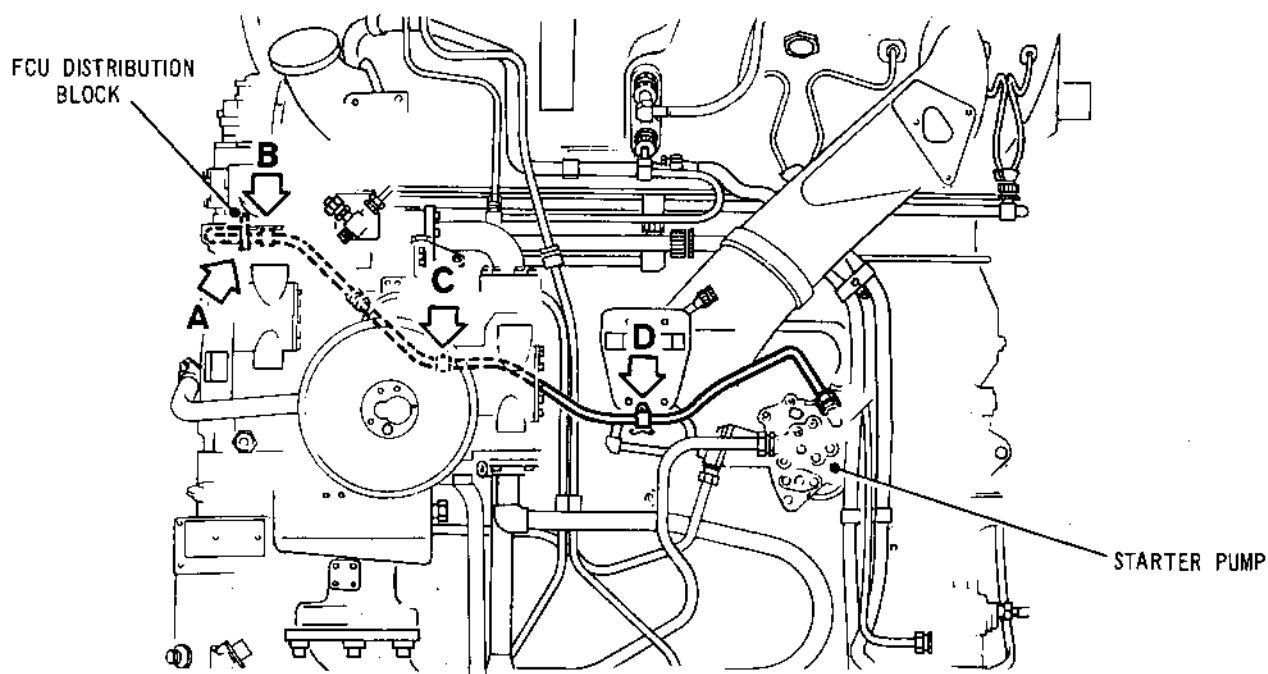


**A**



FLAT WASHER

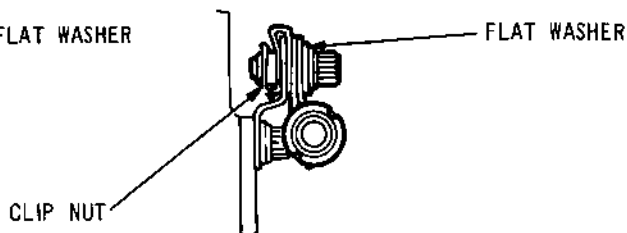
**B**



CLIP NUT

FLAT WASHER

**C**



CLIP NUT

FLAT WASHER

**D**

Fuel Tubes,  
Starter Pump to Distribution and Dump Valve  
Figure 525

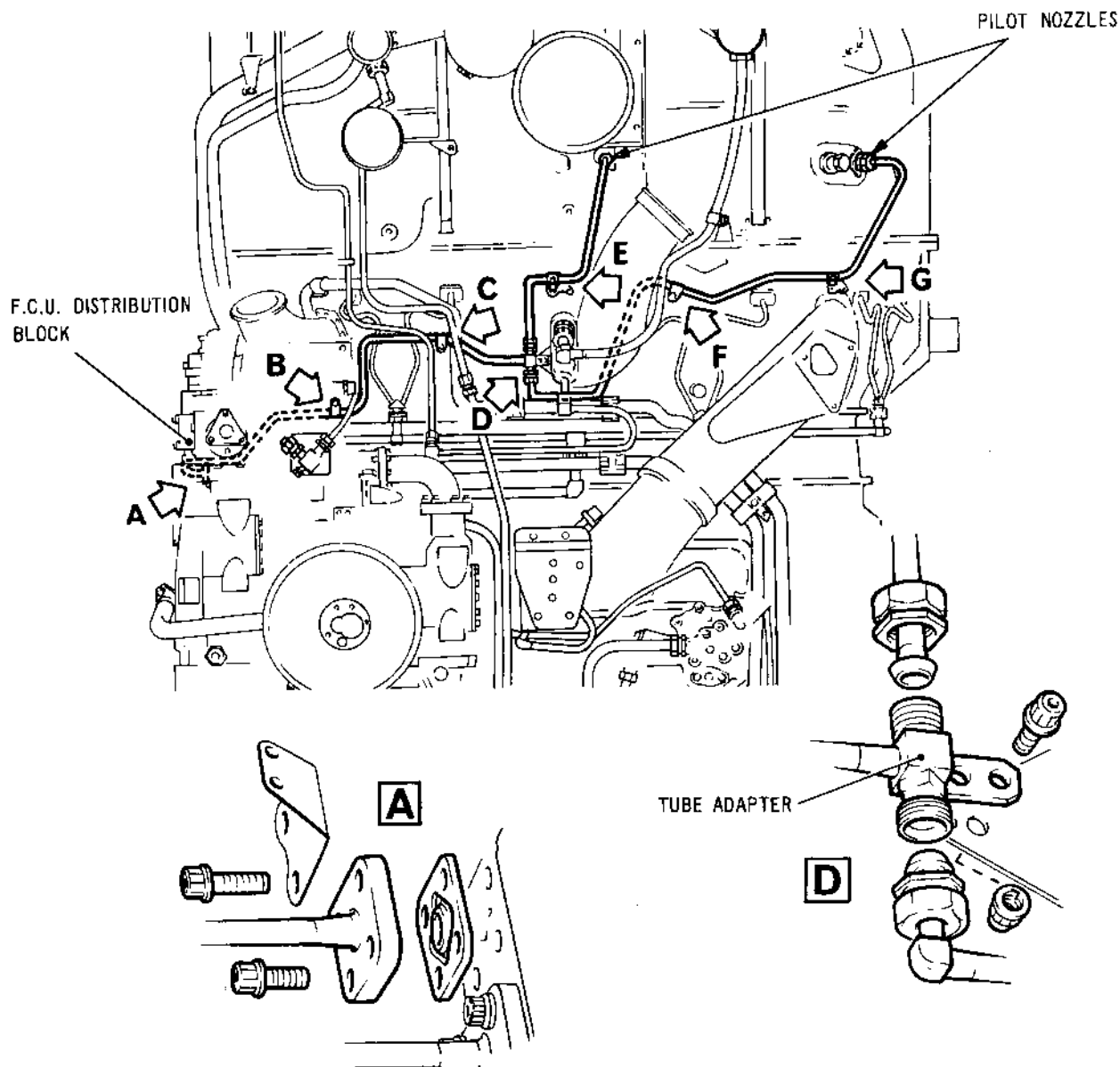
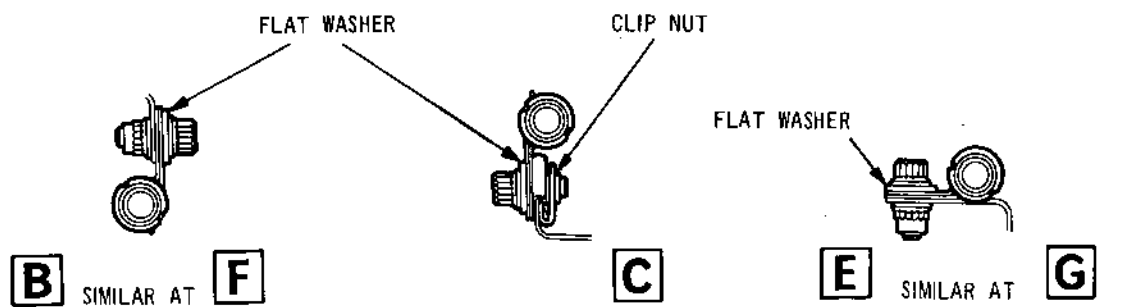
7N8855

ASSEMBLY  
**71-00-01**  
STAGE 3  
Page 560  
Jan 2/80

CR 33200/00B



**OLYMPUS 593**  
MK.610-14-28  
OVERHAUL



Fuel Tubes,  
Distribution and Dump Valve to Pilot Nozzles  
Figure 526



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (3) Position the bracket (73-13-06/2-200) on the tube flange and retain the assembly with bolts (73-13-06/2-170) at the bracket locations and bolts (73-13-06/2-160) at the remaining locations. Lightly tighten the bolts.
  - (4) Retain the tube adapter to the bracket mounted on the HP compressor diffuser case with two bolts and nuts (73-13-06/2-190-180) lightly tightened.
  - (5) Assemble the clipnut (73-13-06/2-110) to the bracket shown at detail C.
  - (6) Assemble two loop clamps (73-13-06/2-10-80) to the tube and align them with the mounting brackets.
  - (7) Retain the loop clamp to the bracket (detail C) with a flat washer and bolt (73-13-06/2-100-90) and the clipnut.
  - (8) Retain the loop clamp (Detail B) with a bolt, flat washer and nut (73-13-06/2-40-30-20).
- B. Install Tube, Adapter to Right-hand Pilot Nozzle (Ref.Fig.526).
- (1) Apply lubricant A to tube union connections and lubricant B to loop clamp attachment bolts.
  - (2) Position the tube (73-13-06/2-370) on the engine, engage the union connections at the pilot nozzle and adapter then lightly tighten the union nuts.
  - (3) Assemble two loop clamps (73-13-06/2-300) to the tube and attach them to the support brackets (Details F and G) with bolts, flat washers and nuts (73-13-06/2-330-320-310).
- C. Install Tube, Adapter to Left-hand Pilot Nozzle (Ref.Fig.526).
- (1) Apply lubricant A to union connections and lubricant B to loop clamp attachment bolt.
  - (2) Position the tube (73-13-06/2-290) on the engine, engage the union connections at the pilot nozzle and adapter then lightly tighten the union nuts.

TN8859

ASSEMBLY  
**71-00-01**  
STAGE 3  
Page 562  
Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (3) Assemble the loop clamp (73-13-06/2-220) to the tube and retain it to the bracket (Detail E) with a bolt, washer and nut (73-13-06/2-250-240-230) lightly tightened.

NOTE: Ensure that a minimum clearance of 0.150 in. (3,81 mm) exists between the tube and the electrical harness bracket.

D. Torque-tighten Attachment Bolts and Union Nuts.

- (1) Torque-tighten all loop clamp retaining bolts and nuts to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (2) Torque-tighten tube flange retaining bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (3) Torque-tighten the union nuts at the pilot nozzles and tube adapter to between 190 and 210 lbf in. (21,5 and 23,7 N.m).
- (4) Wire-lock the union nuts.

27. Install Fuel System Air Bleed Tubes (Ref. Item 44, Fig.501 of Stage 1)

A. Install Tube, Oil Cooler to Union Connection (Ref.Fig.527).

- (1) Apply lubricant A to the union connections and lubricant B to loop clamp attachment bolts.
- (2) Position the tube (73-13-12/1-180) on the engine, engage the union connection at the oil cooler and lightly tighten the union nut.
- (3) Assemble the loop clamp (73-13-12/1-110) to the tube and attach it to the support bracket with a bolt, flat washer and nut (73-13-12/1-140-130-120) lightly tightened.

B. Install Tube and Bleed Valve (Ref.Fig.527).

- (1) Apply lubricant A to the union connection and valve assembly. Apply lubricant B to attachment bolts.

ASSEMBLY

71-00-01

STAGE 3

Page 563

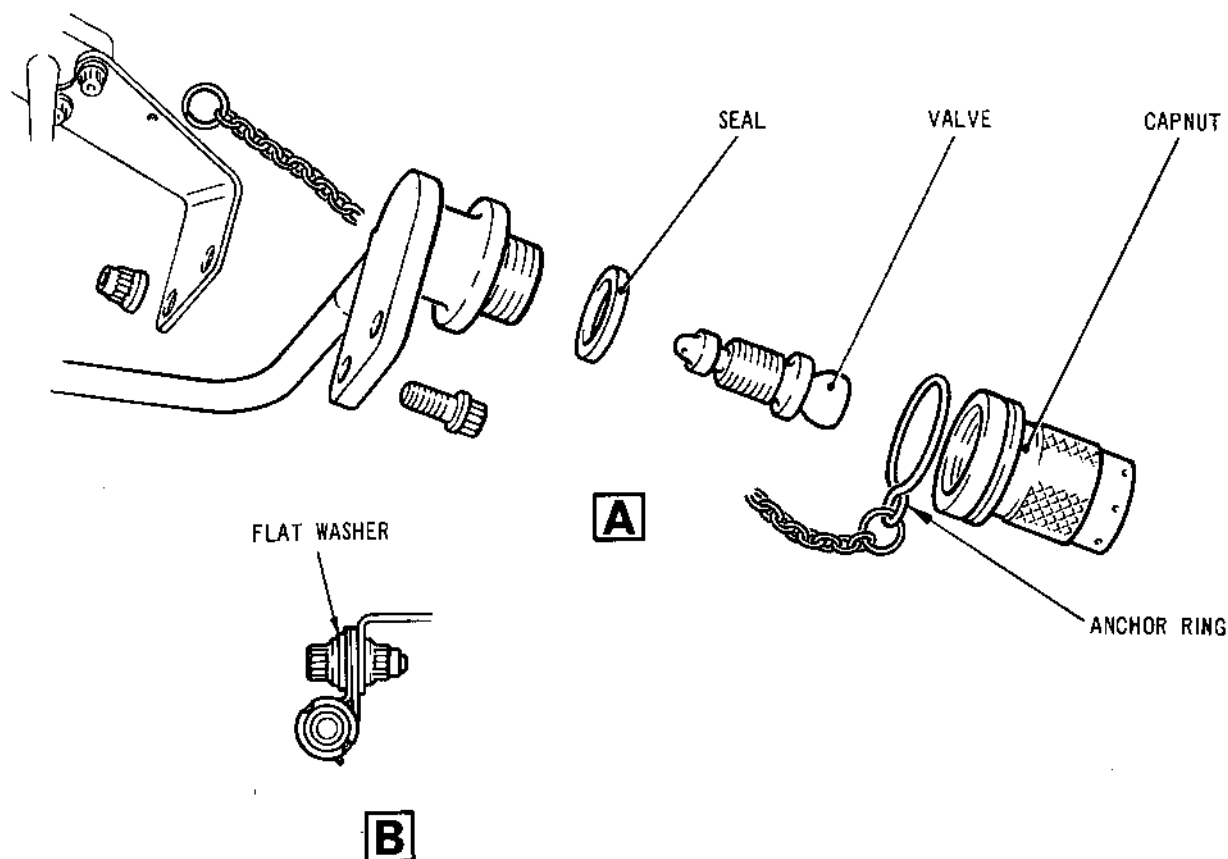
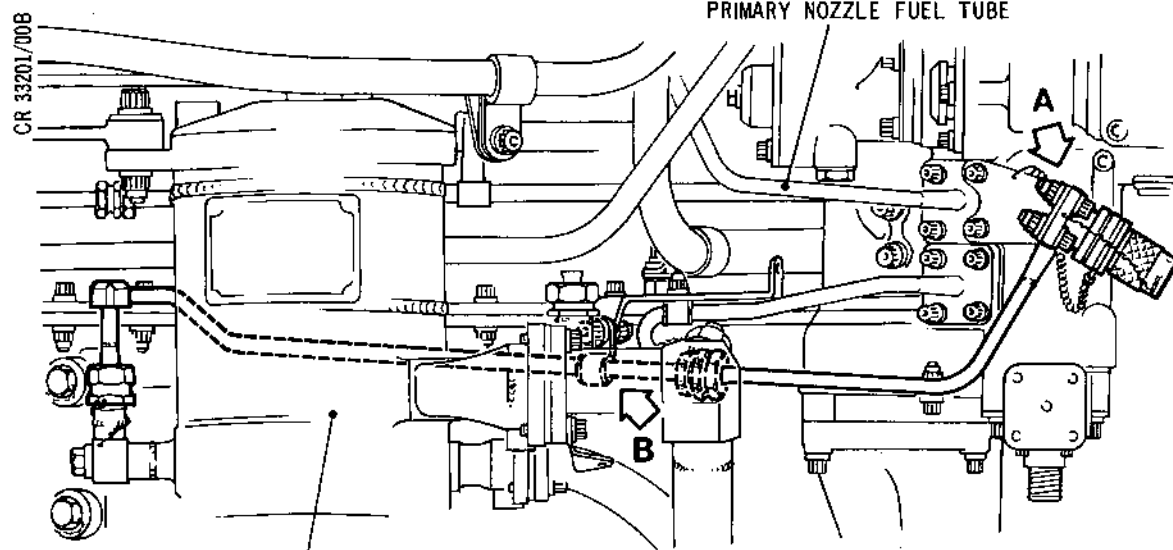
Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



TN8860

Fuel System Air Bleed Tubes  
Figure 527

ASSEMBLY  
**71-00-01**  
STAGE 3  
Page 564  
Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Assemble bleed valve to tube.
  - (a) Screw the valve assembly into the tube (73-13-12/1-60-70) and lightly tighten.
  - (b) Assemble the seal and capnut (73-13-12/1-50-40) to the tube. Tighten the capnut and wire-lock it.
  - (c) Attach the chain to the anchor ring (73-13-12/1-20-30) with the key ring (73-13-12/1-10) then assemble the anchor ring to the capnut.
- (3) Position the tube on the engine, engage the union connection and lightly tighten the union nut.
- (4) Retain the tube attachment lug to the bracket mounted on the primary nozzle fuel tube flange, with bolts and nuts (73-13-12/1-90-80) lightly tightened.
- (5) Attach the chain to the bracket with the key ring.

C. Torque-tighten Attachment Bolts and Union Nuts.

- (1) Torque-tighten the loop clamp attachment bolt and the tube lug attachment bolts to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (2) Torque-tighten the union nuts to between 190 and 210 lbf in. (21,5 and 23,5 N.m) with the torque setting adapter (Tool 909).
- (3) Wire-lock the union nuts.





OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

TUBES AND ACCESSORIES - ASSEMBLY

1. Install LP Shaft Signal System Cylinder/Piston Unit Complete with Front and Centre Cables (Item 45, Fig.501 of Stage 1)

A. Prepare for Installation.

(1) Apply:

- (a) Lubricant 'B' to all bolts unless stated otherwise.
- (b) Jointing compound 'A' to the bracket (76-21-01/2-110) and cover (76-21-01/2-80).
- (c) Lubricant 'T' to S.B.76-8570-26 standard centre cable (76-21-01/2-380) allow to soak, then drip dry.
- (d) Lubricant 'G' to S.B.76-8570-26 standard centre cable (76-21-01/2-380A) during installation (Ref.para.C.(2)).

WARNING: WASH HANDS AFTER CONTACT WITH LUBRICANT 'G' ON SIGNAL SYSTEM COMPONENTS. LUBRICANT CONTAINS COPPER AND LEAD AND IS TOXIC.

B. Install Support Brackets and Cylinder/Piston Unit (Ref.Fig.501).

- (1) Assemble the support bracket (76-21-01/2-110) to the lower left-hand intrascope position on the CCOC and retain with the screws (76-21-01/2-100), tighten the screws. Ensure the heads of the screws are below the surface of the bracket.
- (2) Assemble the cover (76-21-01/2-80) to the bracket and retain with bolts (76-21-01/2-70) with lubricant 'C' applied. Torque-tighten the bolts to 100 lbf in. (11,5 N.m) then wire-lock them.
- (3) Install cylinder/piston unit.
  - (a) Position the block (76-21-01/2A-85) to the rear face of the bracket lug (Ref. SB.76-14).

ASSEMBLY

71-00-01

STAGE 4

Page 501

Dec 31/01



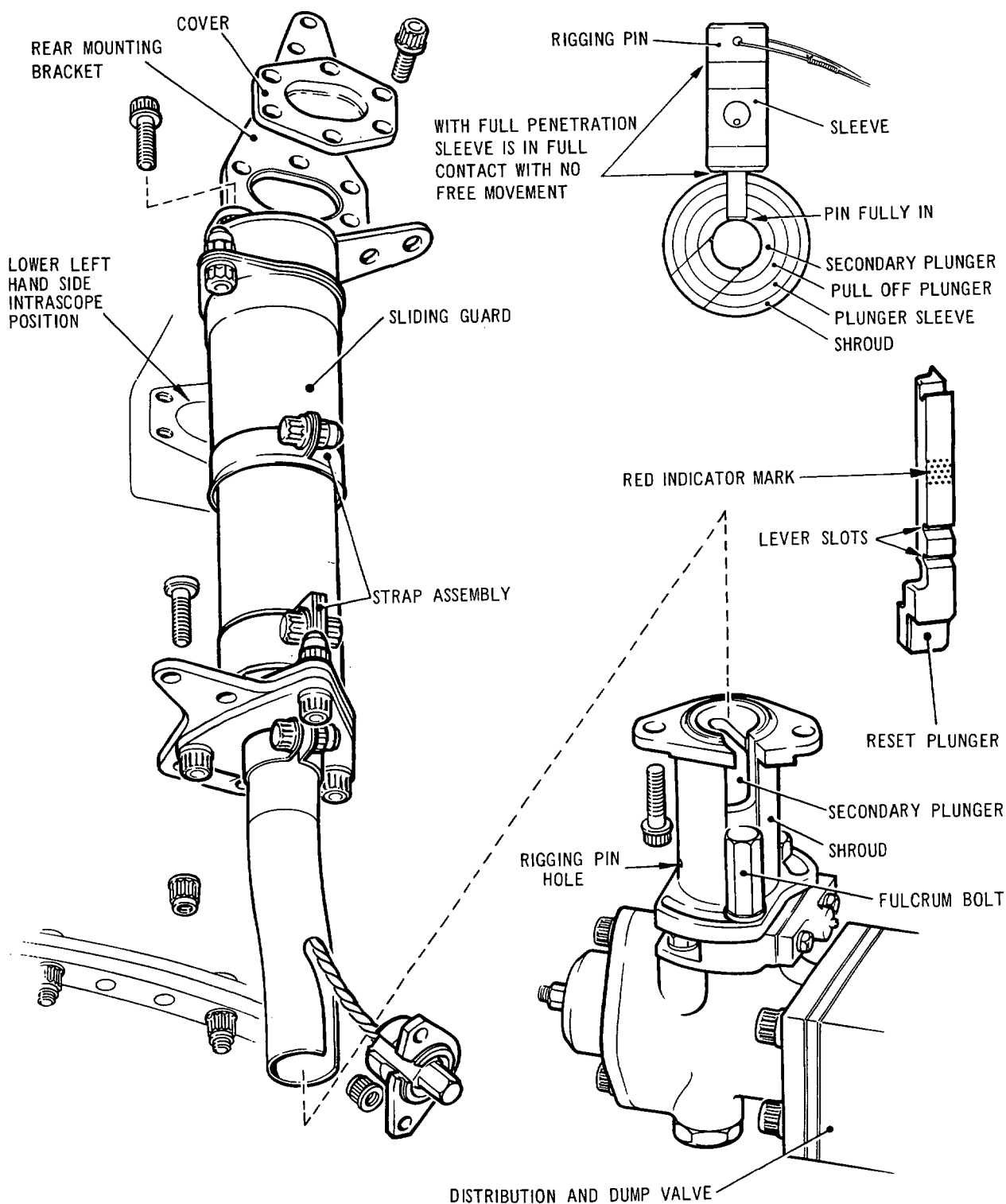
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 33202/00B



Signal System, LP Shaft, Cylinder/Piston Section  
Figure 501

ASSEMBLY  
**71-00-01**  
STAGE 4  
Page 502  
Jan 2/80



OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

- (b) Position the cover (76-21-01/2B-390) to the forward face of the bracket lug.
- (c) Position the cylinder/piston unit fixed guard to the cover.
- (d) Retain the block, cover and cylinder/piston unit fixed guard to the bracket with bolts (76-21-01/2A-90). Torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (e) Secure the cylinder/piston unit base plate (76-21-01/1-110) to the HP compressor diffuser case/CC0C flange using the existing bolts and nuts. Torque-tighten between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (4) Secure the bracket (75-03-01/3-390) to the block (76-21-01/2A-85) using bolts and nuts (75-03-01/3-380-370). Torque-tighten the bolts and the loop clamps bolt between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (5) Slacken off the bolts securing the distribution and dump valve shroud, then turn the shroud to align withdrawal slots.
- (6) Prevent the reset plunger from falling, trip the mechanism with a hooked tool and detach the reset plunger. Do not fully withdraw the plunger mechanism on engines to pre.S.B.73-66 standard.
- (7) Engage the front cable end with the slot in the emergency dump valve secondary plunger.
- (8) Insert the 're-set' plunger to retain the front cable assembly.
- (9) Use the re-setting tool (Tool 1298) and press the re-set plunger to return the emergency dump valve to the normal position, red indicator mark below the face.

ASSEMBLY

71-00-01

STAGE 4

Page 503

Jun 30/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

DELETED

Figure 502

ASSEMBLY

71-00-01

STAGE 4

Page 504

Jun 30/01



OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

- (10) Insert the rigging pin (Tool 1990) and check that the holes in the shroud and plungers are in line. Pin must press fully home so that axial movement of its sleeve is taken up.

NOTE: If the pin does not pass through the pull off plunger alignment hole, the plunger may have been pressed in slightly more than the normal set position. Light rearward pressure on the reset plunger may be necessary.

- (11) Turn the shroud to retain the plunger. Torque-tighten the bolts securing the shroud to the dump valve to 40 lbf in. (4,5 N.m.).
- (12) Pull the cable shield unit forward to locate in the dump valve and retain the shield front flange with the nuts and bolts, supplied with the valve. The locking torque is between 2 and 17 lbf in. (0,2 and 1,8 N.m) for the nuts. Torque-tighten the nuts and bolts to 40 lbf in. (4,5 N.m).

NOTE: Ensure the cocking lever has freedom of movement.

- (13) Assemble the retaining ring to the groove in the adapter (76-21-01/1-40-80). Assemble the loop clamp (76-21-01/1-20) to the shield tube (76-21-01/1-90) in front of the retaining ring, secure the loop clamp with bolt and nut (76-21-01/1-30-10) and torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).

ASSEMBLY

71-00-01

STAGE 4

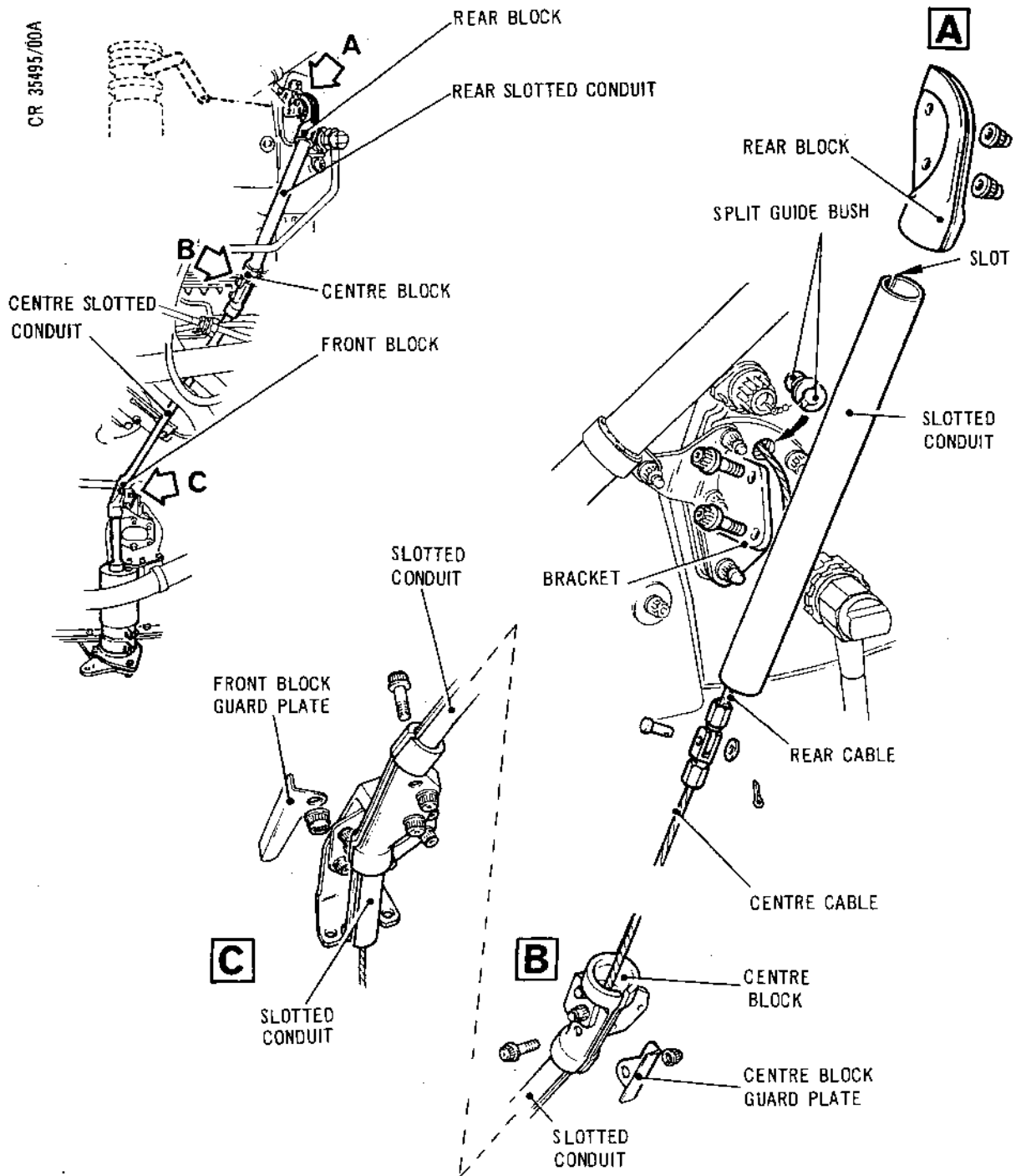
Page 505

Jun 30/01



OLYMPUS 593

MK. 610-14-28  
OVERHAUL



LP Shaft Signal System Operating Cable (S.B.76-26)  
Figure 503

ASSEMBLY  
**71-00-01**  
STAGE 4  
Page 506  
Jan 2/80



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

C. Install Blocks and Conduits.

- (1) On engines to S.B.76-26 standard install blocks and front and centre conduits (Ref.Fig.503).
  - (a) Prior to commencing the installation procedure, check alignment of cable end fittings and ensure that any misalignment will not cause the cables to twist when finally connected.
  - (b) Avoid kinking of cables during the installation procedure.
  - (c) Apply lubricant 'G' liberally by brush to the length of cable where it is in contact with the front block.
  - (d) Compress the front conduit and assemble it to the front block (76-21-01/2-400-410).
  - (e) Locate the centre cable in the conduit and block, compress the conduit then engage it with the cover. Position the block on the support bracket and retain it with bolts and nuts (76-21-01/2-130-120) with lubricant 'A' applied. Torque-tighten the nuts to 100 lbf in. (11,5 N.m).
  - (f) Assemble the centre conduit (76-21-01/2-450) over the centre cable then engage the conduit end in the centre block.



# OLYMPUS 593



MK.610-14-28

snecma

OVERHAUL

- (g) Assemble the rear block (76-21-01/1-510) to the centre conduit, position the rear block on the mounting bracket and retain it with nuts and bolts (76-21-01/2-490-500) with lubricant 'A' applied. Torque-tighten the nuts to 100 lbf in. (11,5 N.m).
- (h) Apply lubricant 'G' liberally by brush to the length of rear cable where it is in contact with the rear block and guide bush.
- (j) Turn the conduits to bring the slots out of alignment with those in the blocks.
- (k) Assemble guard plates to blocks.
  - (i) Assemble guard plate (76-21-01/2-440) to the front block and retain with nut and bolt (76-21-01/2-420-430) with lubricant 'A' applied.
  - (ii) Assemble guard (76-21-02/2-480) to the centre block and retain with nut and bolt (76-21-02/2-460-470) with lubricant 'A' applied.
  - (iii) Torque-tighten nuts to 100 lbf in. (11,5 N.m).
- (2) Connect the centre cable (76-21-01/2-380) to the rear cable (76-21-02/1-150) from the exhaust diffuser with the pin, washer and split cotter pin (76-21-01/2-370-360-350), bend the cotter pin to lock.

ASSEMBLY

## 71-00-01

STAGE 4

Page 508

Dec 31/01





OLYMPUS 593

MK.610-14-28  
OVERHAUL



2. Install the Reheat Fuel Controller Servo Supply Tubes  
(Item 46, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to the tube union threads and lubricant 'B' to the bolts.

B. Installation (Ref.Fig.504).

- (1) Assemble the tube (73-13-13/1-150) to the fuel heater filter tube, lightly tighten the union nut.
- (2) Assemble three loop clamps (73-13-13/1-110-40) to the tube, align with:
  - (a) The bracket (72-33-01/6-300) mounted on HP compressor case front flange, retain with the existing nut, washer, distance piece and bolt, lightly tightened.
  - (b) The bracket (72-01-03/5-270) mounted on the oil feed elbow on the left-hand gearbox, retain with the nut, washers and bolt (73-13-08/1-310-320-330) lightly tightened.
  - (c) The bracket (72-31-01/6-380) mounted on the LP case rear flange. Secure the loop clamp to the bracket with the bolt, washer and nut (73-13-13/1-50-60-70) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,2 N.m).
- (3) Position the tube (73-13-13/1-270) from the front tube rear union to the reheat controller, hand tighten the union nuts at this stage.
- (4) Assemble a loop clamp (73-13-13/1-160) to the tube and bracket (72-33-01/4-150) mounted at the HP case third stage blow-off position. Secure the clamp to the bracket with bolt, washer and nut (73-13-13/1-190-180-170) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,2 N.m).

PRINTED IN ENGLAND

TN799

ASSEMBLY

71-00-01

STAGE 4

Page 509

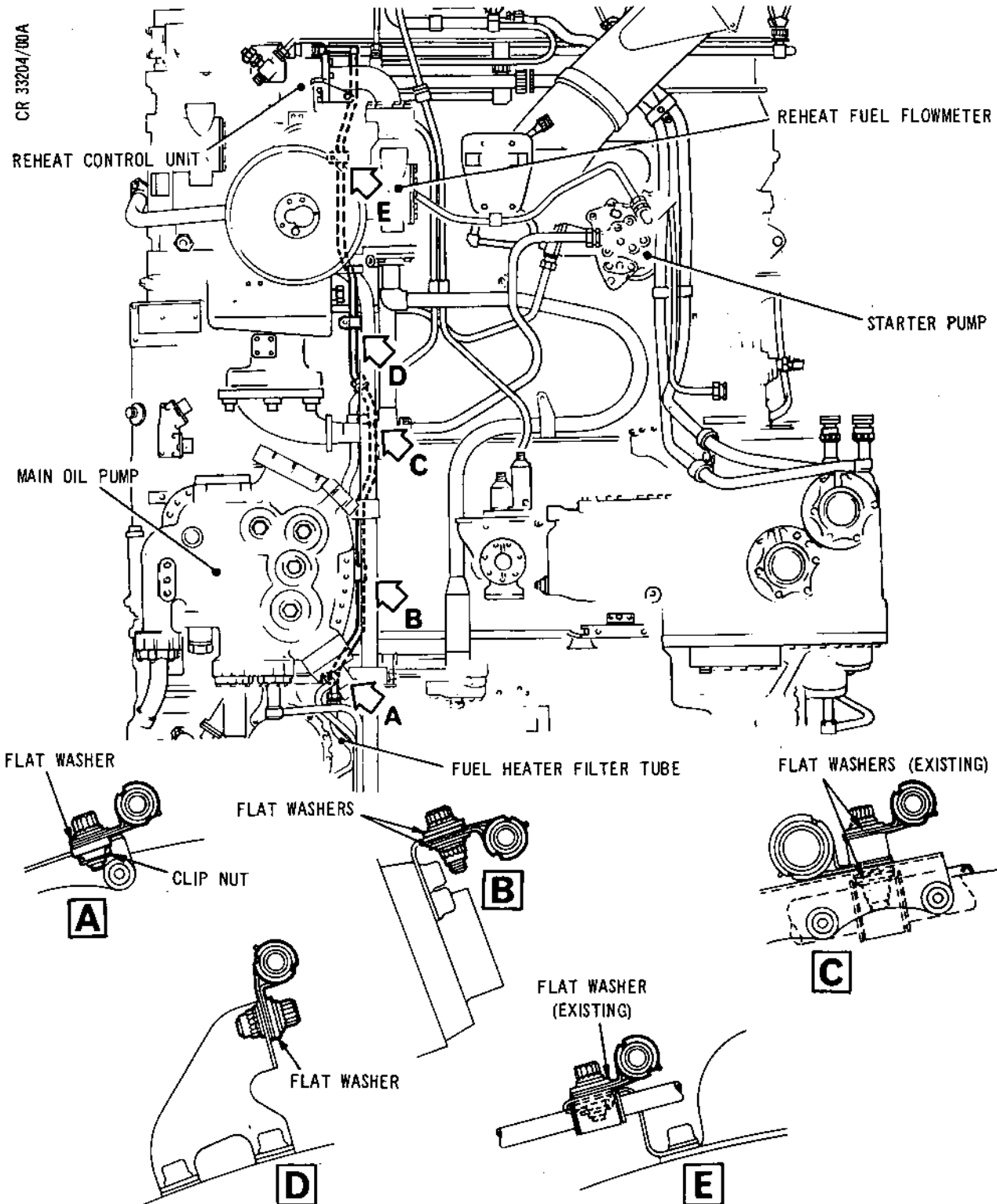
Jan 2/80



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 33204/00A



Fuel Tube  
Filter Heater Outlet to Reheat Fuel Controller  
Figure 504

TN8866

ASSEMBLY  
**71-00-01**  
STAGE 4  
Page 510  
Jan 2/80



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (5) Assemble a loop clamp (73-13-13/1-230) to the tube and bracket (75-01-04/1-50) mounted at the HP case stage five blow-off position. Secure the loop clamp with the existing bolt and washer torque-tightened to between 85 and 95 lbf in. (9,6 and 10,2 N.m).
- (6) Torque-tighten the tube unions to between 190 and 210 lbf in. (21,5 and 23,7 N.m) (Tool 909) and wire-lock the union nuts.
- (7) Ensure that a clearance of 0.150 in. (2,625 mm) exists between the rear tube (73-13-13/1-270) and the CSD to cooler oil tube.

3. Install the Reheat Purge Valve Solenoid and Air Tubes  
(Item 47, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to the tube union threads and lubricant 'B' to the bolt threads unless stated otherwise.
- (2) Record the type and serial number of the valve solenoid on the accessory sheet.

B. Installation (Ref.Fig.505).

- (1) Secure the solenoid valve to the bracket (72-33-01/7-110) on the HP case and delivery case flanges with bolts and nuts (73-24-01/1-30-20). Torque-tighten the nuts and bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (2) Position the tube (75-03-02/2-280) between the delivery case air duct and the purge valve solenoid connection, hand tighten the unions.
- (3) Assemble the loop clamp (75-03-02/2-210) to the tube and bracket (72-42-01/3-230) mounted on the delivery case/CCOC case flange. Retain with bolt, washers and nut (75-03-02/2-240-230-220) with lubricant 'C' applied and lightly tighten.
- (4) Torque-tighten the tube unions:
  - (a) To the air duct to between 250 and 280 lbf in. (28,2 and 32,0 N.m).

ASSEMBLY

71-00-01

STAGE 4

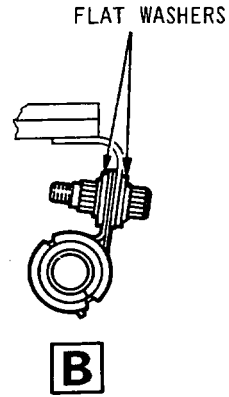
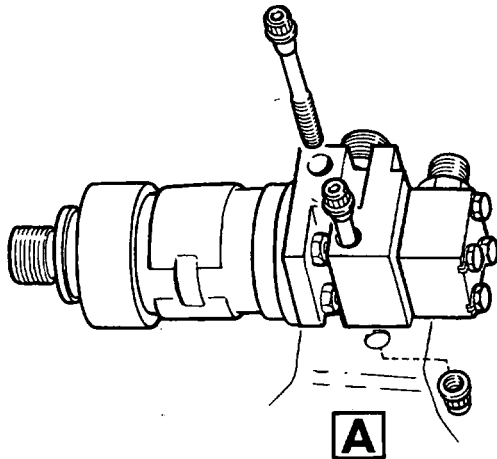
Page 511

Dec 31/01

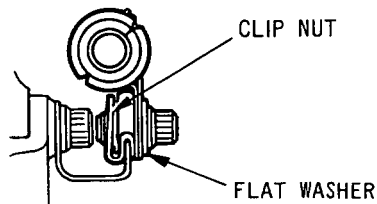
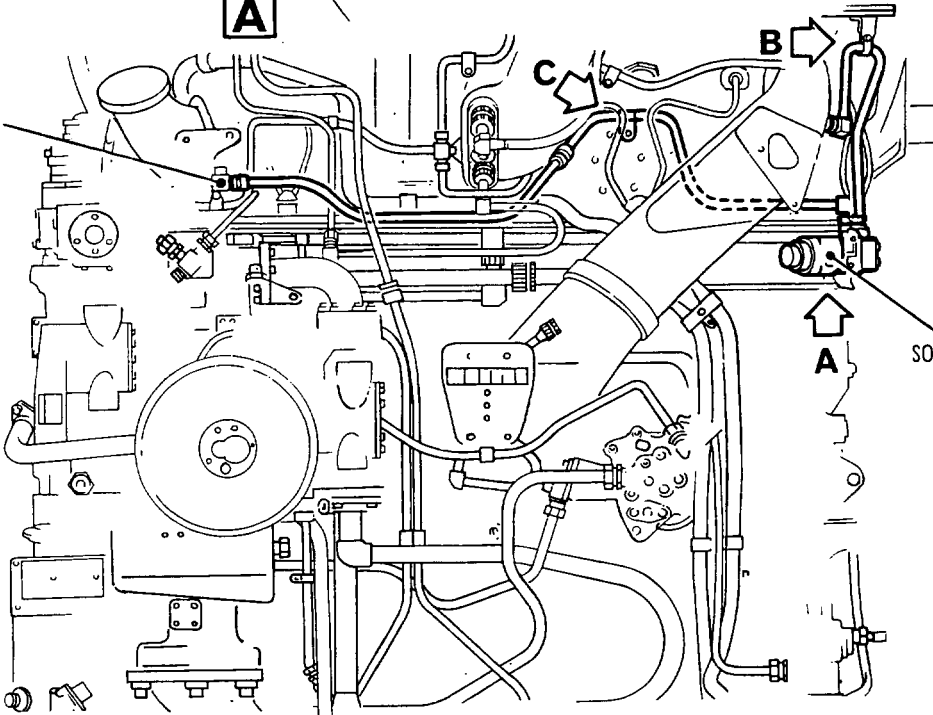


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PURGE VALVE



Reheat Fuel Purging Air Tubes  
Figure 505



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

(b) To the solenoid to between 140 and 160 lbf in.  
(15,8 and 18,1 N.m) (Tools 1648, 1754 and 1755).

(c) Wire-lock the tube union nuts.

(5) Position the tube (75-03-02/2-180) to the reheat  
purge solenoid valve across the bottom of the engine,  
secure the tube union nut to the valve hand tight.

(6) Assemble the loop clamp (75-03-02/2-110) to the tube  
and assemble a clipnut (75-03-02/2-140) to the  
bracket (72-34-00/3-85) mounted on the delivery case  
blank cover. Secure the loop clamp to the bracket  
with bolt and washer (75-03-02/2-120-130) with  
lubricant 'C' applied. Torque-tighten bolt to  
100 lbf in. (11,5 N.m).

(7) Position the tube (75-03-02/2-80) between the purge  
valve and the tube (75-03-02/2-180), hand tighten the  
tube unions.

(8) Torque-tighten the tube unions:

(a) To the purge solenoid valve and purge valve to  
between 190 and 210 lbf in. (21,5 and 23,7 N.m).

(b) To each other to between 280 and 310 lbf in.  
(31,6 and 35,0 N.m) (Tools 1648, 909 and 908).

(c) Wire-lock the tube union nuts.

(9) Ensure that a clearance of 0.100 in. (2,5 mm) exists  
between the tube (75-03-02/2-180) and the HP turbine  
bearing feed tube.

4. Install the Reheat Purge Air Tubes, Purge Valve to the Exhaust  
Diffuser (Item 48, Fig.501 of Stage 1)

A. Prepare for Installation.

(1) Apply lubricant 'A' to the tube unions and lubricant  
'C' to the bolts.

ASSEMBLY

71-00-01

STAGE 4

Page 513

Dec 31/01

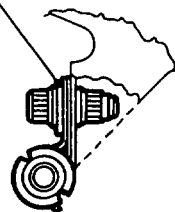
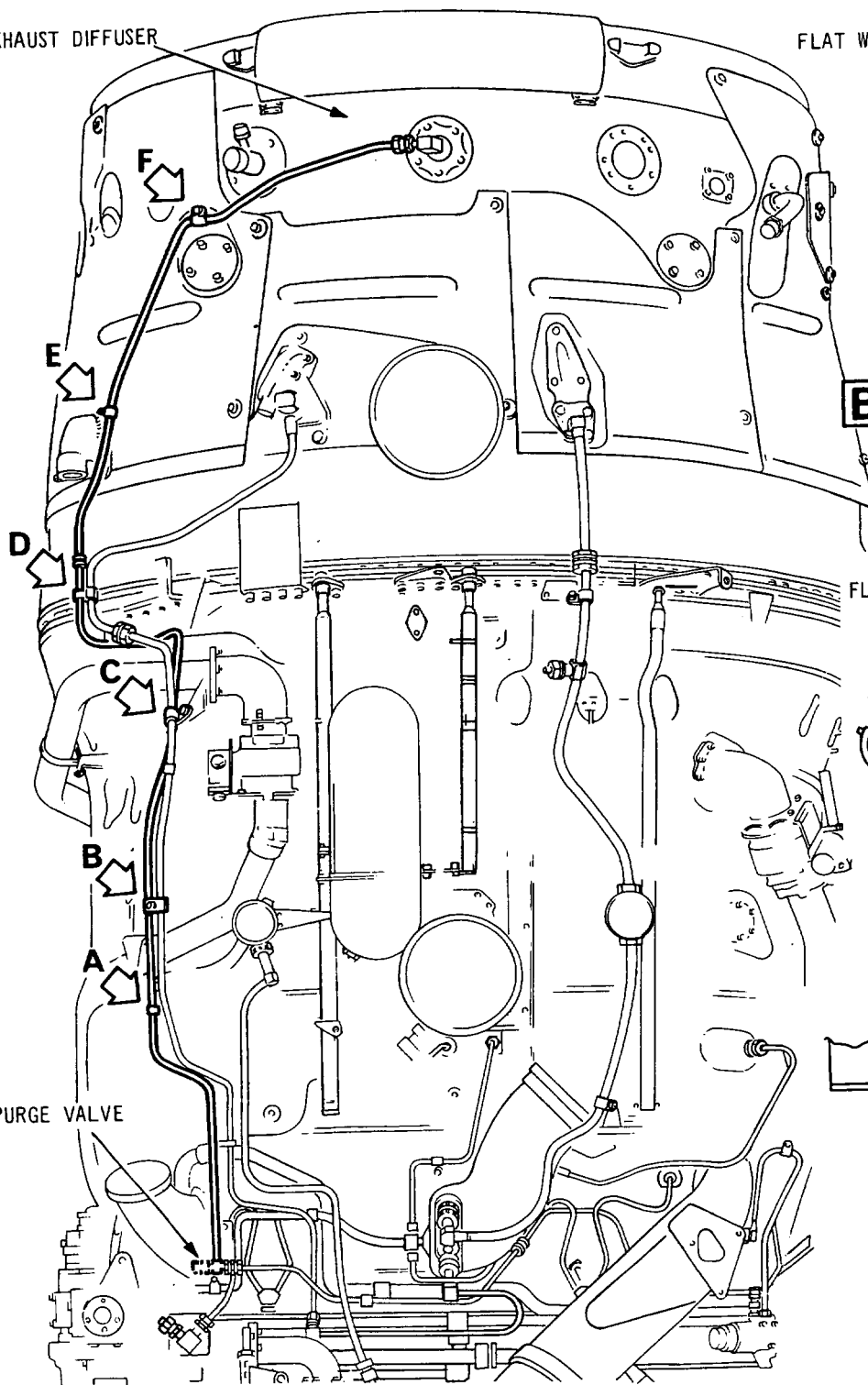


**OLYMPUS 593**  
MK.610-14-28  
OVERHAUL



EXHAUST DIFFUSER

FLAT WASHER



**A**

SIMILAR AT

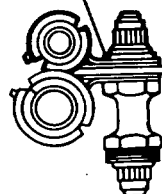
**B**

**E**

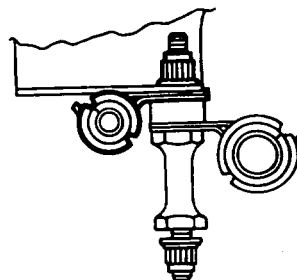
AND

**F**

FLAT WASHER



**C**



**D**

Reheat Purge Air Tubes  
Purge Valve to the Exhaust Diffuser  
Figure 506

ASSEMBLY

**71-00-01**

STAGE 4

Page 514

Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

B. Installation (Ref.Fig.506).

- (1) Position the tube front section (75-03-02/1-420) on the engine and connect the tube front union nut to the valve hand tight.
- (2) Assemble three loop clamps (75-03-02/1-350-240-180) and the half clamp shells (75-03-02/1-235/305/415) (SB.0L.593-75-8972-27 standard) to the tube and secure in the following positions:
  - (a) Secure the clamp to the bracket (72-42-01/4-280) mounted on the delivery case CCOC flange with bolt, washer and nut (75-03-02/1-380-370-360) torque-tightened to 100 lbf in. (11,5 N.m).
  - (b) Secure the clamp to the bracket (75-03-01/3-230) mounted on the fuel heater air elbow flange using the pillar bolt, washer and nut (75-03-02/1-270-260-250) lightly tightened.
  - (c) Secure the clamp to the bracket (72-53-00/7-250) mounted on the CCOC/exhaust diffuser flange with the existing pillar bolt, distance piece and nut (75-03-02/1-200-195-190) lightly tightened.
- (3) Position the tube (75-03-02/1-150) between the front tube and the connector, hand tighten the union nuts.
- (4) Assemble two loop clamps (75-03-02/1-80-10) and the half clamp shells (75-03-02/1-75) (SB.0L.593-75-8972-27 standard) to the rear tube and secure to the brackets:
  - (a) Secure the clamp to the bracket (72-53-00/2-115) mounted on the vent elbow on the exhaust diffuser with the bolt, washer and nut (75-03-02/1-110-100-90) torque-tightened to 100 lbf in. (11,5 N.m).
  - (b) Secure the clamp to the bracket (72-54-01/4-90), mounted on the exhaust diffuser/adaptor flange with the bolt, washer and nut (75-03-02/1-40-30-20) torque-tightened to 100 lbf in. (11,5 N.m).

ASSEMBLY

71-00-01

STAGE 4

Page 515

Dec 31/01



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



(5) Torque-tighten:

- (a) The union nuts at the valve and exhaust diffuser to between 140 and 160 lbf in. (15,8 and 18,1 N.m).
- (b) The tubes union to between 190 and 210 lbf in. (21,5 and 23,7 N.m) (Tools 1754 and 1755).
- (c) Wire-lock the tube union nuts.

5. Install the Fuel Tube, FCU to the Distribution and Dump Valve (Item 49, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to the tube union threads and lubricant 'B' to the bolts.

B. Installation (Ref.Fig.507).

- (1) Position the tube (73-13-10/1-20) between the control unit and the manifold dump valve.
- (2) Insert the seal plate (73-13-10/1-40) between the tube flange and the control unit mating face. Retain the tube and seal plate to the control unit with bolts (73-13-10/1-30) lightly tightened.
- (3) Insert the seal plate (73-13-10/1-50) between the tube flange and the manifold dump valve mating face. Retain the tube and seal plate to the valve with bolts (73-13-10/1-30) lightly tightened.
- (4) Torque-tighten the tube flange bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (5) Install the blanking ferrule (73-13-10/1-10) on the tube and torque-tighten to between 190 and 210 lbf in. (21,5 and 23,7 N.m) (Tool 909). Wire-lock the ferrule.

ASSEMBLY

71-00-01

STAGE 4

Page 516

Jan 2/80





OLYMPUS 593

MK.610-14-28

OVERHAUL

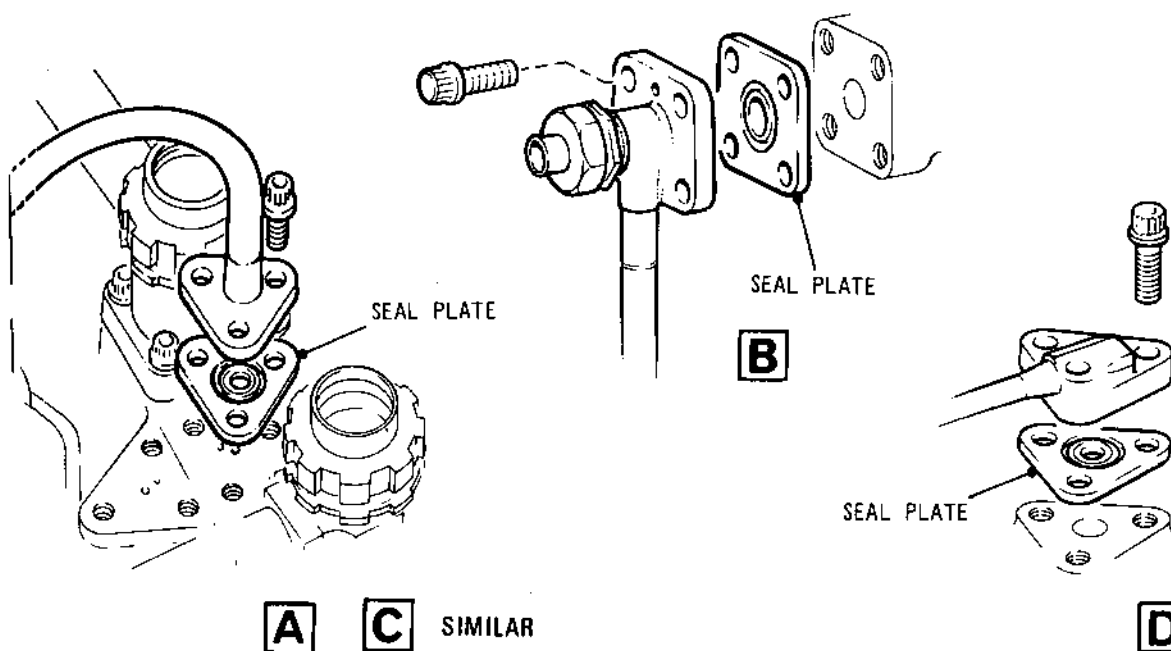


CR 33207/00B

OIL COOLER

DISTRIBUTION AND  
DUMP VALVE

FUEL CONTROL UNIT



**A** **C** SIMILAR

**D**

Fuel Tubes  
FCU to Distribution and Dump Valve, Manifold Dump Valve  
Figure 507

ASSEMBLY

71-00-01

STAGE 4

Page 517

Jan 2/80

PRINTED IN ENGLAND

TN8873



OLYMPUS 593

MK.610-14-28  
OVERHAUL



6. Install the Fuel Tubes, FCU to Distribution and Dump Valve Rear Face (Item 50, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to the tube union threads and lubricant 'B' to the bolts.

B. Installation (Ref.Fig.507).

- (1) Position the tube (73-13-10/1-100) flange and the seal plate (73-13-10/1-130) on the FCU face. Secure the tube and seal plate to the FCU with bolts (73-13-10/1-110-120), the single bolt (73-13-10/1-110) being positioned in the flange nearest to the tube. Torque-tighten the bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (2) Assemble the loop clamp (73-13-10/1-60) to the tube and oil tank vent tube support bracket (79-21-01/1-220) on the cooler lower flange. Secure the loop clamp to the bracket with the existing bolt, washer and nut, torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (3) Position the tube (73-13-10/1-180) to the front tube (73-13-10/1-100) hand tighten the tube union nut.
- (4) Insert a seal plate (73-13-10/1-200) between the tube flange and the distribution and dump valve rear face, emergency dump valve mounting face. Secure the tube and seal with bolts (73-13-10/1-190) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (5) Assemble the loop clamp (73-13-10/1-210) to the tube and bracket (72-33-01/7-200) on the HP case front/rear joint flange. Secure the clamp to the bracket with bolt, washer and clip nut (73-13-10/1-220-230-240) lightly tighten only at this stage.

TN42177

ASSEMBLY

71-00-01

STAGE 4

Page 518

Jan 2/80



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (6) Torque-tighten and wire-lock the tubes union nut to between 190 and 210 lbf in. (21,5 and 23,7 N.m) (Tool 909).

7. Install the Fuel Tube, Second Stage Pump Inlet Elbow to Recirculation Valve (Item 51, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to the tube union threads and lubricant 'B' to the bolts.

B. Installation (Ref.Fig.508).

- (1) Position the tube (73-13-09/1-190) to the engine between the second stage pump inlet and recirculation valve.
- (2) Insert the seal plate (73-13-09/1-210) between the tube flange and the valve mounting face. Secure the tube flange and seal to the valve with bolts (73-13-09/1-200) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (3) Torque-tighten the tube union nut to the pump inlet to between 220 and 240 lbf in. (24,8 and 27,1 N.m). (Tool 1648 and 1752). Wire-lock nut.
- (4) Assemble three loop clamps (73-13-09/1-10-80-120) to the tube and secure at the following positions:
- (a) Attach clamp to the bracket (72-31-01/4-430) mounted on the LP case front blow-off flange with the existing, loosely assembled pillar bolt, washer and nut (73-13-09/1-150-140-130).
- (b) Attach clamp to the bracket (72-31-01/5-300) mounted on the LP case/rear blow-off flange with the existing, loosely assembled pillar bolt, washer and nut.

PRINTED IN ENGLAND

TN8875



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 33208/00A

FUEL TUBE FIRST STAGE PUMP  
TO SECOND STAGE PUMP

MAIN OIL PUMP

OIL TANK

SEAL PLATE

FLAT WASHER

PILLAR BOLT

FLAT WASHER

FLAT WASHER

Fuel Tube  
Second Stage Pump Inlet Elbow to Recirculation Valve  
Figure 508

ASSEMBLY

71-00-01

STAGE 4

Page 520

Jan 2/80

TN8876



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (c) Attach clamp to the underside of the bracket (72-31-01/6-340) mounted on the LP case rear flange with the bolt, washer and nut (73-13-09/1-40-30-20), securing the oil return, RH gearbox to tank.
- (d) Torque-tighten the nuts and bolts retaining the loop clamps to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (5) Ensure that a clearance of 0.080 in. (2,0 mm) exists between the tube and the rear loop clamp support bracket.

8. Install the Fuel Tube, Reheat Fuel Controller to Three-way Connector (Item 52, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to the tube union threads and lubricant 'B' to the bolt.

B. Installation (Ref.Fig.509).

- (1) Position the tube (73-13-08/1-220) (Ref.SB.71-2) to the engine between the LP sensing valve union on the FCU to the three-way connector on the reheat controller. Secure the tube union nuts.
- (2) Assemble a loop clamp (73-13-08/1-140) to the tube and oil tank overboard vent support bracket (75-02-02/1-70). Secure the clamp to the bracket with bolt, spacer, washer and nut (73-13-08/1-180-170-160-150) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m) (Tool 1664 and 909).
- (3) Torque-tighten and wire-lock the tube union nuts to between 190 and 210 lbf in. (21,5 and 23,7 N.m).

ASSEMBLY

71-00-01

STAGE 4

Page 521

Jan 2/80



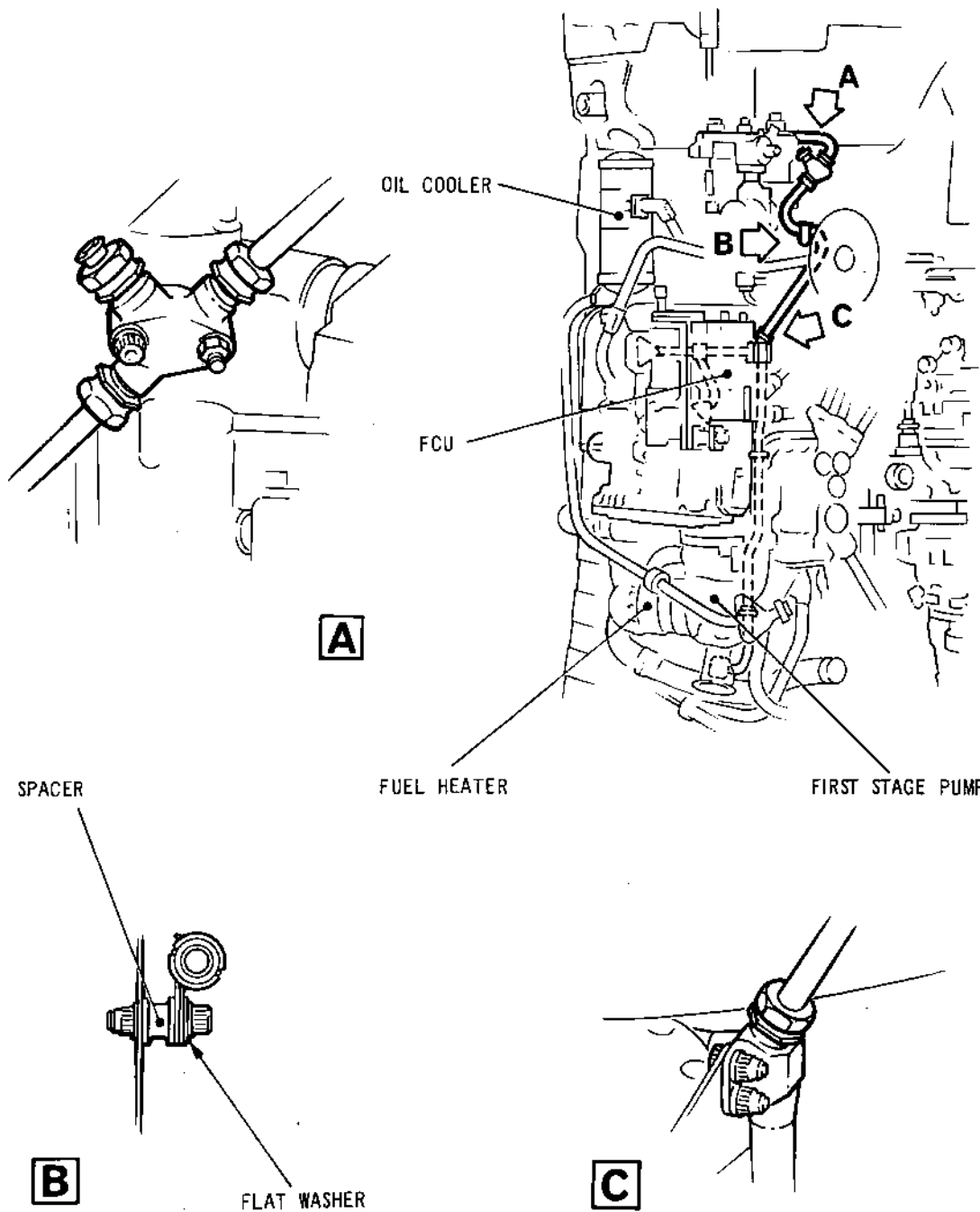
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 33209/00A



TN8878

Fuel Tubes  
Reheat Fuel Controller and FCU to First Stage Pump  
Figure 509 (Sheet 1 of 2)

ASSEMBLY  
**71-00-01**  
STAGE 4  
Page 522  
Jan 2/80



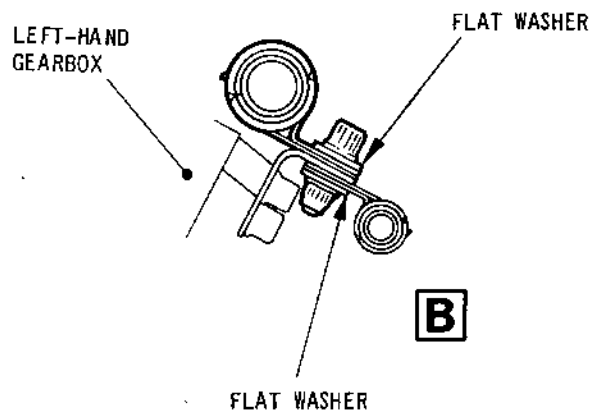
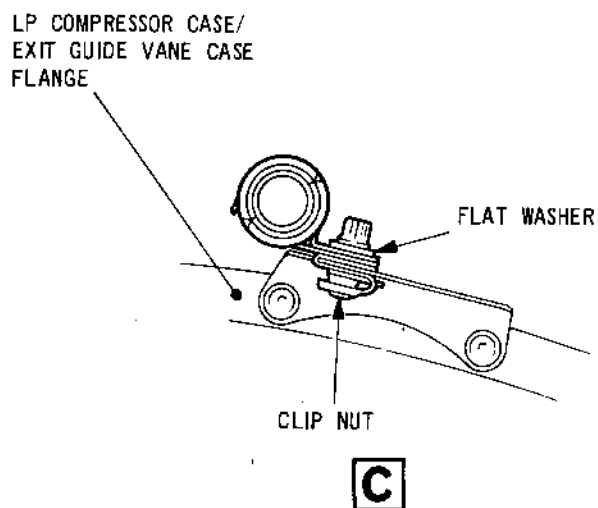
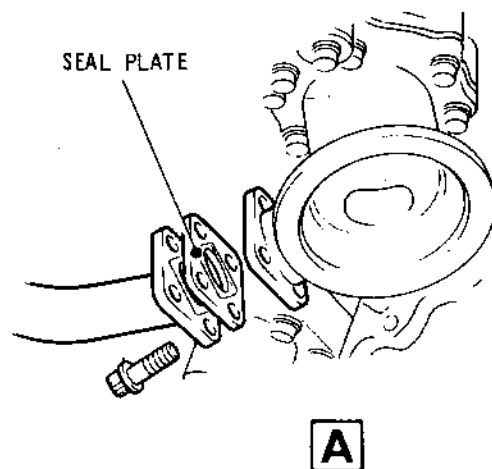
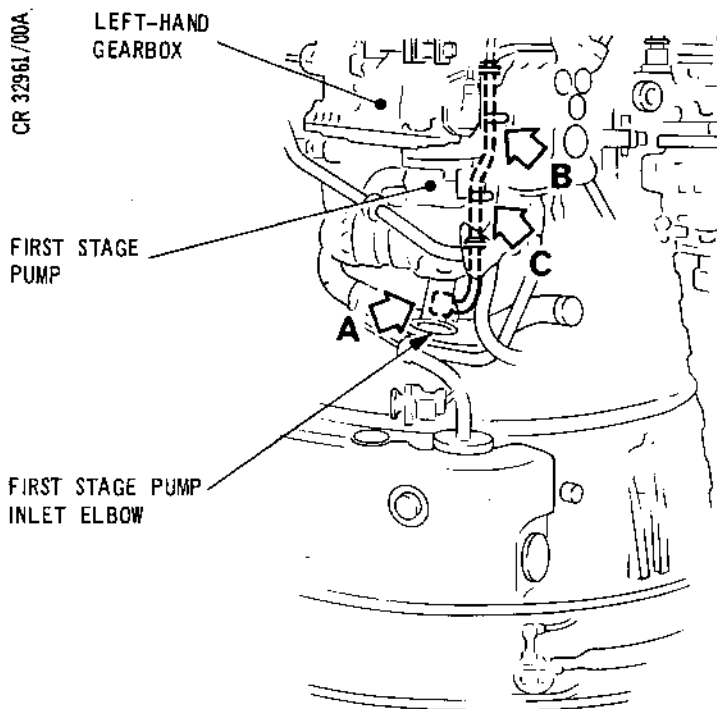
OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND



### Fuel Tubes

Reheat Fuel Controller and FCU to First Stage Pump  
Figure 509 (Sheet 2 of 2)

ASSEMBLY  
**71-00-01**  
STAGE 4  
Page 523  
Jan 2/80

TN5430



OLYMPUS 593

MK.610-14-28  
OVERHAUL



9. Install the Fuel Tube, Reheat Fuel Controller and FCU to First Stage Pump Inlet Elbow (Item 53, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to the tube union threads and lubricant 'B' to the bolts.

B. Installation (Ref.Fig.509).

- (1) Position the tube section (73-13-08/1-440) to the engine FCU forward along the bottom of the engine. Hand tighten the rear tube union nut to the union of the tube secured to the FCU.
- (2) Assemble the loop clamp (73-13-08/1-370) to the tube and the clip nut (73-13-08/1-400) to the bracket (72-31-01/6-380) mounted on the LP case/exhaust guide vanes case flange. Secure the loop clamp to the bracket with bolt and washer (73-13-08/1-380-390) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (3) Assemble the loop clamp (73-13-08/1-300) to the tube and bracket (72-01-03/5-270) mounted on the HP and LP turbine bearing oil feed elbow on the left-hand gearbox. Secure the loop clamp and clamp (73-13-13/1-110) with the common bolt, washers and nut (73-13-08/1-330-320-310) lightly tightened.
- (4) Position the tube (73-13-08/1-450) on the engine between the first installed tube section and the first stage pump inlet elbow, hand tighten the tube union nut.
- (5) Insert the seal plate (73-13-08/1-470) between the tube flange and the pump inlet elbow mounting face. Secure the tube and seal plate to the elbow with bolts (73-13-08/1-460) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (6) Torque-tighten and wire-lock the tube union nuts to between 400 and 440 lbf in. (45,2 and 49,7 N.m) (Tools 1648, 1528 and 947).

TN8645

ASSEMBLY

**71-00-01**

STAGE 4

Page 524

Jan 2/80





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (7) Ensure that a clearance of 0.100 in. (2,5 mm) exists between the tube and the left-hand gearbox casing at the clipping position on the LP and HP turbine bearings oil feed elbow.

10. Install the Second Stage Pump Air/Fuel Drain Tube (Item 54, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to the tube union threads and lubricant 'B' to the bolts.

B. Installation (Ref.Fig.510).

- (1) Assemble the bracket (73-23-01/1-70) to the reheat control unit elbow flange, retain with bolts (73-23-01/1-60) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (2) Assemble the seal plate and elbow (71-73-03/1-90-80) to the pump mounting face. Secure the elbow and seal plate to the pump with bolts (71-73-03/1-60-70) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (3) Assemble the tube (71-73-03/1-50) (Ref.SB.71-2) between the elbow mounted to the pump and the drain tank union on the air/fuel separator body. Lightly tighten the tube union nuts.
- (4) Assemble the loop clamp (71-73-03/1-10) to the tube and bracket mounted on the reheat control unit elbow flange. Secure with the existing bolt, washer and nut and lightly tighten.
- (5) Torque-tighten the tube union nuts to between 50 and 55 lbf ft (68 and 74 N.m) (Tools 1656, 1529 and 948). Wire-lock the union nuts.

11. Install the First Stage Pump and FCU Gland Drain Tube to the Second Stage Pump Drain (Item 55, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to the tube union and bolt threads.

PRINTED IN ENGLAND

TN13802

ASSEMBLY

71-00-01

STAGE 4

Page 525

Jan 2/80

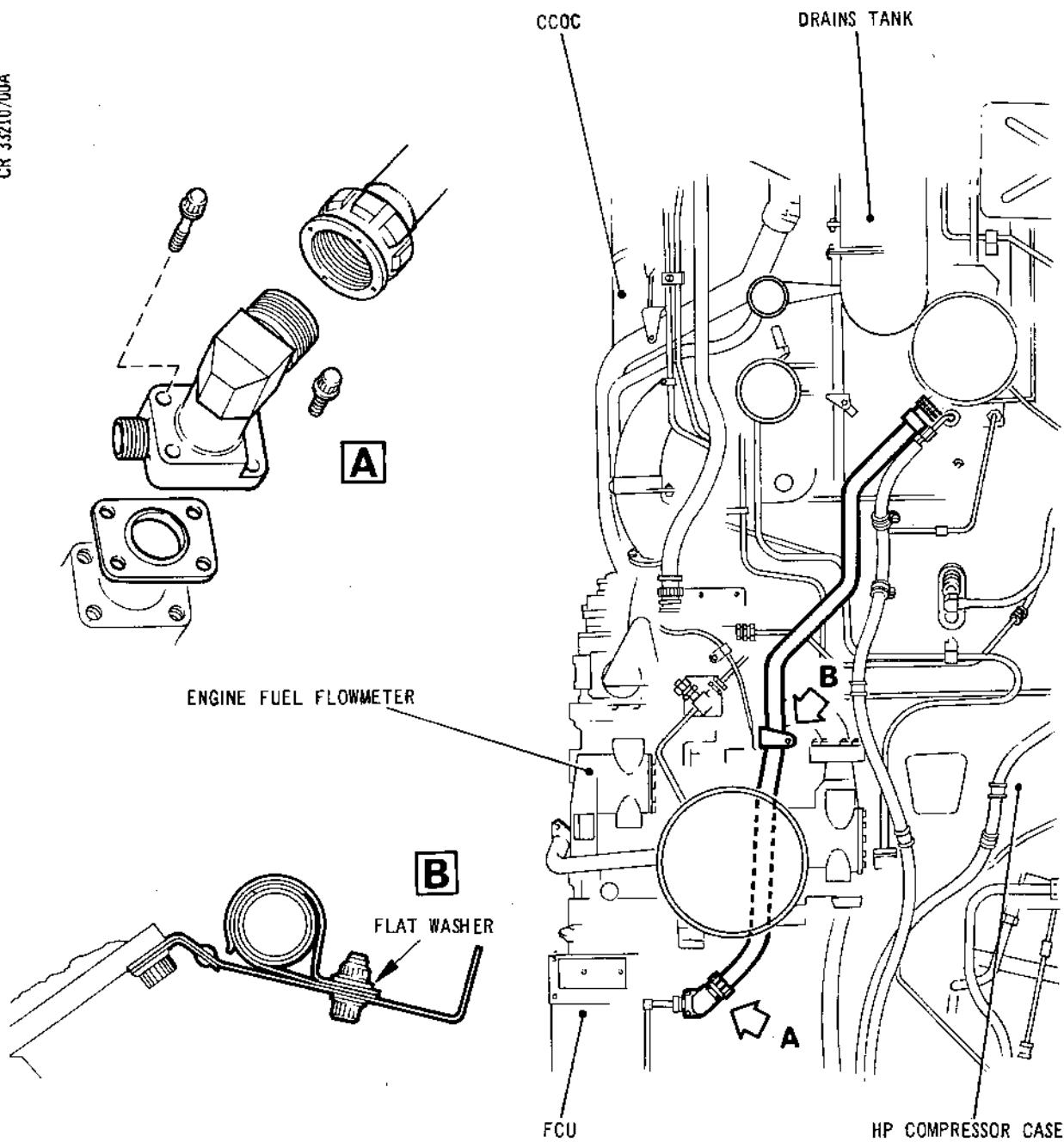


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33210/00A



TN13801

Air/Fuel Drain Tube  
Second Stage Pump  
Figure 510

ASSEMBLY  
**71-00-01**  
STAGE 4  
Page 526  
Jan 2/80

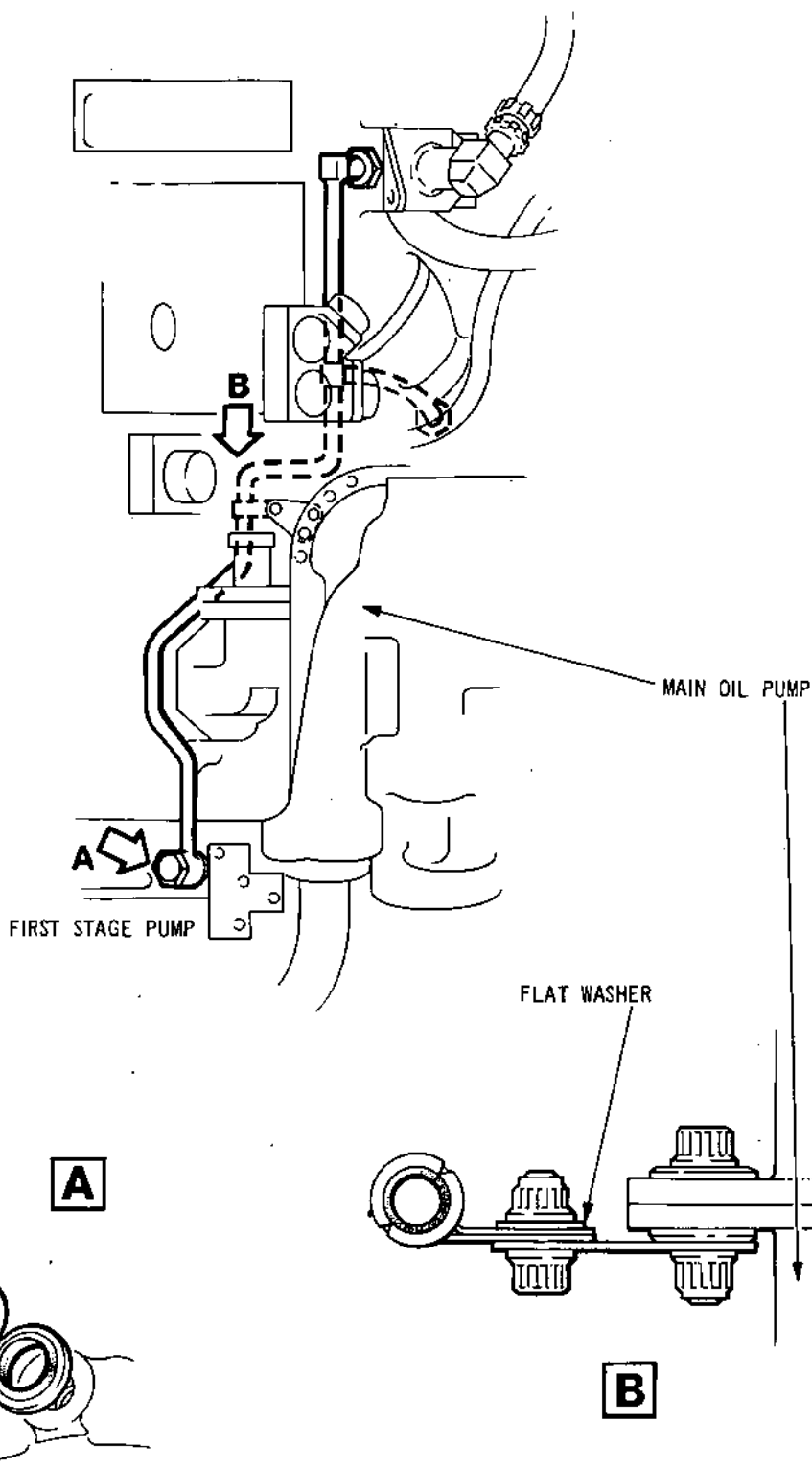


OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 33211/00A

PRINTED IN ENGLAND



Gland Drain  
First Stage Pump, FCU to Second Stage Pump  
Figure 511

ASSEMBLY  
**71-00-01**  
STAGE 4  
Page 527  
Jan 2/80

TN13803



OLYMPUS 593

MK.610-14-28

OVERHAUL



B. Installation (Ref.Fig.511).

- (1) Position the tube (71-73-04/1-100) between the FCU and second stage pump drain pipe and lightly tighten the tube union nuts.
- (2) Assemble the fluid passage bolt (71-73-04/1-10) and two sealing washers (71-73-04/1-20) to the tube connection and attach the connection to the first stage pump with the bolt lightly tightened.
- (3) Assemble the loop clamp (71-73-04/1-30) to the tube and bracket (72-65-00/1-220) mounted on the left-hand gearbox/main oil pump flange. Secure the loop clamp to the bracket with bolt, washer and nut (71-73-04/1-60-50-40) torque-tightened to between 85 and 95 lbf in. (7,6 and 10,7 N.m).
- (4) Torque-tighten the fluid passage bolt to between 210 and 230 lbf in. (23,7 and 26,0 N.m).
- (5) Torque-tighten the tube union nuts to between 190 and 210 lbf in. (21,5 and 23,7 N.m) (Tools 1648 and 909), then wire-lock.

12. Install the Drains Tank Re-ingestion Tube from the Recirculation Valve to the First Stage Pump (Item 56, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to the tube union threads and lubricant 'B' to the bolts.

B. Installation (Ref.Fig.512).

- (1) Assemble the tube (73-13-11/2-170) to the recirculation valve and lightly tighten the union nut.
- (2) Assemble the tube (73-13-11/2-80) to the first stage pump and tube (2-170) and lightly tighten the union nuts.

TN13804

ASSEMBLY

71-00-01

STAGE 4

Page 528

Jan 2/80



OLYMPUS 593

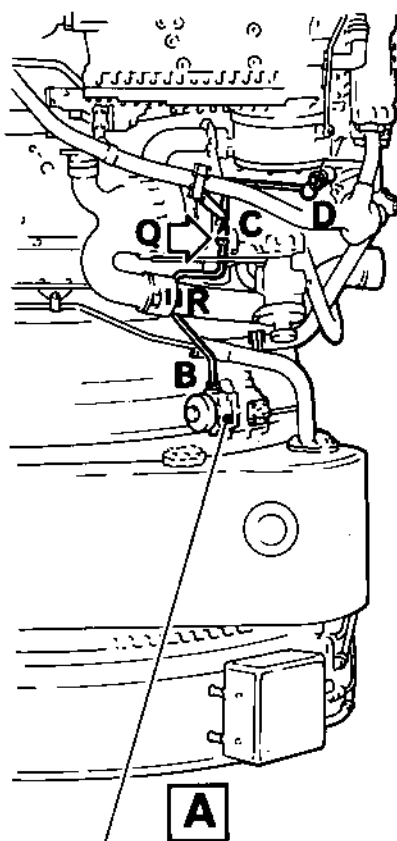
MK. 610-14-28

OVERHAUL



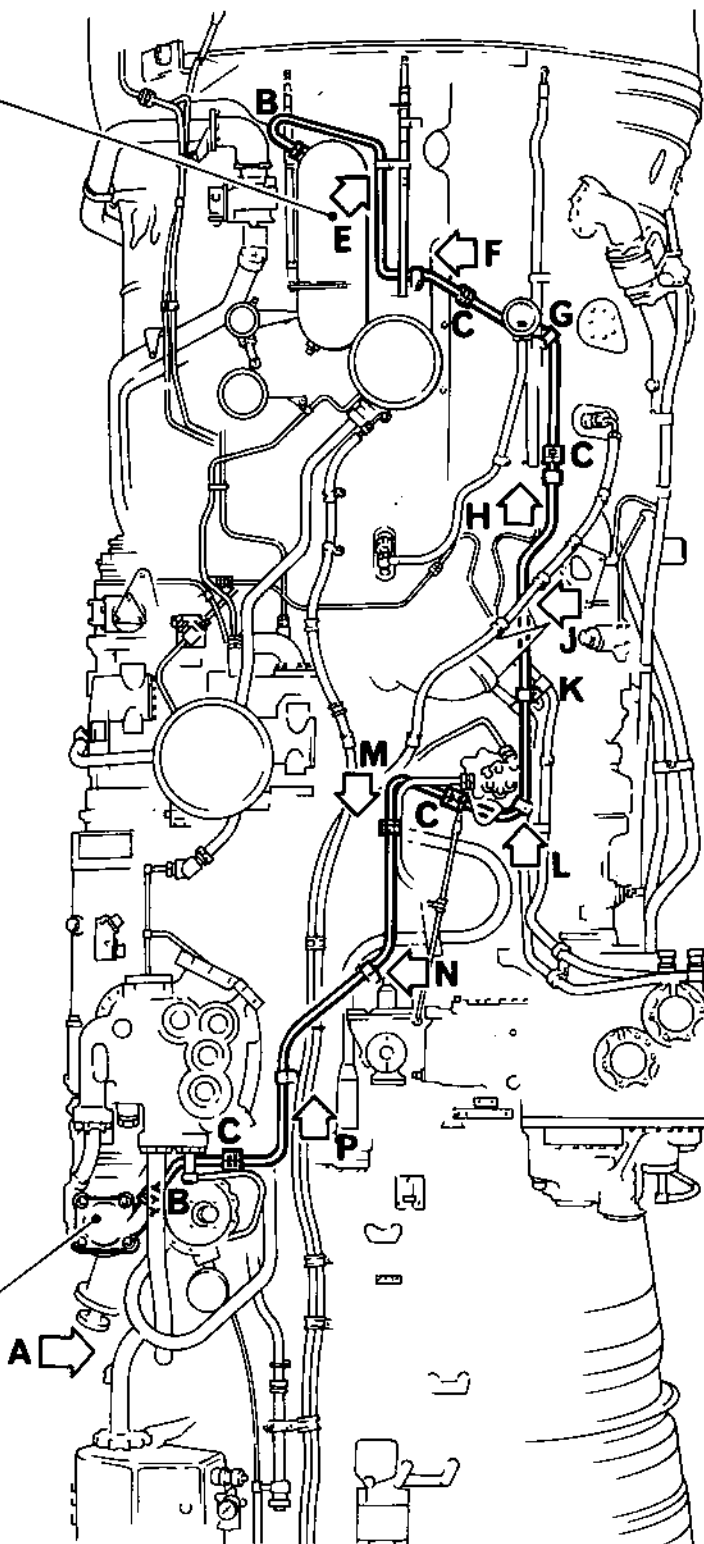
CR 33212/00A

DRAINS TANK



FUEL RE-CIRCULATION VALVE

FIRST STAGE PUMP



Drains Tank Re-Ingestion Tube  
Figure 512 (Sheet 1 of 2)

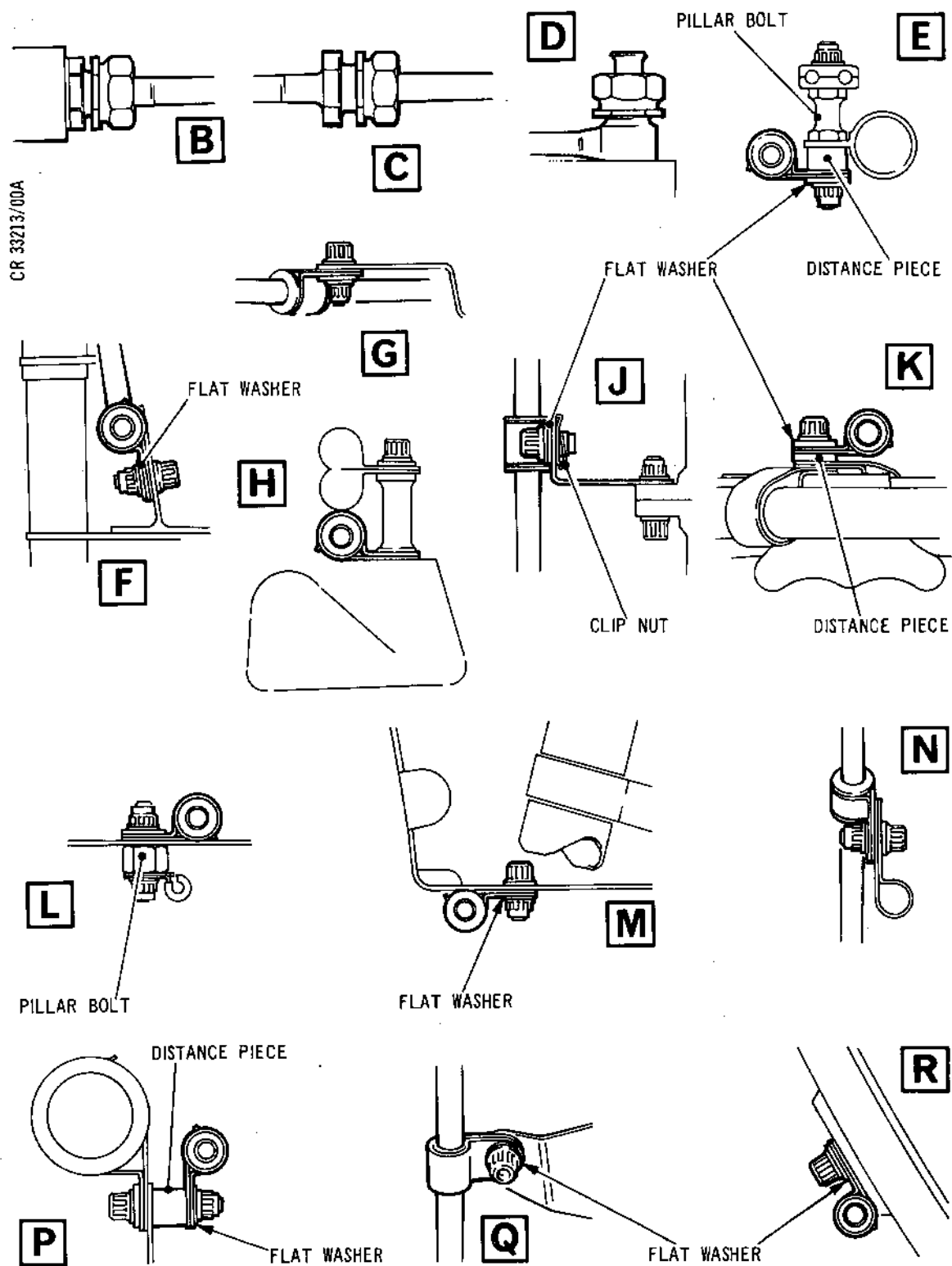
ASSEMBLY  
**71-00-01**  
STAGE 4  
Page 529  
Jan 2/80

PRINTED IN ENGLAND

TN8646



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



Drains Tank Re-Ingestion Tube  
Figure 512 (Sheet 2 of 2)

ASSEMBLY  
**71-00-01**  
STAGE 4  
Page 530  
Jan 2/80

7N8936



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Assemble clip nuts (73-13-11/2-20-120) to the brackets mounted on:
- (a) The LP case blow-off flange (72-31-01/5-460).
  - (b) The oil scavenge tubes, pump to cooler joint flange (79-22-02/1-270).
- (4) Assemble a loop clamp (73-13-11/2-10-90) to each tube, align with the previous brackets.
- (5) Secure the loop clamps to the brackets with bolts and washers (73-13-11/2-40-100-30-110) to the clip nuts torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (6) Assemble the nut, pipe closure assembly, (73-13-11/2-160) to the rear tube.
- (7) Torque-tighten:
- (a) The pipe closure nut between 220 and 240 lbf in. (24,8 and 27,1 N.m).
  - (b) The tube union nuts between 190 and 210 lbf in. (21,5 and 23,7 N.m) (Tools 1648, 909 and 1752).
  - (c) Wire-lock the pipe closure nut and the tube union nuts.
- (8) Position the tube (73-13-11/1-500) to the re-ingestion pump and tube (73-13-11/1-490) to the previous tubes rear union. Lightly tighten the tube union nuts.
- (9) Assemble three loop clamps (73-13-11/1-450-380) to the rear tube and secure to the brackets:
- (a) Attach to the bracket (72-33-01/6-270) mounted on the intermediate case/HP case flange with the existing bolt, washer and nut.
  - (b) Attach to the bracket (72-01-03/5-270) mounted on the HP turbine bearing oil feed elbow on the port gearbox with the existing bolt, washer and nut.
  - (c) Attach to the bracket (72-33-01/4-230) mounted on the HP case, with the bolt, washer and nut (73-13-11/1-410-400-390).

PRINTED IN ENGLAND

TN13805

ASSEMBLY

71-00-01

STAGE 4

Page 531

Jan 2/80



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (d) Torque-tighten the nuts and bolts securing the clamps to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (10) Position the tube (73-13-11/1-370) to the engine HP case/delivery case and lightly tighten the front union nut to the previous tube connection.
- (11) Assemble four loop clamps (73-13-11/1-300-190-230-190) to the tube and secure to the brackets:
  - (a) Attach to the starter pump front mounting bracket (72-33-01/5-90) with the pillar bolt and nuts (73-13-11/1-330-310).
  - (b) Attach to the bracket (72-33-01/7-140) mounted on the HP case front/rear case joint flange, with the existing bolt and washer and clipnut.
  - (c) Attach to the bracket (72-33-01/8-250) mounted on the HP case/delivery case flange. Assemble the clipnut (73-13-11/1-260) to the bracket and attach the clamp to the bracket with bolt and washer (73-13-11/1-240-250) and clipnut.
  - (d) Attach to the bracket (72-42-01/3-400) mounted on the delivery case/CCOC flange with the existing bolt, washer and nut.
  - (e) Torque-tighten the clamp nuts and bolts to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (12) Position the tube (73-13-11/1-180) to the engine CCOC and secure the tube front union nut to the previous tube lightly tightened.
- (13) Assemble the loop clamp (73-13-11/1-110) to the tube, and bracket (75-02-03/1-90) mounted at the HP and LP turbine bearing cold vent overboard connection. Secure the clamp to the bracket with the bolt, washer and nut (73-13-11/1-140-130-120). Torque-tighten the nut and bolt to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (14) Position the tube (73-13-11/1-100) to the engine between the previous tube and the drains tank and screw union nuts on hand tight.

TN13806





OLYMPUS 593

MK.610-14-28

OVERHAUL



(15) Assemble two loop clamps (73-13-11/1-10) to the tube and secure them to the brackets:

- (a) Attach the clamp to the bracket (72-42-01/1-260) mounted on the centre support locating position on the CCOC bottom intrascope blank with the bolt, washer and nut (73-13-11/1-50-30-20).
- (b) Attach the clamp to the lug on the centre support tube with the pillar bolt, spacer, washer and nut (73-13-11/1-60-40-30-20).
- (c) Torque-tighten the nuts and bolts to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(16) Torque-tighten:

- (a) The union nut at the re-ingestion pump to between 220 and 240 lbf in. (24,8 and 27,1 N.m).
- (b) All the other tubes union nuts to between 190 and 210 lbf in. (21,5 and 23,7 N.m).
- (c) Wire-lock all the tubes union nuts.

13. Install the Fuel Feed Tube, Adapter Block and Engine Flowmeter - FCU to Distribution and Dump Valve (Item 57, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to the union threads and lubricant 'B' to the bolts.
- (2) Record the type and serial number of the flowmeter on the accessory sheet.

B. Installation (Ref.Fig.513).

- (1) Position the seal plate and adapter (73-13-02/1-270-240) to the FCU mating face. Secure the adapter and seal plate with bolts (73-13-02/1-250) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

PRINTED IN ENGLAND

TN13808

ASSEMBLY

71-00-01

STAGE 4

Page 533

Jan 2/80



CR 33214/000A

SEAL PLATE

ENGINE FUEL FLOWMETER

FCU

NUT PLATE ASSEMBLY

FCU TO FLOWMETER TUBE ASSEMBLY

SEAL PLATE

ADAPTER

SEAL PLATE

This diagram illustrates the assembly of the FCU to flowmeter tube assembly. The main components shown are the FCU (Fuel Control Unit), the Engine Fuel Flowmeter, and the FCU to Flowmeter Tube Assembly. The assembly includes two Seal Plates, an Adapter, and a Nut Plate Assembly. The FCU is connected to the Engine Fuel Flowmeter via a tube. The FCU to Flowmeter Tube Assembly is shown with its various components, including the Seal Plate, Adapter, and Nut Plate Assembly. The diagram is labeled with CR 33214/000A.

TN13807

ASSEMBLY  
71-00-01  
STAGE 4  
Page 534  
Jan 2/80



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Position the seal plate and flowmeter (73-33-01/1-100-10) to the distribution and dump valve. Secure with the bolts and washers (73-33-01/1-20-30-40). Install the two smaller diameter washers under the boltheads in the lower bolt-holes of the flange. Torque-tighten the bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (3) Position the tube (73-13-02/1-110) on engine, locate the seal plate (73-13-02/1-220) between flanges and secure tube to adapter with bolts (73-13-02/1-120-130) and nuts (73-13-02/1-260) lightly tightened.
- (4) Carefully insert seal plate (73-13-02/1-230) between tube and flowmeter flanges, position nut plate assembly (73-13-02/1-170) against flowmeter flange and secure with lightly tightened nut and bolt (73-13-02/1-140-150).
- (5) Assemble three bolts (73-13-02/1-150) through fuel tube and flowmeter flanges to engage with the three nuts of nut plate assembly. Lightly tighten the bolts. Assemble bolts (73-13-02/1-160) at the remaining two locations and lightly tighten.
- (6) Torque-tighten tube flange bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (7) Secure the tube to the oil tank overboard vent tube support bracket (75-02-02/1-70) with the bolts and nuts (73-13-02/1-100-105-90) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (8) Assemble the loop clamp (73-13-02/1-10) to the tube and bracket (73-13-08/1-280) mounted on the zero 'G' valve and FCU fuel tube. Secure with the bolt, washer and nut (73-13-02/1-40-30-20) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (9) Assemble the blanking ferrule (73-13-02/1-80) to the tube union at the elbow near the flowmeter. Torque-tightened to between 190 and 210 lbf in. (21,5 and 23,7 N.m) and wire-lock (Tool 909).

NOTE: A coupling piece may be fitted in lieu of the flowmeter for engine testing and transit. The test bench facilities being used for fuel flow recording.

ASSEMBLY

## 71-00-01

STAGE 4

Page 535

Jan 2/80

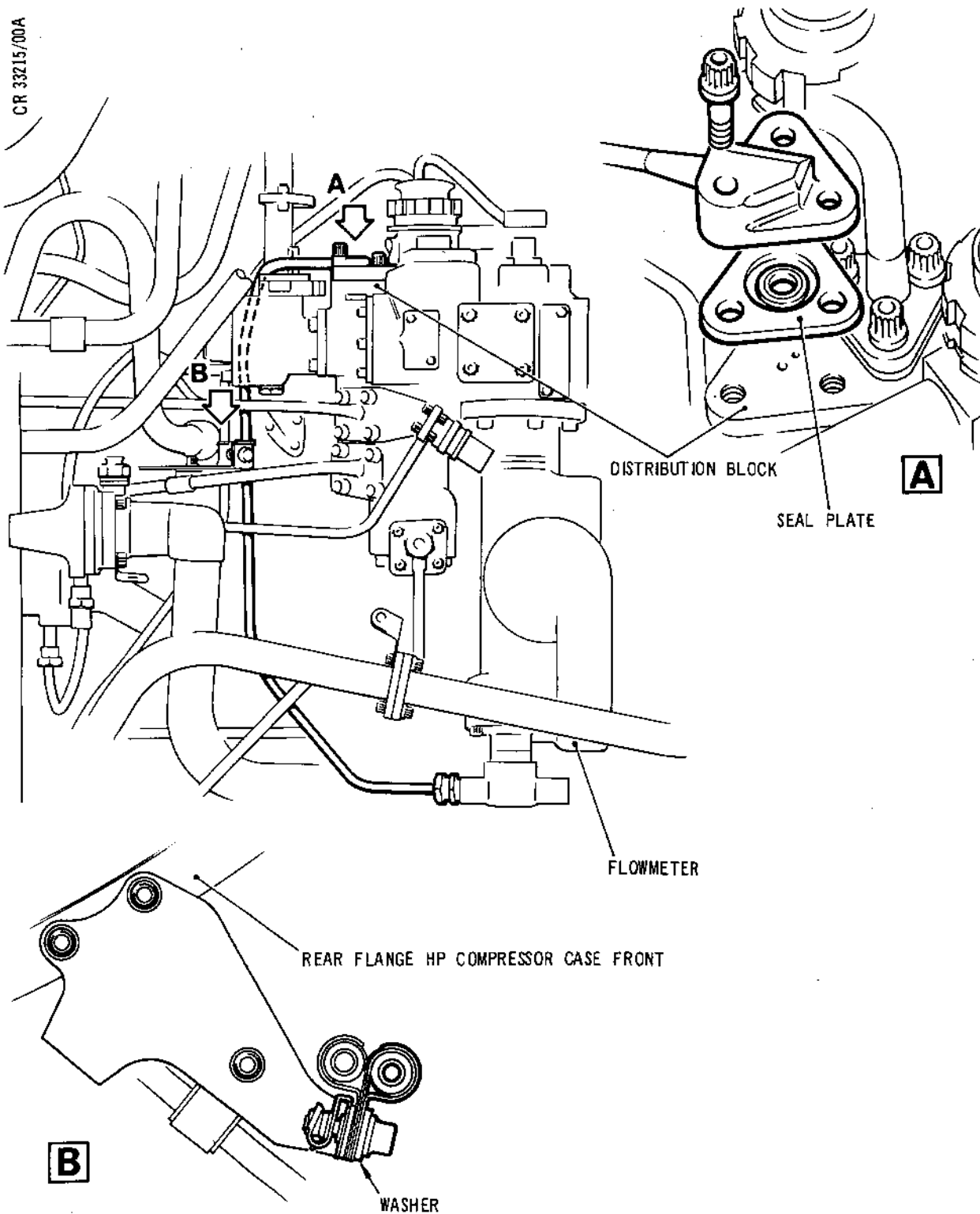


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 33215/00A



Fuel Outlet Tube  
Emergency Dump Valve Servo Outlet Tube  
Figure 514

TN13810

ASSEMBLY  
**71-00-01**  
STAGE 4  
Page 536  
Jan 2/80



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



14. Install Fuel Outlet Tube, Distribution and Dump Valve to FCU Tube Union. Emergency Dump Valve Servo (Item 58, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to the tube union threads and lubricant 'B' to the bolts.

B. Installation (Ref.Fig.514).

- (1) Position the tube (73-13-10/1-280) between the distribution and dump valve mounting face and the main fuel feed tube union and screw on the union nut hand tight.
- (2) Insert the seal plate (73-13-10/1-310) between the tube flange and mounting face and secure the seal and flange with bolts (73-13-10/1-290-300) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m). Wire-lock the bolts.
- (3) Torque-tighten the tube union nut to between 190 and 210 lbf in. (21,5 and 23,7 N.m) and wire-lock it (Tools 1664 and 909).
- (4) Assemble the loop clamp (73-13-10/1-210) to the tube and bracket (72-33-01/7-170) on the HP case front/rear joint flange. Secure the clamp to the bracket with the existing bolt, washer and clipnut (73-13-10/1-220-230-240) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

15. Install Oil Scavenge Tubes, Oil Pump Housing to HP Compressor Diffuser Casing, HP Turbine Bearing (Item 59, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to the tube union threads and lubricant 'B' to the bolts.
- (2) Record the type and serial number of the temperature bulb on the accessory sheet.

PRINTED IN ENGLAND

TN13812

ASSEMBLY

71-00-01

STAGE 4

Page 537

Jan 2/80

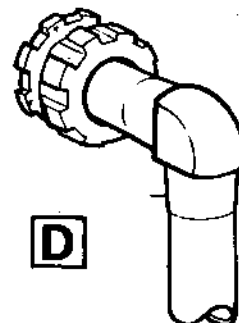
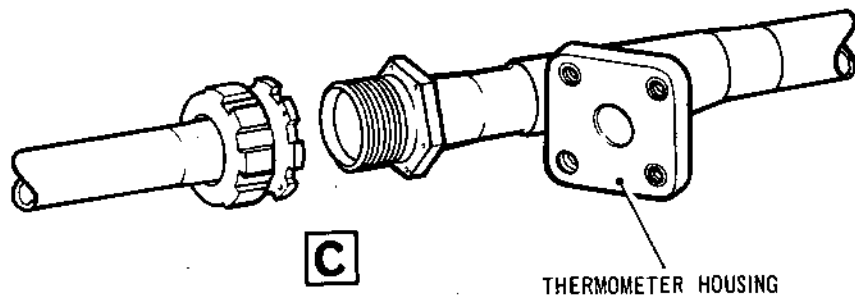
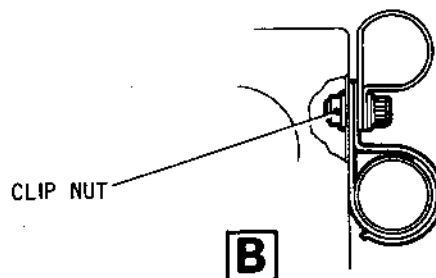
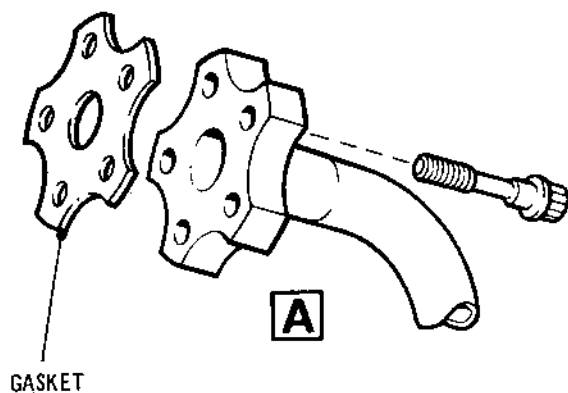
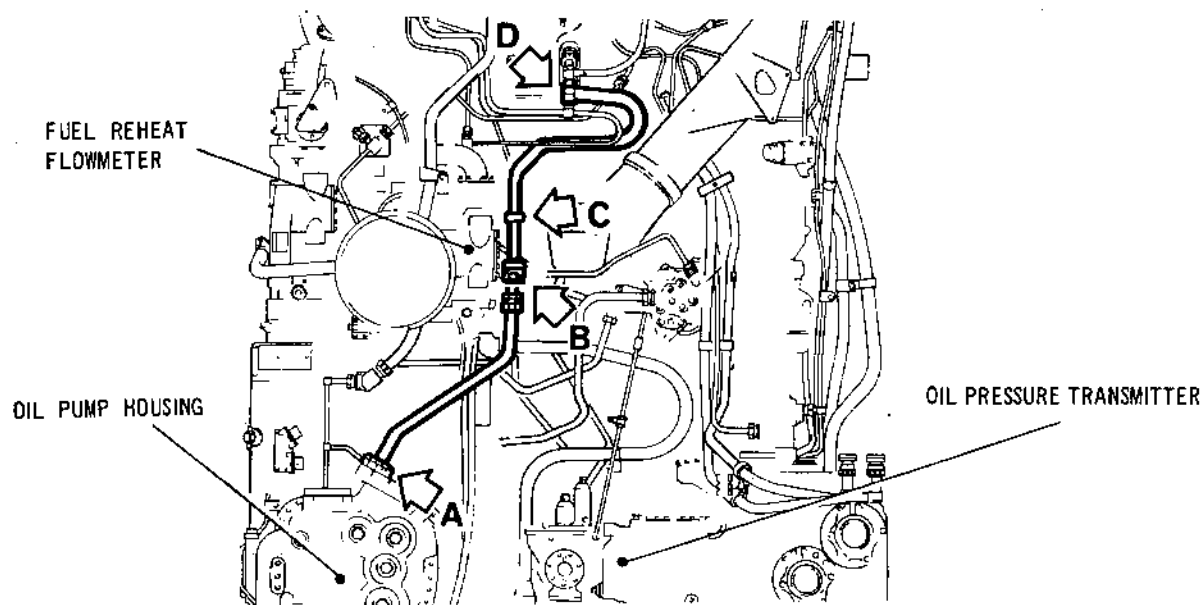


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 33216/008



Oil Scavenge Tubes  
Oil Pump Housing to HP Compressor Diffuser Case  
Figure 515

ASSEMBLY  
**71-00-01**  
STAGE 4  
Page 538  
Jan 2/80



OLYMPUS 593

MK.610-14-28 *sneema*  
OVERHAUL

## B. Installation (Ref.Fig.515).

- (1) Position the tube and gasket (72-01-04/4-10-25) to the oil pump housing mounting face. Secure the tube flange to the housing with bolts (72-01-04/4-20), torque-tightened to between 60 and 65 lbf in. (6,8 and 7,3 N.m).
- (2) Position the tube (72-01-04/4-90) between the previous tube and the delivery case union, lightly tighten the tube union nuts.
- (3) Assemble the loop clamp (72-01-04/4-30) to the tube and bracket on tray assembly (71-51-01/10-200) mounted on the HP case stage five duct. Assemble the clipnut (72-01-04/4-50) to the bracket. Retain the clamp to the bracket with the bolt (72-01-04/4-40) and nut lightly tightened.
- (4) Torque-tighten the tubes union nuts to between 400 and 440 lbf in. (45,2 and 49,7 N.m) and wire-lock (Tools 1528, 947 and 1648).
- (5) Assemble the gasket to the oil thermometer (77-23-02/1-60-40). Position the thermometer in the tube (72-01-04/4-90) and secure with bolts (77-23-02/1-50) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m) and wire-lock.

16. Install Oil Scavenge Tube, Oil Pump Housing to LP Turbine Bearing (Item 60, Fig.501 of Stage 1)

## A. Prepare for Installation.

- (1) Apply lubricant 'A' to the tube union threads and lubricant 'B' to the bolts.

## B. Installation (Ref.Fig.516).

- (1) Position the tube (72-01-04/3-110) to the bottom rear of the engine, secure the rear tube union with the union nut mounted to the exhaust diffuser case lightly tightened.
- (2) Assemble the loop clamp (72-01-04/3-10) and the half clamp shells (72-01-04/3-75) (SB.0L.593-75-8972-27 standard) to the tube and bracket (72-53-00/6-250) mounted on the CC0C/exhaust diffuser flange. Secure the clamp to the bracket with bolt, washer and nut (72-01-04/3-40-30- 20) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

ASSEMBLY

71-00-01

STAGE 4

Page 539

Jun 1/94



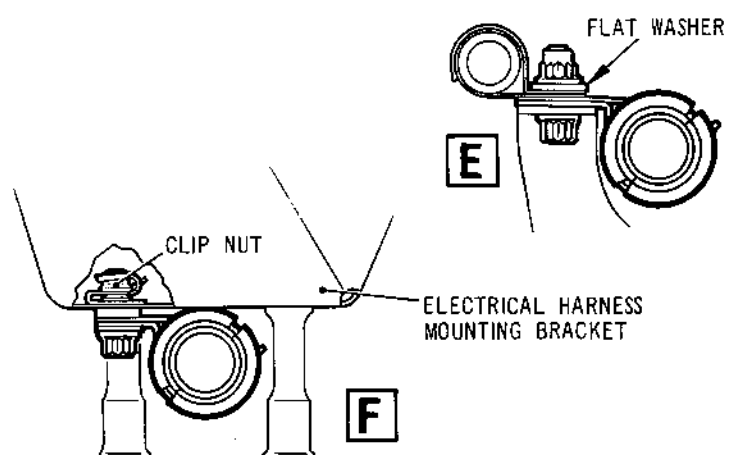
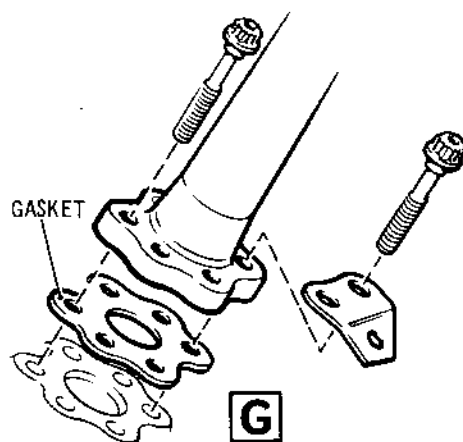
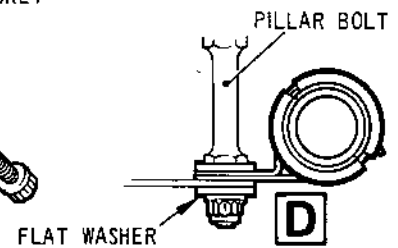
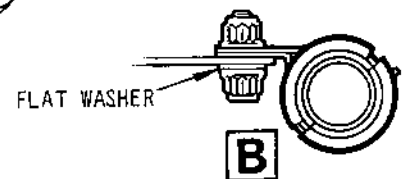
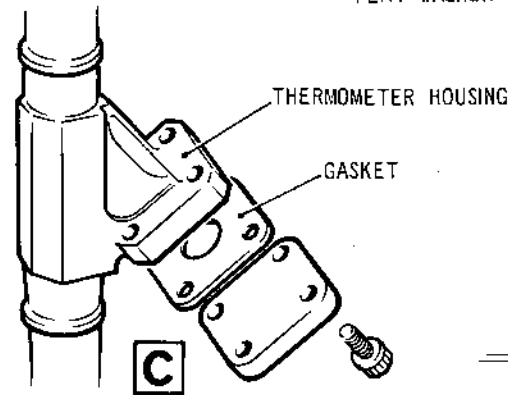
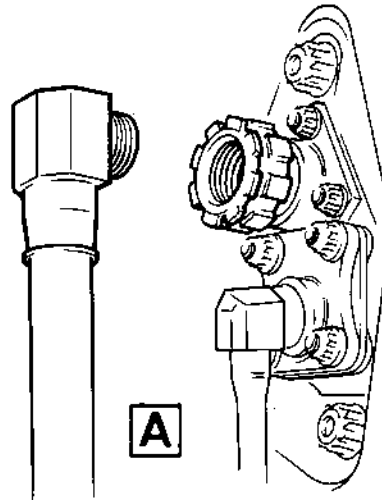
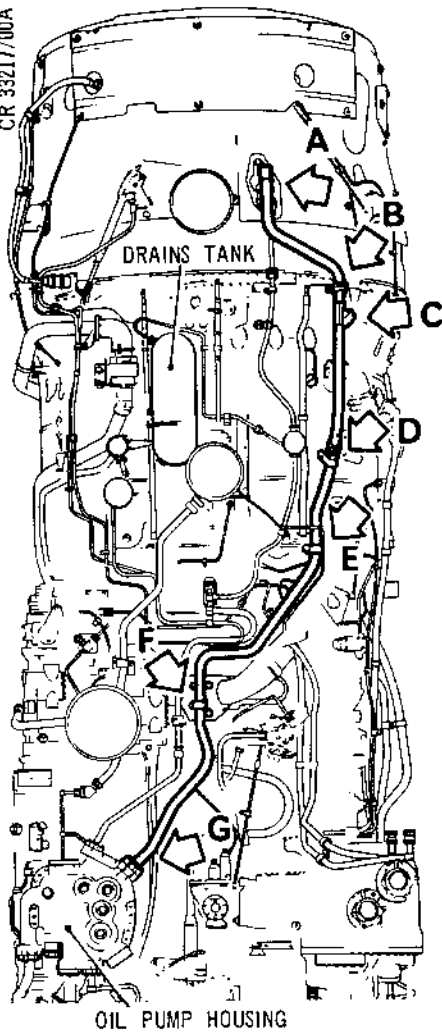
# OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 33217/00A



Oil Scavenge Tubes  
Oil Pump Housing to LP Turbine Bearing  
Figure 516

ASSEMBLY  
**71-00-01**  
STAGE 4  
Page 540  
Jan 2/80





OLYMPUS 593

MK.610-14-28 *sneema*  
OVERHAUL

- (3) Position the tube (72-01-04/3-350) to the bottom of the engine between the oil pump housing mounting face and the rear tube, lightly tighten the union nut securing the tubes together.
- (4) Insert a gasket (72-01-04/3-390) between the tube flange and the oil pump housing mounting face. Position the bracket (72-01-04/3-380) to the tube flange. Secure the bracket, tube flange and gasket to the oil pump face with bolts (72-01-04/3-370-360) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m) and wire-lock.
- (5) Assemble a clipnut (72-01-04/3-310) to the support bracket (75-01-04/1-70) on the HP casing stage five duct. Assemble a loop clamp (72-01-04/3-270) and the half clamp shells (72-01-04/3-345) (SB.0L.593-75-8972-27 standard) to the tube and secure to the clipnut and bracket with a bolt, washer and spacer (72-01-04/3-280-290-300). Torque-tighten the bolt to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (6) Assemble a loop clamp (72-01-04/3-130) and the half clamp shells (72-01-04/3-195) (SB.0L.593-75-8972-27 standard) to the tube and bracket (72-42-01/3-400) mounted on the LP/HP turbine bearing cold vent connector. Secure the clamp to the bracket with bolt, washer and nut (72-01-04/3-160-150-140) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (7) Assemble a loop clamp (72-01-04/3-200) and the half clamp shells (72-01-04/3-265) (SB.0L.593-75-8972-27 standard) to the tube and bracket (75-02-03/1-90) on the delivery case/CCOC flange. Secure the clamp to the underside of the bracket with the pillar bolt, washer and nut (72-01-04/3-230-220-210). Torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (8) Position the gasket and blank (72-01-04/3-105-100) to the rear tube flange and secure with bolts (72-01-04/3-90) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m) and wire-lock.
- (9) Torque-tighten the tubes union nuts to between 490 and 550 lbf in. (55,4 and 62,1 N.m) (Tools 1648, 947, 946, 1528 and 1526) and wire-lock.

ASSEMBLY

71-00-01

STAGE 4

Page 541

Jun 1/94



# OLYMPUS 593



MK.610-14-28

SNECMA

OVERHAUL

17. Install the Electrical Harness Support Bracket and Clamping of IDG Oil Tube (Item 61, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'B' to the bolts unless stated otherwise.

B. Installation (Ref.Fig.517).

- (1) Position the bracket (71-51-01/10-100) to the tray and bracket (71-51-01/10-200-280) assembled to the HP case/delivery case flange. Retain the bracket with:
  - (a) Two nuts (71-51-01/10-110) securing the front of the bracket to the anchor bolts on the tray (Pre-SB.71-18). A nut and bolt (71-51-01/10-270B/275) securing the front of the bracket to the anchor nut and bolt on the tray (SB. 71-18). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
  - (b) Install the bolt and nut (71-51-01/10-150-140) securing the brackets rear right-hand side to the bracket (72-33-01/8-280) mounted on the HP compressor case rear lower flange. Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
  - (c) The pillar bolt and nuts (71-51-01/10-130-120) retaining the loop clamp (79-22-04/2-80) to the IDG-CSD oil tube.
    - (i) Loosen the nut securing the loop clamp and remove the other nut from the pillar bolt.
    - (ii) Assemble the pillar bolt and nut to secure the brackets rear left-hand side.
    - (iii) Torque-tighten to between 120 and 130 lbf in. (13,6 and 14,7 N.m).
    - (iv) Torque-tighten the loop clamp nut to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

ASSEMBLY

## 71-00-01

STAGE 4

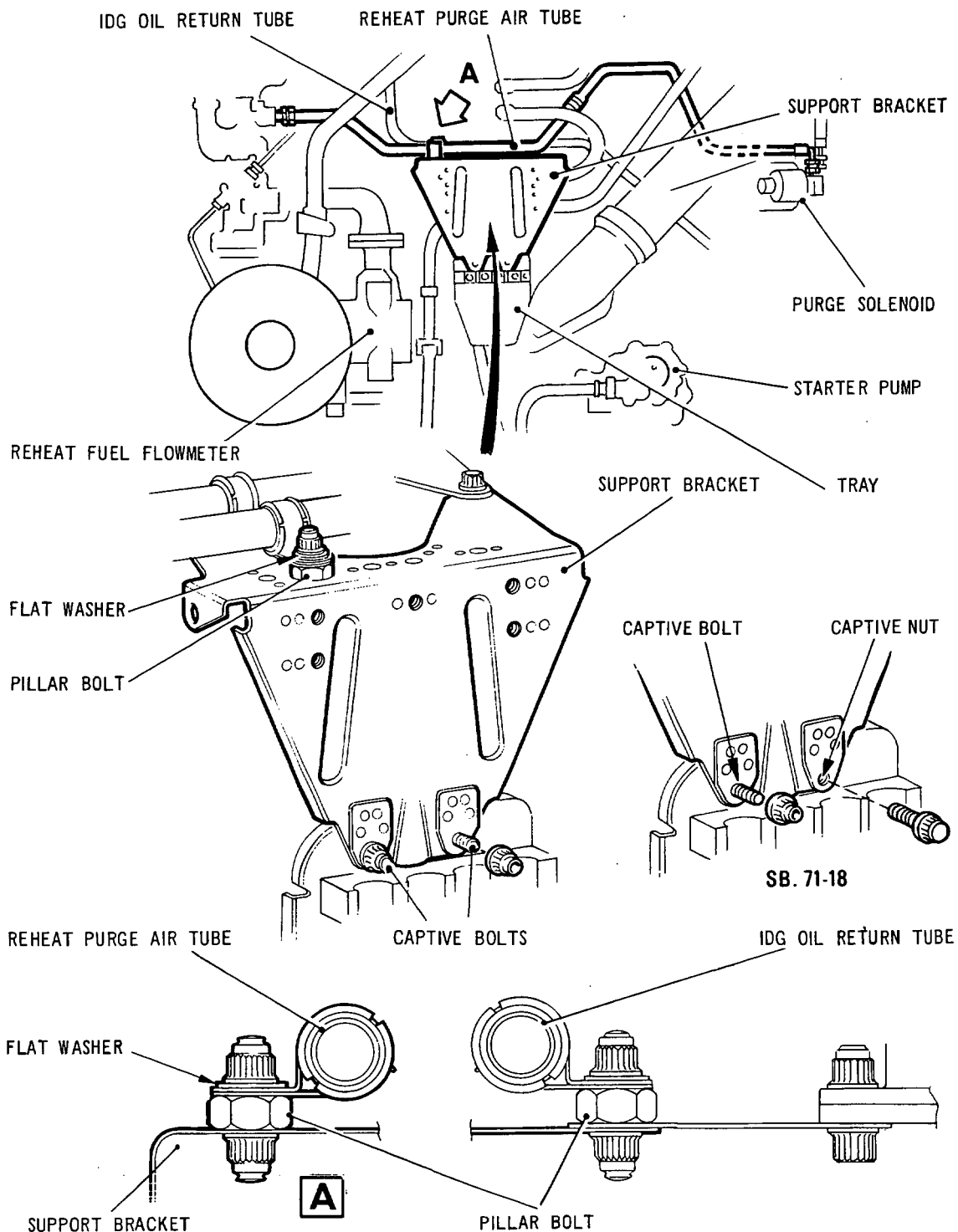
Page 542

Dec 31/01

CR 33218/00C



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



Electrical Harness Support Bracket Clamping of  
the IDG Oil Tube  
Figure 517



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (2) Secure the reheat purge air tube, (delivery case to solenoid), to the bracket (71-51-01/10-100) with the loop clamp (75-03-02/2-10) existing pillar bolt, washer and nut (75-03-02/2-40-30-20) with lubricant 'C' applied. Torque-tighten the nut and bolt to 100 lbf in. (11,5 N.m).
- (3) Ensure a minimum clearance of 0.200 in. (5,0 mm) exists between the bracket (71-51-01/10-100) and the rear intermediate casing drain tube.

18. Assemble the Hydraulic Pump Seal Drain Tubes, Adapters Seal Space to Oil Tank Overboard Vent (Item 62, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to the tube union connections and lubricant 'B' to the bolt threads.

B. Installation (Ref.Fig.518).

- (1) Position the tube front section (71-79-02/1-60) to the main hydraulic pump adapter and the drain connection on the standby pump adapter. Insert a gasket (71-79-02/1-80) between the tube flange and the main pump adapter and secure with the bolts (71-79-02/1-70) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m). Engage union nut with adapter and hand tighten.
- (2) Assemble the loop clamp (71-79-02/1-10) and the half clamp shells (71-79-02/1-55) (SB.0L.593-75-8972-27 standard) to the tube and secure the boss on the right-hand gearbox (Ref. Detail E) with the bolt (71-79-02/1-20) (Ref. SB.72-115 Part 8), torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (3) Position the tube centre section (71-79-02/1-230) to the tube front section, engage the tube union connection nut and hand tighten.
- (4) Position the tube rear section (71-79-02/1-380) between the oil tank overboard vent and the tube centre section connection and engage and hand tighten the tube union nut and union bolt respectively.

ASSEMBLY

## 71-00-01

STAGE 4

Page 544

Dec 31/01

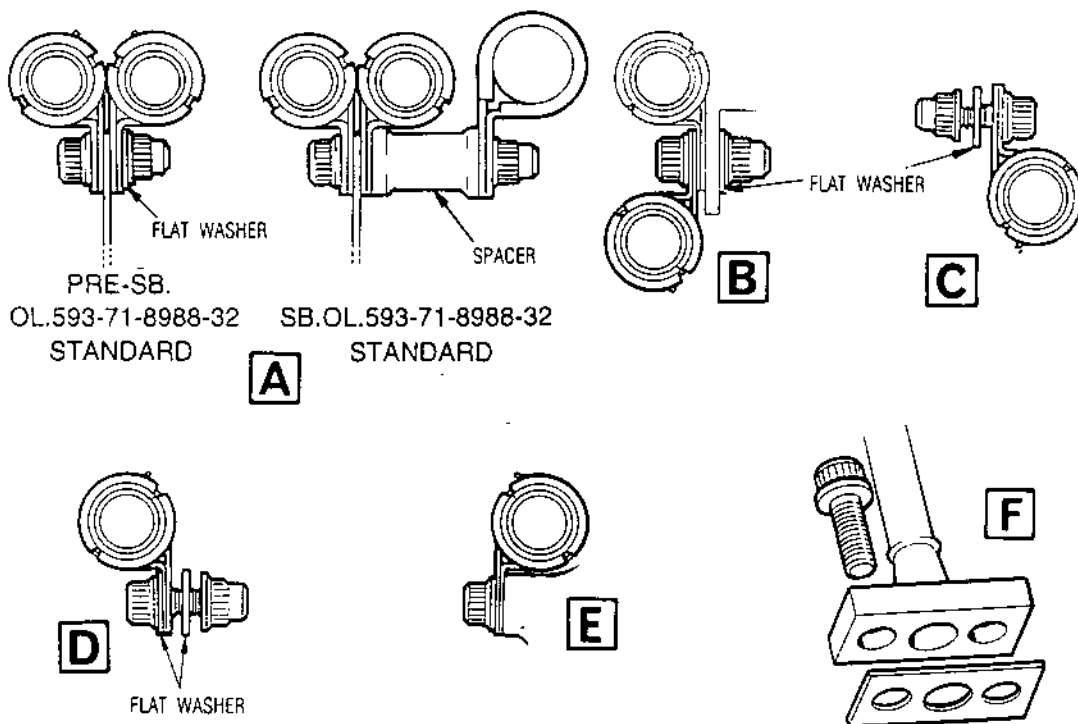
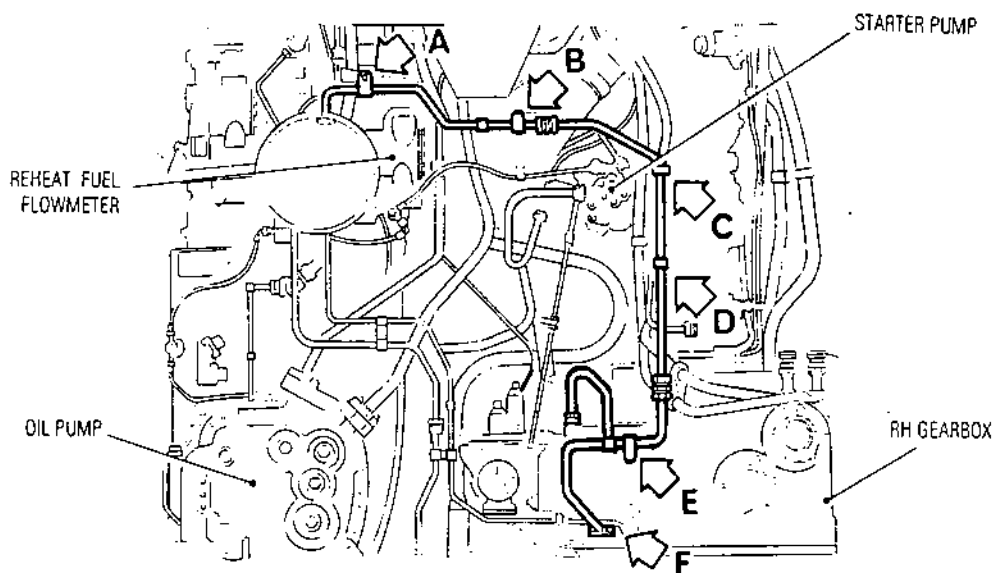


OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema



Hydraulic Pump Seal Drain Tubes, Space Drain  
Tubes to the Oil Tank Overboard Vent  
Figure 518



# OLYMPUS 593

MK.610-14-28 *sneema*  
OVERHAUL

- (5) Assemble two loop clamps (71-79-02/1-90-160) and the half clamp shells (71-79-02/1-155-1-225) (SB.OL.593-75-8972-27 standard) to the tube centre section (Ref. Detail C and D).
- (a) Assemble the rear clamp in front of the bend in the tube and the front clamp approximately one foot in front of the rear clamp.
- (b) Retain the front loop clamp with bolt (Ref. SB.72-115 Part 9), washer and nut (71-79-02/1-120-110-100) and the rear loop clamp with bolt, washer and nut (71-79-02/1-190-180-170) ready for attachment to brackets at a later stage.
- (6) Assemble the loop clamp (71-79-02/1-240) and the half clamp shells (71-79-02/1-305) (SB.OL.593-75-8972-27 standard) to the rear tube and attach to the bracket (71-51-01/10-100) electrical harness support with the bolt, washer and nut (71-79-02/1-270-260-250) lightly tightened (Detail B).
- (7) Pre-SB.OL.593-71-8988-32 standard. Assemble the loop clamp (71-79-02/1-310) and the half clamp shells (71-79-02/1-375) (SB.OL.593-75-8972-27 standard) to the rear tube and secure it to the bracket (73-23-01/1-70), mounted on the reheat fuel controller with the bolt, washer and nut (71-79-02/1-340-330-320) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (8) SB.OL.593-71-8988-32 standard. Assemble the loop clamp (23H) (71-79-02/1-310) and the half clamp shells (71-79-02/1-375) (SB.OL.593-75-8972-27 standard) to the rear tube and the loop clamp (71-51-01/6-200) to the reheat FCU flylead and secure them to the bracket (73-23-01/1-70), mounted on the reheat fuel controller with the bolt, spacer and nut (71-51-01/6-210, 5-165 and 6-180) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (9) Torque-tighten the tube union nuts and union bolt between 190 and 210 lbf in. (21,5 and 23,7 N.m) (Tool 909) and wire-lock.

ASSEMBLY

## 71-00-01

STAGE 4

Page 546

Jun 1/94

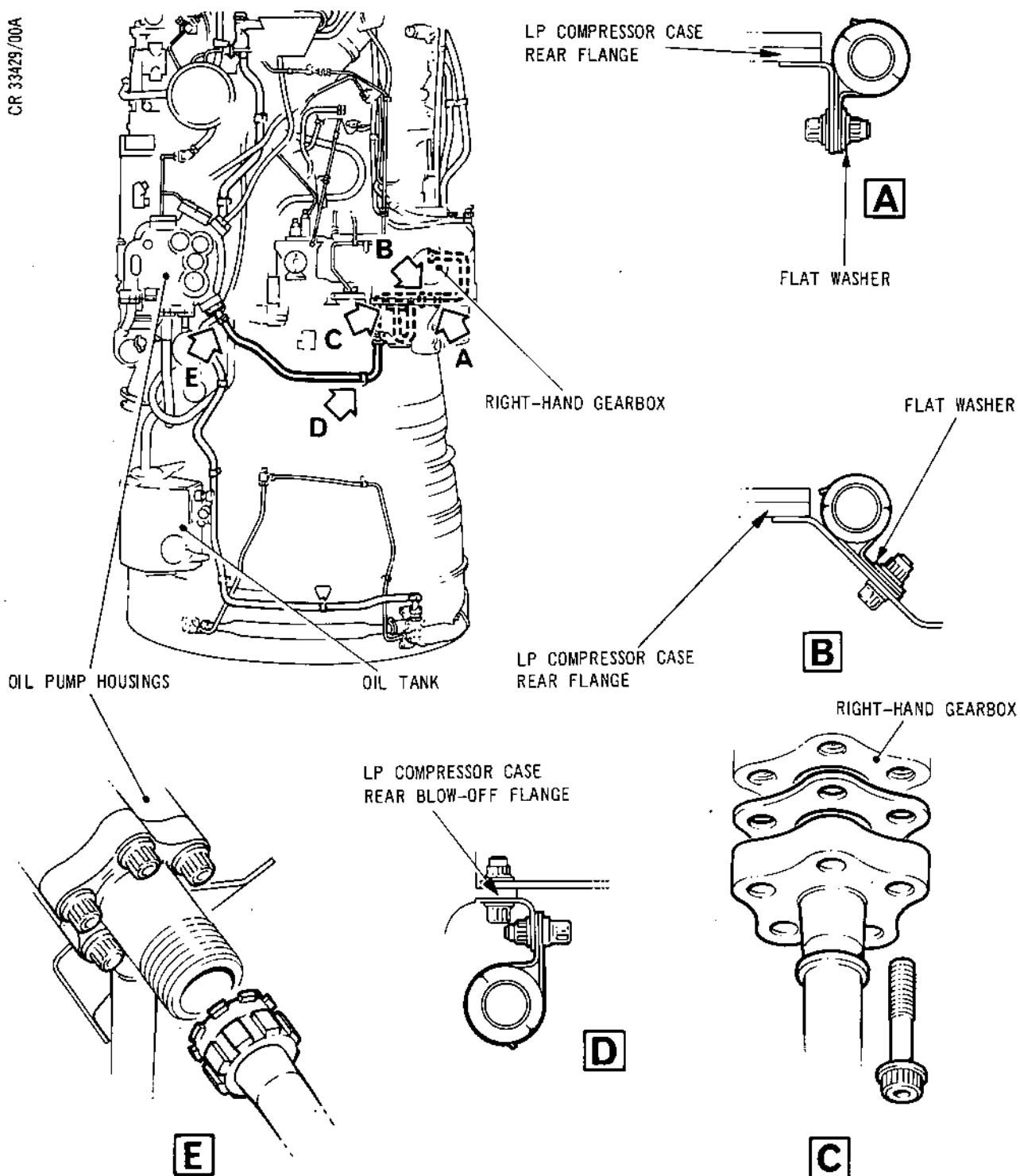
CR 33429/00A



OLYMPUS 593

MK. 610-14-28

OVERHAUL



Oil Feed Tubes LP and HP Thrust Bearings  
Pump to Bearings  
Figure 519

ASSEMBLY  
71-00-01

STAGE 4  
Page 547  
Jan 2/80



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

19. Install the Oil Feed Tubes, LP and HP Thrust Bearings, Right-hand Gearbox Accessory Pump (Item 63, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to the tube union connections and lubricant 'B' to the bolts.

B. Installation (Ref.Fig.519).

- (1) On an engine to S.B.72-146 standard, ensure that the restrictor is in position in the tube in the intermediate case vane and is clean and free from obstruction before connecting tubes.
- (2) Position the tube section (72-01-03/2-70) on the engine and engage the tube union nut with the union on the front bearing feed tube (Detail E). Hand-tighten the union nut.
- (3) Hold the tube (72-01-03/2-240) in position between the connection on the intermediate case at vane two and the installed tube (2-70) connection. Hand tighten the tube union nuts.
- (4) Assemble a loop clamp (72-01-03/2-10) to the first installed tube section (Detail D) and attach to the bracket (72-31-01/5-200), mounted on the LP case rear blow-off flange, using the bolt and nut (72-01-03/2-30-20) loosely assembled pending electrical cable installation.
- (5) Assemble the loop clamp (72-01-03/2-170) to the tube section (72-01-03/2-240) and secure to the bracket (72-31-01/6-210), mounted on the LP case rear flange, with the bolt, washers and nut (72-01-03/2-200-190-180) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m) (Ref. Detail A).
- (6) Assemble the loop clamp (72-01-03/2-100) to the tube section (72-01-03/2-240) and secure to the bracket (72-31-01/6-180), on the LP case rear flange, with the bolt, washer and nut (72-01-03/2-130-120-110) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m) (Ref. Detail B).
- (7) Torque-tighten the tubes union nuts to between 400 and 440 lbf in. (45,2 and 49,7 N.m) (Tools 1648, 947 and 1528) and wire-lock.

ASSEMBLY

71-00-01

STAGE 4

Page 548

Jun 1/94





OLYMPUS 593

MK.610-14-28 SNECMA  
OVERHAUL

- (8) Position the tube section (72-01-03/2-80) between the accessory pump feed mounting face on the right-hand gearbox and the union connection on the tube section (72-01-03/2-240) and engage the union nut hand tight.
- (9) With the gasket (72-01-03/2-95) between the tube flange and pump face (Detail C) secure the flange and gasket with bolts (72-01-03/2-90) torque-tightened to between 80 and 90 lbf in. (9,0 and 10,2 N.m).
- (10) Torque-tighten tube union nut to between 310 and 340 lbf in. (35,0 and 38,4 N.m) (Tools 322 and 1565) and wire-lock it.
- (11) Ensure a clearance of 0.050 in. (1,25 mm) exists between the pipe connector and the intermediate case adapters air supply pipe support bracket on the LP case/exit guide vane case flange.

20. Install Scavenge Oil Tube, LP and HP Thrust Bearings  
(Item 64, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to the bolts, except bolts (72-01-04/2-20).
- (2) Apply lubricant 'B' to bolts (72-01-04/2-20).

B. Installation (Ref.Fig.520).

- (1) Hold the tube (72-01-04/2-60) in position between the main oil pump housing and intermediate case sump (pulse probe and drive housing).
- (2) With the gasket (72-01-04/2-120) between the mating faces and the bracket (72-01-04/2-110) positioned on the tube flange, attach the bracket, flange and gasket to the sump with bolts (72-01-04/2-90-80) lightly tightened. Use the longer bolts at the bracket location (Detail B).
- (3) Remove the nut and bolt retaining the loop clamp (73-13-03/1-72) to the tube, first stage pump to reheat injection system at the rear of the filter housing. Secure the loop clamp to the bracket (72-01-04/2-110) with the nut and bolt torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

ASSEMBLY

71-00-01

STAGE 4

Page 549

Jun 1/94



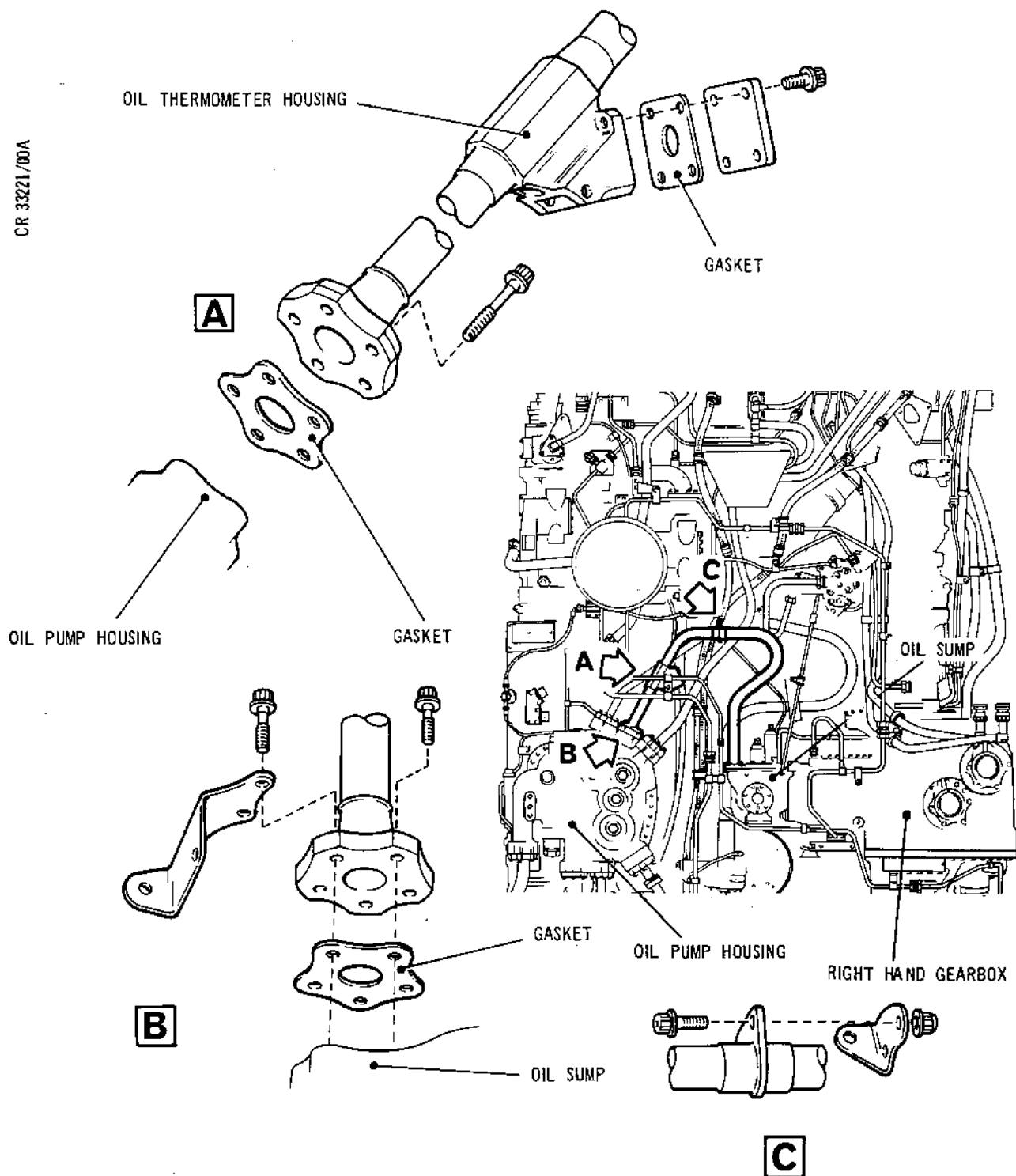
OLYMPUS 593

MK. 610-14-28

OVERHAUL



CR 33221/00A



Scavenge Oil Tube, LP and HP Thrust Bearings  
Figure 520

ASSEMBLY  
**71-00-01**  
STAGE 4  
Page 550  
Jan 2/80



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

- (4) With a gasket (72-01-04/2-130) between mating faces, attach the tube flange and gasket to the pump housing with bolts (72-01-04/2-70) lightly tightened.
- (5) Torque-tighten the bolts securing the tube flanges to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (6) Assemble the gasket (72-01-04/2-55) and blank (72-01-04/2-50) to the tube and secure with the bolts (72-01-04/2-40) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m). Wire-lock the bolts.
- (7) Position the bracket (72-01-04/2-30) to the tube lug (Detail C) and retain with the bolts and nuts (72-01-04/2-20-10) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,3 N.m).

21. Assemble the Oil Feed Tubes, Pump to Bearing, LP and HP Compressor Thrust Oil Failure Warning (Item 65, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to the tube union threads and lubricant 'B' to the bolts.
- (2) Assemble the clipnut (72-01-03/3-190) to the bracket (72-33-01/6-120) mounted on the intermediate case/HP case flange.

B. Installation (Ref.Fig.521).

- (1) Hold the tube section (72-01-03/3-150) in position with the tube flange aligned to the pulse probe and drive housing (Detail A), insert the gasket (72-01-03/3-170) between the mating faces and secure with bolts (72-01-03/3-160) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,3 N.m).
- (2) Assemble the loop clamp (72-01-03/3-10) and the half clamp shells (72-01-03/3-75) (SB.OL.593-75-8972-27 standard) to the tube and secure to the bracket (72-33-01/6-215), mounted on the intermediate case/HP case flange near the sump, with the bolt, washers and nut (72-01-03/ 3-40-30-20), torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

ASSEMBLY

71-00-01

STAGE 4

Page 551

Jun 1/94

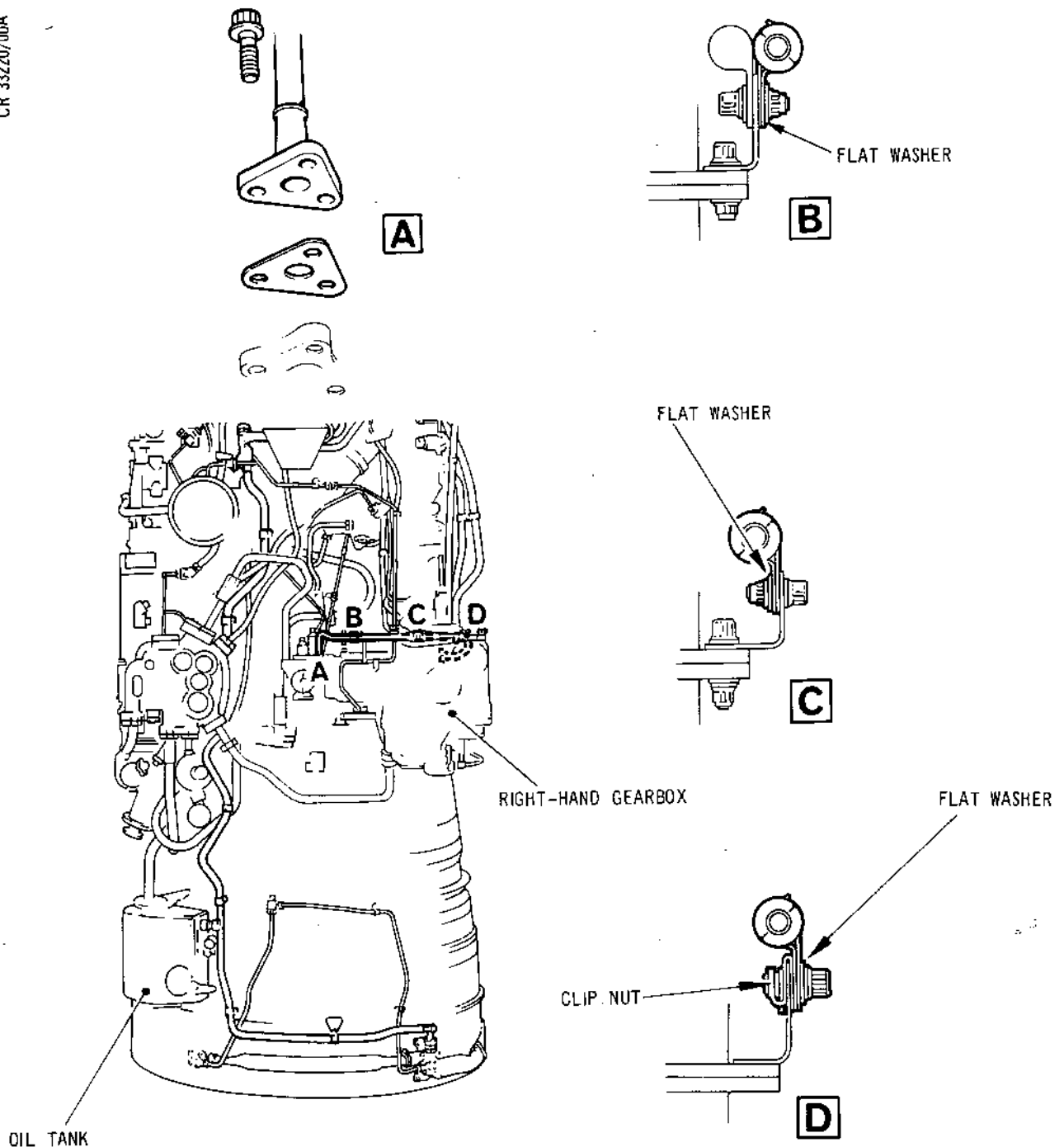


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33220/00A



Oil Feed Tubes LP and HP Thrust Bearings  
Oil Failure Warning  
Figure 521

ASSEMBLY  
**71-00-01**  
STAGE 4  
Page 552  
Jan 2/80



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

Printed in England

- (3) Assemble the loop clamp (72-01-03/3-80) and the half clamp shells (72-01-03/3-145) (SB.0L.593-75-8972-27 standard) to the tube and secure to the bracket (72-33-01/6-160), mounted on the intermediate case/HP case flange, with the bolt, washer and nut (72-01-03/3-110-100-90), torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (4) Position the tube section (72-01-03/3-250) to the intermediate case union and the tube section (3-150) union and engage the union nuts hand tight.
- (5) Assemble the loop clamp (72-01-03/3-180) and the half clamp shells (72-01-03/3-245) (SB.0L.593-75-8972-27 standard) to the tube and secure to the bracket (72-33-01/6-120) and clipnut with the bolt and washer (72-01-03/3-210-200) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (6) Torque-tighten the tube unions nuts between 220 and 240 lbf in. (24,8 and 27,1 N.m) (Tools 1648 and 1752) and wire-lock.

ASSEMBLY

## 71-00-01

STAGE 4

Page 553

Jun 1/94



OLYMPUS 593

MK.610-14-28

OVERHAUL



TUBES AND ACCESSORIES - ASSEMBLY

1. Install Cooling Air Tubes, HP Turbine Bearing and LP Turbine Bearing Front Tube (Item 66, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'B' to the bolt threads.

B. Installation (Ref.Fig.501).

- (1) Position the make-up piece (75-01-01/1-260) to the intermediate case elbow and secure with bolts and nuts (75-01-01/1-280-270) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (2) Install HP turbine bearing tube. Ensure that the bracket (72-33-01/5-400) is to the same Service Bulletin standard as the tube.
- (a) Assemble the sealing ring to the tube (75-01-02/1-140-80).
- (b) Assemble the tube to the HP compressor diffuser case elbow (75-01-05/1-20) and the make-up piece lower face.
- (c) Secure the tube to the elbow with the retaining plate, bolts and nuts (75-01-02/1-130-120-110). Torque-tighten the nuts and bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (d) Position the bracket (72-33-01/6-110) to the inner tube flange bolt-hole and intermediate case/HP case flange.
- (e) Attach the bracket and tube flange with the bolt (75-01-02/1-90) and the remaining tube flange positions with bolts (75-01-02/1-100) to the make-up piece, lightly tightened.

PRINTED IN ENGLAND

TN14501

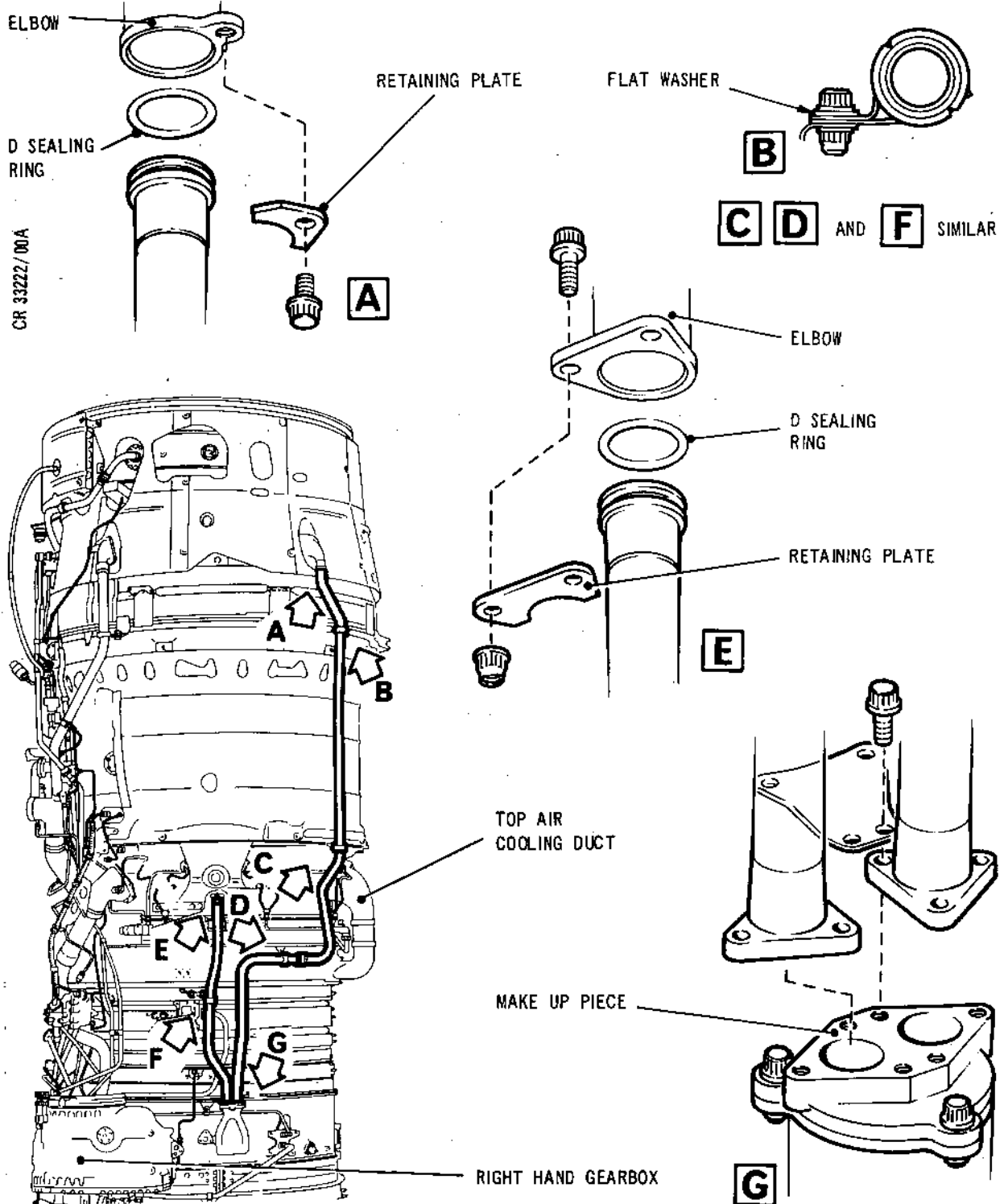
ASSEMBLY  
**71-00-01**  
STAGE 5  
Page 501  
Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



Cooling Air Tubes, Intermediate Case to HP Turbine Bearing  
and Intermediate Case to Exhaust Diffuser  
Figure 501

ASSEMBLY  
71-00-01  
STAGE 5  
Page 502  
Jan 2/80



OLYMPUS 593



MK.610-14-28 *sneema*

OVERHAUL

- (3) Position the bracket (72-33-01/5-400) to the HP compressor case. Secure the bracket with bolts (72-31-01/5-390) or bolts and washers (72-33-01/5-390-395) lightly tightened.
- (4) Assemble the loop clamp (75-01-02/1-10) and the half clamp shells (75-01-02/1-75) (SB.0L.593-75-8972-27 standard) to the tube and secure to the bracket (72-33-01/1-400) on the HP case with the bolt, washer and nut (75-01-02/1-40-30-20). Torque-tighten the nut and bolt between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (5) Torque-tighten the bolts securing the bracket (para.3.) between 85 and 95 lbf in. (9,6 and 10,7 N.m).

C. Install the LP Turbine Bearing Tube.

- (1) Position the tube (75-01-01/1-300) to the bracket (72-33-01/6-110) and the make-up piece. Locate bolt (75-01-01/1-310) at bracket position and bolts (75-01-01/1-320) at remaining positions and attach bracket and tube flange to make-up piece with bolts lightly tightened.
- (2) Assemble the loop clamp (75-01-01/1-190) and the half clamp shells (75-01-01/1-255) (SB.0L.593-75-8972-27 standard) to the tube and secure to the bracket (72-33-01/7-50) mounted on the HP case front/rear joint flange with bolt, washer and nut (75-01-01/1-220-210-200) torque-tightened to between 85 and 95 lbf in. (9,2 and 10,7 N.m).
- (3) Secure the bracket (72-33-01/6-110) to the intermediate case/HP case flange with the existing bolts and nuts (72-33-01/6-130-100) torque-tightened to between 85 and 95 lbf in. (9,2 and 10,7 N.m).
- (4) Torque-tighten nuts and bolts securing the tubes flanges and brackets to between 80 and 90 lbf in. (9,0 and 10,2 N.m).

ASSEMBLY

71-00-01

STAGE 5

Page 503

Jun 1/94





# OLYMPUS 593



MK.610-14-28

SNECMA

OVERHAUL

## 2. Install Cooling Air Tubes, LP Turbine Bearing Rear Tube (Item 67, Fig.501 of Stage 1)

### A. Prepare for Installation.

- (1) Apply lubricant 'C' to the tube union threads and to the nuts and bolts (72-53-00/1-10-30) securing the elbow and bracket (72-53-00/1-40-50). Apply lubricant 'B' to the remaining bolts.

### B. Installation (Ref.Fig.501).

- (1) Assemble the seal ring to the tube (75-01-01/1-180-150).
- (2) Position the tube between the turbine shroud elbow (72-53-00/1-50) and the tube (75-01-01/1-300) mounted to the right-hand HP case and lightly tighten the tube union nut to the forward tube.
- (3) Secure the tube to the elbow with the retaining plate and bolt (75-01-01/1-170-160) torque-tightened to between 60 and 65 lbf in. (6,8 and 7,3 N.m). Wire-lock the bolt.
- (4) Torque-tighten the loosely assembled nuts (72-53-00/1-10) securing the elbow and bracket (72-53-00/1-50-40) to 100 lbf in. (11,5 N.m).
- (5) Assemble the loop clamp (75-01-01/1-10) and the half clamp shells (75-01-01/1-75) (SB.0L.593-75-8972-27 standard) to the tube, align and secure to the bracket (72-53-00/5-160) mounted on the CC0C/exhaust diffuser flange using bolt, washer and nut (75-01-01/1-40-30-20). Torque-tighten the nut and bolt to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (6) Assemble the loop clamp (75-01-01/1-80) and the half clamp shells (75-01-01/1-145) (SB.0L.593-75-8972-27 standard) to the tube and secure to the bracket (72-42-01/3-140) mounted on the delivery case/CC0C flange using bolt, washer and nut (75-01-01/1-110-100-90). Torque-tighten the nut and bolt to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (7) Torque-tighten the tube union nut to between 50 and 55 lbf ft. (68 and 74 N.m), (Tools 1658, 948 and 1529) wire-lock the union nut.

ASSEMBLY

## 71-00-01

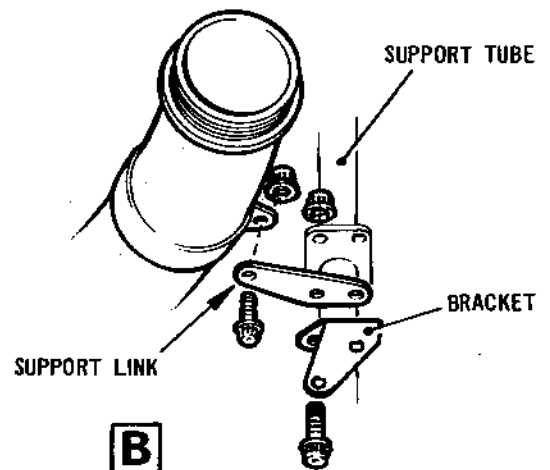
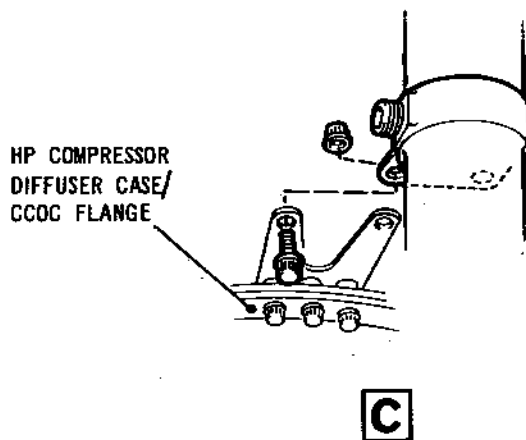
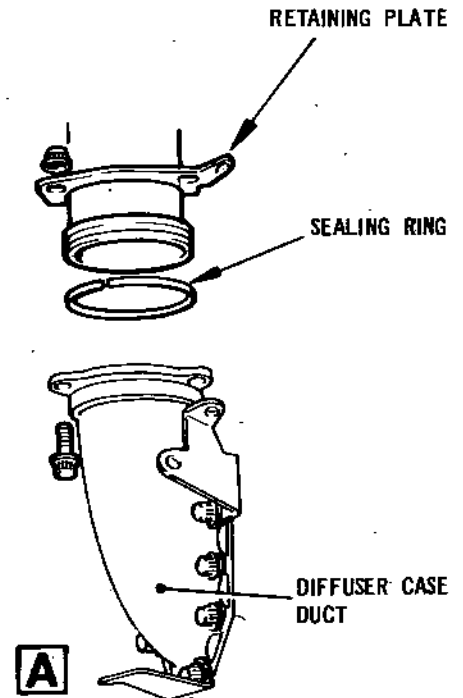
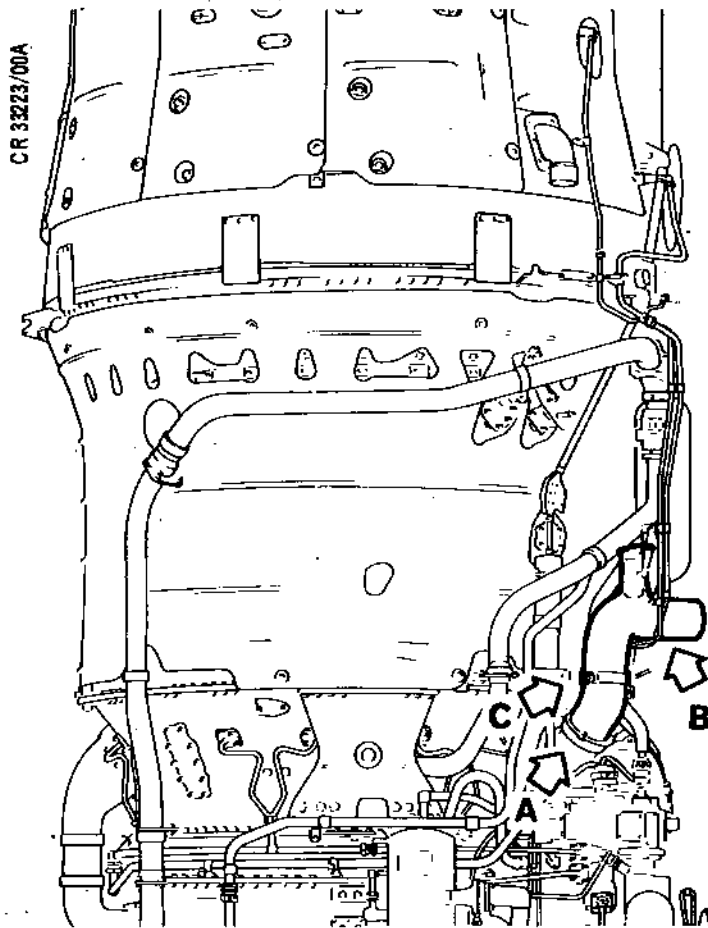
STAGE 5

Page 504

Dec 31/01



**OLYMPUS 593**  
MK.610-14-28  
OVERHAUL



Venting Air Ducts HP Compressor Diffuser Case LH  
Figure 502

ASSEMBLY  
**71-00-01**  
STAGE 5  
Page 505  
Jan 2/80



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



### 3. Install Air Ducts and Tubes, Venting (Item 68, Fig.501 of Stage 1)

#### A. Prepare for Installation.

- (1) Apply lubricant 'A' to the tube union threads and to the pillar bolt and nut (72-53-00/1-160-150) attached to bracket (72-53-00/1-200). Apply lubricant 'B' to the remaining bolts.

#### B. Installation (Ref.Fig.502).

- (1) HP compressor diffuser case venting air duct, left-hand.
  - (a) Assemble the seal ring to the duct (75-02-07/1-70-10).
  - (b) Position the duct to the HP compressor diffuser case duct (75-02-12/1-10) and secure with retaining plate, bolts and nuts (75-02-07/1-40-30-20). Torque-tighten the nuts and bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (c) Assemble the support link (75-02-07/1-100) to the duct lower lug, retain with bolt and nut (75-02-07/1-60-50). Position the bracket (75-02-07/1-110) to the support link and the support tube (72-42-01/1-290) and attach them with bolts and nuts (75-02-07/1-90-80).
  - (d) Attach the lugs on the duct to the bracket (72-42-01/4-310) mounted on the CC0C forward flange with the bolts and nuts (75-02-07/1-60-50).
  - (e) Torque-tighten all the nuts and bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (2) Exhaust diffuser to left-hand tube (Ref.Fig.503).
  - (a) Remove the loosely assembled nuts securing the elbow mounted at vane seven, remove the elbow (72-53-00/2-120). Ensure the gasket (72-53-00/2-125) fitted to the exhaust diffuser mounting face is undamaged.

ASSEMBLY

## 71-00-01

STAGE 5

Page 506

Dec 1/86

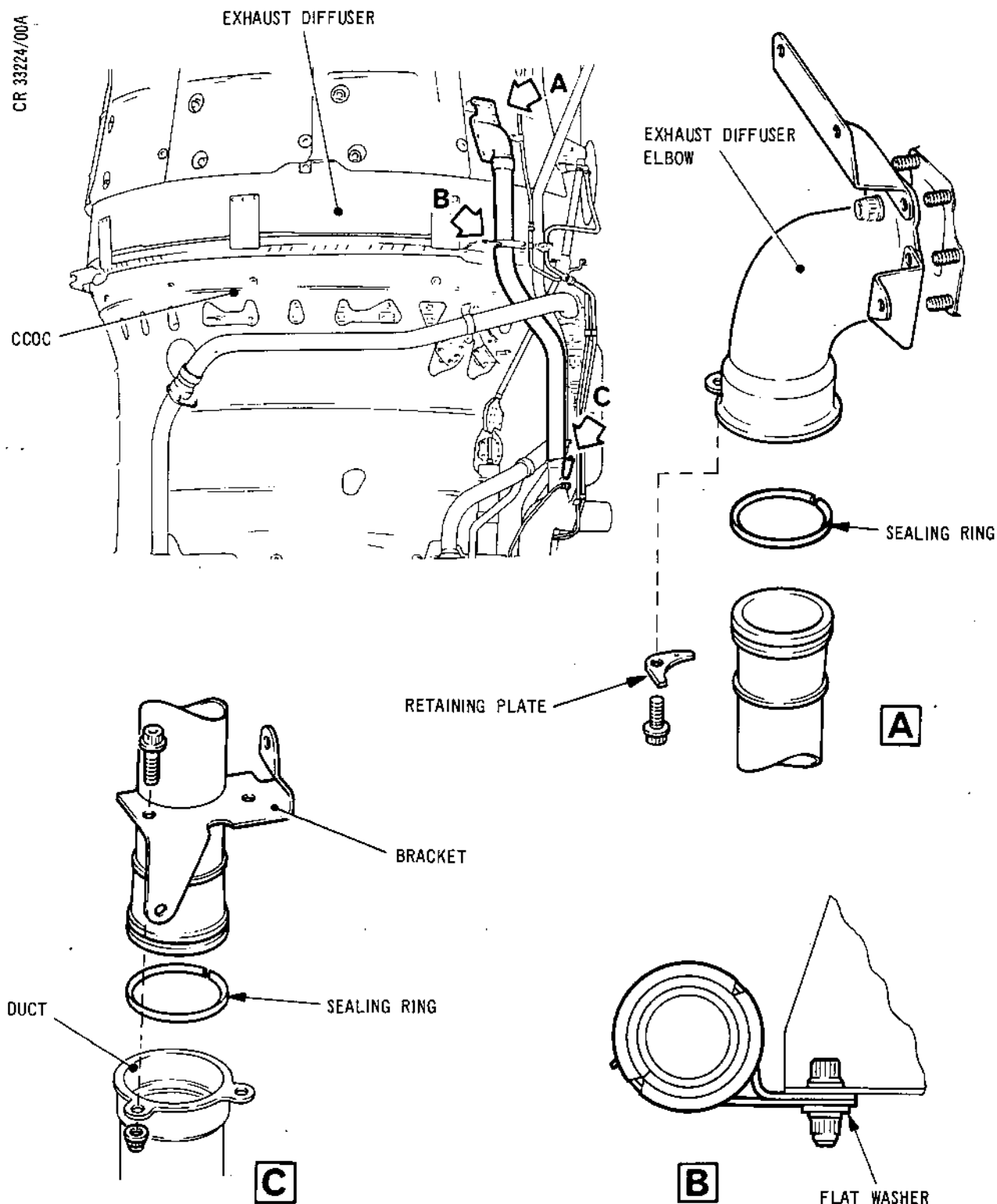
CR 33224/00A



OLYMPUS 593

MK. 610-14-28

OVERHAUL



Venting Air Ducts Exhaust Diffuser to  
Left-hand Duct  
Figure 503

ASSEMBLY  
71-00-01  
STAGE 5  
Page 507  
Jan 2/80



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

- (b) Assemble the seal rings to each end of the tube (75-02-05/1-140-80), and the elbow to the tube.
  - (c) Position the tube and elbow between the previous duct (75-02-07/1-10) and the exhaust diffuser mounting face.
  - (d) Position the brackets (72-53-00/2-110-115) to the elbow and secure with the nuts torque-tightened evenly in sequence to 100 lbf in. (11,5 N.m).
  - (e) Secure the tube to the elbow with retaining plate and bolt (75-02-05/1-130-120). Torque-tighten the bolt to between 67 and 73 lbf in. (7,6 and 8,2 N.m) and wire-lock.
  - (f) Position the bracket (75-02-05/1-110) to the tube (75-02-05/1-80) and duct (75-02-07/1-10) and secure the bracket to the duct with bolts and nuts (75-02-05/1-100-90) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (g) Secure the loop clamps (75-03-02/1-310, 72-01-03/4-120 and 73-13-03/2-10) to the bracket (75-02-05/1-110) using the pillar bolt, washers and nut (72-01-03/4-150-140-130) securing the loop clamps together, torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (h) Assemble the loop clamp (75-02-05/1-10) and the half clamp shells (75-02-05/1-75) (SB.OL.593-75-8972-27 standard) to the tube align and retain to the bracket (72-53-00/ 7-250) mounted on the CC0C/HP turbine case flange with the bolt, washer and nut (75-02-05/ 1-40-30-20). Torque-tighten the nut and bolt between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (3) Compressor diffuser case venting air duct, right-hand (Ref.Fig.504).
- (a) Assemble the seal ring to the duct (75-02-06/1-80-10).

ASSEMBLY

71-00-01

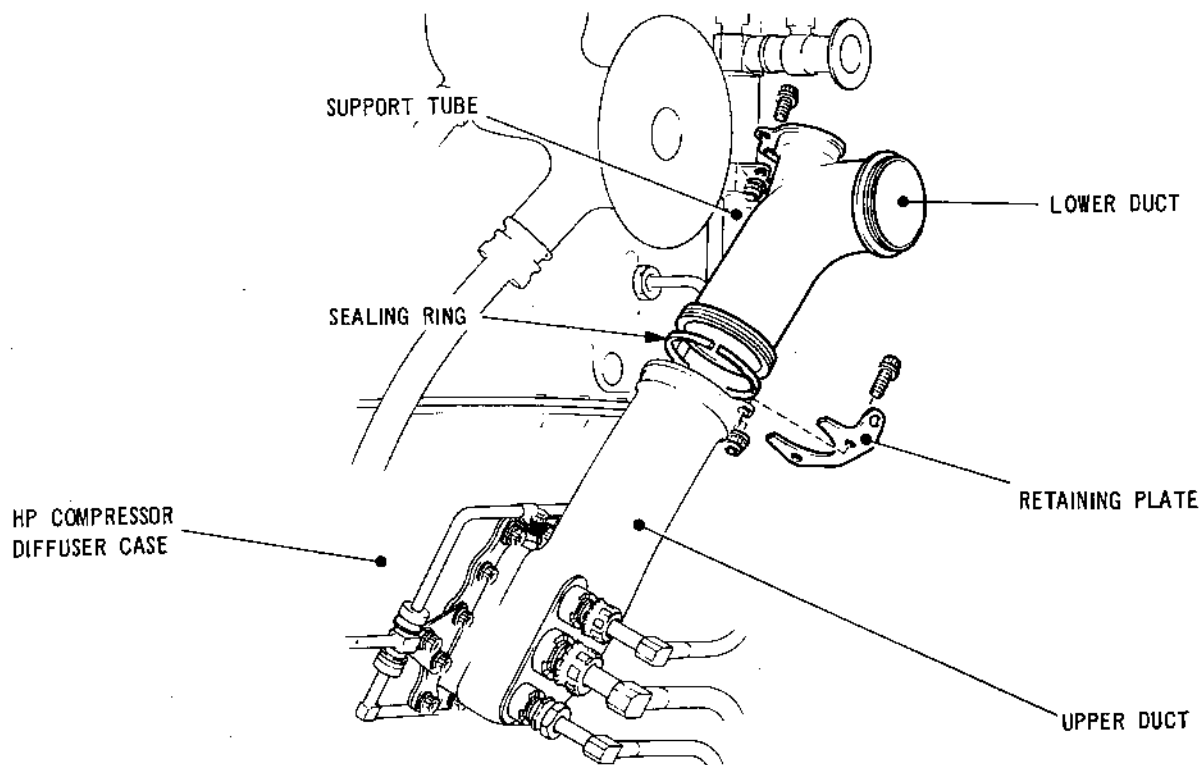
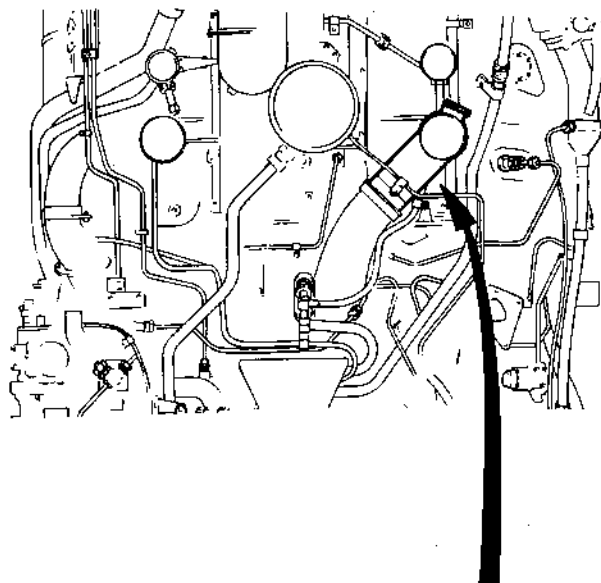
STAGE 5

Page 508

Jun 1/94



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL

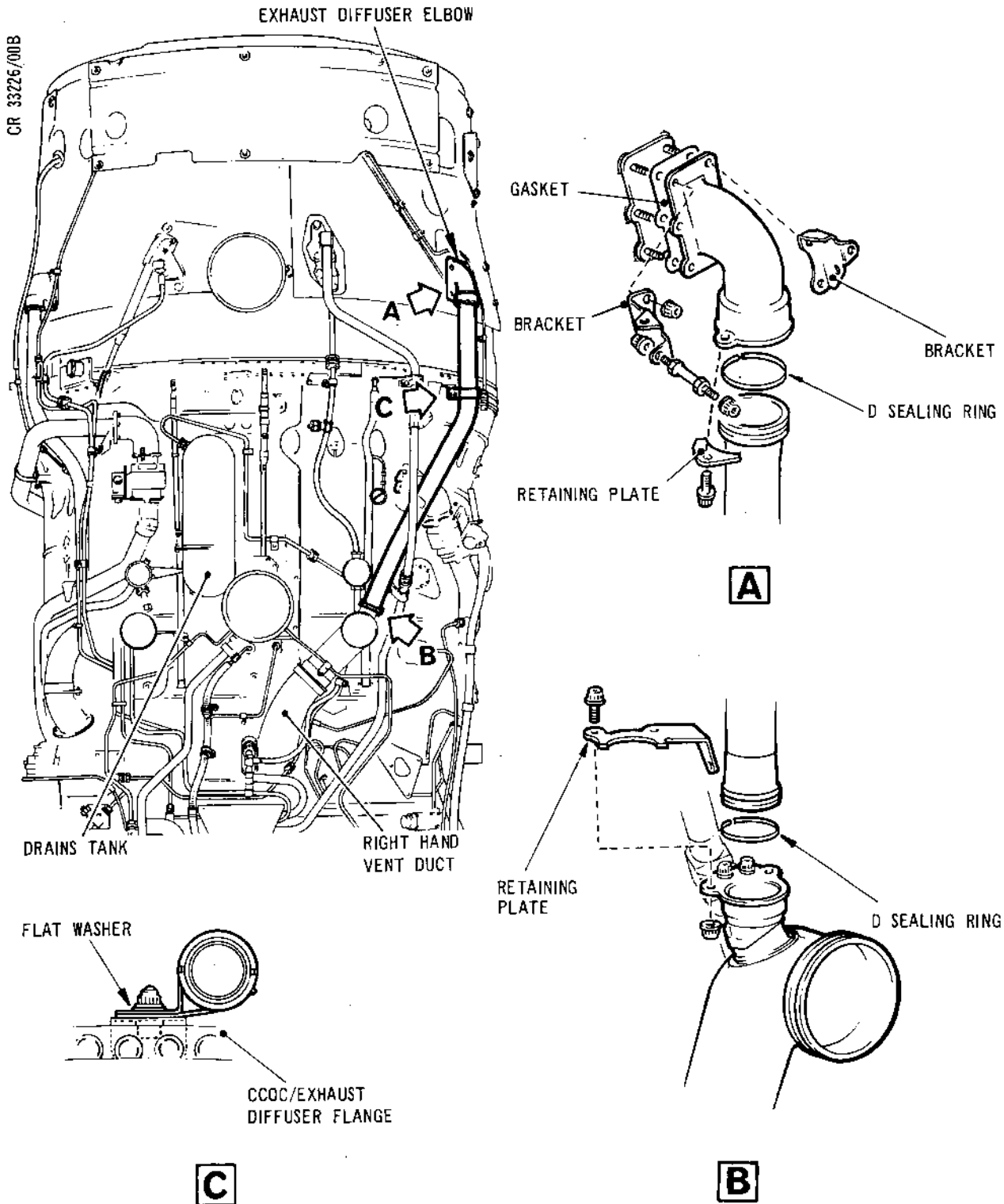


Venting Air Ducts HP Compressor Diffuser Case RH  
Figure 504

ASSEMBLY  
**71-00-01**  
STAGE 5  
Page 509  
Jan 2/80



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



Venting Air Tubes Exhaust Diffuser to Right-hand Duct  
Figure 505

ASSEMBLY  
**71-00-01**  
STAGE 5  
Page 510  
Jan 2/80



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (b) Assemble the duct to the delivery case duct (75-02-12/1-50) and secure with retaining plate, bolts and nuts (75-02-06/1-50-40-30-20). Torque-tighten the nuts and bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (c) Secure the duct to the support tube (72-42-01/1-270) with bolts and nuts (75-02-06/1-70-60) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (4) Exhaust diffuser right-hand duct (Ref.Fig.505).
- (a) Remove the loosely assembled nuts and elbow (72-53-00/1-220). Ensure the gasket (72-53-00/1-225) fitted to the exhaust diffuser case is undamaged.
- (b) Assemble the seal rings to the tube (75-02-04/1-140-80) and assemble the elbow to the tube.
- (c) Position the tube and elbow between the duct (75-02-06/1-10) mounted on the bottom of the HP compressor diffuser case and the exhaust diffuser case.
- (d) Position the brackets (72-53-00/1-200-210) to the elbow flange. Secure the brackets and elbow to the exhaust diffuser case with nuts (72-53-00/1-170) with lubricant 'C' applied to threads. Torque-tightened nuts in sequence to 100 lbf in. (11,5 N.m).
- (e) Assemble the pillar bolt to the bracket (72-53-00/1-160-200) and secure with a nut (72-53-00/1-150) torque-tightened to 100 lbf in. (11,5 N.m). Assemble a nut (72-53-00/1-150) to the pillar bolt and hand-tighten.





OLYMPUS 593 

MK.610-14-28 *snecma*  
OVERHAUL

- (f) Retain the tube to the rear elbow with the retaining plate and bolt (75-02-04/1-130-120). Torque-tighten the bolt to between 67 and 73 lbf in. (7,6 and 8,2 N.m) and wire-lock.
- (g) Retain the tube to the forward duct with the retaining plate, bolts and nuts (75-02-04/1-110-100-90). Torque-tighten the nuts and bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (h) Assemble the loop clamp (75-02-04/1-10) and the half clamp shells (75-02-04/1-75) (SB.0L.593-75-8972-27 standard) to the tube and secure to the bracket (72-53-00/6-150) on the CCOC/exhaust diffuser case flange with bolt, washer and nut (75-02-04/1-40-30-20) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

#### 4. Positional Checks of the Fuel - Air - Oil Overboard Vents and Ducts

NOTE: These operations can only be carried out if the following items are assembled to the engine:

Fuel heater overboard duct.  
Oil tank overboard outlet.  
LP and HP compressor thrust bearing cold vent outlets.  
HP and LP turbine bearing cold vent outlets.  
The number twelve labyrinth outlet.  
Right and left turbine hot vents.  
Fuel drains tank overboard outlet.

##### A. Fuel Heater Overboard Duct and Oil Tank Vent.

- (1) Assemble the front gauging bracket using the sling (Tools 1760 and 1758) to the two brackets mounted to the lower delivery case/CCOC flange and intake case/LP case flange (Tool 1756). Secure with the nuts and bolts provided.
- (2) Using the gauge (Tool 1761) in conjunction with the gauging bracket check the fuel heater overboard duct position.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Using the gauge (Tool 1762) check the position of the oil tank overboard duct position.

NOTE: When the vents do not fall in the limits of the gauges the tubes and securing brackets can be loosened, the vents repositioned and the tubes and brackets re-tightened and locked.

- (4) Remove the front gauging bracket loosely securing the bolts and nuts to the bracket, replace gauges in container (Tool 1757).

B. LP and HP compressor bearing vents and HP and LP turbine bearing vents and number twelve labyrinth and drains tank overboard vents.

- (1) Assemble the rear gauging bracket (Tool 1763) to the three brackets mounted on the delivery case/CCOC flange and the bracket on the CCOC/exhaust diffuser flange using the sling (Tool 1758). Secure with the nuts and bolts provided.
- (2) Using the gauge (Tool 1764) in conjunction with the gauging bracket check the LP and HP compressor thrust bearings cold vent outlet position.
- (3) Using the gauge (Tool 1764) check the LP and HP turbine cold vent outlet position.
- (4) Using the gauge (Tool 1765) check the number twelve labyrinth left and right-hand positions.
- (5) Using the gauge (Tool 1766) check the drains tank overboard outlet position.

NOTE: When the vents do not fall in the limits of the gauges the tubes and securing brackets can be loosened, the vents repositioned and the tubes and brackets re-tightened and locked.

- (6) Remove the rear gauging bracket loosely secure the bolts and nuts to the bracket, replace gauges in container (Tool 1759).



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

5. Assemble the Reheat Fuel Tube, Reheat Fuel Controller to Spray Ring to the Engine (Item 69, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to the tube union threads and lubricant 'B' to the bolts unless stated otherwise.

B. Installation (Ref.Fig.506).

- (1) Position the tube (73-13-03/2-240) at the controller, along the bottom of the engine to the exhaust diffuser case. Finger-tighten the tube union nut to the controller connector.
- (2) Assemble the four loop clamps (73-13-03/2-10-50-90-170) to the tube and secure to the brackets as follows:
  - (a) Left-hand exhaust diffuser air vent duct bracket (75-02-05/1-110), attach the clamp (73-13-03/2-10) using the existing pillar bolt and nut (72-01-03/4-150-130).
  - (b) CC0C/HP turbine case flange bracket (72-53-00/7-250), attach the clamp using the existing pillar bolt, distance piece and nut (75-03-02/1-200-195-190) with lubricant 'C' applied.
  - (c) LP shaft signal system pulley shroud flange on the diffuser bracket (76-21-02/1-40), attach the clamp with bolt, washer and nut (73-13-03/2-120-110-100) to the bracket.
  - (d) Exhaust diffuser adapter flange bracket (72-54-01/3-120), attach the clamp with bolt, washer and nut (73-13-03/2-200-190-180).
  - (e) Torque-tighten the pillar bolt, distance piece and nut (75-03-02/1-200-195-190) to 100 lbf in. (11,5 N.m).
  - (f) Torque-tighten the other nuts and bolts securing the clamps to the brackets between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (3) Torque-tighten the tube union nut to between 50 and 55 lbf ft (68 and 74 N.m) (Tools 1656, 948 and 1529) and wire-lock.

ASSEMBLY

71-00-01

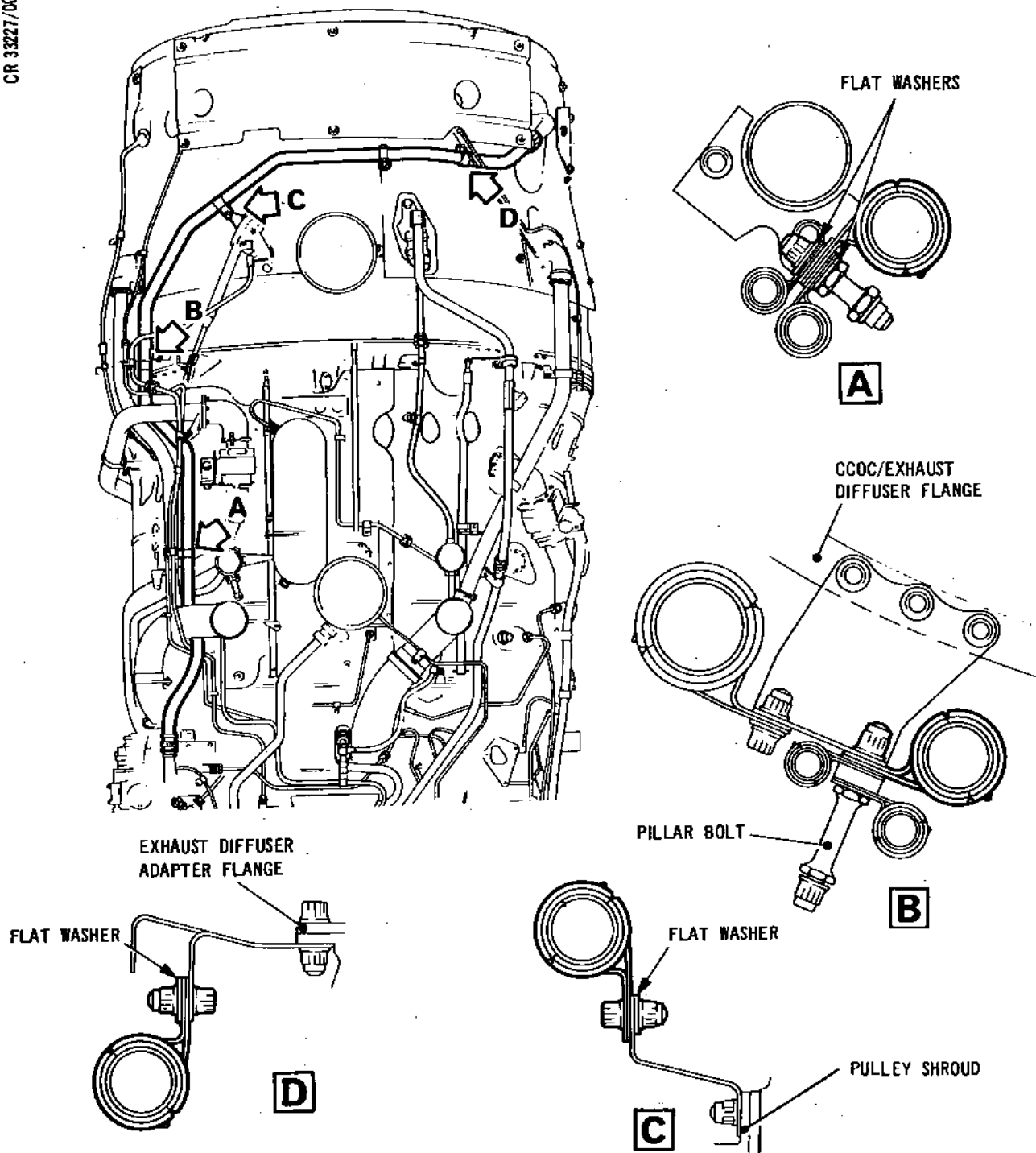
STAGE 5

Page 514

Dec 31/01



**OLYMPUS 593**  
MK. 610-14-28  
OVERHAUL



Reheat Fuel Tubes, Reheat Fuel Controller to the Spray Ring  
Figure 506



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Screw on the ferrule assembly (73-13-03/2-160) to the tube union. Torque-tighten the ferrule between 190 and 210 lbf in. (21,5 and 23,5 N.m) (Tool 909) and wire-lock.

## 6. Install the Electrical Tray (Item 70, Fig.501 of Stage 1)

### A. Prepare for Installation.

- (1) Apply lubricant 'B' to the bolts.

### B. Installation.

- (1) Remove the loosely assembled nut from the pillar bolt which also secures the oil, air and fuel tubes to the bracket (75-02-05/1-110) on the left-hand air vent front flange.
- (2) Position the rear flange of the electrical tray (71-51-01/7-180) to the pillar bolt and secure with the nut finger-tight.
- (3) Assemble the loop clamp (71-51-01/7-40) to the reheat purging air tube (75-03-02/1-420) in alignment with the forward pointing lug on the electrical tray and attach with bolt, washer and nut (71-51-01/7-70-60-50).
- (4) Assemble the two loop clamps (71-51-01/7-110) to the LP turbine bearing oil feed tube (72-01-03/4-330) align with the centre and forward holes in the electrical tray. Attach the loop clamps to the tray using bolts, washers and nuts (71-51-01/7-140-130-120).
- (5) Torque-tighten all the nuts and bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

## 7. Install the Air Valve and Anti-icing Tubes (Item 71, Fig.501 of Stage 1)

### A. Prepare for Installation.

- (1) Record the type and serial number of the air valve on the accessories sheet.

ASSEMBLY  
**71-00-01**

STAGE 5  
Page 516  
Dec 1/86

**OLYMPUS 593****MK.610-14-28    snecma  
OVERHAUL****B. Install Anti-icing Tubes (Ref.Fig.507).**

- (1) Apply lubricant 'A' to the bolt and secure threads.
- (2) Assemble the seal ring (75-11-02/1-170) to the tube (75-11-02/2-110).
- (3) Remove the nut, bolt and retaining plate (75-11-02/2-120-130-140) from the manifold inlet on the intake casing.
- (4) Assemble the tube to the manifold inlet and secure with the retaining plate, bolt and nut. Torque-tighten the nut and bolt to 100 lbf in. (11,5 N.m).
- (5) Assemble the clipnut (75-11-02/2-70) to the bracket (72-31-01/5-30) mounted on the LP casing rear blow-off flange. Assemble the loop clamp (75-11-02/2-40) to the tube, align and secure to the bracket using bolt and washer (75-11-02/2-50-60) and clipnut, torque-tighten the bolt to 100 lbf in. (11,5 N.m).
- (6) Assemble the seal ring (75-11-02/1-170) to the rear tube (75-11-02/1-160) (Pre or SB.72-17 standard).
- (7) Assemble the tube, to the previous tube, secure using retaining plate, bolts and nuts (75-11-02/2-30-20-10) simultaneously securing the tube to the bracket (72-33-01/6-80) mounted on the intermediate case/HP case flange. Torque-tighten the nut and bolt to 100 lbf in. (11,5 N.m).
- (8) Assemble the clipnut (75-11-02/1-120) to the bracket (72-33-01/7-80) mounted on the HP casing front/rear joint flange. Assemble the loop clamp (75-11-02/1-90) and the half clamp shells (75-11-02/1-152) (SB.0L.593-75-8972-27 standard) to the tube, align and secure to the bracket using bolt and washer (75-11-02/1-100-110) and clipnut. Torque-tighten the bolt to 100 lbf in. (11,5 N.m).



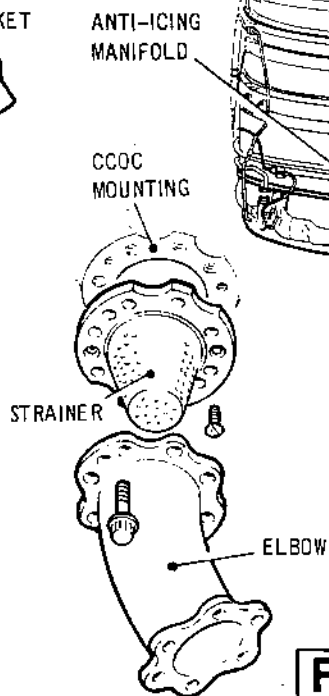
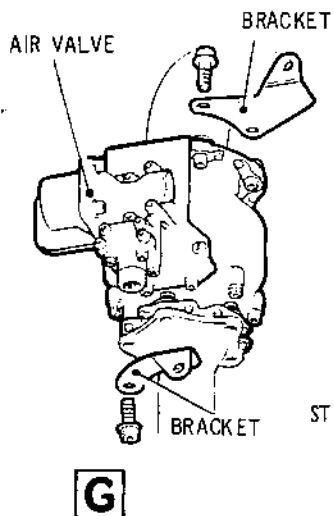
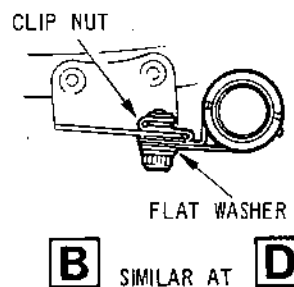
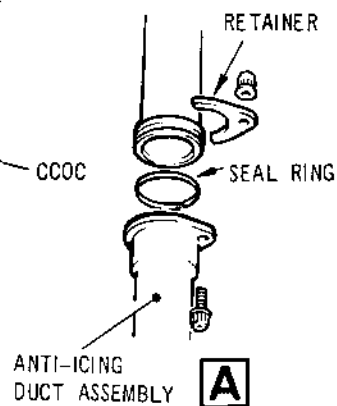
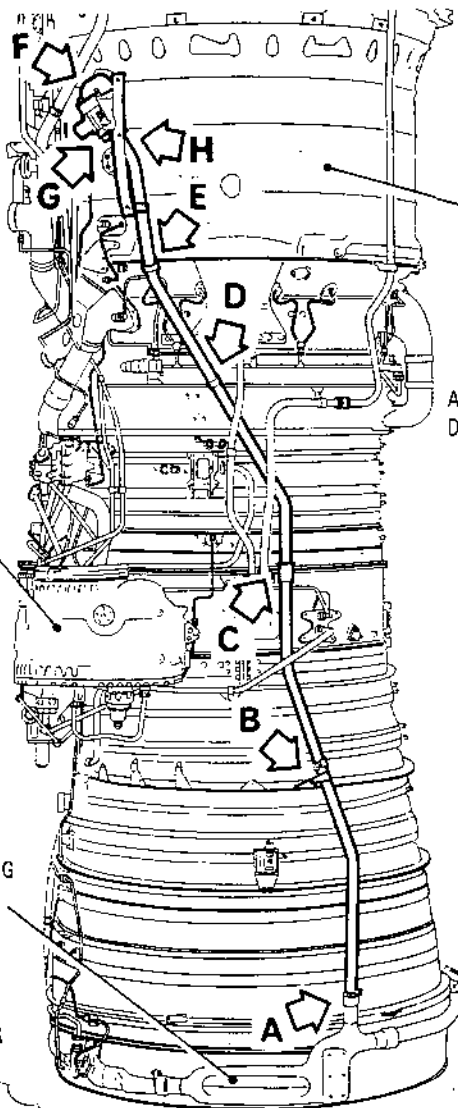
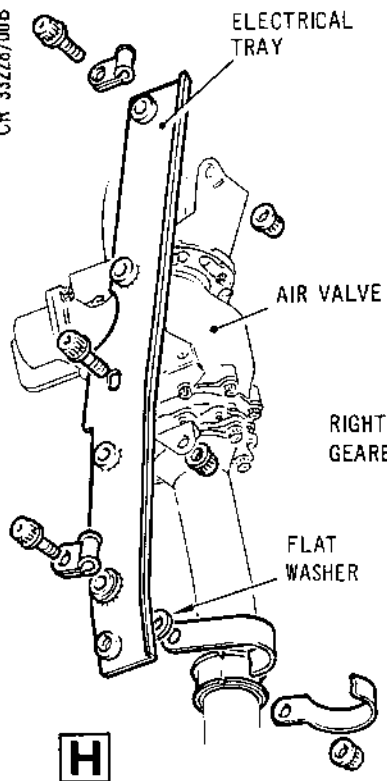
# OLYMPUS 593

MK.610-14-28

OVERHAUL

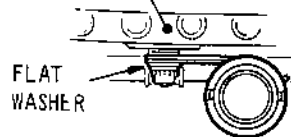
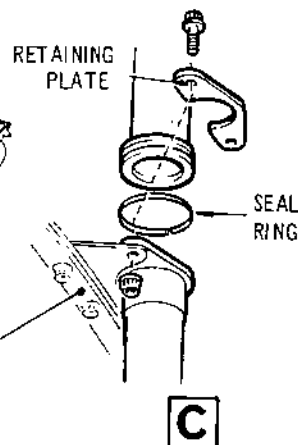


CR 33228/00B



INTERMEDIATE CASE/  
HP COMPRESSOR CASE  
FLANGE

HP COMPRESSOR DIFFUSER  
CASE/CCOC FLANGE



Air Valve and Anti-icing Tubes  
Figure 507

ASSEMBLY  
**71-00-01**

STAGE 5  
Page 518  
Jan 2/80

**OLYMPUS 593**MK.610-14-18  
OVERHAUL

sneema

Printed in England

- (9) Assemble the loop clamp (75-11-02/1-50) and the half clamp shells (75-11-02/1-85) (SB.0L.593-75-8972-27 standard) to the tube, align and secure to the bracket (72-42-01/3-230) mounted on the delivery case/CCOC flange using the existing bolt, washers and nut, torque-tightened to 100 lbf in. (11,5 N.m).
- (10) Apply a thin film of jointing compound 'A' to the strainer (75-11-02/1-30) joint faces.
- (11) Assemble the strainer to the CCOC case, secure using screws (75-11-02/1-40) and ensure the screw heads are below the flange surface.
- (12) Position the elbow (75-11-02/1-10) to the CCOC case over the strainer and secure with the bolts (75-11-02/1-20) with lubricant 'C' applied. Torque-tighten bolt to 100 lbf in. (11,5 N.m). Wire-lock the bolts.

C. Install the Air Valve, Electrical Tray and Loop Clamp.

- (1) Apply lubricant 'B' to the bolts.
- (2) Install the air valve (SB.75-12 and 75-13).
  - (a) Position the air valve (75-12-01/1-10) between the elbow and rear tube rear flange.
  - (b) Position the bracket (75-12-01/1-100) on the elbow flange and retain the bracket and tube flange to the air valve flange with the bolts (75-12-01/1-35-30).
  - (c) Position the bracket (75-12-01/1-110) on the tube flange and retain the bracket, tube flange and valve flange with the bolts (75-12-01/1-20).
  - (d) Torque-tighten all the bolts between 67 and 73 lbf in. (6,8 and 7,3 N.m).
  - (e) Install the blanking ferrule assembly (75-11-02/1-155A) on the tube connection forward of the valve. Torque-tighten nut to between 190 and 210 lbf in. (21,5 and 23,7 N.m) and wire-lock (SB.71-17 standard).

ASSEMBLY

**71-00-01**

STAGE 5

Page 519

Dec 31/01





# OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Assemble the electrical tray (71-51-01/9-230) (Pre or SB.71-16 standard or SB.71-17 standard to the engine. Fig.507 shows Pre SB.71-16 standard).
- (a) Insert the bolt (71-51-01/9-220) in the central hole, without a flange, in the tray.
  - (b) Align and secure the tray to the bracket (75-12-01/1-110) mounted on the air pressure control valve front flange, using the installed bolt and the nut (71-51-01/9-210) torque-tightened to between 67 and 73 lbf in. (6,8 and 7,3 N.m).
  - (c) Assemble the loop clamp to the bolt (71-51-01/9-200-190).
  - (d) Assemble the bolt (with loop clamp fitted) to the rear hole in the electrical tray and the bracket (75-12-01/1-100) mounted to the air valve rear flange, secure with the nut (71-51-01/9-180) and nip-tighten.
- (4) Install the loop clamp (71-51-01/9-140).
- (a) Assemble the loop clamp to the tube (75-11-02/1-160) and align with the second hole from the front in the tray. Install a loop clamp to the bolt (71-51-01/9-130-120). Attach the loop clamp (71-51-01/9-140) to the tray using the bolt (with loop clamp) washer and nut (71-51-01/9-120-110-100) (Pre SB.71-17).
  - (b) Assemble the loop clamp to the tube and align with the front hole in the tray. Attach the loop clamp to the tray using bolt, washer and nut (71-51-01/9-137-110-135) (SB.71-17 standard).
  - (c) Torque-tighten the nut and bolt between 67 and 73 lbf in. (6,8 and 7,3 N.m).

**NOTE:** Ensure there is a minimum clearance of 0.20 in. (5,08 mm) between the rear tube unit and the HP turbine cooling air tube support bracket on the HP case.



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

8. Install the Anti-icing Air Pressure Switch and Tube (Item 72, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'B' to the tube union threads.
- (2) Record the type and serial number of the anti-icing pressure switch on the accessory sheet (Ref. SB.75-13).

B. Installation.

- (1) Position the switch (75-41-01/1-10) to the bracket (72-31-01/5-190) mounted on the LP case rear blow-off flange. Apply lubricant 'B' to the bolts and nuts (75-41-01/1-30-20), and secure the switch with the nuts torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (2) Position the tube (75-11-02/2-220) between the anti-icing pipe and the pressure switch and hand-tighten the union nuts.
- (3) Assemble the two loop clamps (75-11-02/2-150) and the half clamp shells (75-11-02/2-215) (SB.0L.593-75-8972-27 standard) to the tube aligning with the two brackets (72-31-01/5-60-140) mounted on the LP case rear blow-off flange. Apply lubricant 'A' to the bolts and nuts (75-11-02/2-180-160), and secure the clamps to the brackets with bolts, washers (75-11-02/2-170) and nuts torque-tightened to 100 lbf in. (11,5 N.m).
- (4) Triple torque-tighten thrust wire type union nut at the switch to between 90 and 100 lbf in. (10,2 and 11,3 N.m) (Tool 1480), wire-lock the nut.
- (5) Torque-tighten the tube union nut at the anti-icing tube to between 190 and 210 lbf in. (21,5 and 23,7 N.m) (Tools 909 and 949) and wire-lock the nut.

9. Install the Fuel Drain Tube, Dump Valve to Drains Tank (Item 73, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to tube union threads and to the bolts.

ASSEMBLY

71-00-01

STAGE 5

Page 521

Jun 1/94



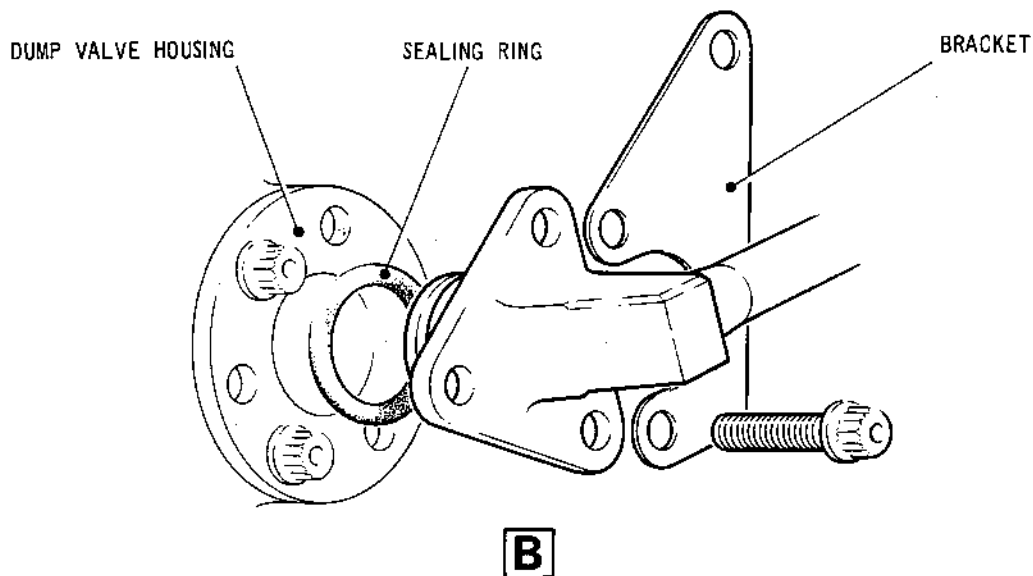
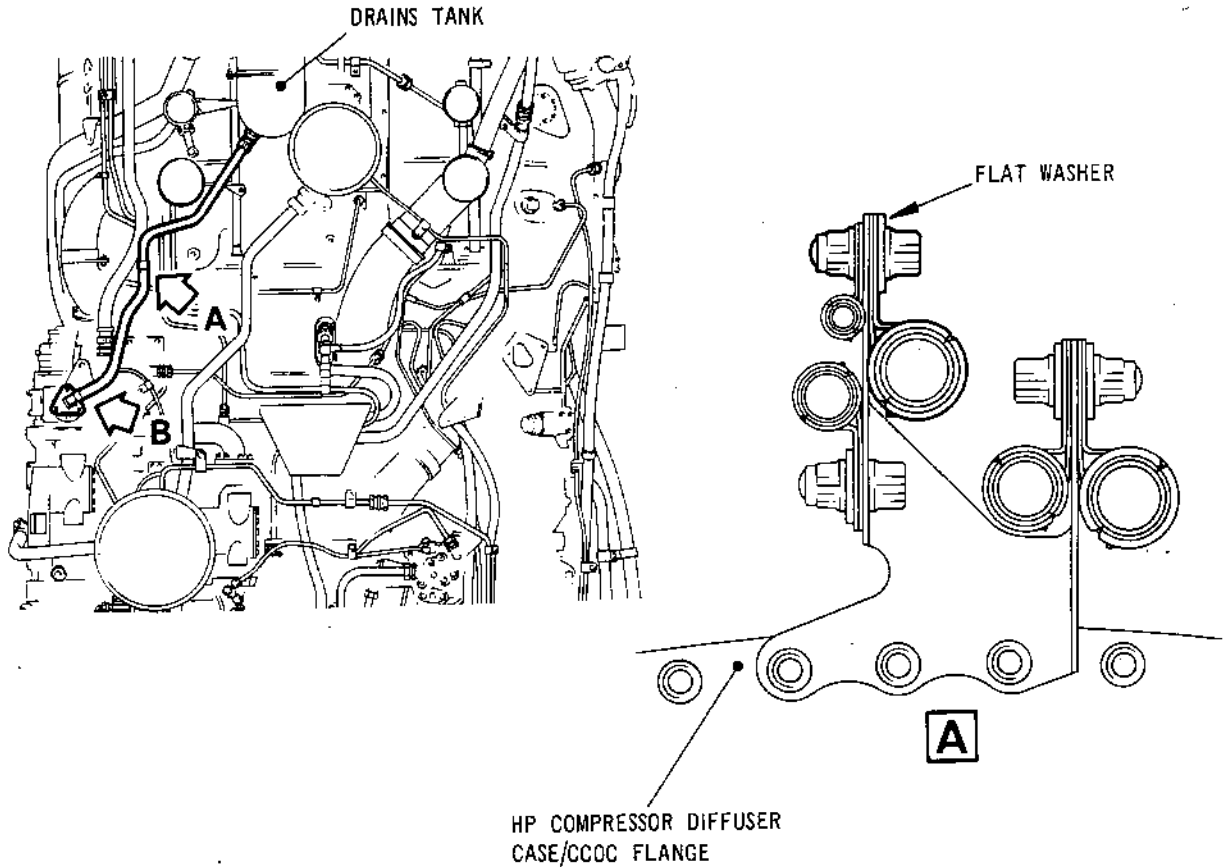
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 33229/00A



Fuel Drain Tube Emergency Dump Valve to Drains Tank  
Figure 508

ASSEMBLY  
**71-00-01**  
STAGE 5  
Page 522  
Jan 2/80



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

B. Installation (Ref.Fig.508).

- (1) Assemble the sealing ring to the tube (71-73-05/1-120-80). Position the tube between the emergency dump valve drain location and the drains tank connection, finger-tighten the tube union nut. Position the bracket (71-73-05/1-110) to the tube flange, secure the bracket and tube flange to the valve housing using bolts (71-73-05/1-100-90) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (2) Torque-tighten the tube union nut between 310 and 340 lbf in. (35 and 38 N.m) (Tools 1648, 322, 1565) and wire-lock.
- (3) Assemble the loop clamp (71-73-05/1-10) to the tube, align and retain to the bracket (72-42-01/4-280) mounted on the delivery case/CCOC flange using the bolt, washer and nut (71-73-05/1-40-30-20), nip-tighten.

10. Install Engine Fuel System Seal Drain Tubes (Item 74, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to the tube union threads and lubricant 'B' to the bolts.

B. Installation (Ref.Fig.509).

- (1) Assemble the T-piece (71-73-02/3-230) to the bracket (73-11-02/1-10) (Ref. detail A) and secure with bolts and nuts (71-73-02/3-220-210) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (2) Install the connector (71-73-02/4-350) (Ref. detail B).
  - (a) Remove the loosely assembled nut, washer and bolt (71-73-02/4-340-320-310) securing the second stage pump fuel drain tube loop clamp (71-73-03/1-10) to the bracket (73-23-01/1-70) mounted on the reheat controller.

TN25108



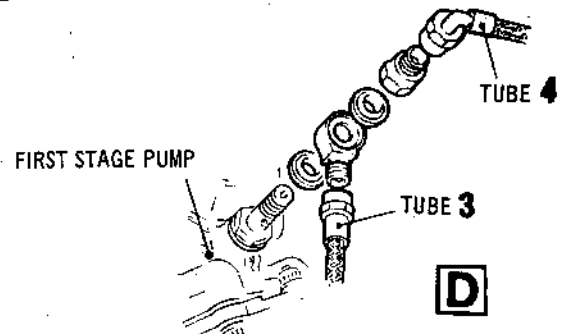
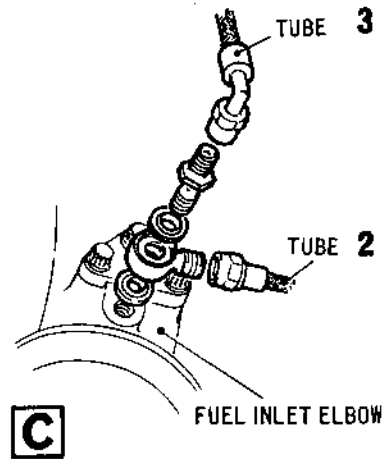
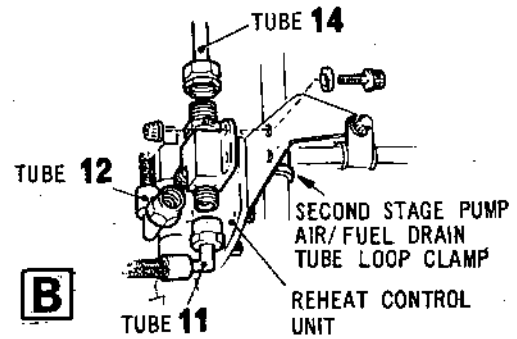
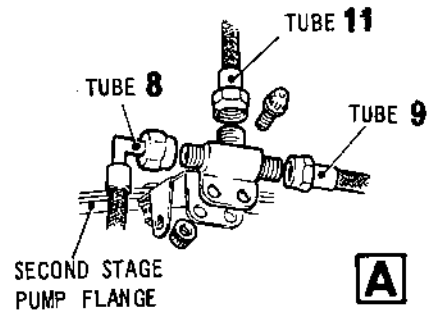
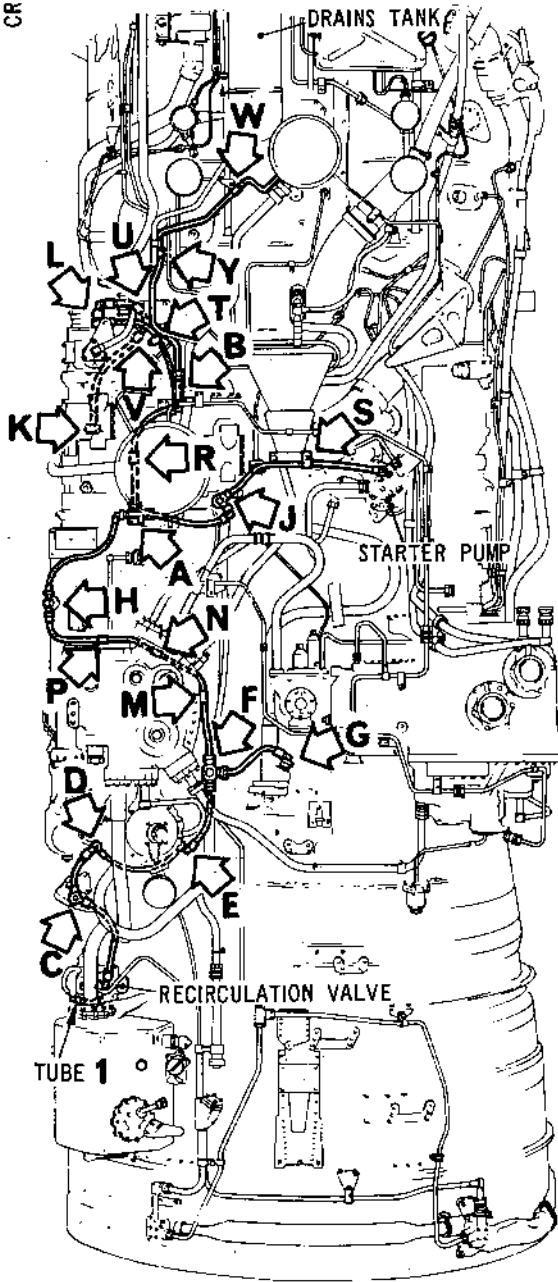
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 33231/00A



TN8295

Engine Fuel System Seal Drain Tubes  
Figure 509 (Sheet 1 of 3)

ASSEMBLY  
71-00-01

STAGE 5

Page 524

Jan 2/80



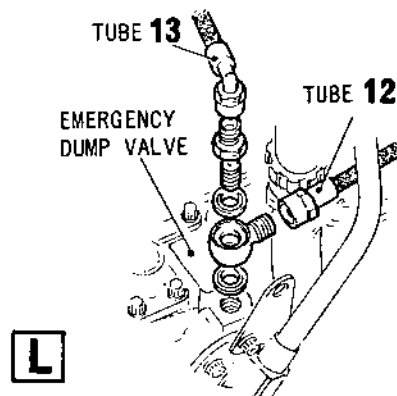
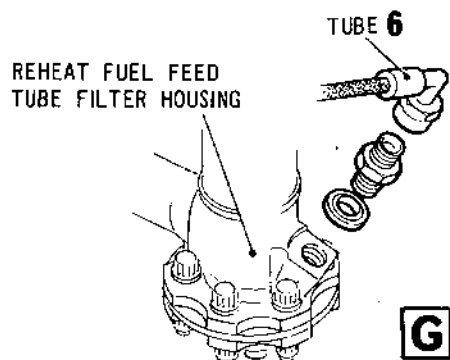
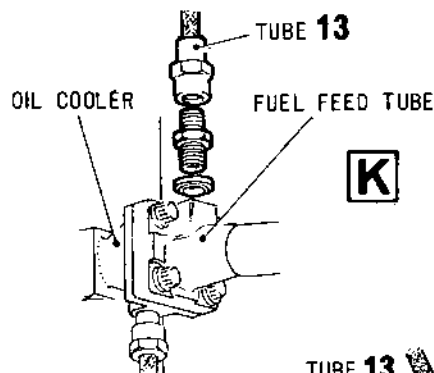
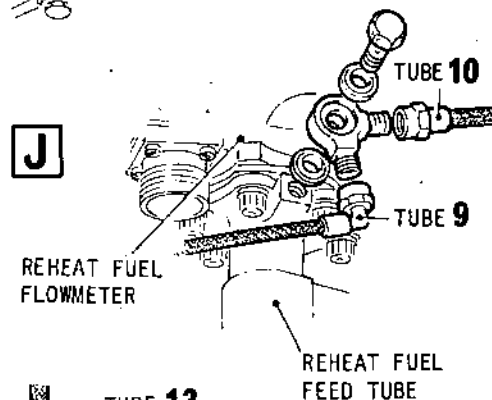
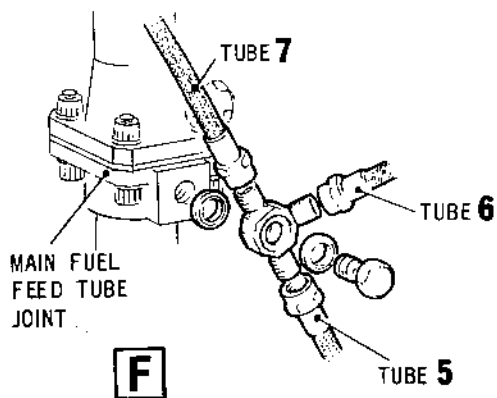
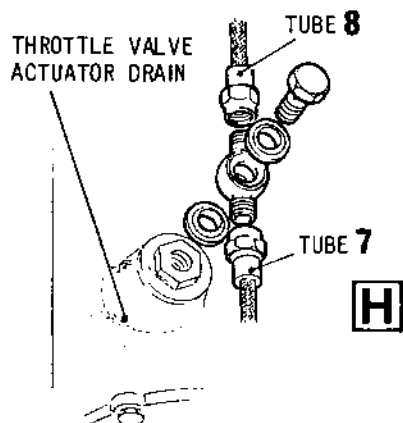
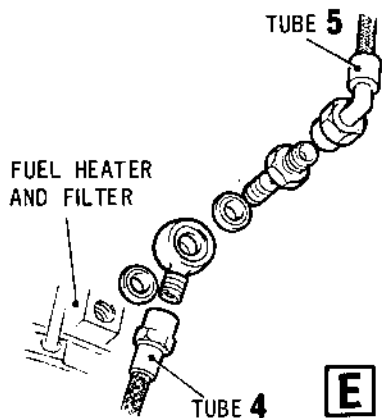
OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 33230/00A

PRINTED IN ENGLAND



Engine Fuel System Seal Drain Tubes  
Figure 509 (Sheet 2 of 3)

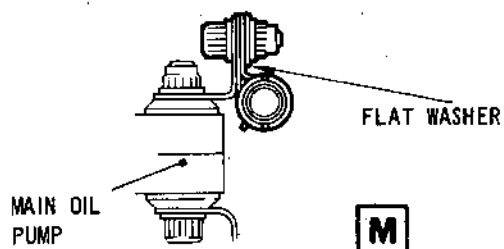
TN8296

ASSEMBLY  
**71-00-01**  
STAGE 5  
Page 525  
Jan 2/80

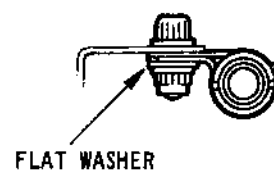


OLYMPUS 593

MK.610-14-28  
OVERHAUL



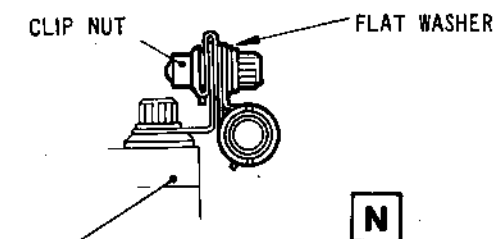
**M**



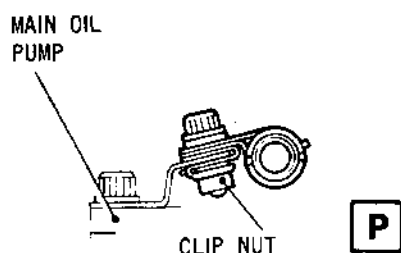
**T**



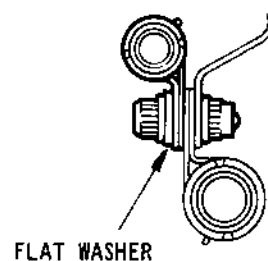
**U**



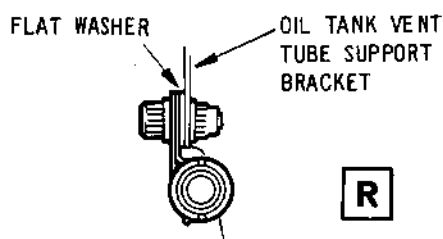
**N**



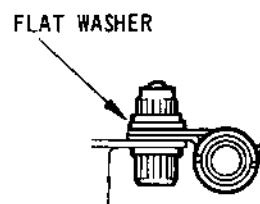
**P**



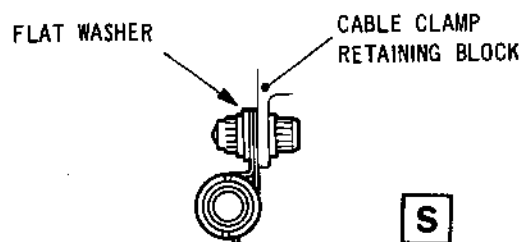
**V**



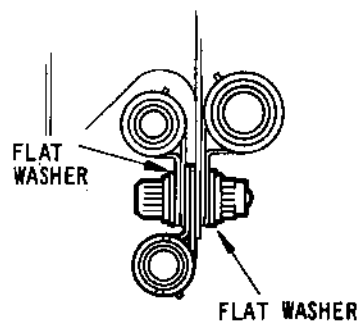
**R**



**W**



**S**



**Y**

Engine Fuel System Seal Drain Tubes  
Figure 509 (Sheet 3 of 3)

TN14666



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Secure the loop clamp and connector (71-73-02/4-350) to the bracket.
- (c) Further secure the connector to the bracket using bolt and nut (71-73-02/4-330-310).
- (d) Torque-tighten the nuts and bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (3) Assemble the connectors finger tight to the following positions:
- (a) Fuel inlet elbow (73-12-03/1-70) on the first stage pump (73-11-01/1-10), connector, seal washers and bolt (71-73-02/1-40B-50B-30B).
- NOTE: The fluid passage bolt and connector must be to SB.71-10 standard.
- (b) Drain location on the first stage pump (73-11-01/1-10), one-way connector, seal washers and adapter (71-73-02/1-90-100-80).
- (c) Drain location on the fuel heater and filter (73-14-01/1-10), one-way connector, seal washers and bolt (71-73-02/1-130-140-120).
- (d) Drain location at the main fuel feed tube rear joint flange (73-13-01/1-10), multiple connector, seal washers and bolt (71-73-02/2-160-170-150).
- (4) Assemble the seal washer and adapter (71-73-02/1-170-160) to the drain location in the reheat fuel feed pipe filter housing (73-13-03/1-320).
- (5) Assemble the multiple connector, seal washers and bolt (71-73-02/2-200-210-190) to the throttle valve actuator drain location (F.C.U.) (73-21-01/1-10).

PRINTED IN ENGLAND

TN8297

ASSEMBLY  
**71-00-01**  
STAGE 5  
Page 527  
Jan 2/80





OLYMPUS 593

MK.610-14-28

OVERHAUL



- (6) Assemble the multiple connector, seal washers and bolt (71-73-02/3-110-120-100) to the drain connection on the reheat flowmeter (73-33-02/1-10).
- (7) Assemble the union adapter and seal washer (71-73-02/4-170-180) to the oil cooler drain location on the fuel tube flange (73-13-01/2-50).
- (8) Assemble the one-way connector, seal washers and bolt (71-73-02/4-150-160-140) to the dump valve drain location (73-12-02/1-10).
- (9) Torque-tighten adapters to between 150 and 170 lbf in. (16,9 and 19,2 N.m).

NOTE: The adapter securing the one-way connector to the drains tank overflow vent body is torque-tightened to between 240 and 260 lbf in. (27,1 and 29,4 N.m) (Ref. Stage 2, para. 6.A.(13).

- (10) Assemble the tubes: ((a) to (n) flexible (o) - rigid) to their connections and hand-tighten the nuts.
  - (a) (71-73-02/1-10) (Tube 1, Ref.Fig.509) between the two connections on the recirculation valve.
  - (b) (71-73-02/1-20) (Tube 2) between the recirculation valve and fuel inlet elbow connection.
  - (c) (71-73-02/1-60) (Tube 3) between the fuel inlet elbow connection and the first stage pump.
  - (d) (71-73-02/1-70) (Tube 4) between the first stage pump and fuel heater and filter.
  - (e) (71-73-02/1-110) (Tube 5) between the fuel heater and filter and the three-way multiple connection mounted on the main fuel feed tube flange joint.

TN8298

ASSEMBLY

71-00-01

STAGE 5

Page 528

Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (f) (71-73-02/1-150) (Tube 6) between the three-way multiple connection and the reheat feed tube filter housing connection.
- (g) (71-73-02/2-140) (Tube 7) between the three-way connection and the actuator gearbox drain connection.
- (h) (71-73-02/2-180) (Tube 8) between the actuator gearbox drain connection and the 'T-piece' mounted to the second stage pump flange.
- (j) (71-73-02/3-10) (Tube 9) between the T-piece mounted to the second stage pump flange and the reheat fuel flowmeter.
- (k) (71-73-02/3-90) (Tube 10) between the reheat fuel flowmeter and the starter pump.
- (l) (71-73-02/3-200) (Tube 11) between the two T-pieces.
- (m) (71-73-02/4-80) (Tube 12) between the T-piece and the emergency dump valve.
- (n) (71-73-02/4-130) (Tube 13) between the emergency dump valve and the oil cooler fuel feed tube flange.
- (o) (71-73-02/4-300) (Tube 14) between the T-piece and the drains tank vent body.
- (11) Torque-tighten all connector bolts between 150 and 170 lbf in. (16,9 and 19,2 N.m). Leave the tube union nuts lightly tightened at this stage.
- (12) Assemble the loop clamps to the tubes in the following positions:
- (a) (71-73-02/2-10) (two clamps) to the two brackets (72-65-00/1-70B-130B) on the oil pump flange on the left-hand gearbox and retain using the bolts, washers and clipnuts (71-73-02/2-40B-30-20B) (SB.72-47 standard).

PRINTED IN ENGLAND

TN8299

ASSEMBLY

71-00-01

STAGE 5

Page 529

Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) (71-73-02/2-80) to the bracket (72-65-00/5-100) on the main oil pump end cover, assemble the clipnut to the bracket, retain the loop clamp to the bracket with bolt and clipnut, (71-73-02/2-90-100).
- (c) (71-73-02/3-130) to the oil tank overboard vent tube support bracket (75-02-02/1-70), retain using the bolt, washer and nut (71-73-02/3-160-150-140).
- (d) (71-73-02/3-20) to the cable clamp retaining block (71-51-01/10-20) using the bolt, washer and nut, (71-73-02/3-50-40-30).
- (e) (71-73-02/4-10) to the bracket (73-23-01/1-10) on the reheat fuel controller, retain with the bolt, washer and nut (71-73-02/4-40-30-20).
- (f) (71-73-02/4-90) (two clamps) one to the bracket (75-02-12/1-40) on the five vane duct of the delivery case, retain using the existing bolt, washer and nut. The other to the IDG oil tube bracket (75-02-12/1-30), retain using the existing bolts, washers and nuts.
- (g) (71-73-02/4-190) to the bracket (75-02-07/1-110) mounted on the front of the left-hand support tube, retain using the bolt, washer and nut (71-73-02/4-220-210-200).
- (h) (71-73-02/4-260) to the bracket (72-42-01/4-280) on the delivery case/CCOC flange using the existing bolt, washer and nut.
- (j) Torque-tighten all the loop clamp nuts and bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m) with the exception of the loop clamps, para.(12)(c) and (e), which are to be hand-tightened only.

TN14670

ASSEMBLY  
**71-00-01**  
STAGE 5  
Page 530  
Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



(13) Torque-tighten all the tube union nuts:

- (a) Flexible tubes nuts to between 90 and 100 lbf in. (10,2 and 11,3 N.m) (Tool 1767).
- (b) Rigid tube nuts to between 190 and 210 lbf in. (21,5 and 23,7 N.m) (Tool 909).

NOTE: Thrust wire type union nuts require triple torque-tightening to ensure correct seating. This procedure involves torque-tightening and slackening the nut twice prior to the final torque-tightening.

(14) Wire-lock all the tube union nuts, connector bolts, adapters and union bodies.

11. Install Fuel Drain Tubes, Overboard Spill (Item 75, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant 'A' to the tube union threads and lubricant 'B' to the bolts.

B. Installation (Ref.Fig.510).

- (1) Assemble the adapter (71-73-02/5-480) to the bracket (72-31-01/5-270) mounted on the LP case rear blow-off flange. Secure with the bolts and nuts (71-73-02/5-460-470B-450), torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (2) Position the rigid tube (71-73-02/5-570) to the connector (71-73-02/5-590) mounted to the drains tank, forward along the bottom of the engine. Finger-tighten the tube union nut to the connector.
- (3) Assemble the loop clamp (71-73-02/5-530) to the tube, align and secure to the bracket (72-42-01/3-500) mounted on the delivery case/CCOC flange using the existing bolt, washer and nut, torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

PRINTED IN ENGLAND

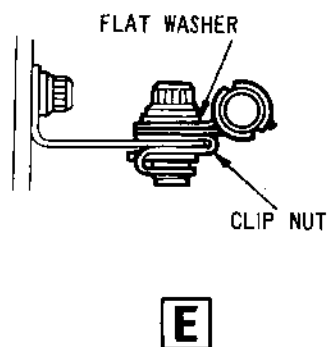
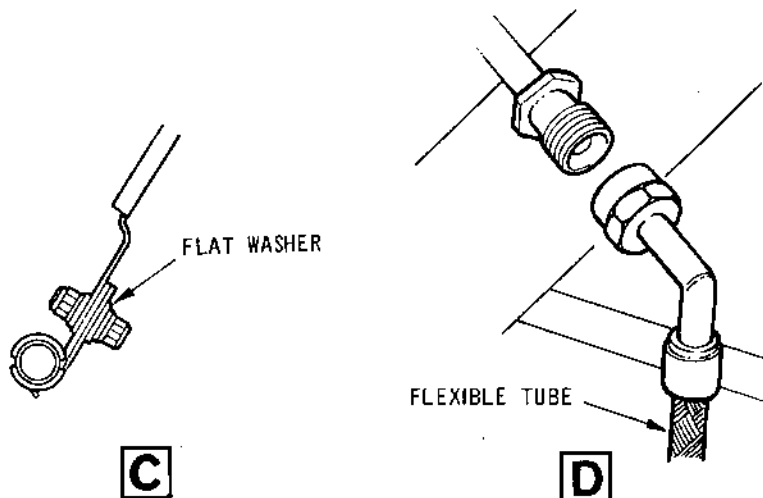
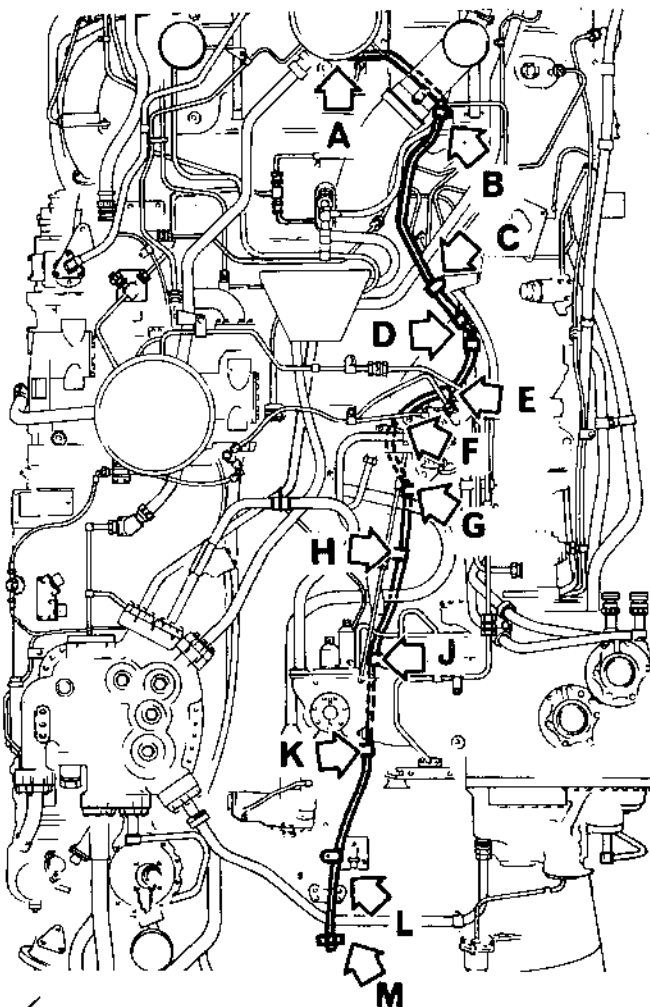
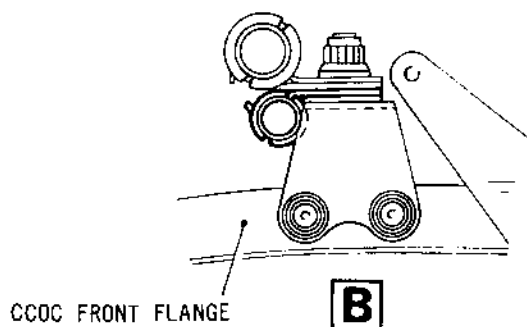
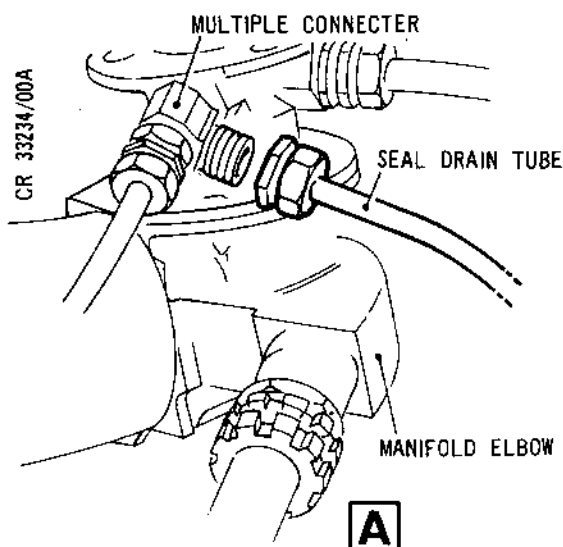
TN14671



OLYMPUS 593

MK.610-14-28

OVERHAUL



Fuel Drain Tube, Overboard Spill  
Figure 510 (Sheet 1 of 2)

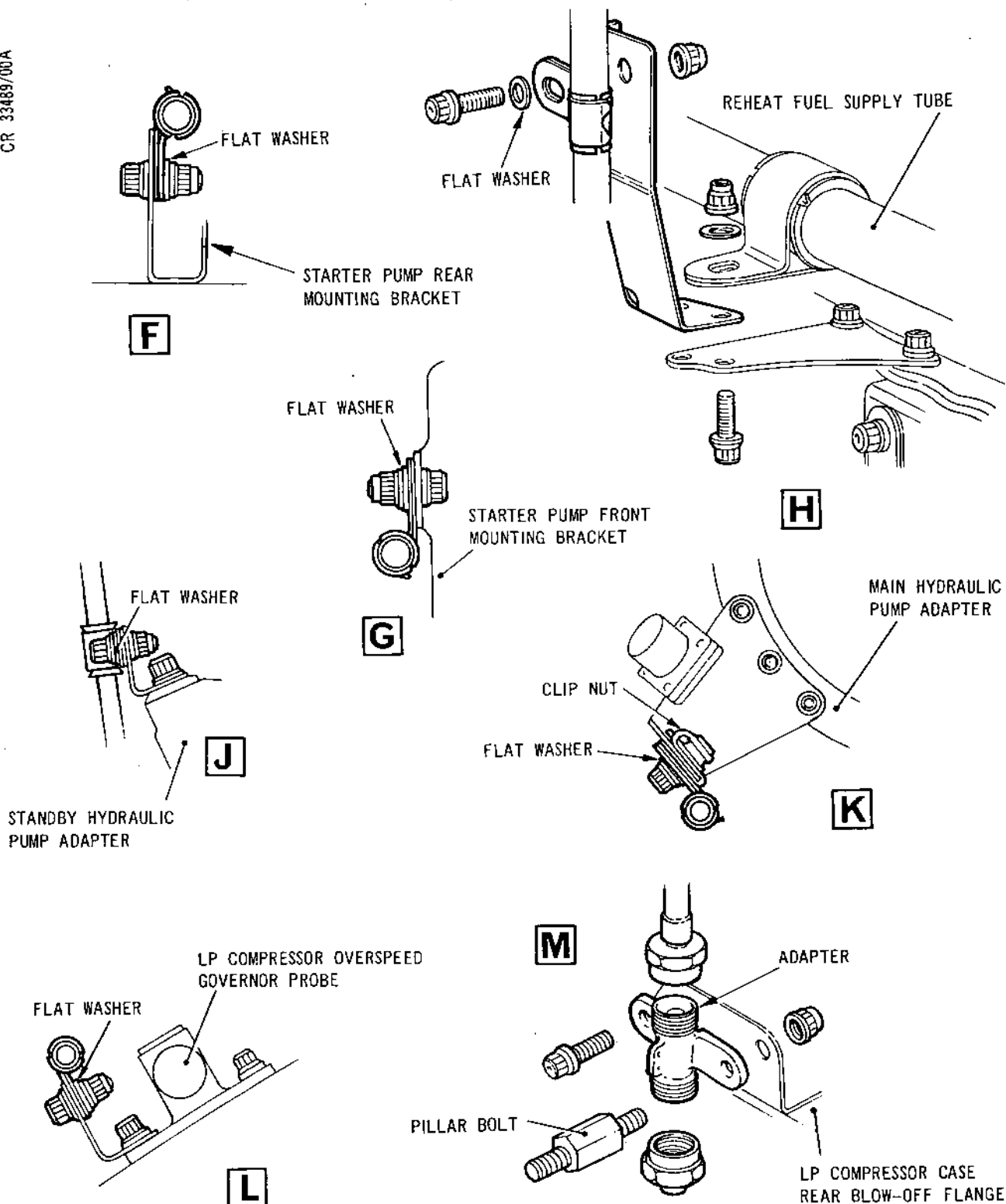
ASSEMBLY  
**71-00-01**  
STAGE 5  
Page 532  
Jan 2/80

TN8300

CR 33489/00A



**OLYMPUS 593**  
MK. 610-14-28  
OVERHAUL



Fuel Drain Tube, Overboard Spill  
Figure 510 (Sheet 2 of 2)

ASSEMBLY  
**71-00-01**  
STAGE 5  
Page 533  
Jan 2/80



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (4) Assemble the loop clamp (71-73-02/5-490) to the tube, align and retain to the bracket (75-01-04/1-170) mounted on the HP case/delivery case cooling air tube flange, using the bolt, washer and nut (71-79-01/1-50-30-20). Lightly tighten the nut and bolt.
- (5) Assemble the flexible tube (71-73-02/5-440) between the adapter (71-73-02/5-480) mounted on the LP compressor rear flange, bottom position and the rigid tube, mounted on the HP case/delivery case flange and lightly tighten the union nuts.
- (6) Assemble the seven loop clamps (71-73-02/5-10-80-150-220-310-370-80) to the flexible tube, align and retain to the following bracket locations:

**NOTE:** Alternative standard flexible tube B477568 (Palmer Aero Products) is of smaller outside diameter than flexible tube B477569 (Dunlop), 0.210 in. (5,33 mm) compared to 0.250 in. (6,35 mm). To compensate for the smaller outside diameter, flexible tube B477568 to be bound with Scotch No.27 adhesive tape, 12,0 mm wide, at clipping positions.

- (a) The bracket (73-22-01/1-40) mounted on the blanking plate (SB.71-28). Attach the clamp to the bracket using the bolt, washer and nut (71-73-02/5-40-30-20) lightly tightened.
- (b) The bracket (72-63-01/7-100) mounted on the main hydraulic pump adapter. Install the clipnut (71-73-02/5-110) to the bracket and secure the clamp with the bolt and washer (71-73-02/5-90-100) to the clipnut, torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (c) The bracket (72-63-01/7-270) mounted on the standby pump adapter. Secure the clamp to the bracket using the bolt, washer and nut (71-73-02/5-180-170-160) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (d) The bracket (71-73-02/5-300).
  - (i) Remove the nut, bolt and washer securing the loop clamp (73-13-03/1-80) to the bracket (72-33-01/6-220) mounted on the HP compressor case front flange.
  - (ii) Position the bracket to the bracket on the HP compressor case flange.

ASSEMBLY

71-00-01

STAGE 5

Page 534

Jun 1/99



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (iii) Attach the brackets and loop clamp with the previously removed bolt, washer and nut.
- (iv) Install the bolt and nut (71-73-02/5-290-280) to secure the brackets to each other.
- (v) Torque-tighten the nuts and bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (vi) Install the clipnut (71-73-02/5-240) to the bracket (71-73-02/5-300).
- (vii) Assemble the loop clamp to the tube and attach with the bolt (71-73-02/5-230) to the bracket using the clipnut and lightly tighten.
- (e) The bracket (72-33-01/5-90) mounting the front of the starter pump. Attach the clamp to the bracket using the bolt, and nut (71-73-02/5-330-320) lightly tightened.
- (f) The bracket (72-33-01/5-360) mounting the rear of the starter pump. Attach the clamp to the lug on the bracket using the bolt, washer and nut (71-73-02/5-400-390-380) lightly tightened.
- (g) The bracket (75-01-04/1-60) mounted on the HP casing stage five duct. Assemble the clipnut (71-73-02/5-110) to the bracket and secure the clamp to the bracket using the bolt and washer (71-73-02/5-90-100) and clipnut torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (7) Torque-tighten the tube union nut to the drains tank to between 190 and 210 lbf in. (21,5 and 23,7 N.m) (Tool 909) and wire-lock.
- (8) Torque-tighten the remaining tube union nuts to between 90 and 100 lbf in. (10,2 and 11,5 N.m) (Tool 1767) and wire-lock.

ASSEMBLY

71-00-01

STAGE 5

Page 535

Jan 2/80





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (9) Assemble the pipe closure nut (71-73-02/5-610) to the adapter (71-73-02/5-480) at the front of the flexible tube and torque-tighten to between 90 and 100 lbf in. (10,2 and 11,5 N.m) (Tools 1480 and 1767) and wire-lock.

12. Install the Mounting Brackets, Thermocouples and Leads, Junction Boxes and Thermocouple Harness (Items 78 to 83, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Record the types and serial numbers of the thermocouples and thermocouple harness on the accessory sheet.

B. Installation.

- (1) Mounting brackets and mounting plate (Ref.Fig.511).
- (a) Apply lubricant 'B' to attachment items.
  - (b) Position the bracket (72-42-01/1-10) to the front lug on the centre support tube (72-42-01/1-230). Secure using the bolts and nuts (72-42-01/1-30-20) and torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (c) Position the bracket (72-42-01/1-60) to the lug, second from the front, on the centre support tube. Secure using the bolts and nuts (72-42-01/1-80-70) and torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (d) Position the bracket (72-42-01/1-160) to the rear lug on the right-hand support tube (72-42-01/1-270). Secure using the bolts and nuts (72-42-01/1-180-170) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (e) Position the bracket (72-42-01/1-110) to the lug, second from the rear, on the right-hand support tube. Secure using the bolts and nuts (72-42-01/1-130-120) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

TN8207

ASSEMBLY

71-00-01

STAGE 5

Page 536

Jan 2/80



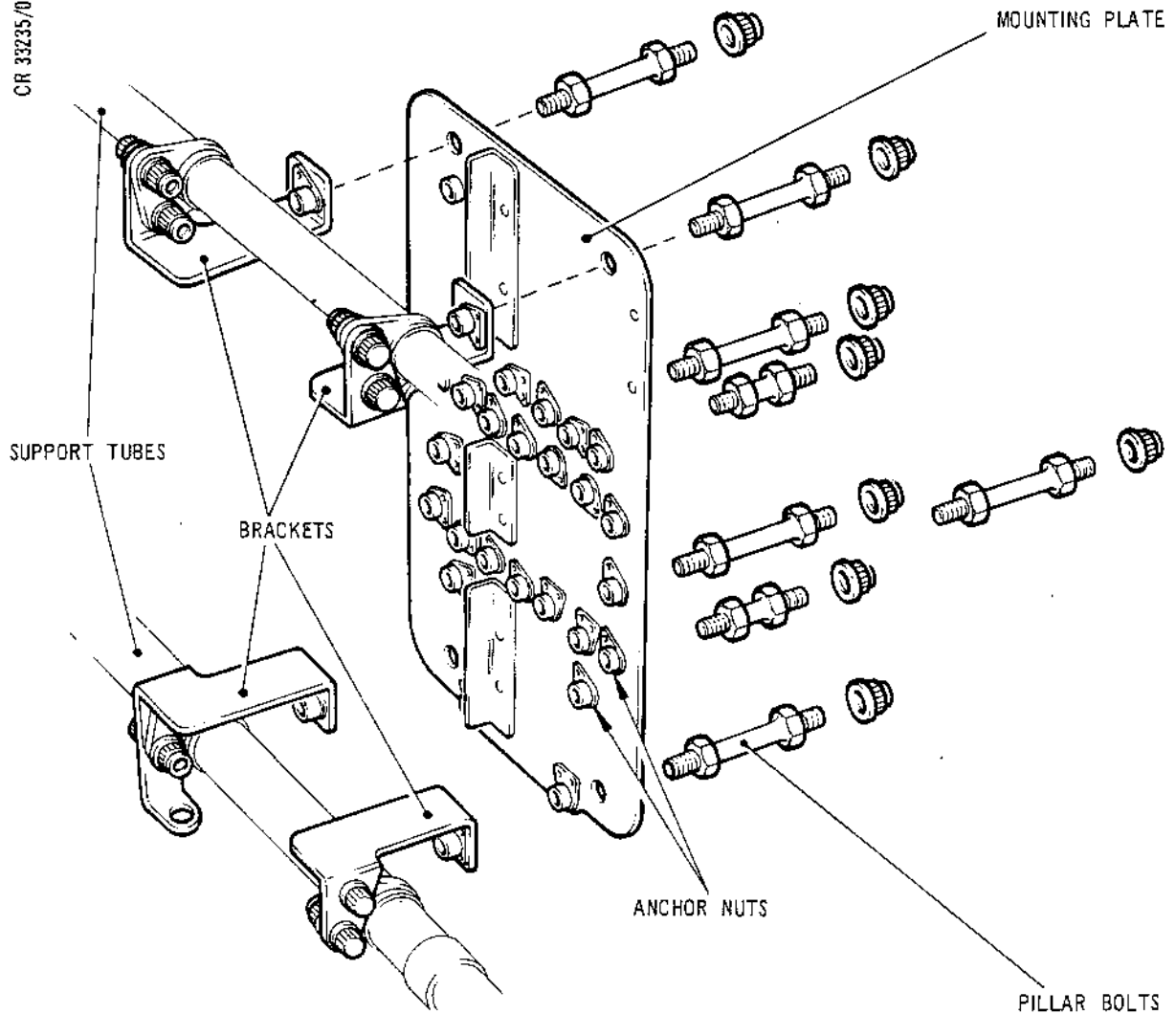
OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



PRINTED IN ENGLAND

TN8204

CR 33235/000A



Support Tube Mounting Brackets and Thermocouple  
Junction Boxes Mounting Plate  
Figure 511

ASSEMBLY  
**71-00-01**  
STAGE 5  
Page 537  
Jan 2/80



# OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

- (f) Position the mounting plate (77-22-08/1-60) (SB.77-2) to the support brackets mounted on the support tubes and retain with the pillar bolts (77-22-08/1-70) screwed into the anchor nuts secured to the four support brackets.
  - (g) Secure the pillar bolts (short) (77-22-08/1-40) and pillar bolts (77-22-08/1-50) to the anchor nuts on the sides of the mounting plate.
  - (h) Torque-tighten the pillar bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (2) Install the thermocouple (77-22-05/1-50) (Ref. Fig.512).
- (a) Apply lubricant 'B' to thermocouple union nut and to attachment bolts and nuts.
  - (b) Position the thermocouple junction box on the mounting plate and the bulb in the LP turbine bearing hot air vent tube union.
  - (c) Retain the thermocouple junction box to the mounting plate with the bolts (77-22-05/1-60) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (d) Torque-tighten the thermocouple union nut to between 220 and 240 lbf in. (25 and 27 N.m) and wire-lock it.
  - (e) Secure the thermocouple lead-out.
    - (i) Assemble the bushing-halves and the loop clamp (77-22-05/1-40-30) to the thermocouple lead-out.
    - (ii) Secure the lead-out loop clamp to the lug on the right-hand support tube using the bolt and nut (77-22-05/1-20-10).
    - (iii) Torque-tighten the nut and bolt between 67 and 73 lbf in. (7,6 and 8,2 N.m).
    - (iv) Ensure there is a minimum clearance of 0.500 in. (12,7 mm) between the thermocouple lead and adjacent components and dressing items.

ASSEMBLY

## 71-00-01

STAGE 5

Page 538

Jun 30/95



OLYMPUS 593

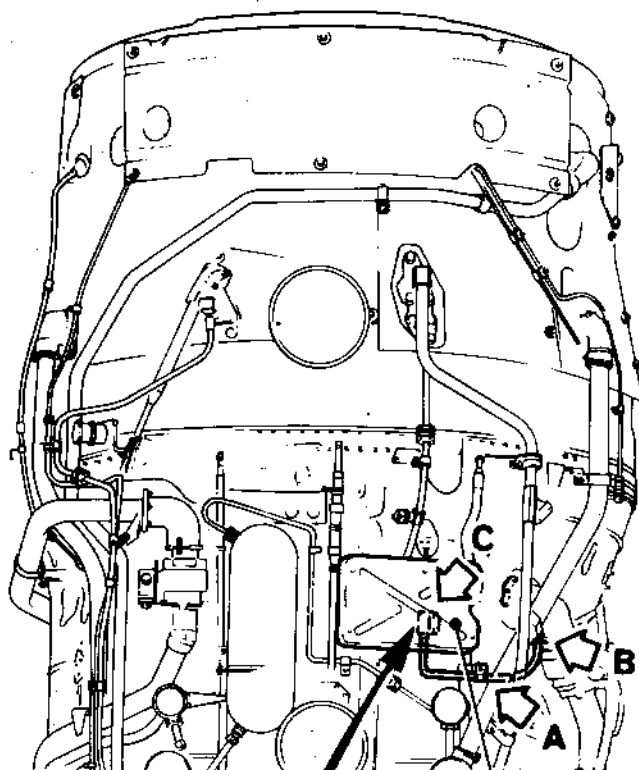
MK.610-14-28

OVERHAUL

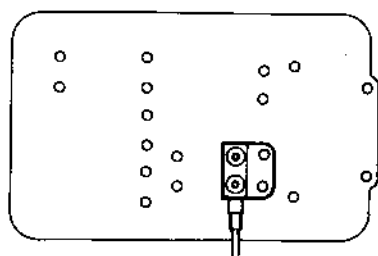


CR 33236/00A

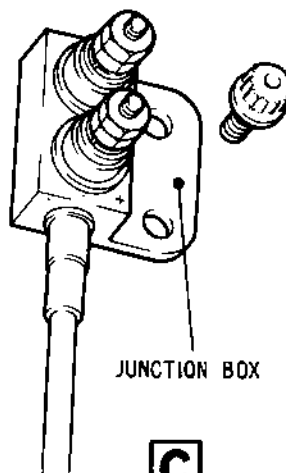
PRINTED IN ENGLAND



COVER AND MOUNTING PLATE

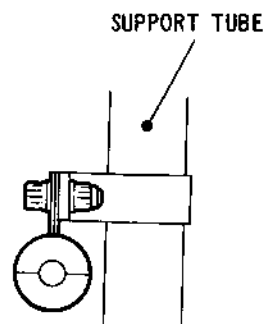


THERMOCOUPLE JUNCTION  
BOX LOCATION



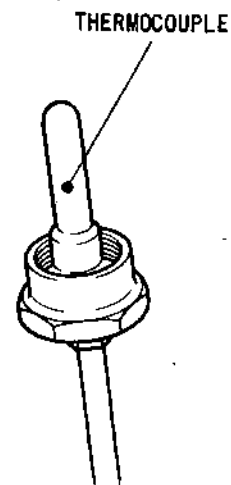
JUNCTION BOX

**C**



SUPPORT TUBE

**A**



THERMOCOUPLE

**B**

Thermocouple LP Turbine Bearing Hot Vent  
Figure 512

TN8206

ASSEMBLY  
**71-00-01**  
STAGE 5  
Page 539  
Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (3) Install the thermocouple (77-22-04/1-10) (Pre or SB.77-4 standard) (Ref.Fig.513).
  - (a) Apply lubricant 'B' to union nut and attachment items.
  - (b) Position the thermocouple junction box on the mounting plate and the bulb in the LP and HP turbine bearing vent tube union.
  - (c) Secure the thermocouple junction box to the mounting plate with the bolts (77-22-04/1-20) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (d) Torque-tighten the thermocouple union nut to between 220 and 240 lbf in. (25 and 27 N.m) and wire-lock it.
- (4) Install the thermocouples (77-22-02/1-10) and lead-outs (77-22-03/1-140-290) (Ref.Fig.514).
  - (a) Remove the lead-out junction box covers (77-22-03/1-140-290) and the loosely assembled nuts and washers from the forward junction box on the lead-out (1-290) which is mounted on the right-hand side of the CCOC.
  - (b) Install the lead-outs.
    - (i) Apply lubricant 'B' to attachment items except those used for terminals.
    - (ii) Position the lead-outs to their respective positions on the mounting plate and the CCOC mounting faces and retain with previously removed washers and nuts.
    - (iii) Retain the left-hand lead-out to the mounting plate with bolts (77-22-03/1-150) and the right-hand lead-out with bolts (77-22-03/1-300) lightly tightened.

FN6266

ASSEMBLY

71-00-01

STAGE 5

Page 540

Jan 2/80

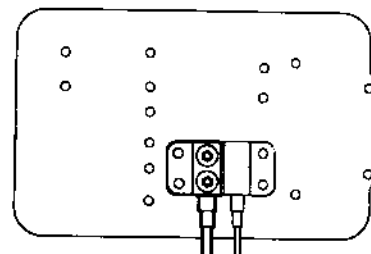
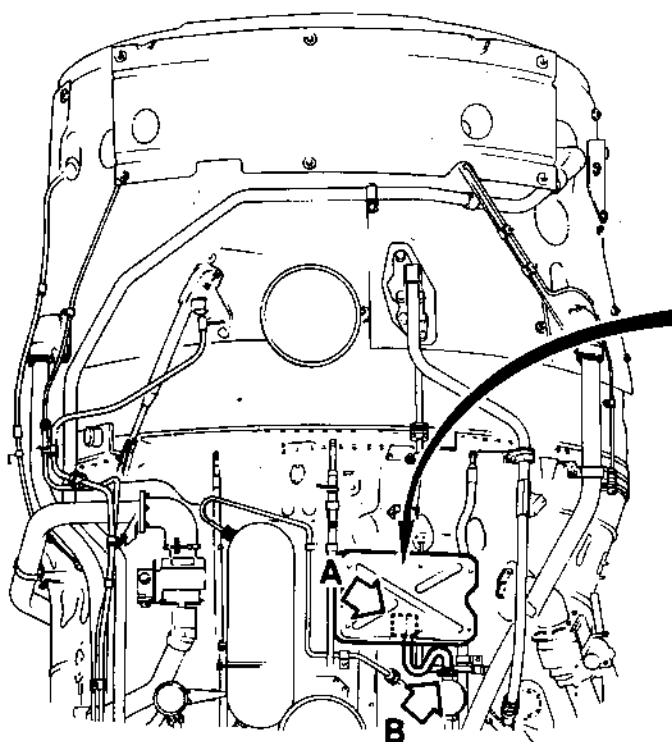
CR 33237/00A



OLYMPUS 593

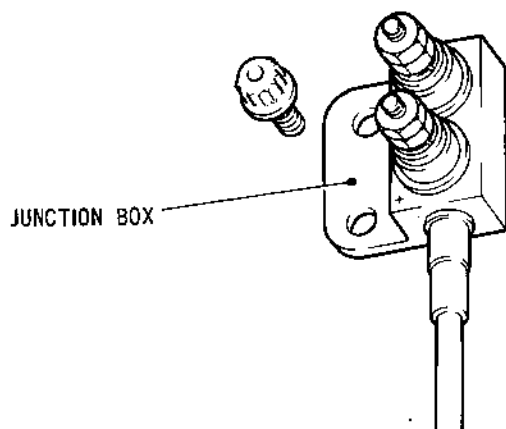
MK. 610-14-28

OVERHAUL



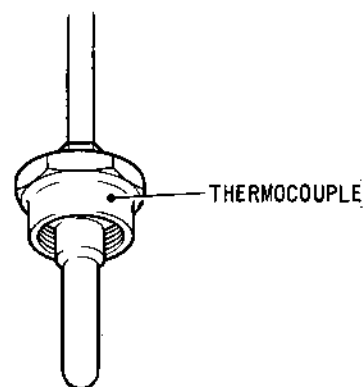
THERMOCOUPLE JUNCTION  
BOX LOCATION

COVER AND MOUNTING PLATE



JUNCTION BOX

**A**



THERMOCOUPLE

**B**

Thermocouple LP and HP Turbine Bearing Vent  
Figure 513



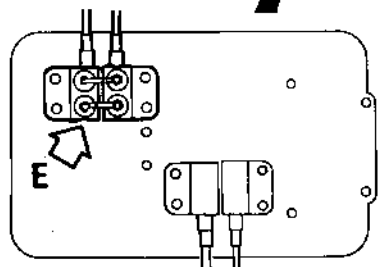
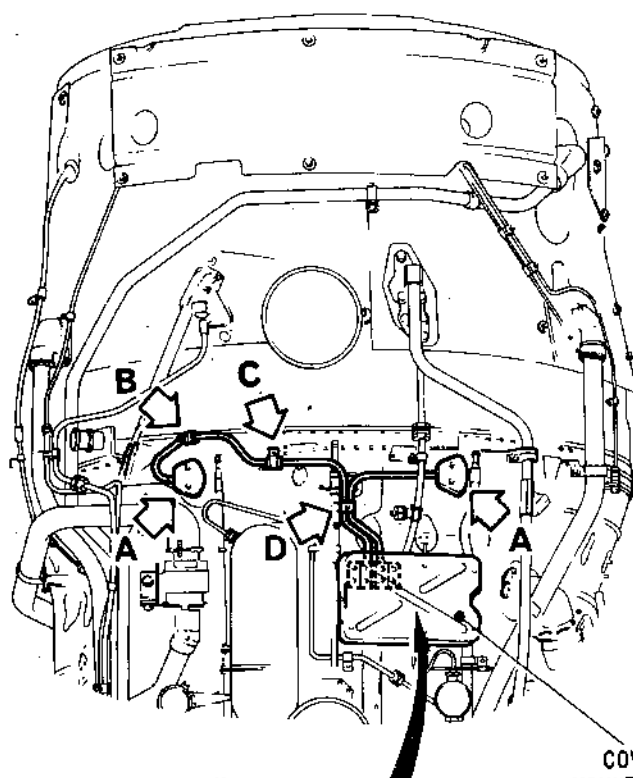
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 33238/00A



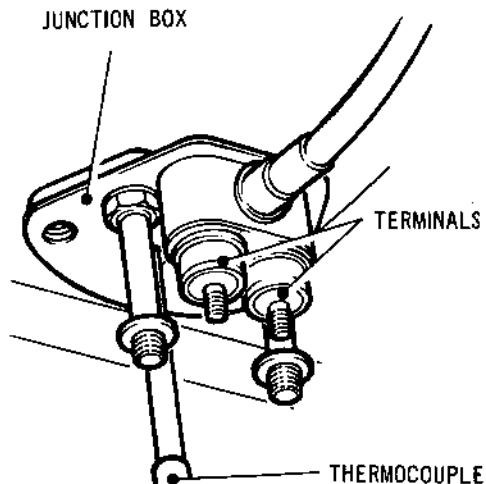
THERMOCOUPLE JUNCTION  
BOX LOCATION

COVER AND  
MOUNTING PLATE

SUPPORT TUBE

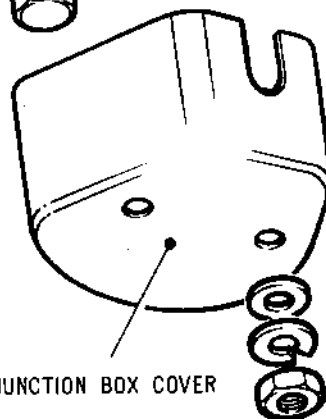
SPACER

**D**



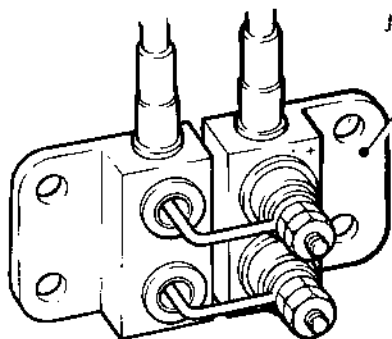
TERMINALS

THERMOCOUPLE



**A**

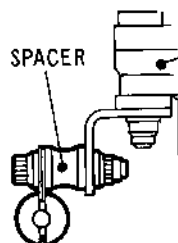
JUNCTION BOX COVER



JUNCTION BOX

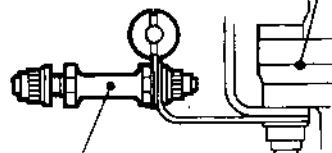
**E**

SPACER



**C**

CCOC/EXHAUST DIFFUSER FLANGE



PILLAR BOLT

**B**

Thermocouples - Turbine Cooling Air  
Figure 514

ASSEMBLY

71-00-01

STAGE 5

Page 542

Jan 2/80

TN8208



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (c) Install the thermocouples.
  - (i) Remove the nuts and washers from the lead-out terminals at the CCOC mountings.
  - (ii) Insert the thermocouples (77-22-02/1-10) in the junction boxes and CCOC mounting faces.
  - (iii) Assemble the thermocouples and junction boxes to the CCOC mounting faces using keywashers and bolts (77-22-02/1-30-20) lightly tightened with lubricant 'C' applied.
  - (iv) Secure the thermocouple terminals to the junction box terminal blocks with the previously removed washers and nuts. Torque-tighten nuts between 10 and 15 lbf in. (1,1 and 1,7 N.m).
- (d) Secure the lead-outs to the rear of the mounting plate to the lug on the centre support tube (72-42-01/1-230) with the grooved clamp, spacer, bolt and nut (77-22-03/1-130-110-120-100). Torque-tighten the nut and bolt between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (e) Secure the left-hand lead:
  - (i) To the bracket (72-53-00/7-40) on the CCOC/exhaust diffuser case flange using the clamp, bushes, spacer, bolt and nut (77-22-03/1-80-90-60-70-50).
  - (ii) To the bracket (72-53-00/7-110) on the CCOC/exhaust diffuser near the junction box using the clamp, bushing halves, pillar bolt and nuts (77-22-03/1-30-40-20-10).
  - (iii) Torque-tighten the nuts and bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

ASSEMBLY

71-00-01

STAGE 5

Page 543

Dec 31/01





OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (f) Torque-tighten the nuts and bolts:
  - (i) Retaining the lead-outs to the mounting plate to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (ii) Retaining the lead-outs terminal block connections at the mounting plate to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (iii) Retaining the thermocouples and junction boxes to the CC0C mounting face to 100 lbf in. (11,5 N.m), align the bolts and keywashers and lock.
  - (iv) Retaining the thermocouple leads to junction box terminal block to between 60 and 65 lbf in. (6,8 and 7,3 N.m).
- (g) Retain the lead-out covers and secure using the washers and nuts, lightly tightened.
- (h) Ensure there is a minimum clearance of 0.500 in. (12,7 mm) between the thermocouple leads and adjacent components and dressing items.
- (5) Install the thermocouple and junction box (77-22-07/1-90) (Pre or SB.77-4 standard), HP compressor rear labyrinth seal (Ref.Fig.515).
  - (a) Position the thermocouple bulb in the union, front lower left CC0C duct (75-02-07/1-10) and the junction box to the mounting plate.
  - (b) Secure the junction box to the mounting plate with the bolts (77-22-07/1-100) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (c) Torque-tighten the thermocouple union nut to the union, to between 220 and 240 lbf in. (25 and 27 N.m) and wire-lock it.
- (6) Install the thermocouple and junction box, intermediate case bearings (77-22-06/1-120) (Pre or SB.77-4 standard) (Ref.Fig.516).

ASSEMBLY

71-00-01

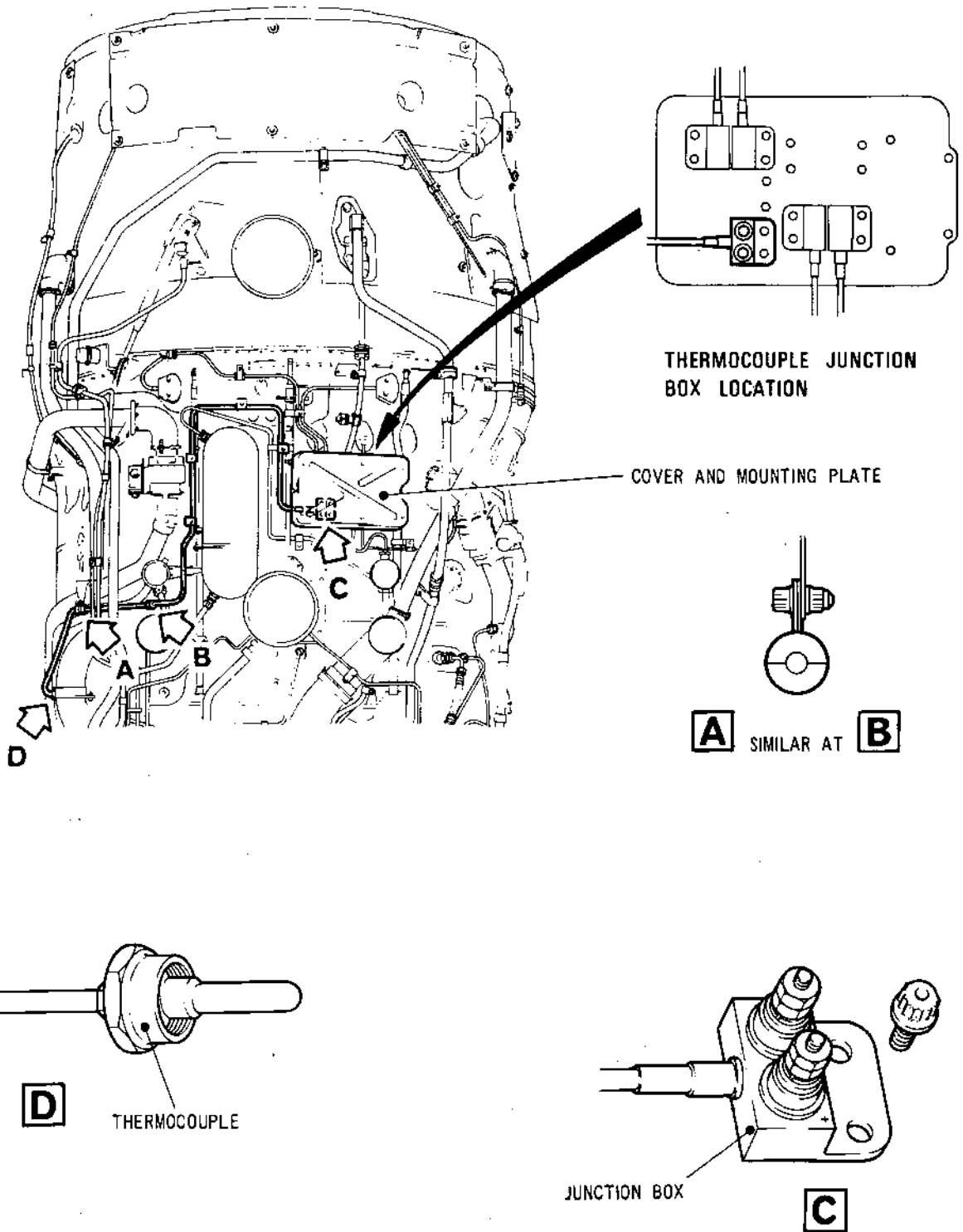
STAGE 5

Page 544

Dec 31/01



**OLYMPUS 593**  
MK. 610-14-28  
OVERHAUL



Thermocouple - HP Compressor Rear Labyrinth Seal  
Figure 515

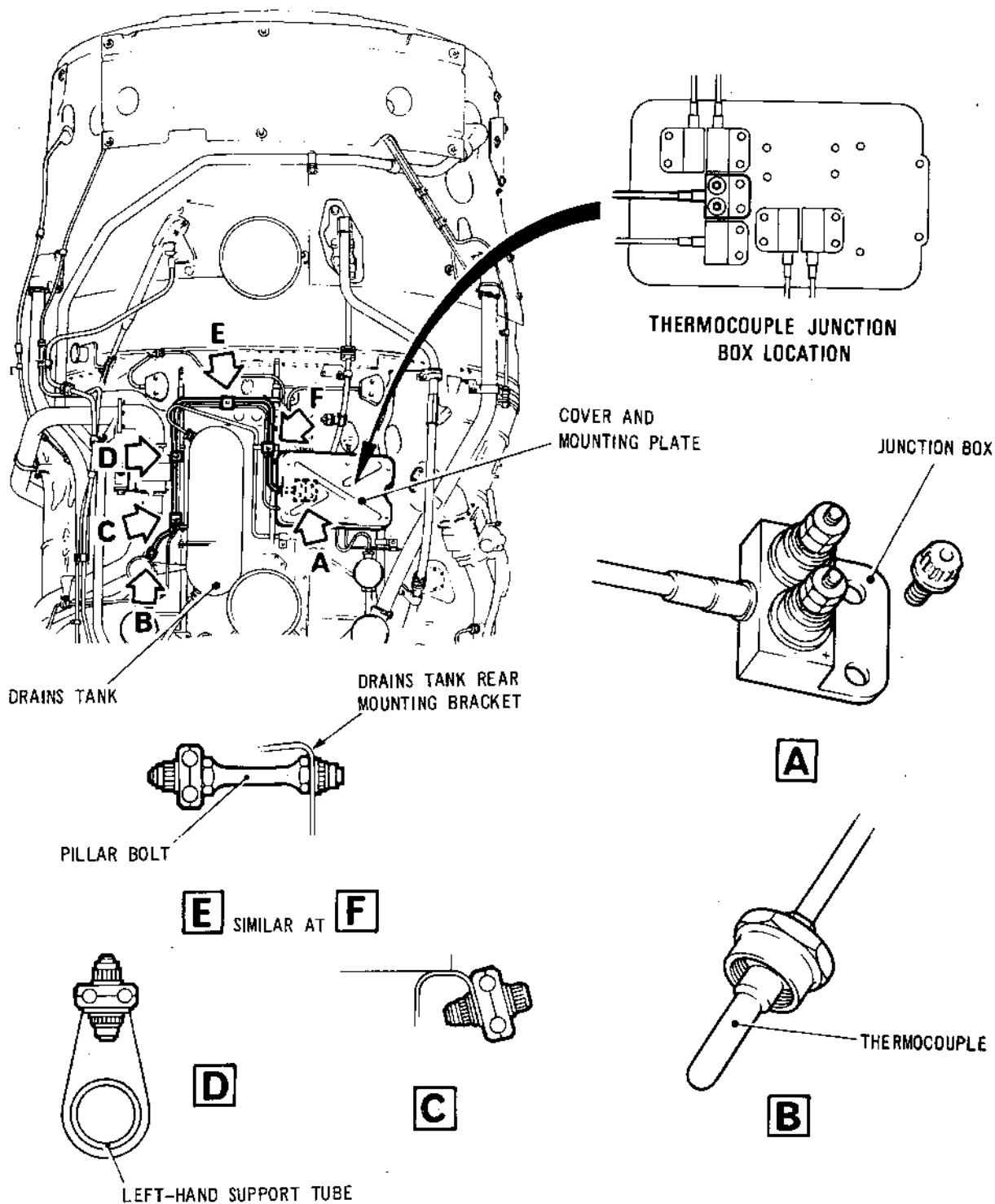


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 33240/00A



Thermocouple - Intermediate Case Bearings  
Figure 516

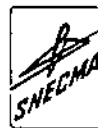
ASSEMBLY  
**71-00-01**  
STAGE 5  
Page 546  
Jan 2/80

TN16859



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (a) Position the thermocouple bulb in the union of the LP/HP thrust bearing air duct mounted on the lower left centre CCOC and the junction box to the mounting plate.
- (b) Secure the junction box to the mounting plate with the bolts (77-22-06/1-130) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (c) Torque-tighten the thermocouple union nut to the union to between 220 and 240 lbf in. (25 and 27 N.m) and wire-lock it.
- (7) Secure thermocouple leads para.(5) and (6) (Ref. Figs.515 and 516).
- (a) Attach the two lead-outs to the pillar bolt mounted to the rear lug on the centre support tube (72-42-01/1-230). Install the grooved clamps (77-22-06/1-80) to the lead-out and pillar bolt and secure with a nut (77-22-06/1-70).
- (b) Secure the two lead-outs to the drains tank rear mounting bracket.
- (i) Assemble the pillar bolt (77-22-06/1-50) to the anchor nut secured to the drains tank rear mounting bracket (71-73-01/1-150). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (ii) Attach the two lead-outs to the pillar bolt using the grooved clamps and nut (77-22-06/1-60-40).
- (c) Attach the two leads to the lug on the left-hand support tube (72-42-01/1-290) with the grooved clamps, bolt and nut (77-22-06/1-30-20-10).
- (d) Attach the two lead-outs to the fuel heater air valve mounting bracket (73-14-02/1-120) with the grooved clamps, bolt and nut (77-22-06/1-110-100-90).

ASSEMBLY

71-00-01

STAGE 5

Page 547

Jan 2/80



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (e) Attach the lead-out, HP compressor rear labyrinth seal, to the lug on the left-hand labyrinth over-board duct (75-02-07/1-10) with the loop clamp, bushes, bolt and nut (77-22-07/1-70-80-60-50).
- (f) Attach the lead-out, HP compressor rear labyrinth seal, to the bracket (75-02-05/1-110) at the port labyrinth duct (75-02-07/1-10) turbine hot vent pipe joint position, with the loop clamp, bushes, bolt and nut (77-22-07/1-30-40-20-10).

NOTE: Ensure the HP compressor rear labyrinth lead-out is a minimum of 0.25 in. (6,35 mm) clear of the thrust bearing vent sealing face.

- (g) Secure the leads. Torque-tighten all the nuts and bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (h) Ensure there is a minimum clearance of 0.500 in. (12,7 mm) between the thermocouple leads and adjacent components and dressing items.
- (8) Install the jet pipe thermocouple lead-out (77-21-03/1-70) (Ref.Fig.517).

- (a) Position the lead between the mounting plate and the exhaust diffuser.

NOTE: Secure the thermocouple lead rear terminal block to the exhaust diffuser to prevent any damage occurring.

- (b) Secure the forward terminal block to the mounting plate with the bolts (77-21-03/1-80), torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (c) Secure the lead-out to the brackets.
  - (i) (72-53-00/6-280) mounted on the CC0C/ exhaust diffuser flange with the loop clamp, bolt and nut (77-21-03/1-60-50-40).

ASSEMBLY

71-00-01

STAGE 5

Page 548

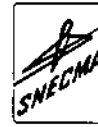
Jun 30/95



OLYMPUS 593

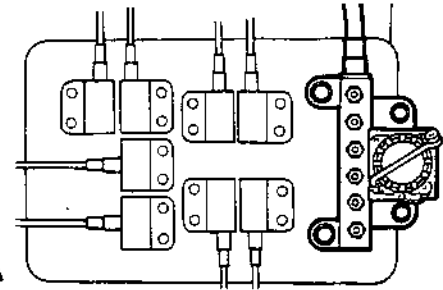
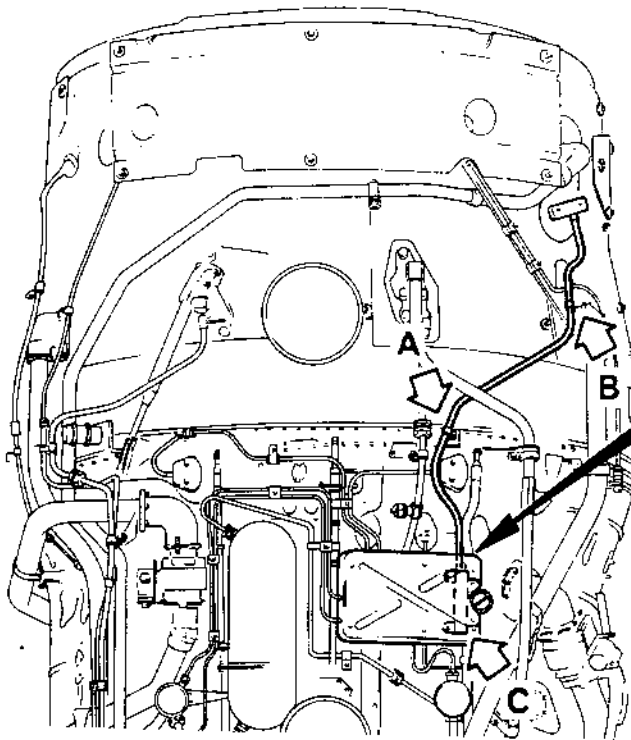
MK.610-14-28

OVERHAUL

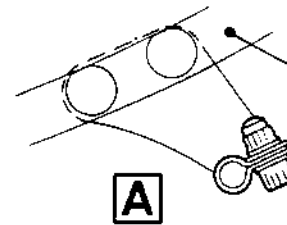


CR 33241/00A

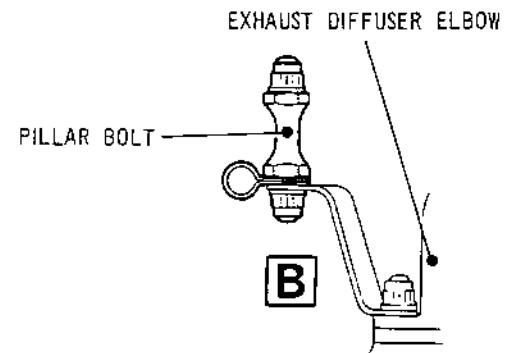
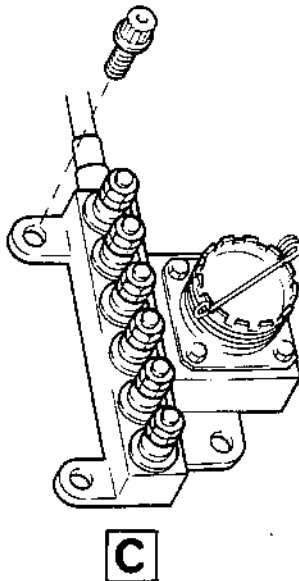
PRINTED IN ENGLAND



THERMOCOUPLE JUNCTION  
BOX LOCATION



CCOC/EXHAUST  
DIFFUSER FLANGE



Leads - Jet Pipe Thermocouple  
Figure 517

ASSEMBLY

71-00-01

STAGE 5

Page 549

Jan 2/80

TN8212



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (ii) (72-53-00/1-200) mounted on the diffuser case air duct with the loop clamp, (77-21-03/1-30) pillar bolt and nut (72-53-00/1-160-150).
  - (iii) Torque-tighten the clamps, nut and bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (iv) Ensure there is a minimum clearance of 0.500 in. (12,7 mm) between the thermocouple leads and adjacent components and dressing items.
- (9) Install the thermocouple and lead-out, HP compressor delivery air (77-22-09/1-160) (Ref.Fig.518).
- (a) Position the thermocouple lead-out between the mounting plate and the union in the delivery casing.
  - (b) Secure to the mounting plate with the bolts (77-22-09/1-170) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (c) Torque-tighten the thermocouple union nut to the union to between 220 and 240 lbf in. (25 and 27 N.m) and wire-lock it.
  - (d) Attach the lead-out to the mounting plate rear right-hand support bracket (72-42-01/1-160) with the loop clamp, bushes, bolt and nut (77-22-09/1-140-150-130-120).
  - (e) Attach the lead to the pillar bolt (72-01-04/3-230), which also secures the rear bearing oil scavenge tube to the support bracket (75-02-03/1-90) at the LP and HP turbine bearing cold vent connection, using the loop clamp, bushes and nut (72-22-09/1-100-110-90).
  - (f) Attach the lead to the retaining bracket (75-02-04/1-110) at the right-hand labyrinth vent duct, turbine hot vent pipe joint, with the loop clamp, bushes, bolt and nut (77-22-09/1-70-80-60-50).

ASSEMBLY

## 71-00-01

STAGE 5

Page 550

Jun 30/95



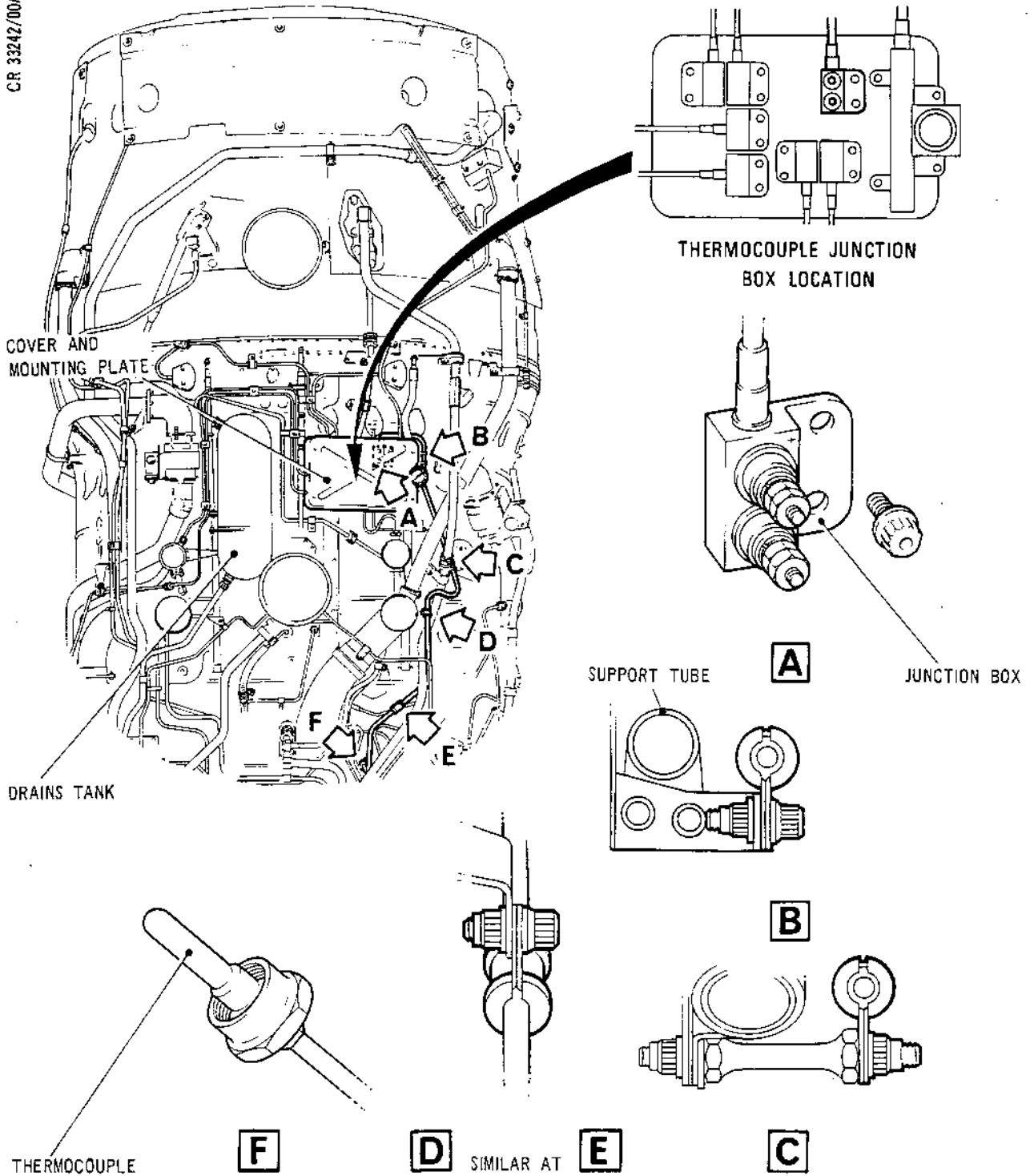
OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 33242/00A

PRINTED IN ENGLAND



Thermocouple HP Compressor Delivery Air  
Figure 518

ASSEMBLY  
71-00-01  
STAGE 5  
Page 551  
Jan 2/80

TN2251





OLYMPUS 593



MK.610-14-28 sheema  
OVERHAUL

- (g) Attach the lead to the bracket (73-12-05/1-70) mounted on the fuel sprayer flange with the loop clamp, bushes, bolt and nut (77-22-09/1-30-40-20-10).
  - (h) Torque-tighten the nuts and bolts retaining the loop clamps to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (j) Ensure there is a minimum clearance of 0.500 in. (12,7 mm) between the thermocouple leads and adjacent components and dressing items.
- (10) Assemble the cover (77-22-08/1-10) to the pillar bolts mounted to the plate and attach with nuts (77-22-08/1-20) lightly tightened.
13. Install the Front Bearing Vent Tubes to Overboard Outlet  
(Item 84, Fig.501 of Stage 1)
- A. Prepare for Installation.
- (1) Apply lubricant 'A' to the tube union nut and to the attachment bolts.
- B. Installation (Ref.Fig.519).
- (1) Position the rear tube (75-02-09/1-300) to the engine and engage the rear tube union nut on the connector of the oil tank overboard outlet hand-tight.
  - (2) Assemble the loop clamp (75-02-09/1-260) to the tube, align to the LP and HP compressor thrust bearings scavenge oil thermometer housing (72-01-04/2-60) (Ref. detail A) and retain in position with the bolt, washer and nut (75-02-10/1-130-120-110) lightly tightened.
  - (3) Assemble the loop clamp (75-02-09/1-180) to the tube. Align clamp to the bracket (72-01-04/2-110) mounted near the LP and HP compressor thrust bearing scavenge oil tube flange on the intermediate case sump (pulse probe and drive housing) and attach with bolt, spacer, washer and nut (75-02-09/1-220-210-200-190) lightly tightened.

ASSEMBLY

71-00-01

STAGE 5

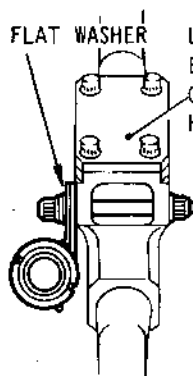
Page 552

Jun 30/95



OLYMPUS 593

MK. 610-14-28  
OVERHAUL

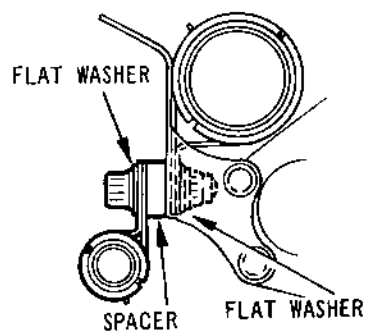


CR 33243/00A

**A**

FLAT WASHER  
LP AND HP THRUST  
BEARING SCAVENGE  
OIL THERMOMETER  
HOUSING

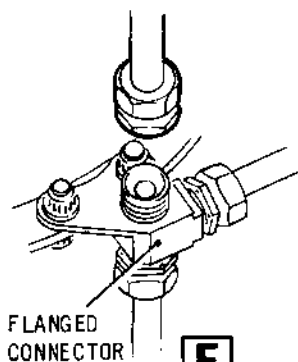
OIL TANK  
OUTLET  
SEAL PLATE



**B**

MAIN OIL  
PUMP

PULSE PROBE  
DRIVE AND HOUSING

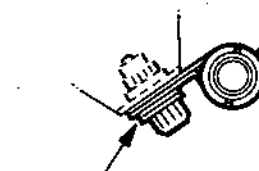


**F**

FLANGED  
CONNECTOR

OIL  
TANK

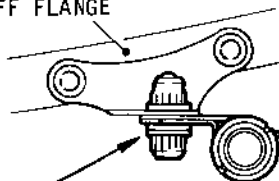
FLANGED  
CONNECTOR



**C**

FLAT WASHER

LP COMPRESSOR CASE  
REAR BLOW-OFF FLANGE



**D**

SIMILAR AT **E**

FLAT WASHER

LP Compressor Front Bearing Vent Tube  
Figure 519

ASSEMBLY  
**71-00-01**  
STAGE 5  
Page 553  
Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Position the centre tube (75-02-09/1-170), loosely connect the tube unions to the rear tube and the flanged connector (72-31-01/4-320).
- (5) Assemble the loop clamp (75-02-09/1-100) to the tube and align with the bracket (73-13-01/1-50) mounted on the main fuel feed tube flange. Secure with the bolt, washer and nut, (75-02-09/1-130-120-110) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (6) Assemble two loop clamps (75-02-09/1-10-60) to the tube and align with the brackets (72-31-01/5-300-360) mounted to the LP compressor case rear blow-off flange. Retain with the existing nuts and bolts lightly tightened.
- (7) Torque-tighten the tube union nuts to between 280 and 310 lbf in. (31,6 and 35,0 N.m) (Tools 1648 and 908). Wire-lock the unions.

14. Install the High Energy (HE) Ignition Unit (Item 85, Fig.501 of Stage 1)

A. Preparation for Installation.

- (1) Apply lubricant 'B' to the bolts.
- (2) Record the type and serial number of the HE ignition unit on the accessory sheet.

B. Installation.

- (1) Position the ignition unit (74-11-01/1-10) to the lower left side of the intake case.
- (2) Insert two bolts (74-11-01/1-20) through the ignition units top mounting lugs and assemble the distance pieces (74-11-01/1-30) to the bolt protrusions. Engage the bolts with the attachment locations hand-tight.

TN2918



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- PRINTED IN ENGLAND
- (3) With the electrical bonding lead (74-11-01/1-70) assembled to the remaining bolt, insert bolt through lower mounting lug.
  - (4) Assemble the distance piece (74-11-01/1-30-20) to the bolt protrusion and engage the bolt with the attachment location hand-tight.
  - (5) Torque-tighten the bolts to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
  - (6) Secure the electrical bonding lead to the stud on the lower end of the ignition unit with washer and nut (74-11-01/1-60-50) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
15. Install the Air Venting Tubes, Starter Break Point to Outlet Seal Plate (Item 86, Fig.501 of Stage 1)
- A. Prepare for Installation.
    - (1) Apply lubricant 'A' to the tube union nuts and attachment bolts.
  - B. Installation (Ref.Fig.520).
    - (1) Position the tube (75-02-10/1-170) to the engine, and screw the rear union nut to the overboard connection.
    - (2) Assemble the loop clamp (75-02-10/1-100) to its location.
      - (a) Assemble the loop clamp to the tube and align with the LP and HP compressor thrust bearings scavenge oil temperature bulb housing (72-01-04/2-60).
      - (b) Attach clamp with the bolt, washer and nut (75-02-10/1-130-120-110) which also retains the loop clamp locating the front bearing vent tube.
      - (c) Lightly tighten the nut and bolt securing the loop clamp.

TN24287

ASSEMBLY  
**71-00-01**  
STAGE 5  
Page 555  
Jan 2/80

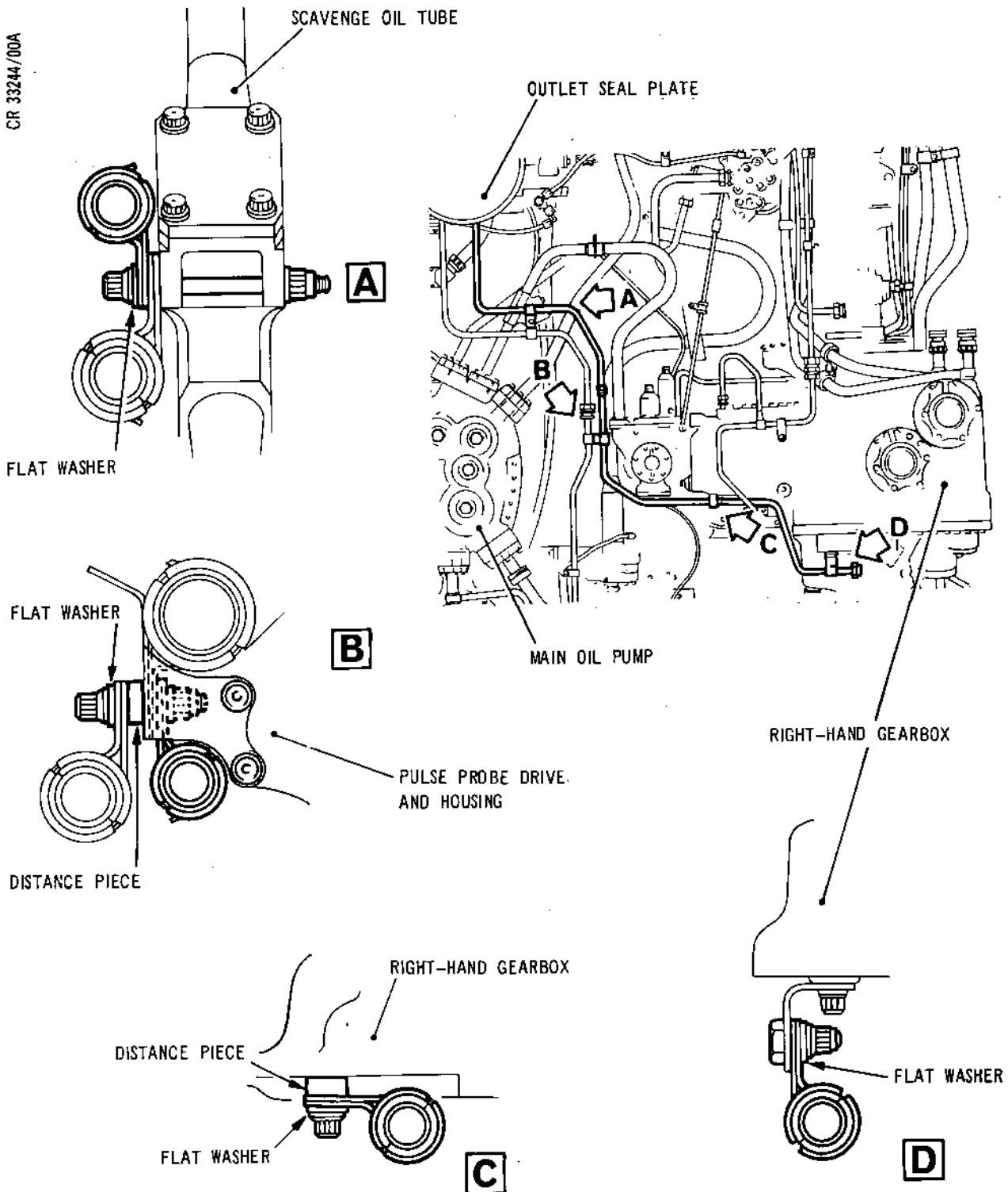


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33244/00A



TN24286

Air Starter Air Venting Tubes  
Figure 520

ASSEMBLY  
**71-00-01**  
STAGE 5  
Page 556  
Jan 2/80



OLYMPUS 598

MK.610-14-28

OVERHAUL



- (3) Position the tube (75-02-10/1-90) to the engine and the previous tube and engage the rear tube front union nut with the tube union.
- (4) Assemble three loop clamps (75-02-10/1-320-250-180) to the tube position as follows:
- (a) To the bracket (72-01-04/2-110) on the thrust bearing oil scavenge tube flange on the pulse probe drive and housing. Secure using the existing bolt, spacer, washer and nut (75-02-09/1-220-210-200-190).
  - (b) To the right-hand gearbox adjacent to the hydraulic pump adapter. Secure using the bolt, washer and spacer (75-02-10/1-260-270-280).
  - (c) To the bracket (72-63-01/4-290) on the right-hand gearbox front cover flange. Secure using the bolt (SB.72-115 Part 7), washer and nut (75-02-10/1-210-200-190).
  - (d) Torque-tighten the loop clamp nuts and bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (5) Torque-tighten the tubes union nuts between 190 and 210 lbf in. (21,5 and 23,7 N.m) (Tool 909) and wire-lock the union nuts.

PRINTED IN ENGLAND

TN266

ASSEMBLY

71-00-01

STAGE 5

Page 557

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBES AND ACCESSORIES - ASSEMBLY

1. Transfer the Engine from the Vertical Build Stand to the Horizontal Stillage Stand

WARNING: THE LIFTING BEAM MUST BE ADJUSTED TO THE ENGINE BY MEANS OF THE JACKS ON THE BEAM TROLLEY AND NOT ON THE OVERHEAD CRANE.

- A. Assemble and secure the left-hand and right-hand trunnion brackets (Tools 1177 and 1193).
- B. Attach the lifting beam to the trunnion brackets and to the lifting brackets on the intermediate casing/HP casing flange (Tool 1176 beam type sling and front lifting arm).
- C. Attach the lifting sling to the bottom lifting position on the beam. (Tool 1175 beam type sling).
- D. Attach the lifting sling to the top lifting position on the beam (Tool 1174 beam type sling).
- E. Lift the engine from the build ram and turn to the horizontal position.
- F. Lower the engine and position into the mobile engine stand.
  - (1) Secure the trunnion adapters to the pedestal with the pedestal clamps.
  - (2) Assemble the front engine supports to the LP case and secure (Tools 1265 mobile engine stand, 261 mobile engine stand mounting bracket, 808 adapters, right-hand bracket, left-hand bracket, 1314 mobile sling stand).
- G. Remove the engine lifting equipment and store on the mobile stand.

PRINTED IN ENGLAND

TN24461

ASSEMBLY

71-00-01

STAGE 6

Page 501

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



2. Install the LP Compressor Shaft Cover

A. Remove the LP Compressor Support Tool.

- (1) Unscrew the bolts securing the jacking adapter (Tool 319) to the LP compressor shaft.

NOTE: The bolts are retained in the adapter with retaining rings.

- (2) Remove the adapter.

B. Install the LP Compressor Shaft Cover.

- (1) Lubricate the retaining bolts (72-31-03/1-10) with lubricant B.
- (2) Ensure the cover (72-31-03/1-20) is thoroughly clean and undamaged (Pre or SB.72-30 standard).
- (3) Install the cover to the LP compressor shaft.
- (4) Install the bolts.
- (5) Torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m).

3. Check and Adjust Position of LP Shaft Signal System Actuator Arm and Install Rear Insulation Blanket

A. Prepare for Actuator Arm Check and Adjustment.

- (1) Remove the split pin, washer and shoulder pin connecting the signal system rear cable to the centre cable.
- (2) Remove bolts and detach the cover from the rear cover assembly (Ref.Fig.501).

IN16860





OLYMPUS 593



MK.610-14-28 sheema  
OVERHAUL

- B. Establish Required Thickness of Adjusting Washer on Actuator Arm Shaft Stop (Ref.Fig.502).

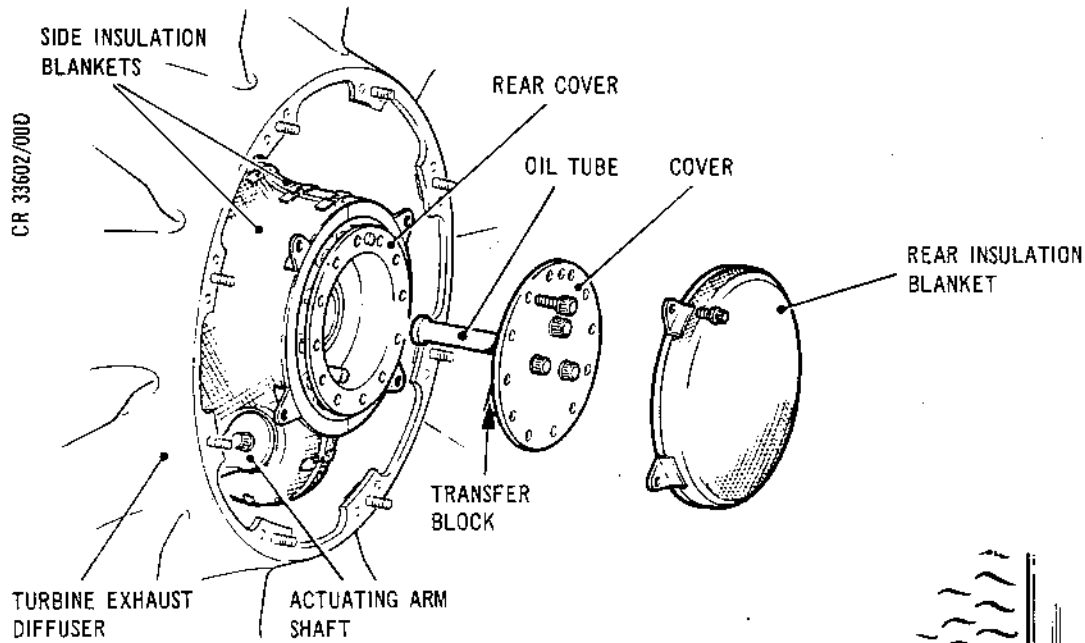
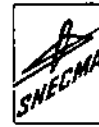
**CAUTION:** DO NOT SLACKEN NUT SECURING ACTUATOR ARM AND ACTUATOR ARM SHAFT.

- (1) If the original adjusting washer has been assembled to the actuator arm shaft stop (special bolt, 76-21-02/1-490) torque-tighten the nut to between 67 and 73 lbf in. (7,6 and 8,2 N.m). Locking (Run-down) torque 3.5 lbf in. (0,4 N.m), then proceed with the check detailed in paragraph (7). Should the check establish that the clearance is incorrect, carry out a full check in accordance with the procedures of the following paragraphs.
- (2) Assemble slave adjusting washer to the actuator arm shaft stop (special bolt, 76-21-02/1-490).
  - (a) Remove the nut and bolt from the bracket lower attachment hole.
  - (b) Slacken the nut and bolt in the bracket upper attachment hole.
  - (c) Turn the bracket to obtain clearance, then remove the nut, adjusting washer and special bolt.
  - (d) Assemble the slave adjusting washer (Tool 234) to the special bolt then locate the bolt in the bracket and retain with the nut lightly tightened.
  - (e) Align the bracket attachment hole and install the retaining nut and bolt, then lightly tighten both retaining nuts.
- (3) Calculate required thickness of adjusting washer.
  - (a) Push the LP rotating assembly fully forward and hold forward while carrying out the following gauge checks.

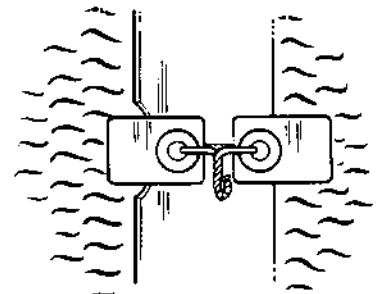


OLYMPUS 593

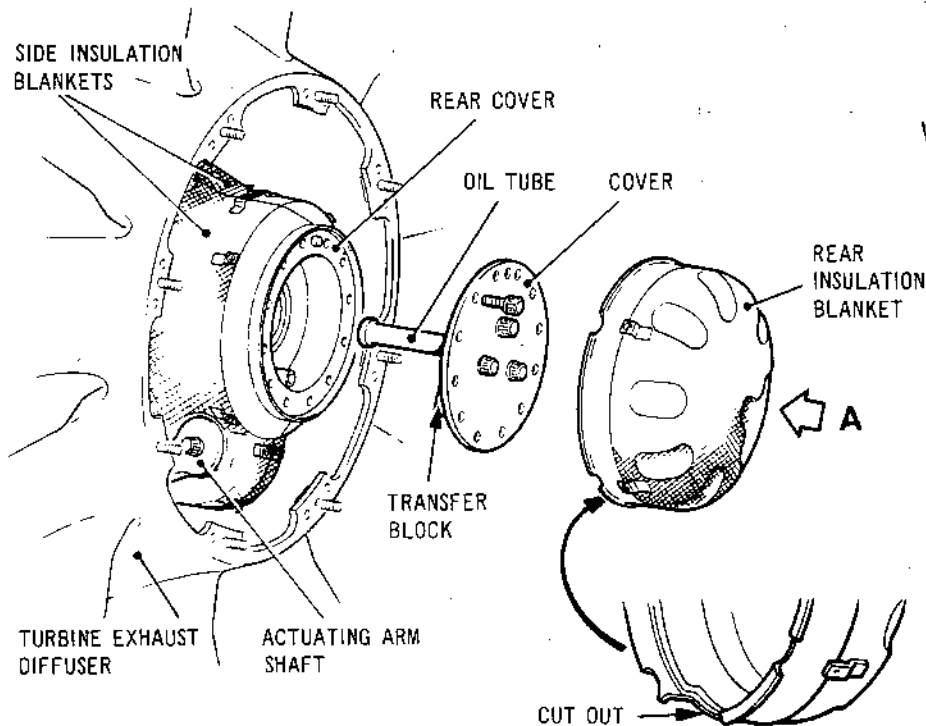
MK.610-14-28  
OVERHAUL



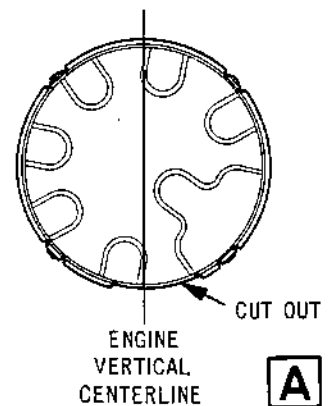
BLANKET ASSEMBLY PRE SB.72-20 STANDARD



WIRE LOCKING ARRANGEMENT  
FOR SECURING BLANKETS  
SB.72-20 STANDARD



BLANKET ASSEMBLY SB.72-20 STANDARD



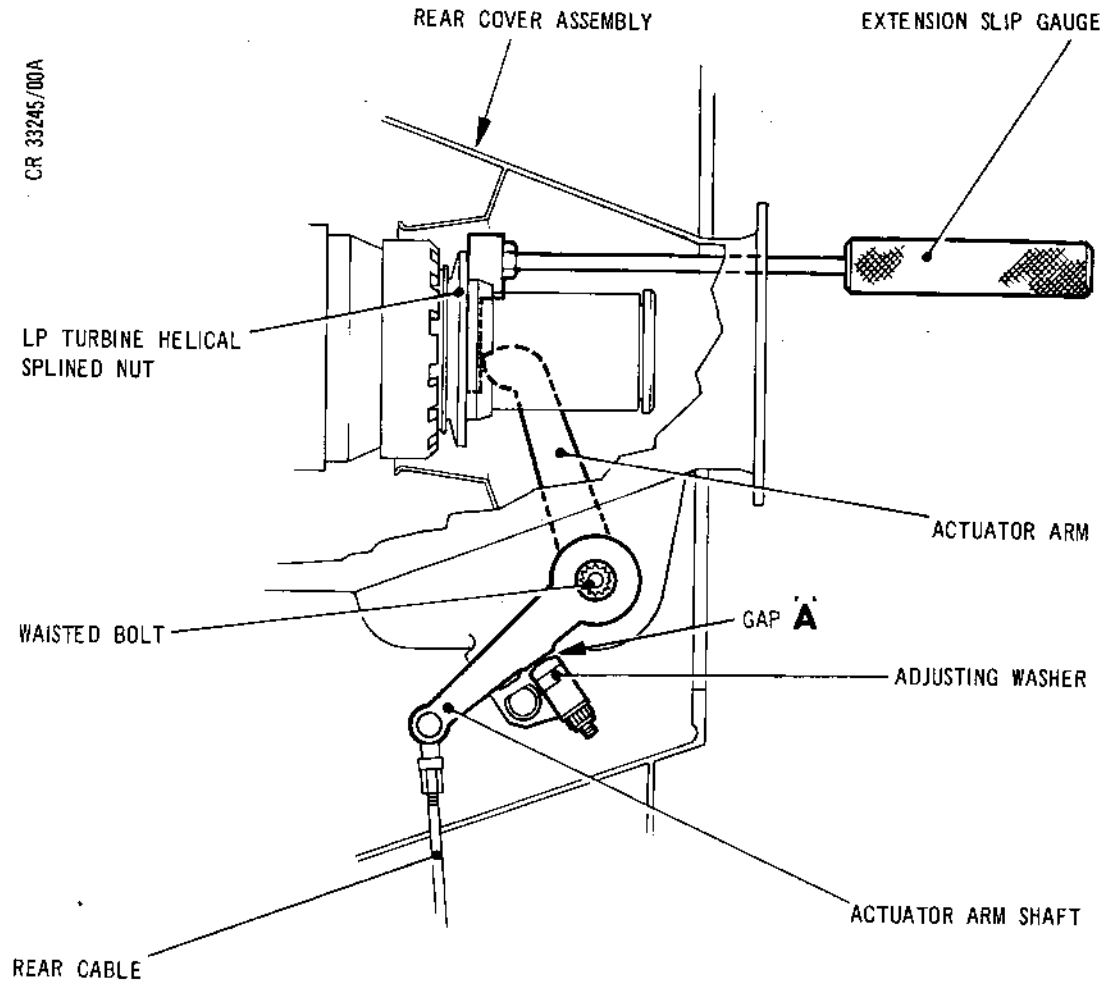
Rear Cover Blanket Assembly  
Figure 501

ASSEMBLY  
**71-00-01**  
STAGE 6  
Page 504  
Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



LP Signal Shaft Lever Adjustment  
Figure 502

ASSEMBLY  
**71-00-01**  
STAGE 6  
Page 505  
Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Insert the 'GO' section of the extension slip gauge (Tool 30) between the helical splined nut and the end of the actuator arm.
- (c) Apply hand pressure to the actuator arm to ensure that the arm, slip gauge and splined nut are in firm contact, then measure the gap between the stop bolt and the actuator arm shaft. Record as dimension A.
- (d) From the following equation, establish the adjusting washer thickness required.

Washer

thickness = 0.090 in. + dimension A + 0.005 in.  
(2,28 mm) + dimension A + (0,13 mm)

- (4) Remove slave washer from special bolt.
  - (a) Remove the lower retaining bolt from the bracket, slacken the upper bolt and turn the bracket to obtain withdrawal clearance for the special bolt.
  - (b) Remove the nut, special bolt and slave washer.
- (5) Install adjusting washer of correct thickness.
  - (a) From the range available (76-21-02/1-200 to 475) select an adjusting washer that is nearest to the dimension calculated in paragraph (3) and assemble it to the special bolt.

NOTE: If an adjusting washer of specific thickness is not available, a washer of increased thickness may be machined to achieve the desired thickness (Ref. 72-09-21, Repair).

- (b) Assemble the special bolt and selected washer to the bracket and with lubricant B applied, screw the nut to the stop bolt and lightly tighten.

TN20410



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (c) Align the bracket attachment hole, apply lubricant B and install the retaining bolt and nut, then lightly tighten both retaining nuts.
- (6) Torque-tighten the bracket retaining nuts and the nut assembled to the special bolt to between 67 and 73 lbf in. (7,6 and 8,2 N.m). Locking (Run-down) torque 3.5 lbf in. (0,4 N.m).
- (7) Check clearance between actuator arm and splined nut.
  - (a) With the LP rotating assembly held fully forward and the actuator arm shaft held firmly against the special bolt, check the clearance between the helical splined nut and actuator arm with the 'GO' and 'NOT GO' sections of the extension slip gauge (Tool 30).
- C. Complete the Assembly Sequence.
  - (1) Connect LP shaft signal system cables.
    - (a) Temporarily connect the rear cable to the centre cable with the shouldered pin, flat washer and split pin (76-21-01/2-370-360-350).
  - (2) Install cover (Ref. Item 87, Fig.501 of Stage 1).
    - (a) Apply jointing compound C to the rear cover attachment flange.
    - (b) With the shoulder pin and its location in alignment, assemble the cover (72-52-03/1-70) to the rear cover and ensure correct engagement of oil transfer block and oil tube (Ref.Fig.501).
    - (c) Retain the cover with twelve bolts (72-52-03/1-60) with lubricant C applied.
    - (d) Torque-tighten the bolts to 100 lbf in. (11,5 N.m). Locking (Run-down) torque 3.5 lbf in. (0,4 N.m).

ASSEMBLY

71-00-01

STAGE 6

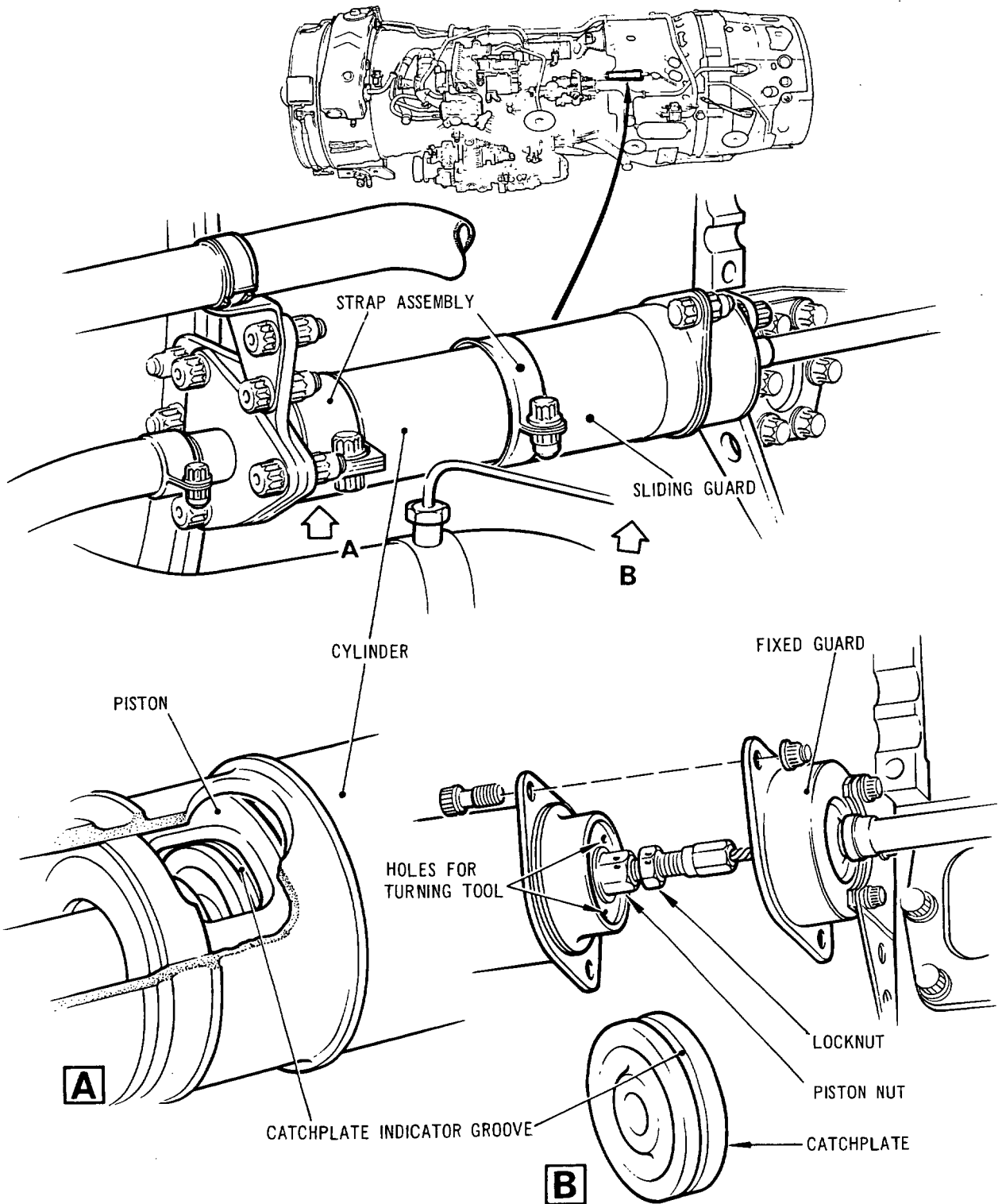
Page 507

Dec 31/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



LP Shaft Signal System Piston Check and Adjustment  
Figure 503



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Assemble rear insulation blanket to side blankets  
(Ref. Item 87, Fig.501 of Stage 1).

- (a) On engines to pre SB.72-20 standard, assemble the rear insulation blanket (72-52-03/1-10) over the end cover and secure it to the side blankets with four nuts and bolts (72-52-03/1-20-30) with lubricant 'B' applied. Torque-tighten the bolts between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (b) On engines to SB.72-20 standard, assemble the rear insulation blanket (72-52-03/1-10), with the large cut-out in the leading edge positioned at the bottom, over the end cover and align the retaining tabs with those on the side blanket. Secure the retaining tabs with locking wire.

4. Check and Adjust the LP Shaft Signal System

WARNING: WASH HANDS AFTER CONTACT WITH LUBRICANT 'G' ON SIGNAL SYSTEM COMPONENTS. LUBRICANT CONTAINS COPPER AND LEAD AND IS TOXIC.

A. Check and Adjust Cylinder and Piston Assembly (Fig.503).

- (1) Ensure that the engine is cold, and that the valve operating mechanism has been armed.
- (2) Check piston setting.
- (a) Slacken bolt securing strap at front of cylinder, disengage lug and move strap assembly rearwards to expose observation holes of cylinder and piston.
- (b) Check visually through coincident holes of cylinder and piston and note position of indicator groove of catch plate. If observation hole of piston is not coincident with that of cylinder, slacken nut and bolt of sliding guard strap, remove flange retaining bolts and move sliding guard to front end of cylinder and then use turning tool (Tool 1768) to turn piston to required position.

ASSEMBLY

71-00-01

STAGE 6

Page 509

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) When correctly set, indicator groove of catch plate is in line with rear edge of observation hole in piston.
- (3) Should setting be incorrect, adjust cable and set piston position in relation to catch plate.
  - (a) If not already done, slacken nut and bolt of sliding guard strap, remove flange retaining bolts and move sliding guard to front end of cylinder.
  - (b) Release cable locknut, hold cable and piston against turning, and turn piston nut, held by retaining ring, in the required direction on cable unit threaded end until indicator groove of catch plate is aligned.
  - (c) Apply lubricant B and torque-tighten locknut to between 67 and 73 lbf in. (7,6 and 8,2 N.m). Wire-lock locknut to piston nut.
  - (d) Recheck and ensure piston setting is correct.
- (4) Move sliding guard rearward to abut flange of fixed guard. Apply lubricant B and secure sliding guard to fixed guard with two nuts and bolts torque-tightened to between 28 and 32 lbf in. (3,2 and 3,6 N.m).
- (5) Apply lubricant B and secure sliding guard clamping strap with nut and bolt torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- B. Check the Quick Shut-down Valve Plunger Mechanism Operation.
  - (1) Check the reset plunger at the fuel distribution and dump valve for free movement (Ref.Fig.504).
    - (a) Check that the reset plunger is free to move sideways in and out of the shroud slot by approximately 0.010 to 0.020 in. (0,25 to 0,50 mm).

IN3631





OLYMPUS 593

MK.610-14-28  
OVERHAUL



RIGGING PIN

SLEEVE

WITH FULL PENETRATION SLEEVE IS IN  
FULL CONTACT WITH NO FREE MOVEMENT

PIN FULLY IN

SECONDARY PLUNGER

PULL OFF PLUNGER

PLUNGER SLEEVE

SHROUD

RIGGING PIN

WARNING LABEL  
CORD

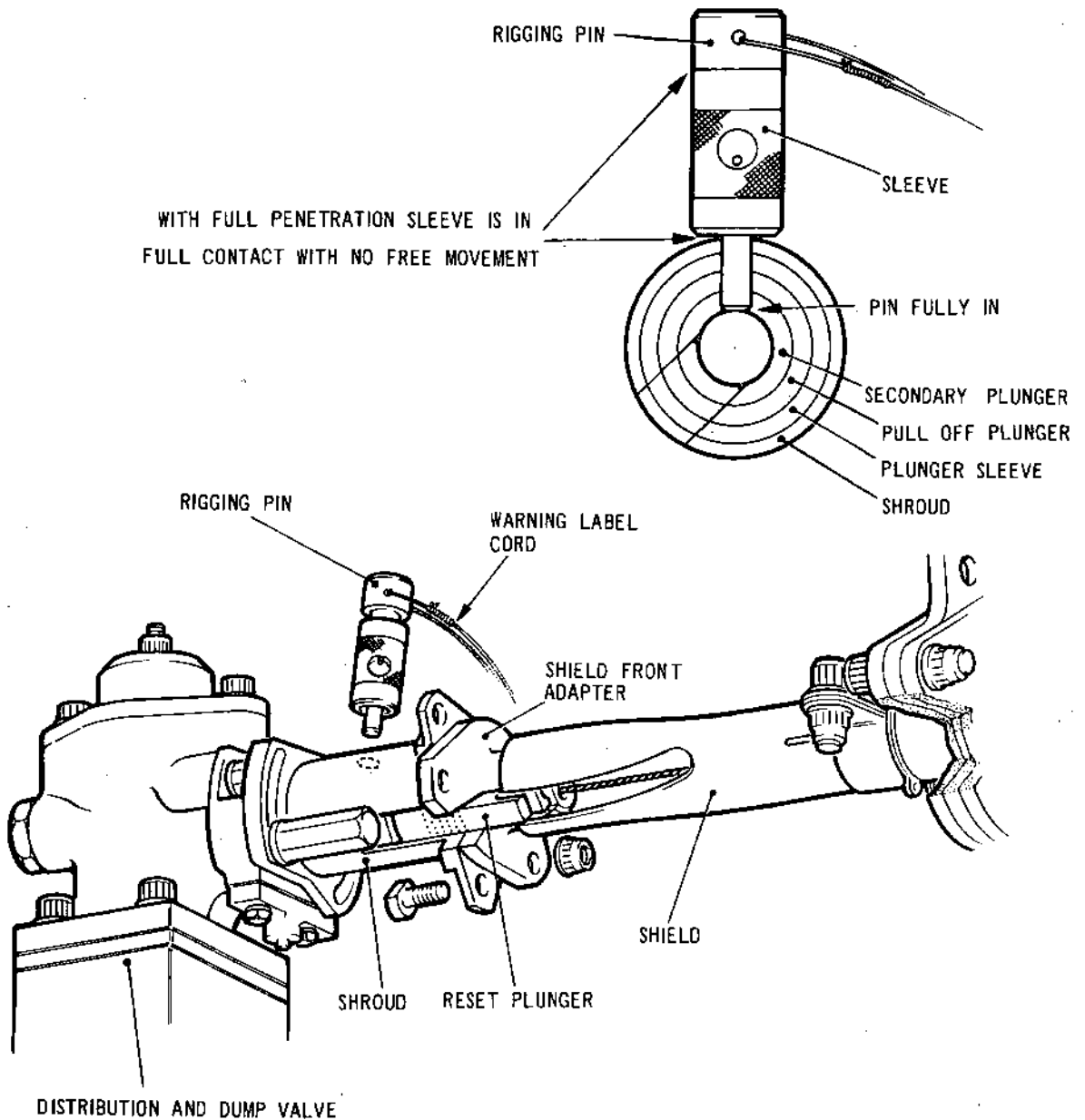
SHIELD FRONT  
ADAPTER

SHIELD

SHROUD

RESET PLUNGER

DISTRIBUTION AND DUMP VALVE



Re-arm Details and Alignment Check of Pull-off Plungers  
Figure 504

ASSEMBLY

71-00-01

STAGE 6

Page 511

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) If the movement is not sufficient, slacken the bolts securing the shroud to the distribution and dump valve and turn the shroud the minimum amount to free the plunger and allow the movement to be obtained. Temporarily re-tighten the bolts and check that the reset plunger remains free.
- (2) On engines to Pre S.B.76-26 standard, disconnect centre cable from rear cable.
  - (a) Remove the split pin, washer and shouldered pin securing the centre cable to the rear cable and separate the cable ends.
- (3) On engines to S.B.76-26 standard, disconnect centre cable from rear cable.
  - (a) Remove the nuts and bolts securing the rear block (76-21-01/2-570) to the mounting bracket.
  - (b) Slacken cable at cylinder and piston adjustment and remove rear block.
    - (i) Release the locknut on the piston nut.
    - (ii) Restrain the cable and while holding the piston with the turning tool (Tool 1768) turn the piston nut to slacken the cable and note the exact amount turned. Support the rear block while slackening the cable.
    - (iii) Disengage and remove the rear block without pulling the cable.
  - (c) Reset the cable adjustment to the original position in accordance with the number of turns noted when slackening.
  - (d) Remove the split, washer and shouldered pin securing the centre cable to the rear cable and separate the cable ends.

TN3632

ASSEMBLY

71-00-01

STAGE 6

Page 512

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Assemble the tensioning tool (Tool 1991) to the fork end at the rear of the centre cable.
- (a) Secure the centre cable fork end to the end of the cable in the tensioning tool with a shouldered pin; ensure that the weight of the tool is supported and does not hang on the cable.
  - (b) Attach the spring balance to the tensioning tool, locating it between the cable and the screw.
  - (c) Screw out the tommy bar to take up the slack in the cable, then position the end of the tool against the rear roller block; ensure that the tool aligns with the axis of the centre cable.
- NOTE: If the tensioning tool is not available, the quick shut-down valve plunger mechanism may be checked with a spring balance, taking care that the cable run alignment is maintained.
- (5) Trip the mechanism.
- (a) Observe the spring balance indicator reading and apply a progressively increasing pull on the cable until the reset plunger trips and exposes the red indicator. Ensure that the pull is in line with the cable run axis within a maximum limit of 170 lb (77,1 kg).
  - (b) Record the force indicated when the reset plunger trips (FORCE A).
  - (c) If the plunger mechanism does not trip within the maximum pull limitation, investigate and rectify the defect, then resume the quick shut-down valve plunger mechanism check procedure.

ASSEMBLY

71-00-01

STAGE 6

Page 513

Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



(6) Establish the force required to operate the thermal expansion cylinder and piston assembly.

(a) Apply a progressively increasing pull on the centre cable ensuring that the pull is in line with the cable run axis. View through the observation holes and note the force at which the front cable begins to move.

(b) Record the force indicated when the front cable was seen to move (FORCE B).

(7) Calculate the force required to trip the reset plunger (FORCE C).

$$\text{FORCE C} = \text{FORCE A} - \text{FORCE B}$$

Acceptable limits Pre S.B.76-26 standard:

FORCE B = 70 lb (32 kg) (max)  
FORCE C = 50 lb (23 kg) (max)  
or 8 lb (4 kg) (min)

Acceptable limits S.B.76-26 standard:

FORCE B = 56 lb (25 kg) (max)  
FORCE C = 50 lb (23 kg) (max)  
or 8 lb (4 kg) (min)

(8) If the force required to operate the thermal expansion piston (FORCE B) exceeds the maximum limit, reject the piston assembly for re-inspection. If the force required to operate the reset plunger mechanism (FORCE C) is greater than 50 lb (23 kg) re-arm the mechanism and carry out a second pull-off check. If the second check confirms that the force is excessive, renew the distribution and dump valve.

(9) If rectification was necessary, re-arm the mechanism as detailed in paragraph C. and E. and repeat the check procedures detailed in para.(4), (5), (6) and (7).

IN3634

ASSEMBLY

71-00-01

STAGE 6

Page 514

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(10) Check piston setting and secure strap.

- (a) Check visually through coincident holes of cylinder and piston and check that indicator groove of catch plate is in line with rear edge of observation hole in piston.
- (b) If setting is correct, torque-tighten locknut to between 67 and 73 lbf in. (7,6 and 8,2 N.m). Wire-lock locknut to piston nut.
- (c) If setting is not correct, adjust piston in relation to catch plate as detailed in paragraph A.
- (d) Position cylinder strap to engage lug. Apply lubricant B to clamping screw and torque-tighten to between 28 and 32 lbf in. (3,2 and 3,6 N.m).

C. Arm the Trip Mechanism (Ref.Fig.504).

- (1) Engage the reset tool (Tool 1298) with the recess at the rear of the reset plunger and press it fully in.
- (2) Ensure that the red indicator mark on the reset plunger is not visible.

D. Complete the Assembly.

- (1) Reconnect the cables.
  - (a) Remove the tensioning tool.
  - (b) Align the fork end of the centre cable and the spade end of the rear cable, then pass the attachment tool (Tool 260) through the holes.
  - (c) Assemble the shouldered pin in place of the attachment tool, then assemble the washer and split pin (76-21-01/2-370-360-350).
  - (d) Bend the split pin legs to lock.

ASSEMBLY

71-00-01

STAGE 6

Page 515

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) On engines to pre S.B.76-26 standard install rear conduit (Ref.Fig.502 of stage 4).
- (a) Apply lubricant G to the cable and lubricant B to nuts and screws.
  - (b) Position the conduits (76-21-01/2-340) between the rear block and the cable ferrule screwed in the front of the pulley shroud.
  - (c) Secure at the front of the conduit with strap, saddles, nut and screw (76-21-01/2-30-40-10-20), tighten the screw.
  - (d) Secure at the rear of the conduit with strap, saddles, nut and screw (76-21-01/2-320-330-300-310) and tighten the screw.
  - (e) Torque-tighten all the conduit screws to 12 lbf in. (locking/run-down torque 2.0 lbf in. (0,23 N.m)).
- (3) On engines to S.B.76-26 standard install rear conduit (Ref.Fig.503 of stage 4).
- (a) Apply lubricant B to attachment bolts and nuts.
  - (b) Apply lubricant G liberally by brush to the length of the cable where it is in contact with the rear block and guide bush.
  - (c) Slide the rear slotted conduit (76-21-01/2-560) over the cable and connection and, with end compressed, engage fully with centre block bore.
  - (d) Ensure that the matched pair, guide bush halves are correctly installed in the hole in the bracket mounted on the turbine exhaust diffuser case.
  - (e) Simultaneously engage cable with slot of rear block (76-21-01/2-570) and, with conduit end compressed, engage block with conduit end and turn block into position on mounting bracket.

TN40226

ASSEMBLY

71-00-01

STAGE 6

Page 516

Feb 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (f) Align block and bracket attachment holes, insert two bolts (76-21-02/1-30) and secure block to bracket with nuts (1-20) torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (g) Apply lubricant G liberally by brush to the cables where it is in contact with the guide bush and block.
- (h) Turn conduit until slot faces downward.

E. Check that the valve operating mechanism is in the locked position (Ref.Fig.504).

- (1) Remove the nuts and bolts securing the shield front adapter to the shroud.
- (2) Slacken the bolts securing the shroud to the distribution and dump valve.
- (3) Turn the shroud and align the slots.
- (4) Insert the rigging pin (Tool 1990) and press fully home through the alignment holes of the shroud, plunger sleeve, pull off plunger and secondary plunger (Ref.Fig.504). The pin must be fully home so that all axial movement of its sleeve is taken up for the check to be acceptable.
- (5) Remove the rigging pin and turn the shroud to the full extent of slotted flange to close slots then finger-tighten the bolts.

CAUTION: ENSURE THAT CABLE IS NOT PULLED AFTER REMOVAL OF RIGGING PIN. A PULL WILL UNLOCK SECONDARY PLUNGER.

- (6) With lubricant 'A' applied to the retaining nuts and bolts, retain the shield front adapter to the shroud then torque-tighten the nuts to 40 lbf in. (4,5 N.m) (locking/run-down torque 2 lbf in. (0,2 N.m)).



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (7) Check that the reset plunger is free to move sideways in and out of the slot by approximately 0.010 to 0.020 in. (0,25 to 0,50 mm). Progressively tighten the shroud to distribution and dump valve securing bolts to 40 lbf in. (4,5 N.m) (locking/run-down torque 2 lbf in. (0,2 N.m)) ensuring that the reset plunger remains free. If free movement is lost, slacken the bolts, turn the shroud the minimum amount necessary to free the plunger, then re-tighten the bolts; check that plunger is still free.

5. Install the Jet Pipe Thermocouple Harness (Ref. Item 88, Fig.501 of Stage 1)

A. Prepare for Installation.

CAUTION: DO NOT HANDLE THERMOCOUPLE HARNESS WHEN PROTECTOR IS NOT ATTACHED.

- (1) Assemble the protector (Tool 240) to the harness (77-21-02/1-10) while in the container, this provides a handling point (Ref.Fig.505).
  - (a) Remove the quick-release pins from the three pairs of attachment lugs on the round portion of the protector.
  - (b) Unscrew and remove the threaded pin from the bracket plate at the position shown.
  - (c) Hold the protector above the thermocouple, hinge the bracket plate away from the protector body and engage the three pins of the bracket plate with corresponding holes in the flange of the thermocouple junction box.
  - (d) While holding the bracket plate in engagement with the junction box, hinge the protector toward the thermocouple body then engage the attachment lugs and quick-release pins as shown. Note that quick-release pins are retained by floating bushes.

IN24467

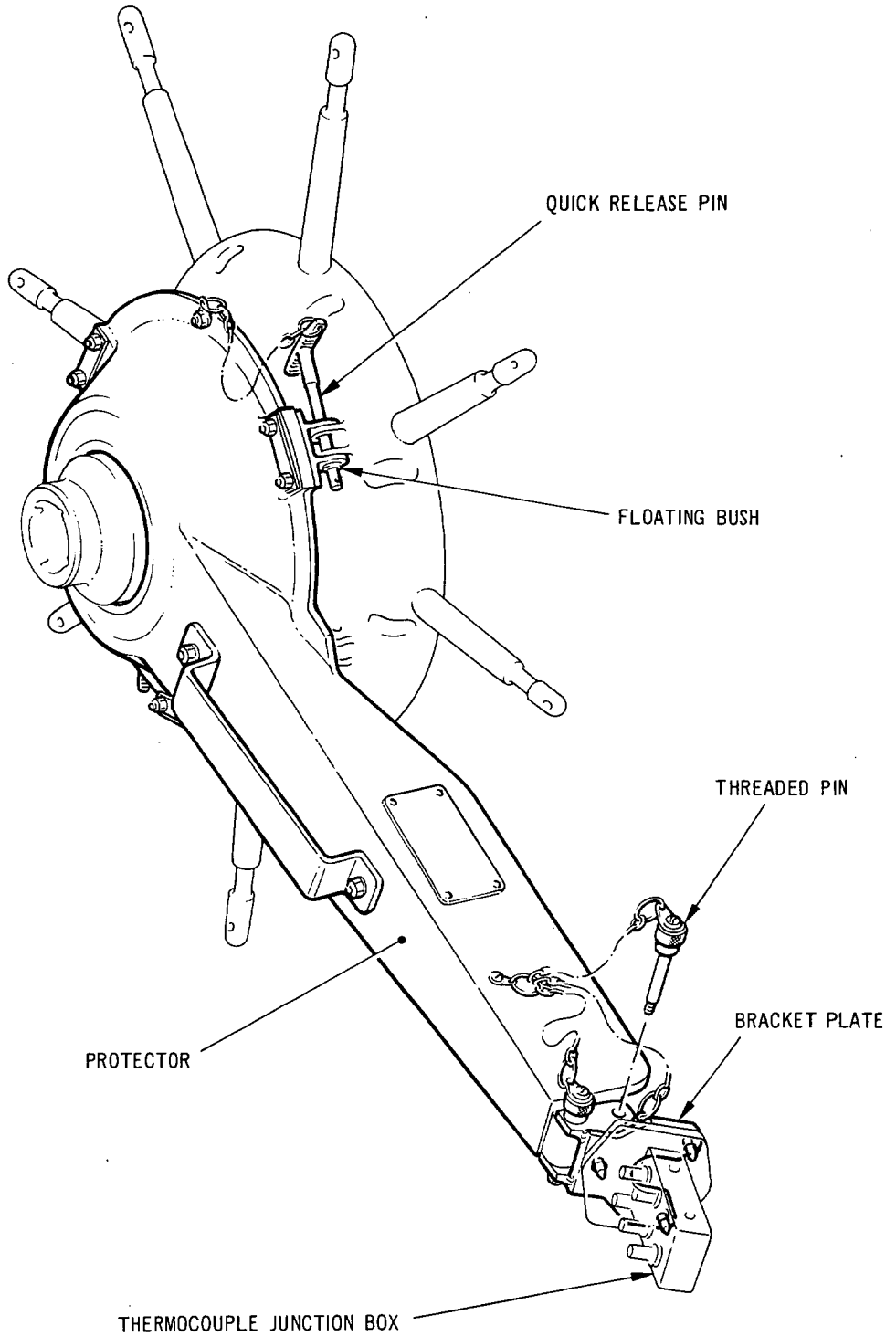




OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 33248/00B



Jet Pipe Thermocouple Harness and Protector  
Figure 505

ASSEMBLY

71-00-01

STAGE 6

Page 519

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (e) Engage and tighten the threaded pin at the bracket plate location.

- (2) Apply lubricant C to harness attachment bolts/nuts.

B. Installation (Ref.Fig.506 Sheet 1).

- (1) Remove the cover from the harness lead-out.
- (2) By means of the protector lift the thermocouple through the rear of the exhaust diffuser, then locate the junction box in the aperture in the lower right-hand side of the diffuser.
- (3) Continue to support the thermocouple by means of the protector handle and locate and retain it on the turbine exhaust diffuser inner flange with three bolts (pre S.BB.72-8038-181) or three new nuts (72-8038-181 or 77-9045-35) (77-21-02/1-20) lightly tightened at the 2, 7 and 10 o'clock positions.
- (4) Remove protector from thermocouple.
  - (a) Unscrew and remove the threaded pin from the bracket plate at the position shown.
  - (b) Support the protector and withdraw the quick-release pins securing it to the thermocouple body.
  - (c) Hinge the protector away from the thermocouple body and disengage the bracket plate from the junction box flange.
- (5) Assemble remaining bolts or new nuts (Pre or S.B. 72-8038-181) (77-21-02/1-20) at the exhaust diffuser inner flange location and lightly tighten them.
- (6) Position the harness using the setting bar (Tool 1770) (Ref.Fig.506).
  - (a) Assemble the positioning plate with the adjustment rod retracted to the three pairs of mounting lugs equally spaced on the rear conical shaped face of the harness.

ASSEMBLY

71-00-01

STAGE 6

Page 520

Dec 31/01



OLYMPUS 593

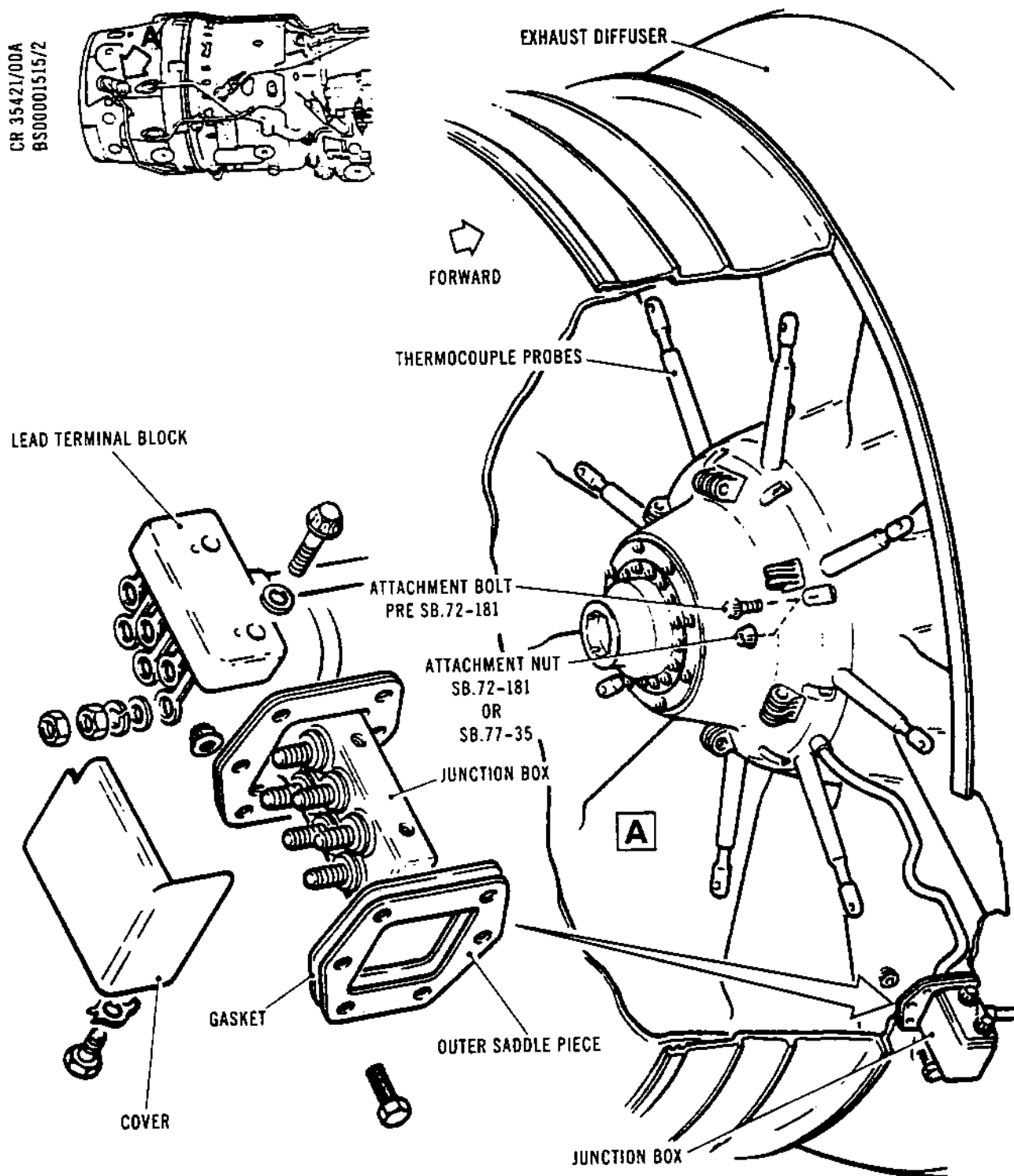
MK.610-14-28

OVERHAUL



SNECMA

CR 35421/00A  
BS00001515/2

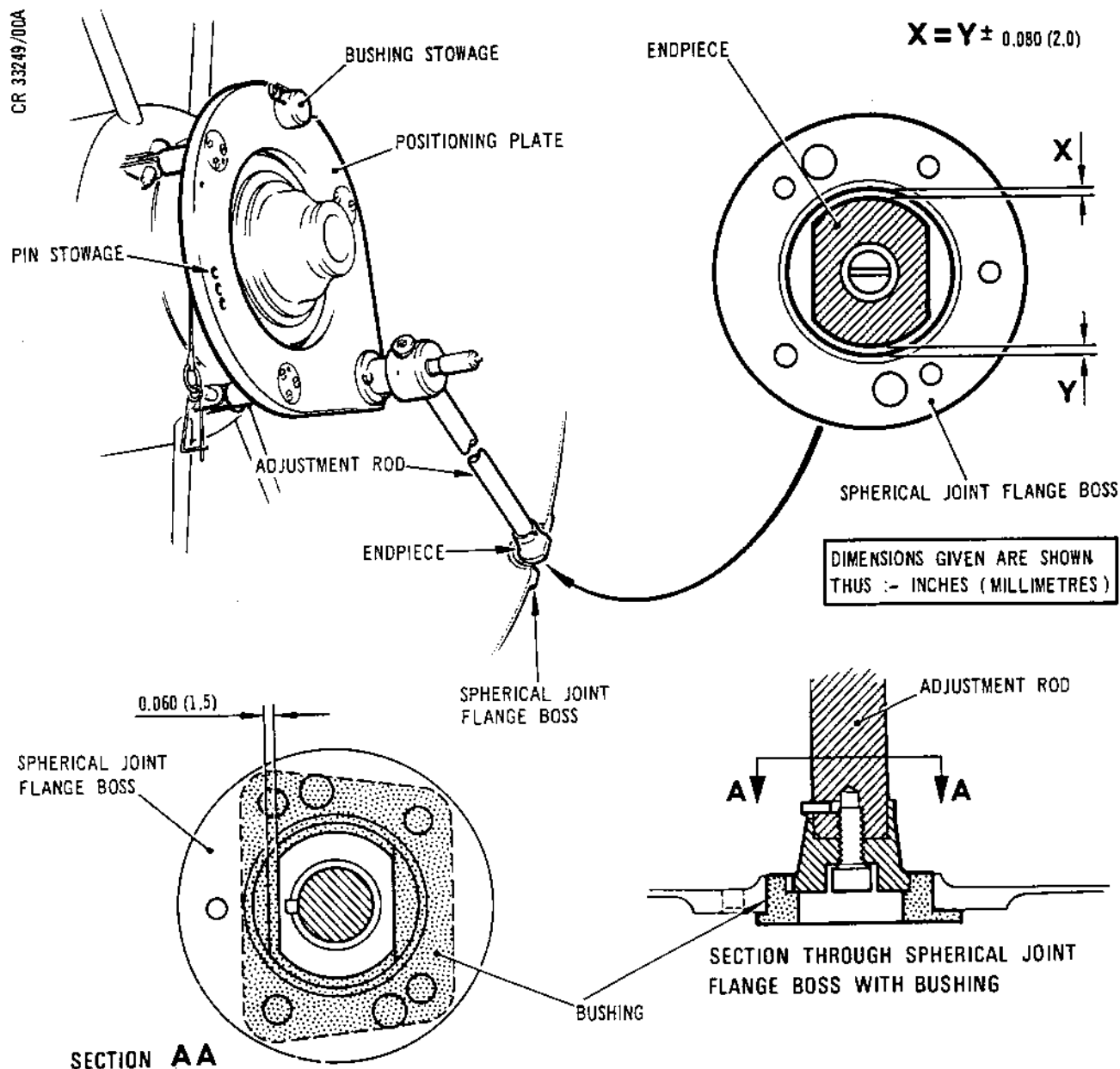


Jet Pipe Thermocouple Harness Positioning and Installation  
Figure 506 (Sheet 1 of 2)

ASSEMBLY  
71-00-01  
STAGE 6  
Page 521  
Dec 30/98



**OLYMPUS 593**  
MK. 610-14-28  
OVERHAUL



TN4070

Jet Pipe Thermocouple Harness Positioning and Installation  
Figure 506 (Sheet 2 of 2)

ASSEMBLY  
**71-00-01**  
STAGE 6  
Page 522  
Jan 2/80



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (b) Secure the plate and rod assembly to the mounts on the thermocouple harness with three pins.
- (c) Extend the adjusting rod until the end piece enters the spherical joint flange boss. Secure the rod with the pin inserted at the rods support housing on the plate.
- (d) Check that the end piece is central in the spherical joint flange boss as shown.
- (e) If necessary move the thermocouple harness on its bolts to centralize the end piece in the boss aperture.
- (f) Hold the thermocouple harness in the required position and torque-tighten the retaining bolts or nuts to 135 lbf in. (15,2 N.m). Locking (Run-down) torque 3.5 lbf in. (0,4 N.m).
- (g) Check the end piece position with the bushing.

NOTE: The bushing has two flats one of which is over dimensioned by 0.06 in. (1,5 mm).

- (i) Align the two bushing flats with those of the end piece and insert the bushing, without force or strain, in the spherical joint flange boss. One bushing flat will contact one of the end piece flats while the other flats must have  $0.06 \pm 0.02$  in. ( $1,5 \pm 0,5$  mm) clearance between them.
- (ii) If the bushing cannot easily be inserted in this position, turn the bushing 180 deg and ensure the dimensions required in (i) are obtained.
- (h) Withdraw the bushing.
- (j) Retract the adjustment rod to allow for the removal of the positioning plate.

ASSEMBLY

71-00-01

STAGE 6

Page 523

Dec 31/01



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (k) Pull out the three pins and remove the positioning plate.
  - (l) Stow the bushing and pins at their respective locations on the positioning plate.
  - (7) Assemble gasket and outer saddle piece (77-21-02/1-110 and 1-29) over junction box, then assemble thermocouple lead connectors over junction box terminals.
  - (8) Temporarily secure lead terminal block to junction box with two bolts and plain washers (77-21-02/1-24 and 1-25).
  - (9) Insert six bolts (77-21-02/1-40) from the outside surface of the diffuser and secure junction box with nuts (77-21-02/1-30) torque-tightened evenly to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (10) Ensure attachment items are dry and free from lubricant. Assemble a thin washer, lockwasher and nut (77-21-02/1-70, 1-60 and 1-50) to each terminal and torque-tighten nuts to between 30 and 35 lbf in. (3,4 and 4 N.m). Assemble locknut (77-21-02/1-50) to each terminal and torque-tighten to between 30 and 35 lbf in. (3,4 and 4 N.m).
  - (11) Torque-tighten bolts securing thermocouple lead terminal block to junction box to between 67 and 73 lbf in. (7,6 and 8,2 N.m). Wire-lock bolts together.
  - (12) Assemble cover (77-21-02/1-28) to junction box, apply lubricant B and secure cover with two bolts and keywashers (77-21-02/1-26 and 1-27). Torque-tighten bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m) and lock with the keywashers.
6. Install the Reheat Injection System (Ref. Item 89, Fig.501 of Stage 1)
- A. Prepare to Install Injection System.
- (1) Ensure that the jet pipe thermocouple was positioned during its installation (Ref.para.5).



OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 35420/00A

FLEXIBLE POURING PIPE

REHEAT SPRAY RING

REHEAT SYSTEM

PREHEATING  
BOX

REST STAND

Positioning the Reheat System on the Rest Stand  
Figure 507

ASSEMBLY

71-00-01

STAGE 6

Page 525

Jan 2/80



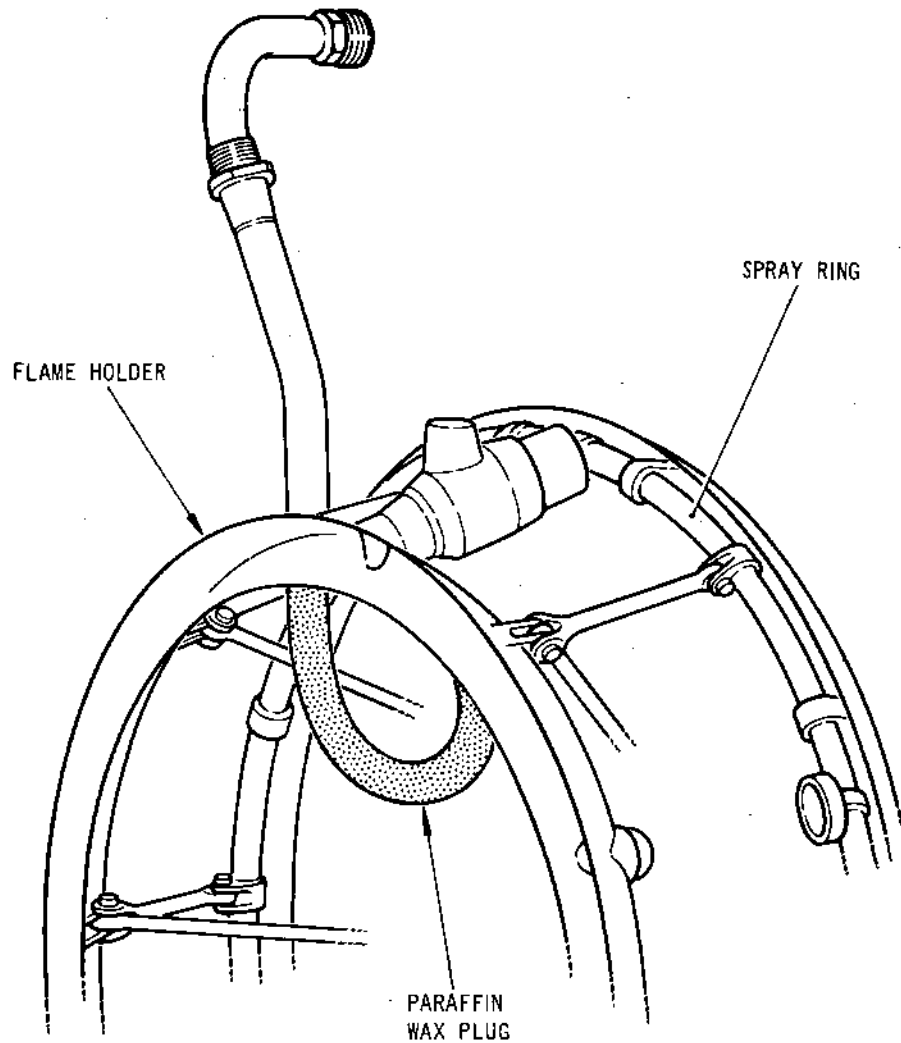
OLYMPUS 593

MK. 610-14-28

OVERHAUL



CR 33251/00D



IN36795

Spray Ring Pipe Elbow - Wax Plug Installation  
Figure 508

ASSEMBLY

71-00-01

STAGE 6

Page 526

Jan 2/80





OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

- (2) Install a paraffin wax plug in spray ring pipe elbow if not already plugged (Ref.Fig.507 and 508). A new unit should be supplied already plugged but an overhauled unit would require a plug to be installed.
- (a) Clean the spray ring pipe elbow by introducing a small quantity of a group 1 or 3 solvent (71-09-00 Standard Practices - Assembly) (about 0,30 litre) shake, drain the pipe and dry it using a compressed air supply.
  - (b) Remove holding flange from reheat injection system and position the spray ring on the rest stand as shown.
  - (c) Fill the preheating box with boiling water, to warm up the spray ring pipe elbow.

CAUTION: REJECT WAX IF TEMPERATURE RISES TO MORE THAN 150 DEG C. USE ELECTRIC HEATING DEVICE THAT ENABLES PROGRESSIVE INCREASE IN TEMPERATURE TO BE CONTROLLED.

- (d) Apply heat progressively to 120 grams of paraffin (Total Flexane 3H) wax until it is at an even temperature of between 120 and 130 deg C. Stir wax during the heating phase and ensure that the required temperature is not exceeded.
- (e) Introduce a flexible pouring pipe in the spray ring, pour the melted paraffin wax into the pipe then remove the pouring pipe.
- (f) Withdraw the preheating box from the spray ring bend by driving down the box support. Leave the spray ring in position on the rest stand to cool for at least one hour.
- (g) Carry out a pressure test with compressed air at 6 bar (87 psig) for one minute and check the plug sealing.



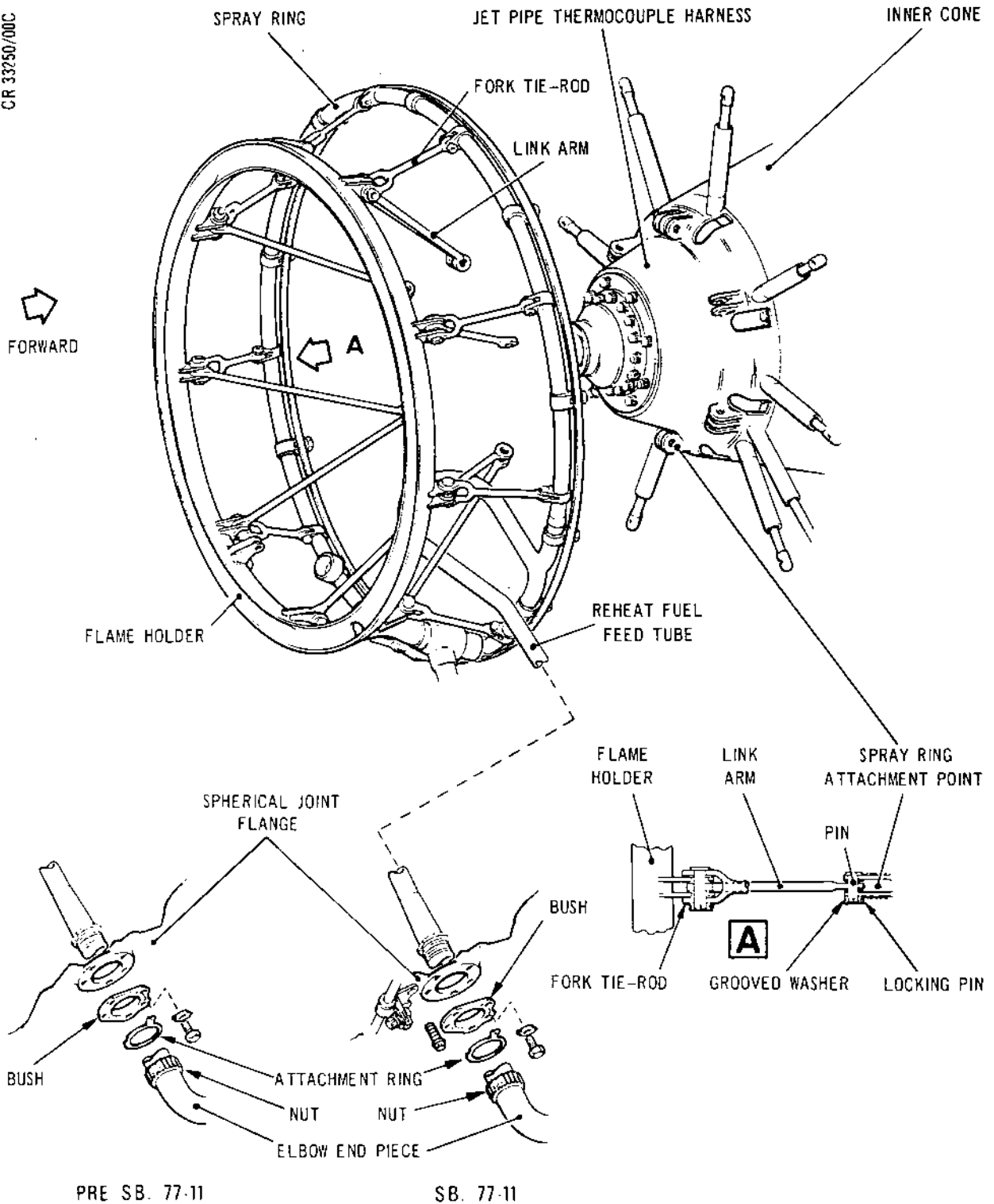
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 33250/00C



Reheat Injection System  
Figure 509

ASSEMBLY  
**71-00-01**  
STAGE 6  
Page 528  
Jan 2/80



(h) Remove spray ring from rest stand.

- (3) Apply lubricant S to the bolts, nuts and pins and lubricant A to the fuel tube and spray ring unions.

B. Install Injection System (Ref.Fig.509).

- (1) If installed, release wingnuts securing holding flange clamp to injector system flame holder and remove holding flange from reheat injection system.
- (2) Locate injection system on thermocouple harness, placing bush, attachment ring and serrated nut (73-12-16/1-120-110-100) in position on elbow end piece as it is progressively inserted through the spherical joint flange, and retain on jet pipe thermocouple with six pins (73-12-06/1-40 and 1-70) inserted through mounts.
- (3) Check that the spray ring end piece does not contact any point of the spherical joint flange boss. If there is contact, centralize the thermocouple harness as detailed in paragraph 5.
- (4) Assemble grooved washers (73-12-06/1-30 and 1-60) to pins at jet pipe thermocouple mounts, lock each pin with a locking pin (73-12-06/1-20-50), bend locking pin leg around washer groove.
- (5) Assemble bush to spray ring.
  - (a) On engines to pre S.B.77-10 and 77-11 standard, position bush on spherical joint flange and retain with five keywashers and bolts (73-12-06/1-90-80) lightly tightened.
  - (b) On engines to S.B.77-10 and 77-11 standard, position bush on spherical joint flange and align pitot tube support bracket and clamp assembly (77-12-03/1-14-8-9). Retain bush and bracket with two bi-hexagon bolts (77-12-03/1-13) at bracket attachment location and hexagon bolts with keywashers (73-12-06/1-80-90) at remaining positions.



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (c) Torque-tighten bolts to between 120 and 130 lbf in. (13,6 and 14,7 N.m). Tighten bolts progressively in sequence to evenly dispose the load over the joint surface.
- (d) On engines to pre S.B.77-10 and 77-11 standard, lock bolts with keywashers.
- (e) On engines to S.B.77-10 and 77-11 standard, lock hexagon bolts with keywashers. Wire-lock bi-hexagon bolts together. Torque-tighten clamp assembly bolt to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (6) Secure spray ring elbow end piece to spherical joint flange.
  - (a) Position attachment ring on bush (73-12-06/1-110-120) and ensure that plate is located on bush dowel.
  - (b) Apply lubricant S to serrated nut threads and screw nut onto threads of elbow end piece.
  - (c) Torque-tighten nut to between 510 and 550 lbf in. (57 and 63 N.m).
- (7) Check that the spray ring moves freely.
- (8) Check that the clearance between the spray ring curved feed tube and the nearest pair of link rods is not less than 0.118 in. (3 mm).
- (9) Lock the serrated nut to attachment ring with wire.
- (10) Remove blanking plugs from spray ring elbow end piece and the reheat fuel supply tube.
- (11) Connect the reheat fuel supply tube (73-13-03/2-240) to the reheat spray ring.
  - (a) Screw tube union nut to spray ring elbow connection by hand until the visible part of the thread is less than 0.10 in. (2,5 mm).

JN4058



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (b) Restrain elbow end piece with spanner, torque-tighten slotted union nut between 780 and 840 lbf in. (88 and 95 N.m) (Tools 1658, 948 and 1529).
- (c) Lock nut with wire.
- (d) Paint a continuous line with heat resistant paint on the elbow end piece, slotted union nut and reheat fuel supply pipe.

NOTE: The line must be positioned to be visible from the underside of an engine when installed.

## 7. Fuel System Pressure Test

### A. General.

Engines are pressure tested using a test rig. A final pressure check of the connections is carried out using the test cell fuel feed pumps.

A low pressure test must precede both the medium and high pressure tests.

For convenience the fuel system is considered in three sections (Ref.Fig.510):

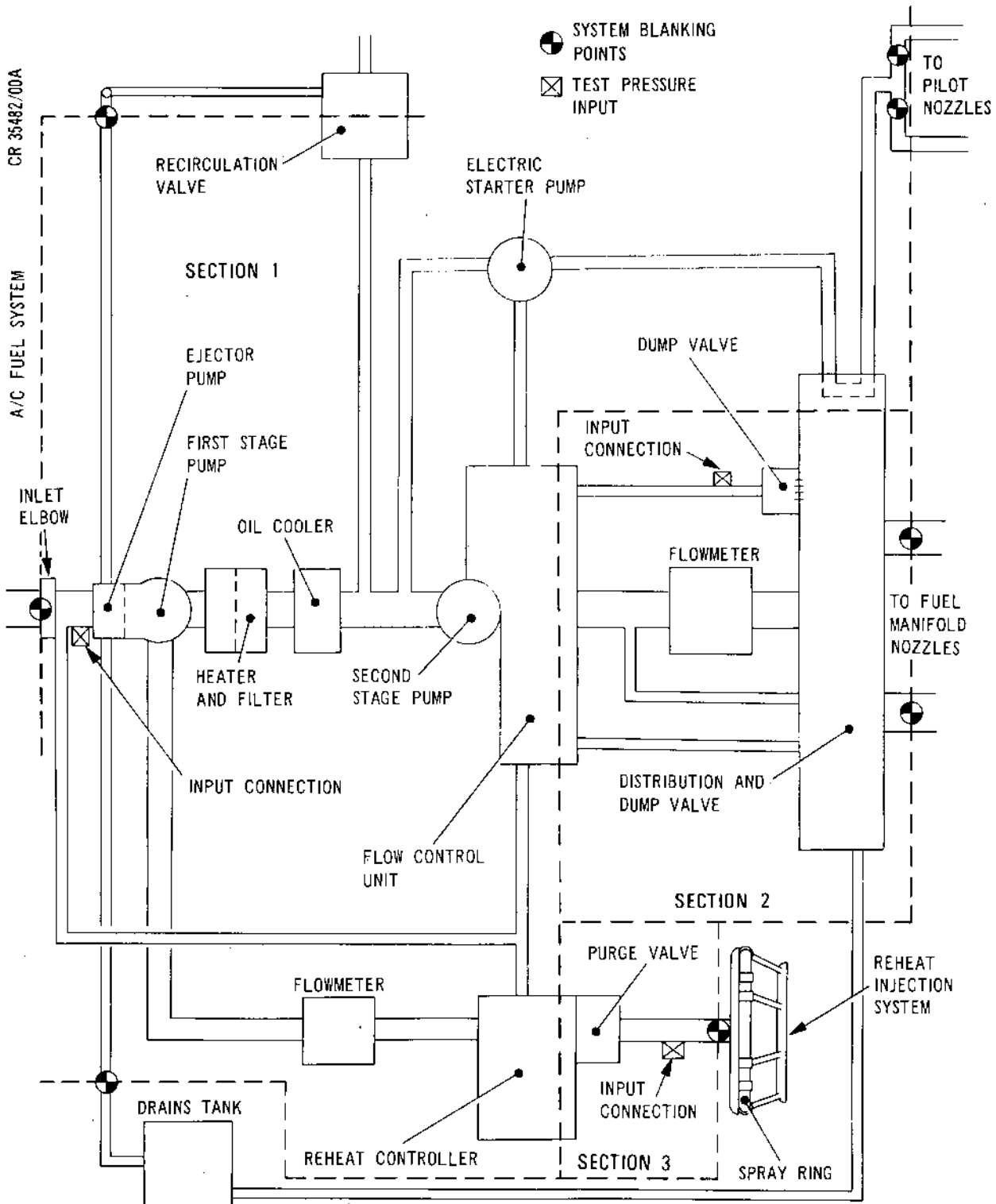
- (1) Upstream of the FCU and reheat controller shut-off valves, can be tested separately.
- (2) Upstream of the reheat controller shut-off valve and distribution and dump valve.

NOTE: Section 1 must be pressurized for a test of Section 2 and can be checked at the same time as this applied pressure is effective downstream of the fuel inlet elbow blank and recirculation valve.

- (3) Downstream of the reheat controller to spray ring elbow, can be tested separately.



OLYMPIUS 5193  
MK.610-14-28  
OVERHAUL



Fuel Pressure Test  
Schematic Arrangements of Sections and Components  
Figure 510

TN43175

ASSEMBLY  
**71-00-01**  
STAGE 6  
Page 532  
Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



B. Tools, Equipment and Approved Materials Required.

(1) Tools and equipment.

Description	Ref. No.
Pressure test and inhibiting rig (PTIR) ...	3100
Adapter (Engine No.1 or 3) ... ..	3101
Adapter (Engine No.2 or 4) ... ..	3102
Adapter (Pre S.B. OL.593-73-1 drain valve) ... ..	3103
Adapter (S.B. OL.593-73-1 drain valve) ...	3104
Blank, for purge valve air/fuel spill outlet tube connection... ..	3105
Blank ... ..	3106
Blank ... ..	3107
Blank, for pilot nozzle connection (2) ...	3108
Blanking plug ... ..	3116
Blank/bleed valve ... ..	3122
Clamp ... ..	3109
Drain adapter ... ..	3117
Drain adapter ... ..	3118
Drain adapter ... ..	3121
Drain adapter ... ..	3110

PRINTED IN ENGLAND

TN43177

ASSEMBLY  
**71-00-01**  
STAGE 6  
Page 533  
Jan 2/80



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



Description						Ref. No.
Drain adapter	...	...	...	...	...	3120
Drain adapter	...	...	...	...	...	3111
Drain adapter (use in conjunction with Tool 3108)	...	...	...	...	...	3119
Hose	...	...	...	...	...	3112
Hose	...	...	...	...	...	3113
Air bleed tube	...	...	...	...	...	3000
Drain tube (Pre S.B. OL.593-73-1 drain valve)	...	...	...	...	...	3001
Drain tube (S.B. OL.593-73-1 drain valve)	...	...	...	...	...	3114
Drain tube...	...	...	...	...	...	3115

(2) Approved materials.

Test fluid

Aviation kerosine ... D.Eng. R.D.2494

or

Inhibiting fluid ... DEF.2001A or  
D.Eng. R.D.2490

Wax for reheat spray  
ring plug ... Total Flexane 3H  
paraffin wax

TN43178

ASSEMBLY  
**71-00-01**  
STAGE 6  
Page 534  
Jan 2/80





OLYMPUS 593

MK.610-14-28

OVERHAUL



C. Prepare for Test.

- (1) Verify that the reheat fuel spray ring elbow is blanked with a wax plug (Ref. Para.6).

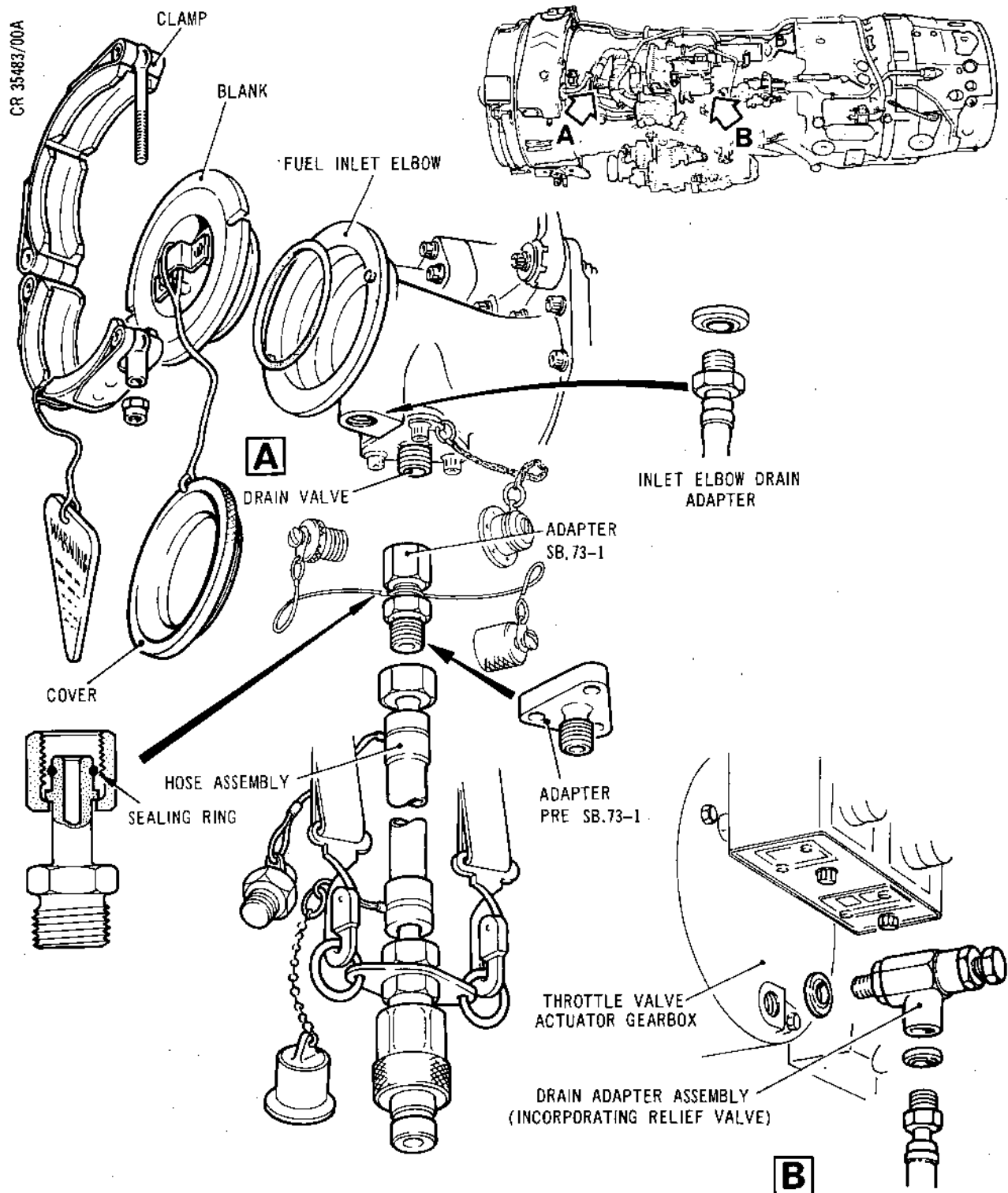
D. Install Test Equipment (Ref.511, Sheet 1 and 2).

CAUTION: ENSURE TEST EQUIPMENT IS CLEAN AND SERVICEABLE BEFORE INSTALLING ON ENGINE.

- (1) Install pressure test blank and clamp (Tool 3106 and 3109) in the fuel inlet elbow (Ref.Fig.511, detail A).
  - (a) Remove the protective blank from the inlet elbow.
  - (b) Detach protective cover, ensure blank unit sealing ring is serviceable and press unit into fuel inlet elbow bore.
  - (c) Position clamp over blank and elbow flanges and tighten securely.
- (2) Assemble hose and adapter (Tool 3113 and 3103 or 3104) to fuel inlet elbow drain valve location (Ref. Fig.511, detail A).
  - (a) Pre S.B.73-1 drain valve - install adapter (Tool 3103).
    - (i) Remove attachment bolts and detach drain valve.
    - (ii) Insert a serviceable seal plate and secure adapter to elbow at valve location with three bolts torque-tightened to between 67 and 73 lbf in. (7,6 and 8,2 N.m) with lubricant B applied.



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



Installation of Test Equipment in Section 1  
Figure 511 (Sheet 1 of 2)

ASSEMBLY  
**71-00-01**  
STAGE 6  
Page 536  
Jan 2/80

TN43180



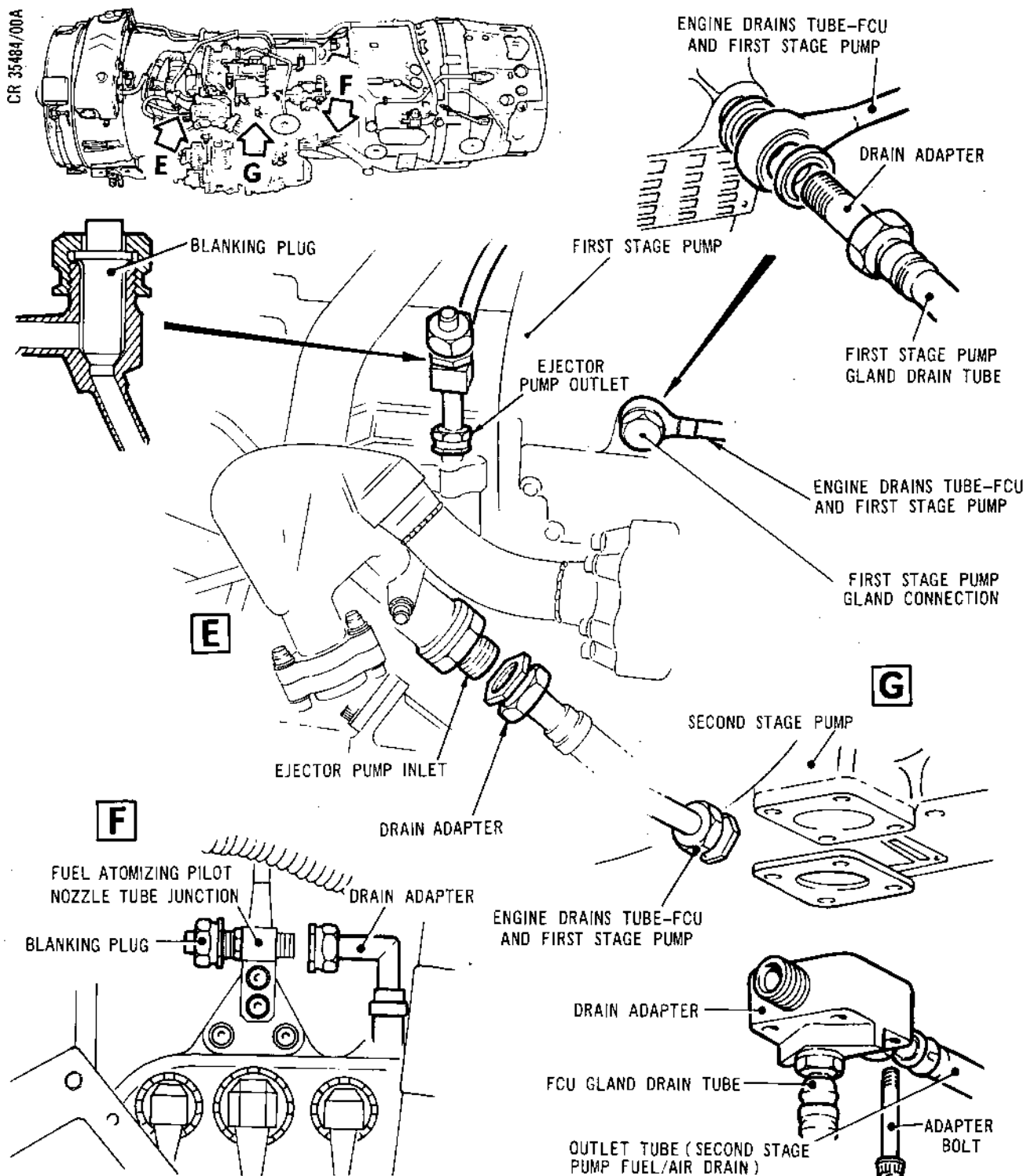
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 35484/00A



Installation of Test Equipment in Section 1  
Figure 511 (Sheet 2 of 2)

ASSEMBLY  
**71-00-01**  
STAGE 6  
Page 537  
Jan 2/80

PRINTED IN ENGLAND

TN43181



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) S.B.73-1 drain valve - install adapter (Tool 3104).
  - (i) Screw adapter securely into drain valve. This action opens the valve.
- (c) Connect hose (Tool 3113) to installed adapter, tighten securely and support hose with strap.
- (3) Install the drain adapter and blanking plug (Tool 3117 and 3116) in return fuel tube, drains tank to first stage pump/recirculation valve at inlet and outlet to ejector pump/first stage pump (Ref.Fig.511, detail E).
  - (a) Disconnect fuel tube from ejector pump inlet and assemble drain adapter to pump connection. Tighten adapter union nut.
  - (b) Remove blanking ferrule from return tube test connection, insert blanking plug and retain with connection union nut firmly tightened.
- (4) Install the throttle valve actuator gearbox spill/drain adapter (Tool 3110) in the actuator casing (Ref.Fig.511, detail B). During this operation, keep fluid loss to a minimum so that the actuator remains primed.
  - (a) Remove drain plug from actuator gearbox rear face.
  - (b) Remove drain tube from adapter, install adapter with seal washer and tighten firmly.
  - (c) Assemble drain tube to adapter with seal washer interposed.
- (5) Assemble drain adapter (Tool 3118) to fuel inlet elbow drain connection (Ref.Fig.511, detail A).
  - (a) On engines to Pre S.B. OL.593-71-10 standard, remove seal failure drains system fluid passage pillar bolt and detach connector complete with drain tubes.

TN43182

ASSEMBLY

**71-00-01**

STAGE 6

Page 538

Jan 2/80



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (b) On engines to S.B. OL.593-71-10 standard, detach seal failure drains tube from fluid passage bolt, remove the bolt and detach connector complete with drain tube.
- (c) Assemble a serviceable seal washer to the adapter and install it in the drain outlet connection.
- (6) Install one of the fuel atomizing pilot nozzle tube blanks (Tool 3108) and the drain adapter (Tool 3119) ready for the low pressure test (Ref.Fig.511, detail F).
- (a) Detach the two fuel atomizing pilot nozzle tubes from the junction of the tube from distribution block/dump valve.
- (b) Detach clamp assembly securing left-hand tube to support bracket to give clearance when installing adapter.
- (c) Screw blank and drain adapter on the tube junction connections and torque-tighten to between 190 and 210 lbf in. (21,5 and 23,7 N.m) with lubricant A applied.
- (7) Install the drain adapter (Tool 3111) in the first stage pump gland drain connection (Ref.Fig.511, detail E).
- (a) Remove fluid passage bolt from drain connector.
- (b) Assemble a serviceable seal washer to each side of connector and secure to pump with adapter torque-tightened between 210 and 230 lbf in. (23,7 and 26 N.m) with lubricant applied.

NOTE: Adapter isolates first stage pump gland drain from engine drains tube and provides test drain tube.

ASSEMBLY

71-00-01

STAGE 6

Page 539

Jan 2/80



OLYMPUS 593

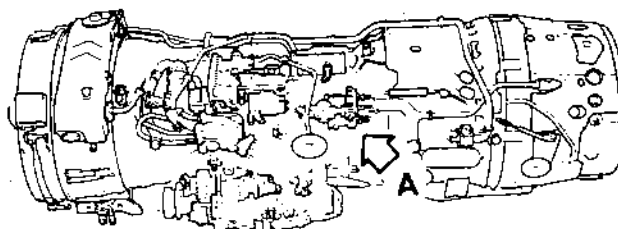
MK.610-14-28

OVERHAUL



CR 35485/00A

COOLING FUEL TUBE



SERVO FUEL TUBE

HOSE ASSEMBLY

DISTRIBUTION  
BLOCK

BLANK

BLANK/BLEED  
VALVE

A

DISTRIBUTION AND  
DUMP VALVE

FUEL DUMP  
OUTLET

FLAT SEAL

SEALING RING

DRAIN ADAPTER

QUICK SHUT DOWN  
(EMERGENCY DUMP)  
VALVE DRAIN TUBE

NORMAL DUMP DRAIN TUBE

Installation of Test Equipment in Section 2  
Figure 512

ASSEMBLY

71-00-01

STAGE 6

Page 540

Jan 2/80

IN43184



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (8) Install the drain adapter (Tool 3120) on the second stage pump (fuel/air) drain outlet (Ref.Fig.511, detail G).
- (a) Unscrew union nuts and disconnect the two drain tubes from the flanged elbow.
  - (b) Remove bolts and detach flanged elbow.
  - (c) With a serviceable seal plate (71-73-03/1-90) between faces, secure drain adapter to pump with four bolts torque-tightened between 67 73 lbf in. (7,6 and 8,2 N.m) with lubricant B applied.
  - (d) Connect first stage pump and FCU gland drain tube to union connection on drain adapter and tighten union nut firmly.

NOTE: Adapter changes common drains passage of flanged elbow to two separate drain outlets to test drain tubes.

- (9) Connect hose (Tool 3112) to connection on servo fuel tube near connection to distribution and dump valve (Ref.Fig.512).
- (a) Remove blanking ferrule from tube flange.
  - (b) Engage hook of hose support as shown and adjust the strap so that the hose is supported clear of engine installations.
  - (c) Attach hose adapter to connection and torque-tighten union nut between 190 and 210 lbf in. (21,5 and 23,5 N.m) with lubricant applied.
- (10) Install blanking unit and blanking/bleed valve (Tool 3107 and 3122) in the fuel outlet connections of distribution and dump valve (Ref.Fig.512).
- (a) Remove both manifold fuel tube connection blanking ferrules.

PRINTED IN ENGLAND

TN20401

ASSEMBLY

71-00-01

STAGE 6

Page 541

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Install blanking units in place of the ferrules.
  - (c) Secure each unit in position torque-tightened between 600 and 660 lbf in. (68 and 74 N.m) with lubricant A applied.
- (11) Install drain adapter (Tool 3121) in distribution and dump valve dump outlet (Ref.Fig.512).
- (a) Remove nut, bolt and flat washer securing tube clamp assembly and electrical lead clamp to support bracket at diffuser case flange.
  - (b) Remove bolts securing tube flange at distribution and dump valve and detach bracket.
  - (c) Support tube and unscrew tube union nut at drains tank.
  - (d) Detach tube end connections and move drain tube to obtain access.
  - (e) Ensure the sealing ring and flat seal are serviceable, assemble adapter to the dump outlet location and secure with three bolts torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m) with lubricant A applied.
- (12) Detach purge air tube from purge solenoid valve outlet connection and assemble adapter (Tool 3101) in tube end (Ref.Fig.513, detail C).
- (a) Disconnect tube from the purge solenoid valve outlet connection.
  - (b) Attach adapter to tube end and torque-tighten union nut to between 190 and 210 lbf in. (21,5 and 23,7 N.m) with lubricant A applied.

TN19182

ASSEMBLY

71-00-01

STAGE 6

Page 542

Jan 2/80

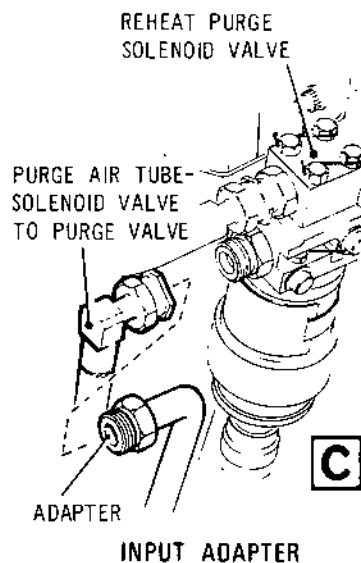
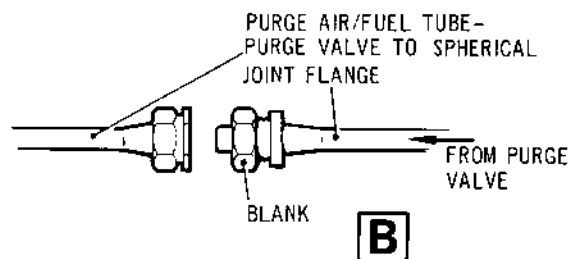
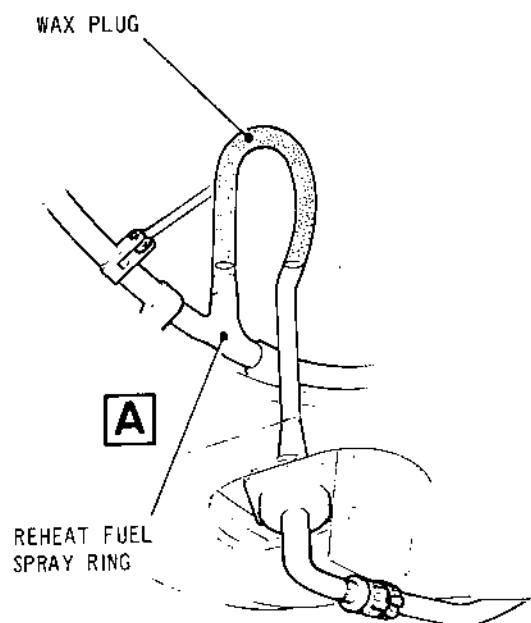
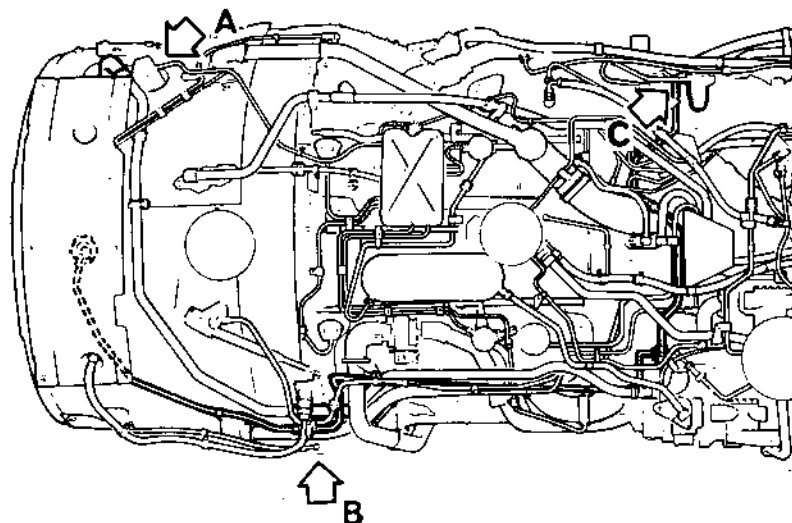


CR 35481/00A



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Installation of Test Equipment in Section 3 (Reheat System)  
Figure 513



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (13) Assemble blank in purge air/fuel tube connector between reheat purge valve and spherical joint flange (Ref.Fig.513, detail B).
  - (a) Disconnect the purge air/fuel tube sections at the junction between reheat purge valve and spherical joint flange.
  - (b) Install blank in end of tube section connected to purge valve and torque-tighten to between 190 and 210 lbf in. (21,5 and 23,7 N.m) with lubricant A applied.
- (14) Disconnection of the seal failure drains system tubes at the following positions will provide a more precise check for leaks (Ref.Fig.514).
  - (a) Reheat fuel filter drain outlet connection.
  - (b) The two flexible tubes at connector at reheat flowmeter bracket.
  - (c) Aircraft drain tube connection.
- (15) Direct free ends of tubes into a container.

E. Pressure Test Procedure, Full System.

- (1) Comply with the following general procedure for a pressure test.
  - (a) Prepare and use the PTIR for the test sequence to be employed in accordance with its general procedure and safety precautions.
  - (b) Couple the two self-sealing hoses of the test rig to the installed test adapter hoses at the inlet elbow and the servo fuel tube.
  - (c) Connect third test rig delivery hose to the test adapter at the purge air tube and tighten the union nut.

TN43186



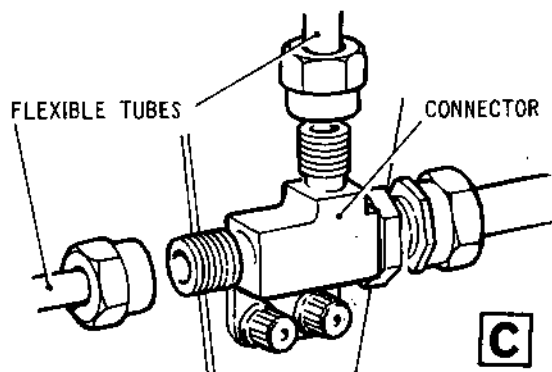
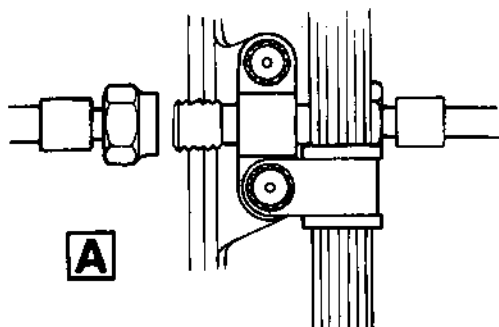
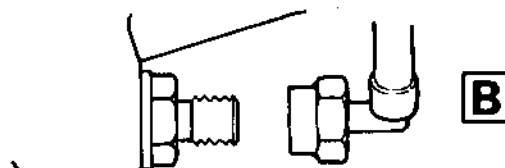
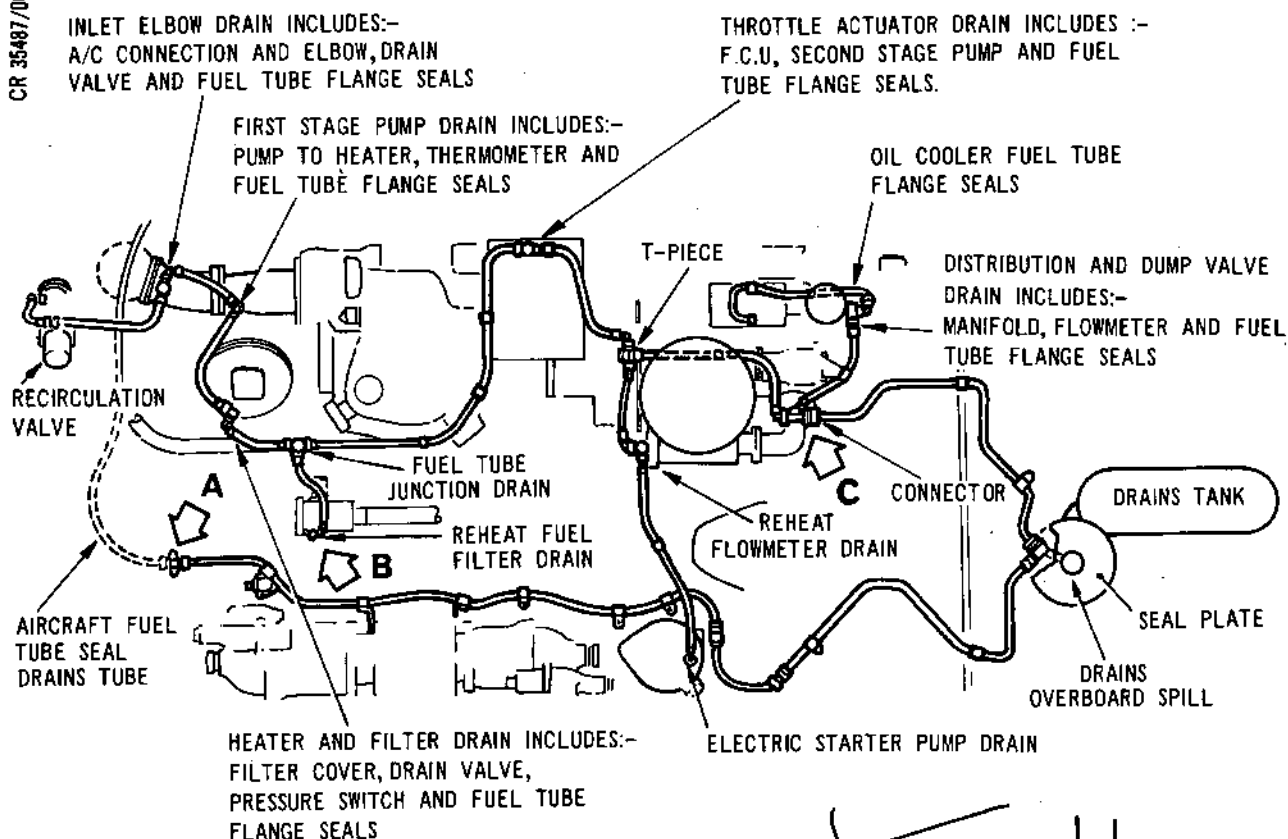
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 35487/00A

PRINTED IN ENGLAND



Seal Failure Drains System Connections  
Figure 514

ASSEMBLY  
71-00-01  
STAGE 6  
Page 545  
Jan 2/80

TN43185



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (d) Verify that the weight of each hose is supported and that all connections are secure before commencing test procedure.
  - (e) Apply pressure slowly and progressively during the test procedure and maintain constant observation for signs of fuel leaks from test equipment or engine fuel system. Should a leak develop, reduce the pressure to zero and stop the pump motor, rectify the fault and re-commence the test procedure.
- (2) Bleed all air from the system and continue with the low pressure test (Ref. para. (3)).
- (a) Operate the test rig and apply a pressure of 30 psig (207 kPa).
  - (b) Section 1 - Open the air bleed valve and bleed until an air free fuel flow is obtained and then close the valve. Allow a short settling period and repeat the bleed process to ensure that the second stage pump region is air free and again close the valve.
  - (c) Section 2 - open bleed valve of manifold blank/ bleed valve and allow to bleed until an air free flow is again obtained and then close bleed valve.
- (3) Carry out the low pressure test of all sections.
- (a) With 30 psig (207 kPa) pressure applied, check leakage rates from the pilot sprayer system, via pilot sprayer fuel tube, and from the ejector pump inlet. Measure leakage from drain adapters. The maximum acceptable leakage rates are as follows:
    - (i) Pilot sprayer tube ... 5 cc/h
    - (ii) Ejector pump inlet ... 1 cc/min

IN43187

ASSEMBLY

71-00-01

STAGE 6

Page 546

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(b) Continue to apply pressure at 30 psig (207 kPa) and complete the low pressure test. Check drains for indication of seal leakage and ensure that the following conditions are met before commencing the high pressure test.

(i) Gland seal leakage should be minimal. Compare with high pressure test limits as a guide (Ref. para. (5) (d)).

(ii) No leakage from the primary static seals is acceptable. If a leak shows from the seal failure drains system, carry out progressive disconnections of drains system and find defective seal(s) by a process of elimination and reference to the relevant component chapter.

NOTE: A leak from the fuel inlet elbow drain could be indicative of a defective seal in the inlet elbow blank.

(iii) There should be no spill from the throttle actuator gearbox rear face drain adapter since the relief valve setting of the adapter is higher than the applied pressure.

(iv) Check system from reheat controller to spray ring. No leakage is acceptable.

(c) Blank pilot sprayer fuel tube for further pressure test.

(i) Remove drain adapter and install blanking unit torque-tightened between 190 and 210 lbf in. (21,5 and 23,5 N.m) with lubricant A applied.

(4) Carry out a medium pressure test of the reheat system.

(a) Operate the test rig and increase the test pressure to 170 psig (1172 kPa).

ASSEMBLY

71-00-01

STAGE 6

Page 547

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Apply pressure for at least five minute and carry out a general external visual examination of the system while continuing to apply pressure. No leaks are acceptable.
  - (c) Reduce test pressure to zero.
  - (d) On satisfactory completion of reheat system test, disconnect test rig supply hose from adapter and test rig manifold coupling. Ensure that test rig coupling seals off the rig delivery.
- (5) When test rig is disconnected from the reheat system, Section 3, continue with a high pressure test of the engine system.
- (a) Operate the test rig and increase the test pressure to 600 psig (4137 kPa).
  - (b) Apply pressure for at least five minutes and carry out a general external visual examination of the system while continuing to apply pressure. No leaks are acceptable.
  - (c) Continue to apply pressure and check component seal failure drain connections for signs of leaks. No leaks are acceptable. If a leak is disclosed, carry out progressive disconnections and find defective seal(s) by a process of elimination and reference to the relevant component chapter.

NOTE: A seal drains connection at a component may be interconnected internally to more than one seal.

TN43311



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (d) Maintain the pressure long enough to measure accurately leakage from the installed drain adapters. Use a graduated measuring jar and stop watch. The acceptable limits are as follows:
- |       |   |     |     |            |
|-------|---|-----|-----|------------|
| (i)   | First stage pump  | ... | ... | 10 cc/min  |
| (ii)  | Second stage pump<br>(fuel/air drain)                         | ... | ... | 10 cc/min  |
| (iii) | FCU gland drain   | ... | ... | 10 cc/min  |
| (iv)  | Throttle valve spill (actuator<br>gearbox rear face drain) .. |     |     | 100 cc/min |
| (v)   | Quick shut-down (emergency<br>dump) valve...                  | ... | ... | 20 cc/min  |
| (vi)  | Manifold (normal) dump<br>valve...                            | ... | ... | 10 cc/min  |
| (vii) | Ejector pump inlet  | ... | ... | 10 cc/min  |
- (e) Reduce test pressure to zero and stop pump motor.
- (6) On completion of a satisfactory pressure test, drain the fuel system using the test rig facilities and then uncouple the delivery hoses. Open the bleed valves to expedite draining.

CAUTION: ENSURE THAT AIR BLEED TUBE IS NOT  
INSTALLED. FOREIGN PARTICLES COULD  
BE DRAWN INTO ENGINE FUEL SYSTEM.

- (7) Inhibit the engine at this stage if required.

F. Remove Test Equipment and Install/Connect Engine Components.

- (1) Remove inlet connection blank and clamp ring. Assemble the transit blank to the inlet connection aperture (Ref.Fig.511, detail A).

ASSEMBLY

71-00-01

STAGE 6

Page 549

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Remove hose and adapter and install drain valve (Ref.Fig.511, detail A).
  - (a) Unscrew union nut and disconnect hose from adapter at inlet elbow drain valve position, release support strap and remove hose from engine.
  - (b) Pre S.B. OL.593-73-1 drain valve - remove adapter and install drain valve.
    - (i) Remove bolts and take off adapter and seal plate.
    - (ii) Apply lubricant B to drain valve attachment bolts.
    - (iii) Assemble drain valve and serviceable seal plate (Ref.70-00-03, Sealing Devices) to inlet elbow location and retain in position with three bolts. Secure wire-locking washer, attached to pressure cap chain with outer bolt.
    - (iv) Torque-tighten the three bolts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (c) S.B. OL.593-73-1 drain valve - remove adapter.
    - (i) Unscrew union nut and remove adapter from valve.
- (3) Remove adapter and plug, connect tube and install the blanking ferrule at ejector pump (Ref.Fig.511, detail E).
  - (a) Remove plug and assemble blanking ferrule and union nut to connection on return fuel tube and torque-tighten between 220 and 240 lbf in. (25 and 27 N.m) with lubricant A applied.
  - (b) Remove adapter and connect fuel tube to ejector pump inlet and torque-tighten union nut between 220 and 240 lbf in. (25 and 27 N.m) with lubricant A applied.
  - (c) Wire-lock both union nuts.

TN18584

ASSEMBLY

**71-00-01**

STAGE 6

Page 550

Jan 2/80





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Remove adapter (Ref.Fig.511, detail B) and install the blanking plug with a new seal washer in the throttle actuator gearbox rear face location. Torque-tighten plug to  $47 \pm 3$  lbf in. ( $5,3 \pm 0,3$  N.m) and wire-lock it. During this operation, keep fluid loss to a minimum to keep actuator gearbox primed.
- (5) Remove blanks (Ref.Fig.511, detail F) and connect the pilot sprayer fuel tubes to the tube junction.
- (a) Remove blanks from fuel atomizing pilot nozzle tube junction.
  - (b) Apply lubricant A to tube union connections and lubricant B to clamp assembly bolt and nut.
  - (c) Screw tube union nuts to junction and torque-tighten to between 190 and 210 lbf in. (21,5 and 23,5 N.m).
  - (d) Secure clamp assembly to support bracket with bolt, flat washer and nut torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N,m).
  - (e) Wire-lock union nuts.
- (6) Remove the drain adapter from the fuel inlet elbow (Ref.Fig.511, detail A) and connect seal failure drains system.
- (a) Apply lubricant A to attachment items.
  - (b) Assemble a new seal washer to each side of the connector, secure in position with the fluid passage bolt and torque-tighten to between 150 and 170 lbf in. (17 and 19,2 N.m).
  - (c) On engines to S.B. OL.593-71-10 standard, connect seal drain tube to fluid passage bolt and triple torque-tighten thrust wire type union nut (Ref.70-00-04, Torque-tightening Technique) to between 90 and 100 lbf in. (10,2 and 11,5 N.m).
  - (d) Wire-lock bolt and union nuts.

ASSEMBLY

**71-00-01**

STAGE 6

Page 551

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (7) Remove the drain adapter at the first stage pump (Ref.Fig.511, detail E). Assemble a new seal washer to each side of drain tube connector and secure to pump with the fluid passage bolt torque-tightened between 210 and 230 lbf in. (24 and 26 N.m) with lubricant A applied. Wire-lock bolt.
- (8) Remove the drain adapter from the second stage pump, install flanged elbow and connect drain tubes (Ref. Fig.511, detail G).
  - (a) Apply lubricant to union nuts and bolts.
  - (b) With a new seal plate between mating faces, secure flanged elbow to pump with four bolts torque-tightened between 67 and 73 lbf in. (7,6 and 8,2 N.m).
  - (c) Secure tube to drains tank to flanged elbow connection with union nut torque-tightened between 600 and 660 lbf in. (68 and 74 N.m).
  - (d) Secure tube from first stage pump and FCU to flanged elbow with union nut torque-tightened between 190 and 210 lbf in. (21,5 and 23,5 N.m).
  - (e) Wire-lock union nuts.
- (9) Detach hose adapter (Ref.Fig.512) and install the blanking ferrule to connection on servo fuel tube near connection to distribution and dump valve.
  - (a) Assemble blanking ferrule to connection and torque-tighten union nut between 190 and 210 lbf in. (21,5 and 23,5 N.m) with lubricant applied.
  - (b) Wire-lock union nut.
- (10) Remove test blanking units and install flight standard blanking ferrules in tube connections (Ref.Fig.512).
  - (a) Assemble a blanking ferrule to each of the two tube connections at the distribution and dump valve and torque-tighten the union nuts between 600 and 660 lbf in. (68 and 74 N.m) with lubricant applied.

TN6364

ASSEMBLY  
**71-00-01**  
STAGE 6  
Page 552  
Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



(b) Wire-lock union nuts.

(11) Remove the drain adapter and connect the fuel dump drain tube (Ref.Fig.512).

(a) Remove drain adapter. Ensure that flat seal remains attached to adapter.

(b) Assemble a new sealing ring to the spigot groove of attachment flange.

(c) Apply lubricant A to tube flange bolts and union connection.

(d) Position the tube and engage the spigot squarely with dump outlet of distribution and dump valve and screw union nut on drains tank union hand-tight.

(e) Secure the flange, together with the support bracket, to the dump outlet with the three bolts lightly tightened. Locate the two longer bolts to retain bracket.

NOTE: If difficulty is experienced in assembling and securing flange to distribution and dump valve, refer to S.B. OL.593-71-8482-20.

(f) Secure tube clamp assembly and electrical lead clamp to bracket at diffuser case flange with bolt, flat washer and nut. Torque-tighten nut to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(g) Torque-tighten the tube flange retaining bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m) and union nut to between 310 and 340 lbf in. (35 and 38 N.m).

(h) Wire-lock union nut.

PRINTED IN ENGLAND

TN6365

ASSEMBLY

71-00-01

STAGE 6

Page 553

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (12) Connect the seal failure drains system tubes detached for leakage checks (Fig.514).
  - (a) Apply lubricant A to the union connections and connect the tubes at the reheat fuel filter drain and the two connections of the connector at the reheat flowmeter bracket.
  - (b) Triple torque-tighten thrust wire type union nuts (Ref.70-00-04) between 90 and 100 lbf in. (10,2 and 11,3 N.m).
  - (c) Wire-lock union nuts.
- (13) Remove adapter and connect purge air tube to purge solenoid valve outlet connection (Ref.Fig.513, detail C).
  - (a) Remove adapter from purge air outlet tube end.
  - (b) Connect purge air tube to the purge solenoid valve outlet connection and torque-tighten union nut to between 190 and 210 lbf in. (21,5 and 23,7 N.m) with lubricant A applied.
  - (c) Wire-lock union nut.
- (14) Remove blank and connect purge air/fuel tube to connector between reheat purge valve and spherical joint flange (Fig.Ref.513, detail B).
  - (a) Remove blank from purge air/fuel tube.
  - (b) Connect tube sections at the junction between reheat purge valve and spherical joint flange and torque-tighten union nut to between 190 and 210 lbf in. (21,5 and 23,7 N,m) with lubricant A applied.

FN8346



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(c) Wire-lock union nut.

NOTE: Wax plug in reheat injection system spray ring will be dispersed when engine is run.

- (15) Assemble pressure caps with new seals to the heater and filter unit and the fuel inlet elbow drain valves. Tighten and wire-lock the caps.
- (16) Close and torque-tighten the air bleed valve between 100 and 110 lbf in. (11,3 and 12,4 N.m). Remove bleed tube and blank, fit dust cap to valve and wire-lock.

8. Install Reheat Flame Detector (Item 90, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant S to the four flame detector attachment bolts (76-15-02/1-90 and 77-12-03/1-153) and lubricant B to remaining nuts and bolts.
- (2) Record the type and serial number of the detector on the accessories sheet.

B. Installation (Ref.Fig.515).

CAUTION: TAKE CARE NOT TO BEND REHEAT FLAME DETECTOR CONDUCTOR AT ANY TIME. BENDING COULD RESULT IN DETERIORATION OF CONDUCTOR INSULATION.

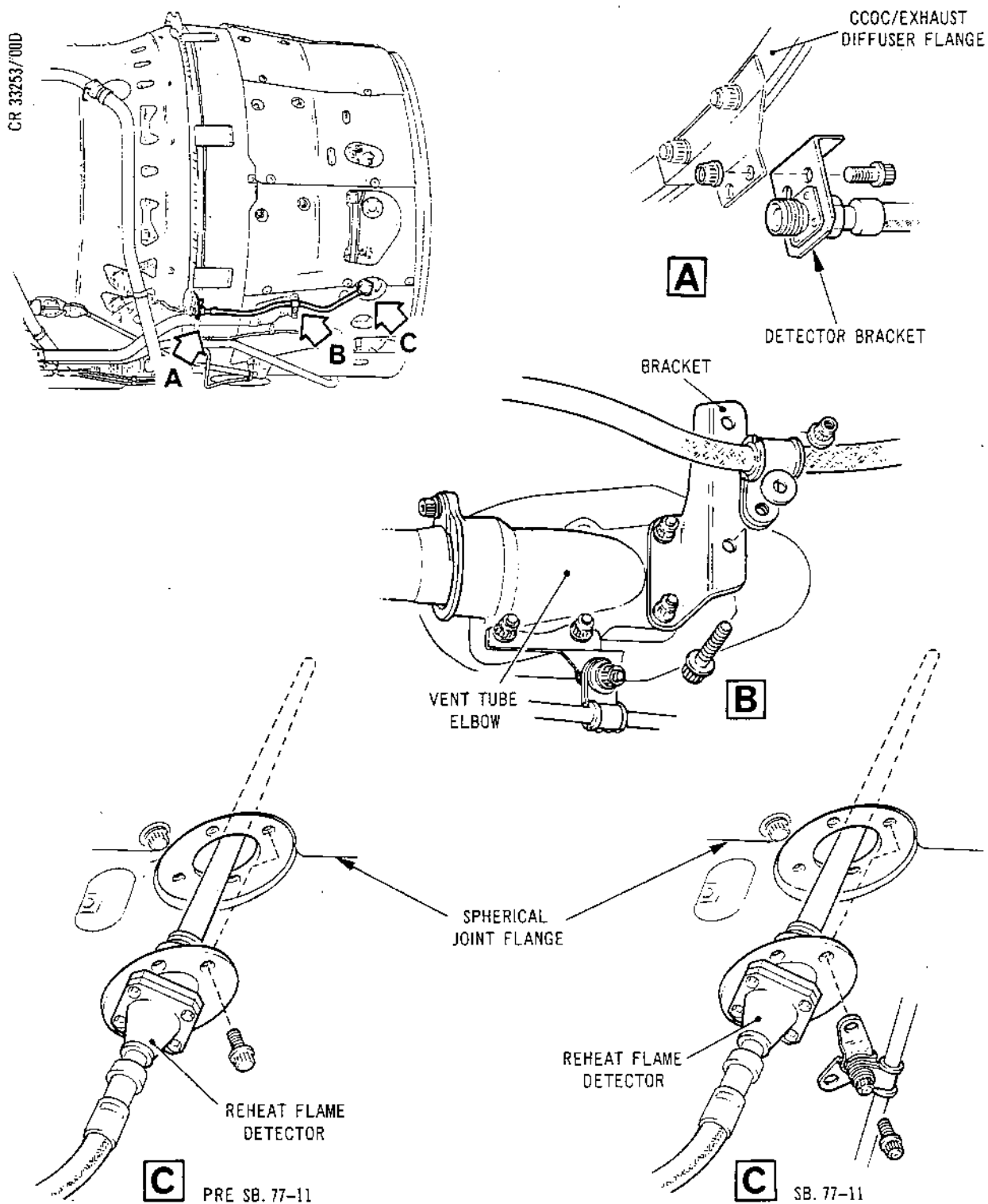
- (1) On engines to pre S.B.77-10 and 77-11 standard, assemble detector (76-15-02/1-80) to spherical joint flange and retain with four bolts (76-15-02/1-90) lightly tightened.
- (2) On engines to S.B.77-10 and 77-11 standard, assemble detector (76-15-02/1-80) to spherical joint flange, align pitot tube clamp and support bracket (77-12-03/1-154) to flange and insert bolts (77-12-03/1-153) to retain bracket. Insert bolts (76-15-02/1-90) in remaining two holes and then lightly tighten all four bolts.



# OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL



Reheat Flame Detector Installation  
Figure 515

ASSEMBLY  
**71-00-01**  
STAGE 6  
Page 556  
Sep 30/94



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Torque-tighten bolts (Pre or S.B.77-10 and 77-11 standard) to  $105 \pm 18$  lbf in. ( $12 \pm 2$  N.m). Wire-lock bolts in pairs.
- (4) Torque-tighten pitot tube clamp bolt to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (5) Assemble the detector bracket to the bracket on the CCOC/exhaust diffuser flange and retain with bolts and nuts (76-15-02/1-110-100). Torque-tighten the nuts and bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (6) Attach the loop clamp (76-15-02/1-10).
  - (a) Assemble loop clamp to the probe and align with the bracket (72-53-00/2-110) on the elbow at vane seven of the exhaust diffuser case.
  - (b) Secure with bolt, washer and nut (76-15-02/1-40-30-20).
  - (c) Torque-tighten the nut and bolt between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (7) Ensure that the gap measured between the reheat flame detector and the nearest point on the trailing edge of the flame holder is within the acceptable limit of  $2.36 \text{ in.} \pm 0.71 \text{ in.}$  ( $60 \text{ mm} \pm 18 \text{ mm}$ ).

9. Install Reheat Igniter (Ref. Item 91, Fig.501 of Stage 1)

A. Prepare for Installation.

CAUTION: UNDER NO CIRCUMSTANCES MUST THE CABLE BE DISCONNECTED FROM THE IGNITER PLUG BODY.

- (1) Apply lubricant S to the bolts.
- (2) Record the type and serial number of the igniter on the accessories sheet.

PRINTED IN ENGLAND

TN24582

ASSEMBLY  
**71-00-01**  
STAGE 6  
Page 557  
Jan 2/80

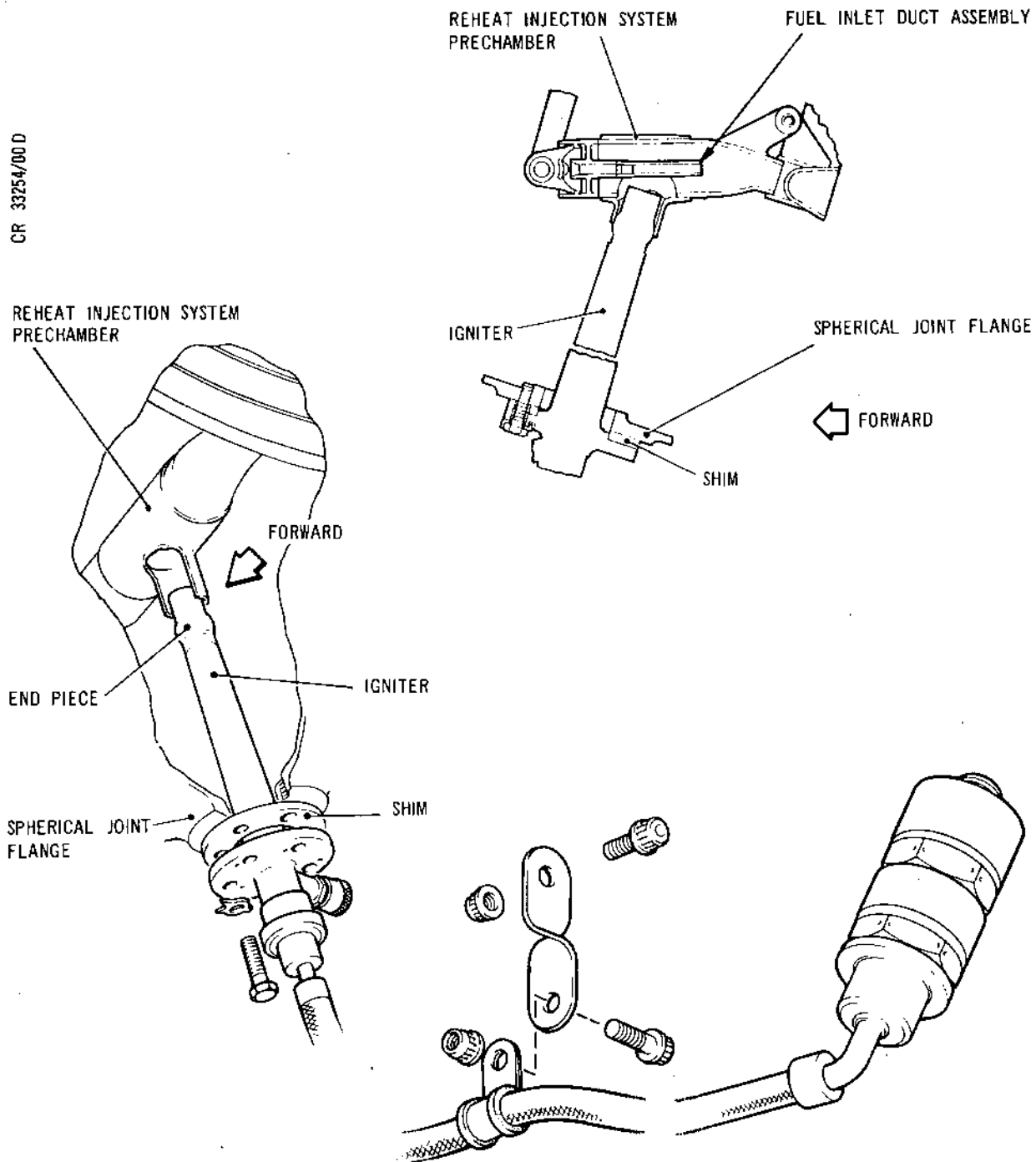


OLYMPUS 893

MK.610-14-28  
OVERHAUL



CR 33254/00D



Reheat Igniter Installation  
Figure 516

ASSEMBLY  
**71-00-01**  
STAGE 6  
Page 558  
Jan 2/80

TN8031





MK.610-14-28  
OVERHAUL

B. Installation (Ref.Fig.516).

- (1) Position the shim on the igniter (74-22-01/1-35-10).
- (2) Position the igniter in its location and insert the igniter through the spherical joint flange. Carefully engage the end piece in the reheat fuel injection system (73-12-06/1-10) prechamber aperture, push fully into engagement and if any resistance is felt, withdraw igniter and align aperture.

CAUTION: ENSURE THAT THE END PIECE OF THE REHEAT IGNITER IS CORRECTLY ENGAGED IN THE PRECHAMBER APERTURE.

- (3) Hold the mating faces in abutment with the air connection in alignment for connection to the air supply pipe and secure igniter to spherical joint with five bolts and keywashers (74-22-01/1-20-30) torque-tightened to between 10 and 14 N.m (90 and 120 lbf in.).
- (4) Lock the bolts with the keywashers.
- (5) On engines to S.B.74-3 standard, assemble the clamp to the igniter lead, secure clamp to support (74-22-01/1-17) with nut and bolt (74-22-01/1-14-17-13-15) lightly tightened. Loosely assemble nut and bolt (74-22-01/1-16-18) to support for attachment of support to ignition transformer bracket.

10. Install the LP Rotor Shaft Bearing Housing Cover (Item 92, Fig.501 of Stage 1)

A. Prepare for Installation.

- (1) Apply lubricant B to the bolts.

B. Installation (Ref.Fig.517).

- (1) Front bearing housing cover.

NOTE: Ensure the headless shoulder pin (72-23-01/1-70) is assembled to the bearing housing front flange.

ASSEMBLY

71-00-01

STAGE 6

Page 559

Jan 2/80

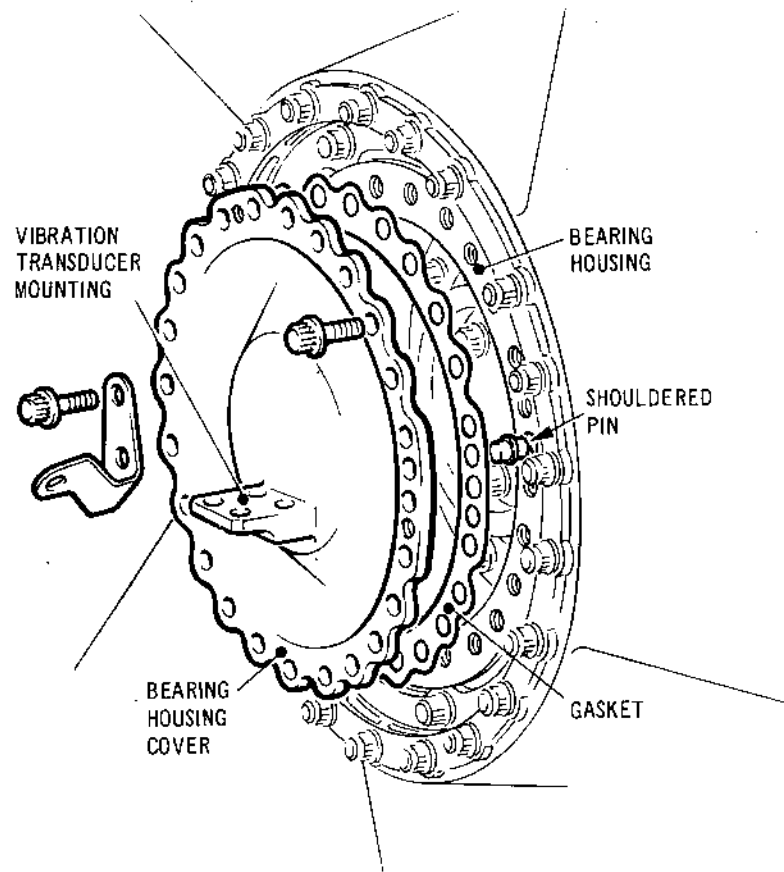


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33255/00A



TN20917

LP Rotor Shaft Bearing Housing Cover  
Figure 517

ASSEMBLY  
**71-00-01**  
STAGE 6  
Page 560  
Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (a) Position the gasket and cover (72-23-01/1-50-40) to the front bearing housing.
- (b) Position the bracket (72-23-01/1-20) to the front bearing housing cover flange.
- (c) Secure the bracket and cover to the housing with the bolts (72-23-01/1-10).
- (d) Secure the cover to the housing with the bolts (72-23-01/1-30) in the remaining bolt positions.
- (e) Torque-tighten the bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m).

PRINTED IN ENGLAND

TN7944

ASSEMBLY

**71-00-01**

STAGE 6

Page 561

Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



### TUBES AND ACCESSORIES - ASSEMBLY

1. Install the Vibration Transducer on the LP Compressor Bearing Cover (Ref. Item 93, Fig.501 of Stage 1)

NOTE: The LP compressor bearing vibration transducer is required for engine testing purposes only.

A. Prepare for Installation.

- (1) Apply lubricant 'B' to the attachment nuts and bolts.
- (2) Record the type and serial number of the transducer on the accessory sheet.

B. Installation (Ref.Fig.501).

- (1) Position the vibration transducer (77-33-02/1-10) on the front bearing cover mounting.
- (2) Secure the transducer with bolts and nuts (77-33-02/1-30-40-20) torque-tightened to between 11 and 13 lbf in. (1,2 and 1,4 N.m), locking (run-down) torque 1 lbf in. (0,12 N.m).

2. Assemble/Install and Test Engine Vibration Transducer Cable

A. Prepare for Installation.

- (1) Ensure transducer connector is assembled to cable (Ref.77-33-01, Assembly).
- (2) Apply lubricant 'B' (Ref.71-09-00, Table 501) to all nuts and bolts except where specific requirement is stated.

B. Assemble Cable to Intake Case (Ref.Fig.501).

- (1) Locate cable (77-33-01/1-200) complete with transducer connector in its installed position on engine.
  - (a) Enter free end of cable and feed through vane No.3 until end passes externally through the flange assembly.

PRINTED IN ENGLAND

ASSEMBLY

71-00-01

STAGE 7

Page 501

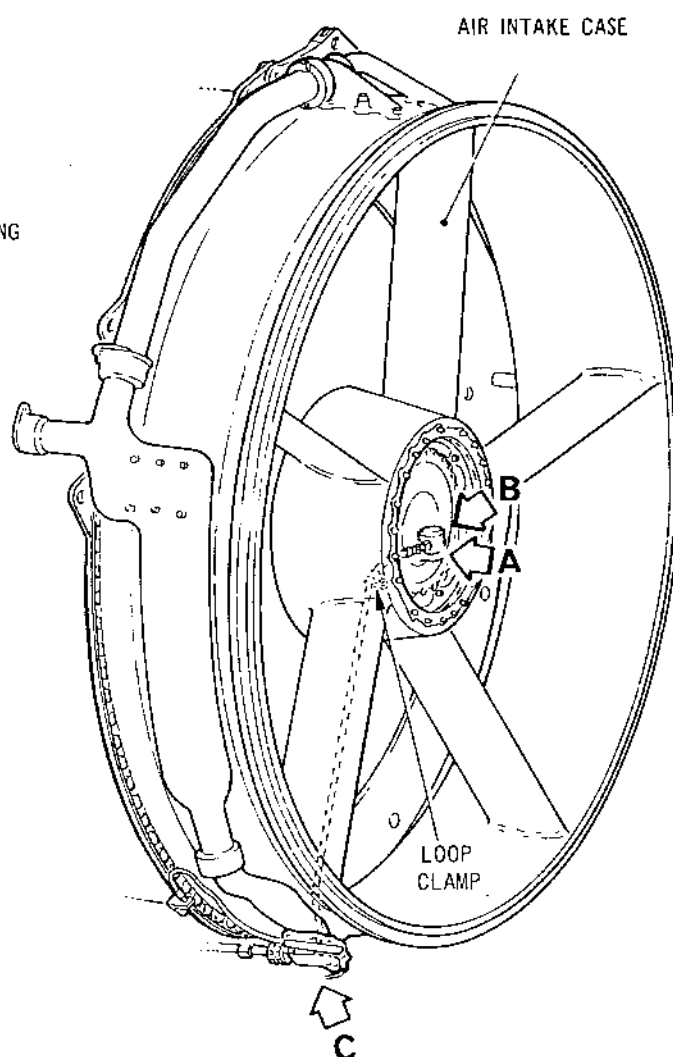
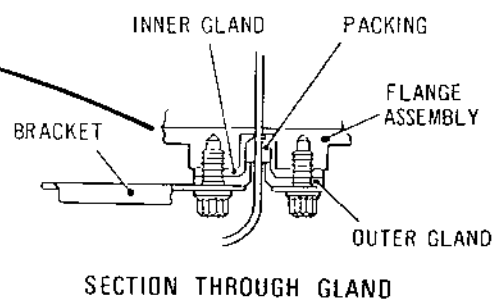
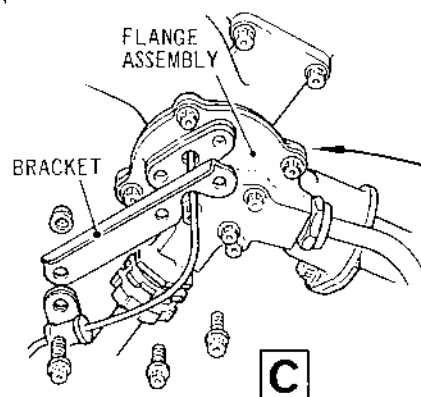
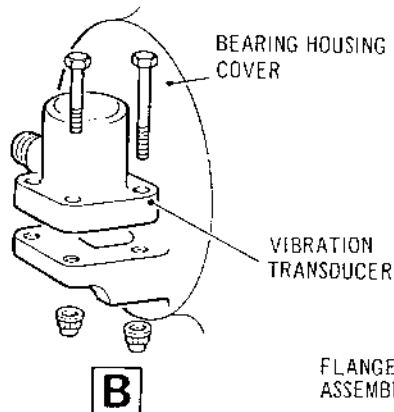
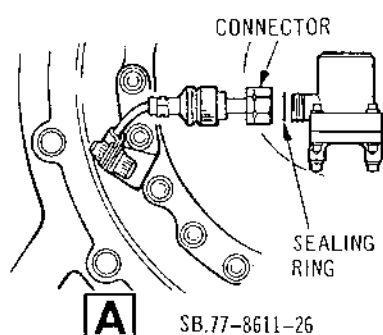
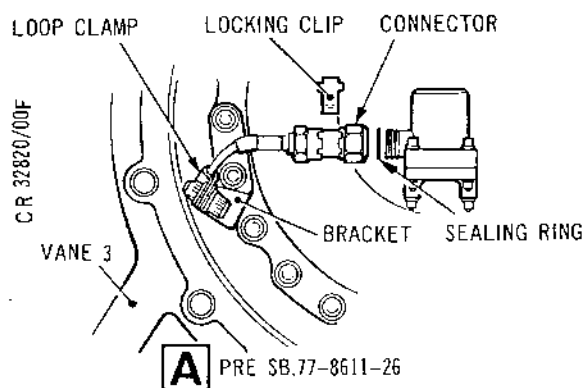
Jun 1/86



OLYMPUS 593

MK.610-14-28

OVERHAUL



Assembling Vibration Transducer and Cable Assembly to Intake Case  
Figure 501



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (b) Ensure that a serviceable sealing ring (77-33-01/1-230) is in position on the connector and engage it with the transducer receptacle hand-tight. Finally tighten and secure the connector when the wall mounted receptacle is attached to the cable and electrical checks are carried out (Ref.para.B).
- (2) Retain cable in the installed position.
- (a) Wrap glass cloth tape (Symel SP 1697) round cable at location registering with support bracket (72-23-01/1-20), assemble loop clamp over wrapping and secure clamp to bracket with bolt and nut (77-33-01/1-50-40) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m). Ensure cable is not kinked or stretched.
- (b) Prepare gland packing. Impregnate silica fibre cord with Wellseal solution.
- (c) Secure cable at flange assembly with inner gland, packing and outer gland (77-33-01/1-110-100) as shown in Figure 501. Position bracket (77-33-01/1-90) on outer gland flange and secure glands and bracket with bolts (77-33-01/1-80) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (d) Cut cable to a length of 12 to 13 in. (305 to 330 mm) from face of gland assembly.
- (e) Assemble loop clamp (77-33-01/1-30) to the cable and secure to the bracket (77-33-01/1-90) with nut and bolt (77-33-01/1-10-20) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (3) Ensure that the cable is not kinked or stretched, the loops are smooth and the cable is positioned to obviate chafing.



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



B. Assemble Wall Mounting Receptacle to Cable End (Ref. Fig.502).

- (1) On engines to Pre SB.77-8661-28 standard, prepare cable end for attachment of contacts.
  - (a) Assemble tape marker (1-190) to cable (1-200) and retain with clip (1-193).
  - (b) Slide plug end bell, telescopic bushes (1-183 and 1-184) and solder sleeve (1-188) over cable and clear of cable end.
  - (c) Remove outer sheath for a distance of 45,0 mm from end of cable (Detail A). Avoid damaging screen braid.
  - (d) Remove screen braid to 12,0 mm from end of outer sheath (Detail A).
  - (e) Comb out screen braid, fold back over outer sheath and trim to 6,0 mm (Detail B). Trim off fillers to fold edge.
  - (f) Assemble an inner sleeve to each core (Detail B).
    - (i) Position a sleeve (1-195) on each core in abutment with the screen braid.

This space left blank intentionally

TN6033

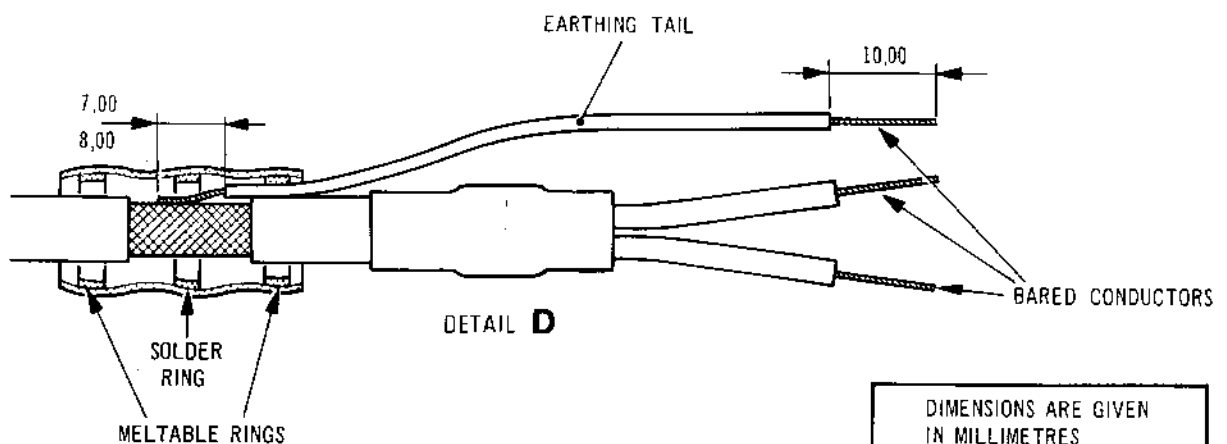
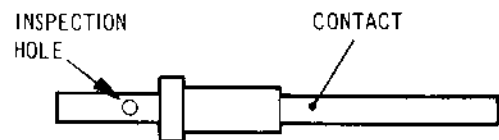
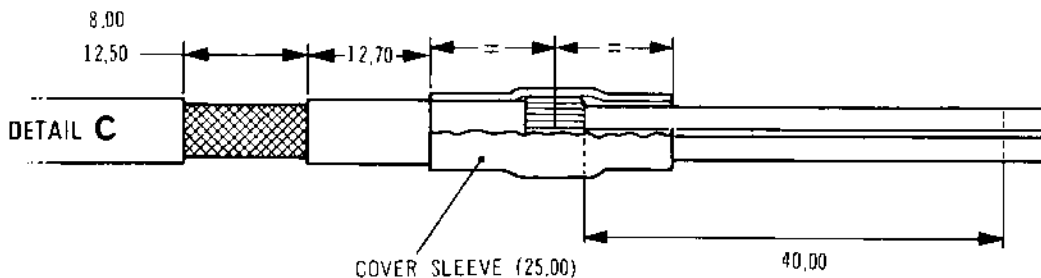
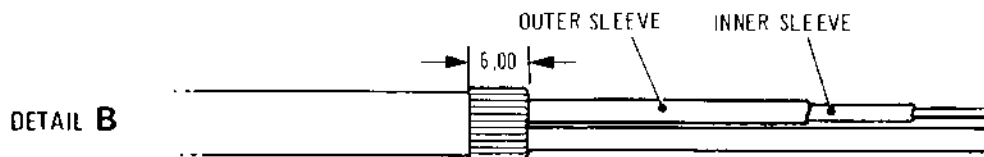
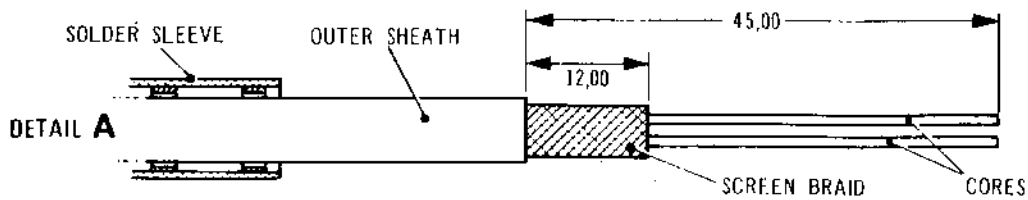
ASSEMBLY  
**71-00-01**  
STAGE 7  
Page 504  
Jan 2/80



MARK 610-14-28  
OVERHAUL



CR 33934/00B



DIMENSIONS ARE GIVEN  
IN MILLIMETRES

Preparation of Cable for Assembly of Contacts  
(Pre SB.77-8661-28 standard)  
Figure 502





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (ii) Set thermo-gun (Tool 2603) with reflector (Tool 2605) attached, to give a minimum temperature of 380°C. Switch on and allow to heat for 5 minutes to reach required temperature.
- (iii) Direct air all round sleeve until sleeve becomes transparent and shrinks to grip the core and then remove the heat source and allow sleeve to cool. Heat application may be from 8 to 20 seconds but should not exceed 50 seconds.
- (iv) Check visually that there are no splits in the sleeves and that there are no signs of heat damage.
- (g) Assemble an outer sleeve (1-197) on each core in abutment with screen braid and covering the inner sleeve. Heat shrink as detailed in para. (f) (i) to (iv) (Detail B).
- (h) Position a cover sleeve (1-199) centrally over back fold of screen braid (Detail C) and heat shrink as detailed in para. (f) (i) to (iv).
- (j) Assemble earthing tail to cable end.
  - (i) Remove outer sheath and expose braid for a distance of 8 to 12,5 mm with the exposed edge 12,7 mm from the edge of the outer sleeve (Detail C). Avoid damaging screen braid.
  - (ii) Remove insulation from earthing tail and expose conductor for a distance of 7,0 to 8,0 mm (Detail D).
  - (iii) Comb out wires of conductor to a fan shape, form them over the exposed braid and apply flux B (Ref.71-09-00 Table 501) to braid and wires.

TNS429

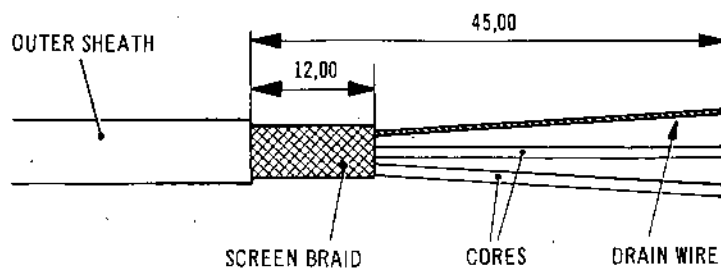
CR 33935/00C



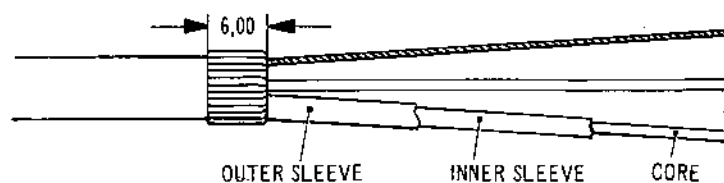
**OLYMPUS 593**  
MK.610-14-28  
OVERHAUL



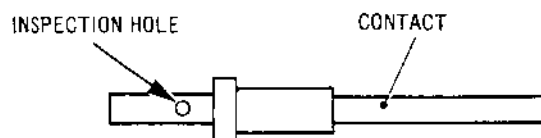
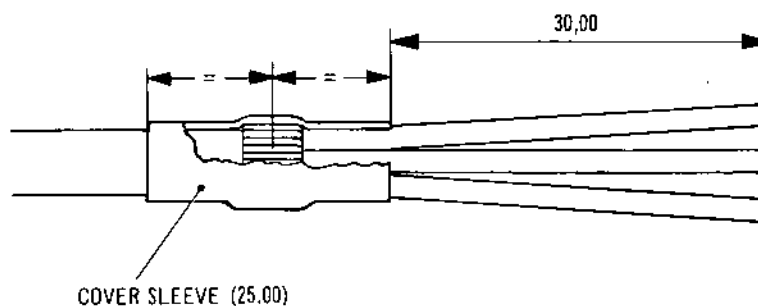
DETAIL A



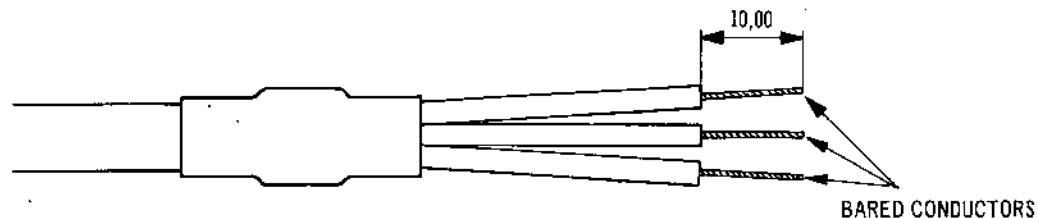
DETAIL B



DETAIL C



DETAIL D



DIMENSIONS ARE GIVEN  
IN MILLIMETRES

Preparation of Cable for Assembly of Contacts  
(SB.77-8661-28 standard)  
Figure 503



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



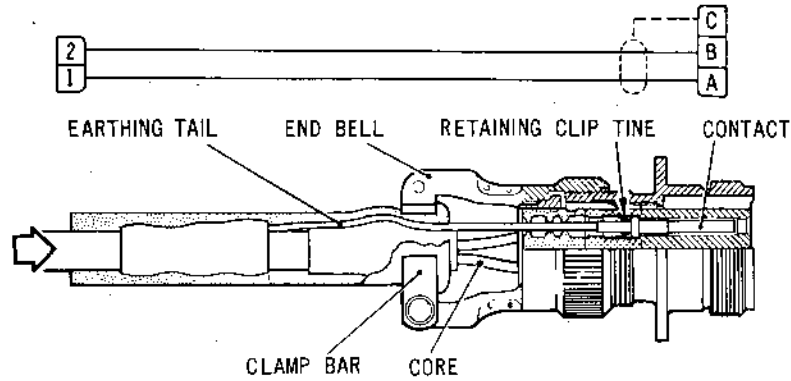
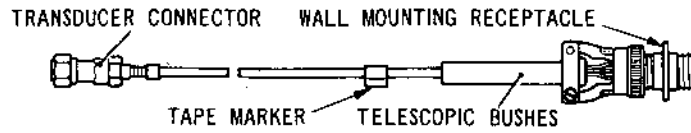
- (iv) Hold earthing tail wires in contact with braid and slide solder sleeve (1-188) centrally into position over exposed braid (Detail D).
  - (v) Set thermo-gun (Tool 2603) with reflector (Tool 2605) attached, to switch position 4 (temperature 500 to 600°C). Switch on and allow to heat for 5 minutes to reach required temperature. Direct air all round sleeve, for between 25 and 35 seconds, until solder runs around exposed braid and earthing wire and the joint is completely sealed by the sleeve. Check that there are no splits in the sleeve and that there are no visible signs of heat damage.
- (2) On engines to SB.77-8661-28 standard, prepare cable end for attachment of contacts (Ref.Fig.503).
- (a) Assemble tape marker (1-190) to cable (1-200) and retain with a clip (1-193).
  - (b) Slide plug end bell and telescopic bushes (1-183 and 184) over cable and clear of cable end.
  - (c) Remove outer sheath for a distance of 45,0 mm from end of cable (Detail A). Avoid damaging screen braid.
  - (d) Remove screen braid to 12,0 mm from end of outer sheath (Detail A).
  - (e) Comb out screen braid, fold back over outer sheath and trim to 6,0 mm (Detail B). Trim off fillers to fold edge.
  - (f) Assemble an inner sleeve (1-195) to each of the two cores and the drain wire (Detail B).
    - (i) Position the sleeve on the core or wire in abutment with the screen braid.

TN 45688

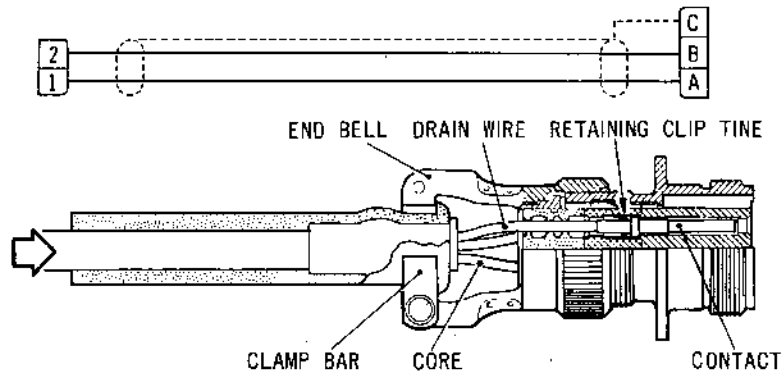
CR 35422/00A



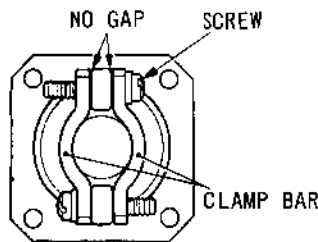
**OLYMPUS 593**  
MK.610-14-28  
OVERHAUL



RECEPTACLE AND WIRING DIAGRAM PRE SB 77-8611-26

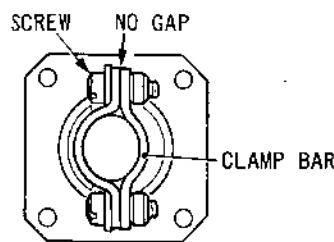


RECEPTACLE AND WIRING DIAGRAM SB 77-8611-26



PRE SB 71-8455-23

VIEW IN DIRECTION OF ARROW



SB 71-8455-23

VIEW IN DIRECTION OF ARROW

ASSEMBLY OF CLAMP BAR

Assembly of Wall Mounting Receptacle to Cable End  
Figure 504



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (ii) Set thermo-gun (Tool 2603) with reflector (Tool 2605) attached, to give a minimum temperature of 380°C). Switch on and allow to heat for 5 minutes to reach required temperature.
- (iii) Direct hot air all round sleeve until sleeve becomes transparent and shrinks to give a firm grip and then remove the heat source and allow sleeve to cool. Heat application may be from 8 to 20 seconds but should not exceed 50 seconds.
- (iv) Check visually that there are no splits in the sleeve and that there are no signs of heat damage.
- (g) Assemble an outer sleeve (1-197) to each of the two cores and the drain wire.
  - (i) Position the sleeve over the inner sleeve and in abutment with the screen braid.
  - (ii) Heat shrink sleeve as detailed in paragraph (f) (ii) to (iv).
- (h) Assemble a cover sleeve (1-198) centrally over the back fold of screen braid (Detail C) and heat shrink as detailed in paragraph (f) (ii) to (iv).
- (3) Assemble contacts to cable cores and insert into insulator (Fig.502 and 503).
  - (a) Remove insulation from end 10,0 mm of core to be crimped. (Detail D).
  - (b) Assemble and crimp contacts (1-186) to end of cores. Ensure that insulation abuts end of contact and conductor is visible through inspection hole.
  - (c) Insert core into coloured end of insert tool (Tool 2701).

TN12642

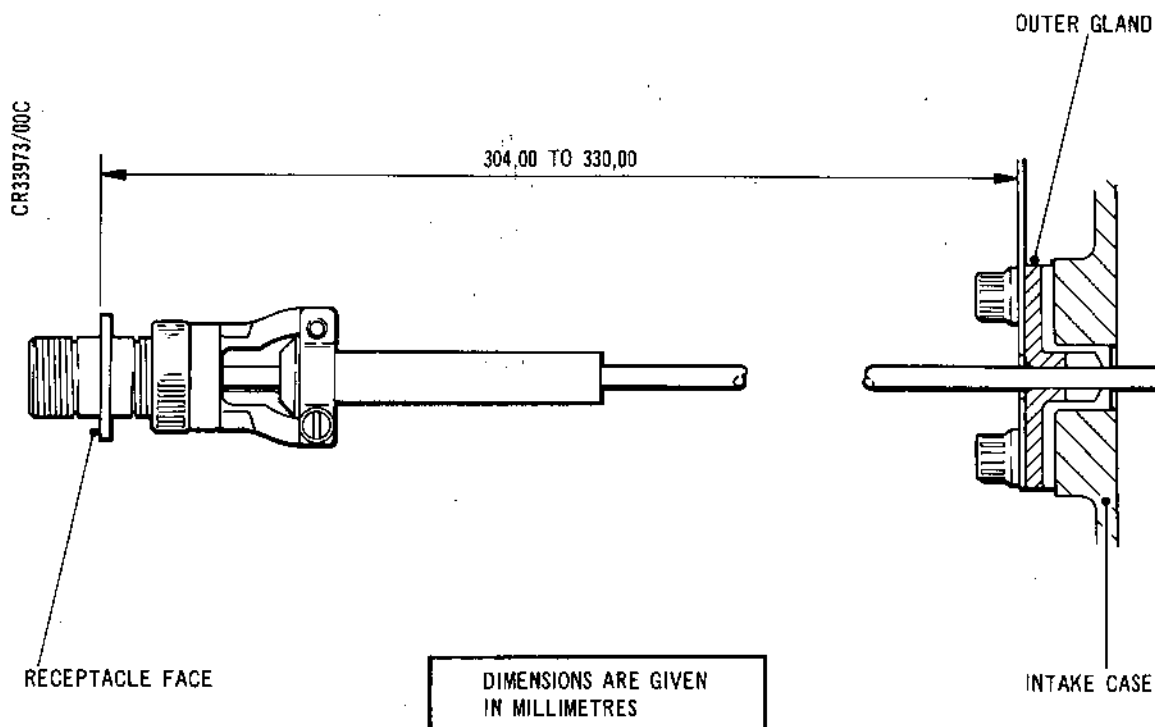
ASSEMBLY  
**71-00-01**  
STAGE 7  
Page 510  
Jan 2/80



OLYMPUS 593

MK. 610-14-28

OVERHAUL



TN6140

Cable Length Dimension  
Figure 505

ASSEMBLY  
**71-00-01**  
STAGE 7  
Page 511  
Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (d) Using firm even pressure, press tool against contact shoulder and insert contact and tool into insulator until retaining tines snap into place behind contact shoulder.
- (e) Withdraw tool from insulator, lightly pull core to ensure contact is properly seated.
- (4) When contacts are inserted, assemble plug end bell to plug body and hand-tighten.
- (5) Position the telescopic bushes (1-183 and 1-184) on to the cable (Fig.504). Secure with plug clamp bar(s) by tightening the two screws with screwdriver (Tool 2606) until adequate grip is provided on the telescopic bushes and no gap is visible between the clamps.
- (6) Wire-lock screws to plug end bell and end bell to plug body.

C. Check Cable Length.

- (1) Check cable length (Ref.Fig.505). With the wall mounting receptacle assembled to the cable end, ensure the dimension from the face of the gland (1-100) to the face of receptacle is between 304 and 330 mm.
- (2) If the dimension is less than 304 mm, remove the cable and assemble a new cable (Ref.77-33-01, Assembly).

D. Check Completed Cable Assembly for Continuity.

- (1) Unscrew connector from transducer.
- (2) Assemble dummy plug, with a shorting link between contacts A and B, to wall mounting receptacle at intake/compressor case.
- (3) Carry out a continuity check between socket contacts 1 and 2 at transducer end of cable.
- (4) Remove dummy plug.

TN6041

ASSEMBLY  
**71-00-01**  
STAGE 7  
Page 512  
Jan 2/80



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



E. Check Transducer Cable Insulation Resistance at Wall Mounting Receptacle.

- (1) Check resistance between contacts A, B and C in turn.
- (2) Check resistance between contact C and body of transducer connector.
- (3) A resistance of less than 20 megohms is not acceptable for these checks.

F. Connect Transducer Cable Connector.

- (1) On engines to Pre SB.77-8611-26 standard, assemble connector as follows:
  - (a) With a new sealing ring (1-230) against shoulder of transducer connector end, assemble connector dry and free from lubricant, to receptacle and hand-tighten.
  - (b) Torque-tighten connector nut to between 60 and 100 lbf in. (6,8 and 11,3 N.m) until castellations of nut align with those of adjacent nut. Engage locking clip (1-220) with castellations. Wire-lock clip ends together.
- (2) On engines to SB.77-8611-26 standard, assemble connector as follows:
  - (a) With a new sealing ring (1-300) against shoulder of transducer connector end, assemble connector dry and free from lubricant, to receptacle and hand-tighten.
  - (b) Torque-tighten connector nut to between 60 and 100 lbf in. (6,8 and 11,3 N.m). Wire-lock connector nut.

G. Secure Wall Mounting Receptacle to Bracket.

- (1) Ensure that sealing ring (1-181) is installed correctly.
- (2) Secure the receptacle to the mounting bracket with four nuts (1-130) and screws (1-140). Torque-tighten to between 8 and 10 lbf in. (0,9 and 1,1 N.m).





OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

3. Install the Air Intake Fairing and Damper Spring  
(Ref.Item 94, Fig.501 of Stage 1)

A. Installation of Damper Spring to the Air Intake Fairing  
(Ref. S.B.72-8746-284).

- (1) If the spring is formed into a loop, unscrew the tapered end from the free end and release the spring.
- (2) Mark the tapered end of the spring to enable the number of turns to be counted when the two ends are screwed together (Ref.72-09-00 Assembly - Temporary Marking).
- (3) Pre-load the spring by holding the free end and twisting (unscrewing) the tapered end two turns, then screw the tapered end into the free end for half a turn.
- (4) Check that the two ends have engaged with each other, and if not, release the spring and repeat operations (3) and (4).
- (5) Screw the tapered end into the free end one more turn.
- (6) Assemble the looped spring around the hollow of the air intake fairing plunged hole.

B. Installation of Damper Spring to the Air Intake Fairing  
(Ref. S.B.72-9005-409).

- (1) Cut 1.000 in. (25,4 mm) wide glass cloth tape (OMat 2/76) into two strips 0.500 in. (12,7 mm) wide by approx. 9.000 in. (228,6 mm) long. Apply one strip to the damper spring location, then repeat with the second strip. Ensure the start of the second tape run is close to the end of the first tape run, but not overlapping, to prevent the layers of tape becoming too uneven.
- (2) Mark the tapered end of the spring to enable the number of turns to be counted when the two ends are screwed together (Ref.70-00-12 - Temporary Marking).
- (3) Assemble spring. The reduced end of close coil spring is to be subject to reverse twist (anti-clockwise) of three turns and screwed clockwise into the open end to lock and form a circle. In the free state the spring must lie flat without twists.

ASSEMBLY

71-00-01

STAGE 7

Page 514

Dec 1/97

Printed in England



OLYMPUS 593



MK.610-14-28

SNECMA

OVERHAUL

---

FIGURE 506 CANCELLED

---

ASSEMBLY

71-00-01

STAGE 7

Page 515

Jun 1/86



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (4) Assemble the looped spring around the hollow of the air intake fairing plunged hole.

C. Installation of Air Intake Fairing.

- (1) Check that all work is completed, components and clips are secure and that area to be enclosed is clean and free from loose objects.
- (2) Apply lubricant B (Ref.72-09-00 Assembly, Servicing and Storage Materials) to attachment nuts.
- (3) Check that damper spring is assembled to flare of plunged hole in fairing inner skin (SB.OL.593-72-8746-284 and SB.OL.593-72-9005-409 Standard).
- (4) With fairing aligned with cut-out section facing lead support clip bracket, hold fairing squarely with bolts projecting slightly through faring flange.
- (5) Assemble a nut to each bolt and push the fairing squarely rearward until the bolts ends just protrude through the nuts with threads engaged.

NOTE: S.B. OL.593-72-8532-195 standard bolts have a plain lead end before the threads.

- (6) Press fairing fully home ensuring that spigot engages squarely.
- (7) Torque-tighten nuts to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

4. Paragraph Deleted.

5. Install the Engine Electrical Looms, Connectors and Supports

- A. Attach and connect the cable looms (Ref.71-00-02, Assembly, Engine Electrical Harness and Ignition Leads). Vibration transducer cable installation procedure is included in paragraph 2. of this stage.

ASSEMBLY

71-00-01

STAGE 7

Page 516

Dec 1/97



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

# 6. Check the Clearances Between the Tubes and Accessories and the Engine

## A. Check Clearances (Ref.Fig.507).

**WARNING:** KERIMID 601 RESIN IS USED IN THE LAYERS OF FIRE RESISTANT WRAPPING ON FUEL TUBES TO SB.OL.593-73-8789-88 STANDARD ALTHOUGH HARMLESS IN ITS CURED STATE ON FINISHED TUBES, ITS VAPOUR IS POTENTIALLY CARCINOGENIC IF USED AS A TOUCH-UP FOLLOWING LOCAL DRESSING OF THE WRAPPING TO OBTAIN CORRECT CLEARANCES.

WHERE POST SB.OL.593-73-8789-88, PRE SB.OL.73-9057-102 STANDARD TUBES ARE LOCALLY DRESSED, EXISTING STOCKS OF KERIMID 601 CAN BE USED FOR LOCAL TOUCH-UP PROVIDED THE APPROPRIATE SAFETY MEASURES AND PRECAUTIONS ARE TAKEN. IF NO STOCKS OF KERIMID 601 EXIST, ARALOK 210 MAY BE USED FOR LOCAL TOUCH-UP WITH NO SAFETY MEASURES OR PRECAUTIONS REQUIRED. POST SB.OL.593-73-9057-102 TUBES MUST HAVE ARALOK 210 FOR LOCAL TOUCH-UP.

- (1) Ensure that an installed clearance exists between adjacent tubes and components. Comply with the clearance limits stated in Table 501 for specific tubes and components and ensure that the clearance between all other adjacent tubes and components is not less than 0.20 in. (5 mm). For additional data on location of tubes and accessories, refer to 71-00-01, Assembly Stage 1, Figure 501.

ASSEMBLY

71-00-01

STAGE 7

Page 517

Dec 31/99

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

SNECMA

TUBE/COMPONENT	ADJACENT TUBE/COMPONENT	MINIMUM CLEARANCE
2. Intermediate case drain tube	Rear bolt securing pulse probe housing attachment flange to intermediate case	0.050 in. (1,270 mm)
3. Fuel tube, recirculating valve to second stage pump	Bracket on LP compressor case rear blow-off flange front face	0.080 in. (2,032 mm)
4. Main oil tank	LP compressor case at any radial position	0.070 in. (1,778 mm)
5. Anti-icing manifold	Air intake at any position	0.030 in. (0,762 mm)
6. Fuel heater air tube	Underside of left-hand engine trunnion	0.100 in. (2,540 mm)
7. Connector on LP and HP compressor thrust bearings oil feed tube	Intermediate case air seals supply tube support bracket on LP compressor case	0.050 in. (1,270 mm)
8. Elbow on FCU fuel tube	Funnel on engine mounted guide tube	0.100 in. (2,540 mm)
9. Intermediate case air seal supply tube	Right-hand gearbox mounting bracket (QAD coupling)	0.100 in. (2,540 mm)
10. FCU to first stage pump fuel tube	Left-hand gearbox case	0.100 in. (2,540 mm)
11. Elbow on IDG oil return tube	Right-hand gearbox case	0.050 in. (1,270 mm)
12. LP and HP compressor thrust bearings cold vent tube	Oil cooler	0.100 in. (2,540 mm)

Engine Tube and Accessory Clearances (Ref.Fig.507)  
Table 501 (Continued)ASSEMBLY  
**71-00-01**  
STAGE 7  
Page 518  
Jun 2/80

**OLYMPUS 593**MK.610-14-28 *sneema*  
OVERHAUL

Printed in England

TUBE/COMPONENT	ADJACENT TUBE/COMPONENT	MINIMUM CLEARANCE
13. Fuel heater air tube	Nos.5 and 6 sprayers fuel supply pipe	0.100 in. (2,540 mm)
14. Fuel manifold upper feed tube	Fuel heater air supply seal housing	0.150 in. (3,810 mm)
16. Right-hand pilot nozzle fuel tube	Electrics harness bracket and clipping at the delivery case and CCOC flange	0.150 in. (3,810 mm)
17. Engine power transmitter manifold	Spherical flange joint at any position	0.150 in. (3,810 mm)
18. Reheat servo supply rear tube	IDG oil tube (IDG to cooler)	0.150 in. (3,810 mm)
19. FCU fuel tube at second stage pump	Fuel tube on second stage pump	0.100 in. (2,540 mm)
20. Fuel tube pump to reheat flowmeter	Joint flange on fuel tube filter to cooler	0.100 in. (2,540 mm)
21. FCU fuel tube at second stage pump	Air passage bolt on second stage pump feed duct	0.070 in. (1,778 mm)
22. Oil cooler mounting bracket	Fuel manifold stem No.6 position	0.150 in. (3,810 mm)
23. Tube, oil return, cooler to tank	Oil tank mounting bracket, top rear	0.050 in. (1,270 mm)
24. HP turbine bearing oil feed tube	Tube, air supply to reheat purge valve	0.100 in. (2,540 mm)
25. HP turbine bearing cold vent tube	Lug on RH support tube	0.050 in. (1,270 mm)
26. Thermocouple leads	All engine components/ dressing items	0.500 in. (12,7 mm)

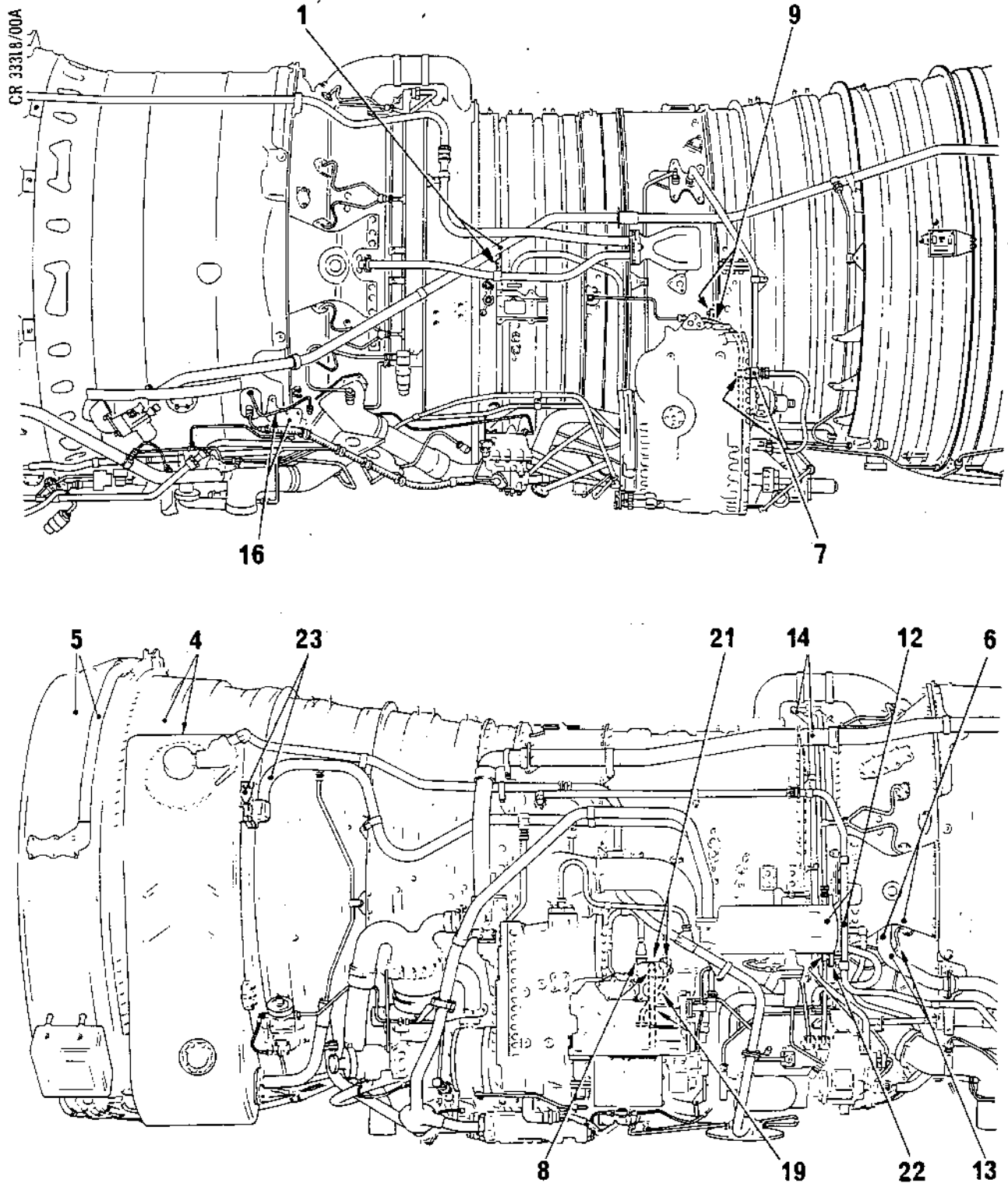
Engine Tube and Accessory Clearances (Ref.Fig.507)  
Table 501 (Concluded)ASSEMBLY  
**71-00-01**  
STAGE 7  
Page 519  
Jun 30/95



OLYMPUS 593

MK.610-14-28

OVERHAUL



Engine Tube and Accessory Clearances  
Figure 507 (Sheet 1 of 2)

TN32422

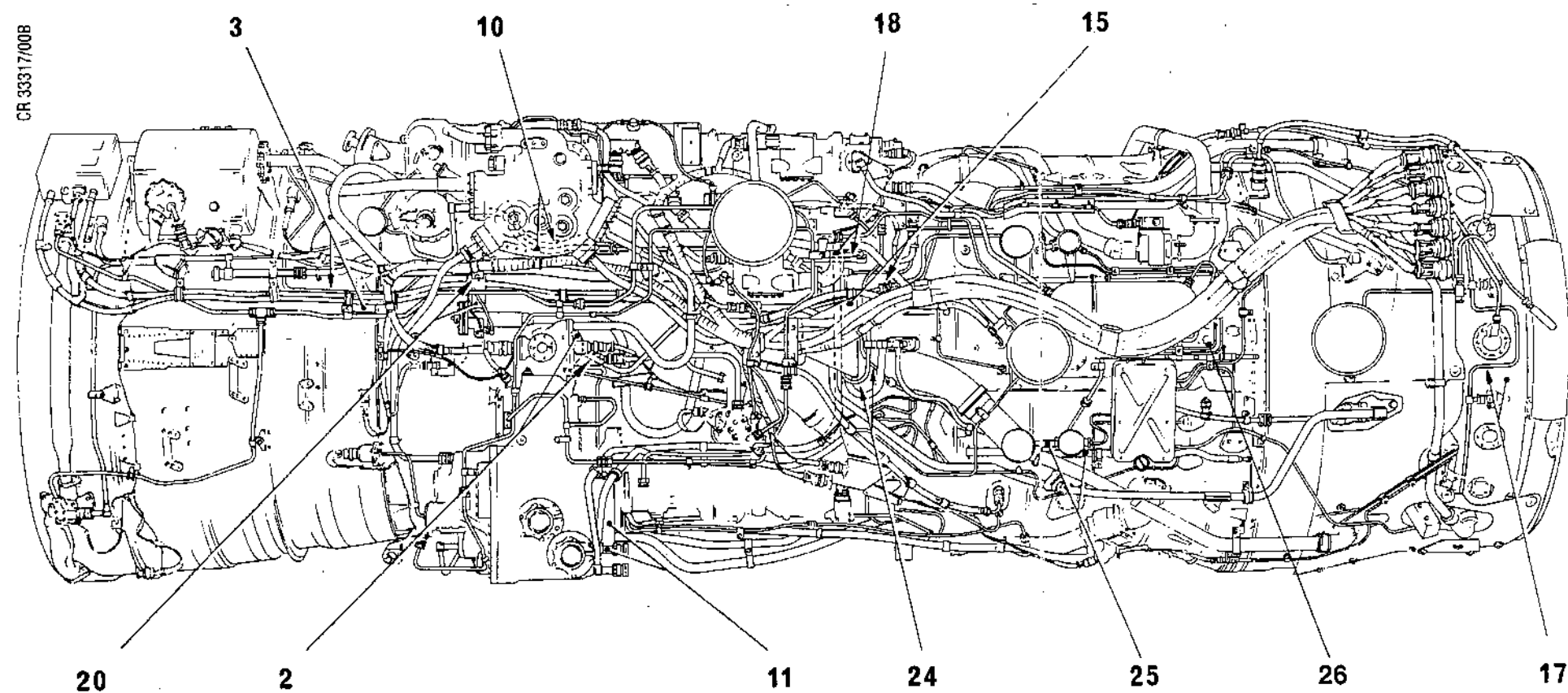
ASSEMBLY

71-00-01

STAGE 7

Page 520

Jan 2/80



Engine Tube and Accessory Clearances  
 Figure 507 (Sheet 2 of 2)





OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

TUBES AND ACCESSORIES - ASSEMBLY

1. Transfer the Engine from the Horizontal Stillage to the Transport Trolley

A. Assemble Engine to Transport Trolley (Ref.Fig.501).

- (1) Assemble the beam type sling (Tool 1248) to the top lifting points of the engine, intermediate case/HP case flange and the delivery case/CCOC flange.
- (2) Support the weight of the engine with the crane and lifting sling.
- (3) Release and remove the pedestal clamps from the trunnion brackets. Remove the front supports from the LP case.
- (4) Lift the engine from the stillage.
- (5) Assemble the trolley adapters to the engine trunnions (Tool 1177 left-hand, 1193 right-hand) and secure.
- (6) Adjust the engine lifting sling to ensure that the engine is hanging square in the horizontal and vertical planes.
- (7) Position the trolley (Tool 1266) and lower engine until trunnion adapters engage pedestals.  
  
NOTE: Trolley has castoring wheels and is for shop use.
- (8) Secure the trunnion adapters with the pedestal clamps.
- (9) Assemble and secure the front engine supports to the LP casing.
- (10) Remove the lifting equipment.

ASSEMBLY

71-00-01

STAGE 8

Page 501

Jun 30/01

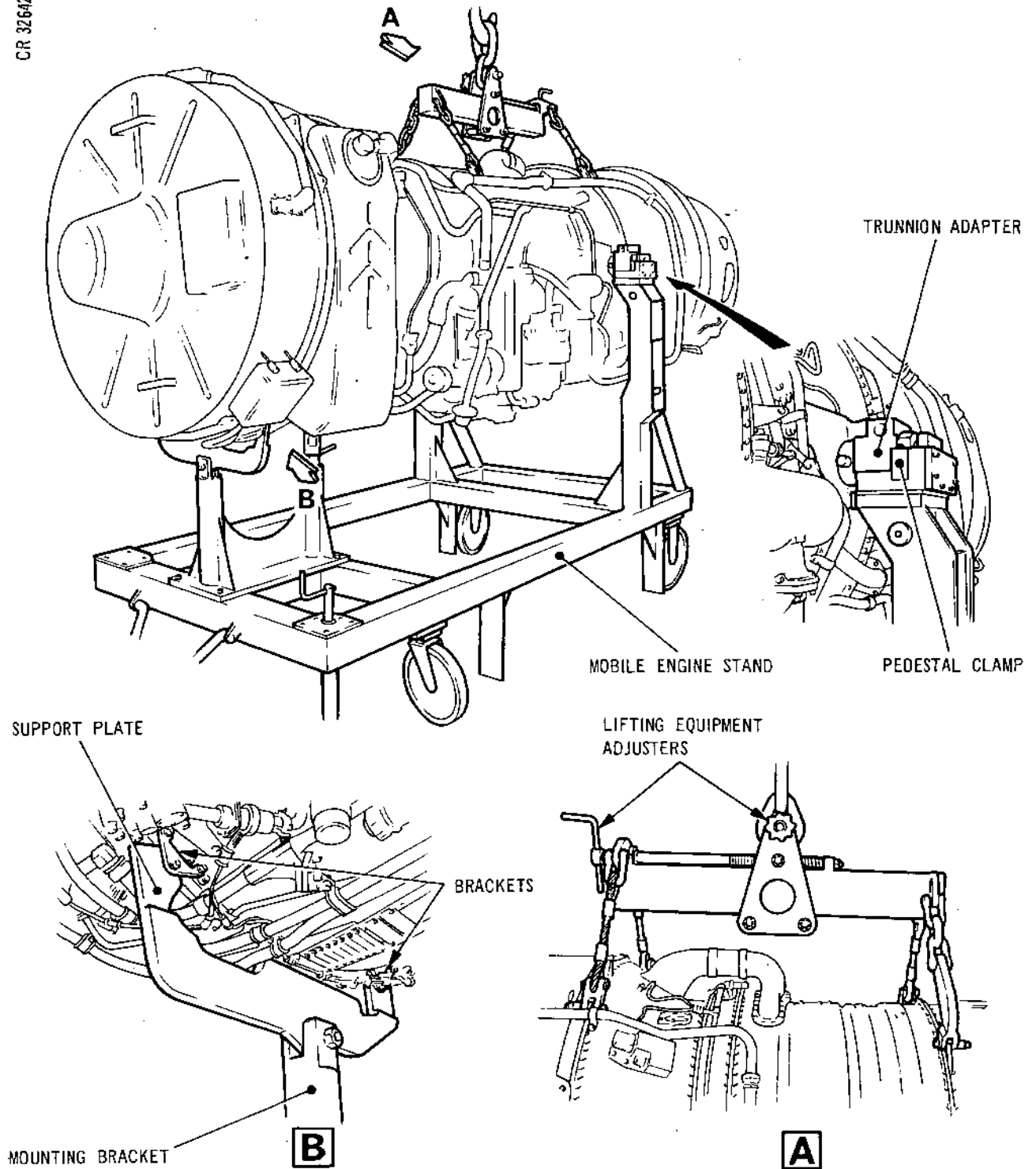


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32642/00A



Engine Sling and Trolley  
Figure 501

**OLYMPUS 593**MK.610-14-28  
OVERHAUL**2. Assemble the Blanks to the Engine****A. Assemble Blanks to Engine.**

- (1) Ensure that all blanks are fitted to the assembled engine. Refer to Table 501 for the blanks and refer to Fig.502 for the location.

I.P.C. REF.NO.	DESCRIPTION	LOCATION	QUANTITY
79-22-04 (1-900)	Protector	IDG oil feed and return tubes	2
72-31-01 (6-900)	Taper plug	Front mounting points	4
71-20-00 (1-500)	Red cap	Spherical bearing 'Y' mounting bracket	2
75-02-03 (1-650)	Blank	LP and HP turbine bearings cold vent outlet	1
71-79-01 (1-500)	Cover	IDG rear oil drain tube	1
75-02-10 (1-360)	Blanking plug	Air starter drain tube	1
71-79-02 (1-510)	Plug	Hydraulic pump seal space drain tube (rear)	1
71-79-02 (1-500)	Cover	Hydraulic pump seal space drain tube (centre)	1

Engine Tube and Accessory Blanks  
Table 501 (Continued)

PRINTED IN ENGLAND

TN29411

ASSEMBLY  
**71-00-01**  
STAGE 8  
Page 503  
Jan 2/80

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

I.P.C. REF.NO.	DESCRIPTION	LOCATION	QUANTITY
72-63-01 (3-400)	Blanking cover	Air starter position on right-hand gearbox	1
73-12-03 (1-910)	Plunger assembly	Main fuel inlet	1
73-12-03 (1-900)	Seal ring	Above plunger	1
72-63-01 (6-120)	Blank cover	Main hydraulic pump position right-hand gearbox	1
72-63-01 (6-270)	Blank cover	Stand-by hydraulic pump position right-hand gearbox	1
71-73-01 (2-240)	Protective cap	Drains tank over- board outlet	1
75-03-01 (1-700)	Protector	Fuel heater over- board duct	1
72-22-01 (5-10)	Cover assembly	Air intake	1
75-02-02 (1-710)	Protector	Oil tank overboard vent	1
72-63-01 (8-180)	Blank assembly	IDG position on right-hand gearbox	1
73-12-01 (1-10)	Plunger assembly	Fuel recirculating valve	1
73-12-01 (1-20)	Seal	Above plunger	1

Engine Tube and Accessory Blanks  
Table 501 (Continued)

TN30973

ASSEMBLY  
**71-00-01**  
STAGE 8  
Page 504  
Jan 2/80



MK.610-14-28  
OVERHAUL



I.P.C. REF.NO.	DESCRIPTION	LOCATION	QUANTITY
72-54-01 (7-10)	Cover	Exhaust diffuser	1
75-02-06 ) (1-260) ) ) 75-02-07 ) (1-320) )	Protector	HP compressor laby- rinth right and left- hand overboard vents	1
75-02-01 (1-450)	Protector	LP and HP compressor thrust bearings overboard vent	1
71-73-06 (1-250)	Cover	Exhaust diffuser hot drain	1
75-05-03	Cover	Aircraft fuel and hydraulic tank pressurization tube	1
73-21-01 (1-800)	Protective cap	FCU HP shut-off valve electrical connections	1
73-11-02 (1-500)	Protector	Second stage fuel pump	1

Engine Tube and Accessory Blanks  
Table 501 (Concluded)

PRINTED IN ENGLAND

TN31160

ASSEMBLY  
**71-00-01**  
STAGE 8  
Page 505  
Jan 2/80



# OLYMPUS 593

MK.610-14-28

OVERHAUL



STANDBY HYDRAULIC PUMP POSITION ON RIGHT-HAND GEARBOX    HYDRAULIC PUMP SEAL SPACE DRAIN TUBE CENTRE SECTION    SECOND STAGE PUMP EXHAUST    HYDRAULIC PUMP SEAL SPACE DRAIN TUBES    AIRCRAFT FUEL AND HYDRAULIC TANK PRESSURIZATION TUBE

MAIN HYDRAULIC PUMP POSITION ON RIGHT-HAND GEARBOX

DRAINS TANK OVERBOARD OUTLET

CR 33314/00A

AIR STARTER DRAIN TUBE (FRONT OR REAR)

LP AND HP TURBINE BEARINGS COLD VENT OUTLET

AIR STARTER POSITION ON RIGHT-HAND GEARBOX

IDG OIL FEED AND RETURN TUBES

IDG POSITION ON RIGHT-HAND GEARBOX

IDG REAR OIL DRAIN TUBE

AIR INTAKE COVER

FRONT MOUNTING POINTS

SPHERICAL BEARING 'Y' MOUNTING BRACKETS

LP AND HP COMPRESSOR THRUST BEARINGS OVERBOARD VENT

EXHAUST DIFFUSER COVER

FUEL RECIRCULATING VALVE

MAIN FUEL INLET

FUEL HEATER OVERBOARD DUCT

FCU HP SHUT-OFF COCK ELECTRICAL CONNECTIONS (TWO OFF)

OIL TANK OVERBOARD VENT

HP COMPRESSOR LABYRINTH RIGHT AND LEFT-HAND OVERBOARD VENTS

EXHAUST DIFFUSER HOT DRAIN

Assembled Engine Blanked for Despatch  
Figure 502

TN32421

ASSEMBLY

## 71-00-01

STAGE 8

Page 506

Jan 2/80

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

TUBES AND ACCESSORIES - SPECIAL TOOLS,  
FIXTURES AND EQUIPMENT

1. General

- A. The special tools, fixtures and equipment listed in Table 1001 and 1002 are those required for the disassembly and assembly of the tubes and accessories to/from the engine.
- B. The tools have been listed in order of usage and the Tool Ref.No. is the number quoted in the text. Tools marked with an \* are used in more than one aspect of the overhaul and will be duplicated in the tables.

2. Tube and Accessories, Disassembly Tools

TOOL REF.NO.	MANUFACTURER PART NO.	DESCRIPTION
*1248	P3C.863655	Engine sling, beam type
*1265	P3C.865977	Mobile engine stand, shop use
* 261	P3C.1073000	Mobile engine stand, mounting bracket
* 808	P3C.1089461	Mobile engine stand, adapter
*1782	PE.209023	Drain tube, oil system
1783	P5J.1257462	Fuel drain adapter
1629	P3C.898067	Wrench cranked ring
1668	T.914825	Puller, general application
* 319	P5J.1266441	Adapter, jacking, LP compressor rotor
*1568	S3S.12558000	Crowfoot socket wrench attachment
*1529	P3C.1089171	Crowfoot socket wrench attachment
*1769	P3C.1262680	Protector, thermocouple harness
*1535	P0.1255624	Container harness
*1175	P3C.857340	Engine beam sling vertical/ horizontal
*1176	P3C.857341	Engine beam sling vertical/ horizontal
*1174	P3C.857339	Engine beam sling vertical/ horizontal
1244	P3C.863609	Build base
*1314	P3C.892833	Engine sling mobile stand
*1480	P3C.1065044	Wrench, open ring, socket

Disassembly Tools  
Table 1001 (Continued)

SPECIAL TOOLS ETC.

**71-00-01**

Page 1001  
Dec 1/81



# OLYMPUS 593

MK.610-14-28

OVERHAUL.



ITEM REF.NO.	MANUFACTURER PART NO.	DESCRIPTION
*1565	P3C.1223189	Spanner 'C'
*1528	P3C.1089111	Crowfoot socket wrench attachment
*1526	P3C.1089005	Crowfoot socket wrench attachment
*1752	PJ.1223158	Crowfoot socket wrench attachment
*1298	PJ.869229	Resetting tool, LP signal system
1559	PT.1223133	Wrench universal ring
*1779	P5J.1263673	Spanner
* 940	PJ.1246969	Fixture restraining, fuel tanks drain valve
*1854	P5J.1294596	Lifting tool, F.C.U.
* 854	P3J.1212148	Fixture lifting, F.C.U.
*1530	P3C.1089255	Ring wrench cranked
* 197	P3C.1065891	Left-hand gearbox lifting fixture
* 793	P3C.1089439	Right-hand gearbox lifting fixture adapter
* 794	P3C.1089440	Right-hand gearbox lifting fixture adapter
* 795	P3C.1089441	Right-hand gearbox lifting fixture
* 798	P3C.1089447	Right-hand gearbox lifting fixture
1302	P3C.869247	Gearbox lifting turnbuckle
3132	PE.27426	Wrench, swivel
* 305	P3C.1073197	Turbine exhaust diffuser lifting fixture

Disassembly Tools  
Table 1001 (Concluded)

### 3. Tube and Accessories, Assembly Tools

TOOL REF.NO.	MANUFACTURER PART NO.	DESCRIPTION
*1872	PE.22056	Universal joint
*1876	PE.20785	Adapter
*1873	T2EC3312	Extension bar
*1877	S3S12620000	Torque wrench
*1875	T2EP1594	Torque adapter

Assembly Tools  
Table 1002 (Continued)

SPECIAL TOOLS ETC.

## 71-00-01

Page 1002  
Dec 1/81



**OLYMPUS 593**MK.610-14-28  
OVERHAUL

TOOL REF.NO.	MANUFACTURER PART NO.	DESCRIPTION
*1664	P3C.530647	Torquemeter wrench
*1854	P5J.1294596	Lifting tool F.C.U.
* 854	P3C.1212148	Fixture lifting F.C.U.
* 613	P3C.1089125	Engine turning tool
1750	PE.24297	Adapter, actuator gearbox quillshaft
1751	PE.24276	Gauge alignment
940	PJ.1246969	Fixture restraining, fuel tank drains valve
*1648	T.295037	Torquemeter wrench
*1528	P3C.1089111	Crowfoot, socket wrench attachment
* 947	PJ.1229344	Adapter, torque setting ring
*1565	P3C.1223189	Spanner C type
* 322	P3C.1073276	Adapter torque setting
*1526	P3C.1089005	Crowfoot, socket wrench attachment
* 946	PJ.1229343	Adapter, torque setting
*1752	PJ.1223158	Crowfoot, socket wrench attachment
58	PG.1234539	Gauge, setting IDG - CSD oil tubes
* 948	PJ.1229345	Adapter, torque setting
* 908	PJ.1223160	Crowfoot, socket wrench attachment
*1656	P3C.12900	Torquemeter wrench
*1529	P3C.1089171	Crowfoot, socket wrench attachment
1779	P5J.1263673	Spanner
* 909	PJ.1223157	Adapter, torque setting
1559	PT.1223133	Wrench, universal ring
1298	PJ.869229	Resetting tool, LP signal system
1990	S3S.15669000	Rigging pin, emergency dump valve
1754	PJ.1223159	Adapter, torque setting
1755	PJ.1223154	Adapter, torque setting
1756	PJ.1246919	Support bracket
1760	PG.1246918	Gauging bracket, front
1758	PJ.809672	Sling
1761	PG.1246984	Gauge, fuel heater overboard duct
1762	PG.1246983	Gauge, oil tank overboard outlet
1757	PJ.1246982	Container
1763	PG.1246923	Gauging bracket, rear
1764	PG.1246926	Gauge, bearings cold vent outlets
1765	PG.1246925	Gauge, No.12 labyrinth left and right-hand vents

Assembly Tools  
Table 1002 (Continued)

SPECIAL TOOLS ETC.

**71-00-01**

Page 1003

Jan 2/80

PRINTED IN ENGLAND

TN14413



OLYMPUS 593  
MK. 810-14-28  
OVERHAUL



TOOL REF.NO.	MANUFACTURER PART NO.	DESCRIPTION
1766	PG.1246928	Gauge, drains tank overboard outlet
1150	PJ.1246921	Container
* 949	PJ.1229346	Torque setting adapter
*1480	P3C.1065044	Wrench, open ended ring
*1767	PT.1223152	Torque setting adapter
*1177	PJ.857348	Engine lifting trunnion, left-hand
*1193	PJ.858944	Engine lifting trunnion, right-hand
*1176	P3C.857341	Engine beam sling vertical/horizontal
*1175	P3C.857340	Engine beam sling vertical/horizontal
*1174	P3C.857339	Engine beam sling vertical/horizontal
* 261	P3C.107300	Mounting bracket, mobile engine stand
* 808	P3C.1089461	Adapter, mobile engine stand
*1314	P3C.892833	Mobile engine sling stand
* 319	P5J.1266441	Adapter, jacking, LP compressor rotor
890	P3C.1212230	Air inlet lifting fixture
234	PJ.1072842	Slave spacer, LP signal system
30	PG.1076082	Setting gauge, LP signal system
1768	PE.19644	Turning tool, LP signal system
260	PJ.1072987	Alignment pin
1991	P5J.1299798	Tensioning tool
240	PE.35246	Protector thermocouple harness
1770	P5G.1262678	Setting bar
1658	T.520387	Torquemeter wrench
1568	S3S.12558000	Crowfoot, socket wrench attachment
3100	PE.17988	Pressure test and inhibiting rig (PTIR)
3101	9970-531-043 (SNECMA)	Adapter
3103	PE.22972	Adapter (Pre S.B. OL.593-73-1 drain valve)
3104	PE.26710	Adapter (S.B. OL.593-73-1 drain valve)

TN14414

Assembly Tools  
Table 1002 (Continued)

SPECIAL TOOLS ETC.

71-00-01

Page 1004  
Jan 2/80

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

Printed in England

TOOL REF.NO.	MANUFACTURER PART NO.	DESCRIPTION
3105	AS.15826	Blank, for purge valve air/fuel spill outlet tube connection
3106	PE.20757	Blank
3107	PE.35092	Blank
3108	AS.15826	Blank, for pilot nozzle connection
3116	PE.29937	Blanking plug
3122	PE.35065	Blank/bleed valve
3109	PE.27277	Clamp
3117	PE.20746	Drain adapter
3118	PE.20748	Drain adapter
3121	PE.27080	Drain adapter
3110	PE.35666	Drain adapter
3120	PE.29969	Drain adapter
3111	PE.29971	Drain adapter
3119	PE.29693	Drain adapter (use in conjunction with AS.15826)
3112	PE.28394	Hose
3113	PE.22893	Hose
3000	PE.22898	Air bleed tube
3001	PE.34076	Drain tube (Pre S.B. OL.593-73-1 drain valve)
3114	PE.26796	Drain tube (S.B. OL.593-73-1 drain valve)
3115	PE.35201	Drain tube
1629	P3C.898067	Cranked ring wrench
*1248	P3C.863655	Engine sling, beam type
*1266	P3C.865978	Mobile engine stand, shop use

Assembly Tools  
Table 1002 (Concluded)

SPECIAL TOOLS ETC.

**71-00-01**Page 1005  
Jun 30/01

**OLYMPUS 593**MK.610-14-28 *sneema*  
OVERHAULELECTRICAL HARNESS AND IGNITION LEADS -  
REMOVAL FROM THE ENGINETABLE OF CONTENTS

Para.	Page
1. General ... ..	101
2. Engine Electrical Harness - Removal from Engine ...	101
A. General ... ..	101
B. Remove Transportation Parts ... ..	101
C. Disconnect Electrical Harness Plugs... ..	103
D. Remove Electrical Harness Clamps ... ..	115
E. Release Electrical Harness from the Front and Rear Block Assemblies ... ..	147
F. Remove Electrical Harness Support Trays and Mounting Brackets from the Engine ... ..	147
3. High Energy Ignition Leads - Removal from Engine ...	149
A. General ... ..	149
B. Remove the Igniter Cables from the Engine... ..	149

TABLE OF ILLUSTRATIONS

Fig.No.	Page
101 Electrical Harness Assembly ... ..	102
102 Electrical Harness Transportation Support Detail ... ..	104
103 Electrical Harness Plug Connection - Grid Locations and Identification (Pre-SB.OL.593-71-8988-32) ... ..	106
104 Electrical Harness Plug Connection - Grid Locations and Identification (SB.OL.593-71-8988-32) ... ..	107
105 Electrical Harness and Plug Connectors Installed on the Engine ... ..	109
106 Electrical Harness Clamps - Grid Location and Identification (Pre-SB.OL.593-71-8988-32) ... ..	113
107 Electrical Harness Clamps - Grid Location and Identification (SB.OL.593-71-8988-32) ... ..	114
108 Disassembly of the First Run of the Electrical Harness from the Engine ... ..	116
109 Harness First Run Clamping Positions ... ..	117
110 Harness First Run Clamping Positions ... ..	121

DISASSEMBLY

**71-00-02**

Contents 1

Jun 1/86

**OLYMPUS 593**MK.610-14-28 *sneema*  
OVERHAULELECTRICAL HARNESS AND IGNITION LEADS -  
REMOVAL FROM THE ENGINETABLE OF CONTENTS

Para.	Page
1. General ... ..	101
2. Engine Electrical Harness - Removal from Engine ...	101
A. General ... ..	101
B. Remove Transportation Parts ... ..	101
C. Disconnect Electrical Harness Plugs... ..	103
D. Remove Electrical Harness Clamps ... ..	115
E. Release Electrical Harness from the Front and Rear Block Assemblies ... ..	147
F. Remove Electrical Harness Support Trays and Mounting Brackets from the Engine ... ..	147
3. High Energy Ignition Leads - Removal from Engine ...	149
A. General ... ..	149
B. Remove the Igniter Cables from the Engine... ..	149

TABLE OF ILLUSTRATIONS

Fig.No.	Page
101 Electrical Harness Assembly ... ..	102
102 Electrical Harness Transportation Support Detail ... ..	104
103 Electrical Harness Plug Connection - Grid Locations and Identification (Pre-SB.0L.593-71-8988-32) ... ..	106
104 Electrical Harness Plug Connection - Grid Locations and Identification (SB.0L.593-71-8988-32) ... ..	107
105 Electrical Harness and Plug Connectors Installed on the Engine ... ..	109
106 Electrical Harness Clamps - Grid Location and Identification (Pre-SB.0L.593-71-8988-32) ... ..	113
107 Electrical Harness Clamps - Grid Location and Identification (SB.0L.593-71-8988-32) ... ..	114
108 Disassembly of the First Run of the Electrical Harness from the Engine ... ..	116
109 Harness First Run Clamping Positions ... ..	117
110 Harness First Run Clamping Positions ... ..	121

DISASSEMBLY

**71-00-02**

Contents 1

Jun 1/86

**OLYMPUS 593**MK.610-14-28 *sneema*  
OVERHAUL

Fig.No.		Page
111	Harness First Run Clamping Positions ... ..	122
112	Harness First Run Clamping Positions ... ..	125
113	Harness First Run Clamping Positions ... ..	126
114	Harness First Run Clamping Positions ... ..	129
115	Disassembly of the Second Run of the Electrical Harness from the Engine (Pre-SB.0L.593-71-8988-32) ... ..	130
116	Disassembly of the Second Run of the Electrical Harness from the Engine (SB.0L.593-71-8988-32) ... ..	131
117	Harness Second Run Clamping Positions ... ..	134
118	Harness Second Run Clamping Positions (Pre-SB.0L.593-71-8988-32) ... ..	135
119	Harness Second Run Clamping Positions (SB.0L.593-71-8988-32) (Sheet 1 of 2) ... ..	136
119	Harness Second Run Clamping Positions (SB.0L.593-71-8988-32) (Sheet 2 of 2) ... ..	137
120	Harness Second Run Clamping Positions ... ..	140
121	Disassembly of the Third Run of the Electrical Harness from the Engine ... ..	141
122	Harness Third Run Clamping Positions ... ..	144
123	Harness Third Run Clamping Positions (Pre SB.71-16)	145
124	Harness Third Run Clamping Positions (SB.71-16)...	146
125	High Energy Harness - Cable Connections ... ..	150
126	High Energy Harness, Layout and Clamping Positions (Sheet 1 of 2) ... ..	152
126	High Energy Harness, Layout and Clamping Positions (Sheet 2 of 2) ... ..	153



OLYMPUS 593

MK.610-14-28

OVERHAUL



ELECTRICAL HARNESS AND IGNITION LEADS -  
REMOVAL FROM THE ENGINE

1. General

- A. This section details the removal of the electrical harness and high energy ignition leads from the engine.
- B. Prior to disassembly, refer to 71-09-00 Disassembly for general information.

2. Engine Electrical Harness - Removal from the Engine

A. General.

- (1) The electrical harness comprises seven multi-cable looms which connect the engine components to the aircraft systems at a common disconnect point (Ref.Fig.101).
- (2) A tray, support bracket and block assemblies located centrally under the engine form the unique point (Ref.Fig.101).
- (3) Straight screwed type connectors at each end of the cables connect to the engine components and to the common disconnect point (Ref.Fig.101).
- (4) Identification of the looms is by tape markers secured to the looms. Markers secured on each loom close to the disconnect connector identify the loom by serial number, part number and letter (Ref.Fig.101).
- (5) Ensure that the electrical harness on removal from the engine is clean and dry, correctly blanked and that the assembly is placed in a clean container for protection.
- (6) Ensure all exposed connections on the engine are suitably blanked.
- (7) Discard the rubber packing strips from the loop clamps after the removal of the loop clamps from the harness.

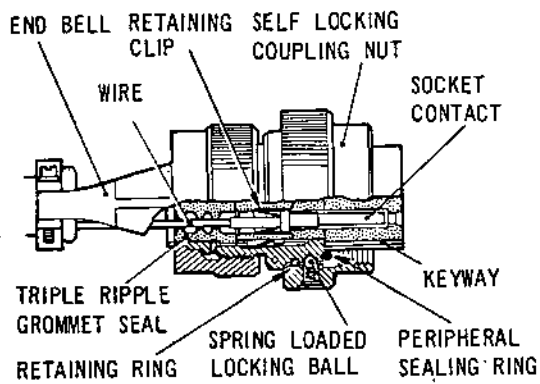
- B. Remove Transportation Parts (Ref.Fig.102).

PRINTED IN ENGLAND

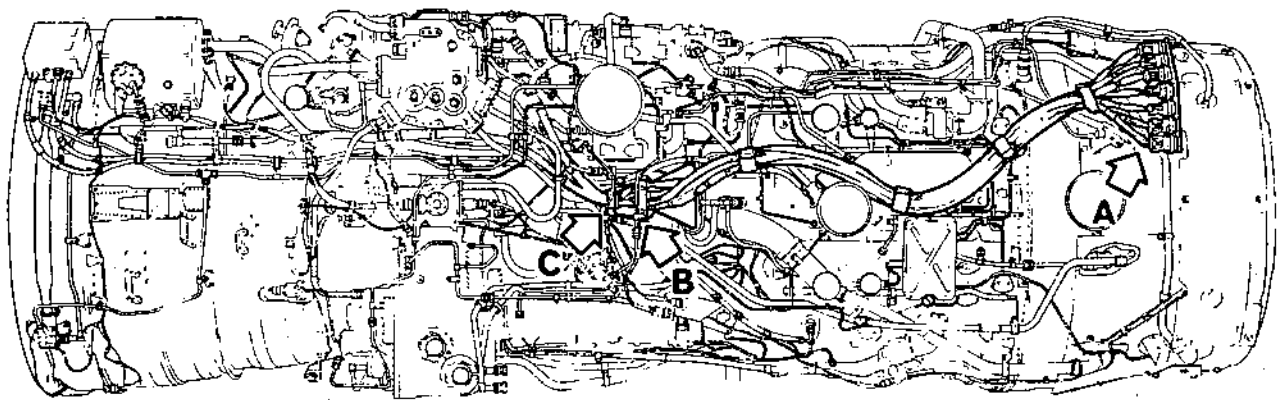
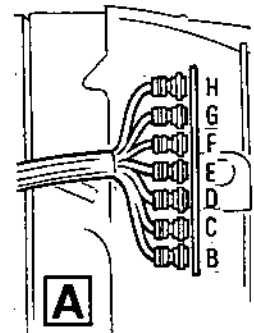
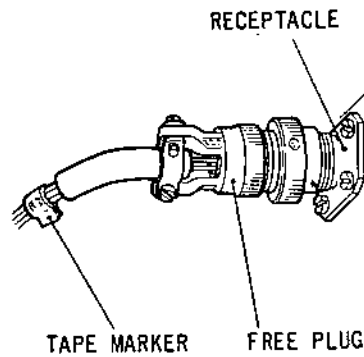


# OLYMPUS 593

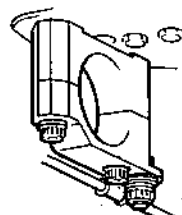
MK.610-14-28  
OVERHAUL



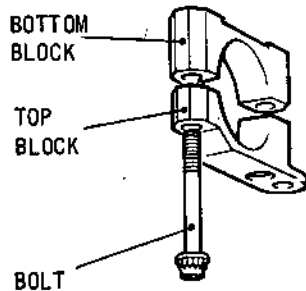
TYPICAL SCREWED CONNECTOR



FRONT BLOCK ASSEMBLY



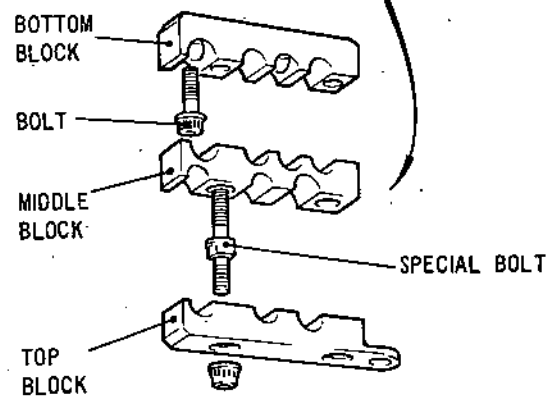
**C**



CR 33290/00A

REAR BLOCK ASSEMBLY

**B**



Electrical Harness Assembly  
Figure 101

DISASSEMBLY

## 71-00-02

Page 102

Aug 27/75





OLYMPUS 593



MK.61D-14-28 SNECMA  
OVERHAUL

(1) General.

To prevent damage during transportation the harness is secured by five harness supports and a mounting plate assembly secured to the engine.

(2) Remove mounting plate.

- (a) Disconnect the seven plugs from their mating dummy receptacles.
- (b) (Post Mod.0L.8180 incorporated). Remove nut, washer and bolt securing spring clip to bracket. Remove clip from the tube and retain for transportation purposes.
- (c) Remove two wingscrews securing the mounting plate to brackets. Remove the mounting plate from the engine and retain for transportation purposes.

(3) Remove harness supports.

- (a) Support A. Remove wingscrew securing clip to harness. Unstrap the harness and remove from the electrical loom.
- (b) Support B. Unstrap the harness and remove from the electrical loom.
- (c) Support C. Unclip harness support from tube. Unstrap the harness and remove from the electrical loom.
- (d) Support D. Unclip harness support from tube. Unstrap the harness and remove from the electrical loom.
- (e) Support E. Remove wingscrew securing harness to the tube. Unstrap the harness support and remove from the electrical loom.
- (f) Retain removed harness supports for transportation purposes.

C. Disconnect Electrical Harness Plugs (Ref.Fig.103, 104 and 105).

(1) General.

DISASSEMBLY

71-00-02

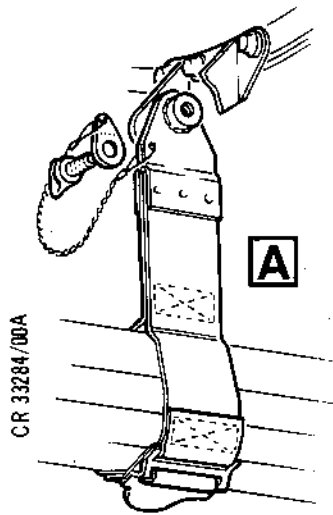
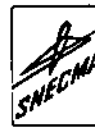
Page 103

Jun 1/94



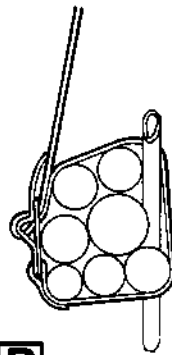
OLYMPUS 593

MK.610-14-28  
OVERHAUL

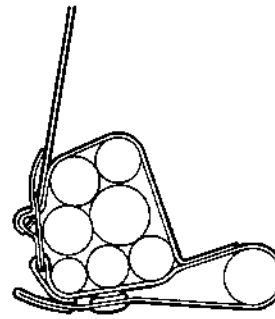


CR 33284/00A

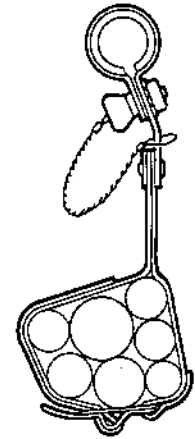
**A**



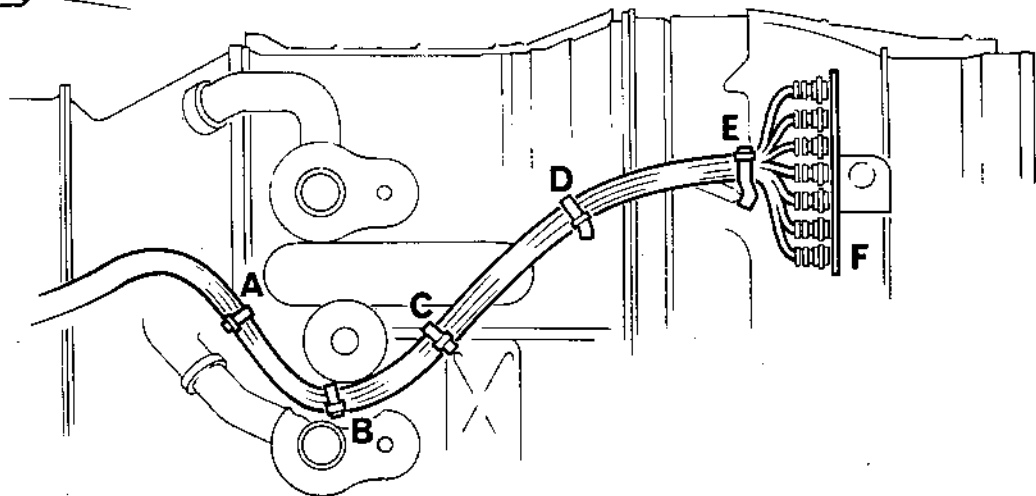
**B**



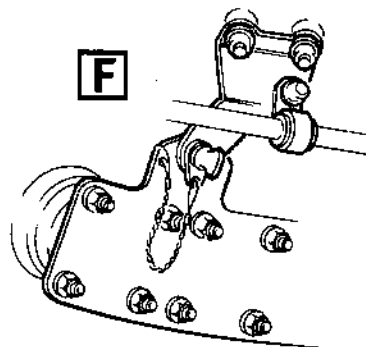
**CD** SIMILAR



**E**



VIEW ON UNDERSIDE OF ENGINE



**F**

Electrical Harness Transportation Support Detail  
Figure 102



OLYMPUS 593

MK.610-14-28

OVERHAUL



To assist identification and location, the plugs are identified by a letter and number e.g. E.1. Location of the plug is by the nomenclature of the component to which the plug is connected. Refer to diagrammatic layout of the harness.

- (2) Disconnect harness plugs - intake case.
  - (a) Disconnect F.1 from the igniter box.
- (3) Disconnect harness plugs - LP compressor case.
  - (a) Disconnect F.2 from the oil contents transmitter.
  - (b) Disconnect G.9 from the fuel recirculating control valve.
  - (c) Disconnect E.16 from the hydraulic pump pressure switch (Pre-SB.71-7). Connection point deleted by SB.71-7.
  - (d) Disconnect C.8 from the fuel filter differential pressure switch indicator.
  - (e) Disconnect G.2 from the fuel filter differential pressure switch heater valve control (Pre-Mod. 8316). Connection point deleted by Mod.8316.
  - (f) Disconnect C.5 from the anti-icing pressure switch.
  - (g) Disconnect D.4 from the air starter motor valve actuator and pressure indicator.
  - (h) Disconnect G.6 from the engine oil inlet thermometer.
  - (j) Disconnect G.1 from the fuel filter inlet thermometer heater valve control.
  - (k) Disconnect D.6 from the engine LP governor speed probe (Pre-Mod.8314). Connection point deleted by Mod.8314.
  - (l) Disconnect H.1 from the hydraulic pump off load valve.

DISASSEMBLY

71-00-02

Page 105

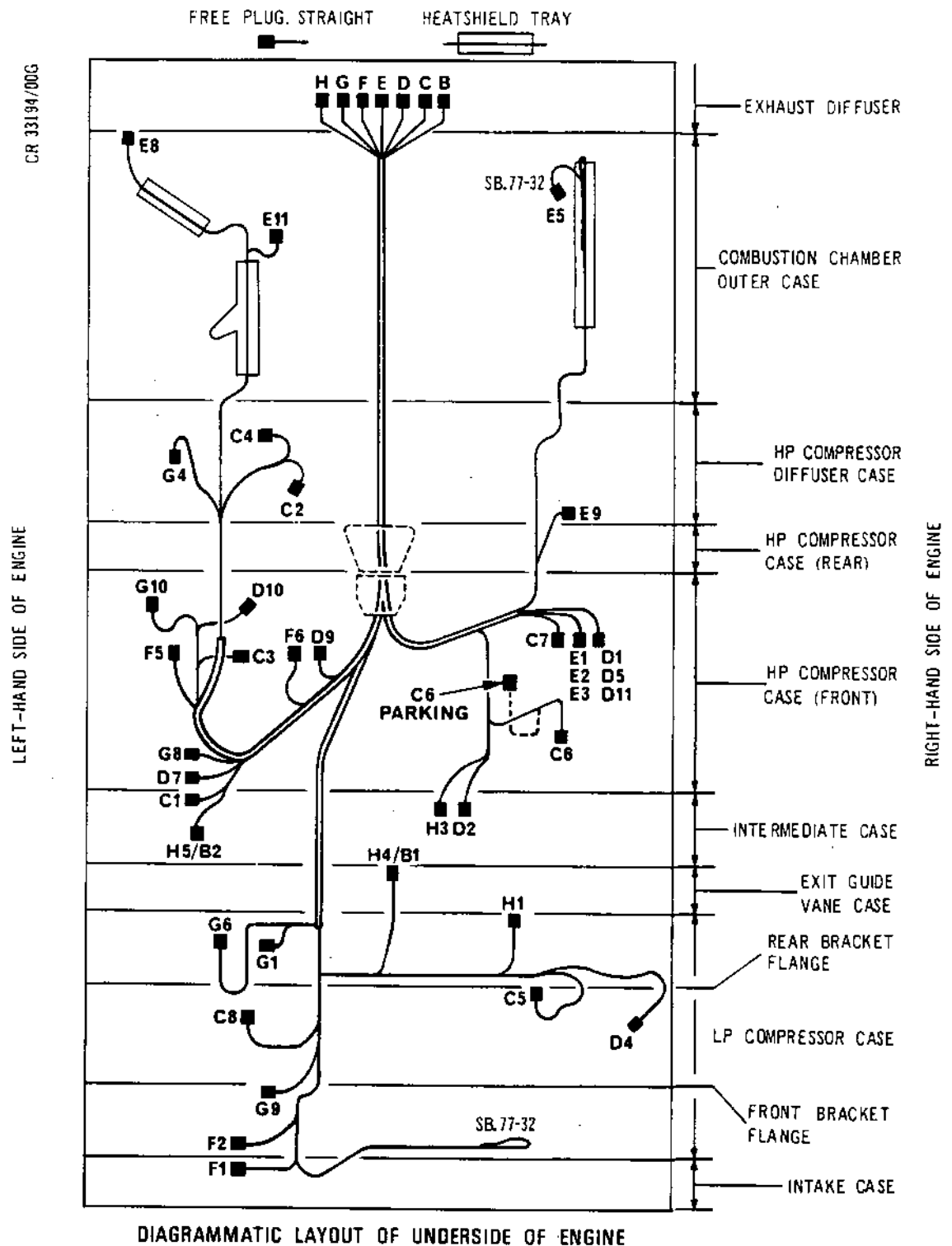
Jun 1/86



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL



Electrical Harness Plug Connection - Grid Locations and Identification (Pre-SB.OL.593-71-8988-32)  
Figure 103

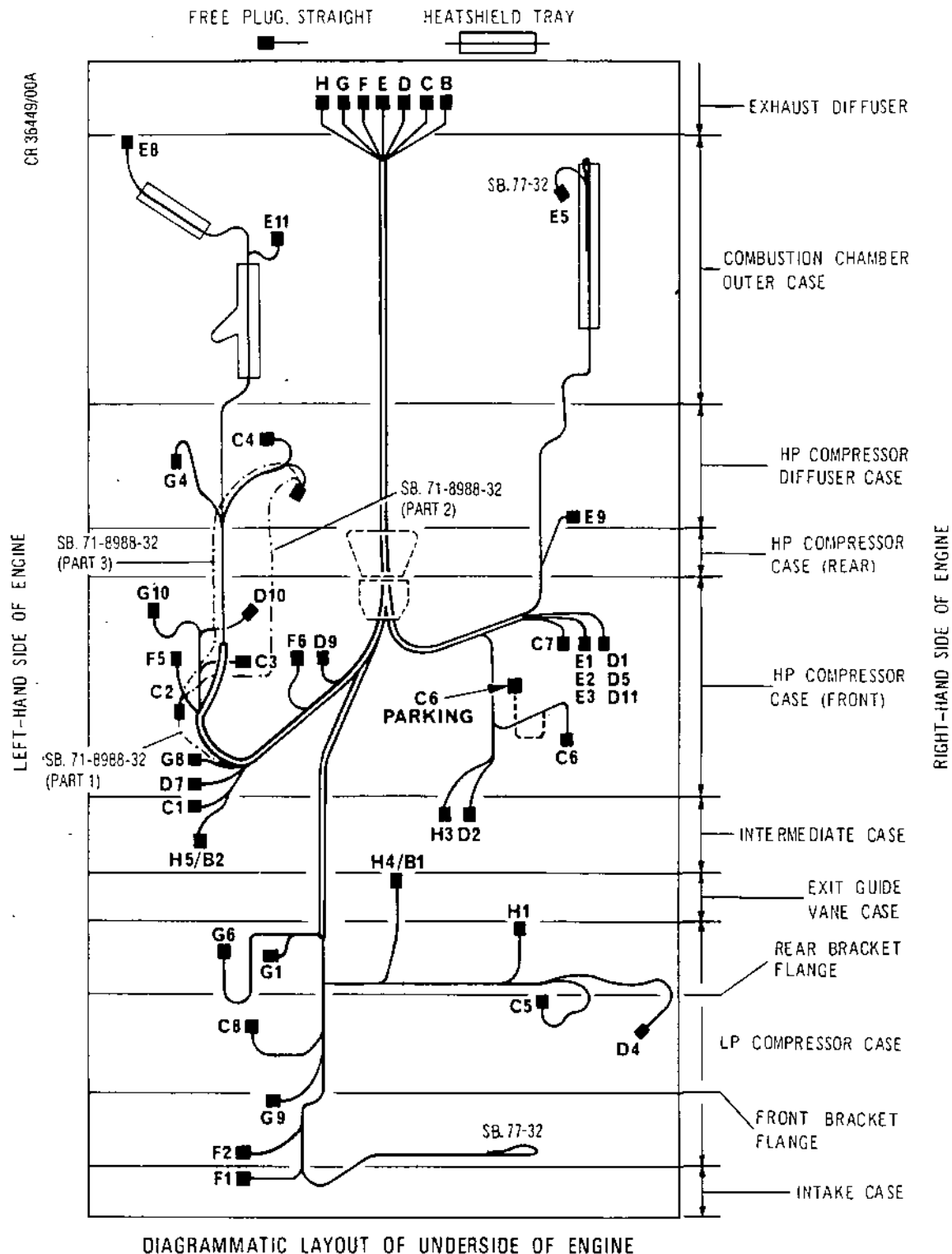
DISASSEMBLY  
71-00-02  
Page 106  
Jun 1/94



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL



Diagrammatic Layout of Underside of Engine  
Electrical Harness Plug Connection - Grid Locations and  
Identification (SB.0L.593-71-8988-32)  
Figure 104



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

This page left blank intentionally

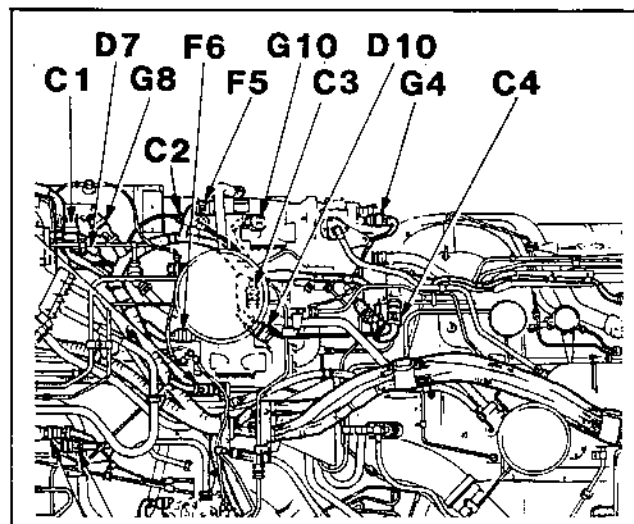
DISASSEMBLY

**71-00-02**

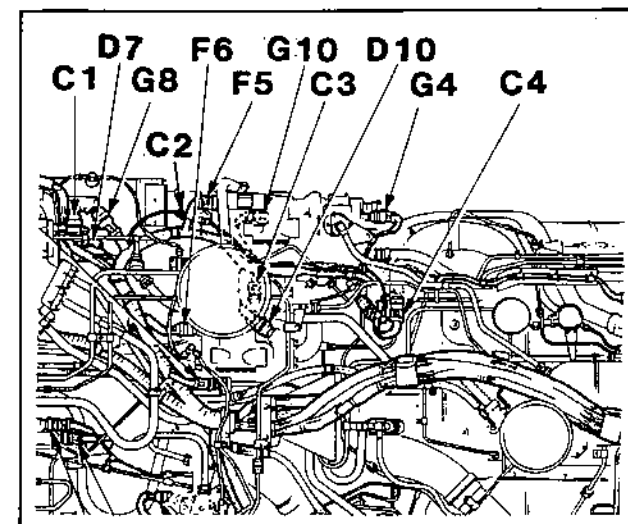
Page 108

Jun 1/94

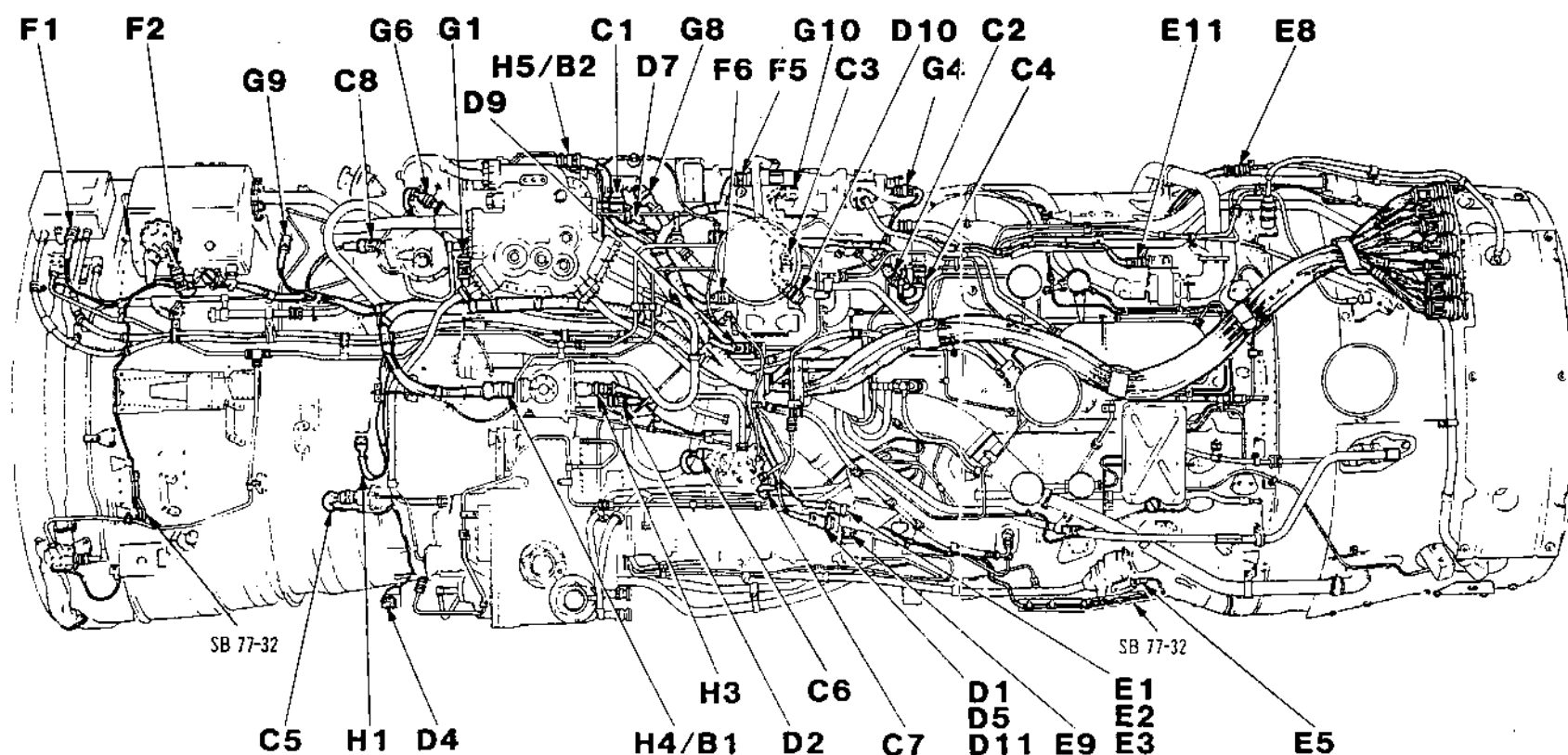
CR 33266/00G



SB.71-8988-32 PARTS 1 AND 2



SB.71-8988-32 PARTS 1 AND 3



Electrical Harness and Plug Connectors  
 Installed on the Engine  
 Figure 105



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

- (4) Disconnect harness plugs - exit guide vane case.
  - (a) Disconnect H.7 from the hydraulic pump pressure switch or the parking position (Pre SB.71-7) using wrench (Tool 1592). Both positions deleted with the embodiment of SB.71-7.
  - (b) Disconnect H.4/B.1 from the No.1 probe.
- (5) Disconnect harness plugs - intermediate case.
  - (a) Disconnect C.1 from the throttle actuator, No.1 (main).
  - (b) Disconnect H.5/B.2 from the No.2 probe.
  - (c) Disconnect H.3 from the engine oil low pressure switch.
  - (d) Disconnect D.2 from the engine oil pressure transmitter.
- (6) Disconnect harness plugs - HP compressor case.
  - (a) Disconnect D.7 from the LP governor control valve solenoid.
  - (b) Disconnect G.8 from the throttle actuator, No.2 (alternative).
  - (c) Disconnect F.5 from the engine fuel flowmeter.
  - (d) Disconnect G.10 from the S.O.V. indicator switch.
  - (e) Disconnect C.3 from the reheat shut-off valve control solenoid.
  - (f) Disconnect F.6 from the reheat fuel flowmeter.
  - (g) Disconnect D.9 from the No.4 bearing failure warning oil outlet thermometer.
  - (h) Disconnect D.10 from the No.4 bearing failure warning oil inlet thermometer.
  - (j) Disconnect C.6 from the hydraulic pump off load valve.
  - (k) Disconnect C.7 from the fuel starting pump.

DISASSEMBLY

71-00-02

Page 111  
Jun 1/94





OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (l) Disconnect E.1 from the IDG disconnect solenoid.
  - (m) Disconnect E.2 from the IDG oil temperature thermometer (inlet).
  - (n) Disconnect E.3 from the IDG oil temperature thermometer (outlet).
  - (p) Disconnect D.1 from the IDG speed probe.
  - (q) Disconnect D.5 from the IDG oil pressure switch.
  - (r) Disconnect D.11 from the IDG mag trim.
  - (s) Disconnect C.2 from the receptacle connector at the bracket on the second stage fuel pump (SB.0L.593-71-8988-32 standard).
  - (t) Remove the nuts and screws and disconnect the receptacle connector from the bracket on the second stage fuel pump (SB.0L.593-71-8988-32 standard).
- (7) Disconnect harness plugs - HP compressor diffuser case.
- (a) Disconnect G.4 from the fuel inlet manifold thermometer.
  - (b) Disconnect C.4 from the reheat purge valve position sensor.
  - (c) Disconnect C.2 from the reheat control motor.
  - (d) Disconnect E.9 from the reheat purge valve solenoid.
- (8) Disconnect harness plugs - combustion chamber case.
- (a) Disconnect E.8 from the reheat flame detector.
  - (b) Disconnect E.11 from the fuel heater air valve solenoid.
  - (c) Disconnect E.5 from the air valve (anti-icing) solenoid (Ref.Fig.119 and 120) (Pre and SB.71-16 standard).

DISASSEMBLY

71-00-02

Page 112

Jun 1/94

CR 33257/00F  
BS00024522/1

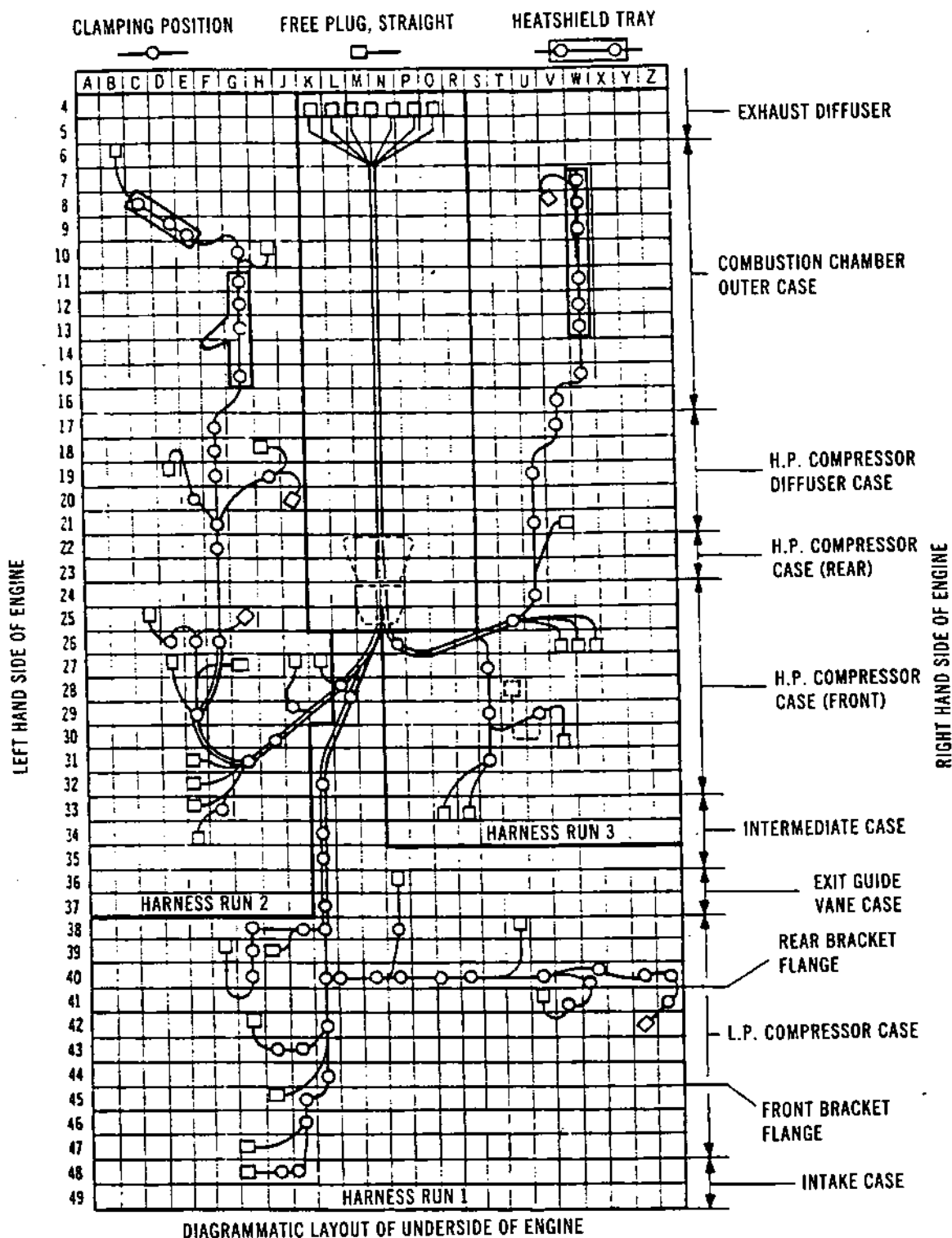


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Electrical Harness Clamps - Grid Location and Identification  
(Air France Configuration)  
Figure 106

CR 36450/00B  
BS00002489/1



OLYMPUS 593



MK.610-14-28

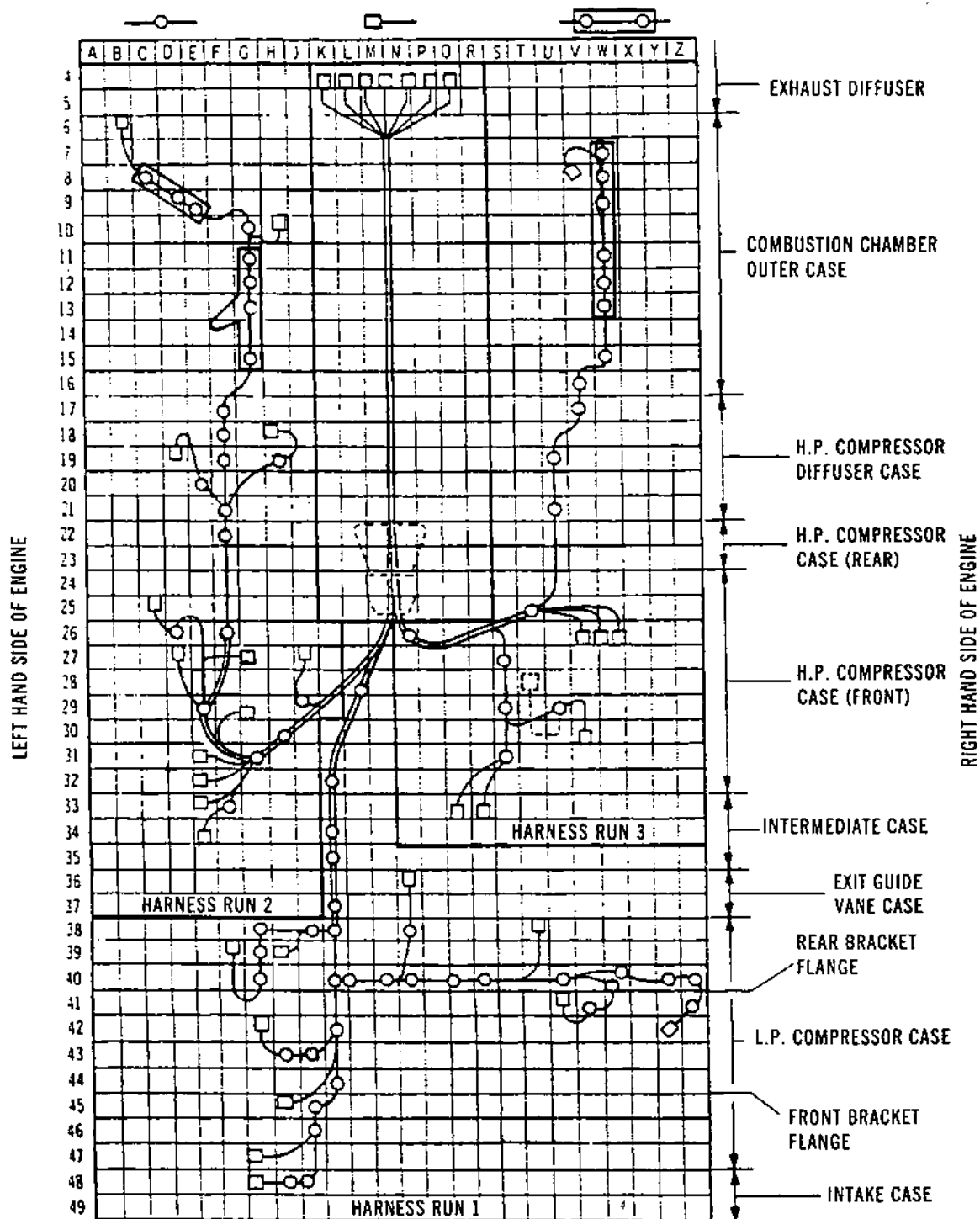
sneema

OVERHAUL

CLAMPING POSITION

FREE PLUG, STRAIGHT

HEATSHIELD TRAY



DIAGRAMMATIC LAYOUT OF UNDERSIDE OF ENGINE

Electrical Harness Clamps - Grid Location and Identification  
(British Airways Configuration)  
Figure 107

DISASSEMBLY

71-00-02

Page 114

Jun 1/99



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

(9) Remove the reheat FCU jump lead (SB.0L.593-71-8988-32 Part 3 standard).

(a) Disconnect the connector plug of the reheat FCU jump lead from the reheat control motor.

(b) Cut the lacing braids which attach the electrical harness to the reheat FCU jump lead.

(c) Remove the jump lead.

D. Remove Electrical Harness Clamps (Ref.Figs.106 and 107).

(1) General.

(a) To identify and locate a clamp on the engine, a grid system with a location number and letter is used in the text e.g. 8C. Refer to Figs.106 and 107 for the grid system.

(b) To facilitate removal of the harness, the complete harness has been broken down into three runs or legs. The order of removal is not obligatory providing all precautions are taken to prevent damage to the harness.

(2) Remove clamps securing the first harness run (Ref. Fig.108).

(a) Clamp 28L (Ref.Fig.109).

(i) Remove the nut and bolt securing the two clamps to the bracket.

(ii) Release the clamps from the harness.

(b) Clamp 32K (Ref.Fig.109).

(i) Remove the nut and bolt securing the clamp to the oil tube.

(ii) Release the clamp from the harness.

(c) Clamp 34K (Ref.Fig.109).

(i) Remove the bolt securing the clamp to the bracket.

DISASSEMBLY

71-00-02

Page 115

Jun 1/94

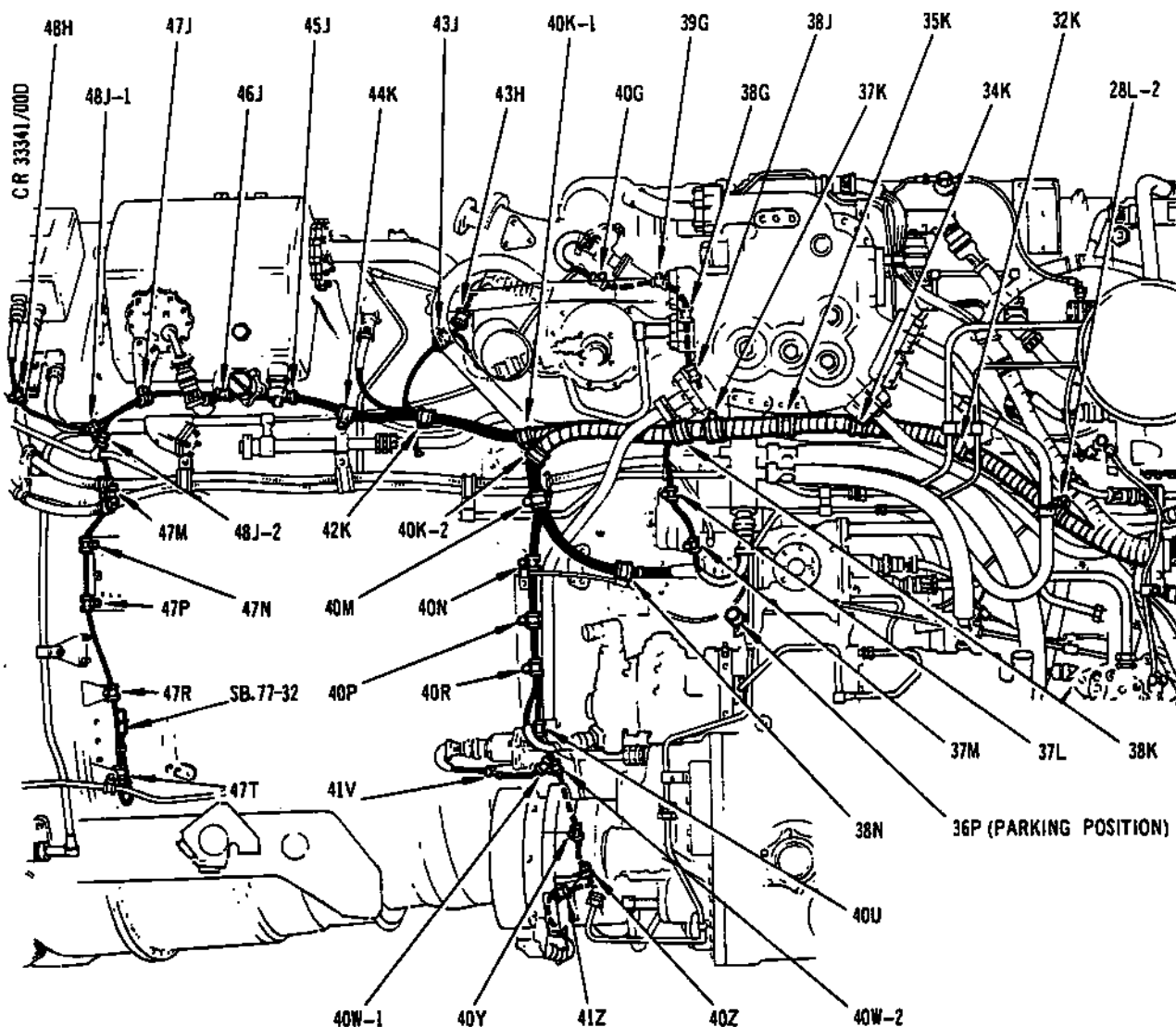


# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema



VIEW ON UNDERSIDE OF ENGINE

Disassembly of the First Run of the Electrical  
Harness from the Engine  
Figure 108

DISASSEMBLY  
**71-00-02**  
Page 116  
Jun 1/94

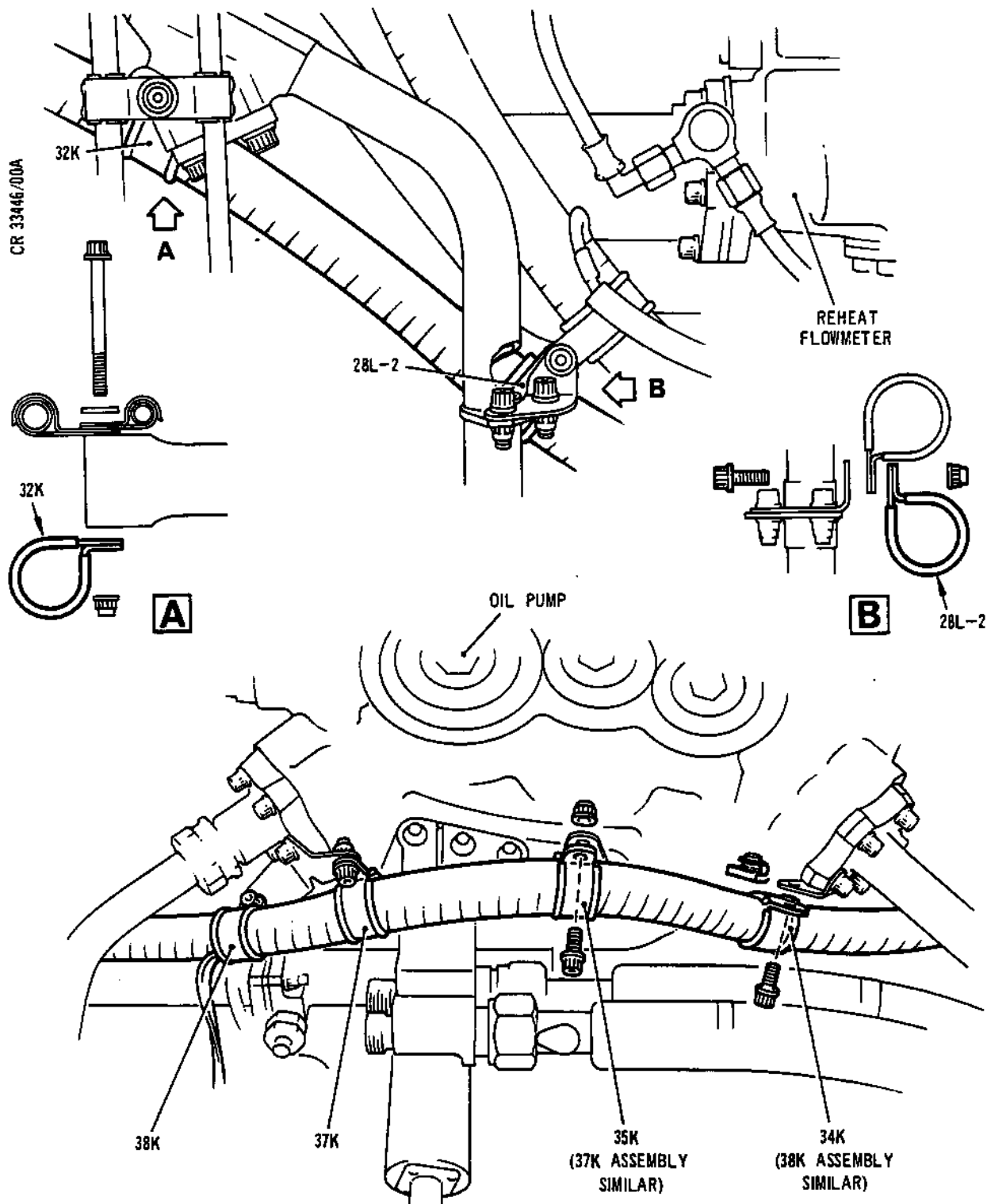


OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA



Harness First Run Clamping Positions  
Figure 109



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

- (ii) Release the clamp from the harness.
- (iii) Remove the clipnut from the bracket.
- (d) Clamp 35K (Ref.Fig.109).
  - (i) Remove the nut and bolt securing the clamp to the bracket.
  - (ii) Release the clamp from the harness.
- (e) Clamp 37K (Ref.Fig.109).
  - (i) Remove the nut and bolt securing the clamp to bracket.
  - (ii) Release the clamp from the harness.
- (f) Clamp 38K (Ref.Fig.109).
  - (i) Remove the nut and bolt securing the clamp to the bracket.
  - (ii) Release the clamp from the harness.
- (g) Clamp 40K (Ref.Fig.110).
  - (i) Remove the nut securing the two clamps to the bolt.
  - (ii) Release the clamps from the harness.
  - (iii) Remove the nut securing bolt to the bracket.
- (h) Clamp 42K (Ref.Fig.110).
  - (i) Remove the nut and bolt securing the clamp to the bracket.
  - (ii) Release the clamp from the harness.
- (j) Clamp 44K (Ref.Fig.110).
  - (i) Remove the nut securing the clamp to the bolt.
  - (ii) Release the clamp from the harness.

DISASSEMBLY

71-00-02

Page 118

Jun 1/94



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

Printed in England

(k) Clamp 45J (Ref.Fig.110).

(i) Remove the nut and bolt securing the clamp to the bracket.

(ii) Release the clamp from the harness.

(l) Clamp 46J (Ref.Fig.111).

(i) Remove the nut and bolt securing the clamp to the bracket.

(ii) Release the clamp from the harness.

(m) Clamp 47J (Ref.Fig.111).

(i) Remove the bolt securing the clamp to the bracket.

(ii) Release the clamp from the harness.

(iii) Remove the clipnut from the bracket.

(n) Clamps 48J (Ref.Fig.111).

(i) Remove the nut securing the two clamps to the bolt.

(ii) Release the clamps from the harness.

(p) Clamps 48H (Ref.Fig.111).

(i) Remove the nut and bolt securing the two clamps to the bracket.

(ii) Release the clamps from both the electrical harness and the ignition lead respectively.

(q) Clamps 47M (Ref.Fig.111).

(i) Remove the nut and bolt securing the three clamps to the bracket.

DISASSEMBLY

71-00-02

Page 119

Jun 1/94





OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

- (ii) Release the three clamps from both the electrical harness and the two ignition leads.
- (r) Clamp 47N (Ref.Fig.111).
  - (i) Remove the nut and bolt securing the clamp to the bracket.
  - (ii) Release the clamp from the harness.
- (s) Clamp 47P (Ref.Fig.111).
  - (i) Remove the nut and bolt securing the clamp to the bracket.
  - (ii) Release the clamp from the harness.
- (t) Clamp 47R (Ref.Fig.112).
  - (i) Remove the nut and bolt securing the clamp to the bracket.
  - (ii) Release the clamp from the harness.
- (u) Clamp 47T (Ref.Fig.112).
  - (i) Remove the nut from the pillar bolt securing the clamp to the bracket.
  - (ii) Release the clamp from the harness.
- (v) Clamp 47U (Ref.Fig.112).
  - (i) Remove the nut and bolt securing the clamp to the bracket (Pre-SB.71-1 Part 1).

DISASSEMBLY

71-00-02

Page 120

Jun 1/94

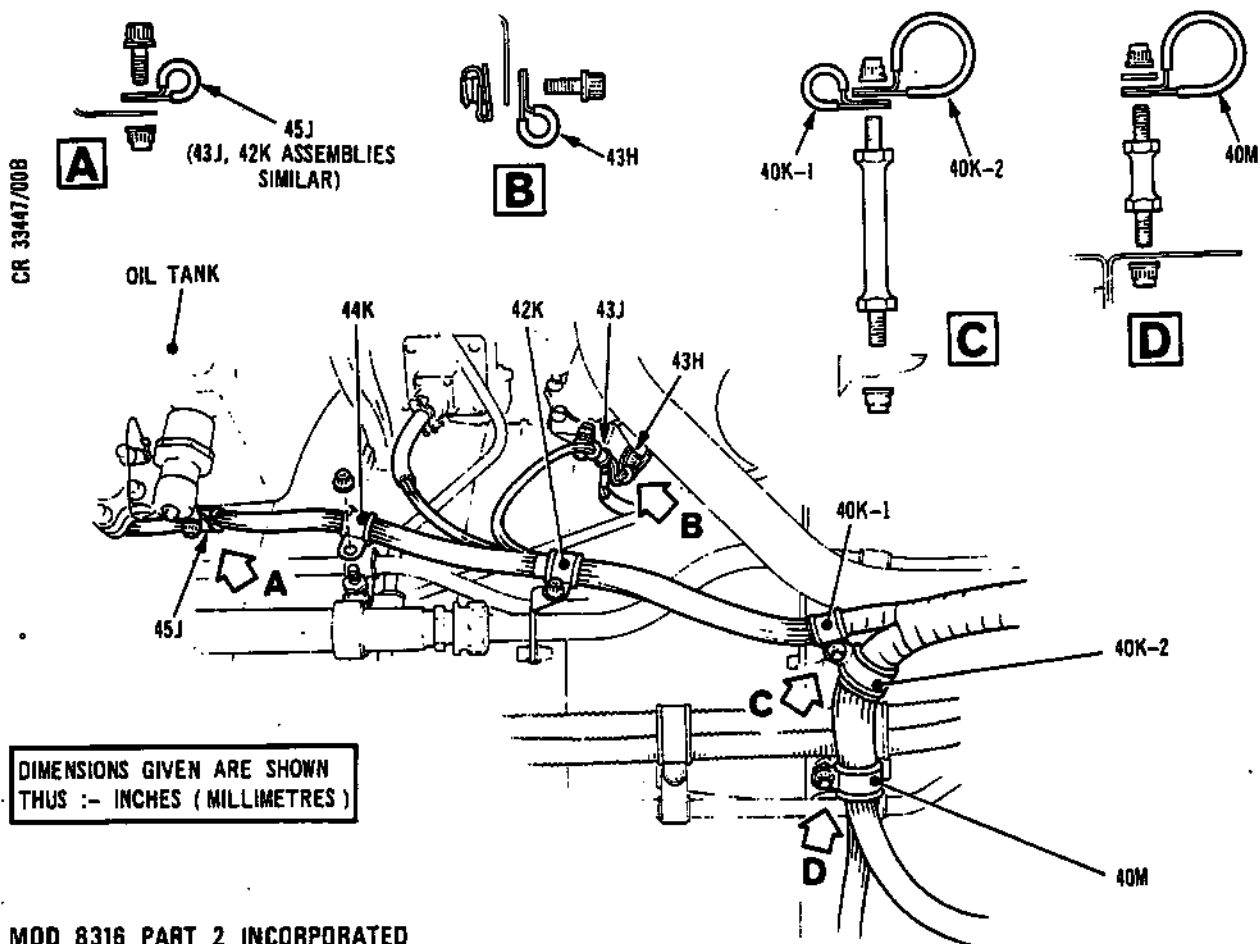


OLYMPUS 593

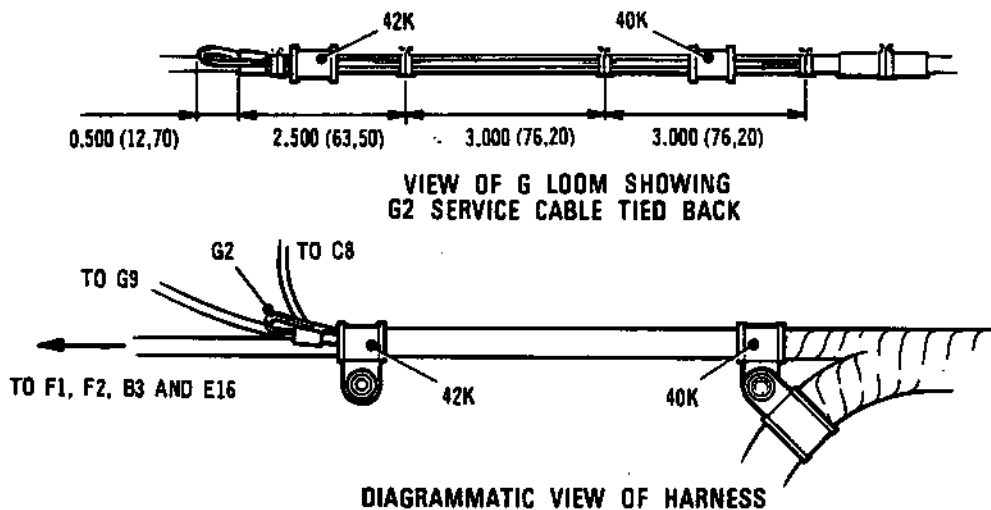


MK.610-14-28  
OVERHAUL

sneema



MOD 8316 PART 2 INCORPORATED



Harness First Run Clamping Positions  
Figure 110



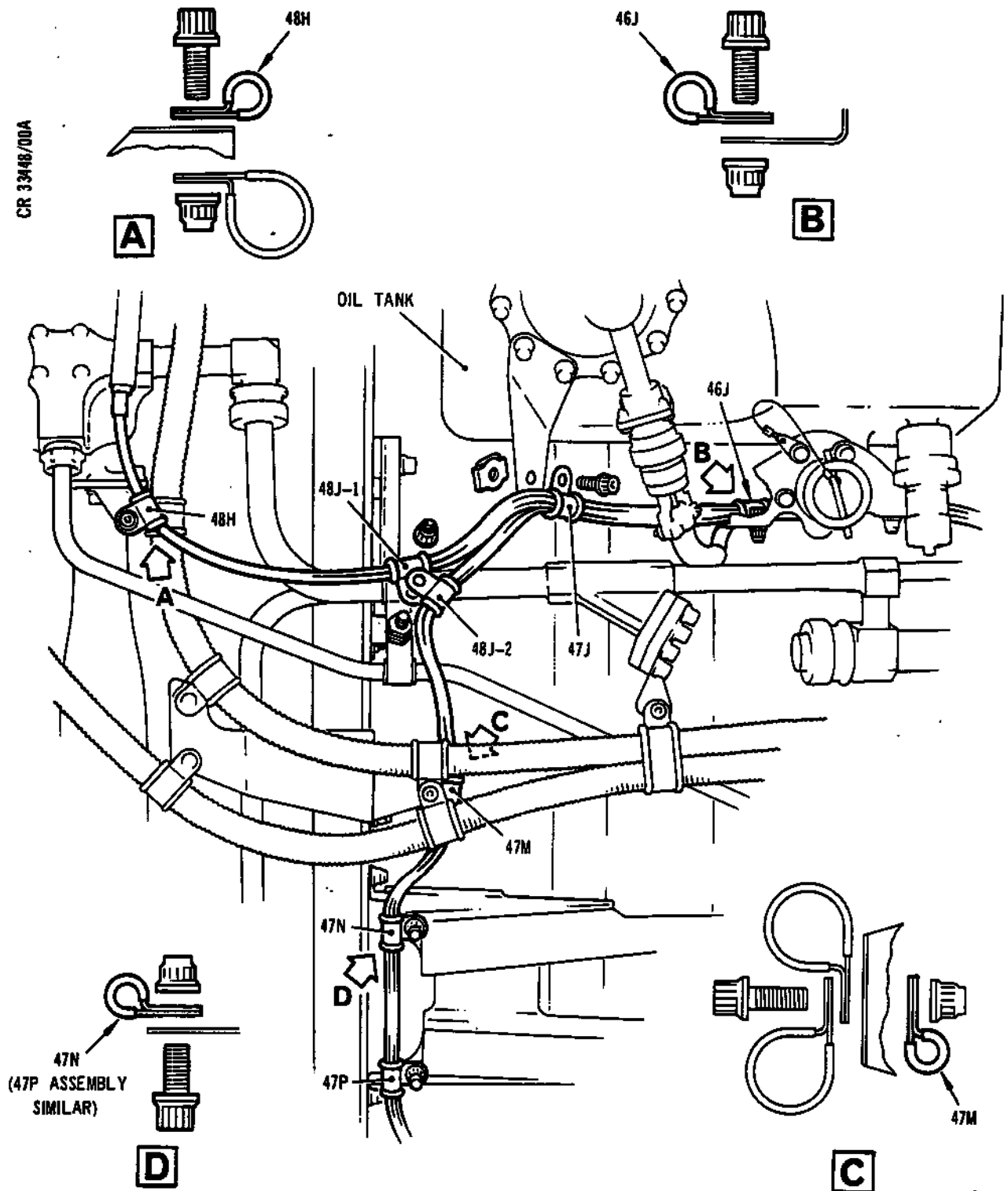
# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

CR 33448/00A



Harness First Run Clamping Positions  
Figure 111

DISASSEMBLY

71-00-02

Page 122

Jun 1/94



OLYMPUS 593



MK.610-14-28 snecma  
OVERHAUL

- (ii) Remove the two nuts securing the two clamps to the pillar bolt (SB.71-1 Part 1, Pre-SB.71-7).
- (iii) Release the clamp(s) from the harness.
- (iv) Attachment at grid reference 47U is deleted (SB.71-7).
- (w) Clamp 46V (Ref.Fig.112).
  - (i) Remove the nut and bolt securing the clamp to the bracket (Pre-SB.71-1 Part 1).
  - (ii) Remove the nut securing the clamp to the pillar bolt (SB.71-1 Part 1, Pre-SB.71-7).
  - (iii) Release the clamp from the harness.
  - (iv) Attachment at grid reference 46V is deleted (SB.71-7).
- (x) Clamp 45V (Ref.Fig.112).
  - (i) Remove the nut and bolt securing the clamp to the bracket (Pre-SB.71-1 Part 1).
  - (ii) Remove the nut securing the clamp to the pillar bolt (SB.71-1 Part 1, Pre-SB.71-7).
  - (iii) Release the clamp from the harness.
  - (iv) Attachment at grid reference 45V is deleted (SB.71-7).
- (y) Clamp 43J (Ref.Fig.110).
  - (i) Remove the nut and bolt securing the clamp to the bracket.
  - (ii) Release the clamp from the harness.

DISASSEMBLY

71-00-02

Page 123

Jun 1/94



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

(z) Clamp 43H (Ref.Fig.110).

- (i) Remove the bolt securing the clamp to the bracket.
- (ii) Release the clamp from the harness.
- (iii) Remove the clipnut from the bracket.

(aa) Clamp 40M (Ref.Fig.110).

- (i) Remove the nut and washer securing the clamp to the pillar bolt.
- (ii) Release the clamp from the harness.
- (iii) Remove the nut securing the pillar bolt to the bracket.

(ab) Clamp 38N (Ref.Fig.113).

- (i) Remove the nut, washer and bolt securing the two clamps to the tube.
- (ii) Release the clamp from the harness.

(ac) Clamp 40N (Ref.Fig.113).

- (i) Remove the nut securing the clamp to the pillar bolt (Pre-SB.71-3 or Mod.8406).
- (ii) Remove the nut and bolt securing the clamp to the bracket (SB.71-3 and Pre-Mod.8406).
- (iii) Release the clamp from the harness.

(ad) Clamp 40P (Ref.Fig.113).

- (i) Remove the nut and bolt securing the clamp to the bracket (SB.71-3).
- (ii) Release the clamp from the harness.

**NOTE:** There is no clamping at position 40P (Pre-SB.71-3).

DISASSEMBLY

71-00-02

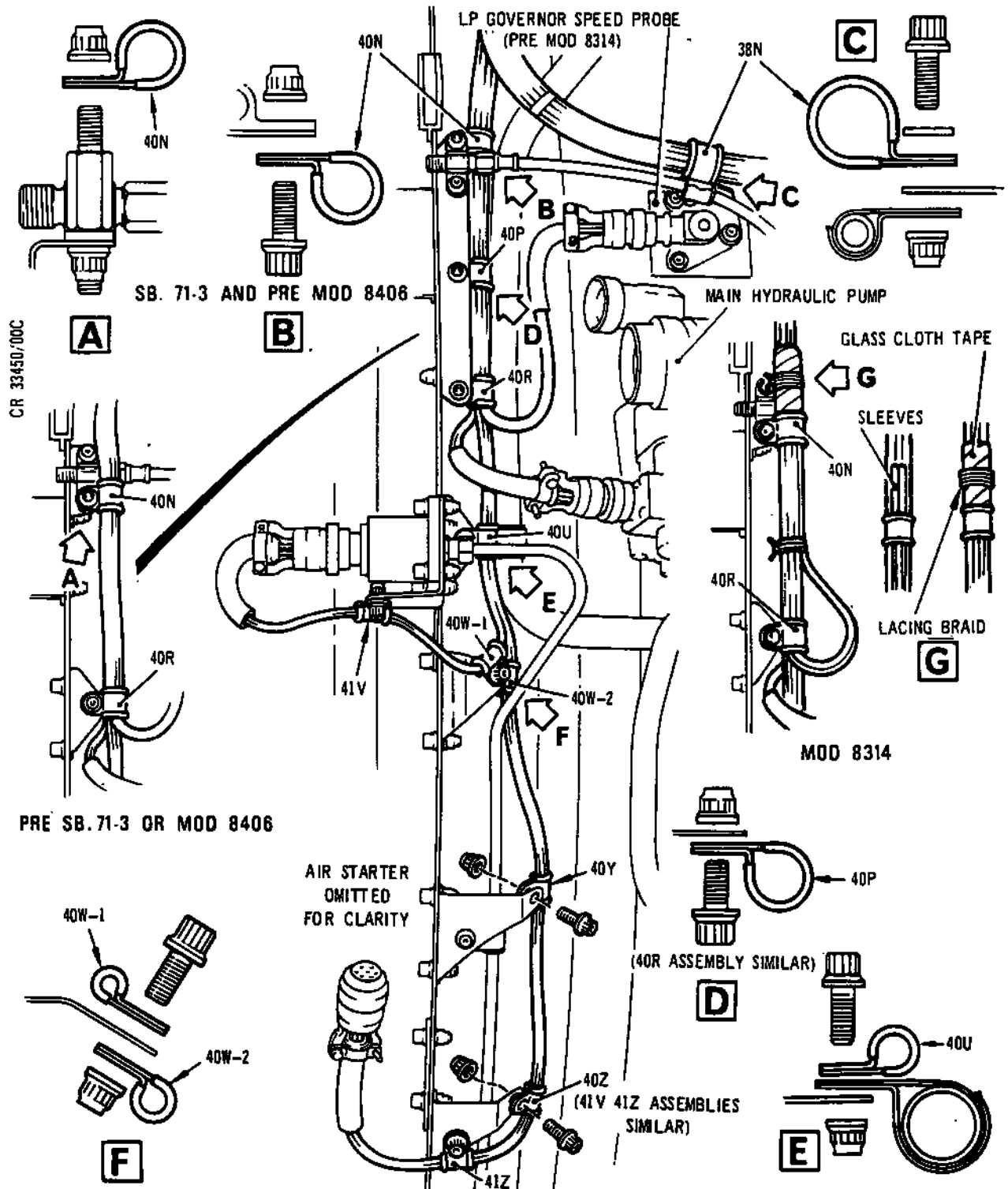
Page 124  
Jun 1/94



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL



Harness First Run Clamping Positions  
Figure 112



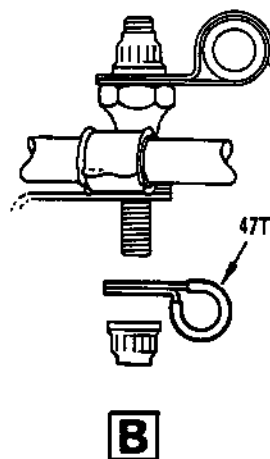
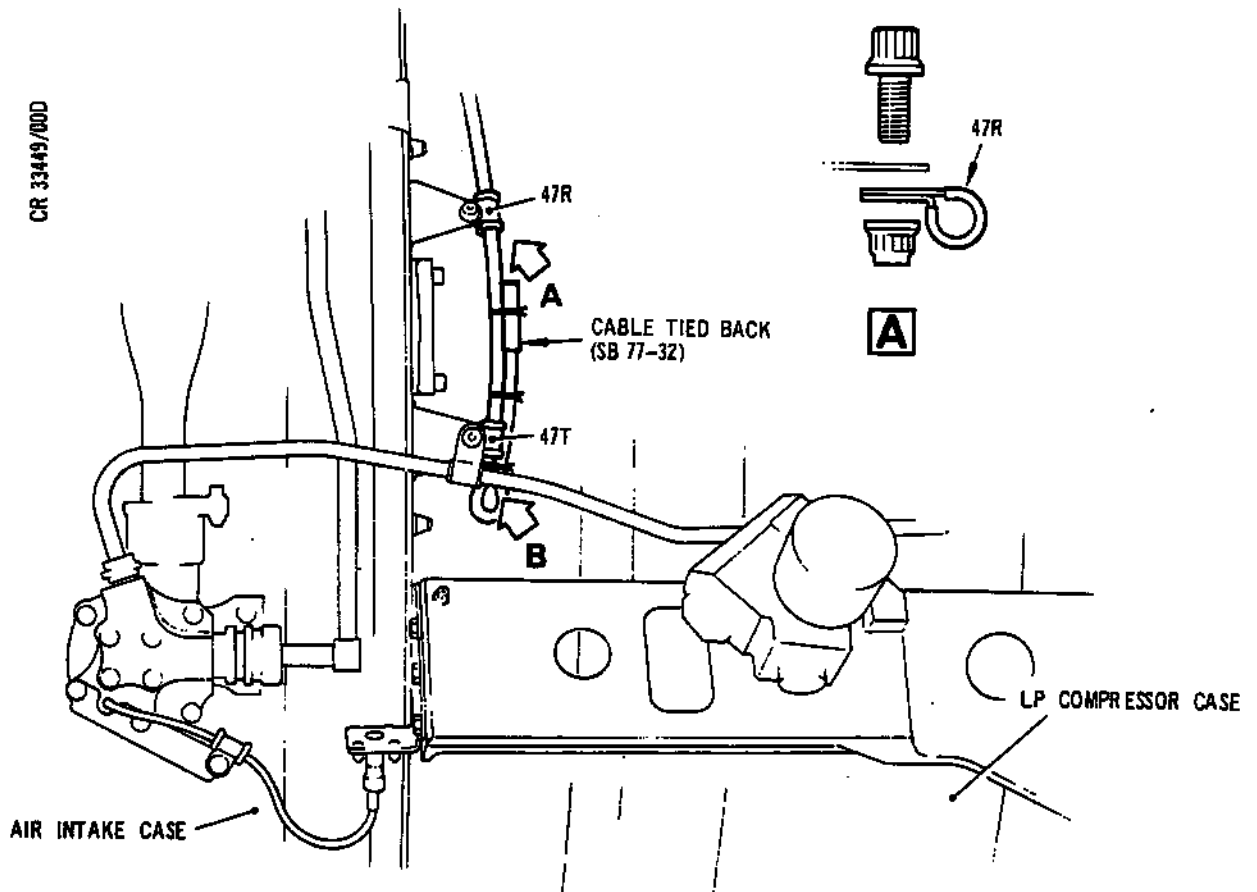
OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

CR 33449/000



Harness First Run Clamping Positions  
Figure 113

DISASSEMBLY

71-00-02

Page 126

Jun 1/94



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England

(ae) Clamp 40R (Ref.Fig.113).

(i) Remove the nut and bolt securing the clamp to the bracket.

(ii) Release the clamp from the harness.

(af) Clamps 40U (Ref.Fig.113).

(i) Remove the nut and bolt securing the two clamps to the bracket.

(ii) Release the clamp from the harness.

(ag) Clamps 40W (Ref.Fig.113).

(i) Remove the nut and bolt securing the two clamps to the bracket.

(ii) Release both clamps from the harness.

(ah) Clamp 41V (Ref.Fig.113).

(i) Remove the nut and bolt securing the clamp to the bracket.

(ii) Release the clamp from the harness.

(aj) Clamp 40Y (Ref.Fig.113).

(i) Remove the nut and bolt securing the clamp to the bracket.

(ii) Release the clamp from the harness.

(ak) Clamp 40Z (Ref.Fig.113).

(i) Remove the nut and bolt securing the clamp to the bracket.

(ii) Release the clamp from the harness.

(al) Clamp 41Z (Ref.Fig.113).

(i) Remove the nut and bolt securing the clamp to the bracket.

(ii) Release the clamp from the harness.

DISASSEMBLY

71-00-02

Page 127

Jun 1/94





OLYMPUS 593



MK.610-14-28  
OVERHAUL

(am) Clamp 38J (Ref.Fig.114).

- (i) Remove the bolt securing the clamp to the bracket.
- (ii) Release the clamp from the harness.
- (iii) Remove the clipnut from the bracket.

(an) Clamp 38G (Ref.Fig.114).

- (i) Remove the bolt securing the clamp to the bracket.
- (ii) Release the clamp from the harness.
- (iii) Remove the clipnut from the bracket.

(ap) Clamp 39G (Ref.Fig.114).

- (i) Remove the nut and bolt securing the clamp to the bracket.
- (ii) Release the clamp from the harness.

(aq) Clamp 40G (Ref.Fig.114).

- (i) Remove the nut and bolt securing the clamp to the bracket.
- (ii) Release the clamp from the harness.

(ar) Clamp 37L (Ref.Fig.114).

- (i) Remove the nut and bolt securing the clamp to the bracket.
- (ii) Release the clamp from the harness.

(as) Clamp 37M (Ref.Fig.114).

- (i) Remove the bolt securing the clamp to the bracket.
- (ii) Release the clamp from the harness.
- (iii) Remove the clipnut from the bracket.

DISASSEMBLY

71-00-02

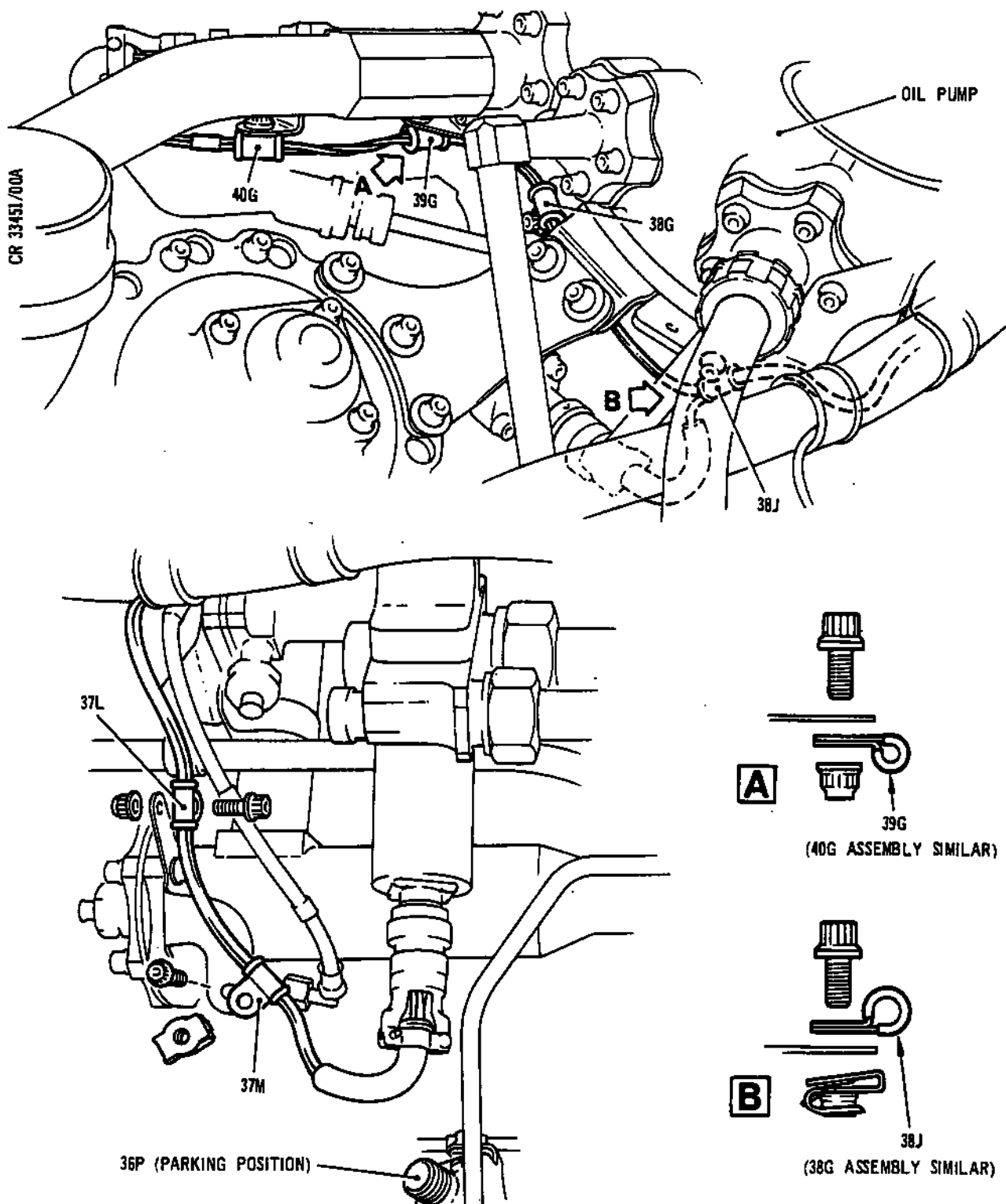
Page 128  
Jun 1/94



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL



Harness First Run Clamping Positions  
Figure 114

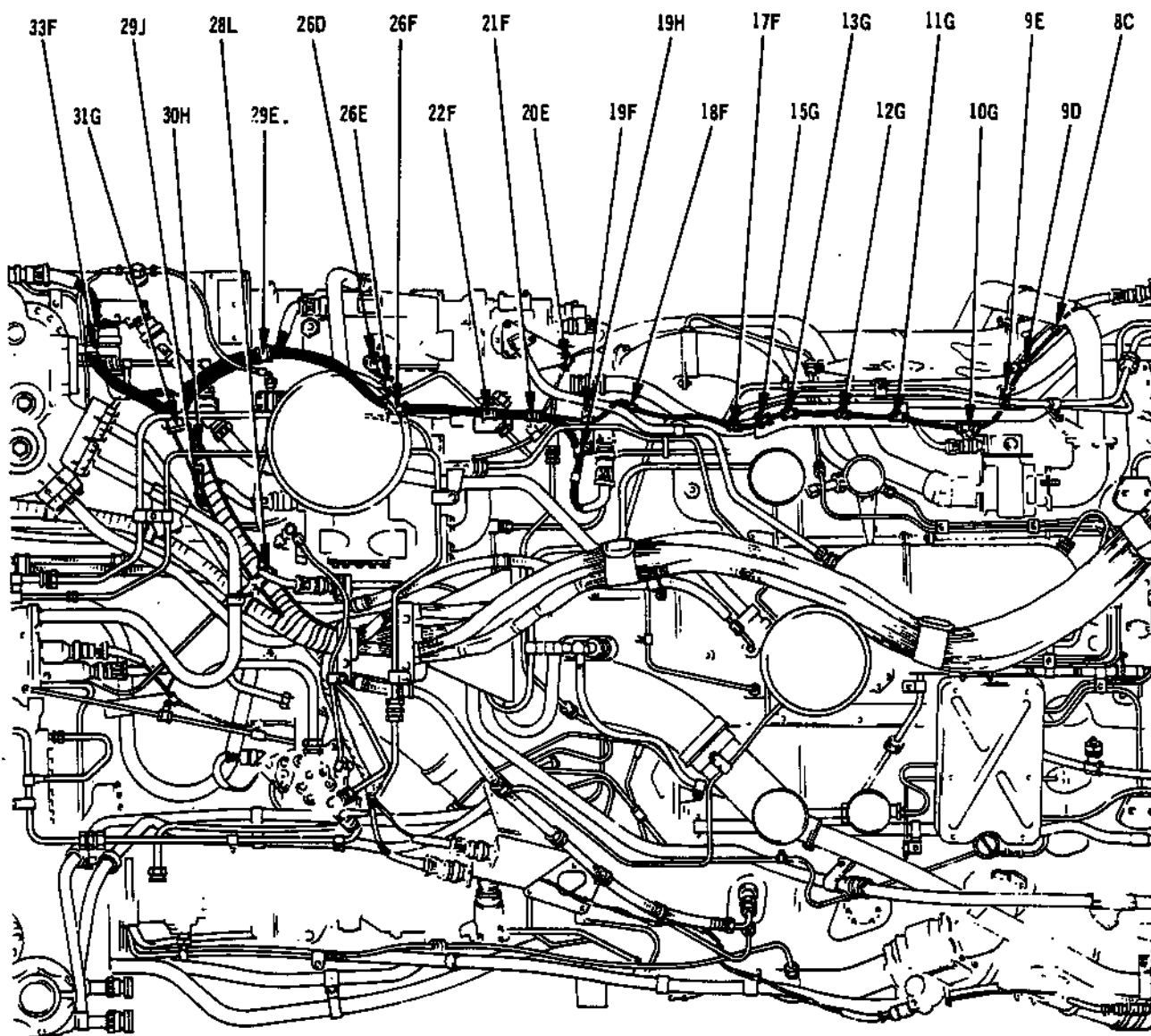


# OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

CR 33352/00A



VIEW ON UNDERSIDE OF ENGINE

Disassembly of the Second Run of the  
Electrical Harness from the Engine  
(Pre-SB.0L.593-71-8988-32)  
Figure 115

DISASSEMBLY

## 71-00-02

Page 130

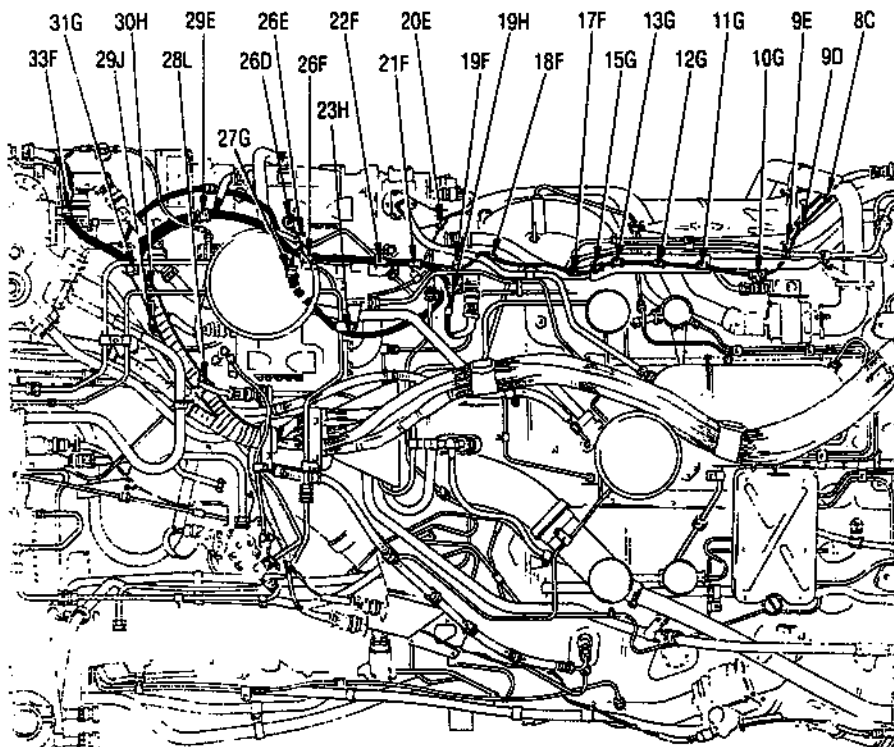
Jun 1/94



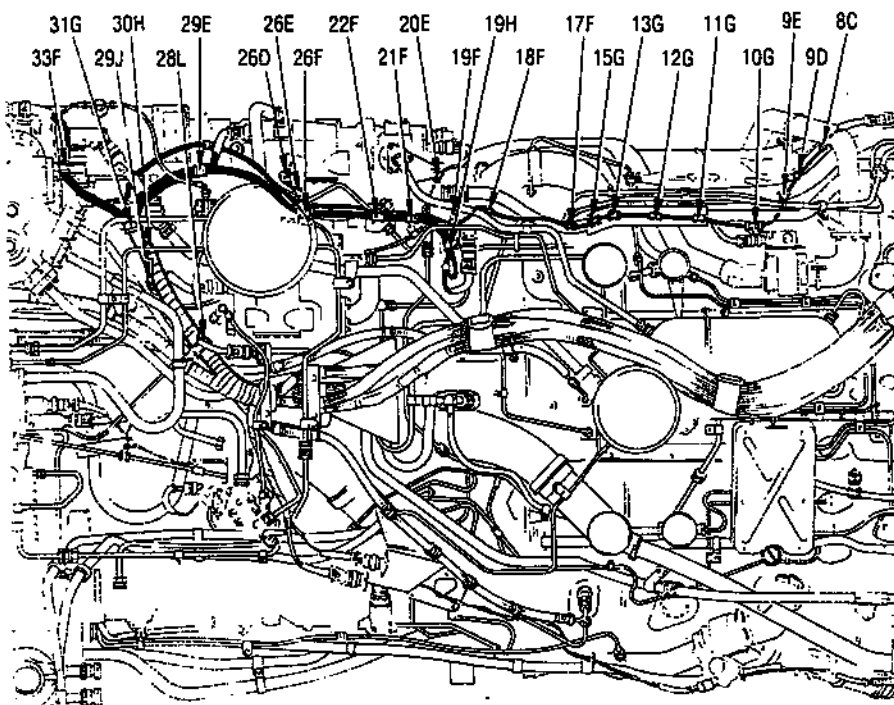
OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL



VIEW ON UNDERSIDE OF ENGINE  
SB.71-8988-32 PARTS 1 AND 2



VIEW ON UNDERSIDE OF ENGINE  
SB.71-8988-32 PART 1 AND 3

Disassembly of the Second Run of the  
Electrical Harness from the Engine  
(SB.OL.593-71-8988-32)

Figure 116

DISASSEMBLY  
**71-00-02**  
Page 131  
Jun 1/94



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (3) Remove clamps securing the second harness run (Ref.Figs.115 and 116).
- (a) Clamps 29J (Ref.Fig.117).
    - (i) Remove the nut, bolt and two washers securing the clamps to the bracket.
    - (ii) Release the clamp from the harness.
  - (b) Clamp 30H (Ref.Fig.117).
    - (i) Remove the bolt securing the clamp to the bracket.
    - (ii) Release the clamp from the harness.
    - (iii) Remove the clipnut from the bracket.
  - (c) Clamp 31G (Ref.Fig.117).
    - (i) Remove the bolt securing the clamp to the bracket.
    - (ii) Release the clamp from the harness.
    - (iii) Remove the clipnut from the bracket.
  - (d) Clamps 33F (Ref.Fig.117).
    - (i) Remove the bolt securing the clamp to the bracket.
    - (ii) Release the clamp from the harness.
  - (e) Clamp 29E (Ref.Fig.118).
    - (i) Remove the bolt securing the clamp to the bracket.
    - (ii) Release the clamp from the harness.
    - (iii) Remove the clipnut from the bracket.
  - (f) Clamps 26F (Ref.Fig.118).
    - (i) Remove the nut, bolt and washer securing the two clamps to the bracket.
    - (ii) Release the clamp from the harness.

DISASSEMBLY

71-00-02

Page 132

Jun 1/94

**OLYMPUS 593**MK.610-14-28 *sneema*  
OVERHAUL

- (g) Clamp 26E (Ref.Fig.118).
  - (i) Remove the nut and bolt securing the clamp to the bracket.
  - (ii) Release the clamp from the harness.
- (h) Clamp 26D (Ref.Fig.118).
  - (i) Remove the nut and bolt securing the clamp to the bracket.
  - (ii) Release the clamp from the harness.
- (j) Clamp 22F (Ref.Fig.118).
  - (i) Remove the nut securing the clamp to the pillar bolt.
  - (ii) Release the clamp from the harness.
- (k) Clamps 21F (Ref.Fig.118).
  - (i) Remove the nut, bolt and washer securing the two clamps to the bracket.
  - (ii) Release the clamp from the harness.
- (l) Clamp 20E (Ref.Fig.118).
  - (i) Remove the nut and bolt securing the clamp to the bracket.
  - (ii) Release the clamp from the harness.
- (m) Clamp 19F (Ref.Fig.118).
  - (i) Remove the bolt securing the clamp to the bracket.
  - (ii) Release the clamp from the harness.
  - (iii) Remove the clipnut from the bracket.
- (n) Clamp 19H (Ref.Fig.118).
  - (i) Remove the bolt securing the clamp to the bracket.

DISASSEMBLY

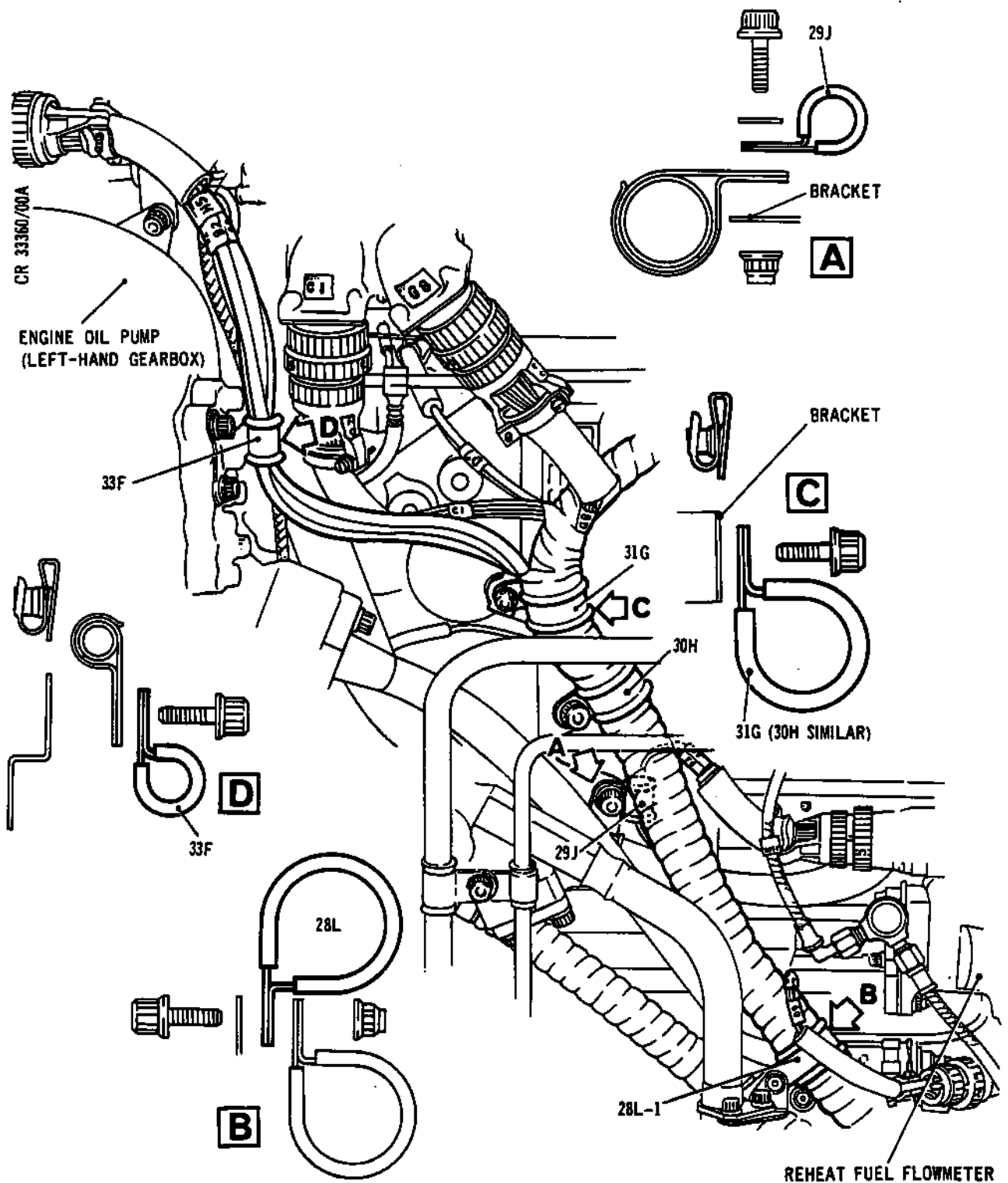
**71-00-02**Page 133  
Jun 1/94



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL



Harness Second Run Clamping Positions  
Figure 117

DISASSEMBLY  
**71-00-02**  
Page 134  
Jun 1/94

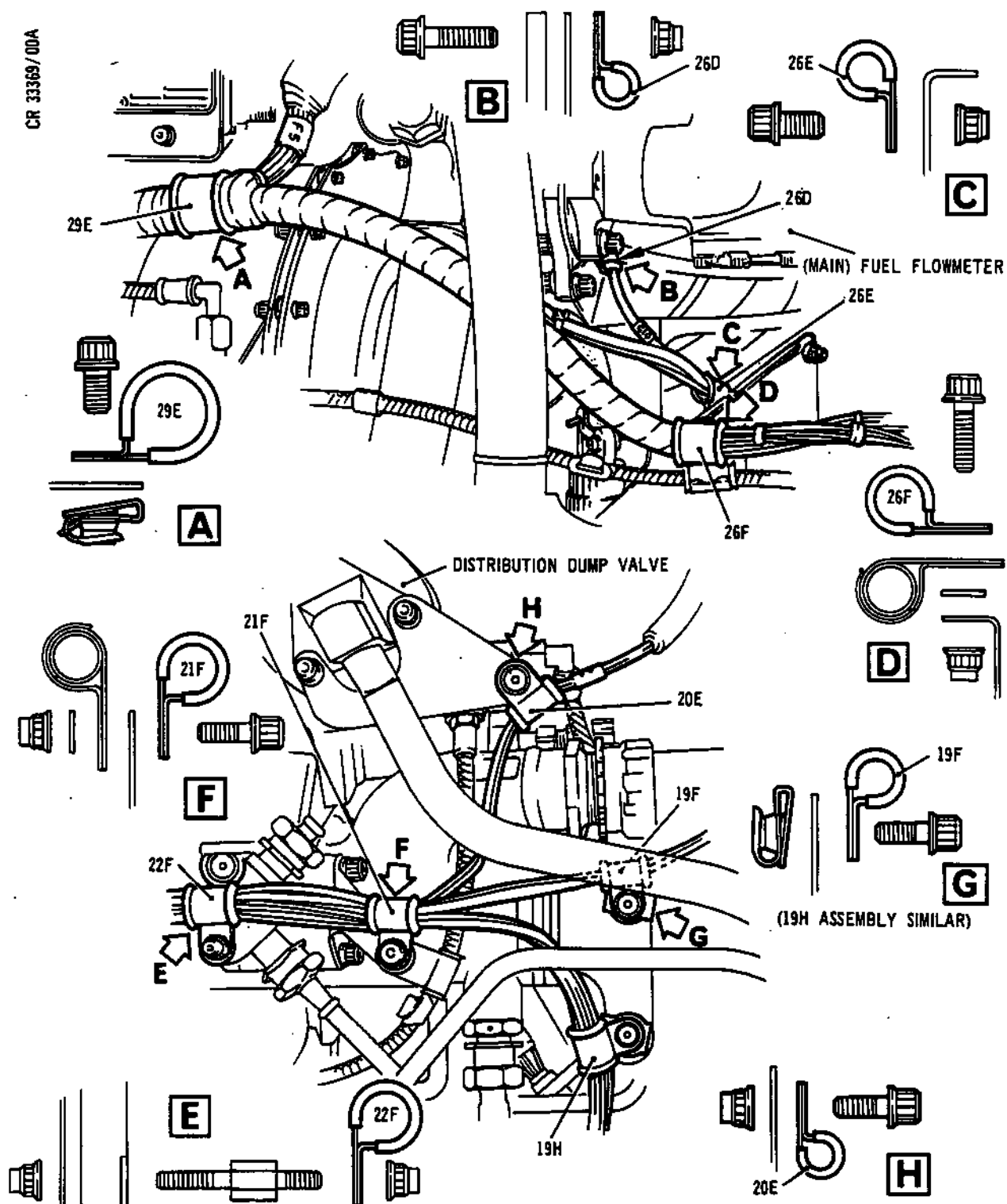


OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

CR 33369/00A



Harness Second Run Clamping Positions  
(Pre-SB.0L.593-71-8988-32)  
Figure 118



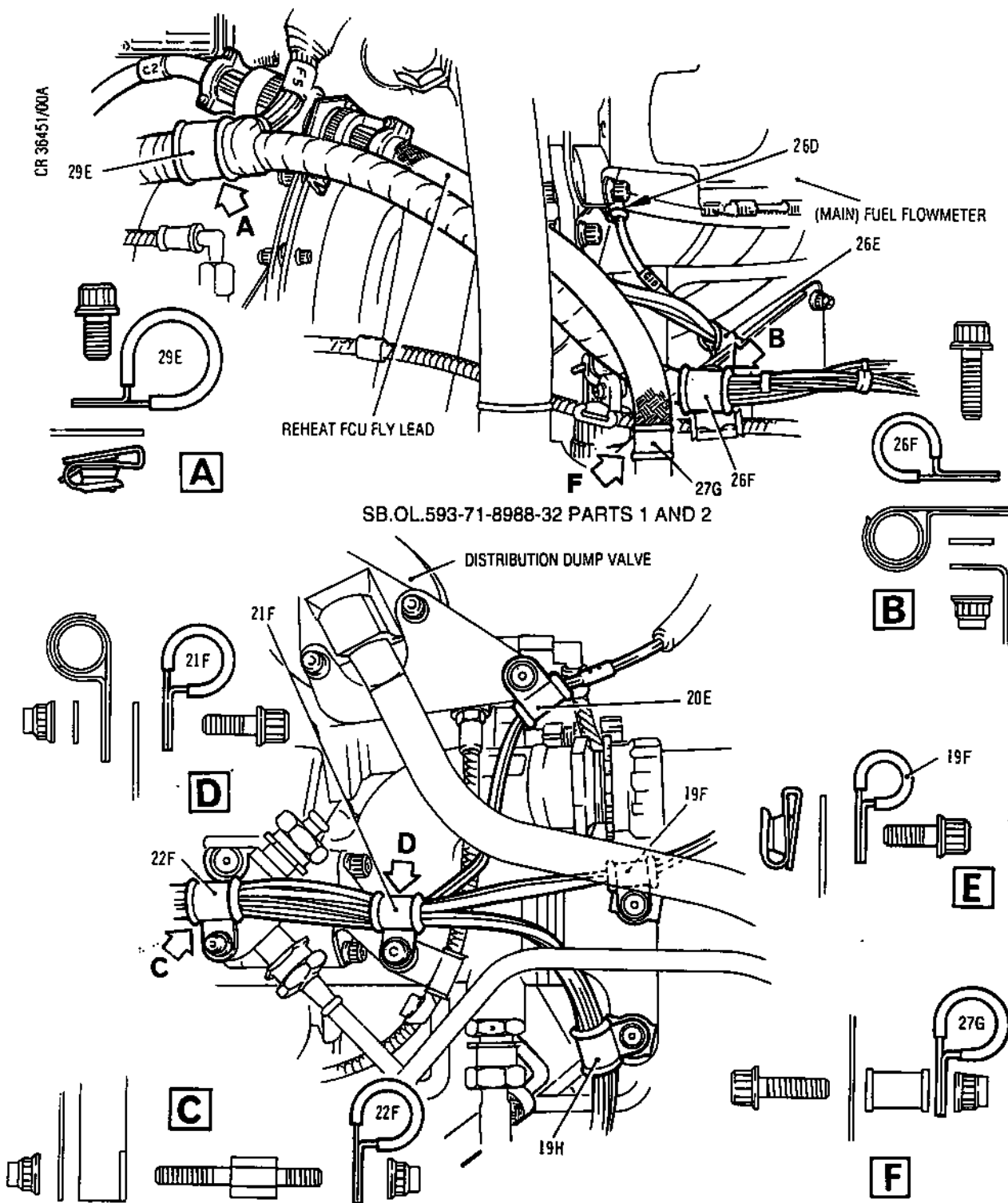


# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema



SB.OL.593-71-8988-32 PARTS 1 AND 2

Harness Second Run Clamping Positions  
(SB.OL.593-71-8988-32)  
Figure 119 (Sheet 1 of 2)

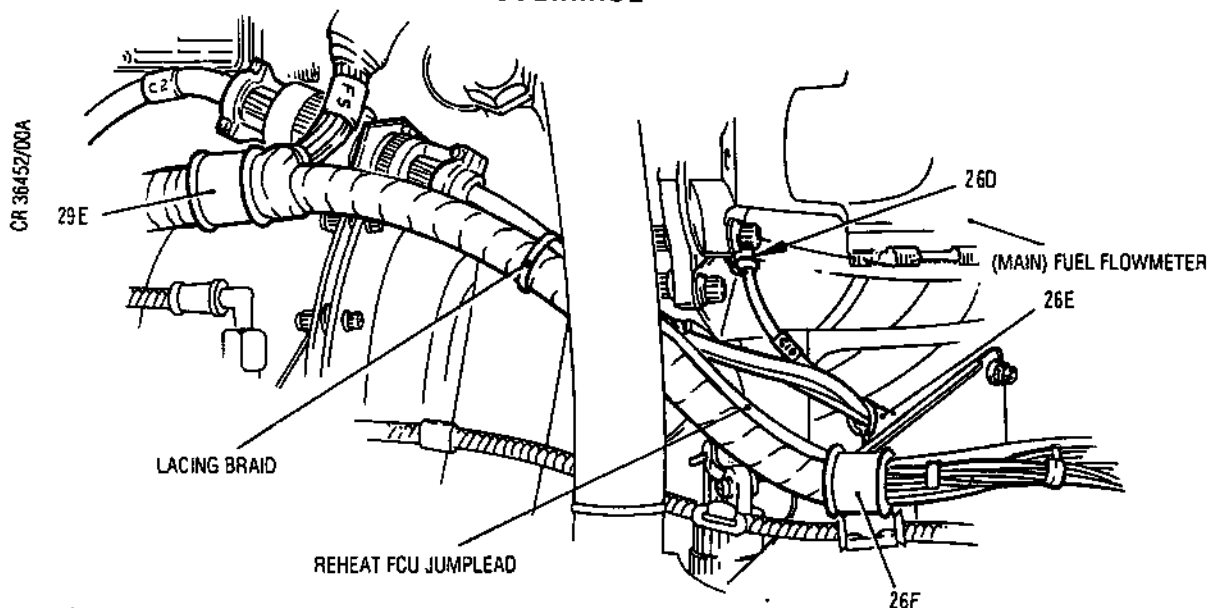
DISASSEMBLY  
**71-00-02**  
Page 136  
Jun 1/94



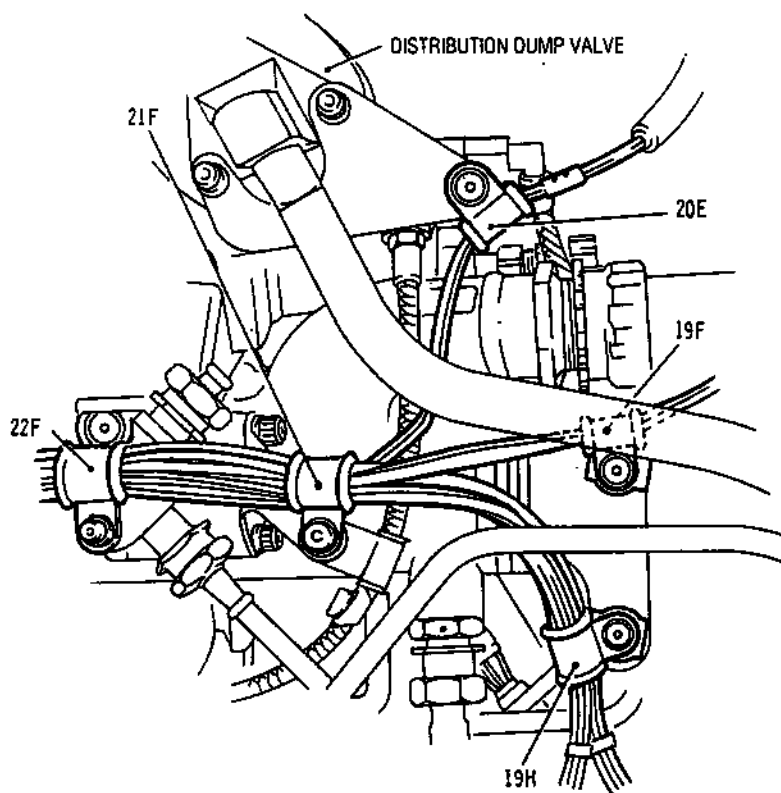
OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL



SB.OL.593-71-8988-32 PARTS 1 AND 3



SB.OL.593-71-8988-32 PARTS 1 AND 3  
Harness Second Run Clamping Positions  
(SB.OL.593-71-8988-32)  
Figure 119 (Sheet 2 of 2)



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

- (ii) Release the clamp from the harness.
- (iii) Remove the clipnut from the bracket.
- (p) Clamp 18F (Ref.Fig.118).
  - (i) Remove the nut and bolt securing the clamp to the bracket.
  - (ii) Release the clamp from the harness.
- (q) Clamp 17F (Ref.Fig.120).
  - (i) Remove the nut and bolt securing the clamp to the bracket.
  - (ii) Release the clamp from the harness.
- (r) Clamp 15G (Ref.Fig.120).
  - (i) Remove the nut and bolt securing the clamp to the tray assembly.
  - (ii) Release the clamp from the harness.
- (s) Clamp 13G (Ref.Fig.120).
  - (i) Remove the nut and bolt securing the clamp to the tray assembly.
  - (ii) Release the clamp from the harness.
- (t) Clamp 12G (Ref.Fig.120).
  - (i) Remove the nut and bolt securing the clamp to the tray assembly.
  - (ii) Release the clamp from the harness.
- (u) Clamp 11G (Ref.Fig.120).
  - (i) Remove the nut and bolt securing the clamp to the tray assembly.
  - (ii) Release the clamp from the harness.
- (v) Clamp 10G (Ref.Fig.120).
  - (i) Remove the nut and bolt securing the clamp to the bracket.

DISASSEMBLY

71-00-02

Page 138

Jun 1/94



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

Printed in England

- (ii) Release the clamp from the harness.
- (w) Clamp 9E (Ref.Fig.120).
  - (i) Remove the nut and bolt securing the clamp to the tray assembly.
  - (ii) Release the clamp from the harness.
- (x) Clamp 9D (Ref.Fig.120).
  - (i) Remove the bolt securing the clamp to the tray assembly.
  - (ii) Release the clamp from the harness.
- (y) Clamp 8C (Ref.Fig.120).
  - (i) Remove the nut and bolt securing the clamp to the tray assembly.
  - (ii) Release the clamp from the harness.
- (4) Remove the clamps securing the third harness run (Ref.Fig.121).
  - (a) Clamps 27S (Ref.Fig.122).
    - (i) Remove the nut and bolt securing the two clamps to the bracket.
    - (ii) Release the clamp from the harness.
  - (b) Clamps 29S (Ref.Fig.122).
    - (i) Remove the nut and bolt securing the two clamps to the bracket.
    - (ii) Release the clamp from the harness.
  - (c) Clamps 31S (Ref.Fig.122).
    - (i) Remove the bolt securing the two clamps to the bracket.
    - (ii) Release the clamp from the harness.
    - (iii) Remove the clipnut from the bracket.

DISASSEMBLY

71-00-02

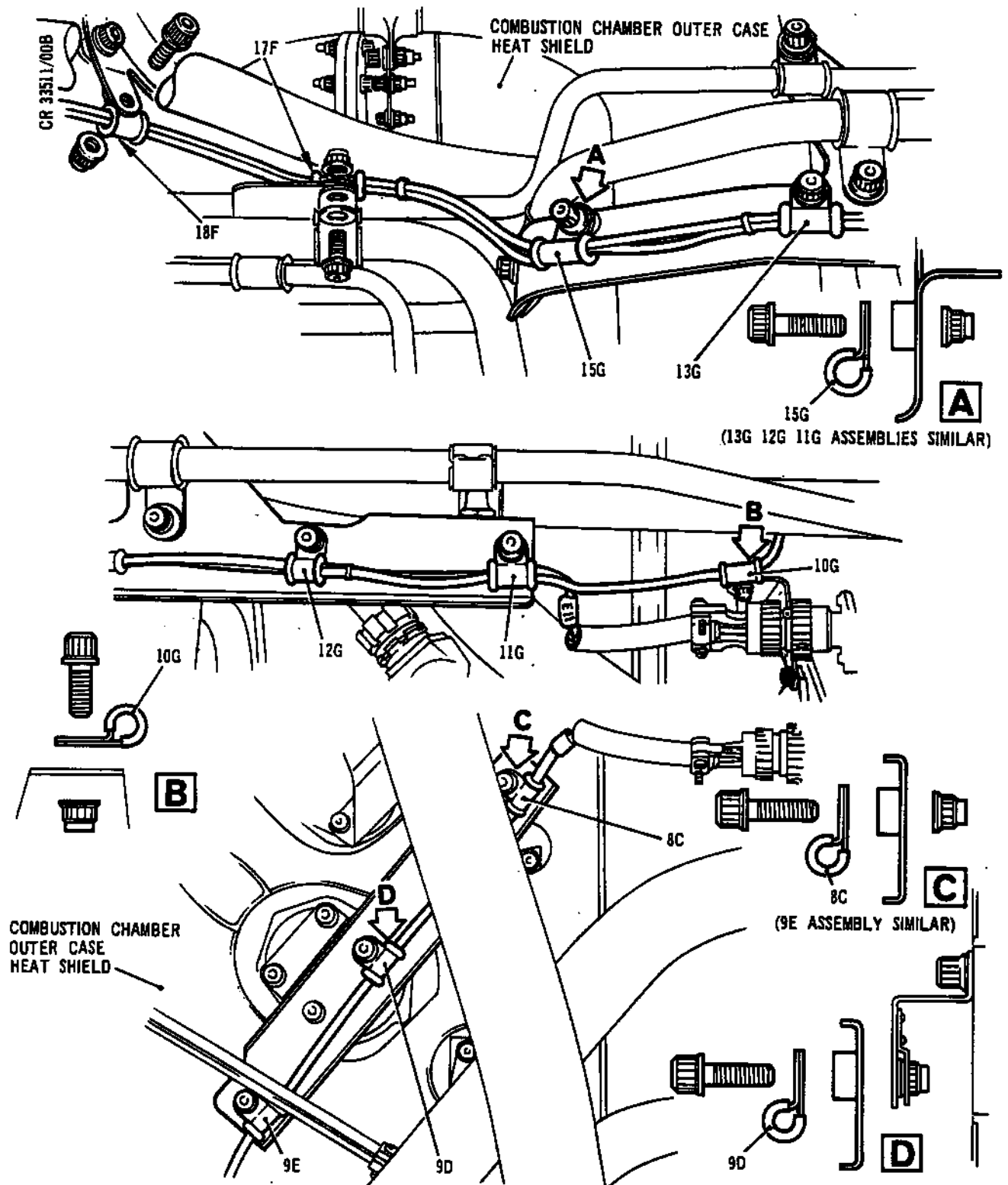
Page 139  
Jun 1/94



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL



Harness Second Run Clamping Positions  
Figure 120

DISASSEMBLY

71-00-02

Page 140

Jun 1/94



# OLYMPUS 593

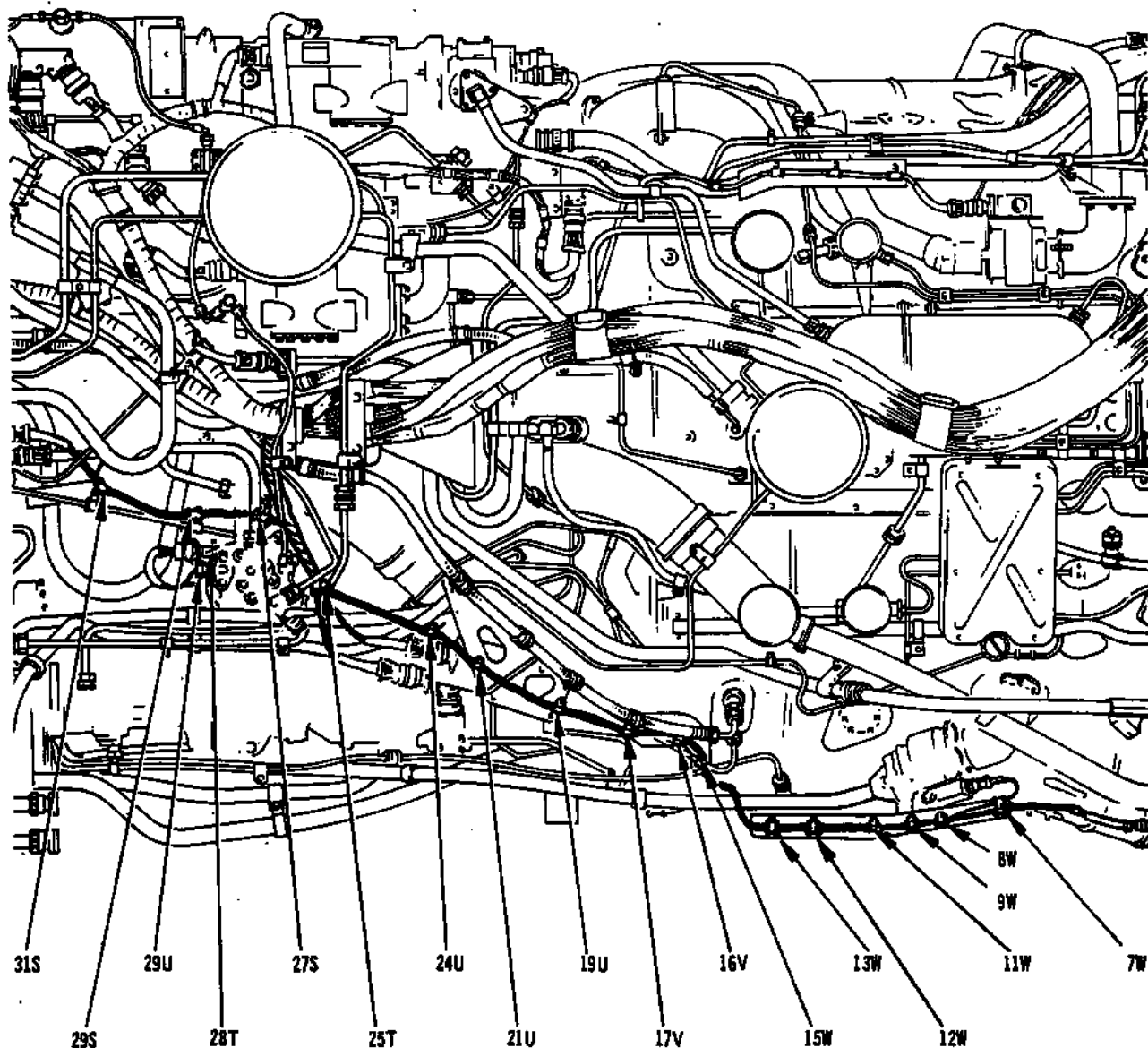


MK.610-14-28  
OVERHAUL

sheema

CR 33353/DOC

Printed in England



VIEW ON UNDERSIDE OF ENGINE  
(SB. 71-16)

Disassembly of the Third Run of the  
Electrical Harness from the Engine  
Figure 121

DISASSEMBLY

71-00-02

Page 141

Jun 1/94



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (d) Clamp 29U (Ref.Fig.122).
  - (i) Remove the nut securing the clamp to the pillar bolt.
  - (ii) Release the clamp from the harness.
- (e) Parking Position 28T (Ref.Fig.122).
  - (i) Remove the four nuts and panhead screws securing the dummy receptacle to the support bracket using wrench (Tool 1592).
- (f) Clamp 25T (Ref.Fig.122).
  - (i) Remove the nut and bolt securing the clamp to the bracket.
  - (ii) Release the clamp from the harness.
- (g) Clamp 24U (Ref.Fig.123).
  - (i) Remove the bolt securing the clamp to the bracket.
  - (ii) Release the clamp from the harness.
  - (iii) Remove the clipnut from the bracket.
- (h) Clamp 21U (Ref.Fig.123).
  - (i) Remove the bolt securing the clamp to the bracket.
  - (ii) Release the clamp from the harness.
  - (iii) Remove the clipnut from the bracket.
- (j) Clamps 19U (Ref.Fig.123).
  - (i) Remove the bolt securing the two clamps to the bracket.
  - (ii) Release the clamp from the harness.
  - (iii) Remove the clipnut from the bracket.
- (k) Clamps 17V (Ref.Fig.123).
  - (i) Remove the bolt securing the two clamps to the bracket.

DISASSEMBLY

71-00-02

Page 142

Jun 1/94



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

Printed in England

- (ii) Release the clamp from the harness.
- (iii) Remove the clipnut from the bracket.
- (l) Clamp 16V (Ref.123).
  - (i) Remove the bolt securing the clamp to the bracket.
  - (ii) Release the clamp from the harness.
  - (iii) Remove the clipnut from the bracket.
- (m) Clamp 15W (Ref.Fig.123).
  - (i) Remove the bolt securing the clamp to the bracket.
  - (ii) Release the clamp from the harness.
  - (iii) Remove the clipnut from the bracket.
- (n) Clamp 13W (Ref.Fig.123).
  - (i) Remove the nut and bolt securing the clamp to the tray assembly.
  - (ii) Release the clamp from the harness.
- (p) Clamp 12W (Ref.Fig.123).
  - (i) Remove the nut and bolt securing the clamp to the tray assembly.
  - (ii) Release the clamp from the harness.
  - (iii) Remove the washer and clamp from the tube (Pre SB.0L.71-17).
- (q) Clamp 11W (Ref.Fig.123).
  - (i) Remove the nut and bolt securing the clamp to the tray assembly.
  - (ii) Release the clamp from the harness.
- (r) Clamp 9W (Ref.Fig.123).
  - (i) Remove the nut and bolt securing the clamp to the tray assembly.

DISASSEMBLY

71-00-02

Page 143  
Jun 1/94





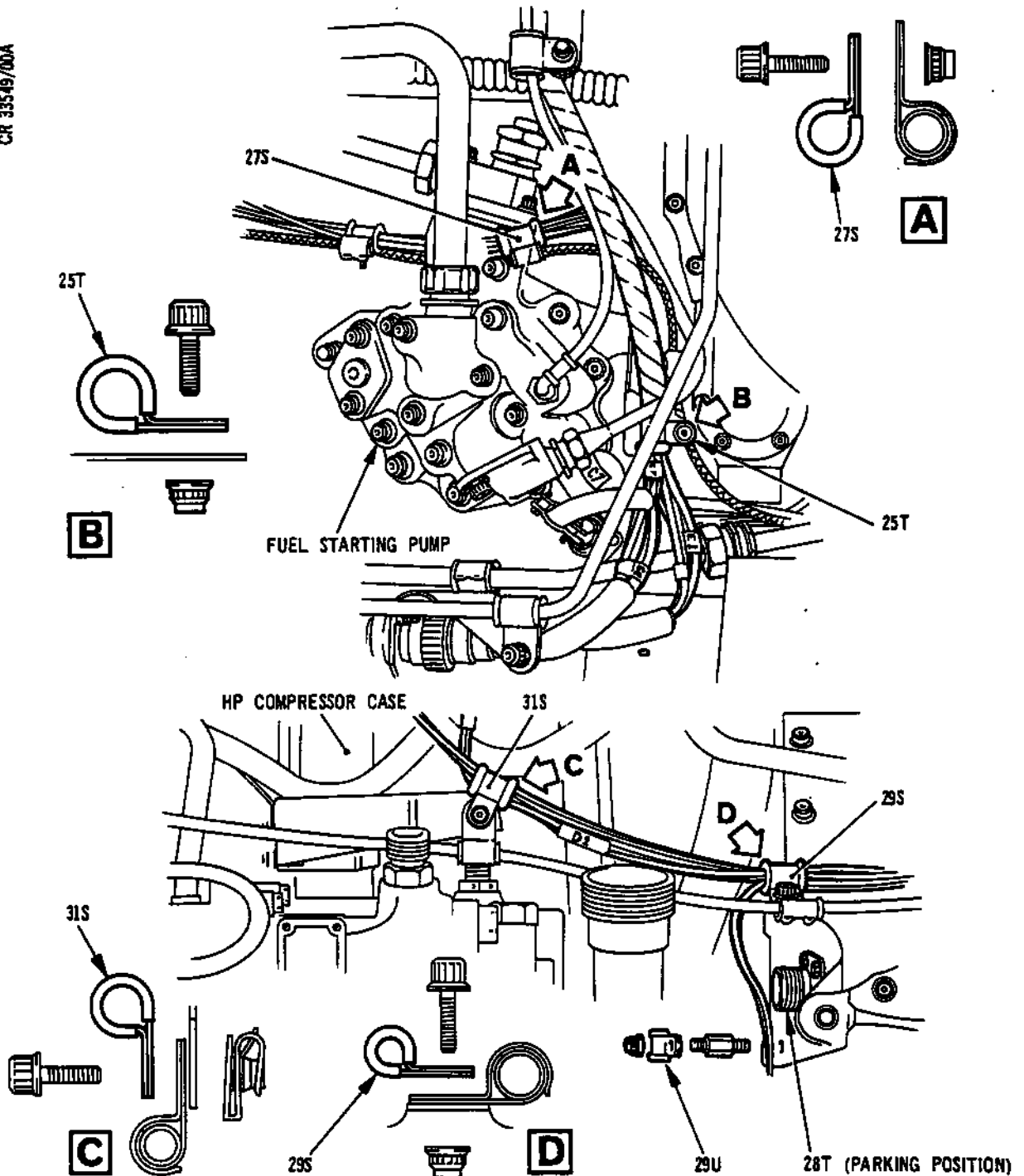
OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

CR 33549/00A



Hardness Third Run Clamping Positions  
Figure 122

DISASSEMBLY

71-00-02

Page 144

Jun 1/94

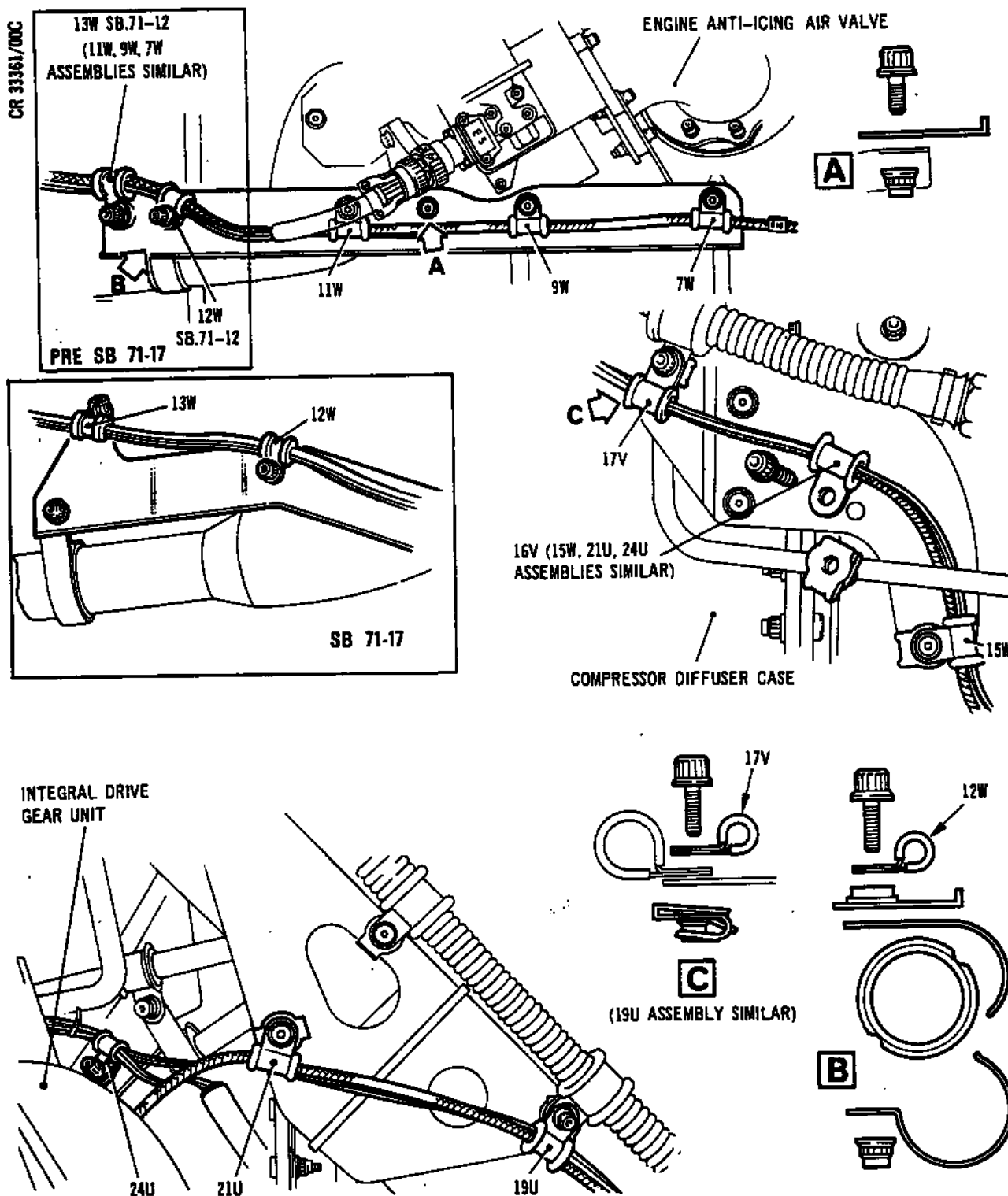


OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema



Hardness Third Run Clamping Positions (Pre-SB.71-16)  
Figure 123



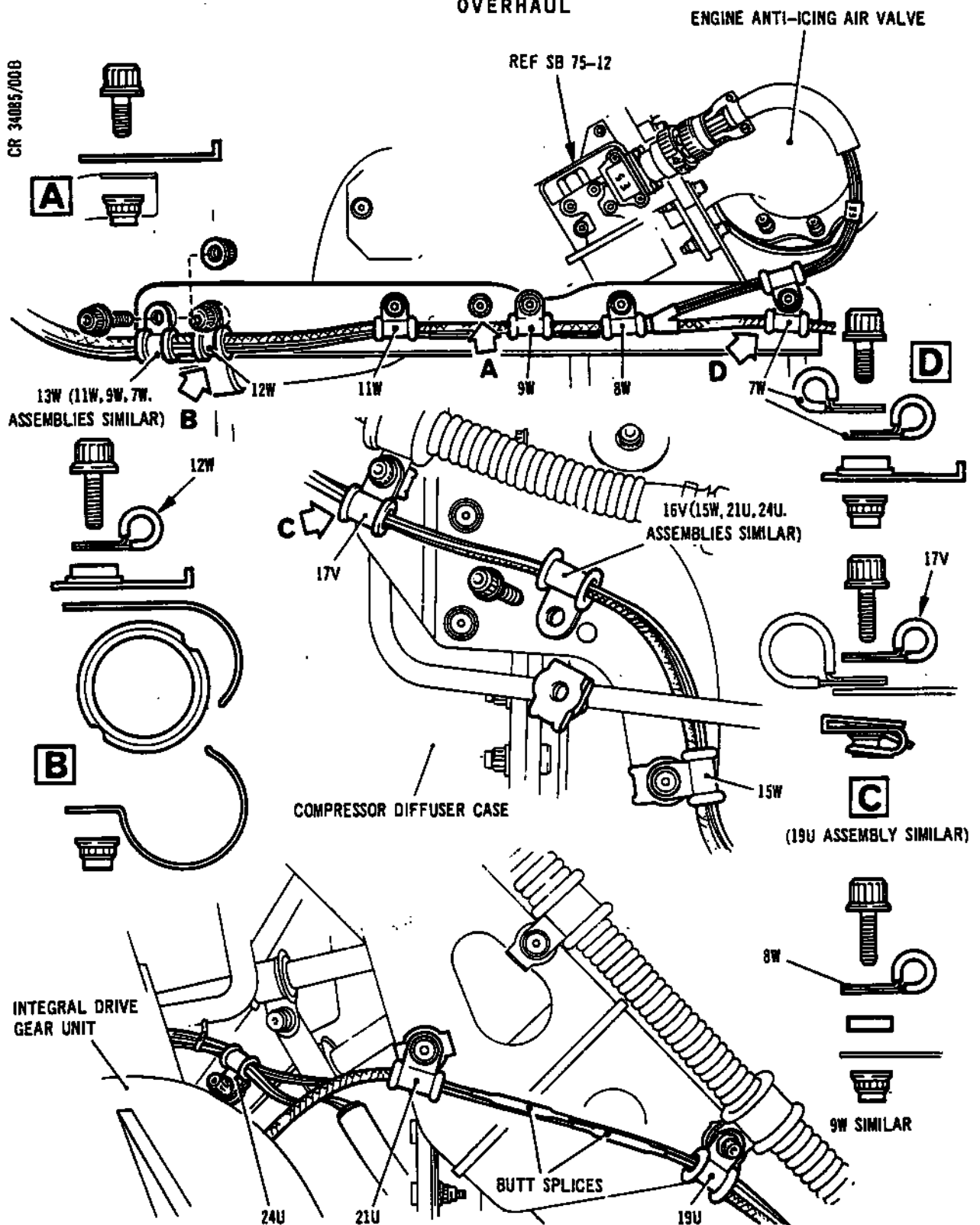
# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sheema

CR 34085/008



Harness Third Run Clamping Positions (SB.71-16)  
Figure 124

DISASSEMBLY

71-00-02

Page 146

Jun 1/94



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

- (s) Clamp 8W (SB.71-16) (Ref.Fig.124)
  - (i) Remove the nut and bolt securing the clamp to the tray assembly.
  - (ii) Release the clamp from the harness.
- (t) Clamp 7W (Ref.Fig.123 and 124) (Pre and SB.71-16 standard).
  - (i) Remove the nut and bolt securing the clamp/clamps to the tray assembly.
  - (ii) Release the clamp/clamps from the harness.
- E. Release Electrical Harness from the Front and Rear Block Assemblies (Ref.Fig.101).
  - (1) Rear block assembly.
    - (a) Remove two nuts securing the top block and release the cables.
    - (b) Remove the two special bolts securing the middle block using a 0.3125 AF spanner on the flats and release the cables.
  - (2) Front block assembly.
    - (a) Remove two bolts securing the top block and release the harness.
    - (b) Carefully remove the complete electrical harness assembly from the engine and prepare for installation in the special transportation container.
- F. Remove Electrical Harness Support Trays and Mounting Brackets from the Engine.
  - (1) General.
    - (a) To identify and locate a support tray or mounting bracket on the engine, a grid system with a location number and letter is used in the text e.g. 8C/9E.
    - (b) Refer to Fig.105 for the grid system.

DISASSEMBLY

71-00-02

Page 147

Jun 1/94



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

- (2) Remove support tray 8C/9E.
  - (a) Remove the nut securing the tray to the pillar bolt.
  - (b) Remove the tray and pillar bolt from the engine.
- (3) Remove support tray 11G/15G.
  - (a) Remove clamp 15G.
    - (i) Remove the nut and bolt securing the tray to the tube with a clamp.
    - (ii) Remove the inner and outer clamps, washer and bush.
  - (b) Remove clamp 13F.
    - (i) Remove the nut and bolt securing the tray to the tube with a clamp.
    - (ii) Remove the inner and outer clamps, washer and bush.
  - (c) Remove clamp 13G.
    - (i) Remove the nut and bolt securing the tray to the tube with a clamp.
    - (ii) Remove the inner and outer clamps, washer and bush.
  - (d) Remove the tray from the engine.
- (4) Remove support tray 7W/13W.
  - (a) Remove the nut and bolt securing the tray to the engine.
  - (b) Remove the tray from the engine.
- (5) Paragraph deleted.
- (6) Remove mounting bracket 16V.
  - (a) Remove the two nuts and bolts securing the bracket to the engine.
  - (b) Remove the bracket from the engine.

DISASSEMBLY

71-00-02

Page 148

Jun 1/94



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

### 3. High Energy Ignition Leads - Removal from the Engine

#### A. General.

- (1) The engine ignition leads consist of two high energy leads connected between the ignition unit and the two igniter plugs.
- (2) During removal of the igniter leads from the engine, care must be taken not to damage the leads or connectors.
- (3) Ensure that the igniter leads on removal from the engine are clean and dry, the connectors are protected and that the assembly is placed in a clean container for protection.
- (4) Ensure exposed connectors on the ignition unit and the igniter plugs are protected.
- (5) Discard the rubber packing strips from the loop clamps (Pre SB.0L.593-74-9084-19) after their removal from the leads.

#### B. Remove the Igniter Leads from the Engine (Ref.Fig.125 and 126).

- (1) Remove both ignition leads from the ignition unit using wrench (Tool 1664) and install suitable blanks and protectors to the exposed cable ends.
- (2) Reference point 'A' (Pre SB.0L.593-9084-19 standard).
  - (a) Remove the bolt securing the clamp to the bracket.
  - (b) Release the clamp from the lead.
  - (c) Remove the clipnut from the bracket.
- (3) Reference point 'A' (SB.0L.593-9084-19 standard).
  - (a) Remove the bolt securing the clip to the bracket.
  - (b) Remove spacer.
  - (c) Release the clip from the lead.
  - (d) Remove the clipnut from the bracket.

DISASSEMBLY

71-00-02

Page 149

Dec 31/00



# OLYMPUS 593

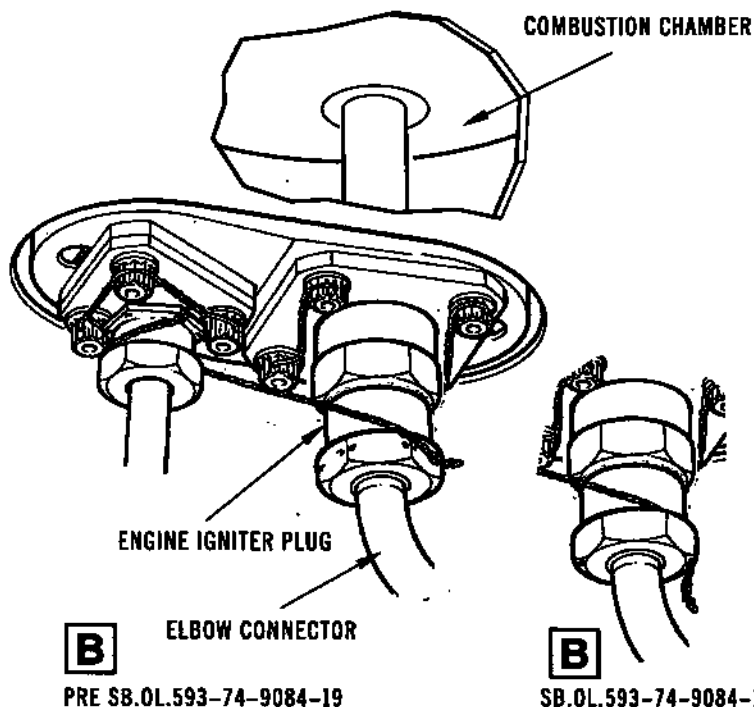
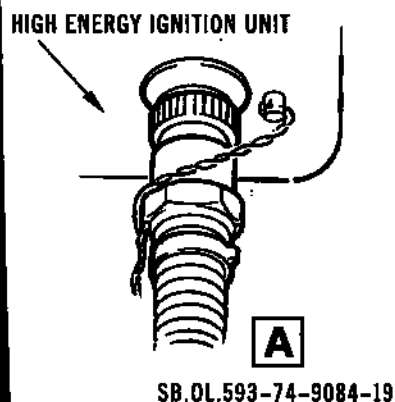
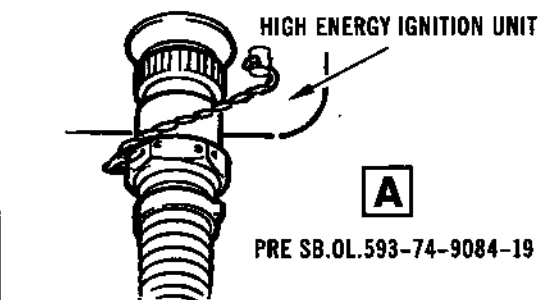
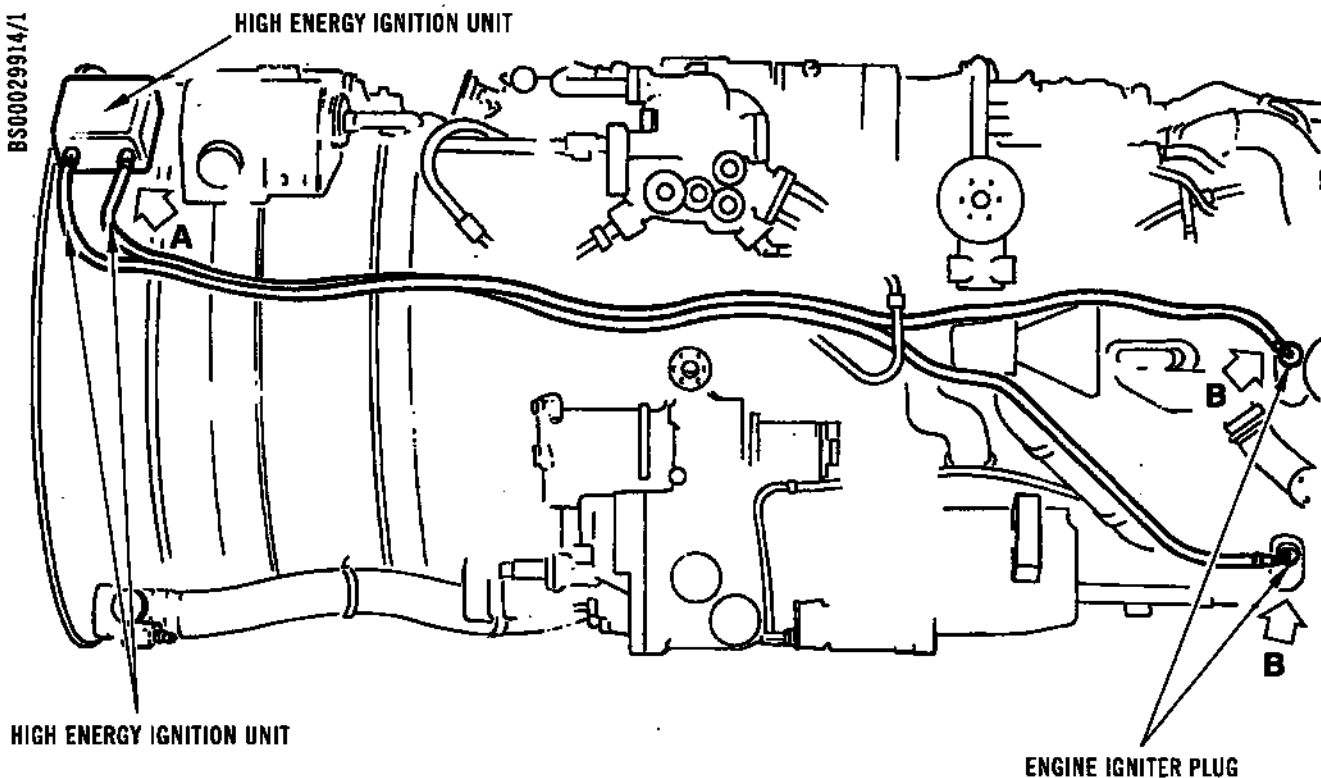
MK.610-14-28  
OVERHAUL



sneema

Printed in England

CR 33288/00C  
BS00029914/1



High Energy Harness - Cable Connections  
Figure 125

DISASSEMBLY  
**71-00-02**  
Page 150  
Dec 31/00



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England

- (4) Reference point 'B' (Pre.SB.0L.593-74-9084-19 standard).

(a) Release the clamp from the lead.

NOTE: The nut and bolt securing the clamp to the bracket have been previously removed during removal of the electrical harness.

- (5) Reference point 'B' (SB.0L.593-74-9084-19 standard).

(a) Release the clip from the lead.

NOTE: The nut and bolt securing the clip to the bracket have been previously removed during removal of the electrical harness.

- (6) Reference point 'C' (Pre SB.0L.593-74-9084-19 standard).

(a) Remove the bolt securing the clamp to the bracket.

(b) Release the clamp from the lead.

(c) Remove the clipnut from the bracket.

- (7) Reference point 'D'.

(a) Remove the bolt securing the clamp to the bracket.

(b) Release the clamp from the lead.

(c) Remove the clipnut from the bracket.

- (8) Reference points 'E' and 'F'.

(a) Release the clamps from both leads.

NOTE: The nut and bolt securing both clamps to their respective leads have been previously removed during the removal of the electrical harness.

- (9) Reference point 'G'.

(a) Remove the nut and bolt securing the clamp to the bracket.

(b) Release the clamp from both leads.

DISASSEMBLY

71-00-02

Page 151

Dec 31/00



CR 33263/00B  
BS00029910/1



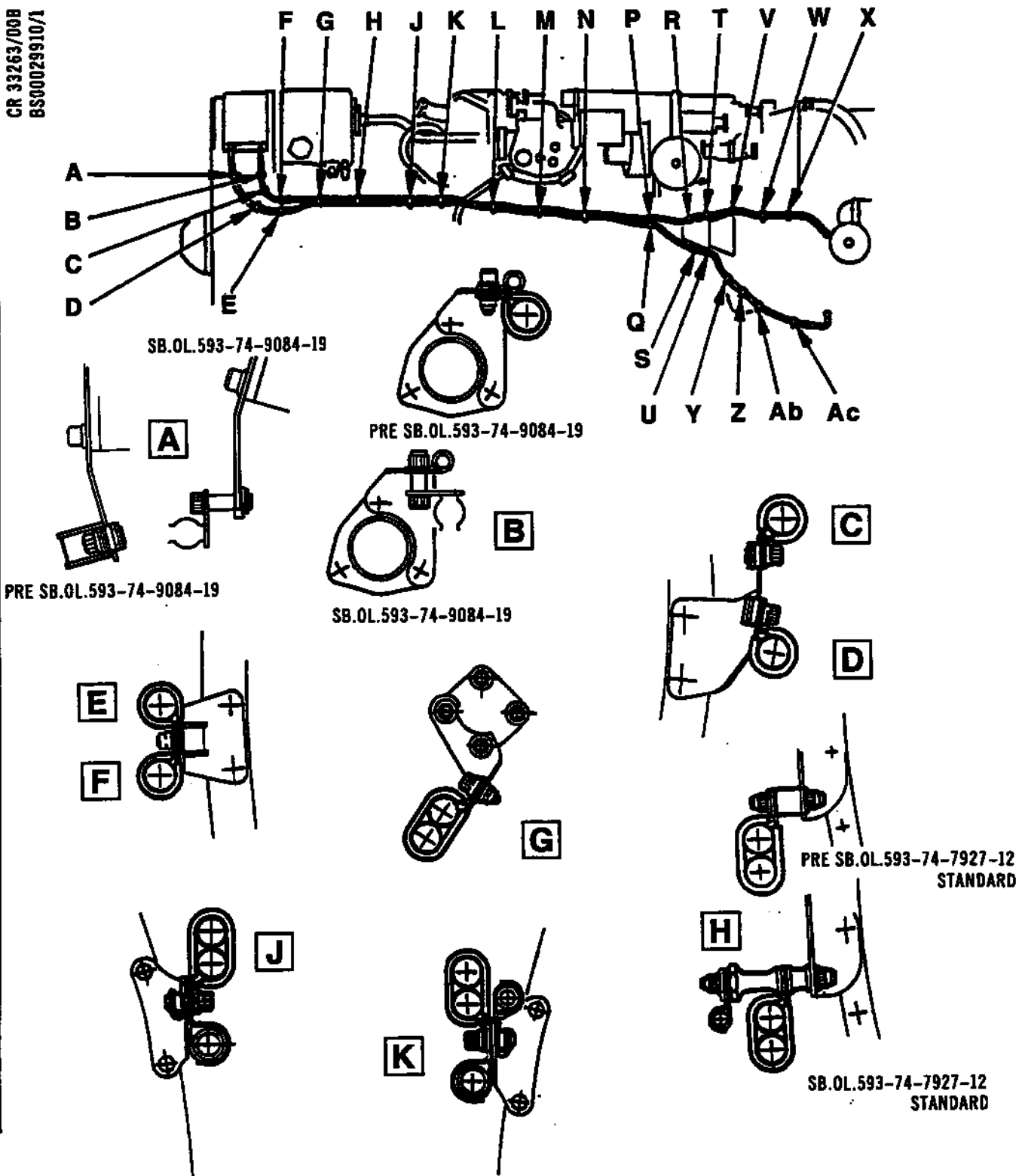
OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL



High Energy Harness, Layout and Clamping Positions  
Figure 126 (Sheet 1 of 4)

CR 33264/00C  
BS00029911/1

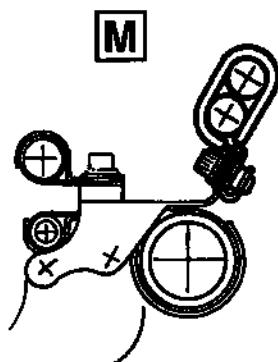


OLYMPUS 593

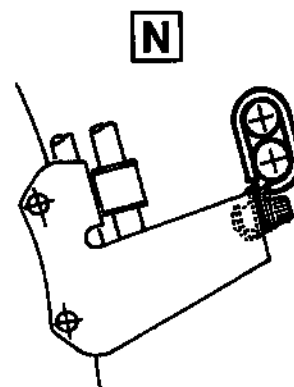
MK. 610-14-28  
OVERHAUL



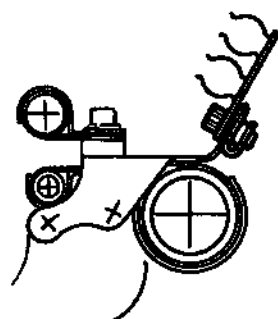
sneema



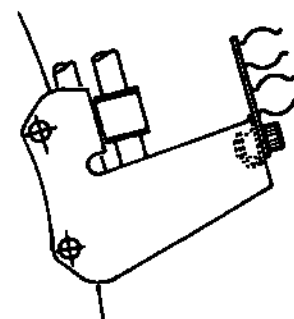
PRE SB.OL.593-74-9084-19



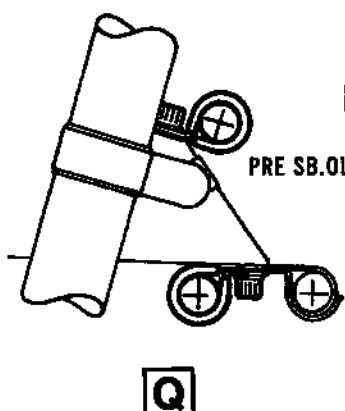
PRE SB.OL.593-74-9084-19



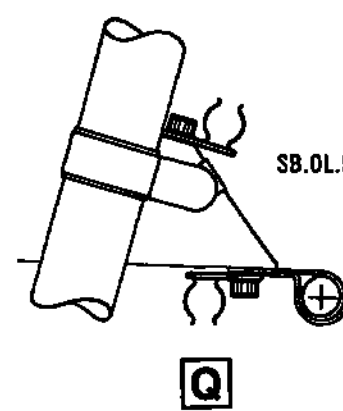
SB.OL.593-74-9084-19



SB.OL.593-74-9084-19



PRE SB.OL.593-74-9084-19



SB.OL.593-74-9084-19

PRE SB.OL.593-74-9084-19

SB.OL.593-74-9084-19

High Energy Harness, Layout and Clamping Positions  
Figure 126 (Sheet 2 of 4)

BS00029983/1

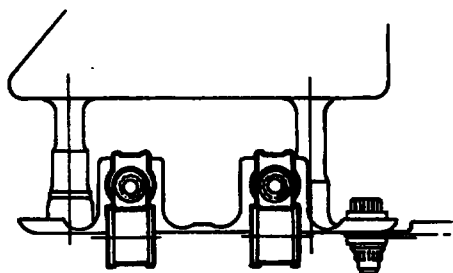


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

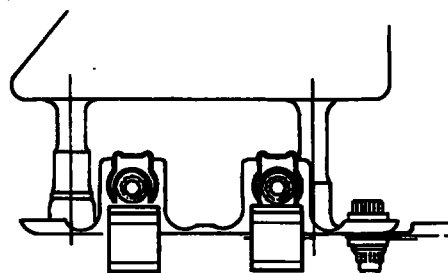


**R**

**T**

PRE SB.OL.593-74-9084-19

PRE SB.OL.593-74-9084-19

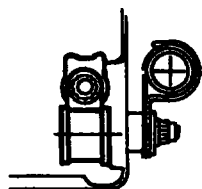


**R**

**T**

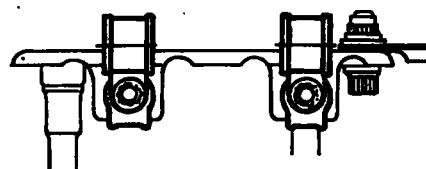
SB.OL.593-74-9084-19

SB.OL.593-74-9084-19



**V**

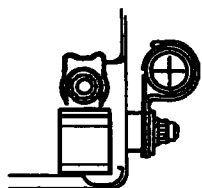
PRE SB.OL.593-74-9084-19



**S**

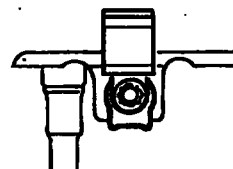
**U**

PRE SB.OL.593-74-9084-19



SB.OL.593-74-9084-19

**V**



**S**

SB.OL.593-74-9084-19

High Energy Harness, Layout and Clamping Positions  
Figure 126 (Sheet 3 of 4)

DISASSEMBLY

71-00-02

Page 154

Dec 31/00

BS00029981/1

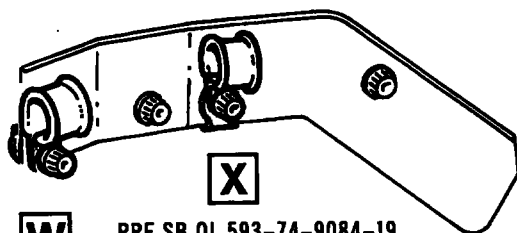


OLYMPUS 593

MK.610-14-28  
OVERHAUL



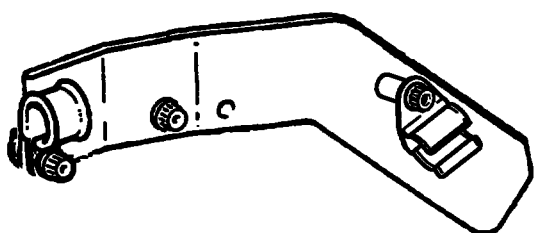
sneema



**W**

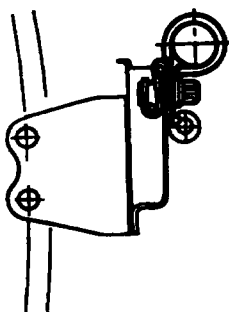
PRE SB.OL.593-74-9084-19

PRE SB.OL.593-74-9084-19



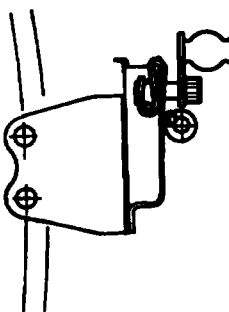
**X**

SB.OL.593-74-9084-19



**Ac**

PRE SB.OL.593-74-9084-19



**Ac**

SB.OL.593-74-9084-19



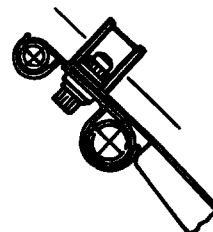
**Z**

PRE SB.OL.593-74-9084-19

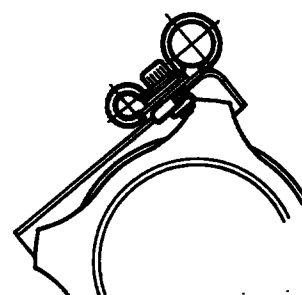


SB.OL.593-74-9084-19

**Z**



**Y**



**Ab**

High Energy Harness, Layout and Clamping Positions  
Figure 126 (Sheet 4 of 4)

DISASSEMBLY

71-00-02

Page 154A

Dec 31/00



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

(10) Reference point 'H'.

- (a) Remove the two nuts and pillar bolt securing the clamp to the bracket (Pre SB.0L.593-74-7927-12 standard).
- (b) Remove the pillar bolt and spacer (SB.0L.593-74-7927-12 standard).
- (c) Release the clamp from both leads.

(11) Reference point 'J'.

- (a) Remove the bolt securing the clamp to the bracket.
- (b) Release the clamp from both leads.
- (c) Remove the clipnut from the bracket.

NOTE: Removing the bolt also releases existing clamp supporting the No.1 bearing vent tube.

(12) Reference point 'K'.

- (a) Remove the bolt securing the clamp to the bracket.
- (b) Release the clamp from both leads.
- (c) Remove the clipnut from the bracket.

NOTE: Removing the bolt also releases existing clamp supporting the No.1 bearing vent tube.

(13) Reference point 'L'.

- (a) Remove the bolt securing the clamp to the bracket.
- (b) Release the clamp from both leads.
- (c) Remove the clipnut from the bracket.

DISASSEMBLY

71-00-02

Page 154B

Dec 31/00



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (14) Reference point 'M' (Pre SB.0L.593-74-9084-19 standard).
- (a) Remove the bolt securing the clamp to the bracket.
  - (b) Release the clamp from both leads.
  - (c) Remove the clipnut from the bracket.
- (15) Reference point 'M' (SB.0L.593-74-9084-19 standard).
- (a) Remove the bolt securing the clip to the bracket.
  - (b) Release the clip from both leads.
  - (c) Remove the clipnut from the bracket.
- (16) Reference point 'N' (Pre SB.0L.593-74-9084-19 standard).
- (a) Remove the bolt securing the clamp to the bracket.
  - (b) Release the clamp from both leads.
  - (c) Remove the clipnut from the bracket.
- (17) Reference point 'N' (SB.0L.593-74-9084-19 standard).
- (a) Remove the bolt securing the clip to the bracket.
  - (b) Release the clip from both leads.
  - (c) Remove the clipnut from the bracket.
- (18) Reference point 'P' (Pre SB.0L.593-74-9084-19 standard).
- (a) Remove the nut and bolt securing the clamp to the bracket.
  - (b) Release the clamp from the lead.

DISASSEMBLY

71-00-02

Page 155  
Dec 31/00



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

(19) Reference point 'P' (SB.0L.593-74-9084-19 standard).

(a) Remove the nut and bolt securing the clip to the bracket.

(b) Release the clip from the lead.

(20) Reference point 'Q' (Pre SB.0L.593-74-9084-19 standard).

(a) Remove the nut and bolt securing the clamp to the bracket.

(b) Release the clamp from the lead.

NOTE: Removing the nut and bolt also releases the clamp supporting the starter feed tube.

(21) Reference point 'Q' (SB.0L.593-74-9084-19 standard).

(a) Remove the nut and bolt securing the clip to the bracket.

(b) Release the clip from the lead.

NOTE: Removing the nut and bolt also releases the clamp supporting the starter feed tube.

(22) Reference point 'R' (Pre SB.0L.593-9084-19 standard).

(a) Remove the bolt securing the clamp to the tray assembly.

(b) Release the clamp from the lead.

(c) Remove the clipnut from the tray assembly.

DISASSEMBLY

71-00-02

Page 156

Dec 31/00



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (23) Reference point 'R' (SB.0L.593-74-9084-19 standard).
- (a) Remove the bolt securing the clip to the tray assembly.
  - (b) Release the clip from the lead.
  - (c) Remove the clipnut from the tray assembly.
- (24) Reference point 'T' (Pre SB.0L.593-74-9084-19 standard).
- (a) Remove the bolt securing the clamp to the tray assembly.
  - (b) Release the clamp from the lead.
  - (c) Remove the clipnut from the tray assembly.
- (25) Reference point 'T' (SB.0L.593-74-9084-19 standard).
- (a) Remove the bolt securing the clip to the tray assembly.
  - (b) Release the clip from the lead.
  - (c) Remove the clipnut from the tray assembly.
- (26) Reference point 'V' (Pre SB.0L.593-74-9084-19 standard).
- (a) Remove the bolt securing the clamp to the tray assembly.
  - (b) Release the clamp from the lead.
  - (c) Remove the clipnut from the tray assembly.
- (27) Reference point 'V' (SB.0L.593-74-9084-19 standard).
- (a) Remove the bolt securing the clip to the tray assembly.
  - (b) Release the clip from the lead.
  - (c) Remove the clipnut from the tray assembly.

DISASSEMBLY

71-00-02

Page 157

Dec 31/00





OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England

(28) Reference point 'W'.

- (a) Remove the bolt securing the clamp to the tray.
- (b) Release the clamp from the lead.
- (c) Remove the clipnut from the tray.

(29) Reference point 'X' (Pre SB.0L.593-74-9084-19 standard).

- (a) Remove the bolt securing the clamp to the tray.
- (b) Release the clamp from the lead.
- (c) Remove the clipnut from the tray.

(30) Reference point 'X' (SB.0L.593-74-9084-19 standard).

- (a) Remove the nut and bolt securing the clip to the tray.
- (b) Remove the spacer.
- (c) Release the clip from the lead.

(31) Remove the two nuts and bolts securing the tray to two brackets and remove the tray from the engine. (Pre SB.0L.593-74-9084-19 standard).

(32) Remove the nut and bolt securing the tray to the bracket and remove the tray from the engine (SB.0L.593-74-9084-19 standard).

(33) Reference point 'S' (Pre SB.0L.593-74-9084-19 standard).

- (a) Remove the bolt securing the clamp to the tray assembly.
- (b) Release the clamp from the lead.
- (c) Remove the clipnut from the tray.

DISASSEMBLY

71-00-02

Page 158  
Dec 31/00



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (34) Reference point 'S' (SB.0L.593-74-9084-19 standard).
  - (a) Remove the bolt securing the clip to the tray assembly.
  - (b) Release the clip from the lead.
  - (c) Remove the clipnut from the tray.
- (35) Reference point 'U'.
  - (a) Remove the bolt securing the clamp to the tray assembly.
  - (b) Release the clamp from the lead.
  - (c) Remove the clipnut from the tray.
- (36) Reference point 'Y'.
  - (a) Remove the nut and bolt securing the clamp to the bracket.
  - (b) Release the clamp from the lead.
  - (c) Replace the nut and bolt to secure two existing clamps to the bracket. Do not torque-tighten if tubes are to be removed.
- (37) Reference point 'Z' (Pre SB.0L.593-74-9084-19 standard).
  - (a) Remove the bolt securing the clamp to the bracket.
  - (b) Release the clamp from the lead.
  - (c) Remove the clipnut from the bracket.
- (38) Reference point 'Z' (SB.0L.593-74-9084-19 standard).
  - (a) Remove the bolt securing the clip to the bracket.
  - (b) Release the clip from the lead.
  - (c) Remove the clipnut from the bracket.

DISASSEMBLY

71-00-02

Page 159

Dec 31/00



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

(39) Reference point 'Ab' (Pre SB.0L.593-9084-19 standard).

- (a) Remove the bolt securing the clamp to the bracket.
- (b) Release the clamp from the lead.
- (c) Remove the clipnut from the bracket.

NOTE : Removing the bolt releases an existing clamp supporting the electrical harness.

(40) Reference point 'Ac' (Pre SB.0L.593-9084-19 standard).

- (a) Remove bolt securing the clamp to the bracket.
- (b) Release the clamp from the lead.

NOTE : Removing the bolt releases an existing clamp supporting the electrical harness. The clipnut is removed at a later stage of the disassembly.

(41) Reference point 'Ac' (SB.0L.593-74-9084-19 standard).

- (a) Remove bolt securing the clip to the bracket.
- (b) Remove the spacer.
- (c) Release the clip from the lead.

NOTE : Removing the bolt releases an existing clamp supporting the electrical harness. The clipnut is removed at a later stage of the disassembly.

(42) Remove lockwire and disconnect both connectors from their respective igniter plugs using wrench (Tool 1664). Install protectors on the exposed connections and igniter plugs.

(43) Carefully remove the ignition leads from the engine and store in a clean container until required.

DISASSEMBLY

71-00-02

Page 160

Dec 31/00

**OLYMPUS 593**MK.610-14-28 *sneema*  
OVERHAULELECTRICAL HARNESS AND HIGH ENERGY (HE) IGNITION LEADS -  
ASSEMBLY ON THE ENGINETABLE OF CONTENTS

Para.	Page
1. General	501
2. Engine Electrical Harness - Assembly on the Engine	501
A. General	501
B. Assembly of Electrical Harness Assembly to the Unique Point Cable Clamp	503
C. Assembly of the First Run of the Electrical Harness to the Engine	504
D. Assembly of the Second Run of the Electrical Harness to the Engine	528
E. Assembly of the Third Run of the Electrical Harness to the Engine	547
F. Install Transportation Parts	553
3. High Energy Ignition Leads - Assembly on the Engine	556
A. General	556
B. Assembly of Ignition Leads to the High Energy (HE) Ignition Unit	556
C. Assembly of Ignition Leads to the Engine	558
D. Assembly of Igniter Leads to Igniter Plugs	565

TABLE OF ILLUSTRATIONS

Fig.No.	Page
501 Electrical Harness Assembly	502
502 Electrical Harness Plug Connection and Identification (Pre-SB.0L.593-71-8988-32)	505
503 Electrical Harness Plug Connection and Identification (SB.0L.593-71-8988-32)	506
504 Electrical Harness and Plug Connectors Installed on the Engine	509/510
505 Electrical Harness Clamps - Grid Location and Identification (Pre-SB.0L.593-71-8988-32)	511
506 Electrical Harness Clamps - Grid Location and Identification (SB.0L.593-71-8988-32)	512
507 Assembly of the First Run of the Electrical Harness to the Engine	514
508 Harness First Run Clamping Positions	515
509 Harness First Run Clamping Positions	519
510 Harness First Run Clamping Positions	520
511 Harness First Run Clamping Positions	525

ASSEMBLY

**71-00-02**Contents 1  
Jun 1/94

**OLYMPUS 593**MK.610-14-28 *sneema*  
OVERHAUL

Fig.No.

Page

512	Harness First Run Clamping Positions ... ..	526
513	Harness First Run Clamping Positions ... ..	529
514	Assembly of the Second Run of the Electrical Harness to the Engine (Pre-SB.0L.593-71-8988-32)...	531
515	Assembly of the Second Run of the Electrical Harness to the Engine (SB.0L.593-71-8988-32) ...	532
516	Harness Second Run Clamping Positions ... ..	533
517	Harness Second Run Clamping Positions (Pre-SB.0L.593-71-8988-32) ... ..	539
518	Harness Second Run Clamping Positions (SB.0L.593-71-8988-32) (Sheet 1 of 2) ... ..	540
518	Harness Second Run Clamping Positions (SB.0L.593-71-8988-32) (Sheet 2 of 2) ... ..	541
519	Harness Second Run Clamping Positions ... ..	542
520	Assembly of the Third Run of the Electrical Harness to the Engine ... ..	545
521	Harness Third Run Clamping Positions ... ..	546
522	Harness Third Run Clamping Positions (Pre SB.71-16)..	550
523	Harness Third Run Clamping Positions (SB.71-16) ...	554
524	Electrical Harness Transportation Support Detail ...	555
525	High Energy Ignition Leads ... ..	557
526	Hgh Energy Ignition Leads, Layout and Clamping Positions (Sheet 1 of 2) ... ..	560
526	High Energy Ignition Leads, Layout and Clamping Positions (Sheet 2 of 2) ... ..	561

ASSEMBLY

**71-00-02**

Contents 2

Jun 1/94



OLYMPUS 593

MK.610-14-28

OVERHAUL



SEE TR

ELECTRICAL HARNESS AND HIGH ENERGY (HE) IGNITION LEADS  
- ASSEMBLY ON THE ENGINE

1. General

- A. This section details the assembly of the electrical harness and high energy (HE) ignition leads to the engine.
- B. Before commencing assembly of the electrical harness and ignition leads, refer to 71-09-00, Assembly, for general information.
- C. During the assembly procedure, reference will be made to the Illustrated Parts Catalogue (I.P.C.) to identify those items where the nomenclature does not positively identify them, due to the duplication of the title, e.g. nuts, bolts, clamps etc. When the item is a part of the breakdown of the text concerned, the item will be identified as bolt (1-10), the 1 referring to the I.P.C. Fig.No., and the 10 referring to the Item No. Where items of a different breakdown are introduced, the breakdown number will be quoted in addition, e.g. bolt (72-32-01/1-10).
- D. Throughout the text special tools are quoted by their Ref. No. e.g. (Tool 1234). For a complete list of tooling required for the assembly of the electrical harness and ignition leads and for the Manufacturers Part No. refer to the Special Tools, Fixtures and Equipment, Table 1002.

2. Engine Electrical Harness - Assembly on the Engine

A. General.

- (1) The electrical harness comprises seven multi-cable looms which connect the engine components to the aircraft systems at a common connection point (Ref.Fig.501).
- (2) A tray, support bracket and block assemblies located centrally under the engine form the unique point (Ref.Fig.501).

PRINTED IN ENGLAND

TN31701

# ATP TEMPORARY REVISION

## British airways

OLYMPUS 593 MK 610-14-28

### OVERHAUL MANUAL

This Temporary Revision complies with BCAR's Chapter A6-2 and TSS No. 0-2

*P. Munn*

for Chief Engineer (Technical & Quality Services) CAA Design Approval No. DA1/8566/78

TEMPORARY REVISION 71-507

Insert in 71-00-02 facing page 501

#### REASON FOR ISSUE

Change in policy on wirelocking self locking engine harness plugs.  
(MCR.ETE.1.AAG.7453/6.7)

#### ACTION

Reference 1. General addition of Paragraphs E. and F. as follows:-

#### E. Concorde Engine Harness - HTMAS Self Locking Connectors

It has been established (by trial modification and consultation with Rolls Royce) that HTMAS self locking connectors do not require wirelocking other than for services that have particular flight connotations which make it prudent to wirelock.

A list of engine harness connectors which must remain wirelocked is set out below, but all other engine harness connectors do not require wirelocking.

#### Olympus Engine Harness Connectors which MUST be Wirelocked

- B1 - LP Pulse Probe
- B2 - HP Pulse Probe
- C2 - Reheat FCU, Fuel metering valve motor
- C3 - Reheat FCU, Shut of valve solenoid
- F5 - Engine Mainfuel Flowmeter Fe
- F6 - Reheat Fuel Flowmeter Fr
- E1 - IDG Disconnect Solenoid

- F Main Engine Disconnect Box
- E Main Engine Disconnect Box
- C Main Engine Disconnect Box
- B Main Engine Disconnect Box

(As defined in MM 71-50-00 pg 2 and pg 4 and OHM 71-00-02 pg 505 and (507/508). Engine harness connectors other than those stated above do not require wirelocking.

30 Sept.1987

TR.71-507

71-00-02

TR Page 1 of 2

# BRITISH AIRWAYS

TEMPORARY REVISION 71-507 (Cont'd.)

ACTION (cont'd.)

## F. Tightening Engine Harness HTMAS connectors

---

- a. Align keyway and mate connector by holding the connector end bell (cable clamp).
- b. "Wiggle" the end bell and then tighten the coupling nut as the plug moves inwards.
- c. Continue wiggling the end bell and then tightening the coupling nut until no further movement of the end bell can be made.
- d. Finger tighten the coupling nut.

CAUTION:- DO NOT OVERTIGHTEN OR DAMAGE MAY OCCUR.

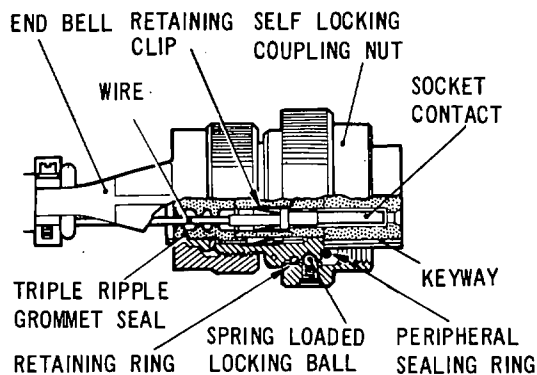




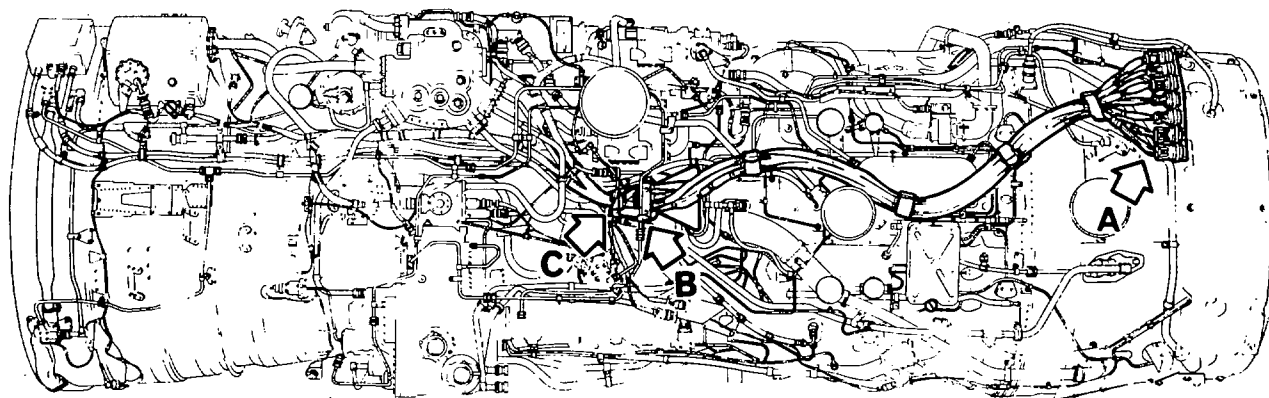
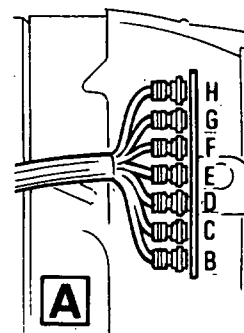
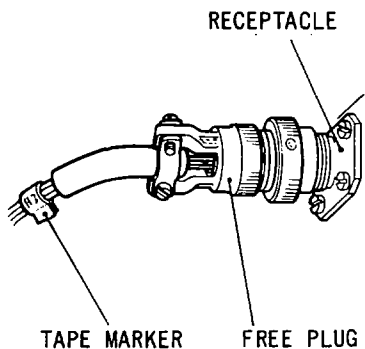
OLYMPUS 593

MK.610-14-28

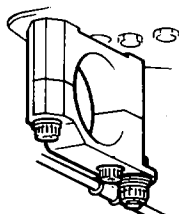
OVERHAUL



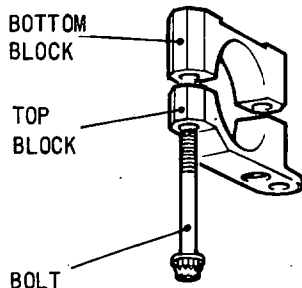
TYPICAL SCREWED CONNECTOR



FRONT BLOCK ASSEMBLY

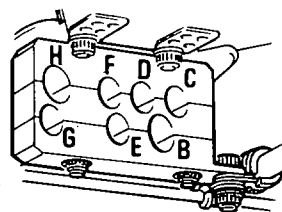


C

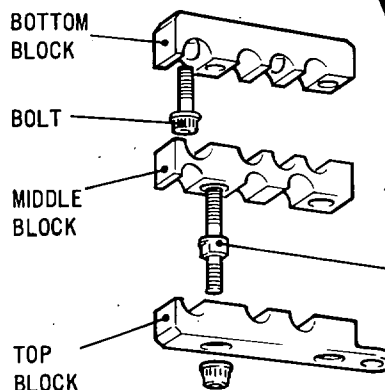


CR 33290/00A

REAR BLOCK ASSEMBLY



B



Electrical Harness Assembly  
Figure 501

ASSEMBLY  
**71-00-02**  
Page 502  
Aug 28/75

TN28970



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (3) Straight screwed type connectors at each end of the cables connect to the engine components and to the common connection point (Ref.Fig.501).
- (4) Identification of the looms is by tape markers secured to the looms. Markers secured on each loom close to the connection identify the loom by serial number, part number and letter (Ref.Fig.501).
- (5) For identification of parts used during assembly, refer to paragraph 1.C. and I.P.C. 71-51-01.
- (6) Lubricate nuts and bolts with lubricant 'B' (Ref.71-09-00, Table 501) except where indicated.
- (7) Following assembly, all electrical harnesses must be checked to ensure that the cable runs are free from fouls, and are clipped correctly to give adequate clearance.
- (8) Ensure that all electrical connections connected to services and accessories are wire-locked correctly, where applicable.

B. Assembly of Electrical Harness Assembly to the Unique Point Cable Clamp (Ref.Fig.501).

- (1) To the electrical unique point tray assembled to the centre mounting bracket, located on the HP blow-off straps bottom centre line, assemble the looms: H, F, D and C. From the longitudinal centre line of the clamp:

Loom H	72.25 in.	(1835,15 mm)	to the rear.
Loom F	72.00 in.	(1828,80 mm)	to the rear.
Loom D	73.00 in.	(1853,40 mm)	to the rear.
Loom C	72.25 in.	(1835,15 mm)	to the rear.

Hold the looms in position and assemble the middle block (10-70) and retain with two bolts (10-60). When blocks touch, the bolts must be released so that the flats on the bolts will line up with the flats in top block (10-50).

CAUTION: ON NO ACCOUNT MUST THE BOLTS (10-60) BE TIGHTENED TO OBTAIN ALIGNMENT.

ASSEMBLY

71-00-02

Page 503

Jun 1/96



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (2) To the middle block assemble the looms B, E and G.  
From the longitudinal centre of the clamp block:

Loom B	73.25 in.	(1859,75 mm)	to the rear.
Loom E	73.00 in.	(1853,40 mm)	to the rear.
Loom G	72.25 in.	(1835,15 mm)	to the rear.

Hold the looms in position and assemble the top block (10-50), retain the top block with nuts (10-40).  
Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

- (3) Assemble bottom clamp block (10-30) to the unique point tray (10-200), assemble the looms H, F, D, C, B, G to the bottom clamp block and retain with the top clamp block (10-20), bolts (10-10) and nuts (10-240). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

C. Assembly of the First Run of the Electrical Harness to the Engine (Ref.Fig.502, 503, 504, 505, 506 and 507).

- (1) Having established the unique point and the loom lengths to the rear the first clamping position grid-reference 28L will be installed. At this position both the first run and second run are assembled at the same position, thereafter only the first run of the harness will be referred to. The first run is composed of the following identities:

ASSEMBLY

71-00-02

Page 504

Jun 1/94

CR 33194/00H  
BS00024521/1

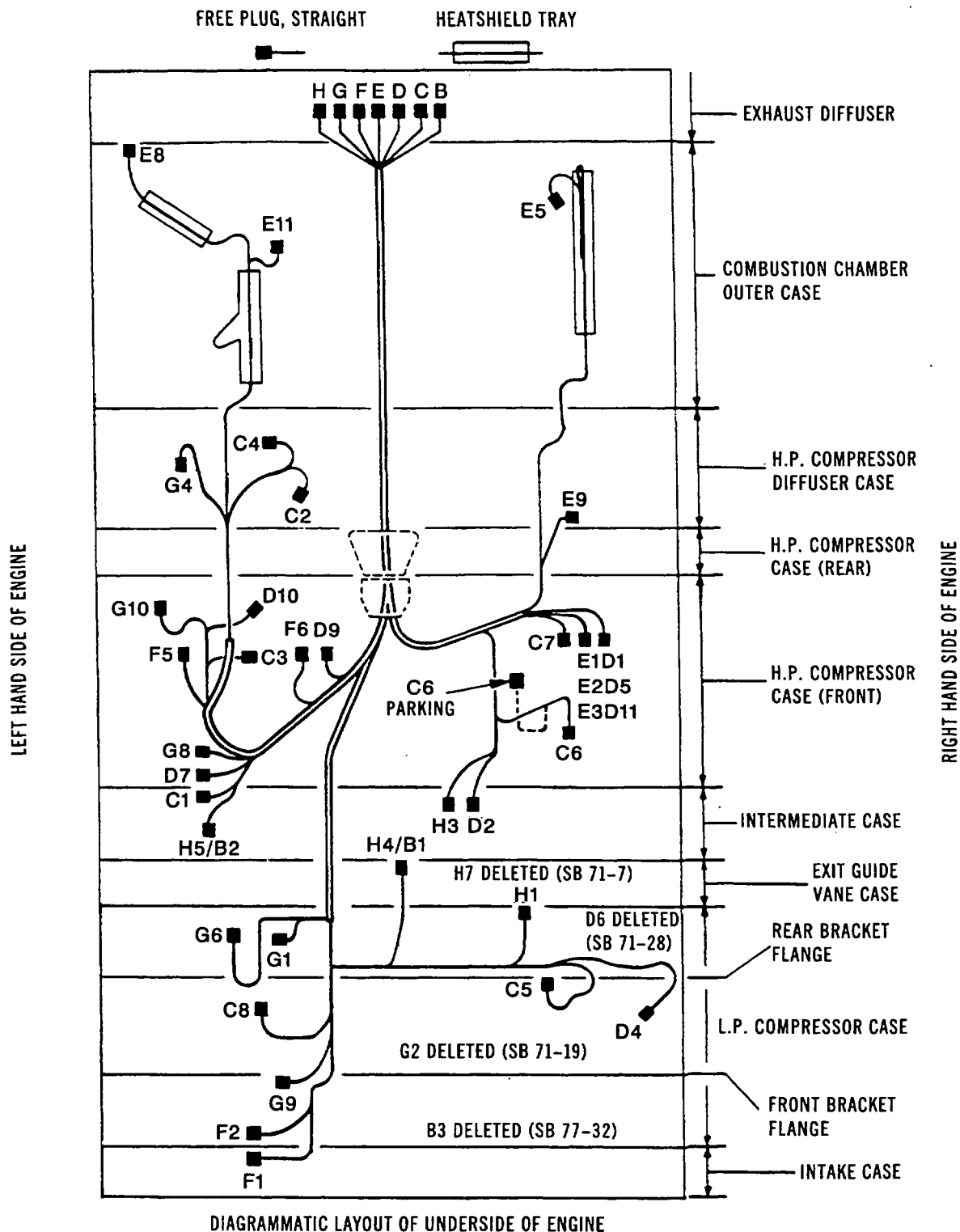


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



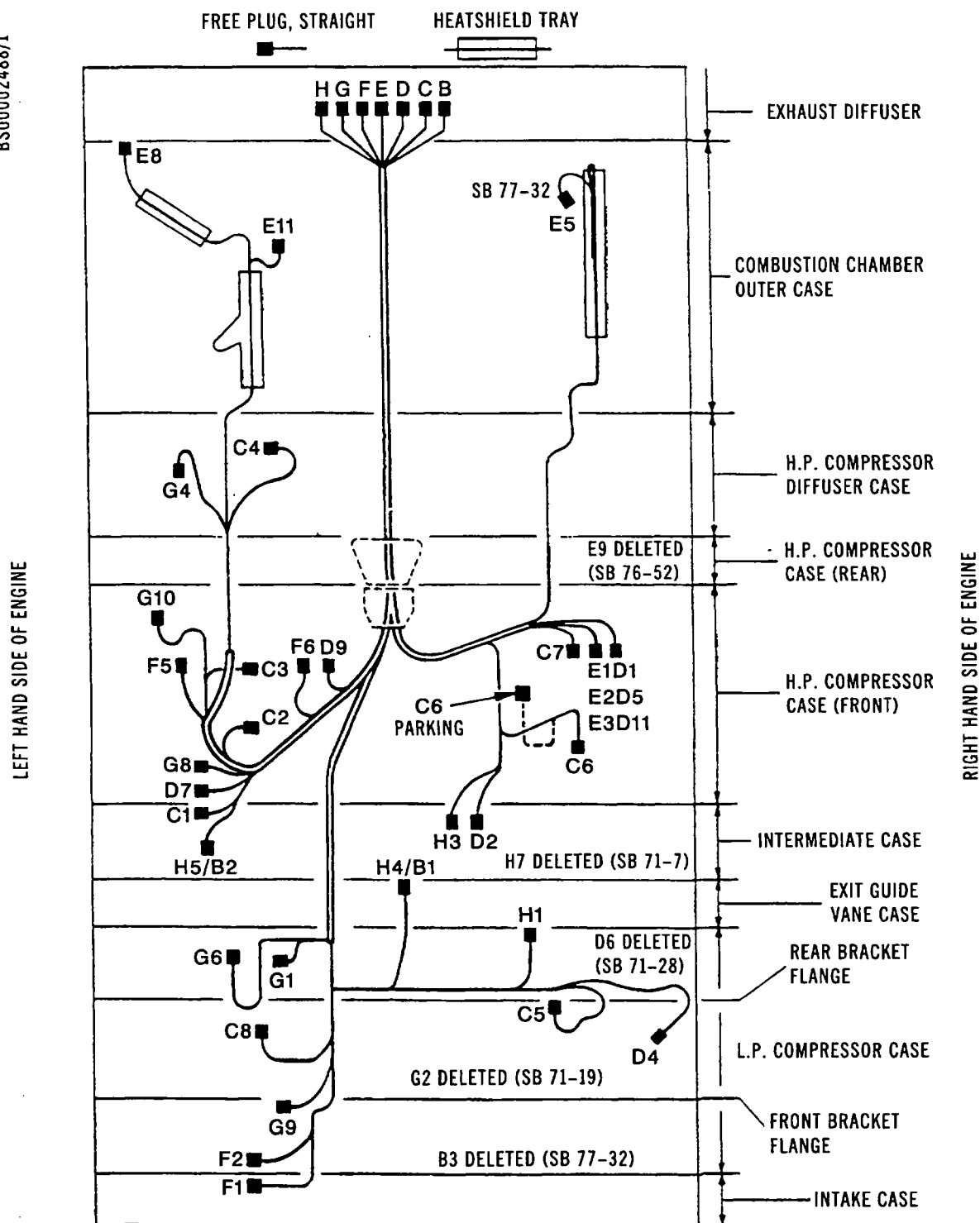
Electrical Harness Plug Connection and Identification  
(Air France Configuration)  
Figure 502

CR 36449/00B  
BS00002488/1



OLYMPUS 593

MK.610-14-28  
OVERHAUL



DIAGRAMMATIC LAYOUT OF UNDERSIDE OF ENGINE

Electrical Harness Plug Connection and Identification  
(British Airways Configuration)  
Figure 503

ASSEMBLY

71-00-02

Page 506  
Jun 1/99



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- |       |  |
|-------|--|
| H1    | - Hydraulic pump off-load valve.                       |
| H4/B1 | - LP compressor RPM probe.                             |
| D4    | - Air starter valve.                                   |
| C5    | - Engine anti-icing air pressure switch.               |
| C8    | - Fuel - differential pressure warning switch (7 psi). |
| G6    | - Engine oil inlet thermometer.                        |
| G1    | - Fuel heater control thermometer.                     |
| G9    | - Engine fuel recirculation valve.                     |
| F2    | - Oil tank contents transmitter and overfill switch.   |
| F1    | - Engine Ignition.                                     |

(2) Assembly of first run by grid-reference.

(a) Grid-reference 28L (Ref.Fig.508).

Assemble the electrical harness to the bracket (72-01-04/2-30) on the LP and HP compressor thrust (No.2 and 3) bearing oil scavenge tube, located near the bottom centre line, approximately mid-way of HP compressor case, with loop clamps (5-70) and (5-80), bolt (5-60) and nut (5-50). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m).



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

This page left blank intentionally

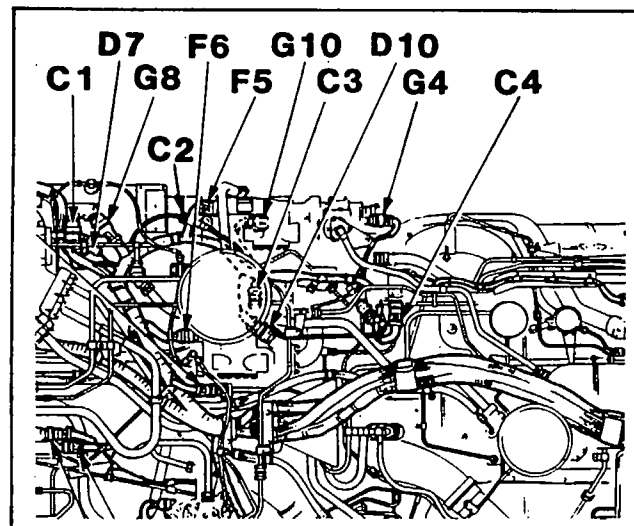
ASSEMBLY

71-00-02

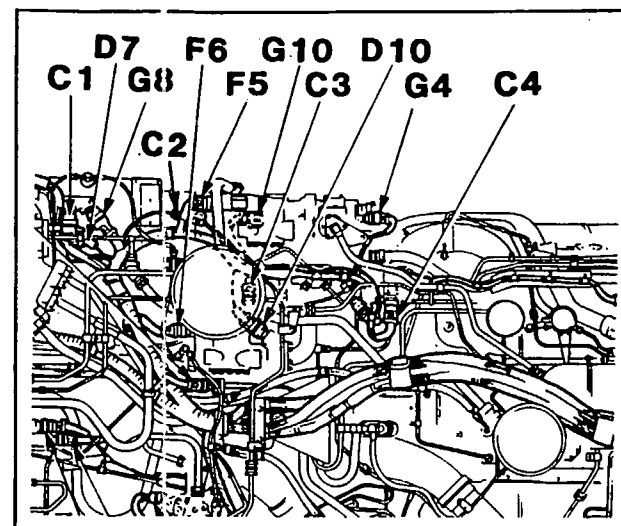
Page 508

Jun 1/94

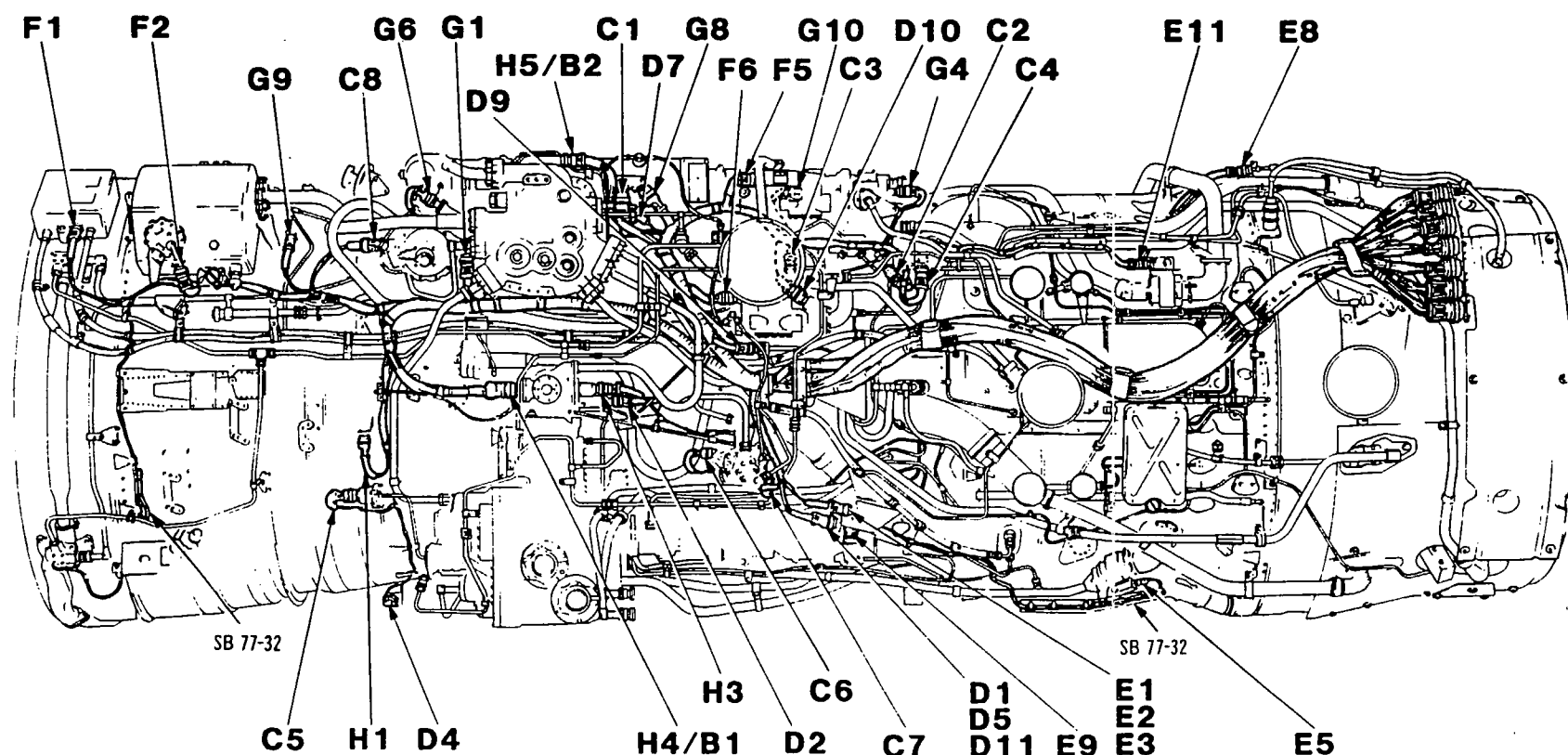
CR 33265/00G



SB.71-8988-32 PARTS 1 AND 2



SB.71-8988-32 PARTS 1 AND 3



Electrical Harness and Plug Connectors  
Installed on the Engine  
Figure 504



CR 33257/00F  
BS00024522/1

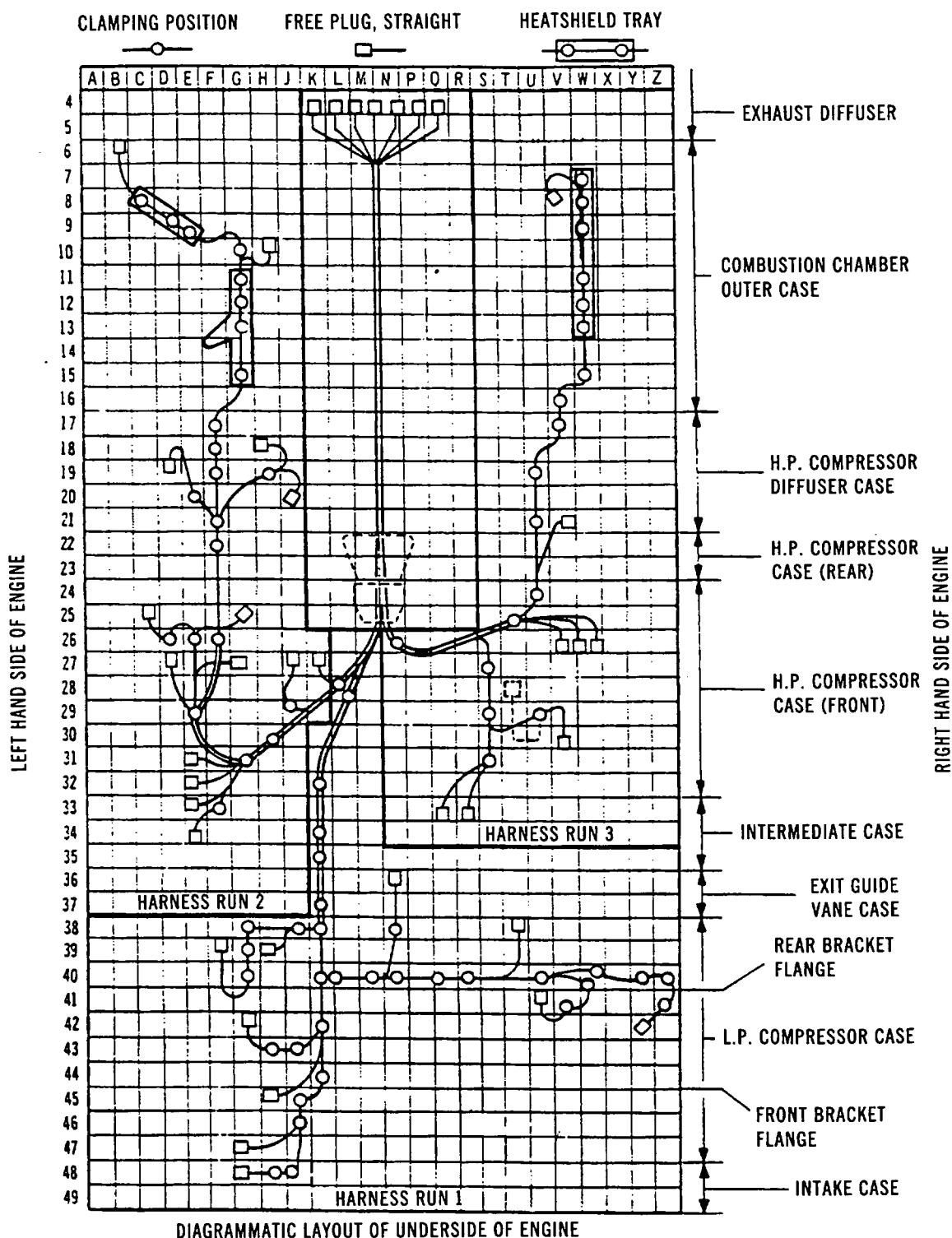


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Electrical Harness Clamps - Grid Location and Identification  
(Air France Configuration)  
Figure 505

CR 36450/00B  
BS00002489/1

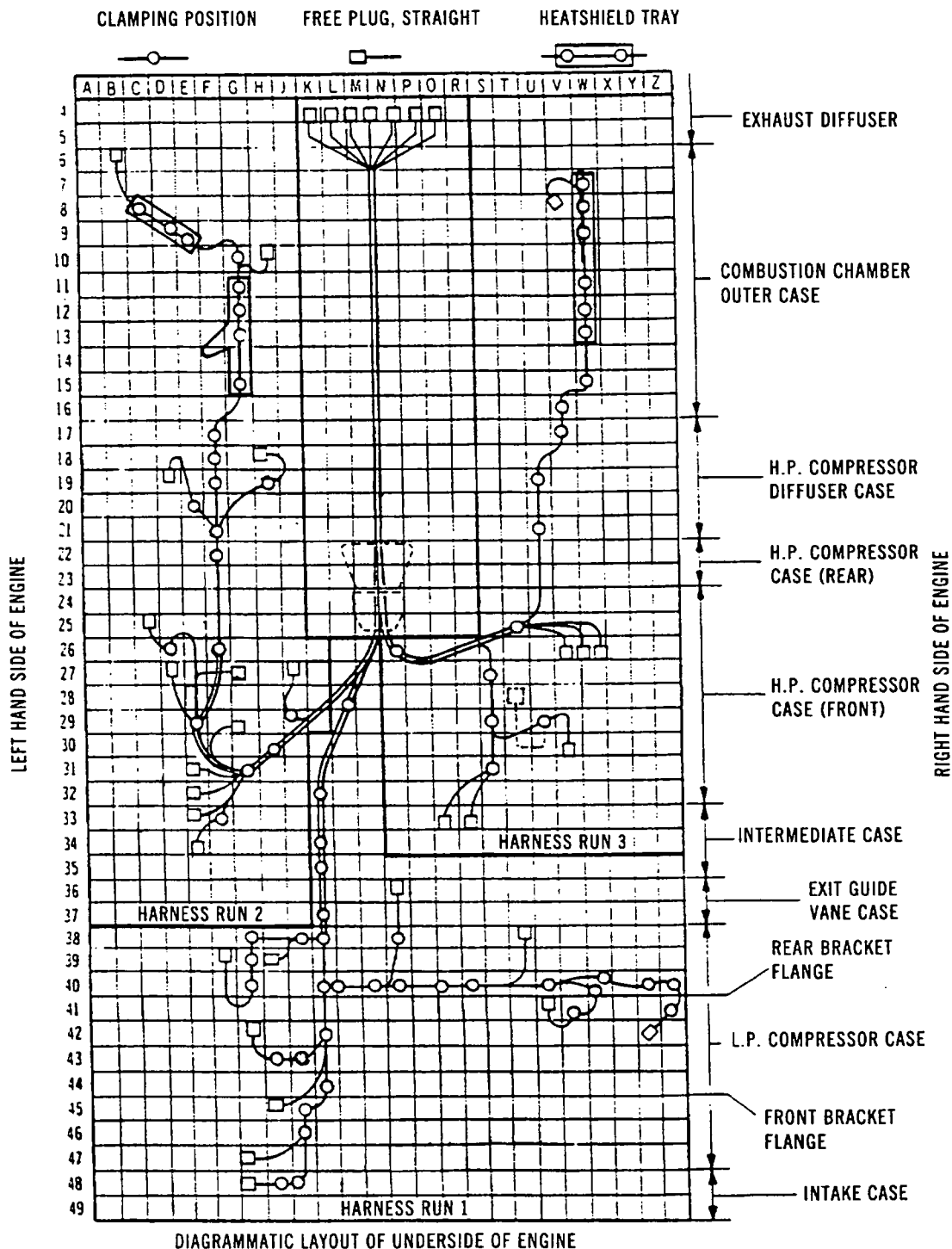


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Electrical Harness Clamps - Grid Location and Identification  
(British Airways Configuration)  
Figure 506

ASSEMBLY

71-00-02

Page 512

Jun 1/99

**OLYMPUS 593**MK.610-14-28 *snecma*  
OVERHAUL

Printed in England

(b) Grid-reference 32K (Ref.Fig.508).

Assemble the electrical harness to the LP and HP compressor thrust (No.2 and 3) bearing scavenge oil tube (72-01-04/2-60), located near the HP front flange, to the left of the bottom centre line, with loop clamp (5-40), existing nut (75-02-10/1-110) and bolt (75-02-10/1-130). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m) with lubricant 'A' applied.

(c) Grid-reference 34K (Ref.Fig.508).

Assemble the electrical harness to an existing bracket (72-01-04/3-380) on the LP turbine (No.5) bearing oil return tube flange to oil pump located approximately mid-way of intermediate casing, to the left of bottom centre line, with loop clamp (5-30), clipnut (5-20), and bolt (5-10). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(d) Grid-reference 35K (Ref.Fig.508).

Assemble the electrical harness to an existing bracket (72-65-00/1-70) on the main oil pump, located on the intermediate case, with loop clamp (4-280), bolt (4-270), and nut (4-260). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(e) Grid-reference 37K (Ref.Fig.508).

Assemble the electrical harness to an existing bracket (72-01-03/1-300) on the LP compressor front (No.1) bearing oil feed tube flange to main oil pump, located approximately at mid-exit guide vane casing to the left of bottom centre line, with loop clamp (4-280), bolt (4-270), and nut (4-260). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

ASSEMBLY

**71-00-02**

Page 513

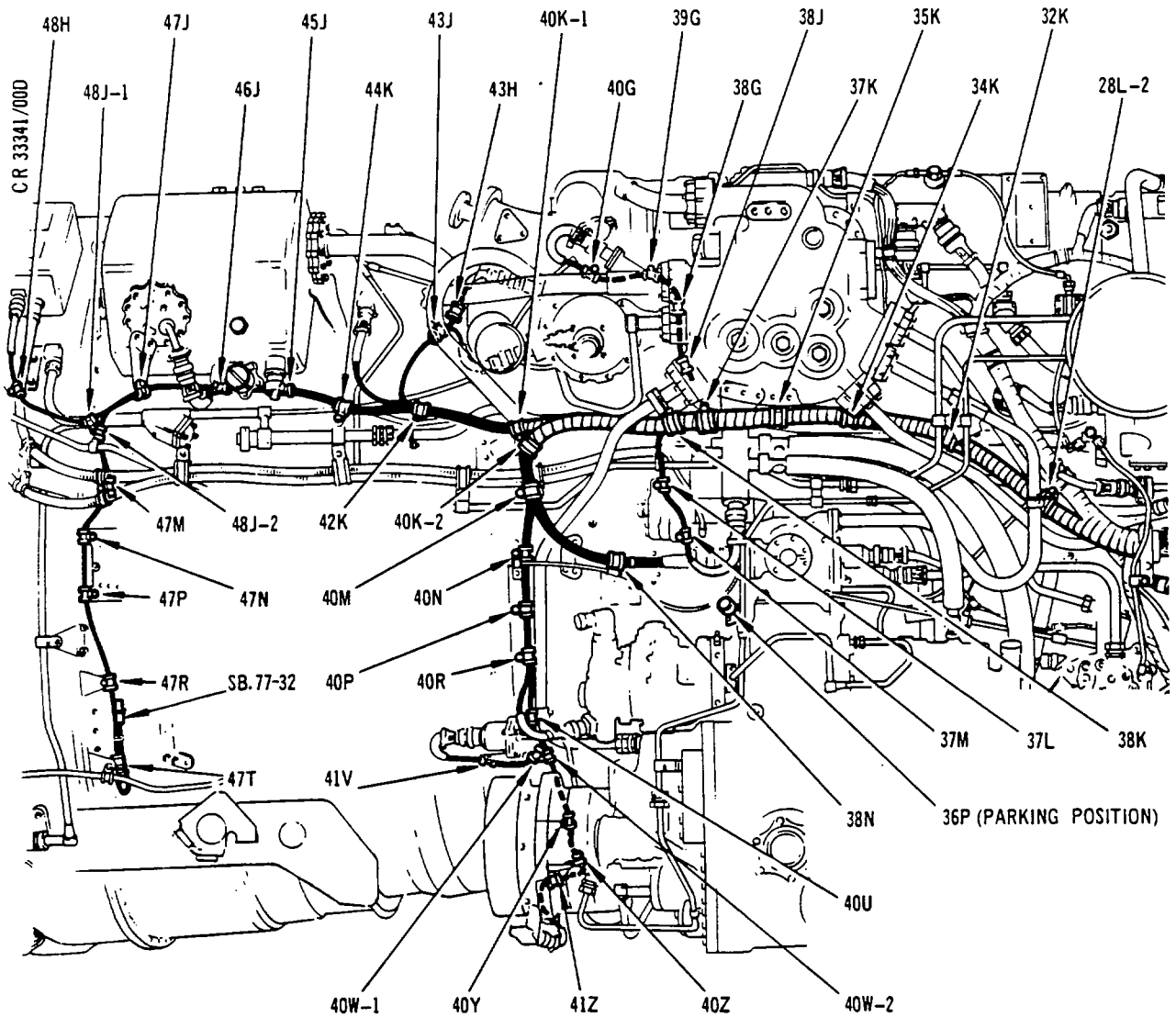
Jun 1/94



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL



VIEW ON UNDERSIDE OF ENGINE

Assembly of the First Run of the Electrical  
Harness to the Engine  
Figure 507

ASSEMBLY

71-00-02

Page 514

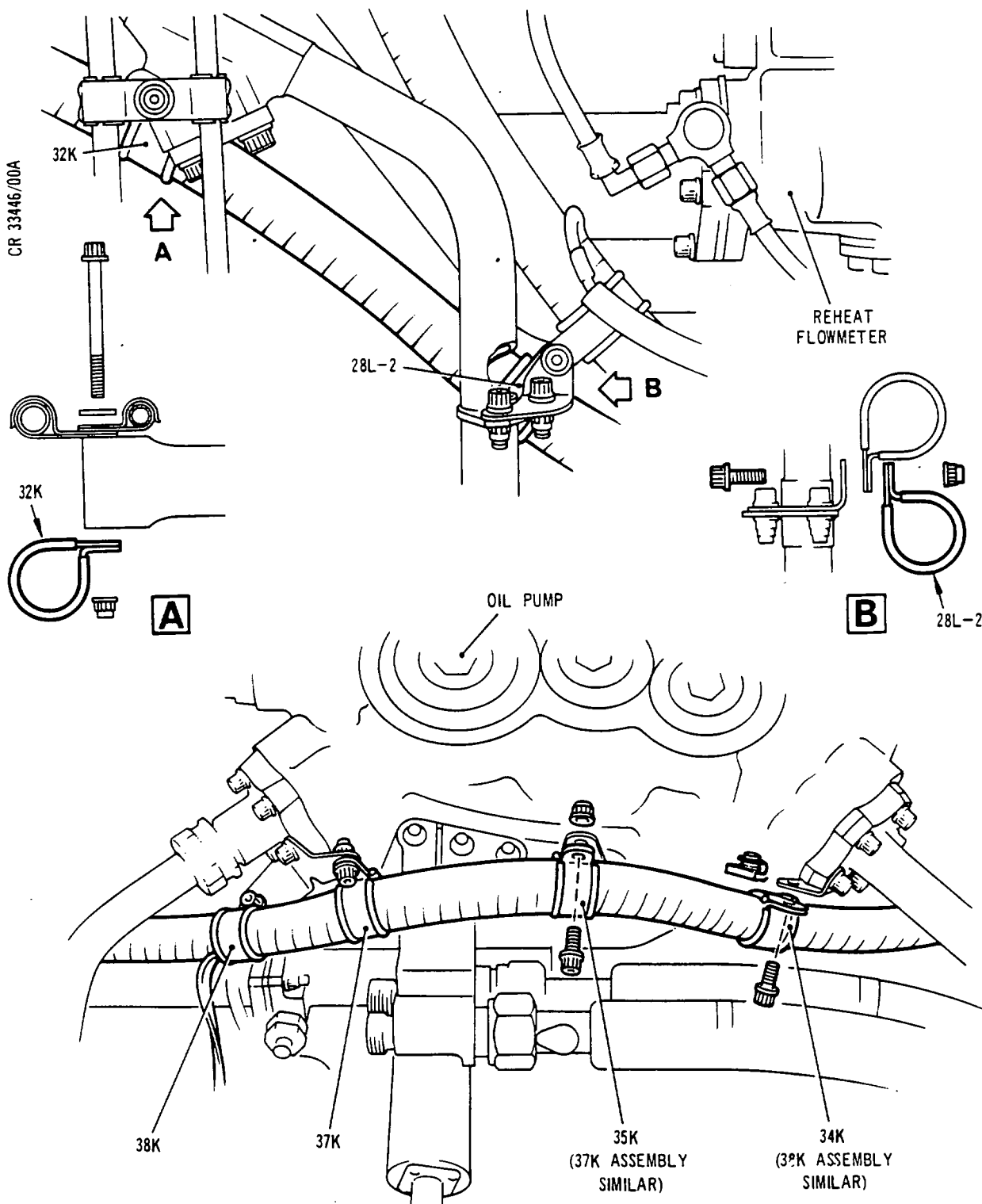
Jun 1/94



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL



Harness First Run Clamping Positions  
Figure 508



OLYMPUS 593



MK.610-14-28 *snecma*  
OVERHAUL

(f) Grid-reference 38K (Ref.Fig.508).

Assemble the electrical harness to an existing bracket (72-01-03/1-300) on the LP compressor front (No.1) bearing oil feed tube flange to main oil pump, located approximately at mid-exit guide vane casing to the left of bottom centre line, with loop clamp (4-250), clipnut (4-240), and bolt (4-230). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(g) Grid-reference 40K (Ref.Fig.509).

Assemble pillar bolt (4-110) to existing bracket (72-31-01/5-410) on the LP rear blow-off flange at bolt-hole positions 37 and 38 with nut (4-100). Assemble the electrical harness to the pillar bolt using loop clamps (4-120 and 4-130) and nut (4-100). Torque-tighten assembly items to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(h) Grid-reference 42K (Ref.Fig.509).

Assemble the electrical harness to an existing bracket (72-01-04/1-230) on the LP compressor front (No.1) bearing oil return tube just forward of the LP rear blow-off flange, near bottom centre line, with loop clamp (4-90), bolt (4-80) and nut (4-70). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

ASSEMBLY

71-00-02

Page 516  
Jun 1/94

**OLYMPUS 593**MK.610-14-28 *sneema*  
OVERHAUL

## (j) Grid-reference 44K (Ref.Fig.509).

Assemble the electrical harness to an existing pillar bolt (73-13-09/1-150) on the bracket (72-31-01/4-430) attached to the LP front blow-off flange to the left of bottom centre line, with loop clamp (2-250) and existing nut (73-13-09/1-130). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m). Connect, tighten and wire-lock plug G9 to the engine fuel recirculation valve.

## (k) Grid-reference 45J (Ref.Fig.509).

Assemble the electrical harness to an existing bracket (79-11-02/1-30) on the oil tank filler connection flange, with loop clamp (2-240), bolt (2-230), and nut (2-220). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

## (l) Grid-reference 46J (Ref.Fig.510).

Assemble the electrical harness to an existing bracket (79-11-02/1-40) on the oil tank filler connection flange with loop clamp (2-240), bolt (2-230), and nut (2-220). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m). Connect, tighten and wire-lock plug F2 to the oil tank contents transmitter and overfill switch.

## (m) Grid-reference 47J (Ref.Fig.510).

Assemble the electrical harness to an existing bracket (79-31-01/1-100) on the oil contents gauge flange, with loop clamp (2-210), clipnut (2-200), and bolt (2-190). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

## (n) Grid-reference 48J (Ref.Fig.510).

Assemble the electrical harness to an existing pillar bolt (72-01-03/1-90) on the LP to intake flange with loop clamps (2-140) (2-150) and existing nut (72-01-03/1-100). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

ASSEMBLY

**71-00-02**

Page 517

Jun 1/94



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

(p) Grid-reference 48H (Ref.Fig.510).

Assemble the electrical harness to an existing bracket (75-11-01/2-180) attached to the anti-icing manifold on the air intake casing, with loop clamp (2-180), bolt (2-170) and nut (2-160). If the ignition lead has still to be clamped at this position, lightly tighten the nut. After installation of the ignition lead torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m). Connect, tighten and wire-lock plug F1 to the ignition unit.

(q) Grid-reference 47M (Ref.Fig.510).

Assemble the electrical harness to an existing bracket (72-22-01/4-140) on the LP to intake casing flange, with loop clamp (2-130), bolt (2-120) and nut (2-110).

NOTE: Assemble the above items loosely pending the fitting of the high energy ignition (HE) leads at this position then torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(r) Grid-reference 47N (Ref.Fig.510).

Assemble the electrical harness to an existing bracket (72-31-01/4-260) on the LP to intake casing flange, with loop clamp (2-100), bolt (2-90) and nut (2-80). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(s) Grid-reference 47P (Ref.Fig.510).

Assemble the electrical harness to an existing bracket (72-31-01/4-260) on the LP to intake casing flange, with loop clamp (2-100), bolt (2-90) and nut (2-80). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

ASSEMBLY

71-00-02

Page 518

Jun 1/94



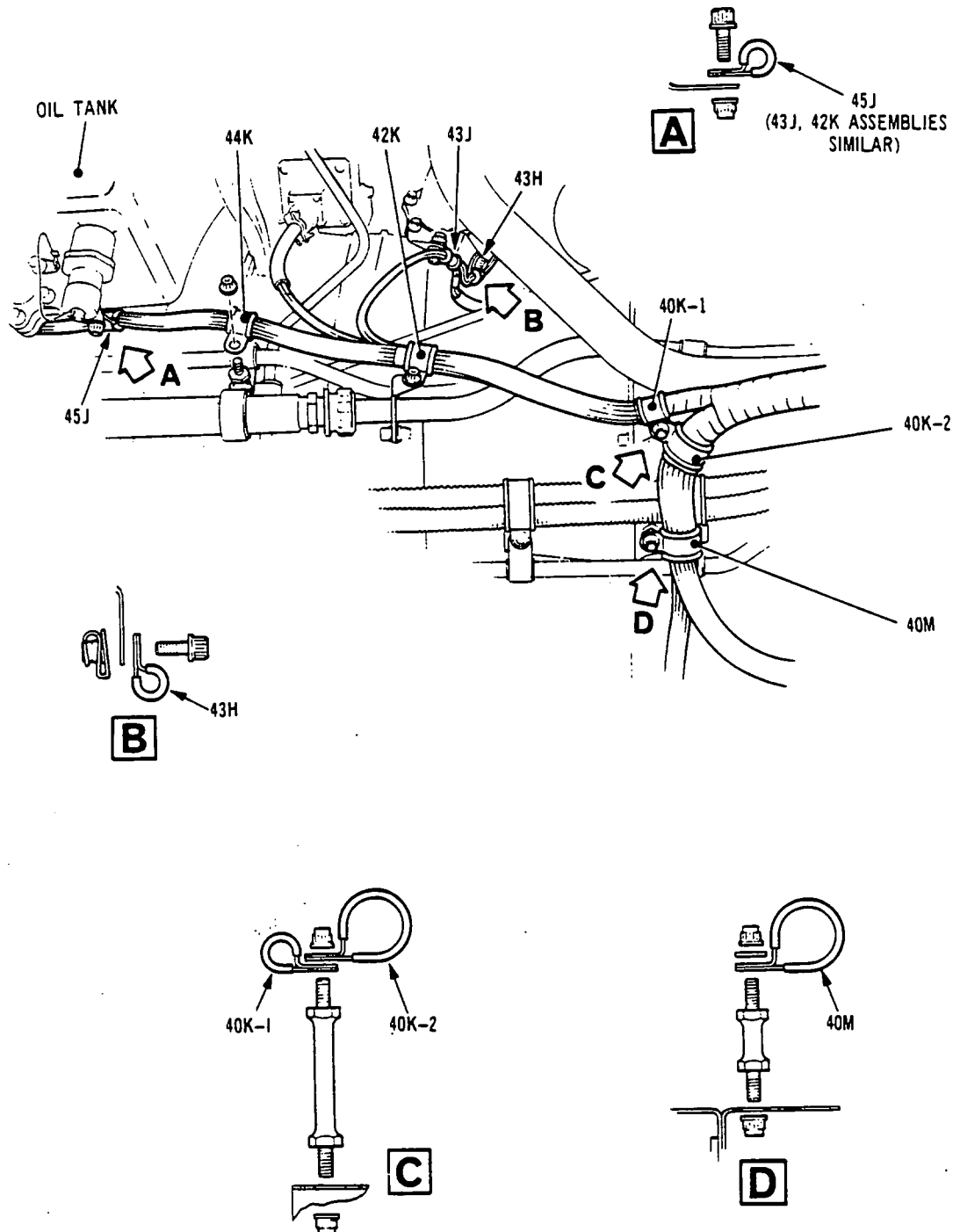


OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema



Harness First Run Clamping Positions  
Figure 509



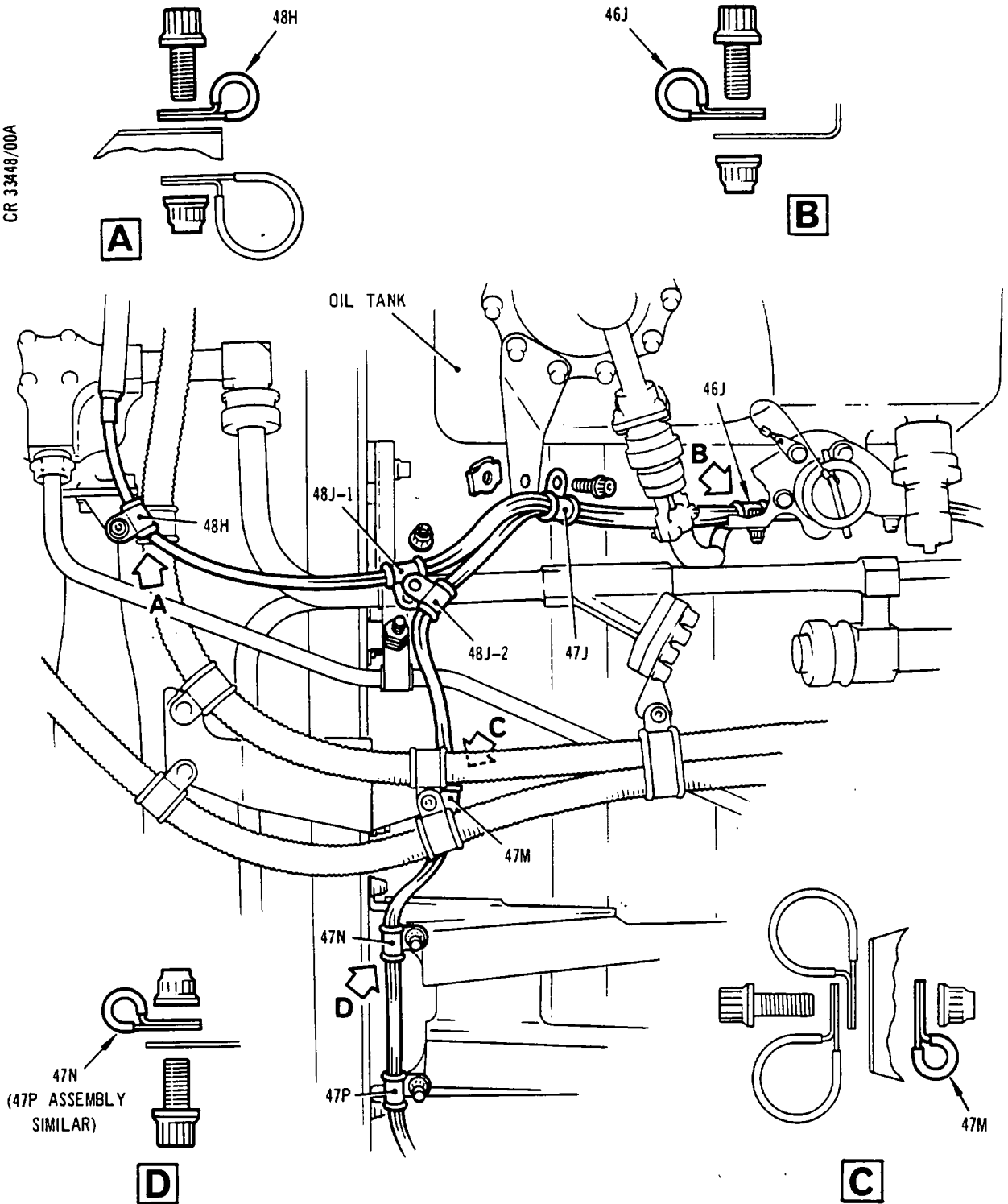
OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

CR 33448/00A



Harness First Run Clamping Positions  
Figure 510

ASSEMBLY

71-00-02

Page 520

Jun 1/94



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

(t) Grid-reference 47R (Ref.Fig.511).

Assemble the electrical harness to an existing bracket (72-22-01/4-200) on the LP to intake casing flange, with loop clamp (2-100), bolt (2-90) and nut (2-80). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(u) Grid-reference 47T (Ref.Fig.511).

Assemble the electrical harness to an existing pillar bolt (75-02-08/1-30) secured to a bracket on the LP to intake casing flange, with loop clamp (2-70) and existing nut (75-02-08/1-20). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(v) Paragraph deleted.

**OLYMPUS 593****MK.610-14-28    snecma  
OVERHAUL**

**(w)    Grid-reference 43J (Ref.Fig.509).**

Assemble the electrical harness to an existing bracket (79-22-01/1-55) on the oil tank to pump flange, with loop clamp (4-60), bolt (4-50) and nut (4-40). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

**(x)    Grid-reference 43H (Ref.Fig.509).**

Assemble the electrical harness to an existing bracket (79-22-01/1-55) on the oil tank to pump flange, with loop clamp (4-30), bolt (4-10) and clipnut (4-20). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m). Connect plug C8 to the fuel differential pressure warning switch (7 psi).

**(y)    Grid-reference 40M (Ref.Fig.509).**

Assemble the electrical harness to pillar bolt (3-220) on the LP rear blow-off flange bracket (72-31-01/5-300) at bolt-holes (36-35), with loop clamp (3-230), washer (3-210) and two nuts (3-200). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

**(z)    Grid-reference 38N (Ref.Fig.512).**

Secure the electrical harness to the existing bracket (73-22-01/1-40) on the pulse probe mounting at the rear of the LP blow-off flange, bottom centre line, with loop clamp (3-190) and existing nut, washer and bolt (71-73-02/5-20-30-40) torque-tightened to between 85 and 95 lbf in. (9,6 and 10,7 N.m). Connect, tighten and wire-lock H4/B1 plug to the LP compressor RPM probe.

ASSEMBLY

**71-00-02**

Page 522

Jun 1/94



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

(aa) Grid-reference 40N (Ref.Fig.512).

- (i) Assemble the electrical harness (Pre SB.71-3 or SB.71-13) to existing pillar bolt (71-73-02/5-470) on bracket (72-31-01/5-270) at the LP rear blow-off flange, with loop clamp (3-180) and existing nut (71-73-02/5-450). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (ii) Assemble the electrical harness (SB.71-3 or Pre SB.71-13) to the existing bracket (72-31-01/5A-320) with loop clamp (3-180), existing nut (71-73-02/5-450) and bolt (71-73-02/5-470B). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(ab) Grid-reference 40P (Ref.Fig.512).

- (i) Assemble the electrical harness (SB.71-3 and Pre SB.71-13) to the existing bracket (72-31-01/5A-320) with loop clamp (3A-170), bolt (3A-160) and nut (3A-150). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (ii) Assemble the electrical harness (SB.71-13) to the LP compressor blow-off flange, with loop clamp (3A-170), bolt (3A-155) and nut (3A-150). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

NOTE: There is no clamping at position 40P (Pre SB.71-3).



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

(ac) Grid-reference 40R (Ref.Fig.512).

Assemble the electrical harness to the existing bracket (72-31-01/5-230) on the LP blow-off flange, with loop clamp (3-140), bolt (3-130) and nut (3-120). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(ad) Grid-reference 40U (Ref.Fig.512).

Assemble the electrical harness to an existing bracket (72-31-01/5-200) on the LP rear blow-off flange, at bolt-holes (28-29), with loop clamp (3-110), existing nut (72-01-03/2-20) and bolt (72-01-03/2-30). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m). Connect, tighten and wire-lock plug D6 (Pre SB.71-8314-28) to the LP governor speed probe. Connect, tighten and wire-lock H1 plug to the hydraulic pump off-load valve.

(ae) Grid-reference 40W (Ref.Fig.512).

Assemble the electrical harness to an existing bracket (72-31-01/5-180) on the LP rear blow-off flange, at bolt holes (26-27), with loop clamps (3-60) (3-70), bolt (3-50) and nut ((3-40). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(af) Grid-reference 41V (Ref.Fig.512).

Assemble the harness to an existing bracket (72-31-01/5-190) on the LP rear blow-off flange, at bolt-holes 27, 28 and 29, with loop clamp (3-100), bolt (3-90) and nut (3-80). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m). Connect, tighten and wire-lock plug C5 to the anti-icing pressure switch.

ASSEMBLY

71-00-02

Page 524

Jun 1/94

CR 33449/000

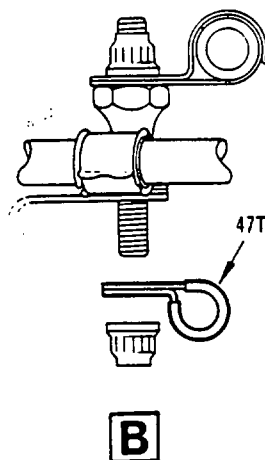
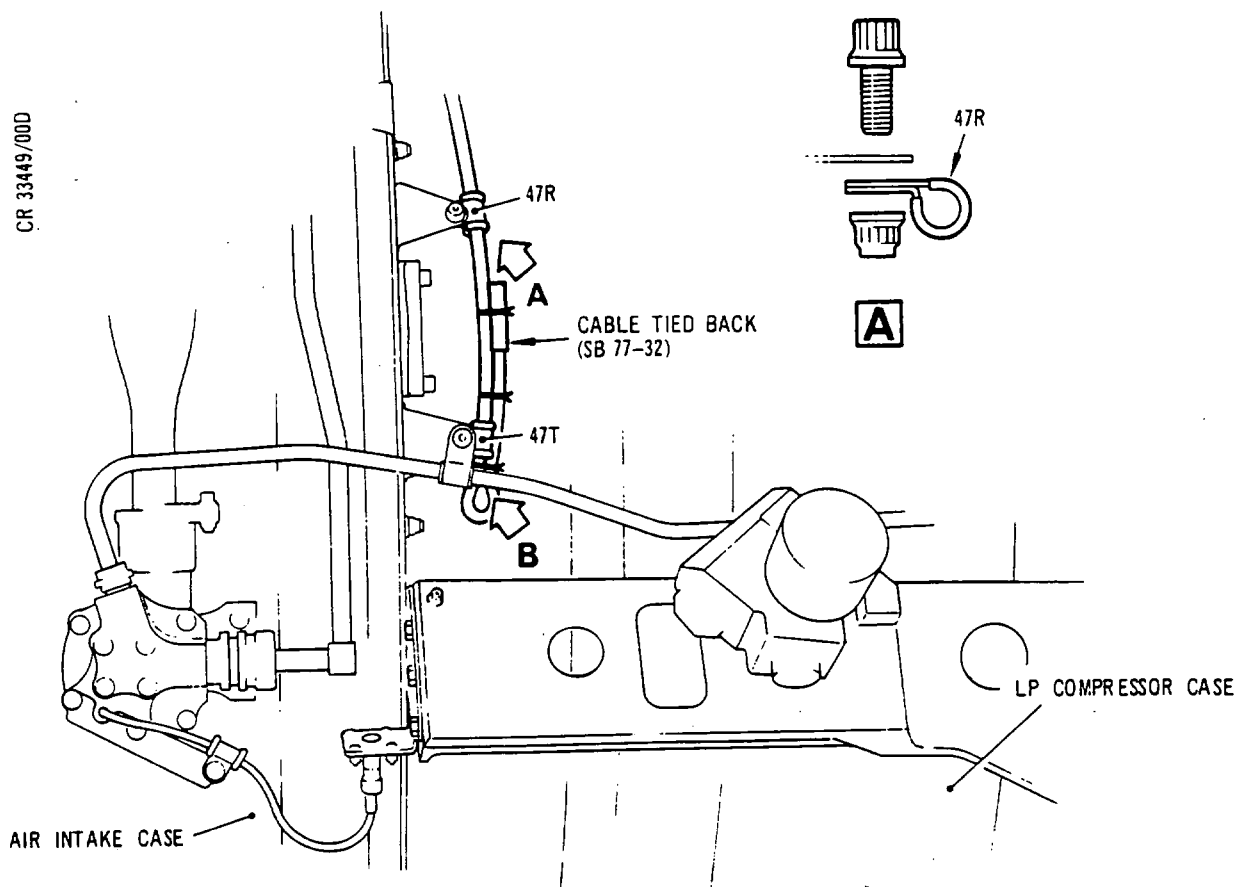


OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema



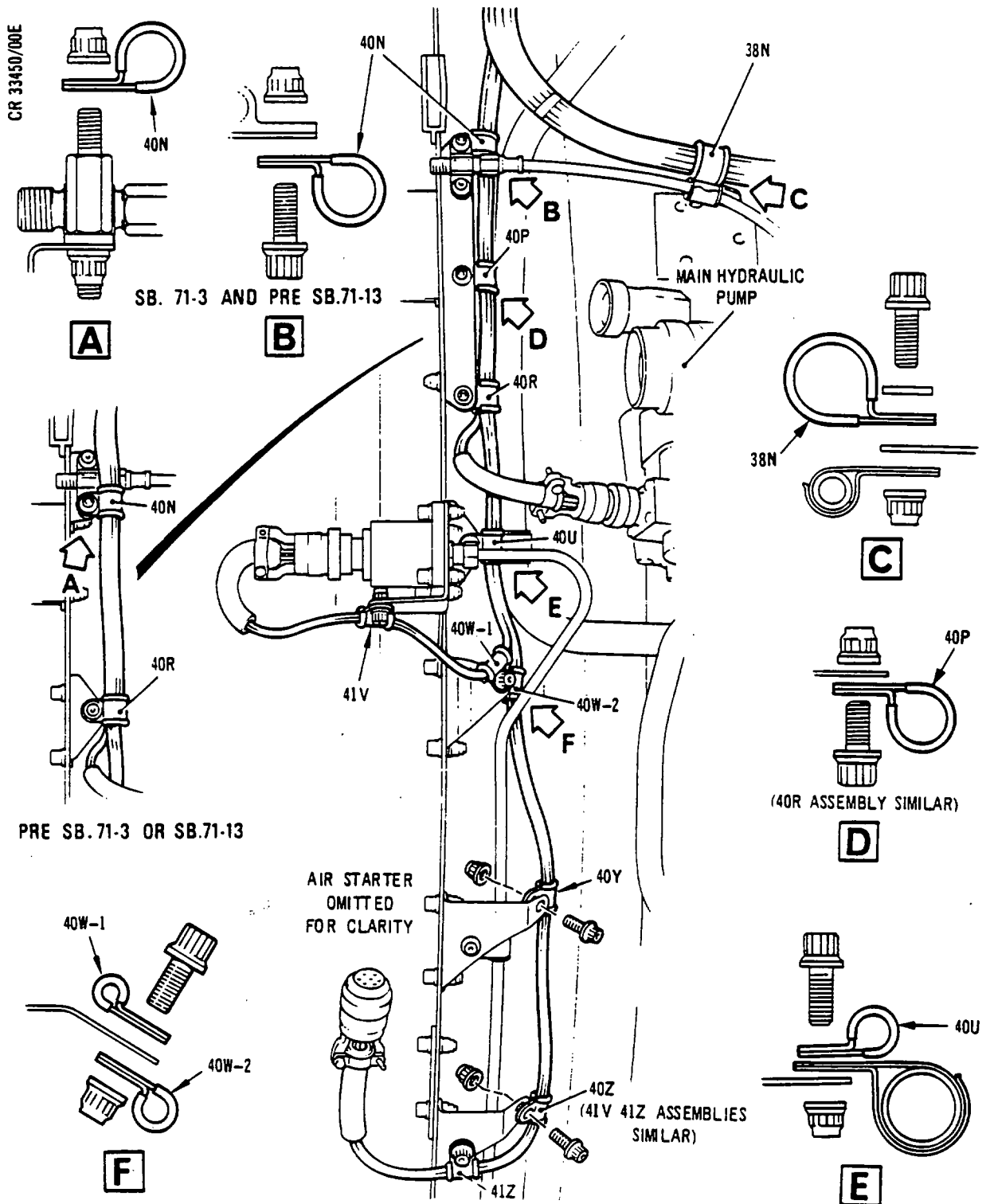
Harness First Run Clamping Positions  
Figure 511



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL



Harness First Run Clamping Positions  
Figure 512





OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

(ag) Grid-reference 40Y (Ref.Fig.512).

Assemble the electrical harness to an existing bracket (72-31-01/5-140) on the LP rear blow-off flange, at bolt-holes (23 and 24), with loop clamp (3-30), bolt (3-20) and nut (3-10). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(ah) Grid-reference 40Z (Ref.Fig.512).

Assemble the electrical harness to an existing bracket (72-31-01/5-110) on the LP rear blow-off flange, with loop clamp (3-30), bolt (3-20) and nut (3-10). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(aj) Grid-reference 41Z (Ref.Fig.512).

Assemble the electrical harness to an existing bracket (72-31-01/5-110) on the LP rear blow-off flange, with loop clamp (3-30), bolt (3-20) and nut (3-10). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m). Connect, tighten and wire-lock plug D4 to the air starter, valve if installed. If valve is not installed, secure plug connection to prevent damage.

(ak) Grid-reference 38J (Ref.Fig.513).

Assemble the electrical harness to the existing bracket (72-65-00/1-380) on the main oil pump, with loop clamp (4-220), bolt (4-200) and clipnut (4-210). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(al) Grid-reference 38G (Ref.Fig.513).

Assemble the electrical harness to the existing bracket (72-65-00/1-320) on the main oil pump, with loop clamp (4-190), bolt (4-170) and clipnut (4-180). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

(am) Grid-reference 39G (Ref.Fig.513).

Assemble the electrical harness to the existing bracket (79-22-01/1-110) on the oil pump flange, with loop clamp (4-160), bolt (4-150) and nut (4-140). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(an) Grid-reference 40G (Ref.Fig.513).

Assemble the electrical harness to the existing bracket (79-22-01/1-55) on the tank to pump oil tube, with loop clamp (4-160), bolt (4-150) and nut (4-140). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m). Connect, tighten and wire-lock plug Gt to the fuel heater control thermometer and plug G6 to the engine oil inlet thermometer.

(ap) Grid-reference 37L (Ref.Fig.513).

Assemble the electrical harness to the existing bracket (73-13-03/1-230) on the reheat fuel filter flange, with loop clamp (3-260), bolt (3-250) and nut (3-240). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(aq) Grid-reference 37M (Ref.Fig.513).

Assemble the electrical harness to the existing bracket (73-13-03/1-230) on the reheat pump fuel filter flange, with loop clamp (3-290), bolt (3-270) and clipnut (3-280). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

D. Assembly of the Second Run of the Electrical Harness to the Engine (Ref.Fig.502, 503, 504, 505, 506, 514 and 515).

(1) The second run of the harness contains the following identities:

D9	-	HP turbine bearing oil drain thermometer.
F6	-	Reheat fuel flowmeter.
H5/B2	-	HP compressor RPM probe.
C1	-	Throttle actuator gearbox (main).
D7	-	N1 governor valve.

ASSEMBLY

71-00-02

Page 528

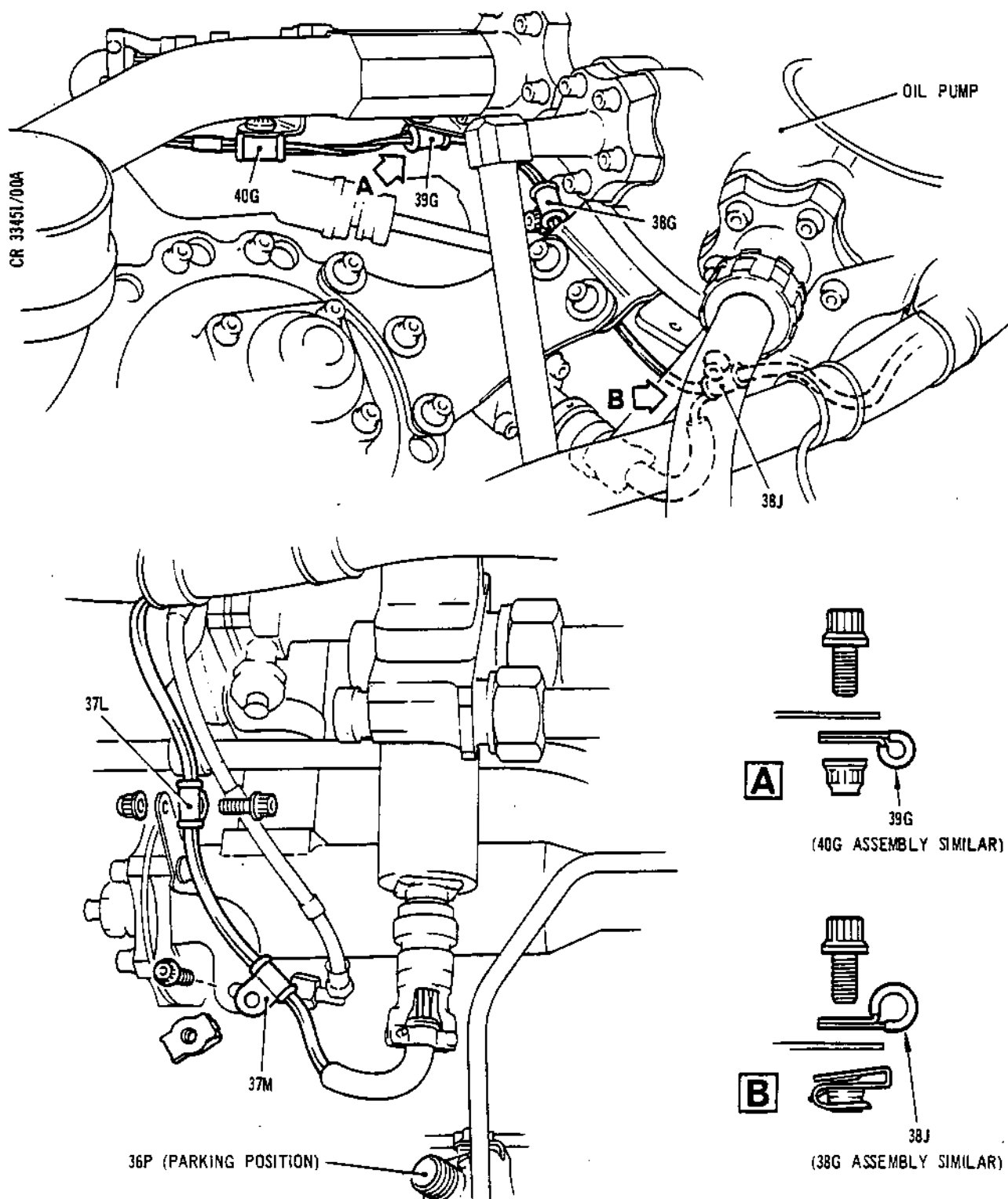
Jun 1/94



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL



Harness First Run Clamping Positions  
Figure 513

**OLYMPUS 593**MK.610-14-28 *sneema*  
OVERHAUL

- G8 - Throttle actuator gearbox (alt.)
- F5 - Engine fuel flowmeter.
- C3 - Reheat controller shut-off valve solenoid.
- G10 - HP valve position indicator.
- D10 - HP turbine bearing oil inlet thermometer.
- G4 - Fuel nozzle inlet thermometer.
- C2 - Reheat controller motor (Pre-SB.0L.593-71-8988-32).
- C2 - Bracket on the second stage fuel pump (SB.0L.593-71-8988-32).
- C4 - Reheat purge valve position transducer.
- E11 - Engine fuel heater control valve.
- E8 - Reheat flame detector.

(2) Assembly of second run by grid-reference.

(a) Grid-reference 29J (Ref.Fig.516).

Assemble the electrical harness to the existing bracket (73-13-08/1-280) on the fuel control unit, on the left-hand gearbox, with loop clamp (5-90), existing nut (73-13-02/1-20), bolt (73-13-02/1-40) and washer (73-13-02/1-30). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m). Connect, tighten and wire-lock plug D9 to the HP turbine (No.4) bearing oil drain thermometer and plug F6 to the reheat fuel flowmeter.

(b) Grid-reference 30H (Ref.Fig.516).

Assemble the electrical harness to the existing bracket (73-13-08/1-280) on the fuel control unit, on the left-hand gearbox, with loop clamp (5-120), bolt (5-100) and clipnut (5-110). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

(c) Grid-reference 31G (Ref.Fig.516).

Assemble the electrical harness to the existing bracket (73-13-08/1-280) on the fuel control unit on the left-hand gearbox, with loop clamp (5-120), bolt (5-100) and clipnut (5-110). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

ASSEMBLY

**71-00-02**

Page 530

Jun 1/94



# OLYMPUS 593

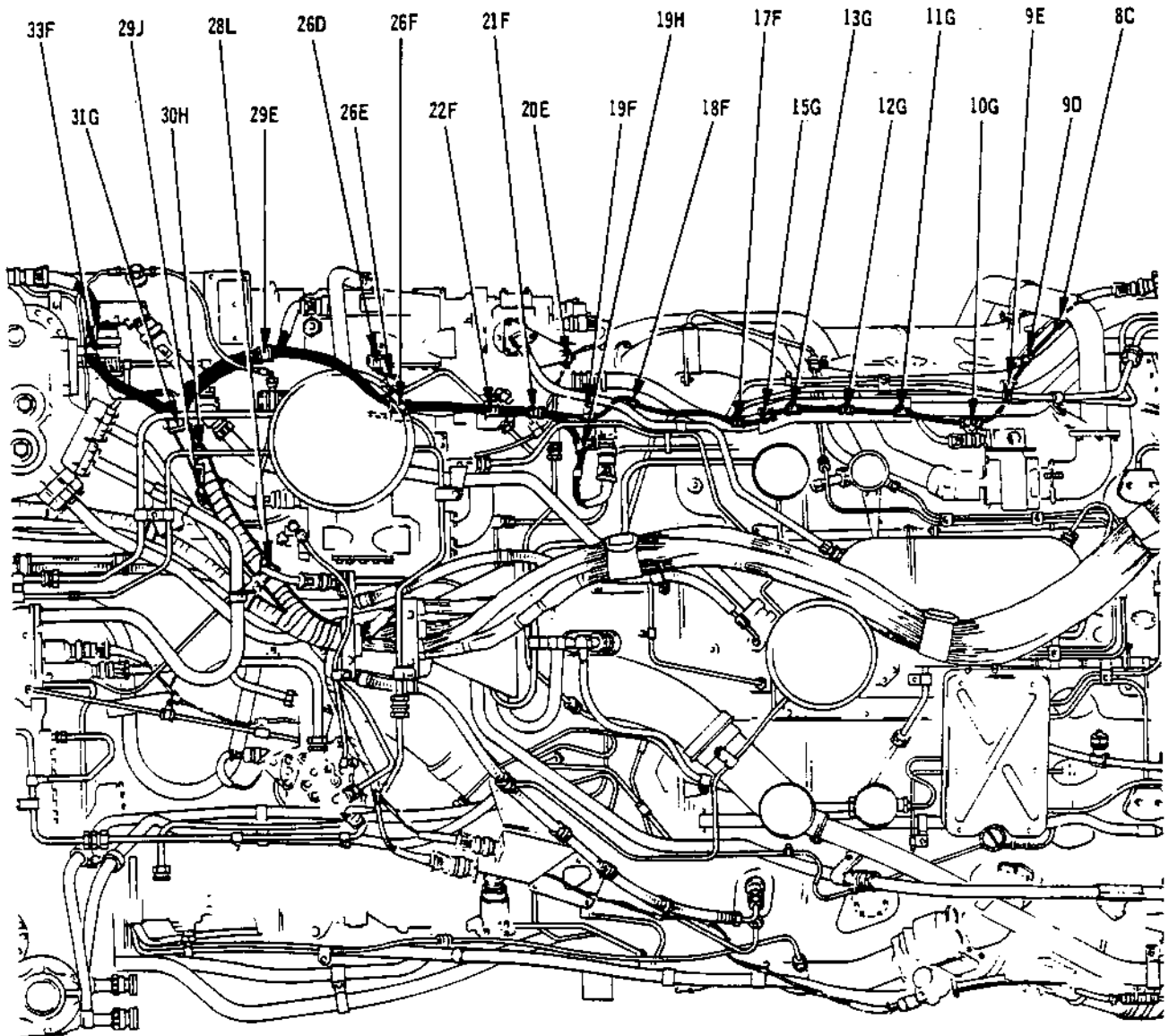


MK.610-14-28  
OVERHAUL

sheema

CR 33352/00A

Printed in England



VIEW ON UNDERSIDE OF ENGINE

Assembly of the Second Run of the Electrical  
Harness to the Engine (Pre-SB.0L.593-71-8988-32)  
Figure 514

ASSEMBLY

71-00-02

Page 531

Jun 1/94

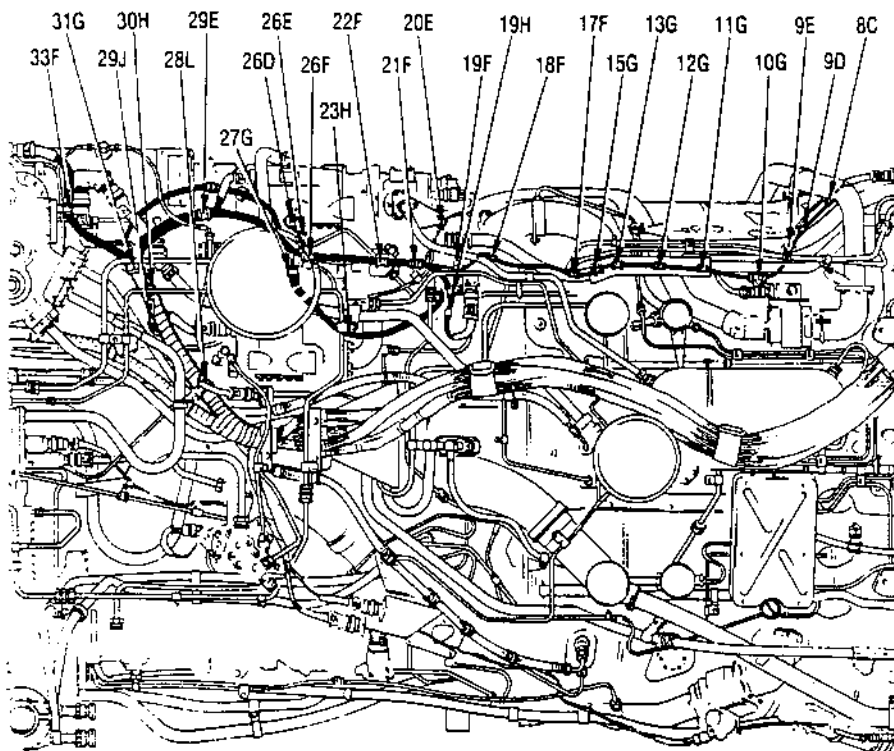


# OLYMPUS 593

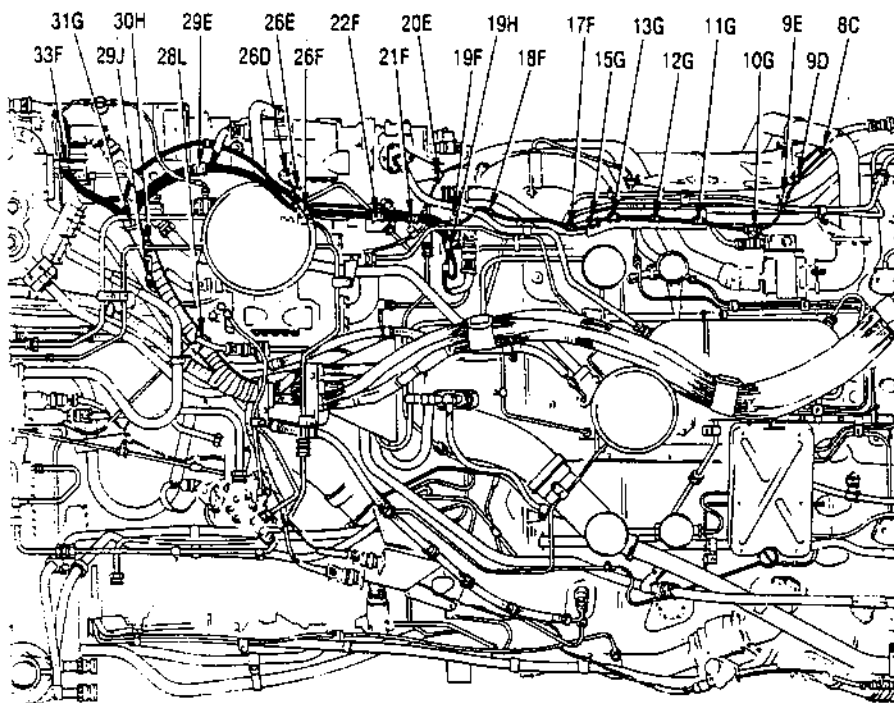


MK.610-14-28 *sneema*  
OVERHAUL

CR 36453/00A



VIEW ON UNDERSIDE OF ENGINE  
SB.71-8988-32 PARTS 1 AND 2



VIEW ON UNDERSIDE OF ENGINE  
SB.71-8988-32 PART 1 AND 3

Assembly of the Second Run of the Electrical Harness to  
the Engine (SB.0L.593-71-8988-32)  
Figure 515

ASSEMBLY

## 71-00-02

Page 532

Jun 1/94

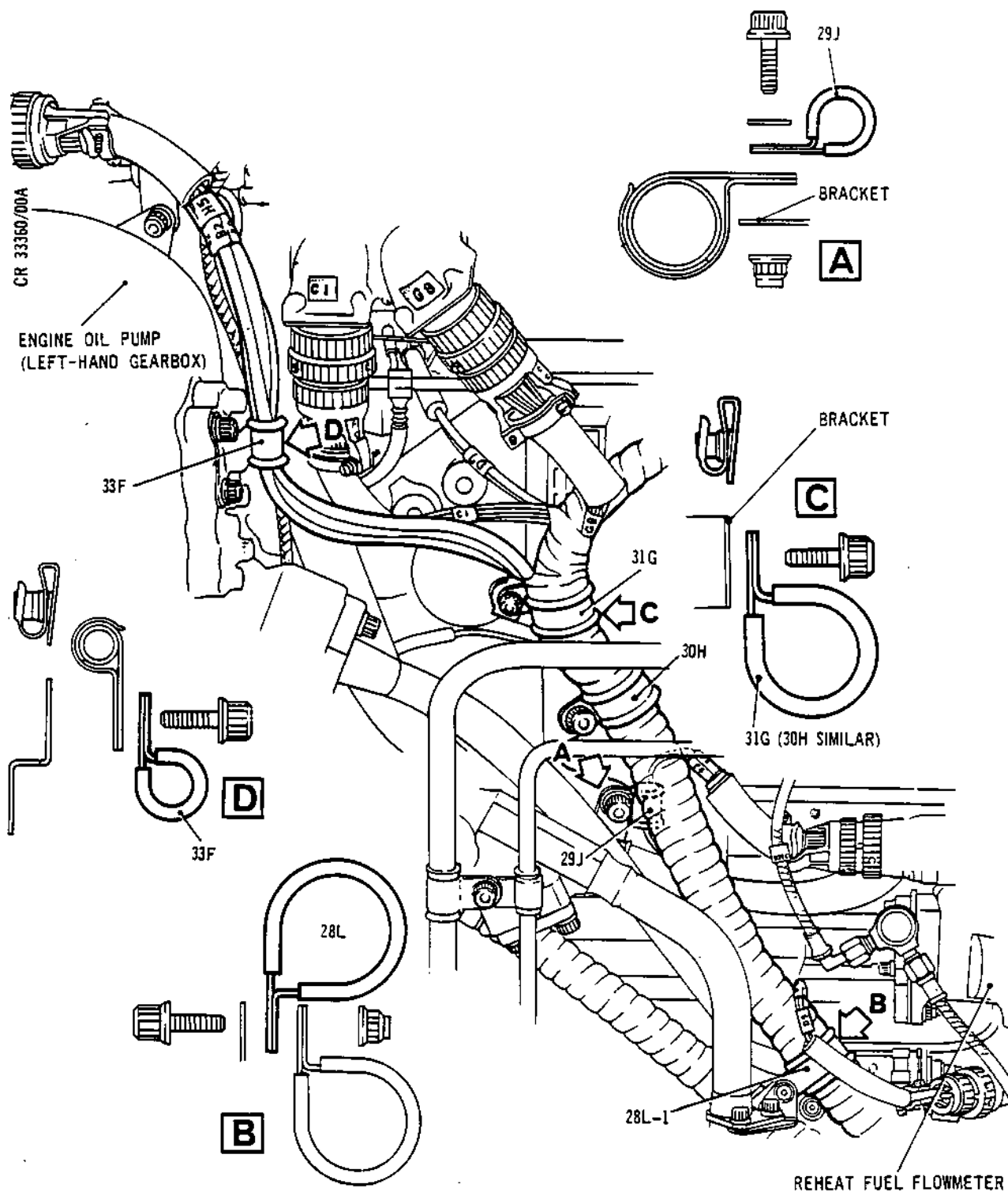


OLYMPUS 593



MK.610-14-28  
OVERHAUL

sheema



Harness Second Run Clamping Positions  
Figure 516

ASSEMBLY

71-00-02

Page 533

Jun 1/94



OLYMPUS 593



MK.610-14-28 sheema  
OVERHAUL

- (d) Grid-reference 33F (Ref.Fig.516).

Assemble the electrical harness to the existing bracket (72-65-00/5-100) on the main oil pump flange, with loop clamp (5-130) and existing clipnut (71-73-02/2-100) and bolt (71-73-02/2-90). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

- (e) Grid-reference 29E (Pre-SB.0L.593-71-8988-32 standard) (Ref.Fig.517).

Assemble the electrical harness to the existing bracket (73-11-02/1-10) on the second stage fuel pump located on the left-hand side of the engine, forward of the HP compressor, with loop clamp (5-160), bolt (5-140) and clipnut (5-150). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m). Connect, tighten and wire-lock plug H5/B2 to the HP compressor RPM probe, plug C1 to the throttle actuator gearbox (Main), plug D7 to the N1 governor valve and plug G8 to the throttle actuator gearbox (Alt).

- (f) Grid-reference 29E (SB.0L.71-8988-32 standard) (Ref.Fig.518).

Assemble the electrical harness to the existing bracket (73-11-02/1-10) on the second stage fuel pump located on the left-hand side of the engine, forward of the HP compressor, with loop clamp, packing strip, spacer and bolt (71-51-01/5-160/6-160/5-165/5-195). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m). Connect, tighten and wire-lock plug H5/B2 to the HP compressor RPM probe, plug C1 to the throttle actuator gearbox (Main), plug D7 to the N1 governor valve, plug G8 to the throttle actuator gearbox (Alt) and plug C2 to the connector receptacle at the bracket on the second stage fuel pump. Connect the receptacle connector of the reheat FCU flylead (SB.0L.593-71-8988-32 Parts 1 and 2 standard) or the reheat FCU jumplead (71-51-01/1-25) (SB.0L.593-71-8988-32 Part 3 standard) to the bracket on the second stage fuel pump with the four screws and self-locking nuts (71-51-01/13-16/17).

ASSEMBLY

71-00-02

Page 534

Jun 1/94





OLYMPUS 593



MK.610-14-28 sheema  
OVERHAUL

- (g) Grid-reference 26F (Pre-SB.0L.593-71-8988-32 standard) (Ref.Fig.517).

Assemble the electrical harness to the existing bracket (75-02-02/1-70) on the control unit to engine flowmeter, with loop clamp (5-170) and existing nut (71-73-02/3-140), washer (71-73-02/3-150) and bolt (71-73-02/3-160). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

- (h) Grid-reference 26F (SB.0L.593-71-8988-32 Parts 1 and 2 standard) (Ref.Fig.518).

Assemble the electrical harness to the existing bracket (75-02-02/1-70) on the control unit to engine flowmeter, with loop clamp and packing strip (71-51-01/5-170/6-160) and existing nut (71-73-02/3-140), washer (71-73-02/3-150) and bolt (71-73-02/3-160). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

- (j) Grid-reference 26F (SB.0L.593-71-8988-32 Part 3 standard) (Ref.Fig.518).

Assemble the electrical harness and the reheat FCU jumplead (71-51-01/1-25) to the existing bracket (75-02-02/1-70) on the control unit to engine flowmeter, with loop clamp and packing strip (71-51-01/5-171/6-160) and existing nut (71-73-02/3-140), washer (71-73-02/3-150) and bolt (71-73-02/3-160). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m). Attach the electrical harness and the reheat FCU jumplead together with the lacing braid (Tygadure T085) as shown.

- (k) Grid-reference 26E (Ref.Fig.517).

Assemble the electrical harness to the existing bracket (75-02-02/1-70) on the control unit to engine flowmeter, with loop clamp (5-200), bolt (5-190) and nut (5-180). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

ASSEMBLY

71-00-02

Page 535

Jun 1/94

**OLYMPUS 593**MK.610-14-28 *sneema*  
OVERHAUL

(l) Grid-reference 26D (Ref.Fig.517).

Assemble the electrical harness to the existing bracket (75-02-02/1-70) on the control unit to engine flowmeter, with loop clamp (5-210), existing nut (73-13-02/1-90) and bolt (73-13-02/1-100). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m). Connect, tighten and wire-lock plug G10 to the HP valve position indicator and plug D10 to the HP turbine bearing oil inlet thermometer.

(m) Grid-reference 22F (Pre-SB.0L.593-71-8988-32 standard) (Ref.Fig.517).

Assemble the electrical harness to the existing pillar bolt (73-23-01/1-100) on the reheat control unit with loop clamp (6-10) and existing nut (73-23-01/1-80) and washer (73-23-01/1-90). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

(n) Grid-reference 22F (SB.0L.593-71-8988-32 Parts 1 and 2 standard) (Ref.Fig.518).

Assemble the electrical harness to the existing pillar bolt (73-23-01/1-100) on the reheat control unit with loop clamp and packing strip (71-51-01/6-10/160) and existing nut (73-23-01/1-80) and washer (73-23-01/1-90). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

(p) Grid-reference 22F (SB.0L.593-71-8988-32 Part 3 standard) (Ref.Fig.518).

Assemble the electrical harness and the reheat FCU jumplead (71-51-01/1-25) to the existing pillar bolt (73-23-01/1-100) on the reheat control unit with loop clamp and packing strip (71-51-01/6-11/160) and existing nut (73-23-01/1-80) and washer (73-23-01/1-90). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

ASSEMBLY

**71-00-02**

Page 536

Jun 1/94



OLYMPUS 593

MK.610-14-28 sheema  
OVERHAUL

- (q) Grid-reference 21F (Pre-SB.0L.593-71-8988-32 standard) (Ref.Fig.517).

Assemble the electrical harness to the existing clamp and bracket supporting the fuel seal drains, with loop clamp (6-10), existing nut (71-73-02/4-20), bolt (71-73-02/4-40) and washer (71-73-02/4-30). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m). Connect, tighten and wire-lock plug F5 to the engine fuel flowmeter and plug C3 to the reheat controller shut-off valve solenoid.

- (r) Grid-reference 21F (SB.0L.593-71-8988-32 Parts 1 and 2 standard) (Ref.Fig.518).

Assemble the electrical harness to the existing clamp and bracket supporting the fuel seal drains, with loop clamp and packing strip (71-51-01/6-15/160), existing nut (71-73-02/4-20), bolt (71-73-02/4-40) and washer (71-73-02/4-30). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m). Connect, tighten and wire-lock plug F5 to the engine fuel flowmeter and plug C3 to the reheat controller shut-off valve solenoid.

- (s) Grid-reference 21F (SB.0L.593-71-8988-32 Part 3 standard) (Ref.Fig.518).

Assemble the electrical harness and the reheat FCU jumplead (71-51-01/1-25) to the existing clamp and bracket supporting the fuel seal drains, with loop clamp and packing strip (71-51-01/6-11/160), existing nut (71-73-02/4-20), bolt (71-73-02/4-40) and washer (71-73-02/4-30). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m). Connect, tighten and wire-lock plug F5 to the engine fuel flowmeter and plug C3 to the reheat controller shut-off valve solenoid.

- (t) Grid-reference 20E (Ref.Fig.517).

Assemble the electrical harness to the existing bracket (71-73-05/1-110) on the fuel drain tube emergency dump valve flange, with loop clamp (6-40), bolt (6-30) and nut (6-20). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m). Connect, tighten and wire-lock plug G4 to the fuel nozzle inlet thermometer.

ASSEMBLY

71-00-02

Page 537

Jun 1/94



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- (u) Grid-reference 19F (Ref.Fig.517).

Assemble the electrical harness to the existing bracket (73-23-01/1-10) on the reheat control unit, with loop clamp (6-100), bolt (6-80) and clipnut (6-90). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

- (v) Grid-reference 19H (Pre-SB.0L.593-71-8988-32 standard) (Ref.Fig.517).

Assemble the electrical harness to the existing bracket (73-23-01/1-10) on the reheat fuel controller, with loop clamp (6-70), bolt (6-50) and clipnut (6-60). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m). Connect, tighten and wire-lock plug C2 to the reheat controller motor and plug C4 to the reheat purge valve position transducer.

- (w) Grid-reference 19H (SB.0L.593-71-8988-32 Parts 1 and 2 standard) (Ref.Fig.518).

Assemble the electrical harness to the existing bracket (73-23-01/1-10) on the reheat fuel controller, with loop clamp and packing strip (71-51-01/6-70/160), bolt (6-50) and clipnut (6-60). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m). Connect, tighten and wire-lock the plug C4 to the reheat purge valve position transducer.

- (x) Grid-reference 19H (SB.0L.593-71-8988-32 Part 3 standard) (Ref.Fig.518).

Assemble the electrical harness and the reheat FCU jump lead to the existing bracket (73-23-01/1-10) on the reheat fuel controller, with loop clamp and packing strip (71-51-01/6-71/160), bolt (6-50) and clipnut (6-60). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m). Connect, tighten and wire-lock the plug on the reheat FCU jumplead to the reheat controller motor and plug C4 to the reheat purge valve position transducer. Attach the electrical harness and the reheat FCU jumplead together with the lacing braid as shown.

ASSEMBLY

71-00-02

Page 538

Jun 1/94

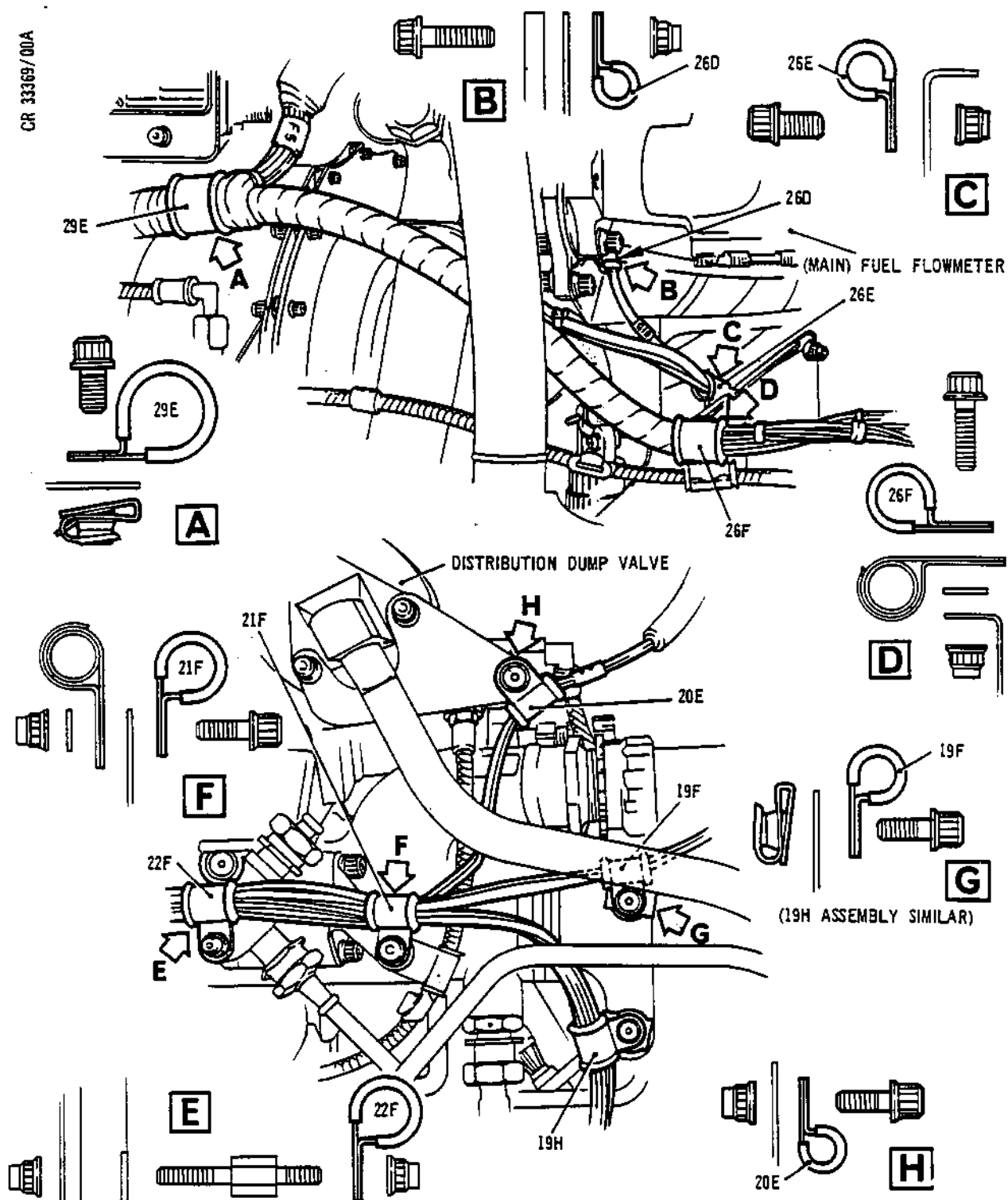
CR 33369/00A



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL



Harness Second Run Clamping Positions  
(Pre-SB.0L.593-71-8988-32)  
Figure 517

ASSEMBLY

71-00-02

Page 539

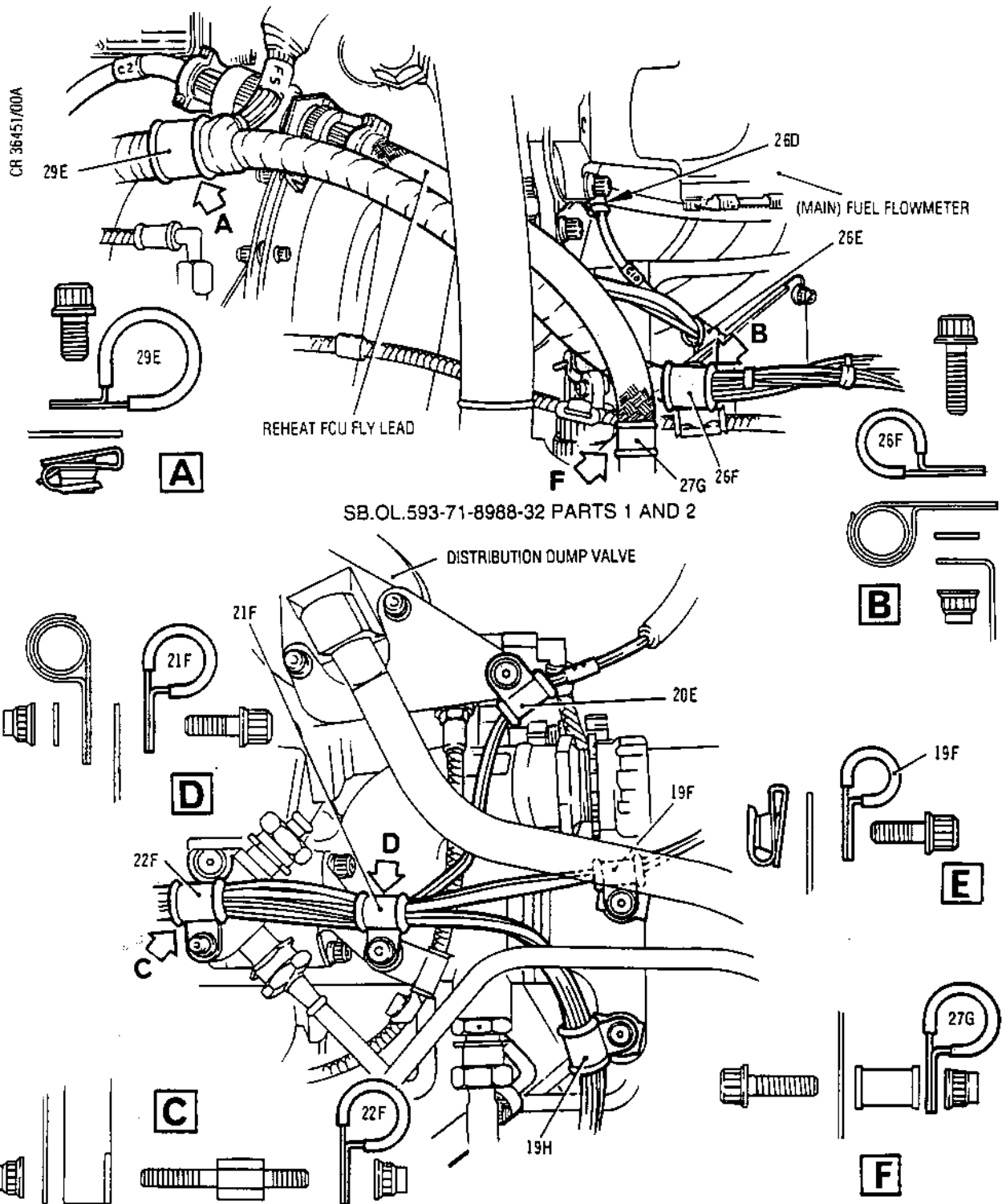
Jun 1/94



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL



SB.OL.593-71-8988-32 PARTS 1 AND 2

Harness Second Run Clamping Positions  
(SB.OL.593-71-8988-32)  
Figure 518 (Sheet 1 of 2)

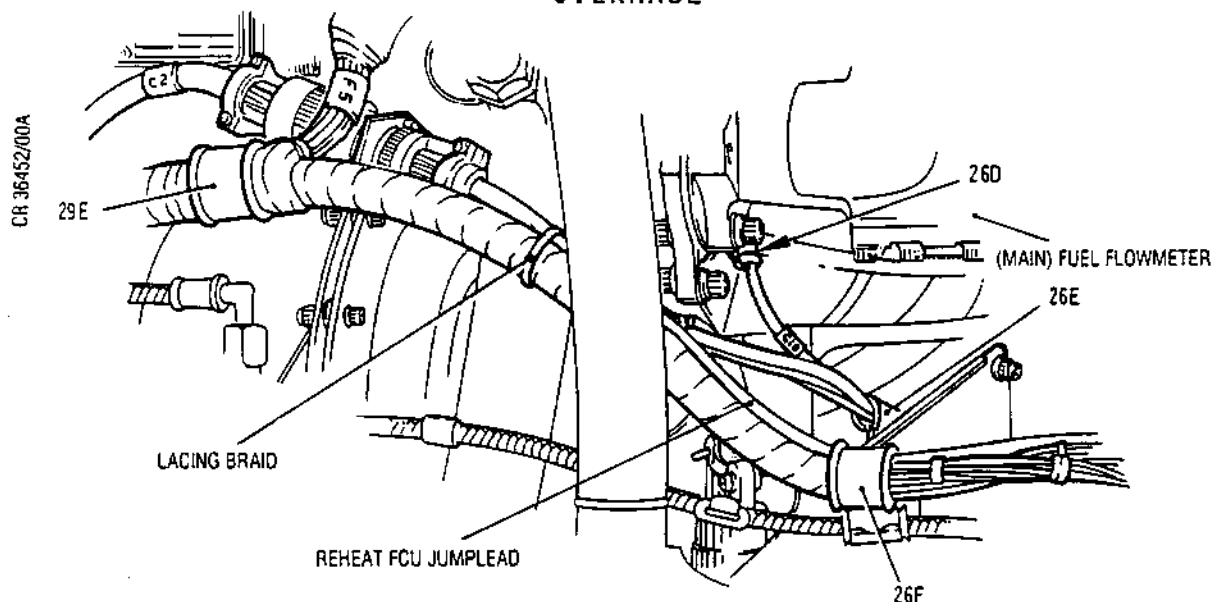


OLYMPUS 593

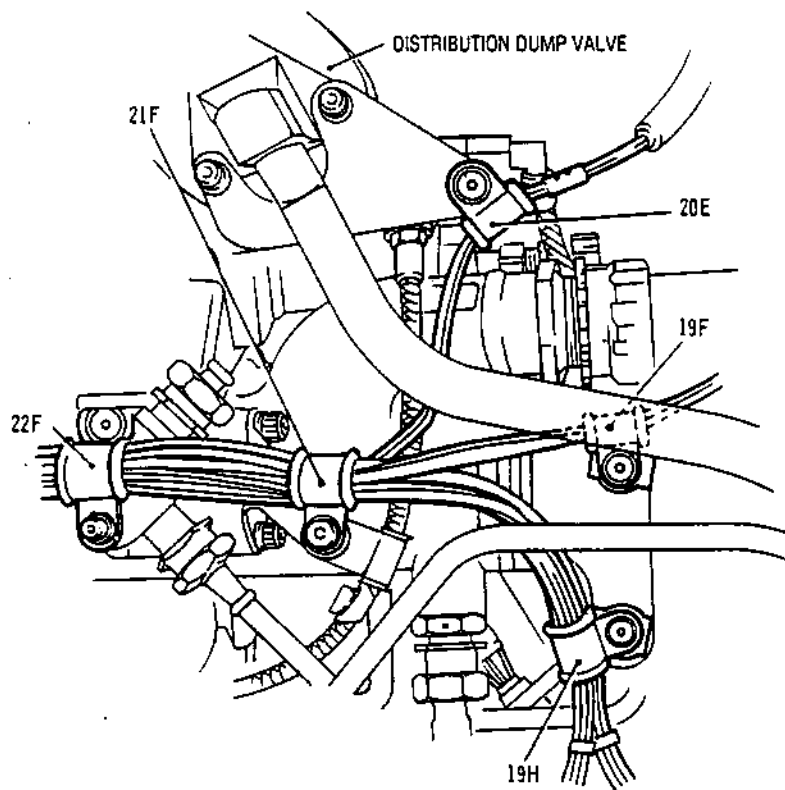


MK.610-14-28  
OVERHAUL

sneema



SB.OL.593-71-8988-32 PARTS 1 AND 3



SB.OL.593-71-8988-32 PARTS 1 AND 3

Harness Second Run Clamping Positions  
(SB.OL.593-71-8988-32)  
Figure 518 (Sheet 2 of 2)

ASSEMBLY

71-00-02

Page 541

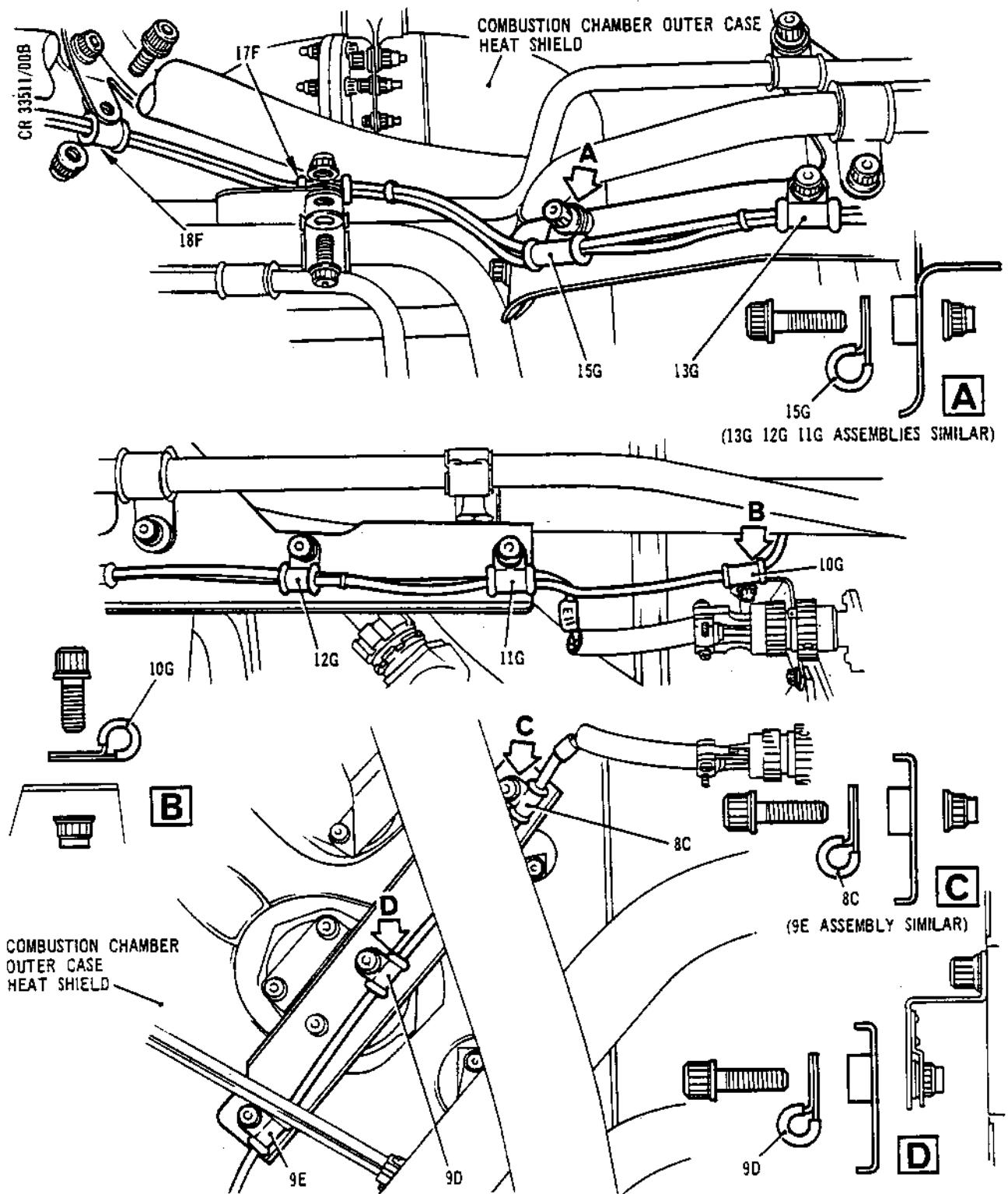
Jun 1/94



# OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL



Harness Second Run Clamping Positions  
Figure 519

ASSEMBLY

71-00-02

Page 542

Jun 1/94





OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

Printed in England

(y) Grid-reference 18F (Ref.Fig.519).

Assemble the electrical harness to an existing retaining plate/bracket (75-02-07/1-40) on left-hand labyrinth vent, with loop clamp (6-130), bolt (6-120) and nut (6-110). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

(z) Grid-reference 17F (Ref.Fig.519).

Assemble the electrical harness to the existing bracket (72-42-01/4-280) on the combustion chamber outer casing, to delivery case flange, at bolt-holes 86, 87 and 88, with loop clamp (6-140), existing nut (71-73-05/1-20), bolt (71-73-05/1-40) and washer (71-73-05/1-30). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(aa) Grid-reference 15G (Ref.Fig.519).

To the existing tray assembly (7-180) on the combustion chamber outer casing, assemble the electrical harness, with loop clamp (7-30), bolt (7-20) and nut (7-10). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

(ab) Grid-reference 13G (Ref.Fig.519).

To the existing tray assembly (7-180) on the combustion chamber outer casing, assemble the electrical harness, with loop clamp (7-30), bolt (7-20) and nut (7-10). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

ASSEMBLY

71-00-02

Page 543

Jun 1/94



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

(ac) Grid-reference 12G (Ref.Fig.519).

To the existing tray assembly (7-180) on the combustion chamber outer casing, assemble the electrical harness, with loop clamp (7-30), bolt (7-20) and nut (7-10). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

(ad) Grid-reference 11G (Ref.Fig.519).

To the existing tray assembly (7-180), on the combustion chamber outer casing, assemble the electrical harness, with loop clamp (7-30), bolt (7-20) and nut (7-10). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m). Connect, tighten and wire-lock plug E11 to the engine fuel heater control valve.

(ae) Grid-reference 10G (Ref.Fig.519).

Assemble the electrical harness to the existing bracket (73-14-02/1-90) on the fuel heater valve, with loop clamp (7-210), bolt (7-200) and nut (7-190). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

(af) Grid-reference 9E (Ref.Fig.519).

Assemble the electrical harness to the existing tray assembly (7-290), located to the rear of the combustion chamber outer casing, left-hand side of engine, with loop clamp (7-240), bolt (7-230) and nut (7-220). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

(ag) Grid-reference 9D (Ref.Fig.519).

Assemble the electrical harness to the existing tray assembly (7-290), located to the rear of the combustion chamber outer casing, left-hand side of the engine, with loop clamp (7-260), and bolt (7-250). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m).



OLYMPUS 593

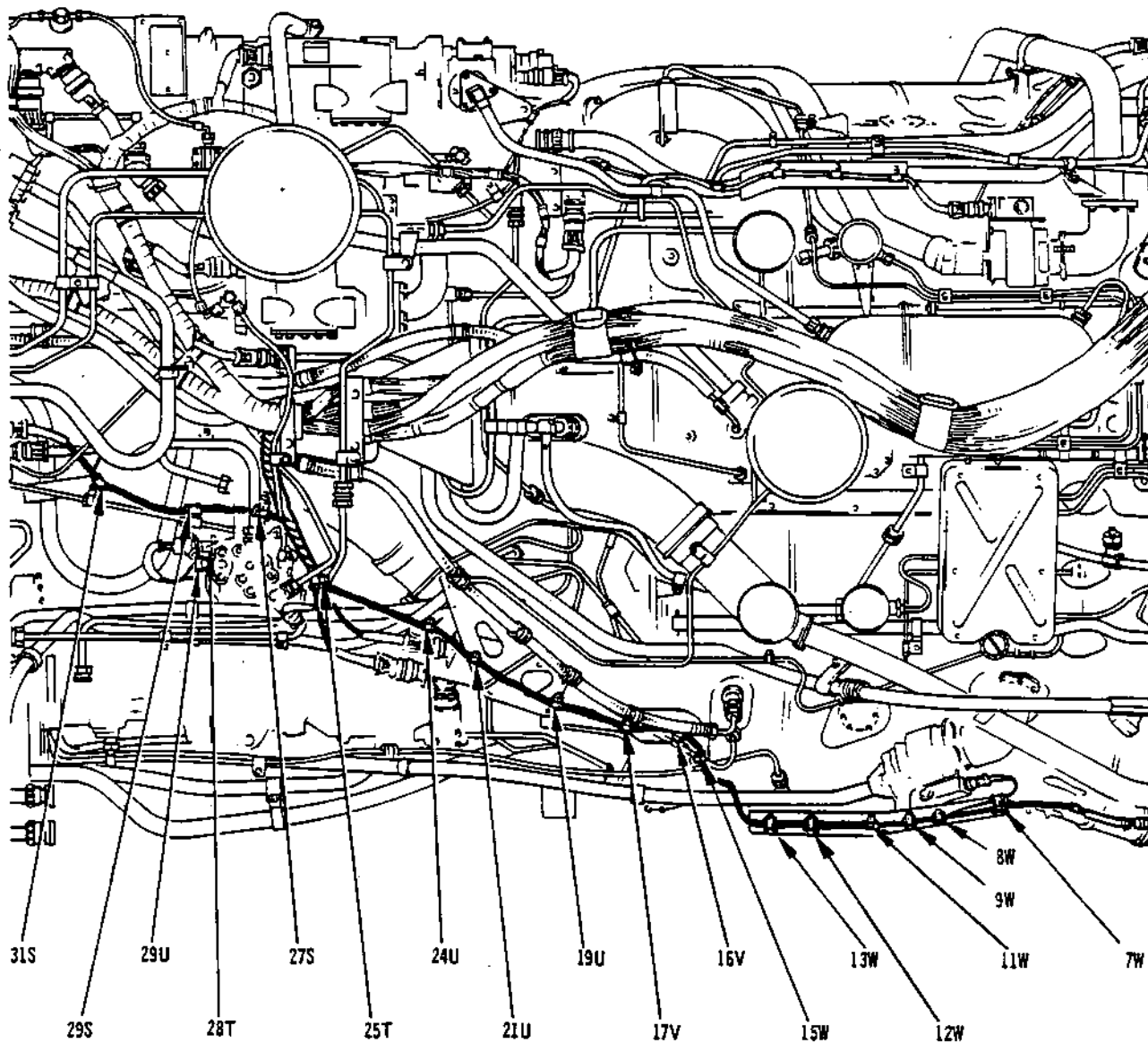


MK.610-14-28  
OVERHAUL

sneema

CR 33353/00C

Printed in England



VIEW ON UNDERSIDE OF ENGINE  
(SB. 71-16)

Assembly of the Third Run of the Electrical  
Harness to the Engine  
Figure 520

ASSEMBLY

71-00-02

Page 545

Jun 1/94

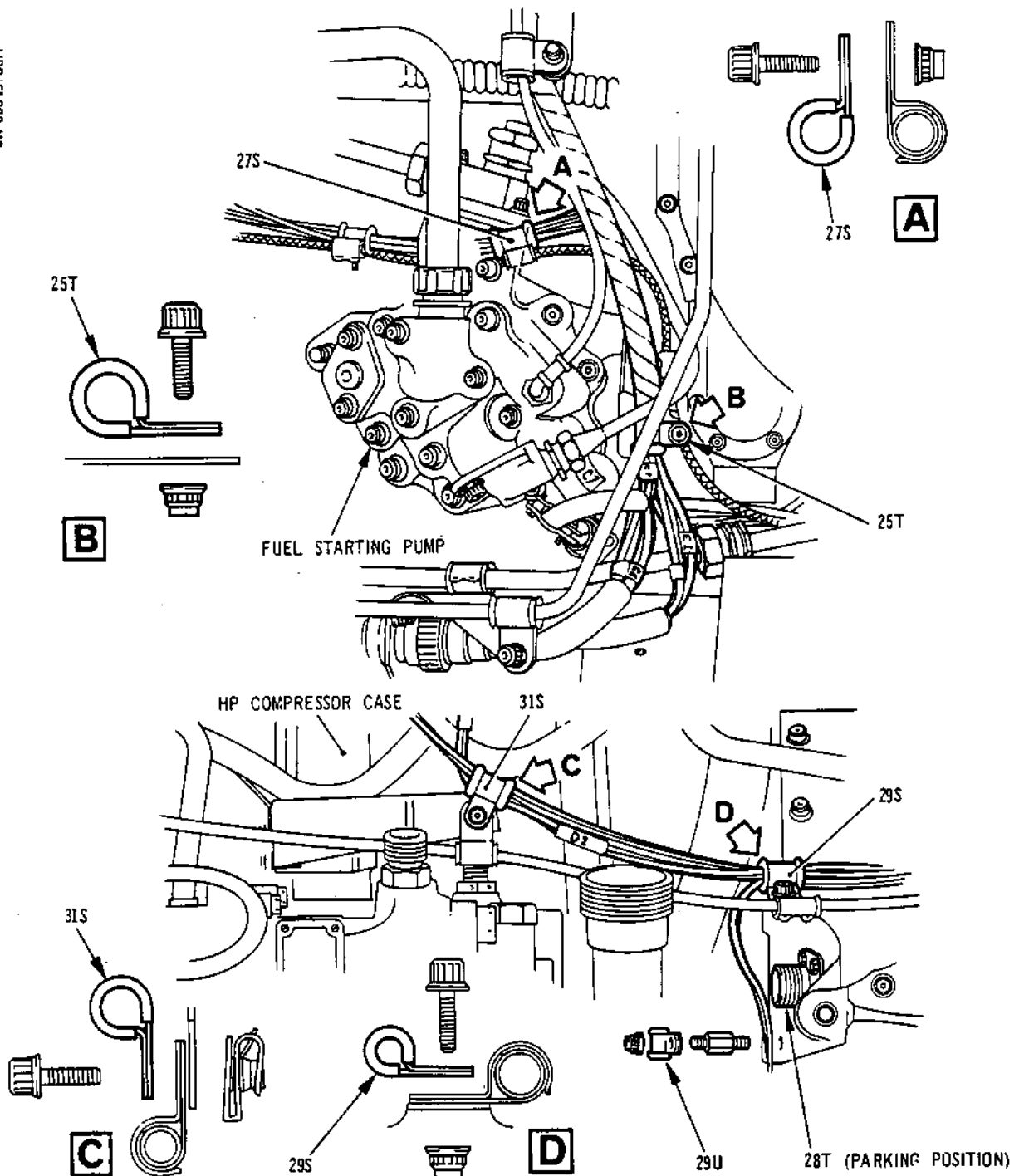


OLYMPUS 593



MK.610-14-28 snecma  
OVERHAUL

CR 33349/00A



Harness Third Run Clamping Positions  
Figure 521

ASSEMBLY

71-00-02

Page 546

Jun 1/94



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

(ah) Grid-reference 8C (ref.Fig.519).

Assemble the electrical harness to the existing tray assembly (7-290), located to the rear of the combustion chamber outer casing, left-hand side of the engine, with loop clamp (7-240), bolt (7-230) and nut (7-220). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m). Connect, tighten and wire-lock plug E8 to the reheat flame detector.

E. Assembly of the Third Run of the Electrical Harness to the Engine (Ref.Fig.502, 503, 504, 505, 506 and 520).

(1) The third run of the harness contains the following identities:

- C6 - Hydraulic pump off-load valve.
- H3 - Engine oil low pressure switch.
- D2 - Engine oil pressure transmitter.
- C7 - Electric starter pump.
- E1 - IDG disconnect solenoid.
- E2 - IDG oil inlet thermometer.
- E3 - IDG oil outlet thermometer.
- D1 - IDG mag. trim.
- D5 - IDG oil low pressure switch.
- D11 - IDG speed probe.
- E9 - Reheat purge valve.
- E5 - Engine anti-icing air pressure control valve.

(2) Assembly of third run by grid-reference.

(a) Grid-reference 27S (Ref.Fig.521).

Assemble the electrical harness to the existing bracket (72-33-01/5-360) at the starter pump mounting bracket, with loop clamp (8-30), existing nut (71-73-02/5-380) and bolt (71-73-02/5-400). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

ASSEMBLY

71-00-02

Page 547  
Jun 1/94



OLYMPUS 593

MK.610-14-28  
OVERHAUL

SNECMA

## (b) Grid-reference 29S (Ref.Fig.521).

Assemble the electrical harness to the starter pump support bracket (72-33-01/5-90) with loop clamp (8-30), existing nut (71-73-02/5-320) and bolt (71-73-02/5-330). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

## (c) Grid-reference 31S (Ref.Fig.521).

Assemble the electrical harness to the existing bracket (71-73-02/5-300) on the reheat fuel feed support bracket at the intermediate case rear flange, with loop clamp (8-10), existing clipnut (71-73-02/5-240) and bolt (71-73-02/5-230). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m). Connect, tighten and wire-lock plug H3 to the engine oil low pressure switch and plug D2 to the engine oil pressure transmitter. On SB.71-9056-33 standard engines, ensure that a minimum slack exists of between 0.750 in. (19,05 mm) and 1.000 in. (25,40 mm) at the halfway point between the plug and the first clipping point.

## (d) Grid-reference 29U (Ref.Fig.521).

Assemble the electrical harness to the starter pump support bracket (72-33-01/5-90), with loop clamp (8-20), existing pillar bolt (73-13-11/1-330) and nut (73-13-11/1-310). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m). Use lubricant A.

(e) Assemble the dummy receptacle (72-33-01/5-30), for C6 plug parking, to the starter pump support bracket (72-33-01/5-100), with dummy receptacle pan head screws (72-33-01/5-20) and nuts (72-33-01/5-10). Torque-tighten to between 8 and 10 lbf in. (0,9 and 1,1 N.m) using wrench (Tool 1592). Connect, tighten and wire-lock plug C6 to the hydraulic pump off-load valve. If valve is not fitted, assemble to the dummy receptacle previously installed.

ASSEMBLY

71-00-02

Page 548

Jun 1/99



OLYMPUS 593


 MK.610-14-28 *sneema*  
OVERHAUL

## (f) Grid-reference 25T (Ref.Fig.521).

Assemble the electrical harness to the starter pump mounting bracket (72-33-01/5-360), with loop clamp (8-60), bolt (8-50) and nut (8-40). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

## (g) Grid-reference 24U (Ref.Fig.522).

Assemble the electrical harness to the existing bracket (72-33-01/7-140) supporting the IDG unit to cooler oil tubes, with loop clamp (8-90), bolt (8-70) and clipnut (8-80). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m). Connect, tighten and wire-lock plug C7 to the electric starter pump. Connect, tighten and wire-lock plug E1, E2, E3 to the existing bracket on the IDG. If the unit is not fitted, suitably blank and stow plugs. Connect, tighten and wire-lock plug D1, D5, D11 to the existing bracket on the IDG. If the IDG is not installed, suitably blank and stow plugs.

## (h) Grid-references 21U (Ref.Fig.522).

Assemble the electrical harness to the existing bracket (75-01-04/1-170) supporting the air duct at the delivery case front flange, with loop clamp (8-120), bolt (8-100) and clipnut (8-110). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

## (j) Grid-reference 19U (Ref.Fig.522).

Assemble the electrical harness to the existing bracket (75-01-04/1-160) supporting the air duct at the delivery case front flange, with loop clamp (8-130), existing clipnut (74-21-01/2-190) and bolt (74-21-01/2-160, Pre SB.71-1, 2-170, SB.71-1). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m). Connect, tighten and wire-lock plug E9 to the reheat purge valve.

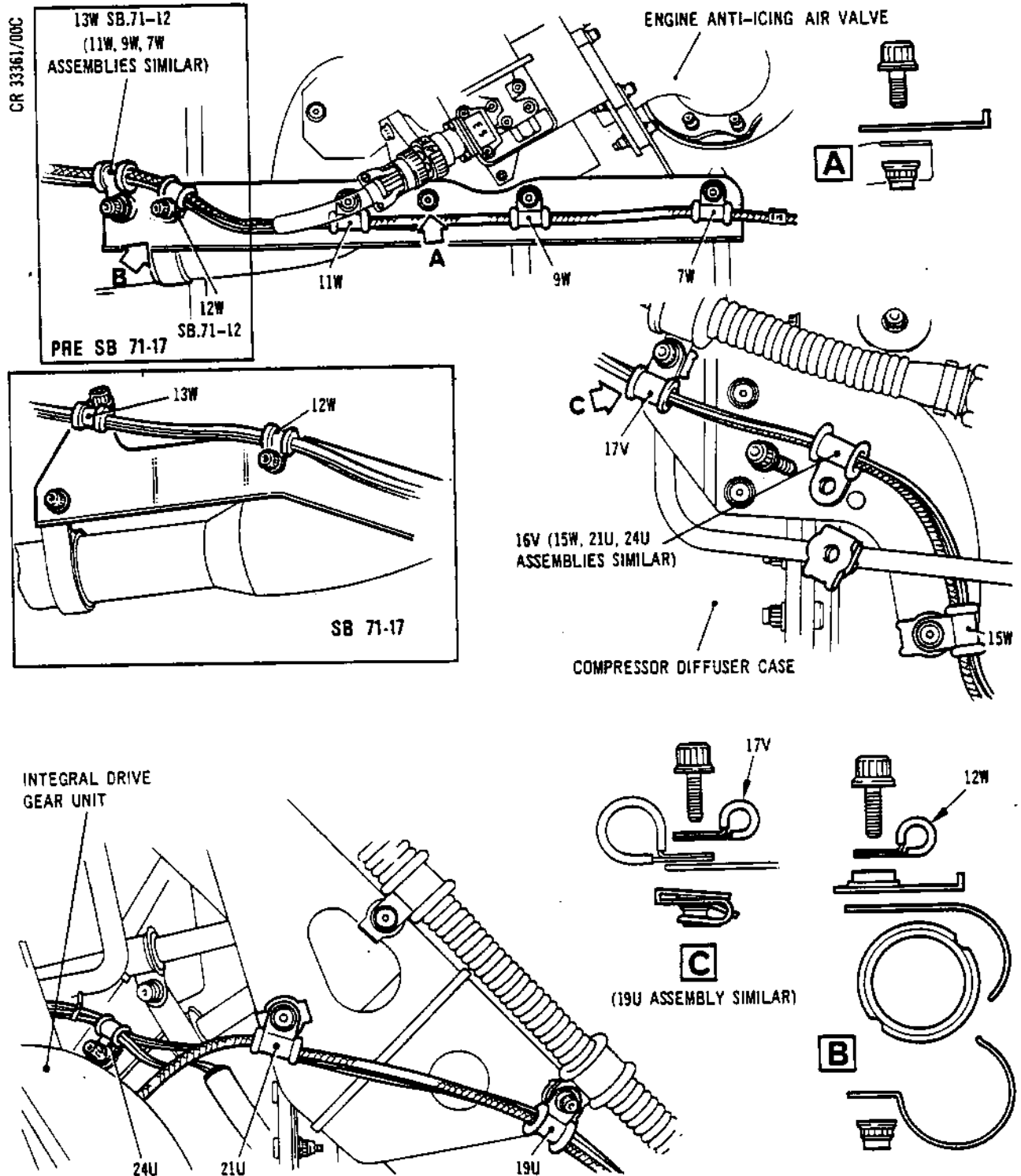


# OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA



Harness Third Run Clamping Positions (Pre-SB.71-16)  
Figure 522

ASSEMBLY

## 71-00-02

Page 550

Jun 1/94





OLYMPUS 503



MK.610-14-28 SHEEMA  
OVERHAUL

(k) Grid-reference 17V (Ref.Fig.522).

(i) Assemble bracket (9-60) to the existing bracket on the delivery case rear flange, near the starboard igniter with two bolts (9-50) and nuts (9-40). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(ii) Assemble the electrical harness to bracket (9-60), with loop clamp (8-160), bolt (8-140) and clipnut (8-150). Do not torque-tighten until HE igniter lead has been installed at reference point 'Ac' (para.3.C.(24)), then torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(l) Grid-reference 16V (Ref.Fig.522).

Assemble the electrical harness to bracket (9-60), with loop clamp (8-190), bolt (8-170) and clipnut (8-180). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(m) Grid-reference 15W (Ref.Fig.522).

Assemble the electrical harness to bracket (9-60), with loop clamp (9-30), bolt (9-10) and clipnut (9-20). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(n) Grid-reference 13W (Ref.Fig.522).

Loosely assemble the electrical harness to tray (9-230), attached to the anti-icing valve and tube, with loop clamp (9-90), bolt (9-80) and nut (9-70). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m) after cable has been adjusted (Ref.para.2.E.(2)(s)).



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

(p) Grid-reference 12W (Ref.Fig.522).

(i) Loosely assemble the electrical harness to tray (9-230) Pre SB.71-17, with loop clamp (9-130) and secure the tray to the anti-icing tube with inner clamp (9-160), outer clamp (9-150), bush (9-170), bolt (9-120) and nut (9-100). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m) after cable has been adjusted (Ref.para.2.E.(2)(s)).

(ii) Loosely assemble the electrical harness to tray (9-230) SB.71-17, with loop clamp (9-130), bolt (9-120) and nut (9-70). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m) after cable has been adjusted (Ref.para.2.E.(2)(s)).

(q) Grid-reference 11W (Ref.Fig.522).

Loosely assemble the electrical harness to tray (9-230), with loop clamp (9-200), bolt (9-190) and nut (9-180). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m) after cable has been adjusted (Ref.para.2.E.(2)(s)). Connect, tighten and wire-lock plug E5 to the anti-icing control valve solenoid.

(r) Grid-reference 9W (Ref.Fig.522).

Loosely assemble the electrical harness to tray (9-230), with loop clamp (9-200), bolt (9-190) and nut (9-180). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m) after cable has been adjusted (Ref.para.2.E.(2)(s)).

(s) Grid-reference 8W (SB.71-16) (Ref.Fig.523).

Loosely assemble the electrical harness to tray (9-230), with loop clamp (9-205), bolt (9-196) and nut (9-180). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m) after cable has been adjusted (Ref.para.2.E.(2)(s)).

ASSEMBLY

71-00-02

Page 552

Jun 1/94



# OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

- (t) Grid-reference 7W (Ref.Fig.522 and 523) (Pre and SB.71-16 standard).

NOTE: Plug E15 is no longer required, and the cable is tied back. Refer to SB 77-8876-32 for details.

Loosely assemble the electrical harness to tray (9-230), with loop clamp/clamps (9-200), bolt (Pre SB.71-16, 9-190) (SB.71-16, 9-194) and nut (9-180). Torque-tighten to between 67 and 73 lbf in. (7,6 and 8,2 N.m) after cable/cables have been adjusted. Ensure that there is minimum total lateral deflection of 1.000 in. (25,4 mm) of the cable between loop clamp grid-references 12W and 11W. Adjust as necessary then recheck after torque-tightening.

## F. Install Transportation Parts (Ref.Fig.524).

### (1) General.

To prevent damage during transportation, the harness is secured by five harness supports and a mounting plate assembly secured to the engine.

### (2) Assembly of mounting plate.

- (a) Assemble the mounting plate (11-110) to the reheat fuel tube with bush (11-240), spring clips (11-220, 230), washer (11-200), nut (11-190) and screw (11-210).
- (b) Secure the mounting plate brackets to the brackets on the exhaust diffuser and the spherical joint flange attachment with thumbnut (11-130) and wingscrew (11-180).
- (c) Connect the seven electrical harness connectors to their respective receptacles.

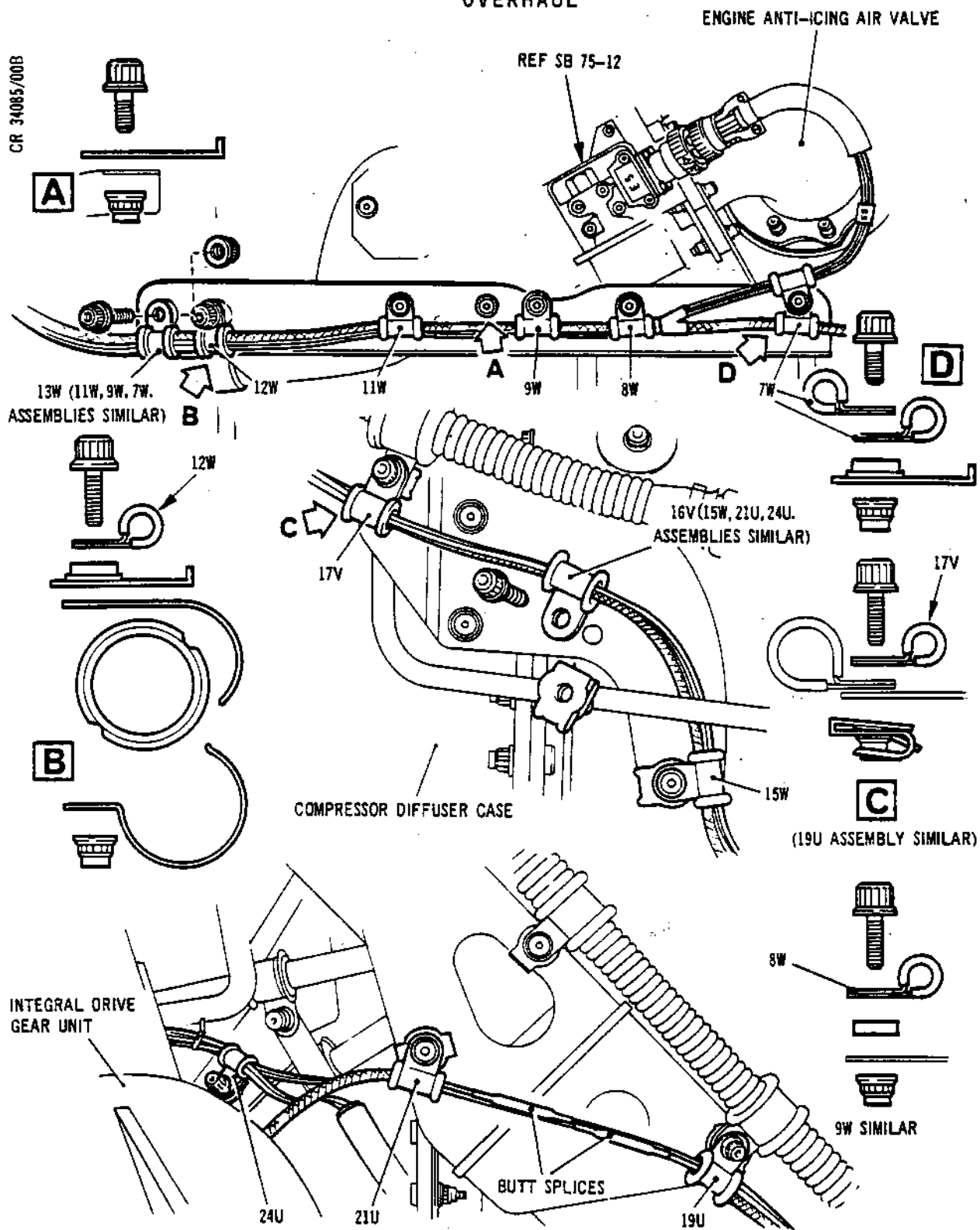


# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

CR 34085/00B



Harness Third Run Clamping Positions (SB.71-16)  
Figure 523

ASSEMBLY

## 71-00-02

Page 554

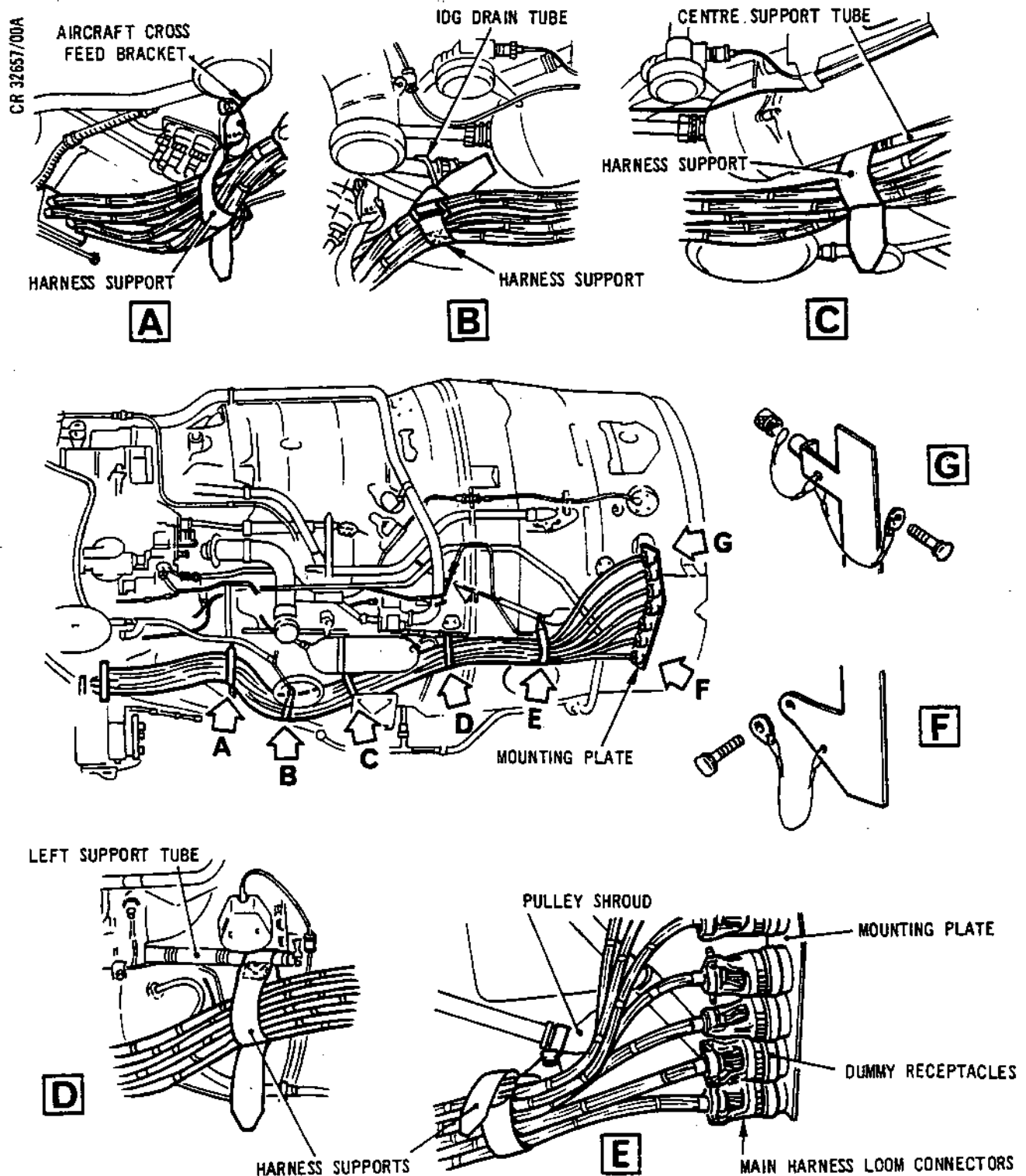
Jun 1/94



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL



Electrical Harness Transportation Support Detail  
Figure 524

ASSEMBLY

71-00-02

Page 555

Jun 1/94



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sheema

## (3) Assembly of harness supports.

- (a) Support A. Secure support (11-10) to bracket on the delivery casing and C00C attachment flange using wingscrew (11-20), then strap the harness into position.
- (b) Support B. Secure support (11-30) to the IDG drain tube, then strap the harness into position.
- (c) Support C. Secure support (11-40) to the centre support tube, then strap the harness into position.
- (d) Support D. Secure support (11-40) to the left support tube, then strap the harness into position.
- (e) Support E. Secure support (11-50) to the LP shaft signal system pulley shroud (76-21-02/1-50) on the exhaust diffuser using wingscrew (11-60), then strap the harness into position.

3. High Energy Ignition Leads - Assembly on the Engine

## A. General.

- (1) For identification of parts used during assembly, refer to paragraph 1.C. and IPC 74-21-01.
- (2) Lubricate clamp nuts and bolts with lubricant 'B' (Ref.71-09-00, Table 501).

## B. Assembly of Ignition Leads to the High Energy (HE) Ignition Unit (Ref.Fig.525).

Assemble the two high energy ignition leads, (2-1) to the high energy ignition unit, located on the air intake casing, left-hand side of the engine, just above bottom centre line. Assemble connections dry and torque-tighten, Pre.SB.0L.593-74-8138-5 standard, between 10 and 15 lbf ft (13,6 and 20,3 N.m). SB.0L.593-74-8138-5 and SB.0L.593-74-9084-19 standard, between 20 and 25 lbf ft (27 and 34 N.m), using wrench (Tool 1664) and wire-lock.

ASSEMBLY

71-00-02

Page 556  
Dec 31/00



# OLYMPUS 593

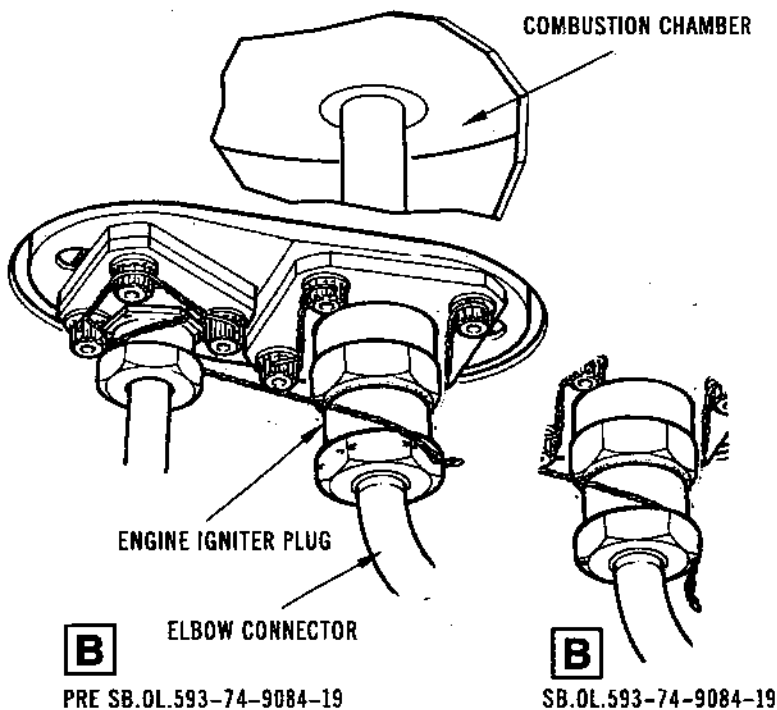
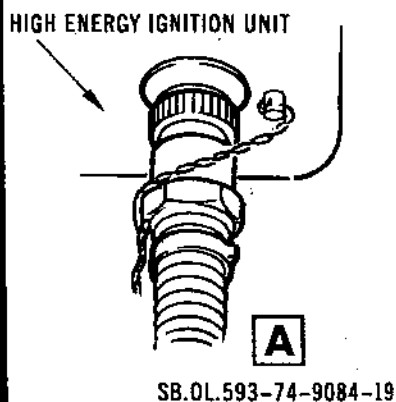
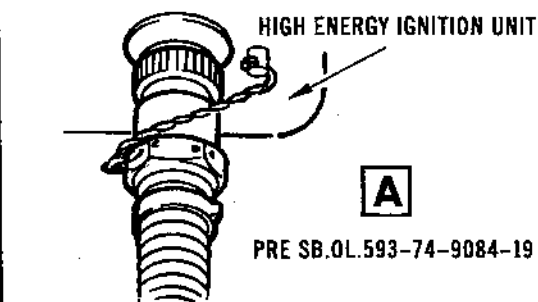
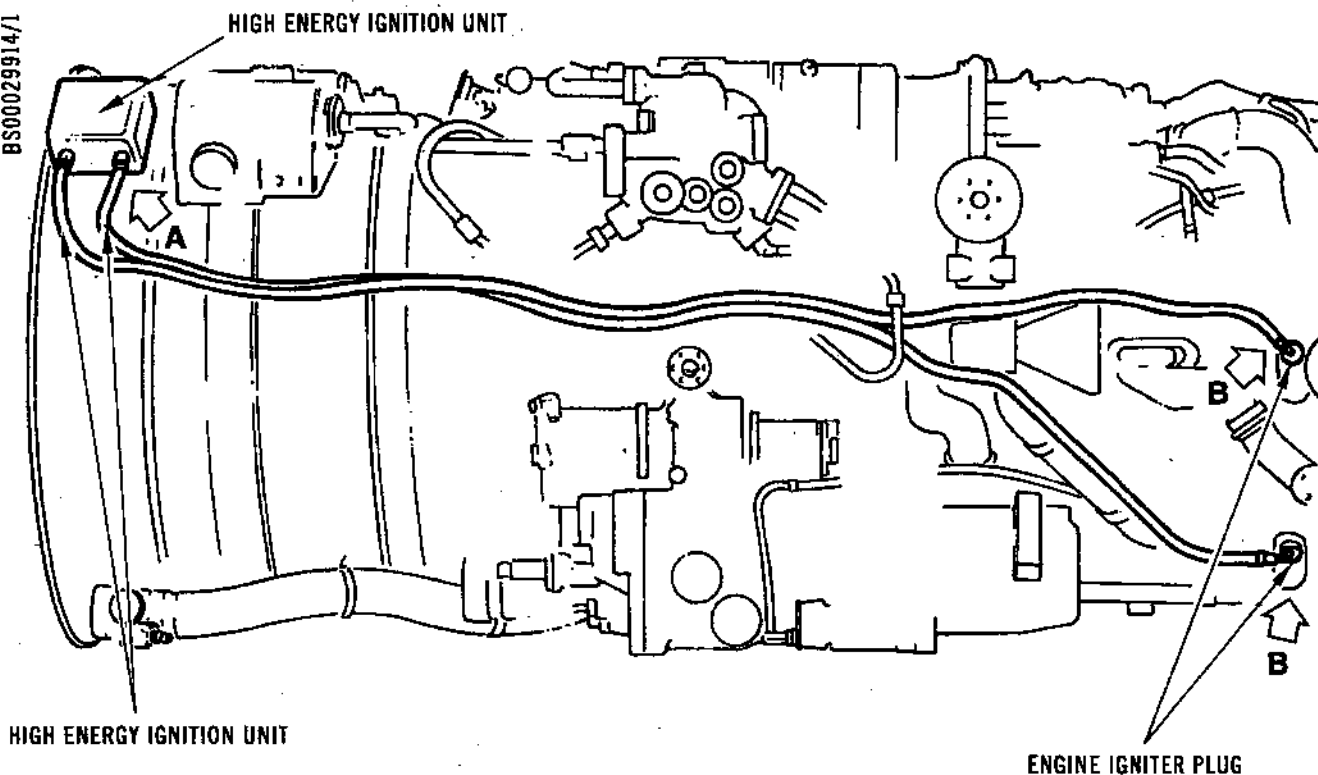


MK.610-14-28  
OVERHAUL

sneema

Printed in England

CR 33288/00C  
BS00029914/1



High Energy Ignition Leads  
Figure 525



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

## C. Assembly of Ignition Leads to the Engine (Ref.Fig.526).

## (1) Reference point 'A'.

Assemble the left-hand side lead only, to an existing bracket (72-01-04/1-300) on the anti-icing manifold adapter, located on the air intake casing, below the HE ignition unit, slightly above the engine bottom centre line. Pre SB.0L.593-74-9084-19 standard lead, retain with loop clamp (1-30), bolt (1-20) and clipnut (1-40). SB.0L.593-74-9084-19 standard lead, retain with clip (1-30), spacer (1-45), bolt (1-20) and clipnut (1-40). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

## (2) Reference point 'B'.

Assemble the right-hand side lead only, to an existing bracket (75-11-01/2-180) on the anti-icing manifold pipe to adapter. Pre SB.0L.593-74-9084-19 standard lead, retain with loop clamp (1-50) and existing nut (71-51-01/2-160) and bolt (71-51-01/2-170), which also retains the electrical harness. SB.0L.593-74-9084-19 standard lead, retain with clip (1-50) and existing nut (71-51-01/2-160) and bolt (71-51-01/2-170), which also retains the electrical harness. Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

## (3) Reference points 'C' and 'D'.

Assemble the left and right-hand leads to their respective positions on an existing bracket (72-22-01/4-210) at the air intake to LP casing joint flange, left-hand side of the engine, slightly above bottom centre line. Retain, with loop clamps (1-70), bolts (1-60) and clipnut (1-80). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

**NOTE:** When using SB.0L.593-74-9084-19 standard lead, position 'C' is not used.

ASSEMBLY

71-00-02

Page 558

Dec 31/00





OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

## (4) Reference points 'E' and 'F'.

Assemble the left and right-hand leads together to an existing bracket (72-22-01/4-140) located on the same flange as points 'C' and 'D'. Retain, with loop clamps (1-90) and existing nut (71-51-01/2-110) and bolt (71-51-01/2-120) retaining the electrical harness, left-hand side of the engine slightly above bottom centre line. Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

## (5) Reference point 'G'.

Assemble the left and right-hand leads together to an existing bracket (72-01-04/1-70), located on the oil scavenge tube joint flange that feeds the LP compressor front (No.1) bearing to left-hand gearbox. Retain, with loop clamp (1-120), bolt (1-110) and nut (1-100). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

## (6) Reference point 'H'.

(a) HE lead (Pre.SB.0L.593-74-8732-12). Locate an existing bracket (72-31-01/4-430) on the forward blow-off flange of the LP casing, near the bottom of the engine, carrying the LP compressor front (No.1) bearing oil feed and return, tubes, and electrical harness. Assemble the left and right-hand leads together and retain to the bracket with loop clamp (1-150), pillar bolt (1-160A) and nuts (1-130) and (1-170). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(b) HE lead (SB.0L.593-74-8732-12). Assemble the left and right-hand leads together and secure to existing bracket (72-31-01/4-430) with clamp (1-150), pillar bolt (1-160B), spacer (1-140) and nuts (1-130) and (1-170). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

## (7) Reference point 'J'.

Locate an existing bracket (72-31-01/5-360) on the rear blow-off flange of the LP casing near the bottom centre line, carrying the LP compressor front (No.1) bearing vent tube. Assemble the left and right-hand leads together and retain, with loop clamp (1-190), bolt (1-180) and clipnut (1-200). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

ASSEMBLY

71-00-02

Page 559

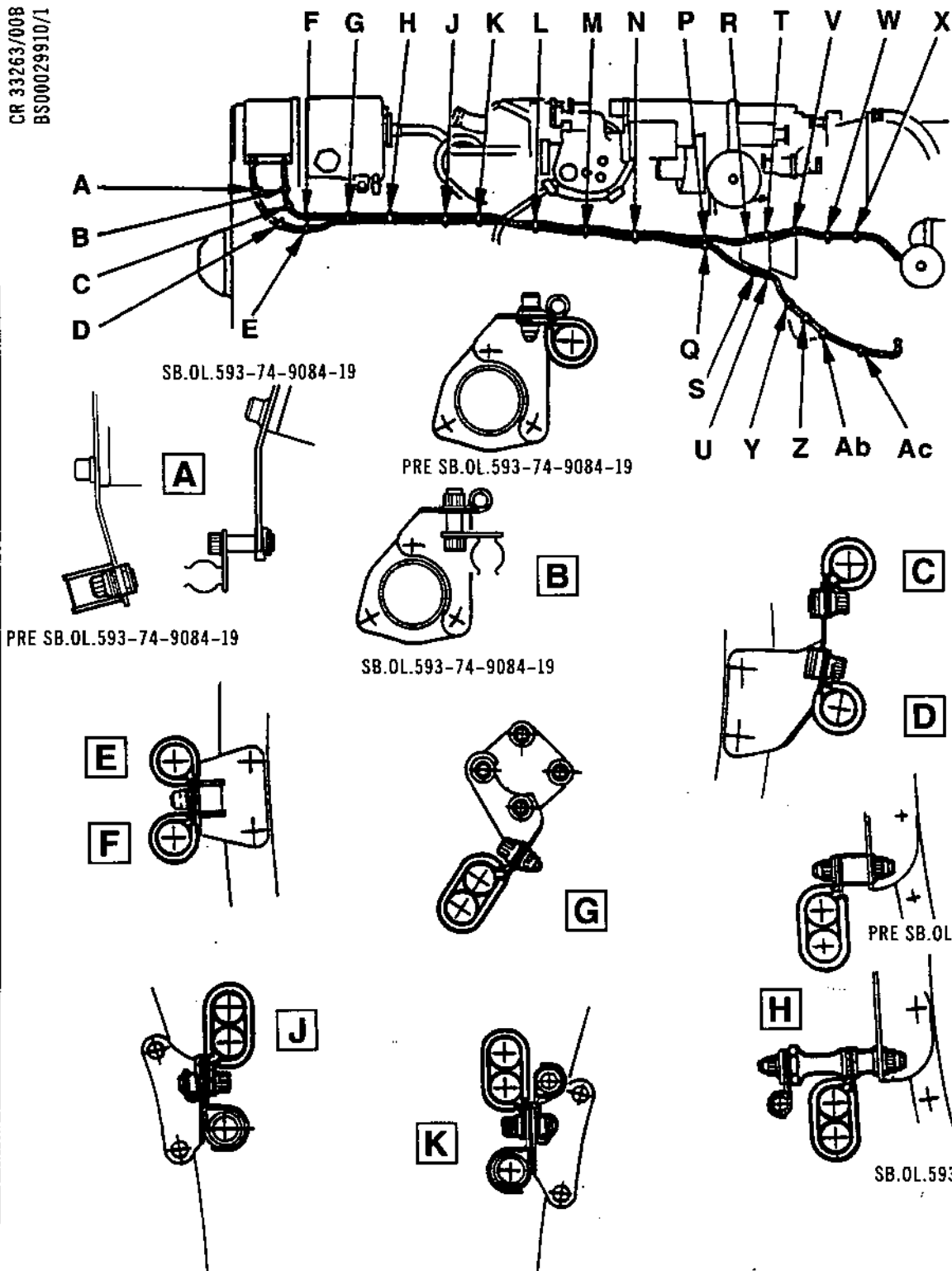
Dec 31/00

CR 33263/008  
BS00029910/1



OLYMPUS 593

MK.61D-14-28  
OVERHAUL



High Energy Ignition Leads, Layout and Clamping Positions  
Figure 526 (Sheet 1 of 4)

CR 33264/00C  
BS00029911/1

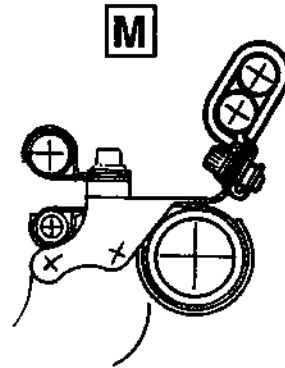


OLYMPUS 593

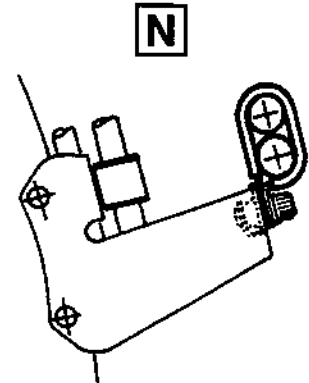
MK.610-14-28  
OVERHAUL



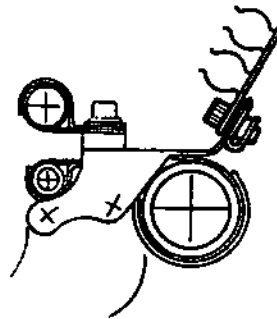
**L**



PRE SB.OL.593-74-9084-19

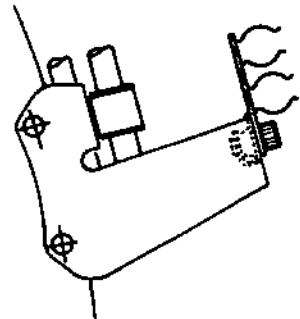


PRE SB.OL.593-74-9084-19



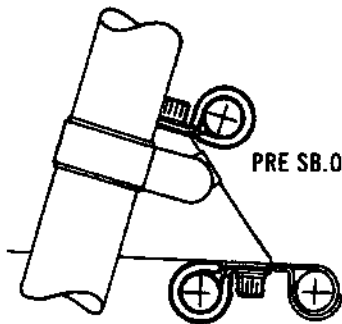
**M**

SB.OL.593-74-9084-19



**N**

SB.OL.593-74-9084-19

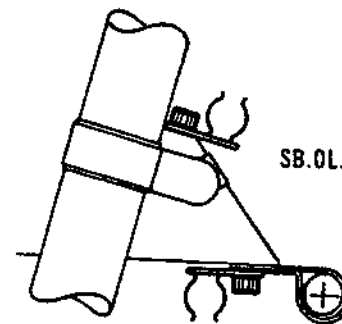


**P**

PRE SB.OL.593-74-9084-19

**Q**

PRE SB.OL.593-74-9084-19



**P**

SB.OL.593-74-9084-19

**Q**

SB.OL.593-74-9084-19

High Energy Ignition Leads, Layout and Clamping Positions  
Figure 526 (Sheet 2 of 4)

ASSEMBLY

71-00-02

Page 561  
Dec 31/00

BS00029983/1

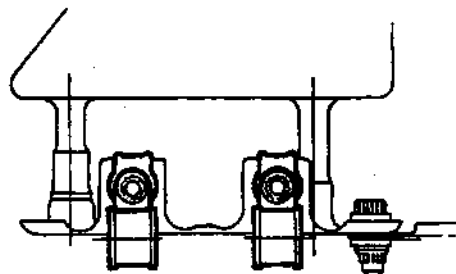


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sheema

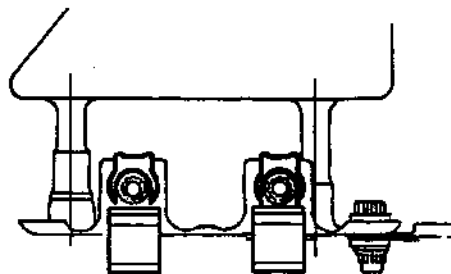


R

T

PRE SB.OL.593-74-9084-19

PRE SB.OL.593-74-9084-19

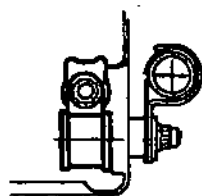


R

T

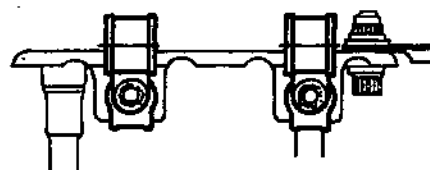
SB.OL.593-74-9084-19

SB.OL.593-74-9084-19



V

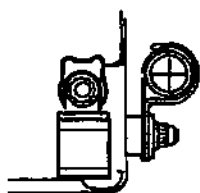
PRE SB.OL.593-74-9084-19



S

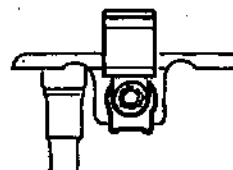
U

PRE SB.OL.593-74-9084-19



SB.OL.593-74-9084-19

V



S

SB.OL.593-74-9084-19

High Energy Ignition Leads, Layout and Clamping Positions  
Figure 526 (Sheet 3 of 4)

ASSEMBLY

71-00-02

Page 562

Dec 31/00

BS00029981/1

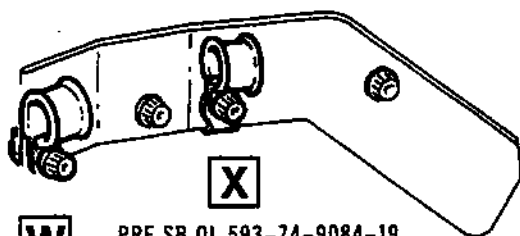


OLYMPUS 593

MK.610-14-28  
OVERHAUL



SNECMA

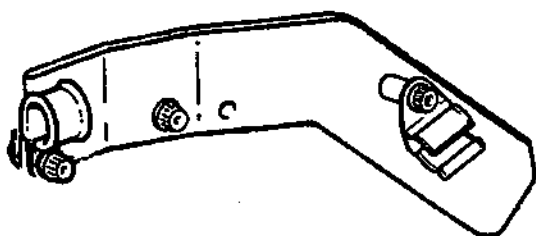


**W**

PRE SB.OL.593-74-9084-19

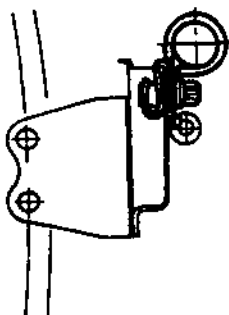
**X**

PRE SB.OL.593-74-9084-19



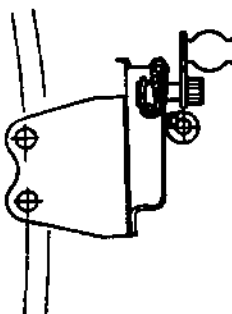
**X**

SB.OL.593-74-9084-19



**Ac**

PRE SB.OL.593-74-9084-19



**Ac**

SB.OL.593-74-9084-19



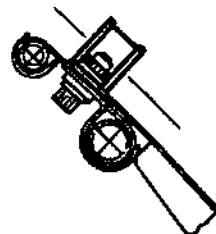
**Z**

PRE SB.OL.593-74-9084-19

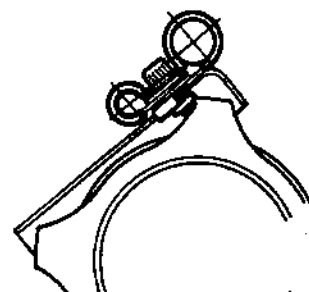


SB.OL.593-74-9084-19

**Z**



**Y**



**Ab**

High Energy Ignition Leads, Layout and Clamping Positions  
Figure 526 (Sheet 4 of 4)

ASSEMBLY

71-00-02

Page 562A  
Dec 31/00



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

## (8) Reference point 'K'.

Locate an existing bracket (72-31-01/5-300) on rear blow-off flange of the LP casing near the bottom centre line, carrying the LP compressor front (No.1) bearing vent tube, the second stage fuel pump to recirculation valve and the electrical harness. Assemble the left and right-hand leads together and retain, with loop clamp (1-220), bolt (1-210) and clipnut (1-230). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

NOTE: Before securing the leads at the next clipping position, cross the lead so that the left-hand lead is now on the left-hand side of the engine and the right-hand lead is on the right-hand side looking forward.

## (9) Reference point 'L'.

Assemble the left and right-hand leads together to an existing bracket (72-31-01/6-330) on the LP casing rear flange. This bracket, facing forward, is located on the left-hand side of the engine just above the centre line. Retain with loop clamp (1-220), bolt (1-210) and clipnut (1-230). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

## (10) Reference point 'M'.

Locate an existing bracket (72-01-04/2-110) on the rear face of sump at the intermediate case, near bottom centre line, carrying the following tubes; LP compressor front (No.1) bearing vent, air starter drain and first stage pump to flowmeter. Assemble the left and right-hand leads together and retain, with, Pre SB.0L.593-74-9084-19 standard, loop clamp (1-220), bolt (1-210) and clipnut (1-230), SB.0L.593-74-9084-19 standard, clip (1-220), bolt (1-210) and clipnut (1-230). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

ASSEMBLY

71-00-02

Page 562B

Dec 31/00



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

## (11) Reference point 'N'.

Locate an existing bracket (72-33-01/6-270) on the rear face of the intermediate case near bottom centre line, carrying the drains tank re-ingestion tube and the air supply to pressure seals tube. Assemble the left and right-hand leads together and retain with, Pre SB.0L.593-74-9084-19 standard, loop clamp (1-220), bolt (1-210) and clipnut (1-230), SB.0L.593-74-9084-19 standard, clip (1-220), bolt (1-210) and clipnut (1-230). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

## (12) Reference point 'P'.

Locate an existing bracket (72-33-01/4-230) on the HP case blow-off strap, carrying the following tubes: LP and HP compressor thrust (No.2 and 3) bearings cold vents, HP and LP turbine (No.4 and 5) bearings oil feed, reheat fuel supply, starter feed, drains tank re-ingestion. Assemble the left-hand lead, Pre SB.0L.593-74-9084-19 standard, with loop clamp (2-30), bolt (2-20) and nut (2-10), SB.0L.593-74-9084-19 standard with clip (2-30), bolt (2-20) and nut (2-10). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

## (13) Reference point 'Q'.

To the same bracket (72-33-01/4-230) as indicated at point 'P', assemble the right-hand lead, Pre SB.0L.593-74-9084-19 standard, with loop clamp (2-60), bolt (2-50) and nut (2-40), SB.0L.593-74-9084-19 standard with clip (2-60), bolt (2-50) and nut (2-40), together with an existing clamp securing the second stage pump fuel tube to the electric starter pump. Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

## (14) Reference point 'R'.

Assemble the left-hand lead to the unique point support tray (71-51-01/10-200) which retains the electrical harness. Assemble lead to left-hand side of tray, near front end with, Pre SB.0L.593-74-9084-19 standard, loop clamp (2-80), bolt (2-70) and clipnut (2-90), SB.0L.593-74-9084-19 standard with clip (2-80), bolt (2-70) and clipnut (2-90). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

ASSEMBLY

71-00-02

Page 563

Dec 31/00

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

(15) Reference point 'T'.

Assemble the left-hand lead to the unique point support tray, (71-51-01/10-200) to the rear of point 'R' with, Pre SB.0L.593-74-9084-19 standard, loop clamp (2-80), bolt (2-70) and clipnut (2-90), SB.0L.593-74-9084-19 standard with clip (2-80), bolt (2-70) and clipnut (2-90). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(16) Reference point 'V'.

Assemble the left-hand lead to the unique point support tray mounting bracket (72-33-01/8-280) at the left-hand side, rear end, Pre SB.0L.593-74-9084-19 standard with loop clamp (2-80), bolt (2-70) and clipnut (2-90), SB.0L.593-74-9084-19 standard with clip (2-80), bolt (2-70) and clipnut (2-90). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(17) Reference point 'W'.

**CAUTION:** IF ASSEMBLING SB.0L.593-74-9084-19 STANDARD LEAD, REFER TO PARA.(18) BEFORE ASSEMBLING TRAY (2-150).

- (a) Assemble lead support tray (2-150), to the existing bracket (73-12-05/1-60) on fuel sprayer boss on delivery case and bracket (72-42-01/4-120) on the delivery case to combustion chamber outer casing, near bottom centre line. Retain tray, with bolts (2-140) and nuts (2-130). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (b) Assemble the left-hand lead on the tray, Pre SB.0L.593-74-9084-19 standard with loop clamp (2-110), bolt (2-100) and clipnut (2-120), SB.0L.593-74-9084-19 standard with clip (2-110), bolt (2-100) and clipnut (2-120). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

ASSEMBLY

**71-00-02**

Page 564

Dec 31/00





OLYMPUS 593



MK.610-14-28  
OVERHAUL

sheema

(18) Reference point 'X'.

CAUTION: LEADS PRE AND TO THE STANDARD OF SB.0L.  
593-74-9084-19 ARE POSITIONED ON THE  
TRAY AT DIFFERENT POSITIONS.

Assemble the left-hand lead on the tray (2-150),  
Pre SB.0L.593-74-9084-19 standard with loop clamp  
(2-110), bolt (2-100) and clipnut (2-120), SB.0L.  
593-74-9084-19 standard with clip (2-110), spacer  
(2-155), bolt (2-100) and nut (2-130) which also  
locates bracket (72-42-01/4-120). Torque-tighten  
to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

(19) Reference point 'S'.

Assemble the right-hand lead to the unique point  
support tray (71-51-01/10-200) which retains the  
main electrical harness, located at the engine  
bottom centre line, below the delivery case. Assemble  
the lead to the right-hand side of the tray, near  
the front end, Pre SB.0L.593-74-9084-19 standard  
with loop clamp (2-180), bolt (2-160) and clipnut  
(2-190), SB.0L.593-74-9084-19 standard with clip  
(2-180), bolt (2-160) and clipnut (2-190). Torque-  
tighten to between 85 and 95 lbf in. (9,6 and 10,7  
N.m).

(20) Reference point 'U'.

To the unique point position, immediately to the rear  
of clipping point 'S', assemble the right-hand lead  
with loop clamp (2-180), bolt (2-160) and clipnut  
(2-190). Torque-tighten to between 85 and 95 lbf in.  
(9,6 and 10,7 N.m).

(21) Reference point 'Y'.

To an existing bracket (75-01-04/1-160), located at  
the HP casing cooling air duct, to the right-hand side  
of the engine bottom centre line, assemble the right-  
hand lead, with loop clamp (2-200) and existing nut  
(71-79-01/1-20), bolt (71-79-01/1-50) and washer  
(71-79-01/1-30) securing the retaining seal failure  
drain tube and IDG rupture tube.

ASSEMBLY

71-00-02

Page 565  
Dec 31/00



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

## (22) Reference point 'Z'.

To an existing bracket (75-01-04/1-170) located at the HP casing cooling air duct, assemble the right-hand lead to the rear of the last clipping point, Pre SB.0L.593-74-9084-19 standard with loop clamp (2-180), bolt (2-160) and clipnut (2-190), SB.0L.593-74-9084-19 standard with clip (2-180), bolt (2-160) and clipnut (2-190). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

## (23) Reference point 'Ab'.

To an existing bracket (75-01-04/1-170) located at the HP casing cooling air duct and to the rear of the clamping point 'Z', assemble the right-hand lead, with loop clamp (2-180), bolt (2-160 Pre SB.71-1) (2-170 SB.71-1) and clipnut (2-190). Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

NOTE: When assembling lead to the standard of SB.0L.593-74-9084-19, the existing bolt (2-160 or 2-170) and clipnut (2-190) are utilised but the igniter lead is not attached.

## (24) Reference point 'Ac'.

To an existing bracket, (71-51-01/9-60), located on the rear flange of the delivery casing to the right-hand side of the engine bottom centre line which carries the electrical harness, assemble the right-hand lead, Pre SB.0L.593-74-9084-19 standard with loop clamp (2-200), SB.0L.593-74-9084-19 standard with clip (2-200), spacer (2-210) and existing nut and bolt already retaining the main electrical harness. Torque-tighten to between 85 and 95 lbf in. (9,6 and 10,7 N.m).

## D. Assembly of Ignition Leads to Igniter Plugs. (Ref.Fig. 525).

Assemble the two ignition leads to their respective igniters in the combustion chamber outer casing. Assemble connectors dry, torque-tighten, Pre SB.0L.593-74-8138-5 standard, between 10 and 15 lbf ft (13,6 and 20,3 N.m). SB.0L.593-74-8138-5 and SB.0L.593-74-8138-5 standard, between 20 and 25 lbf ft (27 and 34 N.m) using wrench (Tool 1664) and wire-lock.

ASSEMBLY

71-00-02

Page 566  
Dec 31/00

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



ENGINE ELECTRICAL HARNESS AND HIGH ENERGY IGNITION  
LEADS - TESTING

TABLE OF CONTENTS

Para.	Page
1. General	701
2. Test Procedure for Checking Electrical Harness	701
A. Engine Electrical Test Set	701
B. Equipment and Power Supply Required for Testing	701
C. Cable Looms	701
D. Pre-test Procedure	702
E. Interline Insulation Tests	703
F. Accessory Resistance Tests	706
G. Accessory Insulation Tests	707
H. Accessory Functional Tests	708
J. Final Inspection	709
K. Installation of Harness Transportation Details	710

TABLE OF ILLUSTRATIONS

Fig.No.	Page
701	Electrical Harness Transportation Support Detail 711
702	Interline Insulation Tests 731
703	Oil Level/Gauge Resistance Relationship 736

LIST OF TABLES

Table No.	Page
701	Cable Loom Services 712
702	Accessory Resistance Tests 714
703	A.C. Actuator Resistance Tests 718
704	Accessory Insulation Tests 719
705	A.C. Actuator Insulation Tests 723
706	Accessory Screen Selections 724
707	Solenoid Control Functional Test 725
708	A.C. Actuator Functional Tests 726
709	Igniter Functional Tests 730
710	Air Starter Valve Functional Test 730
711	Pipe Temperature Thermocouple Harness Functional Check 730

TESTING

**71-00-02**

Contents 1

Dec 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



ENGINE ELECTRICAL HARNESS AND HIGH ENERGY IGNITION  
LEADS - TESTING

1. General

This section contains the test procedures to be carried out after the installation of the electrical harness prior to engine test and at other times at the discretion of the Quality Manager.

2. Test Procedure for Checking Electrical Harness

A. Engine Electrical Test Set (Tool 814).

- (1) The test set is designed to check all the electrical units by feeding into the free connectors of the engine electrical harness break point.
- (2) It is unnecessary to reset the meter between ranges as 'zeroing' is automatic.
- (3) Where necessary, refer to the Ground Equipment Manual TP.203/BR for adjustment procedures.

B. Equipment and Power Supply Required for Testing.

- (1) Engine electrical system test set (Tool 814).
- (2) Test set (Tool 2604) )
- (3) CO<sub>2</sub> aerosol spray ) See Para.2.J.
- (4) A.c. supply 115  $\pm$ 5 volts, 400  $\pm$ 4 Hz.
- (5) D.c. supply 28  $\pm$ 2 volts.

C. Cable Looms.

NOTE: Connector sockets X and WYZ on the test set are required only when testing nacelle mounted accessories and are not relevant to the Overhaul Manual.

- (1) The Test Set is designed to accept the harness direct from the engine except for cables G and H where the jumper cables must be used.

PRINTED IN ENGLAND

TN1132



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) The seven jumper cables (B, C, D, E, F, G and H) are provided for use when the engine is mounted in the aircraft.
- (3) A cable (J) is provided for connecting the HP shut-off valve to the test set. This cable divides into two connectors (one 'OPEN', one 'CLOSE').
- (4) The thermocouple lead (V) terminates in nine pairs of crocodile clips.
- (5) Secure cable (G) and (H) adapters to their respective jumper cables when required to correct the orientation of the connectors.
- (6) Four other cables are provided:
  - (a) Earth loop cable.
  - (b) Earth cable.
  - (c) 28 V supply cable.
  - (d) 115 V, 400 Hz supply cable.
- (7) Refer to Table 701 for the cable loom services.

D. Pre-test Procedure.

- (1) Before starting a test, check the insulation of the test set and cables as follows:
  - (a) Connect plugs G, H, J and V to their respective sockets (plug G to socket G) etc., also connect plugs B, C, D, E and F to their respective sockets where the test set jumper cables are to be used.
  - (b) Set all switches to 'OFF'. Switches 137 to 141 and 144 are centre off.
  - (c) Connect 115 V, 400 Hz supply and switch the a.c. supply switch 'ON'.

TN1133



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (d) Set the Meter Range Selector Switch (134) to "Insulation 200 V" range.
  - (e) Operate switches 1 to 126 and 136 in turn and ensure that the resistance meter pointer remains on "infinity".
  - (f) Switch the a.c. supply 'OFF'.
- (2) Connect up looms as follows:
- (a) Connect the engine harness connectors to the test set or jumper cables (Plug B into Socket B, Plug C into Socket C) etc.
  - (b) Connect the 'CLOSE' and 'OPEN' connectors on loom J to the appropriate connectors on the HP valve on the engine fuel system.
  - (c) Connect up 28 V d.c. supply cable.
  - (d) Plug green earth loop cable into the test set and attach crocodile clip to the engine casing.
  - (e) Connect earth cable between engine casing and test set frame.

E. Interline Insulation Tests (Ref.Fig.702).

- (1) General.
- (a) The interline insulation tests are arranged so that each line of the engine electrical harness coming through the harness break point is tested for insulation resistance in turn with all the other lines passing through the break point.
  - (b) Carry out the tests with all accessories fitted to the engine and with the air starter shut-off valve in the closed position.
  - (c) If a fault condition occurs while carrying out interline tests, the accessory or line involved is to be determined by referring to Fig.702.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(2) Pre-test procedure.

Set switches as follows:

Switch 134 - Interline insulation  
D.c. supply switch - ON  
A.c. supply switch - ON  
All remaining test set switches 'OFF'  
All green 'OFF' lights - illuminated

(3) Operation of interline test panel.

NOTE: Interline insulation checks are not required between positions 86 to 124 on switches 129A and B, 130A and B and 131A and B. These positions are related to connector sockets X and WYZ and are only required when testing nacelle mounted accessories and are not relevant to the Overhaul Manual.

- (a) Set switch 127A to Position 1 ('OFF' light goes out) and set switch 127B to Position 1. The resistance meter should indicate 'short' (as self check).
- (b) Switch 127B is then switched from Position 1 to Position 29 in turn with a pause between positions. The interline insulation meter readings should be above 4 M ohms. Certain readings however will be less than 4 M ohms, and these are acceptable provided they meet the following:
  - (i) Identify the two components involved (Ref. Fig.702). Locate these components in Table 704 and 705 and add together the minimum insulation resistance values of the two components.
  - (ii) If the interline insulation reading is equal to or exceeds the sum of the resistance values previously calculated (Ref. sub-para.(b)(i)), then the interline resistance value is acceptable.

Switch 127B is then switched 'OFF'.

TN2450



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (c) Switch 128B is then switched to Position 30 (light out) and then on to Position 58, observing meter as previously indicated (Ref.sub-para.(b)). Switch 128B is then switched to 'OFF' (light on).
- (d) Switch 129B is then switched to Position 59 (light out) and then on to Position 87, observing meter as previously indicated (Ref.sub-para.(b)). Switch 129B is then switched to 'OFF' (light on).
- (e) Switch 131B is then switched to Position 117 (light out) and then on to Position 145, observing meter as previously indicated (Ref.sub-para.(b)). Switch 131B is then switched to 'OFF' (light on).
- (f) The line on switch 127A Position 1 has now been tested for insulation against line 2 to 145 on the B switches.
- (g) Set switch 127A to Position 2 and set switch 127B to Position 2. The resistance meter should indicate 'short' (as self check). Then switch B switches from Position 3 to Position 145 in turn, observing meter and leaving switches in the 'OFF' position when not in use.
- (h) Set switch 127A to Position 3 and set switch 127B to Position 3. The resistance meter should indicate 'short' (as self check). Then switch B switches from Position 4 to Position 145 in turn, observing meter and leaving switches in the 'OFF' position when not in use.
- (j) Repeat the previous operations until switch 131A reaches Position 145.
- (k) On completion of tests, ensure that interline switches (127-131) are in the 'OFF' (lights on) position. Switch a.c. supplies 'OFF' and switch 134 'OFF'.





OLYMPUS 593

MK.610-14-28

OVERHAUL



F. Accessory Resistance Tests.

(1) Connect the following cables:

- (a) Engine harness cables to test set (Tool 814) using jumper cables as required.
- (b) Cable V from the test set to the thermocouple terminals on the engine.
- (c) Cable J between test set and HP shut-off valve.
- (d) Supply cables.
- (e) Earth loop cable.
- (f) Earth cable.

(2) Set switches as follows:

Switches 127A to 131A	-	OFF) All lights on
Switches 127B to 131B	-	OFF)
Switch 132	-	OFF
Switch 134	-	OFF
Switch 136	-	OFF
Switch 137	-	Res. and Ins. test position
Switch 138	-	Res. and Ins. test position
Switch 140	-	OFF
Switch 142	-	OFF
Switch 143	-	OFF
115 V 400 Hz	-	OFF
28 V d.c.	-	ON

(3) Engine mounted accessory resistance tests.

Carry out tests detailed in Table 702 by the operation of circuit switches 1 to 126.

(4) Engine mounted a.c. actuator resistance tests.

- (a) Carry out tests detailed in Table 703 by varying the position of switch 136.

TN2521



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) On completion of the tests return switches 134 and 136 to 'OFF'.

G. Accessory Insulation Tests.

- (1) With cables connected as in paragraph 2.F.(1) set switches as follows:

Switches 127A to 131A	-	OFF)	All lights ON
Switches 127B to 131B	-	OFF)	
Switch 132	-	OFF	
Switch 134	-	OFF	
Switch 136	-	OFF	
Switch 137	-	Res. and Ins. test	position
Switch 138	-	Res. and Ins. test	position
Switch 140	-	OFF	
Switch 142	-	OFF	
Switch 143	-	OFF	
115 V 400 Hz	-	ON	
28 V d.c.	-	ON	

Earth loop lamp must be 'ON' when 50 V, 100 V and 200 V Ins. ranges are selected.

- (2) Engine mounted accessory insulation tests.

Carry out tests detailed in Table 704 operating switches 1 to 141 and varying position of switch 134.

- (3) Engine mounted a.c. actuator insulation tests.

- (a) Carry out tests detailed in Table 705 by varying position of switches 134 and 136.

- (b) Return switches 134 and 136 to 'OFF'.

- (4) Screens to earth insulation tests (Ref. Table 706).

- (a) Set switch 134 to 200 V range. Operate switch 133 and check that the meter indicates open circuit. If a short circuit is indicated, identify the faulty screen as follows:

PRINTED IN ENGLAND

TN3783



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (i) Rotate switch 132 from 1 to 22 pausing to observe the meter reading which should be above 2M ohms.
- (ii) Where a short circuit is indicated, identify the faulty screen by reference to the switch position in Table 706.
- (b) Select switch 132 to position 23 and check that the meter indicates a short circuit.
- (c) Return switch 132 to 'OFF' (light ON) and switch 134 to 'OFF'.

#### H. Accessory Functional Tests.

- (1) With cables connected as in paragraph 2.F.(1), set switches as follows:

Switches 127A to 131A	-	OFF) Lights ON
Switches 127B to 131B	-	OFF)
Switch 132	-	OFF
Switch 134	-	OFF
Switch 136	-	OFF
Switch 137	-	Function Test Position
Switch 138	-	Function Test Position
Switch 140	-	OFF
Switch 142	-	OFF
Switch 143	-	OFF
115 V, 400 Hz supply	-	ON
28 V d.c. supply	-	ON

- (2) Engine mounted solenoid control functional tests.

Carry out tests detailed in Table 707.

- (3) Engine mounted a.c. actuator functional tests.

- (a) Carry out tests detailed in Table 708.
- (b) Return switches 140 and 142 to 'OFF'.

TN3791



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



(4) Igniter functional tests.

WARNING: BEFORE COMMENCING THE FUNCTIONAL TESTS ON IGNITERS, ENSURE THAT ALL PERSONNEL ARE CLEAR OF THE ENGINE. A MINIMUM OF 20 MINUTES MUST ELAPSE AFTER ANY MOTORING CYCLE, FUEL FUNCTIONAL TEST ETC. HAS TAKEN PLACE. THE ENGINE MUST BE THOROUGHLY DRAINED OF FUEL.

(a) Carry out functional tests as detailed in Table 709.

(b) Return switch 143 to 'OFF'.

(5) Air starter valve functional test.

(a) Carry out functional test as detailed in Table 710.

(6) Return all switches to 'OFF', remove all cable looms and replace all plug protection caps and blanks removed from the engine and test equipment.

J. Jet Pipe Temperature Thermocouple Harness Functional Check.

(1) The jet pipe temperature thermocouple harness can be functionally tested using test set (Tool 2604) and a CO<sub>2</sub> aerosol spray as follows:

(a) Check condition of batteries.

(b) Connect test set to jet pipe temperature thermocouple test socket (if this is unavailable, use alternative test lead which incorporates crocodile clips to attach to each thermocouple circuit).

(c) Switch test set 'ON' and adjust datum control to give mid-position on each of the three meters.

(d) Place flexible spout of aerosol into hole in thermocouple and give one squirt of CO<sub>2</sub> spray.

(e) The correct function of the thermocouple is indicated by a steady deflection of the three test set meter.

PRINTED IN ENGLAND

TN17344



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



(f) Repeat para.(d) and (e) for each thermocouple in turn.

(g) Switch test set 'OFF' and disconnect test leads.

K. Installation of Harness Transportation Details  
(Ref.Fig.701).

(1) General.

To prevent damage during transportation the harness is secured by five harness supports and a mounting plate assembly secured to the engine.

(2) Install mounting plate.

(a) Secure mounting plate to brackets with two wingscrews.

(b) (Post Mod.OL.8180 incorporated). Secure spring clip to bracket with a nut, washer and bolt. Torque-tighten to between 25 and 30 lbf in. (2,8 and 3,4 N.m).

(c) Connect the seven plugs to their respective mating dummy receptacles.

(3) Install harness supports.

(a) Support A. Strap harness to the electrical loom and secure the harness to the clip with a wing-screw.

(b) Support B. Strap the harness to the electrical loom and tube.

(c) Support C. Strap the harness to the electrical loom and clip around the tube.

(d) Support D. Strap the harness to the electrical loom and clip around the tube.

(e) Support E. Strap the harness around the electrical loom and secure to tube with a clip and wingscrew.

TN17359

TESTING  
71-00-02

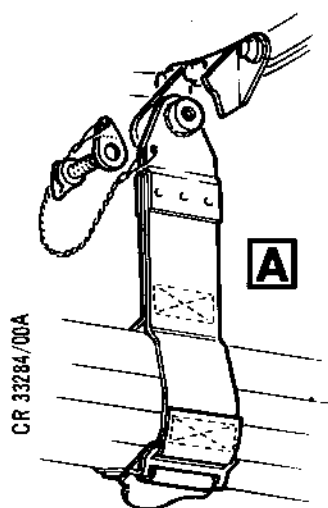
Page 710  
Dec 1/76



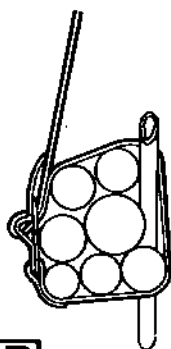
OLYMPUS 593

MK. 610-14-28

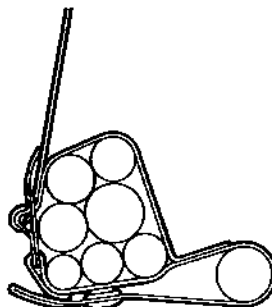
OVERHAUL



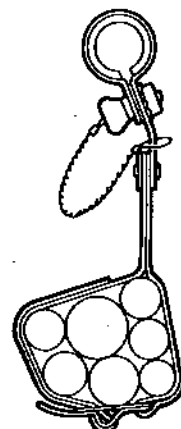
A



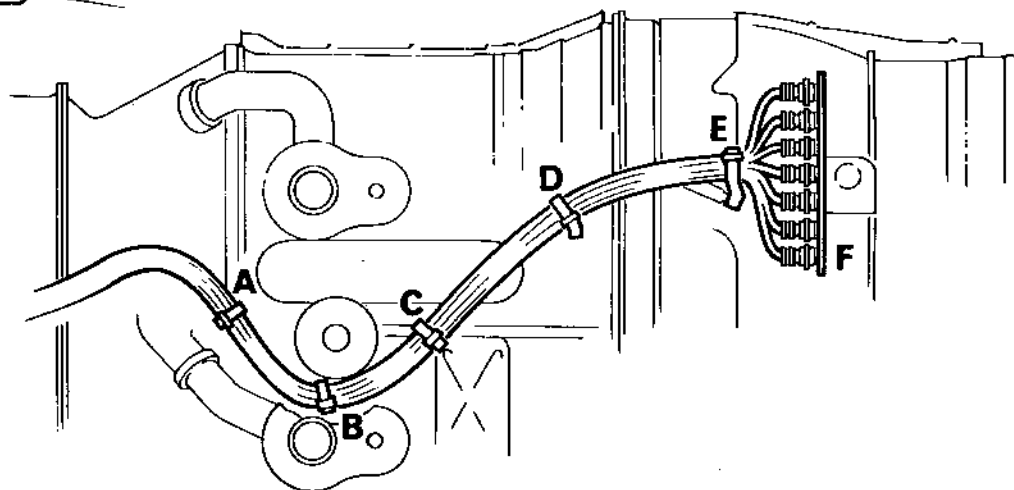
B



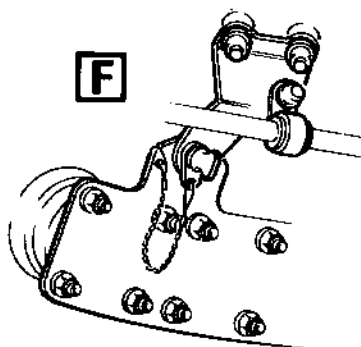
C D SIMILAR



E



VIEW ON UNDERSIDE OF ENGINE



F

Electrical Harness Transportation Support Detail  
Figure 701

TESTING  
71-00-02

Page 711  
Dec 1/76

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

TEST SET CONNECTOR IDENT.	ENGINE BREAK IDENT.	SERVICES
B	B	4 take-offs N <sub>2</sub> speed probe 4 take-offs N <sub>1</sub> speed probe
C	C	Reheat fuel valve Hydraulic pump off-load valve (ALT) Fuel filter differential pressure switch (7 psi) Engine fuel starting pump Reheat purge valve position Engine anti-icing pressure switch Reheat actuator Throttle actuator (MAIN)
D	D	N <sub>1</sub> governor valve IDG mag. trim Engine oil pressure transducer HP turbine bearing oil inlet temperature HP turbine bearing oil drain temperature IDG low oil pressure switch Air starter valve IDG speed probe
E	E	Reheat purge valve Engine anti-icing valve IDG disconnect solenoid Engine fuel heater valve IDG oil inlet temperature IDG oil outlet temperature

Cable Loom Services  
Table 701 (Continued)

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

TEST SET CONNECTOR IDENT.	ENGINE BREAK IDENT.	SERVICES
F	F	Engine oil tank quantity Main engine flowmeter Reheat flowmeter Engine ignition
G	G	HP valve position indicator Engine fuel recirculation valve Fuel filter inlet temperature Sprayer fuel inlet temperature Engine oil temperature Fuel filter differential pressure switch (5 psi) Throttle actuator (ALT)
H	H	Hydraulic pump off-load valve (MAIN) 1 take-off N <sub>2</sub> speed probe 3 take-offs N <sub>1</sub> speed probe Engine low oil pressure switch
J	HP valve (OPEN) HP valve (CLOSE)	HP valve open solenoid HP valve close solenoid
V	9 pairs of crocodile clips	Thermocouples
	Cable Loom Services Table 701 (Concluded)	

PRINTED IN ENGLAND





# OLYMPUS 593

MK.610-14-28  
OVERHAUL



CIRCUIT UNDER TEST	CIRCUIT SWITCH NO.	METER RANGE SELECTOR (SW. 134)	METER READING (RESISTANCE) OHMS	REMARKS
HP valve position indicator	1	0 - 200 ohms	110 - 130	
HP valve (closed)	2	0 - 20 ohms	7 - 12	
HP valve (open)	3	0 - 20 ohms	7 - 12	
Reheat fuel valve	4	0 - 200 ohms	18 - 26	
Reheat purge valve	5	0 - 200 ohms	30 - 40	
Engine anti-icing valve	6	0 - 20 ohms	14 - 20	
Hydraulic pump (main)	7	0 - 200 ohms	20 - 30	
Off load valve (alt.)	8	0 - 200 ohms	20 - 30	
Fuel recirculation valve	9	0 - 200 ohms	12 - 20	
IDG disconnect solenoid	10	0 - 20 ohms	4 - 9	
Fuel heater valve	11	0 - 20 ohms	16 $\pm$ 2	
N <sub>1</sub> governor valve	12	0 - 200 ohms	30	
Engine ) Overfull oil )	14	0 - 4 K ohms	Full scale	Open circuit
tank ) Contents	15	0 - 4 K ohms	0-3070 $\pm$ 5% in 150 ohms steps to 2250 ohms and one step of 820 ohms	Dip tank contents and refer to Fig.703 (Meter half value)
IDG mag. trim	21	0 - 2 K ohms	400 - 500	
(throttle	22	0 - 2 K ohms	520 - 670	
( (alt.)				
(throttle	23	0 - 2 K ohms	520 - 670	
N <sub>2</sub> ( (main)				
speed (N <sub>2</sub> rpm)	24	0 - 2 K ohms	520 - 670	
probes(ground	25	0 - 2 K ohms	520 - 670	
(testing				
(air start	26	0 - 2 K ohms	520 - 670	

Resistance Tests on Engine Mounted Accessories  
Table 702 (Continued)

TESTING  
**71-00-02**  
Page 714  
Dec 1/86



OLYMPUS 593

MK. 610-14-28  
OVERHAUL

CIRCUIT UNDER TEST	CIRCUIT SWITCH NO.	METER RANGE SELECTOR (SW. 134)	METER READING (RESISTANCE) OHMS	REMARKS
(throttle (alt.)	27	0 - 2 K ohms	460 - 600	
(decel. (system	28	0 - 2 K ohms	460 - 600	
(throttle (main)	29	0 - 2 K ohms	460 - 600	
(decel. to N <sub>1</sub> (intake	30	0 - 2 K ohms	460 - 600	
speed (N <sub>1</sub> rpm	31	0 - 2 K ohms	460 - 600	
probes (reheat	32	0 - 2 K ohms	460 - 600	
(control (ground	33	0 - 2 K ohms	460 - 600	
(testing				
Engine oil pressure transducer	34	0 - 200 ohms	60 - 75	
Engine oil pressure transducer	35	0 - 200 ohms	60 - 75	
Anti-icing pressure switch	36	0 - 4 K ohms	Full scale)	Switch open circuit
Reheat purge valve position	40	0 - 2 K ohms	270 - 450	
Reheat purge valve position	41	0 - 2 K ohms	210 - 310	
Fuel starter pump	44	0 - 200 ohms	55 - 65	) See
Fuel starter pump	45	0 - 200 ohms	55 - 65	) note

NOTE: Disconnect fuel starting pump and replace with fuel starting pump test plug. Reconnect fuel starting pump after test.

Fuel starter pump	44	0 - 20 ohms	3 - 5	
Fuel starter pump	45	0 - 20 ohms	3 - 5	
HP turbine oil inlet temp. thermometer	50	0 - 200 ohms	126 - 146	
HP turbine brg. oil drain temp. thermometer	51	0 - 200 ohms	126 - 146	

Resistance Tests on Engine Mounted Accessories  
Table 702 (Continued)

TESTING

71-00-02

Page 715

Sep 1/78



# OLYMPUS 593

MK. 610-14-28

OVERHAUL



CIRCUIT UNDER TEST	CIRCUIT SWITCH NO.	METER RANGE SELECTOR (SW. 134)	METER READING (RESISTANCE) OHMS	REMARKS
Fuel filter inlet temp. thermometer	52	0 - 200 ohms	126 - 146	
Sprayer fuel inlet temp. thermometer	53	0 - 200 ohms	126 - 146	
Engine oil temp. thermometer	54	0 - 200 ohms	126 - 146	
IDG oil inlet temp. thermometer	55	0 - 200 ohms	126 - 146	
IDG oil outlet temp. thermometer	56	0 - 200 ohms	126 - 146	
(motor	57	0 - 200 ohms	25 - 35	
(motor	58	0 - 2 K ohms	1050 - 1200	
Reheat (motor	59	0 - 2 K ohms	100 - 140	
flow- (servo	60	0 - 2 K ohms	250 - 350	
meter (control				
(density				
(P.U.	61	0 - 2 K ohms	1500 - 1700	
(probe 1				
(motor	62	0 - 200 ohms	25 - 35	Pins A and B
(				
(motor	63	0 - 2 K ohms	1050 - 1200	Pins A and C
Main (				
engine (motor	64	0 - 2 K ohms	100 - 140	Pins D and A
flow- (				
meter (servo	65	0 - 2 K ohms	250 - 350	Pins F and E
(control				
(density				
(P.U. probe 1	66	0 - 2 K ohms	1500 - 1700	Pins J and I
(				
Engine oil low	67	0 - 20 ohms	2 - 8	)
pressure switch				) Depends
IDG oil low	68	0 - 20 ohms	2 - 8	) on
pressure switch				) cable resistance.
Fuel filter diff.	71	0 - 4 K ohms	Full scale	) Switch
press. switch(7 psi)				) open circuit.

Resistance Tests on Engine Mounted Accessories  
Table 702 (Continued)

TESTING  
**71-00-02**  
Page 716  
Feb 1/79

IN3784



# OLYMPUS 593

MK.610-14-28

OVERHAUL



CIRCUIT UNDER TEST	CIRCUIT SWITCH NO.	METER RANGE SELECTOR (SW. 134)	METER READING (RESISTANCE) OHMS	REMARKS
IDG speed probe	110	0 - 200 ohms	20 - 25	
<b>NOTE:</b> On Pre SB.71-4 standard engines, circuit switch No.113 and 116 will give open circuit.				
Engine flowmeter servo control	113	0 - 200 ohms	55 - 75	
Engine flowmeter P.U. probe 2	114	0 - 4 K ohms	2100 - 2300	Meter reads half value
Reheat flowmeter P.U. probe 2	115	0 - 4 K ohms	2100 - 2300	
Reheat flowmeter servo control	116	0 - 200 ohms	55 - 75	
Turbine (terminal 8 cooling (	118	0 - 20 ohms	1 $\pm$ 0.5	Turbine brg. hot vent
thermo- (terminal 7	119	0 - 20 ohms	3 $\pm$ 1	'G' labyrinth
couples (terminal 5	120	0 - 20 ohms	1 $\pm$ 0.5	No.4 and 5 brg. vent
(terminal 4	121	0 - 20 ohms	2 $\pm$ 1	No.2 and 3 brg. vent
(terminal 6	122	0 - 20 ohms	2 $\pm$ 1	HP turbine cooling air
T <sub>J</sub> (terminal 1	123	0 - 20 ohms	3 $\pm$ 1	) Jet pipe
thermo- (terminal 2	124	0 - 20 ohms	3 $\pm$ 1	
couples (terminal 3	125	0 - 20 ohms	3 $\pm$ 1	
(terminal 12	126	0 - 20 ohms	2 $\pm$ 1	HP compressor delivery air

Resistance Tests on Engine Mounted Accessories  
Table 702 (Concluded)

TESTING

## 71-00-02

Page 717

Sep 1/78

PRINTED IN ENGLAND

TN3785



# OLYMPUS 593

MK. 610-14-28  
OVERHAUL



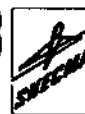
CIRCUIT UNDER TEST	CIRCUIT SWITCH NO.	METER RANGE SELECTOR (SW. 134)	METER READING (RESISTANCE) OHMS	REMARKS
Throttle actuator, motor Ref. (main)	1	0 - 200 ohms	30 - 38	
Throttle actuator, motor control (main)	2	0 - 20 ohms	2 - 5	
Throttle actuator, tacho and P.O. ref. (main)	3	0 - 200 ohms	38 - 46	
Throttle actuator, tacho signal (main)	4	0 - 2 K ohms	741 - 919	
Throttle actuator, motor brake (alt.)	5	0 - 20 ohms	2 - 5	
Throttle actuator, P.O. signal (main)	6	0 - 200 ohms	120 - 145	
Throttle actuator, motor ref. (alt.)	7	0 - 200 ohms	30 - 38	
Throttle actuator, motor control (alt.)	8	0 - 20 ohms	2 - 5	
Throttle actuator, tacho and P.O. ref. (alt.)	9	0 - 200 ohms	38 - 46	
Throttle actuator, tacho signal (alt.)	10	0 - 2 K ohms	741 - 919	
Throttle actuator motor brake (main)	11	0 - 20 ohms	2 - 5	
Throttle actuator, P.O. signal (alt.)	12	0 - 200 ohms	120 - 145	
Reheat, tacho signal	25	0 - 4 K ohms	1500 - 1700	Meter reads half value
Reheat, motor control	26	0 - 20 ohms	2 - 5	
Reheat	27	0 - 200 ohms	25 - 35	
Reheat, tacho ref.	28	0 - 2 K ohms	360 - 460	

Resistance Tests on Engine Mounted A.C. Actuators  
Table 703



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



CIRCUIT UNDER TEST	CIRCUIT SWITCH NO.	METER RANGE SELECTOR (SW. 134)	METER READING (RESISTANCE) OHMS	REMARKS
HP valve position indicator	1	200 V	2 M	
HP valve (closed)	2	200 V	2 M	
HP valve (open)	3	200 V	2 M	
Reheat shut-off valve	4	50 V	0.4 M	) 0.2 M actual res.
Reheat purge valve	5	50 V	0.4 M	)
Engine anti-icing valve	6	100 V	0.4 M	)
Hydraulic pump (main)	7	200 V	4 M	
Off load valve (alt.)	8	200 V	4 M	
Fuel recirculation valve	9	200 V	4 M	
IDG disconnect solenoid	10	200 V	3 M	
Fuel heater valve	11	100 V	0.4 M	
N <sub>1</sub> governor valve	12	200 V	20 M	
Engine oil tank quantity	) 14	100 V	2 M	
IDG mag. trim	) 15	100 V	2 M	
(throttle (alt.))	21	200 V	2 M	
(throttle (alt.))	22	200 V	4 M	
(throttle (main))	23	200 V	4 M	
N <sub>2</sub> speed (N <sub>2</sub> rpm)	24	200 V	4 M	
probes(ground test-ing)	25	200 V	4 M	
(air start (throttle (alt.))	26	200 V	4 M	
(throttle (alt.))	27	200 V	4 M	
(decel. (system	28	200 V	4 M	
N <sub>1</sub> speed (throttle probes( (main)	29	200 V	4 M	

Insulation Tests on Engine Mounted Accessories  
Table 704 (Continued)

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



CIRCUIT UNDER TEST	CIRCUIT SWITCH NO.	METER RANGE SELECTOR (SW. 134)	METER READING (RESISTANCE) OHMS	REMARKS
N <sub>1</sub> speed (decel. to intake probes (N <sub>1</sub> rpm (reheat (control (ground (testing	30	200 V	4 M	
Engine oil pressure transducer	31	200 V	4 M	
Engine oil pressure transducer	32	200 V	4 M	
Anti-icing pressure switch	33	200 V	4 M	
Reheat purge valve position	34	200 V	4 M	
Reheat purge valve position	35	200 V	4 M	
Fuel starter pump	36	200 V	4 M	
Fuel starter pump	40	50 V	0.4 M	)
HP turbine brg. oil inlet temp. thermometer	41	50 V	0.4 M	) Actual res. 0.2 M
HP turbine brg. oil drain temp. thermometer	44	200 V	2 M	)
Fuel filter inlet temp. thermometer	45	200 V	2 M	
Sprayer fuel inlet temp. thermometer	50	200 V	2 M	
Engine oil temp. thermometer	51	200 V	2 M	
IDG oil inlet temp. thermometer	52	200 V	2 M	
IDG oil outlet temp. thermometer	53	200 V	2 M	
	54	200 V	2 M	
	55	200 V	2 M	
	56	200 V	2 M	

Insulation Tests on Engine Mounted Accessories  
Table 704 (Continued)

TESTING  
**71-00-02**  
Page 720  
Dec 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



CIRCUIT UNDER TEST	CIRCUIT SWITCH NO.	METER RANGE SELECTOR (SW. 134)	METER READING (RESISTANCE) OHMS	REMARKS
--------------------	--------------------	--------------------------------	---------------------------------	---------

Reheat (motor	57	200 V	2 M	
flow- (motor	58	200 V	2 M	
meter (motor	59	200 V	2 M	
(servo con-	60	200 V	2 M	
(trol density				
(P.U. probe	61	200 V	2 M	
(motor	62	200 V	2 M	
Main (motor	63	200 V	2 M	
engine (motor	64	200 V	2 M	
flow- (servo con-	65	200 V	2 M	
meter (trol density				
(P.U. probe	66	200 V	2 M	
Engine oil pressure	67	200 V	2 M	
switch				
IDG oil pressure	68	200 V	2 M	
switch				
Fuel filter diff.	71	200 V	2 M	
press. switch				
(7 psi)				
IDG speed probe	110	100 V	2 M	

NOTE: On Pre SB.71-4 standard engines, circuit switch No.113 and 116 will give open circuit.

Engine flowmeter	113	200 V	2 M	
servo control				
Engine flowmeter	114	200 V	2 M	
P.U. probe 2				
Reheat flowmeter	115	200 V	2 M	
P.U. probe 2				
Reheat flowmeter	116	200 V	2 M	

Insulation Tests on Engine Mounted Accessories  
Table 704 (Continued)

TESTING  
71-00-02

Page 721  
Sep 1/78



**OLYMPUS 593**MK.610-14-28 *sneema*  
OVERHAUL

CIRCUIT UNDER TEST	CIRCUIT SWITCH NO.	METER RANGE SELECTOR (SW. 134)	METER READING (RESISTANCE) OHMS	REMARKS
Turbine(terminal 8	118	100 V	2 K	Turbine brg. hot vent
cooling(				'G' labyrinth
thermo-(terminal 7	119	100 V	50 K	No.4 and 5
couples(terminal 5	120	100 V	50 K	brg. vent
(				No.2 and 3
(terminal 4	121	100 V	50 K	brg. vent
(				HP turbine
(terminal 6	122	100 V	50 K	cooling air
TJ (terminal 1	123	50 V	10 K	)
thermo-(terminal 2	124	50 V	10 K	) Jet pipe
couples(terminal 3	125	50 V	10 K	)
(terminal 12	126	100 V	50 K	HP compressor
(				delivery air
Air starter valve	Open/ close	200 V	1 M	Operate switch 141

Insulation Tests on Engine Mounted Accessories  
Table 704 (Concluded)

**OLYMPUS 593**MK. 610-14-28  
OVERHAUL

PRINTED IN ENGLAND

CIRCUIT UNDER TEST	CIRCUIT SWITCH NO.	METER RANGE SELECTOR (SW. 134)	METER READING (RESISTANCE) OHMS	REMARKS
Throttle actuator, motor ref. (main)	1	200 V	5 M	
Throttle actuator, motor control (main)	2	200 V	5 M	
Throttle actuator, tacho and P.O. ref. (main)	3	200 V	5 M	
Throttle actuator, tacho signal (main)	4	200 V	5 M	
Throttle actuator, motor brake (alt.)	5	200 V	5 M	
Throttle actuator, P.O. signal (main)	6	200 V	5 M	
Throttle actuator, motor ref. (alt.)	7	200 V	5 M	
Throttle actuator, motor control (alt.)	8	200 V	5 M	
Throttle actuator, tacho and P.O. ref. (alt.)	9	200 V	5 M	
Throttle actuator, tacho signal (alt.)	10	200 V	5 M	
Throttle actuator, motor brake (main)	11	200 V	5 M	
Throttle actuator, P.O. signal (alt.)	12	200 V	5 M	
Reheat actuator, tacho signal	25	200 V	0.5 M	
Reheat actuator, motor control	26	200 V	0.5 M	
Reheat actuator, tacho and motor ref.	27	200 V	0.5 M	

Insulation Tests on Engine Mounted A.C. Actuators  
Table 705

TESTING

**71-00-02**

Page 723

Dec 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

SWITCH 132  
POSITION

ACCESSORY SCREEN

1	HP valve position indicator
2	Main engine flowmeter (Servo control density)
4	IDG speed probe
5	Reheat flowmeter (P.U. probe 1)
6	Main engine flowmeter (P.U. probe 1)
7	IDG mag. trim
8	N <sub>2</sub> speed probe (throttle alt.)
9	N <sub>2</sub> speed probe (throttle main)
10	N <sub>2</sub> speed probe (N <sub>2</sub> rpm)
11	N <sub>2</sub> speed probe (ground testing)
12	N <sub>2</sub> speed probe (air start)
13	N <sub>1</sub> speed probe (throttle alt.)
14	N <sub>1</sub> speed probe (decel. system)
15	N <sub>1</sub> speed probe (throttle main)
16	N <sub>1</sub> speed probe (decel. to intake)
17	N <sub>1</sub> speed probe (N <sub>1</sub> rpm)
18	N <sub>1</sub> speed probe (reheat control)
19	N <sub>1</sub> speed probe (ground testing)
20	Main engine flowmeter P.U. probe 2
21	Reheat flowmeter P.U. probe 2
22	Reheat flowmeter (Servo control density)
23	Reheat flame detector (earthed on engine)

Accessory Screen Selections  
Table 706

TESTING  
**71-00-02**  
Page 724  
Jun 1/86



OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

CIRCUIT UNDER TEST	CIRCUIT SWITCH NO.	SOLENOID CURRENT METER	REMARKS
HP valve (closed)	2	2.5 + 0.5 amps	
HP valve (open)	3	2.5 + 0.5 amps	
Reheat shut-off valve	4	0.85 + 0.25 amps	
Reheat purge valve	5	0.85 + 0.25 amps	
Engine anti-icing valve	6	1.5 + 0.5 amps	
Hydraulic pump (main)	7	1.5 + 0.5 amps	
Off load valve (alt.)	8	1.5 + 0.5 amps	
Fuel re-circulation valve	9	1.5 + 0.5 amps	
IDG disconnect solenoid	10	7 amps max.	To be manually reset.
Fuel heater valve	11	1.5 + 0.5 amps	

Functional Test of Engine Mounted Solenoid Controls  
Table 707

TN6361

TESTING

71-00-02

Page 75

Dec 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CIRCUIT UNDER TEST	POSITION OF ACTUATOR SELECTOR SW.142
Throttle Actuator (Main)	Throttle Main
Throttle Actuator (Main)	Throttle Main
Throttle Actuator (Main)	Throttle Main
Throttle Actuator (Main)	Throttle Main
Throttle Actuator (Alternative)	Throttle Alternative
Throttle Actuator (Alternative)	Throttle Alternative

A.C. Actuator Functional Tests  
Table 708 (Continued) (Sheet 1 - LH)

TESTING  
71-00-02  
Page 726  
Dec 1/76

IN12865

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



A.C. ACTUATORS		METER READING			REMARKS
SW.140	SW.139	BRAKE CURRENT	MOTOR CONTROL CURRENT	P.O./ TACHO SIGNAL	
Tacho	Pos. 1	2 amps (Max)	1 amp (Max)	Left of zero	Actuator runs to open
Tacho	Pos. 2	2 amps (Max)	1 amp (Max)	Right of zero	Actuator runs to closed
Pick Off	Pos. 1	2 amps (Max)	1 amp (Max)	See Re- marks	Pointer starts slightly right of zero, through zero to full scale left and back slightly
Pick Off	Pos. 2	2 amps (Max)	1 amp (Max)	See Re- marks	Pointer goes to full scale then back through zero and stops slightly right of zero
Tacho	Pos. 1	2 amps (Max)	1 amp (Max)	Left of zero	Actuator runs to open
Tacho	Pos. 2	2 amps (Max)	1 amp (Max)	Right of zero	Actuator runs to closed

A.C. Actuator Functional Tests  
Table 708 (Continued) (Sheet 1 - RH)

TESTING

**71-00-02**

Page 727

Dec 1/76

PRINTED IN ENGLAND

TN13872



OLYMPUS 593

MK.610-14-28  
OVERHAUL



CIRCUIT UNDER TEST	POSITION OF ACTUATOR SELECTOR SW.142
Throttle Actuator (Alternative)	Throttle Alternative
Throttle Actuator (Alternative)	Throttle Alternative
Reheat Actuator	Reheat
Reheat Actuator	Reheat

A.C. Actuator Functional Tests  
Table 708 (Concluded) (Sheet 2 - LH)

TN12749

TESTING  
**71-00-02**  
Page 728  
Dec 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



A.C. ACTUATORS		METER READING			REMARKS
SW.140	SW.139	BRAKE CURRENT	MOTOR CONTROL CURRENT	P.O./ TACHO SIGNAL	
Pick Off	Pos. 1	2 amps (Max)	1 amp (Max)	See Re- marks	Pointer starts slightly right of zero, through zero to full scale left and back slightly
Pick Off	Pos. 2	2 amps (Max)	1 amp (Max)	See Re- marks	Pointer goes to full scale, then back through zero and stops slightly right of zero
Tacho	Pos. 1	No Brake Reading	2 amps (Max)	Right of zero	Actuator runs to open
Tacho	Pos. 2	No Brake Reading	2 amps (Max)	Left of zero	Actuator runs to closed

A.C. Actuator Functional Tests  
Table 708 (Concluded) (Sheet 2 - RH)

PRINTED IN ENGLAND

TN12866

TESTING  
71-00-02  
Page 729  
Dec 1/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



---

FUNCTION

---

Operate switch 143 (lift to release). Light must come 'ON'

Operate switch 144 to Position L, this will fire Left-hand Igniter

Operate switch 144 to Position R, this will fire Right-hand Igniter. Return switch 143 to 'OFF'

---

Igniter Functional Tests  
Table 709

---

FUNCTION

---

Operate switch 141 to open and close positions, the appropriate indicator should be illuminated. Solenoid current meter should read 3 amps max.

---

Air Starter Valve Functional Test  
Table 710

---

---

TEST SET A.C.	ENGINE DISCONNECT PANEL	CIRCUIT
Lead 1A	To terminal No.1 +	Control System
Lead 1B	To terminal No.1 -	
Lead 2A	To terminal No.2 +	Flight Recorder
Lead 2B	To terminal No.2 -	
Lead 3A	To terminal No.3 +	Temperature indicator
Lead 3B	To terminal No.3 -	

---

Pipe Temperature Thermocouple Harness Functional Check  
Table 711

TESTING  
71-00-02

Page 730  
Dec 1/76

TN17149

PRINTED IN ENGLAND

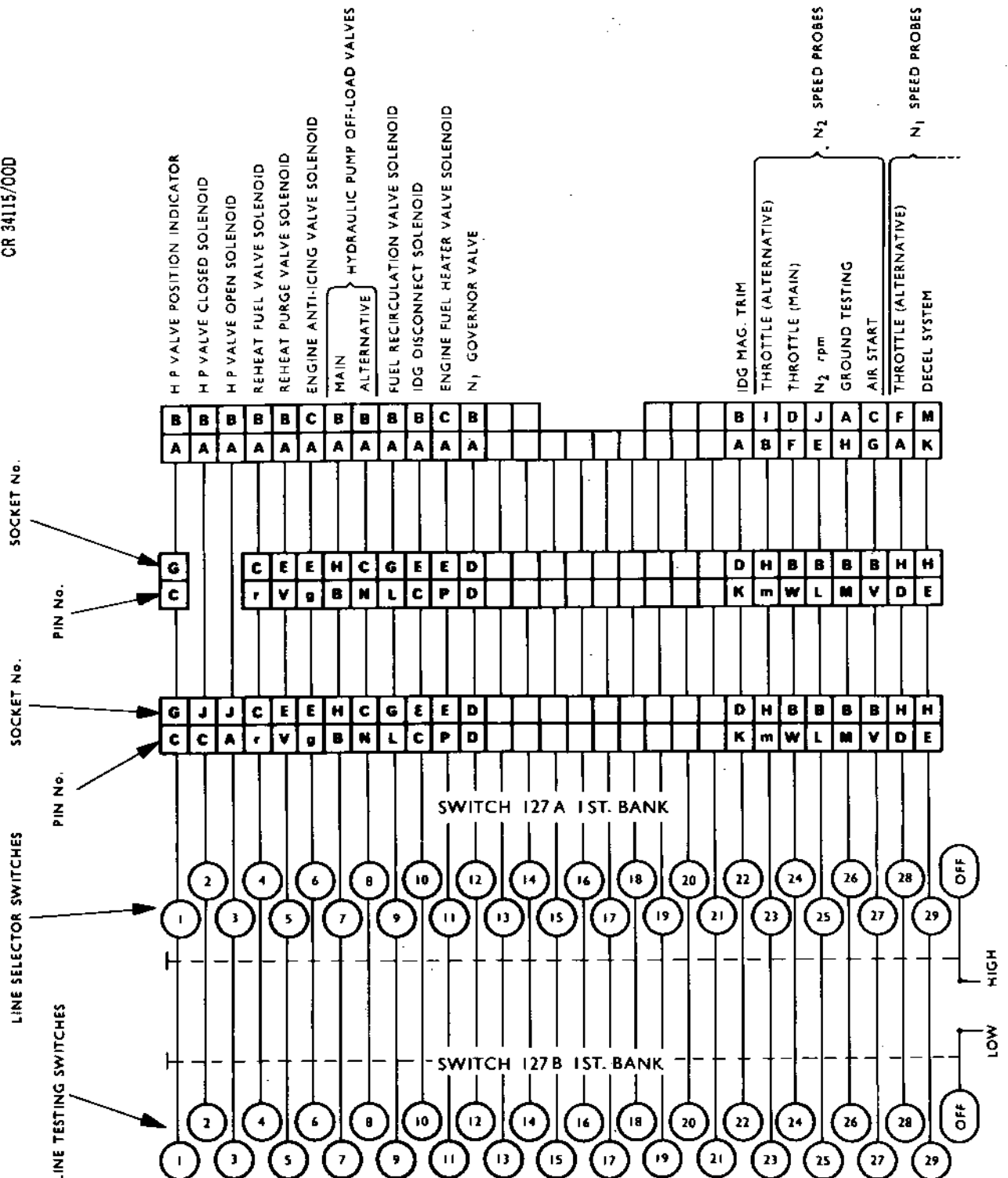


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 34115/000



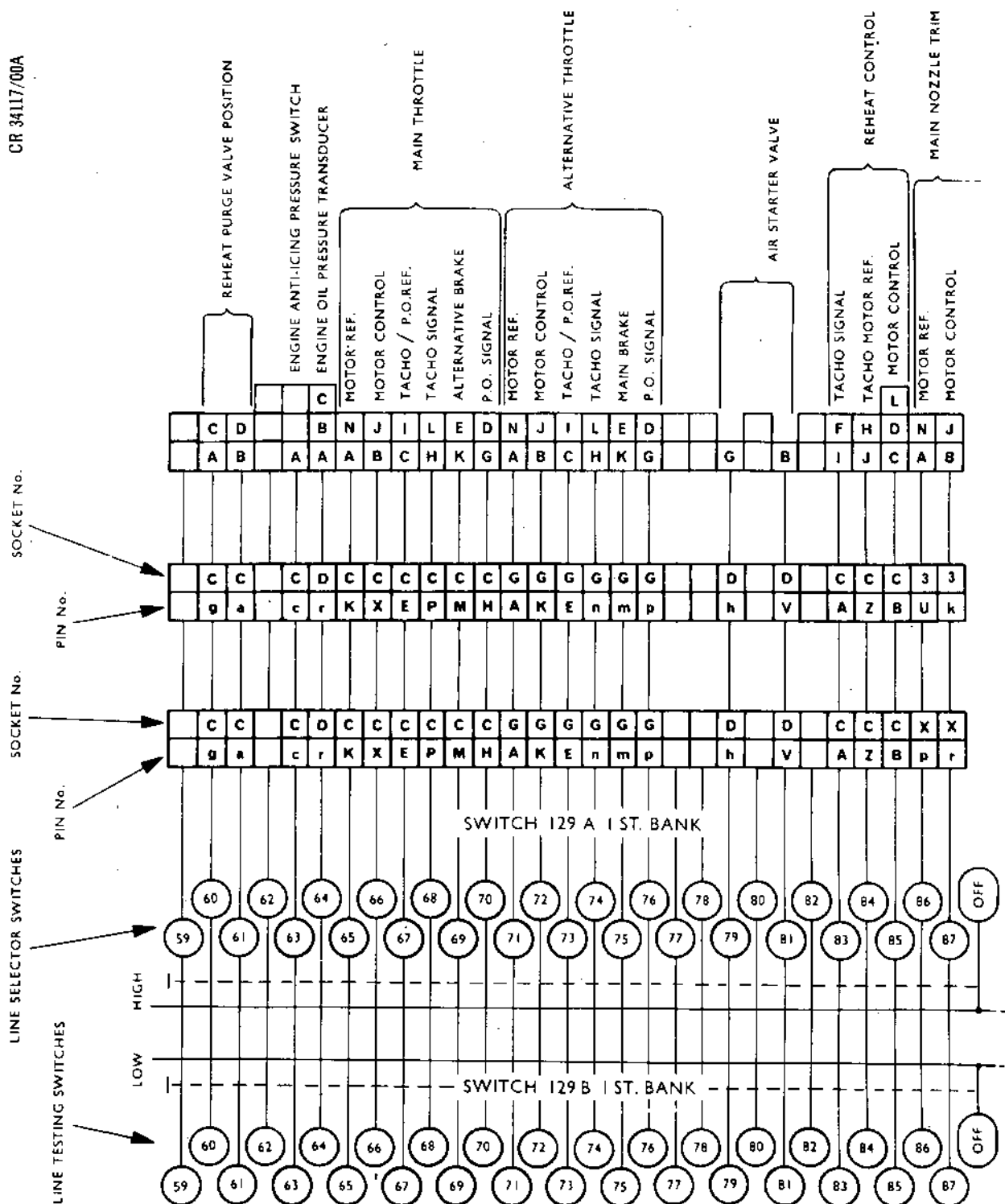
Interline Insulation Tests  
Figure 702 (Sheet 1 of 5)



CR 34117/00A



**OLYMPUS 593**  
MK.610-14-28  
OVERHAUL



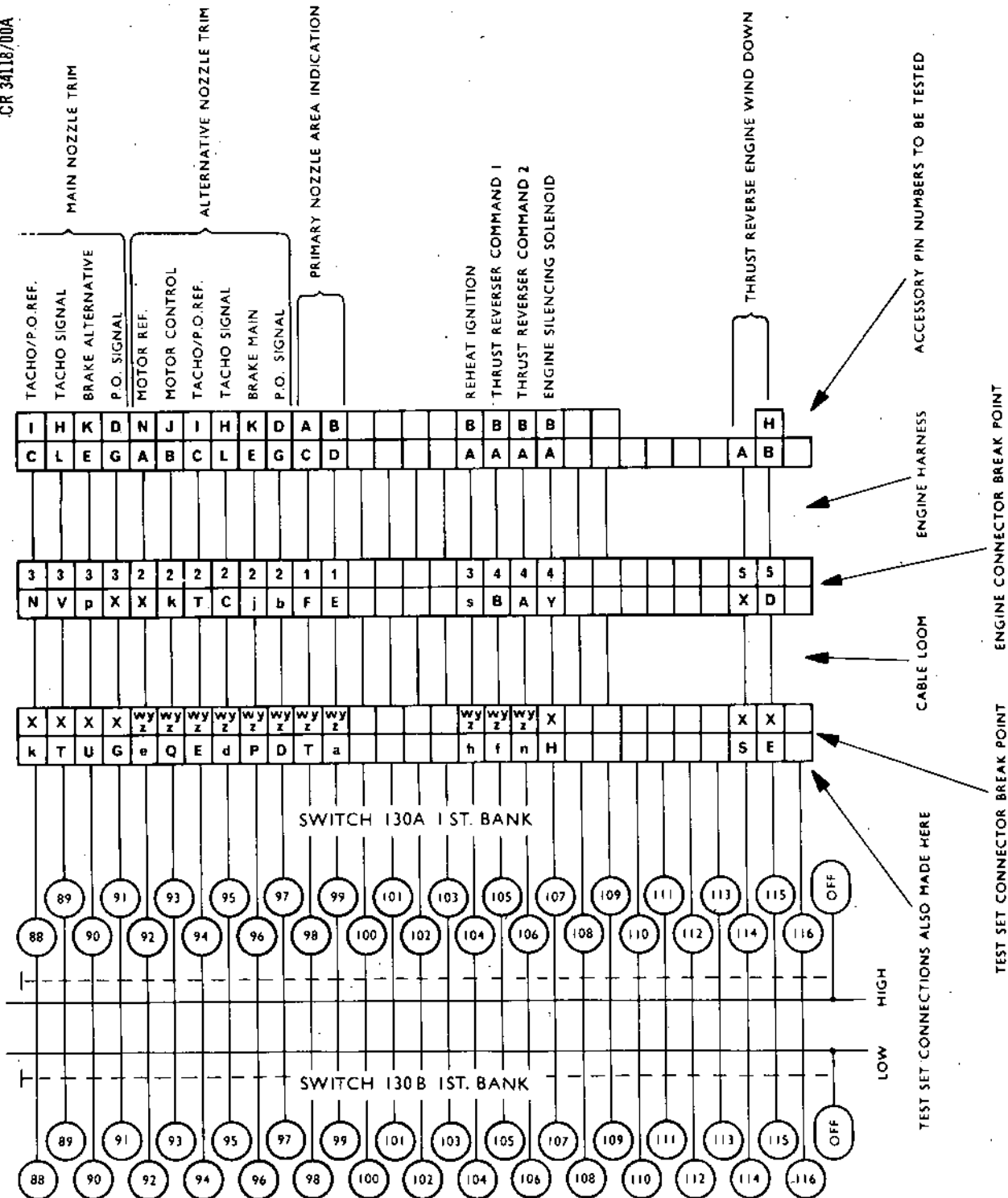
Interline Insulation Tests  
Figure 702 (Sheet 3 of 5)



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 34118/00A



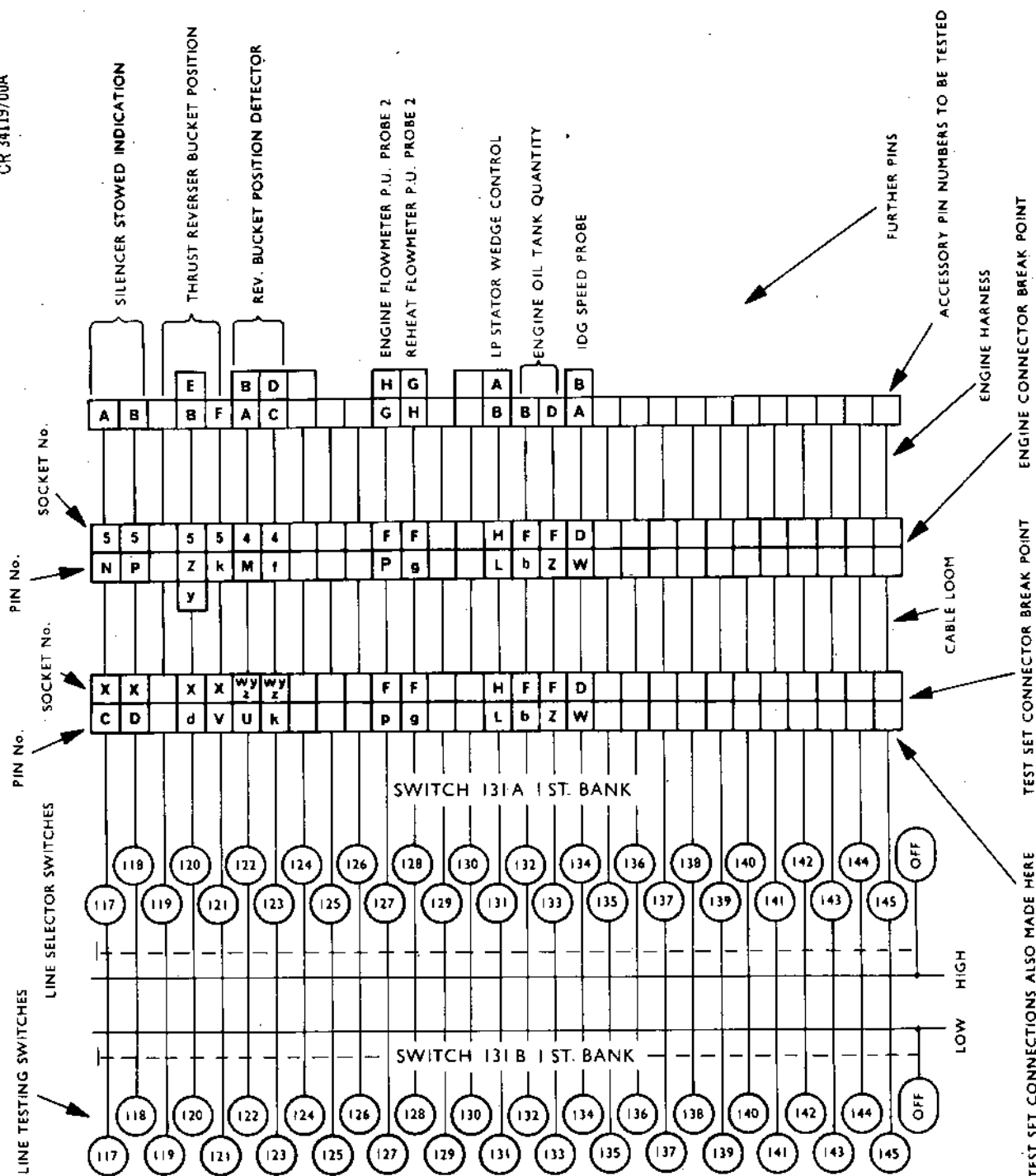
IN3592

Interline Insulation Tests  
Figure 702 (Sheet 4 of 5)

TESTING  
71-00-02  
Page 734  
Dec 1/76



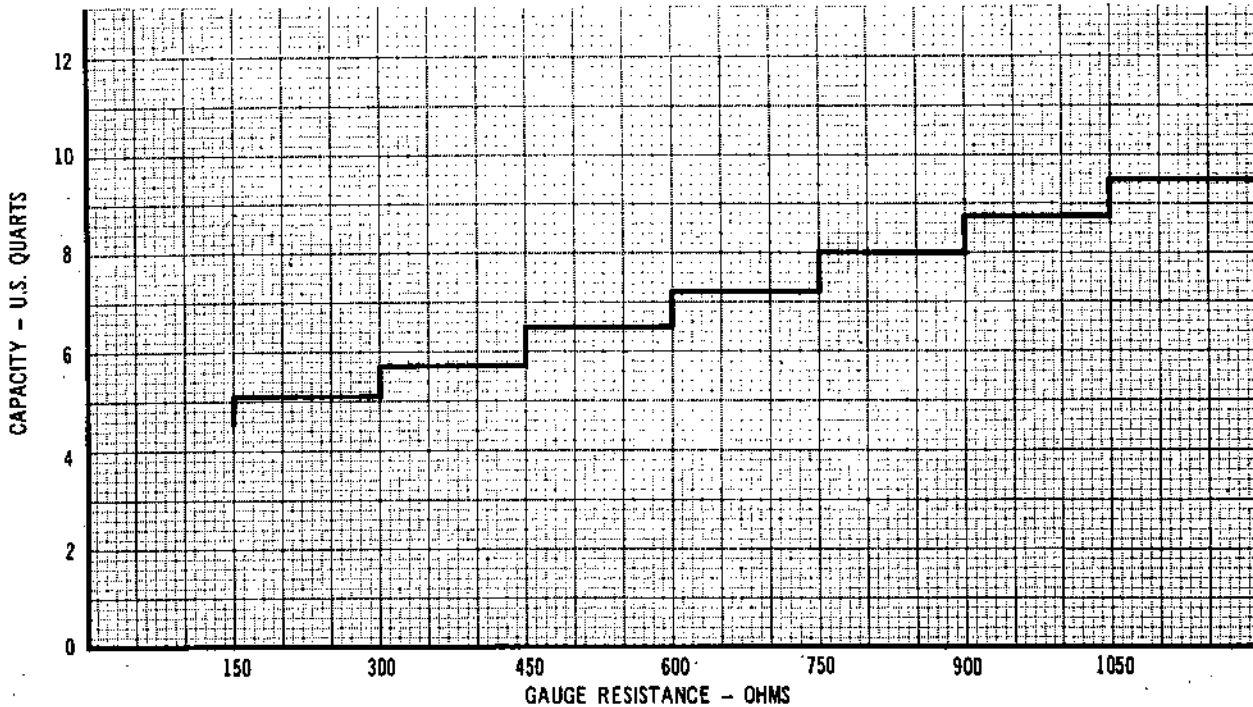
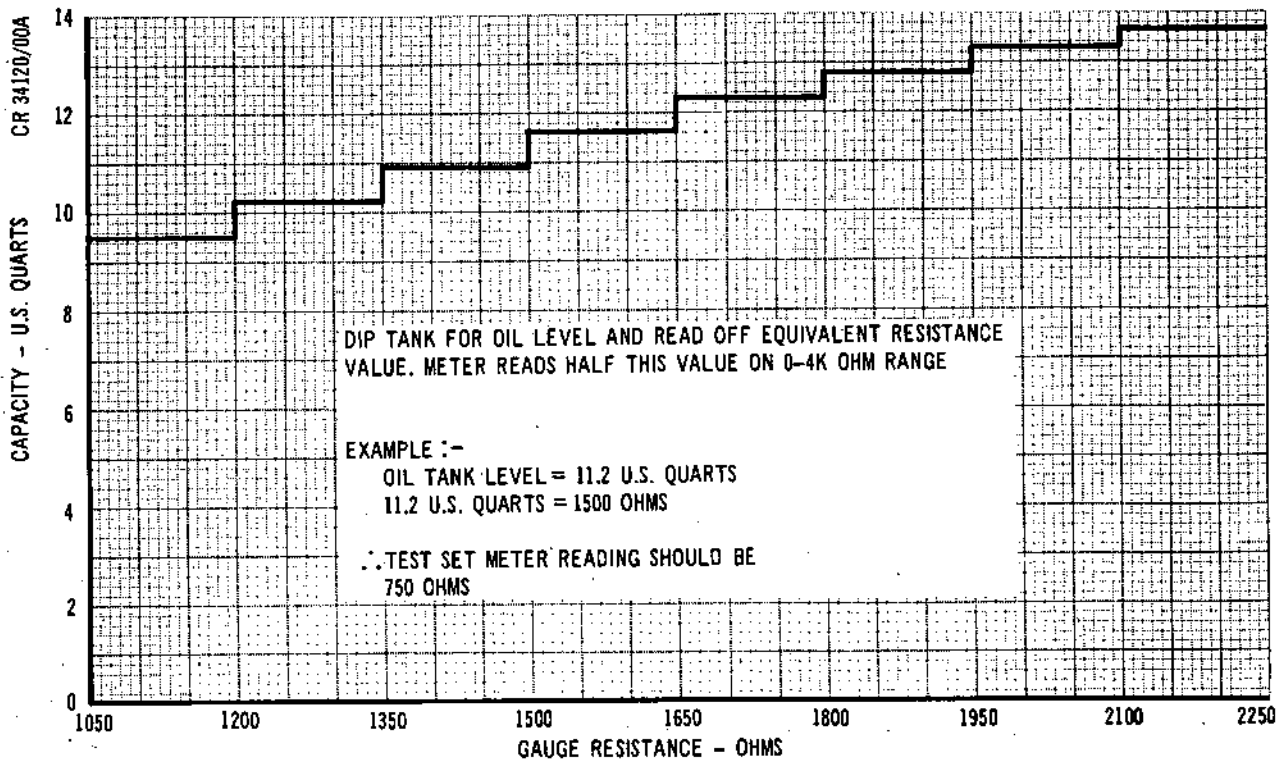
**OLYMPUS 593**  
MK.610-14-28  
OVERHAUL



Interline Insulation Tests  
Figure 702 (Sheet 5 of 5)



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



Oil Level/Gauge Resistance Relationship  
Figure 703

TESTING  
71-00-02

Page 736  
Dec 1/76

TN9540



OLYMPUS 593

MK.610-14-28  
OVERHAUL



ELECTRICAL HARNESS AND HIGH ENERGY (HE) IGNITION LEADS  
- SPECIAL TOOLS, FIXTURES AND EQUIPMENT

1. General

- A. The special tools, fixtures and equipment listed in Tables 1001 and 1002 are those required for the removal and installation and testing of the electrical harness on the engine.
- B. The tools are listed in their order of usage and the Tool Ref.No. is the number quoted in the text. Tools marked with an \* are used in more than one aspect of assembly.
- C. The tools have been illustrated in order of usage, but tools listed in more than one aspect of assembly or disassembly will be illustrated once only.

2. Electrical Harness Disassembly Tools

TOOL REF.NO.	MANUFACTURERS PART NO.	DESCRIPTION
1592	PT.696175	Wrench

Disassembly Tools  
Table 1001

3. Electrical Harness Assembly Tools

TOOL REF.NO.	MANUFACTURERS PART NO.	DESCRIPTION
*1592	PT.696175	Wrench
1664	P3C.530647	Wrench, Torquemeter
1618	PT.871398	Wrench, Torquemeter

Assembly Tools  
Table 1002

SPECIAL TOOLS ETC.

71-00-02

Page 1001  
Jan 2/80





OLYMPUS 593

MK.610-14-28  
OVERHAUL



4. Electrical Harness Test Tools

TOOL REF.NO.	MANUFACTURERS PART NO.	DESCRIPTION
814	(PE.21500 )	Test Set, Engine Electrical System
2604	PE.21200	J.P.T. Test Set

Test Tools  
Table 1003

TN40783

SPECIAL TOOLS ETC.

**71-00-02**

Page 1002  
Jan 2/80



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



PREPARE ENGINE FOR DESPATCH

TABLE OF CONTENTS

Para.	Page
1. General ... ..	501
2. Intrascopes Checks and Despatch Procedures ... ..	501
A. Receive Engine from Test ... ..	501
B. Assemble Engine to Mobile Engine Stand ... ..	502
C. Clean Air Intake and Exhaust Diffuser ... ..	504
D. Prepare Engine for Intrascopes Checks ... ..	504
E. Intrascopes Checks - Rotating Assembly ... ..	505
F. Carry out Positional Checks of Overboard Vents and Ducts ... ..	508
G. Assemble Engine to Rollover Stand ... ..	511
H. Intrascopes Checks - Static Assembly ... ..	514
J. Remove Fuel Filter Element ... ..	514
3. Remove Slave Test Equipment from Engine ... ..	519
A. Remove the Main and Standby Slave Hydraulic Pumps ... ..	519
B. Remove the Slave Pressure Blank from the Gearbox IDG Location... ..	523
C. Remove the Slave TRA Elbow ... ..	523
4. Install IDG Splined Shaft and Vane Cover ... ..	524
A. Install the Integrated Drive Generator (IDG) Splined Shaft ... ..	524
B. Install the Air Duct Vane Cover ... ..	524
5. Inspection Clearance Checks ... ..	524
A. Carry Out Inspection of Engine Exterior, Components Removed and Re-assembled and Tube Clearance Checks ... ..	524
B. Assemble Oil Drain Tube ... ..	529
6. Rig Test and Final Installation of Main Electrical Harness ... ..	530
A. Prepare for Rig Test ... ..	530

PRINTED IN ENGLAND

TN24801

ENGINE DESPATCH

**71-00-03**

Contents 1

Jan 2/80

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

Para.	Page
B. Use of Test Set ... ..	530
C. Interline Insulation Test ... ..	536
D. Accessory Resistance Tests (Tables 503 and 504) ..	538
E. Accessory Insulation Tests ... ..	539
F. Accessory Functional Tests ... ..	540
G. Check Bonding of Complete Engine ... ..	567
H. Check Harness ... ..	568
J. Assemble Main Harness Stowage Bracket and Supports... ..	568
7. Final Despatch Procedures ... ..	570
A. Install Heat Shield ... ..	570
B. Inspection Checks ... ..	572
C. Assemble Engine Transportation Blanks ... ..	572
D. Clean Engine ... ..	576
E. Remove Engine from Rollover Stand and Assemble to Mobile Engine Stand or Trolley ... ..	576
F. Carry Out C. of G. Check and Weigh Engine ... ..	577
G. Install Engine in Moisture and Vapour Proof (MVP) Bag ... ..	581
H. Complete Engine Records and Despatch Engine ... ..	581

#### TABLE OF ILLUSTRATIONS

Fig.No.	Page
501 Assembling Engine to Mobile Engine Stand... ..	503
502 Overboard Vents Positional Checks Sheet 1 of 2... ..	506
502 Overboard Vents Positional Checks Sheet 2 of 2... ..	507
503 Assembling Engine to Rollover Stand ... ..	510
504 Draining Oil Tank ... ..	512
505 Draining Fuel System ... ..	515
506 Filter Element Removal/Installation ... ..	516
507 Remove Hydraulic Pumps ... ..	521
508 HP Compressor Diffuser and IDG Slave Equipment ... ..	522

FN5909

ENGINE DESPATCH

**71-00-03**Contents 2  
Jan 2/80



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



Fig.No.

Page

509	Splined Shaft Assembly ...	525
510	Tube Clearance Checks Sheet 1 of 2 ...	531/532
510	Tube Clearance Checks Sheet 2 of 2 ...	533
511	Assembling IDG Oil Drain Tube...	534
512	Interline Insulation Tests Sheet 1 of 5 ...	561
512	Interline Insulation Tests Sheet 2 of 5 ...	562
512	Interline Insulation Tests Sheet 3 of 5 ...	563
512	Interline Insulation Tests Sheet 4 of 5 ...	564
512	Interline Insulation Tests Sheet 5 of 5 ...	565
513	Oil Level/Gauge Resistance Relationship ...	566
514	Main Harness Stowage ...	569
515	Assembling Heat Shield ...	571
516	Assembling Engine Transportation Blanks ...	575
517	C. of G. Check and Weigh Engine ...	579
518	Correction Chart for C. of G. Sling Scale...	580

LIST OF TABLES

Table No.

Page

501	Engine Tube Clearances ...	527
502	Cable Loom Services ...	542
503	Resistance Tests on Engine Mounted Accessories ...	544
504	Resistance Tests on Engine Mounted A.C. Actuators...	548
505	Insulation Tests on Engine Mounted Accessories ...	549
506	Insulation Tests on Engine Mounted A.C. Actuators...	553
507	Accessory Screen Selections ...	554
508	Functional Test of Engine Mounted Solenoid Controls ...	555
509	Functional Tests of Engine Mounted A.C. Actuators...	556
510	Functional Tests of Igniters ...	560
511	Functional Test of Air Starter Valve ...	560
512	Transportation Blanks ...	572

ENGINE DESPATCH

**71-00-03**

Contents 3

Jan 2/80

# British airways

## OLYMPUS 593 OVERHAUL MANUAL

TEMPORARY REVISION No.71-506

Insert in chapter 71-00-03 Engine Despatch facing page 501

### REASON FOR ISSUE:

To delete a requirement at BEOL for British Airways' Engines only, to perform introscope inspections, C of G check and engine weighing at the engine despatch stage. (MRA 66).

### PREPARE ENGINE FOR DESPATCH.

#### 1. General.

Add the following:

F. Engine despatch procedures sub-para's. 2. E. and 2. H. (Introscope Checks) and 7. G. (C of G check and engine weighing) are not required on British Airways' Engines as a routine following engine test.

If occasions arise where these checks are considered necessary they will be stated as a specific BEOL history sheet requirement.

BA  
.  
.  
.  
.  
.  
.  
.



OLYMPUS 593

MK.610-14-28

OVERHAUL



## PREPARE ENGINE FOR DESPATCH

### 1. General

- A. Prior to commencing engine despatch, refer to 72-09-00 Assembly for general information.
- B. During the despatch procedure, reference will be made to the Illustrated Parts Catalogue (I.P.C.) to identify those items where the nomenclature does not positively identify them, due to the duplication of the title e.g. nuts, bolts, washers, vanes, spacer, disks etc. An item will be identified as bolt (1-10), the 1 referring to the I.P.C. Fig.No., and the 10 referring to the Item No. Where items from any other breakdown are introduced, the full breakdown numbers will be quoted e.g. bolt (72-51-03/1-90).
- C. Throughout the text special tools are quoted by their Ref. No. e.g. (Tool 1234). For a complete list of tooling required for the engine despatch, and for the Manufacturers Part No., refer to Special Tools, Fixtures and Equipment Tables 1002 to 1005.
- D. This chapter details the work necessary for preparing the engine for despatch after final testing and includes final inspection of the engine.
- E. The engine may be received from test with slave accessories attached. Where necessary the procedures are detailed for the removal of slave accessories along with the subsequent assembly of the engines own components.

### 2. Intrascopes Checks and Despatch Procedures

#### A. Receive Engine from Test.

- (1) On receipt of engine from test carry out the following inspection checks.
  - (a) Check engine test records for:
    - (i) Engine acceptance.
    - (ii) Fuel system inhibited.
    - (iii) Engine filters checked and found satisfactory.

ENGINE DESPATCH

**71-00-03**

Page 501

Aug 11/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (b) Log the following data in inspection records.
    - (i) Engine running time.
    - (ii) Reheat running time.
    - (iii) Number of engine starts.
    - (iv) Number of reheat 'light ups'.
  - (c) Record, on the appropriate work sheet, any work that has not been completed and not required for test as detailed in the engine build sheets and any work for rectification as detailed in engine test records. This work is to be completed during the despatch procedures and cleared in final inspection.
  - (d) Accept the engine for intrascope check.
- B. Assemble Engine to Mobile Engine Stand (Tool 1266) (Ref.Fig.501).
- (1) Assemble the lifting equipment (Tool 2501) to the lifting brackets on the engine by inserting two quick release pins at the intermediate case and HP compressor case flange and by inserting two quick release pins at the delivery case and combustion chamber outer case (CCOC) flange.
  - (2) Support the engine, release and remove the pedestal clamps from the trunnion brackets on the engine transportation trolley.
  - (3) Disconnect the engine supports from the LP compressor casing and lift the engine clear of the trolley.
  - (4) Do not remove the trunnion adapters (Tool 1177 and 1193) from the engine trunnions.
  - (5) Adjust the lifting equipment where necessary to set the engine in a vertical plane by turning the handnut and in the horizontal plane by turning the handle.
  - (6) Position the engine over the mobile engine stand (Tool 1266). Assemble the brackets (Tool 1083 and 1756) to the LP compressor casing front flange. Assemble the support plate (Tool 808) to the brackets.

ENGINE DESPATCH

71-00-03

Page 502  
Jun 30/01



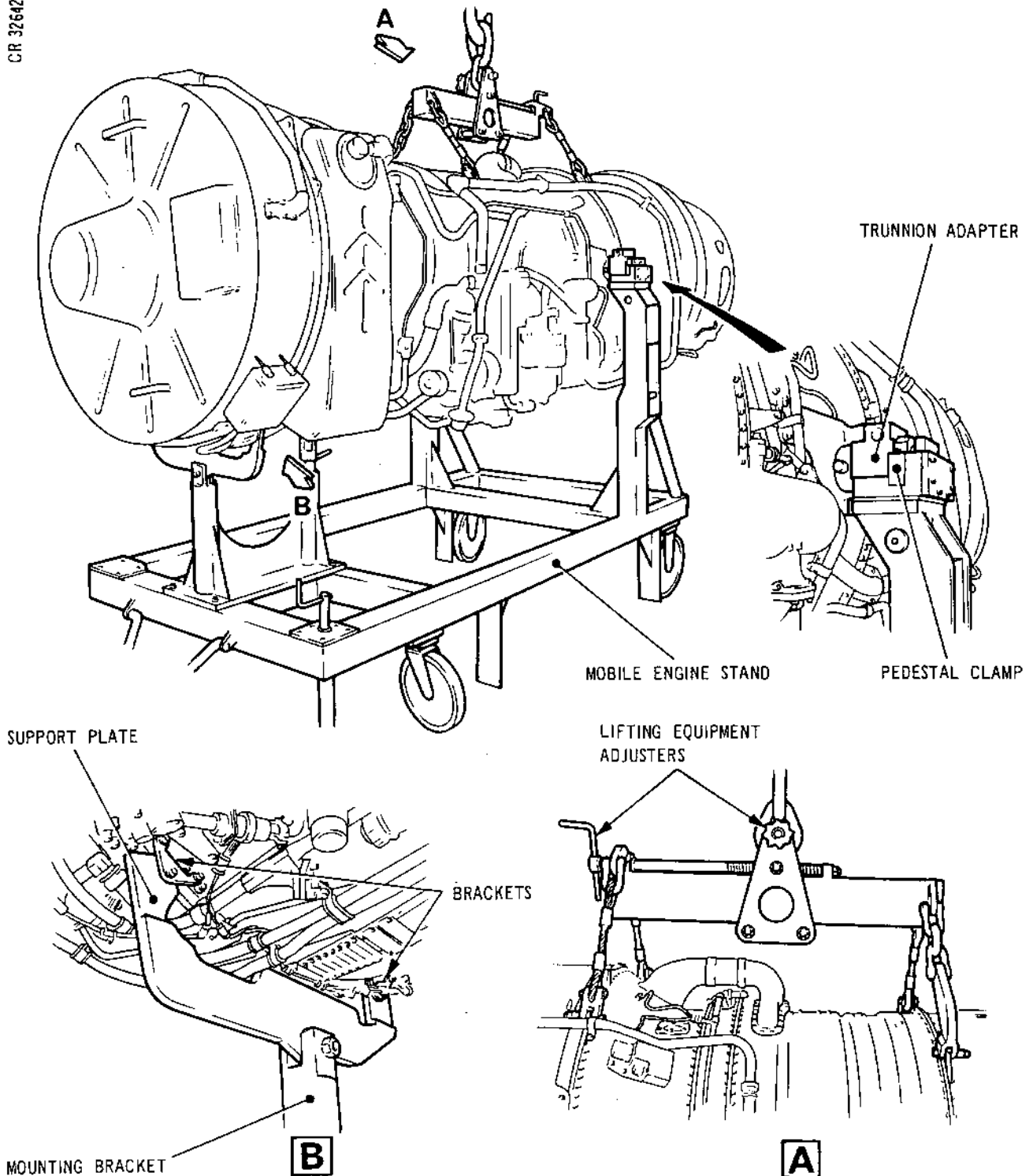
OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 32642/00A

PRINTED IN ENGLAND



TN16893

Assembling Engine to Mobile Engine Stand  
Figure 501

ENGINE DESPATCH

71-00-03

Page 503

Aug 11/75





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (7) Lower the engine carefully until the trunnion adapters locate in the trunnion locations and secure the support plate to the mounting bracket (Tool 261) at the front of the engine with bolt.
- (8) Secure the trunnion adapters with the pedestal clamps.
- (9) Remove lifting equipment.

C. Clean Air Intake and Exhaust Diffuser.

- (1) Release the clamps and remove the slave transportation blank from the air intake.
- (2) Clean the inlet guide vanes and all accessible LP compressor rotor and stator blades using an approved cleaning solution, i.e. tiket or kerosene.
- (3) Dry the air intake thoroughly using suitable fluff-free cloths.
- (4) Temporarily reassemble the transport blank.
- (5) Release the clamps and remove the slave transportation blank from the exhaust diffuser.
- (6) Clean the exhaust diffuser using an approved cleaning solution, i.e. tiket or kerosene and remove all traces of exhaust deposits.
- (7) Dry the exhaust diffuser thoroughly using suitable fluff-free cloths.
- (8) If the engines own reheat spray ring and TJ harness are fitted clean with an approved cleaning solution, i.e. tiket or kerosene.
- (9) Dry the reheat spray ring and TJ harness thoroughly using suitable fluff-free cloths.
- (10) Temporarily reassemble the slave transport blank.

D. Prepare Engine for Intrascopie Check.

- (1) Assemble the HP hand turning equipment (Ref.72-09-01).

TN29537

ENGINE DESPATCH

71-00-03

Page 504  
Aug 11/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Using the HP hand turning equipment carry out a freedom of rotation check.

CAUTION: DURING FREEDOM OF ROTATION CHECKS ENSURE ENGINE TURNS FREELY, ENSURE THAT ENGINE TURNING TORQUE DOES NOT EXCEED 350 TO 375 LBF IN. (39,5 TO 42,3 N.m).

- (3) Remove the front and rear engine blanks and carry out the following visual inspection checks for signs of damage and cracks. Check for cleanliness.

- (a) Inspect the entry guide vanes.
- (b) Inspect the stage 1 LP Compressor rotor blades and stator vanes (Ref.72-09-03 Inspection/Check).

NOTE: Any evidence of damage on the stage 1 LP compressor rotor blades and stator vanes, within the acceptance standards detailed in 72-09-03 Inspection/Check, must entail further detailed internal examination of all compressor rotor blades.

- (c) Inspect the trailing edges of the LP turbine blades.
- (d) Inspect the LP turbine blade 'Z' gaps to ensure that the stellite pads are in the correct position and of the right standard.
- (e) Inspect the exhaust diffuser and TJ harness.

**E. Intrascopes Checks - Rotating Assembly.**

- (1) Conduct intrascopes checks at the following locations in accordance with (Ref.72-09-03 INSPECTION/CHECK).
  - (a) HP compressor 1st stage rotor blades trailing edge.
  - (b) HP compressor 2nd stage rotor blades leading edge.
  - (c) HP compressor 2nd stage rotor blades trailing edge.
  - (d) HP compressor 3rd stage rotor blades leading edge.
  - (e) HP turbine blades trailing edge.
  - (f) LP turbine leading edge.

ENGINE DESPATCH

**71-00-03**

Page 505

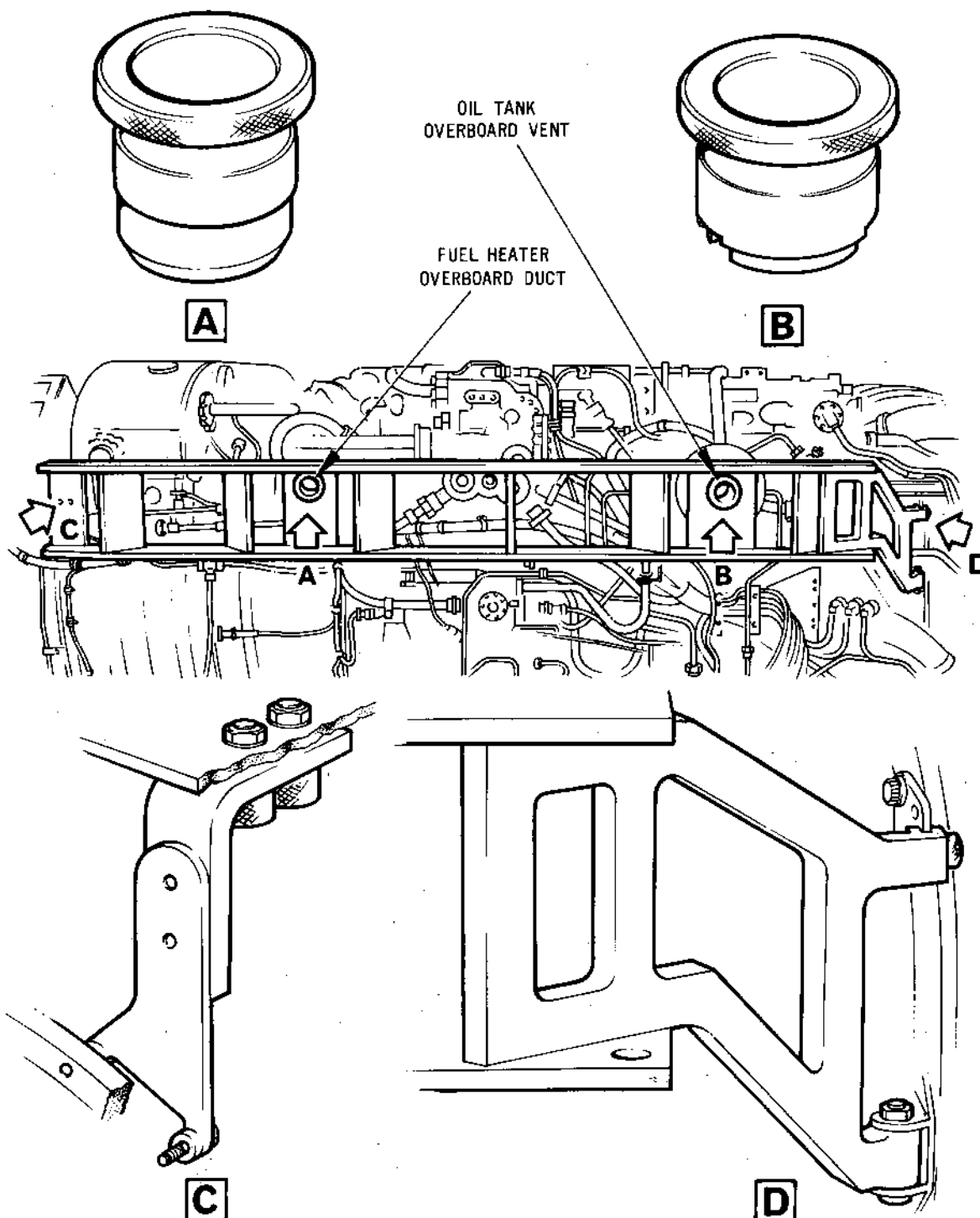
Jan 2/80



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 32644/00A



Overboard Vents Positional Checks Sheet 1 of 2  
Figure 502

ENGINE DESPATCH

**71-00-03**

Page 506

Aug 11/75

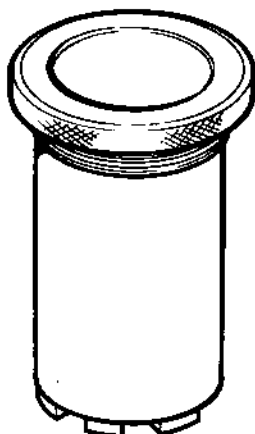
7N16894



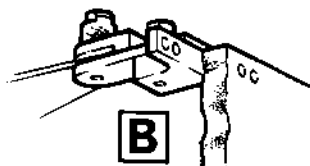
**OLYMPUS 593**  
MK.610-14-28  
OVERHAUL



CR 32643/00A



**A**



**B**



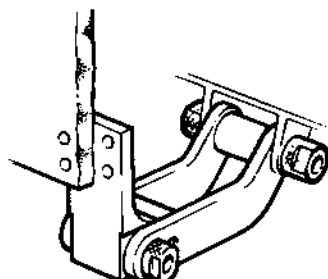
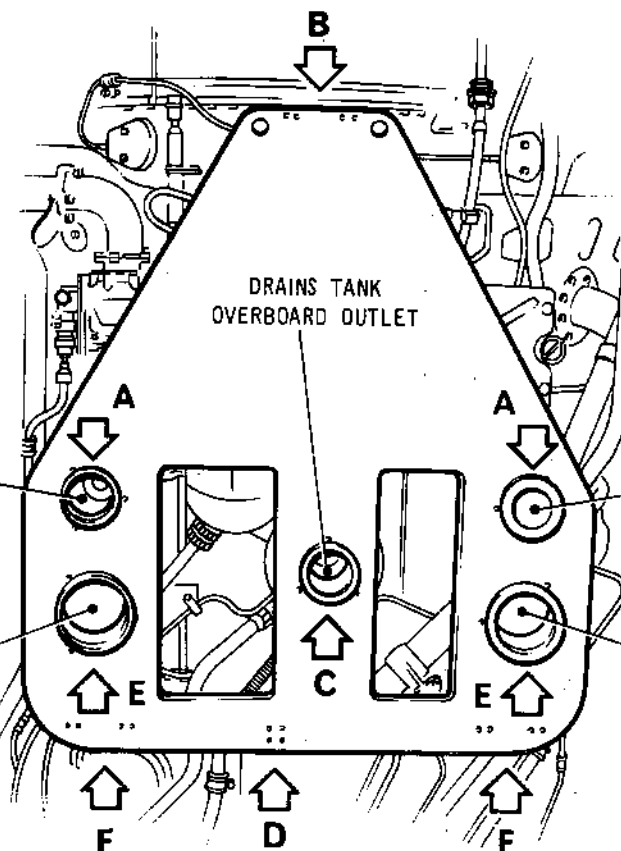
**C**

LP AND HP COMPRESSOR  
THRUST BEARINGS  
COLD VENT OUTLET

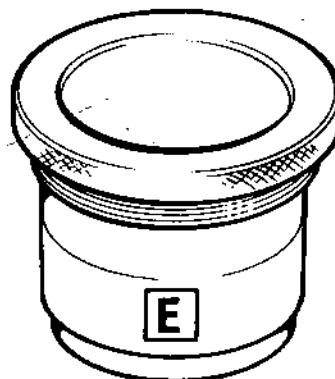
LP AND HP TURBINE  
BEARING COLD VENT  
OUTLET

HP COMPRESSOR REAR  
LABYRINTH LEFT-HAND  
OVERBOARD VENT

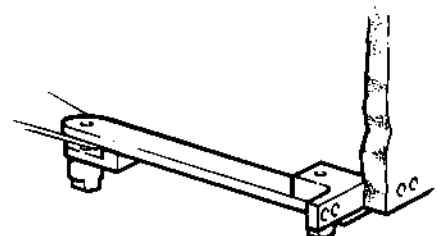
HP COMPRESSOR REAR  
LABYRINTH RIGHT-HAND  
OVERBOARD VENT



**D**



**E**



**F**

Overboard Vents Positional Checks Sheet 2 of 2  
Figure 502

ENGINE DESPATCH

**71-00-03**

Page 507

Aug 11/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) If damage is discovered when inspecting the HP compressor, then further intrascope checks of the HP compressor 4th, 5th, 6th and 7th stages will be necessary in accordance with (Ref.72-09-03 INSPECTION/CHECK).
- (3) Record damage in the engine despatch inspection sheets.
- (4) Remove the HP hand turning equipment (Ref.72-09-01 ASSEMBLY).
- (5) Clear the engine for fitting to the rollover stand.

F. Carry Out Positional Checks of Overboard Vents and Ducts (Ref.Fig.502, sheet 1).

NOTE: The positional checks are required to ensure that the overboard vents and ducts are correctly positioned after engine test.

- (1) Assemble the front gauging bracket (Tool 1760) to the engine and check the fuel heater overboard ducts and the oil tank vent.

NOTE: The checking gauge must align with the overboard duct or overboard outlet being checked, the gauge will locate flush with the front gauging bracket (Tool 1760) without undue force where alignment is correct.

- (a) Remove the blanks from the fuel heater overboard duct and the oil tank overboard outlet.
- (b) Remove the two nuts and plate from the front gauging bracket.
- (c) Locate the gauging bracket to the left-hand support bracket (Tool 1756) on the inlet guide vane and LP compressor case flange.
- (d) Assemble the gauging bracket to the two brackets on the delivery casing and CCOC flange and secure with the bolts provided.
- (e) Using the checking gauge (Tool 1761) check the position of the fuel heater overboard duct.

IN30387

ENGINE DESPATCH

**71-00-03**

Page 508  
Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (f) Using the checking gauge (Tool 1762) check the position of the oil tank overboard outlet.
  - (g) Reposition the overboard ducts or overboard outlets where alignment cannot be achieved and recheck where necessary.
  - (h) Remove the gauges and front gauging bracket from the engine.
  - (j) Assemble the plate to the front of the gauging bracket and place the gauges and bracket in their container (Tool 1757).
  - (k) Assemble the blanks to the fuel heater overboard duct and the oil tank overboard outlet.
- (2) Check the LP and HP compressor thrust bearings, the LP and HP turbine bearings, HP compressor rear labyrinth and the drains tank overboard vents (Ref. Fig.502, sheet 2).

NOTE: The checking gauge must align with the vent or overboard outlet being checked, the gauge can be screwed down flush with the rear gauging bracket (Tool 1763) without undue force where alignment is correct.

- (a) Remove the blanks from the LP and HP compressor thrust bearings, the LP and HP turbine bearings, HP compressor rear labyrinth and the drains tank overboard vents.
- (b) Assemble the rear gauging bracket (Tool 1763) to the three brackets on the delivery case and CCOC flange and the single bracket on the CCOC and exhaust diffuser flange.
- (c) Secure the gauging bracket with the bolts and nuts provided.
- (d) Using the gauge (Tool 1764) with the rear gauging bracket, check the position of LP and HP compressor thrust bearing cold vent outlet.
- (e) Using the gauge (Tool 1764) with the rear gauging bracket, check the position of LP and HP turbine bearing cold vent outlet.

ENGINE DESPATCH

71-00-03

Page 509

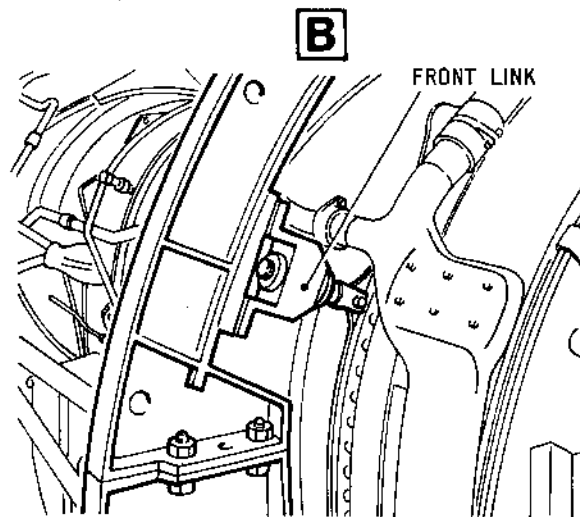
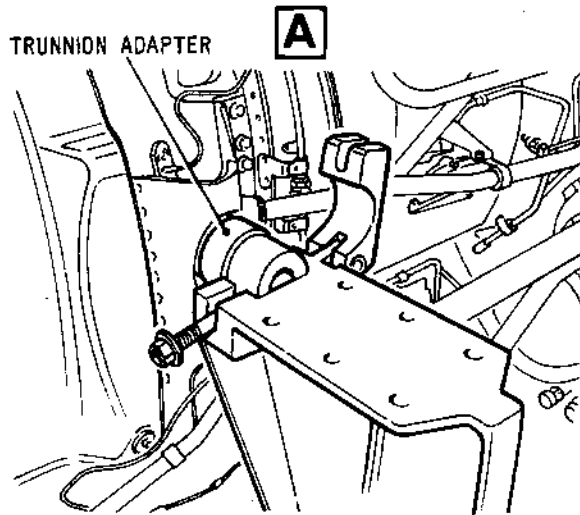
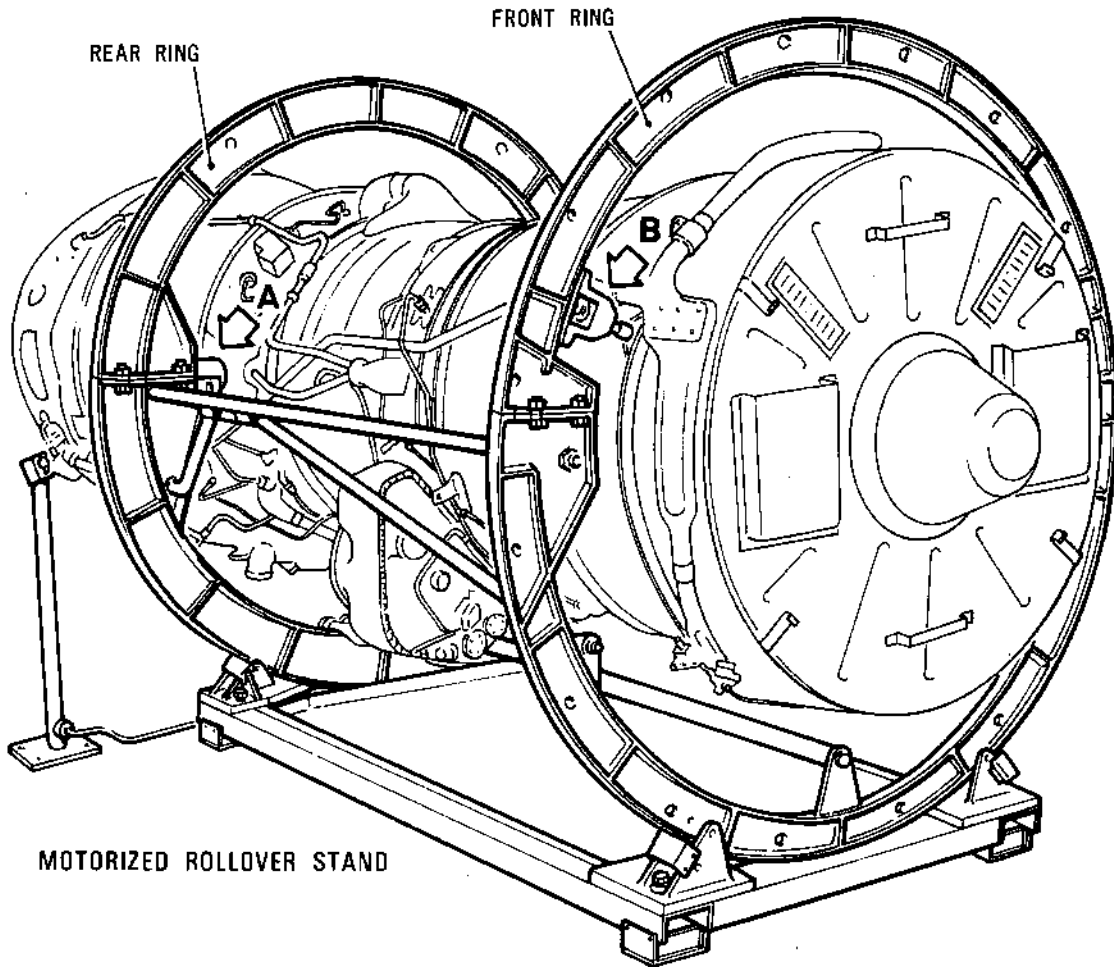
Jan 2/80



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 32645/00A



Assembling Engine to Rollover Stand  
Figure 503

ENGINE DESPATCH

71-00-03

Page 510

Aug 11/75

TN16908



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (f) Using the gauge (Tool 1765) with the rear engine bracket, check the position of the HP compressor rear labyrinth left and right-hand vents.
  - (g) Using the gauge (Tool 1766) with the rear engine bracket, check the position of the drains tank overboard outlet.
  - (h) Reposition the vent tubes or overboard vents where alignment cannot be achieved and recheck where necessary.
  - (j) Remove the gauges and the rear gauging bracket from the engine and place the gauges and bracket in their container (Tool 1150).
  - (k) Reassemble the blanks to the overboard vents.
- G. Assemble Engine to Rollover Stand (Ref.Fig.503).
- (1) Prepare the rollover stand.
    - (a) Set the motorized rollover stand (Tool 94) in the upright position on its base rollers and lock the rollover rings with the retaining pins.
    - (b) Remove the eight nuts and bolts securing the top section of the front rollover ring to the frame, then remove the top section of the ring.
    - (c) Remove the eight nuts and bolts securing the top section of the rear rollover ring to the frame, then remove the top section of the ring.
    - (d) Ensure that the front links are assembled to the frame.
  - (2) Locate the engine in the rollover stand (Ref.Fig.503).
    - (a) Assemble the lifting equipment (Tool 2501) to the lifting brackets on the engine by inserting two quick release pins at the intermediate case and HP compressor case flange and by inserting two quick release pins at the delivery case and CCOC case flange (Ref.Fig.501).

ENGINE DESPATCH

71-00-03

Page 511  
Jun 30/01



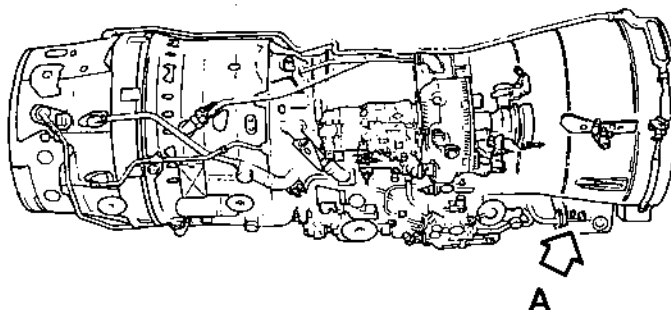
CR 32646/00B



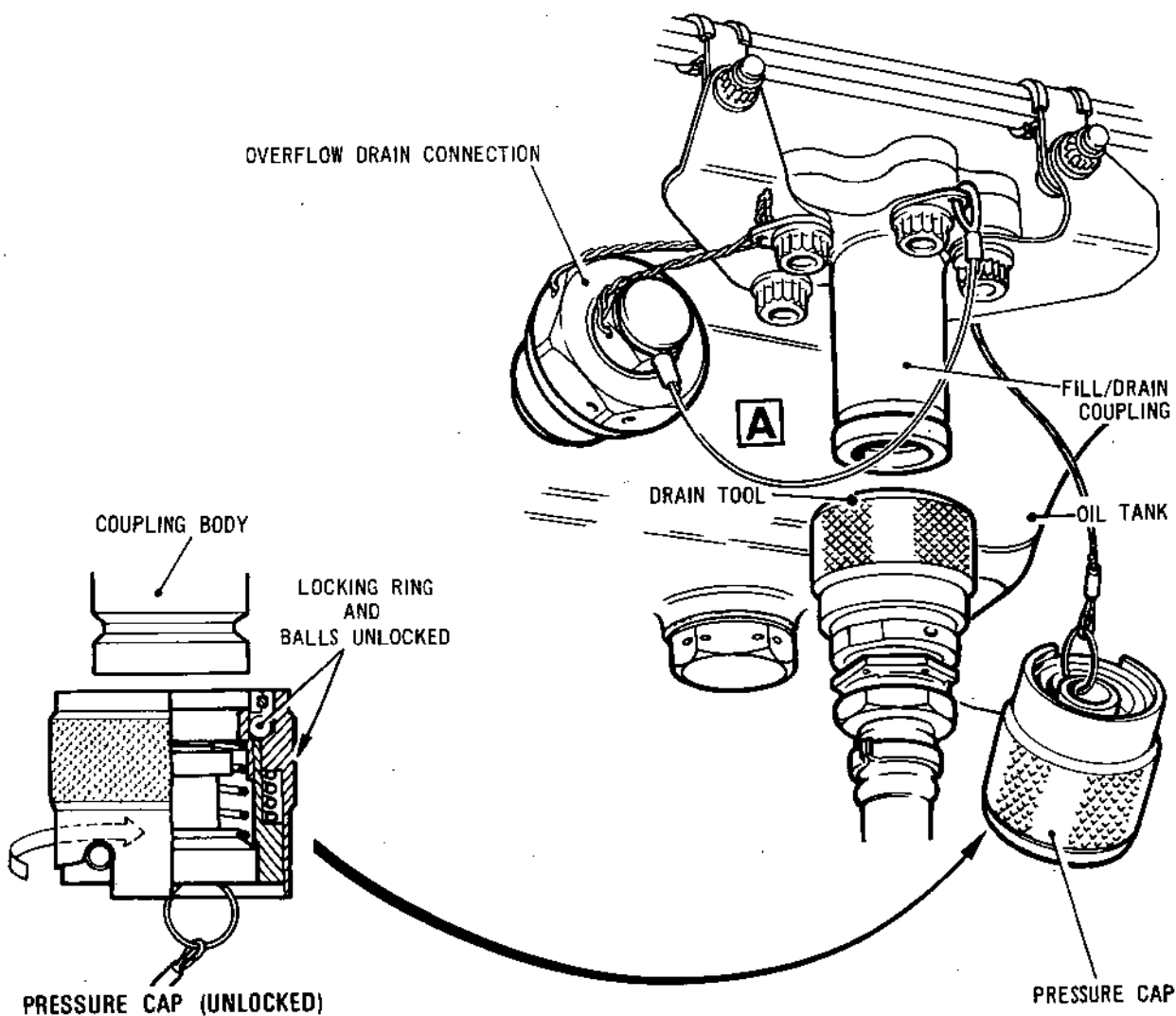
OLYMPUS 593

MK.610-14-28

OVERHAUL



FORWARD →



Draining Oil Tank  
Figure 504

ENGINE DESPATCH

71-00-03

Page 512

Jan 2/80



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (b) Support the engine, then release the front engine supports (Tool 261) and remove the trunnion pedestal clamps from the mobile engine stand.
- (c) Raise the engine from the mobile engine stand. Remove the trunnion adapters from the engine trunnions and return to the transportation trolley, then remove the support plate (Tool 808) and two brackets (Tools 1083 and 1756) from the engine.
- (d) Slide the rollover stand trunnion adapters over the engine trunnions.
- (e) Position the engine over the rollover stand and lower carefully into the stand until the trunnion bushes engage with the trunnion housings.
- (f) Assemble the top section of the front rollover ring. Adjust the two front engine suspension spigots on the front ring to locate the lower lifting points on the LP compressor case and air intake flange. Insert the pins provided then, using the alignment bar (Tool 1023) where necessary, secure the ring with eight nuts and bolts.
- (g) Assemble the top section of the rear rollover ring using the alignment bar (Tool 1023) where necessary and secure with eight nuts and bolts.
- (h) Secure the trunnion clamps in position with the swing bolts and nuts.
- (j) Remove the lifting equipment.
- (3) Drain oil tank (Ref.Fig.504).
- (a) Position a container, with a capacity adequate for a quantity of 25 litres, below the oil fill/drain coupling.
- (b) Detach the fill/drain coupling pressure cap. Turn the locking ring and pull downwards to release the locking balls of the quick release coupling.

ENGINE DESPATCH

71-00-03

Page 513

Jan 2/80



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (c) With the end of the drain tube (Tool 3009) in the container, engage the tube adapter with the coupling to open the valve.
- (d) When oil ceases to drain from the tank, disconnect the drain tube and replace the pressure cap. Ensure that the locking ring is in the locked position.
- (e) Remove the screwed plug (79-11-01/1-350) from the base of the tank and drain the remaining oil.
- (f) With a Corrujoint seal (79-11-01/1-360) assembled to the plug, apply lubricant 'B' and screw the plug into its location. Torque-tighten the plug between 230 and 250 lbf in. (26 and 28,2 N.m) and wire-lock to the oil tank contents transmitter and overfull warning switch retaining bolt.

#### H. Intrascope Checks - Static Assembly.

- (1) Conduct intrascope checks at the following locations of the CCOC in accordance with (Ref.72-09-03 INTRASCOPE CHECK).
  - (a) 16 Vaporizers of the combustion chamber.
  - (b) Front fairing of combustion chamber.
  - (c) Inner and outer flame tubes of the combustion chamber.
  - (d) HP turbine stator segments leading edge.
- (2) If damage is discovered when inspecting the combustion chamber then further intrascope checks will be necessary of the outer primary zone and a more detailed check of the vaporizers in accordance with (Ref.72-09-03 INTRASCOPE CHECKS).
  - (a) Record all damage in the engine despatch record sheets.

#### J. Remove Fuel Filter Element.

NOTE: The fuel filter and filter element are under breakdown 73-14-01 and the IPC references in this para are from 73-14-01.

ENGINE DESPATCH

**71-00-03**

Page 514  
Jan 2/80

TN29492



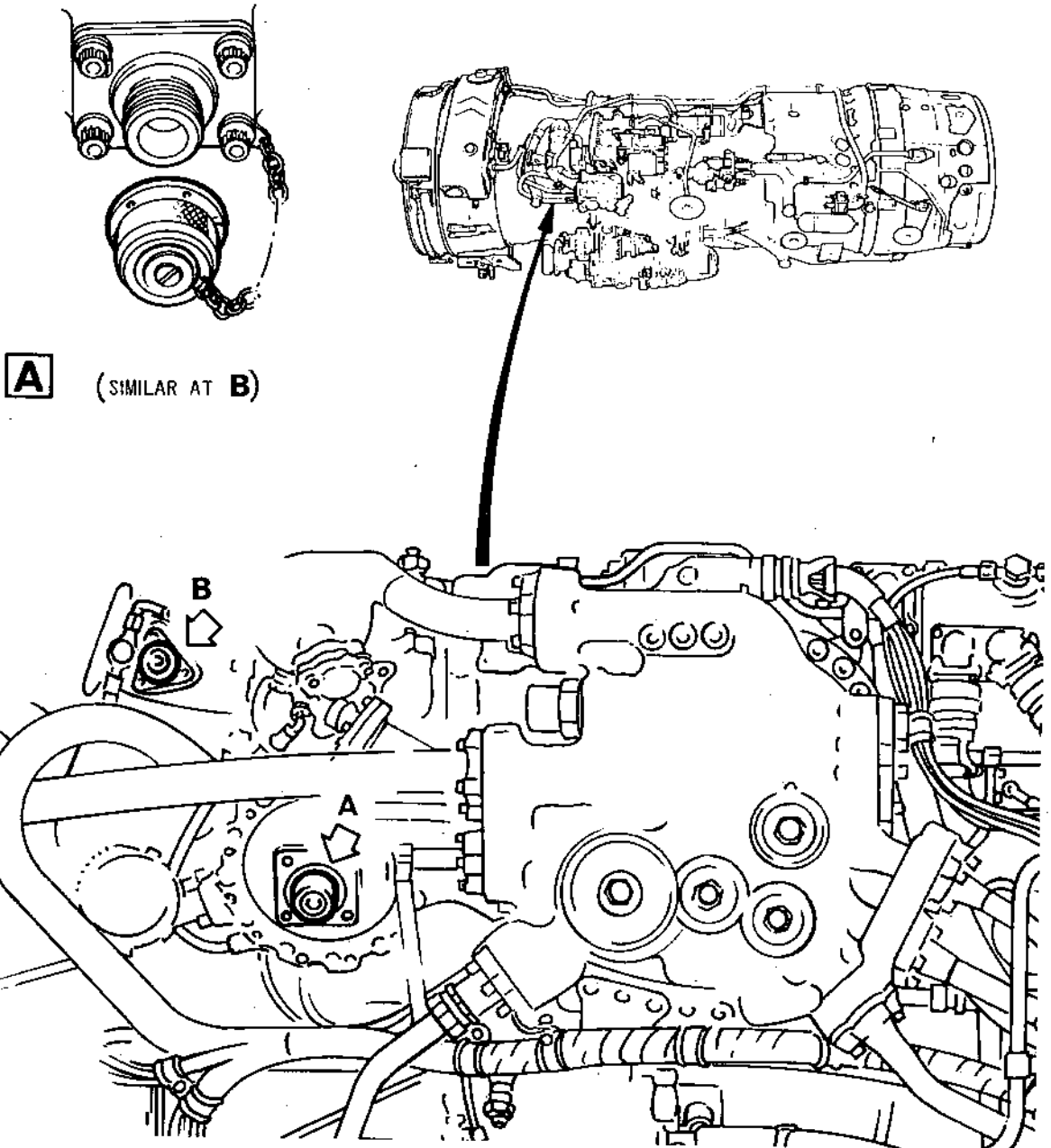
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32647/00A

PRINTED IN ENGLAND



Draining Fuel System  
Figure 505

ENGINE DESPATCH

71-00-03

Page 515

Aug 11/75

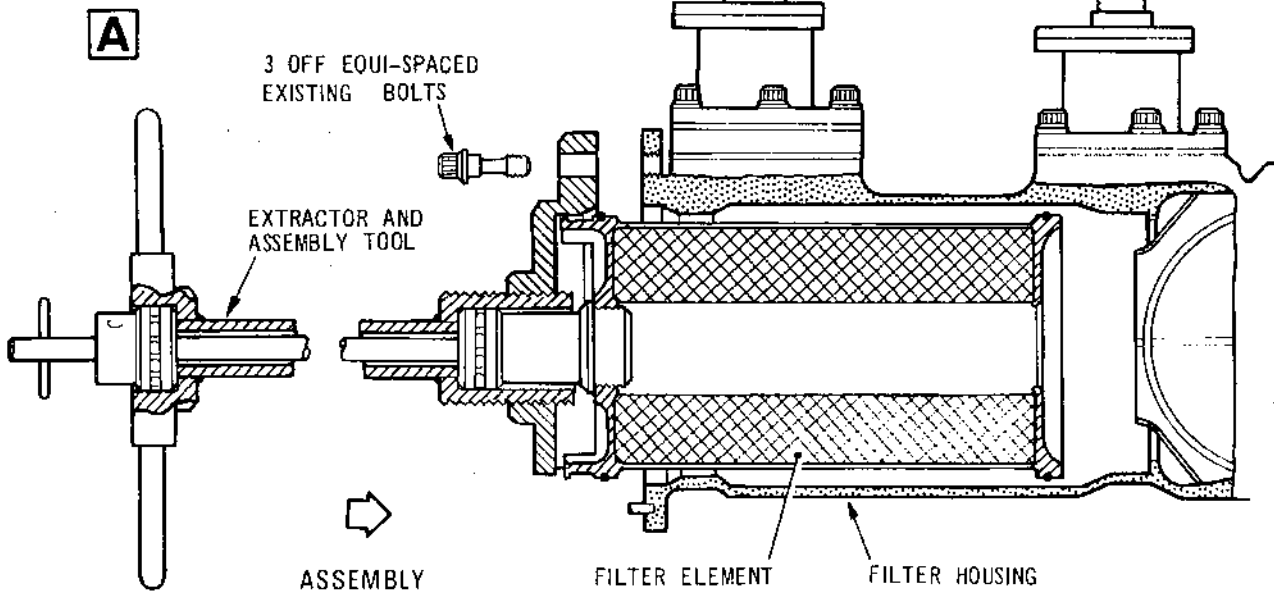
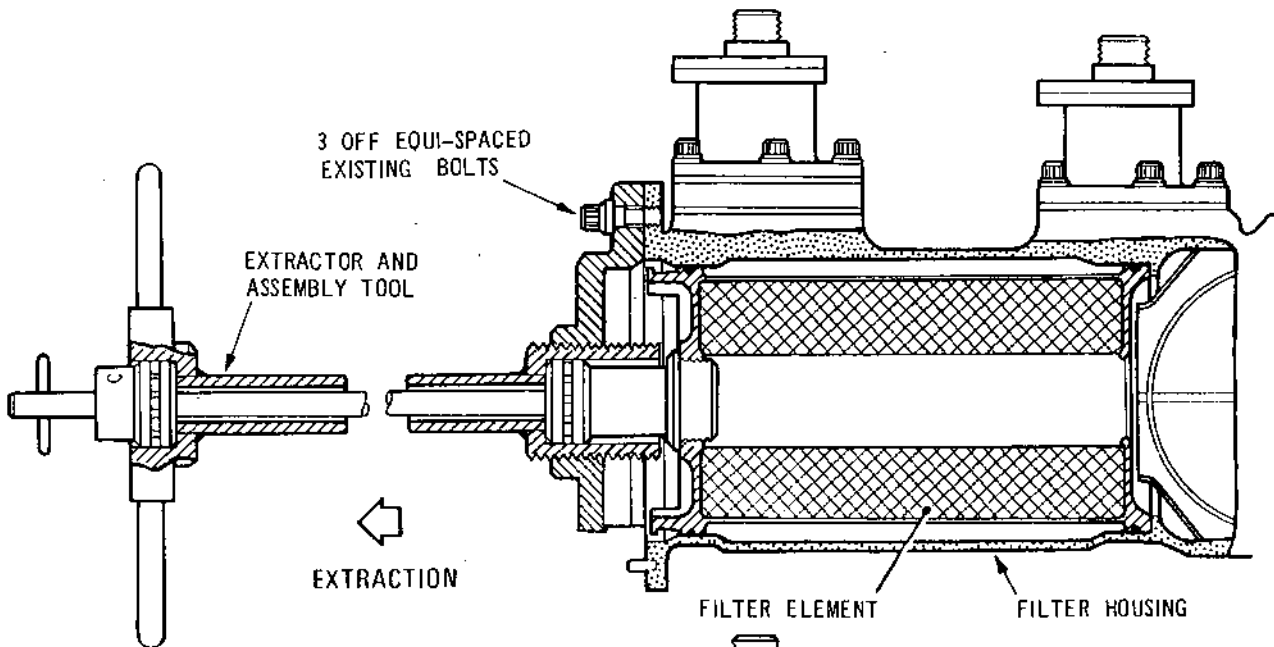
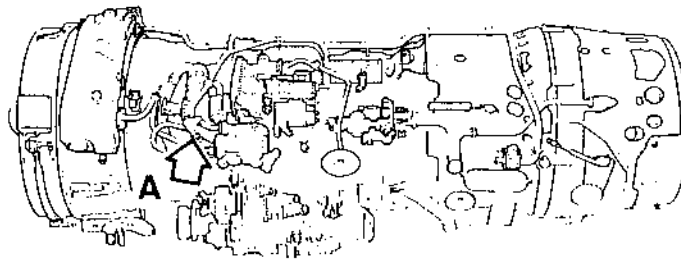
TN16926



OLYMPUS 593

MK. 610-14-28

OVERHAUL



Filter Element Removal/Installation  
Figure 506

ENGINE DESPATCH

71-00-03

Page 516

Aug 11/75



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (1) Drain the engine fuel system (Ref.Fig.505).
  - (a) Utilise the air bleed valve near the distribution block, the fuel filter and fuel inlet drain valves and drain the system upstream of the FCU using drain tool (Tool 1783).
  - (b) When fuel ceases to drain, remove the drain tubes and close the bleed valve.

- (2) Remove the filter element (Ref.Fig.506).

- (a) Remove two bolts (1-150) and plate (1-160) securing the steady bracket (1-170) to the bracket at main oil pump flange.
- (b) Remove the four bolts (1-40) and washers (1-50) securing the steady bracket to the filter, then remove the bracket and locating plate (1-60).

NOTE: Refer to Vendors Overhaul Manual (Ref. 73-14-01) for identification of items mentioned in para.(c), (d) and (e).

- (c) Support the filter cover unit, then remove the eight bolts and one bolt and the locking plate.
- (d) Withdraw the cover unit and the seal plate tilting unit as necessary to obtain withdrawal clearance.
- (e) Locate the extractor tool (Tool 944) on the filter housing, to secure the extractor to the housing by three of the existing bolts, then screw the extractor into the filter element (2-20).
- (f) Screw in on the extractor handle and withdraw the filter element to the maximum extent of the extractor, detach the extractor from the housing and withdraw the filter element fully.
- (g) Detach the filter element from the extractor, remove the seal rings (2-10) from the filter element, then place the element in the container (Tool 801).
- (h) Assemble temporary blanks to the filter housing.

ENGINE DESPATCH

**71-00-03**

Page 517  
Jan 2/80



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



(3) Clean and pressure test the filter element in accordance with the vendors manual (Delaney Gallay). On completion of the pressure test re-assemble the filter element as detailed in para.(4).

(4) Assemble filter element (Ref.Fig.506).

(a) Assemble the sealing rings (2-10) to the filter element (2-20).

(b) Screw assembly tool (Tool 944) into the end of the filter element.

NOTE: The filter element comprises a screwed thread at one end only.

(c) Locate the filter element in the filter housing and push the element squarely into the housing until the assembly tool abuts the filter housing.

NOTE: Refer to Vendors Overhaul Manual (Ref. 73-14-01) for identification of items mentioned in para.(d), (f), (g) and (j).

(d) Secure the assembly tool to the filter housing with the three existing bolts. Complete the location of the filter element in the housing by screwing in the tool.

(e) Unscrew the assembly tool from the filter element then release the assembly tool from the filter housing.

(f) Apply lubricant 'B' to the seven bolts and one bolt.

(g) Assemble a new seal plate to the filter cover unit.

(h) Align the filter cover and seal plate with the attachment bolt holes ensuring the locating pin is engaged.

(j) Support the cover unit and engage the locking plate with seven attachment bolts and one attachment bolt.

TN32105

ENGINE DESPATCH

71-00-03

Page 518  
Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (k) Lightly tighten the bolts to retain the mating faces in contact.
- (l) Assemble the steady bracket (1-170) and locating plate (1-60) to the cover and retain in position with four washers (1-50) and bolts (1-40), lightly tightened.
- (m) Secure the steady bracket to the bracket attached to the main oil pump flange with the plate (1-160) and two bolts (1-150), manipulating the bracket as necessary to align serrations.
- (n) Torque-tighten the cover unit and bracket attachment bolts between 80 and 90 lbf in. (9,0 and 10,2 N.m) ensuring that the cover unit bolts are evenly tightened in diametral pairs.

### 3. Remove Slave Test Equipment from Engine

NOTE: The air starter should have been removed as detailed in 72-00-26, TESTING.

#### A. Remove the Main and Standby Slave Hydraulic Pumps.

NOTE: The slave main and standby hydraulic pumps attachment items are under breakdown 72-63-01 and the I.P.C. references in this para. are from 72-63-01 except where specifically detailed.

- (1) Remove the slave main hydraulic pump (Ref.Fig.509).
  - (a) Using universal spanners (Tool 1619 to 1624) remove the electrical connection from the main slave hydraulic pump.
  - (b) Remove the rim clenching clamp assembly (6-10) securing the pump to the right-hand gearbox.

CAUTION: REMOVE NUT (6-20) ON OUTER EYE-BOLT (6-80) OF CLAMP BEFORE ATTEMPTING TO RELEASE TORQUE ON INNER EYE-BOLT (6-80). ENSURE THAT EACH NUT IS RETAINED WITH ITS RESPECTIVE EYE-BOLT.

ENGINE DESPATCH

**71-00-03**

Page 519  
Jan 2/80





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) Remove the pump from the gearbox.
  - (d) Remove the retaining ring securing the splined shaft to the main hydraulic pump drive shaft.
  - (e) Withdraw the (slave) splined shaft with attached seal rings, then reassemble the retaining ring to the drive shaft and return the slave items to the test equipment store.
  - (f) Assemble a temporary blank to the pump location on the right-hand gearbox.
- (2) Remove the slave standby hydraulic pump (Ref.Fig.507).
- (a) Using universal spanners (Tool 1619 to 1624) remove the electrical connection from the standby slave hydraulic pump.
  - (b) Remove the rim clenching clamp assembly (6-130) securing the pump to the right-hand gearbox.

CAUTION: REMOVE NUT (6-140) ON OUTER EYE-BOLT (6-200) OF CLAMP BEFORE ATTEMPTING TO RELEASE TORQUE ON INNER EYE-BOLT (6-200). ENSURE THAT EACH NUT IS RETAINED WITH ITS RESPECTIVE EYE-BOLT.

- (c) Remove the pump from the gearbox.
- (d) Remove the retaining ring securing the splined shaft to the standby hydraulic pump drive shaft.
- (e) Withdraw the splined shaft with attached seal rings, then reassemble the retaining ring to the drive shaft and return the slave items to the test equipment store.
- (f) Assemble a temporary blank to the pump location on the right-hand gearbox.

NOTE: The rim clenching clamp assemblies are engine components and must be retained with the engine.

TN32108

ENGINE DESPATCH

71-00-03

Page 520

Jan 2/80

CR 32651/00A

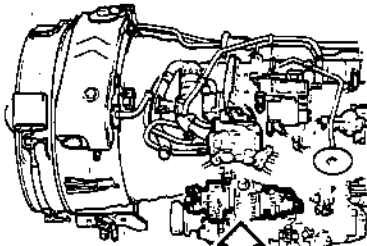


# OLYMPUS 593

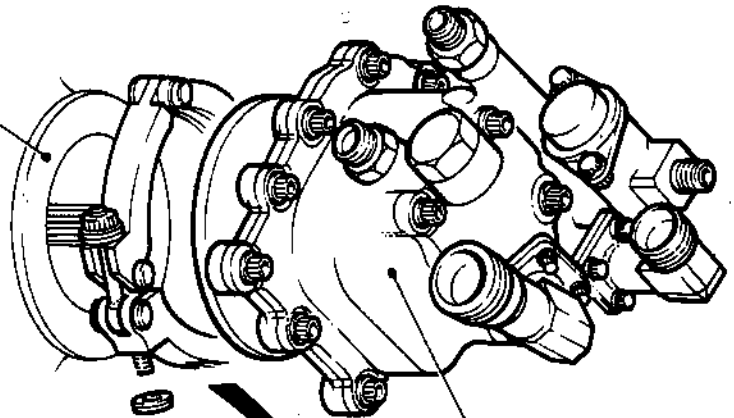
MK.610-14-28  
OVERHAUL



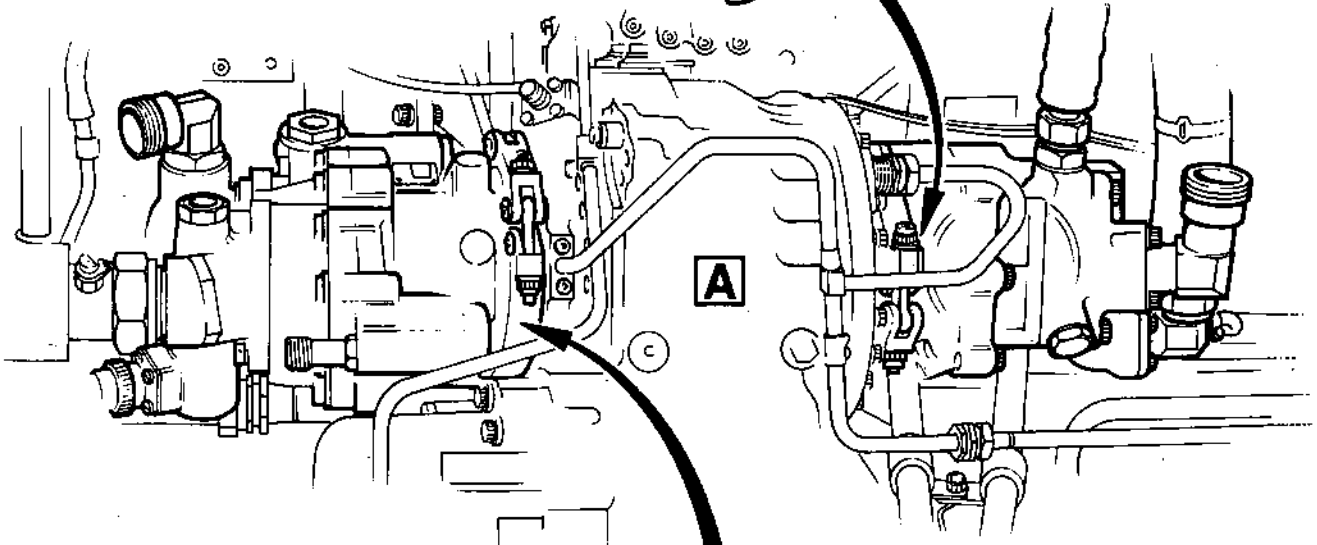
LEFT-HAND GEARBOX



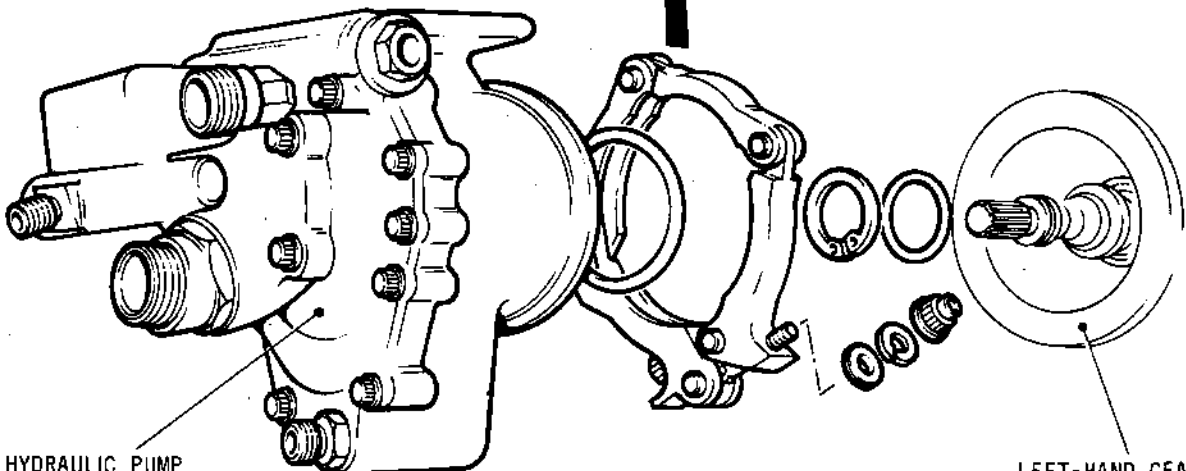
A



STAND-BY HYDRAULIC PUMP



A



MAIN HYDRAULIC PUMP

LEFT-HAND GEARBOX

Remove Hydraulic Pumps  
Figure 507

ENGINE DESPATCH

## 71-00-03

Page 521

Jan 2/80

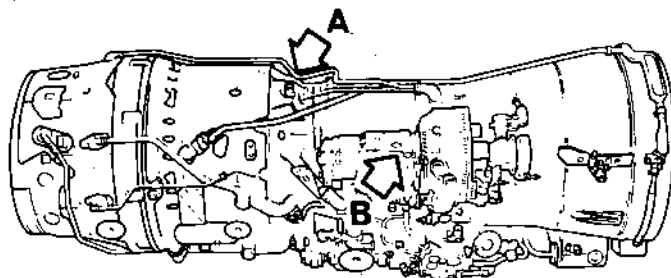


OLYMPUS 593

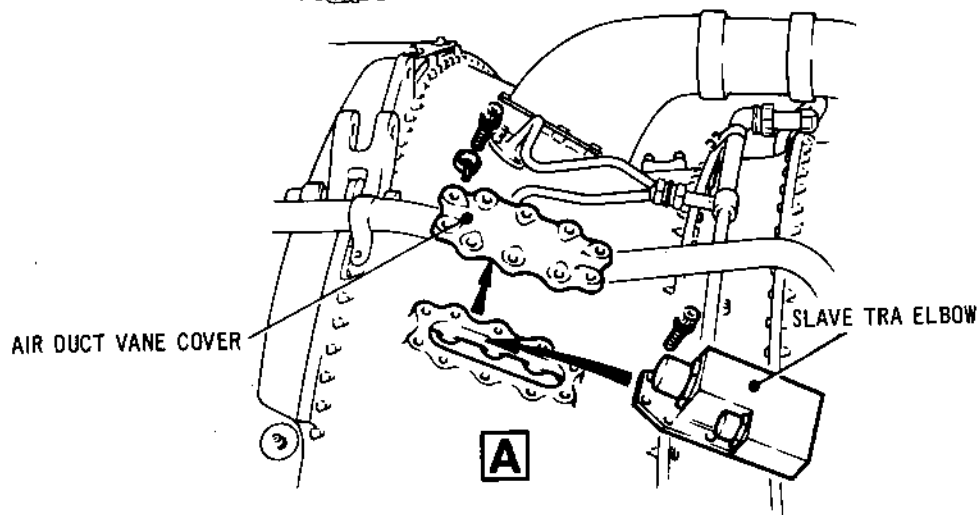
MK.610-14-28  
OVERHAUL



CR 32552/00C



FORWARD



'B 488388 - PRESSURE BLANK COVER

P3C 1089329 - PRESSURE TEST BLANK

**B**

(REMOVED IF PRESSURE BLANK COVER INSTALLED)

SPLINED SHAFT

ANVIL

RIGHT-HAND GEARBOX

LOCKING RING

HP Compressor Diffuser and IDG Slave Equipment  
Figure 508

ENGINE DESPATCH

**71-00-03**

Page 522

Jan 2/80

TN8607



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (g) Return the slave hydraulic pumps and splined shafts to test equipment store.

B. Remove the Slave Pressure Blank from the Gearbox IDG Location (Ref.Fig.508).

NOTE: The test blank attachment items are under breakdown 72-63-01 and the IPC references in this paragraph are from 72-63-01 except where specifically detailed.

- (1) Unscrew and remove the bolt (8-10) and spherical washer (8-20) from the nut (8-110) and mounting bracket (8-160).
- (2) Use the approved drift against the anvil and drive the coupling in the direction that will release the threads and disengage the coupling.
- (3) Remove the test blank. If the blank B.488388 (72-00-25, Tool 3070) is installed, the splined shaft (72-63-03/1-40) will have been removed. Assemble the splined shaft to the IDG drive shaft as detailed in para.4.A.
- (4) Assemble the bolt and spherical washer to the QAD retaining bracket and nut. Restrain the QAD coupling to prevent movement.
- (5) Temporarily blank the IDG location on the right-hand gearbox.
- (6) Examine Corruplus seal (8-30) for serviceability and retain with engine.

C. Remove the Slave TRA Elbow (Ref.Fig.508).

- (1) Remove the slave TRA elbow from vane No.2 or 8 on the delivery casing.
  - (a) Remove the 10 bolts (72-34-00/3-230), and the slave elbow from vane No.2 or 8 of the delivery casing.
  - (b) Assemble a suitable temporary blank to the vane.

NOTE: Installation of the air duct vane cover is detailed in para.4.B.

- (c) Retain the bolts with the engine.

ENGINE DESPATCH

71-00-03

Page 523

Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



snecma

#### 4. Install IDG Splined Shaft and Vane Cover

##### A. Install the Integrated Drive Generator (IDG) Splined Shaft (Ref.Fig.509).

NOTE: The IDG splined shaft items are under breakdown 72-63-03 and the IPC references in this para. are from 72-63-03.

- (1) Remove the bolt (1-10) and the retainer sleeve (1-20) from the IDG drive shaft in the right-hand gearbox.
- (2) Assemble the seal rings (1-30) to the splined shaft (1-40) then assemble the shaft to the drive shaft.
- (3) Apply lubricant 'A' to the bolt (1-10) and assemble with the shaft retainer sleeve (1-20) to the drive shaft to retain the splined shaft.
- (4) Torque-tighten the bolt to between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (5) Temporarily blank the IDG location on the right-hand gearbox.

##### B. Install the Air Duct Vane Cover (Ref.Fig.508).

- (1) Apply lubricant 'C' to the ten bolts (72-34-00/3-230).
- (2) Assemble the cover (72-34-00/3-220) to vane 2 or 8 of the HP compressor diffuser case and retain with the bolts and cupwashers (72-34-00/3-240).

NOTE: The cover will be assembled to vane 2 or 8 depending on the slave TRA elbow location.

- (3) Torque-tighten the bolts to 100 lbf in. (11,5 N.m) then lock the cupwashers at vane 2 and 8.

#### 5. Inspection Clearance Checks

##### A. Carry Out Inspection of Engine Exterior, Components Removed and Re-assembled and Tube Clearance Checks.

- (1) Check items disturbed during test as detailed in test records.

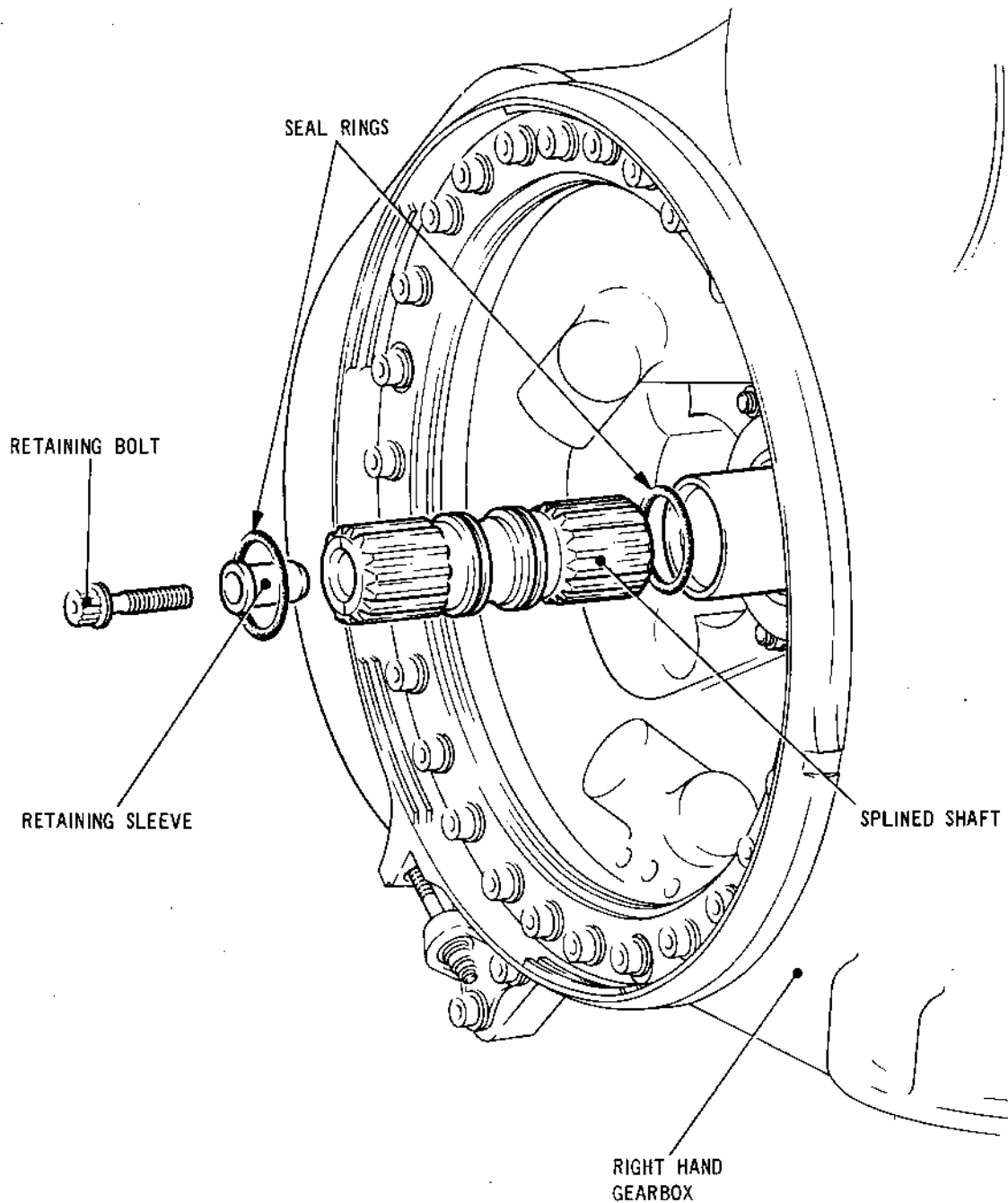
ENGINE DESPATCH

71-00-03

Page 524  
Dec 31/01



**OLYMPUS 593**  
MK.610-14-28  
OVERHAUL



Splined Shaft Assembly  
Figure 509



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (a) Check for correct assembly.
- (b) Check effectiveness of locking devices.
- (2) Carry out the following checks.
  - (a) Inspect main and auxiliary oil pumps pressure relief valve caps.
  - (b) Magnetic plugs and filter cover.
  - (c) Igniter leads.
  - (d) Stage 1 fuel pump seal drain tube.
  - (e) Stage 2 turbo pump seal drain tube.
  - (f) Plug in pressure filter cover on right-hand gearbox.
- (3) Inspect heat shields for fouls, cracks and sharp corners at the following locations.
  - (a) CCOC heat shields left and right-hand sections.
  - (b) Rear cover heat shields left and right-hand sections.
  - (c) Exhaust diffuser panels 1 to 10.
  - (d) Exhaust diffuser auxiliary shields.
- (4) Inspect the reheat fuel pipe for damage and fretting and ensure that a red line is marked on the nut and fittings with heat resistant paint.
- (5) Check that all the intrascope port plugs and blanks are correctly fitted and wire-locked.
- (6) Check the engine exterior for cleanliness and damage.

TN8685

ENGINE DESPATCH

**71-00-03**

Page 526

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(7) Check the clearances between the tubes and accessories and the engine (Ref.Fig.510).

- (a) Ensure that an installed clearance exists between adjacent tubes and components. Comply with the clearance limits stated in Table 501 for specific tubes and components and ensure that the clearance between all other adjacent tubes and components is not less than 0.20 in. (5 mm). For additional data on location of tubes and accessories, refer to 71-00-01, Assembly Stage 1, Figure 501.

TUBE/COMPONENT	ADJACENT TUBE/COMPONENT	MINIMUM CLEARANCE
2. Intermediate case drain tube	Rear bolt securing pulse probe housing attachment flange to intermediate case	0.050 in. (1,270 mm)
3. Fuel tube, recirculating valve to second stage pump	Bracket on LP compressor case rear blow-off flange front face	0.080 in. (2,032 mm)
4. Main oil tank	LP compressor case at any radial position	0.070 in. (1,778 mm)
5. Anti-icing manifold	Air intake at any position	0.030 in. (0,762 mm)
6. Fuel heater air tube	Underside of left-hand engine trunnion	0.100 in. (2,540 mm)
7. Connector on LP and HP compressor thrust bearings oil feed tube	Intermediate case air seals supply tube support bracket on LP compressor case	0.050 in. (1,270 mm)

Engine Tube and Accessory Clearances (Ref.Fig.510)  
Table 501 (Continued)

ENGINE DESPATCH

71-00-03

Page 527  
Jan 2/80



**OLYMPUS 593**MK.610-14-28  
OVERHAUL

TUBE/COMPONENT	ADJACENT TUBE/COMPONENT	MINIMUM CLEARANCE
8. Elbow on FCU fuel tube	Funnel on engine mounted guide tube	0.100 in. (2,540 mm)
9. Intermediate case air seal supply tube	Right-hand gearbox mounting bracket (QAD coupling)	0.100 in. (2,540 mm)
10. FCU to first stage pump fuel tube	Left-hand gearbox case	0.100 in. (2,540 mm)
11. Elbow on IDG oil return tube	Right-hand gearbox case	0.050 in. (1,270 mm)
12. LP and HP compressor thrust bearings cold vent tube	Oil cooler	0.100 in. (2,540 mm)
13. Fuel heater air tube	Nos.5 and 6 sprayers fuel supply pipe	0.100 in. (2,540 mm)
14. Fuel manifold upper feed tube	Fuel heater air supply seal housing	0.150 in. (3,810 mm)
16. Right-hand pilot nozzle fuel tube	Electrics harness bracket and clipping at the delivery case and CCOC flange	0.150 in. (3,810 mm)
17. Engine power transmitter manifold	Spherical flange joint at any position	0.150 in. (3,810 mm)
18. Reheat servo supply rear tube	IDG oil tube (IDG to cooler)	0.150 in. (3,810 mm)
19. FCU fuel tube at second stage pump	Fuel tube on second stage pump	0.100 in. (2,540 mm)

Engine Tube and Accessory Clearances (Ref.Fig.510)  
Table 501 (Continued)

ENGINE DESPATCH

**71-00-03**

Page 528

Jan 2/80

TN2527



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

TUBE/COMPONENT	ADJACENT TUBE/COMPONENT	MINIMUM CLEARANCE
20. Fuel tube pump to reheat flowmeter	Joint flange on fuel tube filter to cooler	0.100 in. (2,540 mm)
21. FCU fuel tube at second stage pump	Air passage bolt on second stage pump feed duct	0.070 in. (1,778 mm)
22. Oil cooler mounting bracket	Fuel manifold stem No.6 position	0.150 in. (3,810 mm)
23. Tube, oil return, cooler to tank	Oil tank mounting bracket, top rear	0.050 in. (1,270 mm)
24. HP turbine bearing oil feed tube	Tube, air supply to reheat purge valve	0.100 in. (2,540 mm)
25. HP turbine bearing cold vent tube	Lug on RH support tube	0.050 in. (1,270 mm)

Engine Tube and Accessory Clearances (Ref.Fig.510)  
Table 501 (Concluded)

B. Assemble Oil Drain Tube (Ref.Fig.511).

NOTE: The oil drain tube to be assembled is the rear section of the IDG cooler rupture valve to the overboard spill at the drains tank.

NOTE: The IDG oil drain tube items are under breakdown 71-79-01 and the IPC references in this para. are from 71-79-01.

- (1) Apply lubricant 'A' to the union threads on the tube (1-160) and lubricant 'B' to the bolts (1-40-50-120).
- (2) Loosely assemble the tube (1-2160) to the overboard spill adapter at the drains tank.

ENGINE DESPATCH

71-00-03

Page 529  
Jan 2/80

TN297



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (3) Assemble the tube loop clamp assembly (1-10) to the tube and attach to the CCOC flange tube support bracket with a nut (1-20), washer (1-30) and bolt (1-40).
- (4) Assemble the tube loop clamp assembly (1-10) to the tube and attach to the support bracket on the HP delivery casing cooling air duct with a nut (1-20), washer (1-30) and bolt (1-50).
- (5) Assemble the tube loop clamp assembly (1-10) to the tube and attach to the support bracket on the HP compressor rear labyrinth vent duct with a nut (1-100), washer (1-110) and bolt (1-120).
- (6) Torque-tighten all tube clamp bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (7) Using adapter (Tool 908) and spanner torque-tighten the tube union nut between 280 and 310 lbf in. (31,6 and 35,0 N.m).
- (8) Wire-lock the union nut to overboard spill adapter then assemble a blank to the tube end.

#### 6. Rig Test and Final Installation of Main Electrical Harness

##### A. Prepare for Rig Test.

- (1) Inspect electrical system and check engine test records concerning the electrical system, noting any items that have been disturbed.
- (2) Remove all blanks from the harness main connections.

##### B. Use of Test Set (Tool 814).

- (1) It is unnecessary to reset the meter between ranges as zeroing is automatic. Where necessary refer to the Ground Equipment Manual TP 203/BR for adjustment procedures.
- (2) Cable looms.

NOTE: Connector sockets X and WYZ on the test set are required only when testing nacelle mounted accessories and are not relevant to the Overhaul Manual.

- (a) The test set (Tool 814) connects direct to the engine harness connectors, except connector G and H which require the test set jumper cables to be used.

IN298

ENGINE DESPATCH

**71-00-03**

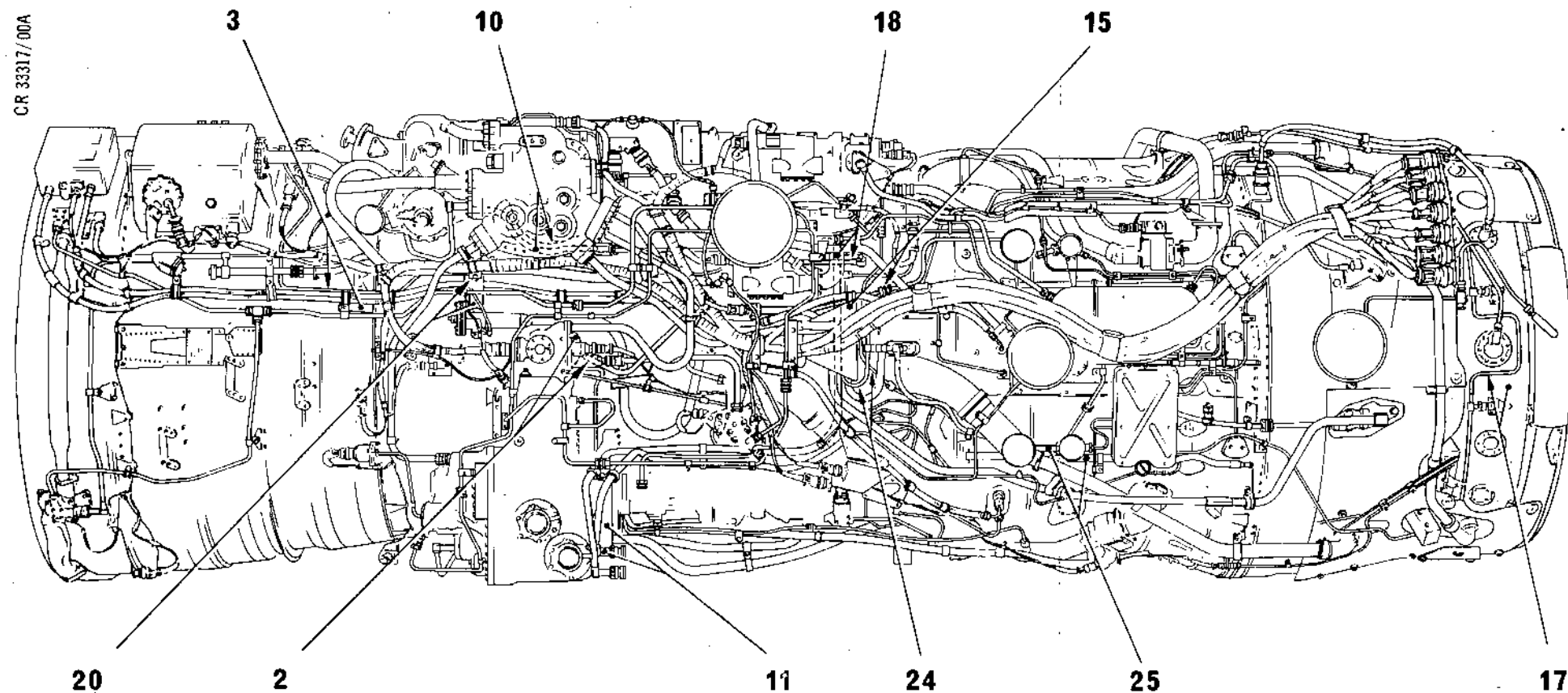
Page 530

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Tube Clearance Checks  
Figure 510 (Sheet 1 of 2)

ENGINE DESPATCH

**71-00-03**

Page 531/532

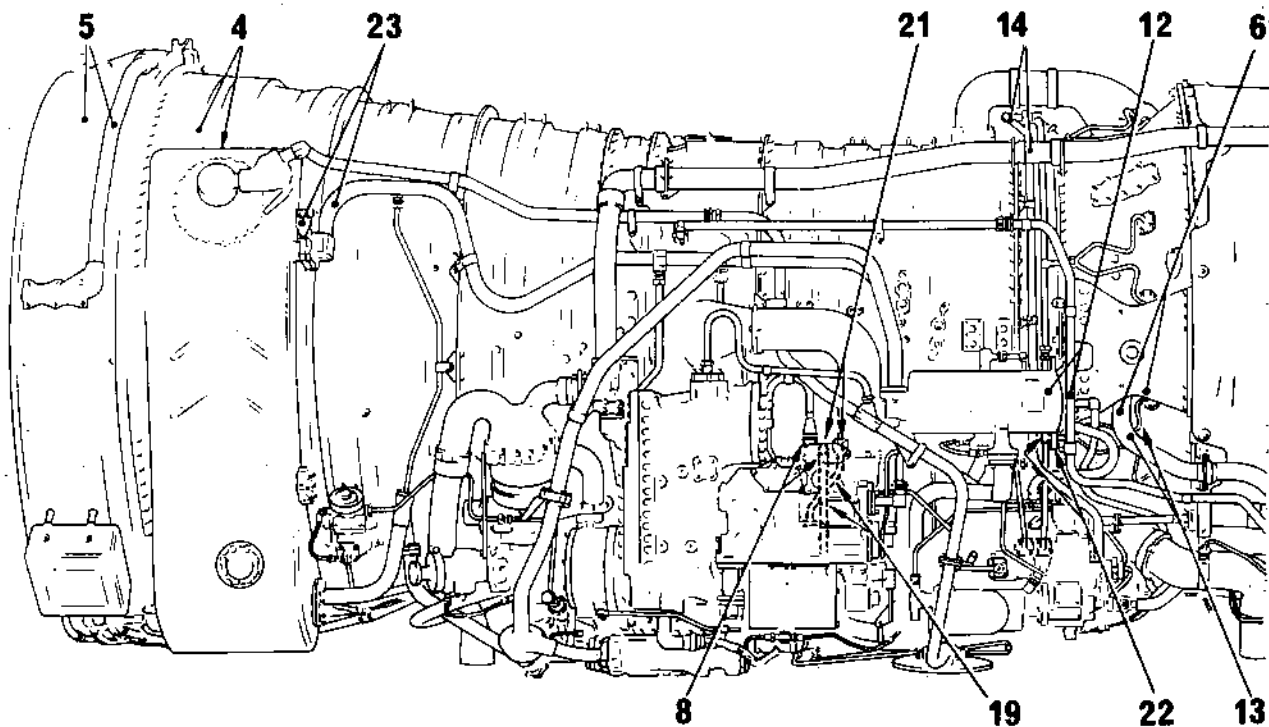
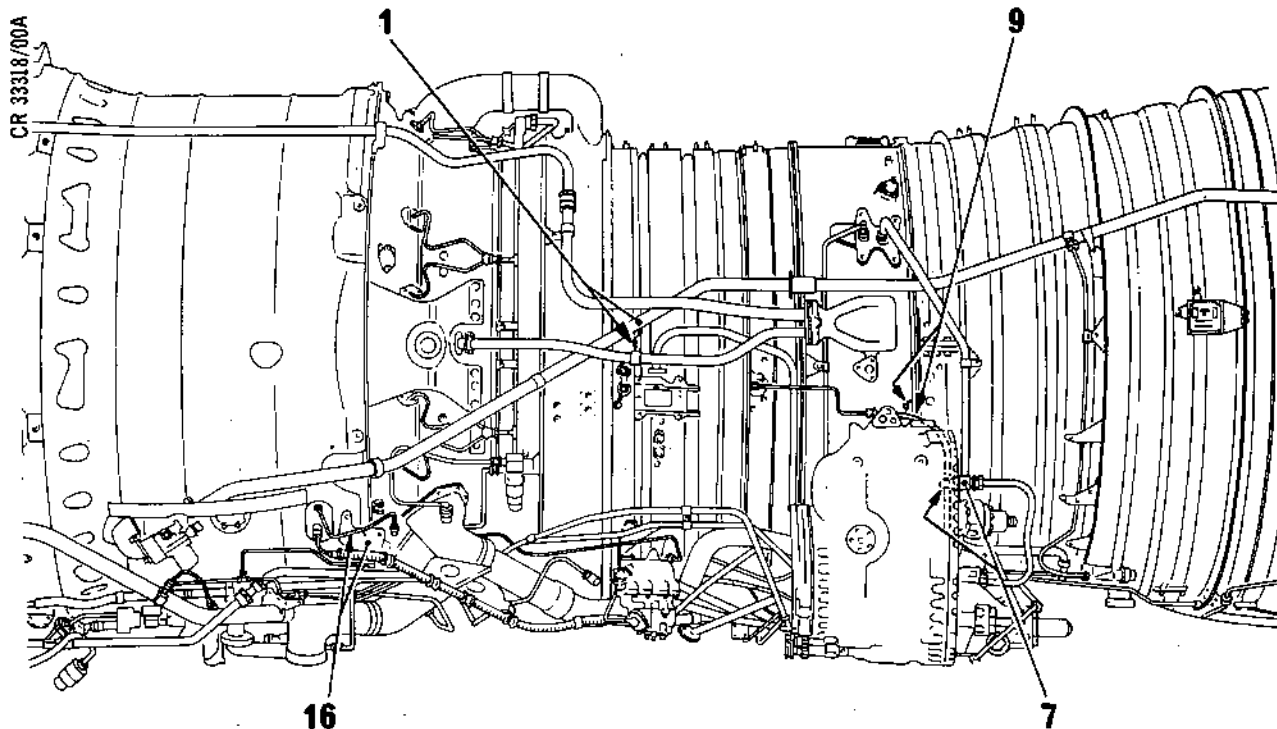
Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



Tube Clearance Checks  
Figure 510 (Sheet 2 of 2)

ENGINE DESPATCH

71-00-03

Page 533

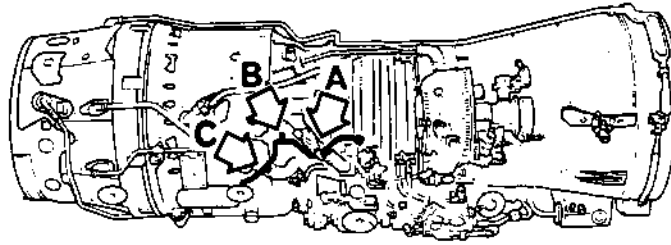
Jan 2/80



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 32656/00A



FORWARD →

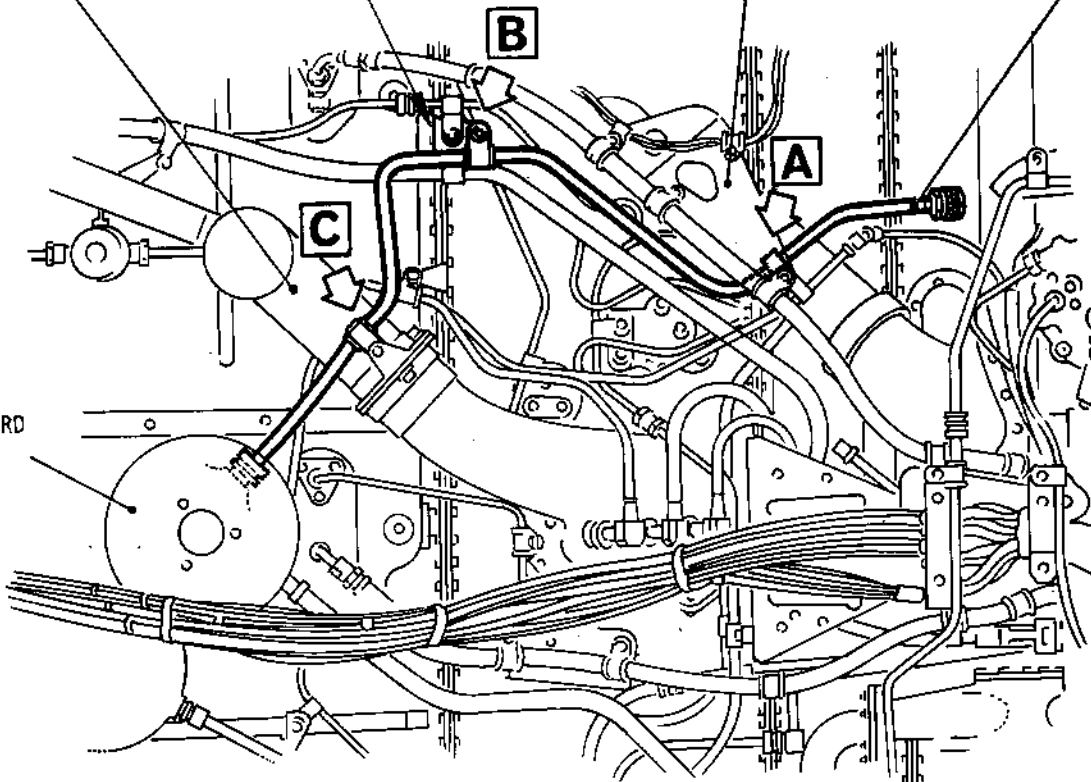
LABYRINTH VENT DUCT  
SUPPORT BRACKET

CCOC FLANGE TUBE  
SUPPORT BRACKET

HP DELIVERY CASE  
COOLING AIR DUCT

IDG OIL DRAIN  
TUBE

OVERBOARD  
SPILL  
ADAPTER



TN8689

Assembling IDG Oil Drain Tube  
Figure 511

ENGINE DESPATCH

**71-00-03**

Page 534

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Where cable G and H are supplied with cable adapters, connect the adapters to the respective jumper cables to adapt orientation of the connectors at the engine end.
- (c) Cable J connects the HP shut-off valve to the test set and divides into two connectors, one for the start solenoid valve connection (OPEN) and one for the shut-off solenoid valve connection (CLOSE).
- (d) The thermocouple test lead (V) terminates in nine pairs of crocodile clips.
- (e) The two power supply cables connect to their respective power supplies, that is:
- (i) A.C. supply of  $115 \pm 5$  V,  $400 \pm 4$  Hz.
  - (ii) D.C. supply of  $28 \pm 2$  V.
- (f) An earth loop cable and earth cable are provided.
- (g) The cable loom services are detailed in Table 502.
- (3) Check insulation of the test set and cables.
- (a) Connect plugs G, H, J and V to their respective sockets (plug G to socket G) etc., also connect plugs B, C, D, E and F to their respective sockets where the test set jumper cables are to be used during test.
  - (b) Set all switches to OFF. Switches 137 to 141 and 144 are centre off.
  - (c) Connect the 115V, 400 Hz supply and select the a.c. supply switch ON.
  - (d) Set the meter range selector switch (134) to Insulation 200V range.
  - (e) Operate switches 1 to 126 and 136 in turn and ensure that the resistance meter pointer remains on INFINITY.
  - (f) Select the a.c. supply switch OFF.

ENGINE DESPATCH

**71-00-03**

Page 535

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(4) Connect the looms.

- (a) Connect the engine harness connectors to the test set or jumper cables (Plug B to Socket B, Plug C to Socket C) etc.
- (b) Connect the 'CLOSE' and 'OPEN' connectors on loom J to the appropriate connectors on the HP valve on the engine fuel system.
- (c) Connect the 28 V d.c. supply cable.
- (d) Plug the green earth loop cable into the test set and attach the spring clip to the engine casing.
- (e) Connect the earth cable to the engine casing and test set frame.

C. Interline Insulation Test.

(1) General.

- (a) The interline insulation tests are arranged so that each line of the engine electrical harness coming through the harness break-point is tested for insulation resistance in turn with all other lines passing through the breakpoint.
- (b) Carry out the tests with all accessories fitted to the engine and with the air starter shut-off valve in the closed position.
- (c) If a fault condition occurs while carrying out the tests, the accessory or line involved can be determined by referring to Fig.512.

(2) Before proceeding to operate the inter-line test panel, set the switches as follows:

Switch 134	- INTER-LINE INSULATION
D.C. Supply switch	- ON
A.C. Supply switch	- ON
All remaining test set switches	- OFF
All green OFF lights	- ILLUMINATED

IN17794

ENGINE DESPATCH

71-00-03

Page 536

Jan 2/80





OLYMPUS 593

MK.610-14-28  
OVERHAUL



(3) Test procedure.

NOTE: Interline insulation checks are not required between positions 86 to 124 on switches 129A and B, 130A and B and 131A and B. These positions are related to connector sockets X and WYZ and are only required when testing nacelle mounted accessories and are not relevant to the Overhaul Manual.

- (a) Set switch 127A to position 1 (OFF light goes out) and set switch 127B to position 1. The resistance meter should indicate SHORT.
- (b) Progressively turn switch 127B from position 1 to position 29 with a pause between positions. Meter readings should be more than 4 M ohms.
- (c) Readings of less than 4 M ohms are acceptable under the following conditions.
  - (i) Identify the two components by referring to Fig.512.
  - (ii) Locate the components in Tables 505 and 506 and add together the minimum insulation resistance values of the components.
  - (iii) If the interline insulation reading is equal to or exceeds the sum of the resistance values of the two components, the interline resistance value is acceptable.
- (d) Set switch 127B to OFF.
- (e) Set switch 128B to position 30 (light out) and then on to position 58. Observe the meter for readings below 4 M ohms (Ref.sub-para.(c)).
- (f) Set switch 128B to OFF (light on).
- (g) Set switch 129B to position 59 (light out) and then on to position 87. Observe the meter for readings below 4 M ohms (Ref.sub-para.(c)).
- (h) Set switch 129B to OFF (light on).
- (j) Set switch 131B to position 117 (light out) and then on to position 145. Observe the meter for readings below 4 M ohms (Ref.sub-para.(c)).

ENGINE DESPATCH

**71-00-03**

Page 537

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (k) Set switch 131B to OFF (light on).
- (l) The line on switch 127A position 1 has now been tested for insulation against lines 2 to 145 on the B switches.
- (m) Set switch 127A to position 2 and set switch 127B to position 2. The resistance meter should indicate SHORT.
- (n) Progressively set B switches from position 3 to position 145 observing the meter and leaving switches in the OFF position when not in use.
- (p) Set switch 127A to position 3 and set switch 127B to position 3. The resistance meter should indicate SHORT.
- (q) Progressively set B switches from position 4 to position 145, observing the meter and leaving switches in the OFF position when not in use.
- (r) Repeat the foregoing operations until switch 131A reaches position 145.
- (s) On completion of tests, ensure that all interline switches (127-131) are in the OFF position (lights on).
- (t) Switch a.c. supply OFF.
- (u) Set switch 134 OFF.

D. Accessory Resistance Tests (Tables 503 and 504).

- (1) Connect the cables as follows:
  - (a) Engine harness cables to test set using jumper cables as required.
  - (b) Cable V from the test set to the thermocouple terminals on the engine.
  - (c) Cable J from the test set to the HP shut-off valve.

FN8538

ENGINE DESPATCH

**71-00-03**

Page 538

Jan 2/80



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (d) Supply cables.
- (e) Earth loop cable.
- (f) Earth cable.
- (2) Set switches as follows:
- |   |   |               |
|---|---|---------------|
| (a) Switches 127A to 131A - OFF               | ) | All lights on |
| (b) Switches 127B to 131B - OFF               | ) |               |
| (c) Switch 132 - OFF                          |   |               |
| (d) Switch 134 - OFF.                         |   |               |
| (e) Switch 136 - OFF.                         |   |               |
| (f) Switch 137 - Res. and Ins. Test Position. |   |               |
| (g) Switch 138 - Res. and Ins. Test Position. |   |               |
| (h) Switch 140 - OFF.                         |   |               |
| (j) Switch 142 - OFF.                         |   |               |
| (k) Switch 143 - OFF.                         |   |               |
| (l) 115V 400 Hz - OFF.                        |   |               |
| (m) 28V d.c. - ON.                            |   |               |
- (3) Carry out accessory resistance tests detailed in Table 503 by operating the circuit switches 1 to 126.
- (4) Carry out a.c. actuator resistance tests detailed in Table 504 by varying the position of switch 136.
- (5) After completing the tests, return switches 134 and 136 to OFF.

E. Accessory Insulation Tests.

- (1) Before carrying out the tests listed in Tables 505 and 506 connect the cables as detailed in Para.D.(1).

ENGINE DESPATCH

71-00-03

Page 539

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) With the exception of 115V 400 Hz, which must be switched ON, set switches as detailed in Para.D.(2).
- (3) Carry out accessory insulation tests detailed in Tables 505 and 506.
- (4) The earth loop lamp must be ON when 50V, 100V and 200V insulation ranges are selected.
- (5) After completing the tests, return switches 134 and 136 to OFF.
- (6) Screens to earth tests (Table 507).
  - (a) Set switch 134 to 200V range.
  - (b) Operate switch 133 and check that the meter indicates open circuit. If a short circuit is indicated, identify the faulty screen as follows.
    - (i) Turn switch 132 from 1 to 22, pausing at each position to observe meter reading which should be above 2 M ohms.
    - (ii) Where a short circuit is indicated, identify the faulty screen by reference to the switch position in Table 507.
  - (c) Select switch 132 to position 23 and check that the meter indicates a short circuit.
  - (d) After completing the tests, return switch 132 to OFF (light on), and switch 134 to OFF.

F. Accessory Functional Tests.

- (1) Before carrying out the tests listed in Tables 508 to 511 connect the cables as detailed in Para.D.(1).
- (2) Set switches as detailed in Para.D.(2) with the exception of 115V. 400 Hz which must be switched ON.
- (3) Carry out accessory functional tests as detailed in Tables 508 to 511.

TN8410

ENGINE DESPATCH

**71-00-03**

Page 540

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) After completing the tests, return switches 140 and 142 to OFF.
- (5) Functional tests of igniters (Table 510).

WARNING: ENSURE THAT ALL PERSONNEL ARE CLEAR OF THE ENGINE. A MINIMUM OF 20 MINUTES MUST ELAPSE AFTER ANY MOTORING CYCLE, FUEL FUNCTIONAL TEST ETC., HAS TAKEN PLACE. THE ENGINE MUST BE THOROUGHLY DRAINED OF FUEL.

- (6) Return all switches to OFF, remove all cable looms and replace all plug protection caps and blanks removed for the test.
- (7) Jet pipe temperature thermocouple harness functional check.
  - (a) Check condition of batteries, then connect test set (Tool 2604) to the jet pipe temperature thermocouple test socket. If this is unavailable, use alternative test lead which incorporates crocodile clips to attach to each thermocouple circuit.
  - (b) Switch the test set ON and adjust datum control to give mid position on each of three meters.
  - (c) Place flexible spout of aerosol into hole in thermocouple and apply one squirt of CO<sup>2</sup> spray.
  - (d) The correct function of the thermocouple is indicated by a steady deflection of the three test set meters.
  - (e) Repeat the sequence for each thermocouple in turn.
  - (f) Switch the test set OFF and disconnect leads.



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

TEST SET CONNECTOR IDENT.	ENGINE BREAK IDENT.	SERVICES
B	B	Engine vibration front 4 off N <sub>2</sub> speed probes 4 off N <sub>1</sub> speed probes
C	C	Reheat fuel valve Hyd. pump off load valve (alt.) Fuel filter diff. press switch (7 psi) Engine fuel starting pump Reheat purge valve position Engine anti-icing pressure switch Reheat actuator Throttle actuator (main)
D	D	N <sub>1</sub> governor valve IDG mag. trim Engine oil press. transducer HP turbine bearing oil inlet temp. HP turbine bearing oil drain temp. IDG low oil press. switch Air starter valve IDG speed probe
E	E	Reheat purge valve Engine anti-icing valve IDG disconnect solenoid Engine fuel heater valve IDG oil inlet temperature IDG oil outlet temperature

Cable Loom Services  
Table 502 (Continued)

ENGINE DESPATCH

## 71-00-03

Page 542  
Jun 1/86

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

PRINTED IN ENGLAND

TEST SET CONNECTOR IDENT.	ENGINE BREAK IDENT.	SERVICES
F	F	Engine oil tank quantity Main engine flowmeter Reheat flowmeter Engine ignition
G	G	HP valve position indicator Engine fuel recirc. valve Fuel filter inlet temp. Sprayer fuel inlet temp. Engine oil temp. Fuel filter diff. press switch (5 psi) Throttle actuator (alt.)
H	H	Hyd. pump off load valve (main) 1 off N <sub>2</sub> speed probe 3 off N <sub>1</sub> speed probe Engine low oil press. switch
J	HP valve (open) HP valve (close)	HP valve open solenoid HP valve close solenoid
V	9 pairs of crocodile clips	Thermocouples

Cable Loom Services  
Table 502 (Concluded)

ENGINE DESPATCH

**71-00-03**Page 543  
Jan 2/80



# OLYMPUS 503

MK.610-14-28  
OVERHAUL



CIRCUIT UNDER TEST	CIRCUIT SWITCH NO.	METER RANGE SELECTOR (SW. 134)	METER READING (RESISTANCE) OHMS	REMARKS
HP valve position indicator	1	0 - 200 ohms	110 - 130	
HP valve (closed)	2	0 - 20 ohms	7 - 12	
HP valve (open)	3	0 - 20 ohms	7 - 12	
Reheat fuel valve	4	0 - 200 ohms	18 - 26	
Reheat purge valve	5	0 - 200 ohms	30 - 40	
Engine anti-icing valve	6	0 - 20 ohms	14 - 20	
Hydraulic pump (main)	7	0 - 200 ohms	20 - 30	
Off load valve (alt.)	8	0 - 200 ohms	20 - 30	
Fuel recirculation valve	9	0 - 200 ohms	12 - 20	
IDG disconnect solenoid	10	0 - 20 ohms	4 - 9	
Fuel heater valve	11	00 - 20 ohms	16 $\pm$ 2	
N <sub>1</sub> governor valve	12	0 - 200 ohms	30	
Engine )Overfull oil ) tank )Contents	14	0 - 4 K ohms	Full scale	Open circuit
	15	0 - 4 K ohms	0-3070 $\pm$ 5% in 150 ohms steps to 2250 ohms and one step of 820 ohms	Dip tank contents and refer to Fig. 513 (Meter reads half value)
Engine vibration, front	16	0 - 4 K ohms	Full scale	Open circuit
IDG mag. trim	21	0 - 2 K ohms	400 - 500	
(throttle (alt.)	22	0 - 2 K ohms	520 - 670	
(throttle	23	0 - 2 K ohms	520 - 670	
N <sub>2</sub> (main) speed (N <sub>2</sub> rpm)	24	0 - 2 K ohms	520 - 670	
probes(ground (testing	25	0 - 2 K ohms	520 - 670	
(air start	26	0 - 2 K ohms	520 - 670	

Resistance Tests on Engine Mounted Accessories  
Table 503 (Continued)

ENGINE DESPATCH

## 71-00-03

Page 544  
Jun 1/86





OLYMPUS 593

MK.610-14-28  
OVERHAUL

CIRCUIT UNDER TEST	CIRCUIT SWITCH NO.	METER RANGE SELECTOR (SW. 134)	METER READING (RESISTANCE) OHMS	REMARKS
(throttle (alt.)	27	0 - 2 K ohms	460 - 600	
(decel. (system	28	0 - 2 K ohms	460 - 600	
(throttle (main)	29	0 - 2 K ohms	460 - 600	
(decel. to N <sub>1</sub> (intake	30	0 - 2 K ohms	460 - 600	
speed (N <sub>1</sub> rpm	31	0 - 2 K ohms	460 - 600	
probes (reheat	32	0 - 2 K ohms	460 - 600	
(control (ground	33	0 - 2 K ohms	460 - 600	
(testing				
Engine oil pressure transducer	34	0 - 200 ohms	60 - 75	
Engine oil pressure transducer	35	0 - 200 ohms	60 - 75	
Anti-icing pressure switch	36	0 - 4 K ohms	Full scale)	Switch open circuit
Reheat purge valve position	40	0 - 2 K ohms	270 - 450	
Reheat purge valve position	41	0 - 2 K ohms	210 - 310	
Fuel starter pump	44	0 - 200-ohms	55 - 65	) See Note
Fuel starter pump	45	0 - 200 ohms	55 - 65	)

NOTE: Disconnect fuel starting pump and replace with fuel starting pump test plug. Reconnect fuel starting pump after test.

Fuel starter pump	44	0 - 20 ohms	3 - 5	
Fuel starter pump	45	0 - 20 ohms	3 - 5	
HP turbine oil inlet temp. thermometer	50	0 - 200 ohms	126 - 146	
HP turbine brg. oil drain temp. thermometer	51	0 - 200 ohms	126 - 146	

Resistance Tests on Engine Mounted Accessories  
Table 503 (Continued)

ENGINE DESPATCH

71-00-03

Page 545  
Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL

CIRCUIT UNDER TEST	CIRCUIT SWITCH NO.	METER RANGE SELECTOR (SW. 134)	METER READING (RESISTANCE) OHMS	REMARKS
Fuel filter inlet temp. thermometer	52	0 - 200 ohms	126 - 146	
Sprayer fuel inlet temp. thermometer	53	0 - 200 ohms	126 - 146	
Engine oil temp. thermometer	54	0 - 200 ohms	126 - 146	
IDG oil inlet temp. thermometer	55	0 - 200 ohms	126 - 146	
IDG oil outlet temp. thermometer	56	0 - 200 ohms	126 - 146	
(motor	57	0 - 200 ohms	25 - 35	
(motor	58	0 - 2 K ohms	1050 - 1200	
Reheat (motor	59	0 - 2 K ohms	100 - 140	
flow- (servo	60	0 - 2 K ohms	250 - 350	
meter (control				
(density				
(P.U.	61	0 - 2 K ohms	1500 - 1700	
(probe 1				
(motor	62	0 - 200 ohms	25 - 35	Pins A and B
(				
(motor	63	0 - 2 K ohms	1050 - 1200	Pins A and C
Main (				
engine (motor	64	0 - 2 K ohms	100 - 140	Pins D and A
flow- (				
meter (servo	65	0 - 2 K ohms	250 - 350	Pins F and E
(control				
(density				
(P.U. probe 1	66	0 - 2 K ohms	1500 - 1700	Pins J and I
(				
Engine oil low pressure switch	67	0 - 20 ohms	2 - 8	)
IDG oil low pressure switch	68	0 - 20 ohms	2 - 8	) Depends on cable resistance.
Fuel filter diff. press. switch(7 psi)	71	0 - 4 K ohms	Full scale	) Switch open circuit.

TN24554

Resistance Tests on Engine Mounted Accessories  
Table 503 (Continued)

ENGINE DESPATCH

71-00-03

Page 546

Jan 2/80



OLYMPUS 593

MK. 610-14-28  
OVERHAUL

CIRCUIT UNDER TEST	CIRCUIT SWITCH NO.	METER RANGE SELECTOR (SW. 134)	METER READING (RESISTANCE) OHMS	REMARKS
IDG speed probe	110	0 - 200 ohms	20 - 25	
NOTE: On Pre SB.71-4 standard engines, circuit switch 113 and 116 will give open circuit.				
Engine flowmeter servo control	113	0 - 200 ohms	55 - 75	
Engine flowmeter P.U. probe 2	114	0 - 4 K ohms	2100 - 2300	) Meter reads half value
Reheat flowmeter P.U. probe 2	115	0 - 4 K ohms	2100 - 2300	
Reheat flowmeter servo control	116	0 - 200 ohms	55 - 75	
Turbine (terminal 8 cooling (	118	0 - 20 ohms	1 $\pm$ 0.5	Turbine brg hot vent
thermo- (terminal 7	119	0 - 20 ohms	3 $\pm$ 1	'G' labyrinth
couples (terminal 5	120	0 - 20 ohms	1 $\pm$ 0.5	No.4 and 5 brg vent
(terminal 4	121	0 - 20 ohms	2 $\pm$ 1	No.2 and 3 brg vent
(terminal 6	122	0 - 20 ohms	2 $\pm$ 1	HP turbine cooling air
Tj (terminal 1	123	0 - 20 ohms	3 $\pm$ 1	) Jet pipe
thermo- (terminal 2	124	0 - 20 ohms	3 $\pm$ 1	
couples (terminal 3	125	0 - 20 ohms	3 $\pm$ 1	
(terminal 11	126	0 - 20 ohms	3 $\pm$ 1	
				HP compressor delivery air

Resistance Tests on Engine Mounted Accessories  
Table 503 (Concluded)

ENGINE DESPATCH

71-00-03

Page 547

Jan 2/80

PRINTED IN ENGLAND

TN16891



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CIRCUIT UNDER TEST	CIRCUIT SWITCH NO.	METER RANGE SELECTOR (SW. 134)	METER READING (RESISTANCE) OHMS	REMARKS
Throttle actuator, motor Ref. (main)	1	0 - 200 ohms	30 - 38	
Throttle actuator, motor control (main)	2	0 - 20 ohms	2 - 5	
Throttle actuator, tacho and P.O. ref. (main)	3	0 - 200 ohms	38 - 46	
Throttle actuator, tacho signal (main)	4	0 - 2 K ohms	741 - 919	
Throttle actuator, motor brake (alt.)	5	0 - 20 ohms	2 - 5	
Throttle actuator, P.O. signal (main)	6	0 - 200 ohms	120 - 145	
Throttle actuator, motor ref. (alt.)	7	0 - 200 ohms	30 - 38	
Throttle actuator, motor control (alt.)	8	0 - 20 ohms	2 - 5	
Throttle actuator, tacho and P.O. ref. (alt.)	9	0 - 200 ohms	38 - 46	
Throttle actuator, tacho signal (alt.)	10	0 - 2 K ohms	741 - 919	
Throttle actuator, motor brake (main)	11	0 - 20 ohms	2 - 5	
Throttle actuator, P.O. signal (alt.)	12	0 - 200 ohms	120 - 145	
Reheat, tacho signal	25	0 - 4 K ohms	1500 - 1700	Meter reads half value
Reheat, motor control	26	0 - 20 ohms	2 - 5	
Reheat	27	0 - 200 ohms	25 - 35	
Reheat, tacho ref.	28	0 - 2 K ohms	360 - 460	

Resistance Tests on Engine Mounted A.C. Actuators  
Table 504

ENGINE DESPATCH

71-00-03

Page 548

Jan 2/80

TN16892



# OLYMPUS 593

MK.610-14-28

OVERHAUL



CIRCUIT UNDER TEST	CIRCUIT SWITCH NO.	METER RANGE SELECTOR (SW. 134)	METER READING (RESISTANCE) OHMS	REMARKS
HP valve position indicator	1	200 V	2 M	
HP valve (closed)	2	200 V	2 M	
HP valve (open)	3	200 V	2 M	
Reheat shut-off valve	4	50 V	0.4 M	) 0.2 M actual res.
Reheat purge valve	5	50 V	0.4 M	
Engine anti-icing valve	6	100 V	0.4 M	
Hydraulic pump (main)	7	200 V	4 M	
Off load valve (alt.)	8	200 V	4 M	
Fuel recirculation valve	9	200 V	4 M	
IDG disconnect solenoid	10	200 V	3 M	
Fuel heater valve	11	100 V	0.4 M	
N <sub>1</sub> governor valve	12	200 V	20 M	
Engine oil tank quantity	) 14	100 V	2 M	
	) 15	100 V	2 M	
IDG mag. trim	21	200 V	2 M	
(throttle	22	200 V	4 M	
( (alt.)				
(throttle	23	200 V	4 M	
N <sub>2</sub> ( (main)				
speed (N <sub>2</sub> rpm	24	200 V	4 M	
probes(ground test-	25	200 V	4 M	
(ing				
(air start	26	200 V	4 M	
(throttle	27	200 V	4 M	
( (alt.)				
(decel.	28	200 V	4 M	
N <sub>1</sub> (system				
speed (throttle	29	200 V	4 M	
probes( (main)				

Insulation Tests on Engine Mounted Accessories  
Table 505 (Continued)

ENGINE DESPATCH

## 71-00-03

Page 549

Dec 1/86



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CIRCUIT UNDER TEST	CIRCUIT SWITCH NO.	METER RANGE SELECTOR (SW. 134)	METER READING (RESISTANCE) OHMS	REMARKS
N <sub>1</sub> speed (decel. to probes (intake (N <sub>1</sub> rpm (reheat (control (ground (testing	30	200 V	4 M	
Engine oil pressure transducer	31	200 V	4 M	
Engine oil pressure transducer	32	200 V	4 M	
Anti-icing pressure switch	33	200 V	4 M	
Reheat purge valve position	34	200 V	4 M	
Reheat purge valve position	35	200 V	4 M	
Fuel starter pump	36	200 V	4 M	
Fuel starter pump	40	50 V	0.4 M	) Actual res. ) 0.2 M )
HP turbine brg. oil inlet temp. thermometer	41	50 V	0.4 M	
HP turbine brg. oil drain temp. thermometer	44	200 V	2 M	
Fuel filter inlet temp. thermometer	45	200 V	2 M	
Sprayer fuel inlet temp. thermometer	50	200 V	2 M	
Engine oil temp. thermometer	51	200 V	2 M	
IDG oil inlet temp. thermometer	52	200 V	2 M	
IDG oil outlet temp. thermometer	53	200 V	2 M	
	54	200 V	2 M	
	55	200 V	2 M	
	56	200 V	2 M	

Insulation Tests on Engine Mounted Accessories  
Table 505 (Continued)

ENGINE DESPATCH

71-00-03

Page 550

Jan 2/80



OLYMPUS 593

MK.610-14-28

OVERHAUL



CIRCUIT UNDER TEST	CIRCUIT SWITCH NO.	METER RANGE SELECTOR (SW. 134)	METER READING (RESISTANCE) OHMS	REMARKS
--------------------	--------------------	--------------------------------	---------------------------------	---------

(motor	57	200 V	2 M	
Reheat(motor	58	200 V	2 M	
flow- (motor	59	200 V	2 M	
meter (servo con-	60	200 V	2 M	
(trol density				
(P.U. probe	61	200 V	2 M	
(motor	62	200 V	2 M	
Main (motor	63	200 V	2 M	
engine(motor	64	200 V	2 M	
flow- (servo con-	65	200 V	2 M	
meter (trol density				
(P.U. probe	66	200 V	2 M	
Engine oil pressure	67	200 V	2 M	
switch				
IDG oil pressure	68	200 V	2 M	
switch				
Fuel filter diff.	71	200 V	2 M	
press. switch				
(7 psi)				
IDG speed probe	110	100 V	2 M	

NOTE: On Pre SB.71-4 standard engines, circuit switch 113 and 116 will give open circuit.

Engine flowmeter	113	200 V	2 M	
servo control				
Engine flowmeter	114	200 V	2 M	
P.U. probe 2				
Reheat flowmeter	115	200 V	2 M	
P.U. probe 2				
Reheat flowmeter	116	200 V	2 M	
Turbine(terminal 8	118	100 V	2 K	Turbine brg hot vent
cooling(				
thermo-(terminal 7	119	100 V	50 K	'G' labyrinth
couples(terminal 5	120	100 V	50 K	No.4 and 5 brg vent
(				

Insulation Tests on Engine Mounted Accessories  
Table 505 (Continued)

ENGINE DESPATCH

71-00-03

Page 551

Jan 2/80

**OLYMPUS 593**MK.610-14-28 *snecma*  
OVERHAUL

CIRCUIT UNDER TEST	CIRCUIT SWITCH NO.	METER RANGE SELECTOR (SW. 134)	METER READING (RESISTANCE) OHMS	REMARKS
(terminal 4	121	100 V	50 K	No.2 and 3 brg vent
(terminal 6	122	100 V	50 K	HP turbine cooling air
Tj (terminal 1	123	50 V	10 K)	
thermo-(terminal 2	124	50 V	10 K)	Jet pipe
couples (terminal 3	125	50 V	10 K)	
(terminal 12	126	100 V	50 K	HP compressor delivery air
Air starter valve	Open/close	200 V	1 M	Operate switch 141

Insulation Tests on Engine Mounted Accessories  
Table 505 (Concluded)

ENGINE DESPATCH

**71-00-03**

Page 552

Sep 30/94





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CIRCUIT UNDER TEST	CIRCUIT SWITCH NO.	METER RANGE SELECTOR (SW. 134)	METER READING (RESISTANCE) OHMS	REMARKS
Throttle actuator, motor ref. (main)	1	200 V	5 M	
Throttle actuator, motor control (main)	2	200 V	5 M	
Throttle actuator, tacho and P.O. ref. (main)	3	200 V	5 M	
Throttle actuator, tacho signal (main)	4	200 V	5 M	
Throttle actuator, motor brake (alt.)	5	200 V	5 M	
Throttle actuator, P.O. signal (main)	6	200 V	5 M	
Throttle actuator, motor ref. (alt.)	7	200 V	5 M	
Throttle actuator, motor control (alt.)	8	200 V	5 M	
Throttle actuator, tacho and P.O. ref. (alt.)	9	200 V	5 M	
Throttle actuator, tacho signal (alt.)	10	200 V	5 M	
Throttle actuator, motor brake (main)	11	200 V	5 M	
Throttle actuator, P.O. signal (alt.)	12	200 V	5 M	
Reheat actuator, tacho signal	25	200 V	0.5 M	
Reheat actuator, motor control	26	200 V	0.5 M	
Reheat actuator, tacho and motor ref.	27	200 V	0.5 M	

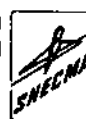
Insulation Tests on Engine Mounted A.C. Actuators  
Table 506

ENGINE DESPATCH

71-00-03

Page 553

Jan 2/80

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

PRINTED IN ENGLAND

SWITCH 132  
POSITION

ACCESSORY SCREEN

---

1	HP valve position indicator
2	Main engine flowmeter (Servo control density)
4	IDG speed probe
5	Reheat flowmeter (P.U. probe 1)
6	Main engine flowmeter (P.U. probe 1)
7	IDG mag. trim
8	N <sub>2</sub> speed probe (throttle alt.)
9	N <sub>2</sub> speed probe (throttle main)
10	N <sub>2</sub> speed probe (N <sub>2</sub> rpm)
11	N <sub>2</sub> speed probe (ground testing)
12	N <sub>2</sub> speed probe (air start)
13	N <sub>1</sub> speed probe (throttle alt.)
14	N <sub>1</sub> speed probe (decel. system)
15	N <sub>1</sub> speed probe (throttle main)
16	N <sub>1</sub> speed probe (decel. to intake)
17	N <sub>1</sub> speed probe (N <sub>1</sub> rpm)
18	N <sub>1</sub> speed probe (reheat control)
19	N <sub>1</sub> speed probe (ground testing)
20	Main engine flowmeter P.U. probe 2
21	Reheat flowmeter P.U. probe 2
22	Reheat flowmeter (Servo control density)
23	Reheat flame detector (Earthed on engine)

---

Accessory Screen Selections  
Table 507

ENGINE DESPATCH

**71-00-03**

Page 554

Jun 1/86



OLYMPUS 593

MK.610-14-28  
OVERHAUL

CIRCUIT UNDER TEST	CIRCUIT SWITCH NO.	SOLENOID CURRENT METER	REMARKS
HP valve (closed)	2	2.5 $\pm$ 0.5 amps	
HP valve (open)	3	2.5 $\pm$ 0.5 amps	
Reheat shut-off valve	4	0.85 $\pm$ 0.25 amps	
Reheat purge valve	5	0.85 $\pm$ 0.25 amps	
Engine anti-icing valve	6	1.5 $\pm$ 0.5 amps	
Hydraulic pump (main)	7	1.5 $\pm$ 0.5 amps	
Off load valve (alt.)	8	1.5 $\pm$ 0.5 amps	
Fuel re-circulation valve	9	1.5 $\pm$ 0.5 amps	
IDG disconnect solenoid	10	7 amps max.	To be manually reset.
Fuel heater valve	11	1.5 $\pm$ 0.5 amps	

Functional Test of Engine Mounted Solenoid Controls  
Table 508

ENGINE DESPATCH

71-00-03

Page 555

Jan 2/80



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CIRCUIT UNDER TEST	POSITION OF ACTUATOR SELECTOR SW.142
Throttle Actuator (Main)	Throttle Main
Throttle Actuator (Main)	Throttle Main
Throttle Actuator (Main)	Throttle Main
Throttle Actuator (Main)	Throttle Main
Throttle Actuator (Alternative)	Throttle Alternative
Throttle Actuator (Alternative)	Throttle Alternative

Functional Tests of Engine Mounted A.C. Actuators  
Table 509 (Continued) (Sheet 1 - LH)

ENGINE DESPATCH

71-00-03

Page 556

Jan 2/80

FN16921

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

A.C. ACTUATORS		METER READING			REMARKS
SW.140	SW.139	BRAKE CURRENT	MOTOR CONTROL CURRENT	P.O./ TACHO SIGNAL	
Tacho	Pos. 1	2 amps (Max)	1 amp (Max)	Left of zero	Actuator runs to open
Tacho	Pos. 2	2 amps (Max)	1 amp (Max)	Right of zero	Actuator runs to closed
Pick Off	Pos. 1	2 amps (Max)	1 amp (Max)	See Re- marks	Pointer starts slightly right of zero, through zero to full scale left and back slightly
Pick Off	Pos. 2	2 amps (Max)	1 amp (Max)	See Re- marks	Pointer goes to full scale then back through zero and stops slightly right of zero
Tacho	Pos. 1	2 amps (Max)	1 amp (Max)	Left of zero	Actuator runs to open
Tacho	Pos. 2	2 amps (Max)	1 amp (Max)	Right of zero	Actuator runs to closed

Functional Tests of Engine Mounted A.C. Actuators  
Table 509 (Continued) (Sheet 1 - RH)

ENGINE DESPATCH

**71-00-03**

Page 557

Jan 2/80

PRINTED IN ENGLAND

TN16922



OLYMPUS 593

MK.610-14-28  
OVERHAUL



---

CIRCUIT UNDER  
TEST

POSITION  
OF ACTUATOR  
SELECTOR  
SW.142

---

Throttle  
Actuator  
(Alternative)

Throttle  
Alternative

Throttle  
Actuator  
(Alternative)

Throttle  
Alternative

Reheat  
Actuator

Reheat

Reheat  
Actuator

Reheat

---

Functional Tests of Engine Mounted A.C. Actuators  
Table 509 (Concluded) (Sheet 2 - LH)

TN16092

ENGINE DESPATCH

**71-00-03**

Page 558

Jan 2/80

**OLYMPUS 593**MK.610-14-28 SNECMA  
OVERHAUL

A.C. ACTUATORS		METER READING			REMARKS
SW.140	SW.139	BRAKE CURRENT	MOTOR CONTROL CURRENT	P.O./ TACHO SIGNAL	
Pick Off	Pos. 1	2 amps (Max)	1 amp (Max)	See Re- marks	Pointer starts slightly right of zero, through zero to full scale left and back slightly
Pick Off	Pos. 2	2 amps (Max)	1 amp (Max)	See Re- marks	Pointer goes to full scale, then back through zero and stops slightly right of zero
Tacho	Pos. 1	No Brake Reading	2 amps (Max)	Right of zero	Actuator runs to closed
Tacho	Pos. 2	No Brake Reading	2 amps (Max)	Left of zero	Actuator runs to open

Functional Tests of Engine Mounted A.C. Actuators  
Table 509 (Concluded) (Sheet 2 - RH)

ENGINE DESPATCH

**71-00-03**Page 559  
Sep 30/94



OLYMPUS 593

MK.610-14-28  
OVERHAUL



---

FUNCTION

---

Operate switch 143 (lift to release); light must come 'ON'.

Operate switch 144 to position L; this will fire left-hand igniter.

Operate switch 144 to position R; this will fire right-hand igniter. Return switch 143 to 'OFF'.

---

Functional Tests of Igniters  
Table 510

---

FUNCTION

---

Operate switch 141 to open and close positions, the appropriate indicator should be illuminated. Solenoid current meter should read 3 amps. max.

---

Functional Test of Air Starter Valve  
Table 511

ENGINE DESPATCH

**71-00-03**

Page 560

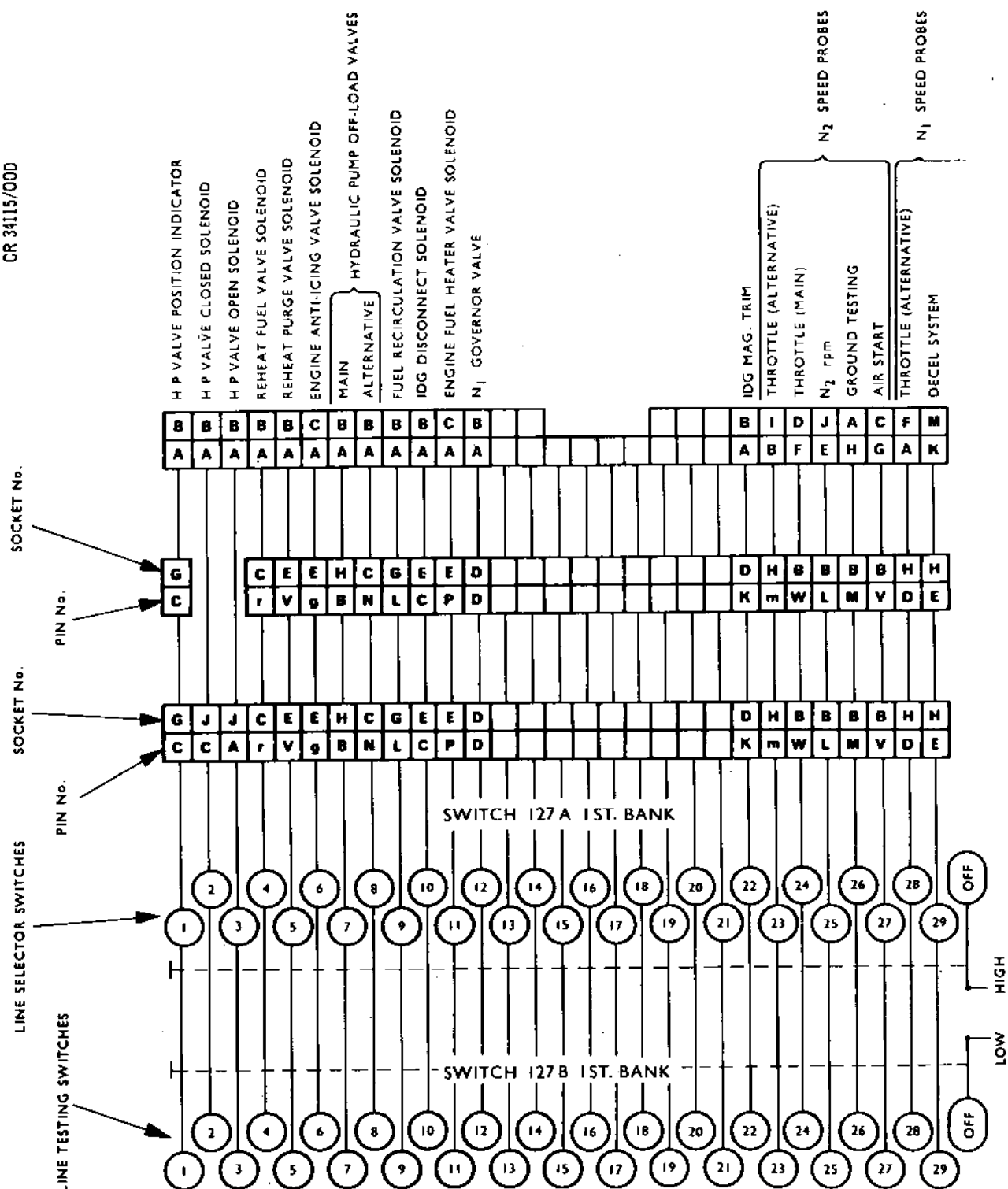
Jan 2/80



CR 34115/00D



MK.610-14-28  
 OVERHAUL



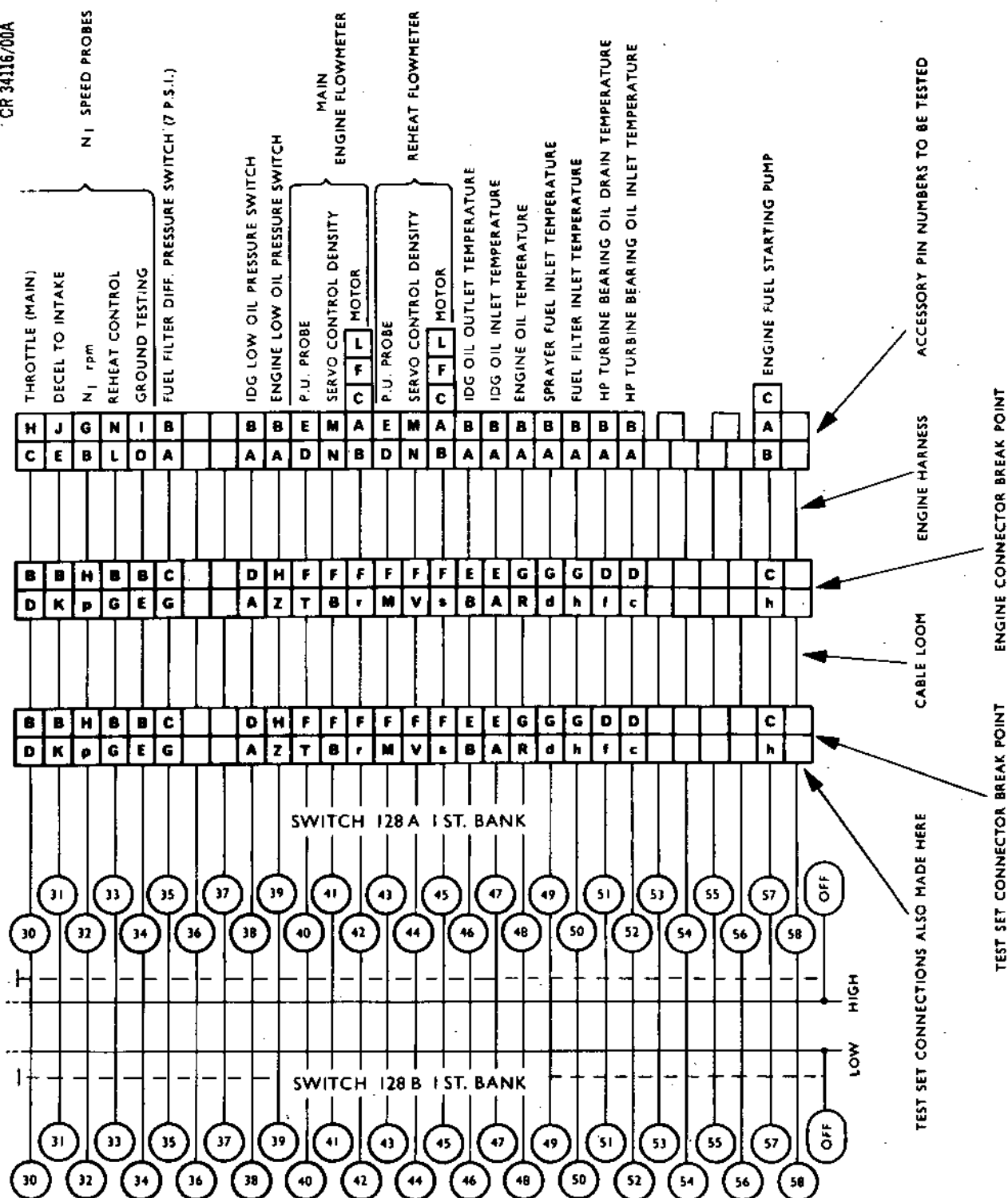
Interline Insulation Tests  
Figure 512 (Sheet 1 of 5)

71-00-03

Page 561  
Dec 1/86



CR 34116/00A



Interline Insulation Tests  
Figure 512 (Sheet 2 of 5)

ENGINE DESPATCH

**71-00-03**

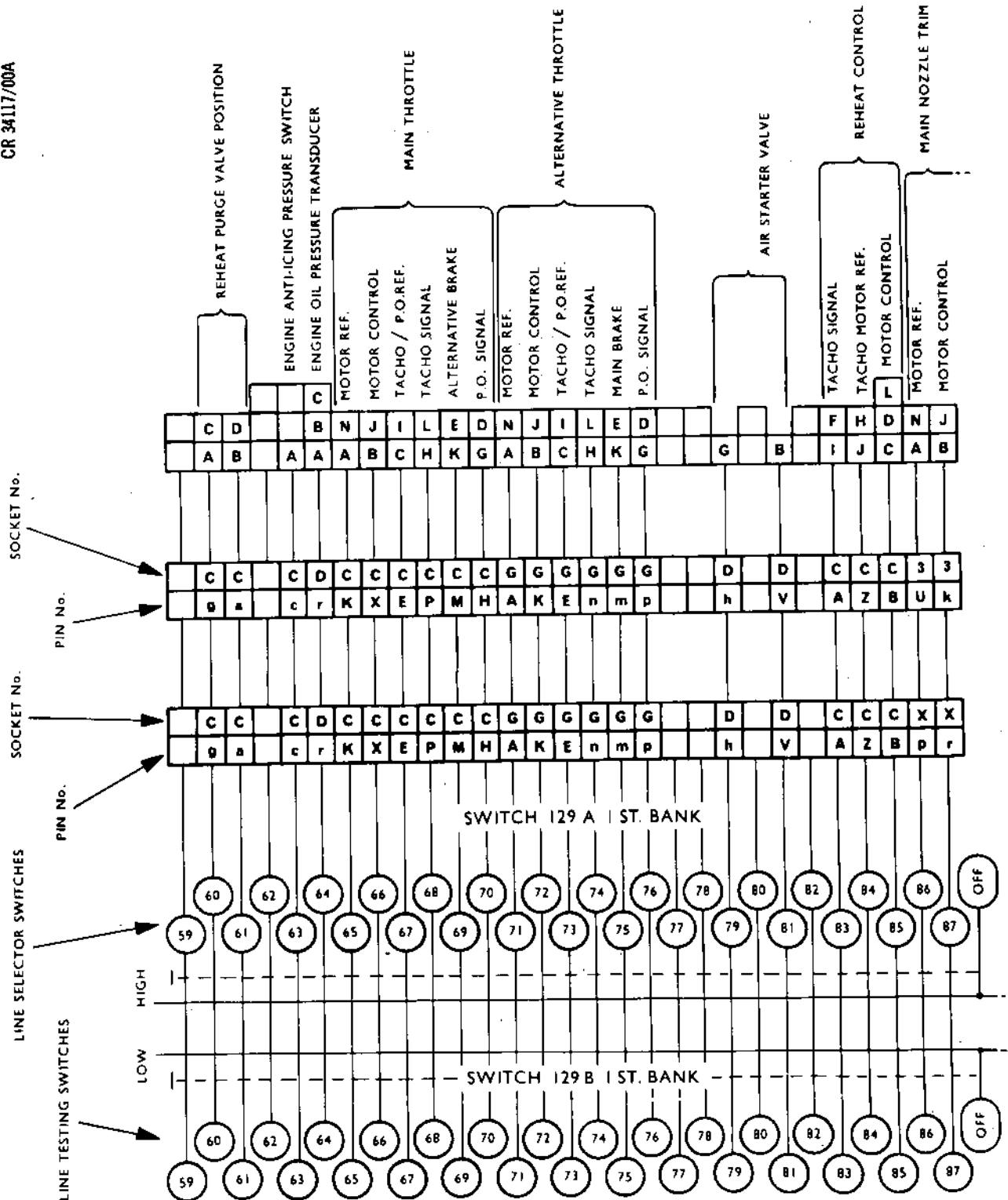
Page 562

Jan 2/80

CR 34117/00A



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



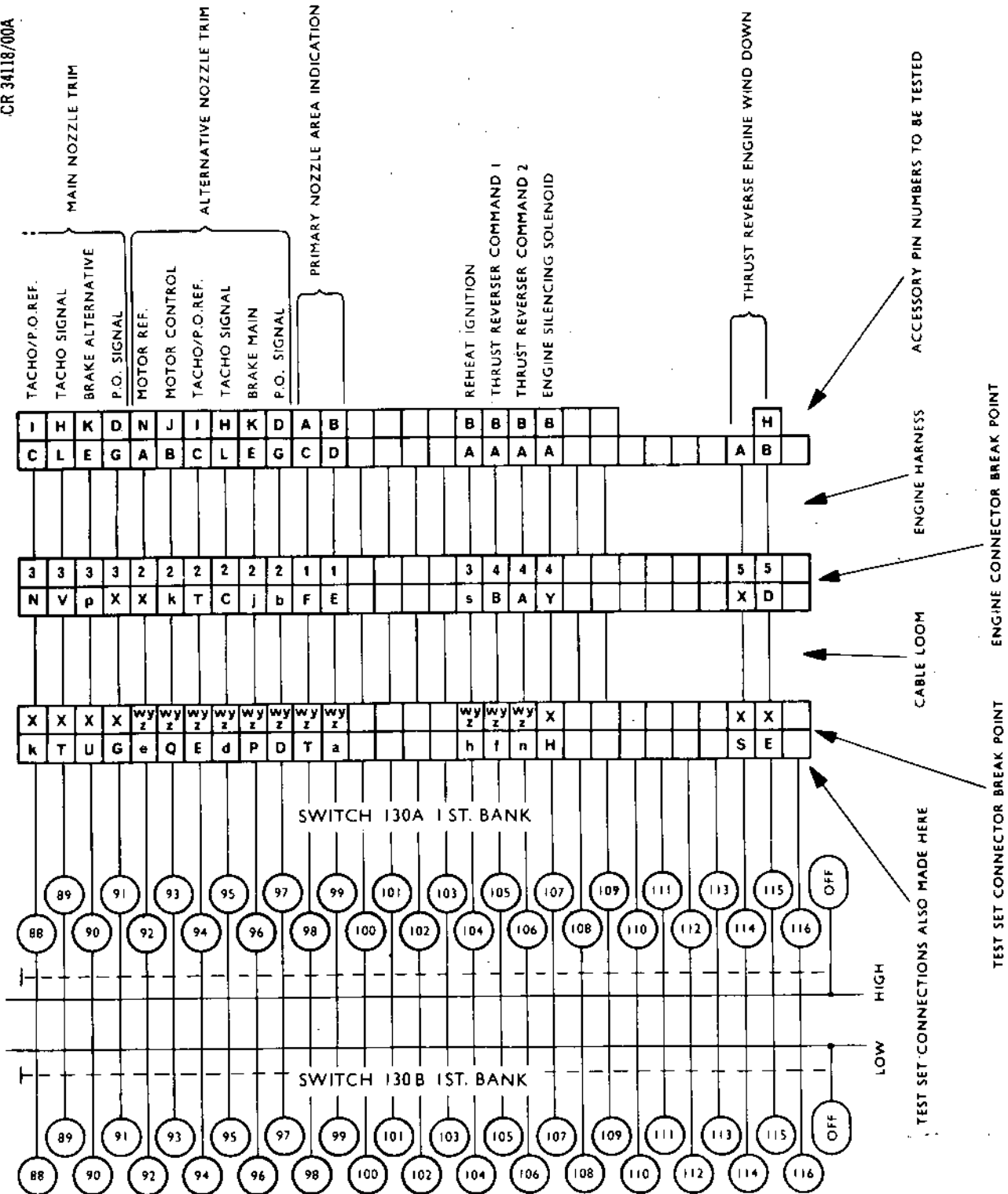
Interline Insulation Tests  
Figure 512 (Sheet 3 of 5)



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 34118/00A



Interline Insulation Tests  
Figure 512 (Sheet 4 of 5)

ENGINE DESPATCH

71-00-03

Page 564

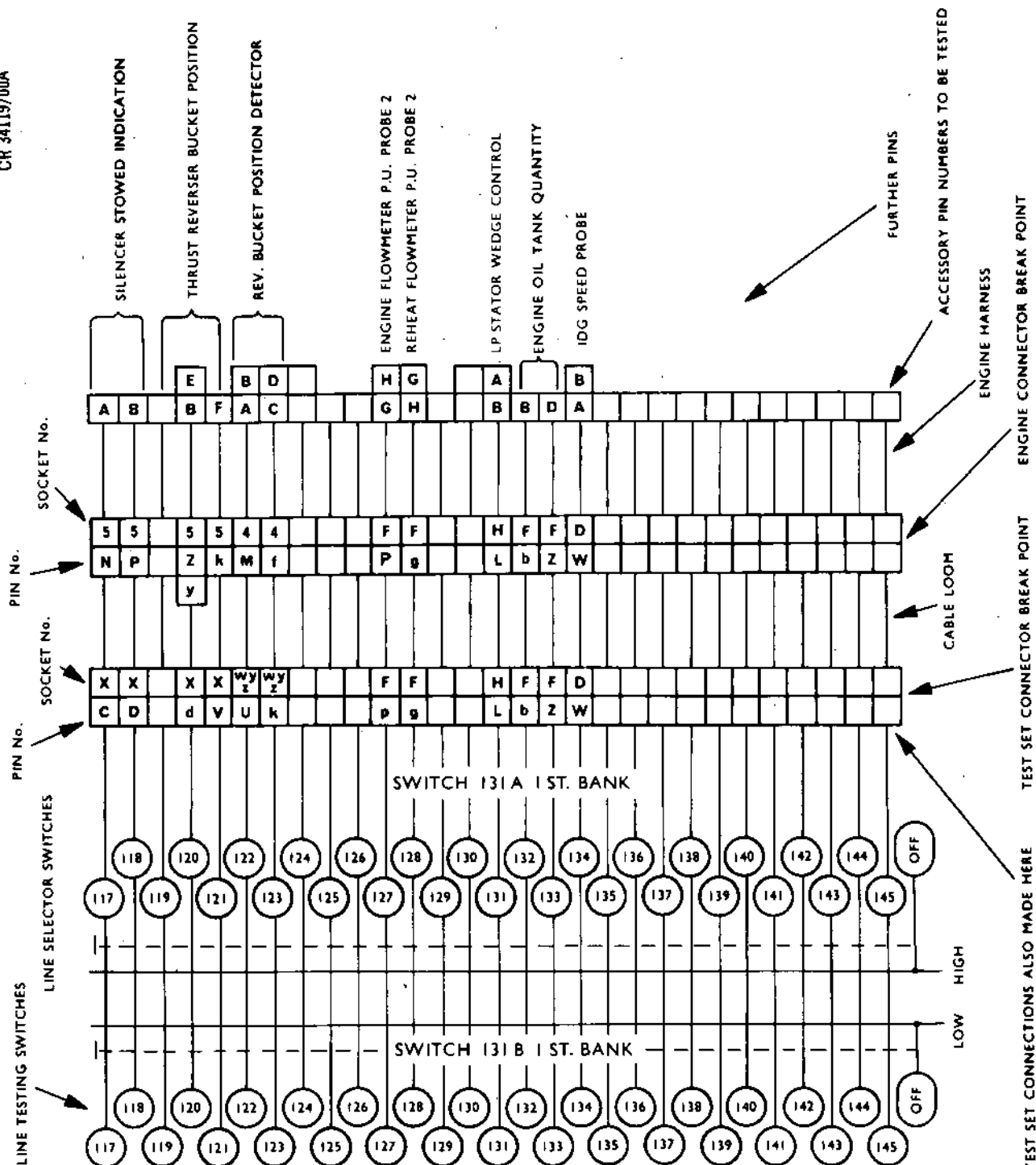
Jan 2/80

FN3790

CR 34119/00A



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



Interline Insulation Tests  
Figure 512 (Sheet 5 of 5)

ENGINE DESPATCH

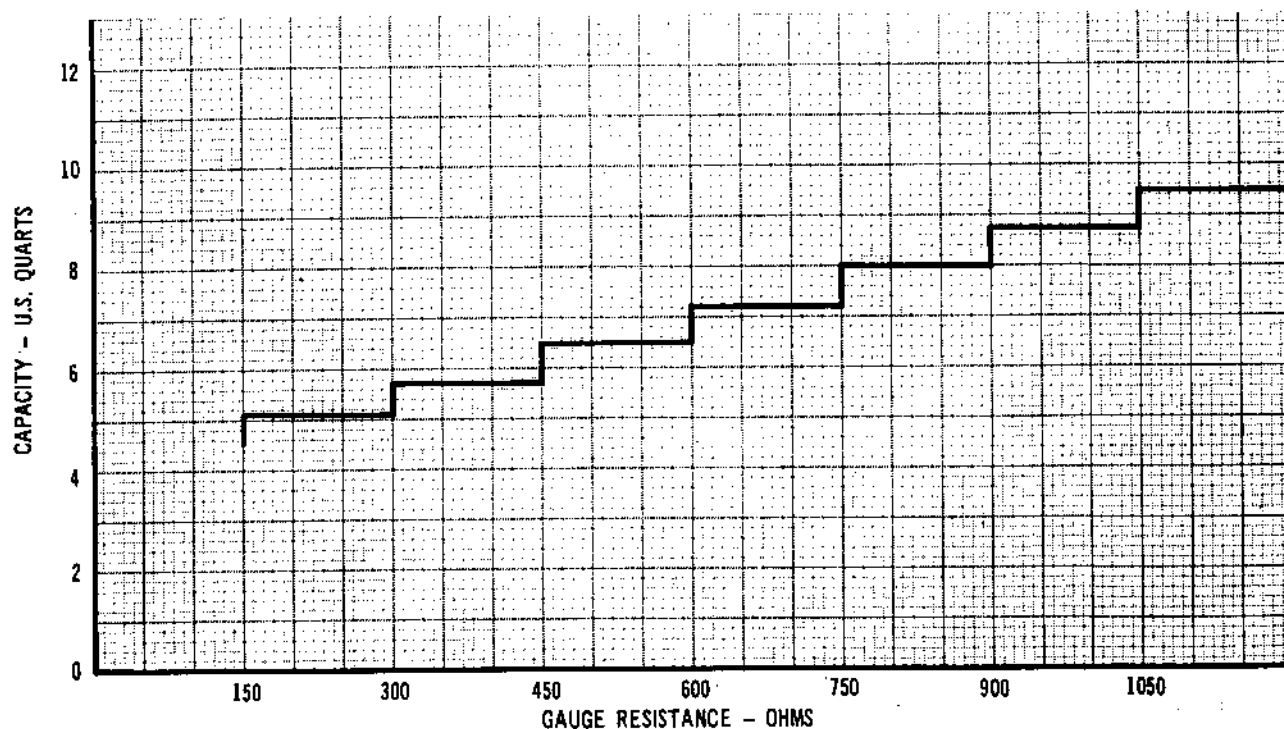
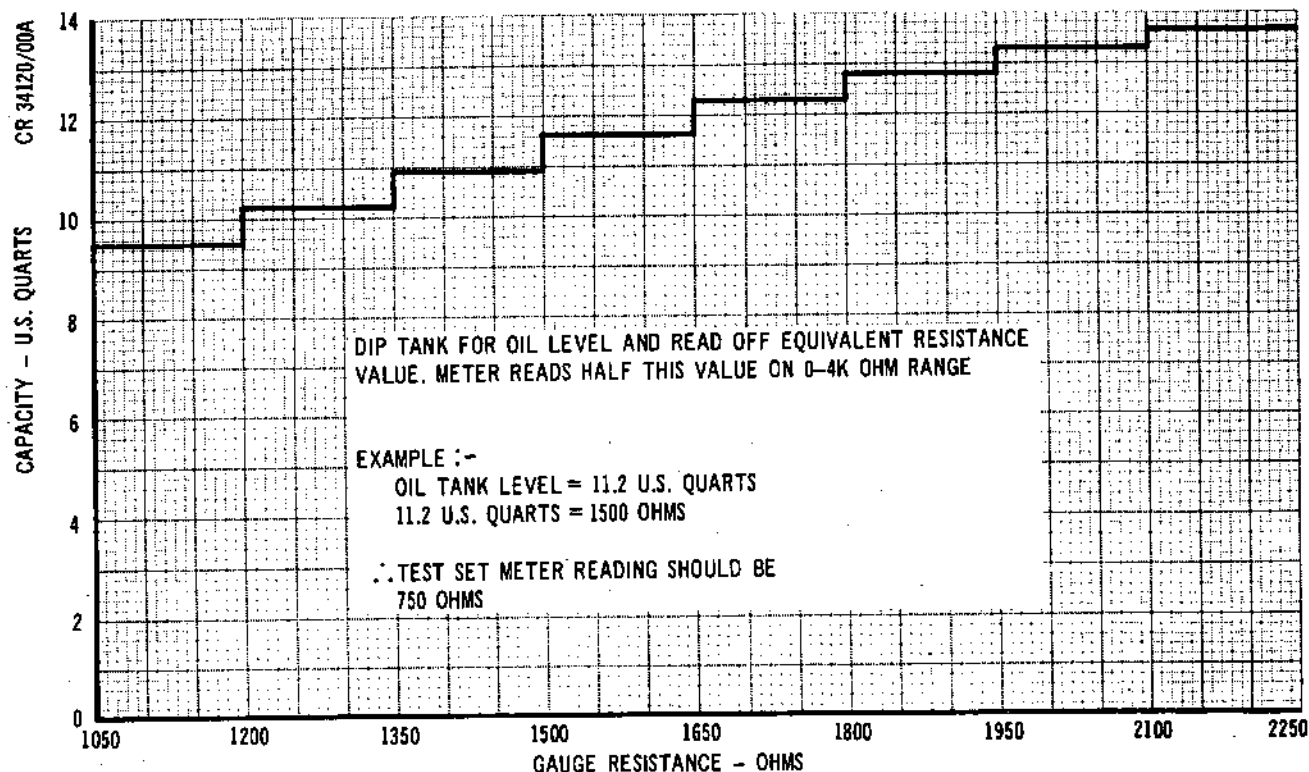
71-00-03

Page 565

Jan 2/80



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



Oil Level/Gauge Resistance Relationship  
Figure 513

ENGINE DESPATCH

71-00-03

Page 566

Jan 2/80

JN46258



OLYMPUS 593

MK.610-14-28  
OVERHAUL



G. Check Bonding of Complete Engine.

- (1) Carry out the following bonding check using a double bridge milliohm meter.
- (2) Ensure that all bonding faces of bosses, clips, bolts and screw threads are free of any insulating materials e.g. paint and anodising.
- (3) Connect one lead of the Bondmeter to one of the primary bonding attachment points on the CCOC heat shields.
- (4) Starting with the foremost casing, place the other Bondmeter lead on each casing in turn and measure and record the bonding resistance. The resistance must not exceed 10 milliohms on each casing.
- (5) Starting from the top centre point of the foremost case and working in a clockwise direction (viewed from front), place the other Bondmeter lead on each accessory in turn, measure and record the bonding resistance. Repeat this procedure on each engine case in turn working rearwards. The resistance must not exceed 10 milliohms on each accessory.
- (6) Repeat para.(5) measuring and recording the bonding resistance of all tubes. As with the accessories, the resistance must not exceed 10 milliohms.
- (7) Repeat para.(5) measuring and recording the bonding resistance of all electrical wiring. As with the accessories the resistance must not exceed 10 milliohms.
- (8) Place the second Bondmeter lead on the second primary bonding attachment point, measure and record the bonding resistance. The resistance must not exceed 10 milliohms.

PRINTED IN ENGLAND

TN18596

ENGINE DESPATCH

71-00-03

Page 567

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



H. Check Harness.

- (1) Check the main electrical harness to ensure that the cable runs are free from fouls and are clipped correctly.
- (2) Ensure that all electrical connections connected to services and accessories are wire-locked correctly, where applicable.

J. Assemble Main Harness Stowage Bracket and Supports (Ref.Fig.514).

NOTE: The main harness stowage bracket and supports are under breakdown 71-51-01 and the IPC references in this para. are from 71-51-01 except where specifically detailed.

- (1) Assemble the dummy receptacles (11-100) to their locations on the mounting plate (11-110) and retain with screws (11-90), washers (11-80) and nuts (11-70).
- (2) Assemble the mounting plate assembly (11-110) to the jet pipe rear drain and the reheat purge air tubes brackets on the exhaust diffuser and spherical joint flange attachment.
- (3) Assemble the support (11-50) to the LP shaft signal system pulley shroud (76-21-01/2-430) on the exhaust diffuser.
- (4) Assemble the support (11-10) to the aircraft cross feed pipe bracket on the delivery casing and CCOC attachment flange.
- (5) Assemble the main harness loom connectors to their respective positions on the mounting plate. Tighten to secure.
- (6) Assemble the harness to the supports (11-50 and 11-10) and secure with integral straps.

TN18597

ENGINE DESPATCH

**71-00-03**

Page 568

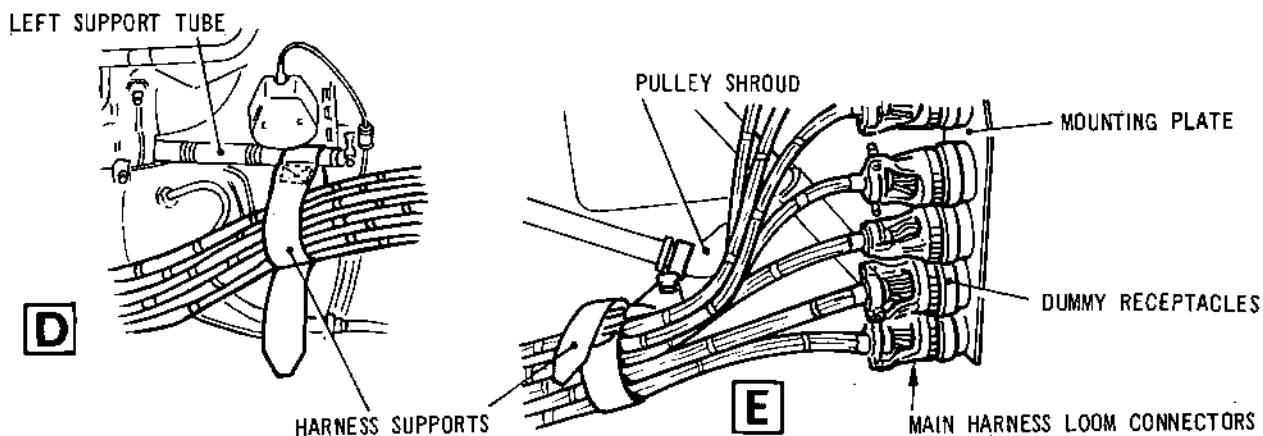
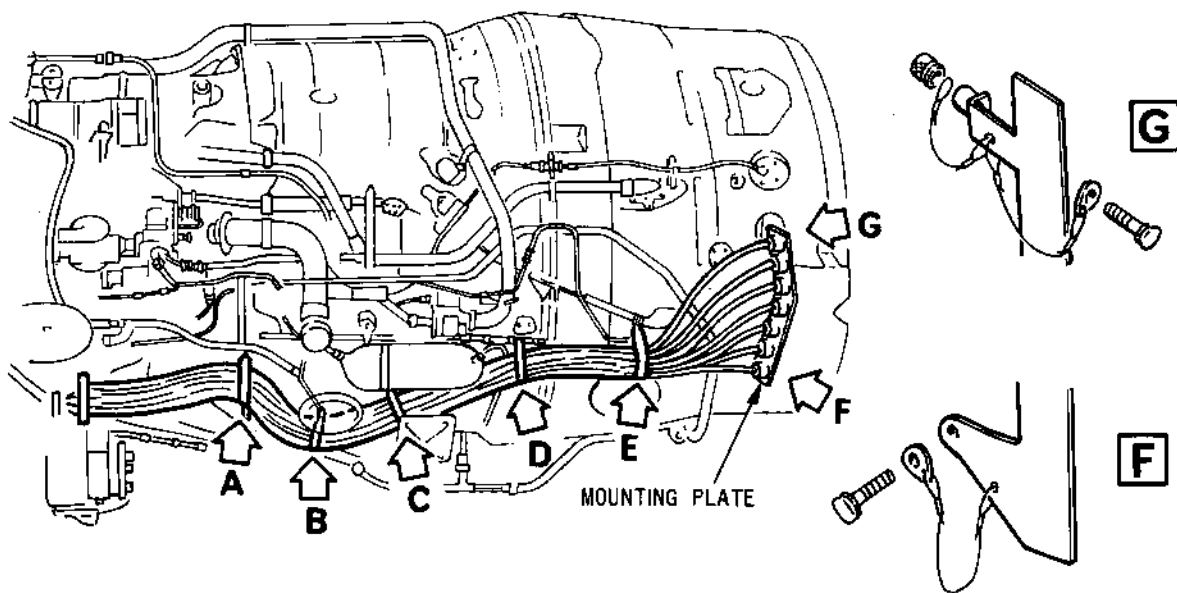
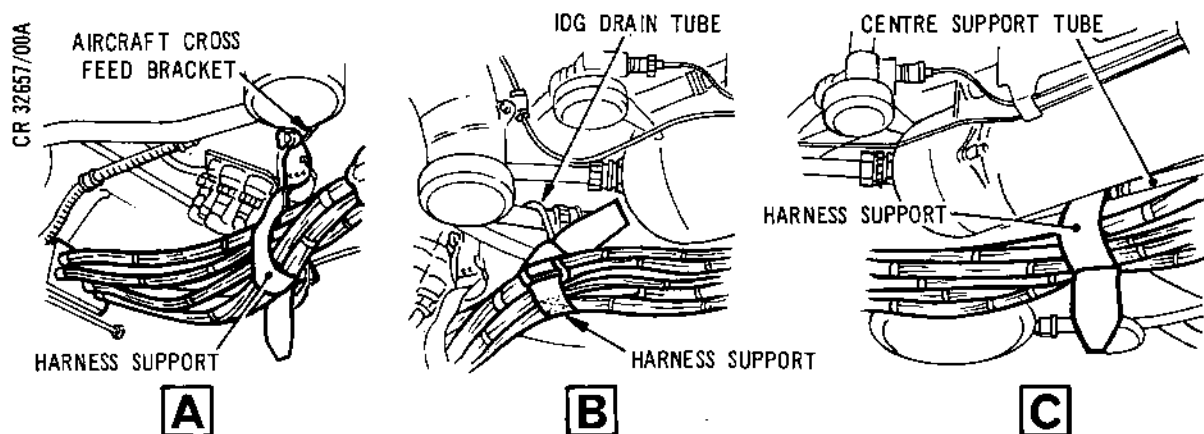
Jan 2/80





OLYMPUS 593

MK.610-14-28  
OVERHAUL



Main Harness Stowage  
Figure 514

ENGINE DESPATCH

71-00-03

Page 569

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (7) Strap the harness to the centre and left support tubes on the CCOC with one support (11-40) at each tube position.
- (8) Strap the harness to the IDG drain tube with the support (11-30).

## 7. Final Despatch Procedures

### A. Install Heat Shield (Ref.Fig.515).

NOTE: The heat shield items are under breakdown 71-32-02 and the IPC references in this para. are from 71-32-02.

- (1) Apply lubricant 'B' to all attachment items.
- (2) Assemble the tie bracket (4-120) to the bracket on the exhaust diffuser and spherical joint flange attachment at the reheat purge tube flange position, secure with a nut (4-80) and bolt (4-90).
- (3) Retain the tie bracket (4-120) and bracket (4-130) to the bracket on the reheat purge tube adapter flange using the bolts (4-110) and nuts (4-100) securing the transmitter pitot manifold clipping.
- (4) Torque-tighten the nuts between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (5) Apply lubricant 'B' to the attachment bolts (4-30).
- (6) Apply lubricant 'G' to the mating surfaces of the heatshield (4-10) and washers (4-60).
- (7) Pass the reheat igniter cable through the aperture in the heatshield, assemble the shield to the six mountings and secure the shield to each mounting with a bolt (4-30), two dampers (4-50/70), two washers (4-60), a distance piece (4-40) and a nut (4-20) at each location.
- (8) Torque-tighten between 67 and 73 lbf in. (7,57 and 8,25 N.m).

TN18600

ENGINE DESPATCH

**71-00-03**

Page 570

Jan 2/80

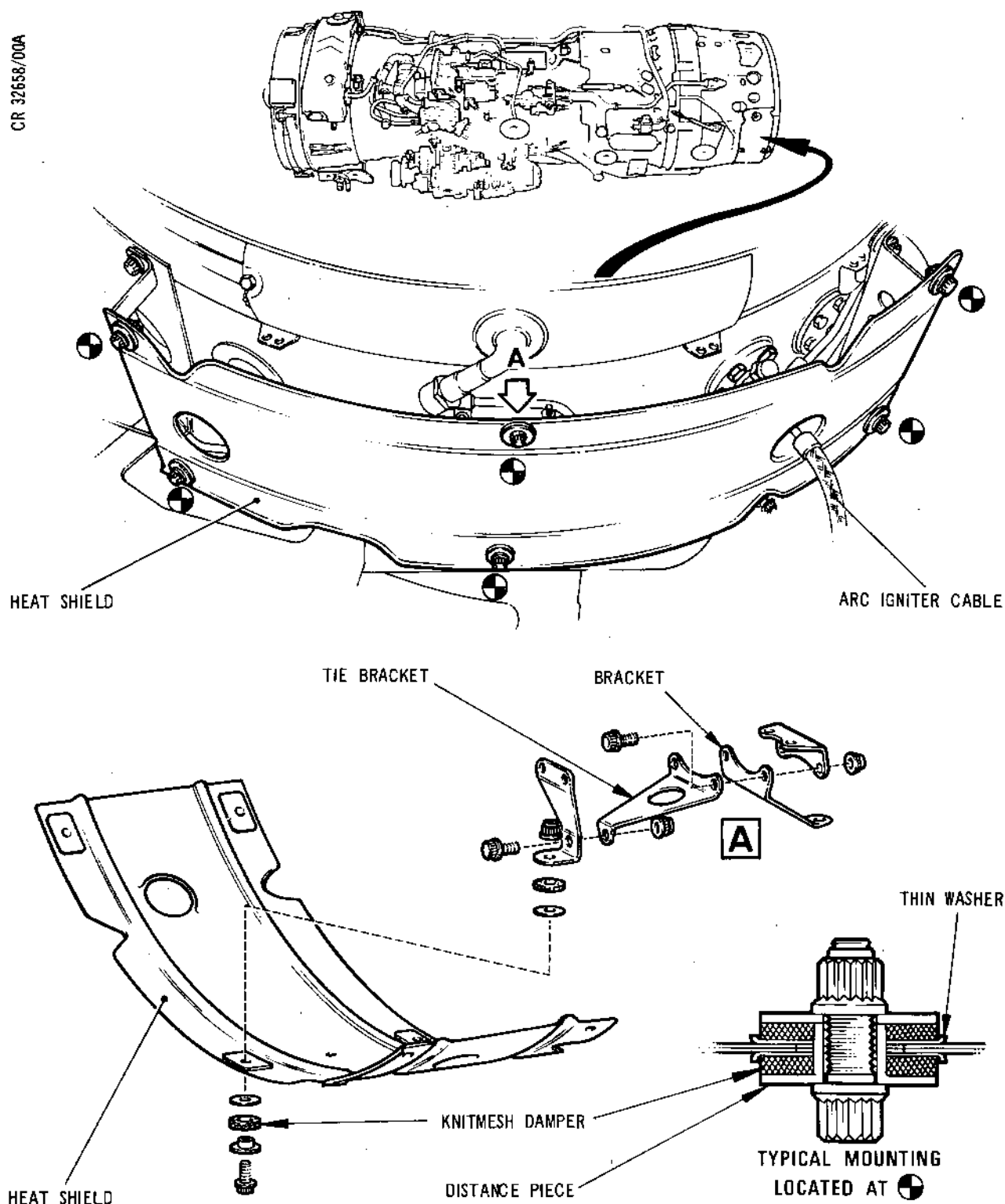
CR 3258/00A



OLYMPUS 593

MK.610-14-28

OVERHAUL



Assembling Heat Shield  
Figure 515

ENGINE DESPATCH

71-00-03

Page 571

Jan 2/80

**OLYMPUS 593**MK.610-14-28  
OVERHAUL**B. Inspection Checks.**

- (1) Check that all approved modifications (electrical and mechanical) are incorporated as per the modification standard required.
- (2) Check that all accessory type and serial numbers recorded, are correct to those recorded in the original build accessory sheet.

**C. Assemble Engine Transportation Blanks.**

- (1) Remove all slave and temporary blanks and assemble the engine transportation blanks as detailed in Table 512 (Ref.Fig.516).

ITEM NO.	DESCRIPTION	LOCATION	QUANTITY
79-22-04 (1-900)	Protector	IDG oil feed and return tubes	2
71-73-02 (1-450)	Red-cap	Aircraft fuel failure drain tube (as required)	2
72-31-01 (6-900)	Taper plug	Front mounting points	4
71-20-00 (1-500)	Red-cap	Spherical bearing 'Y' mounting bracket	2
75-02-03 (1-650)	Blank	LP and HP turbine bearings cold vent outlet	1
71-79-01 (1-500)	Blank	IDG rear oil drain tube	1
75-02-10 (1-350)	Blanking plug	Air starter drain tube (front or rear)	1

Transportation Blanks  
Table 512 (Continued)

ENGINE DESPATCH

**71-00-03**Page 572  
Jan 2/80

TN18829

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

ITEM NO.	DESCRIPTION	LOCATION	QUANTITY
71-79-02 (1-500)	Blank cover	Hydraulic pump seal space drain tubes	2
71-79-02 (1-510)	Screwed blanking plug	Hydraulic pump seal space drain tube centre section	2
72-63-01 (3-400)	Blanking cover	Air starter position on right- hand gearbox	1
73-12-03 (1-910)	Plunger assembly	Main fuel inlet	1
	Seal ring	Above plunger	1
72-63-01 (6-120)	Blank cover	Main hydraulic pump position on right-hand gearbox	1
72-63-01 (6-270)	Blank cover	Standby hydraulic pump position on right-hand gearbox	1
71-73-01 (2-240)	Protective cap	Drains tank overboard outlet	1
75-03-01 (1-700)	Protector	Fuel heater overboard duct	1
72-22-01 (5-10)	Cover assembly	Air intake	1
75-02-02 (1-710)	Protector	Oil tank overboard vent	1
72-63-01 (8-180)	Blank assembly	IDG position on right-hand gearbox	1

Transportation Blanks  
Table 512 (Continued)

ENGINE DESPATCH

**71-00-03**

Page 573

Jan 2/80

PRINTED IN ENGLAND

TN573

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

ITEM NO.	DESCRIPTION	LOCATION	QUANTITY
73-12-01 (1-900)	Red-cap	Fuel recirculating valve	1
72-54-01 (7-10)	Cover assembly	Exhaust diffuser	1
75-02-06 (1-260) 72-02-07 (1-320)	Protector	HP compressor labyrinth right and left-hand overboard vents	2
75-02-01 (1-450)	Protector	LP and HP compressor thrust bearings overboard vent	1
71-73-06 (1-250)	Protector	Exhaust diffuser hot drain	1
73-21-01 (1-800)	Protective cap	FCU HP shut-off valve connection (two electrical connections)	2
73-11-02 (1-500)	Protector	Second stage fuel pump	1
75-02-02 (1-710)	Red cap	Oil tank overboard vent alternator drain connection	1

Transportation Blanks  
Table 512 (Concluded)

TN12868

ENGINE DESPATCH

**71-00-03**

Page 574

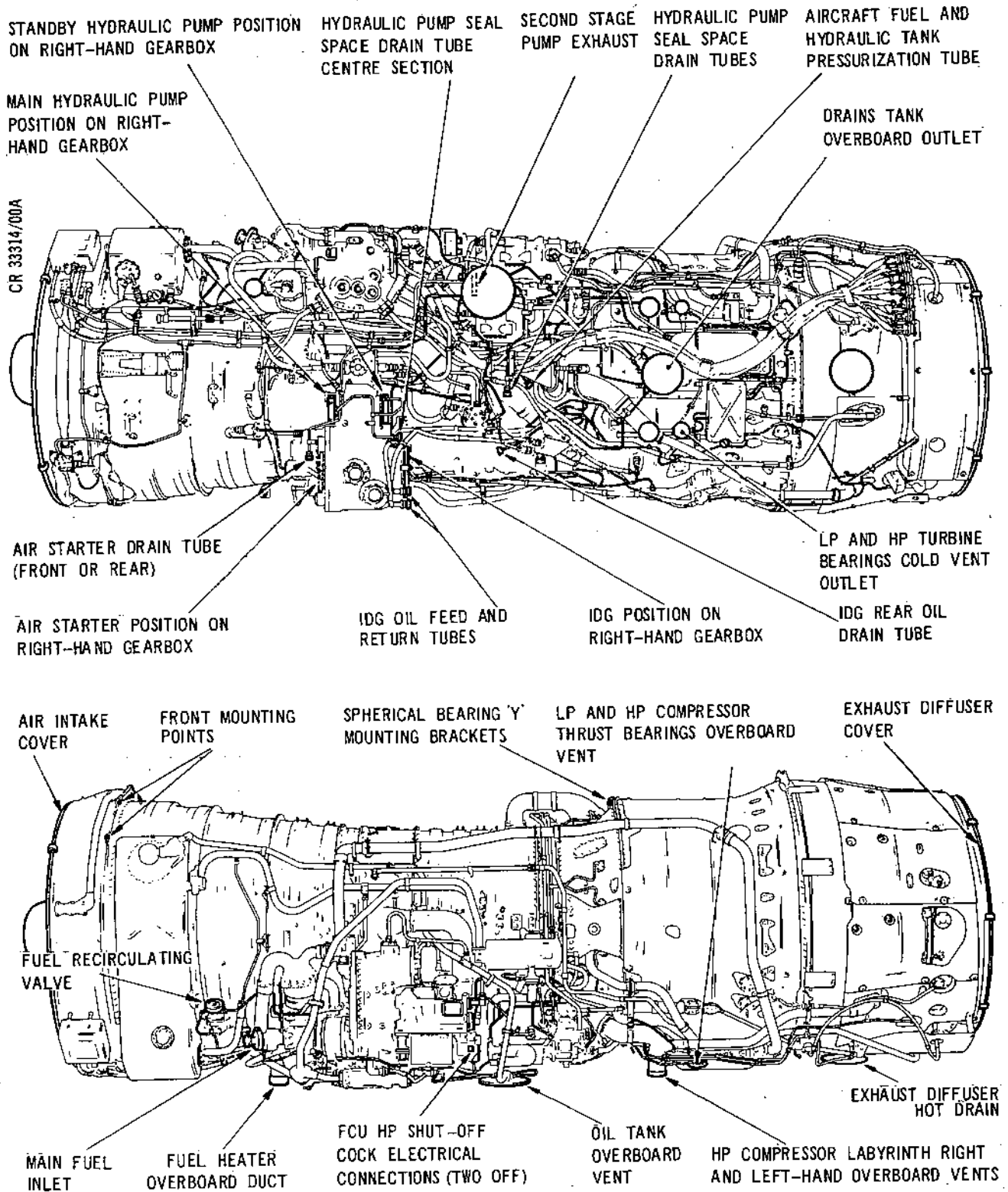
Jan 2/80



OLYMPUS 593

MK. 610-14-28

OVERHAUL



Assembling Engine Transportation Blanks  
Figure 516



OLYMPUS 593

MK.610-14-28  
OVERHAUL



SNECMA

D. Clean Engine.

- (1) Thoroughly clean the exterior of the engine with the approved solution i.e. kerosene or a soap and water solution.

E. Remove Engine from Rollover Stand and Assemble to Mobile Engine Stand or Trolley.

- (1) Remove engine from rollover stand (Ref.Fig.503).
  - (a) Position the engine in the 'Flight' position and lock the rollover rings with the retaining pins.
  - (b) Release and remove the eight bolts securing the top half of the rear rollover ring, then lift the top half clear of the engine.
  - (c) Attach the lifting equipment (Tool 2501) to the top lifting brackets of the engine at the intermediate case/HP compressor case flanges and at the delivery case/CCOC case flanges.
  - (d) Support the engine with the overhead hoist.
  - (e) Release the tension on the suspension spigots on the top half of the front rollover ring, ensuring that the engine is correctly balanced on the lifting equipment.
  - (f) Remove the pins securing the suspension spigots to the lower lifting points of the LP compressor casing/air intake flange.
  - (g) Release and remove the eight bolts securing the top half of the rear rollover ring, then lift the top half clear of the engine.
- (2) Raise the engine clear of the rollover stand.
- (3) Assemble the top halves of the rollover rings to the rollover stand.

ENGINE DESPATCH

71-00-03

Page 576

Jun 30/01





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Assemble the engine to the mobile engine stand (Tool 1265) as detailed in 2.B.(6), (7) and (8), or to trolley (Tool 1266) as follows:
- (a) Remove the rollover trunnion bushes from the engine trunnions and assemble to the rollover stand.
  - (b) Remove the trunnion adapters (Tool 1177 and 1193) from the trolley or mobile engine stand and assemble to the engine trunnions and secure with retaining pins.
  - (c) Lower the engine into the trolley (Tool 1266) until the trunnion adapters locate in the trunnion locations. Secure the right and left-hand engine front leg supports to the LP compressor case front flange.
  - (d) Secure the trunnion adapters with the pedestal clamps.
  - (e) Remove lifting equipment.

F. Carry Out C. of G. Check and Weigh Engine (Ref.Fig.517 and 518).

- (1) Attach the steelyard balance to the overhead hoist and adjust the balance weights until the balance pointers of the steelyard are in line.

NOTE: Prior to the next operation, weigh the C. of G. sling (Tool 1276) and mark the weight at some convenient position on the sling.

- (2) Attach the C. of G. sling (Tool 1276) to the steelyard then attach the C. of G. sling to the top lifting points on the engine at the intermediate case/HP compressor case flange and at the delivery case/CCOC case flanges.

PRINTED IN ENGLAND

TN12869

ENGINE DESPATCH

71-00-03

Page 577

Jan 2/80



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



- (3) Release and remove the trunnion pedestal clamps from the trunnion adapters.
- (4) Raise the engine clear of the trolley or stillage and remove the trunnion adapters from the engine trunnions.
- (5) Remove the transportation blanks from the Air Inlet and Exhaust Diffuser.
- (6) Position a spirit level at the location provided on the C. of G. sling, adjust the sling handwheel until the engine is level as indicated by the spirit level.
- (7) Note the indicated reading shown on the scale of the C. of G. sling.

NOTE: The indicated reading shown on the sling scale is not the C. of G. of the engine.

- (8) Use the correction chart (Ref.Fig.518) to determine the C. of G. of the engine, record the C. of G. in the engine records.

NOTE: The mean C. of G. of the engine from the correction chart will be 12.3 in. (302,42 mm)  $\pm$  0.25 in. (6,35 mm) forward of the engine trunnions.

- (9) Weigh the engine.

NOTE: The weight of the engine is determined in the engine state existing after finalising these despatch procedures, e.g. the engine will be weighed without the IDG, the Main and Standby Hydraulic Pumps and the Air Starter.

TN18830

ENGINE DESPATCH

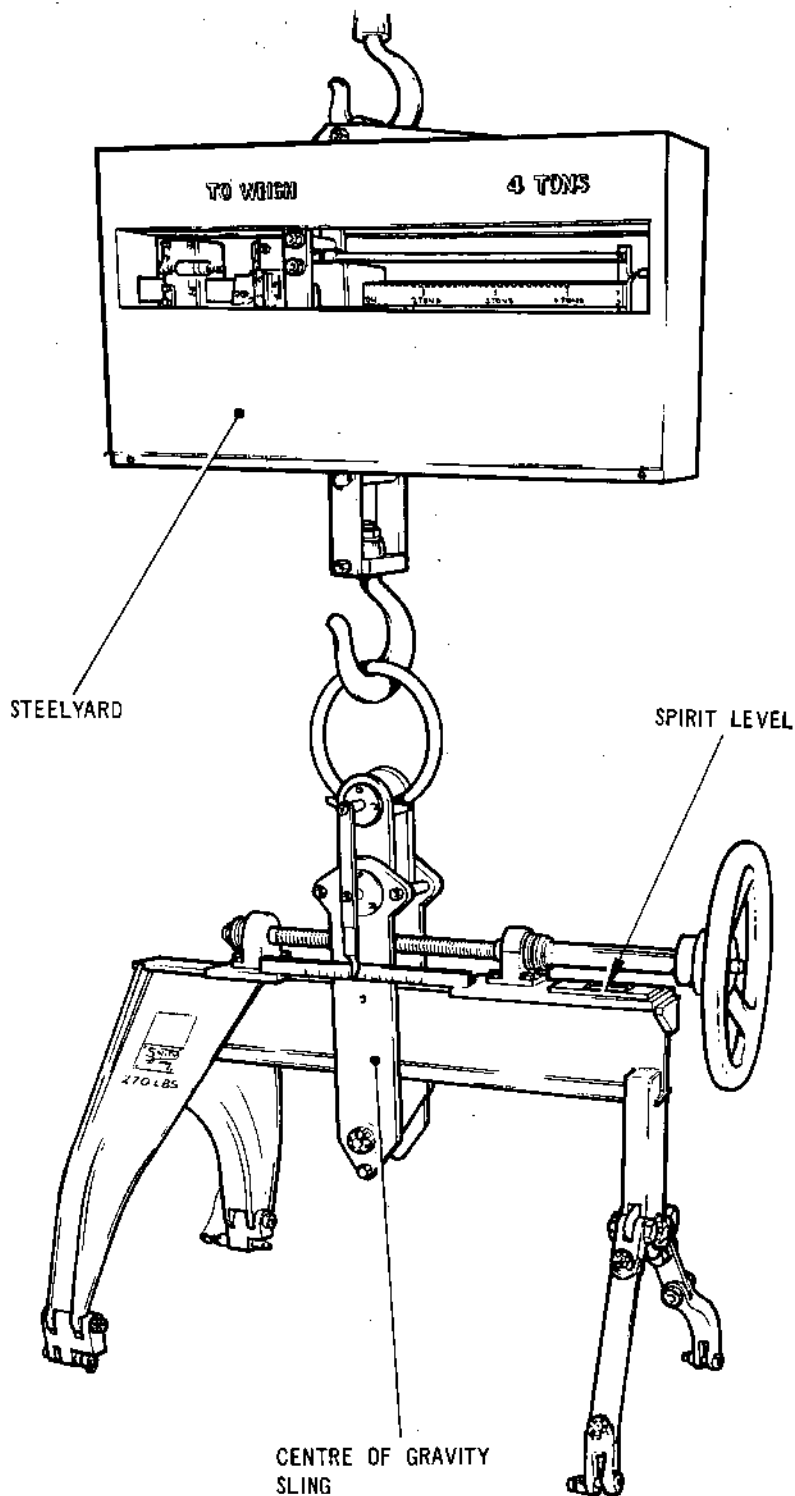
71-00-03

Page 578  
Jan 2/80



OLYMPUS 593

MK. 610-14-28  
OVERHAUL



C. of G. Check and Weigh Engine  
Figure 517

ENGINE DESPATCH

**71-00-03**

Page 579

Jan 2/80



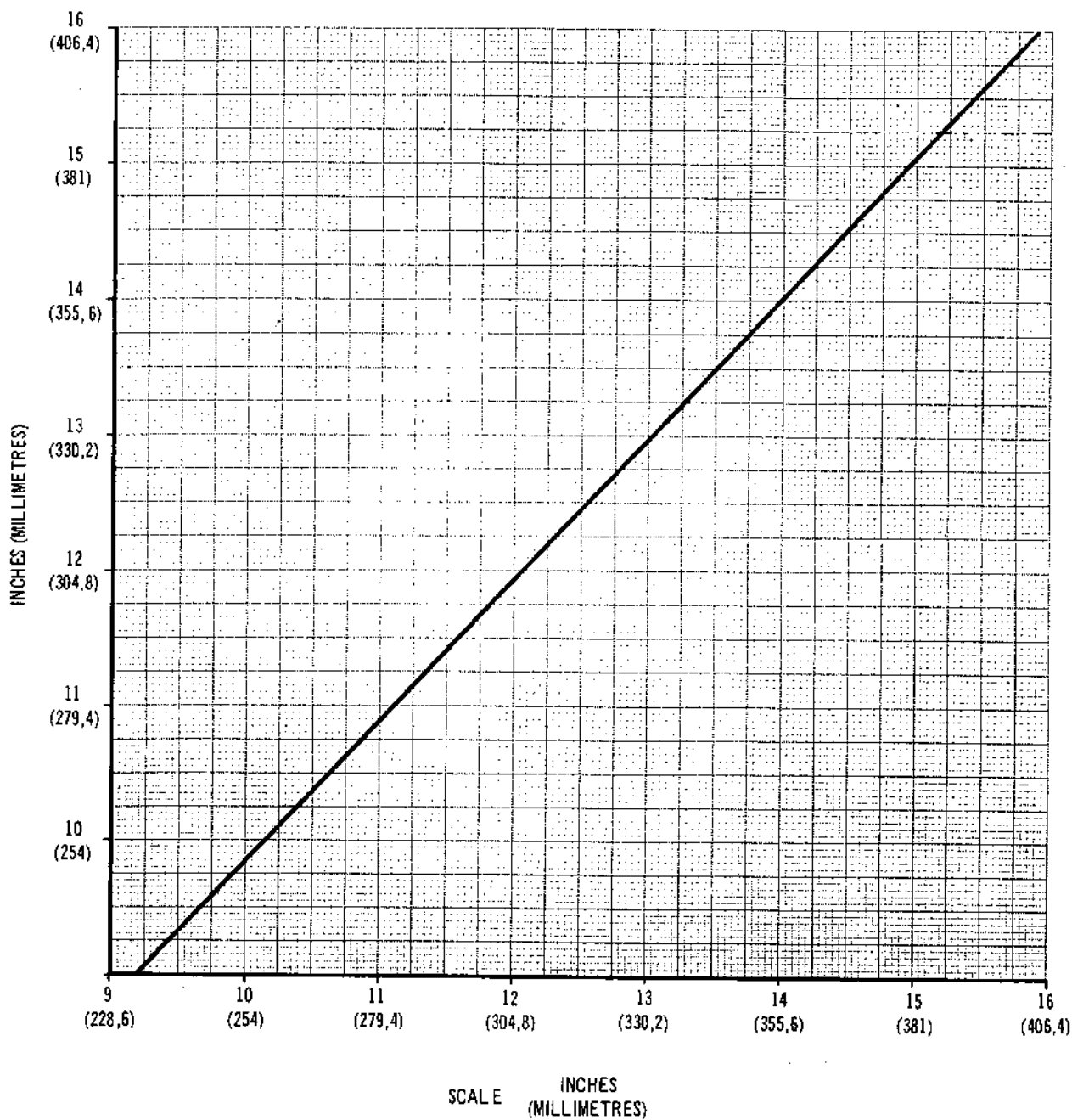
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 3378/00A

CENTRE OF GRAVITY OF ENGINE FORWARD OF TRUNNIONS



1N26497

Correction Chart for C. of G. Sling Scale  
Figure 518

ENGINE DESPATCH

71-00-03

Page 580

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (10) Deduct the weight of the C. of G. sling from the weight of the engine established in (9), the resultant engine weight must be 6600 lb (2993,8 kg)  $\pm$  82.5 lb (37,45 kg), record the weight in the engine records in accordance with the accessories standard of the engine.
- (11) On completion of the C. of G. and engine weight checks assemble the transportation blanks to the air inlet and exhaust diffuser. Assemble the trunnion adapters to the engine trunnions.
- (12) Lower the engine into the trolley or mobile engine stand and secure with the pedestal clamps then secure the engine front supports.
- (13) Remove C. of G. sling and steelyard.
- G. Install Engine in Moisture and Vapour Proof Bag (MVP) (Ref.71-00-03 Storage Instructions).
- H. Complete Engine Records and Despatch Engine.

PRINTED IN ENGLAND

TN44453

ENGINE DESPATCH

**71-00-03**

Page 581

Jan 2/80



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

## INSTALLATION OF ENGINE IN MOISTURE AND VAPOUR PROOF BAG AND TRANSPORTATION STAND

### TABLE OF CONTENTS

Para.	Page
1. General ... ..	901
2. Install the Engine in the MVP Bag ... ..	901
A. Prepare the Transportation Stand ... ..	901
B. Prepare the Engine and Install in the MVP Bag/Stand ... ..	903
C. Seal Engine in the MVP Bag ... ..	903

### TABLE OF ILLUSTRATIONS

Fig.No.	Page
901 Transportation Stand and MVP Bag ... ..	902
902 Prepare and Install Engine in MVP Bag ... ..	904
903 Seal MVP Bag... ..	906

STORAGE INSTRUCTIONS

## 71-00-03

Contents 1  
Jun 30/01

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

INSTALLATION OF ENGINE IN MOISTURE AND VAPOUR PROOF BAG AND  
TRANSPORTATION STAND

1. General

On completion of overhaul, testing and engine despatch procedures the engine is installed in a moisture and vapour proof (MVP) bag for protection of the engine during storage and transportation.

NOTE: For engines being despatched by cargo aircraft, ensure that the engine is assembled to the light weight stand (Tool 3167) which is specifically designed for use in cargo aircraft.

NOTE: For engines being despatched or stored locally ensure the engine is assembled to the mobile storage stand (Tool 1780 or 3166).

2. Install the Engine in the MVP Bag (Tool 3168)

A. Prepare the Transportation Stand (Ref.Fig.901).

- (1) Remove the left and right-hand trunnion blocks and the left and right-hand engine front supports from the transportation stand.
- (2) Carefully unpack the MVP bag from the container, unfold and inspect for damage.  
  

CAUTION: CARE MUST BE TAKEN WHEN HANDLING MPV BAG IN CLOSE PROXIMITY OF ENGINE OR STAND TO AVOID DAMAGE TO MVP MATERIAL.
- (3) Carefully spread the MVP bag over the transportation stand. Align the four holes of each trunnion block location of the MVP bag with the trunnion block locations of the stand.
- (4) Assemble the right and left-hand trunnion blocks to the MVP bag and stand then secure each with four nuts and bolts.
- (5) Align the engine front mounting locations of the MVP bag with the engine front mounting locations of the stand, assemble the right and left-hand engine front mountings to the MVP bag and stand, and secure each with four nuts and bolts.

STORAGE INSTRUCTIONS

**71-00-03**

Page 901

Jun 30/01

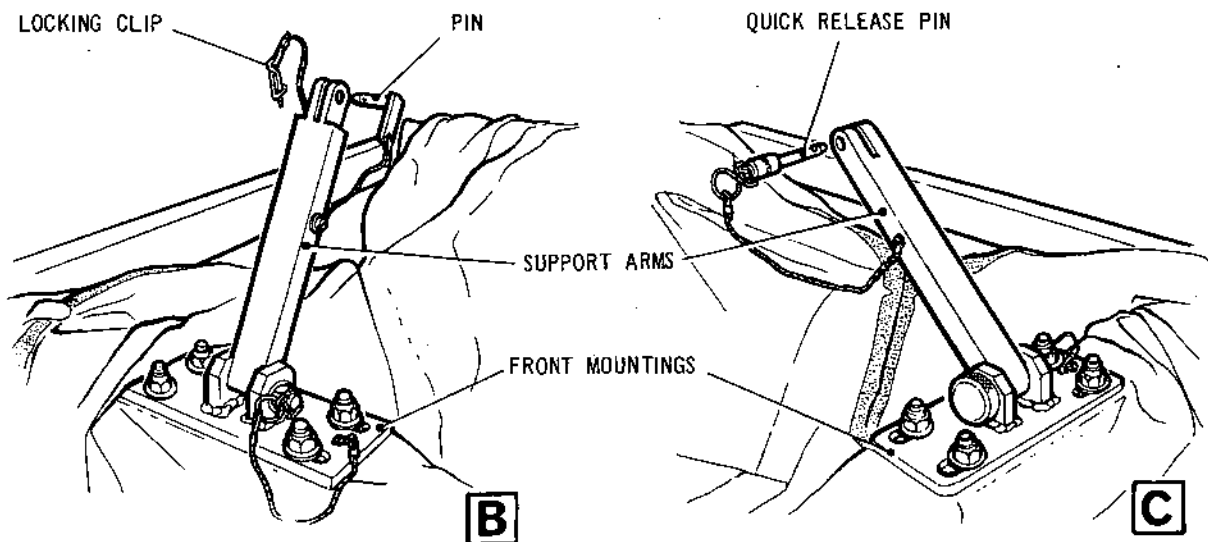
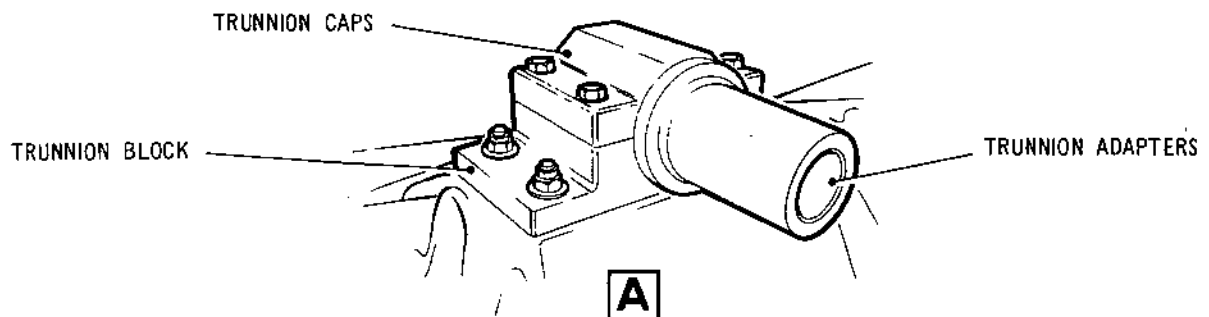
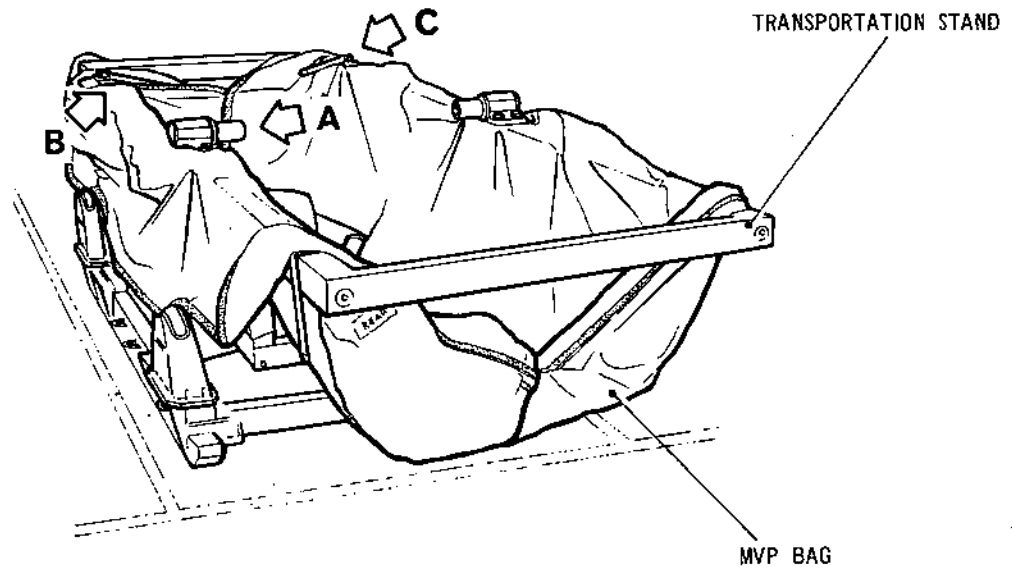


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33015/00A



Transportation Stand and MVP Bag  
Figure 901

STORAGE INSTRUCTIONS

**71-00-03**

Page 902  
Aug 27/75





OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

B. Prepare the Engine and Install in the MVP Bag/Stand (Ref.Fig.902).

- (1) Assemble the lifting equipment (Tool 2501) to the lifting brackets on the engine at the intermediate case/HP compressor case flanges and at the delivery case/combustion chamber outer case (CC0C) flanges.
- (2) Support the engine, and release and remove the pedestal clamps from the trunnion brackets on the trolley.
- (3) Release the engine front supports from the LP compressor case and raise the engine clear of the trolley.
- (4) With the engine suspended at a suitable working position and using a suitable protective padding material, cover all sharp protrusions on the engine to prevent any chafing on the MVP bag.
- (5) Remove the trunnion caps and adapters from the trunnion blocks, then assemble the trunnion adapters to the engine trunnions.
- (6) Position the engine over the stand and MVP bag and lower the engine carefully until the trunnion adapters are just in position.
- (7) Attach the stand front support arms to the engine mounting ring with the quick release pin on the right-hand side and a pin and locking clip on the left-hand side, release the tension from the overhead hoist and remove lifting equipment.
- (8) Assemble the trunnion caps onto the trunnion blocks and secure with four bolts. Wire-lock the bolts.

C. Seal the Engine in the MVP Bag (Ref.Fig.903).

- (1) Place 45 lbs (20.4 Kgs) of fresh silica gel into clean dry bandoliers and place over the engine with grease proof paper interposed between the bandoliers and the engine.
- (2) Locate a humidity indicator in the MVP bag window, then assemble the MVP bag support straps to remove any possibility of strain on the seal.

STORAGE INSTRUCTIONS

71-00-03

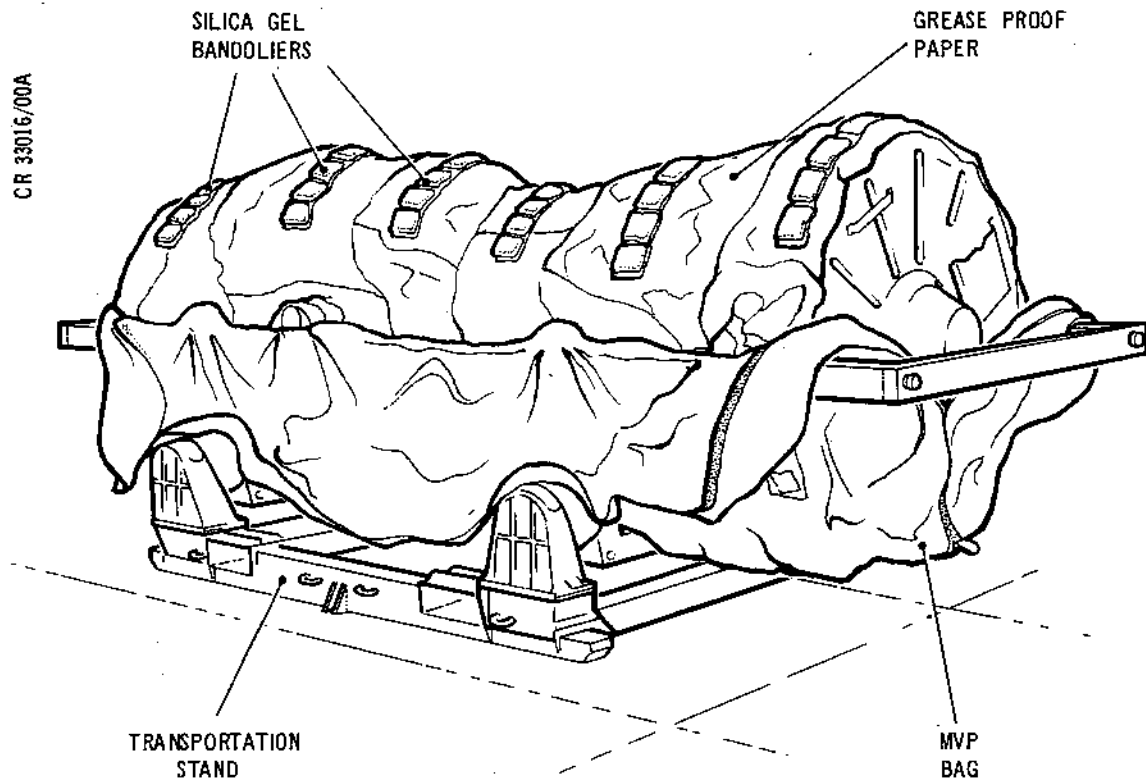
Page 903

Jun 30/01



OLYMPUS 593

MK. 610-14-28  
OVERHAUL



Prepare and Install Engine in MVP Bag  
Figure 902

STORAGE INSTRUCTIONS

**71-00-03**

Page 904  
Aug 27/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Using the sealing tool provided with the MVP bag, seal the bag ensuring that the inner and outer sealing sections are fully engaged over the total length of the sealing section. Engage press stud tabs and support straps as soon as is practicable to remove strain from sealing section.
- (4) Examine the exterior of the MVP bag for damage and carry out any repairs necessary using the repair kit provided with the MVP bag.
- (5) Examine the humidity indicator after 24 hours. If the humidity indicator has turned pink then the bag must be resealed. Open the bag, discard the silica gel and recharge the dry bandoliers with 45 lbs (20.4 Kgs) of fresh silica gel and reseal the engine as detailed in para.(1), (2) and (3). If the humidity indicator remains blue after the 24 hours time delay from sealing, complete the engine records.

PRINTED IN ENGLAND

TN30845

STORAGE INSTRUCTIONS

**71-00-03**

Page 905  
Aug 27/75

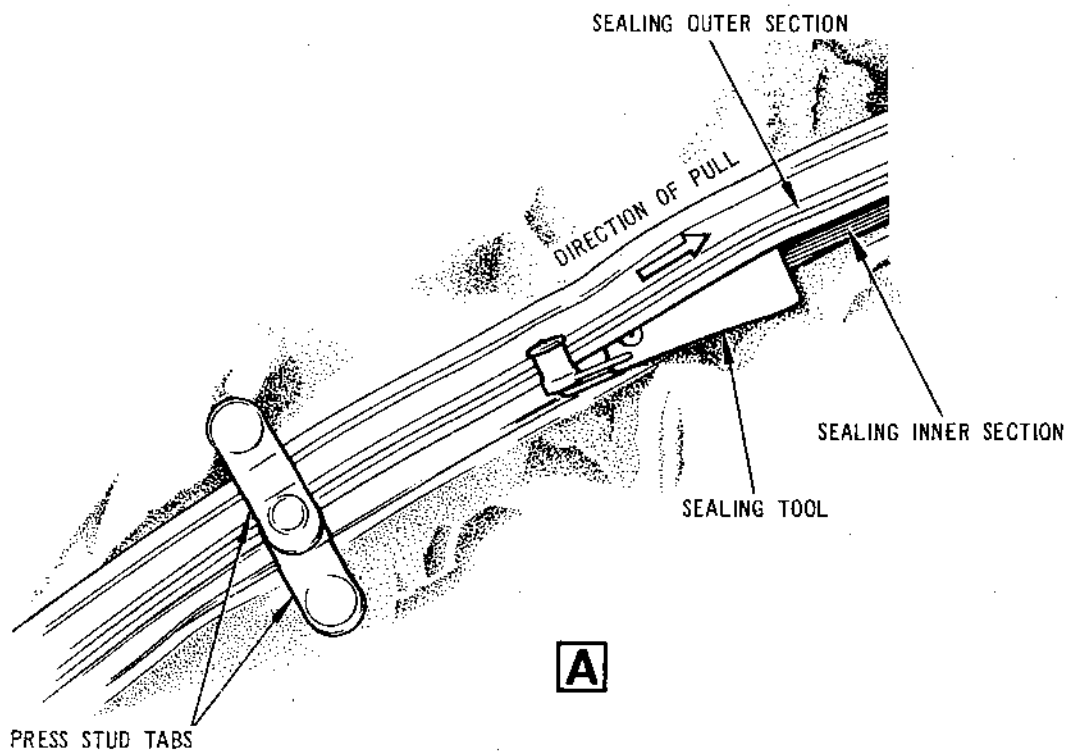
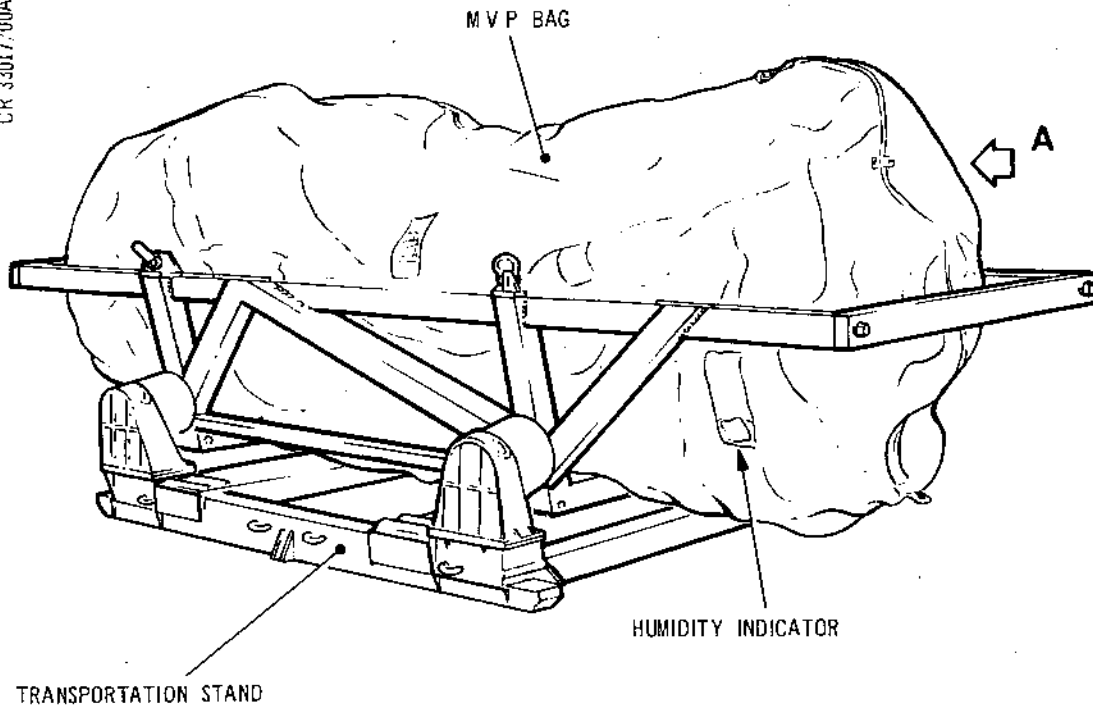


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33017/00A



Seal MVP Bag  
Figure 903

STORAGE INSTRUCTIONS

**71-00-03**

Page 906  
Aug 27/75

TN16103



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

PREPARE ENGINE FOR DESPATCH - SPECIAL TOOLS,  
FIXTURES AND EQUIPMENT

1. General

- A. The special tools, fixtures and equipment listed in Table 1001 are those required to prepare the engine for despatch.
- B. The tools have been listed in order of usage, and the Tool Ref.No. is the number quoted in the text.
- C. The tools have been illustrated in order of usage, but tools used in more than one aspect of overhaul will only be illustrated once. Additional illustrations of tooling in operation (as thought necessary), are included in the text in the appropriate section.

2. Engine Despatch Tools

TOOL REF.NO.	MANUFACTURER PART NO.	DESCRIPTION
2501	LG.10976	Lifting equipment, engine
1265	P3C.865977	Mobile Engine Stand
1177	P3C.857348	Trunnion adapter LH
1193	P3C.858944	Trunnion adapter RH
1756	PJ.1246919	Bracket LH) for use with
1083	PJ.1246920	Bracket RH) support plate (808)
261	P3C.1073000	Mounting bracket
808	P3C.1089461	Support plate and stay
1760	PG.1246918	Gauging bracket, front
1761	PG.1246984	Gauge
1762	PG.1246983	Gauge
1757	PJ.1246982	Container, gauging bracket
1763	PG.1246923	Gauging bracket, rear
1764	PG.1246926	Gauge
1765	PG.1246925	Gauge
1766	PG.1246928	Gauge
1150	PJ.1246921	Container, gauging bracket
94	P3C.1050115	Rollover stand, motorized
1023	P3C.689808	Alignment bar
3009	PE.26472	Drain adapter, oil tank
1783	P3C.1257462	Drain adapter, fuel
944	PJ.1246854	Extractor, fuel filter element
801	P3C.1264697	Container, filter element

Despatch Tools  
Table 1001 (Continued)

SPECIAL TOOLS ETC

71-00-03

Page 1001

Jun 30/01

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

SNECMA

TOOL REF.NO.	MANUFACTURER PART NO.	DESCRIPTION
1708	RL.114529	Test block
1619	P3C.871927	Wrench, universal
1620	P3C.871928	Wrench, universal
1621	P3C.871929	Wrench, universal
1622	P3C.871930	Wrench, universal
1623	P3C.871931	Wrench, universal
1624	P3C.871932	Wrench, universal
1528	P3C.1089111	Spanner, oil tubes
1268	P3C.865987	Lifting equipment, IDG
1480	P3C.1065044	Spanner, air tubes
956	P3C.1229377	Lifting equipment, air starter
1529	P3C.1089171	Spanner, tubes
1774	P3C.1229347	Spanner, reheat spray ring
1769	P3C.1262680	Protector, TJ harness
1535	P0.1255624	Container, protector
1770	P5G.1262678	Setting equipment, TJ harness and reheat injection system
1534	PT.1089480	Spanner, tubes
948	P3C.1229345	Adapter, torque setting
908	P3C.1223160	Adapter, torque wrench
814	PE.21500	Test console, electrical harness
2604	PE.21200	JPT test set
1266	PJ.865978	Mobile trolley, engine
1276	P3C.867203	C. of G. sling
	-	Steelyard, engine weighing balance (Ashworth Ross and Co. Ltd., Densbury)
3167	LG.11204	Transit Stand
1780	PE.17701	Transit Stand
3166	LG.11381	Transit Stand
3168	LG.10509	MVP Bag

Despatch Tools  
Table 1001 (Concluded)

SPECIAL TOOLS ETC

**71-00-03**

Page 1002

Jun 30/01



OLYMPUS 593

MK.610-14-28

OVERHAUL



STANDARD PRACTICES - DISASSEMBLY

TABLE OF CONTENTS

Para.	Page
1. General	101
2. Locking Devices	101
A. Split Cotter Pins and Lockwire Removal	101
B. Clipnut Assemblies Removal	102
3. Quick Attach/Detach (QAD) Coupling	102

TABLE OF ILLUSTRATIONS

Fig.No.	Page
101 Disassembling QAD Couplings	103

DISASSEMBLY

71-09-00

Contents 1

Mar 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



## STANDARD PRACTICES - DISASSEMBLY

### 1. General

- A. Disassembly comprises of removing the electrical harness, tubes and components from the engine and then dismantling each assembly, if applicable, to a sufficient depth to facilitate subsequent overhaul procedures.
- B. During the disassembly procedures it is assumed that all normal locking devices will be released prior to removing bolts, nuts, etc.
- C. When disconnecting tubes having union nut type end fittings, the adapter and/or tube shall be prevented from turning with the union nut by using the appropriate wrenches.
- D. Approved blanks and covers shall be installed on the electrical plugs, tubes and components at the appropriate stages of disassembly to protect joint faces, and also to prevent the ingress of foreign matter.
- E. An initial examination of components shall be carried out as they are removed, and any evidence of defects which may be removed by cleaning shall be noted on the inspection report. These components shall then be passed to inspection for assessment of defects prior to cleaning.
- F. All self-locking nuts, captive nuts and inserts are reusable providing that they satisfy the Inspection/Check examination (Ref.72-09-00) and the locking (run-down) torque requirements specified in the relevant Sub-assembly Chapter.
- G. Appropriate measures shall be taken to collect spillage of oil, fuel, etc. as tubes and components are disconnected and/or removed.
- H. Where special containers and pallets are specified, they must be used to segregate and protect components after disassembly. Where special containers are not specified, use other suitable containers to fulfil the same purpose.

### 2. Locking Devices

- A. Split Cotter Pins and Lockwire Removal.
  - (1) Split cotter pins must be removed and locking wire must be cut and removed prior to releasing nuts, etc.

DISASSEMBLY

71-09-00

Page 101

Nov 1/78





OLYMPUS 593

MK.610-14-28  
OVERHAUL



(2) Split cotter pins and locking wire shall be scrapped.

B. Clipnut Assemblies Removal.

(1) Insert the tapered thin edge of a suitable lever between the mating component and the spigot side of the clip.

(2) Turn the lever to lift the spigot from its socket and withdraw the spigot.

3. Quick Attach/Detach (QAD) Couplings (Ref.Fig.101)

- A. Support the assembly to be removed with the specified lifting equipment.
- B. Unscrew and remove the coupling ring clamping bolt and spherical washer.
- C. Use the specified drift against the flat face of the release anvil and drive the coupling ring in the direction to separate the trunnions until it is just loosened.
- D. Turn the coupling ring by hand until the threads disengage and align with their withdrawal slots.
- E. Withdraw the assembly.
- F. Install the appropriate blanks.

TN8000

DISASSEMBLY

71-09-00

Page 102

Sep 1/80



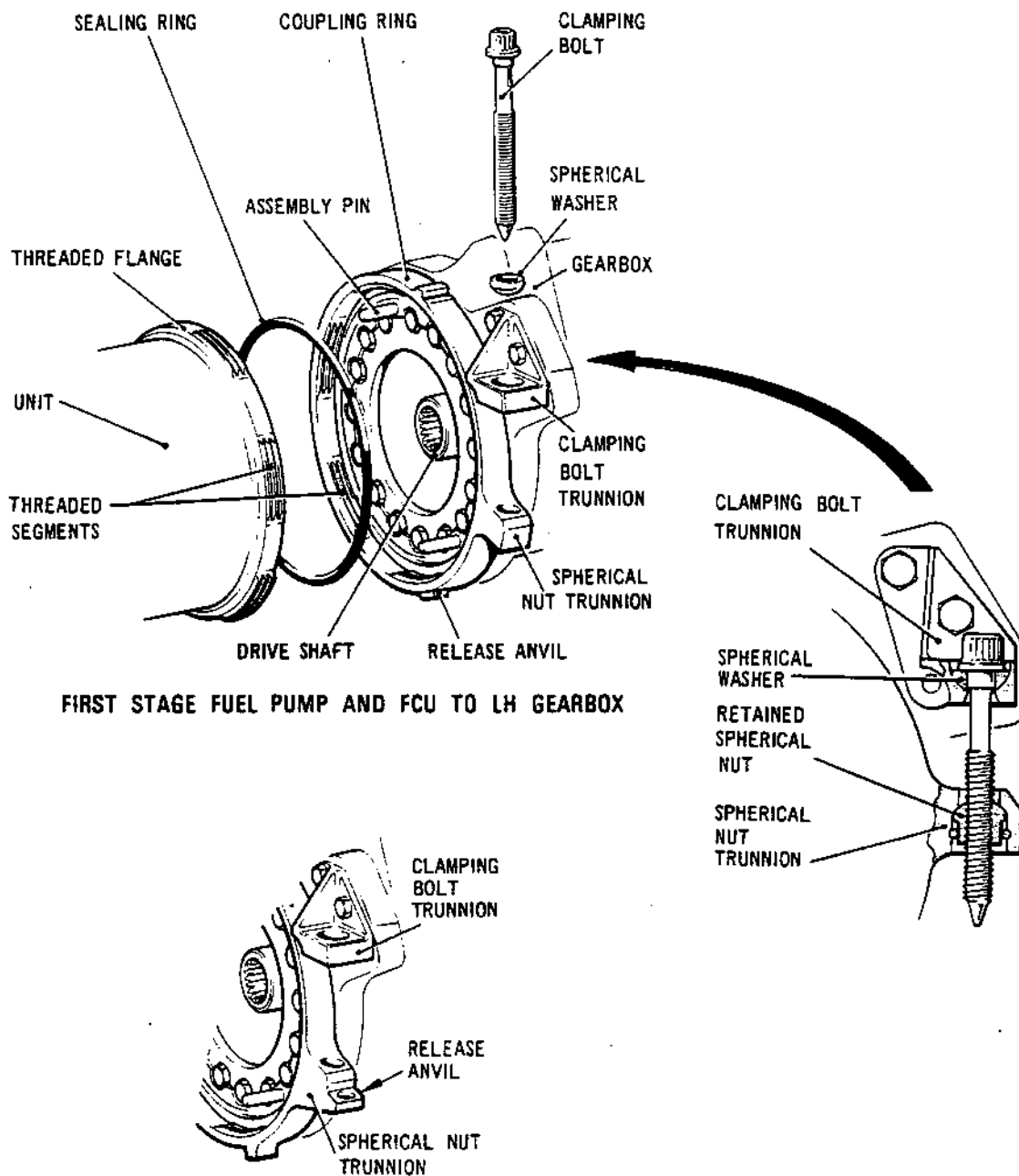
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 3435/008



FIRST STAGE FUEL PUMP AND FCU TO LH GEARBOX

AIR STARTER AND IDG TO RH GEARBOX

Disassembling QAD Couplings  
Figure 101

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



sneema

STANDARD PRACTICES - ASSEMBLYTABLE OF CONTENTS

Para.		Page
1.	General ... ..	501
2.	Use of Lubricants, Sealing and Jointing Compounds and Consumable Materials ... ..	502
	A. General ... ..	502
	B. Thread Lubricants ... ..	502
	C. Jointing Compounds ... ..	505
3.	Torque-tightening ... ..	505
	A. General ... ..	505
	B. Using Adapters with Torque Wrenches ... ..	506
	C. Components with Locking Features Requiring Alignment ... ..	508
4.	Components with Friction Type Locking Features ... ..	508
	A. Locking (Run-down) Torque Check ... ..	508
5.	General Locking Procedures ... ..	511
	A. Wire-locking... ..	511
	B. Method of Wire-locking Electrical Plugs ... ..	511
6.	Electrical Harness ... ..	513
	A. Method of Lacing Looms ... ..	513
	B. Method of Lacing Junctions ... ..	514
	C. Cable Twisting and Plaiting ... ..	516
	D. Clamp Marking Using Coloured Lacing Braid ... ..	516
	E. Unique Point Clamp Marking Using Coloured Lacing Braid ... ..	518
	F. Securing Tape Markers to Harness Assemblies ... ..	518
	G. West Country Whipping ... ..	518
	H. Loom Clearances ... ..	522
7.	Tubes ... ..	522
	A. Rigid and Flexible Tubes... ..	522
8.	Blanking ... ..	523
	A. Engine Final Assembly ... ..	523
9.	Quick Attach/Detach (QAD) Couplings ... ..	523
	A. Prepare the Components ... ..	523
	B. Assemble the Components ... ..	525
	C. Tighten the Coupling Ring ... ..	525

ASSEMBLY

**71-09-00**

Contents 1

Jun 1/96

**OLYMPUS 593**MK.610-14-28  
OVERHAULTABLE OF ILLUSTRATIONS

Fig.No.		Page
501	Using Adapter with Torque Wrenches ... ..	507
502	General Wire-locking ... ..	510
503	Method of Wire-locking Electrical Harness Plugs ...	512
504	Methods of Lacing Loom and Junctions... ..	515
505	Cable Twisting and Plaiting ... ..	517
506	Clamp Marking Using Coloured Braid ... ..	519
507	Securing Tape Markers to the Harness ... ..	520
508	West Country Whipping ... ..	521
509	Assembling QAD Couplings... ..	524

LIST OF TABLES

Table No.		Page
501	Lubricants, Joint and Sealing Compounds, Cables and Consumable Materials ... ..	503
502	Locking Torque Limits for Captive and non- Captive Self-locking Nuts and Locking Screw Thread-Inserts ... ..	509
503	Wire-locking Pitch Ratio... ..	511
504	Table no longer Required	-
505	Distance Between Cable Lacings... ..	514

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

STANDARD PRACTICES - ASSEMBLY1. General

- A. Before commencing assembly, check the inspection records/ reports to ensure that all components are cleared for assembly, having had any repairs or modifications called for embodied.
- B. Prior to assembly, examine all components to ensure that they have not been damaged during storage or transit, and that they are clean.
- C. When installing or connecting items or units during the assembly sequence, ensure that joint faces and sealing ring grooves are clean and free from damage.
- D. During assembly, all blanks and covers shall be left in position until the assembly sequence necessitates their removal, in order to protect protruding items and joint faces and to prevent the ingress of foreign matter. The appropriate engine blanks and covers shall be installed at the completion of engine final assembly.
- E. Throughout the assembly, reference is made to the Modification (Mod) No. or Service Bulletin (S.B.) No. to accommodate engines of varying standards brought about by the introduction of modifications. Where direct replacement occurs unaffected the assembly sequence, the S.B. or Mod. will not be quoted, but the Illustrated Parts Catalogue (I.P.C.) reference will denote the S.B. or Mod., enabling the engine to be built to the standard required. For information on the relationship of Mod. and S.B., refer to the Service Bulletin Index, and for embodiment information (if applicable), refer to the Service Bulletin folder.
- F. During assembly, all vital dimensions that must be obtained are referenced in the text to the appropriate section and Ref.No. of the Fits and Clearances Schedule (F.C.S.).
- G. All self-locking nuts, captive nuts and inserts that have passed the Inspection/Check examination are reusable providing that they satisfy the locking (run-down) torque specified in para.3.
- H. Nuts and bolts supplied with corrosion preventative coatings must be thoroughly cleaned to remove all traces of preservatives. Ensure that all surfaces are clean and dry before the application of the prescribed lubricant.

ASSEMBLY

**71-09-00**

Page 501

Jun 30/97



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

## 2. Use of Lubricants, Sealing and Jointing Compounds and Consumable Materials

### A. General.

**CAUTION:** EXTREME CARE MUST BE TAKEN TO ENSURE THAT MOLYBDENUM DISULPHIDE LUBRICANT IS NOT USED IN AREAS WHERE IT IS NOT SPECIFIED. MOLYBDENUM DISULPHIDE LUBRICANTS BREAK DOWN ABOVE 300 DEG. C RELEASING SULPHUR WHICH CAN INDUCE STRESS CORROSION AND PREMATURE FAILURE OF ENGINE PARTS SO LUBRICATED.

- (1) Where the application of a lubricant or sealing compound is necessary during assembly, it is specified by means of a letter, e.g. apply lubricant 'B'. Refer to Table 501 for specifications and approved brands for these materials.
- (2) Where the use of a consumable material is required during assembly, it is specified by the material nomenclature e.g., use silicone varnish. Where there is more than one material with the same nomenclature, they will be differentiated by a letter e.g., use lacing braid A. Refer to Table 501 for specifications and approved brands for these materials.

### B. Thread Lubricants.

- (1) Apply the recommended lubricant (Ref. appropriate Sub-assembly Chapter) immediately prior to assembly.
  - (a) Ensure that all traces of preservatives are removed and that the surfaces to be lubricated are clean and dry.
  - (b) Using a suitable small brush (if the viscosity of the lubricant permits), apply just sufficient lubricant to cover the following surfaces:

Nut to bolt or stud	...	Abutment face of nut and threads of bolt or stud
Setbolt	... ..	Abutment face of bolthead and threads of bolt
Retaining nut to shaft	...	Abutment face of nut and threads of shaft

ASSEMBLY

71-09-00

Page 502  
Jun 30/97

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

Printed in England

MATERIAL	SPECIFICATION	APPROVED BRANDS
<u>Lubricant</u>		
A	D.E.R.D.2497 Iss.3	Esso ETO 25 Mobil RM.193A-3 Shell Asto 555 (Shell ASTO 555 USA blended must be marked D.E.R.D. 2479 on the can) Royco Turbine Oil 555 Castrol 599
B	D.T.D.806B OMat 405B	AeroShell Grease 8 Rocol Aerospec 350
C	MSRR 4008	Rocol 251T
G	D.T.D.900/4980	Rocol G576 (Formerly Foliac G576) Polybutylcuprysil Grease
S	AIR 4247 (D.T.D.900/392B)	AeroShell Compound 08 Total 4247 Nycoset GA47
<u>Compound, Jointing</u>		
A	D.T.D.900/4344 (OMat 423)	Silkolene 762
C	D.T.D.900/4134A	Hermetite 1310
<u>Compound, Sealing</u>		
A	- OMat 843E	Silastoseal 'F', Midland Silicones Ltd. Silastic 734
B	OMat 843B	Silcoset 151

Lubricants, Jointing and Sealing Compounds, Cables and  
Consumable Materials  
Table 501 (Continued)

ASSEMBLY

71-09-00

Page 503  
Dec 31/01

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

MATERIAL	SPECIFICATION	APPROVED BRANDS
<u>Braid, Lacing</u>		
A	3100631 (OMat 274)	Tygadure T.085
B	Rand D.1127 (Black)	Nomex
C	3100631	
<u>Varnish, Silicone</u>		
	MS.996	Midland Silicones Ltd.
<u>Tape, Adhesive</u>		
	OMat 272	Scotch No.27 12 mm wide
<u>Tape, Sealing, Thread</u>		
0.5 in. (12,7 mm) wide B.427935		
<u>Tape, Glasscloth</u>		
A	128AP/10T	Fluoglas
B	3105718	Permacel P.212
C	U320585 (OMat 296)	Scotch No.69
D	U322806	Polymide Type 92 3M Ltd.
E	U322727	Symel SP1697
F	OMat 2/76	Scotch No.361
<u>Flux, Multicore</u>		
A	Type 366	
B	1544	Kester

Lubricants, Jointing and Sealing Compounds, Cables and  
Consumable Materials  
Table 501 (Continued)

ASSEMBLY

**71-09-00**Page 504  
Dec 31/00



**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

**MATERIAL****SPECIFICATION****APPROVED BRANDS**Wire, LockingLockwire A  
0,8 mmNimonic 90(MSRR.7015)  
Inconel 600(AMS 5687)Lockwire B  
0,5 mm diameter or  
0.022 in. diameterD.T.D.189A (OMat 2/97)  
D.T.D.198ATape, BindingU.321892 (OMat 2/18A) Rapidon  
OMat 280A Spirap TFECable, Electrical

A	BAS 9189-20	Size 20
B	Etude 41583	Filotex, size 16, fireproof
C	1150-2XA-AWG16	Size 16, two twisted cores, screened and jacketed, fireproof
D	BAS 9192-20	Size 20, two twisted cores, shielded and jacketed
E	33655EDT N2 or CD 1401	Size 20, Filotex ETUDE or TYGADURE
F	BAS 9194-20	Size 20, three cables twisted together
G	BAS 9190-20	Size 20, screened cable
H	BAS 9191-20	Size 20, two cables twisted together

Lubricants, Jointing and Sealing Compounds, Cables and  
Consumable Materials  
Table 501 (Continued)

ASSEMBLY

**71-09-00**Page 504A  
Dec 31/00

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

Printed in England

MATERIAL	SPECIFICATION	APPROVED BRANDS
J	Etude 45671	Filotex, size 20, two core, screened and jacketed
K	BAS 9189-16	Size 16
<u>Strip, Packing</u>		
A	B86531 (Silicone rubber B408LG reinforced with PRF52 fabric coated with B417)	Dunlop Precision Rubber Division.
<u>Solvents</u>		
1	OMat No.1/257	Desoclean 45 (PD680 Type 1)
	OMat No.1/257A	Desoclean 20
	OMat No.1/257B	Applied 8-300
	OMat No.1/257C	Applied 8-000
	OMat No.1/257D	Ardrox 5548
	OMat No.1/257E	MS 38
	OMat No.1/257F	MS 56
	OMat No.1/257G	Lotoxane
	OMat No.1/257H	Lotoxane Fast
	Odourless Kerosine -	
	OMat No.1/260	
	OMat No.102A	Stoddards Solvent (PD-680 Type 1)
	OMat No.102B	Safranor
	OMat No.1/270	Turco 6646
	OMat No.1/270A	Ardrox 161-K
	OMat No.1/267	Lemsolv
2	OMat No.150	Acetone
3	OMat No.1/257J	Primaclean 3650

Lubricants, Jointing and Sealing Compounds, Cables and Consumable Materials  
Table 501 (Continued)

ASSEMBLY

**71-09-00**

Page 5048

Dec 31/00

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

Printed in England

MATERIAL	SPECIFICATION	APPROVED BRANDS
4	Iso-Propyl alcohol (Propan-2-OL) OMat No.1/40 Methylated spirits - OMat No.155A	
5	Methylene chloride - OMat No.169	
<u>Resin</u>	OMat 8/35 (MSRR 9160)	ARALOK 210
<u>Inhibiting Fluid</u>		
A	D.E.F.STAN 91-44/1 (Previously D.E.F. 2001A) D.E.R.D.2490 Air 3515/B Air 3516/A	Aeroshell Fluid 1  Aeroshell Turbine Oil 3 Aeroshell Turbine Oil 3 Esso Turbo Oil 10F

Lubricants, Jointing and Sealing Compounds, Cables and  
Consumable Materials  
Table 501 (Concluded)

ASSEMBLY

**71-09-00**Page 504C  
Dec 31/00



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Tube end ...      ...      Union body threads and  
fittings                              ferrule groove or abutment  
   face mating with thrust wire  
   or nut respectively

- (2) Ensure that lubricant contamination on any other surface is removed immediately.

#### C. Jointing Compounds.

- (1) Ensure that the joint faces are smooth and free from burrs.
- (2) Clean the joint faces using a clean, lint free cloth moistened with a group 2 or 4 solvent (Refer to Table 501).
- (3) Apply a thin, even coating of jointing compound to both faces using a clean stiff bristle brush or a small flexible knife; leave a clear border (0.050 in. (1,27 mm) maximum width) around the inner edges of the joint thus preventing internal exuding.

NOTE: Sufficient compound should be applied to allow a slight exuding from the outer edges of the joint when it has been made.

- (4) A minimum of 10 minutes air drying time must be allowed before the joint is assembled.

ASSEMBLY

71-09-00

Page 504b

Dec 31/00



OLYMPUS 593



MK.610-14-28

SNECMA

OVERHAUL

- (5) Check the torque loading of joint securing nuts or bolts after a wait of at least 10 minutes after torque-tightening and, if necessary, restore to required value. Compound can slowly exude under pressure resulting in a considerable reduction of nut or bolt torque loading.
- (6) Remove surplus compound using a clean, lint free cloth moistened with a group 2 or 5 solvent (Refer to Table 501) before complete hardening occurs.

### 3. Torque-tightening

#### A. General.

- CAUTIONS:
1. EXTREME CARE MUST BE TAKEN TO ENSURE THAT MOLYBDENUM DISULPHIDE LUBRICANT IS NOT USED IN AREAS WHERE IT IS NOT SPECIFIED. MOLYBDENUM DISULPHIDE LUBRICANTS BREAK DOWN ABOVE 300 DEG C. RELEASING SULPHUR WHICH CAN INDUCE STRESS CORROSION AND PREMATURE FAILURE OF ENGINE PARTS SO LUBRICATED.
  2. IT IS OF THE UTMOST IMPORTANCE TO ENSURE THAT ALL FEED/SCAVENGE FILTERS AND MAGNETIC PLUG ASSEMBLIES ARE FULLY TORQUE-TIGHTENED ON ASSEMBLY. FAILURE TO DO THIS CAN RESULT IN OIL LEAKAGE IN FLIGHT WHICH MAY NOT BE APPARENT DURING GROUND CHECKS/RUNNING.
  3. WRENCHES USED FOR TORQUE-TIGHTENING MUST BE CALIBRATED AT REGULAR INTERVALS AGAINST A CERTIFIED CHECKING RIG. TORQUE WRENCH ACCURACY SHALL BE WITHIN  $\pm 5$  PER CENT.
- 
- (1) A specific torque loading is applied when tightening threaded components to ensure optimum security and to prevent overstressing which could result in subsequent failure.
  - (2) The torque loadings are specified in the relevant Sub-assembly Chapters, together with the applicable locking (run-down) torques where the component concerned has a friction type locking device.

ASSEMBLY

71-09-00

Page 505

Jun 1/99



OLYMPUS 593

MK.610-14-28  
OVERHAUL



SNECMA

- (3) Never exceed the stated maximum torque loading nor loosen an item when torque-tightened to obtain alignment of a locking device.
- (4) To ensure that the specified torque loading is achieved, the components must be lubricated as specified in para.2.A. and B.

**B. Using Adaptors With Torque Wrenches.**

NOTE: In certain instances a special adapter is specified to enable a torque wrench/adapter assembly to be calibrated on the checking rig, rendering the following calculations unnecessary.

- (1) When an adapter which alters the leverage is used with a torque wrench it is necessary to compensate the indicated torque reading accordingly.
- (2) If the adapter increases the effective leverage (Ref.Fig.501, detail A), the following formula must be used to determine the compensated wrench setting:

$$S = \frac{L \times T}{L + E}$$

where S = compensated wrench setting  
L = effective length of wrench  
E = effective length of adapter  
and T = required torque loading

NOTE: When using this and similar formulae, all quantities must be expressed in similar units, i.e. wrench length in feet if required, torque is in lbf ft.

ASSEMBLY

71-09-00

Page 506  
Dec 31/99

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

- (3) For example, to find the compensated wrench settings when using a 10 in. wrench and 5 in. adapter to torque-tighten a nut to between 67 and 73 lbf in.:

$$S = \frac{10 \times 67}{10 + 5} = 44.7 \text{ lbf in. (lower limit)}$$

and

$$S = \frac{10 \times 73}{10 + 5} = 48.7 \text{ lbf in. (upper limit)}$$

therefore the wrench settings are 45 and 49 lbf in. (corrected to the nearest lbf in.).

- (4) If the adapter decreases the effective leverage of the wrench (Ref. detail B) the formula must be altered to subtract the adapter length from the wrench length:

$$S = \frac{L \times T}{L - E}$$

Printed in England



OLYMPUS 593

MK.610-14-28  
OVERHAUL



SNECMA

THIS PAGE LEFT BLANK INTENTIONALLY

ASSEMBLY

71-09-00

Page 506B

Jun 1/99

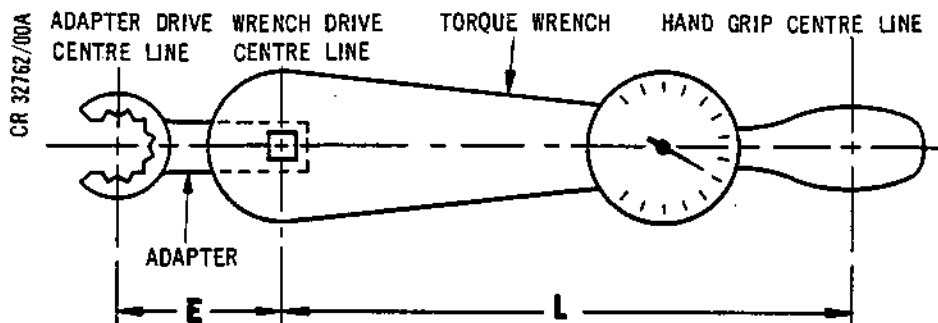




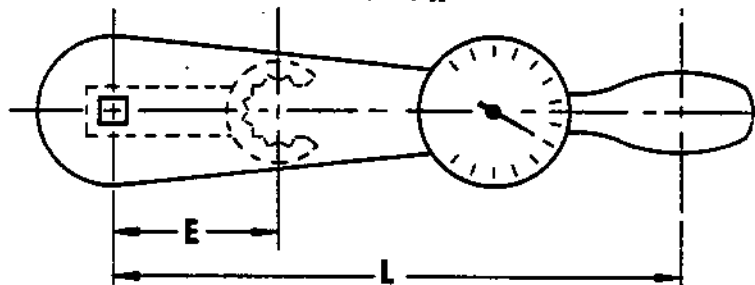
OLYMPUS 593

MK. 610-14-28

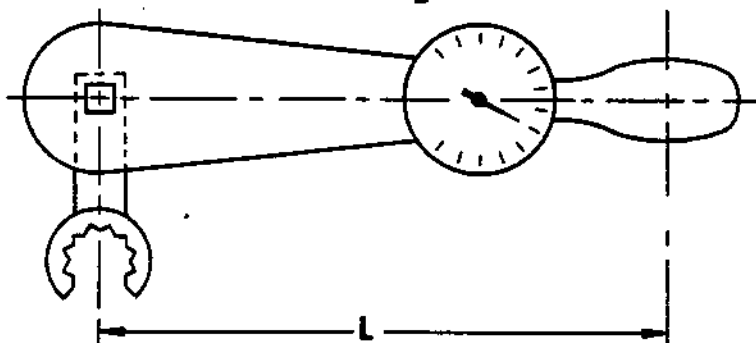
OVERHAUL



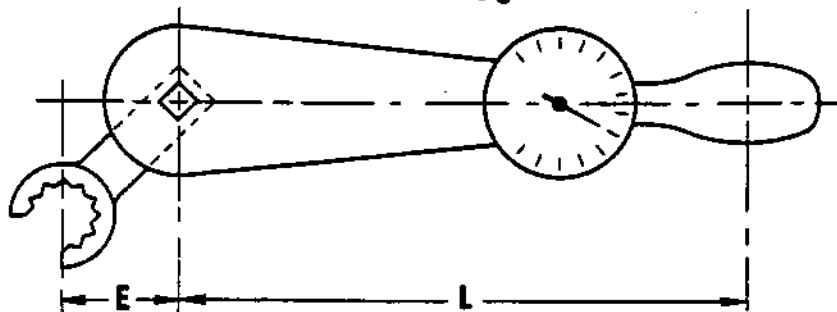
DETAIL A



DETAIL B



DETAIL C



DETAIL D

Using Adapter With Torque Wrenches  
Figure 501

ASSEMBLY

71-09-00

Page 507

Nov 1/78



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (5) No compensation of the wrench setting is required if the adapter does not alter the effective leverage of the wrench (Ref. detail C).
- (6) When the adapter axis is not parallel to the wrench axis, the effective length of the adapter must be measured in a plane parallel to the wrench axis (Ref. detail D).

C. Components with Locking Features Requiring Alignment.

- (1) Lubricate the assembly as specified in the relevant Chapter.
- (2) Run down the nut or bolt by hand.
- (3) Torque-tighten the nut or bolt to the lower figure specified.

CAUTION: NEVER SLACKEN OFF TORQUE-TIGHTENED NUT OR BOLT TO ACHIEVE ALIGNMENT OF LOCKING FEATURE.

- (4) Continue tightening slowly within the upper torque limit until alignment of the locking feature is achieved.

4. Components with Friction Type Locking Features

A. Locking (Run-down) Torque Check.

- (1) Lubricate the item as specified in para.2.B.
- (2) If initially the item only requires hand tightening, the locking portion of the item need not be engaged. If nip tightening is called for, the item is to be tightened with a spanner below the torque figure, but sufficient to ensure the item and any item it secures, cannot be loosened by persons working on the engine, or movement of the engine.
- (3) When tightening of the item is required, run down the nut or bolt until the locking element is fully engaged, with the load faces out of contact.

NOTE: A self-locking nut is fully engaged when the end of the bolt is flush with, or slightly protruding from the end of the nut.

FN27907

ASSEMBLY

71-09-00

Page 508

Nov 1/78



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Using a direct reading torque wrench, measure the torque required to turn the nut or bolt. This locking (run-down) torque must be within the limits specified in the relevant Sub-assembly Chapter, or if not quoted, as specified in Table 502.
- (5) If the nut or bolt fails to meet the locking torque requirements, use selective assembly or, if this fails, renew the nut or bolt and recheck the locking torque until satisfactory.
- (6) Torque-tighten the nut or bolt to the figure specified in the relevant Sub-assembly Chapter.

**NOTE:** Unless otherwise stated, the torque-tightening figure is inclusive of the locking torque, i.e. the locking torque shall not be added to the torque-tightening figure.

- (7) After torque-tightening the nut ensure that a minimum of 2.5 threads is protruding beyond the outer face of the nut.
- (8) Reject and destroy any nut where it is obvious that it will not give a satisfactory locking torque on any bolt. Do not attempt to restore locking properties.

UNF SIZE	T.P.I.	LOCKING TORQUE	
		MINIMUM	MAXIMUM
O.1900 (No.10)	32	2.0 lbf in. (0,23 N.m)	17 lbf in. (1,9 N.m)
O.2500	28	3.5 lbf in. (0,40 N.m)	35 lbf in. (3,9 N.m)
O.3125	24	6.5 lbf in. (0,73 N.m)	72 lbf in. (8,1 N.m)
O.3750	24	9.5 lbf in. (1,07 N.m)	96 lbf in. (11 N.m)
O.4375	20	14.0 lbf in. (1,58 N.m)	120 lbf in. (14 N.m)
O.5000	20	18.0 lbf in. (2,03 N.m)	180 lbf in. (20 N.m)

Locking Torque Limits for Captive and Non-captive Self-locking Nuts and Locking Screw Thread Inserts  
Table 502

ASSEMBLY

## 71-09-00

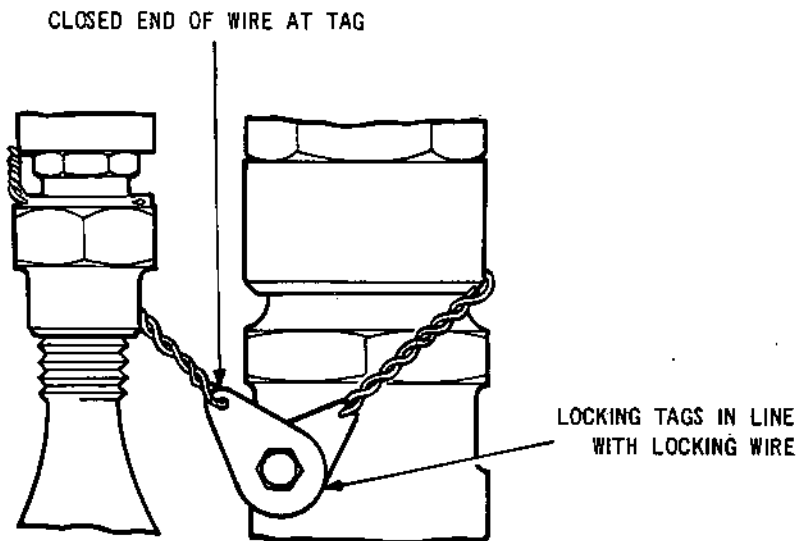
Page 509  
Jul 1/81



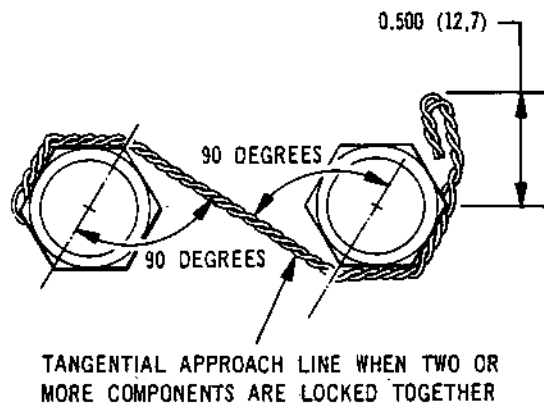
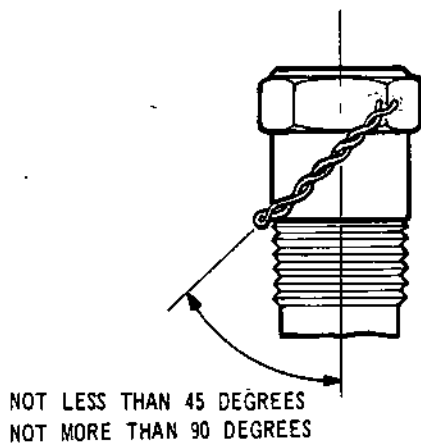
OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 32778/00B



#### CORRECT USE OF LOCKING TAGS



#### CORRECT LOCKING OF NUTS AND BOLTS

NOTE:- EXAMPLES SHOWN ARE RIGHT-HAND  
THREADS. REVERSE CONFIGURATION  
OF WIRE FOR LEFT-HAND THREADS.

DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)

General Wire-locking  
Figure 502

ASSEMBLY  
**71-09-00**  
Page 510  
Nov 1/78

TN27909



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## 5. General Locking Procedures

### A. Wire-locking (Ref.Fig.502).

- (1) Unless otherwise stated, use 0,8 mm (0.031 in.) diameter Nimonic steel locking wire for all wire-locking applications.
- (2) Ensure that the locking wire is adequately tensioned to resist rotation of the locked component. Also ensure that there are no untwisted lengths of wire in excess of 0.375 in. (9,525 mm) and no unsupported lengths in excess of 3 in. (76,2 mm).
- (3) Refer to the illustration for typical acceptable locking configurations.
- (4) Ensure that cut off pieces of wire are retrieved and are not allowed to become lost in or around the engine.
- (5) Tuck the free end of the locking wire away so that it cannot catch either skin or clothing.

### B. Method of Wire-locking Electrical Plugs (Ref.Fig.503).

- (1) Thread wire through the locking hole and middle it. Detail A.
- (2) Make one complete twist (one half pitch) to start, ensuring a snug fit around the lug without straining the wire.
- (3) Use wire-locking pliers to keep the wire taut whilst twisting in tension. Refer to Table 503 for the pitch ratio. Detail B.

WIRE GAUGE	PITCHES EACH
	1.000 IN. (24,2 MM)
20 SWG, 0.036 in. (0,889 mm)	2½ to 5
0,8 mm (0.031 in.)	3 to 6
22 SWG, 0.028 in. (0,71 mm)	3 to 6
26 SWG, 0.018 in. (0,46 mm)	5 to 6½

Wire-locking Pitch Ratio  
Table 503

ASSEMBLY

71-09-00

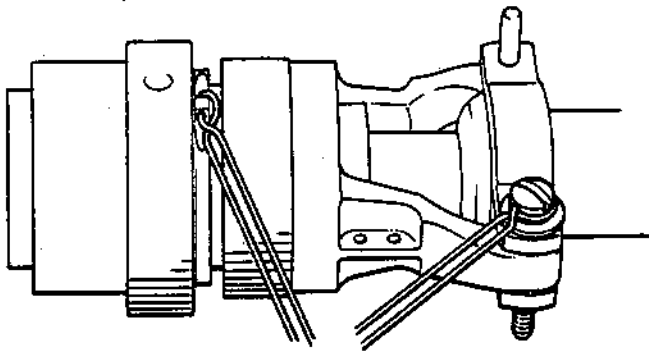
Page 511  
Nov 1/78



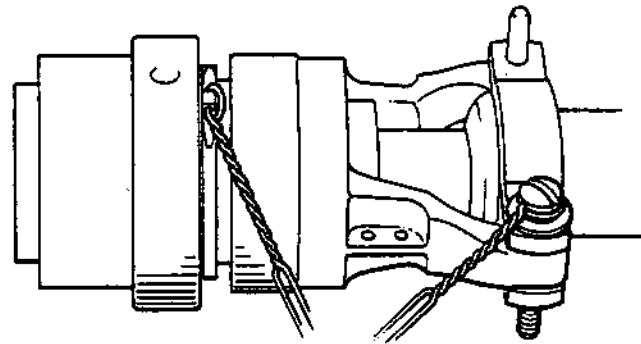
OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



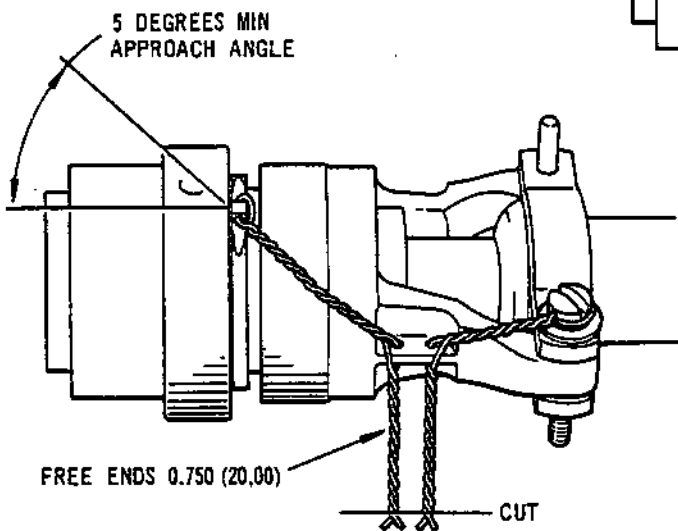
DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)



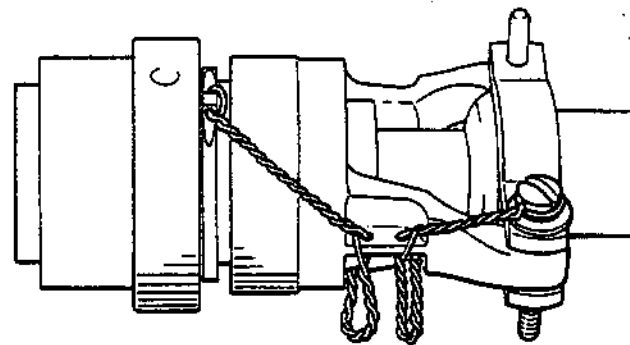
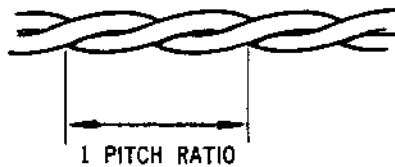
DETAIL A



DETAIL B



DETAIL C



DETAIL D

Method of Wire-locking Electrical Harness Plugs  
Figure 503

ASSEMBLY  
71-09-00

Page 512  
Nov 1/78

TN27911

CR 32012/00A



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (4) Take the wire to the second lock hole in a direction such that any tendency for a part to loosen will be counteracted by the wire.
- (5) Pass the wire through the final lock hole and ensure that there is tension between the holes. Form a tail approximately 0.75 in. (20 mm) in length. Detail C.
- (6) Cut the surplus wire from the tail and double back the exposed ends to prevent a hazard.
- (7) The maximum number of parts in series that can be locked together using the double twist wire method is three. Detail D.
- (8) There must be no untwisted lengths in excess of 0.197 in. (5,0 mm), and the developed length between lock holes must not exceed 3.000 in. (75,0 mm).

## 6. Electrical Harness

### A. Method of Lacing Looms (Ref.Fig.504).

- (1) Pass lacing braid through the middle of the cable bunch and make a clove hitch. Detail A.
- (2) Make a further half hitch. Detail B.
- (3) Pull both ends of the lacing braid firmly and secure with a reef-knot. Detail C.
- (4) Cut ends off leaving tails with a minimum length of 0.250 in. (6,35 mm) and cement the finished ends with silicone varnish.
- (5) Repeat lacing of the cables at regular intervals. Refer to Table 505 for the maximum distance allowed between ties.

ASSEMBLY

71-09-00

Page 513

Nov 1/78



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CABLE BUNCH DIAMETER

MAXIMUM DISTANCE  
BETWEEN TIES

0 to 0.250 in. (0 to 6,35 mm)	2.000 in. (50,800 mm)
0.250 to 0.625 in. (6,35 to 15,875 mm)	3.000 in. (76,200 mm)
0.625 in. and above (15,875 mm and above)	4.000 in. (101,600 mm)

Distance Between Cable Lacings  
Table 505

B. Method of Lacing Junctions (Ref.Fig.504).

- (1) At junctions, select the largest bunch of cables, pass lacing braid through the middle of the bunch and make a clove hitch. Detail A.
- (2) Make a further half hitch. Detail B.
- (3) Pull both ends of braid lacing tight and securely reef-knot. Detail C.
- (4) Ensure that there is sufficient lacing at end 'Y' to tie a further reef-knot on completion of junction lacing. Detail D.
- (5) Thread end 'Z' of braid lacing between the smaller and larger bunches of cables. Detail D.
- (6) Take the braid lacing a turn around the small bunch of cables and again pass it between the two bunches. Detail D.
- (7) Take the braid lacing around the larger bunch of cables and pull tight, completing a figure-of-eight whip. Detail D.
- (8) Repeat the figure-of-eight sequence six times, pulling the braid lacing tight after each sequence.
- (9) Take braid lacing across the six completed whippings to the start point and thread it between the two bunches of cables. Detail E.

IN27915

ASSEMBLY  
71-09-00  
Page 514  
Mar 1/76





OLYMPUS 593

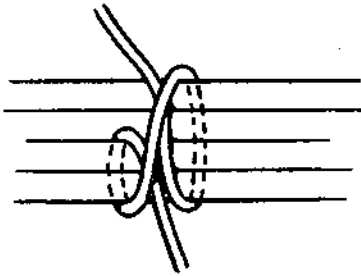
MK.610-14-28  
OVERHAUL



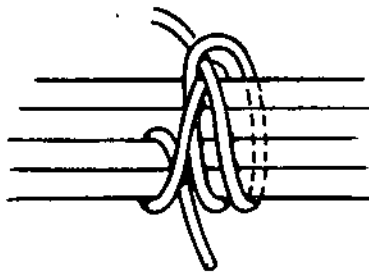
CR 32007/00A

### METHOD OF LACING LOOMS

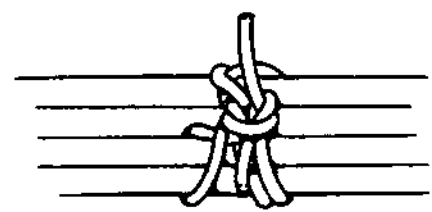
DETAIL A



DETAIL B

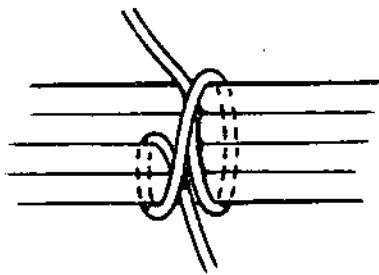


DETAIL C

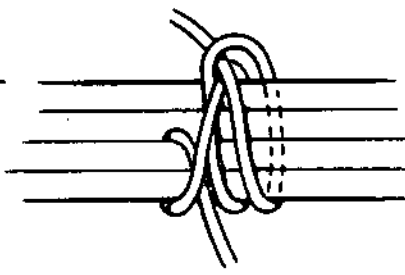


### METHOD OF LACING JUNCTIONS

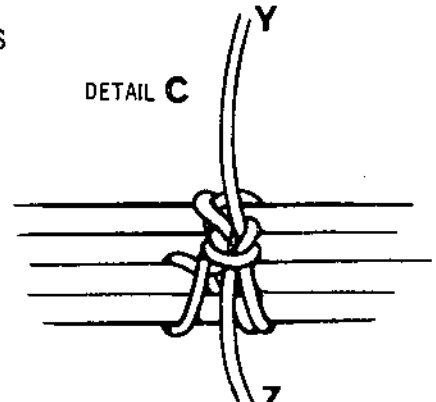
DETAIL A



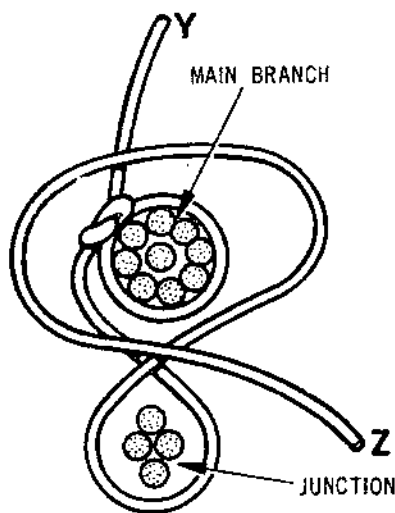
DETAIL B



DETAIL C



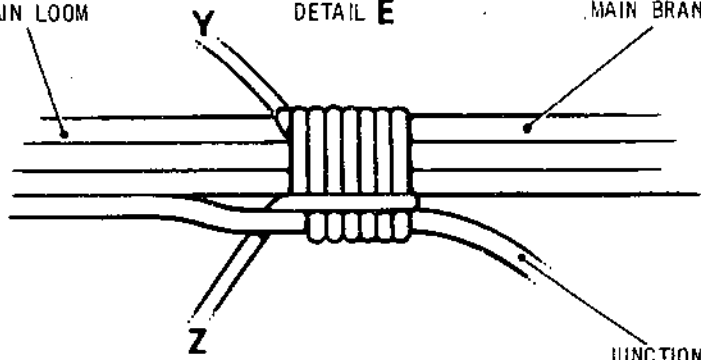
DETAIL D



MAIN LOOM

Y

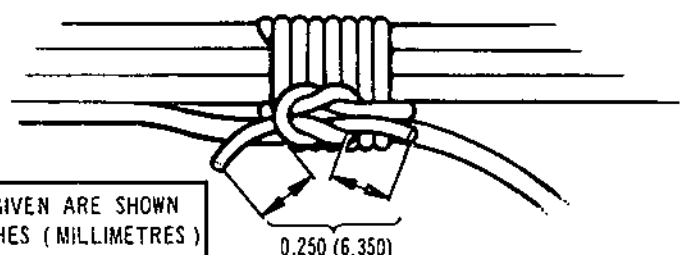
DETAIL E



MAIN BRANCH

JUNCTION

DETAIL F



DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)

0.250 (6,350)

Methods of Lacing Looms and Junctions  
Figure 504

ASSEMBLY

71-09-00

Page 515

Mar 1/76

PRINTED IN ENGLAND

TN27916



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (10) Return the braid lacing across the six completed whippings on the opposite side and thread it between the two bunches of cable. Pull tight to form a frapping lashing. Detail E.
- (11) Repeat this sequence until two more frapping lashings are obtained.
- (12) Take the braid lacing across the whipping to the start point. Pull tightly and pick up end 'Y' of the braid lacing. Tie a firm reef-knot together with end 'Z', cut off the excess lacing leaving tails with a minimum length of 0.250 in. (6,350 mm) from the knot. Detail F.
- (13) Cement the knot using silicone varnish.

C. Cable Twisting and Plaiting (Ref.Fig.505).

NOTE: The length and position over which the twisting or plaiting is required is shown on the appropriate loom template.

- (1) Branches of two single cables are to be twisted together into the pattern shown, no lacing is required.
- (2) Branches of three single cables are to be plaited together to form the pattern shown, no lacing is required.

D. Clamp Marking Using Coloured Lacing Braid (Ref.Fig.506).

- (1) Divide the bunch of cables into approximately two equal bunches, middle the lacing braid and pass the ends around one bunch of the divided cables.
- (2) Tie a firm reef-knot facing away from the cables.
- (3) Pass each end of the lacing braid around each side of the complete bunch of cables and tie a half-knot, pulling tight, opposite to the reef-knot position.
- (4) Again pass each end of the lacing braid around each side of the complete bunch of cables and tie a half-knot opposite to the previous half-knot position.

TN27917

ASSEMBLY

71-09-00

Page 516

Mar 1/76



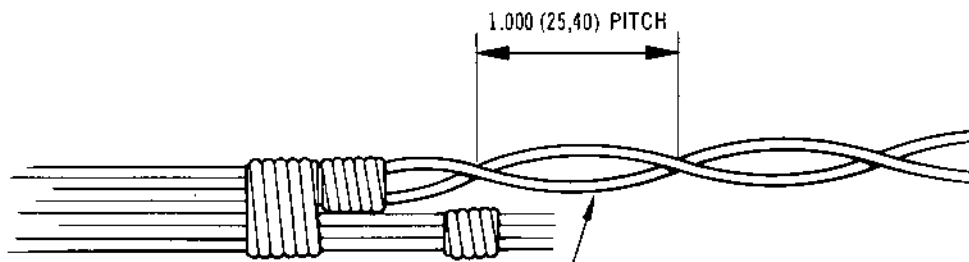
OLYMPUS 593

MK.610-14-28  
OVERHAUL



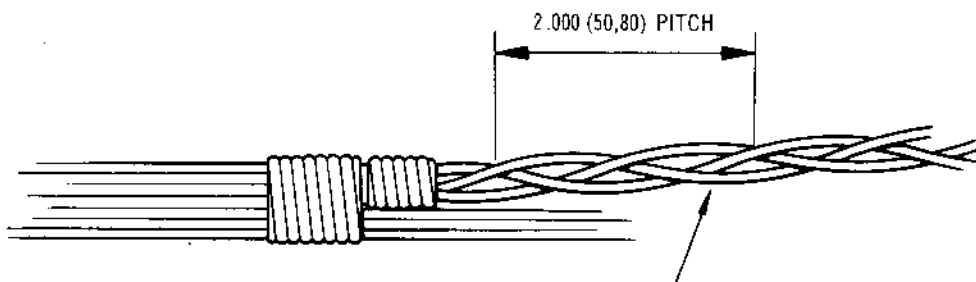
DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)

CR 32008/00B



BRANCHES OF TWO SINGLE CABLES ARE TO BE TWISTED  
TOGETHER INTO THE PATTERN AND PITCH SHOWN ABOVE

#### CABLE TWISTING



BRANCHES OF THREE SINGLE CABLES ARE TO BE PLAITED  
TOGETHER TO FORM THE PATTERN AND PITCH SHOWN ABOVE

#### CABLE PLAITING

Cable Twisting and Plaiting  
Figure 505

ASSEMBLY

71-09-00

Page 517  
May 1/79



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



SEE TR

- (5) Once more pass each end of the lacing braid around each side of the complete bunch of cables and tie a reef-knot, pulling tight, opposite to the previous reef-knot position. A West Country whip has now been accomplished.
- (6) Cut off the free ends leaving tails of approximately 0.250 in. (6,350 mm) long.
- (7) Cement the reef-knot with silicone varnish.
- (8) Repeat the whole procedure for West Country whipping at a point 0.750 in. (19,050 mm) from the first whipping ensuring that the centre line for the clamp finishes midway between the two whippings.

E. Unique Point Clamp Marking Using Coloured Lacing Braid (Ref.Fig.506).

- (1) Perform procedure for clamp marking (Ref. para.6.D.) except that the distance between whippings is 1.250 in. (31,750 mm).

F. Securing Tape Markers to Harness Assemblies (Ref.Fig.507).

- (1) Attach the AGS clip to the tape marker with the ears of the clip on the same side as the marked side of the tape. Detail A.
- (2) Pass the tape through the centre and then around the bunch of cables. Pull tight and secure by flattening the two ears of the AGS clip. Detail B.
- (3) Fold the tape back and secure by flattening the two ears of the AGS clip. Detail C.
- (4) Fold the tape forward and trim sufficiently to tuck under the first fold, then tuck it in.
- (5) Apply pressure at the ears of the AGS clip to ensure a snug fit. Detail D.

G. West Country Whipping (Ref.Fig.508).

- (1) Middle the braid, pass the ends around the split ferrule to be whipped and tie a reef-knot.

TN27919

ASSEMBLY  
**71-09-00**  
Page 518  
Mar 1/76

OLYMPUS 593 ENGINE OVERHAUL MANUAL

TEMPORARY REVISION NO. 71-504

Insert in Chapter 71-09-00 page 518

This TR replaces TR71-503 which should be REMOVED AND DESTROYED

REASON FOR ISSUE:

Revised method of tightening electrical connectors on the engine with special attention to eight specified connectors - (EA 73 and CM42083).

Re-issued. Coupling nut tightening procedure amended  
(CM42083 issue B).  
Editorial

STANDARD PRACTICES - ASSEMBLY

6. Electrical Harness

Additional Topic

H. Olympus 593 - Electrical Connectors

- (1) To combat the problem of electrical connectors loosening due to vibration a new method of tightening the connectors is to be used. This method is to be applied to all connectors on the engine.
- (2) Mod CM42083 calls up special attention the eight connectors listed below:-

D9 - No. 4 bearing failure warning oil outlet thermometer  
G6 - Engine Oil inlet thermometer  
C5 - Anti-icing pressure switch  
H1 - Hydraulic Pump off load valve (main)  
E5 - Anti-icing control valve solenoid  
E11 - Fuel heater air valve solenoid  
B3 - Front vibration unit  
D6 - Engine LP governor speed probe

The modification calls for initial tightening as specified in 'C' and for a yellow line to be painted across the coupled connectors so that they may be easily inspected for loosening in service. Wire locking will not be replaced.

- (3) Procedure for tightening the electrical connectors:-
  - (a) Align keyways and push connectors together.
  - (b) Tighten coupling nut using fingers only until resistance is felt.
  - (c) Push plug from cable clamp using a wagglng action until resistance is felt.

14 July 1977

TR71-504  
71-09-00  
TR Page 1 of 2

OLYMPUS 593 ENGINE OVERHAUL MANUAL

- (d) Tighten coupling nut as in (b)
- (e) Repeat steps (b) and (c) until the connector cannot be waggled any more and the coupling feels firm.
- (f) Check the coupling nut is finger tight.
- (g) Using suitable tooling tighten coupling nut a further 1/8 of an inch.

CAUTION: DO NOT OVER TIGHTEN OR DAMAGE WILL OCCUR.

- (h) Paint a yellow line across the coupled connector.
- (4) Inspection
- (a) On connectors modified with the yellow line inspect to ensure alignment still exists. If not this must be recorded on the worksheets giving an indication of total misalignment and Electrical Systems Development informed.
  - (b) On connectors where the modification has not been carried out, at the inspection period the coupling nut must be loosened by three complete turns and the connector retightened using the procedure in '(3)'.
- (5) The yellow line must be maintained in a serviceable condition and repainted if the component or connector is changed.



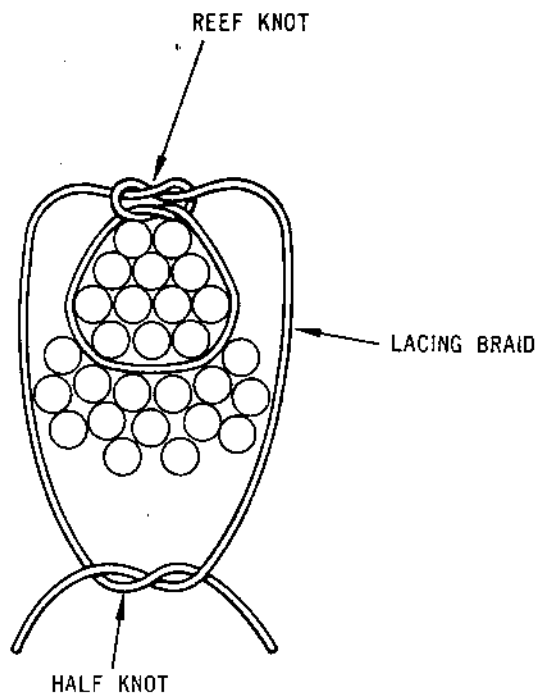
OLYMPUS 593

MK.610-14-28  
OVERHAUL

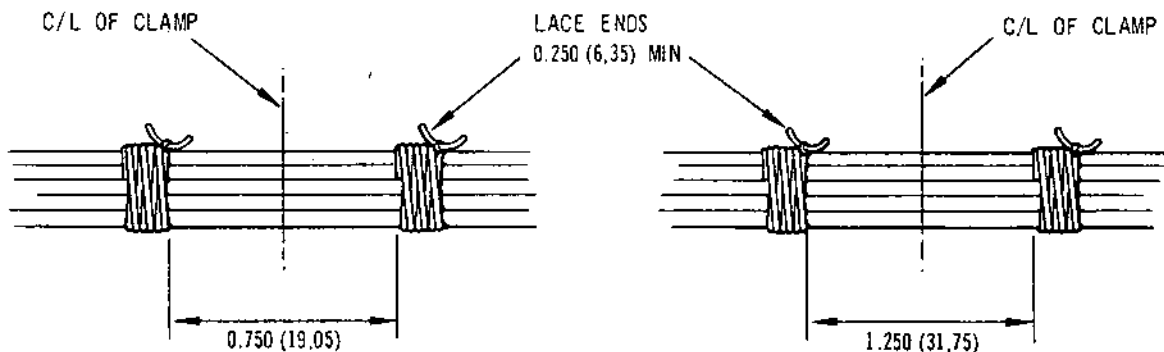


DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)

CR 32009/00A



TYPICAL MARKING USING  
COLOURED LACING BRAID



TYPICAL CLIP MARKING

UNIQUE POINT CLAMP MARKING

Clamp Marking Using Coloured Braid  
Figure 506

ASSEMBLY

71-09-00

Page 519

Mar 1/76

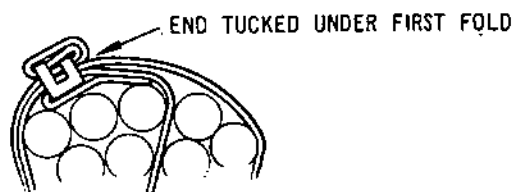
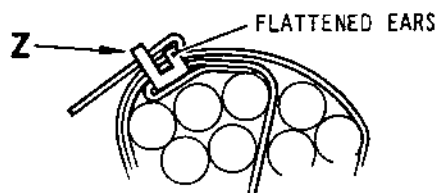
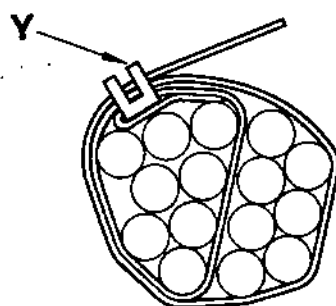
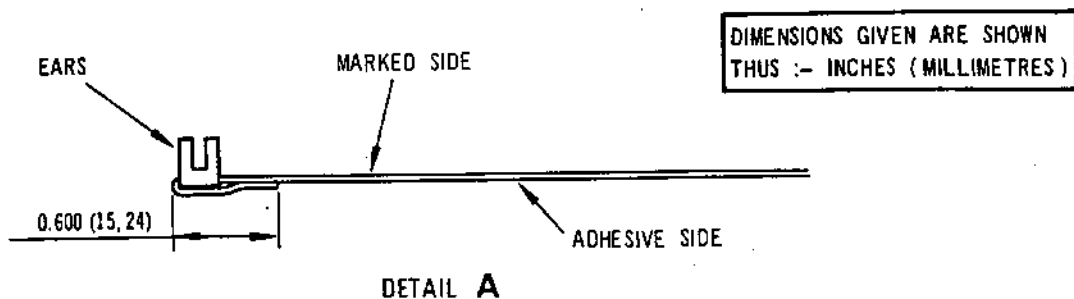
PRINTED IN ENGLAND

TN27920



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Securing Tape Markers to the Harness  
Figure 507

ASSEMBLY  
**71-09-00**  
Page 520  
Mar 1/76

CR 32010/00A

TN27921





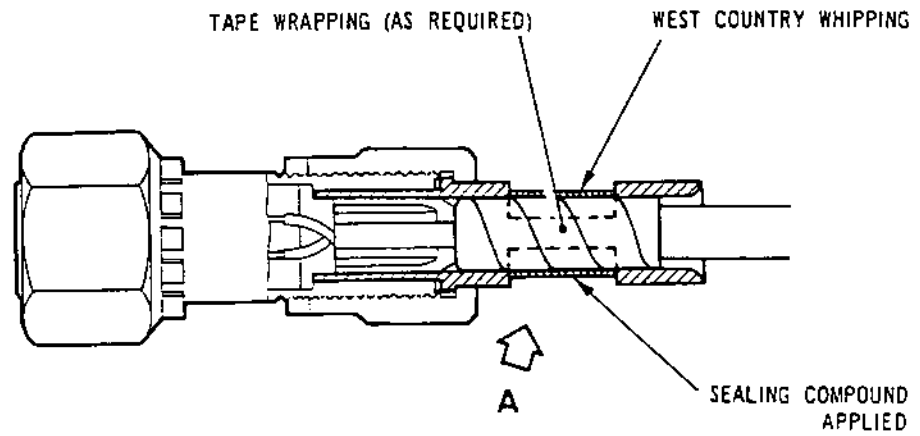
OLYMPUS 593

MK. 610-14-28  
OVERHAUL

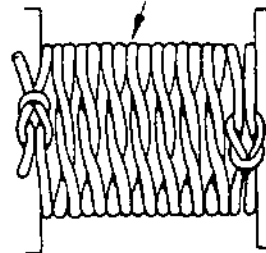


PRINTED IN ENGLAND

CR 33445/00A



WEST COUNTRY WHIPPING



A

TN27922

West Country Whipping  
Figure 508

ASSEMBLY  
71-09-00  
Page 521  
Mar 1/76



OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

- (2) Continue half-knotting on alternative sides to the end of the split.
- (3) Securely reef-knot the ends of the braid and cut off the ends leaving free ends 0.315 in. (8,0 mm) in length.

NOTE: All the knots are to be on the cable.

- (4) Cement the finished ends with silicone varnish and cure the completed assembly for 8 hours at 80 deg C.

#### H. Loom Clearances.

CAUTION: FAILURE TO INSTALL THE ELECTRICAL HARNESS CORRECTLY WILL LEAD TO DAMAGE WHICH CAN RESULT IN SERIOUS AIRWORTHINESS PROBLEMS.

- (1) Check the main electrical harness to ensure that the cable runs have adequate clearance and are clipped correctly as specified in the relevant procedure for the affected component.
- (2) Ensure that all electrical connections are correctly wire-locked, where applicable.

### 7. Tubes

#### A. Rigid and Flexible Tubes.

- (1) Examine each tube prior to assembly to ensure that the tube is clean, free from damage and two serviceable wire-locking holes are available in each union nut.
- (2) Lubricate and install new sealing rings (if applicable) and sparingly lubricate the tube union nuts as specified in the relevant text.
- (3) Remove the blanks, then position the tube and ensure that the end fittings align with their locations. Connect the end fittings and tighten as far as possible by hand ensuring that there is no stiction of the union nut. Ensure that the tube is not kinked, twisted, distorted or stretched when the union nuts are tightened.
- (4) Ensure that the tube support clips will align without straining the tube.

ASSEMBLY

71-09-00

Page 522  
Jun 1/98



OLYMPUS 593



MK.610-14-28

SNECMA

OVERHAUL

**CAUTION:** DO NOT STRAIN RIGID TUBE TO ALIGN END FITTINGS AND/OR SUPPORT CLIPS. IF TUBE WILL NOT ALIGN WITHOUT STRAIN, REMOVE IT AND INVESTIGATE CAUSE.

- (5) Using a suitable spanner to prevent turning of the tube and/or union adapter (if applicable), torque-tighten each union nut in turn to the figure specified in the relevant text. Flexible tubes with wire type union nut must be torque-tightened three times to ensure correct seating. The union nut must be torque-tightened and slackened twice prior to the final torque-tightening.
- (6) Wire-lock the union nuts.
- (7) Install the tube support clips ensuring that the correct bushes, packing or tape is used between the clamp and the tube. Do not overtighten clamps on flexible tubes and cause nicking.
- (8) Ensure that all tubes have a clearance between each other and other components of not less than 0.200 in. (5,08 mm) with the exception of those listed in 71-00-01 Assembly.

**CAUTION:** DO NOT ATTEMPT TO RECTIFY LEAKAGE FROM TUBE END FITTINGS BY FURTHER TIGHTENING. REMOVE TUBE, INSTALL NEW SEALING DEVICES AND/OR RECTIFY DEFECT, THEN RE-INSTALL TUBE AND RECHECK FOR LEAKAGE.

## 8. Blanking

### A. Engine Final Assembly.

- (1) Remove blanks from components and tubes immediately prior to the assembly of, or to, the component or tube. Ensure that only those blanks necessary for the assembly of the item are removed, and that all other mounting faces, tube ends etc. have blanks assembled.
- (2) Ensure that all tubes which connect to aircraft services, i.e. fuel, air and hydraulic, must be blanked with the correct transit blanks.
- (3) Ensure that the correct transit blanks are assembled to the air intake case and turbine exhaust diffuser.

ASSEMBLY

71-09-00

Page 523

Jun 1/98



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

9. Quick Attach/Detach (QAD) Couplings (Ref.Fig.509)

A. Engage, Tighten and Lock QAD Couplings.

- (1) Prepare coupling for tightening before unit installation.

**CAUTION:** EXAMINE THE THREAD SURFACES AND ABUTMENT FACES OF THE RING AND FLANGE FACES TO ENSURE ALL SURFACES ARE FREE OF ANY DEFECTS OR DAMAGE MARKS.

- (a) Clean the surfaces of the coupling ring and flange thread segments, and the abutment faces of the spherical washer and bolt, using a clean, lint free cloth moistened with a group 1 or 3 solvent (Refer to Table 501).
- (b) Apply a thin coating of lubricant 'A' to the thread surfaces, bolt threads and abutment face, and the spherical washer abutment faces.
- (c) Apply lubricant (70-00-03, Sealing Devices) to the toroidal sealing ring before installation.

B. Engage Coupling Ring.

- (1) Align the unit to the mounting face and turn the coupling ring so that its thread segments align with the treaded flange slots and the spherical nut trunnion is positioned so that it can be tightened to the clamping bolt trunnion when the segmented threads are engaged.
- (2) Locate the unit on the mounting face as detailed in the relevant chapter. Ensure that the sealing ring is in position, assemble pins and drive shaft splines are engaged and that the mating faces are squarely in abutment.
- (3) Turn the coupling ring in the direction to bring the trunnion together by hand and engage the segmented threads as far as possible.

C. Tighten the Coupling Ring.

**CAUTION:** ENSURE THAT THREADS HAVE CORRECTLY ENGAGED BEFORE ATTEMPTING TO TIGHTEN COUPLING RING.

- (1) Insert clamping bolt, together with spherical washer, through fixed locking trunnion and screw into spherical nut of coupling ring trunnion by hand.

ASSEMBLY

71-09-00

Page 524

Dec 1/97



**OLYMPUS 593**

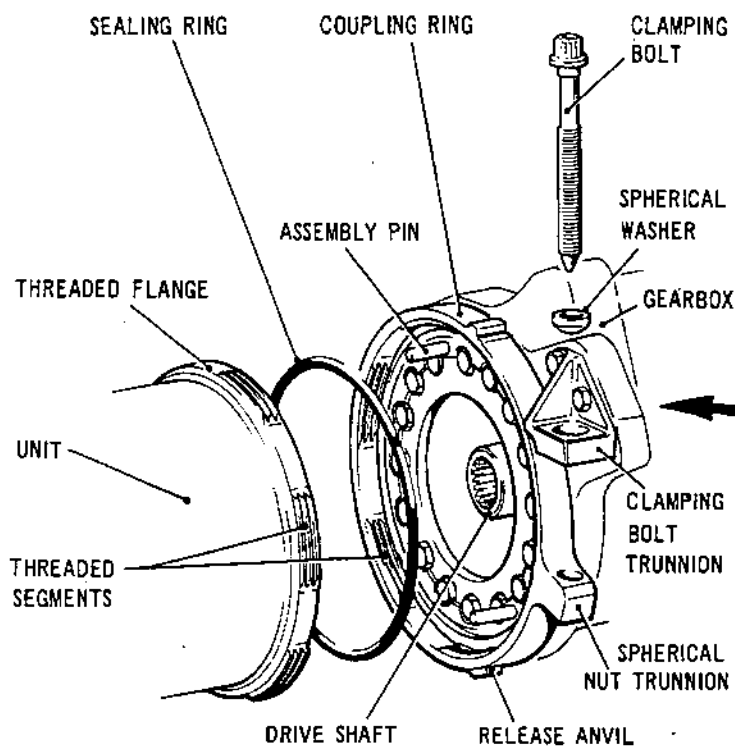
MK.610-14-28

OVERHAUL

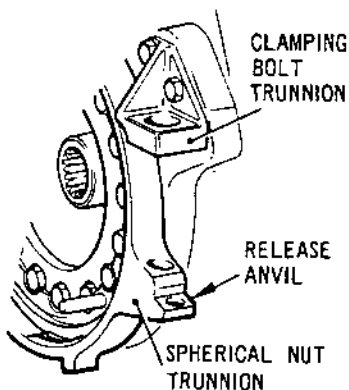


SNECMA

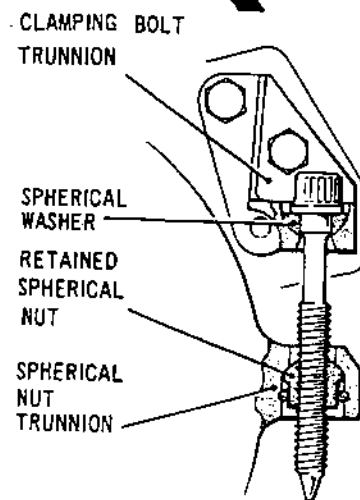
CR 34358/00B



FIRST STAGE FUEL PUMP AND FCU TO LH GEARBOX



AIR STARTER AND IDG TO RH GEARBOX



Assembling QAD Couplings  
Figure 509

ASSEMBLY

**71-09-00**

Page 525

Jun 1/96



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

- (2) Measure the locking (run-down) torque of the bolt.
  - (a) Screw bolt in until load faces are just out of contact.
  - (b) Measure torque necessary to turn bolt and ensure that it is within the specified limits given in the relevant component chapter. Inspect mating surfaces of the ring and flange to ensure freedom from surface defects.
- (3) Tighten the locking bolt with a wrench (Ref.72-00-00, special tools Tool 419) using one hand only.

NOTE: The amount of turn given to the bolt by use of this wrench gives an action that results in a positive full run-down to near the final tightening position without exceeding the torque-loading limit.
- (4) Torque-tighten the locking bolt to the value specified for the unit.
- (5) Tap radially around the periphery of a coupling ring, where accessible, using a hide faced hammer or an 8 ounce hammer and aluminium drift and ensure equal disposition of the ring.
- (6) Measure the torque-loading remaining on the locking bolt.
- (7) Repeat operations (4), (5) and (6) until the following conditions are met.
  - (a) There is less than 18 lbf in. (2 N.m) difference between the specified torque-loading (4) and the torque-loading remaining (6).
  - (b) The bolt is tightened to within the specified torque-loading limits.

ASSEMBLY

71-09-00

Page 526

Jun 1/96



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## ENGINE MOUNTINGS - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

71-20-00

Page 201

Dec 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.
- D. Certain components are subject to Controlled Manufacturing Technique (CMT) procedures. The cleaning of these components is critical and variations from the specified cleaning procedures and solutions are prohibited without approval from the engine manufacturer. All components to which this applies are identified as such in the Remarks column of the Cleaning Processes Table.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except		A or B	F	-
	40		A or B	-	-
	60		A or B	F	CMT Component

Cleaning Processes  
Table 201

TN43712





OLYMPUS 593

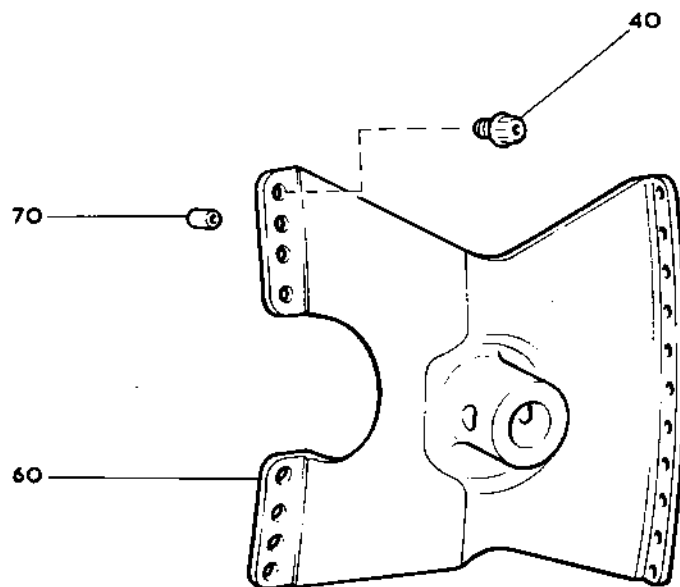
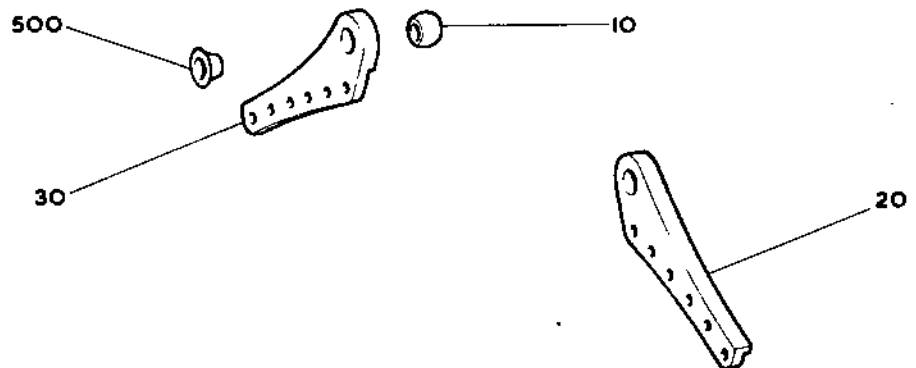
MK.610-14-28

OVERHAUL



CR 33176/00A

PRINTED IN ENGLAND



TN43713

Engine Mountings  
Figure 201

CLEANING  
**71-20-00**

Page 203  
Apr 1/76

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



sneema

ENGINE MOUNTINGS - INSPECTION/CHECKTABLE OF CONTENTS

Para.	Page
1. General ... ..	301
2. General Inspection ... ..	301
3. Crack Detection... ..	301
A. Magnetic Particle Crack Detection ... ..	301
B. Fluorescent Dye Crack Detection ... ..	302
4. Spherical Bearing ... ..	304
A. Inspect Spherical Outside Diameter ... ..	304
B. Inspect Bore ... ..	304
5. Mounting Brackets ... ..	304
A. Inspect Spherical Bearing Location ... ..	304
B. Inspect Attachment Flange ... ..	305
6. Mounting Trunnion ... ..	305
A. Inspect Attachment Flanges ... ..	305
B. Inspect Engine Trunnion Spigot Stem and Bore ... ..	306
C. Inspect Mounting Flange Body ... ..	306
D. Inspect Mounting Flange/Spigot Stem Radius (Zone A) ... ..	308
E. Inspect Headless Pin ... ..	308
F. Inspect for Corrosion ... ..	308

TABLE OF ILLUSTRATIONS

Fig.No.	Page
301 Crack Detection Test Diagram ... ..	303
302 Engine Mounting ... ..	307
303 Mounting Trunnion - Inspection Critical Areas ... ..	309

LIST OF TABLES

Table No.	Page
301 Items to be Fluorescent Dye Crack Tested ... ..	302
302 Items to be Magnetic Particle Crack Tested ... ..	302
303 Cross References to Illustrated Parts Catalogue...	304

INSPECTION/CHECK

**71-20-00**

Contents 1

Dec 31/99



OLYMPUS 593



MK.610-14-28

SHEEMA

OVERHAUL

ENGINE MOUNTINGS - INSPECTION/CHECK

Printed in England

1. General

- A. Each item in this chapter is given a two-part identification; thus, 302-20 refers to Figure 302 and to Item 20 called out on that figure. Each item may be further identified by its Part Number by the use of Table 303, which cross-refers figures in this chapter to the equivalent chapter and figure in the Illustrated Parts Catalogue (I.P.C.); the called-out item number will be the same on both figures.
- B. All items which will be crack tested are listed in Tables 301 and 302.
- C. Dimensional checks are cross referenced to the equivalent Fits and Clearances Schedule (F.C.S.) chapter against the item concerned.
- D. When the inspection of an item discloses a minor defect that requires rectification, it is defined as 'Accept after repair'. On all such occasions the item must be rectified in accordance with Standard Practices 72-09-22 Repair. Where a Ref.No. follows 'Accept after repair' e.g. (Ref.72-21-01 Repair No.1), a specific Repair Scheme is available to which the item must be rectified. Items that are rejected, or for which a repair scheme is not currently available, should be held at the discretion of the operator, as service experience may prove the need for a repair.
- E. On completion of a repair, rectification or test, the item(s) must be inspected, to ensure that the necessary work has been satisfactorily completed.

2. General Inspection

- A. Inspect all items illustrated in this chapter, whether specified or not, in accordance with Standard Practices (Ref.72-09-00 Inspection/Check). In addition, carry out the inspections detailed for the specified items, from para.4 onwards. Special attention must be paid to the critical areas of certain specified items during inspection. An instruction to this effect is included in the inspection detailed for the specified item.
- B. Inspection terms used in this chapter are explained in Standard Practices (Ref.72-09-00 Inspection/Check).

INSPECTION/CHECK

71-20-00

Page 301

Dec 31/99



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

### 3. Crack Detection

#### A. Magnetic Particle Crack Detection.

- (1) Submit the items listed in Table 301 to crack detection in accordance with the process quoted.
- (2) Items to be crack detected by this method are illustrated in the Crack Detection Test Diagram (Fig.301). For details of the processes, refer to 72-09-00 Inspection/Check.

Items marked with an asterisk (\*) in Table 301 feature defined critical areas. (Ref.Fig.303). In addition to the general overall crack detection examination, special attention must also be paid to these defined critical areas during the inspection.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
302	60*	Mounting Trunnion	MP1

Items to be Magnetic Particle Crack Tested  
Table 301

#### B. Fluorescent Dye Crack Detection.

- (1) Submit the items listed in Table 302 to crack detection in accordance with the process quoted. For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
302	20	Mounting Bracket	F1A
302	30	Mounting Bracket	F1A

Items to be Fluorescent Dye Crack Tested  
Table 302

INSPECTION/CHECK

71-20-00

Page 302  
Dec 31/99



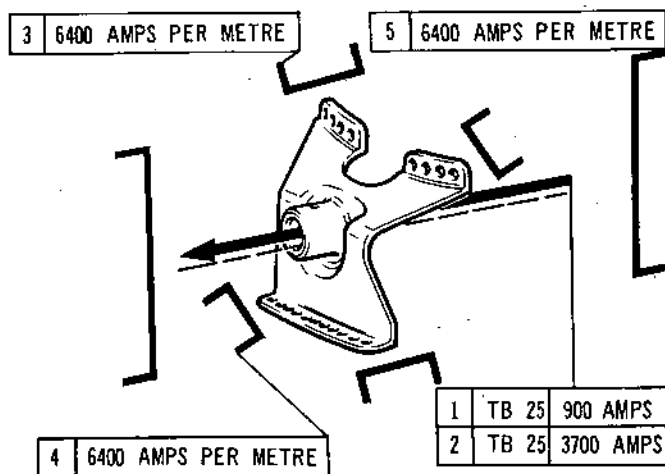
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32029/00A



MOUNTING TRUNNION (302-60)

Crack Detection Test Diagram  
Figure 301

INSPECTION/CHECK

71-20-00

Page 303  
Jun 1/76

TN29656



OLYMPUS 593

MK.610-14-28  
OVERHAUL



---

FIG.NO. ILLUSTRATED PARTS CATALOGUE EQUIVALENT

---

301 Not applicable  
302 71-20-00 Fig.1

---

Cross References to Illustrated Parts Catalogue  
Table 303

4. Spherical Bearing (302-10)

A. Inspect Spherical Outside Diameter.

- (1) Nicks and burrs. Accept after repair.
- (2) Wear.
  - (a) Light witness mark. Accept.
- (3) Scores.
  - (a) Any scores. Reject.
- (4) Fretting.
  - (a) Any fretting. Reject.

B. Inspect Bore.

- (1) Wear.
  - (a) Any wear. Reject.
- (2) Scores.
  - (a) Any scores. Reject.

5. Mounting Brackets (302-20/30)

A. Inspect Spherical Bearing Location.

- (1) Nicks and burrs. Accept after repair.

INSPECTION/CHECK

**71-20-00**

Page 304

Dec 1/75

TN29660

# British airways

## OLYMPUS 593 ENGINE OVERHAUL MANUAL

TEMPORARY REVISION No.71-505

Insert in chapter 71-20-00 facing page 305

### REASON FOR ISSUE:

To define a method of measurement of wear in spherical bores on mounting brackets B.401953 and B.401952 and to give an acceptance standard for wear.

Rolls-Royce OLY/SEDP/569 refers.

### ENGINE MOUNTINGS - INSPECTION/CHECK.

#### 5. Mounting Brackets (302-20/30).

Amend sub-para A (2) to read:-

##### (2) Wear.

With a NEW spherical fitted in the housing bore, measure both the diametral and the axial movement possible.

Accept wear in a diametral direction up to 0.018" and in an axial direction up to 0.030".



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

Printed in England

(2) Wear.

(a) Light witness mark. Accept.

(3) Scores.

(a) Not more than 0.005 in.  
(0,130 mm) in depth. Accept after repair.

B. Inspect Attachment Flange.

(1) Nicks and burrs. Accept after repair.

(2) Wear.

(a) Not more than 2 per cent  
reduction in flange  
thickness. Accept.

(b) Any elongation of bolt-  
holes. Reject.

(3) Scores.

(a) Not more than 0.005 in.  
(0,130 mm) in depth. Accept after  
repair providing  
repair does not  
reduce flange  
thickness by more  
than 2 per cent

(4) Distortion.

(a) Any distortion. Accept if com-  
patibility is  
preserved.

6. Mounting Trunnion (302-60)

A. Inspect Attachment Flanges.

**CAUTION:** THE FRONT AND REAR FLANGE FILLET RADII ARE A  
DEFINED CRITICAL AREA. (Ref.Fig.303). SPECIAL  
ATTENTION MUST BE PAID TO THIS AREA FOR SIGNS OF  
DAMAGE DURING THE GENERAL OVERALL INSPECTION.

(1) Nicks and burrs. Accept after  
repair.

(2) Wear.

INSPECTION/CHECK

71-20-00

Page 305

Dec 31/99





OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

(a) Any elongation of bolt-holes or headless pin-hole. Reject.

(3) Isolated scores/scratches.

(a) Not more than 0.005 in. (0,127 mm) in depth. Accept after repair subject to satisfactory crack detection.

B. Inspect Engine Trunnion Spigot Stem and Bore.

CAUTION: THE SPIGOT STEM ROOT IS A CRITICAL AREA. (Ref Fig.303). SPECIAL ATTENTION MUST BE PAID TO THIS AREA FOR SIGNS OF DAMAGE DURING THE GENERAL OVERALL INSPECTION.

(1) Nicks and burrs. Accept after repair.

(2) Wear.

(a) Light witness mark on stem. Accept.

(b) Any elongation of locking pin-holes. Reject.

(3) Isolated scores, scratches, gouges.

(a) Not more than 0.020 in. (0,508 mm) deep in the spigot stem. Accept after repair.

(b) Not more than 0.010 in. (0,254 mm) deep in the spigot stem bore. Accept after repair.

(4) Scores, gouges, wear in pin hole.

(a) Not more than 0.005 in. (0,127 mm) deep. Accept after repair.

(5) General damage at edge of pin hole.

(a) Not more than 0.010 in. (0,254 mm) deep. Accept after repair.

INSPECTION/CHECK

71-20-00

Page 306

Dec 31/99



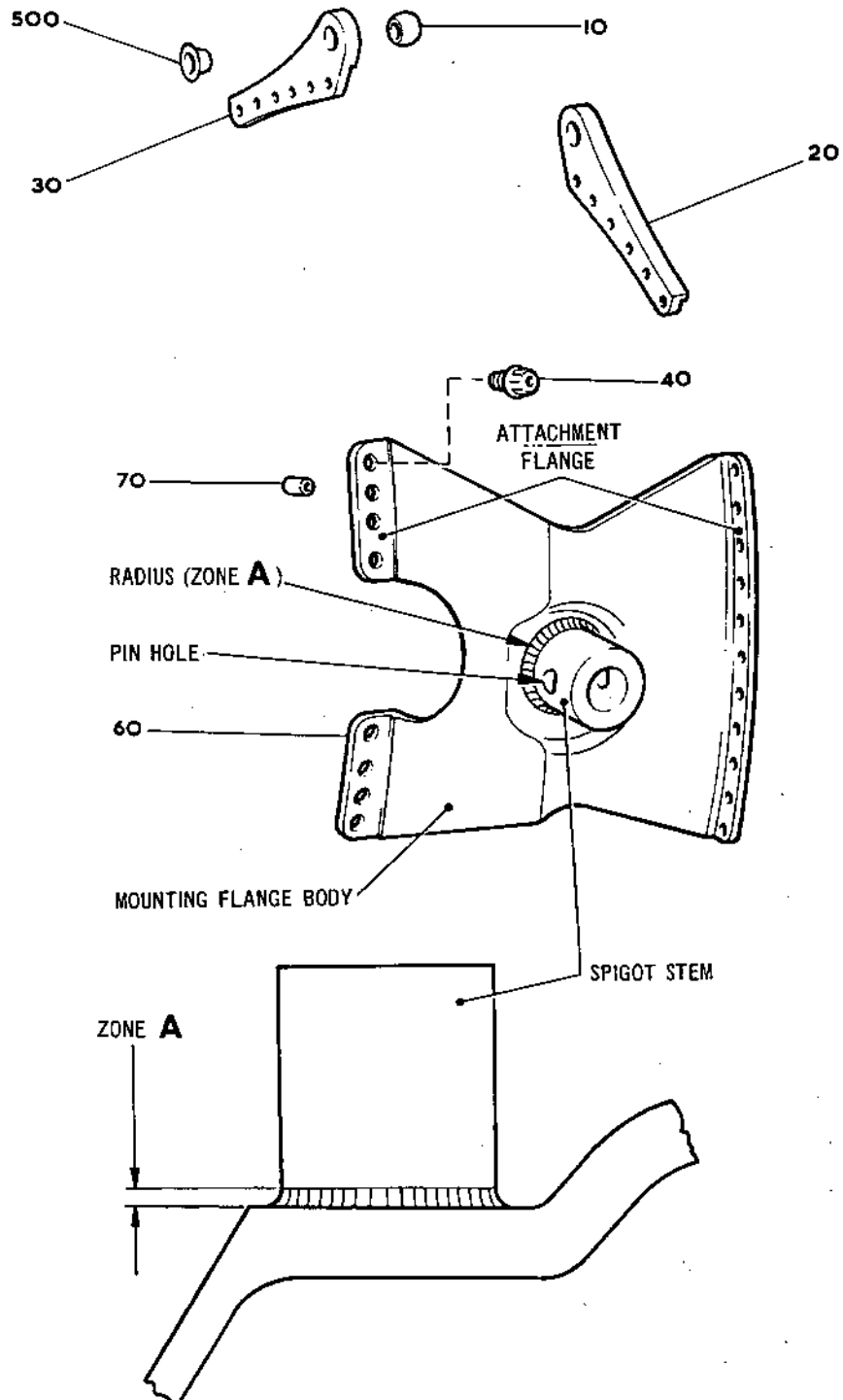
OLYMPUS 593

MK. 610-14-28

OVERHAUL



CR 35604/00A



Engine Mounting  
Figure 302

INSPECTION/CHECK

71-20-00

Page 307

May 1/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



SNECMA

C. Inspect Mounting Flange Body.

(1) Isolated scores, scratches, gouges.

(a) Not more than 0.020 in. Accept after  
(0,508 mm) deep. repair.

(2) Overheating. Reject for hardness  
checks.

(3) Paint flaking Reject for repair  
(Ref.72-09-04,  
Repair).

D. Inspect Mounting Flange/Spigot Stem Radius (Zone A).

(1) Circumferential or axial scores/scratches.

(a) Not more than 0.005 in. Accept after  
(0,127 mm) deep. repair.

(b) More than 0.005 in. Hold in  
(0,127 mm) but not quarantine.  
greater than 0.020 in.  
(0,508 mm) deep.

(c) More than 0.020 in. Reject.  
(0,508 mm) deep.

E. Inspect Headless Pin.

(1) Nicks and burrs. Accept after  
repair.

(2) Damage. Reject.

F. Inspect for Corrosion.

(1) Inspect mounting trunnion for corrosion especially  
in the spigot radius (ref. Fig.302 zone A).

(a) Not more than 0.005 in. Accept after repeat  
(0,127 mm) deep. cleaning and/or  
local blending  
(ref. 72-09-22  
Repair).

INSPECTION/CHECK

71-20-00

Page 308

Dec 31/99

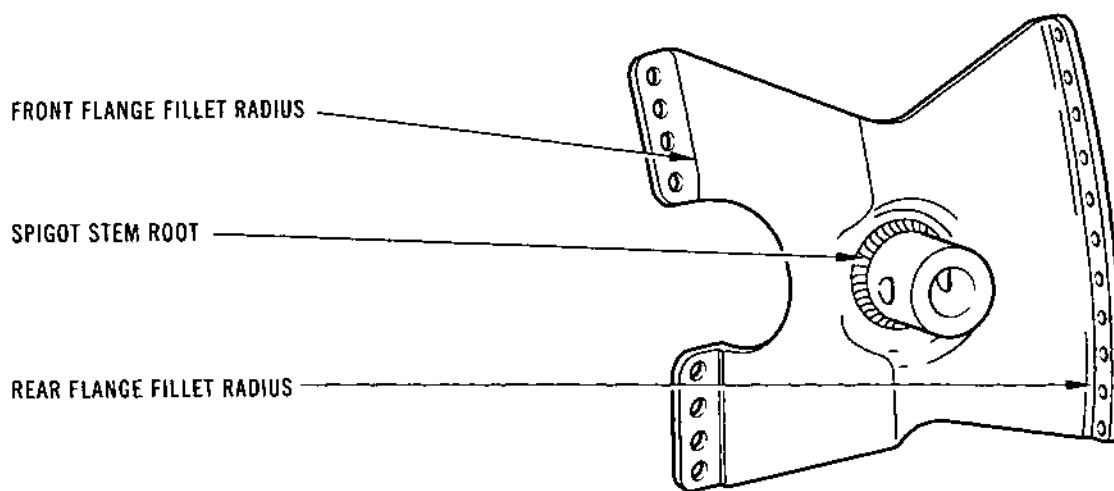


OLYMPUS 593

MK.610-14-28  
OVERHAUL



SNECMA



Mounting Trunnion - Inspection Critical Areas

INSPECTION/CHECK

71-20-00

Page 309

Dec 31/99



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

ENGINE MOUNTINGS - REPAIR

TABLE OF CONTENTS

Repair No.	Title	Scheme No.
1	Engine Mounting Trunnions - Removal of Cracks in Flange by Blending and Polishing	B510768
2	Engine Mounting Trunnion - Removal of Corrosion from Front and Rear Mounting Holes	B513506
3	Trunnion, Mounting - Restoration of mounting trunnion holes by nickel plating	B516368

Printed in England

REPAIR

71-20-00

Contents 1  
Jan 31/95

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



ENGINE MOUNTING TRUNNIONS - REPAIR  
REMOVAL OF CRACKS IN FLANGE BY BLENDING AND POLISHING

MODIFICATION NO. OL.8920C

1. Effectivity

<u>IPC</u>	<u>Fig./Item</u>	<u>Part No.</u>
71-20-00	1 60	B507464

2. Introduction

A. General.

- (1) This repair describes the procedure to remove minor cracks in the front flange of the mounting trunnions by blending and polishing.
- (2) Dimensions are shown thus, INCHES (MILLIMETRES), in tables and illustrations.
- (3) Refer to Chapter 72-09-00, Repair, for all standard practices applicable to this repair.
- (4) Remove sharp edges 0.004 to 0.020 in. (0,10 to 0,51 mm) unless otherwise stated.
- (5) Tolerances on machined dimensions are plus/minus 0.010 in. (0,25 mm) unless otherwise stated.
- (6) Tolerances on all angles are plus/minus 2 degrees unless otherwise stated.
- (7) Surface texture is to be 125 micro-inches (3,2 micrometres) unless otherwise stated.
- (8) All tools referred to by item number in procedural steps are detailed in para.4.
- (9) Protect the component against corrosion after each operation, and place in a container for protection against damage during transit between operations.

B. Repair Limitations.

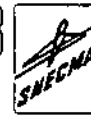
- (1) Blending and polishing to remove cracks may only be carried out in the areas marked ZONE B, and to a maximum depth of 0.020 in. (0,51 mm) (Ref. Figs.401 and 402).

REPAIR  
**71-20-00**  
Repair No.1  
Page 401  
Dec 1/89



OLYMPUS 593

MK.610-14-28  
OVERHAUL



### 3. Instructions

CAUTION: DURING REPAIR OF THIS COMPONENT, ITS SURFACES MUST BE PROTECTED FROM CORROSION AT ALL TIMES. WORK TO PROCEDURE DETAILED IN 72-09-20 REPAIR, USING DEWATERING FLUID.

#### A. Remove Coating.

- (1) Remove the existing Sermetal W coating using cleaning process F, as detailed in 72-09-00 Cleaning.

#### B. Inspect.

- (1) Inspect the trunnion for cracks using the magnetic particle process specified for this component in 71-20-00 Inspection/Check.

#### C. Remove Cracks.

- (1) Hand dress to remove the cracks within the limitations of the repair (Ref. paragraph 2B). Grinding must not be used.

#### D. Polish.

- (1) Polish the area dressed in the previous operation, to achieve a surface finish of 16 micro-inches (0,4 micrometres).

#### E. Etch.

- (1) Mask off and locally swab etch the dressed and polished area. Do not allow etchant to encroach onto areas not polished. For procedure, refer to 72-09-14 Repair, using solution B.

#### F. Inspect.

- (1) Inspect the trunnion for cracks using the magnetic particle process specified for this component in 71-20-00 Inspection/Check.

#### G. Identify.

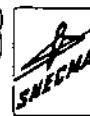
- (1) Mark SAL B510768 or R1 adjacent to the existing part number, using vibro-percussion engraving as specified in 72-09-00 Repair.



OLYMPUS 593

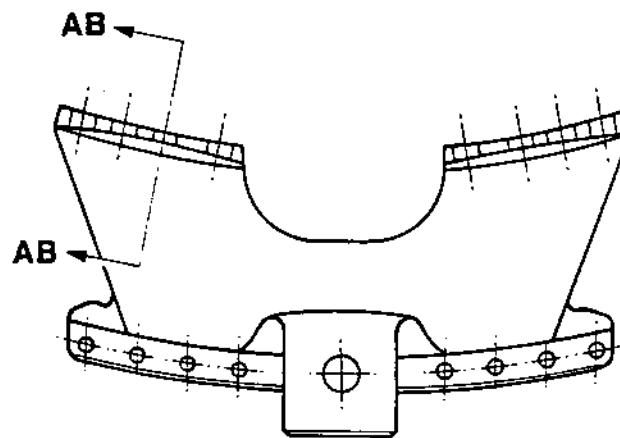
MK. 610-14-28

OVERHAUL

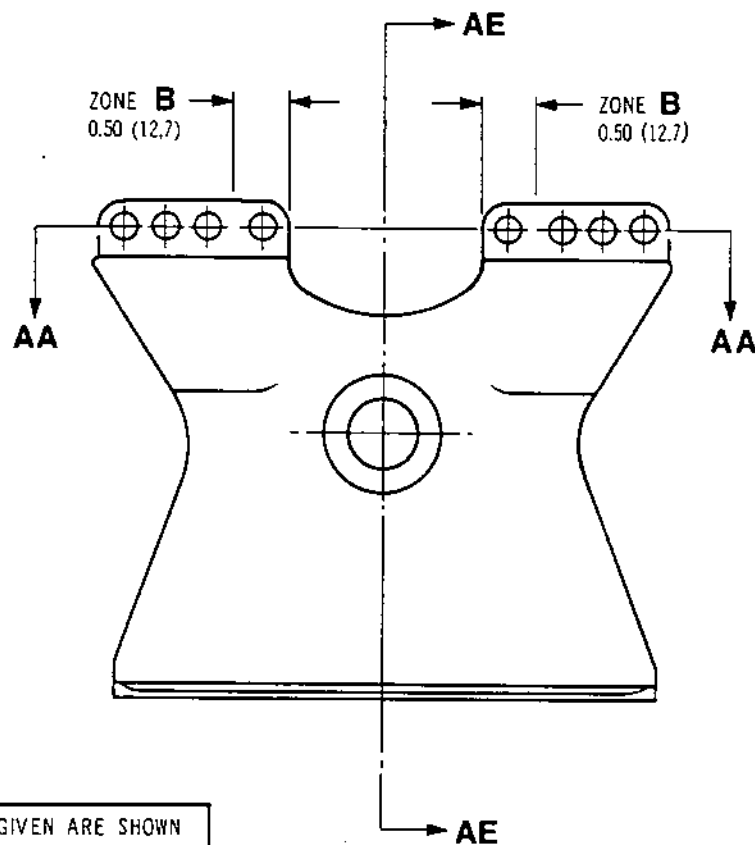


PRINTED IN ENGLAND

CR 36235/00A



SECTION AA - AA



DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)

Engine Mounting Trunnions  
Figure 401

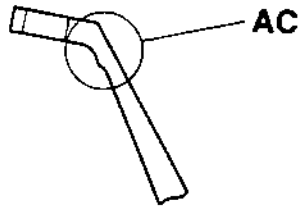
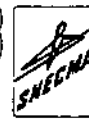
REPAIR  
71-20-00  
Repair No.1  
Page 403  
Dec 1/89





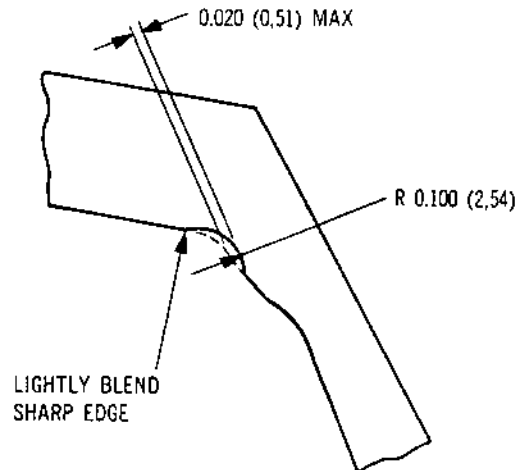
OLYMPUS 593

MK.610-14-28  
OVERHAUL



SECTION **AB - AB**

(REF FIG 401)



VIEW AT **AC**

DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES ( MILLIMETRES )

Blending and Polishing Details  
Figure 402

REPAIR  
**71-20-00**  
Repair No.1  
Page 404  
Dec 1/89



OLYMPUS 593

MK.610-14-28

OVERHAUL



H. Abrasive Blast.

- (1) Dry abrasive blast the trunnion all over except where indicated AG in Figure 403. Use aluminium oxide grit 300 to 500 mesh at 2N Almen intensity. For procedure, refer to 72-09-24 Repair.

J. Apply Coatings.

- (1) Apply a Sermetel W coating (OMat 7/46) to the trunnion all over except where indicated AG and AH in Figure 403. For procedure, refer to TSD 594 OP 349 (type A), but without uniblasting. Stove at 515 deg.C for four hours.
- (2) Apply a Sermaseal coating (OMat 7/168) to the areas coated with Sermetel W. For procedure, refer to TSD 594 OP 349.

K. Final Inspection.

- (1) Inspect the trunnion to ensure that the repair has been carried out satisfactorily and that the trunnion is in a serviceable condition.

L. Protect.

- (1) Apply temporary protection all over the trunnion, using lanolin/white spirit as instructed in 72-09-20 Repair.

4. Special Tools, Fixtures and Equipment

None.

5. Replacement Parts

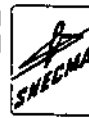
None.

PRINTED IN ENGLAND



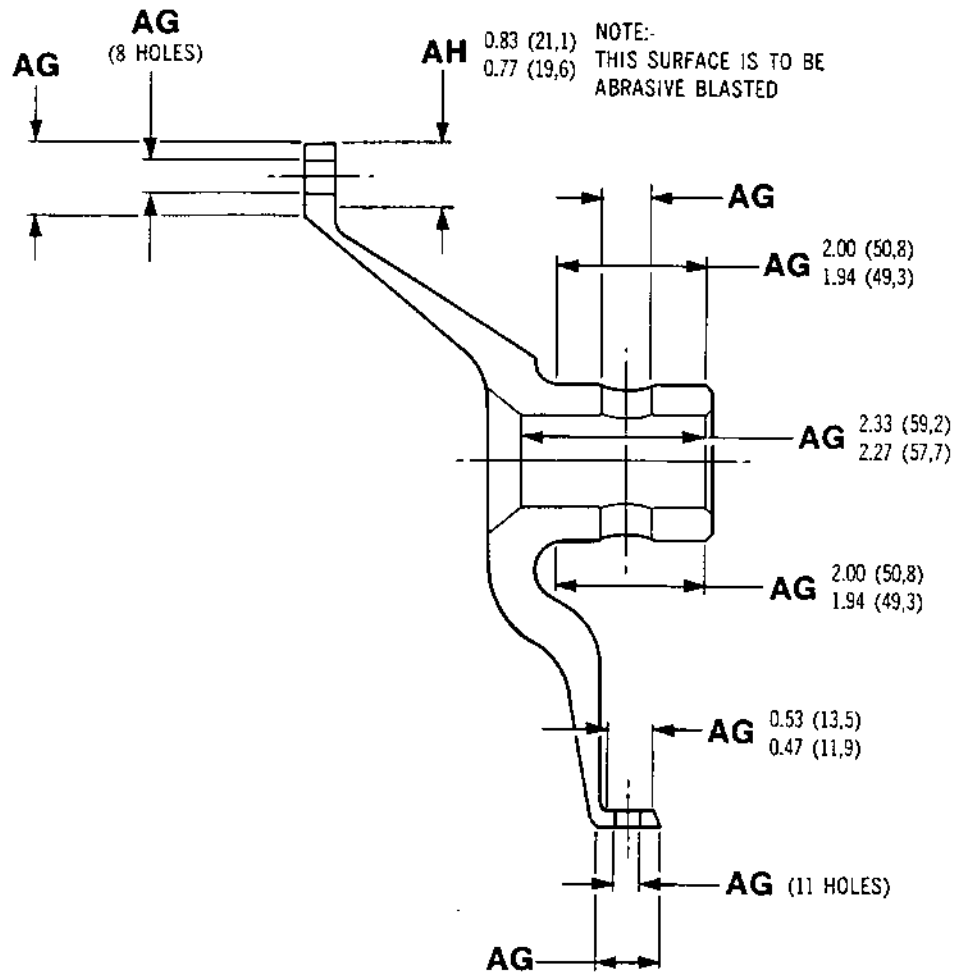
# OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 36233/00A



SECTION AE - AE

(REF FIG 401)

DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)

Areas to be Sermetel Coated  
Figure 403

REPAIR  
71-20-00  
Repair No.1  
Page 406  
Dec 1/89



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



MOUNTING TRUNNION  
PROVISION FOR REMOVAL OF CORROSION FROM  
FRONT AND REAR FLANGE MOUNTING HOLES

REPAIR NO. B.513506

1. EFFECTIVITY

I.P.C.	Fig./Item	Part No.
71-20-00	1 060A 060B	B480959 B507464

2. REPAIR LIMITATIONS

Compliance with all aspects of this repair process should be achieved without deviation. Where a need to deviate is considered necessary reference should be made to the repair authority for agreement.

Repairable limits on holes prior to repair as follows:

PART A: Corrosion in front flange 2 off 0.500/0.501 (12,70/12,73) diameter dowel holes up to a depth of 0.005 (0,127) and not more than 1/3rd of the total surface area.

PART B: Corrosion in front flange 6 off 0.469 (11,91) diameter bolt holes up to a depth of 0.005 (0,127).

PART C: Corrosion in rear flange 11 off 0.3125/0.3134 (7,94/7,96) diameter fitted bolt holes up to a depth of 0.005 (0,127).

Front flange dowel holes are acceptable within above limits but must be processed in accordance with part 'A' of the following procedure.

Front and rear flange mounting bolt holes with corrosion in excess of the above may be repaired in accordance with the following Parts 'B' and 'C'.

PRINTED IN ENGLAND

REPAIR

71-20-00

Repair No.2

Page 401

Jul 31/93



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



### 3. GENERAL

#### UNLESS OTHERWISE SPECIFIED

Drawing practice & tolerance interpretation to ISO 1101 (JES 160)

Dimensions in inches (millimeters)

Tolerances on machined dimension plus/minus 0.010 (0,025)

Tolerance on angles plus/minus 2°

Break sharp edges 0.004 (0,1) to 0.020 (0,5)

Surface texture interpretation to ISO 1302 (JES 137)

Surface texture to be 125 (3,2) microinches (micrometers)

Welding symbols to ISO 2553 (JES 139)

3rd angle projection

### 4. REPAIR PROCEDURE

#### REPAIR PROCEDURE

#### SUPPLEMENTARY INFORMATION

CAUTION: DURING REPAIR THE SURFACES OF THIS COMPONENT MUST BE PROTECTED FROM CORROSION AT ALL TIMES. WORK TO PROCEDURE DETAILED IN OVERHAUL MANUAL 72-09-20 (REPAIR), USING DE-WATERING OIL.

- 1) Inspect, verify position and depth of corrosion. Proceed to Part A, B or C in accordance with Repair Limitations above. Ref fig.401.

#### PART A:

- 1) Strip paint and de-rust. Ref Overhaul Manual section 72-09-00 (Cleaning) process H. Table 208.
- 2) Crack detect defective holes. Ref Overhaul Manual section 72-09-00 (Inspection/Check). Using fluorescent dye penetrant process F3A.

NOTE: At this point it is permissible to effect SB 0L.593-71-8885-31, if applicable. Mark identity SAL B513506/A or R2A adjacent to new part number introduced by SB 0L.593-71-8885-31.

If SB 0L.593-71-8885-31 is not to be effected then proceed as follows:



**OLYMPUS 593**  
MK.610-14-28  
OVERHAUL



- |    |   |  |
|----|---|--|
| 3) | Replace protective coating.   | Ref Overhaul Manual<br>section 72-09-04<br>(Repair). Using high<br>heat resisting aluminium<br>enamel (PL101), or<br>Sermetel W, ref.<br>SB 0L.593-71-8885-31. |
| 4) | Mark on SAL B513506'A' or R2A<br>adjacent to existing part<br>number, using vibro-percussion<br>method. | Ref Overhaul Manual<br>section 72-09-00<br>(Repair).   |

PART B:

- |    |  |   |
|----|--|---|
| 1) | Ream corroded holes by 0.005<br>(0,127) stages, to a maximum<br>of 0.4837 (12,286) diameter. | Ref fig.401.  |
| 2) | Strip paint and de-rust.   | Ref Overhaul Manual<br>section 72-09-00<br>(Cleaning) process H.<br>Table 208.                                    |
| 3) | Crack detect repaired area.  | Ref Overhaul Manual<br>section 72-09-00<br>(Inspection/Check).<br>Using fluorescent dye<br>penetrant process F3A. |

NOTE: At this point it is permissible to effect SB 0L.593-71-8885-31, if applicable. Mark identity SAL B513506/B or R2B adjacent to new part number introduced by SB 0L.593-71-8885-31.

If SB 0L.593-71-8885-31 is not to be effected then proceed as follows:

- |    |   |   |
|----|---|---|
| 4) | Replace protective coating.   | Ref Overhaul Manual<br>section 72-09-04<br>(Repair). Using high<br>heat resisting aluminium<br>enamel (PL101), or<br>Sermetel W ref.<br>SB 0L.593-71-8885-31. |
| 5) | Mark on SAL B513506'B' or R2B<br>adjacent to existing part<br>number, using vibro-percussion<br>method. | Ref Overhaul Manual<br>section 72-09-00<br>(Repair).  |

REPAIR

**71-20-00**

Repair No.2

Page 403

Jul 31/93



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



PART C:

- 1) Ream corroded holes by 0.005 (0,127) stages, to a maximum of 0.3184 (8,087) diameter. Ref fig.401.
- 2) Strip paint and de-rust. Ref Overhaul Manual section 72-09-00 (Cleaning) process H. Table 208.
- 3) Crack detect defective holes. Ref. Overhaul Manual section 72-09-00 (Inspection/Check). Using fluorescent dye penetrant process F3A.

NOTE: At this point it is permissible to effect SB 0L.593-71-8885-31, if applicable. Mark identity SAL B513506/C or R2C adjacent to new part number introduced by SB 0L.593-71-8885-31.

If SB 0L.593-71-8885-31 is not to be effected then proceed as follows:

- 4) Replace protective coating. Ref Overhaul Manual section 72-09-04 (Repair). Using high heat resisting aluminium enamel (PL101), or Sermetel W ref. SB 0L.593-71-8885-31.
- 5) Mark on SAL B513506'C' or R2C adjacent to existing part number, using vibro-percussion method. Ref Overhaul Manual section 72-09-00 (Repair).

5. MATERIAL

COMPONENT	MATERIAL	RR CODE
Mounting trunnion	Non-corrosive resistant steel MSRR 6002	ABX

REPAIR

71-20-00

Repair No.2

Page 404

Jul 31/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



6. DATA

None.

7. TOOLS

None.

8. REPLACEMENT PARTS

PART NUMBER	DESCRIPTION	QUANTITY	ITEM
None.			

PRINTED IN ENGLAND

REPAIR

71-20-00

Repair No.2

Page 405

Jul 31/93

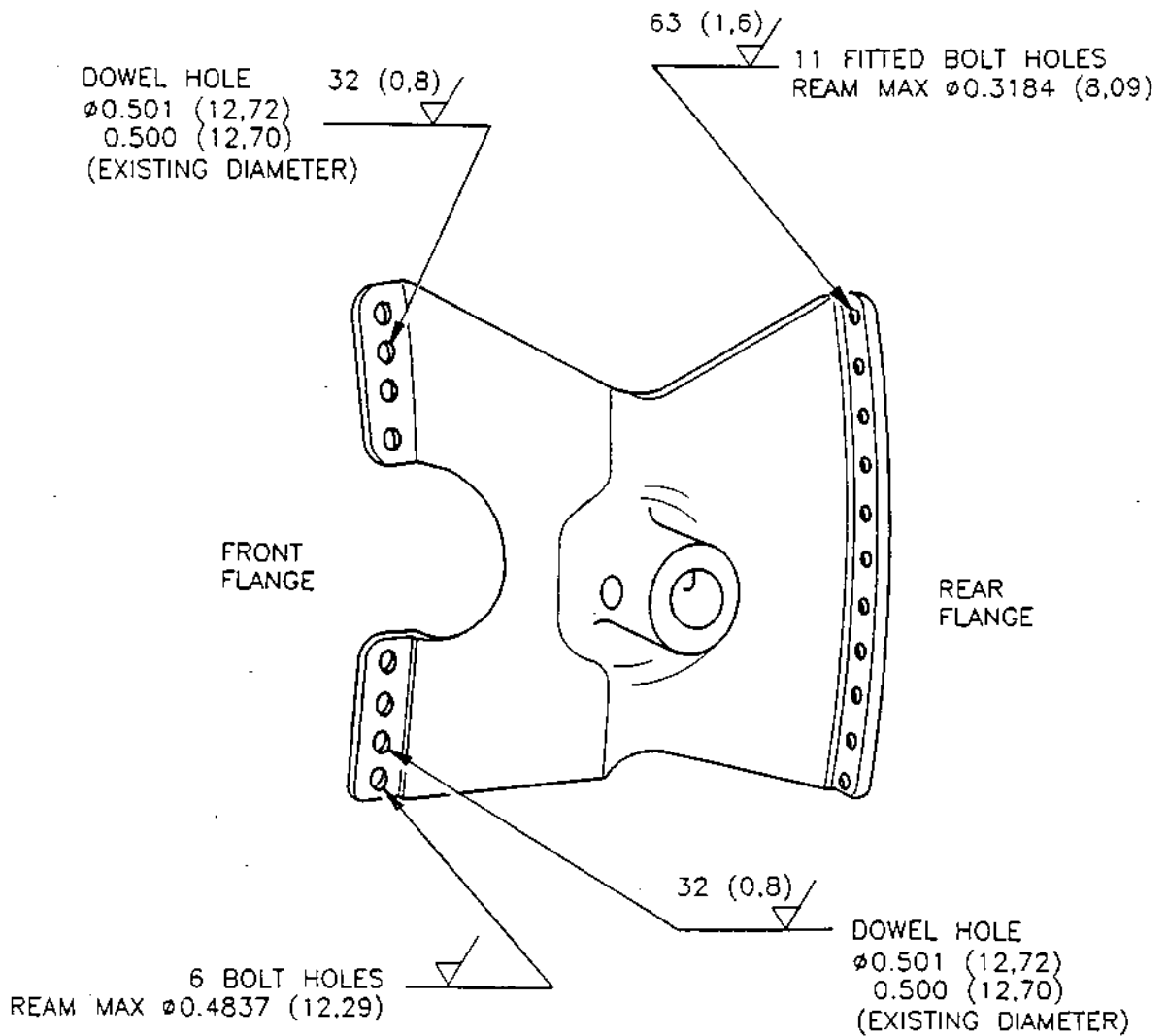




OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 36299 00A



DIMENSIONS GIVEN ARE SHOWN  
THUS:- INCHES (MILLIMETRES)

MOUNTING TRUNNION  
FIG 401

REPAIR  
71-20-00  
Repair No.2  
Page 406  
Jul 31/93



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

## TRUNNION, MOUNTING

### RESTORATION OF MOUNTING TRUNNION HOLES BY NICKEL PLATING.

B516368

#### 1. EFFECTIVITY

<u>IPC</u>	<u>Fig./Item</u>	<u>Part No.</u>
71-20-00	1/60A	B480959
71-20-00	1/60B	B507464

#### 2. REPAIR LIMITATIONS

Compliance with all aspects of this repair process should be achieved without deviation. Where a need to deviate is considered necessary, reference should be made to the Repair Authority for agreement.

The maximum permissible size of hole prior to Nickel plating is 0.510 (12,95) diameter. Refer fig.402.

This Repair Instruction may be repeated any number of times within the limitations stated.

#### 3. GENERAL

##### UNLESS OTHERWISE SPECIFIED

Drawing practice & tolerance interpretation to ISO1101 (JES160)

Dimensions in Inches (Millimetres)

Tolerances on machined dimensions plus/minus 0.010 (0,25)

Tolerance on angles plus/minus 2 degrees

Break sharp edges 0.004 to 0.020 (0,1 to 0,5)

Surface texture interpretation to ISO1302 (JES137)

Surface texture to be 32 (0,8) Microinches (Micrometres)

Welding symbols to ISO2553 (JES139)

3rd Angle Projection

#### 4. REPAIR PROCEDURE

#### SUPPLEMENTARY INFORMATION

NOTE: OPERATIONS 1 TO 3 ARE FOR REPEAT REPAIRS ONLY, FOR NEW REPAIRS PROCEED TO OPERATION 4.

- |    |  |                      |
|----|--|----------------------|
| 1) | Degrease component.  | Refer TSD 594 OP.101 |
| 2) | Remove Nickel plating by machining to near pre-plating sizes followed by a chemical strip to remove remainder. | Refer TSD 594 OP.113 |

REPAIR

## 71-20-00

Repair No. 3

Page 401

Jan 31/95



# OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

- |     |   |  |
|-----|---|--|
| 3)  | Locally Magnetic particle inspect repair area.  | Refer TSD 594 OP.201                   |
| 4)  | Degrease component.   | Refer TSD 594 OP.101                   |
| 5)  | Stress relieve heat treat at $200^{\circ}\text{C} \pm 10^{\circ}\text{C}$ for 1 hour.   | Refer TSD 594 OP.320                   |
| 6)  | Mask off all areas except diameter marked XX to be plated.  | Refer TSD 594 OP.320<br>Refer fig.402  |
| 7)  | Clean component.  | Refer TSD 594 OP.105<br>solution "A".  |
| 8)  | Etch component for 15 seconds.  | Refer TSD 594 OP.205                   |
| 9)  | Thoroughly water wash.  |  |
| 10) | Apply Nickel plate to diameter marked XX. Apply sufficient thickness to allow finish machining of 0.500/0.501 (12,70/12,73) dia. holes. | Refer TSD 594 OP.320<br>Refer fig.402. |
| 11) | Thoroughly cold water wash, followed by hot water wash at $80^{\circ}\text{C}$ .  |  |
| 12) | Remove masking  | Refer TSD 594 OP.320                   |
| 13) | De-embrittlement heat treat at $200^{\circ}\text{C} \pm 10^{\circ}\text{C}$ for 3 hours within 16 hours of plating.                     |  |
| 14) | Degrease component.   | Refer TSD 594 OP.101                   |
| 15) | Inspect plating for integrity and to ensure the required thickness of plating has been attained.  | Refer TSD 594 OP.320                   |
| 16) | Finish machine pin holes to 0.500/0.501 (12,70/12,73) dia.  | Refer fig.403.                         |

REPAIR

## 71-20-00

Repair No. 3

Page 402

Jan 31/95




# OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

- 17) Mark Repair Instruction number R1 B516368 or R3 and coating identity symbol on component, adjacent to normal 'assembly of' number, using the vibro-percussion engraving technique.

Coating symbol 

## 5. MATERIAL

<u>COMPONENT</u>	<u>MATERIAL</u>	<u>RR CODE</u>
B480959	Low alloy steel MSRR 6002	AKM
B507464	Low alloy steel MSRR 6002	AKM

## 6. DATA

NONE.

## 7. TOOLS

<u>TOOL NUMBER</u>	<u>DESCRIPTION</u>	<u>ITEM</u>
NONE.		

## 8. REPLACEMENT PARTS

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>ITEM</u>
NONE.			

Printed in England

REPAIR

# 71-20-00

Repair No. 3

Page 403

Jan 31/95

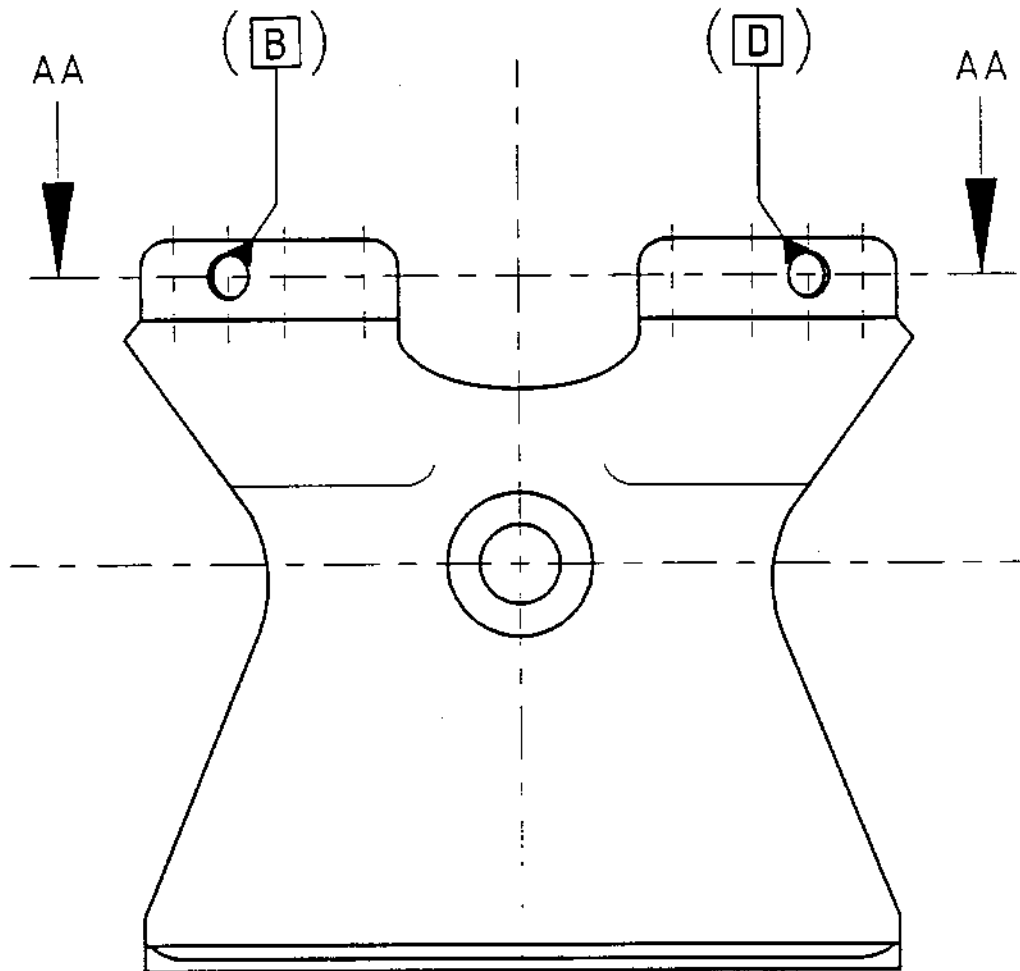


OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema



VIEW OF MOUNTING TRUNNION  
FIG.401

REPAIR  
**71-20-00**  
Repair No. 3  
Page 404  
Jan 31/95



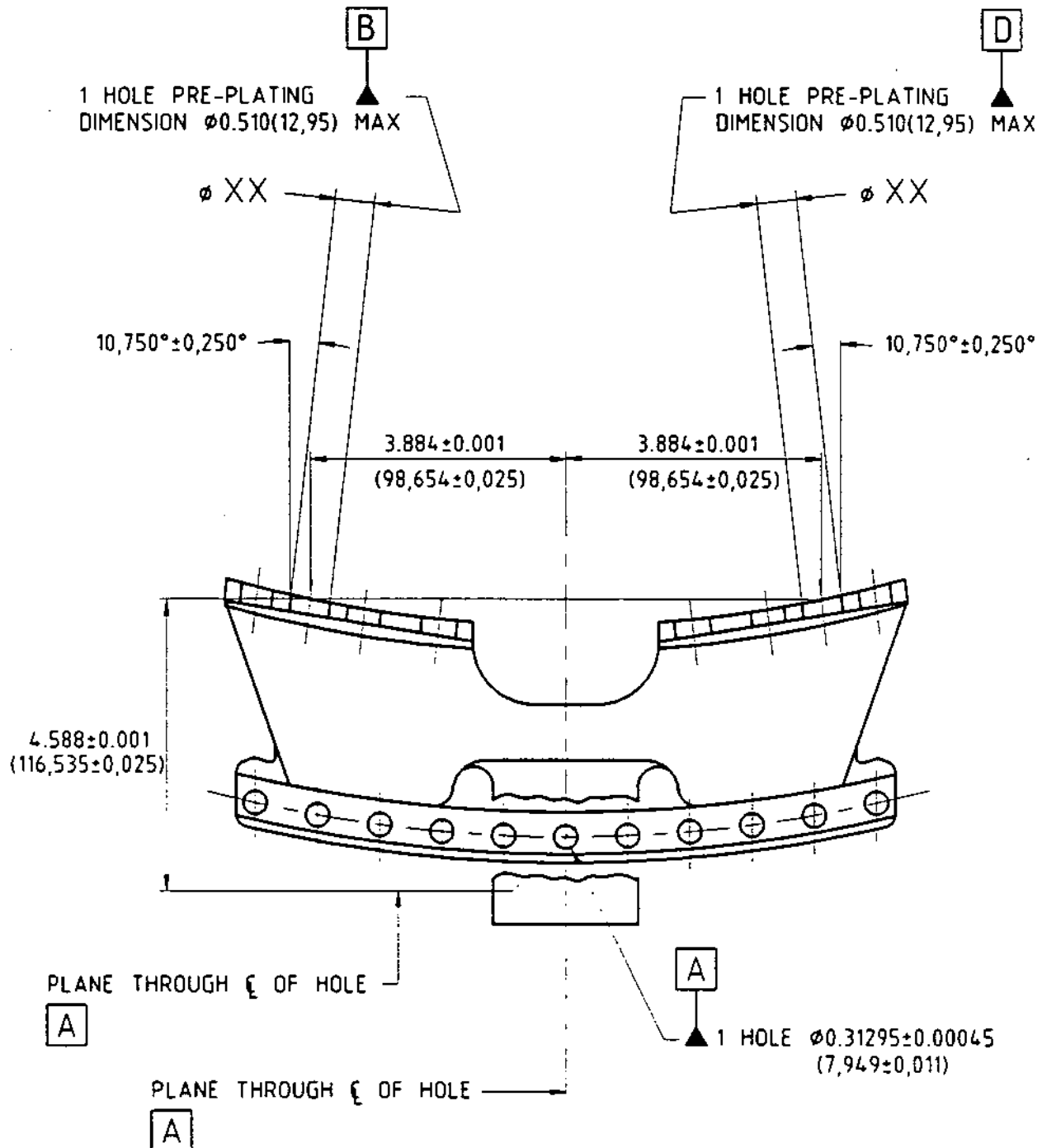
OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England



REPAIR

71-20-00

Repair No. 3

Page 405

Jan 31/95

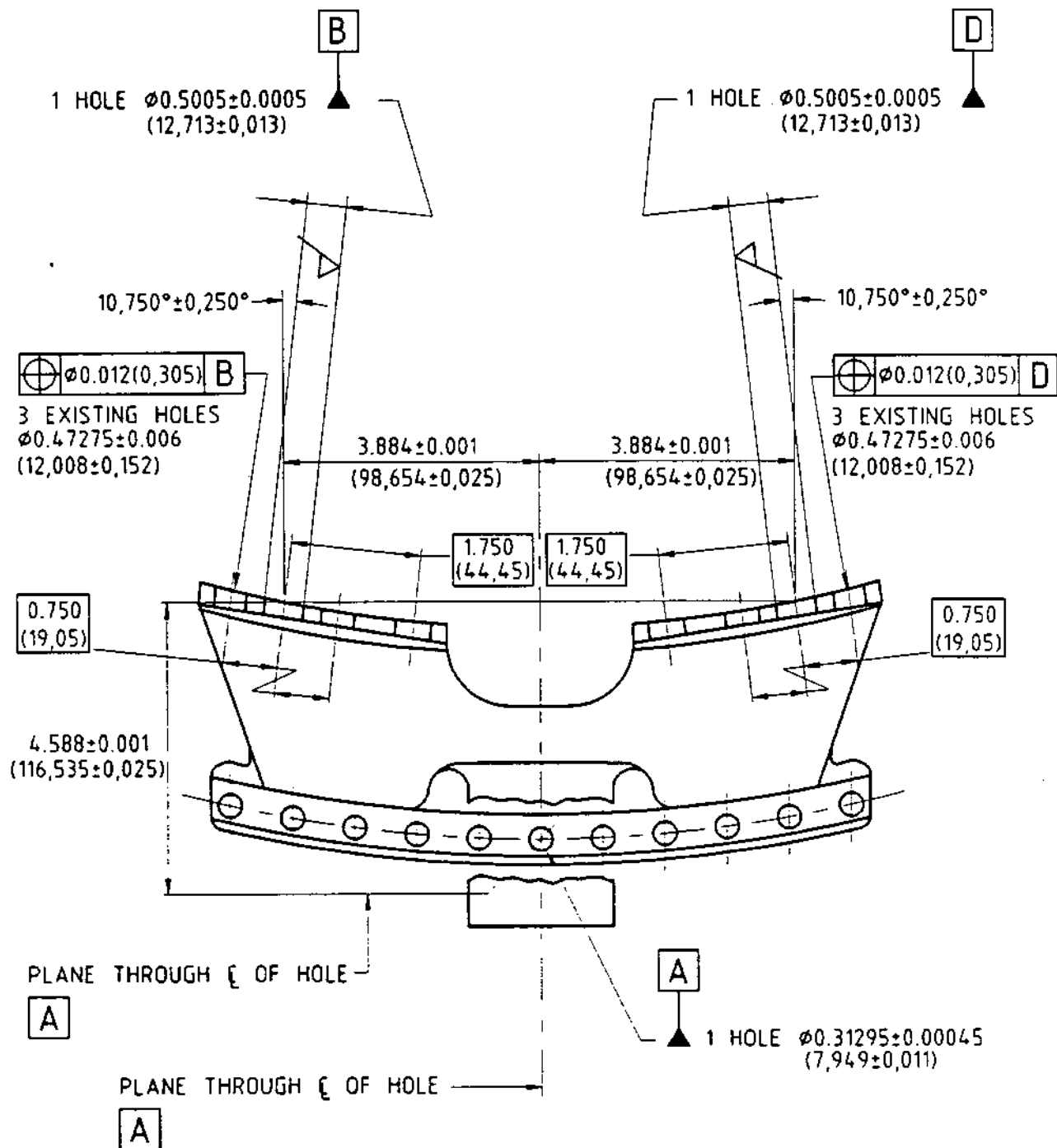


# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema



REPEAT SECTION AA  
FIG.403

REPAIR

## 71-20-00

Repair No. 3

Page 406

Jan 31/95

## ENGINE HEATSHIELDS - INSPECTION/CHECK

### TABLE OF CONTENTS

Para.	Page
1. General ... ..	301
2. General Inspection... ..	301
3. Crack Detection ... ..	301
A. Magnetic Particle Crack Detection ... ..	301
B. Fluorescent Dye Crack Detection ... ..	302
4. Heatshield Assembly ... ..	305
A. Inspect Captive Nuts and Bolts ... ..	305
B. Inspect Heatshield Contact Faces... ..	305
C. Inspect Heatshield ... ..	305
D. Inspect Rounded and Lipped Edges... ..	306
E. Inspect External Finish ... ..	306
5. Knitmesh Damper ... ..	306
A. Inspect Knitmesh Damper ... ..	306
6. Brackets and Channel Assembly ... ..	307
A. Inspect Attachment Faces ... ..	307
B. Inspect Bracket ... ..	307
C. Inspect Captive Nuts and Plain Plate Nuts ... ..	307

### TABLE OF ILLUSTRATIONS

Fig.No.	Page
301 Crack Detection Test Diagram ... ..	304
302 Engine Heatshields, Combustion Chamber Outer Case ... ..	308
303 Engine Heatshields, Combustion Chamber Outer Case ... ..	309
304 Engine Heatshields, Turbine Exhaust Diffuser... ..	310
305 Engine Heatshields, Turbine Exhaust Diffuser... ..	311
306 Engine Heatshields, Turbine Exhaust Diffuser... ..	312
307 Engine Heatshields, Turbine Exhaust Diffuser... ..	313
308 Engine Heatshields, Turbine Exhaust Diffuser... ..	314

### LIST OF TABLES

Table No.	Page
301 Items to be Magnetic Particle Crack Tested ... ..	302
302 Items to be Fluorescent Dye Crack Tested ... ..	302
303 Cross References to Illustrated Parts Catalogue ... ..	303

INSPECTION/CHECK

71-32-00

Contents  
May 1/79





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



## ENGINE HEATSHIELDS - INSPECTION/CHECK

### 1. General

- A. Each item in this chapter is given a two-part identification; thus, 302-20 refers to Figure 302 and to Item 20 called out on that figure. Each item may be further identified by its Part Number by the use of Table 303, which cross-refers figures in this chapter to the equivalent chapter and figure in the Illustrated Parts Catalogue (I.P.C.); the called-out item number will be the same on both figures.
- B. All items which will be crack tested are listed in Tables 301 and 302.
- C. Dimensional checks are cross referenced to the equivalent Fits and Clearances Schedule (F.C.S.) chapter against the item concerned.
- D. When the inspection of an item discloses a minor defect that requires rectification, it is defined as 'Accept after repair'. On all such occasions the item must be rectified in accordance with Standard Practices 72-09-22 Repair. Where a Ref.No. follows 'Accept after repair' e.g. (Ref.72-21-01 Repair No.1), a specific Repair Scheme is available to which the item must be rectified. Items that are rejected, or for which a repair scheme is not currently available, should be held at the discretion of the operator, as service experience may prove the need for a repair.
- E. On completion of a repair, rectification or test, the item(s) must be inspected, to ensure that the necessary work has been satisfactorily completed.

### 2. General Inspection

- A. Inspect all items illustrated in this chapter, whether specified or not, in accordance with Standard Practices (Ref.72-09-00 Inspection/Check). In addition, carry out the inspections detailed for the specified items, from para.4 onwards.
- B. Inspection terms used in this chapter are explained in Standard Practices (Ref.72-09-00 Inspection/Check).

### 3. Crack Detection

- A. Magnetic Particle Crack Detection.

(1) Submit the items listed in Table 301 to crack detection in accordance with the process quoted.

INSPECTION/CHECK

**71-32-00**

Page 301

Apr 1/77



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (2) Items to be crack detected by this method are illustrated in the Crack Detection Test Diagram (Fig.301). For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

No current requirement

Items to be Magnetic Particle Crack Tested  
Table 301

B. Fluorescent Dye Crack Detection.

- (1) Submit the items listed in Table 302 to crack detection in accordance with the process quoted. For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

302	40	Left Shield Assembly	F1A
302	240	Right Shield Assembly	F1A
303	10	Left Rear Cover Assembly	F1A
303	40	Right Rear Cover Assembly	F1A
304	10	Heatshield Assembly	
		Panel 10	F1A
304	70	Heatshield Assembly	
		Panel 9	F1A
304	130	Heatshield Assembly	
		Panel 8	F1A
304	200	Heatshield Assembly	
		Panel 7	F1A
304	270	Heatshield Assembly	
		Panel 6	F1A
305	10	Heatshield Assembly	
		Panel 5	F1A
305	75	Channel Assembly	F1A

Items to be Fluorescent Dye Crack Tested  
Table 302 (Continued)

INSPECTION/CHECK

71-32-00

Page 302  
Dec 1/75

JN16823



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
305	80	Heatshield Assembly Panel 4	FlA
305	140	Heatshield Assembly Panel 3	FlA
305	200	Heatshield Assembly Panel 2	FlA
305	260	Heatshield Assembly Panel 1	FlA
307	10	Heatshield Assembly	FlA
307	120	Tie Bracket	FlA
307	130	Bracket	FlA
308	10	Heatshield Assembly	FlA
308	70	Bracket Assembly	FlA

Items to be Fluorescent Dye Crack Tested  
Table 302 (Concluded)

FIG.NO.	ILLUSTRATED PARTS CATALOGUE EQUIVALENT
301	Not applicable
302	71-32-01 Fig.1
303	71-32-01 Fig.2
304	71-32-02 Fig.1
305	71-32-02 Fig.2
306	71-32-02 Fig.3
307	71-32-02 Fig.4
308	71-32-02 Fig.5

Cross References to Illustrated Parts Catalogue  
Table 303

INSPECTION/CHECK

71-32-00

Page 303

May 1/79



OLYMPUS 593

MK.610-14-28  
OVERHAUL



No Current Requirement

TN16822

Crack Detection Test Diagram  
Figure 301

INSPECTION/CHECK

**71-32-00**

Page 304

Dec 1/75



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



4. Heatshield Assembly (302-40/240, 303-10/40, 304-10/70/130/200/  
270, 305-10/80/140/200/260, 307-10, 308-10)

A. Inspect Captive Nuts and Bolts (Ref.72-09-00 Inspection/  
Check).

(1) Security.

(a) Retaining plates secure                      Accept.  
and solid rivets  
positive.

B. Inspect Heatshield Contact Faces.

(1) Wear and fretting.

(a) Not more than 5 per                      Accept after  
cent reduction in                      repair.  
material thickness  
and unstepped wear.

C. Inspect Heatshield.

(1) Dents.

(a) Dents of smooth                      Accept after repair  
contour.                      providing repair  
does not induce  
cracking.

(2) Gouges.

(a) Not more than 0.005 in.                      Accept after  
(0,130 mm) in depth                      repair.  
with no removal of  
metal.

(3) Wear.

(a) Bolt-holes elongated                      Accept after repair  
not more than 0.030 in.                      providing repair  
(0,760 mm).                      does not induce  
cracking.

(4) Cracks.

(a) Any signs of cracking.                      Reject.

INSPECTION/CHECK

71-32-00

Page 305  
May 1/79



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



(5) Distortion.

Accept if compatibility is preserved.

(6) Punctures.

Reject for repair.

D. Inspect Rounded and Lipped Edges.

(1) Dents.

(a) Minor dents.

Accept after repair providing repair restores profile and does not induce cracking.

(2) Nicks.

(a) Not more than 0.010 in.  
(0,2540 mm) in depth.

Accept after repair subject to satisfactory crack detection.

E. Inspect External Finish.

(1) Peeling or damage  
of gold paint.

Accept after touch-up or re-finish (Ref. 72-09-03 Repair for areas of finish and application of finish).

5. Knitmesh Damper (302-90/110/200/270/290/380, 304-40/60/100/120/160/180/230/250/300/320, 305-40/60/110/130/170/190/230/250/290/310, 307-50/70, 308-40/60)

A. Inspect Knitmesh Damper.

(1) Check compression rate using spring test equipment  
(Ref. 72-09-00 Inspection/Check).

(a) Free length 0.150 in.  
(3,810 mm).

Accept.

INSPECTION/CHECK

71-32-00

Page 306

May 1/79

TN16824



OLYMPUS 593

MK.610-14-28

OVERHAUL



(b) Fitted length 0.100 in. Accept.  
(2,540 mm).

(c) Load at fitted length Accept.  
5 to 15 lbs (2,27 to  
6,80 kg) i.e. spring  
rate of 100 to 300 lb/  
in. (17,56 to 52,68 N/mm).

(2) Damage.

(a) Disintegration of mesh. Reject.

6. Brackets (304-265, 306-10/70/170/220/270/320/370/420, 307-120/130, 308-70/110) and Channel Assembly (305-75)

A. Inspect Attachment Faces.

(1) Wear and fretting.

(a) Not more than 10 per cent reduction in flange thickness. Accept.

(b) Bolt-holes elongated not more than 0.030 in. Accept after repair.  
(0,760 mm).

(2) Scores.

(a) Not more than 0.010 in. Accept after repair  
(0,250 mm) in depth. providing flange thickness is not reduced by more than 10 per cent.

B. Inspect Bracket.

(1) Nicks and burrs. Accept after repair.

(2) Distortion. Accept if compatibility is preserved.

C. Inspect Captive Nuts and Plain Plate Nuts (Ref.72-09-00 Inspection/Check).

(1) Security.

(a) Solid rivets positive and nuts secure. Accept.

INSPECTION/CHECK

71-32-00

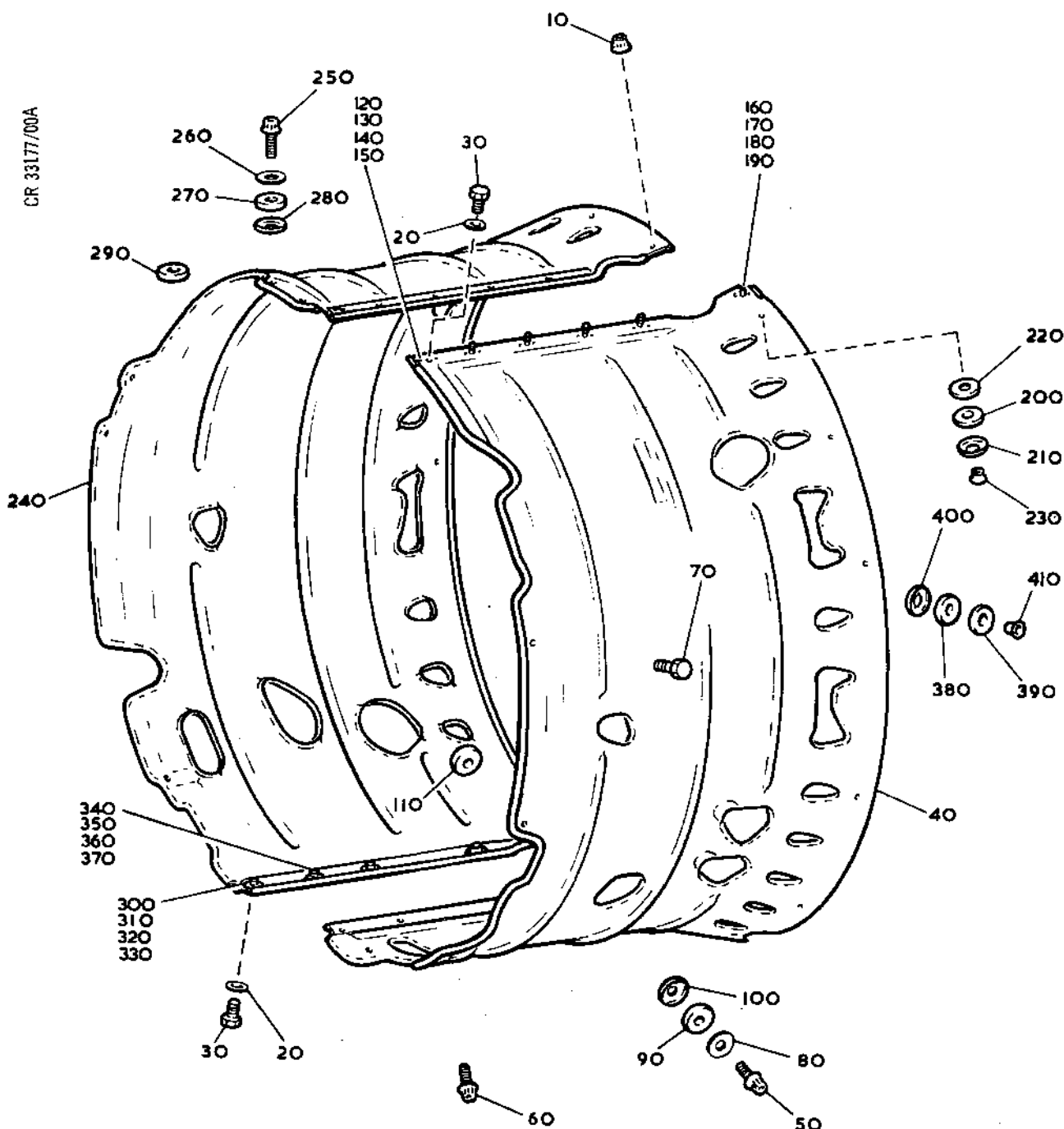
Page 307

Dec 1/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TN16828

Engine Heatshields, Combustion Chamber Outer Case  
Figure 302

INSPECTION/CHECK

71-32-00

Page 308

Dec 1/75



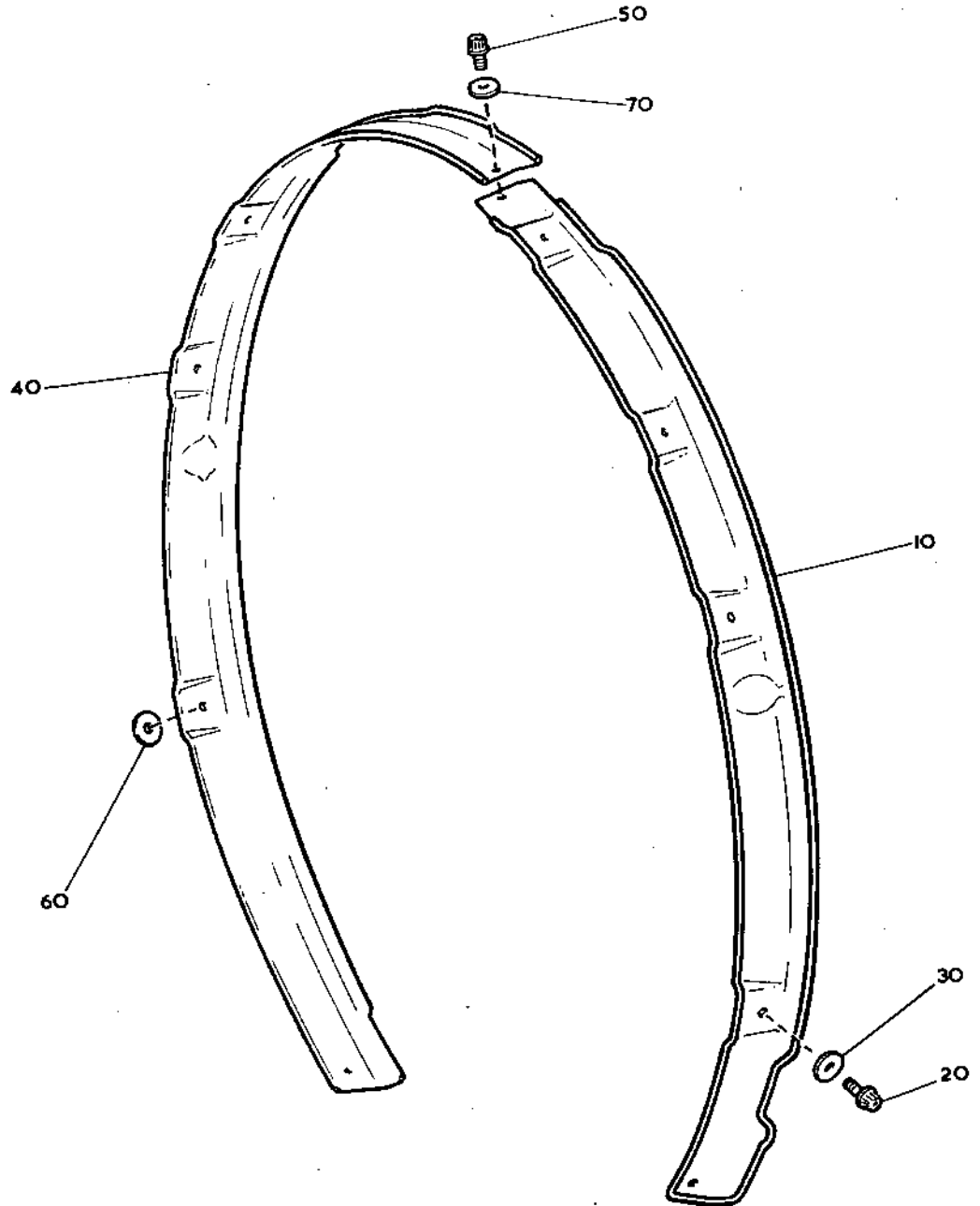


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32746/00B



Engine Heatshields, Combustion Chamber Outer Case  
Figure 303

INSPECTION/CHECK

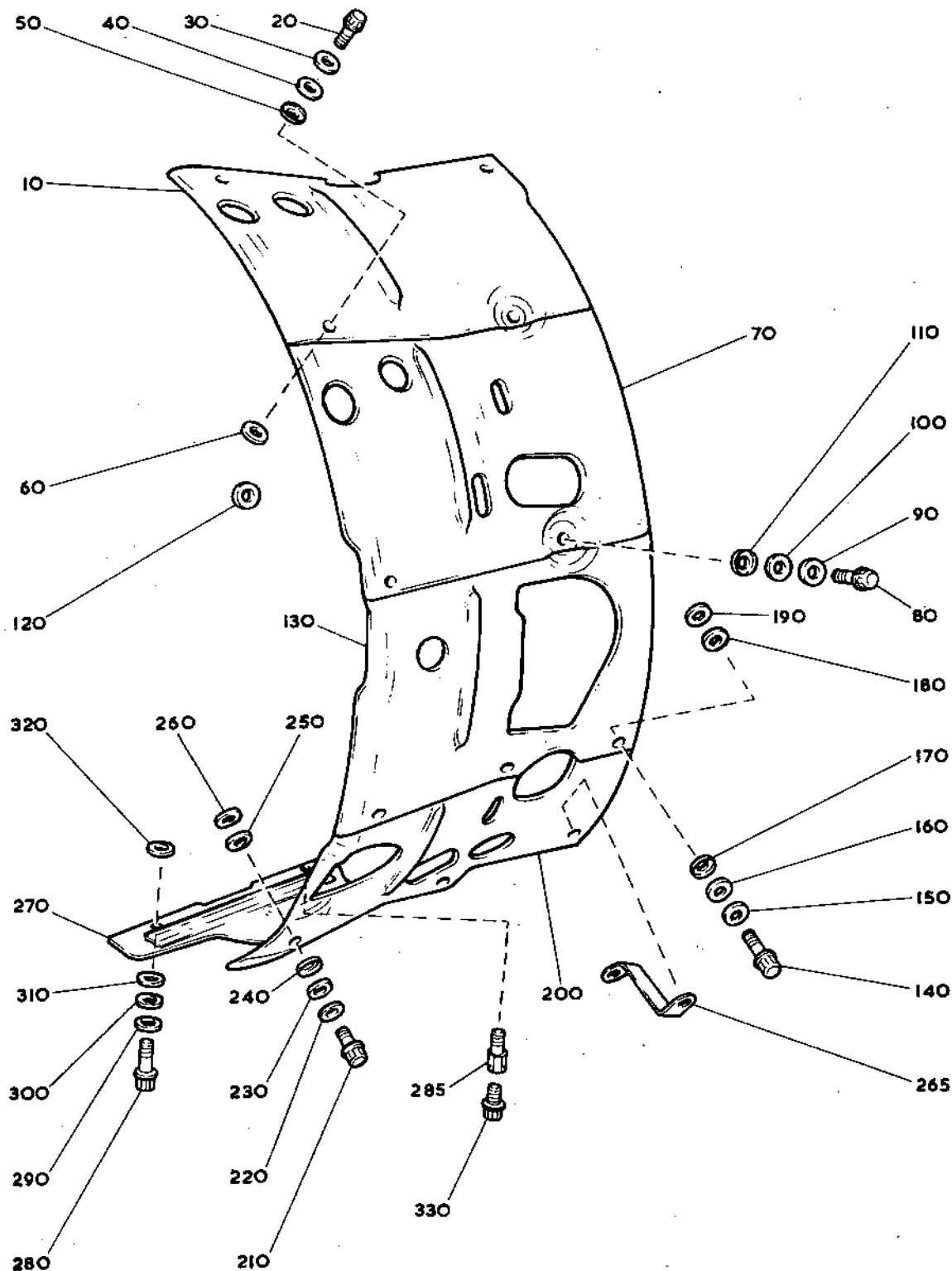
71-32-00

Page 309

Dec 1/75



TN16830



Engine Heatshields, Turbine Exhaust Diffuser  
Figure 304

INSPECTION/CHECK

**71-32-00**

Page 310  
Dec 1/75



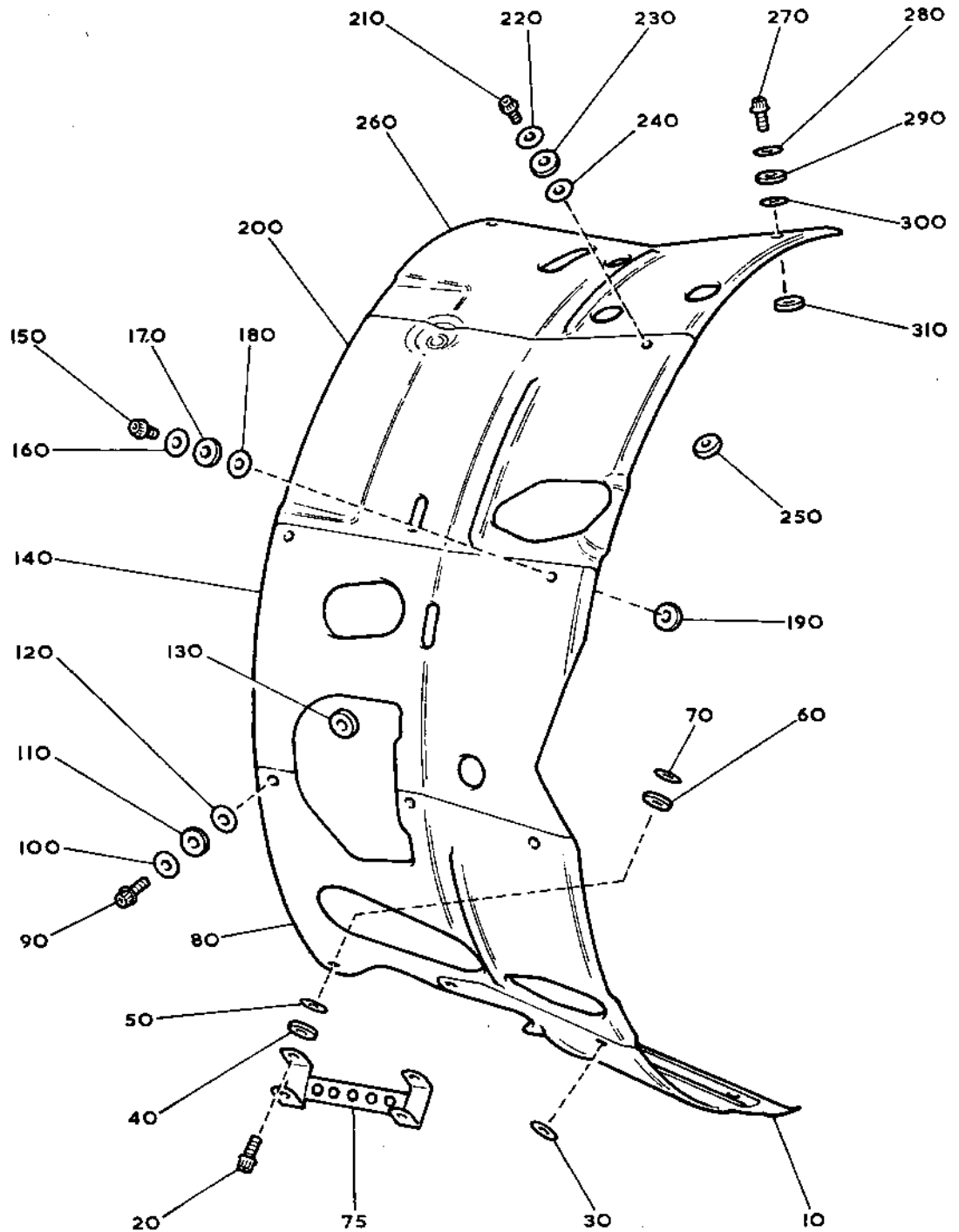
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32498/00B



Engine Heatshields, Turbine Exhaust Diffuser  
Figure 305

INSPECTION/CHECK

71-32-00

Page 311

Dec 1/75

BS00028134/1

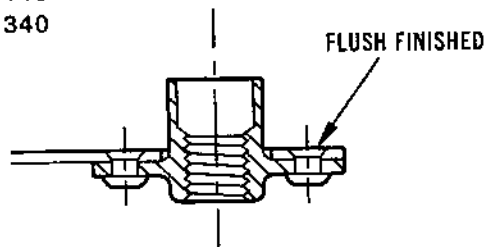
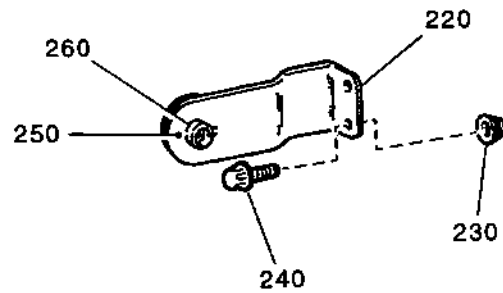
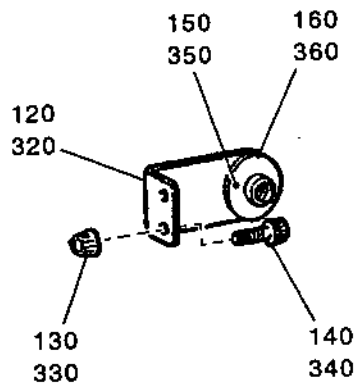


OLYMPUS 593

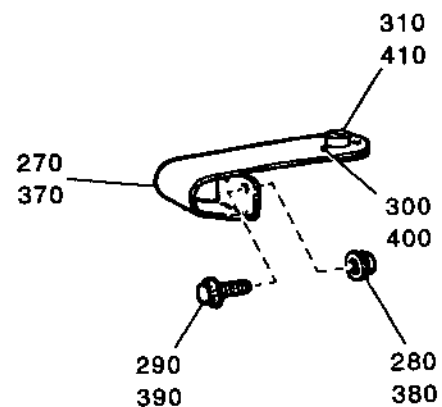
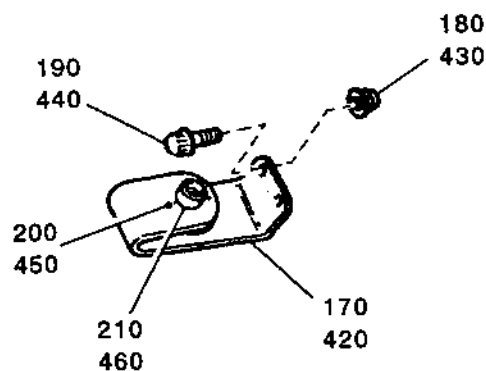
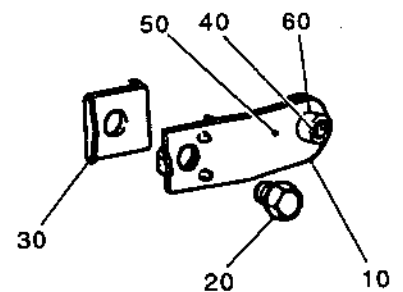
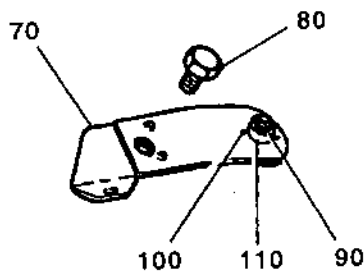
MK.610-14-28  
OVERHAUL



sneema



TYPICAL SECTION THROUGH  
PLAIN PLATE NUT AND BRACKET



Engine Heatshields, Turbine Exhaust Diffuser  
Figure 306

INSPECTION/CHECK

71-32-00

Page 312  
Jun 30/00



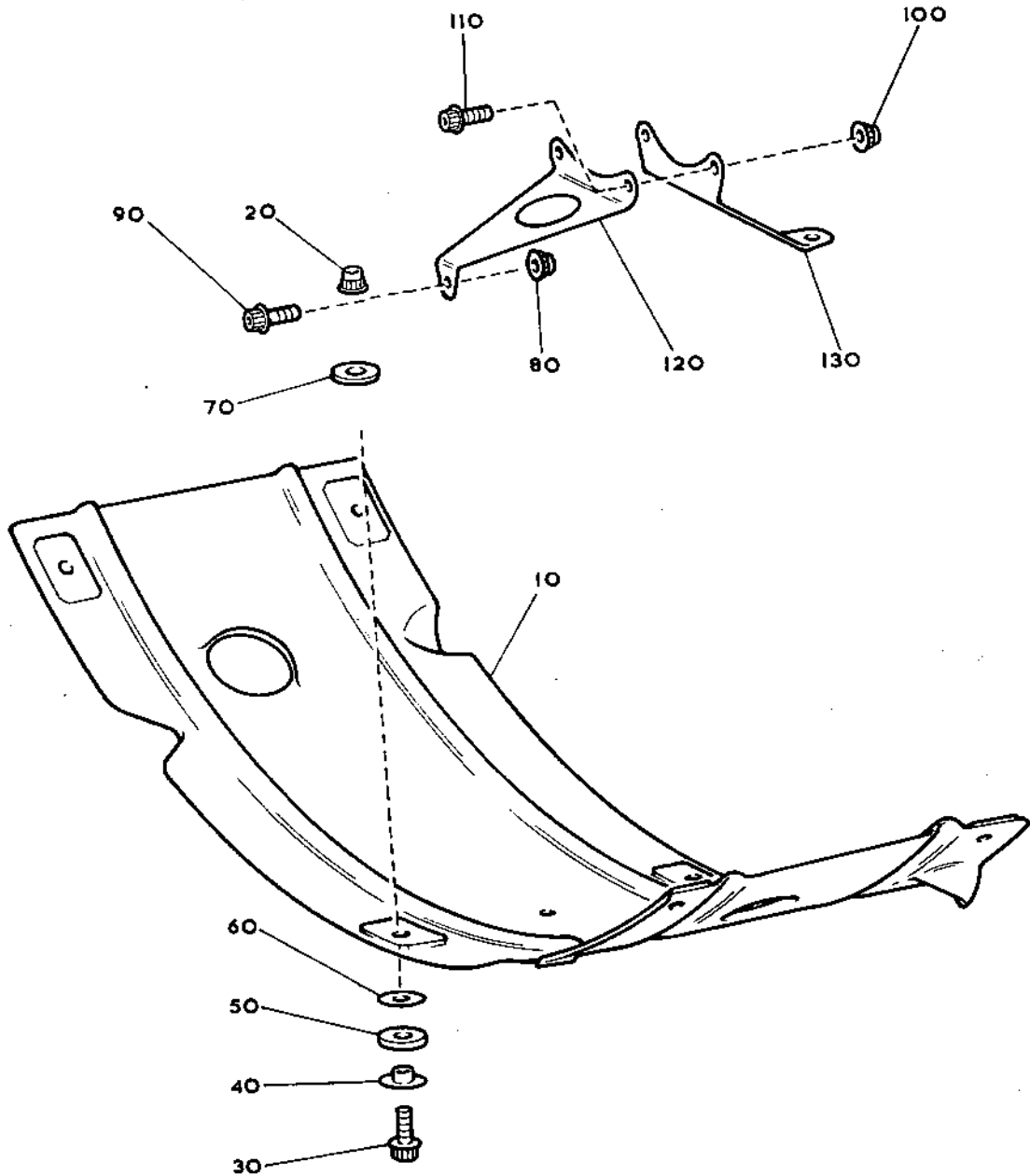
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32622/00B



Engine Heatshields, Turbine Exhaust Diffuser  
Figure 307

INSPECTION/CHECK

**71-32-00**

Page 313  
Dec 1/75

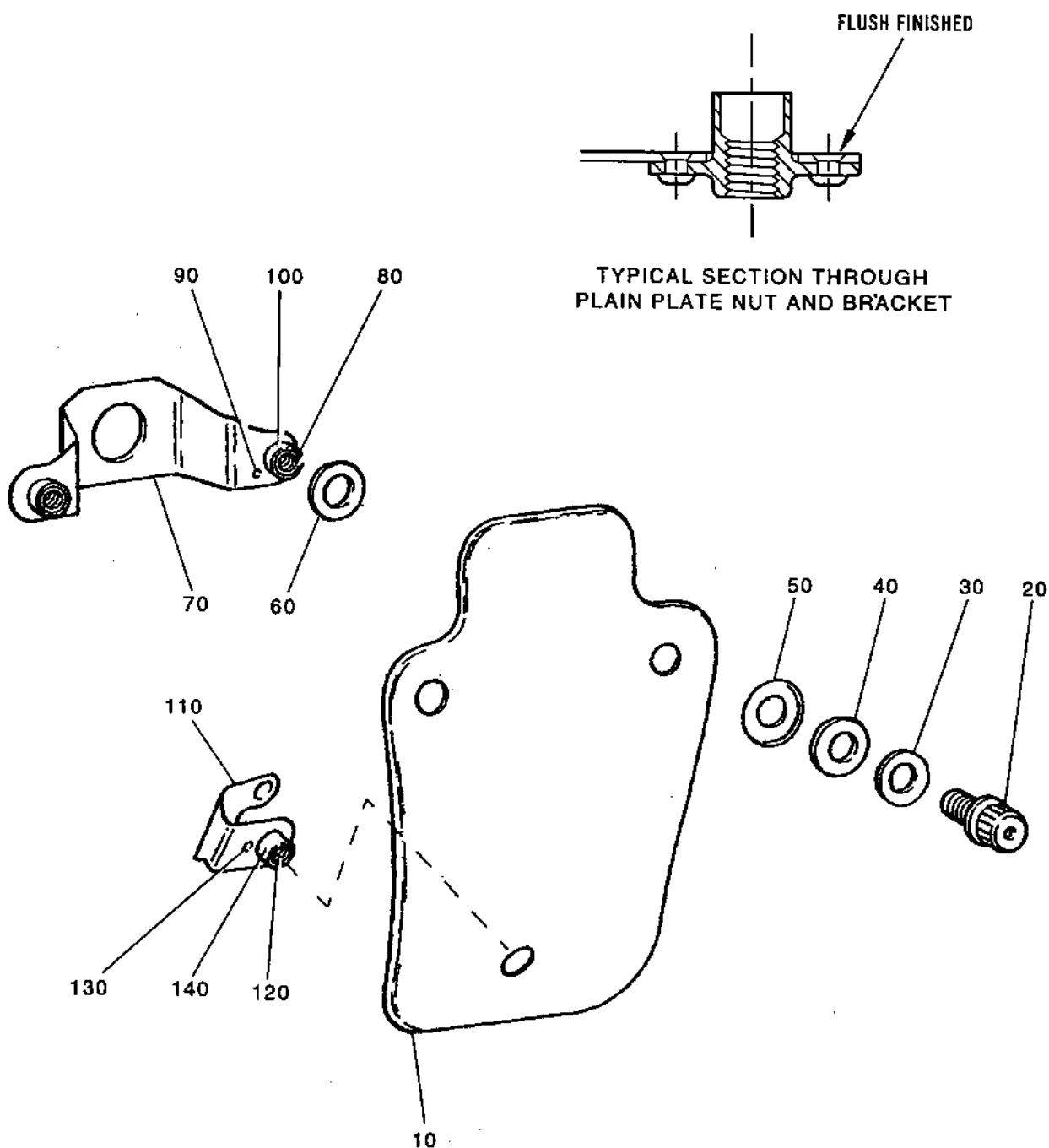


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Engine Heatshields, Turbine Exhaust Diffuser  
Figure 308

INSPECTION/CHECK

71-32-00

Page 314

Jun 30/00



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



## HEAT SHIELDS - COMBUSTION CHAMBER OUTER CASE - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

**71-32-01**

Page 201

Dec 1/76

PRINTED IN ENGLAND

TN43603



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.
- D. Certain components are subject to Controlled Manufacturing Technique (CMT) procedures. The cleaning of these components is critical and variations from the specified cleaning procedures and solutions are prohibited without approval from the engine manufacturer. All components to which this applies are identified as such in the Remarks column of the Cleaning Processes Table.

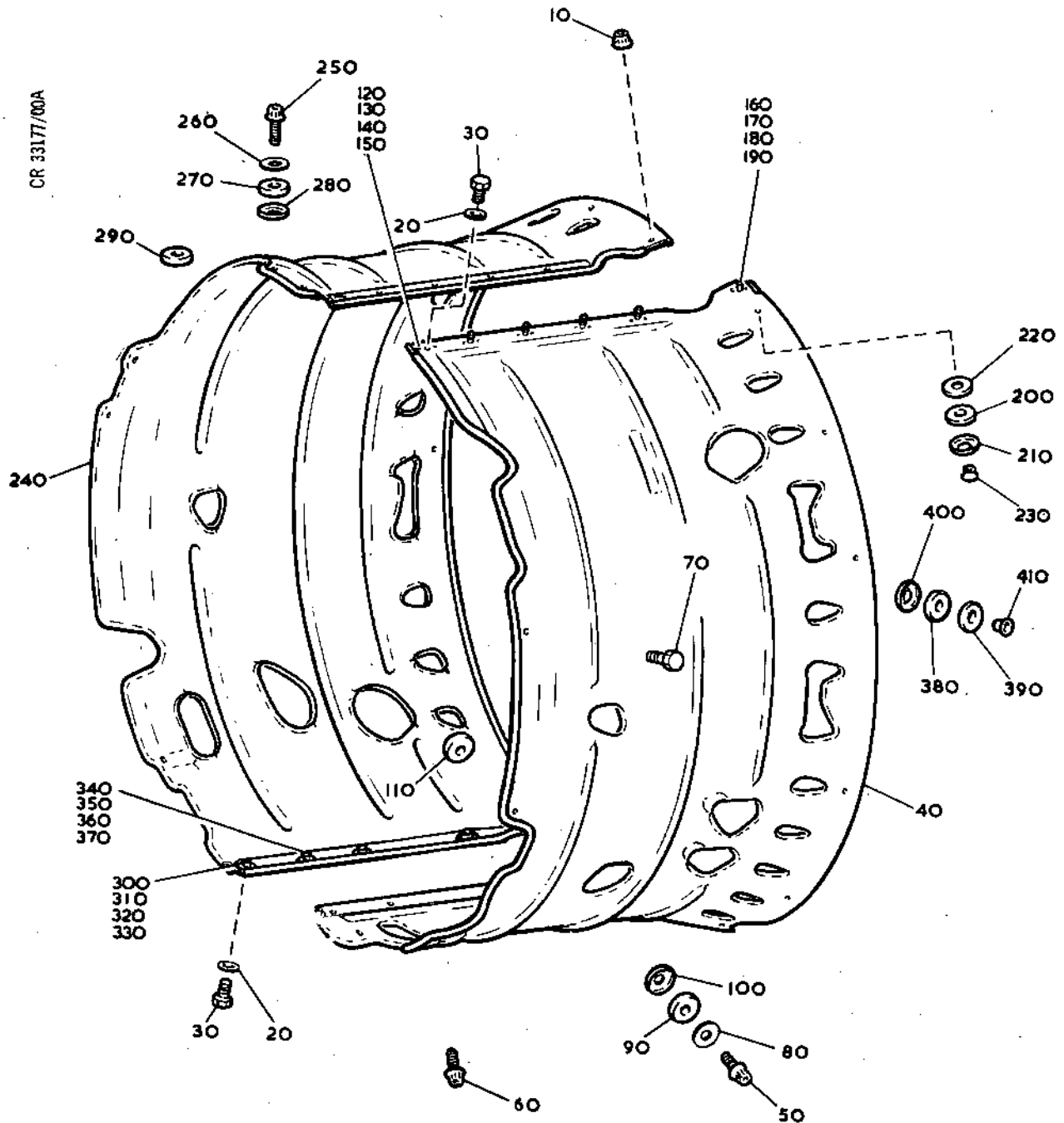
FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	G	Process G is to be used if the paint is to be stripped from the heat shield
202	ALL		A or B	G	

Cleaning Processes  
Table 201

TN43604



TN43605



Combustion Chamber Outer Case Heat Shields  
Figure 201

CLEANING  
71-32-01  
Page 203  
Apr 1/76

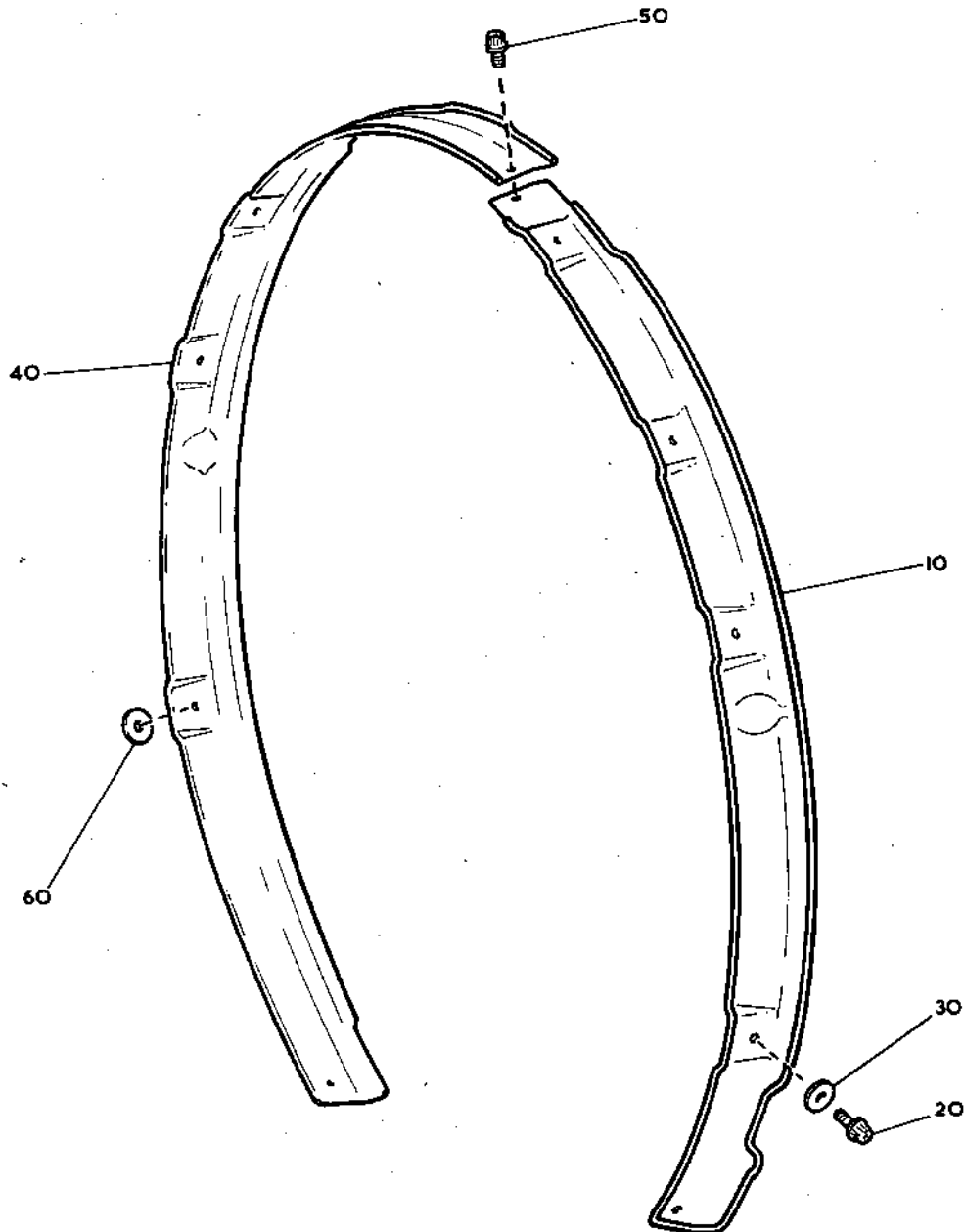


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32746/00C



TN43606

Combustion Chamber Outer Case Heat Shields  
Figure 202

CLEANING  
**71-32-01**

Page 204  
Dec 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



HEAT SHIELDS - COMBUSTION CHAMBER OUTER CASE - REPAIR

TABLE OF CONTENTS

Repair No.	Title	Scheme No.
1	Heat Shields - Repair of Fretting and Cracking by Welding and Patching.	B.513550

PRINTED IN ENGLAND

REPAIR  
**71-32-01**  
Contents 1  
Jun 1/91

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

HEAT SHIELD, COMBUSTION CHAMBER OUTER CASING  
REPAIR OF FRETTING AND CRACKING BY DIRECT WELDING  
AND PATCHING OR BLENDING

REPAIR NO. B5135501. Effectivity

<u>I.P.C.</u>	<u>Fig./Item</u>	<u>Part No.</u>
71-32-01	1 40A	B485826
	1 240A	B485833

2. Introduction

## A. General.

- (1) This instruction describes the procedure for repairing the combustion chamber outer casing heat shield by direct welding, patching or blending where fretting or cracking has occurred.
- (2) Dimensions are shown thus, INCHES (MILLIMETRES), in tables and illustrations.
- (3) Refer to Chapter 72-09-00, Repair, for all standard practices applicable to this repair procedure.
- (4) Remove all sharp edges 0.004 to 0.020 in. (0,10 to 0,50 mm) unless otherwise stated.
- (5) Tolerances on machined dimensions are plus/minus 0.010 in (0,25 mm) unless otherwise stated.

## B. Repair Limitations.

- (1) Compliance with all aspects of these repairs should be achieved without deviation. Where a need to deviate is considered necessary, agreement should first be sought from the Repair Authority.
- (2) There are three separate parts to this repair procedure:
  - (a) Repair by blending minor edge defects up to 0.187 in. (4,75 mm) in length (Part 1).
  - (b) Repair by direct welding single cracks (Part 2).

REPAIR

**71-32-01**Repair No. 1  
Page 401  
Jun 1/91



OLYMPUS 593

MK.610-14-28

OVERHAUL



(c) Repair by patching branch cracking and areas that cannot be repaired by direct welding (Part 3).

(3) The Heat Shield material specification is stainless steel to MSRR 6523, Rolls-Royce code EBM.

### 3. Instructions.

#### A. Assessment of Repair.

Inspect the component to determine the extent of any damage then refer to the relevant instructions below.

(1) Repair by Blending (Part 1).

(a) Blend.

1 Refer to Figure 401. Removing only the minimum amount of material necessary, hand blend to remove damage within the limitation given, to produce a smooth continuous profile with no sharp edges.

(b) Inspect.

1 Carry out crack detection as specified for this component in Chapter 72-09-00, FlA, Inspection/Check.

(c) Identify.

1 Mark the component SAL B513550/1 adjacent to the existing part number using vibro-percussion engraving marking as specified in Chapter 72-09-00, Repair.

(2) Repair by Welding (Part 2).

(a) Preparation.

1 Refer to Chapter 72-09-03, Repair. Locally remove gold paint from area to be welded.

2 Refer to TSD 594-409. Thoroughly clean and prepare the area for welding.

REPAIR

71-32-01

Repair No. 1  
Page 402  
Jun 1/91



OLYMPUS 593

MK.610-14-28

OVERHAUL



## (b) Weld.

- 1 Refer to TSD 594-409. Using filler rods to MSRR 9500/2, repair cracks by welding.

NOTE: Take suitable precautions to prevent distortion during welding.

## (c) Inspect.

- 1 Check component for distortion.
- 2 Carry out crack detection as specified for this component in Chapter 72-09-00, FlA, Inspection/Check.

## (d) Restore Finish.

- 1 Referring to Chapter 72-09-03, Repair, touch up gold paint locally.

## (e) Identify.

- 1 Mark the component SAL B513550/2 adjacent to the existing part number using vibro-percussion engraving marking as specified in Chapter 72-09-00, Repair.

## (3) Repair by Patching (Part 3).

## (a) Preparation.

- 1 Cut away the defective area ensuring minimum corner radii of 0.500 in. (12,70 mm).
- 2 Using patch material to MSRR 6523 (0.019 to 0.025 in. (0,48 to 0,64 mm) thick before forming), prepare a flush fitting patch to suit the contours of the cut away area (see para. 5 Replacement Parts, of this instruction).
- 3 Refer to Chapter 72-09-03, Repair. Locally remove gold paint from area to be welded.
- 4 Refer to TSD 594-409. Thoroughly clean and prepare the area for welding.

REPAIR

71-32-01

Repair No. 1

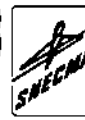
Page 403

Jun 1/91



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(b) Weld.

- 1 Refer to TSD 594-409. Using filler rods to MSRR 9500/2 argon arc weld patch in position.

NOTE: Take suitable precautions to prevent distortion during welding.

(c) Inspect.

- 1 Carry out crack detection as specified for this component in Chapter 72-09-00, F1A, Inspection/Check.

(d) Dress.

- 1 Dress the patch flush to existing contour taking care that parent material is not impaired.

(e) Inspect.

- 1 Carry out crack detection as specified for this component in Chapter 72-09-00, F1A, Inspection/Check.

(f) Restore Finish.

- 1 Refer to Chapter 72-09-03, Repair. Touch up gold paint locally.

(g) Identify.

- 1 Mark the component SAL B513550/3 adjacent to the existing part number using vibro-percussion engraving marking as specified in Chapter 72-09-00, Repair.

C. Final Inspection.

- (1) Finally inspect component to ensure that repair has been carried out satisfactorily and that the Heat Shield is in a serviceable condition.

4. Special Tools, Fixtures and Equipment

None.

5. Replacement Parts

BR50909 Patch Material Qty as required.

REPAIR

71-32-01

Repair No. 1  
Page 404  
Jun 1/91

CR 36328 00A

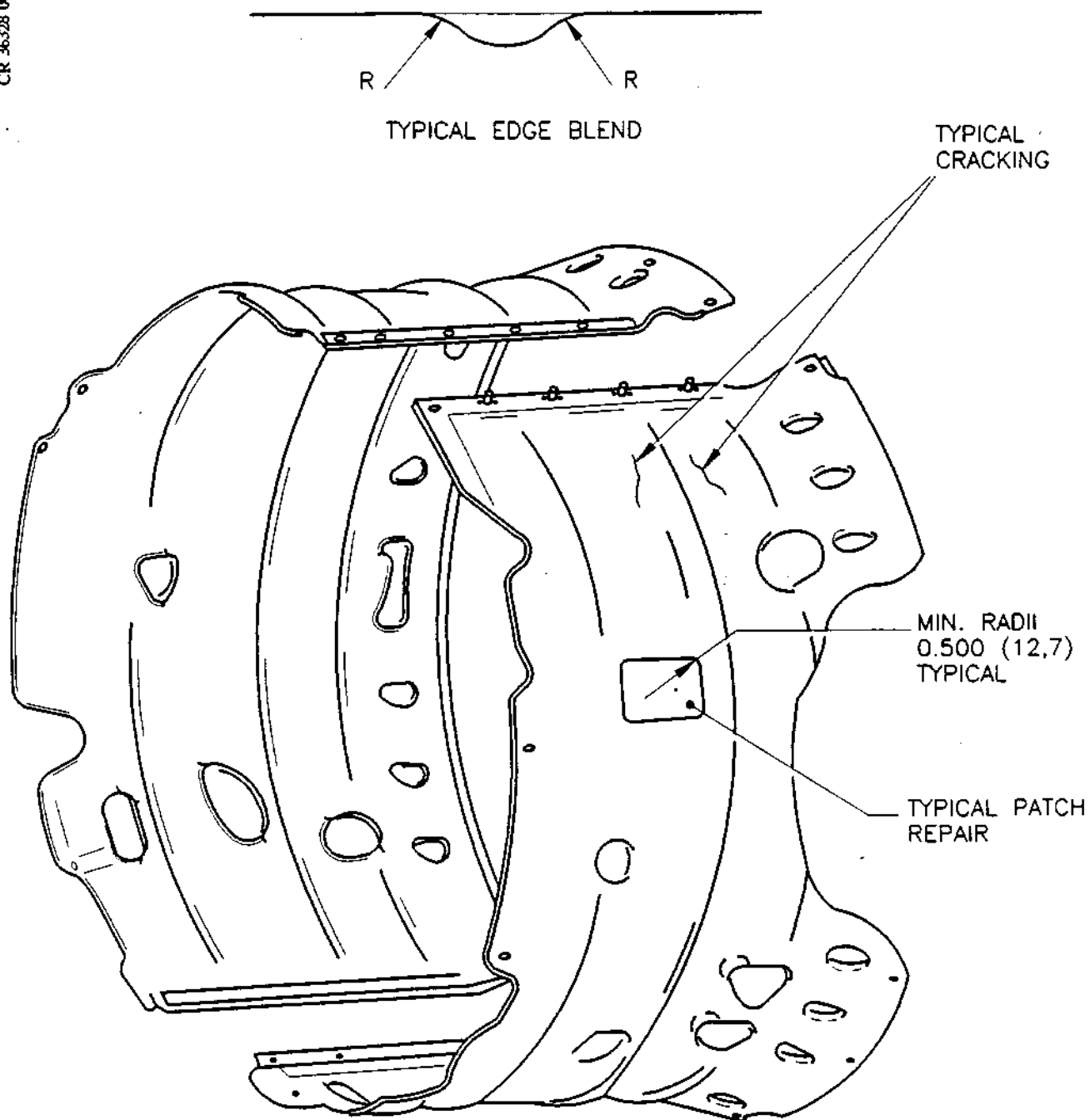


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



DIMENSIONS GIVEN ARE SHOWN  
THUS:- INCHES (MILLIMETRES)

HEAT SHIELD-C.C.O.C.

Heat Shield, Combustion Chamber Outer Casing  
Figure 401

REPAIR

71-32-01

Repair No. 1  
Page 405  
Jun 1/91





OLYMPUS 593

MK.610-14-28  
OVERHAUL



## HEAT SHIELDS - TURBINE EXHAUST DIFFUSER - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

71-32-02

Page 201

Dec 1/76

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum, but repeat the process a number of times until the assembly item is satisfactorily cleaned. If the finish is damaged, then the damaged part will have to be replaced or reconditioned.
- D. Certain components are subject to Controlled Manufacturing Technique (CMT) procedures. The cleaning of these components is critical and variations from the specified cleaning procedures and solutions are prohibited without approval from the controlling laboratory. All components to which this applies are identified as such in the Remarks column of the Cleaning Processes Table.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL	-	A or B	G	Process G is to be used if the paint is to be stripped from the heat shields
202	ALL	-	A or B	G	
203	ALL	-	A or B	G	
204	ALL	-	A or B	G	
205	ALL-	-	A or B	G	

Cleaning Processes  
Table 201

TN46761



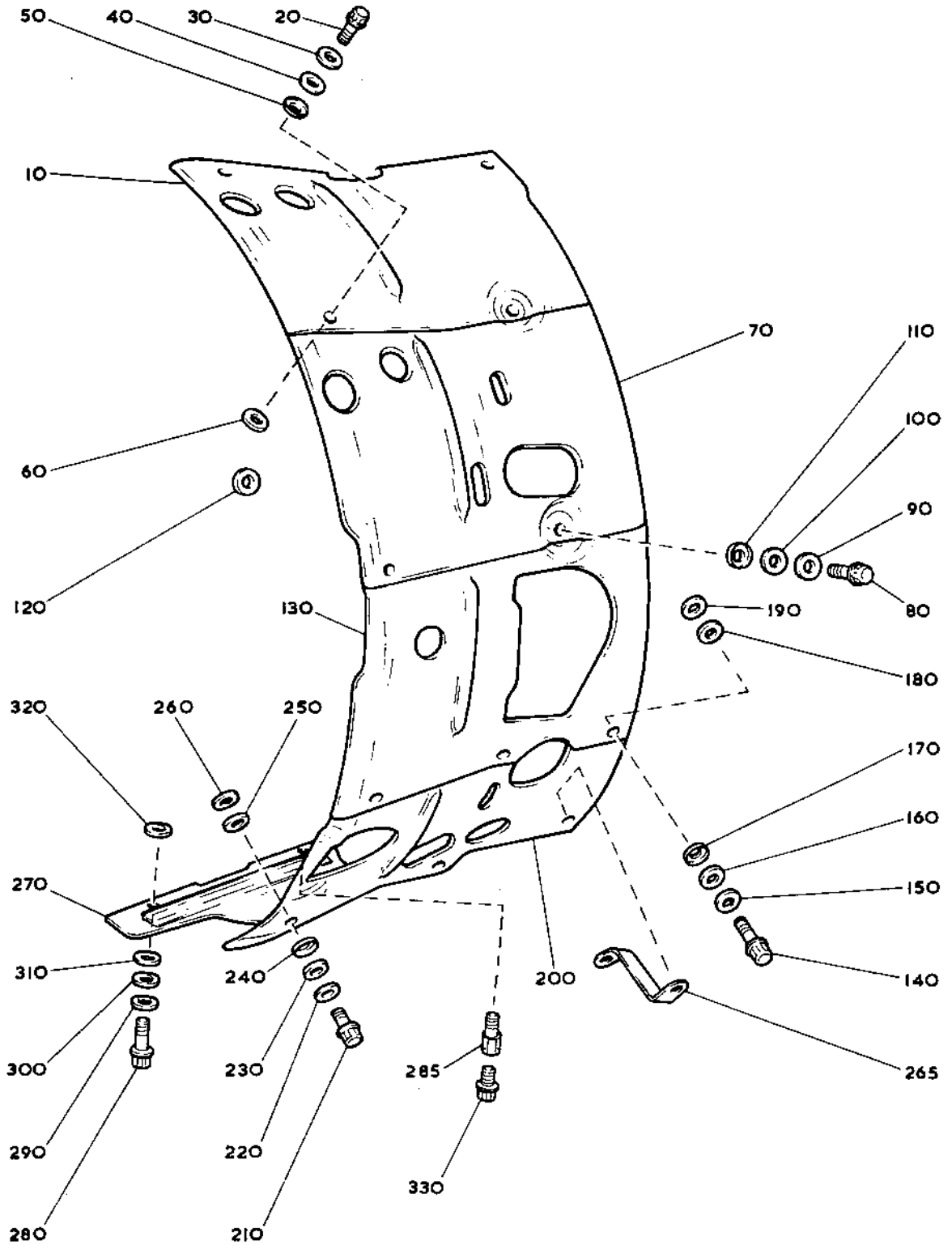
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32497/008



Engine Heat Shields  
Figure 201

TN27638

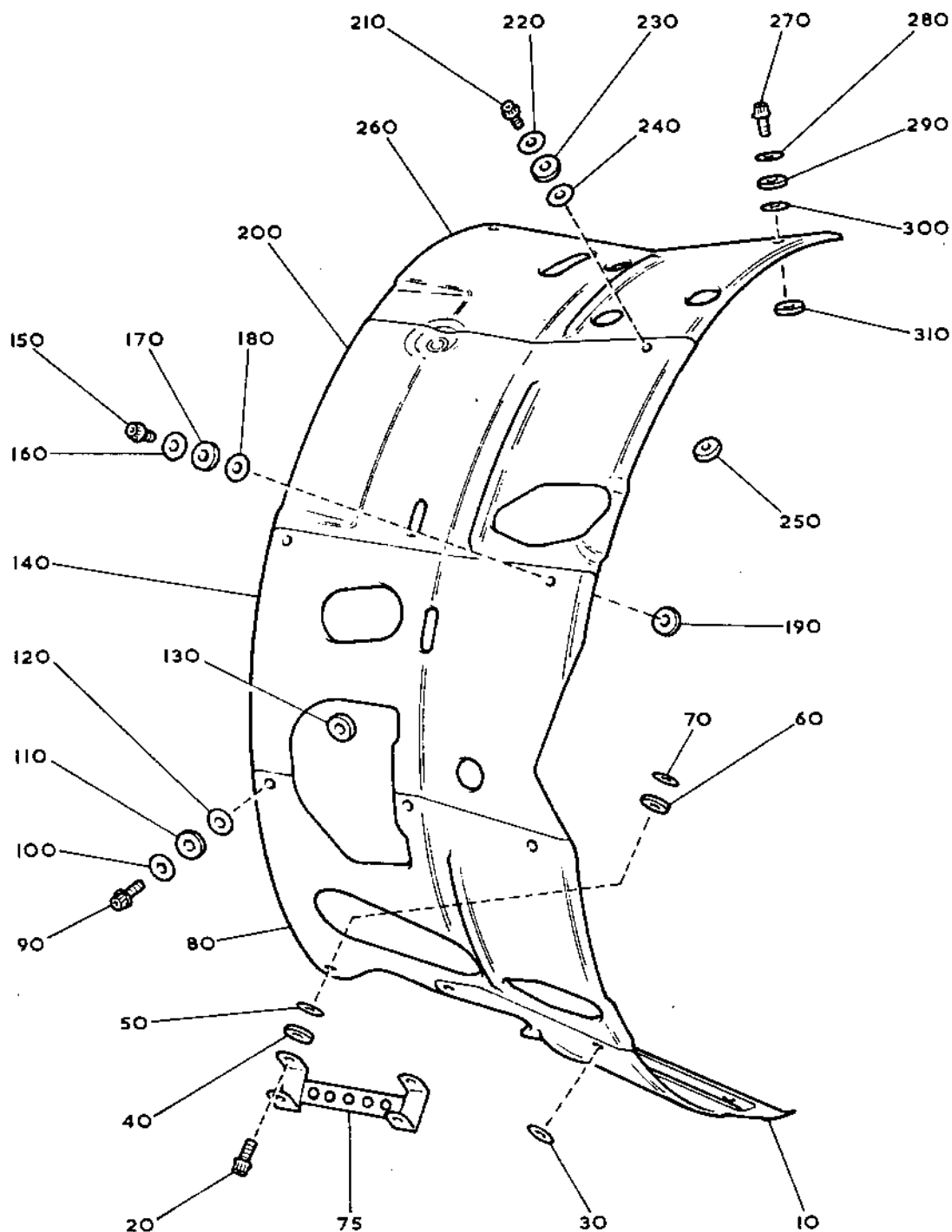
CLEANING  
**71-32-02**  
Page 203  
Aug 28/75



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 32498/00B



TN27639

Engine Heat Shields  
Figure 202

CLEANING  
**71-32-02**  
Page 204  
Aug 28/75

BS00028133/1

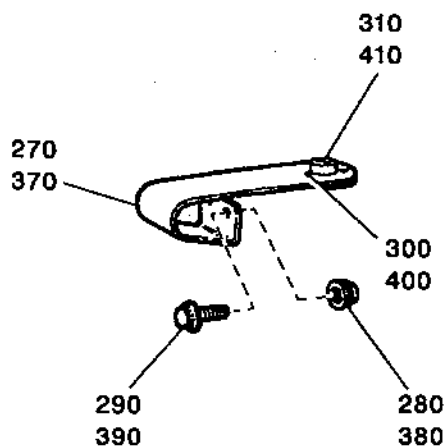
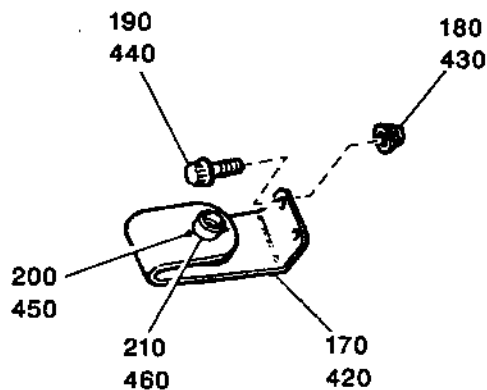
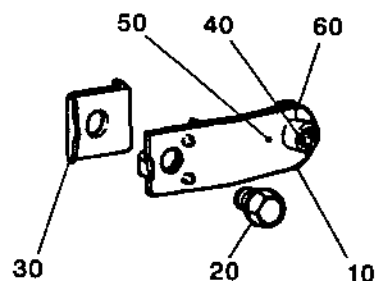
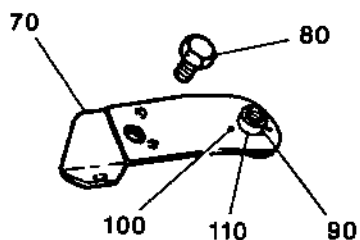
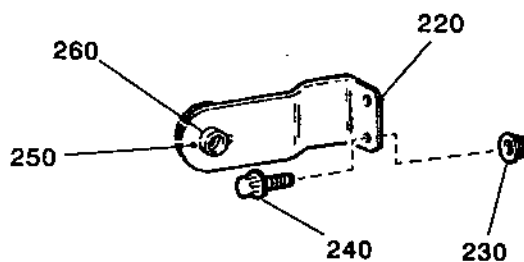
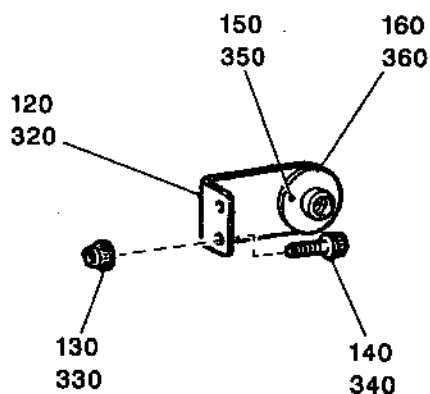


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

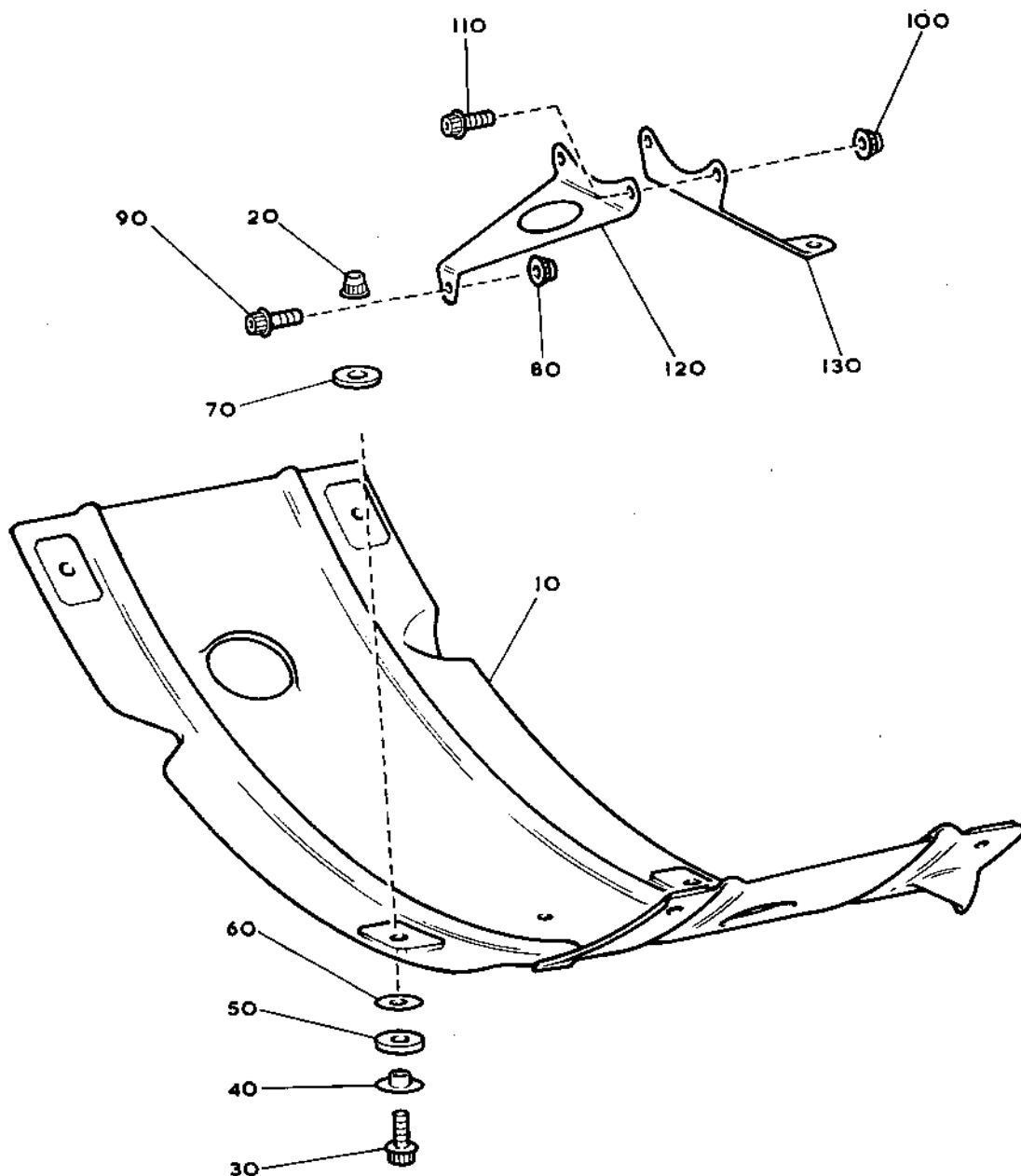


Engine Heat Shields  
Figure 203

CR 32622/00B



**OLYMPUS 593**  
MK.610-14-28  
OVERHAUL



Engine Heat Shields  
Figure 204



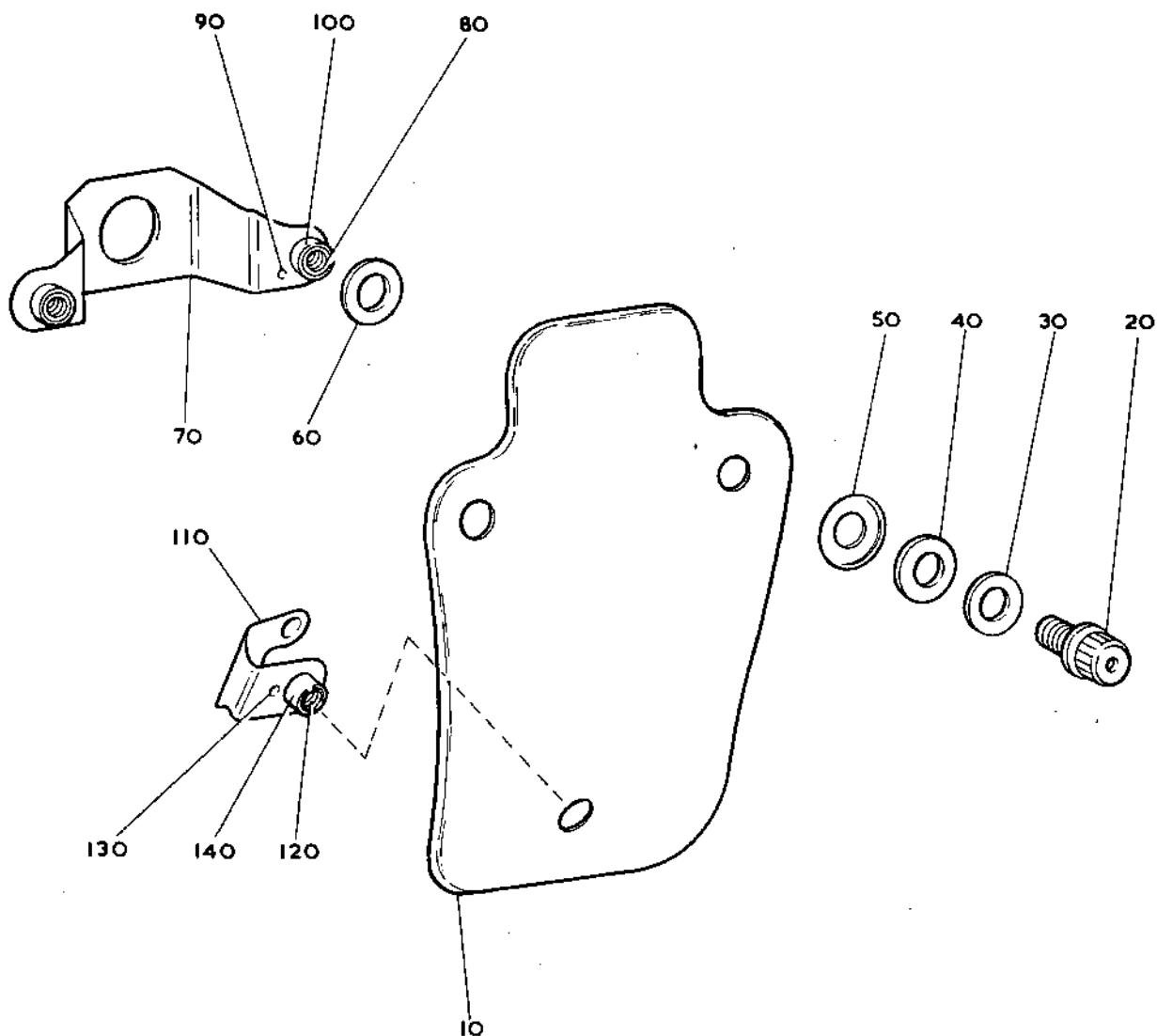
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33178/00A

PRINTED IN ENGLAND



TN4194

Engine Heat Shields  
Figure 205

CLEANING  
**71-32-02**

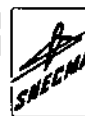
Page 207  
Aug 28/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



HEAT SHIELDS - TURBINE EXHAUST DIFFUSER - REPAIR

TABLE OF CONTENTS

Repair No.	Title	Scheme No.
1	Heat Shields - Repair of Fretting and Cracking by Welding and Patching.	B.513551

PRINTED IN ENGLAND

REPAIR

71-32-02

Contents 1

Jun 1/91



**OLYMPUS 593**MK.610-14-28  
OVERHAUL

HEAT SHIELD, TURBINE EXHAUST DIFFUSER  
REPAIR OF FRETTING AND CRACKING BY DIRECT WELDING  
PATCHING OR BLENDING

REPAIR NO.B5135511. Effectivity

<u>I.P.C.</u>	<u>Fig./Item</u>	<u>Part No.</u>
71-32-02	1 10A	B465542
	1 70A	B473863
	1 130A	B473862
	1 200A	B465528
	1 270A	B482570
	2 10A	B465520
	2 80A	B473861
	2 140A	B473860
	2 200A	B473859
	2 260A	B465501

2. Introduction

## A. General.

- (1) This repair describes the procedure for repairing the turbine exhaust diffuser heat shield by direct welding, patching or blending where fretting or cracking has occurred.
- (2) Dimensions are shown thus, INCHES (MILLIMETRES), in tables and illustrations.
- (3) Refer to Chapter 72-09-00, Repair, for all standard practices applicable to this repair procedure.
- (4) Remove all sharp edges 0.004 to 0.020 in. (0,10 to 0,50 mm) unless otherwise stated.
- (5) Tolerances on machined dimensions are plus/minus 0.010 in (0,25 mm) unless otherwise stated.

## B. Repair Limitations.

- (1) Compliance with all aspects of these repairs should be achieved without deviation. Where a need to deviate is considered necessary, agreement should first be sought from the Repair Authority.

REPAIR

**71-32-02**

Repair No. 1

Page 401

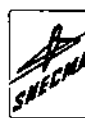
Jun 1/91



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) There are three separate parts to this repair procedure:
  - (a) Part 1. Repair by blending minor edge defects up to 0.187 in. (4,75 mm) in length.
  - (b) Part 2. Repair by welding single cracks.
  - (c) Part 3. Repair by patching branch cracking and areas that cannot be repaired by direct welding.
- (3) The heat shield material specification is Titanium to MSRR 8608, Rolls-Royce code TAK.

### 3. Instructions

A. Inspect the component to determine the extent of any damage then refer to the appropriate instructions below.

#### (1) Repair by Blending (Part 1).

##### (a) Blend.

- 1 Refer to Figure 401. Removing only the minimum material, hand blend to remove damage and produce a smooth continuous profile.

##### (b) Inspect.

- 1 Carry out crack detection test using procedure specified at Chapter 72-09-00, F1A, Inspection/Check.

##### (c) Identify.

- 1 Mark the component SAL B513551/1 adjacent to the existing part number using vibro-percussion engraving marking as specified in Chapter 72-09-00, Repair.

#### (2) Repair by Welding (Part 2)

##### (a) Preparation.

- 1 Referring to Chapter 72-09-00, Repair, locally remove gold paint from area to be repaired.

REPAIR

71-32-02

Repair No. 1

Page 402

Jun 1/91



OLYMPUS 593

MK.610-14-28

OVERHAUL



- 2 Refer to TSD 594-409. Thoroughly clean and prepare the damaged area for welding.

(b) Weld.

- 1 Refer to TSD 549-409. Using filler rods to MSRR 9500/70 repair cracks by welding.

NOTE: Take suitable precautions to prevent distortion during welding.

(c) Inspect.

- 1 Check component for distortion.
- 2 Carry out crack detection test using procedure specified at Chapter 72-09-00, FlA, Inspection/Check.

(d) Restore Finish.

- 1 Refer to Chapter 72-09-03, Repair, and touch up gold paint locally.

(e) Identify.

- 1 Mark the component SAL B513551/2 adjacent to the existing part number using vibro-percussion engraving marking as specified in Chapter 72-09-00, Repair.

(3) Repair by Patching (Part 3).

(a) Preparation.

- 1 Cut away the defective area ensuring minimum corner radii of 0.500 in. (12,70 mm).
- 2 Using patch material to MSRR 8608 (0.019 to 0.025 in. (0.48 to 0,64 mm) thick before forming), prepare a flush fitting patch to suit the contours of the cut away area (see para. 5 Replacement Parts, of this instruction).
- 3 Refer to Chapter 72-09-03, Repair. Locally remove gold paint from area to be welded.

REPAIR

71-32-02

Repair No. 1

Page 403

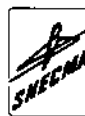
Jun 1/91



OLYMPUS 593

MK.610-14-28

OVERHAUL



- 4 Refer to TSD 594-409. Thoroughly clean and prepare the area for welding.

(b) Weld.

- 1 Refer to TSD 594-409. Using filler rods to MSRR 9500/70 argon arc weld patch in position.

NOTE: Take suitable precautions to prevent distortion during welding.

(c) Inspect.

- 1 Check for distortion and manipulate to maintain existing contours.
- 1 Carry out crack detection as specified for this component in Chapter 72-09-00, FlA, Inspection/Check.

(d) Dress.

- 1 Dress the patch flush to existing contour taking care that parent material is not impaired.

(e) Inspect.

- 1 Carry out crack detection as specified for this component in Chapter 72-09-00, FlA, Inspection/Check.

(f) Restore Finish.

- 1 Refer to Chapter 72-09-03, Repair. Touch up gold paint locally.

(g) Identify.

- 1 Mark the component SAL B513551/3 adjacent to the existing part number using vibro-percussion engraving marking as specified in Chapter 72-09-00, Repair.

C. Final Inspection.

- (1) Finally inspect component to ensure that repair has been carried out satisfactorily and that the Heat Shield is in a serviceable condition.

REPAIR

71-32-02

Repair No. 1

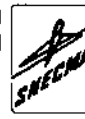
Page 404

Jun 1/91



OLYMPUS 593

MK.610-14-28  
OVERHAUL



4. Special Tools, Fixtures and Equipment

None.

5. Replacement Parts

CU59158 Patch Material Qty as required.

PRINTED IN ENGLAND

REPAIR

71-32-02

Repair No. 1  
Page 405  
Jun 1/91

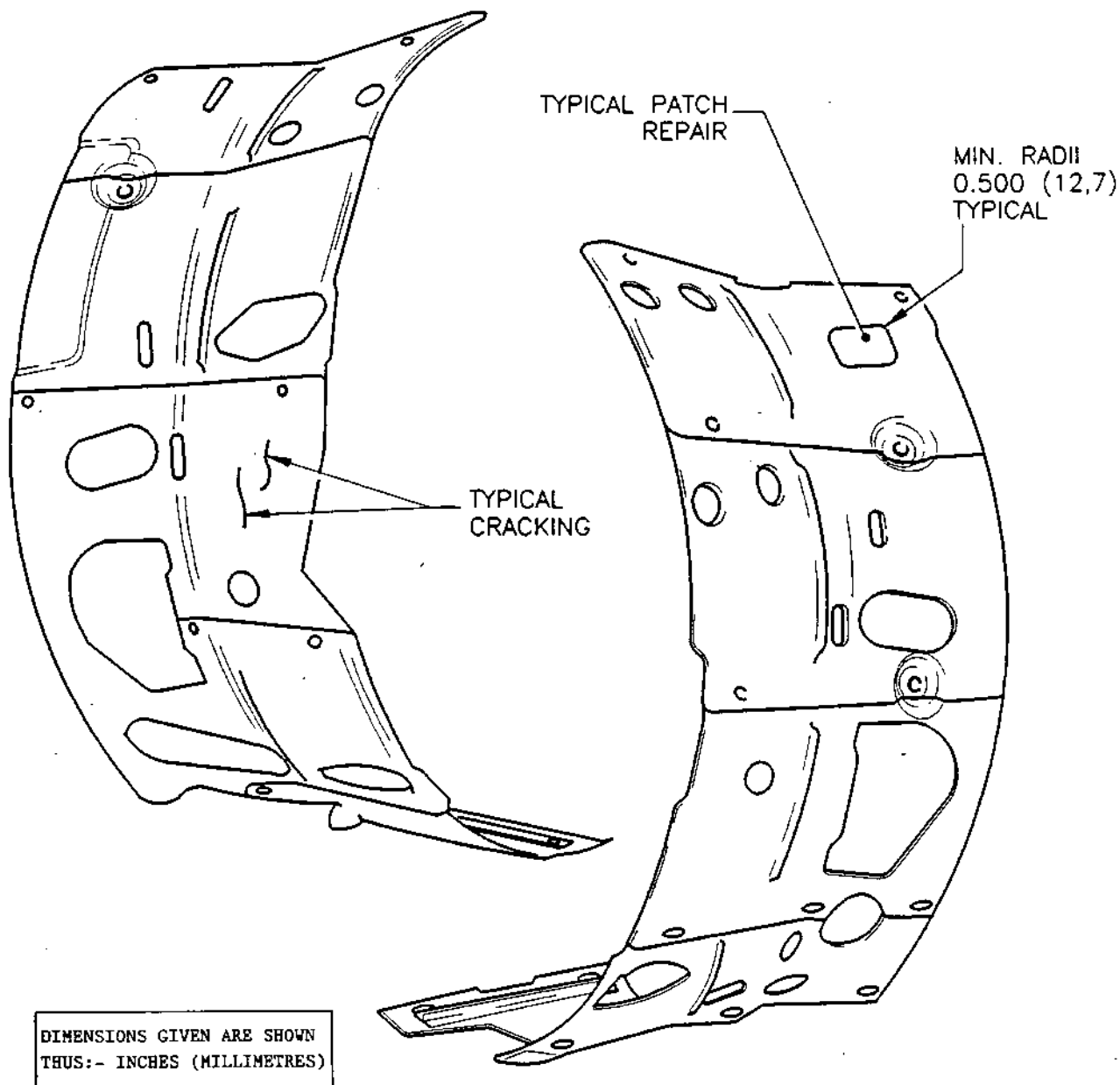


OLYMPUS 593

MK.610-14-28  
OVERHAUL



TYPICAL EDGE BLEND



DIMENSIONS GIVEN ARE SHOWN  
THUS:- INCHES (MILLIMETRES)

# HEATSHIELDS - TURBINE EXHAUST DIFFUSER

Heatshields - Turbine Exhaust Diffuser  
Figure 401

REPAIR  
**71-32-02**

Repair No. 1  
Page 406  
Jun 1/91

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

SNECMA

ENGINE ELECTRICAL CABLES - DISASSEMBLYTABLE OF CONTENTS

Para.	Page
1. General ... ..	101
2. Disassembly of the Electrical Cables... ..	101
A. General ... ..	101
B. Disassembly of the Cables into Separate Harness Looms ... ..	101
C. Disassembly of Electrical Harness Plugs ... ..	102
D. Removal of Electrical Harness Cables ... ..	102

TABLE OF ILLUSTRATIONS

Fig.No.	Page
101 Disassembly of HTMA Plugs ... ..	103
102 Wiring Diagram of B and H Harness (Sheet 1 of 2) ... ..	104
102 Wiring Diagram of B and H Harness (Sheet 2 of 2) ... ..	105
103 Wiring Diagram of C Harness (Sheet 1 of 2) ... ..	106B
103 Wiring Diagram of C Harness (Sheet 2 of 2) ... ..	107
104 Wiring Diagram of D Harness ... ..	108
105 Wiring Diagram of E Harness ... ..	109
106 Wiring Diagram of F Harness (Sheet 1 of 2) ... ..	110
106 Wiring Diagram of F Harness (Sheet 2 of 2) ... ..	111
107 Wiring Diagram of G Harness ... ..	112

LIST OF TABLES

Table No.	Page
101 Cable Identification... ..	106

DISASSEMBLY

**71-51-01**Contents 1  
Dec 31/00



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

ENGINE ELECTRICAL CABLES - DISASSEMBLY1. General

- A. Prior to commencing the disassembly, refer to 71-09-00 Disassembly for general information.
- B. Throughout the text special tools are quoted by their Ref.No. e.g. (Tool 1234). For a complete list of tooling required for disassembly and for the Manufacturers Part No., refer to Special Tools, Fixtures and Equipment Table 1001.
- C. The procedures for the removal of the engine electrical harness from the power plant are detailed in 71-00-02 Electrical Harness, Ignition Leads and Vibration Transducer Cable, Removal from the Engine.
- D. This chapter contains the procedure for the disassembly of the engine electrical cables, after removal from the engine, to the extent required for cleaning and inspection. Also included in this text is the procedure for disassembly required to replace an unacceptable item following inspection or trouble shooting.

2. Disassembly of the Electrical Cables

## A. General.

The complete engine electrical cables comprises seven multi-cable looms. The cables are to be treated as fragile and care is to be taken when handling.

## B. Disassembly of the Cables into Separate Harness Looms.

- (1) Carefully remove the complete electrical harness from the transportation container and place on a table.
- (2) Carefully remove the Rapidon bindings and lacing braid securing the separate branches.
- (3) Remove the sealing rings from the plugs.
- (4) Remove the transportation straps or bindings securing the looms together.

NOTE : The harness is now considered to be disassembled, further disassembly is only to be performed at the discretion of inspection or trouble shooting procedures.

DISASSEMBLY

71-51-01

Page 101

Jun 1/98





OLYMPUS 593

MK.610-14-28  
OVERHAUL



C. Disassembly of Electrical Harness Plugs (Ref.Fig.101).

NOTE: This disassembly is only to be performed when required, at the discretion of inspection or trouble shooting procedures.

- (1) Remove the lockwire securing the two screws to the plug end bell.
- (2) Remove the lockwire securing the plug end bell to the plug body.
- (3) Remove the two screws securing the clamp to the plug end bell and remove the two half clamps, or slide the telescopic sleeves away from the plug, whichever is appropriate.
- (4) Unscrew the plug end bell from the plug body and slide clear of the plug.
- (5) Withdraw all the contacts from the plug body using the insert/extractor tool (Tool 2701).
- (6) Remove the plug end bell from the cable and retain all removed items together.

D. Removal of Electrical Harness Cables.

NOTE: This disassembly is only to be performed when required, at the discretion of inspection or trouble shooting procedures.

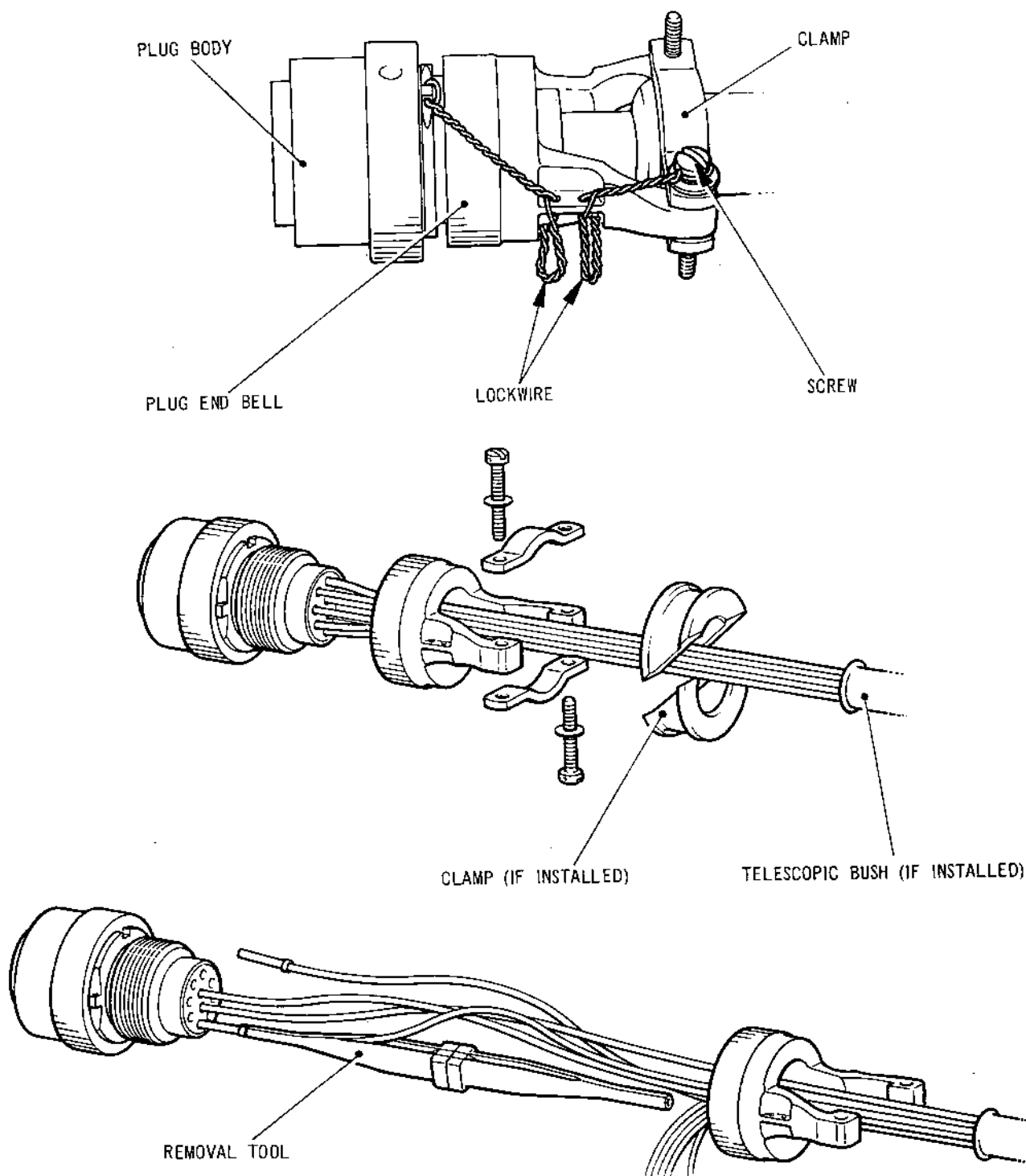
- (1) Identify the cable to be removed by referring to the wiring diagrams (Ref.Fig.102 through 107 and Table 101).
- (2) At both the engine disconnect end and the component end of the cable, remove the lockwire securing the two screws to the plug end bell (Ref.Fig.101).
- (3) Remove the lockwire securing the plug end bell to the plug body.

CR 3355/00A



OLYMPUS 593

MK. 610-14-28  
OVERHAUL



Disassembly of HTMA Plugs  
Figure 101

CR 33389/00C  
BS00024520/2



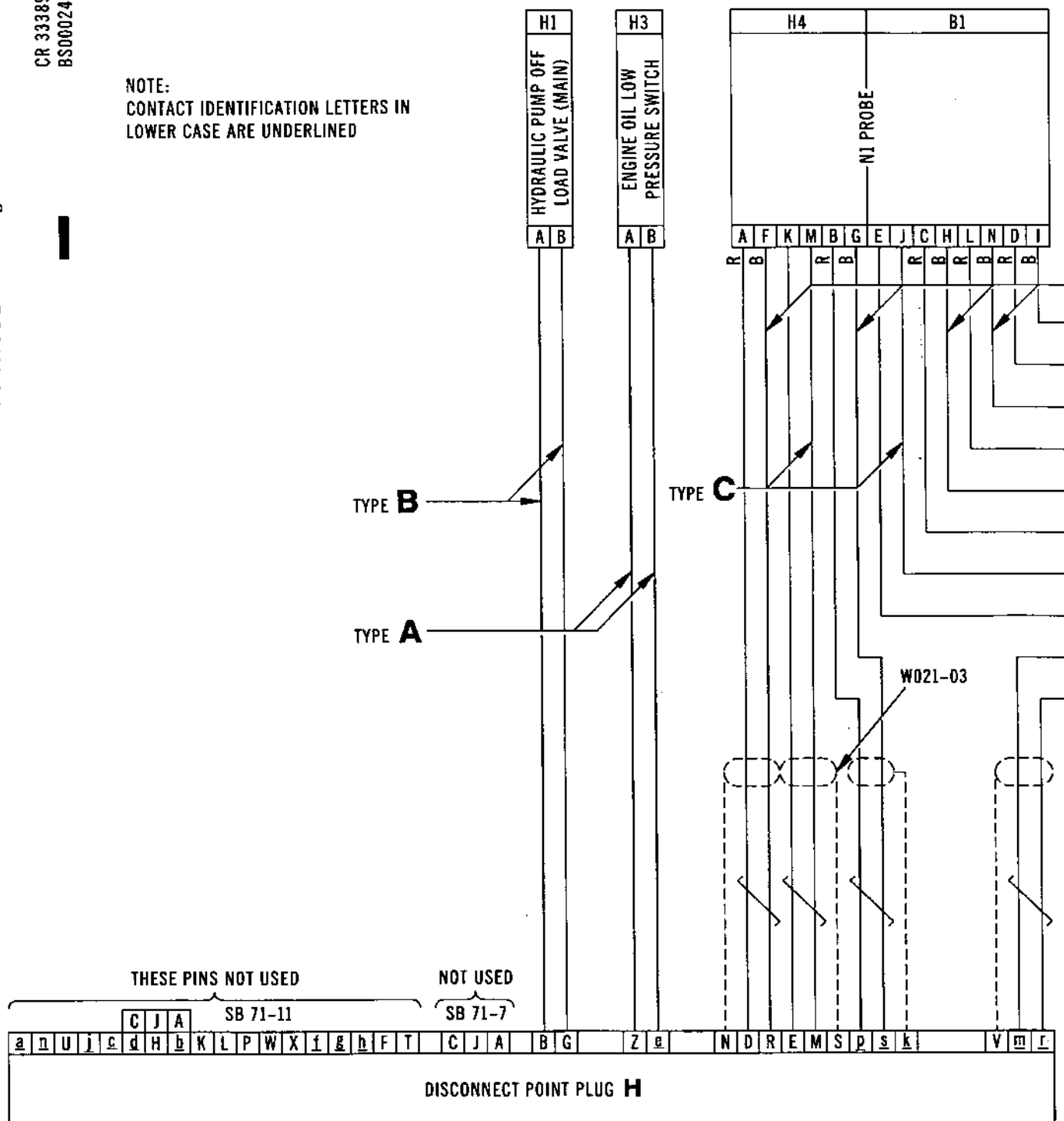
OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

NOTE:  
CONTACT IDENTIFICATION LETTERS IN  
LOWER CASE ARE UNDERLINED



Wiring Diagram of B and H Harness  
Figure 102 (Sheet 1 of 2)

DISASSEMBLY

71-51-01

Page 104

Dec 31/00

CR 33556/00E  
BS00029718/1

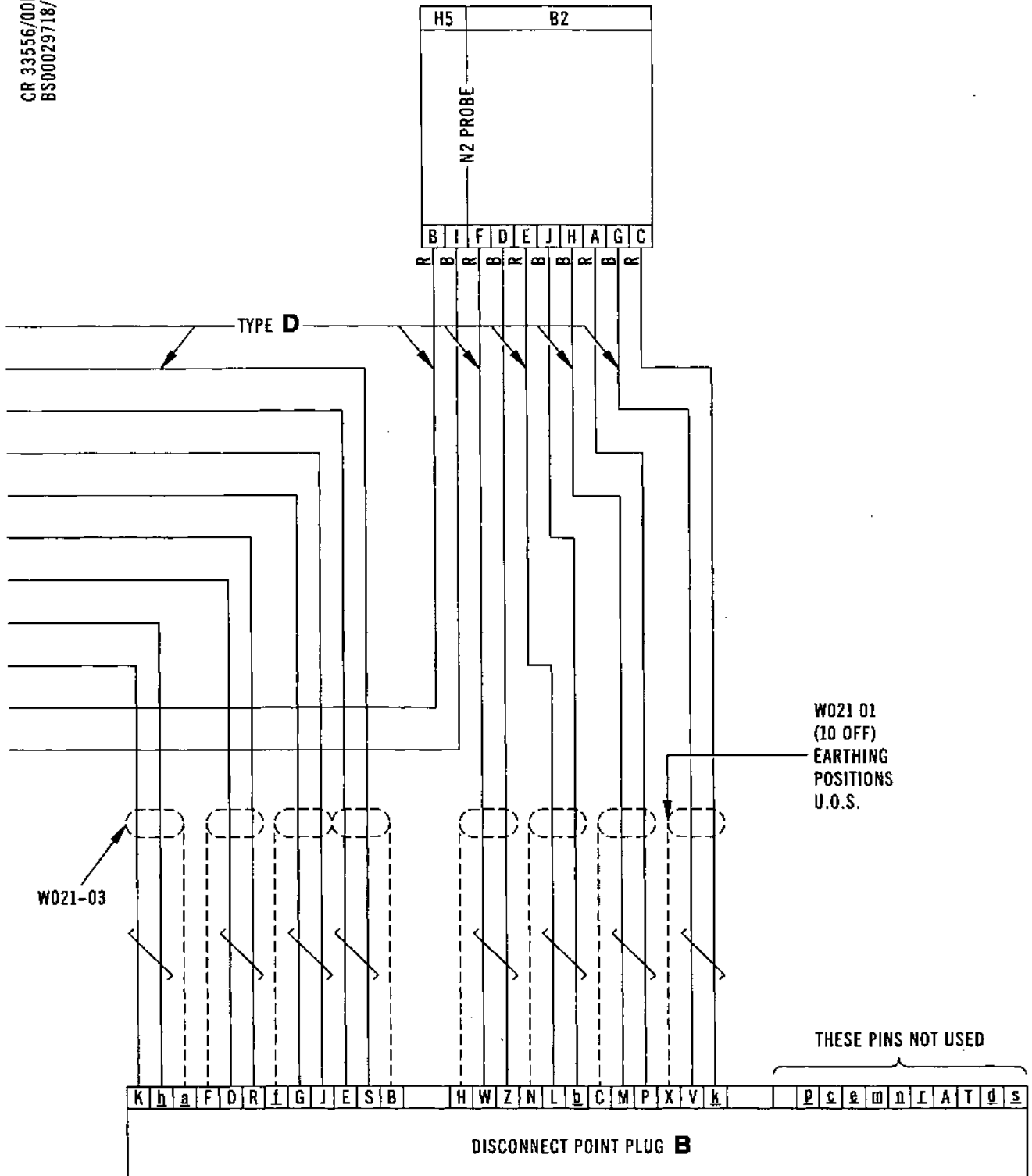


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Wiring Diagram of B and H Harness  
Figure 102 (Sheet 2 of 2)



# OLYMPUS 593

MK.610-14-28

OVERHAUL



- (4) Remove the two screws securing the clamp to the plug end bell and remove the two half clamps, or slide the telescopic sleeves away from the plug, whichever is appropriate.
- (5) Unscrew the plug end bell from the plug body and slide clear of the plug.
- (6) Withdraw the appropriate contacts from both plugs using the insert/extractor tool (Tool 2701).
- (7) Remove all lacings and tape markers as required and remove the cable from the loom.

PRINTED IN ENGLAND

Cable	R.R. Part No.	Manufacturers Part No.	Title
A	3105585	BAS 9189-20	Cable - size 20.
B	3105860	ETUDE 41583	Fireproof cable - size 16, Filotex.
C		1150-2XA-AWG16	Fireproof cable - size 16, Filotex. Twisted, screened and jacketed.
D	3105588	BAS 9192-20	Cable - size 20. Two twisted cores, shielded and jacketed.
E		33655 EDT N2 or CD 1401	Filotex ETUDE or CD 1401.
F	3105772	BAS 9194-20	Cable - size 20, three cables twisted together.
G		BAS 9190-20	Screened cable, size 20.
H		BAS 9191-20	Cable - size 20. Two cables twisted together.
J		45671 or CD 1401	Filotex ETUDE or TYGADURE.
K	3105844	BAS 9189-16	Cable - size 16.

Cable Identification  
Table 101

DISASSEMBLY  
**71-51-01**

Page 106  
Feb 1/77

Printed in England



OLYMPUS 593

MK.610-14-28  
OVERHAUL



SNECMA

This page is left blank intentionally

DISASSEMBLY

71-51-01

Page 106A

Dec 31/00

CR 33391/00A  
BS00029719/1



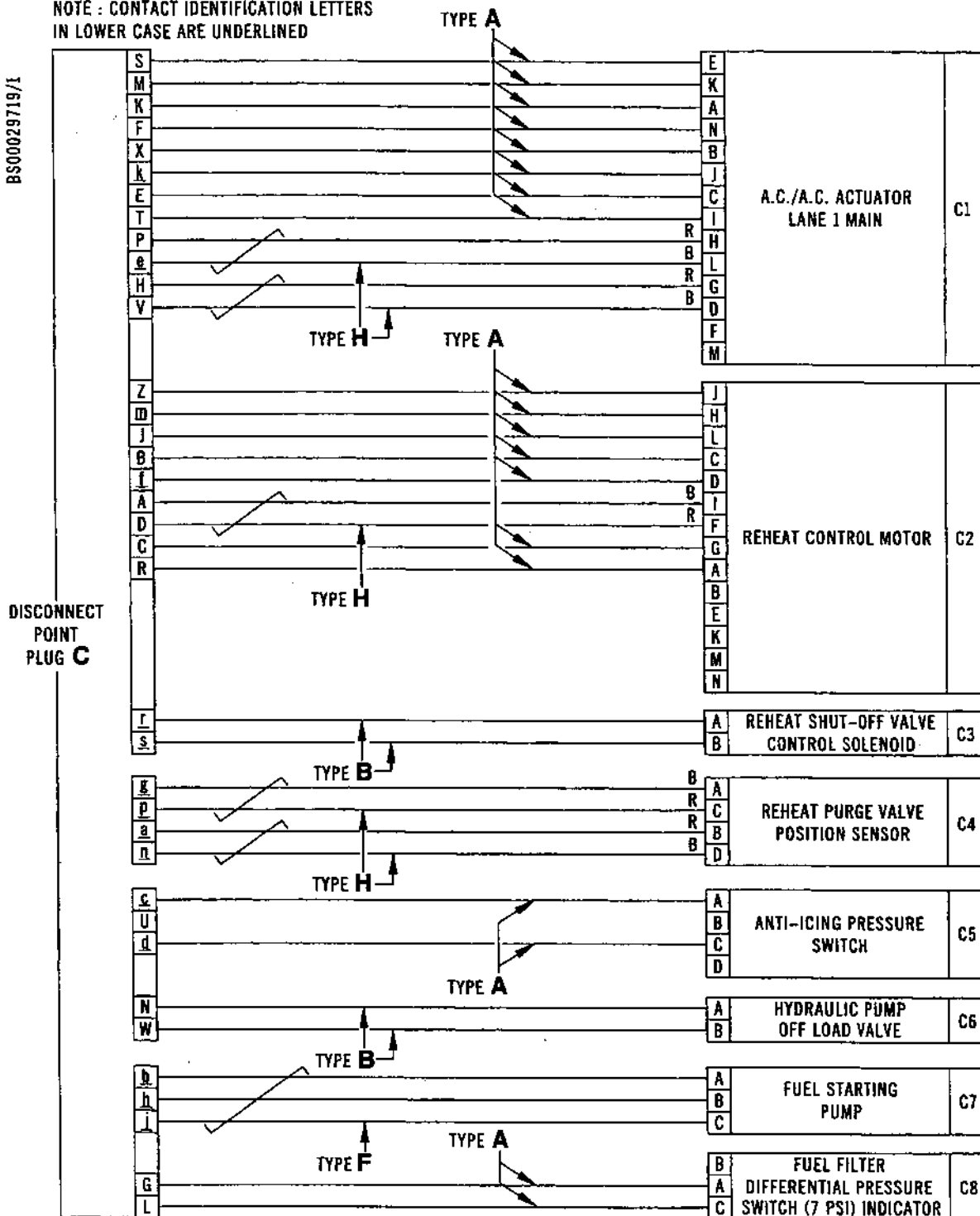
OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

NOTE : CONTACT IDENTIFICATION LETTERS  
IN LOWER CASE ARE UNDERLINED>



Wiring Diagram of C Harness (PRE-SB.71-8988-32)  
Figure 103  
(Sheet 1 of 2)



# OLYMPUS 593



MK.610-14-28

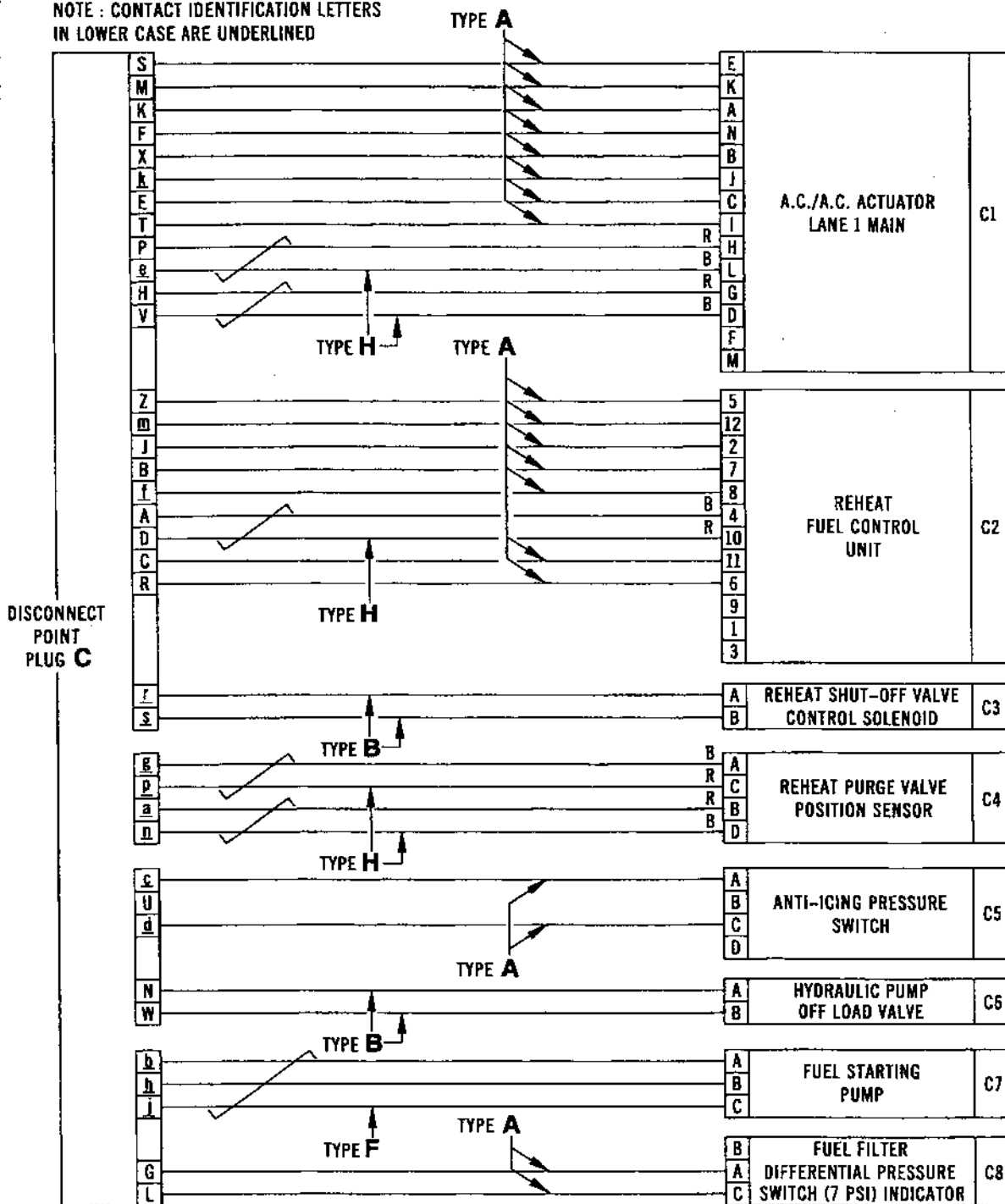
sneema

OVERHAUL

Printed in England

BS00029980/1

NOTE : CONTACT IDENTIFICATION LETTERS  
IN LOWER CASE ARE UNDERLINED>



Wiring Diagram of C Harness (SB.71-8988-32)

Figure 103  
(Sheet 2 of 2)

DISASSEMBLY

## 71-51-01

Page 107

Dec 31/00





# OLYMPUS 593



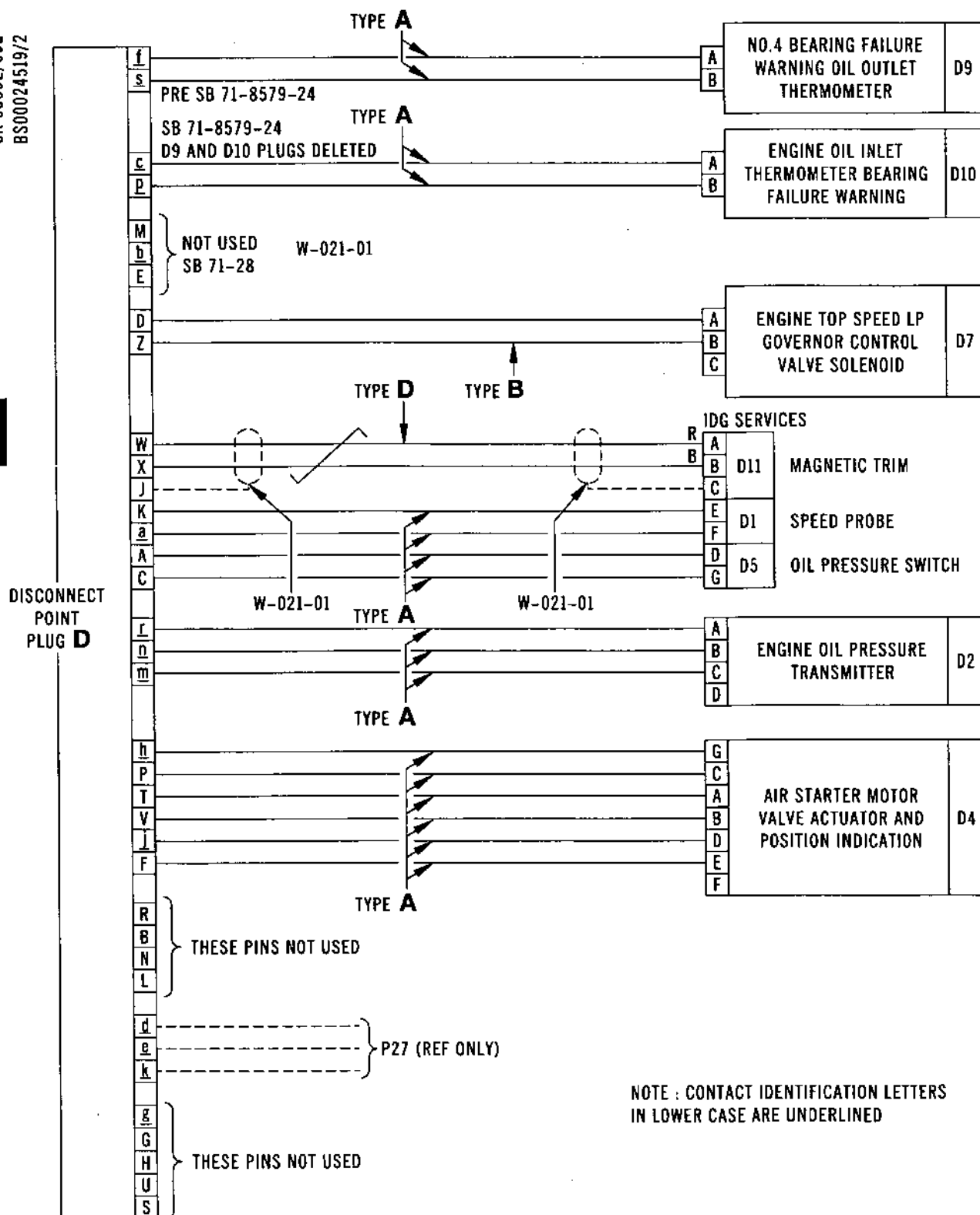
MK.610-14-28

sheema

OVERHAUL

Printed in England

CR 33392/DOE  
BS00024519/2



Wiring Diagram of D Harness  
Figure 104

DISASSEMBLY  
**71-51-01**

Page 108  
Dec 31/00

CR 33393/00F  
BS00024518/1

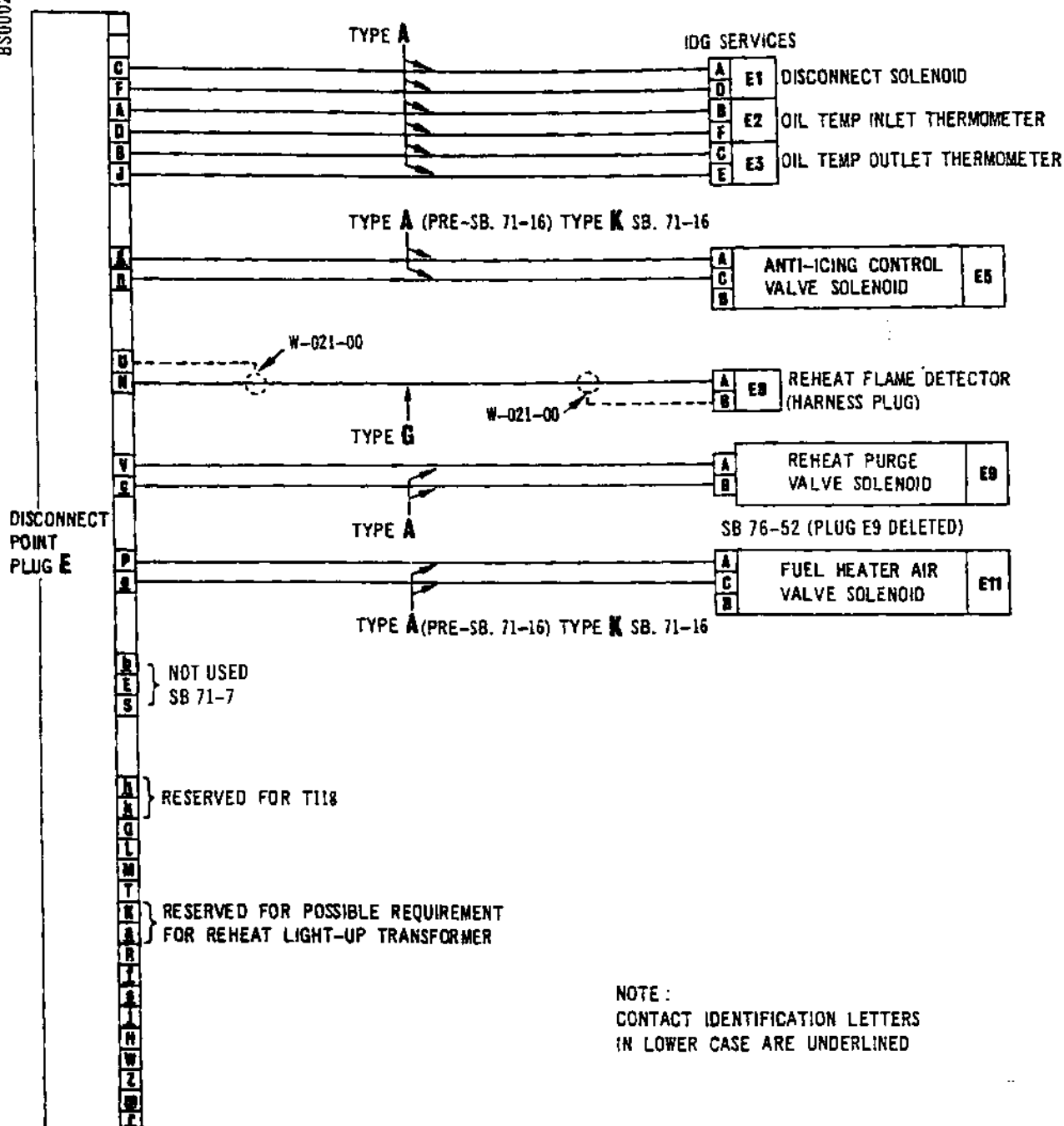


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Wiring Diagram of E Harness  
Figure 105

Printed in England



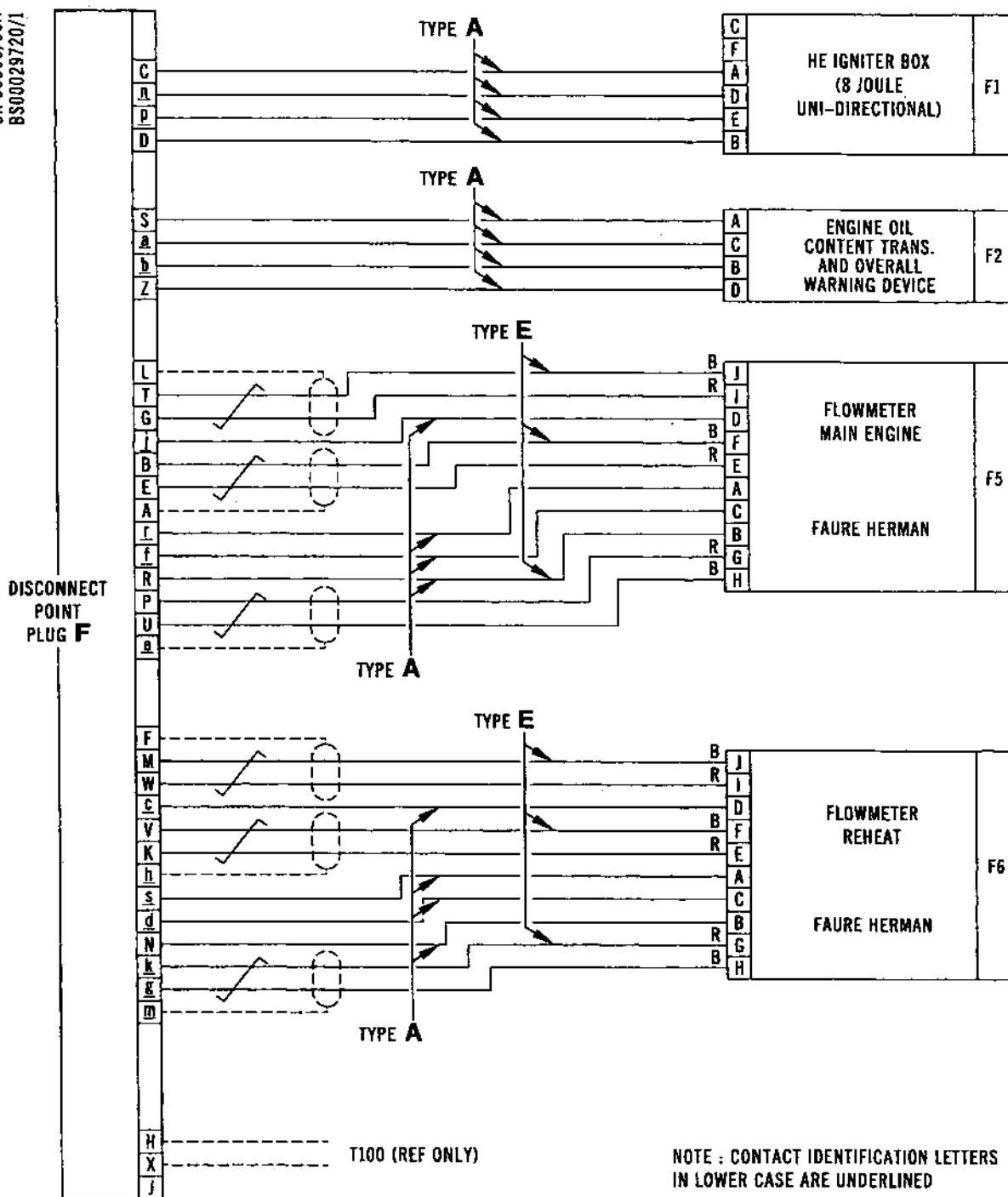
OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

CR 33395/00A  
BS00029720/1



Wiring Diagram of F Harness (Pre-SB.71-4)  
Figure 106 (Sheet 1 of 2)



OLYMPUS 593



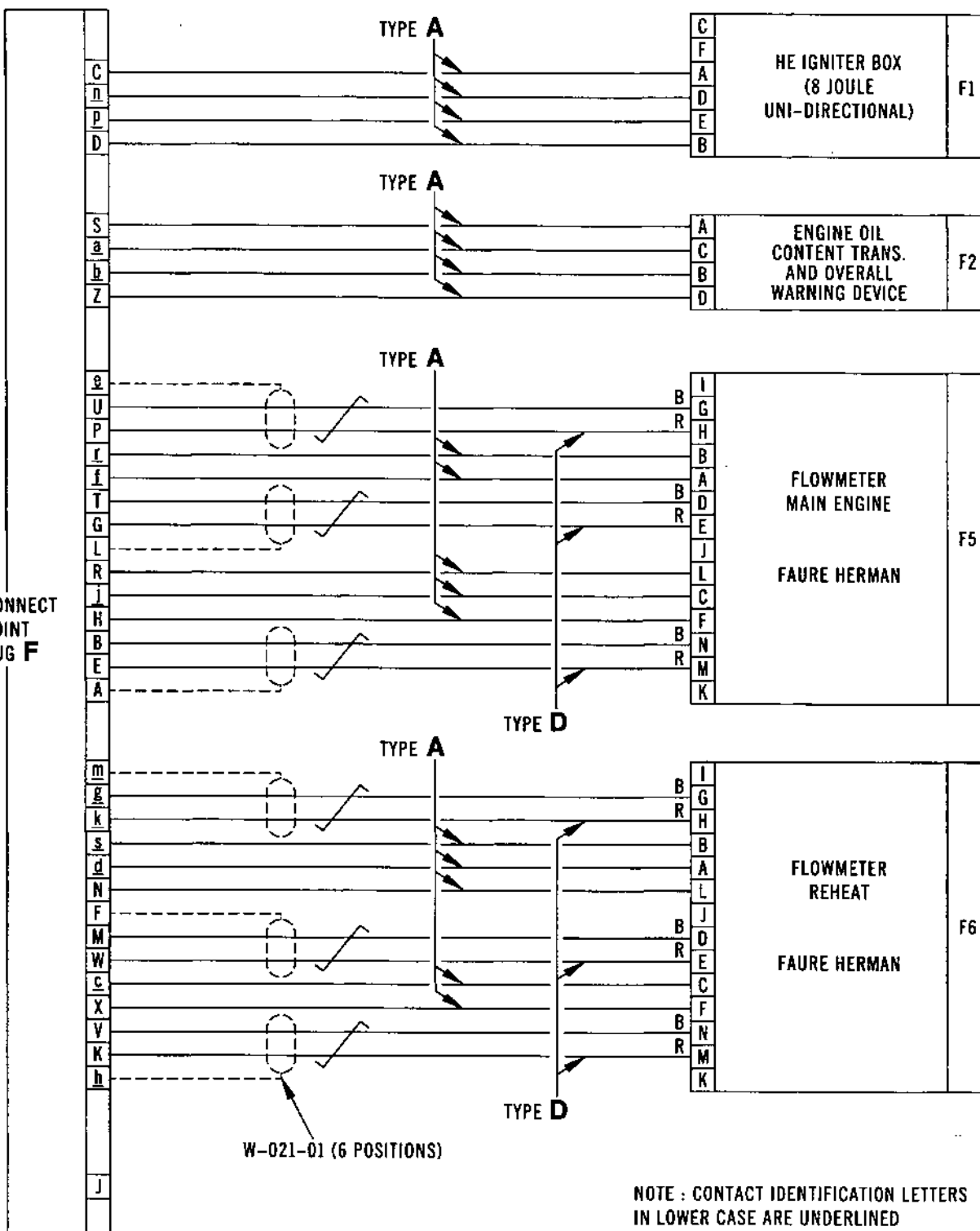
MK.610-14-28

sneema

OVERHAUL

CR 33568/00A  
BS00029721/1

DISCONNECT  
POINT  
PLUG F



Wiring Diagram of F Harness (SB.71-4)  
Figure 106 (Sheet 2 of 2)

CR 33394/00D  
BS00024509/2



Wiring Diagram of G Harness  
Figure 107

## DISASSEMBLY

71-51-01

Page 112  
Dec 31/00



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



## ENGINE ELECTRICAL CABLES - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

PRINTED IN ENGLAND



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.
- D. Certain components are subject to Controlled Manufacturing Technique (CMT) procedures. The cleaning of these components is critical and variations from the specified cleaning procedures and solutions are prohibited without approval from the engine manufacturer. All components to which this applies are identified as such in the Remarks column of the Cleaning Processes Table.

NOTE: To conform with the I.P.C. Part No. of the clipping, the rubber packing strips are illustrated in the figures. The packing strips are consumable items and will not be assembled to the clipping during cleaning or Inspection/Check.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201/ 201A	Ref. Fig.212 to 217		-	-	-
202	ALL		A or B	-	-
203	ALL		A or B	-	-
204	ALL		A or B	-	-
205	ALL		A or B	-	-
206	ALL		A or B	-	-
207	ALL		A or B	-	-
208	ALL		A or B	-	-
209	ALL		A or B	-	-

Cleaning Processes  
Table 201 (Continued)



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
210	ALL		A or B	-	-
211	ALL		-	-	Transportation items
212 to 217	ALL		-	-	Wipe clean with white spirit, then dry with lint free cloth

Cleaning Processes  
Table 201 (Concluded)

PRINTED IN ENGLAND

TN43716

CLEANING

71-51-01

Page 203

Dec 1/76





# OLYMPUS 593

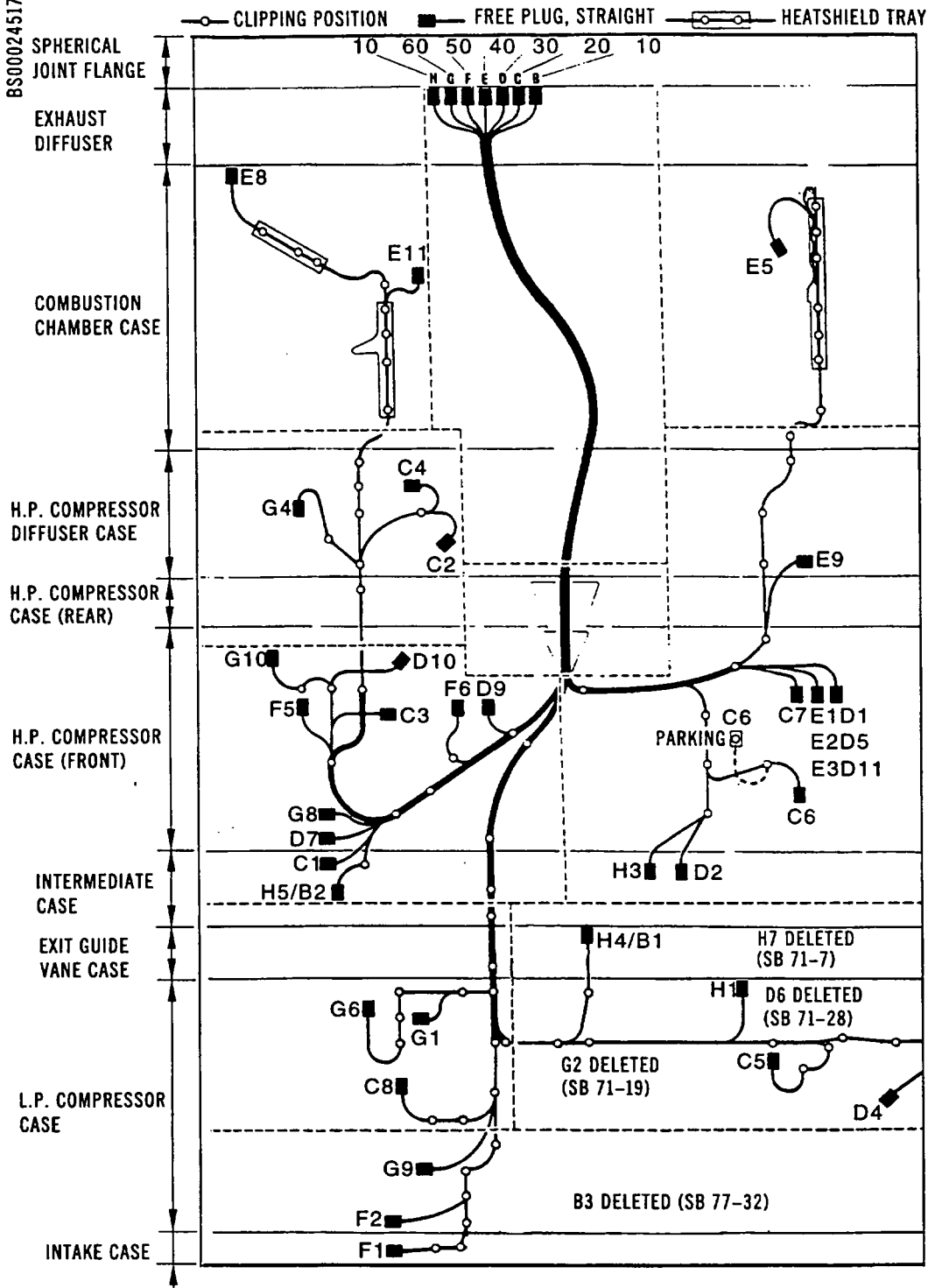


MK.610-14-28  
OVERHAUL

sneema

## DIAGRAMMATIC LAYOUT OF UNDERSIDE OF ENGINE

CR 33434/00C  
BS00024517/1



FOR PLUG DETAILS  
B1,B2,H1,H3,H4,H5  
SEE FIG.313

C1,C2,C3,C4,C5,  
C6,C7,C8,  
SEE FIG.314

D1,D2,D4,D5,  
D7,D9,D10,D11,  
SEE FIG.315

E1,E2,E3,E5,E8  
E9,E11,  
SEE FIG.316

F1,F2,F5,F6,  
SEE FIG.317

G1,G4,G6,G8,  
G9,G10  
SEE FIG.318

Engine Electrical Cables  
(Air France Configuration)  
Figure 201

FORWARD



CLEANING

## 71-51-01

Page 204  
Jun 1/99



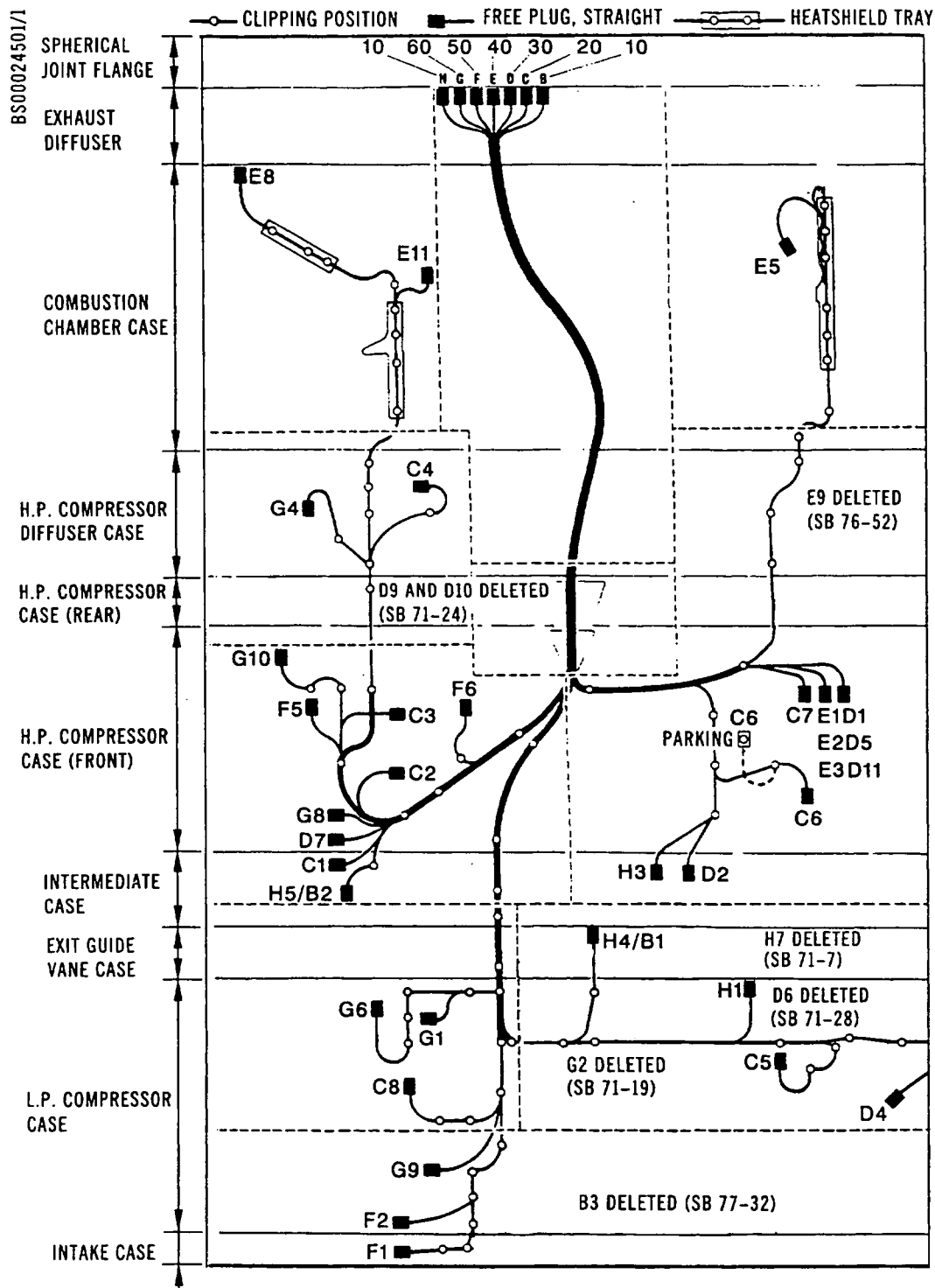
# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

## DIAGRAMMATIC LAYOUT OF UNDERSIDE OF ENGINE



Engine Electrical Cables  
(British Airways Configuration)  
Figure 201A

CLEANING

### 71-51-01

Page 204A  
Jun 1/99

Printed in England



OLYMPUS 593

MK.610-14-28  
OVERHAUL



*sneema*

This Page is Left Blank Intentionally

CLEANING

71-51-01

Page 204B

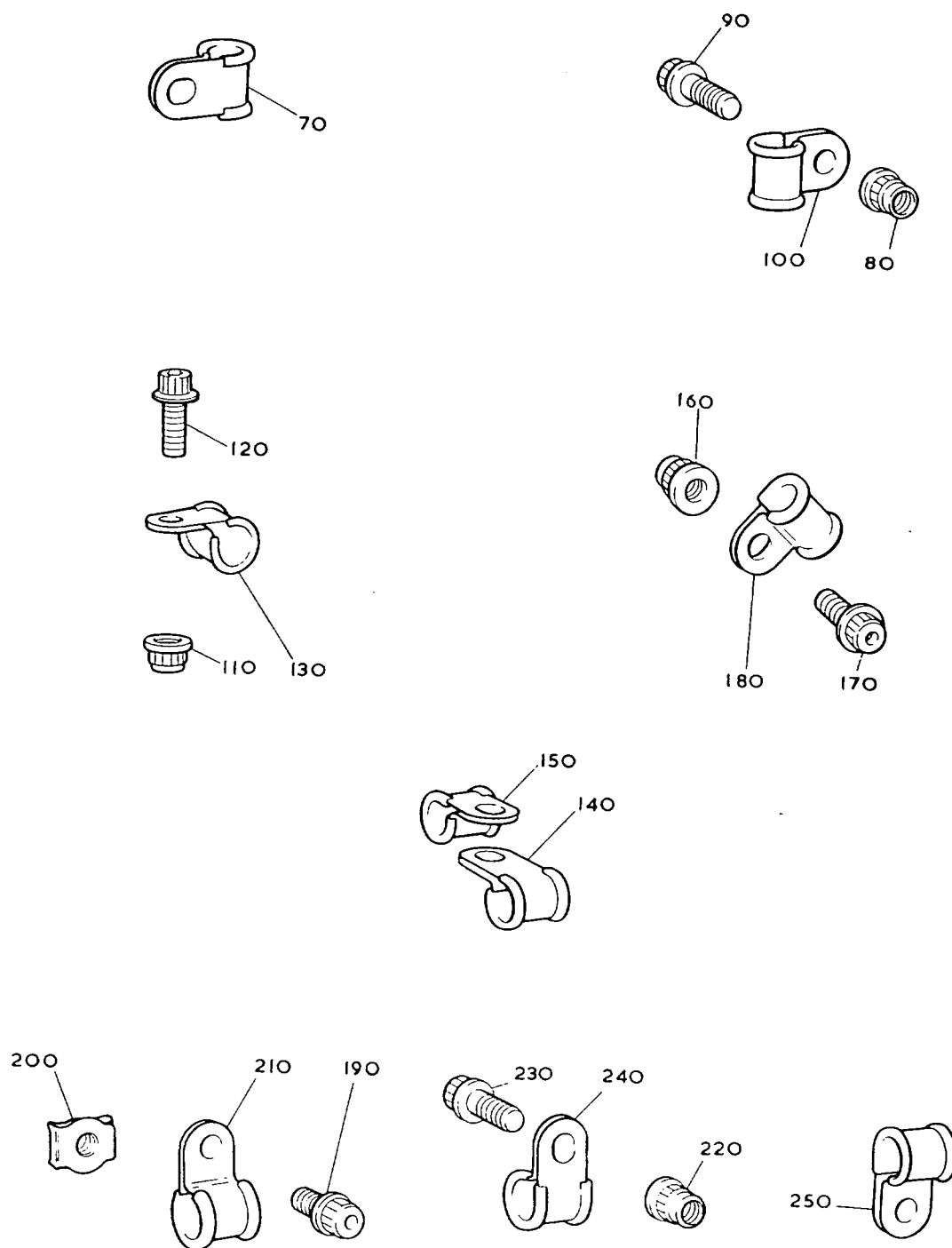
Jun 1/99

CR 33050/00B



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Engine Electrical Cables  
Figure 202

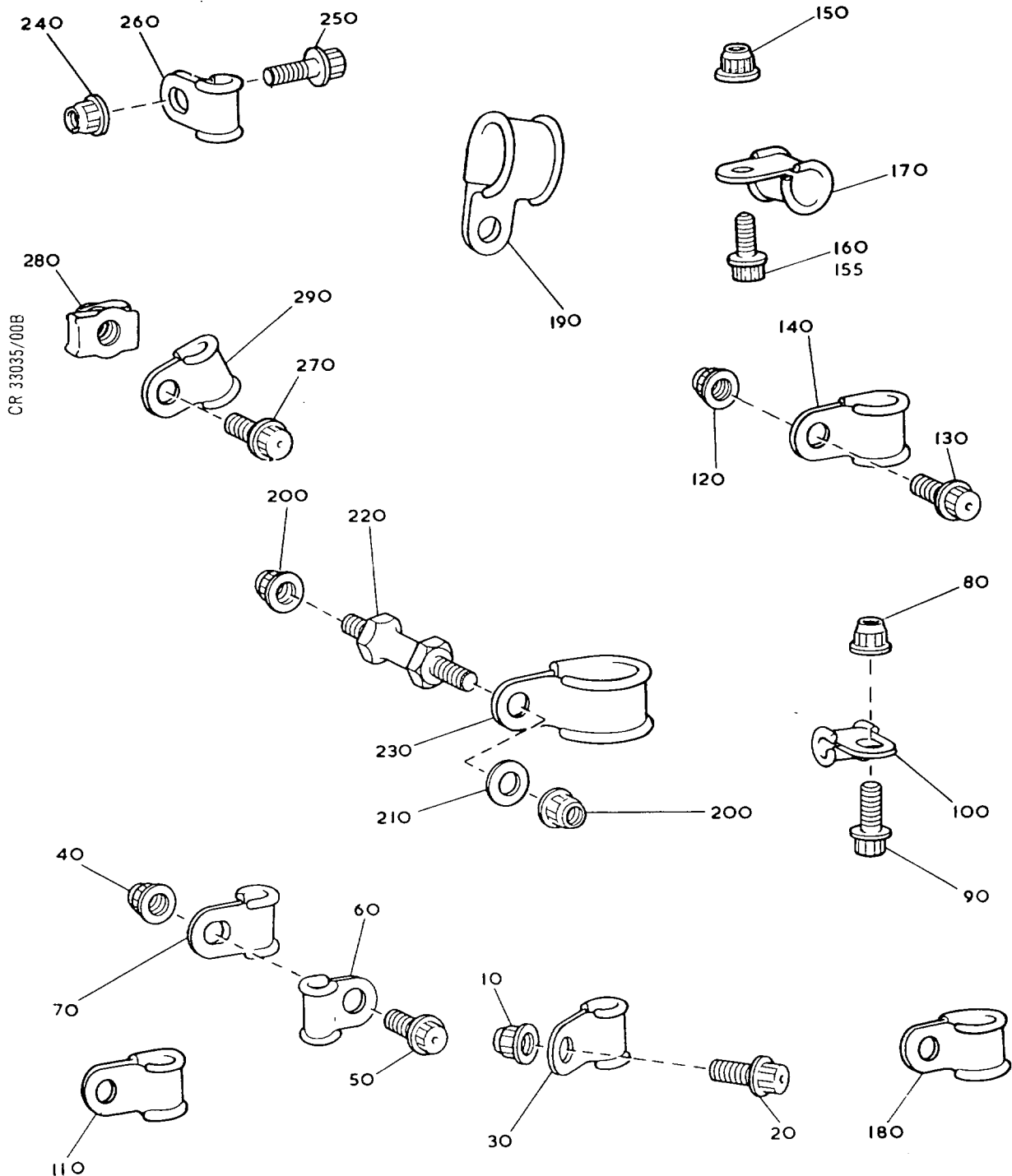


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

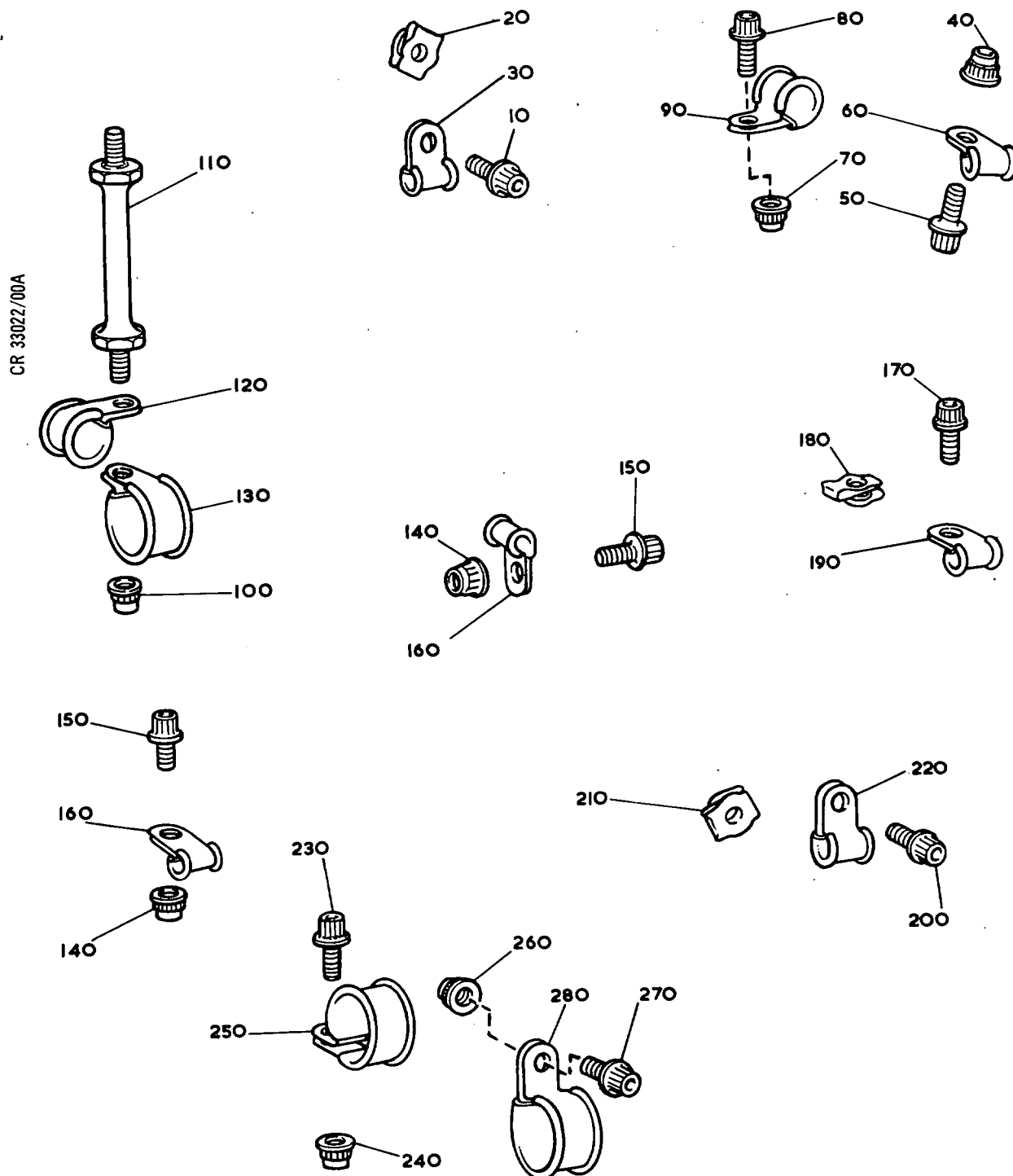


Engine Electrical Cables  
Figure 203

CLEANING  
**71-51-01**  
Page 206  
Dec 1/76



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



Engine Electrical Cables  
Figure 204



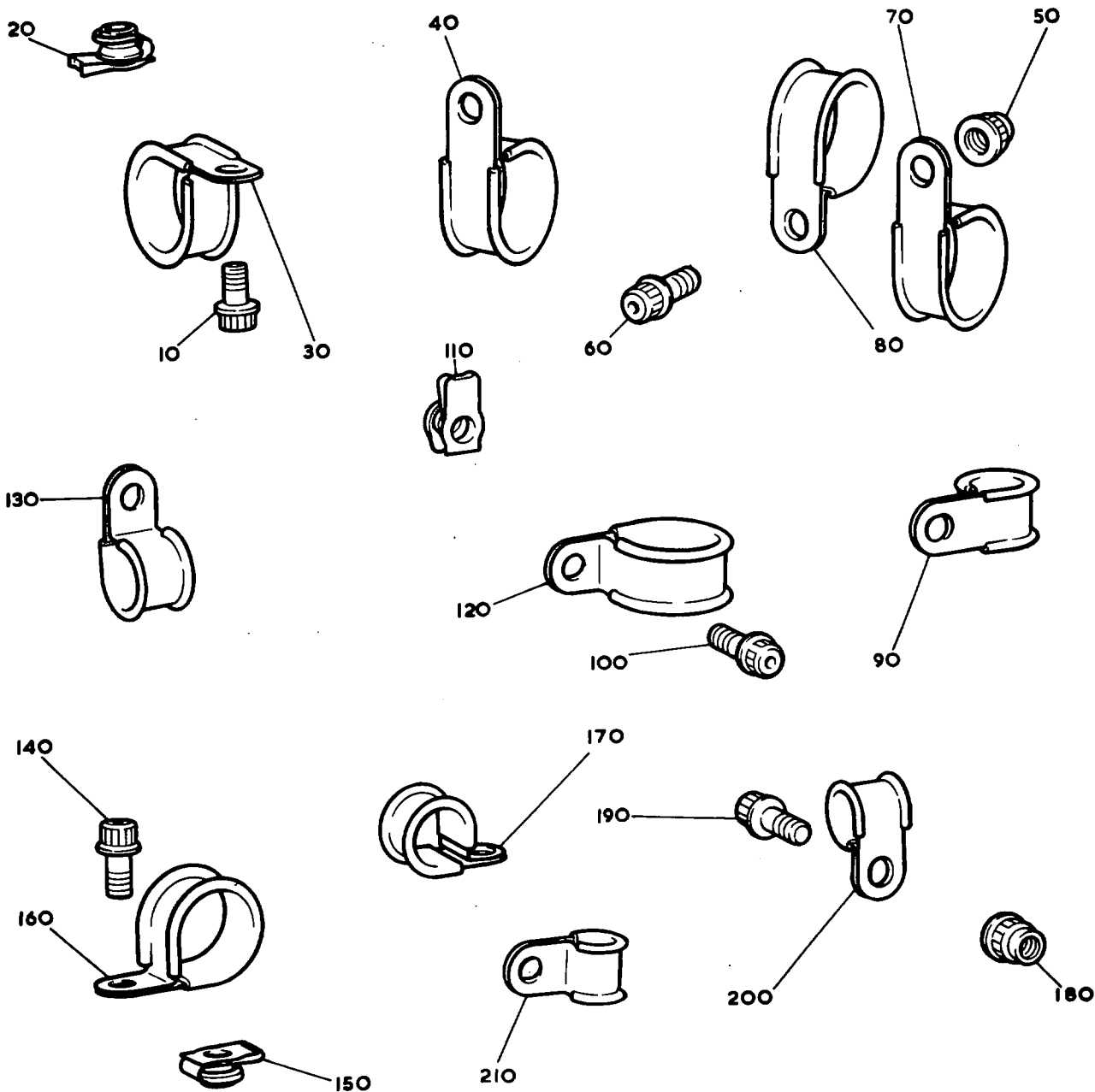
OLYMPUS 593

MK. 610-14-28

OVERHAUL



CR 33045/00A



TN43808

Engine Electrical Cables  
Figure 205

CLEANING  
**71-51-01**  
Page 208  
Apr 1/76

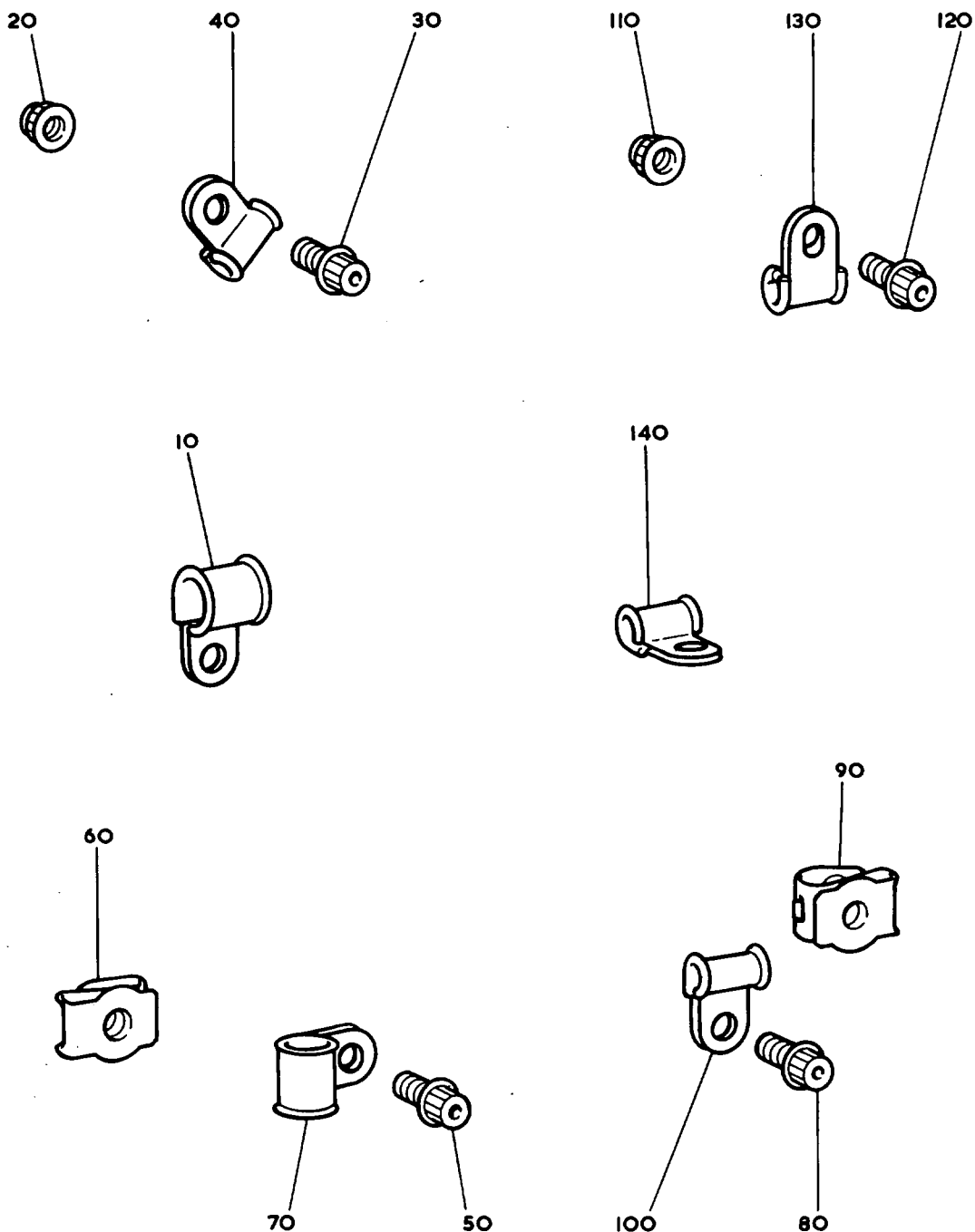
CR 33023/00A



OLYMPUS 593

MK.610-14-28

OVERHAUL



Engine Electrical Cables  
Figure 206



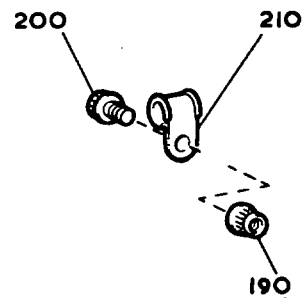
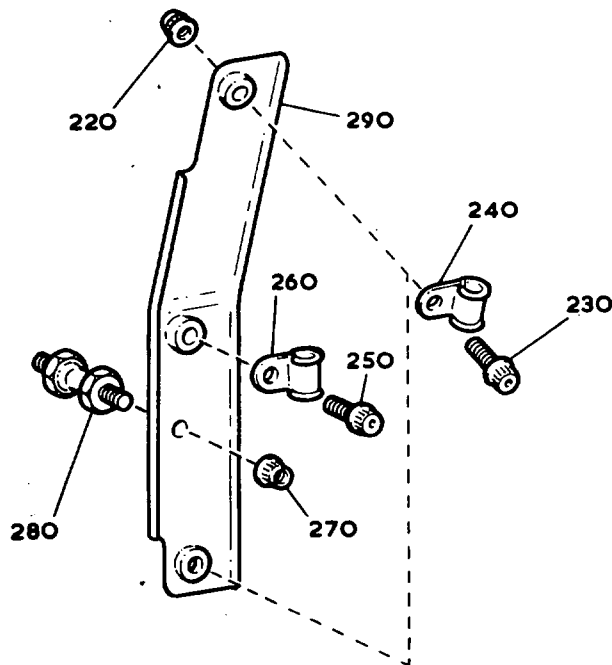
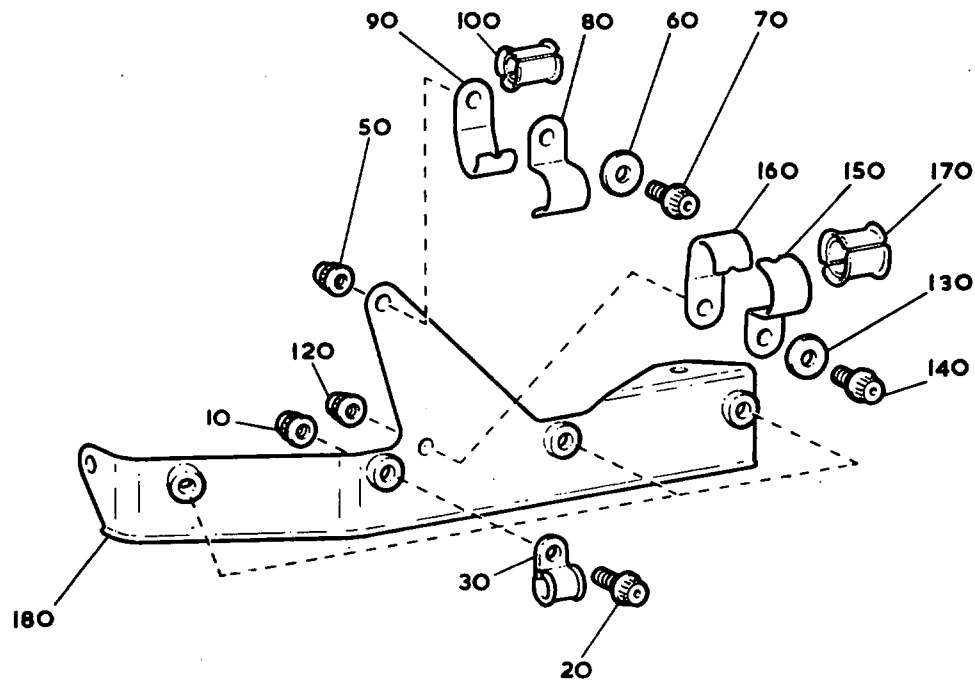


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33051/00A



Engine Electrical Cables  
Figure 207

CLEANING  
**71-51-01**  
Page 210  
Apr 1/76

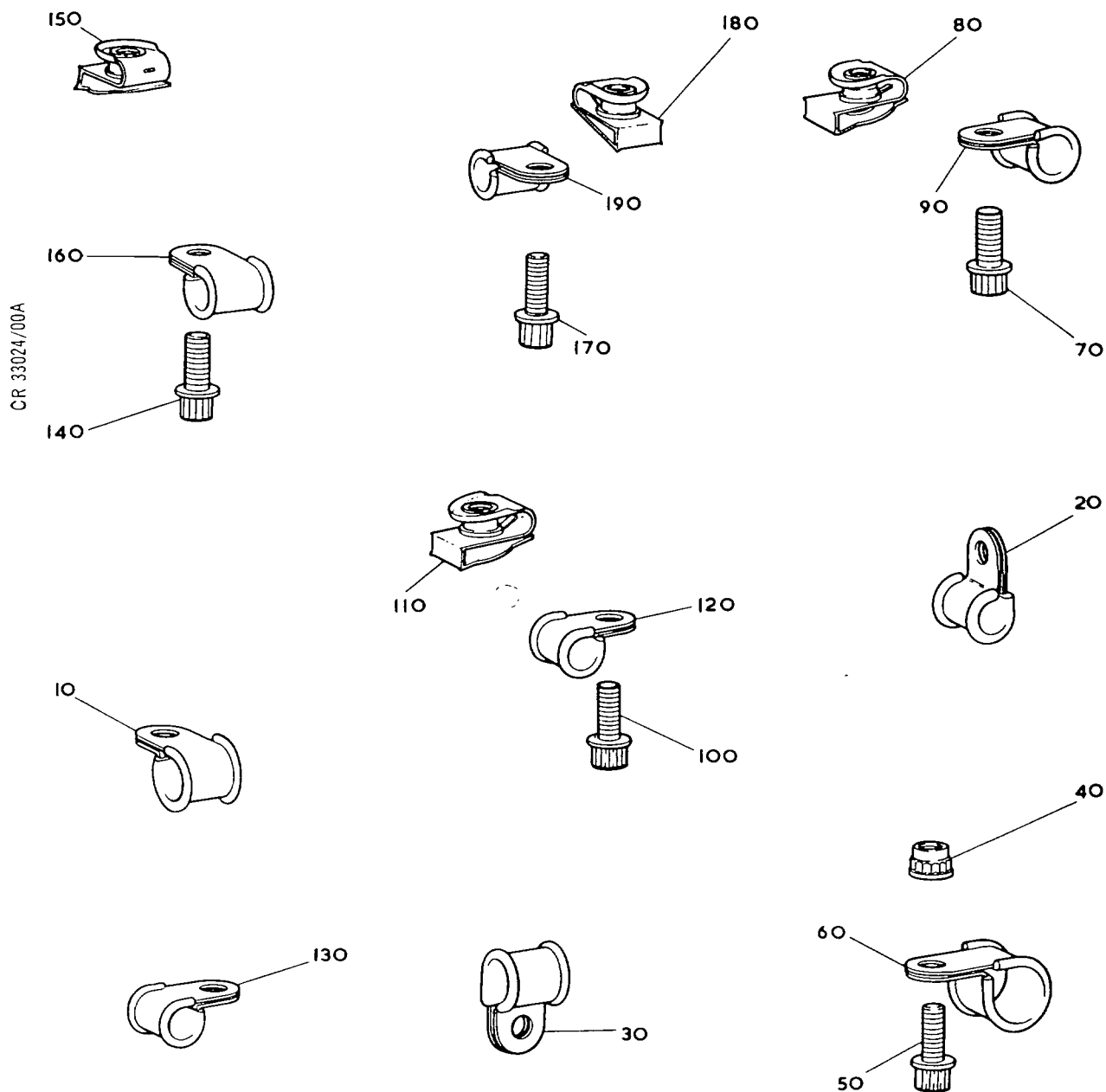
TN43810



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



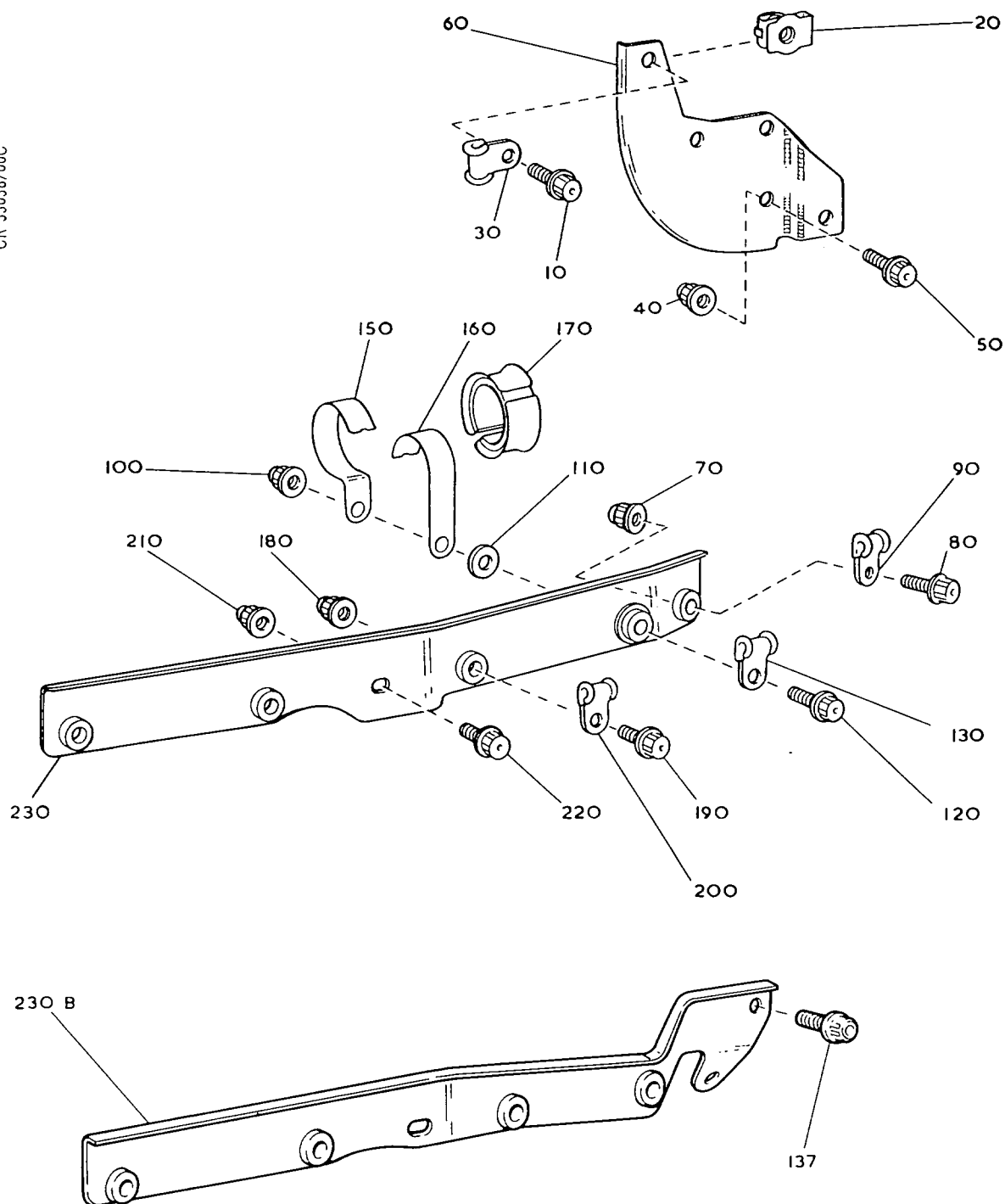
Engine Electrical Cables  
Figure 208

CLEANING  
**71-51-01**  
Page 211  
Apr 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



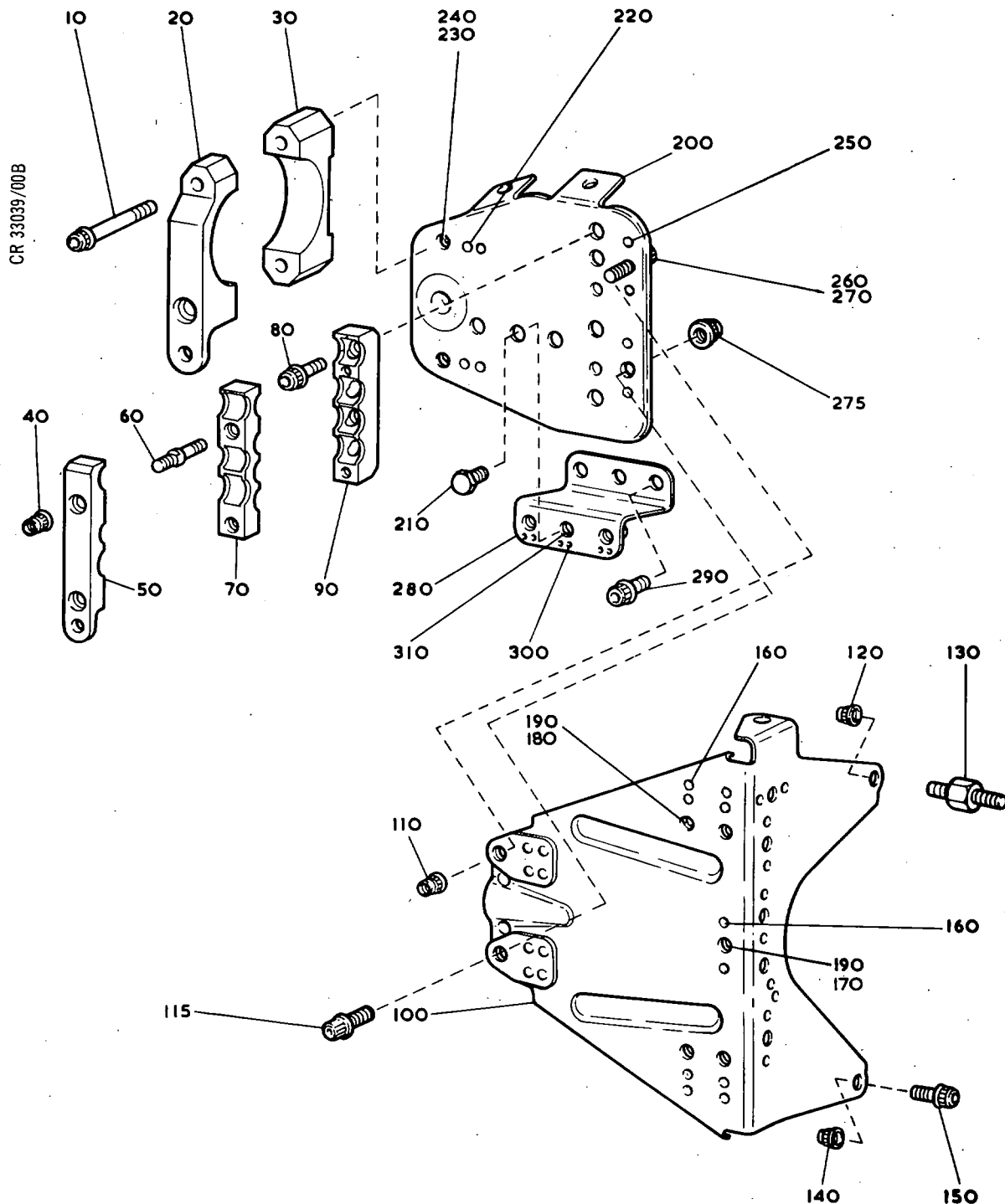
Engine Electrical Cables  
Figure 209



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



TN43813

Engine Electrical Cables  
Figure 210

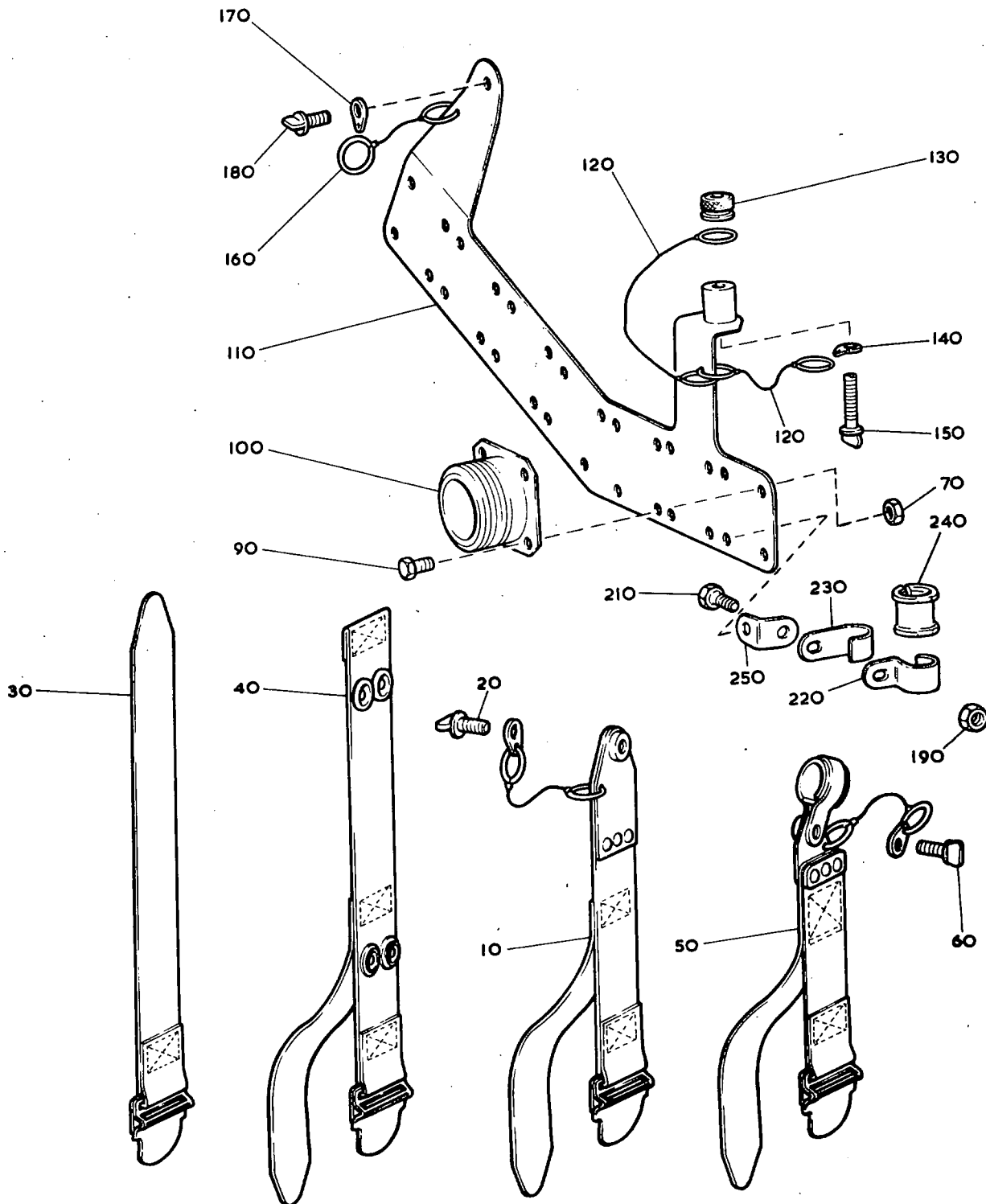
CLEANING  
**71-51-01**  
Page 213  
Dec 1/76



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 33014/00A



TN43814

Engine Electrical Cables  
Figure 211

DR 33666/00C  
BS00024516/2

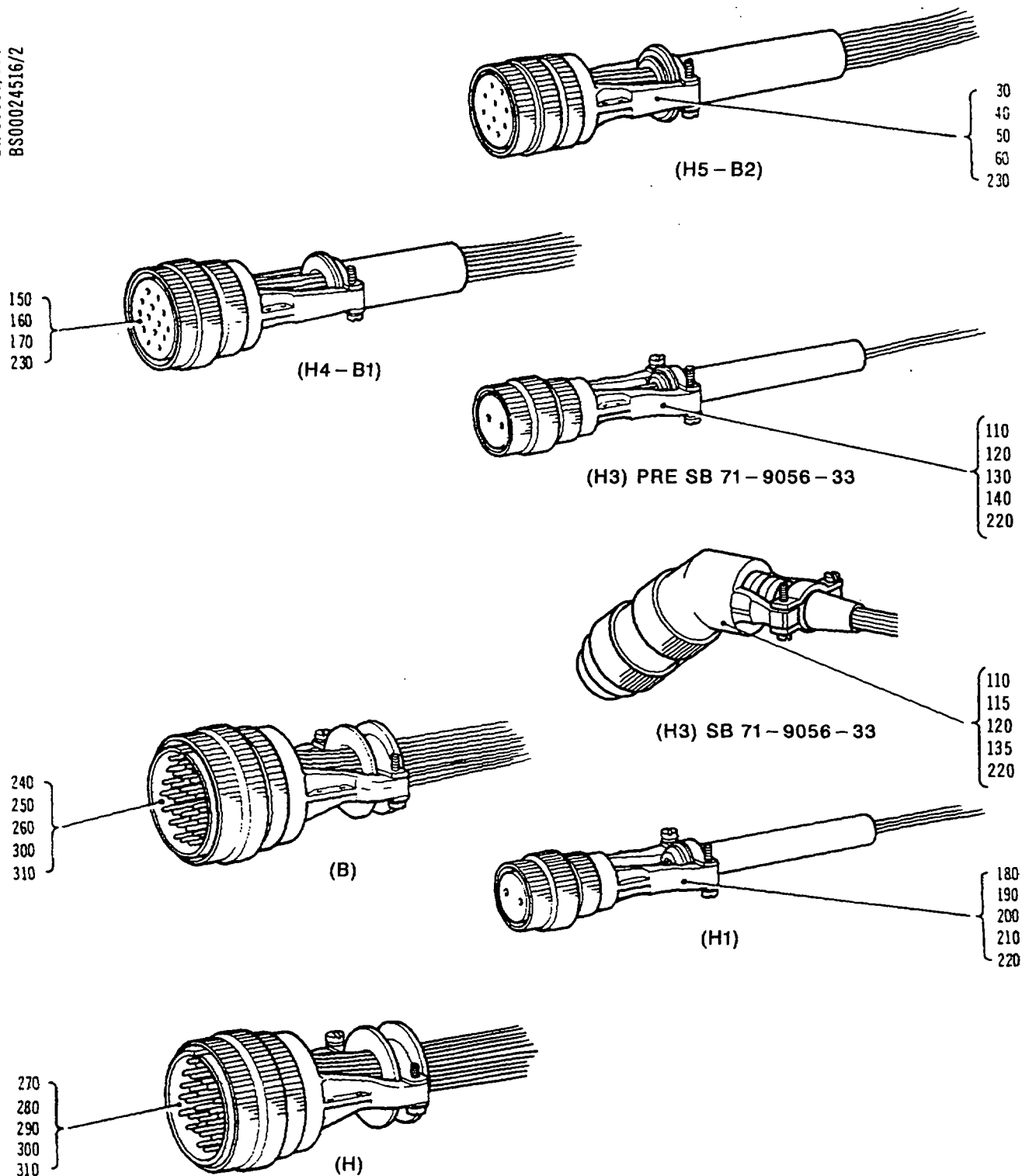


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Engine Electrical Cables  
Figure 212

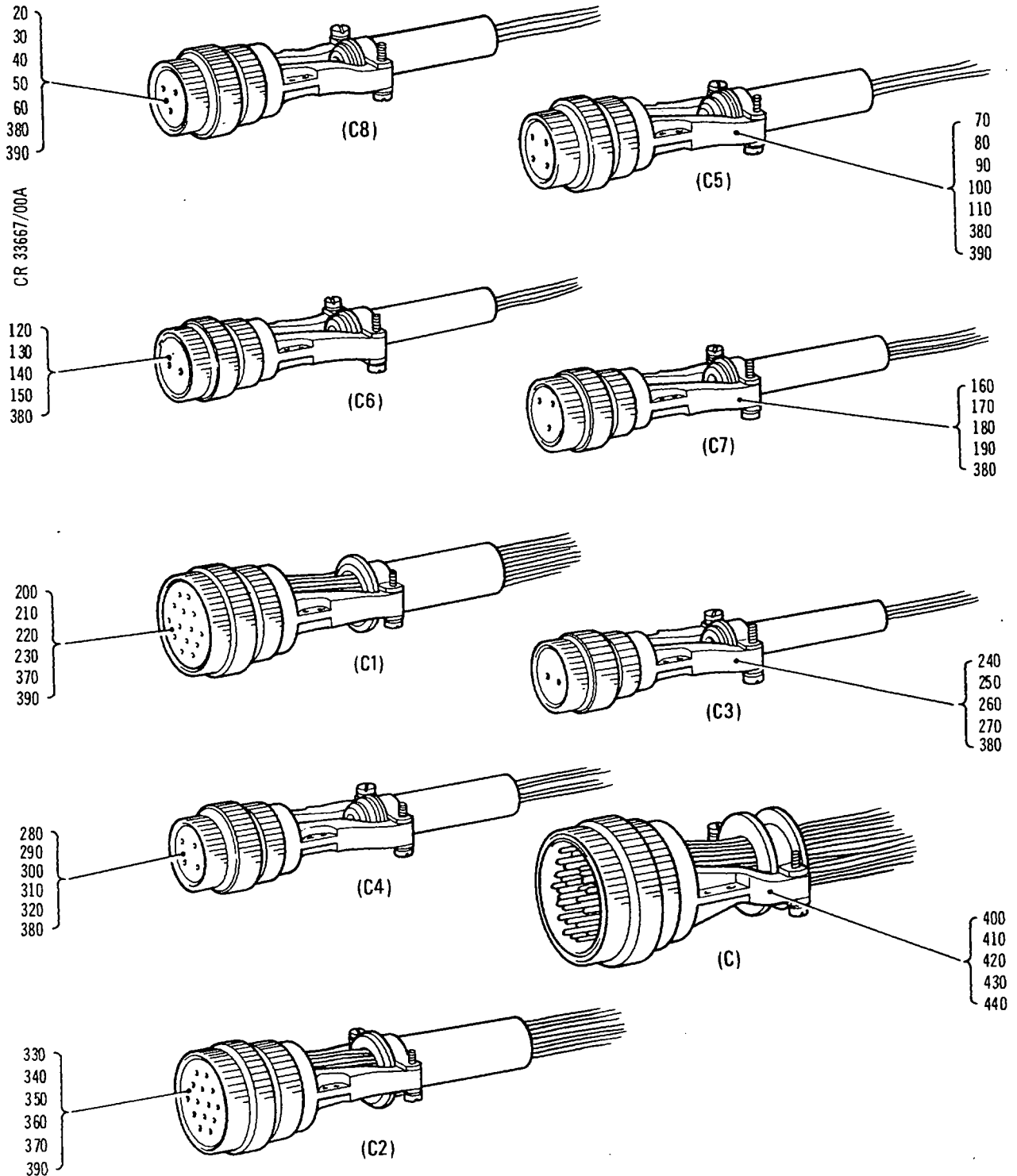


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



SEE FIGURE 201 FOR LOCATIONS



Engine Electrical Cables  
Figure 213

CR 33668/00B  
BS00024515/1



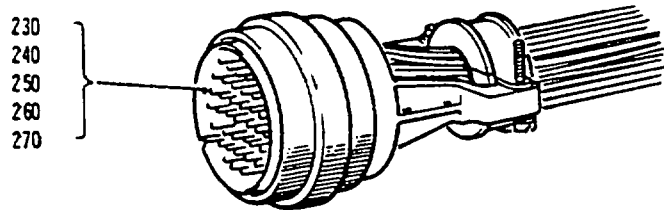
OLYMPUS 593

MK.610-14-28  
OVERHAUL

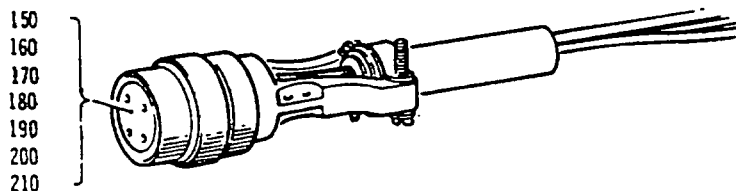


sneema

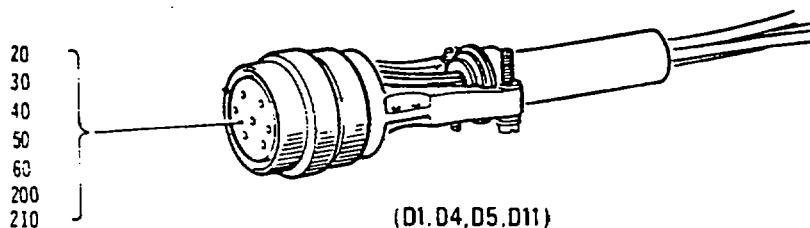
SEE FIGURE 201 FOR LOCATIONS



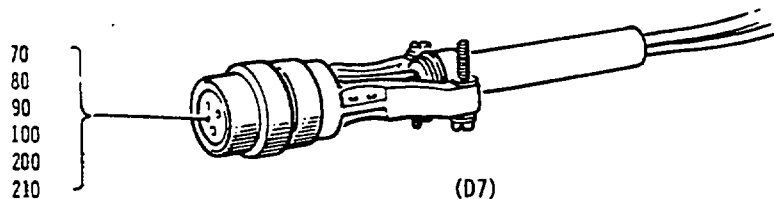
(D)



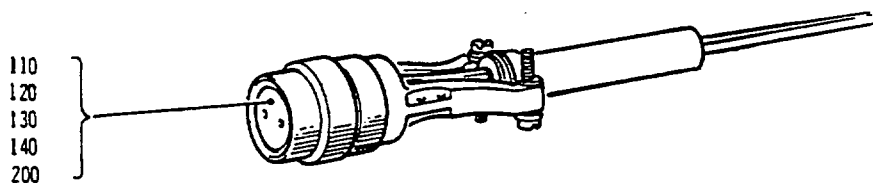
(D2)



(D1, D4, D5, D11)



(D7)



(D9, D10) (PRE SB 71-24)

Engine Electrical Cables  
Figure 214



CR 33669 00C  
BS00024514/1



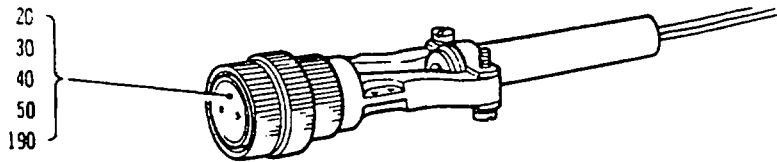
OLYMPUS 593

MK.610-14-28  
OVERHAUL

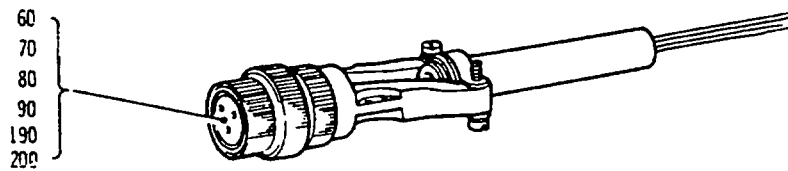


sneema

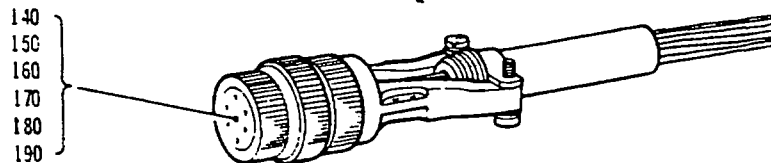
SEE FIGURE 201 FOR LOCATIONS



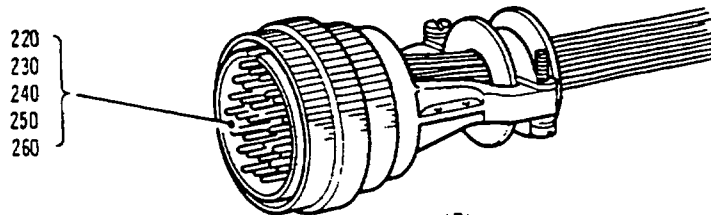
(E8)



(E5, E11)



(E1, E2, E3)



(E)

Engine Electrical Cables  
Figure 215

CLEANING

71-51-01

Page 218

Jun 1/99



OLYMPUS 593

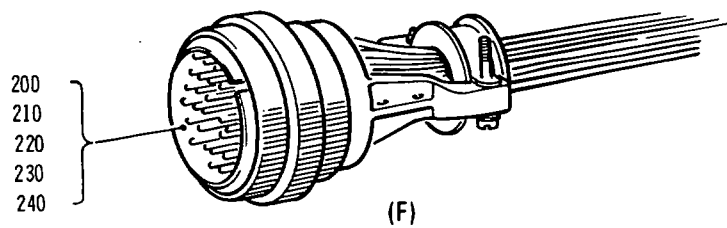
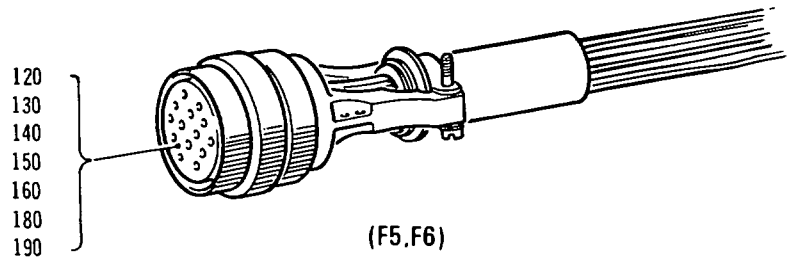
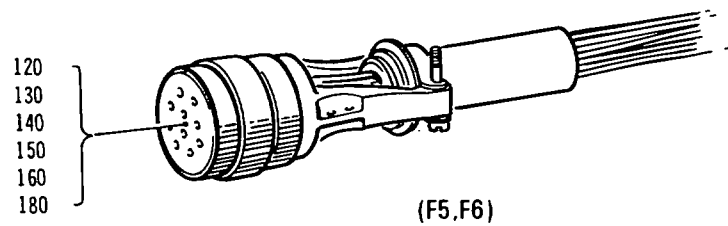
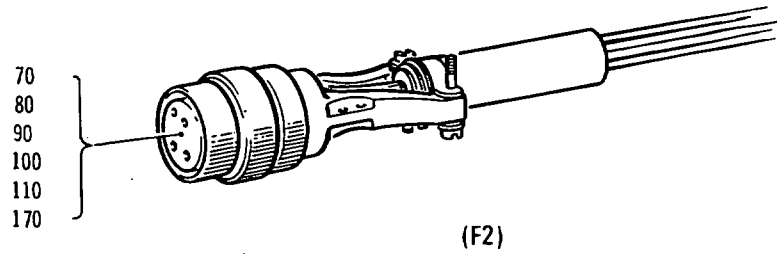
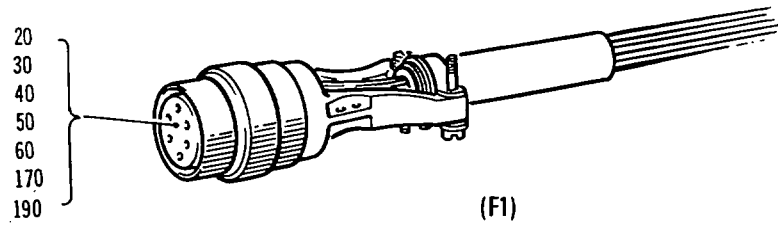
MK.610-14-28

OVERHAUL



SEE FIGURE 201 FOR LOCATIONS

CR 33670/00A



Engine Electrical Cables  
Figure 216



OLYMPUS 593

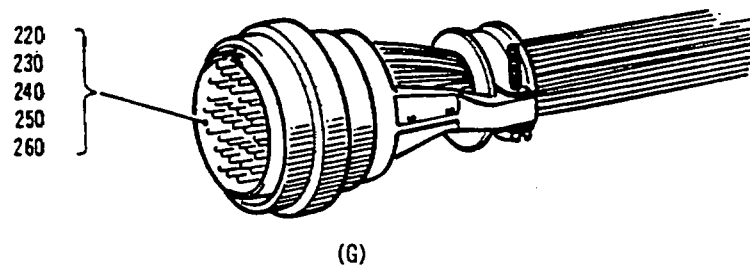
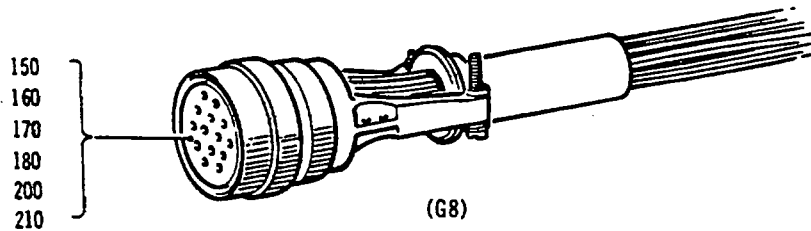
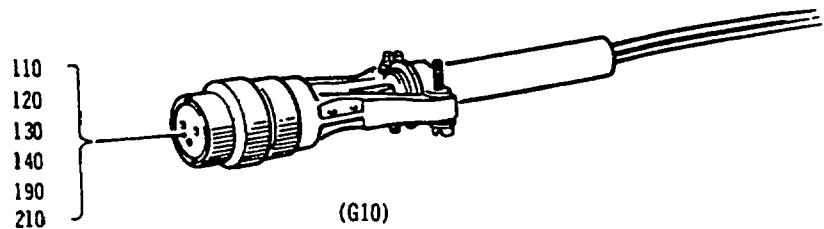
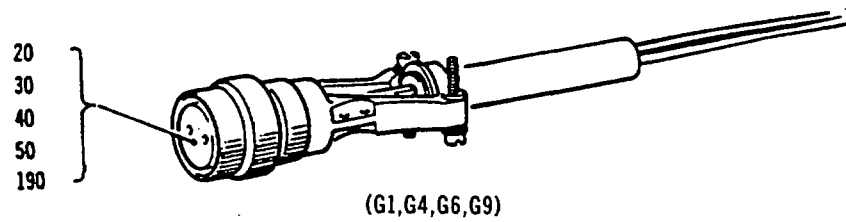
MK.610-14-28  
OVERHAUL



sneema

CR 33671/00B  
BS00024513/1

SEE FIGURE 201 FOR LOCATIONS



Engine Electrical Cables  
Figure 217



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



ENGINE ELECTRICAL CABLES - INSPECTION/CHECK

TABLE OF CONTENTS

Para.	Page
1. General ... ..	301
2. General Inspection...	301
3. Crack Detection ... ..	301
A. Magnetic Particle Crack Detection ... ..	301
B. Fluorescent Dye Crack Detection ... ..	302
4. Harness Wiring Assembly ... ..	304
A. Inspect Lacing and Harness Binding ... ..	304
B. Inspect Cable ... ..	305
C. Carry Out Insulation and Continuity Checks ... ..	305
5. Tray Assembly ... ..	305
A. Inspect Captive Nuts... ..	305
B. Inspect Loop Clamp Attachment Bosses ... ..	305
C. Inspect Attachment Flanges... ..	306
D. Inspect Tray Assembly ... ..	306
6. Bracket and Mounting Plate ... ..	306
A. Inspect Attachment Faces ... ..	306
B. Inspect Brackets ... ..	307
7. Block ... ..	307
A. Inspect Threads ... ..	307
B. Inspect Block ... ..	307
8. Harness Support Assembly... ..	307
A. Inspect Support Assembly ... ..	307
9. Paragraph deleted	
10. Straight Free Plug... ..	308
A. Inspect Threads ... ..	308
B. Inspect Contact Sockets and Contact Pins ... ..	308
C. Carry Out Contact Socket Drop Checks ... ..	308
D. Inspect Plug ... ..	308
E. Inspect Telescopic Bush ... ..	309
F. Inspect Cable Clamps and Half Clamps ... ..	309
G. Inspect Cable for Security to Plug ... ..	309
H. Check Effectiveness of Locking Device ... ..	309
J. Peripheral Sealing Ring ... ..	310
K. Inspect Plug Core ... ..	310
L. Inspect Wire-lock Holes ... ..	310

PRINTED IN ENGLAND

INSPECTION/CHECK

**71-51-01**

Contents 1

Jun 1/86

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

TABLE OF ILLUSTRATIONS

Fig.No.							Page
301	Crack Detection Test Diagram	...	...	...	...	...	303
302	Engine Electrical Cables	...	...	...	...	...	311
302A	Engine Electrical Cables	...	...	...	...	...	311A
303	Engine Electrical Cables	...	...	...	...	...	312
304	Engine Electrical Cables	...	...	...	...	...	313
305	Engine Electrical Cables	...	...	...	...	...	314
306	Engine Electrical Cables	...	...	...	...	...	315
307	Engine Electrical Cables	...	...	...	...	...	316
308	Engine Electrical Cables	...	...	...	...	...	317
309	Engine Electrical Cables	...	...	...	...	...	318
310	Engine Electrical Cables	...	...	...	...	...	319
311	Engine Electrical Cables	...	...	...	...	...	320
312	Engine Electrical Cables	...	...	...	...	...	321
313	Engine Electrical Cables	...	...	...	...	...	322
314	Engine Electrical Cables	...	...	...	...	...	323
315	Engine Electrical Cables	...	...	...	...	...	324
316	Engine Electrical Cables	...	...	...	...	...	325
317	Engine Electrical Cables	...	...	...	...	...	326
318	Engine Electrical Cables	...	...	...	...	...	327

LIST OF TABLES

Table No.				Page
301	Items to be Magnetic Particle Crack Tested	...	...	302
302	Items to be Fluorescent Dye Crack Tested	...	...	302
303	Cross References to Illustrated Parts Catalogue	...	...	304

INSPECTION/CHECK

**71-51-01**Contents 2  
Jun 1/99



OLYMPUS 593

MK.610-14-28

OVERHAUL



## ENGINE ELECTRICAL CABLES - INSPECTION/CHECK

### 1. General

- A. Each item in this chapter is given a two-part identification; thus, 302-20 refers to Figure 302 and to Item 20 called out on that figure. Each item may be further identified by its Part Number by the use of Table 303, which cross-refers figures in this chapter to the equivalent chapter and figure in the Illustrated Parts Catalogue (I.P.C.); the called-out item number will be the same on both figures.
- B. All items which will be crack tested are listed in Tables 301 and 302.
- C. Dimensional checks are cross referenced to the equivalent Fits and Clearances Schedule (F.C.S.) chapter against the item concerned.
- D. When the inspection of an item discloses a minor defect that requires rectification, it is defined as 'Accept after repair'. On all such occasions the item must be rectified in accordance with Standard Practices 72-09-22 Repair. Where a Ref.No. follows 'Accept after repair' e.g. (Ref.72-21-01 Repair No.1), a specific Repair Scheme is available to which the item must be rectified. Items that are rejected, or for which a repair scheme is not currently available, should be held at the discretion of the operator, as service experience may prove the need for a repair.
- E. On completion of a repair, rectification or test, the item(s) must be inspected, to ensure that the necessary work has been satisfactorily completed.

### 2. General Inspection

- A. Inspect all items illustrated in this chapter, whether specified or not, in accordance with Standard Practices (Ref.72-09-00 Inspection/Check). In addition, carry out the inspections detailed for the specified items, from para.4 onwards.
- B. Inspection terms used in this chapter are explained in Standard Practices (Ref.72-09-00 Inspection/Check).

### 3. Crack Detection

- A. Magnetic Particle Crack Detection.

- (1) Submit the items listed in Table 301 to crack detection in accordance with the process quoted.

INSPECTION/CHECK

**71-51-01**

Page 301

Apr 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Items to be crack detected by this method are illustrated in the Crack Detection Test Diagram (Fig.301). For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

No current requirement

Items to be Magnetic Particle Crack Tested  
Table 301

B. Fluorescent Dye Crack Detection.

- (1) Submit the items listed in Table 302 to crack detection in accordance with the process quoted. For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

No current requirement

Items to be Fluorescent Dye Crack Tested  
Table 302

TN17352

INSPECTION/CHECK

71-51-01

Page 302

Dec 1/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

No Current Requirement

TN17351

Crack Detection Test Diagram  
Figure 301

INSPECTION/CHECK

**71-51-01**

Page 303

Dec 1/75





# OLYMPUS 593

MK.610-14-28  
OVERHAUL



Fig.No.

Illustrated Parts Catalogue Equivalent

301	Not applicable	
302	71-51-01	Fig.1
303	71-51-01	Fig.2 and 2A
304	71-51-01	Fig.3 and 3A
305	71-51-01	Fig.4
306	71-51-01	Fig.5
307	71-51-01	Fig.6
308	71-51-01	Fig.7
309	71-51-01	Fig.8
310	71-51-01	Fig.9
311	71-51-01	Fig.10
312	71-51-01	Fig.11
313	71-51-01	Fig.12
314	71-51-01	Fig.13
315	71-51-01	Fig.14
316	71-51-01	Fig.15
317	71-51-01	Fig.16
318	71-51-01	Fig.17

Cross References to Illustrated Parts Catalogue  
Table 303

4. Harness Wiring Assembly (302-10/20/30/40/50/60)

A. Inspect Lacing and Harness Binding.

NOTE: Pay particular attention to the loop clamp locations when checking for wear (Ref.Fig.302).

(1) Damage.

- |  |   |
|--|---|
| (a) Harness binding free from fraying and lacing intact. | Accept subject to insulation checks (Ref.71-00-02 Testing). |
|--|---|

FN16760

INSPECTION/CHECK

**71-51-01**

Page 304

Dec 1/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



B. Inspect Cable.

NOTE: Where practicable inspect the cable at the loop clamp locations when checking for wear (Ref.Fig.302).

(1) Damage.

- |   |   |
|---|---|
| (a) Cables free from cuts, fraying or disintegration of insulation. | Accept subject to insulation checks (Ref.71-00-02 Testing). |
|---|---|

C. Carry out Insulation and Continuity Checks (Ref.71-00-02 Testing).

5. Tray Assembly (308-180/290, 310-230, 311-200)

A. Inspect Captive Nuts (Ref.72-09-00 Inspection/Check).

(1) Security.

- |   |         |
|---|---------|
| (a) Nut retainers secure and solid rivets positive. | Accept. |
|---|---------|

B. Inspect Loop Clamp Attachment Bosses.

- |                      |                      |
|----------------------|----------------------|
| (1) Nicks and burrs. | Accept after repair. |
|----------------------|----------------------|

(2) Wear.

- |  |                      |
|--|----------------------|
| (a) Not more than 10 per cent reduction in material thickness. | Accept.              |
| (b) Bolt-holes elongated not more than 0.030 in. (0,760 mm).   | Accept after repair. |

C. Inspect Attachment Flanges.

- |                      |                      |
|----------------------|----------------------|
| (1) Nicks and burrs. | Accept after repair. |
|----------------------|----------------------|

(2) Wear.

- |   |         |
|---|---------|
| (a) Not more than 5 per cent reduction in material thickness. | Accept. |
|---|---------|

INSPECTION/CHECK

**71-51-01**

Page 305  
Dec 1/75



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (b) Bolt-holes elongated  
not more than 0.030 in.  
(0,760 mm).

Accept after  
repair.

D. Inspect Tray Assembly.

- (1) Nicks and burrs.

Accept after  
repair.

- (2) Distortion.

Accept if com-  
patibility is  
preserved.

6. Bracket (310-60, 311-100/280, 312-250) and Mounting  
Plate (312-110)

A. Inspect Attachment Faces.

- (1) Wear and fretting.

- (a) Not more than 10 per  
cent reduction in  
material thickness.

Accept.

- (b) Bolt-holes elongated  
not more than 0.030 in.  
(0,760 mm).

Accept after  
repair.

- (2) Scores.

- (a) Not more than 0.010 in.  
(0,250 mm) in depth.

Accept after repair  
providing material  
thickness is not  
reduced by more  
than 10 per cent.

B. Inspect Brackets.

- (1) Nicks and burrs.

Accept after  
repair.

- (2) Distortion.

Accept if com-  
patibility is  
preserved.

- (3) Wear.

- (a) Bolt-holes elongated  
not more than 0.030 in.  
(0,760 mm).

Accept after  
repair.

INSPECTION/CHECK

71-51-01

Page 306  
Jun 1/86



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

7. Block (311-20/30/50/70/90)

A. Inspect Threads (Ref.72-09-00 Inspection/Check).

B. Inspect Block.

(1) Nicks and burrs.

Accept after  
repair.

(2) Wear.

(a) Not more than 5 per  
cent reduction in  
material thickness.

Accept providing  
90 per cent of  
effective designed  
profile is  
maintained.

(b) Bolt-holes elongated  
not more than 0.030 in.  
(0,760 mm).

Accept after  
repair.

8. Harness Support Assembly (312-10/30/40/50)

A. Inspect Support Assembly.

(1) Inspect for general  
condition.

Accept if  
serviceable.

9. Paragraph deleted.

INSPECTION/CHECK

71-51-01

Page 307

Jun 1/86



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

10. Straight Free Plug (313-30/70/110/150/180/240/270, 314-20/70/120/160/200/240/280/330/400, 315-20/70/110/150/230, 316-20/60/140/220, 317-20/70/120/200, 318-20/60/110/150/220)

A. Inspect Threads (Ref.72-09-00 Inspection/Check).

NOTE: Check run-down of thread on the mating component.

B. Inspect Contact Sockets and Contact Pins.

(1) Damage to pin locations and pins.

(a) Any damage.

Reject for repair  
(Ref.71-51-01  
Assembly).

C. Inspect Plug.

(1) Nicks and burrs.

Accept after  
repair.

(2) Distortion.

(a) Any distortion to cable  
clamp supports.

Reject.

INSPECTION/CHECK

71-51-01

Page 308

Jun 1/99

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

**D. Inspect Telescopic Bush.**

- (1) Torn or broken bushes.

Reject for replacement (Ref.71-51-01 Assembly).

- (2) Swelling.

- (a) Any signs of swelling due to oil contamination.

Reject for replacement (Ref.71-51-01 Assembly).

**E. Inspect Cable Clamps and Half Clamps.**

- (1) Nicks and burrs.

Accept after repair.

- (2) Distortion.

Accept if compatibility is preserved.

**F. Inspect Cable for Security to Plug.**

- (1) Security.

- (a) Cable secure.

Accept.

- (b) Cable detached from contact sockets or contact pins.

Reject for repair (Ref.71-51-01 Assembly).

**G. Check Effectiveness of Locking Device.**

**NOTE:** Use a new Straight Free Plug as a comparison when determining the degree of resistance of the clicker lock i.e. with thumb and forefinger, exert turning pressure on the knurled connector until the locking device operates through one serration. The comparison should be used to determine the effectiveness of the locking device on the Straight Free Plugs submitted for overhaul inspection and must therefore be the acceptance standard.

- (1) Locking device positive.

Accept.

INSPECTION/CHECK

**71-51-01**

Page 309

Jun 1/99



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

H. Peripheral Sealing Ring.

NOTE: The Peripheral Sealing Ring, irrespective of condition, must be renewed at each overhaul.

J. Inspect Plug Core.

NOTE: Check that Seal Plugs (313-310, 314-390/410, 315-210/270, 316-200/260, 317-190/240, 318-210/260) are still in place in the vacant cable positions in the rear of the Straight Free Plug.

(1) Swelling.

(a) Any swelling due to oil contamination.

Reject for replacement (Ref.71-51-01 Assembly).

K. Inspect Wire-lock Holes.

NOTE: Two wire-lock holes are drilled to supplement the clicker lock device, each straight free plug must have at least one positive unbroken wire-lock hole.

(1) Unbroken wire-lock hole.

Accept.



# OLYMPUS 593

MK.610-14-28  
OVERHAUL

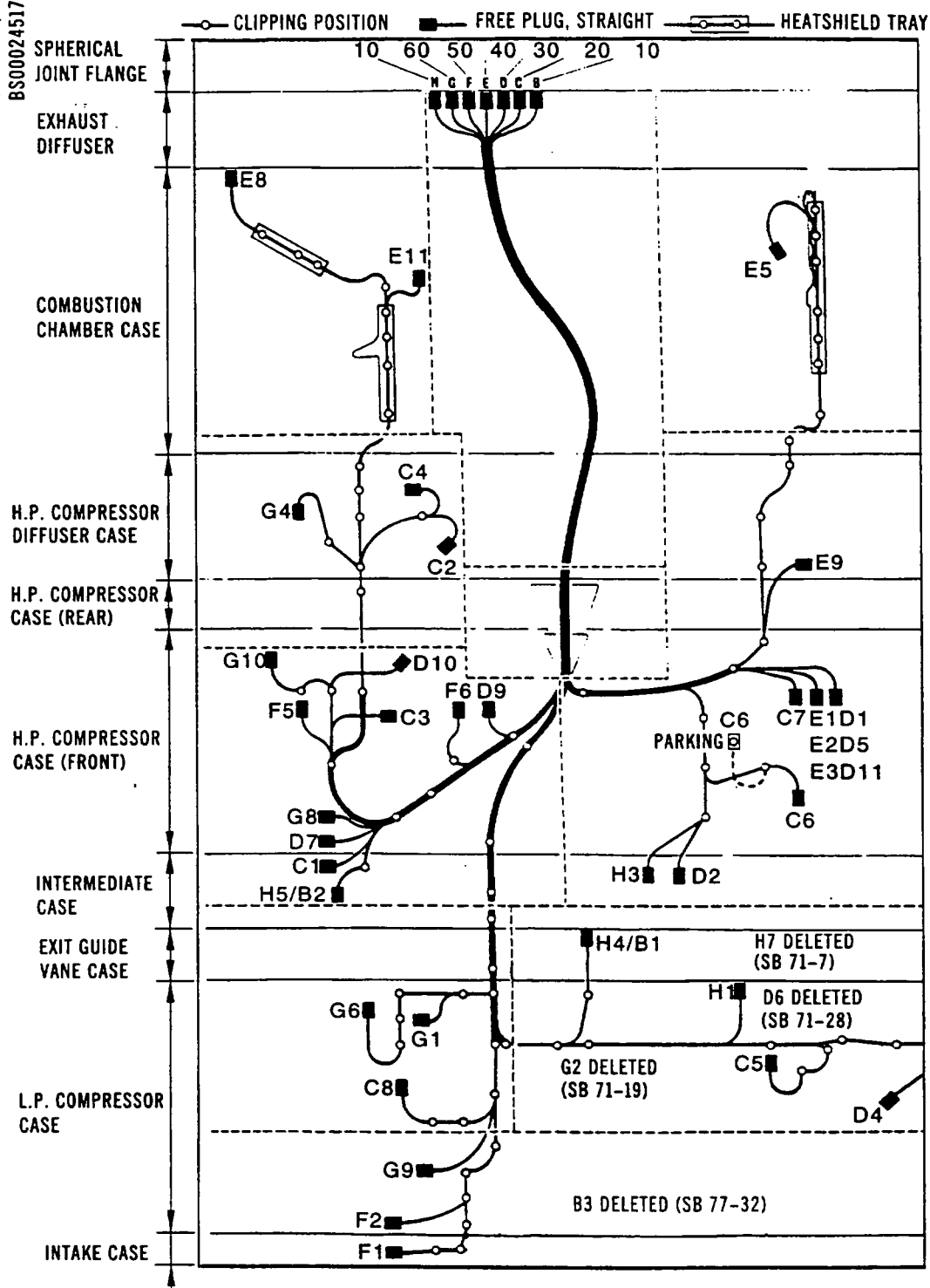


sneema

Printed in England

CR 33434/00C  
BS00024517/1

## DIAGRAMMATIC LAYOUT OF UNDERSIDE OF ENGINE



FOR PLUG DETAILS  
B1,B2,H1,H3,H4,H5  
SEE FIG.313

C1,C2,C3,C4,C5,  
C6,C7,C8,  
SEE FIG.314

D1,D2,D4,D5,  
D7,D9,D10,D11,  
SEE FIG.315

E1,E2,E3,E5,E8  
E9,E11,  
SEE FIG.316

F1,F2,F5,F6,  
SEE FIG.317

G1,G4,G6,G8,  
G9,G10  
SEE FIG.318

FORWARD



Engine Electrical Cables  
(Air France Configuration)  
Figure 302

INSPECTION/CHECK

### 71-51-01

Page 311  
Jun 1/99





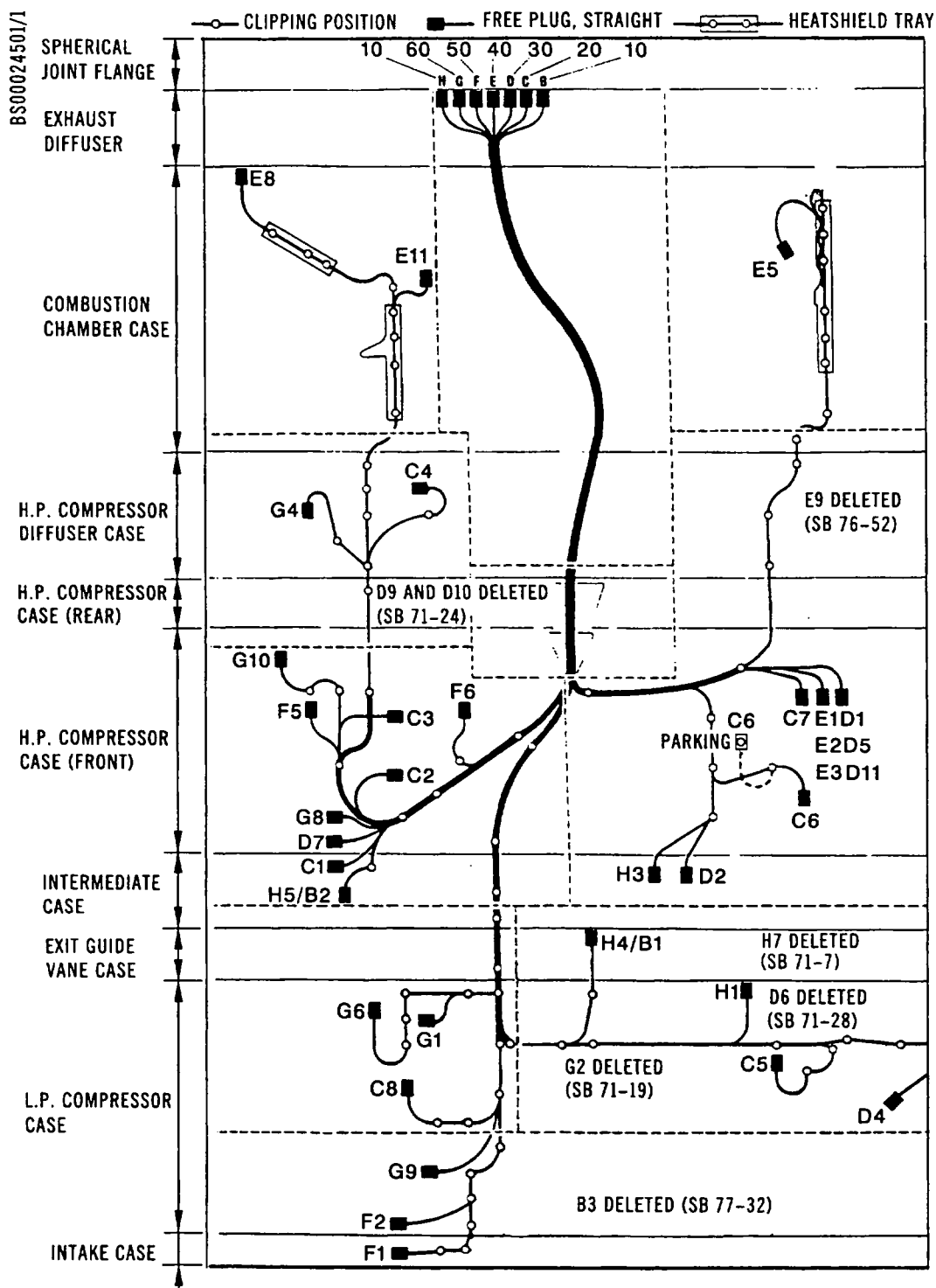
# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

## DIAGRAMMATIC LAYOUT OF UNDERSIDE OF ENGINE



FOR PLUG DETAILS  
B1,B2,H1,H3,H4,H5  
SEE FIG.313

C1,C2,C3,C4,C5,  
C6,C7,C8,  
SEE FIG.314

D1,D2,D4,D5,  
D7,D11,  
SEE FIG.315

E1,E2,E3,E5,E8  
E11,  
SEE FIG.316

F1,F2,F5,F6,  
SEE FIG.317

G1,G4,G6,G8,  
G9,G10  
SEE FIG.318

FORWARD



Engine Electrical Cables  
(British Airways Configuration)  
Figure 302A

INSPECTION/CHECK

### 71-51-01

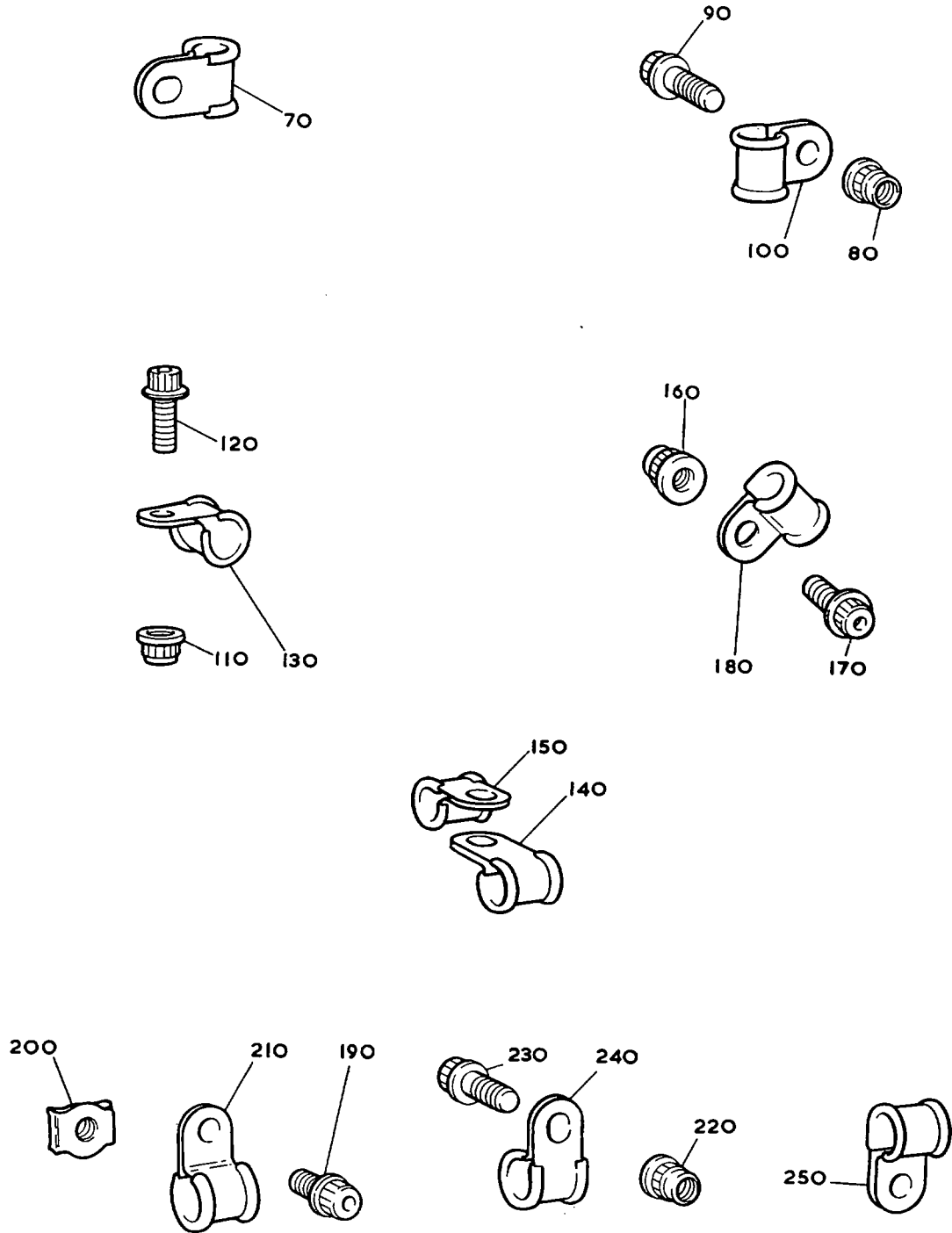
Page 312  
Jun 1/99

CR 33050/00B



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Engine Electrical Cables  
Figure 303

INSPECTION/CHECK

71-51-01

Page 312A  
Jun 1/99

Printed in England



OLYMPUS 593

MK.610-14-28  
OVERHAUL



*sneema*

This Page is Left Blank Intentionally

INSPECTION/CHECK

**71-51-01**

Page 312B

Jun 1/99

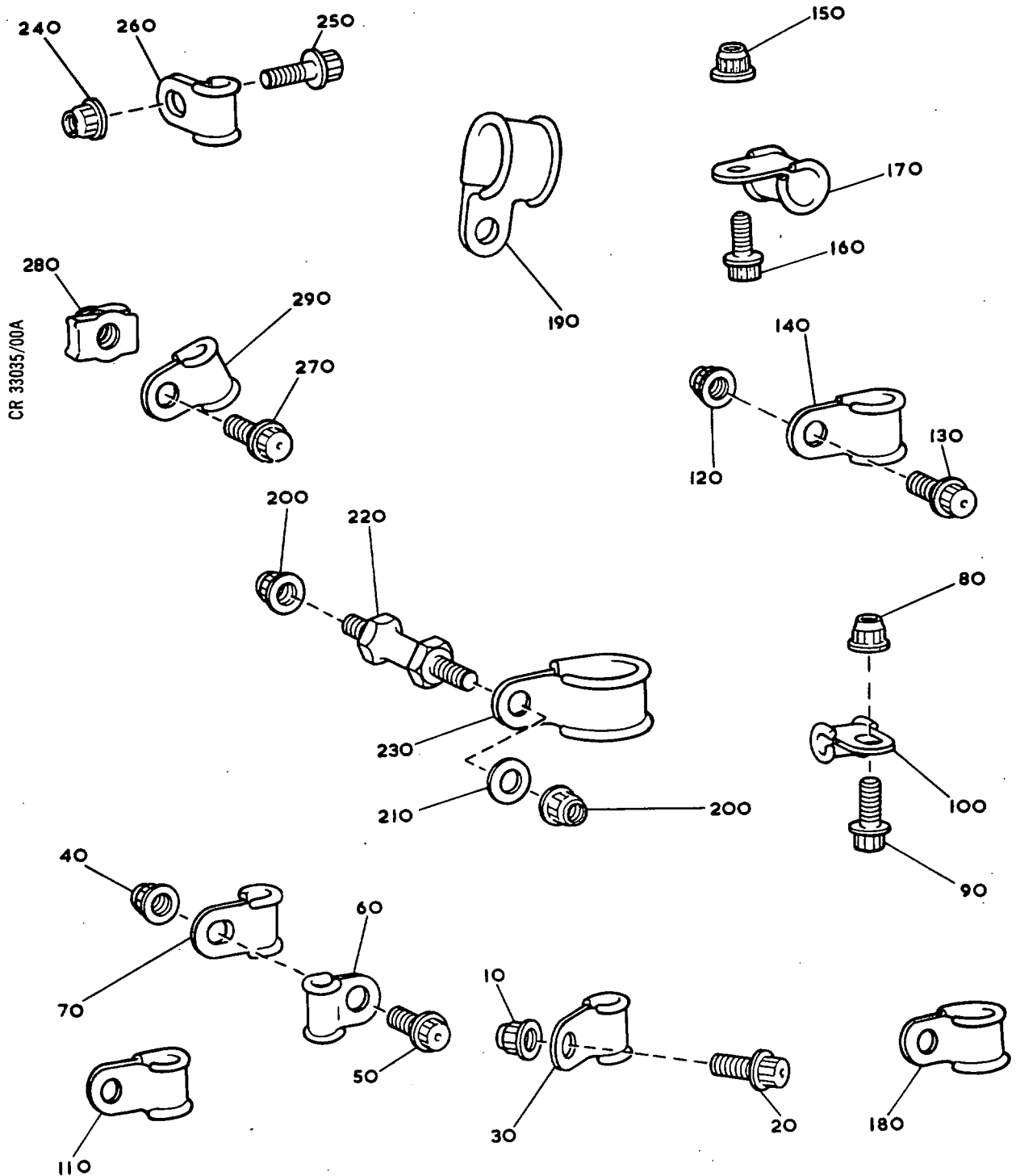


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



Engine Electrical Cables  
Figure 304

INSPECTION/CHECK

71-51-01

Page 313

Dec 1/75

TN15392

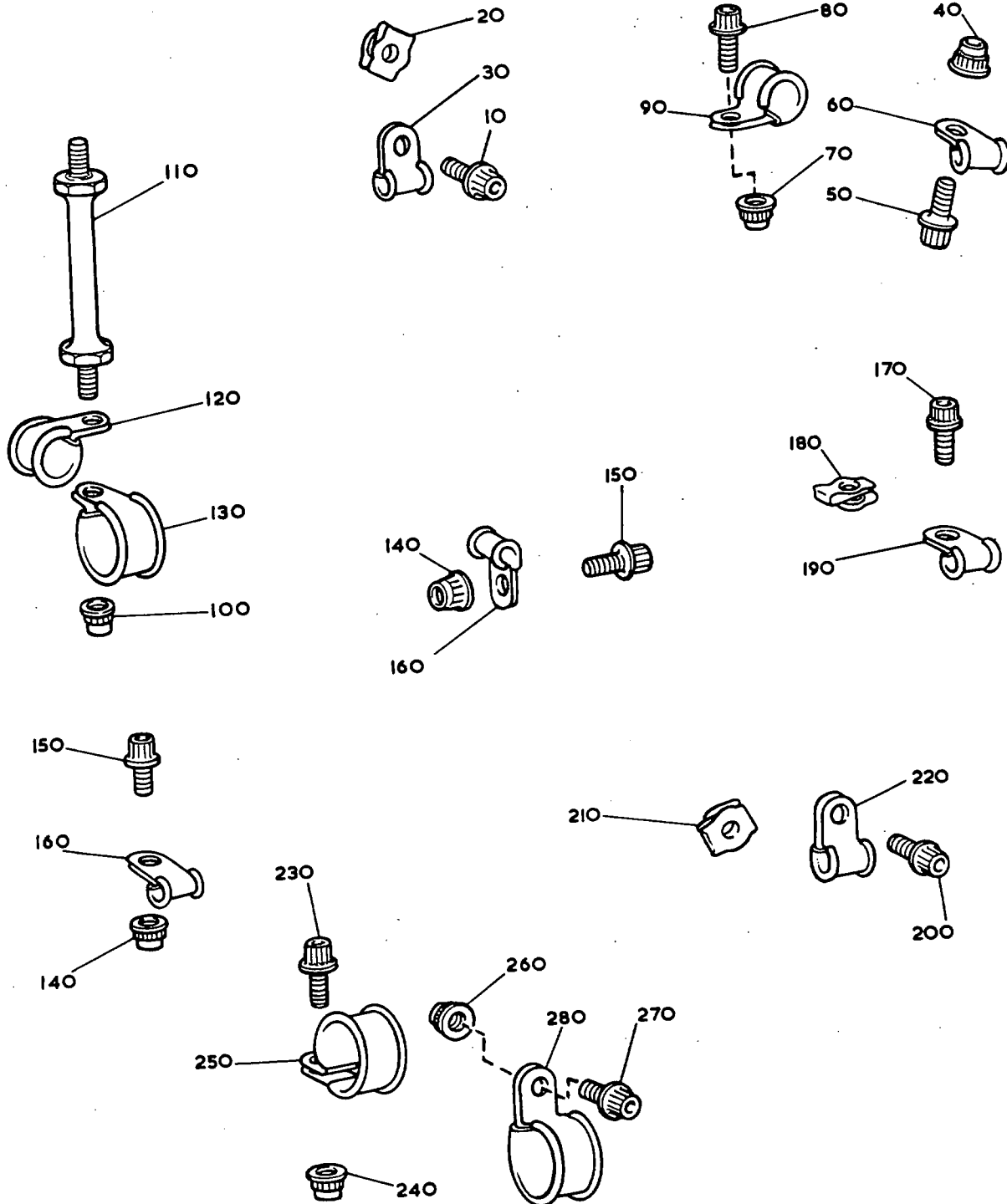


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33022/00A



Engine Electrical Cables  
Figure 305

INSPECTION/CHECK

71-51-01

Page 314  
Dec 1/75

TN15396

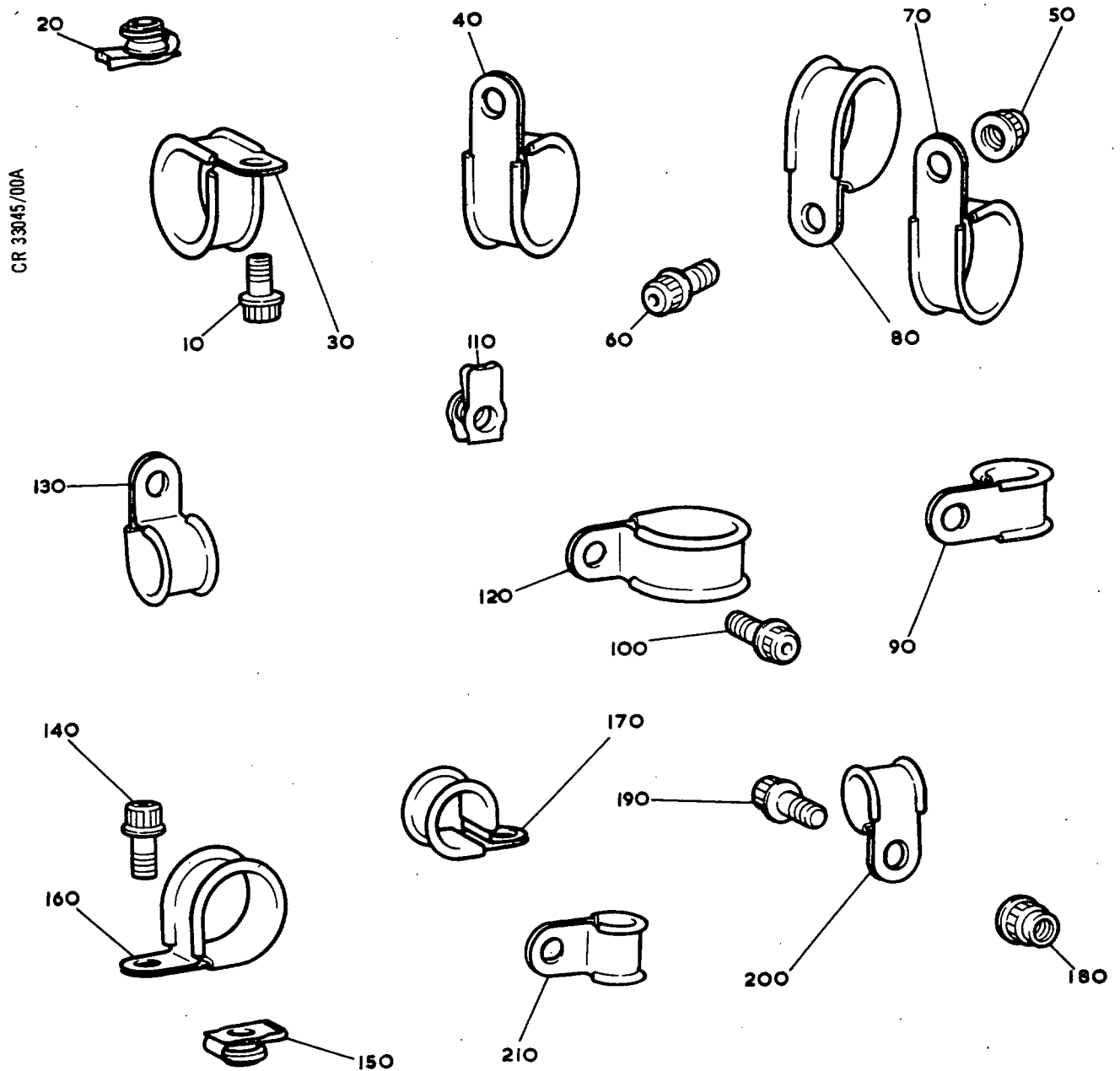


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



TN15397

Engine Electrical Cables  
Figure 306

INSPECTION/CHECK  
**71-51-01**  
Page 315  
Dec 1/75

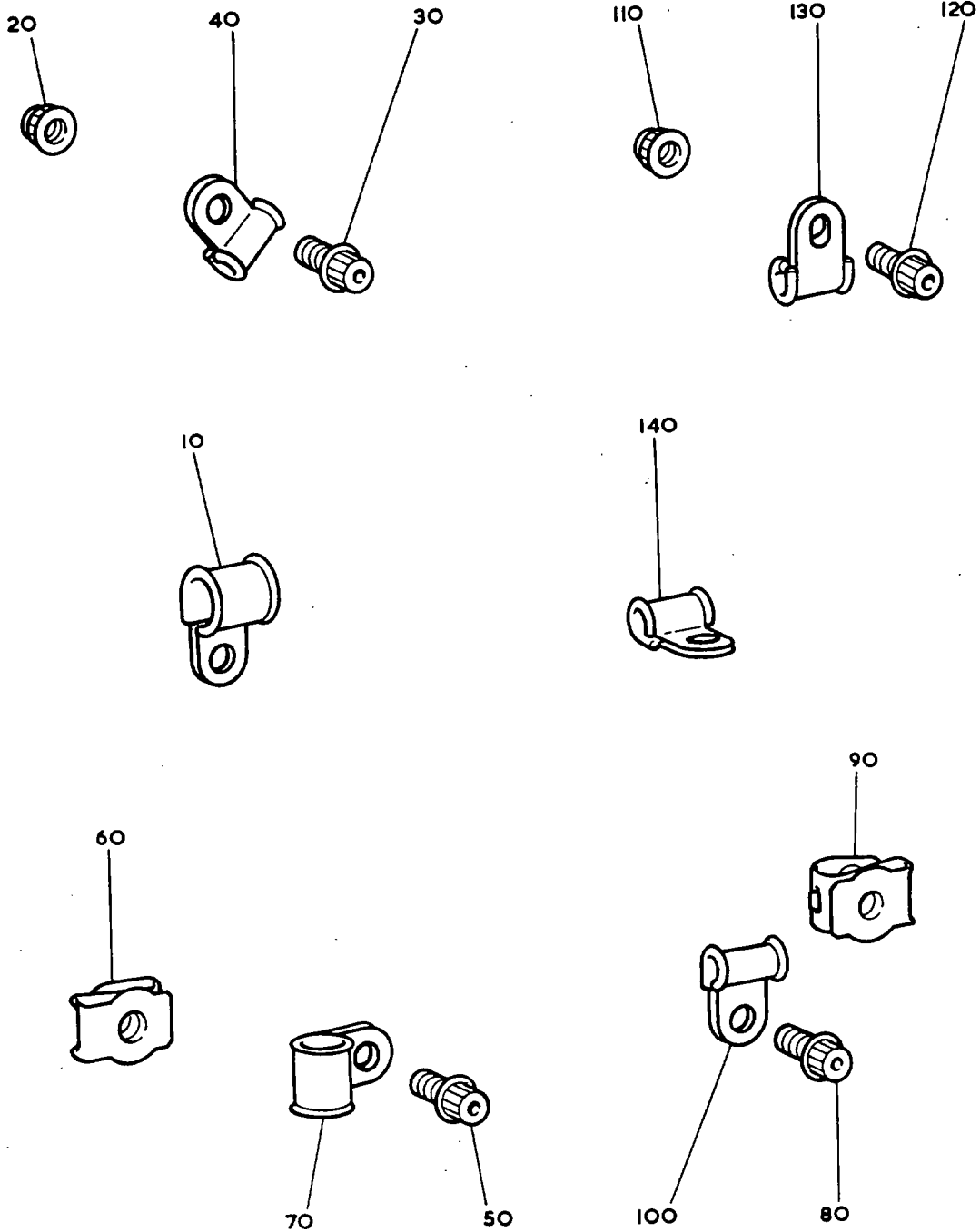


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 33023/00A



TN25541

Engine Electrical Cables  
Figure 307

INSPECTION/CHECK

**71-51-01**

Page 316  
Dec 1/75



OLYMPUS 593

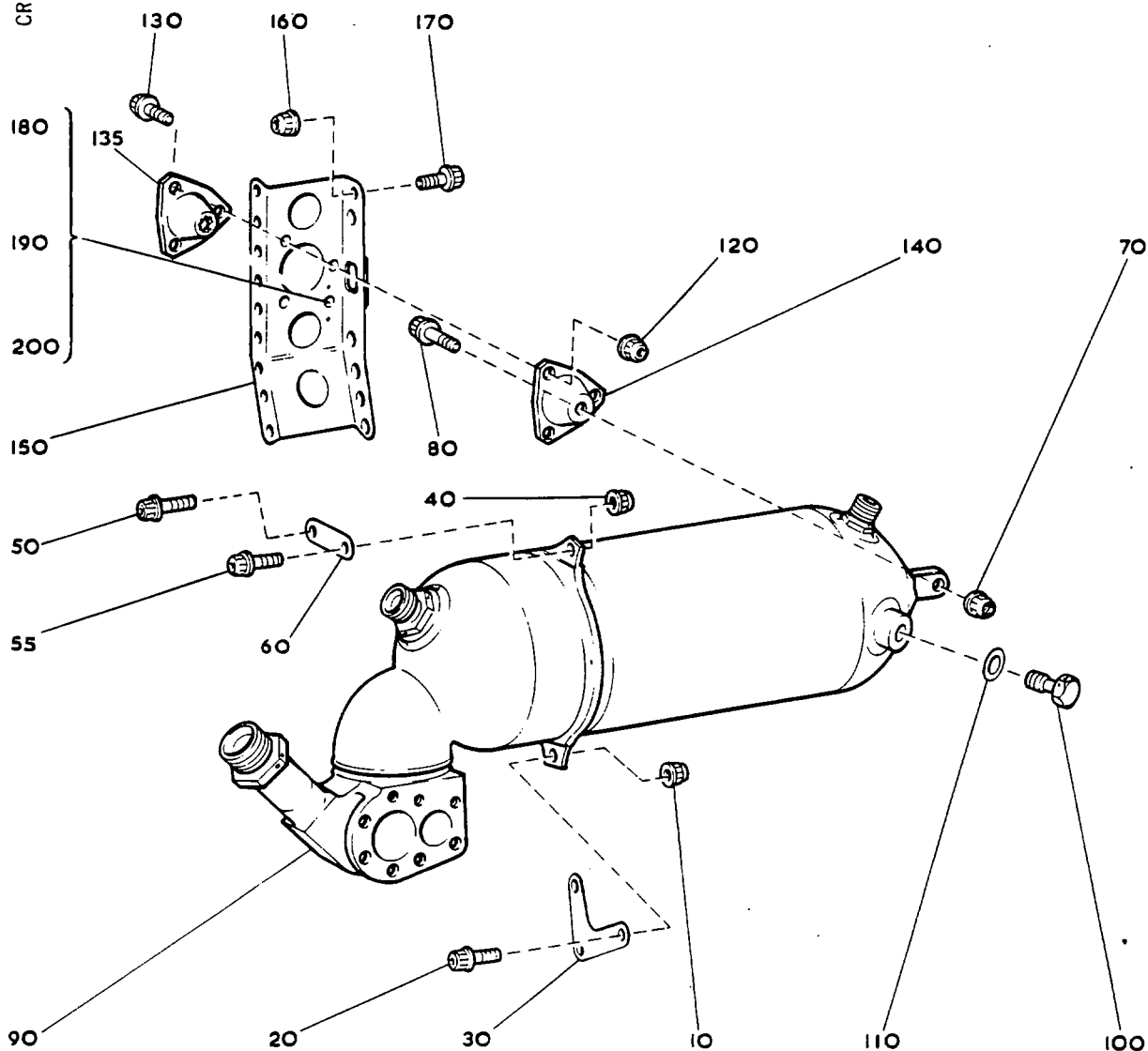
MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

CR 32418/00D



Drains Tank Details  
Figure 302

INSPECTION/CHECK

**71-70-00**

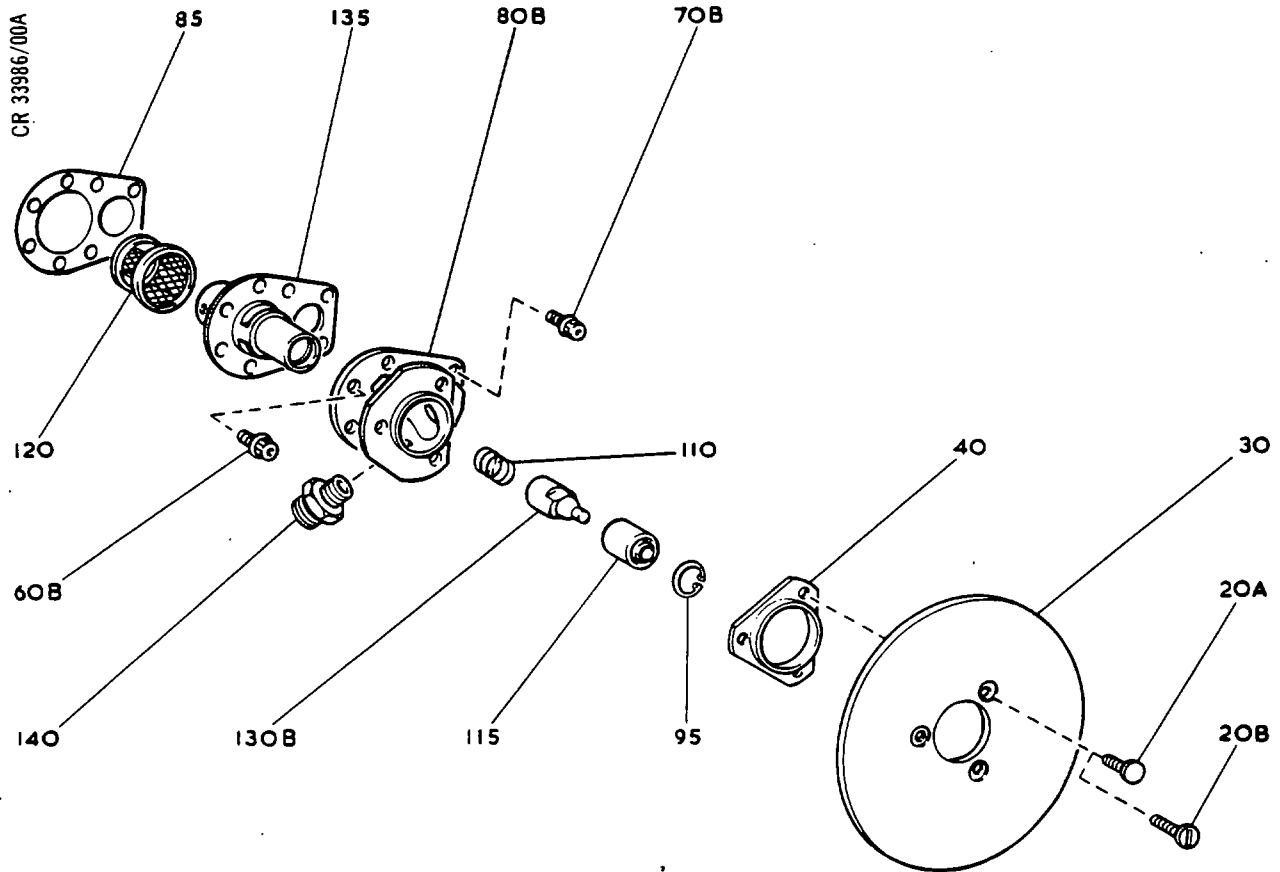
Page 317  
Dec 1/81





OLYMPUS 593

MK.610-14-28  
OVERHAUL



Drains Tank Details  
Figure 303

INSPECTION/CHECK

71-70-00

Page 318

Aug 1/76

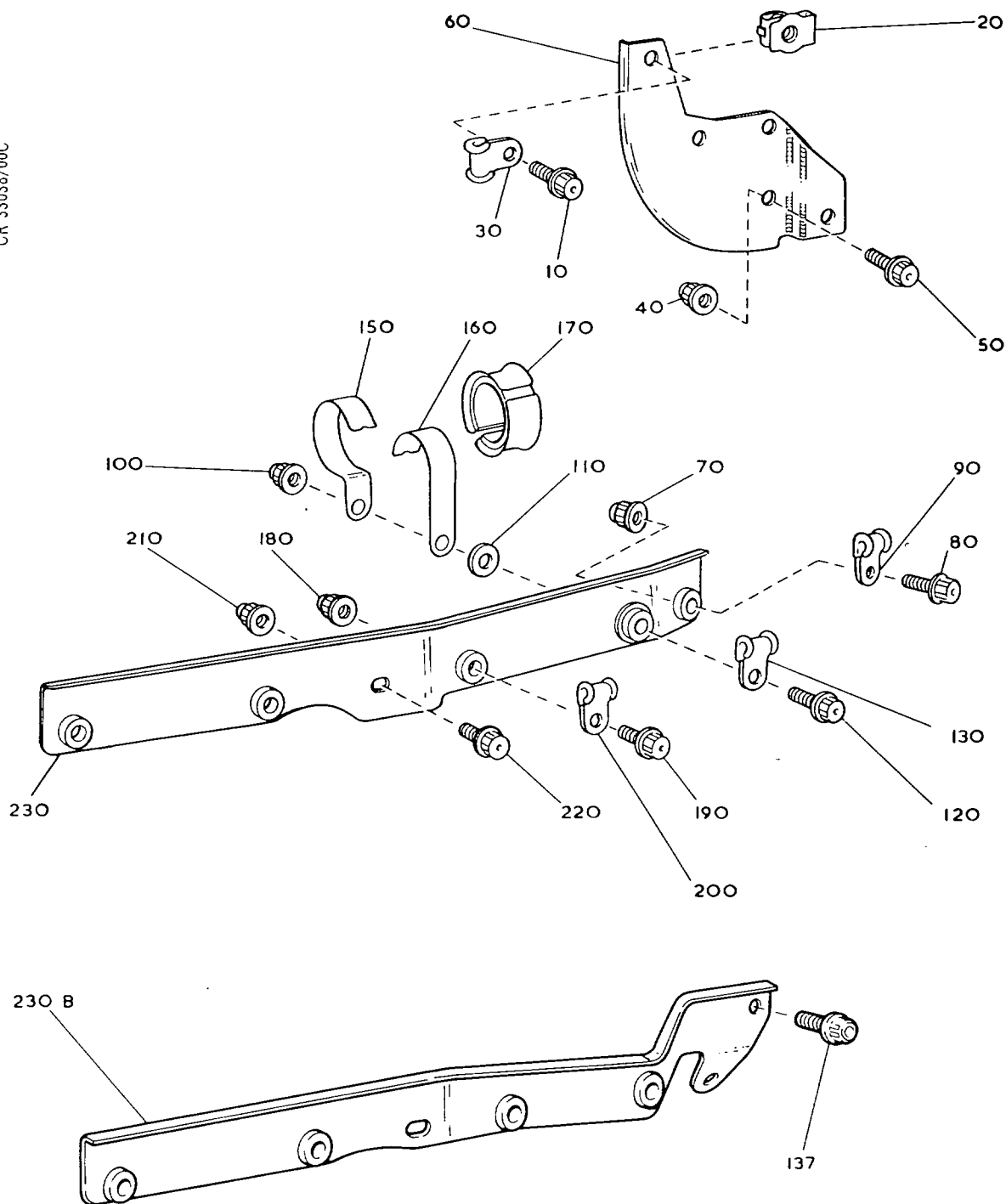
TN3208

CR 33038/00C



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Engine Electrical Cables  
Figure 310

INSPECTION/CHECK

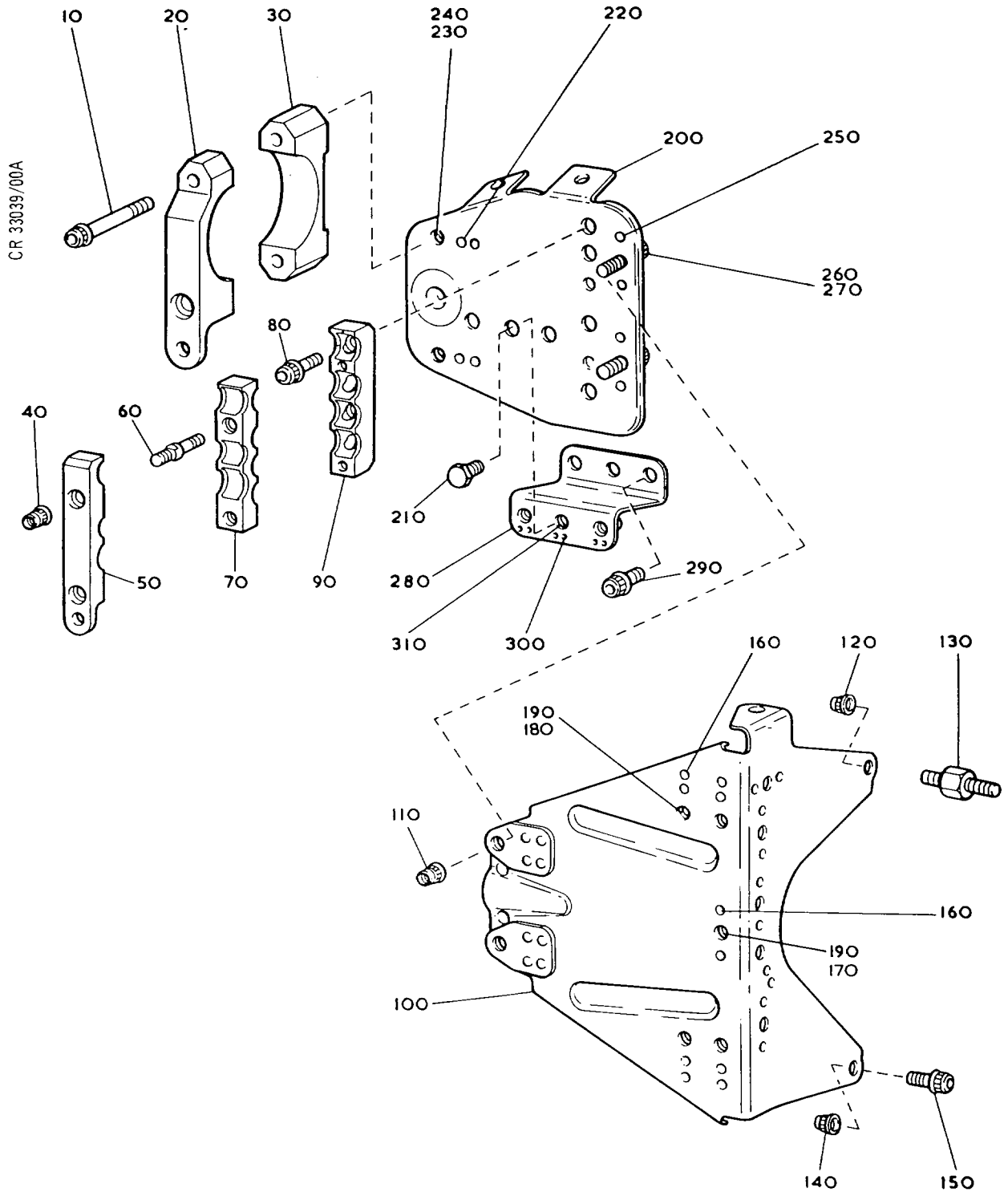
71-51-01

Page 319  
Jun 1/86



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Engine Electrical Cables  
Figure 311

INSPECTION/CHECK

**71-51-01**

Page 320

Dec 1/75



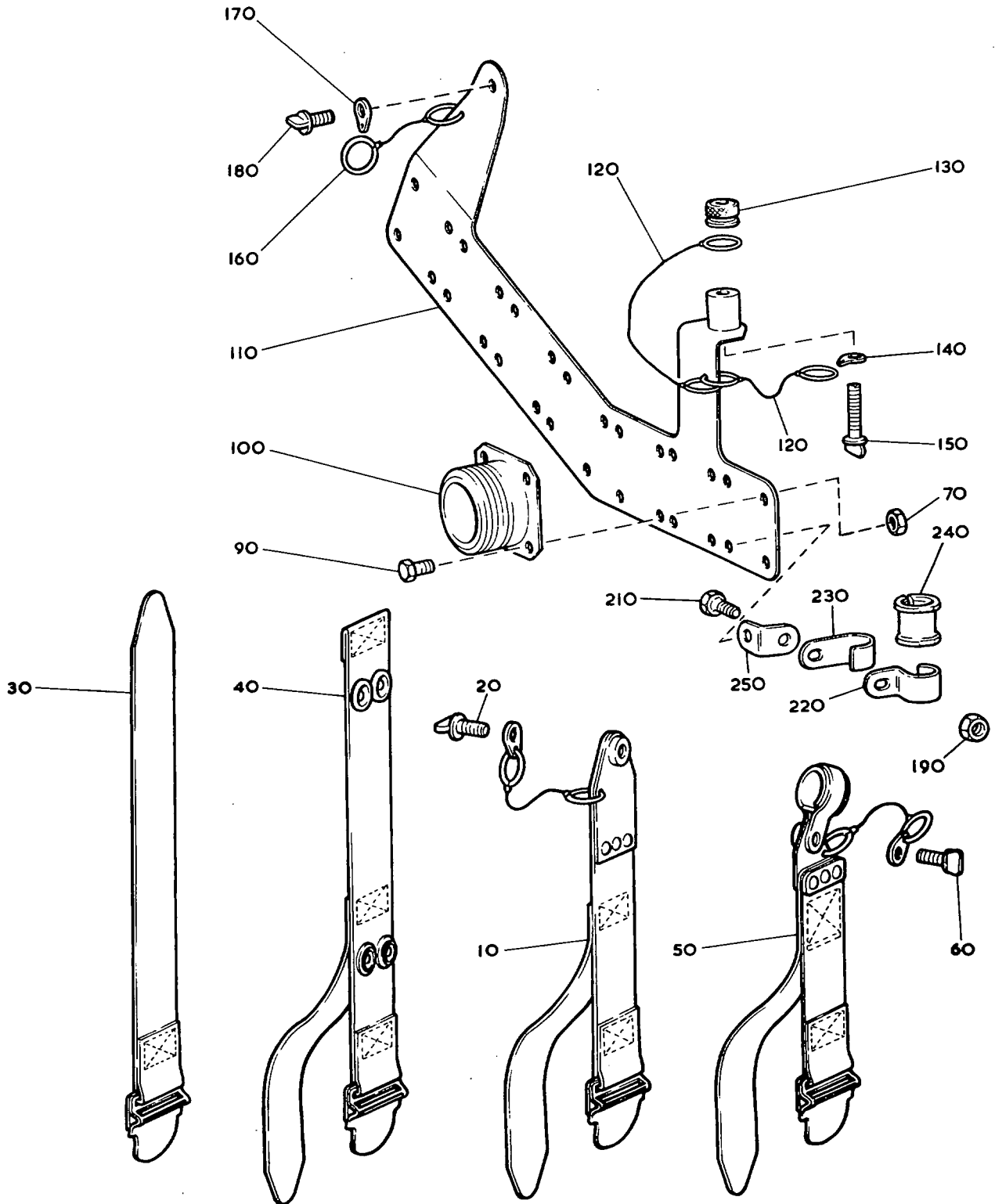
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 33014/00A



Engine Electrical Cables  
Figure 312

INSPECTION/CHECK

71-51-01

Page 321

Dec 1/75

CR 32038/00C  
BS00000088/2



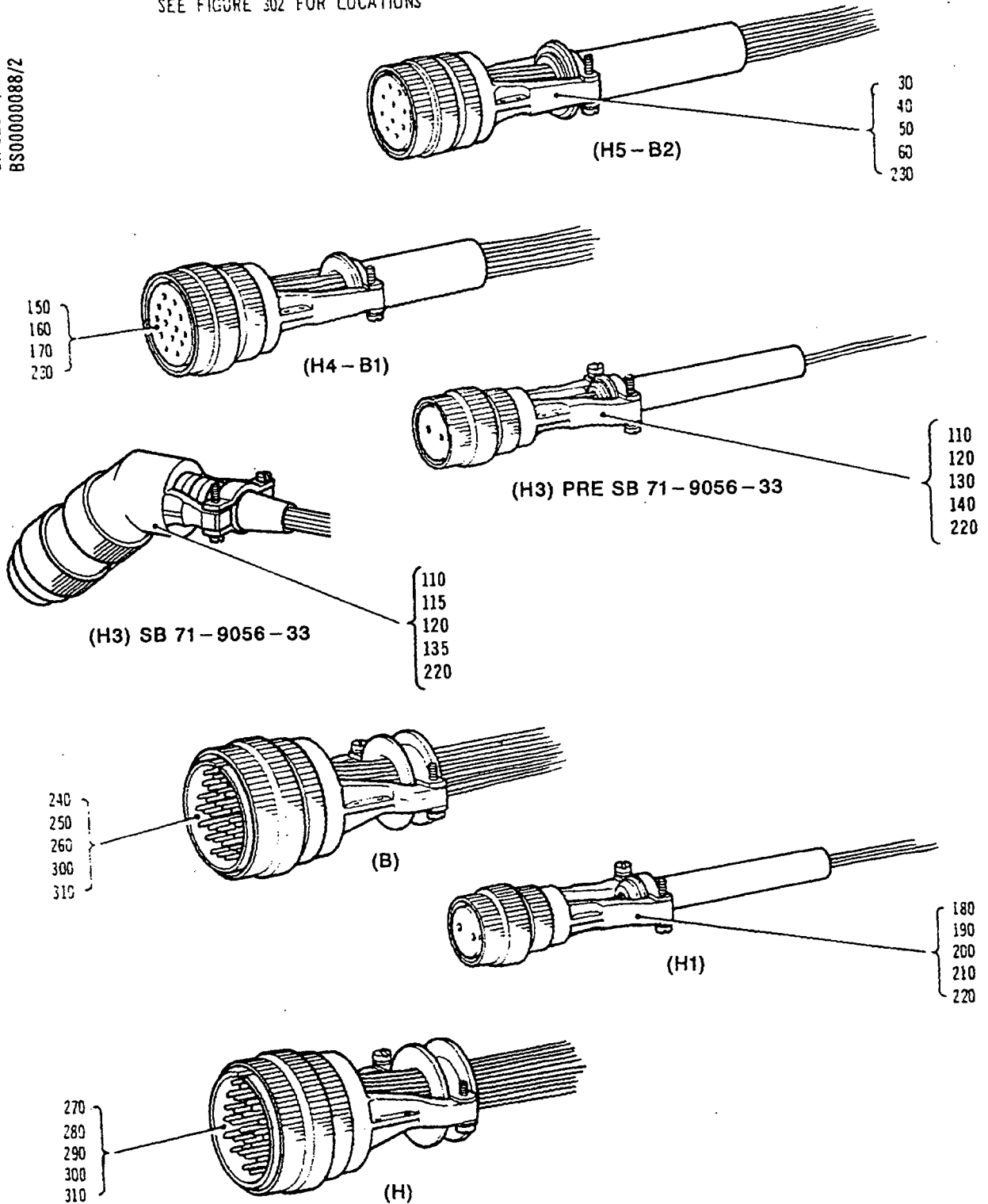
OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

SEE FIGURE 302 FOR LOCATIONS



Engine Electrical Cables  
Figure 313

INSPECTION/CHECK

71-51-01

Page 322

Jun 1/99



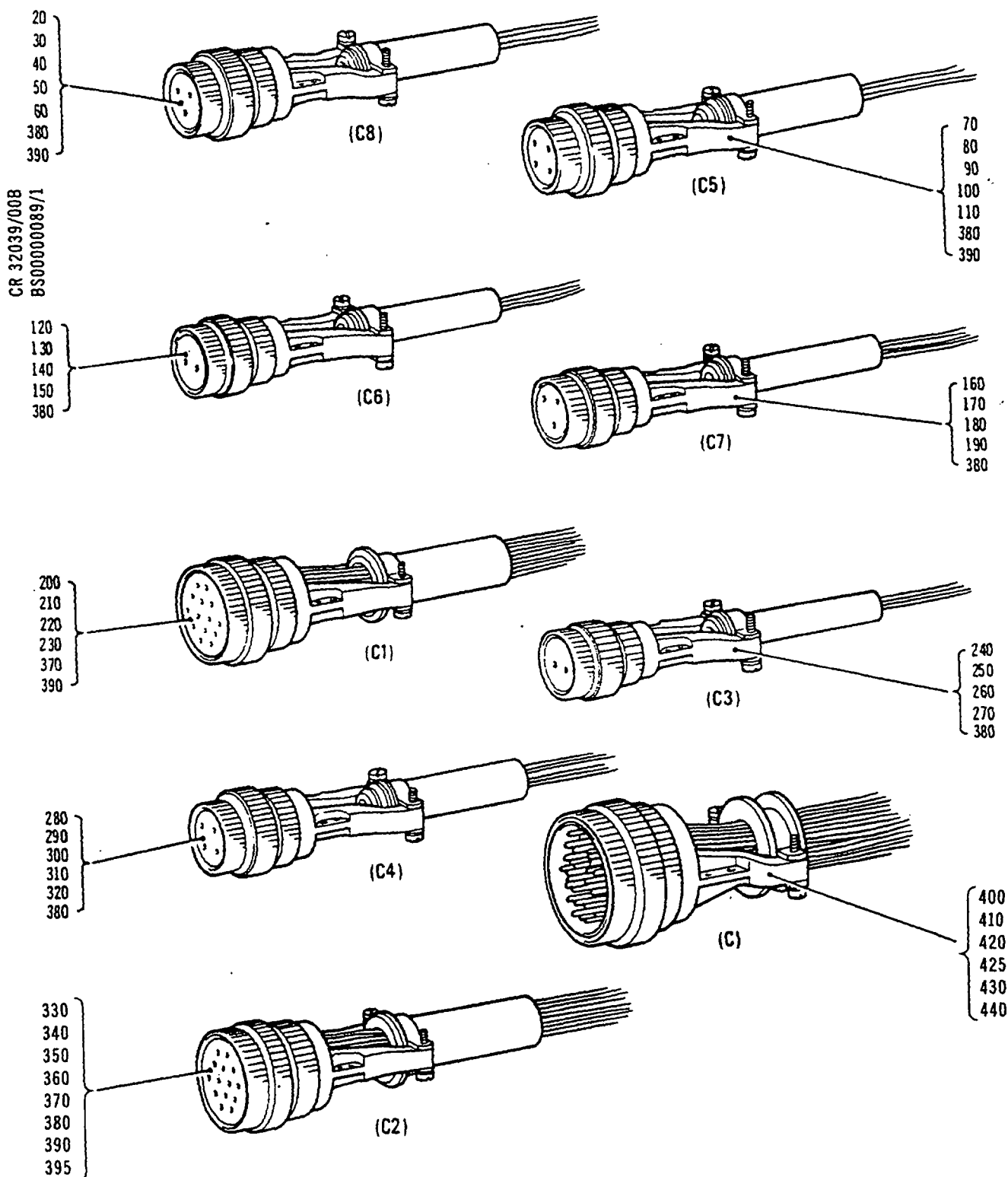
OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

SEE FIGURE 302 FOR LOCATIONS



Engine Electrical Cables  
Figure 314

INSPECTION/CHECK

71-51-01

Page 323

Jun 1/99

CR 32040/00B  
BS00000090/1



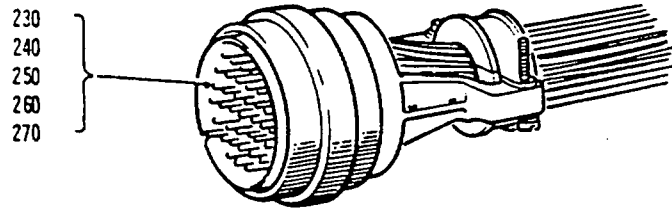
OLYMPUS 593

MK.610-14-28  
OVERHAUL

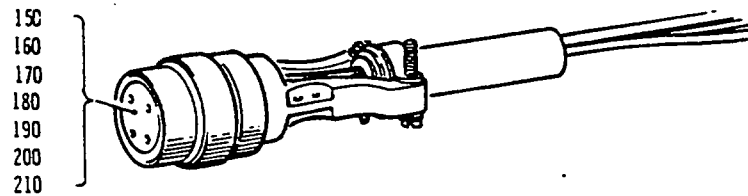


sneema

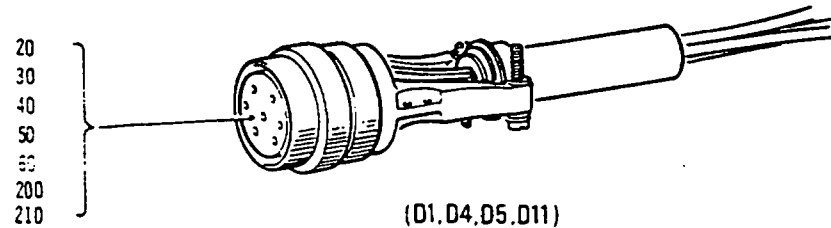
SEE FIGURE 302 FOR LOCATIONS



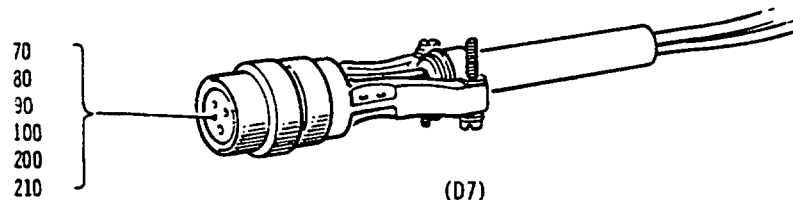
(D)



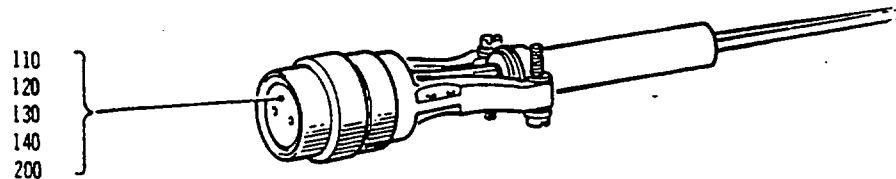
(D2)



(D1, D4, D5, D11)



(D7)



(D9, D10) (PRE SB 71-24)

Engine Electrical Cables  
Figure 315

INSPECTION/CHECK

71-51-01

Page 324

Jun 1/99

CR 32041/00C  
BS00000091/1



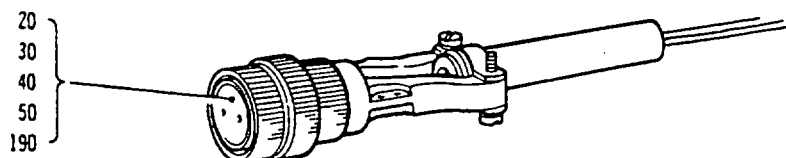
OLYMPUS 593

MK.610-14-28  
OVERHAUL

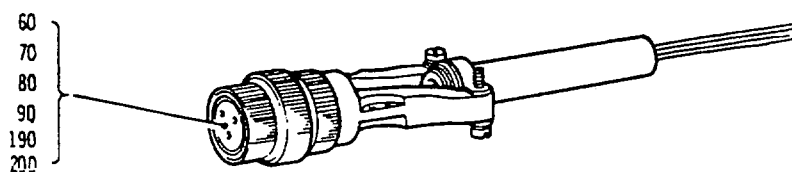


sneema

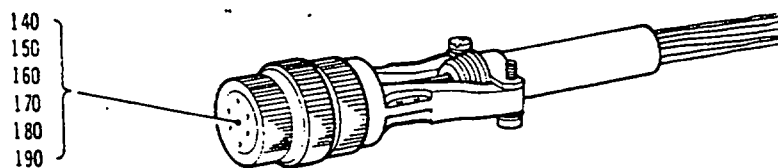
SEE FIGURE 302 FOR LOCATIONS



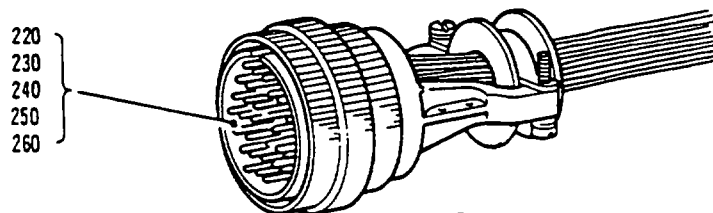
(E8)



(E5.E11)



(E1.E2.E3)



(E)

Engine Electrical Cables  
Figure 316

INSPECTION/CHECK

71-51-01

Page 325  
Jun 1/99





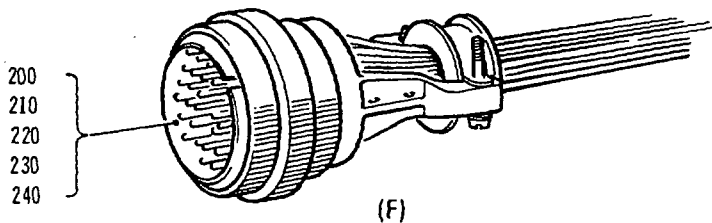
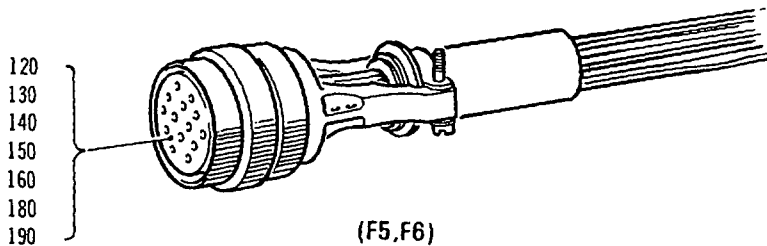
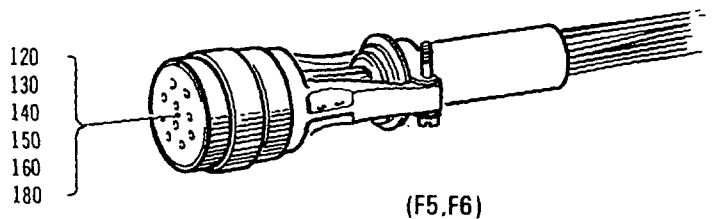
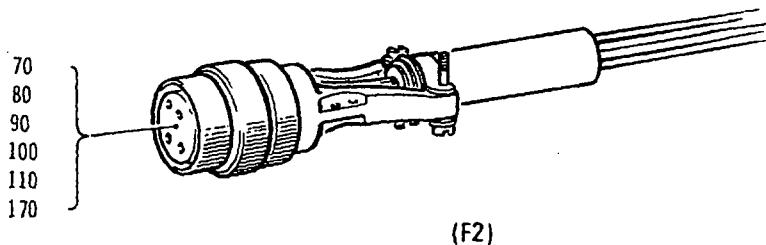
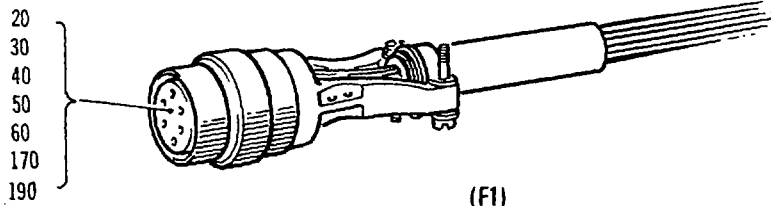
OLYMPUS 593

MK.610-14-28  
OVERHAUL



SEE FIGURE 302 FOR LOCATIONS

CR 32042/00A



Engine Electrical Cables  
Figure 317

INSPECTION/CHECK

**71-51-01**

Page 326  
Dec 1/75

CR 33359/00B  
BS00024512/1



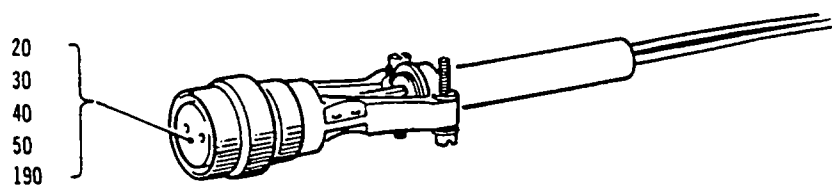
OLYMPUS 593

MK.610-14-28  
OVERHAUL

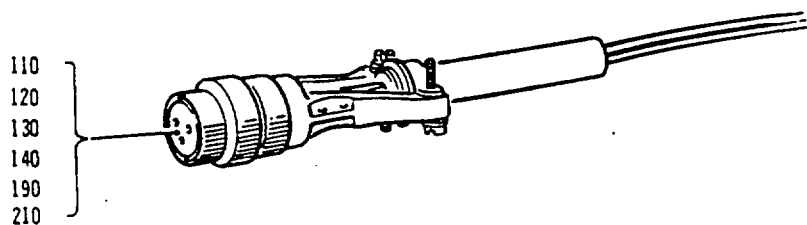


sneema

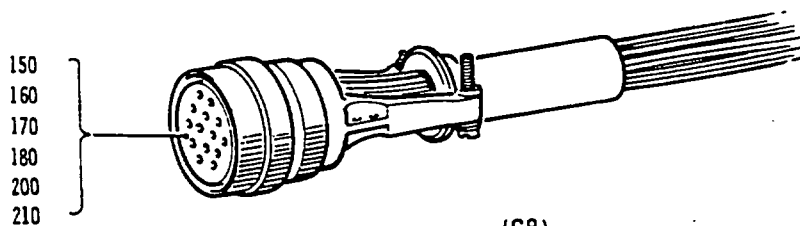
SEE FIGURE 302 FOR LOCATIONS



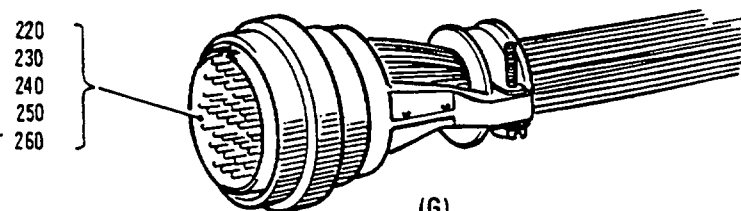
(G1,G4,G6,G9)



(G10)



(G8)



(G)

Engine Electrical Cables  
Figure 318

INSPECTION/CHECK

71-51-01

Page 327  
Jun 1/99



OLYMPUS 593

MK.610-14-28  
OVERHAUL



ENGINE ELECTRICAL CABLES - REPAIR

TABLE OF CONTENTS

Repair No.	Title	Scheme No.
1	Electrical Cables - Repair by Splicing, Shrink Sleeving and Wrapping	B.493642A-N

PRINTED IN ENGLAND

TN12464

REPAIR  
**71-51-01**  
Contents 1  
Feb 1/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



ELECTRICAL CABLES - REPAIR BY SPLICING, SHRINK  
SLEEVING, AND WRAPPING  
MODIFICATION OL.8520 (C)

1. Effectivity

<u>I.P.C.</u>	<u>Fig./Item</u>	<u>Part Description</u>
71-51-01	1 1A	Single core size 20 and size 16 cables (para.3). Single or multicore size 20 and size 16 cables screened and jacketed (para.4). Low noise cables, screened and jacketed (para.5). Single and multicore fireproof cables screened and jacketed (para.6). Single fireproof cables jacketed (para.7).

2. Introduction

A. General.

- (1) This repair facilitates simple rectification of damaged cables within the loom and avoids replacing long lengths of cable.
- (2) The repair embodies the procedures for salvaging five different types of cable, reference Para.1 Effectivity Part Description.
- (3) Several of the five types of cable included in this repair can be repaired to alternative salvages; the salvage used is determined by the location of the damage within the cable loom, and the facilities available.
- (4) Each of the methods used, are identified by a suffix letter added to the salvage number, i.e. the third method of repairing the first type of cable listed is identified thus: B.493642C.



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (5) Figures and Tables applicable to these salvages are positioned on the page following their initial reference, where two initial quotes appear on the same page they follow in their order of reference.
- (6) Materials necessary to accomplish these repairs are tabled with each repair group; a list of tool manufacturers and suppliers are contained in table form, reference para.8.
- (7) Dimensions are shown thus INCHES (MILLIMETRES).
- (8) A log book entry stating the salvage number, its suffix letter and the circuit title, shall be made after embodiment of each repair.

B. Repair Limitations.

- (1) Not more than two crimp joints shall be used in any one cable run and crimp joints must not be located at cable bends.
- (2) All cables repaired using these salvages shall be subjected to and comply with their relevant electrical circuit test (Ref.71-00-02, Testing).
- (3) During re-attachment of repaired cables, to the cable loom, all securing nuts disturbed to facilitate these repairs shall be torque loaded (Ref.71-00-02, Assembly).
- (4) Ensure that all safety precautions, warnings, applicable whilst working on Polytetrafluoroethylene (PTFE) are strictly adhered to.
- (5) An aircraft dressing item, side tray and clamp is located in the engine bay and secures the engine electrical cables prior to the main connector block. It is important that no cable repairs are carried out within 18.00 in. (427,2 mm) of the main break connectors at the aircraft/engine face. At other connections/terminations within the harness the only limitation being the accessibility of the appropriate tools.

TN2128



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

### 3. Repair Single Core Size 20 and Size 16 Cables

WARNING: HEALTH HAZARD. MATERIALS USED IN THESE REPAIRS ARE COMPOSED OF POLYTETRAFLUOROETHYLENE (PTFE). THIS MATERIAL WILL EMIT TOXIC GASES WHEN SUBJECTED TO TEMPERATURES ABOVE 340 DEG C, THE HIGHER THE TEMPERATURE THE GREATER THE EMISSION OF TOXIC GAS. ADEQUATE VENTILATION IS TO BE PROVIDED WITHIN THE WORK AREA AND CLOSE TO THE HEATING SOURCE.

#### A. Salvage B.493642A.

##### (1) Limitations.

- (a) This salvage to be confined to cables with damaged insulation not exceeding 0.600 in. (15,24 mm) in length, and where there is sufficient room in the area of damage to operate the necessary tools to effect the repair.
- (b) Ensure that the splice positions do not coincide with a clamp loop position.
- (c) The salvage is to comply with the layout in Figure 401.
- (d) Use only materials specified in Table 401.

##### (2) Procedure.

- (a) Cut the cable at the centre of the damaged area, using conventional wire cutters.
- (b) Determine the applicable 'Y' dimension by comparison of Figure 401 and Table 401.
- (c) Remove the cable insulation from the newly cut cable ends and produce the calculated 'Y' dimension, use an Ideal Stripmaster.

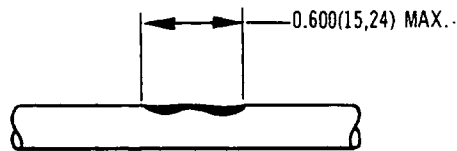


OLYMPUS 593  
MK. 610-14-28  
OVERHAUL

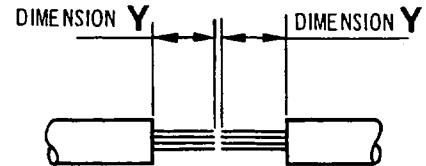


CR 34654/00A

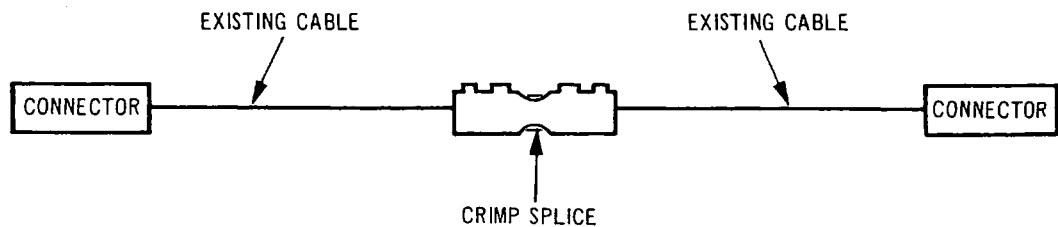
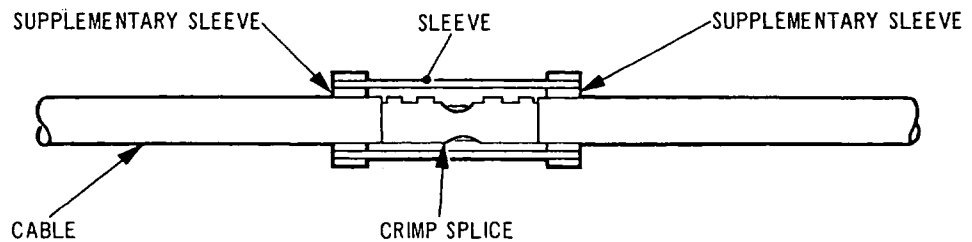
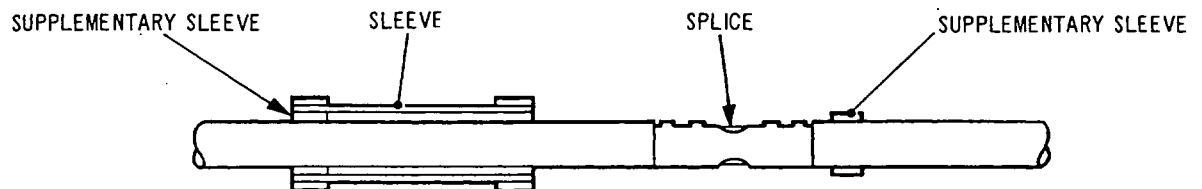
DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)



DAMAGED AREA



CUT AND STRIP CABLE



Single Core Size 20 and 16 Cables  
Layout of Scheme B.493642A  
Figure 401

REPAIR  
**71-51-01**  
Repair No.1  
Page 404  
Feb 1/78

TN2130

PRINTED IN ENGLAND

Cable Size	Splice Kit Ref.	Shrink Sleeve	Dimension Y	Crimp Tool
20/20 All O/Dia's	Raychem Kit W-096-01 Raychem Kit W-096-02 AMP 2-326745-1 AMP 322822	- - Raychem W-053-13 Raychem W-053-13	0.32 - 0.34 in. (8,0 - 8,7 mm) 0.32 - 0.34 in. (8,0 - 8,7 mm) 0.22 - 0.24 in. (5,5 - 6,0 mm) 0.22 - 0.24 in. (5,5 - 6,0 mm)	Raychem AD 1377 Raychem AD 1377 AMP 46467 AMP 46447
20/20 O/D 0.046- 0.063	AMP Kit 329645	-	0.22 - 0.24 in. (5,5 - 6,0 mm)	AMP 46467
20/20 O/D 0.080- 0.100	AMP Kit 329644 AMP Kit 150771	- -	0.22 - 0.24 in. (5,5 - 6,0 mm) 0.22 - 0.24 in. (5,5 - 6,0 mm)	AMP 46467 AMP 46467
20/16	Raychem Kit W-096-02 AMP 322822	- Raychem W-053-13	0.32 - 0.34 in. (8,0 - 8,7 mm) 0.22 - 0.24 in. (5,5 - 6,0 mm)	Raychem AD 1377 AMP 46447
16/16	Raychem Kit W-096-02 AMP 322822	- Raychem W-053-13	0.32 - 0.34 in. (8,0 - 8,7 mm) 0.22 - 0.24 in. (5,5 - 6,0 mm)	Raychem AD 1377 AMP 46447



OLYMPUS 593

MK.610-14-28

OVERHAUL



Repair Materials Specification B.493642A.B.C.D.  
Table 401





OLYMPUS 593

MK.610-14-28

OVERHAUL



- (d) Inspect the stripped ends of the cable to ensure that the core strands are free from damage, that the insulation is cleanly severed and ascertain that the required 'Y' dimension length has been obtained.
- (e) Select, from the splice kit (Table 401), the correct sleeve and supplementary sleeves, then slide them over the cable and position them each side of the repair.
- (f) Select the appropriate single post insulated butt splice (part of splice kit), then insert the conductor cable ends in the butt splice.
- (g) With the conductors abutting at the central indentation of the insulated butt splice, crimp the splice to the conductor cable using the correct crimping tool selected from Table 401.
- (h) Slide the sleeves over the repair area as shown in Figure 401 and crimp through the supplementary sleeves to the cable.
- (j) Visually inspect the crimped areas, then secure the cable to its original cable run or loom with the previously used securing clips and lacing.
- (k) Subject the repaired cable length to electrical checks (Ref.71-00-02, Testing).

B. Salvage B.493642B.

NOTE: This is an alternative to salvage B.493642A and introduces a shrink sleeve in place of a crimped sleeve, to restore the cable insulation.

(1) Limitations.

- (a) This salvage to be confined to cables with damaged insulation not exceeding 0.600 in. (15,24 mm) in length and where there is sufficient room in the area of damage to operate the necessary tools to effect the repair.

TN2417



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Ensure that the splice positions do not coincide with a clamp loop position.
  - (c) The salvage is to comply with the layout in Figure 402.
  - (d) Use only materials specified in Table 401.
- (2) Procedure.
- (a) Cut, strip and inspect the cable as detailed in para.3.A.(2)(a) to (d) but refer to Figure 402.
  - (b) Select, from the splice kit (Table 401), the correct size shrink sleeve and position it over one end of the cable at a neutral position, near to the repair area.
  - (c) Select the appropriate single post insulated butt splice from the splice kit (Table 401), then insert the conductor cable ends in the butt splice.
  - (d) With the conductors abutting at the central indentation of the insulated butt splice, crimp the splice over the conductor cable using the correct crimping tool selected from Table 401.
  - (e) Position the shrink sleeve centrally over the repair area and the core splice as shown in Figure 402, then apply the heat shrink procedure to the PTFE sleeve. For heat shrinking instructions of PTFE sleeves refer to para.8.B.
  - (f) Visually inspect the repaired areas, then secure the cable to its original cable run or loom with the previously used securing clips and lacing.
  - (g) Subject the repaired cable length to electrical checks (Ref.71-00-02, Testing).

CR 34655/00A

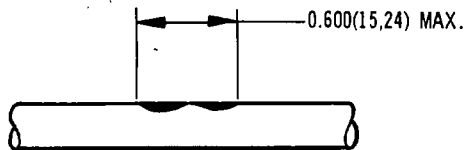


OLYMPUS 593

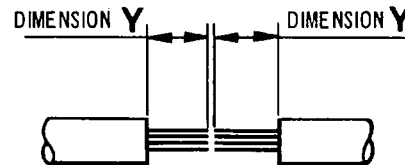
MK.610-14-28  
OVERHAUL



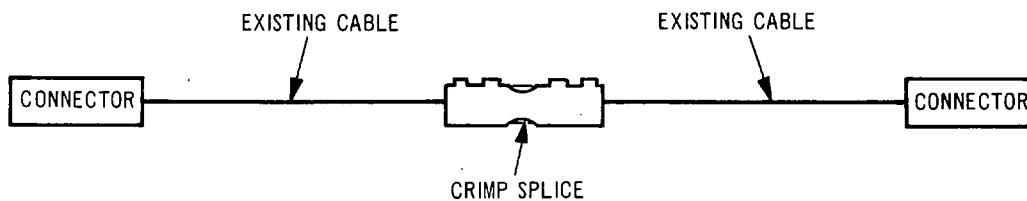
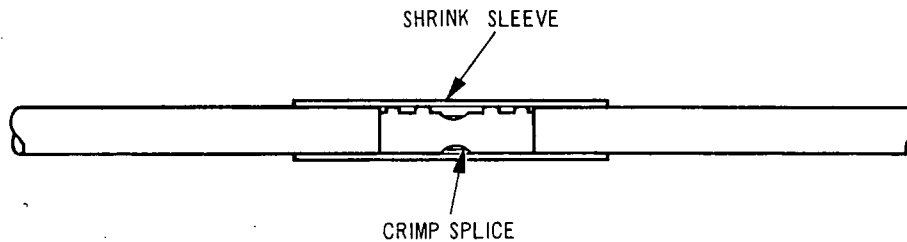
DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES ( MILLIMETRES )



DAMAGED AREA



CUT AND STRIP CABLE



Single Core Size 20 and 16 Cables  
Layout of Scheme B.493642B  
Figure 402

TN2536

REPAIR  
**71-51-01**  
Repair No.1  
Page 408  
Feb 1/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



C. Salvage B.493642C.

NOTE: This salvage is complementary to schemes B.493642A and B and is implemented when damage to the insulation is reasonably close to a replaceable cable termination, reference Figure 403. The limitation reference para. 2.B.(5) must be adhered to when the cable termination is at one of the main break connectors.

(1) Limitations.

- (a) Ensure that the position of the splice location does not coincide with a clamp loop position.

(2) Procedure.

- (a) Withdraw the cable end from the termination point (Ref.71-00-02).
- (b) Cut the cable at a position beyond the damaged portion, then prepare the cable for fitment of a single post insulated butt splice as described for salvages B.493642A. or B.
- (c) Select a new length of cable and attach the appropriate termination point connector (Ref.71-00-02).
- (d) Complete the splice connection at the new splice point in accordance with scheme B.493642A. or B.
- (e) Visually inspect the repaired area, then re-install the cable in the harness and secure with the lacing and clipping used prior to this repair.
- (f) Subject the repaired cable length to electrical checks (ref.71-00-02, Testing).

PRINTED IN ENGLAND

TN2580

REPAIR

71-51-01

Repair No.1

Page 409

Feb 1/78

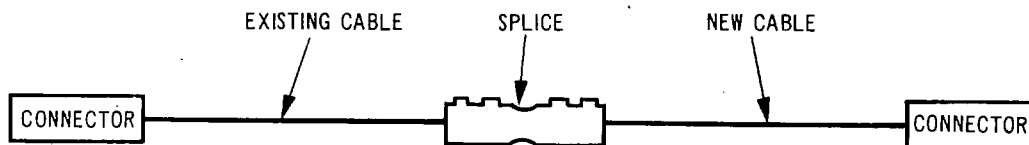
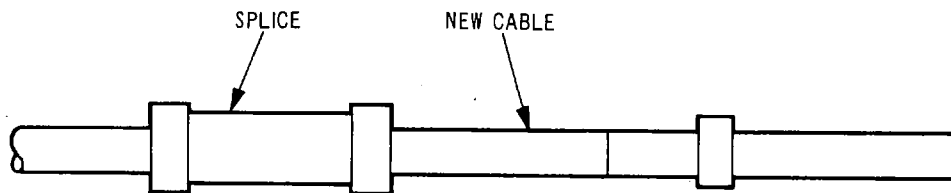
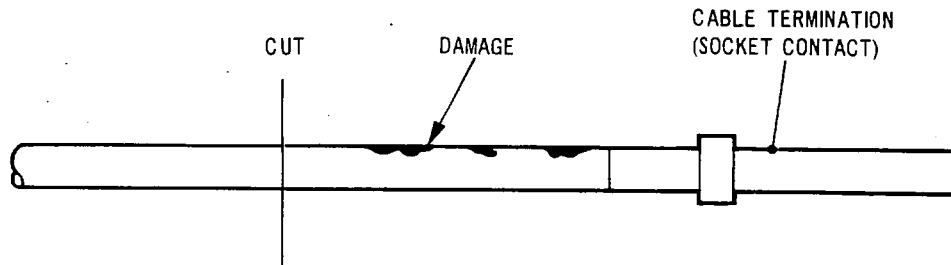


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 34656/00A



TN2442

Single Core Size 20 and 16 Cables  
Layout of Scheme B.493642C  
Figure 403

REPAIR  
**71-51-01**  
Repair No.1  
Page 410  
Feb 1/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



D. Salvage B.493642D.

NOTE: This salvage is complementary to salvages B.493642A. and B and is implemented where the damaged area is located in the middle of a cable run, or isolated from a convenient termination point reference Figure 404.

(1) Limitations.

- (a) Ensure that the position of the splice locations do not coincide with clamp loop positions.
- (b) Where more than one cable has been damaged splices must be staggered.
- (c) No more than two splice connectors are to be used in any one length of cable.

(2) Procedure.

- (a) Cut out the damaged section of the cable at a convenient point either side of the damaged area, and where the tools necessary to effect the repair can be operated.
- (b) Splice in a new section of suitable length cable, using two single post insulated butt splices and crimp or shrink sleeve the outer insulation as described for salvages B.493642A. or B.
- (c) Visually inspect the repaired area, then secure the cable run to the cable loom, attach the cable using all the relevant lacing and clamp loops; ensure that the new splice is laced into the cable loom.
- (d) Subject the repaired cable length to electrical checks (ref.71-00-02, Testing).

PRINTED IN ENGLAND

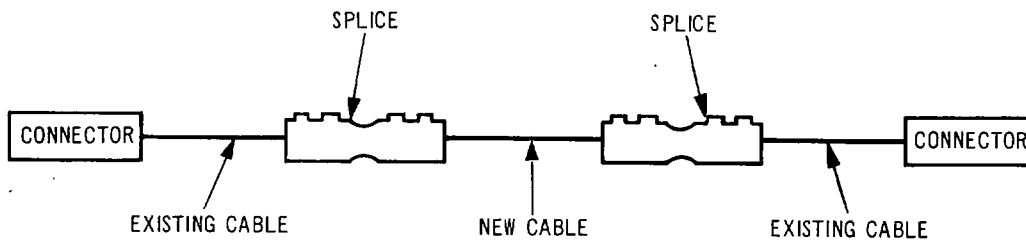
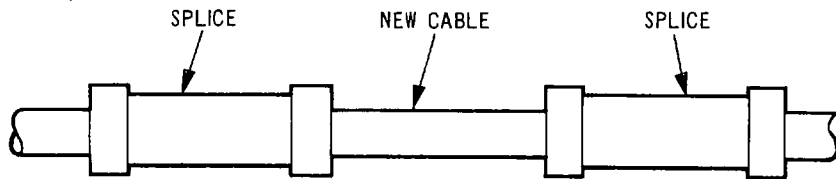
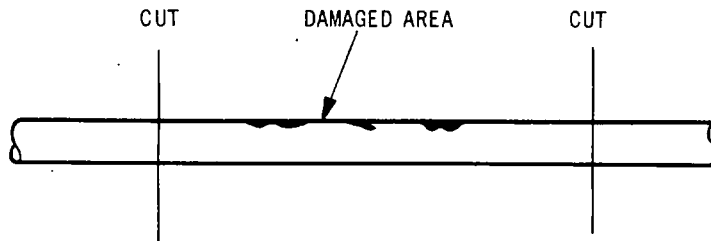
TN2514



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 34657/00A



TN31388

Single Core Size 20 and 16 Cables  
Layout of Scheme B.493642D  
Figure 404



OLYMPUS 593

MK.610-14-28  
OVERHAUL



4. Repair Single or Multicore Size 20 and Size 16 Cables Screened and Jacketed

WARNING: HEALTH HAZARD. MATERIALS USED IN THESE REPAIRS ARE COMPOSED OF POLYTETRAFLUOROETHYLENE (PTFE). THIS MATERIAL WILL EMIT TOXIC GASES WHEN SUBJECTED TO TEMPERATURES ABOVE 340 DEG C, THE HIGHER THE TEMPERATURE THE GREATER THE EMISSION OF TOXIC GAS. ADEQUATE VENTILATION IS TO BE PROVIDED WITHIN THE WORK AREA AND CLOSE TO THE HEATING SOURCE.

A. Salvage B.493642E.

NOTE: This salvage is to be implemented where the damage is confined to the cable outer jacket, and is achieved by wrapping the damaged area with a suitable PTFE tape, reference Figure 405.

(1) Limitations.

- (a) Ensure that the damage is confined to the outer jacket.

(2) Procedure.

- (a) Obtain a single length of PTFE sealing tape (ref. Table 402) of sufficient length to carry out operations (b) and (c).
- (b) Commencing at a point approximately 1.50 in. (38,10 mm) from the damaged area, wrap the tape around the cable using a 50 per cent overlap of the PTFE tape to a point approximately 1.50 in. (38,10 mm) beyond the damaged area.
- (c) Without a break in the tape, wrap in the reverse direction, maintaining the 50 per cent overlap, to completely cover the first wrap and finish neatly at the starting point.
- (d) Secure the end of the PTFE sealing tape using lacing braid (ref. Table 402) with clove hitch and reef knot. Seal the knot with Silicone varnish.

PRINTED IN ENGLAND

TN3978





OLYMPUS 593

MK.610-14-28

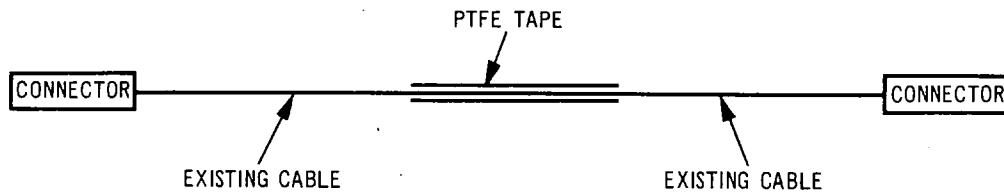
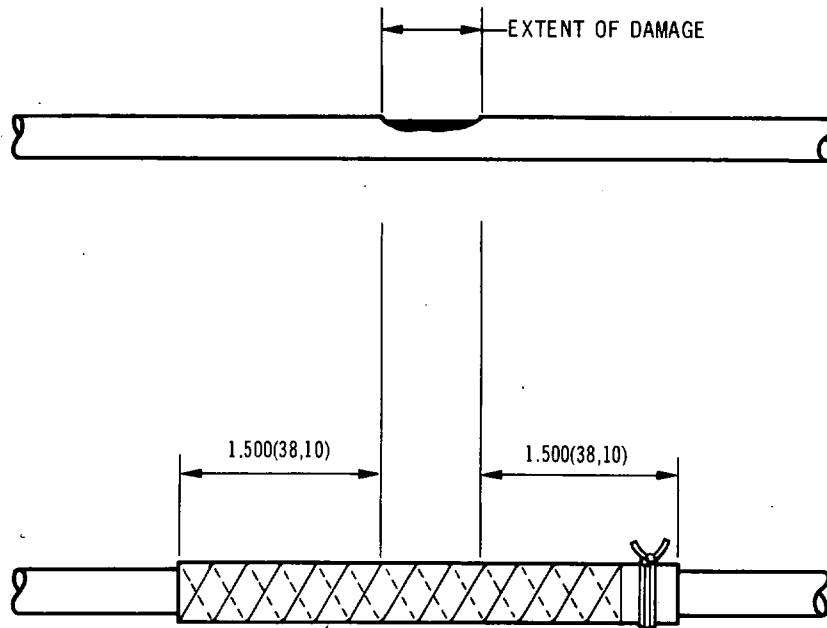
OVERHAUL



DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)

CR 34658/00A

DAMAGE CONFINED TO OUTER JACKET ONLY



Single Core Size 20 and 16 Cables  
Layout of Scheme B.493642E  
Figure 405

REPAIR  
**71-51-01**

Repair No.1  
Page 414  
Feb 1/78

TN2515

Cable Size	Splice Kit Ref.	Shrink Sleeve	Dimension Y	Crimp Tool
20	Raychem Kit W-096-01	-	0.32 - 0.34 in. (8,0 - 8,7 mm)	Raychem AD 1377
	Raychem Kit W-096-02	-	0.32 - 0.34 in. (8,0 - 8,7 mm)	Raychem AD 1377
	AMP 2-326745-1	Raychem W-053-13	0.22 - 0.24 in. (5,5 - 6,0 mm)	AMP 46467
	AMP 322822	Raychem W-053-13	0.22 - 0.24 in. (5,5 - 6,0 mm)	AMP 46447
16	Raychem Kit W-096-02	-	0.32 - 0.34 in. (8,0 - 8,7 mm)	Raychem AD 1377
	AMP 322822	Raychem W-053-13	0.22 - 0.24 in. (5,5 - 6,0 mm)	AMP 46447



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



#### FOR REPAIRING CABLE SCREEN AND JACKETS

SCREEN BRAID STRIP AND USE BRAID FROM NEW CABLE OF SAME TYPE.  
SHRINK SLEEVE RAYCHEM TFE SIZE 6 FOR CABLE UP TO 0.150 IN. (3,810 MM) O/DIA.  
RAYCHEM TFE SIZE 2 FOR CABLE 0.150 IN. - 0.250 IN. (6,350 MM) O/DIA.  
SOLDER SLEEVE RAYCHEM W-021-00 FOR CABLE UP TO 0.150 IN. (3,810 MM) O/DIA.  
GLASS CLOTH TAPE RAYCHEM W-021-02 FOR CABLE 0.150 IN. - 0.250 IN. (6,350 MM) O/DIA.  
PTFE SEALING TAPE SCOTCH - TYPE 69 OR CXLP 1.000 IN. (25,0 MM) WIDE.  
LACING BRAID B.427935  
SEALANT TYGADURE T085  
SILICONE VARNISH MS 996.

Repair Material Specification Schemes B.493642E.F.G.H. and J  
Table 402



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (e) Visually inspect the repaired area, then secure the cable into the cable loom and cable run using the relevant lacing and clamp loops.
- (f) Subject the repaired length to electrical checks (ref.71-00-02, Testing).

B. Salvage B.493642F.

NOTE: This salvage is to be implemented where both the outer jacket and screen is damaged, provided that the screen function is not seriously impaired, and not more than 50 per cent of the braid strands are broken (ref. Figure 406).

(1) Limitations.

- (a) Ensure that the damage is limited to the outer jacket and screen braiding only.

(2) Procedure.

- (a) Comb out and re-lay the damaged screen braid, to cover the maximum area of the exposed cable; curl the braid strand ends outwards to avoid penetration of the core insulation.
- (b) Starting at a point approximately 0.500 in. (12,70 mm) from one end of the damaged area and using glass cloth tape (ref.Table 402), wrap the cable to a point approximately 0.500 in. (12,70 mm) beyond the other end of the damaged area. Maintain a 50 per cent overlap of the tape width during the wrapping.
- (c) Commencing at a point approximately 1.00 in. (25,00 mm) from the edge of the glass cloth tape and using PTFE tape (ref.Table 402), wrap the cable and the glass cloth tape; maintain a 50 per cent overlap to a point approximately 1.00 in. (25,00 mm) beyond the far edge of the glass cloth tape. Without a break in the tape, wrap in the reverse direction maintaining the 50 per cent overlap and finish neatly at the starting point.

TN48294

REPAIR  
**71-51-01**

Repair No.1  
Page 416  
Feb 1/78



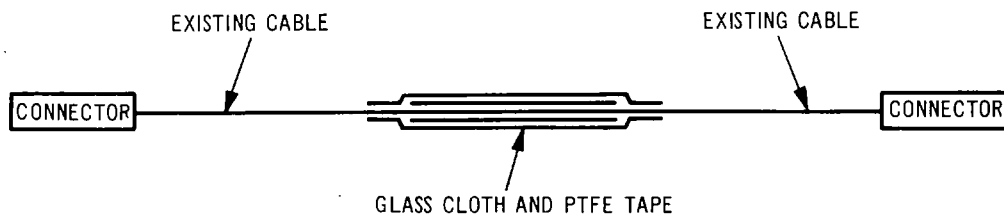
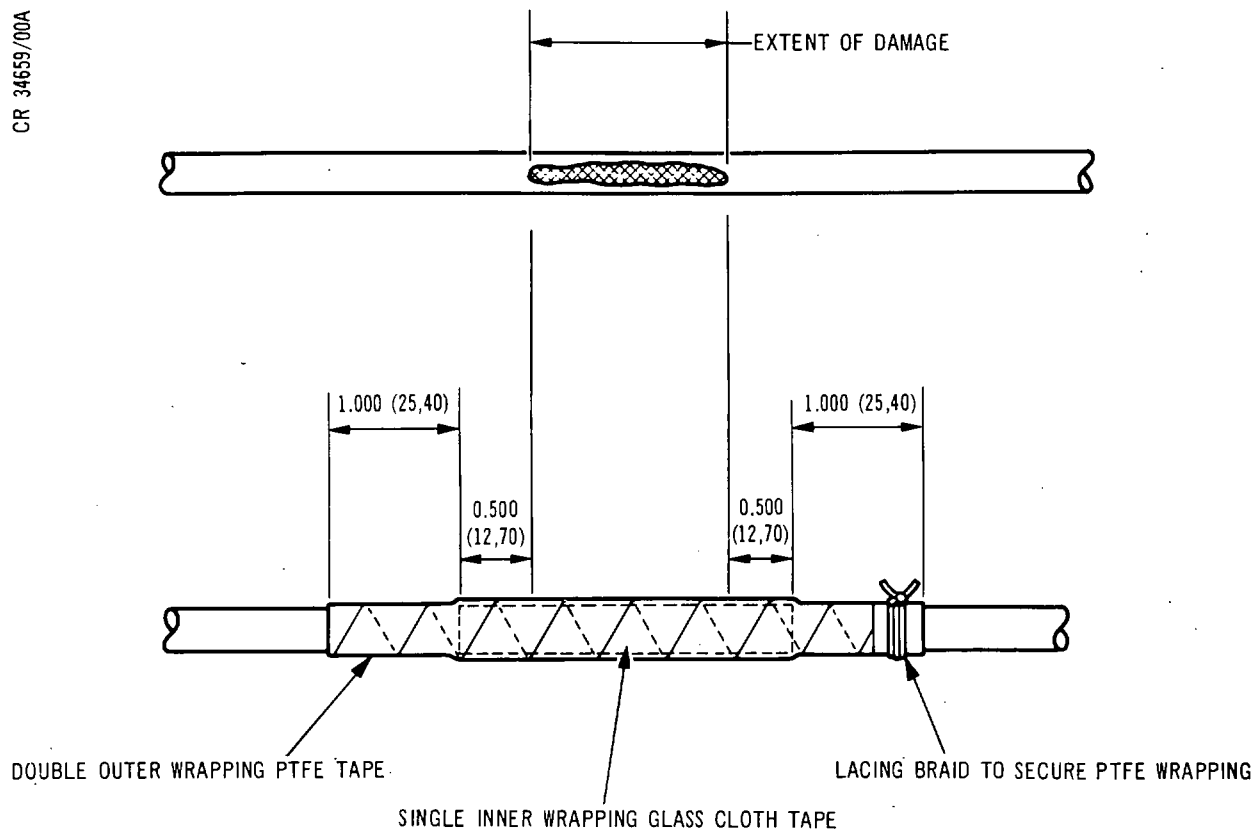
OLYMPUS 593

MK. 610-14-28  
OVERHAUL



DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)

CR 34659/00A



Single or Multicore Size 20 and 16 Cables  
Screened and Jacketed Layout of Scheme B.493642F  
Figure 406

REPAIR  
**71-51-01**  
Repair No.1  
Page 417  
Feb 1/78

PRINTED IN ENGLAND

TN48293



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (d) Secure the end of the PTFE tape using lacing braid (ref. Table 402) with clove hitch and a reef knot, seal the knot with Silicone varnish.
- (e) Visually inspect the repaired area, then secure cable into the cable loom and cable run using the relevant lacing and clamp loops.
- (f) Subject the repaired cable length to electrical checks (ref. 71-00-02, Testing).

C. Salvage B.493642G.

NOTE: This salvage is to be implemented to screened and jacketed cables where damage to the core insulation does not exceed 0.600 in. (15,24 mm) in length in any one cable core, and where there is sufficient room in the area of damage to operate the necessary tools to effect the repair.

(1) Limitations.

- (a) Multicore cable splices are to be staggered by twice the splice length.
- (b) Not more than two splices to be installed in any one cable core.
- (c) Ensure that the repair area does not coincide with a clamp loop position.

(2) Procedure.

- (a) Cut away sufficient outer jacket insulation to expose 3.50 in. (87,5 mm) of the screen braid, then remove 3.00 in. (75 mm) of the screen braid; leaving approximately 0.25 in. (6,25 mm) of braid protruding from each end of the insulation at the extremes of the repair area; refer to Figure 407 for repair detail and dimensions.
- (b) Cut through the cable cores at their appropriate staggered positions.

TN48296



OLYMPUS 593

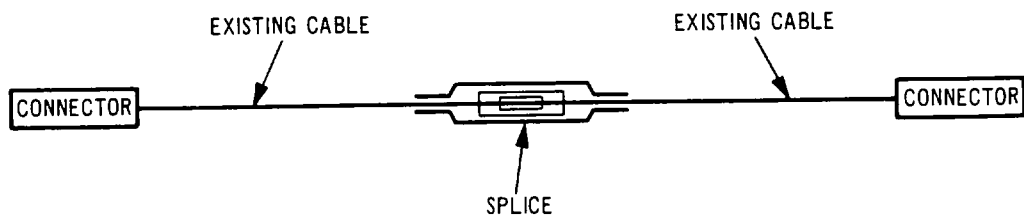
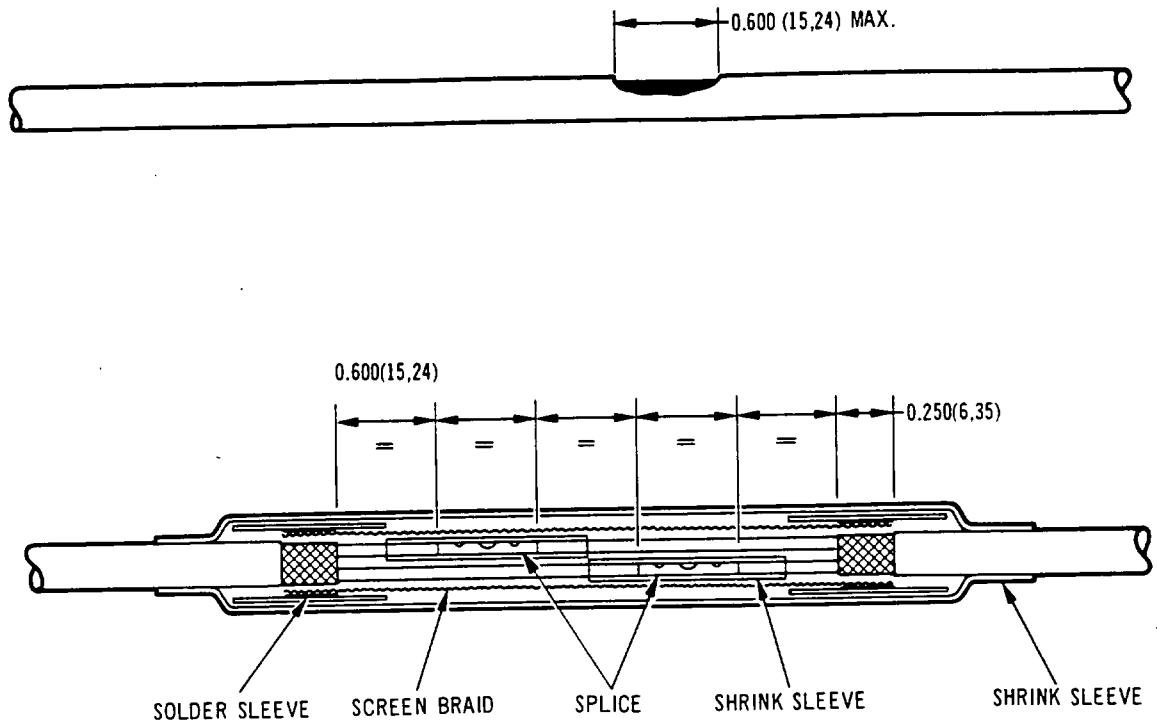
MK. 610-14-28

OVERHAUL



DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)

CR 34660/00A



Single or Multicore Size 20 and 16 Cables  
Screened and Jacketed Layout of Scheme B.493642G  
Figure 407

REPAIR

71-51-01

Repair No.1

Page 419

Feb 1/78



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (c) Locate a length of correct size shrink sleeve over the cable followed by two correct size solder sleeves and a suitable length of axially compressed screen braid (ref. Table 402); position the parts at a convenient neutral point away from the cable repair area.
- (d) Taking each cable end in turn and using the Ideal Stripmaster, strip the cable ends to expose sufficient of the conductor to accommodate the butt splices.
- (e) Locate on the cores, at the longest exposed sections, the correct size shrink sleeves.
- (f) Select the appropriate butt splice and crimp tool from Table 402, then insert conductor ends in the butt splice.
- (g) With the conductors abutting at the central indentation of the splices, crimp the splices over the conductors using the correct crimp tool.
- (h) Position the shrink sleeves centrally over the splice connectors and shrink into position; refer to para.8.A. for the heat shrink techniques.
- (j) Position the length of screen braid centrally over the repair area; ensure that the 0.25 in. (6,35 mm) overlap at the braid ends is maintained and that the bare ends of the braid are turned outwards, avoiding penetration of the core insulation.
- (k) Locate the solder sleeves over the 0.25 in. (6,35 mm) cable braiding, at both ends of the repair area, reference Figure 407, then trim off any excess braid, and finally solder into position; refer to para.8.B. for soldering details.

REPAIR

71-51-01

Repair No.1

Page 420

Jun 1/98



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (l) When both ends of the braided cable has been soldered satisfactorily, position the shrink sleeve over the repair and shrink into position; refer to para.8.A. for the heat shrink techniques.
- (m) Visually inspect the repaired area, then secure the cable to its original cable run or bunch with the previously used securing clips and lacing. Ensure that the spliced area does not coincide with a clamp loop position.
- (n) Subject the repaired cable length to electrical checks (Ref.71-00-02, Testing).

#### D. Salvage B.493642G (Alternative).

NOTE : This salvage is implemented as an alternative salvage to that quoted in sub-para.C. This salvage permits the operator to use a PTFE tape wrapping in place of shrink sleeve at the cable outer insulation. Observe the Note and limitations at the commencement of sub-para.C.

#### (l) Procedure.

- (a) Carry out operations (a), (b) and (d) detailed in sub-para.C, but with reference to Figure 408.
- (b) Locate on the cable two correct size solder sleeves and a suitable length of axially compressed screen braid; position the parts at a convenient neutral point away from the cable repair area.
- (c) Carry out operations (e), (f), (g), (h), (j) and (k) detailed in sub-para.C.
- (d) Commencing approximately 1 in. (25,4 mm) from one end of the repair area, and using PTFE tape (ref. Table 402), wrap the cable and repair area and continue for approximately 1 in. (25,4 mm) beyond the repair area. Maintain a 50 per cent overlap of the tape during the wrapping. Without a break in the tape, wrap in the reverse direction maintaining the 50 per cent tape overlap, and finish neatly at the starting point.

REPAIR

71-51-01

Repair No.1

Page 421

Jun 1/98



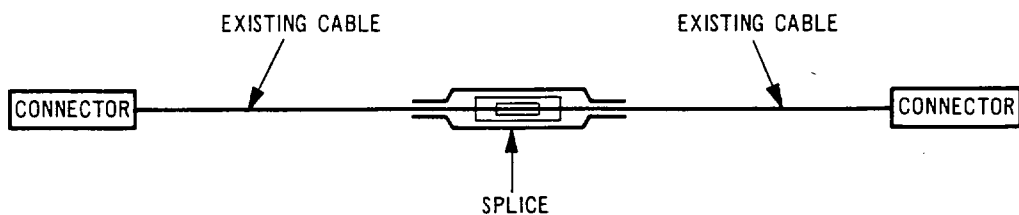
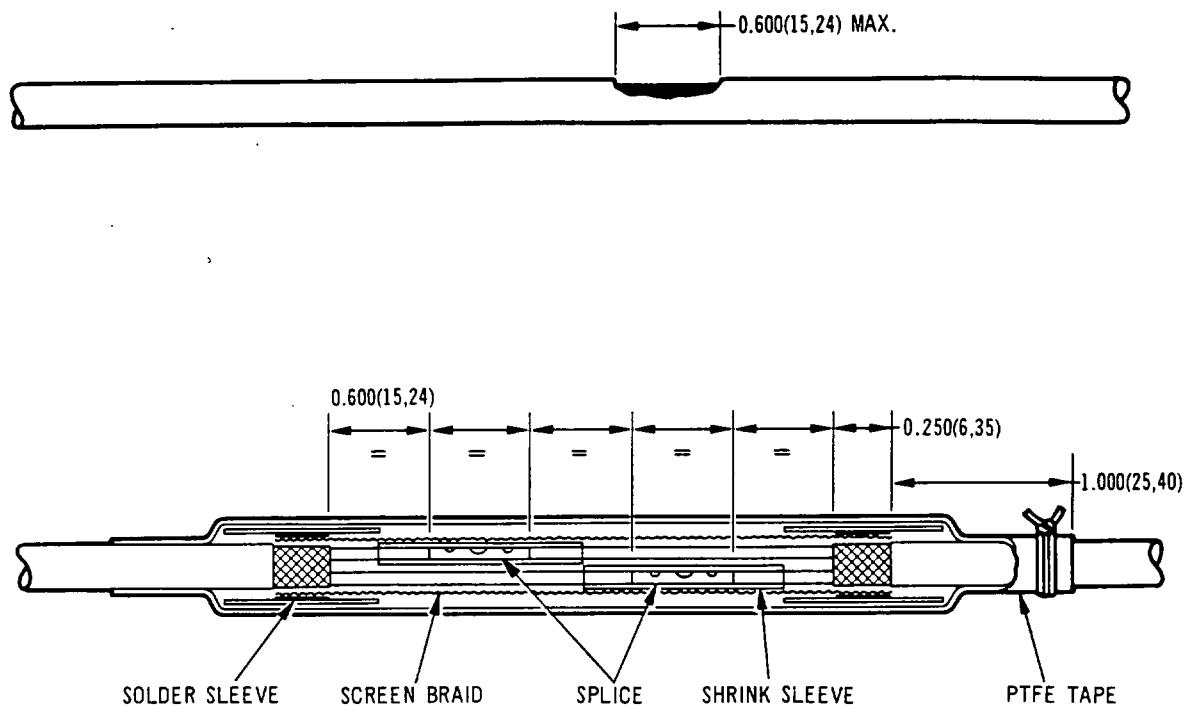


OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)

CR 34661/00A



Single or Multicore Size 20 and 16 Cables Screened and Jacketed  
Layout of Scheme B.493642G Alternative  
Figure 408

REPAIR  
**71-51-01**  
Repair No.1  
Page 422  
Feb 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (e) Secure the end of the PTFE tape using lacing braid (ref. Table 402) with clove hitch and reef knots; seal the knot with Silicone varnish.
- (f) Visually inspect the repaired area, then secure the cable to its original cable run or loom with the previously used securing clips and lacing.
- (g) Subject the repaired cable length to electrical checks (Ref.71-00-02, Testing).

E. Salvage B.493642H.

NOTE: This salvage is to be implemented on screened and jacketed cables where extensive damage has been sustained close to a replaceable termination, and where there is sufficient room in the area of damage to operate the necessary tools to effect the repair; refer to Figure 409 for repair layout and Table 402 for suitable materials.

(1) Limitations.

- (a) Not more than two splices to be installed in any one cable core.
- (b) Multicore cable splices are to be staggered by twice the splice length.
- (c) Ensure that the intended splice location at the end of the in situ cable does not coincide with a clamp loop position.

(2) Procedure.

- (a) Withdraw the cable end from the termination point (Ref.71-00-02).
- (b) Cut the cable at the furthestmost side of the damaged area from the termination point, so that the damaged section is removed with the length of cable previously disconnected from the termination point; use conventional electrical wire cutters.

PRINTED IN ENGLAND

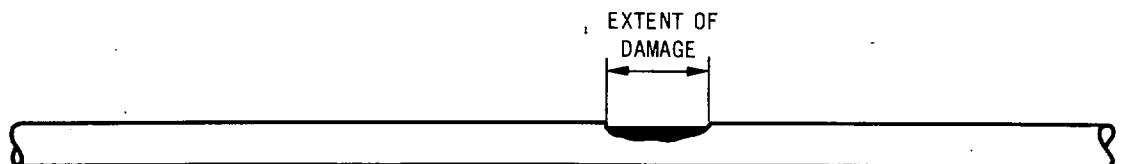
TN48525



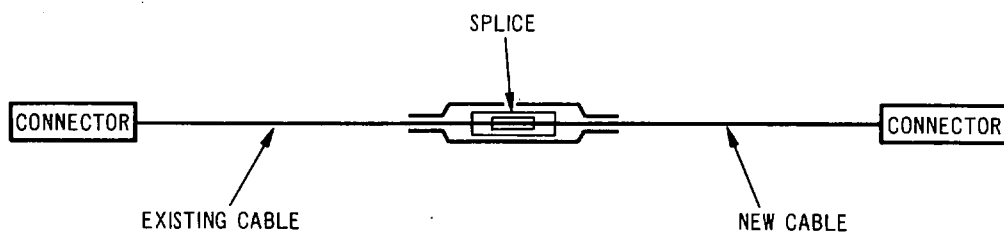
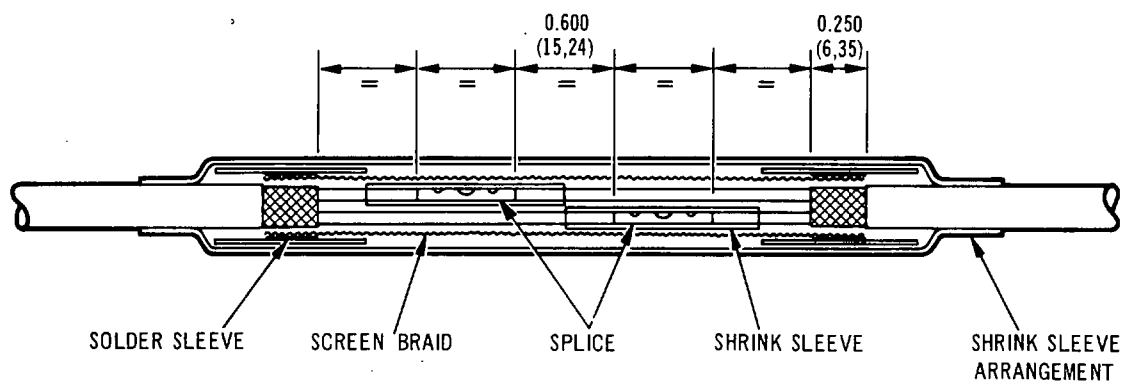
OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)



CR 34662/00A



Single or Multicore Size 20 and 16 Cables  
Screened and Jacketed Layout of Scheme B.493642H  
Figure 409

REPAIR  
**71-51-01**  
Repair No.1  
Page 424  
Feb 1/78

TN48512



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (c) Cut away sufficient outer jacket insulation and screen braid from the end of the in situ length of cable; this is to accommodate the stripping of the conductor core(s) and the staggered length of cable for the butt splice(s) in a subsequent operation. Leave approximately 0.25 in. (6,35 mm) of screen braid protruding from beneath the outer jacket insulation.
- (d) Select a new length of replacement cable, prepare one end to accommodate the fittings required for attachment to the termination point, i.e. pins, socket contacts, etc. then attach the prepared end to the termination point (Ref.71-00-02).
- (e) Prepare the conductor core insulation and cable cores for attachment of the butt splice connectors; use the Ideal Stripmaster.

NOTE : Ensure when cutting multicore cable core(s), that allowance has been made for the staggered positions of the butt splice(s), then cut the cable core conductors to accommodate the butt splice(s).

- (f) Locate on the cable the correct size shrink sleeve, two correct size solder sleeves and a suitable length of axially compressed screen braid; position the parts at a convenient neutral point away from the cable repair area.

NOTE : The shrink sleeve is only to be used if alternative PTFE wrap (sub-para.F) is not used.

- (g) Locate on the core(s) the correct size core shrink sleeve(s).

REPAIR

71-51-01

Repair No.1

Page 425

Jun 1/98



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (h) Select the appropriate butt splice(s) and crimp tool, then insert conductor ends in the butt splice(s).
- (j) With the conductors abutting at the central indentations of the butt splice(s), crimp the splice(s) to the cable conductors using the correct crimp tool.
- (k) Carry out operations (h) to (l) as detailed in sub-para.C.
- (l) Visually inspect the repaired area, then secure the cable to its original cable run or loom with the previously used securing clips and lacing.
- (m) Subject the repaired cable length to electrical checks (Ref.71-00-02, Testing).

F. Salvage B.493642H (Alternative).

NOTE: This is an alternative to Salvage B.493642H and permits the use of PTFE tape wrapping in place of the shrink sleeve at the cable outer insulation; refer to Figure 410 for the repair layout and to Table 402 for the materials. Observe the limitations in sub-para.E.

(1) Procedure.

- (a) Carry out operations (a) to (k) detailed in sub-para.E, but omit reference to the assembling and soldering of the outer shrink sleeve.
- (b) Commencing approximately 1.0 in. (25,4 mm) from one end of the repair area, and using PTFE tape, wrap the cable and repair area and continue for approximately 1.0 in. (25,4 mm) beyond the repair area. Maintain a 50 per cent overlap of the PTFE tape during the wrapping. Without a break in the tape, wrap in the reverse direction maintaining the 50 per cent tape overlap, and finish neatly at the starting point.



OLYMPUS 593

MK.610-14-28

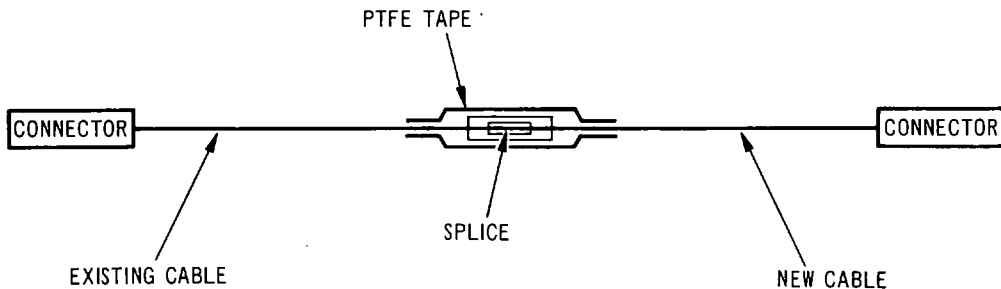
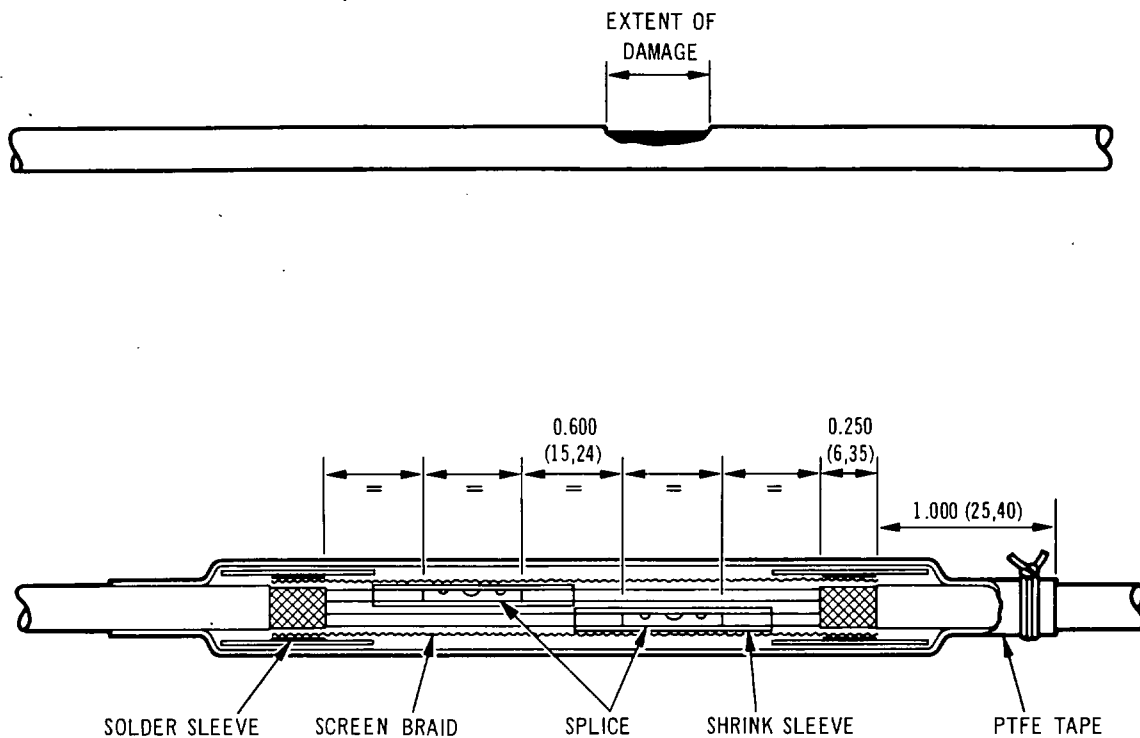
OVERHAUL



DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)

PRINTED IN ENGLAND

CR 34663/00A



TN48527

Single or Multicore Size 20 and 16 Cables Screened and Jacketed  
Layout of Scheme B.493642H (Alternative)  
Figure 410

REPAIR

71-51-01

Repair No.1

Page 427

Feb 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) Secure the end of the PTFE tape using lacing braid with clove hitch and reef knot; seal the knot with Silicone varnish.
- (d) Visually inspect the repaired area, then secure the cable to its original cable run or loom with the previously used securing clips and lacing.
- (e) Subject the repaired cable length to electrical checks (Ref.71-00-02, Testing).

G. Salvage B.493642J.

NOTE: This salvage is implemented on screened and jacketed cables, where damage cannot be rectified using salvage B.493642H (sub-para. E or F and where the damaged sustained in the cable run is not convenient to a termination point; refer to Figure 411 for repair layout.

(1) Limitations.

- (a) Not more than two splices to be installed in any one cable core.
- (b) Multicore cable splices are to be staggered by twice the splice length.

(2) Procedure.

- (a) Cut out the damaged length of cable at convenient points either side of the damaged area.
- (b) Adopting the method of attachment used in salvage B.493642H or its alternative, introduce a length of new cable between the in situ cable ends, using a butt splice connection at both ends of the new cable length.

TN48530



OLYMPUS 593

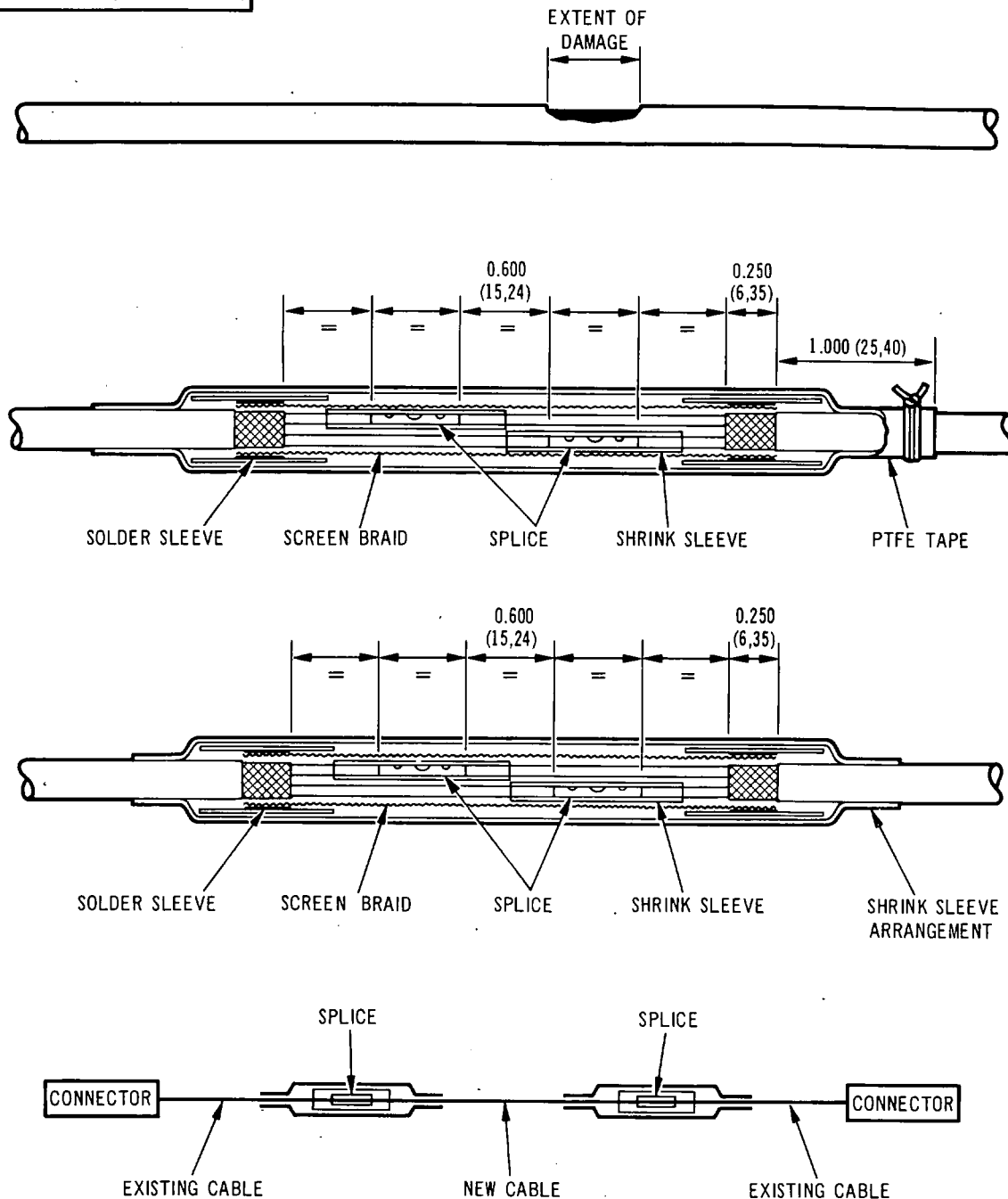
MK. 610-14-28  
OVERHAUL



DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)

PRINTED IN ENGLAND

CR 34664/00A



TN48529

Single or Multicore Size 20 and 16 Cables Screened and Jacketed  
Layout of Scheme B.493642J  
Figure 411

REPAIR  
**71-51-01**  
Repair No.1  
Page 429  
Feb 1/78





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (c) Visually inspect the repaired area, then secure the cable to its original cable run or loom with the previously used securing clamps and lacing.
- (d) Subject the repaired cable length to electrical checks (Ref.71-00-02, Testing).

5. Repair Low Noise Cable, Screened and Jacketed

A. Salvage B.493642K.

NOTE: This salvage is implemented to low noise cables screened and jacketed, where the damage is confined to the outer jacket only; refer to Figure 412 for the repair layout and Table 403 for suitable materials.

(1) Procedure.

- (a) Remove all debris from the damaged area, then ensure that the damage is confined to the outer jacket, and that the materials beneath the outer jacket are free from damage.
- (b) Using the appropriate PTFE tape, and commencing 1.500 in. (38,1 mm) to one side of the damaged area, firmly wrap the 1.500 in. (38,1 mm) area of insulation, the damage section, and the insulation 1.500 in. (38,1 mm) beyond the other side of the damage. Maintain a 50 per cent overlap of the tape during the wrapping.
- (c) Without a break in the tape wrap in the reverse direction until the first wrap is completely covered, maintaining the 50 per cent overlap, and finish neatly at the starting point.
- (d) Secure the tape using lacing braid with a clove hitch and reef knot; seal the knot with Silicone varnish.

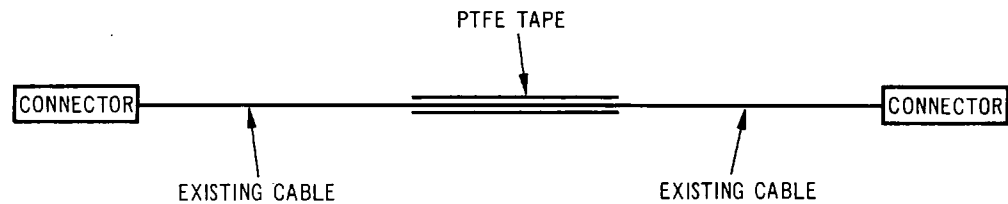
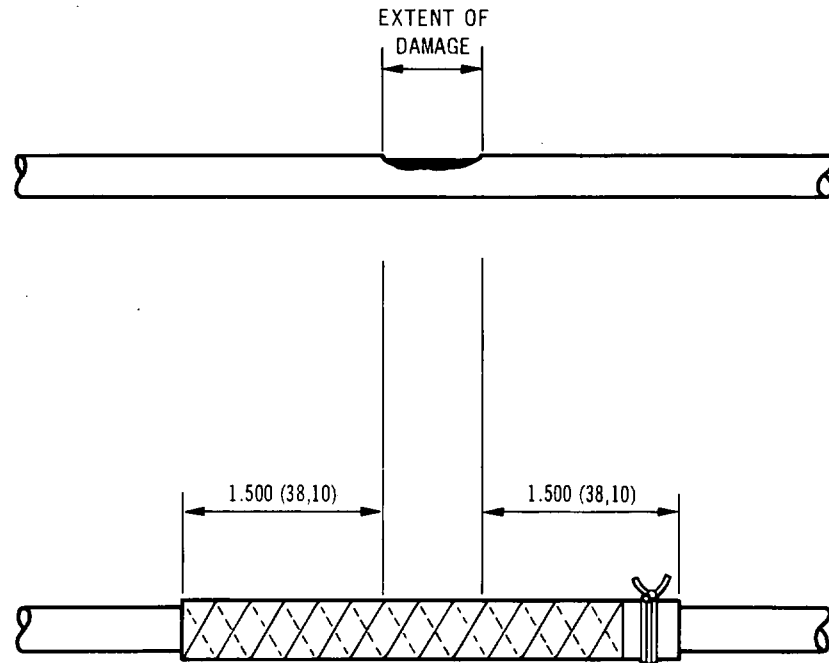
TN48533



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)



Low Noise Cables Screened and Jacketed  
Layout of Scheme B.493642K  
Figure 412



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



Material	Type
PTFE Sealing Tape	B.427935
Lacing Braid	TYGADURE T085
Sealant	Silicone Varnish MS 996

Repair Material Specifications Scheme B.493642K  
and B.493642N  
Table 403

- (e) Visually inspect the repaired area, then secure the cable to its original cable run or loom with the previously used securing clamps and lacing.
- (f) Subject the repaired cable length to electrical checks (Ref.71-00-02, Testing).

6. Repair Single or Multicore Fireproof Cable Screened and Jacketed

A. Salvage B.493642L.

NOTE: This salvage is implemented on single or multicore fireproof screened and jacketed cables, where the damage is confined to the outer jacket only; refer to Figure 413 for the repair layout and Table 404 for suitable materials.

(1) Procedure.

- (a) Remove all debris from the damaged area, then ensure that the damage is confined to the outer jacket, and that the materials beneath the outer jacket are free from damage.

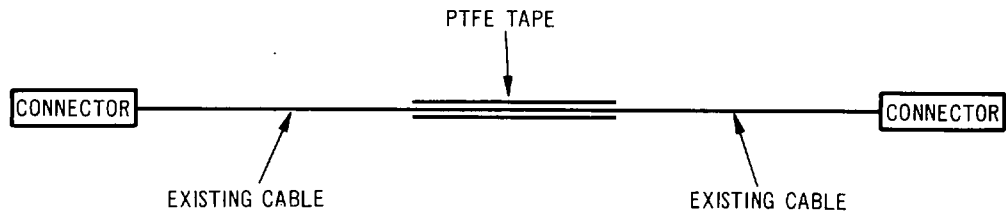
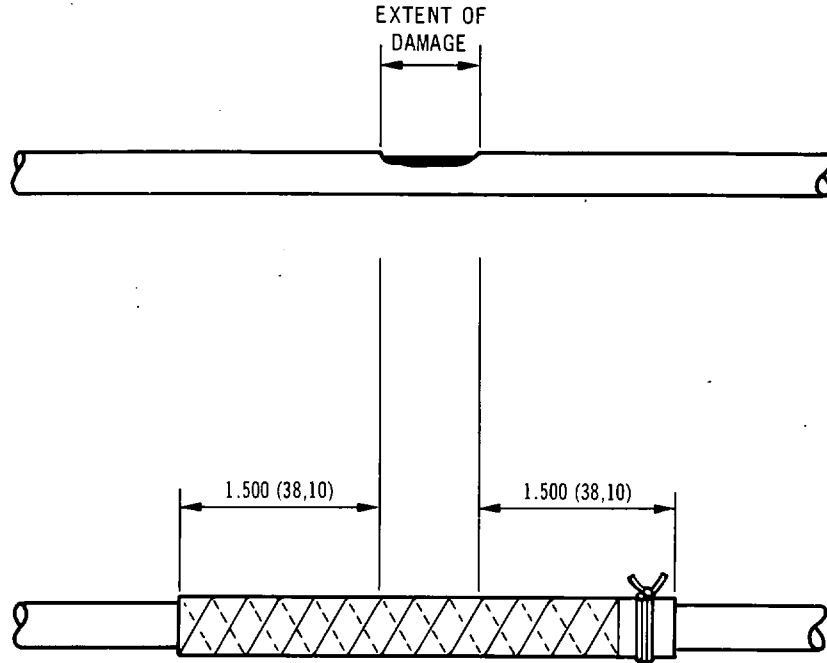
TN48539



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)



Single or Multicore Fireproof Cables Screened and Jacketed  
Layout of Scheme B.493642L  
Figure 413

REPAIR  
**71-51-01**  
Repair No.1  
Page 433  
Feb 1/78

PRINTED IN ENGLAND

TN48540

CR 34666/00A



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (b) Using the appropriate PTFE tape, and commencing 1.500 in. (38,1 mm) to one side of the damaged area, firmly wrap the 1.500 in. (38,1 mm) area of insulation, the damage section, and the insulation 1.500 in. (38,1 mm) beyond the other side of the damage. Maintain a 50 per cent overlap of the tape during the wrapping.

Material	Type
* Glass Cloth Tape	SCOTCH - TYPE 69 or CXLP 1.000 in. (25,0 mm) wide
PTFE Sealing Tape	B.427935
Lacing Braid	TYGADURE TO85
Sealant	Silicone Varnish MS 996
* Applicable to Scheme B.493642M only	

Repair Material Specifications Schemes B.493642L.M.N.  
Table 404

- (c) Without a break in the tape wrap in the reverse direction until the first wrap is completely covered, maintaining the 50 per cent overlap, and finish neatly at the starting point.
- (d) Secure the tape using lacing braid with a clove hitch and reef knot; seal the knot with Silicone varnish.
- (e) Visually inspect the repaired area, then secure the cable to its original cable run or loom with the previously used securing clips and lacing.
- (f) Subject the repaired cable length to electrical checks (Ref.71-00-02, Testing).

TN48542



OLYMPUS 593

MK.610-14-28  
OVERHAUL



B. Salvage B.493642M.

NOTE: This salvage is implemented on single or multicore fireproof screened and jacketed cables, where both the outer jacket and screened sleeves are damaged, but the screen function is not seriously impaired, i.e., not more than 50 per cent of the braid strands being broken; refer to Figure 414 for the repair layout and Table 404 for suitable materials. If more extensive damage has been sustained the cable must be replaced.

(1) Procedure.

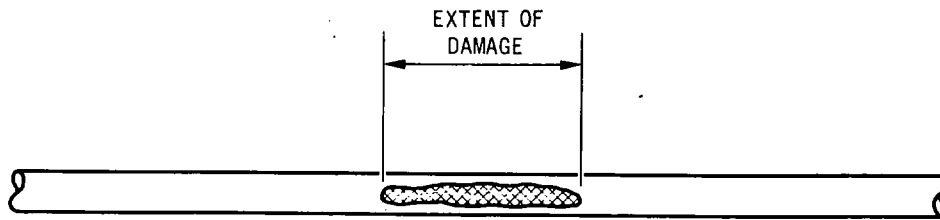
- (a) Smooth out and re-lay the damaged screen braid to cover the maximum area of exposed cable; curl the frayed ends away from the cable to avoid their penetration of the core insulation.
- (b) Commencing at a point approximately 0.500 in. (12,70 mm) from the damaged area, wrap the cable with glass cloth tape, using a 50 per cent overlap of the cloth and continue to a point 0.500 in. (12,70 mm) beyond the damaged area.
- (c) Using PTFE tape and commencing at a point approximately 1.000 in. (25,40 mm) from the glass cloth tape, firmly wrap the one inch area of insulation and the glass cloth tape, then continue the wrap to a point 1.000 in. (25,40 mm) over the insulation, beyond the other end of the glass cloth tape. Maintain a 50 per cent overlap of the tape during this operation.
- (d) Without a break in the tape wrap in the reverse direction until the first wrap is completely covered, maintaining the 50 per cent overlap, and finish neatly at the starting point.
- (e) Secure the tape using lacing braid with a clove hitch and reef knot; seal the knot with Silicone varnish.



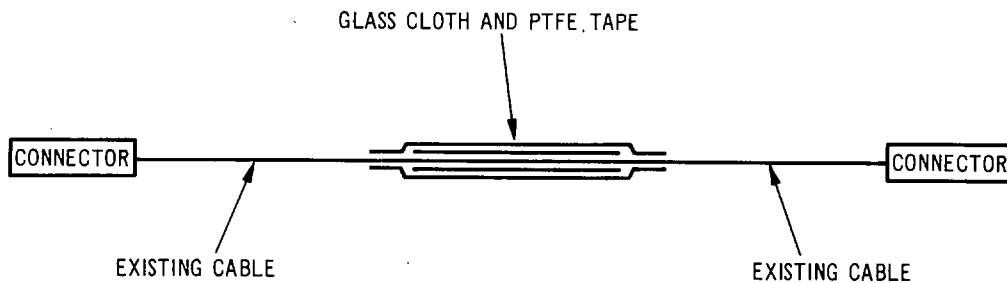
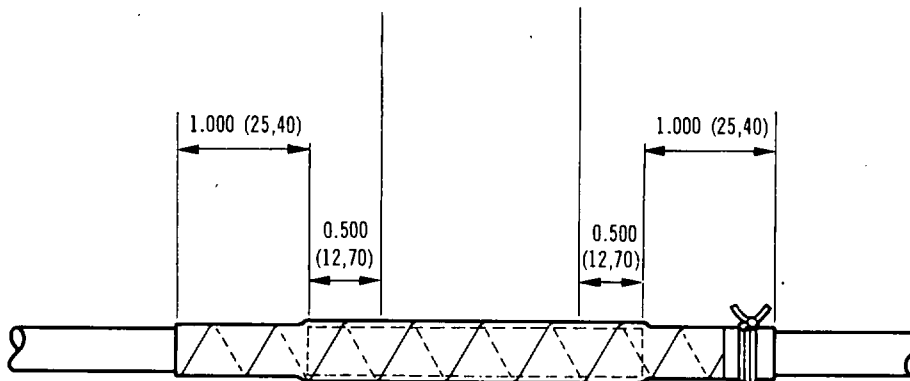
OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)



CR 34667/00A



TN48543

Single or Multicore Fireproof Cables Screened and Jacketed  
Layout of Scheme B.493642M  
Figure 414

REPAIR  
**71-51-01**  
Repair No.1  
Page 436  
Feb 1/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (f) Visually inspect the repaired area, then secure the cable to its original cable run or loom with the previously used securing clips and lacing.
- (g) Subject the repaired cable length to electrical checks (Ref.71-00-02, Testing).

7. Repair Single Fireproof Cable Jacketed

A. Salvage B.493642N.

NOTE: This salvage is implemented on single fireproof jacketed cables, where the damage is confined to the outer jacket; refer to Figure 415 for the repair layout and Table 405 for suitable materials.

(1) Procedure.

- (a) Remove all debris from the damaged area, then ensure that the damage is limited only to the outer jacket.
- (b) Using the appropriate PTFE tape, and commencing 1.500 in. (38,1 mm) to one side of the damaged area, firmly wrap the 1.500 in. (38,1 mm) area of insulation, the damaged section, and the insulation 1.500 in. (38,1 mm) beyond the other side of the damage. Maintain a 50 per cent overlap of the tape during the wrapping.
- (c) Without a break in the tape wrap in the reverse direction until the first wrap is completely covered maintaining the 50 per cent tape overlap, and finish neatly at the starting point.
- (d) Secure the tape using lacing braid with a clove hitch and reef knot; seal the knot with Silicone varnish.

PRINTED IN ENGLAND

TN48544





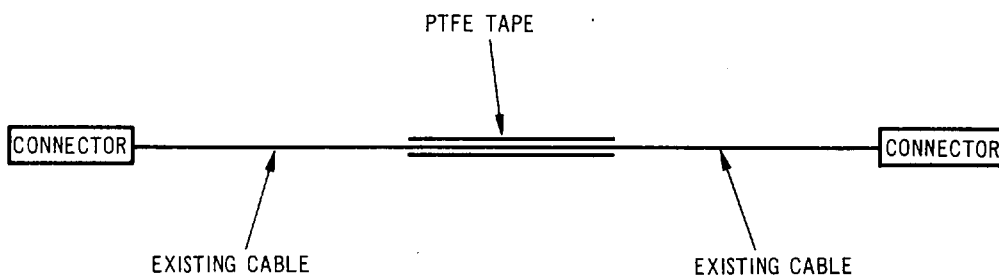
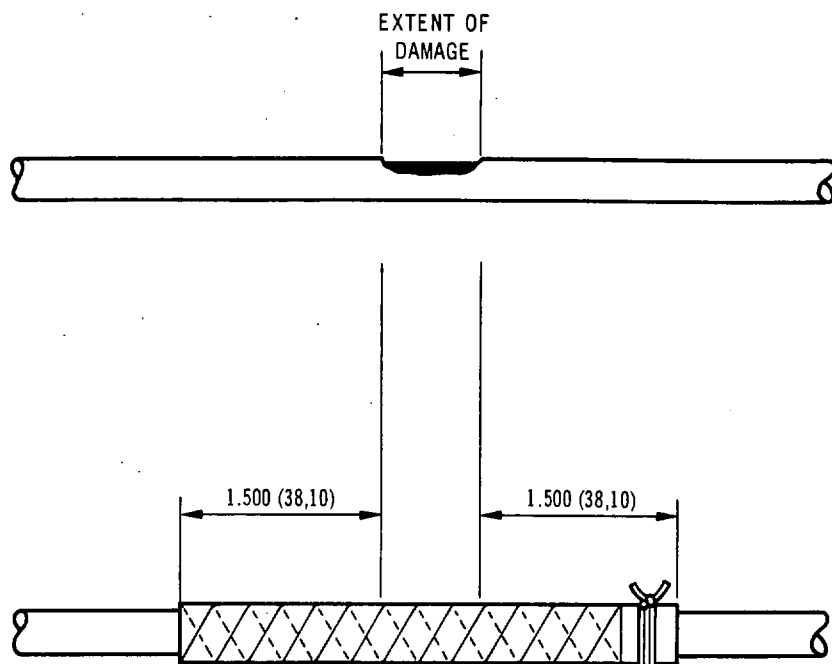
OLYMPUS 593

MK.610-14-28  
OVERHAUL



DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)

CR 34668/00A



TN48545

Single Fireproof Jacketed Cable  
Layout of Scheme B.493642N  
Figure 415

REPAIR  
**71-51-01**  
Repair No.1  
Page 438  
Feb 1/78



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (e) Visually inspect the repaired area, then secure the cable to its original cable run or loom with the previously used securing clamps and lacing.
- (f) Subject the repaired cable length to electrical checks (Ref.71-00-02, Testing).

## 8. Tools and Equipment

Tool Description	Type No.	Suppliers	Ref.Fig.
Crimp tool	Raychem AD 1377	Raychem Ltd., Cheney Manor, Swindon, Wilts., England	
Raychem thermo-gun (110 volt)	C.V.1511-110 and PR13C reflector		
Raychem thermo-gun (110 volt)	C.V.1509-110 and PR25 reflector		
Crimp tool	AMP 46467	A.M.P. Ltd., Terminal House, Stanmore, Middlesex, England	
Crimp tool	AMP 46447		
Stripping tool	Ideal Stripmaster		

Tools and Equipment for Repair Schemes B.493642A to N  
Table 405

### A. Heat Shrinkage Instruction.

**WARNING:** BEFORE USING THE HEAT SHRINKING PROCEDURE ENSURE THAT ALL SAFETY PRECAUTIONS REGARDING VENTILATION OF THE WORK AREA ARE COMPLIED WITH, AND THAT A SUITABLE RAYCHEM THERMO-GUN TYPE CV.1509-110 OR CV.1511-110 WITH A PR24 OR PR13C REFLECTOR IS USED. THE MINIMUM POWER REQUIREMENT OF THIS EQUIPMENT IS 900 WATTS.

REPAIR

71-51-01

Repair No.1

Page 439

Jun 1/98



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (1) Set the heat gun to produce a minimum temperature of 380 deg C; a five minute warm-up period of the gun, prior to heat application at the sleeve is recommended.
- (2) With the sleeve correctly positioned on the cable, direct the hot air onto the sleeve, until the PTFE becomes transparent and the sleeve has shrunk to a snug fit. Ensure that the hot air is applied to the entire circumference and length of the sleeve.
- (3) As soon as the sleeve has become transparent and has shrunk into position, cease the application of hot air. Shrinkage normally occurs within 8-20 seconds but should not exceed 50 seconds.
- (4) Inspect the finished shrink sleeve for condition. Ensure that the surface is smooth and free from splitting, and that the surrounding area of the cable is free from heat damage.

**B. Instructions for Soldering Screen Braid.**

**WARNING:** **HEALTH HAZARD.** MATERIALS USED IN THESE REPAIRS ARE COMPOSED OF POLYTETRAFLUOROETHYLENE (PTFE). THIS MATERIAL WILL EMIT TOXIC GASES WHEN SUBJECTED TO TEMPERATURES ABOVE 340 DEG C. THE HIGHER THE TEMPERATURE THE GREATER THE EMISSION OF TOXIC GAS. ADEQUATE VENTILATION IS TO BE PROVIDED WITHIN THE WORK AREA AND CLOSE TO THE HEATING SOURCE.

- (1) Paint the cable braid area to be soldered with an approved flux (Kester 1544).
- (2) Locate the solder sleeves over the braid ends, ensure that the solder rings are centrally located over the 0.25 in. (6,25 mm) cable end areas.
- (3) Allow a suitable Thermo-gun, such as the Raychem type CV1511-110 with a PR13C reflector, set at position 4, to warm-up for a five minute period at a power of 1100 watts.

REPAIR

71-51-01

Page 440

Repair No.1

Jun 1/98



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (4) At the end of the five minute period the temperature must be between 500 and 600 deg C. Apply heat to the solder sleeves; ensure that the heat is evenly distributed around the sleeve periphery,. A heat soak time of 25 to 35 seconds, will ensure a good solder flow.
- (5) Check that the solder has run satisfactorily around the cable periphery, slight trace of solder should be visible around the edge of the solder sleeves and ensure that the cable adjacent to the joint shows no visible signs of heat damage.



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (g) With the blade release handle depressed, insert the unstripped end of the sample cable length, through the bush to butt against the previously adjusted stop. When the adjustable cable stop has been removed, insert the cable to the required measured length.
- (h) Free the blade release handle, then apply outward pressure to the release handle, to ensure that the end of the blade release remains in contact with the cam screw.
- (j) Holding the cable rigid rotate the tool in excess of one revolution.
- (k) Raise the blade and remove the sample length of cable from the tool.
- (l) Separate the insulation at the cut by gently bending the cable. Remove the end insulation thereby exposing the conductor.

NOTE: Do not use the cutting blade to remove the insulation end.

- (m) Examine the conductor strands for any damage caused by the blade; if necessary readjust the cam screw.
- (n) When satisfactory removal of the insulation from the sample cable has been achieved and the condition of the cable conductor is acceptable, retain the tool settings and strip the engine cable requiring repair.

#### B. Heat Shrinkage Instruction.

WARNING: BEFORE USING THE HEAT SHRINKING PROCEDURE ENSURE THAT ALL SAFETY PRECAUTIONS REGARDING VENTILATION OF THE WORK AREA ARE COMPLIED WITH, AND THAT A SUITABLE RAYCHEM THERMO-GUN TYPE CV.1509-110 OR CV.1511-110 WITH A PR24 OR PR13C REFLECTOR IS USED. THE MINIMUM POWER REQUIREMENT OF THIS EQUIPMENT IS 900 WATTS.

TN2437



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (1) Set the heat gun to produce a minimum temperature of 380 deg C; a five minute warm-up period of the gun, prior to heat application at the sleeve is recommended.
- (2) With the sleeve correctly positioned on the cable, direct the hot air onto the sleeve, until the PTFE becomes transparent and the sleeve has shrunk to a snug fit. Ensure that the hot air is applied to the entire circumference and length of the sleeve.
- (3) As soon as the sleeve has become transparent and has shrunk into position, cease the application of hot air. Shrinkage normally occurs within 8-20 seconds but should not exceed 50 seconds.
- (4) Inspect the finished shrink sleeve for condition. Ensure that the surface is smooth and free from splitting, and that the surrounding area of the cable is free from heat damage.

C. Instructions for Soldering Screen Braid.

WARNING: HEALTH HAZARD. MATERIALS USED IN THESE REPAIRS ARE COMPOSED OF POLYTETRAFLUOROETHYLENE (PTFE). THIS MATERIAL WILL EMIT TOXIC GASES WHEN SUBJECTED TO TEMPERATURES ABOVE 340 DEG C. THE HIGHER THE TEMPERATURE THE GREATER THE EMISSION OF TOXIC GAS. ADEQUATE VENTILATION IS TO BE PROVIDED WITHIN THE WORK AREA AND CLOSE TO THE HEATING SOURCE.

- (1) Paint the cable braid area to be soldered with an approved flux (Kester 1544).
- (2) Locate the solder sleeves over the braid ends, ensure that the solder rings are centrally located over the 0.25 in. (6,25 mm) cable end areas.
- (3) Allow a suitable Thermo-gun, such as the Raychem type CV1511-110 with a PR13C reflector, set at position 4, to warm-up for a five minute period at a power of 1100 watts.

REPAIR

71-51-01

Repair No.1

Page 443

Feb 1/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (4) At the end of the five minute period the temperature must be between 500 and 600 deg C. Apply heat to the solder sleeves; ensure that the heat is evenly distributed around the sleeve periphery,. A heat soak time of 25 to 35 seconds, will ensure a good solder flow.
- (5) Check that the solder has run satisfactorily around the cable periphery, slight trace of solder should be visible around the edge of the solder sleeves and ensure that the cable adjacent to the joint shows no visible signs of heat damage.

IN2578

REPAIR

**71-51-01**

Repair No.1

Page 444

Feb 1/78



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

## ENGINE ELECTRICAL CABLES - ASSEMBLY

### TABLE OF CONTENTS

Para.		Page
1.	General ... ..	501
2.	Cable Terminal Preparation ... ..	502
A.	General ... ..	502
B.	Assemble Shrink Sleeves and Shrink/Solder Sleeves to Cables ... ..	502
C.	Assemble Contacts to Cable Cores... ..	506
D.	Termination of Low Noise Cables ... ..	507
E.	Termination of Screen Braid with No Earth Requirement ... ..	507
F.	Attachment of Staggered Earthing Tail Using High Temperature Solder Sleeve ... ..	509
G.	Attachment of Non-staggered Earthing Tail Using High Temperature Solder Sleeve... ..	510
3.	Assemble Plugs to Cables... ..	512
A.	General ... ..	512
B.	Assemble Telescopic Bushes to Cables ... ..	512
C.	Connect Plugs to Cables ... ..	513
D.	Secure Plugs to Cables Containing Telescopic Bushes... ..	515
E.	Secure Plugs to Cables Containing Glasscloth Tape ... ..	515
4.	Assemble B and H Harness... ..	517
A.	General ... ..	517
B.	Preparation for New Assembly or Rectification ... ..	517
C.	Assemble a New Harness ... ..	517
D.	Replace a Defective Cable ... ..	518
E.	Assemble Plugs to Cables ... ..	518
5.	Assemble C Harness ... ..	527
A.	General ... ..	527
B.	Preparation for New Assembly or Rectification ... ..	527
C.	Assemble a New Harness ... ..	530
D.	Replace a Defective Cable ... ..	530
E.	Assemble Plugs to Cables ... ..	533
6.	Assemble D Harness ... ..	536
A.	General ... ..	536
B.	Preparation for New Assembly or Rectification ... ..	537
C.	Assemble a New Harness ... ..	537
D.	Replace a Defective Cable ... ..	537
E.	Assemble Plugs to Cables ... ..	540

ASSEMBLY

# 71-51-01

Contents 1  
Dec 31/00





# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

Printed in England

7.	Assemble E Harness	...	...	...	...	...	542
A.	General	...	...	...	...	...	542
B.	Preparation for New Assembly or Rectification	...	...	...	...	...	543
C.	Assemble a New Harness	...	...	...	...	...	543
D.	Replace a Defective Cable	...	...	...	...	...	545
E.	Assemble Plugs to Cables	...	...	...	...	...	547
8.	Assemble F Harness	...	...	...	...	...	548
A.	General	...	...	...	...	...	548
B.	Preparation for New Assembly or Rectification	...	...	...	...	...	548
C.	Assemble a New Harness	...	...	...	...	...	549
D.	Replace a Defective Cable	...	...	...	...	...	549
E.	Assemble Plugs to Cables	...	...	...	...	...	552
9.	Assemble G Harness	...	...	...	...	...	554
A.	General	...	...	...	...	...	554
B.	Preparation for New Assembly or Rectification	...	...	...	...	...	555
C.	Assemble a New Harness	...	...	...	...	...	555
D.	Replace a Defective Cable	...	...	...	...	...	556
E.	Assemble Plugs to Cables	...	...	...	...	...	558
10.	Assembly of Complete Electrical Cables	...	...	...	...	...	560
A.	General	...	...	...	...	...	560
B.	Preparation for Assembly	...	...	...	...	...	560
C.	Binding Harnesses	...	...	...	...	...	563
D.	Final Dressing...	...	...	...	...	...	565

## TABLE OF ILLUSTRATIONS

Fig.No.		Page
501	Termination of Low Noise Cables	505
502	Attachment of Staggered Earthing Tail	508
503	Attachment of Non-staggered Earthing Tail	511
504	Assembly of Electrical Plugs to Cables	514
505	Wiring Diagram for B and H Harness (Sheet 1 of 2)	520
505	Wiring Diagram for B and H Harness (Sheet 2 of 2)	521
506	Cancelled	
507	Assembly of B and H Harness Plug Assemblies	525
508	Wiring Diagram for C Harness (Sheet 1 of 2)	528
508	Wiring Diagram for C Harness (Sheet 2 of 2)	529
509	Assembly of C Harness Plug Assemblies	534
510	Wiring Diagram for D Harness	538
511	Assembly of D Harness Plug Assemblies	541
512	Wiring Diagram for E Harness	544

ASSEMBLY

# 71-51-01

Contents 2

Dec 31/00

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

Fig.No.

Page

513	Assembly of E Harness Plug Assemblies ...	546
514	Wiring Diagram for F Harness (Sheet 1 of 2) ...	550
514	Wiring Diagram for F Harness (Sheet 2 of 2) ...	551
515	Assembly of F Harness Plug Assemblies ...	553
516	Wiring Diagram for G Harness ...	557
517	Assembly of G Harness Plug Assemblies ...	559
518	Assembly of Harnesses to Unique Point Blocks...	562
519	Binding of Harnesses with Rapidon Tape...	564
520	Binding of B Harness Branch ...	566

LIST OF TABLES

Table No.

Page

501	Thermofit Shrink Sleeving Sizes ...	503
502	Electrical Harness Shrink/Solder Sleeves ...	504
503	Removal of Insulation from Core for Crimping...	506
504	Cable Identification... ..	519
505	Plug Assembly Identification of B and H Harness	522
506	Plug Assembly Identification of C Harness	532
507	Plug Assembly Identification of D Harness	539
508	Plug Assembly Identification of E Harness	543
509	Plug Assembly Identification of F Harness	552
510	Plug Assembly Identification of G Harness	556
511	Cable Length from the Unique Point ...	563
512	Deleted	

ASSEMBLY

**71-51-01**

Contents 3

Jun 1/99



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



ENGINE ELECTRICAL CABLES - ASSEMBLY

1. General

- A. Before commencing this assembly refer to Standard Practices 71-09-00, Assembly for general information.
- B. Refer to 71-00-02 Engine Electrical Harness, for the description of the electrical cable and harness assemblies.
- C. Throughout the text, special tools are quoted by their reference number; e.g. Tool 1234. For a complete list of tooling required for assembly and for the Manufacturer's Part Number, refer to Special Tools, Fixtures and Equipment, Table 1002.
- D. During the assembly procedure reference will be made to the Illustrated Parts Catalogue (I.P.C.) to identify those items where the nomenclature does not positively identify them, due to the duplication of the title e.g. connectors, pins, seals, etc. When the item is a part of the breakdown of the text concerned, the item will be identified e.g. seal (12-40), the 12 referring to the I.P.C. Fig.No., and the 40 referring to the Item No.
- E. The extent of assembly required at overhaul on serviceable harnesses is limited to binding the seven harnesses into one electrical cable assembly (Ref.para.10), but to enable the replacement of defective items or complete harnesses to be made, following rejection by Inspection/Check or Test, the extent of assembly in this text covers the complete assembly of each harness.
- F. The text follows the sequence that the assembly will be carried out, i.e. preparation of cable terminals, assembly of plugs, assembly of harness etc., but each part is dependent on each other and must be carried out in unison.
- G. During assembly treat the cables and plugs of the electrical cable assembly as fragile, and ensure that plug pins are protected from damage by assembling the correct blanking covers, and that harnesses and cable assemblies are stowed in containers.

ASSEMBLY

**71-51-01**

Page 501  
Feb 1/79



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



## 2. Cable Terminal Preparation

### A. General.

The following procedure details the assembling of various terminals to the ends of cables. These procedures are to be used in conjunction with the assembly of the seven harnesses (Ref. para. 4 to 9), which detail the various types of cables, contacts, sealing plugs etc. that are to be used and the positions at which they are to be attached. The assembling of the various plugs to the cables are detailed in para. 3.

### B. Assemble Shrink Sleeves and Shrink/Solder Sleeves to Cables.

WARNING: SHRINK SLEEVES ARE COMPOSED OF POLYTETRAFLUOROETHYLENE (PTFE) WHICH WILL EMIT TOXIC GAS WHEN SUBJECTED TO TEMPERATURES ABOVE 340 DEG C. GAS EMISSION INCREASES WITH TEMPERATURE INCREASE. ADEQUATE VENTILATION MUST BE PROVIDED AS CLOSE TO HEATING SOURCE AS POSSIBLE.

- (1) Assemble the (Thermofit) shrink sleeves to the cables.
  - (a) Establish the bore size and length of the shrink sleeve required (Ref. Table 501).
  - (b) Assemble the shrink sleeve over the cores or screen termination as required (Ref. Fig. 501 Detail D).
  - (c) Attach the reflector (Tool 2605) to the Thermo-gun (Tool 2603) and set the control on the Thermo-gun to between 380 and 410 deg.C.
  - (d) Allow the Thermo-gun to heat up to the required temperature, then direct the hot air over all the surface of the sleeve for 8 to 20 seconds until it has become transparent and shrunk to a snug fit. Do not apply heat in excess of 50 seconds.

TN15837



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

BORE	SHRINK SLEEVE PART NO.	LENGTH
0.0787 (2 mm)	3105103	1.000 in. (25,40 mm)
0.2362 (6 mm)	3105100	1.000 in. (25,40 mm)
0.3937 (10 mm)	3102076	1.000 in. (25,40 mm)
0.5512 (14 mm)	3105139	1.500 in. (38,10 mm)
0.8661 (22 mm)	3105329	1.000 in. (25,40 mm)

Thermofit Shrink Sleeving Sizes  
Table 501

- (e) Stop the application of hot air when the sleeve has shrunk and allow the sleeve to cool. Turn off the Thermo-gun. Ensure that the sleeve is not split and that no heat damage has occurred.
- (2) Assemble the shrink/solder sleeves to the cables.

NOTE: The shrink/solder sleeve consists of a pre-fluxed solder ring situated centrally in a sleeve composed of Polytetrafluorethylene. Observe the warning given at the commencement of this paragraph.

- (a) Establish the correct size of shrink/solder sleeve required (Ref. Table 502).
- (b) Apply multicore flux 'B' to the bore of the solder sleeve.

NOTE: Ensure that the earthing braid and earthing tail conductor have had multicore flux 'B' applied.

- (c) Assemble the sleeve in the correct position over the screen braid and earthing tail (Ref.Fig.502 Detail E).

ASSEMBLY

71-51-01

Page 503

Feb 1/79



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

POSITION (REF. WIRING DIAGRAMS)	SHRINK/SOLDER SLEEVE PART NO.	QUANTITY
H4 at Disconnect Point	W-021-03	1
H Disconnect Point	W-021-01	3
B1 at Disconnect Point	W-021-03	1
B Disconnect Point	W-021-01	8
D11 at Disconnect Point	W-021-01	1
D11	W-021-01	1
E8	W-021-00	1
E8 at Disconnect Point	W-021-00	1
F5 at Disconnect Point	W-021-01	3
F6 at Disconnect Point	W-021-01	3
G10 at Disconnect Point	W-021-01	1

Electrical Harness Shrink/Solder Sleeves  
Table 502

- (d) Attach the reflector (Tool 2605) to the Thermo-gun (Tool 2603) and set the control on the Thermo-gun to between 500 and 600 deg C.
- (e) Allow the Thermo-gun to heat up to the required temperature, then direct the hot air over all the surface of the sleeve until the solder runs around the exposed braid and earthing tail. Ensure that the sleeve shrinks to a snug fit.
- (f) Stop the application of hot air and allow the sleeve to cool. Turn off the Thermo-gun. Ensure that the joint is completely covered and the earthing tail is secure, the sleeve is not split and that no heat damage has occurred.

ASSEMBLY

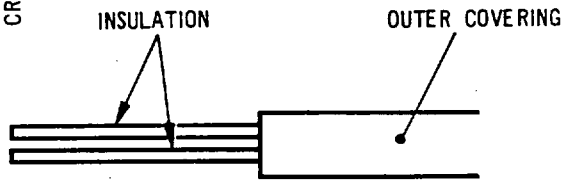
71-51-01

Page 504

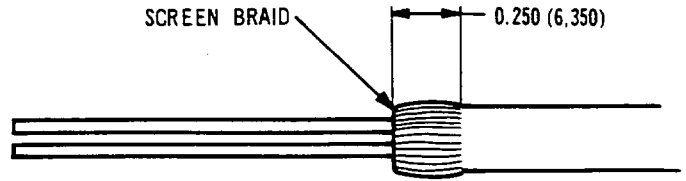
Jun 1/99

CR 33417/00A

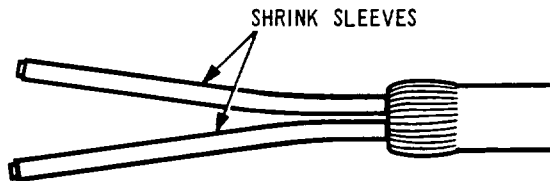
DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)



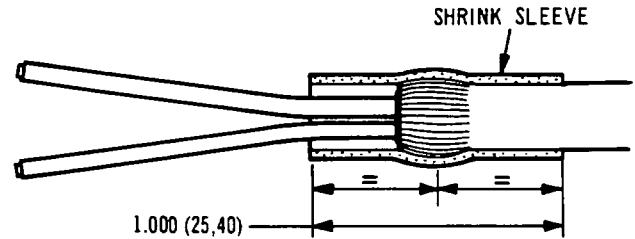
DETAIL A



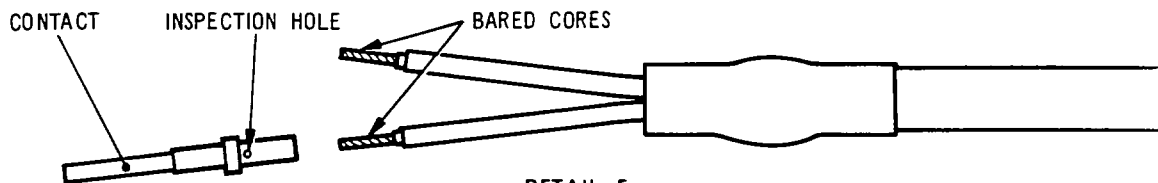
DETAIL B



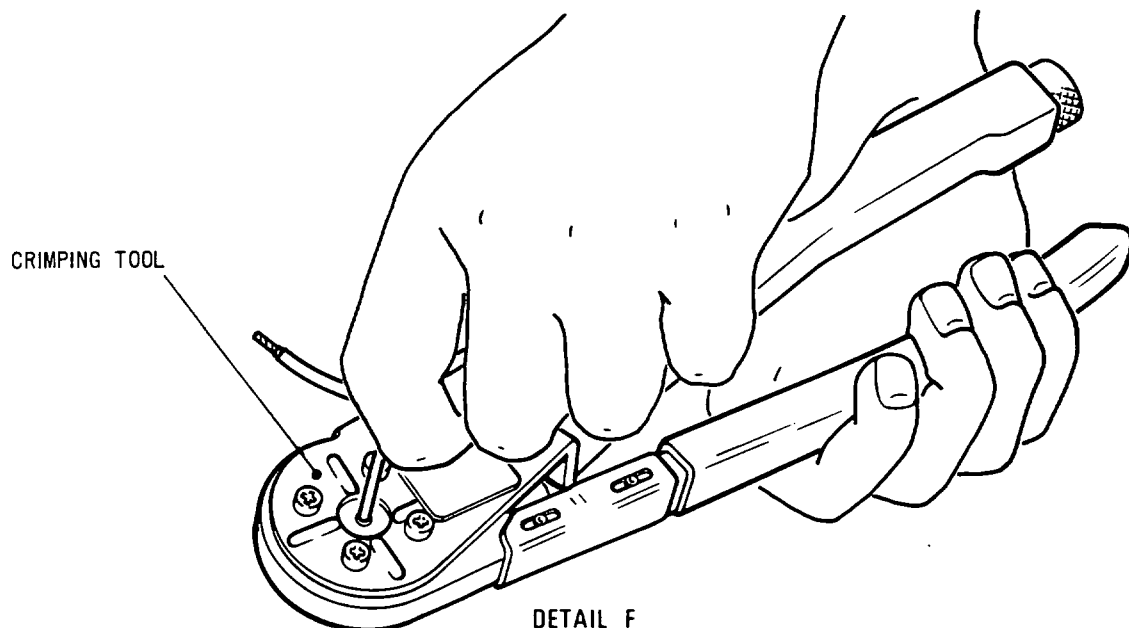
DETAIL C



DETAIL D



DETAIL E



DETAIL F

Termination of Low Noise Cables  
Figure 501



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

## C. Assemble Contacts to Cable Cores (Ref.Fig.501).

**NOTE :** There are two types of contacts used with the electrical plugs, pin contacts and socket contacts. Both types use the same tools and are similarly assembled to the cores.

- (1) Strip the insulation from the ends of the cores to be crimped using Ideal Stripmaster. The length to be stripped is dependent on the cable size (Ref.Table 503) and (Detail E).
- (2) Insert a cable core into the rear of a contact so that the insulation abuts against the rear of the contact.
- (3) Ensure that the core is visible through the inspection hole of the contact (Detail E).
- (4) Using the crimping tool (Tool 2703) and the correct contact locator (Tool 2704), insert the contact into the tool ensuring that the shoulder of the contact abuts the crimping tool (Detail F), then crimp the contact.
- (5) Assemble contact(s) to the remaining core(s) as detailed in para.(2) to (4).

CABLE SIZE (AWG)	LENGTH OF INSULATION TO BE REMOVED
16	0.480 to 0.530 in. (12,1920 to 13,4620 mm)
18	0.240 to 0.280 in. (6,0960 to 7,1120 mm)
20	0.240 to 0.280 in. (6,0960 to 7,1120 mm)
22	0.240 to 0.280 in. (6,0960 to 7,1120 mm)
24	0.240 to 0.280 in. (6,0960 to 7,1120 mm)

Removal of Insulation from Core for Crimping  
Table 503

ASSEMBLY

## 71-51-01

Page 506

Jun 1/98





OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

D. Termination of Low Noise Cables (Ref.Fig.501).

- (1) Remove sufficient of the outer covering, screen braid and fillers to allow individual cores to be prepared for the installation of the connectors (Detail A).
- (2) Strip the outer covering for a further 0.500 in. (12,700 mm). Comb out the screen and lay it back along the outer covering. Trim the screen as required (Detail B).
- (3) Slide the shrink sleeves onto the individual cores so that they abut the screen (Detail C) and shrink into position as detailed in para.2.B.
- (4) Assemble a shrink sleeve 1.000 in. (24,40 mm) in length over the exposed braid so that the sleeve is positioned centrally (Detail D), then shrink into position as detailed in para.2.B.
- (5) Strip the shrink sleeve and Kapton insulation from the cores to the correct length (Ref.Table 503) and (Detail E) using the Ideal Stripmaster.
- (6) Assemble contacts to the bared cores of the cables (Ref.para.2.C.).

E. Termination of Screen Braid with No Earth Requirement (Ref.Fig.502).

- (1) Remove from the cable sufficient of the outer covering, screen braid and fillers to allow individual cores to be prepared for the installation of the connectors (Ref.Table 503) and (Detail A), and the turn back of the screen braid (Detail B).
- (2) Lay the screen braid back along the outer covering for not less than 0.250 in. (6,350 mm) (Detail B). Terminations may be staggered to avoid bunching and trimmed as required.

ASSEMBLY

71-51-01

Page 507

Jun 1/98



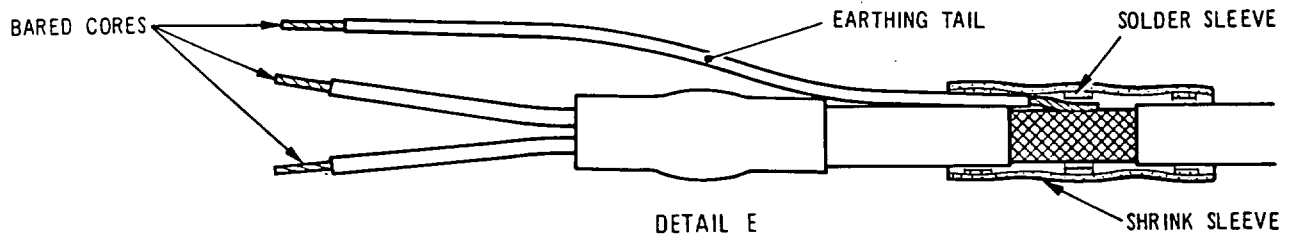
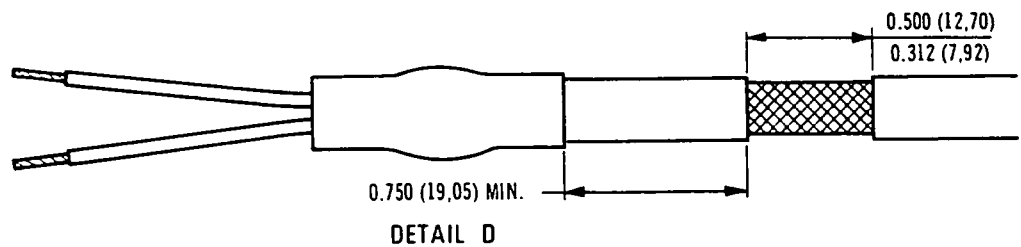
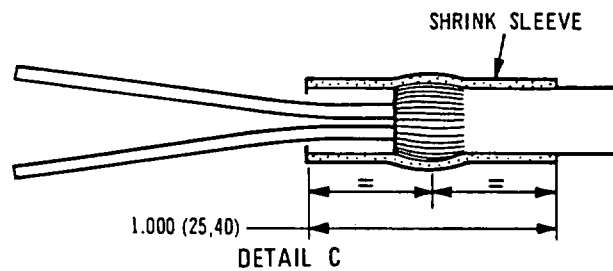
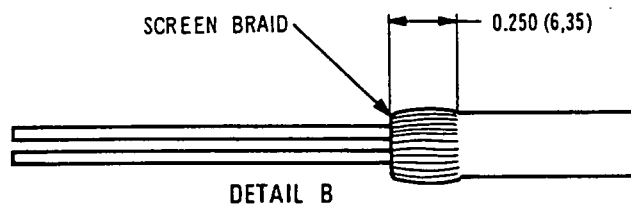
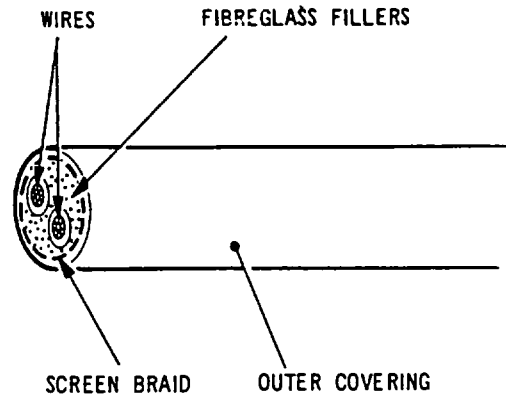
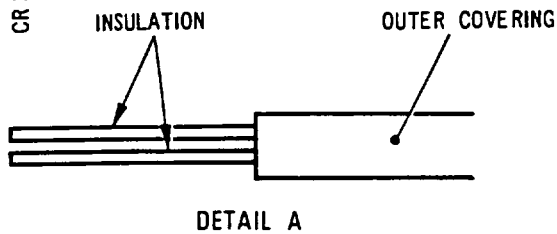
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33415/00B

DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)



Attachment of Staggered Earthing Tail  
Figure 502



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (3) Assemble a shrink sleeve 1.000 in. (24,40 mm) in length over the exposed braid so that the sleeve is positioned centrally (Detail C), then shrink into position as detailed in para.2.B.
- (4) Assemble contacts to the bared cores of the cables (Ref.para.2.C.).

F. Attachment of Staggered Earthing Tail Using High Temperature Solder Sleeve (Ref.Fig.502)..

- (1) Assemble the (earthing tail) shrink/solder sleeve to the cable and ensure that it is fed onto the cable sufficiently to allow the screen braid to be exposed (Detail D).
- (2) Remove from the cable sufficient of the outer covering, screen braid and fillers to allow individual cores to be prepared for the installation of the connectors (Ref.Table 503) and (Detail A), and the turn back of the screen braid (Detail B).
- (3) Lay the screen braid back along the outer covering for not less than 0.250 in. (6,350 mm). Terminations may be staggered to avoid bunching and trimmed as required (Detail B).
- (4) Assemble a shrink sleeve 1.000 in. (24,20 mm) in length over the exposed braid so that the sleeve is positioned centrally (Detail C), then shrink into position as detailed in para.2.B.
- (5) At a minimum distance of 0.750 in. (19,050 mm) from the sleeve, remove the outer covering to expose the screen braid for a length of between 0.500 and 0.312 in. (12,70 and 7,925 mm) (Detail D).
- (6) Strip the insulation from the earthing tail for a distance of (approx.) 0.300 in. (7,620 mm), then coat the bared conductor with multicore flux 'B'.

PRINTED IN ENGLAND

TN17252

ASSEMBLY

71-51-01

Page 509

Feb 1/79



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (7) Slide the previously assembled shrink/solder sleeve into position with the solder sleeve centrally over the exposed braid (Detail E).
- (8) Insert the bared conductor of the earthing tail between the solder sleeve and the exposed braid (Detail E).
- (9) Shrink the shrink/solder sleeve onto the cable (Ref.para.2.B.).
- (10) Assemble the contacts to the bared cores of the cables (Ref.para.2.C.).

G. Attachment of Non-staggered Earthing Tail Using High Temperature Solder Sleeve (Ref.Fig.503).

- (1) Remove from the cable sufficient of the outer covering, screen braid and fillers to allow individual cores to be prepared for the installation of the connectors (Ref.Table 503) and (Detail A).
- (2) Further strip the outer covering to expose between 0.312 and 0.500 in. (7,92 and 12,70 mm) of screen braid (Detail A), then coat the braid with multicore flux 'B'.
- (3) Strip the insulation from the earthing tail for a distance of (approx.) 0.300 in. (7,62 mm) (Detail B), then coat the bared conductor with multicore flux 'B'.
- (4) Slide the shrink/solder sleeve over the cable and position the solder sleeve centrally over the exposed braid (Detail C).
- (5) Insert the bared conductor of the earthing tail between the solder sleeve and the exposed braid.
- (6) Shrink the shrink/solder sleeve onto the cable (Ref.para.2.B.).
- (7) Assemble contacts to the bared cores of the cables (Ref.para.2.C.).

TN17277

ASSEMBLY

71-51-01  
Page 510  
Feb 1/79

CR 33409/00B

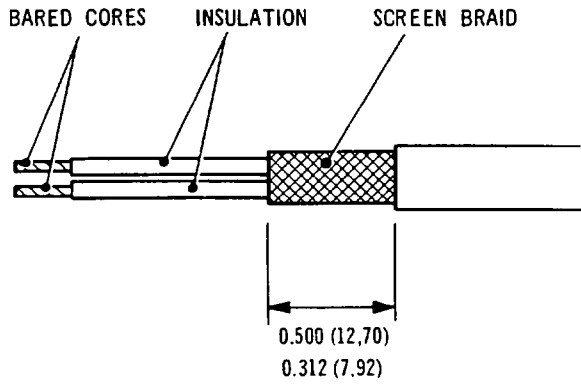
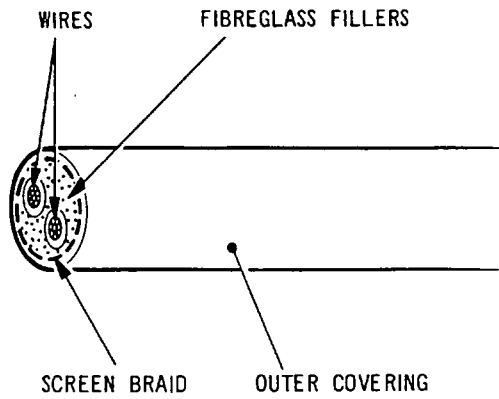


OLYMPUS 593

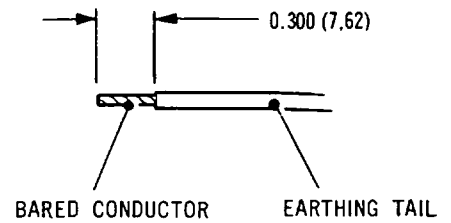
MK.610-14-28  
OVERHAUL



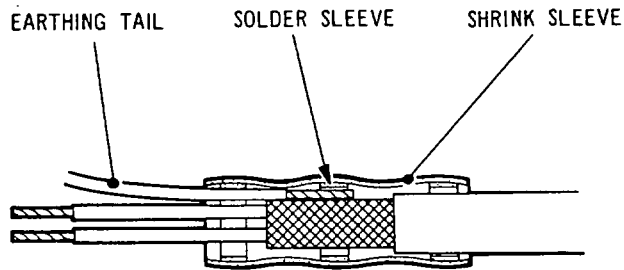
DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES ( MILLIMETRES )



DETAIL A



DETAIL B



DETAIL C

Attachment of Non-staggered Earthing Tail  
Figure 503



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

### 3. Assemble Plugs to Cable

#### A. General.

The following procedure details the assembling of various types of plugs to cables and the assembling of telescopic bushes or wrapping. These procedures are to be used in conjunction with the assembly of the seven harnesses (Ref. para.4 to 9), which detail the cables, plugs, bushes etc. that are to be used and the positions at which they are to be attached. The preparation of the various cable terminals are detailed in para.2.

NOTE: When SB.71-15 and 71-8455-23 are embodied, the plug type will be identified by the manufacturers code prefix HTMAS for Cannon and 992 for Deutsch. Pre SB.71-15 and 71-8455-23 plugs are identified by the code prefix HTMA.

#### B. Assemble Telescopic Bushes to Cables (Fig.504).

NOTE: Glasscloth tape must be assembled to all plug positions that do not have telescopic bushes assembled. The procedure for assembling the tape is detailed at the appropriate part of the plug assembly.

(1) Assemble the telescopic bushes to the cables at the following positions (Detail A).

- (a) On engines to Pre SB.71-15, 71-8455-23 and 71-9056-33 standard, assemble telescopic bushes to all plug positions other than disconnect points B, C, D, E, F, G and H.
- (b) On engines to SB.71-15 and 71-8455-23 standard, assemble telescopic bushes to all positions other than disconnect points B, C, D, E, F, G and H and plug positions B1/H4, C1, C2 and G8.
- (c) On engines to SB.71-9056-33 standard, assemble telescopic bushes to all positions other than disconnect points B, C, D, E, F, G and H and plug position H3 (where a support bush is used).

ASSEMBLY

71-51-01

Page 512

Jun 1/99



OLYMPUS 593

MK.610-14-28

OVERHAUL



C. Connect Plugs to Cables (Fig.504).

- (1) Remove from the appropriate plug the plug end bell from the plug body and release the clamp bars (Detail B). Assemble the plug end bell on to the cables (Detail C).
- (2) Identify the cable contacts and the positions they are to be inserted into in the plug body.
- (3) Place a contact into the insert tool (Tool 2701), then insert the contact into the correct hole in the rear of the plug body. Press the insert tool against the contact shoulder using firm even pressure (Detail C). The contact should be correctly locked in position when a slight click is heard, indicating that the contact has bottomed and the retaining tines have locked into place behind the contact shoulder.

NOTE: Some insert tools are dual purpose, inserter/extractor, ensure the correct end of the tool is used.

- (4) Remove the insert tool from the plug body and check that the contact is correctly locked by giving the cable a gentle pull.
- (5) Insert the remainder of the contacts into the correct positions in the plug body.
- (6) Fill any unoccupied holes in the plug with sealing plugs as detailed in the appropriate table.
- (7) If the plug being connected is at positions G8, C1 or C2, assemble the spacers to the harness with the cables laying along the outside groove of the spacers (Detail D).
- (8) Screw the plug end bell onto the plug body and hand-tighten.

PRINTED IN ENGLAND

TN17276

ASSEMBLY

71-51-01

Page 513

Feb 1/79



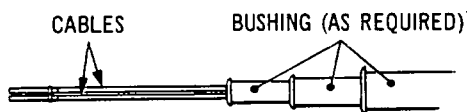
OLYMPUS 593

MK. 610-14-28  
OVERHAUL

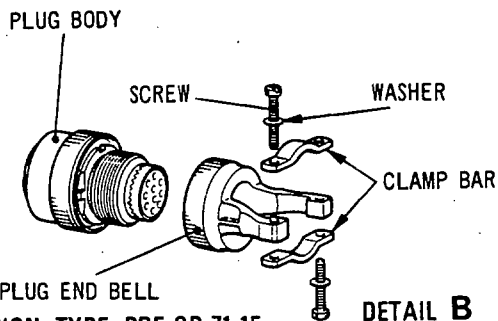


DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)

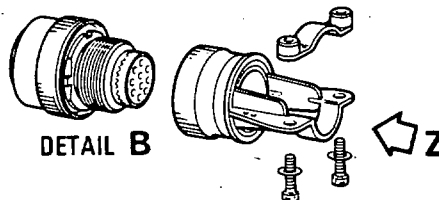
CR 32006/00C



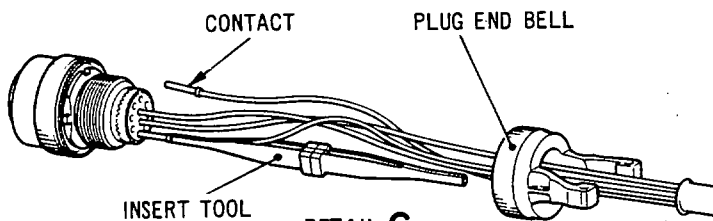
DETAIL A



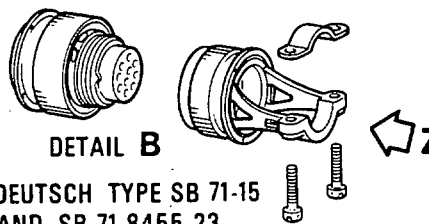
CANNON TYPE PRE SB 71-15  
AND PRE SB 71-8455-23  
H.T.M.A.



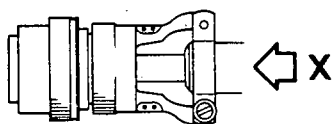
CANNON TYPE SB 71-15  
AND SB 71-8455-23  
H.T.M.A.(S)



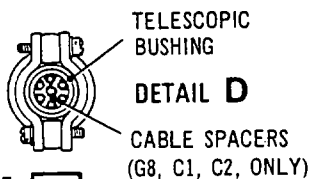
DETAIL C  
CONNECTING PLUG TO CABLES



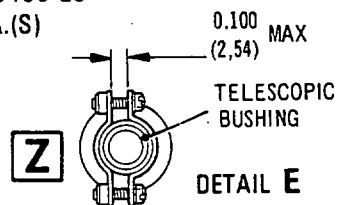
DEUTSCH TYPE SB 71-15  
AND SB 71-8455-23  
H.T.M.A.(S)



CANNON TYPE PRE SB 71-15  
AND PRE SB 71-8455-23  
H.T.M.A.

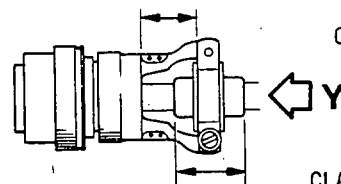


TELESCOPIC  
BUSHING  
DETAIL D  
CABLE SPACERS  
(G8, C1, C2, ONLY)

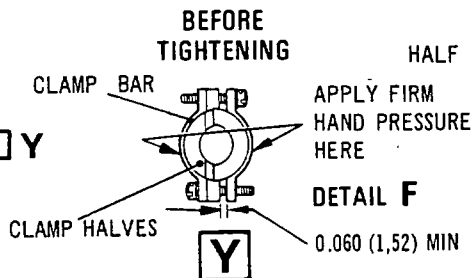


CANNON TYPE  
(DEUTSCH TYPE SIMILAR)

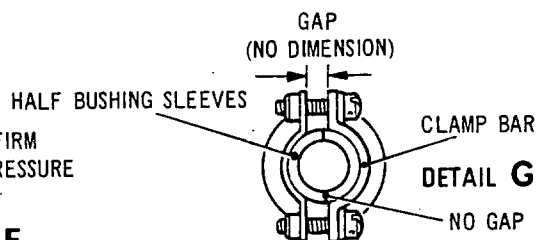
CABLE MUST NOT  
BE IN TENSION WHEN  
FITTING CLAMPS



GLASSCLOTH TAPE  
1.000 (25,40) WIDE



CANNON TYPE PRE SB 71-15  
AND PRE SB 71-8455-23  
H.T.M.A.



CANNON OR DEUTSCH TYPE  
SB 71-15 AND SB 71-8455-23  
H.T.M.A.(S)

Assembly of Electrical Plugs to Cables  
Figure 504

TN17278



**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

Printed in England

**D. Secure Plugs to Cables Containing Telescopic Bushes and Support Bush (SB.71-9056-33) (Fig.504).**

- (1) Ensure that all telescopic bushes and cable spacers (at positions G8, C1 or C2) are correctly positioned under the clamp bars (Detail D).

**CAUTION: CABLES MUST NOT BE IN TENSION WHEN ASSEMBLING CLAMPS.**

- (2) On engines to Pre SB.71-15 and 71-8455-23 standard, at positions other than disconnect points B to H, tighten evenly the two clamp bar screws with screwdriver (Tool 2606) until no gap is visible between clamp bars (Detail D). Using pliers (Tool 2607) wire-lock the plug assembly and clamp screws. Use lockwire B.
- (3) On engines to SB.71-15 and 71-8455-23 standard, at plug positions B2/H5, D1.5.11, F5 and F6, tighten evenly the two clamp bar screws with screwdriver (Tool 2606) to achieve firm clamping of the cable, whilst maintaining an even gap between the clamp bars, which must not exceed 0.100 in. (2,540 mm) (Detail E). Ensure that the telescopic bush is not distorted and trapped between the clamping ends of the bars. Using pliers (Tool 2607), wire-lock the plug assembly and clamp screws. Use lockwire B.
- (4) On engines to SB.71-15 and 71-8455-23 standard, at positions C3, C4, C5, C6, C7, C8, D2, D7, D9, D10, E1.2.3, E5, E8, E9, E11, F1, F2, G1, G4, G6, G9, G10, H1 and H3 tighten the clamp screws with screwdriver (Tool 2606) until no gap is visible between clamp bars. Using pliers (Tool 2607), wire-lock the plug assembly and clamp screws. Use lockwire B.

**E. Secure Plugs to Cables Containing Glasscloth Tape.**

- (1) Wrap glasscloth tape of at least 2 layers thickness around the cables at the clamp positions. The tape must be applied over approximately 1.000 in. (25,400 mm) length of cable and must be of sufficient thickness to conform with the following clamping requirements.

**NOTE :** Glasscloth tape 'A' has a backing strip which must be removed.

ASSEMBLY

**71-51-01**

Page 515

Jun 1/99



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (2) On engines to Pre SB.71-15 and 71-8455-23 standard at disconnect points B to H, wrap glasscloth tape 'A', 'B' or 'C' around the cables to achieve the following result.
  - (a) Place the half clamps over the wrapped section of the cable. Assemble the clamp bars over the half clamps, then apply hand pressure to the clamp bars and ensure that a gap between 0.060 in. and 0.100 in. (1,524 and 2,540 mm) exists between the clamp bars (Detail F).
  - (b) Using screwdriver (Tool 2606), tighten the two clamp bar screws until no gap exists between the clamp bars.
  - (c) Using pliers (Tool 2607), wire-lock the plug assembly and clamp screws. Use lockwire B.
- (3) On engines to SB.71-15 and 71-8455-23 standard at disconnect points B to H and plug positions B1/H4, C1, C2 and G8 wrap glasscloth tape 'A' around the cables to achieve the following result.
  - (a) At disconnect points B to H place the half bushing sleeves over the wrapped section of the cable, then apply hand pressure to the half bushing sleeves and ensure that the cable assembly is firmly clamped. Assemble the clamp bars over the half bushing sleeves and using screwdriver (Tool 2606), tighten the two clamp bar screws until the half bushing sleeves are held together without a gap (Detail G).

NOTE: The resultant gap between the clamp bars is not governed dimensionally after tightening.

  - (b) At plug positions B1/H4, C1, C2 and G8 place the clamp bars over the wrapped section of the cable. Using screwdriver (Tool 2606), tighten the two clamp bar screws to achieve firm clamping of the cable, whilst maintaining an even gap between the clamp bars which must not exceed 0.100 in. (2,540 mm)

ASSEMBLY

71-51-01

Page 516

Jun 1/99



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (c) Using pliers (Tool 2607), wire-lock the plug assembly and clamp screws. Use lockwire B.

#### 4. Assemble B and H Harness

##### A. General.

The following procedure is not required if the existing harness is serviceable. This text details the assembling of a new harness, or the replacement of cables or plugs in the event that defects found during Inspection/Check or Test, cannot be rectified by the procedures detailed in Repair No.1 of 71-51-01. When defective plugs are to be replaced, refer to 71-51-01 Disassembly for the removal of the plugs.

NOTE: The B and H harnesses are combined into one assembly.

##### B. Preparation for New Assembly or Rectification.

- (1) Determine the SB./Mod. standard required, then refer to the loom template (Tool 2711). The template will detail the positioning of the cables, lacings, plugs and wrappings.
- (2) Determine the various types of cables required by reference to Fig.505 and Table 504, and for the lengths of cable, refer to Table 511 and the loom template.
- (3) Determine the various types and sizes of plugs, bushes, contacts and sealing plugs by reference to Table 505 and the I.P.C., and for shrink/solder sleeves (if required) refer to Table 502.

NOTE: Having obtained the required items noted in para.B. proceed with the assembly or rectification of the harness.

##### C. Assemble a New Harness.

- (1) Position the new cables on the loom template, then measure off the correct lengths and cut as required.
- (2) Prepare the ends of the cables and attach the earthing tails (as required), then assemble the correct pin or socket contacts to the cable cores (Ref. para.2).

ASSEMBLY

71-51-01

Page 517

Jun 1/99



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Assemble the correct plugs to the cables (Ref. para.E. and para.3.).
- (4) Assemble the lacings and clamp markings as detailed on the template.
- (5) Check that the harness is serviceable (Ref. 71-00-02 Testing). Rectify any defects and re-test until serviceable.
- (6) Place the harness in its storage container (LG.11199) and assemble protectors to the plugs.

D. Replace a Defective Cable.

- (1) Remove the defective harness from its storage container and position it on the loom template as indicated.
- (2) Measure off the correct length of the required cable against the template.
- (3) Prepare the ends of the cable and attach an earthing tail (if required), then assemble the correct pin or socket contacts to the cable cores (Ref. para.2).
- (4) Assemble the correct plugs to the cable (Ref. para.E. and para.3.).
- (5) Release and remove the defective cable (or cables) from the harness, then assemble the new cable(s) to the harness and replace the required lacings and clamp markings as detailed on the template.
- (6) Check that the harness is now serviceable (Ref. 71-00-02 Testing). Rectify any defects and re-test until serviceable.
- (7) Replace the harness in its storage container (LG.11199) and assemble protectors to the plugs.

E. Assemble Plugs to Cables.

CAUTION: CANNON SEALING RINGS MUST ONLY BE ASSEMBLED TO CANNON PLUGS AND DEUTSCH SEALING RINGS ASSEMBLED TO DEUTSCH PLUGS.

NOTE: Throughout the text refer to wiring diagram (Ref.Fig.505), plug assemblies (Ref.Fig.507) and the assembly of plugs to cables (Ref. para.3.).

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

Printed in England

CABLE TYPE	R.R. PART NO.	MANUFACTURERS PART NO.	TITLE
A	3105585	BAS 9189-20	Cable - size 20.
B	3105860	ETUDE 41583 (ALTERNATIVE BAS 9115-16) (ALTERNATIVE ASNE 0437DL-16)	Fireproof cable - size 16, Filotex. 16, Filotex.
C		1150-2XA-AWG16 (ALTERNATIVE NBAC 0401)	Fireproof cable - size 16, Filotex. Twisted, screened and jacketed.
D	3105588	BAS 9192-20	Cable - size 20. Two twisted cores, shielded and jacketed.
E		33655 EDT N2 or CD 1401	Filotex ETUDE or CD 1401.
F	3105772	BAS 9194-20	Cable - size 20, three cables twisted together.
G		BAS 9190-20 (ALTERNATIVE BMS 13-31-7-1-20)	Screened cable, size 20.
H		BAS 9191-20 (ALTERNATIVE BMS 13-31-5-2-20)	Cable - size 20. Two cables twisted together.
J		45671 or CD 1401	Filotex ETUDE or TYGADURE.
K	3105844	BAS 9189-16	Cable - size 16.

Cable Identification  
Table 504

ASSEMBLY

**71-51-01**Page 519  
Dec 31/00

CR 33389/00C  
BS00024520/2

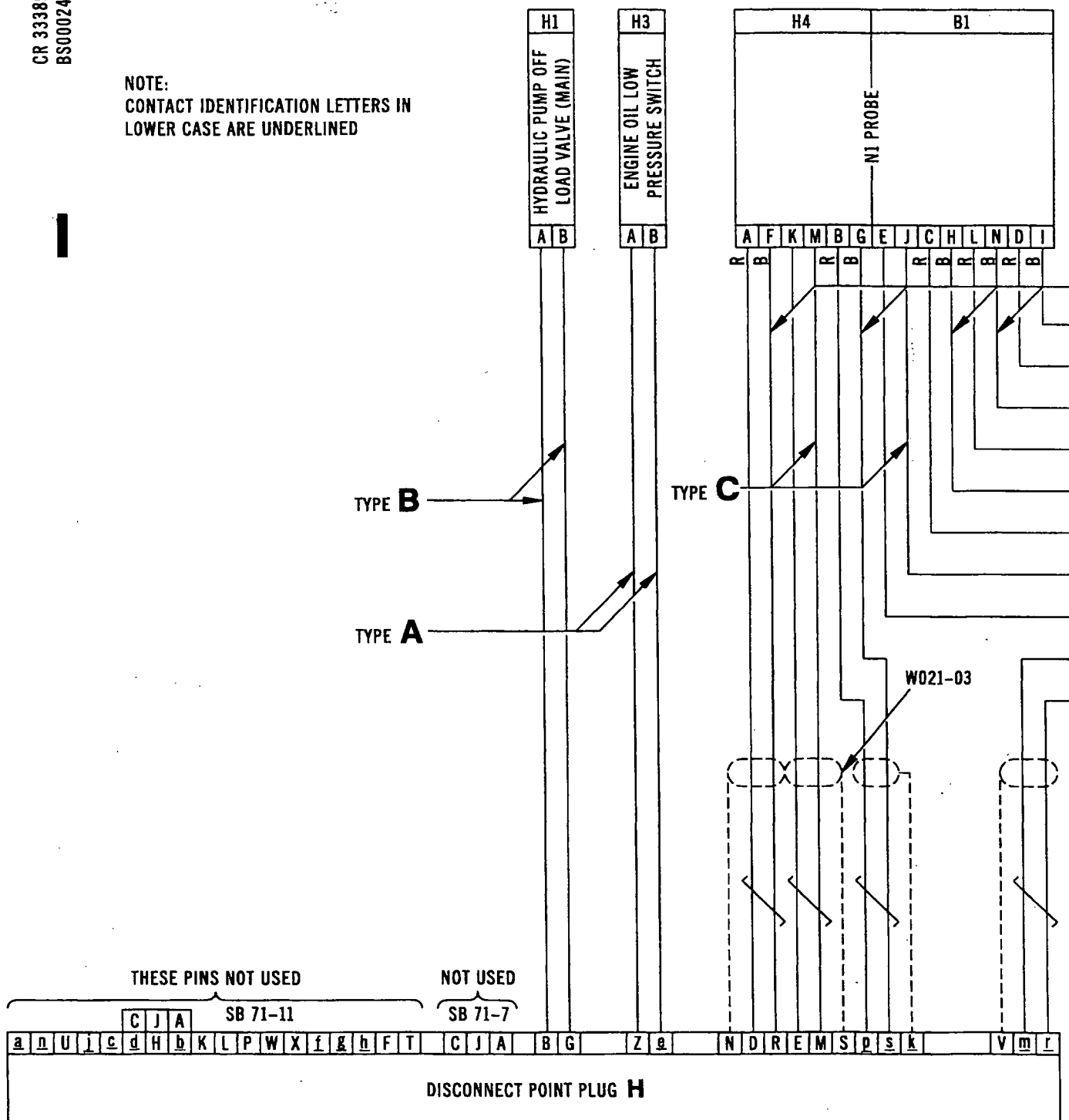


OLYMPUS 593

MK.610-14-28  
OVERHAUL



NOTE:  
CONTACT IDENTIFICATION LETTERS IN  
LOWER CASE ARE UNDERLINED



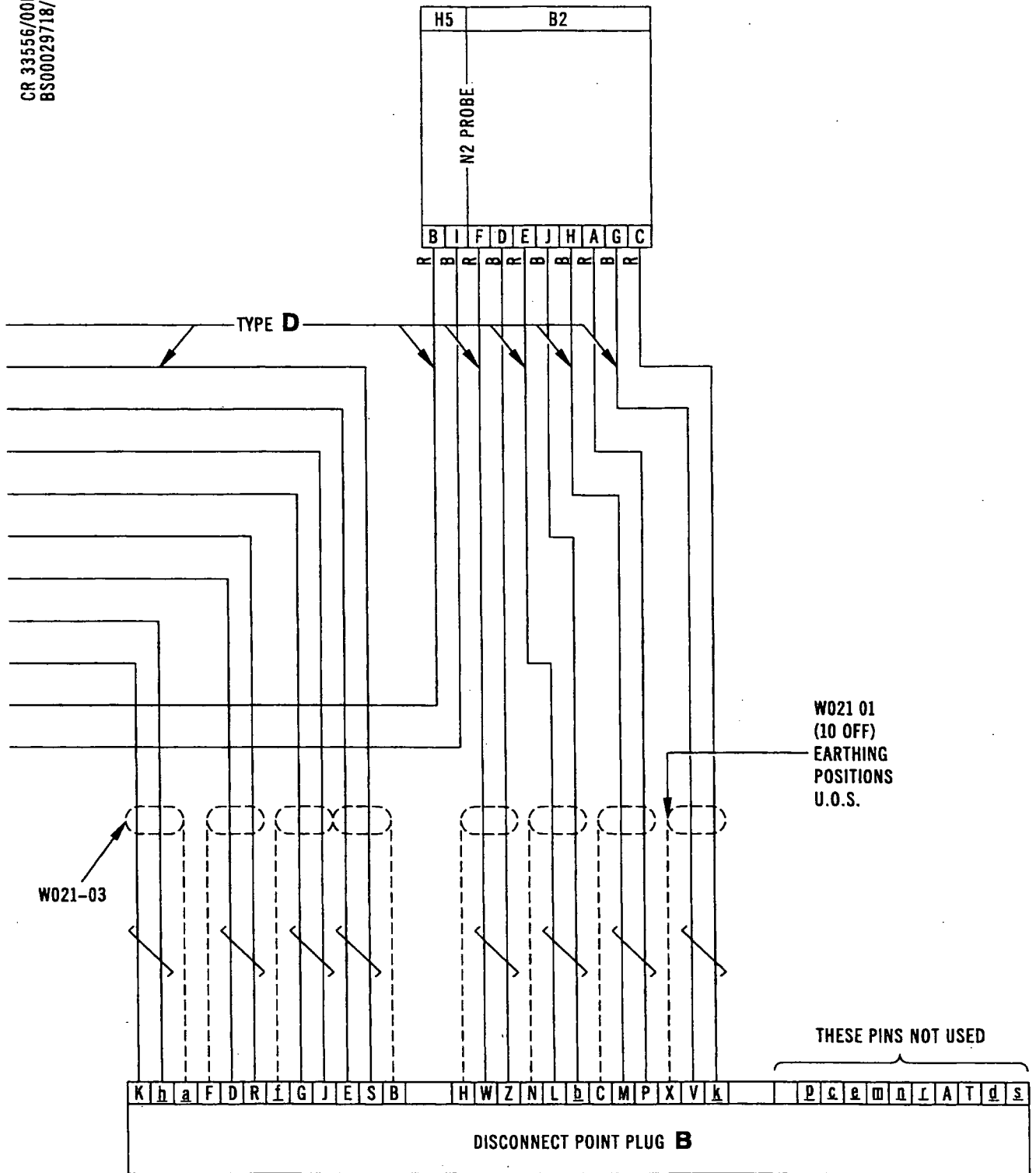
Wiring Diagram for B and H Harness  
Figure 505 (Sheet 1 of 2)

CR 33556/00E  
BS00029718/1



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Wiring Diagram for B and H Harness  
Figure 505 (Sheet 2 of 2)

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

PLUG	PLUG I.P.C. REF.	CONTACT I.P.C. REF.	SEALING PLUG I.P.C. REF.	BUSH I.P.C. REF.
B	12-240	12-300	12-310	+12-260 or 265
H	12-270	12-300	12-310	+12-290 or 295
H1	12-180	12-220	-	12-200/210
B3	Deleted			
H3	12-110	12-220	-	*12-130/140
				**12-135
H4-B1	12-150	12-230	-	***12-170
H5-B2	12-30	12-230	-	12-50/60
H7	Deleted			

+ Half clamps or bushing sleeves

\* Pre SB.71-9056-33, \*\* SB.71-9056-33,

\*\*\* Pre SB.71-8455-23

Plug Assembly Identification of B and H Harness  
Table 505

## (1) Assemble plug B to cables.

- (a) Assemble, connect and secure the plug to the cables, ensuring that sealing plugs are assembled to unused plug holes and tape is assembled under the clamp location (Ref. para. 3.C. and E.).

ASSEMBLY

**71-51-01**Page 522  
Dec 31/00





OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

This page deleted

ASSEMBLY

71-51-01

Page 523

Jun 1/86



OLYMPUS 593

MK. 610-14-28  
OVERHAUL



PRINTED IN ENGLAND

FIGURE 506 CANCELLED



# OLYMPUS 593

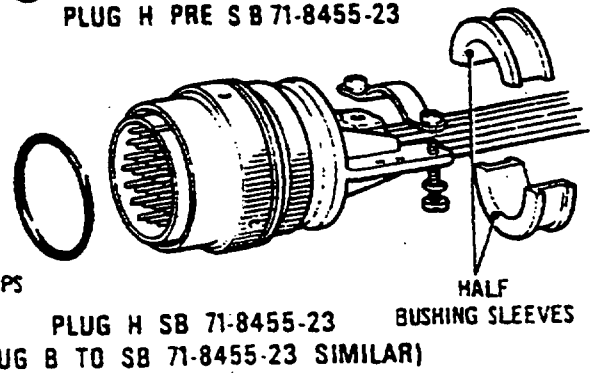
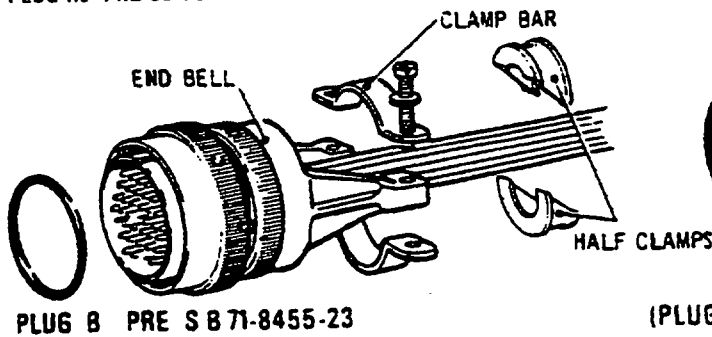
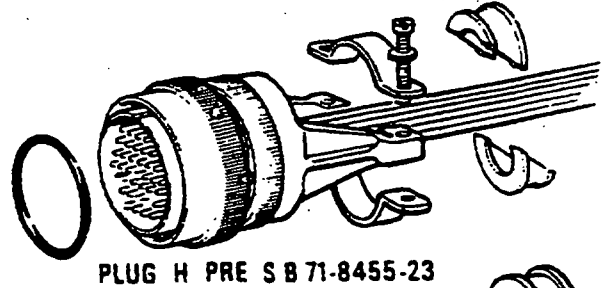
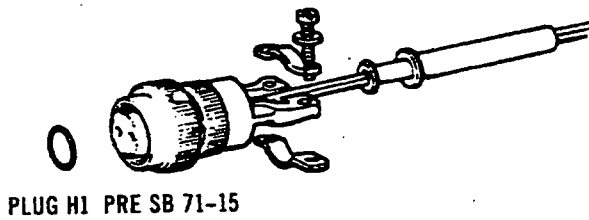
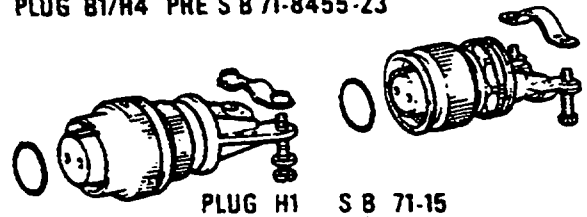
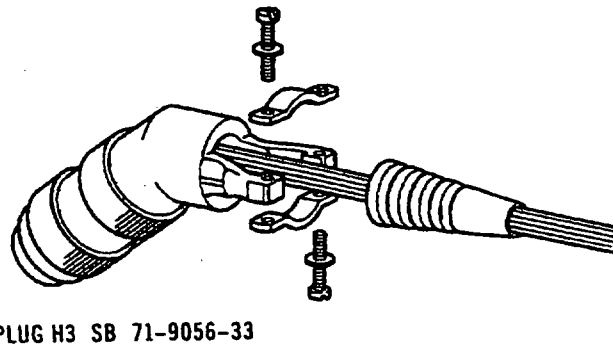
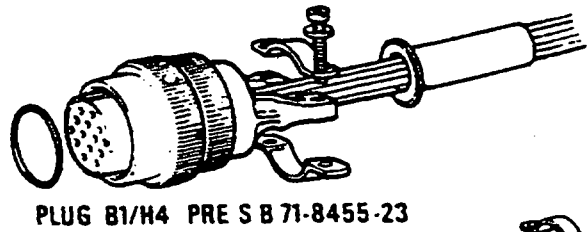
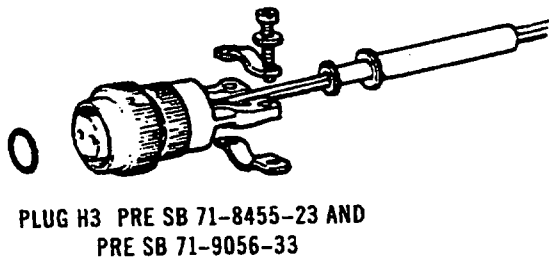
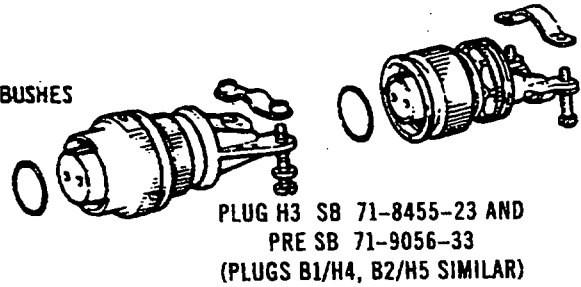
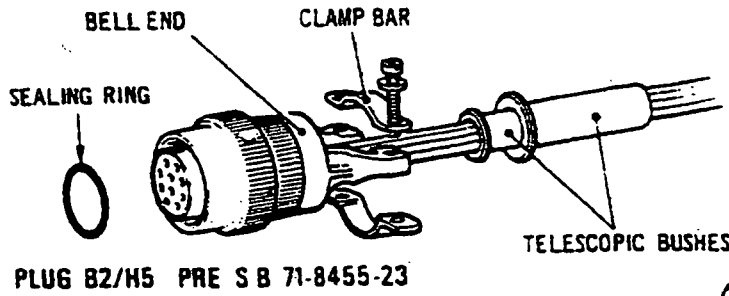


MK.610-14-28  
OVERHAUL

sneema

CR 33438/00F  
BS00024511/2

Printed in England



Assembly of B and H Harness Plug Assemblies  
Figure 507



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

- (b) Insert a new sealing ring (12-250) into the plug.
- (2) Assemble plug H to cables.
  - (a) Assemble, connect and secure the plug to the cables, ensuring that sealing plugs are assembled to unused plug holes and tape is assembled under the clamp location (Ref.para.3.C. and E.).
  - (b) Insert a new sealing ring (12-280) into the plug.
- (3) Assemble plug H1 to cables.
  - (a) Assemble the two telescopic bushes to the cables.
  - (b) Assemble, connect and secure the plug to the cables (Ref.para.3.C. and D.).
  - (c) Insert a new sealing ring (12-190) into the plug.
- (4) Assemble plug H3 to cable.
  - (a) Assemble the two telescopic bushes to the cables (Pre SB.71-9056-33) or the support bush (SB.71-9056-33).
  - (b) Assemble, connect and secure the plug to the cables (Ref.para.3.C. and D.).
  - (c) Insert a new sealing ring (12-120) into the plug.
- (5) Assemble plug H4-B1 to cables.
  - (a) Assemble the telescopic bush to the cables (Pre SB.71-8455-23).
  - (b) Assemble, connect and secure the plug to the cables, ensuring that the tape is assembled under the clamp location on plugs to SB.71-8455-23 standard (Ref.para.3.C. and D. or E.).
  - (c) Insert a new sealing ring (12-40) into the plug.

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

(6) Assemble plug H5-B2 to cables.

(a) Assemble the two telescopic bushes to the cables.

(b) Assemble, connect and secure the plug to the cables (Ref.para.3.C. and D.).

(c) Insert a new sealing ring (12-40) into the plug.

## 5. Assemble C Harness

### A. General.

The following procedure is not required if the existing harness is serviceable. This text details the assembling of a new harness, or the replacement of cables or plugs in the event that defects found during Inspection/Check or Test, cannot be rectified by the procedures detailed in Repair No.1 of 71-51-01. When defective plugs are to be replaced, refer to 71-51-01 Disassembly for the removal of the plugs.

### B. Preparation for New Assembly or Rectification.

- (1) Determine the SB./Mod. standard required, then refer to the loom template (Tool 2711). The template will detail the positioning of the cables, lacings, plugs and wrappings.

ASSEMBLY

**71-51-01**

Page 527

Dec 31/00

CR 33391/00A  
BS00029719/1

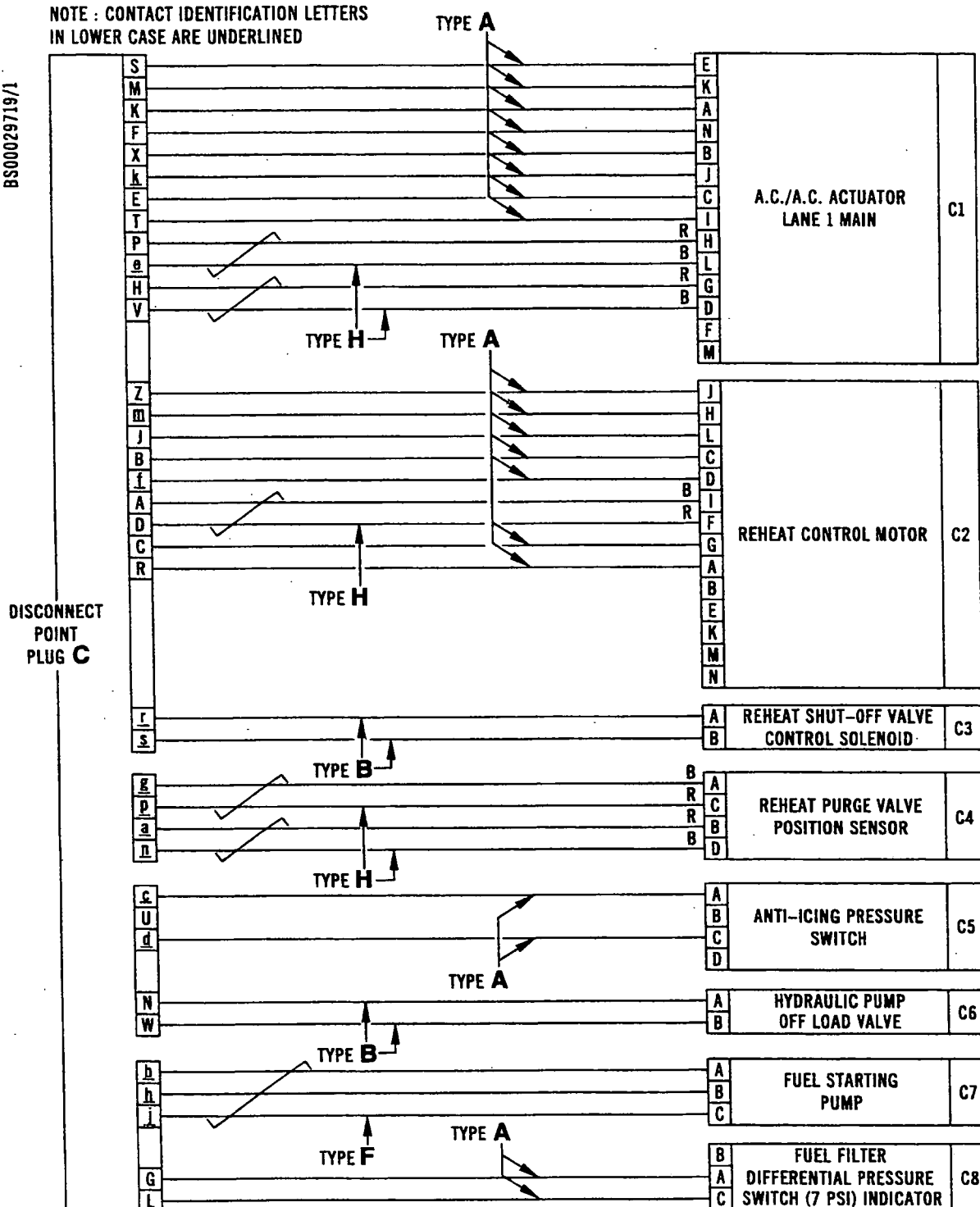


OLYMPUS 593

MK.610-14-28  
OVERHAUL



NOTE : CONTACT IDENTIFICATION LETTERS  
IN LOWER CASE ARE UNDERLINED



Wiring Diagram for C Harness (Pre.SB.71-8988-32)  
Figure 508  
(Sheet 1 of 2)

ASSEMBLY

71-51-01

Page 528  
Dec 31/00

BS00029980/1

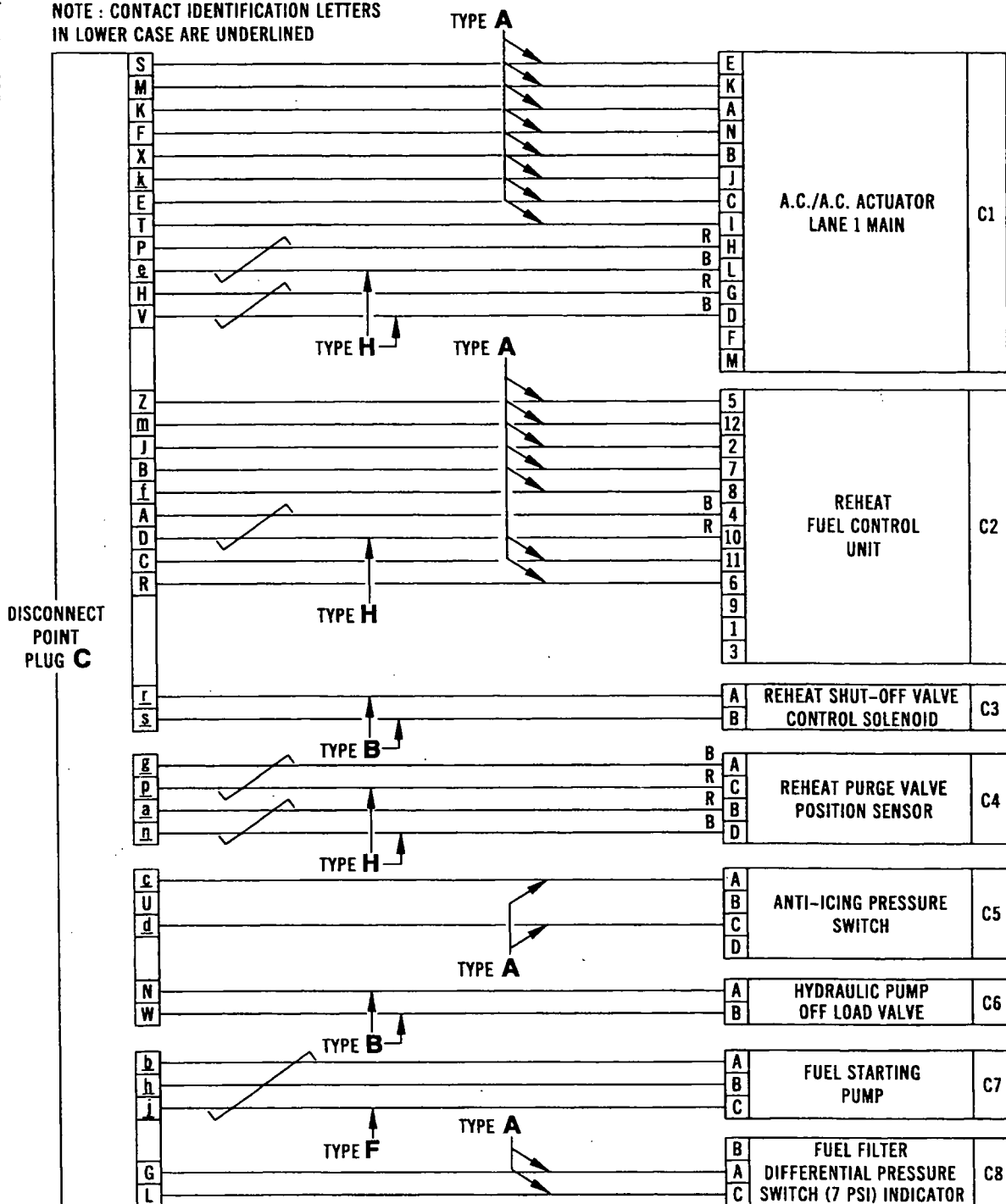


OLYMPUS 593

MK.610-14-28  
OVERHAUL



NOTE : CONTACT IDENTIFICATION LETTERS  
IN LOWER CASE ARE UNDERLINED



Wiring Diagram for C Harness (SB.71-8988-32)  
Figure 508  
(Sheet 2 of 2)

ASSEMBLY

71-51-01

Page 529  
Dec 31/00



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Determine the various types of cables required by reference to Fig.508 and Table 504, and for the lengths of cable, refer to Table 511 and the loom template.
- (3) Determine the various types and sizes of plugs, bushes, contacts and sealing plugs by reference to Table 506 and the I.P.C., and for shrink/solder sleeves (if required) refer to Table 502.

NOTE: Having obtained the required items noted in para.B. proceed with the assembly or rectification of the harness.

C. Assemble a New Harness.

- (1) Position the new cables on the loom template, then measure off the correct lengths and cut as required.
- (2) Prepare the ends of the cables and attach the earthing tails (as required), then assemble the correct pin or socket contacts to the cable cores (Ref. para.2).
- (3) Assemble the correct plugs to the cables (Ref. para.E. and para.3).
- (4) Assemble the lacings and clamp markings as detailed on the template.
- (5) Check that the harness is serviceable (Ref. 71-00-02 Testing). Rectify any defects and re-test until serviceable.
- (6) Place the harness in its storage container (LG.11199) and assemble protectors to the plugs.

D. Replace a Defective Cable.

- (1) Remove the defective harness from its storage container and position it on the loom template as indicated.
- (2) Measure off the correct length of the required cable against the template.



Printed in England



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

This page left blank intentionally

ASSEMBLY

71-51-01

Page 531  
Dec 31/00

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



- (3) Prepare the ends of the cable and attach an earthing tail (if required), then assemble the correct pin or socket contacts to the cable cores (Ref. para.2).
- (4) Assemble the correct plugs to the cable (Ref. para.E and para.3).
- (5) Release and remove the defective cable (or cables) from the harness, then assemble the new cable(s) to the harness and replace the required lacings and clamp markings as detailed on the template.
- (6) Check that the harness is now serviceable (Ref. 71-00-02 Testing). Rectify any defects and re-test until serviceable.
- (7) Replace the harness in its storage container (LG.11199) and assemble protectors to the plugs.

PLUG	PLUG I.P.C. REF.	CONTACT I.P.C. REF.	SEALING PLUG I.P.C. REF.	BUSH I.P.C. REF.
C	13-400	13-430	13-440	+13-420 or 425
C1	13-200	13-370	13-390	*13-230
C2	13-330	13-370	13-390	*13-360
C3	13-240	13-380	-	13-260/270
C4	13-280	13-380	-	13-300/310/320
C5	13-70	13-380	13-390	13-90/100/110
C6	13-120	13-380	-	13-140/150
C7	13-160	13-380	-	13-180/190
C8	13-20	13-380	13-390	13-40/50/60

+ Half clamps or bushing sleeves      \* Pre SB.71-8455-23

Plug Assembly Identification of C Harness  
Table 506



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



E. Assemble Plugs to Cables.

CAUTION: CANNON SEALING RINGS MUST ONLY BE ASSEMBLED TO CANNON PLUGS AND DEUTSCH SEALING RINGS ASSEMBLED TO DEUTSCH PLUGS.

NOTE: Throughout the text refer to wiring diagram (Ref.Fig.508), plug assemblies (Ref.Fig.509) and the assembly of plugs to cables (Ref. para.3.).

- (1) Assemble plug C to cable.
  - (a) Assemble, connect and secure the plug to the cables, ensuring that sealing plugs are assembled to unused plug holes and tape is assembled under the clamp location (Ref. para.3.C. and E.).
  - (b) Insert a new sealing ring (13-410) into the plug.
- (2) Assemble plug C1 to cable.
  - (a) Assemble the telescopic bush to the cables (pre SB.71-8455-23).
  - (b) Assemble and connect the plug to the cables, ensuring that sealing plugs are assembled to unused plug holes.
  - (c) On plugs to pre SB.71-8455-23 assemble cable spacers and secure the plug (Ref.para.3.C. and D.), or on plugs to SB.71-8455-23 assemble tape to the cable under the clamp location and secure the plug (Ref.para.3.C. and E.).
  - (d) Insert a new sealing ring (13-210) into the plug.
- (3) Assemble plug C2 to cable.
  - (a) Assemble the telescopic bush to the cables (pre SB.71-8455-23).

PRINTED IN ENGLAND

TN15391

ASSEMBLY

**71-51-01**

Page 533  
Feb 1/79



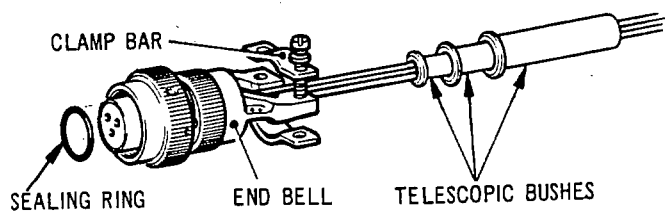
OLYMPUS 593

MK. 610-14-28

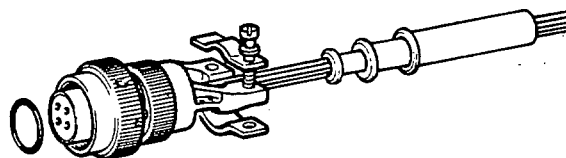
OVERHAUL



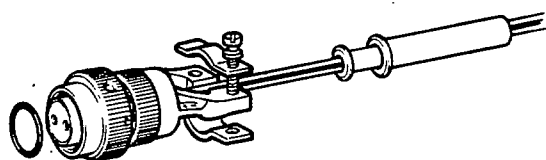
CR 33439/00C



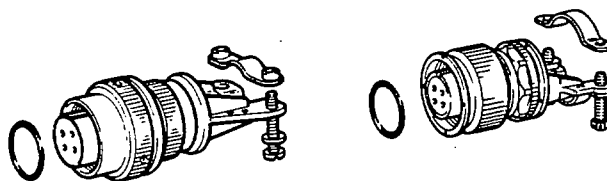
PLUG C8 PRE SB 71-8455-23



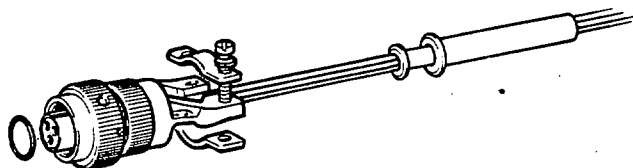
PLUG C5 PRE SB 71-8455-23



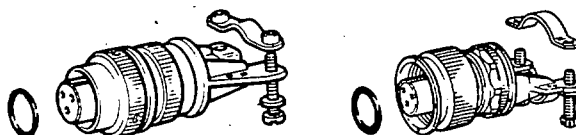
PLUG C6 PRE SB 71-15



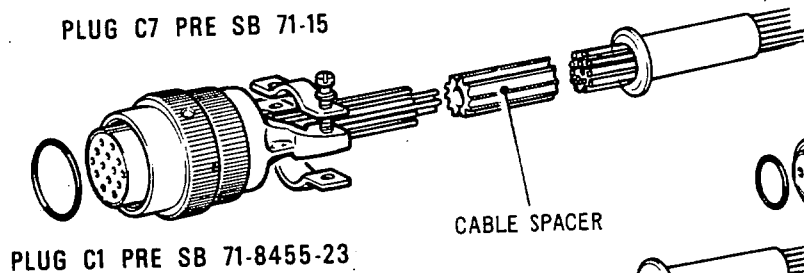
PLUG C5 SB 71-8455-23  
(PLUGS C1, C2, C3, C4 AND C8  
TO SB 71-8455-23 SIMILAR)



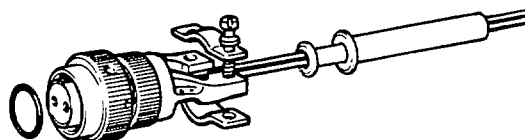
PLUG C7 PRE SB 71-15



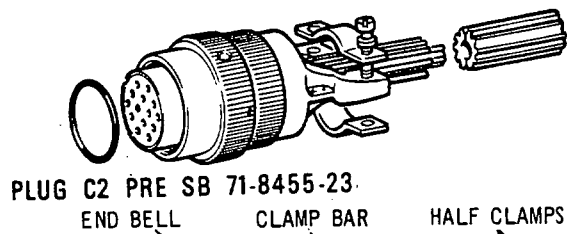
PLUG C7 SB 71-15  
(PLUG C6 TO SB 71-15 SIMILAR)



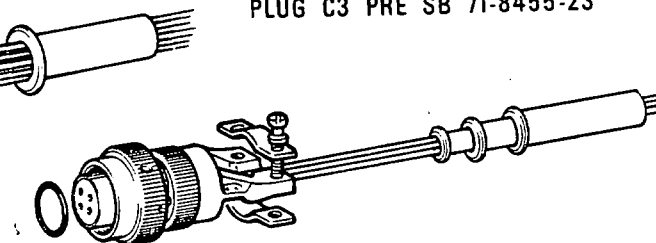
PLUG C1 PRE SB 71-8455-23



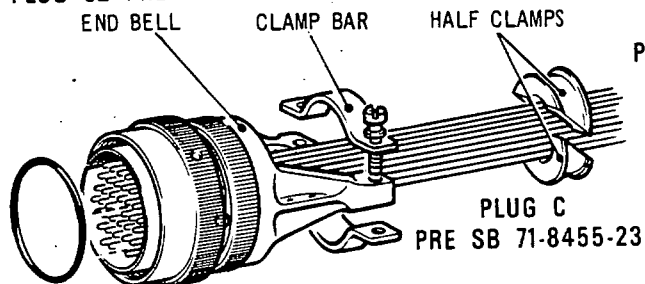
PLUG C3 PRE SB 71-8455-23



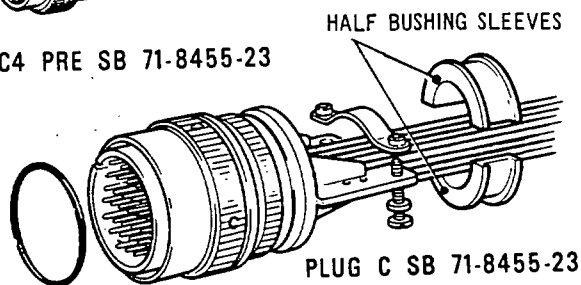
PLUG C2 PRE SB 71-8455-23



PLUG C4 PRE SB 71-8455-23



PLUG C  
PRE SB 71-8455-23



PLUG C SB 71-8455-23

Assembly of C Harness Plug Assemblies  
Figure 509

TN25732



OLYMPUS 593

MK.610-14-28  
OVERHAUL

- (b) Assemble and connect the plug to the cables, ensuring that sealing plugs are assembled to unused plug holes.
  - (c) On plugs to pre SB.71-8455-23 assemble cable spacers and secure the plug (Ref.para.3.C. and D.), or on plugs to SB.71-8455-23 assemble tape to the cable under the clamp location and secure the plug (Ref.para.3.C. and E.).
  - (d) Insert a new sealing ring (13-340) into the plug.
- (4) Assemble plug C3 to cable.
- (a) Assemble the two telescopic bushes to the cables.
  - (b) Assemble, connect and secure the plug to the cables (Ref.para.3.C. and D.).
  - (c) Insert a new sealing ring (13-250) into the plug.
- (5) Assemble plug C4 to cable.
- (a) Assemble the three telescopic bushes to the cables.
  - (b) Assemble, connect and secure the plug to the cable (Ref.para.3.C. and D.).
  - (c) Insert a new sealing ring (13-290) into the plug.
- (6) Assemble plug C5 to cable.
- (a) Assemble the three telescopic bushes to the cables.
  - (b) Assemble, connect and secure the plug to the cable (Ref.para.3.C. and D.).
  - (c) Insert a new sealing ring (13-80) into the plug.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (7) Assemble plug C6 to cable.
  - (a) Assemble two telescopic bushes to the cables.
  - (b) Assemble, connect and secure the plug to the cable (Ref.para.3.C. and D.).
  - (c) Insert a new sealing ring (13-130) into the plug.
- (8) Assemble plug C7 to cable.
  - (a) Assemble two telescopic bushes to the cables.
  - (b) Assemble, connect and secure the plug to the cable (Ref.para.3.C. and D.).
  - (c) Insert a new sealing ring (13-170) into the plug.
- (9) Assemble plug C8 to cable.
  - (a) Assemble three telescopic bushes to the cables.
  - (b) Assemble, connect and secure the plug to the cables, ensuring that a sealing plug is assembled to the unused plug hole (Ref.para.3.C. and D.).
  - (c) Insert a new sealing ring (13-30) into the plug.

## 6. Assemble D Harness

### A. General.

The following procedure is not required if the existing harness is serviceable. This text details the assembling of a new harness, or the replacement of cables or plugs in the event that defects found during Inspection/Check or Test, cannot be rectified by the procedures detailed in Repair No.1 of 71-51-01. When defective plugs are to be replaced, refer to 71-51-01 Disassembly for the removal of the plugs.

TN17124



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

Printed in England

B. Preparation for New Assembly or Rectification.

- (1) Determine the SB./Mod. standard required, then refer to the loom template (Tool 2711). The template will detail the positioning of the cables, lacings, plugs and wrappings.
- (2) Determine the various types of cables required by reference to Fig.510 and Table 504, and for the lengths of cable, refer to Table 511 and the loom template.
- (3) Determine the various types and sizes of plugs, bushes, contacts and sealing plugs by reference to Table 507 and the I.P.C., and for shrink/solder sleeves (if required) refer to Table 502.

NOTE: Having obtained the required items noted in para.B. proceed with the assembly or rectification of the harness.

C. Assemble a New Harness.

- (1) Position the new cables on the loom template, then measure off the correct lengths and cut as required.
- (2) Prepare the ends of the cables and attach the earthing tails (as required), then assemble the correct pin or socket contacts to the cable cores (Ref. para.2).
- (3) Assemble the correct plugs to the cables (Ref. para.E. and para.3.).
- (4) Assemble the lacings and clamp markings as detailed on the template.
- (5) Check that the harness is serviceable (Ref. 71-00-02 Testing). Rectify any defects and re-test until serviceable.
- (6) Place the harness in its storage container (LG.11199) and assemble protectors to the plugs.

D. Replace a Defective Cable.

- (1) Remove the defective harness from its storage container and position it on the loom template as indicated.

ASSEMBLY

71-51-01

Page 537

Jun 1/99



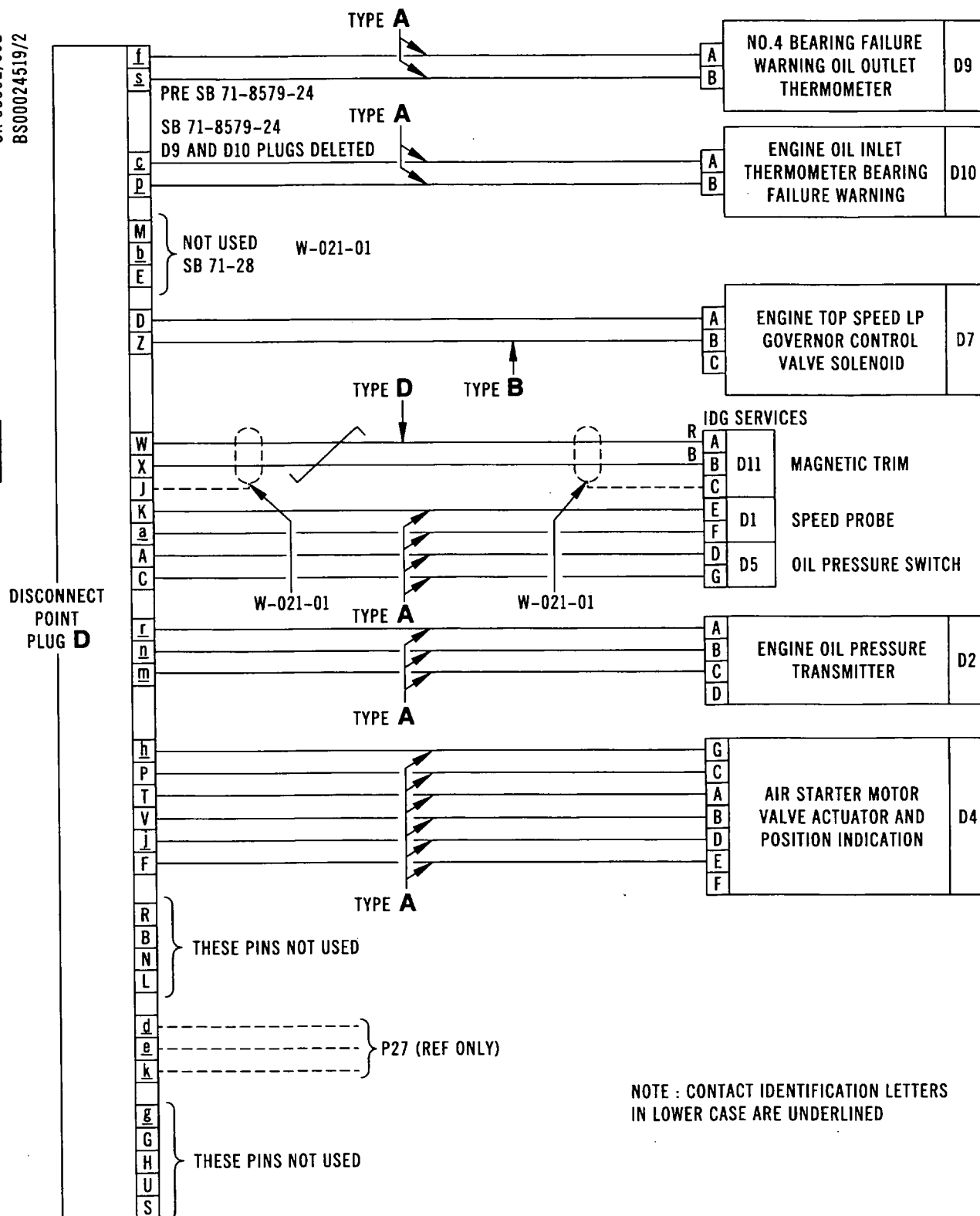
OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

CR 33392/00E  
BS00024519/2



Wiring Diagram for D Harness  
Figure 510

ASSEMBLY

71-51-01

Page 538  
Dec 31/00



**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

Printed in England

- (2) Measure off the correct length of the required cable against the template.
- (3) Prepare the ends of the cable and attach an earthing tail (if required), then assemble the correct pin or socket contacts to the cable cores (Ref. para.2).
- (4) Assemble the correct plugs to the cable (Ref. para.E. and para.3.).
- (5) Release and remove the defective cable (or cables) from the harness, then assemble the new cable(s) to the harness and replace the required lacings and clamp markings as detailed on the template.
- (6) Check that the harness is now serviceable (Ref. 71-00-02 Testing). Rectify any defects and re-test until serviceable.
- (7) Replace the harness in its storage container (LG.11199) and assemble protectors to the plugs.

PLUG	PLUG I.P.C. REF.	CONTACT I.P.C. REF.	SEALING PLUG I.P.C. REF.	BUSH I.P.C. REF.
D	14-230	14-260	14-270	+14-250 or 255
D1/D5/D11	14-20	14-200	14-210	14-40/50/60
D4	14-20	14-200	14-210	14-40/50/60
D2	14-150	14-200	14-210	14-170/180/190
D6	Deleted			
D7	14-70	14-200	14-210	14-90/100
*D9	14-110	14-200	-	14-130/140
*D10	14-110	14-200	-	14-130/140

+ Half clamps or bushing sleeves.

\* Pre SB.71-8579-24

Plug Assembly Identification of D Harness  
Table 507

ASSEMBLY

**71-51-01**

Page 539

Jun 1/99



OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

E. Assemble Plugs to Cables.

CAUTION: CANNON SEALING RINGS MUST ONLY BE ASSEMBLED TO CANNON PLUGS AND DEUTSCH SEALING RINGS ASSEMBLED TO DEUTSCH PLUGS.

NOTE: Throughout the text refer to wiring diagram (Ref.Fig.510), plug assemblies (Ref.Fig.511) and the assembly of plugs to cables (Ref. para.3.

(1) Assemble plug D to cables.

(a) Assemble, connect and secure the plug to the cables, ensuring that sealing plugs are assembled to unused plug holes and tape is assembled under the clamp location (Ref.para.3.C. and E.).

(b) Insert a new sealing ring (14-240) into the plug.

(2) Assemble plug D1/D5/D11 to cables.

NOTE: Assemble plug D4 in the same manner.

(a) Assemble the three telescopic bushes to the cables.

(b) Assemble, connect and secure the plug to the cables (Ref.para.3.C. and D.).

(c) Insert a new sealing ring (14-30) into the plug.

(3) Assemble plug D2 to cables.

(a) Assemble the three telescopic bushes to the cables.

(b) Assemble, connect and secure the plug to the cable, ensuring that a sealing plug is assembled to the unused plug hole (Ref.para.3.C. and D.).

(c) Insert a new sealing ring (14-160) into the plug.

(4) Assemble plug D7 to cables.



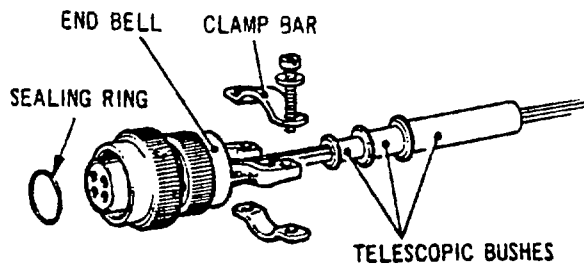
OLYMPUS 593

MK.610-14-28  
OVERHAUL

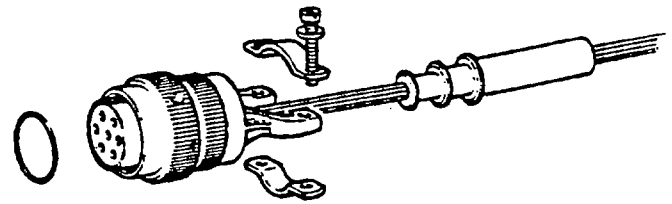


sneema

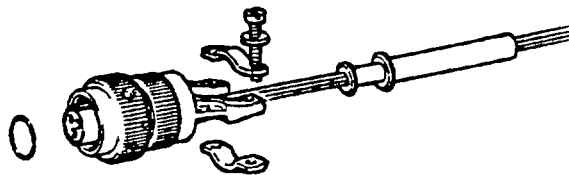
CR 33440/000  
BS00024525/1



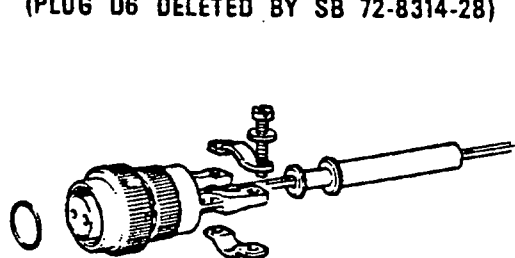
PLUG D2  
PRE SB 71-8455-23



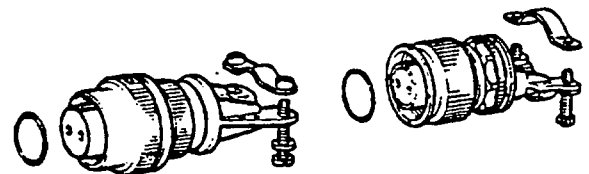
PLUG D1/D5/D11 (D4 SIMILAR)  
PRE SB 71-8455-23



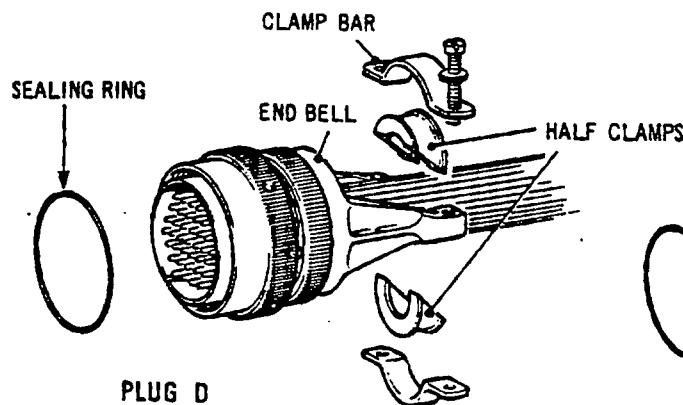
PLUG D7 PRE SB 71-8455-23  
(PLUG D6 DELETED BY SB 72-8314-28)



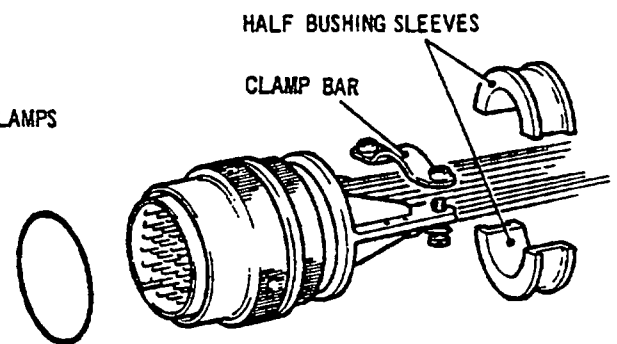
PLUG D9 (D10 SIMILAR) PRE SB 71-8455-23



PLUG D9 SB 71-8455-23  
(PLUGS D2, D1/D5/D11, D4 AND D7  
TO SB 71-8455-23 SIMILAR)



PLUG D  
PRE SB 71-8455-23



PLUG D  
SB 71-8455-23

Assembly of D Harness Plug Assemblies  
Figure 511



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (a) Assemble the two telescopic bushes to the cables.
- (b) Assemble, connect and secure the plug to the cable, ensuring that a sealing plug is assembled to the unused plug hole (Ref.para.3.C. and D.).
- (c) Insert a new sealing ring (14-80) into the plug.
- (5) Assemble plug D9 to cables (Pre SB.71-8579-24).

NOTE: Assemble plug D10 (Pre SB.71-8579-24) in the same manner.

- (a) Assemble the two telescopic bushes to the cables.
- (b) Assemble, connect and secure the plug to the cables (Ref.para.3.C. and D.).
- (c) Insert a new sealing ring (14-120) into the plug.
- (6) Terminate end of cable at plug position D9 and D10 (SB.71-8579-24).

NOTE: When SB.71-8579-24 is embodied the D9 and D10 plugs are not required.

- (a) Assemble a shrink sleeve to each of the two contacts (Ref.para.2.B.).

## 7. Assemble E Harness

### A. General.

The following procedure is not required if the existing harness is serviceable. This text details the assembling of a new harness, or the replacement of cables or plugs in the event that defects found during Inspection/Check or Test, cannot be rectified by the procedures detailed in Repair No.1 of 71-51-01. When defective plugs are to be replaced, refer to 71-51-01 Disassembly for the removal of the plugs.

ASSEMBLY

**71-51-01**

Page 542  
Jun 1/99



OLYMPUS 593

MK.610-14-28  
OVERHAUL

## B. Preparation for New Assembly or Rectification.

- (1) Determine the SB./Mod. standard required, then refer to the loom template (Tool 2711). The template will detail the positioning of the cables, lacings, plugs and wrappings.
- (2) Determine the various types of cables required by reference to Fig.512 and Table 504, and for the lengths of cable, refer to Table 511 and the loom template.
- (3) Determine the various types and sizes of plugs, bushes, contacts and sealing plugs by reference to Table 508 and the I.P.C., and for shrink/solder sleeves (if required) refer to Table 502.

NOTE: Having obtained the required items noted in para.B. proceed with the assembly or rectification of the harness.

## C. Assemble a New Harness.

- (1) Position the new cables on the loom template, then measure off the correct lengths and cut as required.

PLUG	PLUG I.P.C. REF.	CONTACT I.P.C. REF.	SEALING PLUG I.P.C. REF.	BUSH I.P.C. REF.
E	15-220	15-250	15-260	+15-240 or 245
E1/E2/E3	15-140	15-190	-	15-160/170/180
E5/E11	15-60	15-190	15-200	15-80/90
E16	Deleted			
E8/E9	15-20	15-190	-	15-40/50
E15	Deleted			

+ Half clamps or bushing sleeves

Plug Assembly Identification of E Harness  
Table 508

ASSEMBLY

71-51-01

Page 543  
Jun 1/99



# OLYMPUS 593

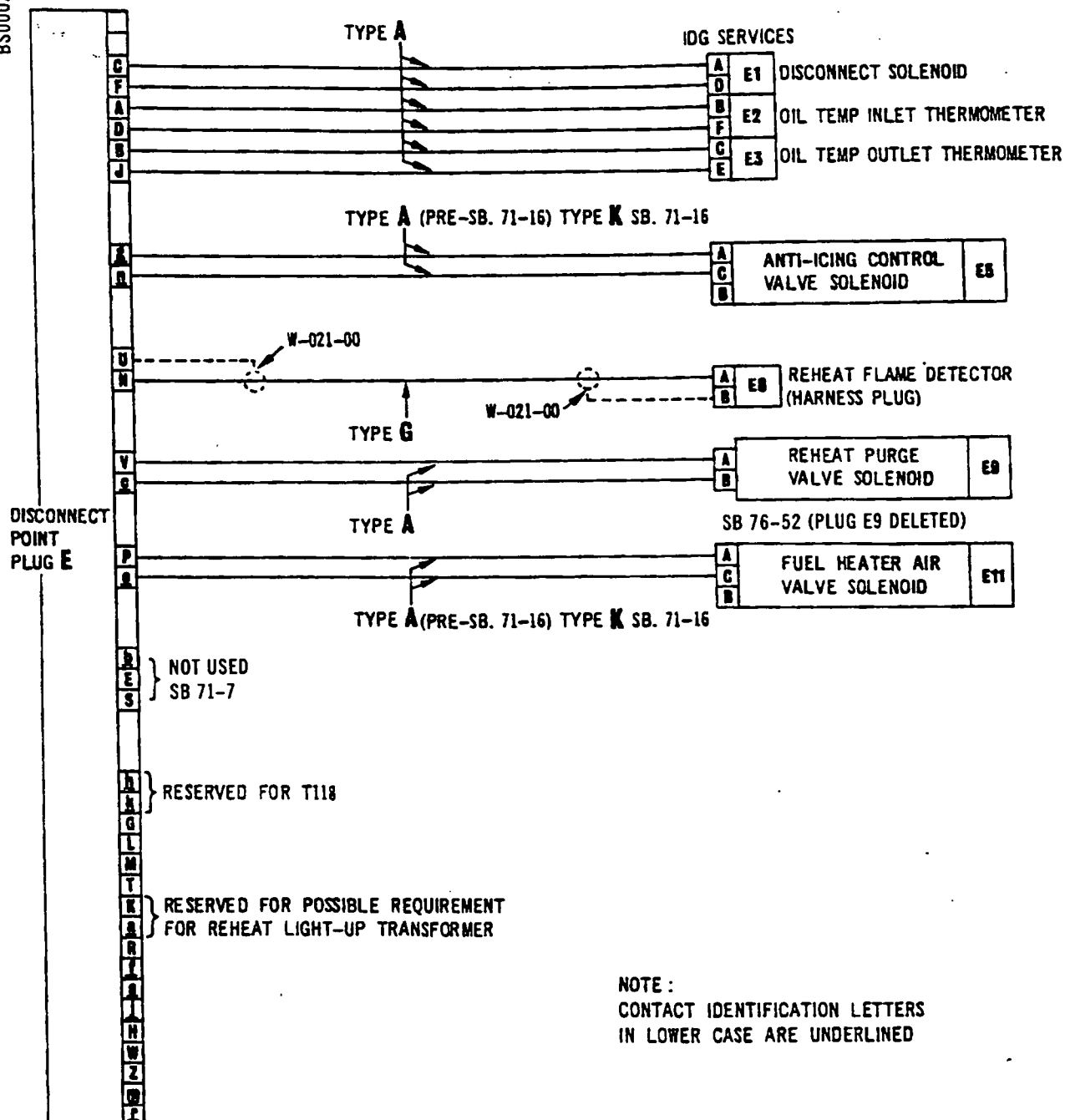


MK.610-14-28  
OVERHAUL

sneema

Printed in England

CR 33393/00F  
BS00024518/1



NOTE:  
CONTACT IDENTIFICATION LETTERS  
IN LOWER CASE ARE UNDERLINED

Wiring Diagram for E Harness  
Figure 512

ASSEMBLY  
**71-51-01**  
Page 544  
Jun 1/99



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Prepare the ends of the cables and attach the earthing tails (as required), then assemble the correct pin or socket contacts to the cable cores (Ref.para.2).
- (3) Assemble the correct plugs to the cables (Ref.para.E. and para.3.).
- (4) Assemble the lacings and clamp markings as detailed on the template.
- (5) Check that the harness is serviceable (Ref. 71-00-02 Testing). Rectify any defects and re-test until serviceable.
- (6) Place the harness in its storage container (LG.11199) and assemble protectors to the plugs.

D. Replace a Defective Cable.

- (1) Remove the defective harness from its storage container and position it on the loom template as indicated.
- (2) Measure off the correct length of the required cable against the template.
- (3) Prepare the ends of the cable and attach an earthing tail (if required), then assemble the correct pin or socket contacts to the cable cores (Ref. para.2).
- (4) Assemble the correct plugs to the cable (Ref.para.E. and para.3.).
- (5) Release and remove the defective cable (or cables) from the harness, then assemble the new cable(s) to the harness and replace the required lacings and clamp markings as detailed on the template.
- (6) Check that the harness is now serviceable (Ref. 71-00-02 Testing). Rectify any defects and re-test until serviceable.
- (7) Replace the harness in its storage container (LG.11199) and assemble protectors to the plugs.



OLYMPUS 593

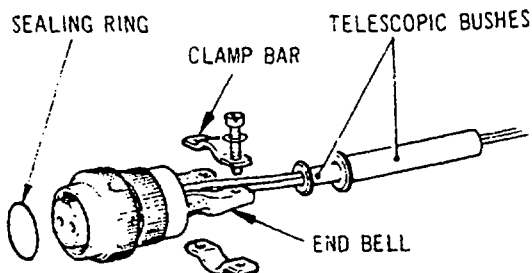


MK.610-14-28

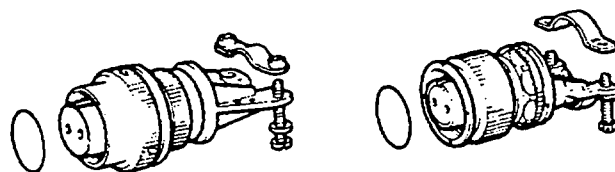
sneema

OVERHAUL

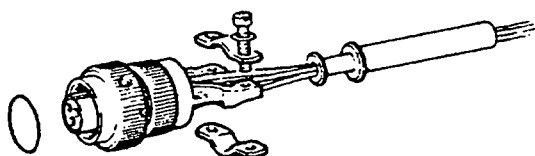
CR 33441/00E  
BS00024510/1



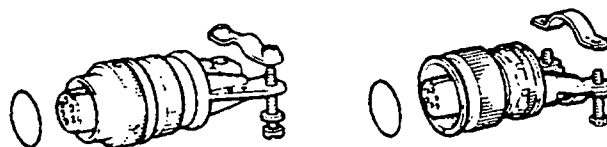
PLUG E8 (E9 SIMILAR) PRE SB 71-15



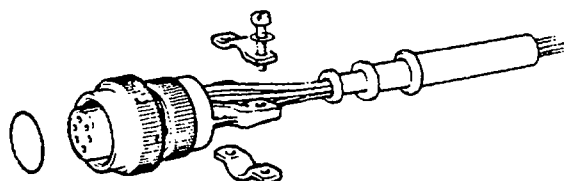
PLUG E8 SB 71-15 (PLUGS E9, E5  
AND E11 TO SB 71-15 SIMILAR)



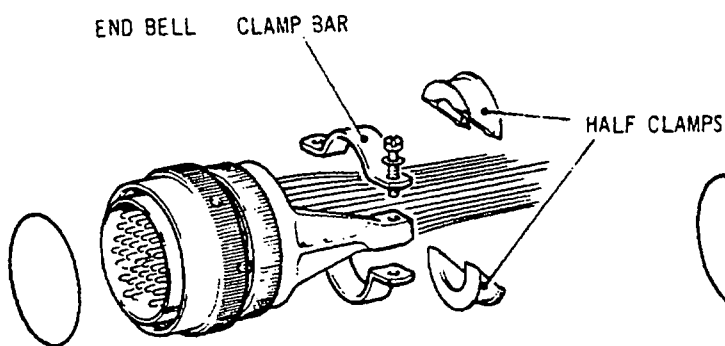
PLUG E5 (E11 SIMILAR)  
PRE SB 71-15



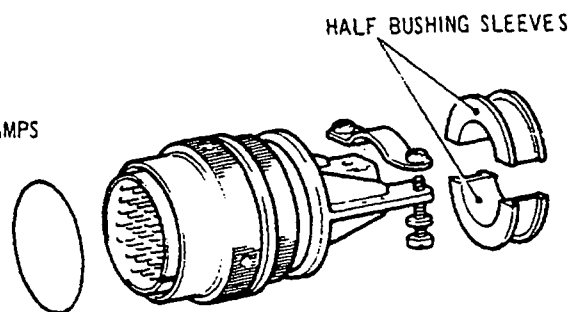
PLUG E1/E2/E3 SB 71-8455-23



PLUG E1/E2/E3 PRE SB 71-8455-23



PLUG E PRE-SB 71-8455-23



PLUG E SB 71-8455-23

Assembly of E Harness Plug Assemblies  
Figure 513

ASSEMBLY  
71-51-01

Page 546  
Jun 1/99





OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

E. Assemble Plugs to Cables.

**CAUTION:** CANNON SEALING RINGS MUST ONLY BE ASSEMBLED TO CANNON PLUGS AND DEUTSCH SEALING RINGS ASSEMBLED TO DEUTSCH PLUGS.

**NOTE:** Throughout the text refer to wiring diagram (Ref.Fig.512), plug assemblies (Ref.Fig.513) and the assembly of plugs to cables (Ref. para.3.).

(1) Assemble plug E to cables.

(a) Assemble, connect and secure the plug to the cables, ensuring that sealing plugs are assembled to unused plug holes and tape is assembled under the clamp location (Ref.para.3.C. and E.).

(b) Insert a new sealing ring (15-230) into the plug.

(2) Assemble plug E1/E2/E3 to cables.

(a) Assemble the three telescopic bushes to the cables.

(b) Assemble, connect and secure the plug to the cables (Ref.para.3.C. and D.).

(c) Insert a new sealing ring (15-150) into the plug.

(3) Assemble plug E5 to cables.

**NOTE:** Assemble plug E11 in the same manner.

(a) Assemble the two telescopic bushes to the cables.

(b) Assemble, connect and secure the plug to the cables, ensuring that a sealing plug is assembled to the unused plug hole (Ref.para.3.C. and D.).

(c) Insert a new sealing ring (15-70) into the plug.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Terminate end of cable at plug position E16 (SB.71-7 and Pre SB.71-11).

NOTE: When SB.71-7 is embodied the E16 plug is not required and when SB.71-11 is embodied the cables will have been removed.

- (a) Assemble a plain sleeve (15-330) to each of the three contacts (Ref. para. 2.B.).

- (5) Assemble plug E8 to cables.

NOTE: Assemble plug E9 in the same manner.

- (a) Assemble the two telescopic bushes to the cables.

- (b) Assemble, connect and secure the plug to the cables (Ref. para. 3.C. and D.).

- (c) Insert a new sealing ring (15-30) into the plug.

- (6) Wall mounting receptacle.

The wall mounting receptacle is no longer required, and the cable is tied back. Refer to SB 77-8876-32 for details.

## 8. Assemble F Harness

### A. General.

The following procedure is not required if the existing harness is serviceable. This text details the assembling of a new harness, or the replacement of cables or plugs in the event that defects found during Inspection/Check or Test, cannot be rectified by the procedures detailed in Repair No.1 of 71-51-01. When defective plugs are to be replaced, refer to 71-51-01 Disassembly for the removal of the plugs.

### B. Preparation for New Assembly or Rectification.

- (1) Determine the SB./Mod. standard required, then refer to Table 512 for the loom template required. The template will detail the positioning of the cables, lacings, plugs and wrappings.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Determine the various types of cables required by reference to Fig.514 and Table 504, and for the lengths of cable, refer to Table 511 and the loom template.
- (3) Determine the various types and sizes of plugs, bushes, contacts and sealing plugs by reference to Table 509 and the I.P.C., and for shrink/solder sleeves (if required) refer to Table 502.

NOTE: Having obtained the required items noted in para.B. proceed with the assembly or rectification of the harness.

C. Assemble a New Harness.

- (1) Position the new cables on the loom template, then measure off the correct lengths and cut as required.
- (2) Prepare the ends of the cables and attach the earthing tails (as required), then assemble the correct pin or socket contacts to the cable cores (Ref. para.2).
- (3) Assemble the correct plugs to the cables (Ref. para.E. and para.3).
- (4) Assemble the lacings and clamp markings as detailed on the template.
- (5) Check that the harness is serviceable (Ref. 71-00-02 Testing). Rectify any defects and re-test until serviceable.
- (6) Place the harness in its storage container (LG.11199) and assemble protectors to the plugs.

D. Replace a Defective Cable.

- (1) Remove the defective harness from its storage container and position it on the loom template as indicated.
- (2) Measure off the correct length of the required cable against the template.
- (3) Prepare the ends of the cable and attach an earthing tail (if required), then assemble the correct pin or socket contacts to the cable cores (Ref. para.2).

PRINTED IN ENGLAND

TN13069

ASSEMBLY  
71-51-01  
Page 550  
Dec 31/00



# OLYMPUS 593

MK.610-14-28  
OVERHAUL

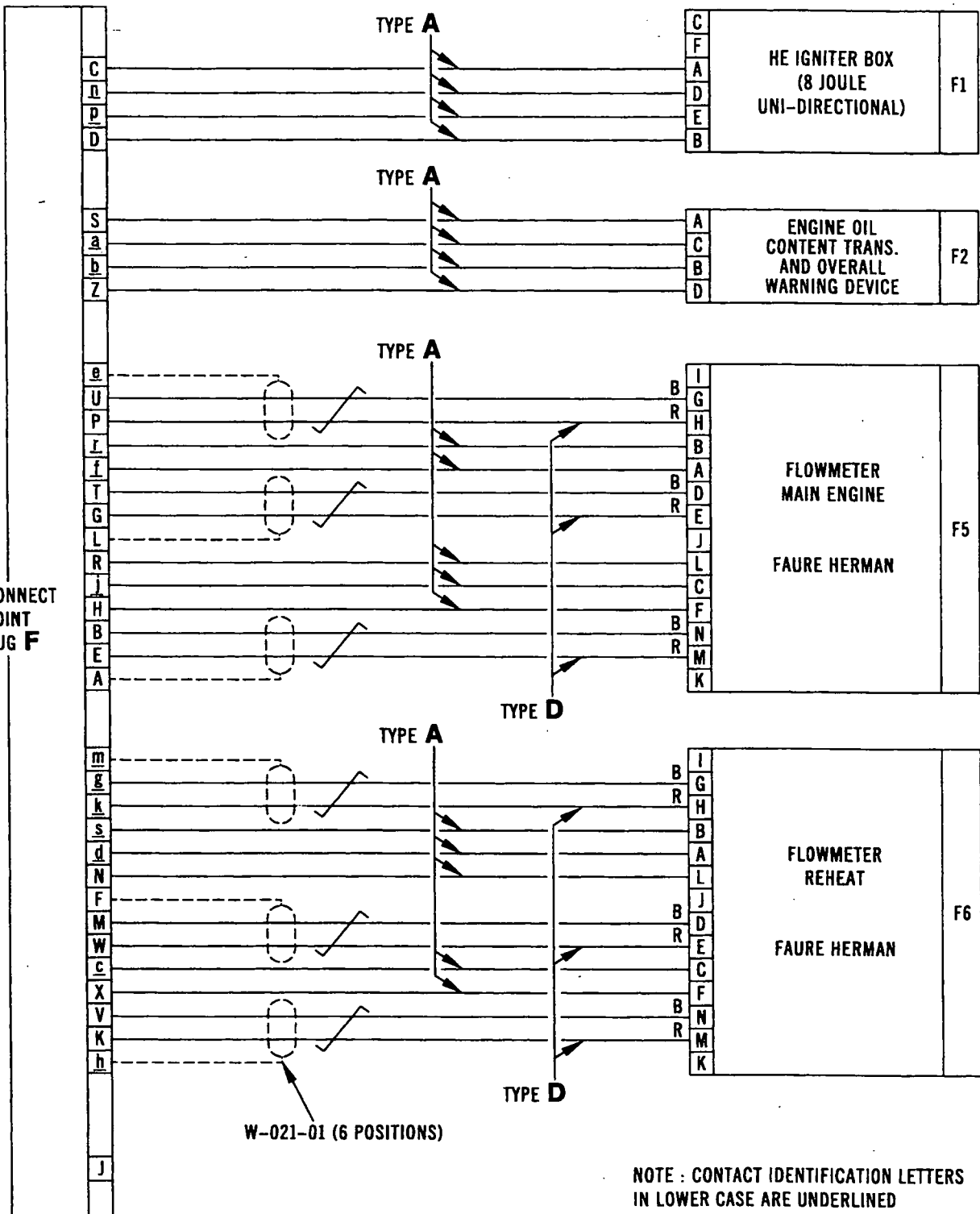


sneema

CR 33568/00A  
BS00029721/1

Printed in England

DISCONNECT  
POINT  
PLUG F



W-021-01 (6 POSITIONS)

NOTE : CONTACT IDENTIFICATION LETTERS  
IN LOWER CASE ARE UNDERLINED

Wiring Diagram of F Harness (SB.71-4)  
Figure 514 (Sheet 2 of 2)

ASSEMBLY

## 71-51-01

Page 551

Dec 31/00



# OLYMPUS 593

MK.610-14-28

OVERHAUL



PLUG	PLUG I.P.C. REF.	CONTACT I.P.C. REF.	SEALING PLUG I.P.C. REF.	BUSH I.P.C. REF.
F	16-200	16-230	16-240	+16-200 or 225
F1	16-20	16-170	16-190	16-40/50/60
F2	16-70	16-170	-	16-90/100/110
F5/F6	16-120	16-180	*16-190	16-140/150/160

+ Half clamps or bushing sleeves

\* SB.71-4

Plug Assembly Identification of F Harness  
Table 509

- (4) Assemble the correct plugs to the cable (Ref. para. E. and para. 3.).
- (5) Release and remove the defective cable (or cables) from the harness, then assemble the new cable(s) to the harness and replace the required lacings and clamp markings as detailed on the template.
- (6) Check that the harness is now serviceable (Ref. 71-00-02 Testing). Rectify any defects and re-test until serviceable.
- (7) Replace the harness in its storage container (LG.11199) and assemble protectors to the plugs.

#### E. Assemble Plugs to Cables.

**CAUTION:** CANNON SEALING RINGS MUST ONLY BE ASSEMBLED TO CANNON PLUGS AND DEUTSCH SEALING RINGS ASSEMBLED TO DEUTSCH PLUGS.

**NOTE:** Throughout the text refer to wiring diagram (Ref. Fig. 514), plug assemblies (Ref. Fig. 515) and the assembly of plugs to cables (Ref. para. 3.).

- (1) Assemble plug F to cables.
  - (a) Assemble, connect and secure the plug to the cables, ensuring that sealing plugs are assembled to unused plug holes and tape is assembled under the clamp location (Ref. para. 3.C. and E.).

ASSEMBLY

## 71-51-01

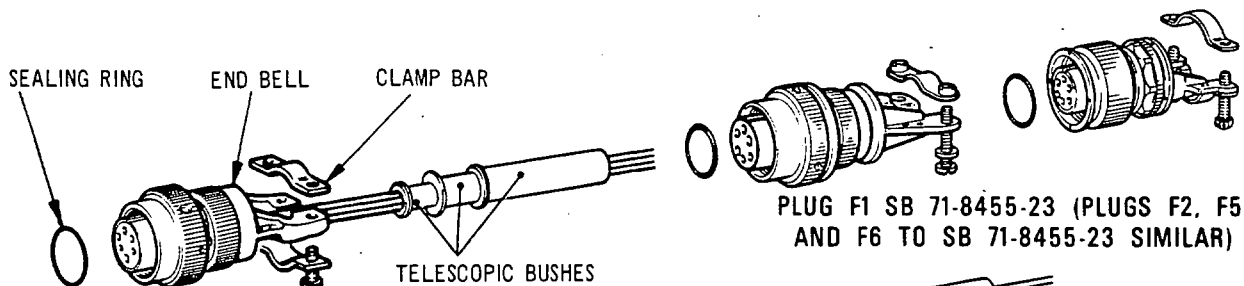
Page 552  
Feb 1/79



OLYMPUS 593

MK.610-14-28

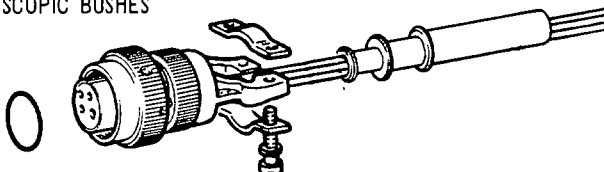
OVERHAUL



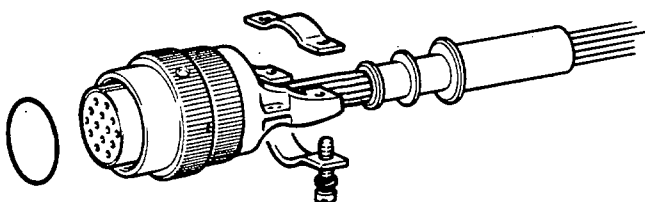
PLUG F1 PRE S B 71-8455-23

PLUG F1 SB 71-8455-23 (PLUGS F2, F5 AND F6 TO SB 71-8455-23 SIMILAR)

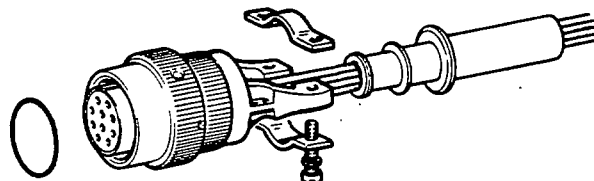
CR 33442/00B



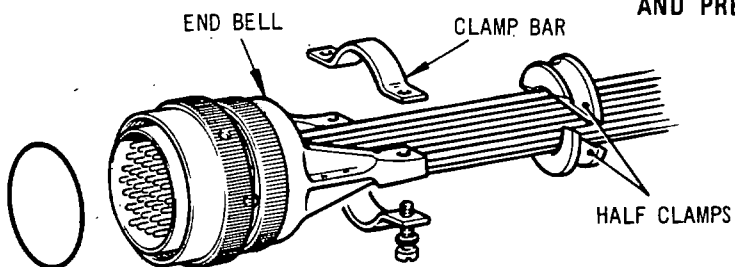
PLUG F2 PRE S B 71-8455-23



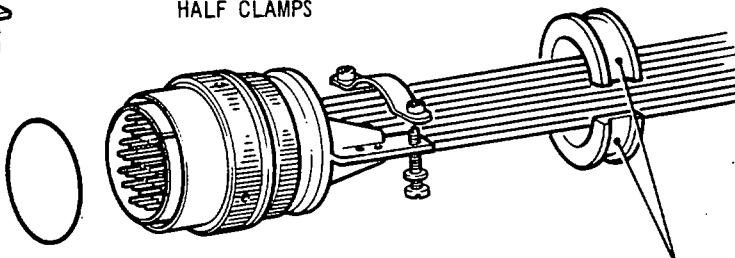
PLUG F5 (F6 SIMILAR)  
PRE S B 71-8455-23 AND S B 71-4



PLUG F5 (F6 SIMILAR)  
PRE S B 71-8455-23  
AND PRE S B 71-4



PLUG F PRE S B 71-8455-23



PLUG F S B 71-8455-23

HALF BUSHING SLEEVES

TN28219

Assembly of F Harness Plug Assemblies  
Figure 515



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Insert a new sealing ring (16-210) into the plug.
  - (2) Assemble plug F1 to cables.
    - (a) Assemble the three telescopic bushes to the cables.
    - (b) Assemble, connect and secure the plug to the cables, ensuring that sealing plugs are assembled to unused plug holes (Ref. para. 3.C. and D.).
    - (c) Insert a new sealing ring (16-30) into the plug.
  - (3) Assemble plug F2 to cables.
    - (a) Assemble the three telescopic bushes to the cables.
    - (b) Assemble, connect and secure the plug to the cables (Ref. para. 3.C. and D.).
    - (c) Insert a new sealing ring (16-80) into the plug.
  - (4) Assemble plug F5 to cables.
- NOTE: Assemble plug F6 in the same manner.
- (a) Assemble the three telescopic bushes to the cables.
  - (b) Assemble, connect and secure the plug to the cables, ensuring that if SB.71-4 is embodied, sealing plugs are assembled to unused plug holes (Ref. para. 3.C. and D.).
  - (c) Insert a new sealing ring (16-130) into the plug.

## 9. Assemble G Harness

### A. General.

The following procedure is not required if the existing harness is serviceable. This text details the assembling of a new harness, or the replacement of cables or plugs in the event that defects found during Inspection/Check or Test, cannot be rectified by the procedures detailed in Repair No.1 of 71-51-01. When defective plugs are to be replaced, refer to 71-51-01 Disassembly for the removal of the plugs.

TN26194





OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

Printed in England

B. Preparation for New Assembly or Rectification.

- (1) Determine the SB./Mod. standard required, then refer to the loom template (Tool 2711). The template will detail the positioning of the cables, lacings, plugs and wrappings.
- (2) Determine the various types of cables required by reference to Fig.516 and Table 504, and for the lengths of cable, refer to Table 511 and the loom template.
- (3) Determine the various types and sizes of plugs, bushes, contacts and sealing plugs by reference to Table 510 and the I.P.C., and for shrink/solder sleeves (if required) refer to Table 502.

NOTE: Having obtained the required items noted in para.B. proceed with the assembly or rectification of the harness.

C. Assemble a New Harness.

- (1) Position the new cables on the loom template, then measure off the correct lengths and cut as required.
- (2) Prepare the ends of the cables and attach the earthing tails (as required), then assemble the correct pin or socket contacts to the cable cores (Ref. para.2).
- (3) Assemble the correct plugs to the cables (Ref. para.E. and para.3.).
- (4) Assemble the lacings and clamp markings as detailed on the template.
- (5) Check that the harness is serviceable (Ref. 71-00-02 Testing). Rectify any defects and re-test until serviceable.
- (6) Place the harness in its storage container (LG.11199) and assemble protectors to the plugs.

ASSEMBLY

71-51-01

Page 555

Jun 1/99



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

PLUG	PLUG I.P.C. REF.	CONTACT I.P.C. REF.	SEALING PLUG I.P.C. REF.	BUSH I.P.C. REF.
G	17-220	17-250	17-260	+17-240 or 245
G1/G4/G6/ G9	17-20	17-190	-	17-40/50
*G2	17-60	17-190	17-210	17-80/90/100
G8	17-150	17-200	17-210	**17-180
G10	17-100	17-190	17-210	17-130/140

+ Half clamps or bushing sleeves

\* Pre SB.17-19

\*\* Pre SB.71-8455-23

Plug Assembly Identification of G Harness  
Table 510

D. Replace a Defective Cable.

- (1) Remove the defective harness from its storage container and position it on the loom template as indicated.
- (2) Measure off the correct length of the required cable against the template.
- (3) Prepare the ends of the cable and attach an earthing tail (if required), then assemble the correct pin or socket contacts to the cable cores (Ref. para.2).
- (4) Assemble the correct plugs to the cable (Ref. para.E. and para.3.).
- (5) Release and remove the defective cable (or cables) from the harness, then assemble the new cable(s) to the harness and replace the required lacings and clamp markings as detailed on the template.
- (6) Check that the harness is now serviceable (Ref. 71-00-02 Testing). Rectify any defects and re-test until serviceable.
- (7) Replace the harness in its storage container (LG.11199) and assemble protectors to the plugs.

ASSEMBLY

71-51-01

Page 556

Feb 1/79

Printed in England

CR 33394/00D  
BS00024509/2

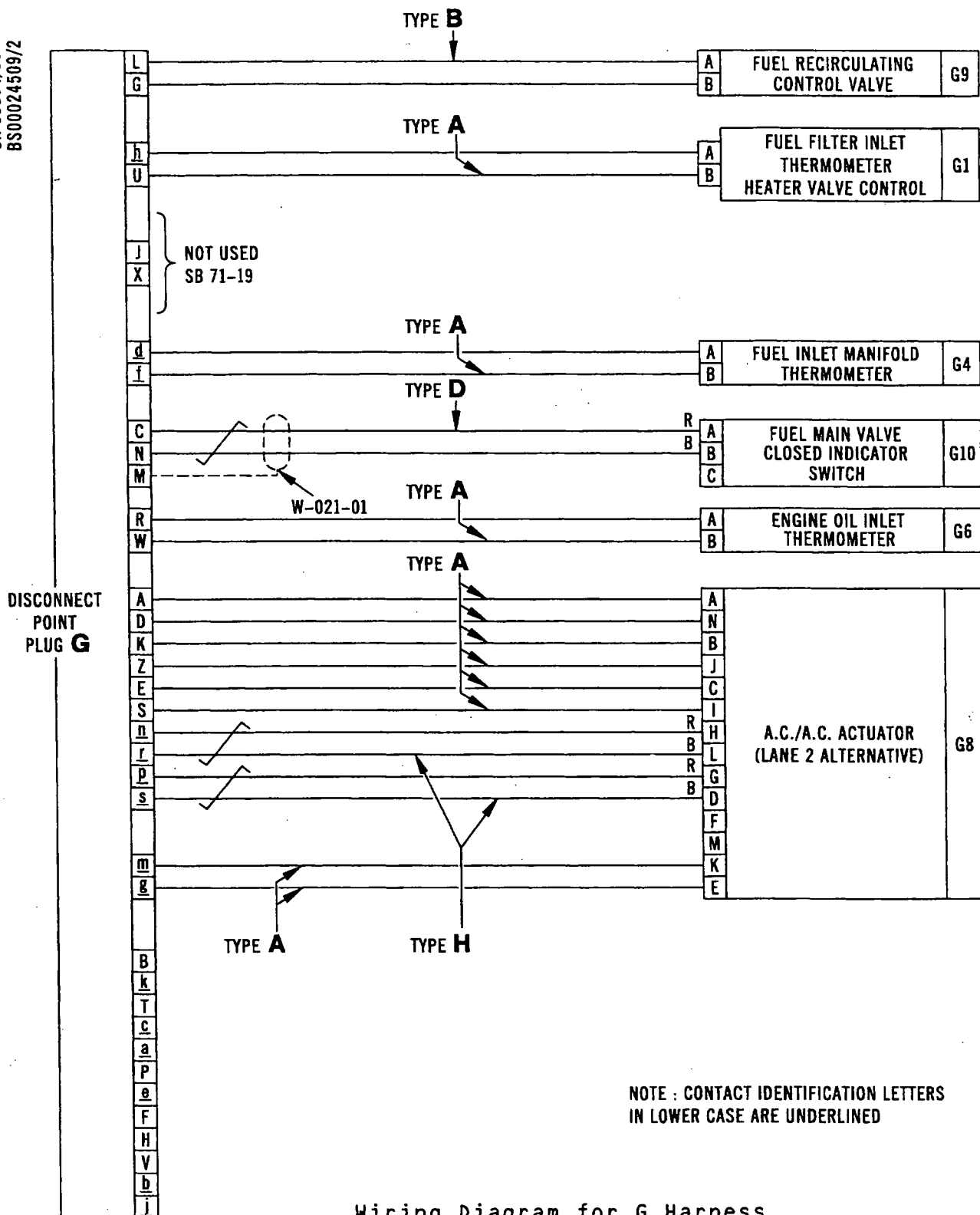


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Wiring Diagram for G Harness  
Figure 516



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

E. Assemble Plugs to Cables.

CAUTION: CANNON SEALING RINGS MUST ONLY BE ASSEMBLED TO CANNON PLUGS AND DEUTSCH SEALING RINGS ASSEMBLED TO DEUTSCH PLUGS.

NOTE: Throughout the text refer to wiring diagram (Ref.Fig.516), plug assemblies (Ref.Fig.517) and the assembly of plugs to cables (Ref. para.3.).

(1) Assemble plug G to cables.

(a) Assemble, connect and secure the plug to the cables, ensuring that sealing plugs are assembled to unused plug holes and tape is assembled under the clamp location (Ref.para.3.C. and E.).

(b) Insert a new sealing ring (17-230) into the plug.

(2) Assemble plug G1 to cables.

NOTE: Assemble plugs G4, G6 and G9 in the same manner.

(a) Assemble the two telescopic bushes to the cables.

(b) Assemble, connect and secure the plug to the cables (Ref.para.3.C. and D.).

(c) Insert a new sealing ring (17-30) into the plug.

CR 33443/00D  
BS00024508/1

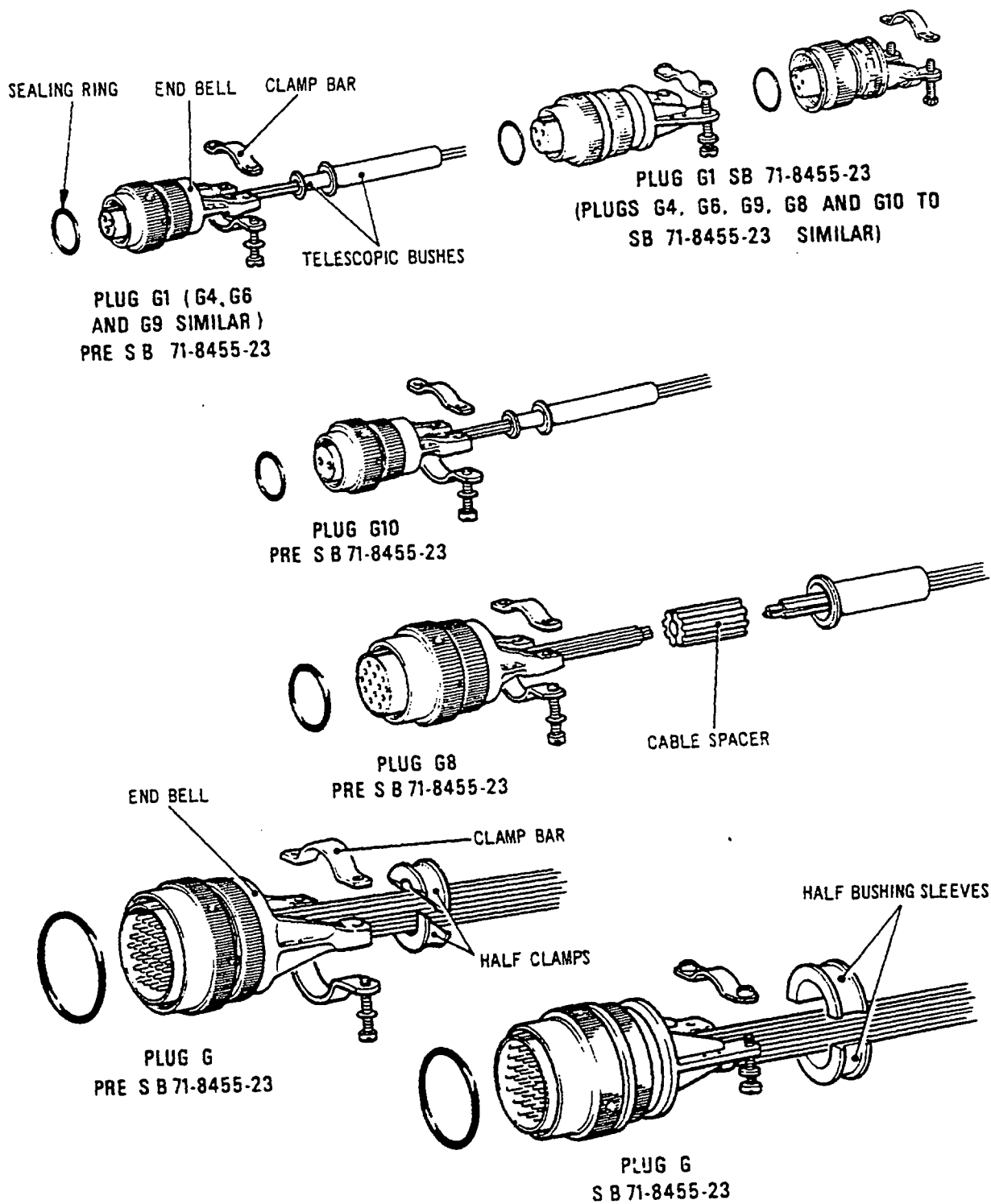


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Assembly of G Harness Plug Assemblies  
Figure 517



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (3) Assemble plug G8 to cables.
  - (a) Assemble the telescopic bush to the cables (Pre SB.71-8455-23).
  - (b) Assemble and connect the plug to the cables, ensuring that sealing plugs are assembled to unused plug holes.
  - (c) On plug to Pre SB.71-8455-23 secure the plug (Ref.para.3.C. and D.), or on plug to SB.71-8455-23, assemble tape to the cable under the clamp location and secure the plug (Ref.para.3.C. and E.).
  - (d) Insert a new sealing ring (17-160) into the plug.
- (4) Assemble plug G10 to cables.
  - (a) Assemble two telescopic bushes to the cables.
  - (b) Assemble, connect and secure the plug to the cables, ensuring that a sealing plug is assembled to the unused plug hole (Ref.para.3.C. and D.).
  - (c) Insert a new sealing ring (17-120) into the plug.

## 10. Assembly of Complete Electrical Cables

### A. General.

The complete assembly of electrical cables comprises seven multi-cable harnesses. Loom template (Tool 2711) is required to provide the correct positioning of the harnesses, wrappings and the unique point.

### B. Preparation for Assembly.

- (1) Remove the harnesses from their respective storage containers and lay out in their respective positions on the loom template.

ASSEMBLY

71-51-01

Page 560

Jun 1/99



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (2) Secure the bottom block (10-90) of the unique block to the loom template (Tool 2711) with two bolts (10-80). Torque-tighten the bolts between 85 and 95 lbf in. (9,6 to 10,7 N.m).
- (3) Assemble the harnesses H, F, D and C to the bottom block in the positions indicated (Ref.Fig.518).
- (4) Hold the harnesses in position, then assemble the middle block (10-70) and retain with two special bolts (10-60). Tighten the bolts using the flats on the bolts provided, until the middle and bottom block touch, then release pressure until the flats on the bolts line up with the flats in the block.

CAUTION: ALIGNMENT OF FLATS ON SPECIAL BOLTS AND BLOCK MUST NOT BE ACCOMPLISHED BY TIGHTENING AFTER BLOCKS TOUCH EACH OTHER.

- (5) Before assembling the remaining harnesses to the engine block, ensure that the harnesses already connected are laid out correctly and that the harness break-offs correspond with the template, without creating a twist within the harness.
- (6) Assemble the harnesses G, E and B to the middle block in the positions indicated (Ref.Fig.518).
- (7) Hold the harnesses in position, then assemble the top block (10-50) over the harnesses and secure with two nuts (10-40). Torque-tighten the nuts between 85 and 95 lbf in. (9,6 to 10,7 N.m).
- (8) Establish that the unique point is in the correct position and that the harness lengths from the unique point centre line to the rear faces of the plugs are correct (Ref.Table 511).

ASSEMBLY

71-51-01

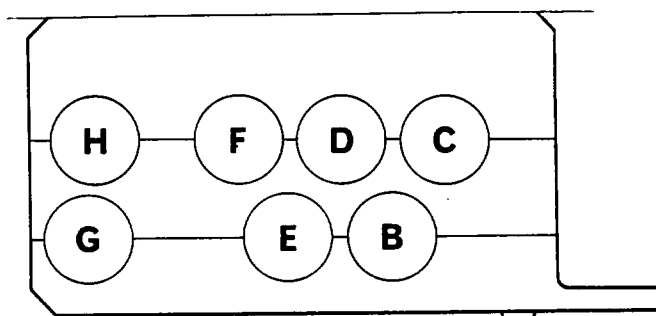
Page 561

Feb 1/79

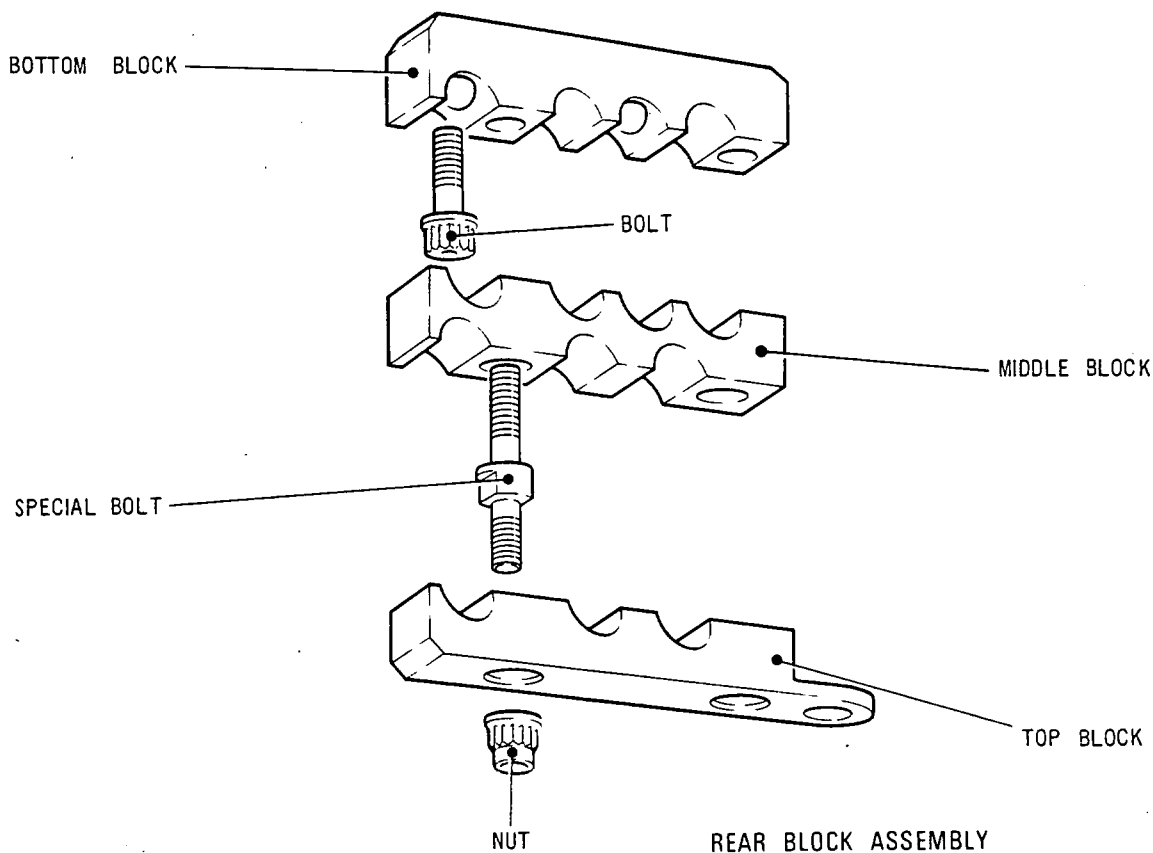


OLYMPUS 593

MK.610-14-28  
OVERHAUL



VIEW LOOKING FORWARD



Assembly of Harnesses to Unique Point Blocks  
Figure 518





OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

PLUG	CABLE LENGTH*	
B	73.25 in. (1858,75 mm)	*From unique point centre line to rear face of disconnect position plug
C	72.25 in. (1834,35 mm)	
D	73.00 in. (1852,40 mm)	
E	73.00 in. (1852,40 mm)	
F	72.00 in. (1828,00 mm)	
G	72.25 in. (1834,35 mm)	
H	72.25 in. (1834,35 mm)	

Cable Length from the Unique Point  
Table 511

### C. Binding Harnesses.

- (1) Bind the branch harnesses with Rapidon tape 'A' (Ref. Fig.519 and 520).
  - (a) Bind the branch harness with Rapidon tape starting at the grid positions 26F and 25T and ensure that no twist occurs (Ref. Fig.519).
  - (b) Where the branch harness terminates at the main branch, a sufficient length of Rapidon must be left so that it can be interlaced into the main branch Rapidon.
  - (c) Bind the main branch with Rapidon tape starting at grid position 40K, position 1.
  - (d) Leave a sufficient length of Rapidon tape so that it can be interlaced for a length of (approx) 2.000 in. (50,8 mm) with the branch from 40K, position 2.
  - (e) Bind the main branch with Rapidon tape starting at grid position 40K, position 2, and continue along the main branch to the unique point, interlacing the previously installed branch loom Rapidon tapes.

**NOTE:** When the complete cable assembly is assembled to the engine, the Rapidon tape ends are to be secured within the respective cable clamps.

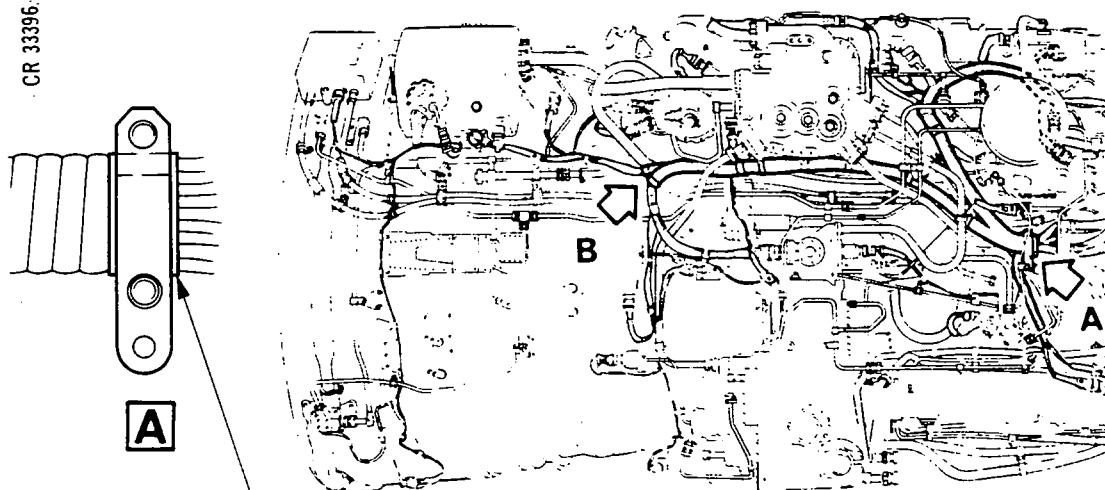
ASSEMBLY

71-51-01

Page 563

Jun 1/98

CR 33396:00A

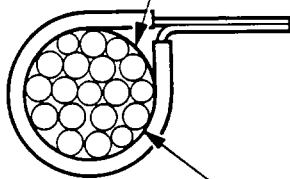


A

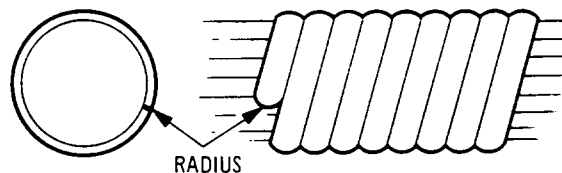
B

SEALING TAPE

ALL CUT ENDS OF RAPIDON TO  
BE TERMINATED AS SHOWN

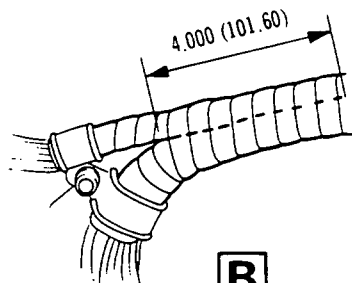


TYPICAL CLAMP LOOP

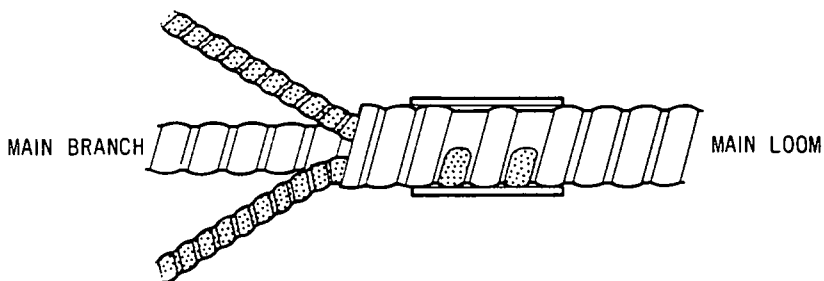


BINDING TERMINATION

TO AVOID TRAPPING CABLES WRAP CABLE  
BUNCH, AS SHOWN USING SEALING TAPE, A MINIMUM  
OF 2 TURNS BUT SUFFICIENT TO ENSURE  
THAT A GOOD GRIP IN THE CLAMP IS ACHIEVED



B



JUNCTIONING OF RAPIDON

DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES ( MILLIMETRES )

Binding of Harnesses with Rapidon Tape  
Figure 519

ASSEMBLY

71-51-01

Page 564

Feb 1/79



OLYMPUS 593

MK.610-14-28  
OVERHAUL



D. Final Dressing.

- (1) Secure looms prior to clamping during the engine dressing stage with sealing tape.
- (2) Use glasscloth tape as packing under clamps where adverse tolerances may cause a loose fitting.
- (3) Assemble clamps on to the cables in accordance with the template.
- (4) Ensure that all lacings and binding have been carried out correctly.
- (5) Ensure that coloured braid markings are in the correct positions in accordance with the template.
- (6) Ensure that tape markers are correct and attached securely to the cables.
- (7) Ensure that all protective caps are secure on the plugs.
- (8) Carefully place the complete harness into a clean container for transportation or storage.
- (9) Ensure that all documents have been duly signed.

PRINTED IN ENGLAND

ASSEMBLY

71-51-01

Page 565  
Jun 1/86



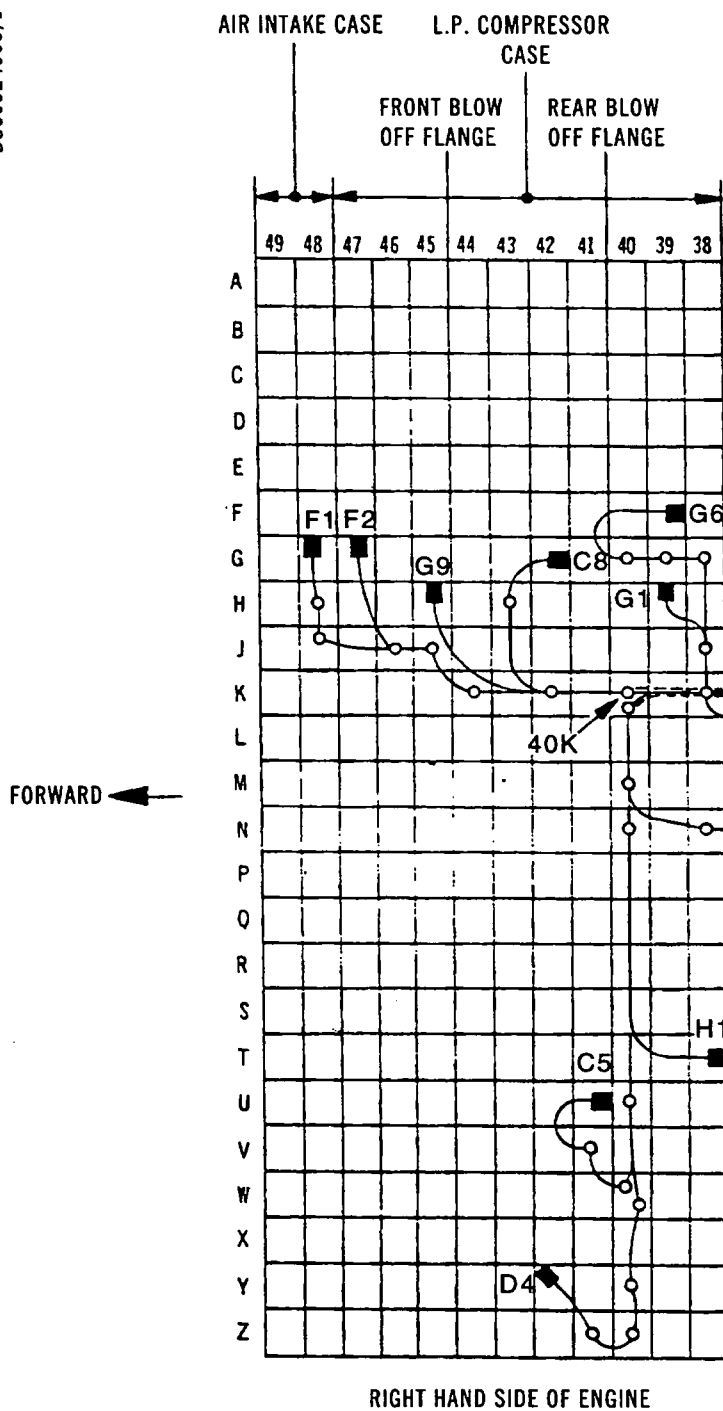
OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

CR 32891/00C  
BS00024503/1



Binding of B Harness Branch  
Figure 520

ASSEMBLY

71-51-01

Page 566  
Jun 1/99



OLYMPUS 593

MK.610-14-28

OVERHAUL



ENGINE ELECTRICAL CABLES - SPECIAL TOOLS,  
FIXTURES AND EQUIPMENT

1. General

- A. The special tools, fixtures and equipment listed in Table 1001 and 1002 are those required to disassemble and assemble the engine electrical harness looms.
- B. The tools have been listed in order of usage and the Tool Ref. No. is the number quoted in the text. Tools marked with an \* are used in more than one aspect of overhaul, and will be duplicated in the tables. Tools used other than those supplied by Rolls-Royce (1971) Limited are indicated by the component manufacturer and part number.
- C. The tools are illustrated in order of usage, but tools used in more than one aspect of overhaul will only be illustrated once. Additional illustrations of tooling in operation are included in the text for clarification of usage.

TOOL REF.NO.	MANUFACTURERS PART NO.	DESCRIPTION
*2701	Cannon NAS 1664-16	Insert/Extractor Tool

Disassembly Tools  
Table 1001

TOOL REF.NO.	MANUFACTURERS PART NO.	DESCRIPTION
2603	T2JA 1014	RAYCHEM Thermo-gun CV1511
2605	T2JC 1012	Reflector PR13C
2703	Buchanan Type 3191-A (MS 3191)	Crimping Tool
2704	Buchanan 20A1	Contact Locator
*2701	Cannon NAS 1664-16	Insert/Extractor Tool
2705	812-004	Ferrule Assembly Tool

Assembly Tools  
Table 1002 (Continued)

SPECIAL TOOLS

**71-51-01**

Page 1001

Oct 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TOOL REF.NO.	MANUFACTURERS PART NO.	DESCRIPTION
2706	Buchanan, 7103175	Contact Locator
2707	Daniels Type M22520/2-01	Crimping Tool
2708	Type, Vibrometer SEL.5	Insert
2709	Type FW-C31-2-1000	Crimping Tool (Amphenol)
2710	Type MC	Insert
2606	T2FA 1300	Screwdriver, electrical
2607	PE.25442	Pliers, wire-locking
2711	PJ.1259781	Loom Template

Assembly Tools  
Table 1002 (Concluded)

TN14121

SPECIAL TOOLS

**71-51-01**

Page 1002  
Oct 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



ENGINE DRAINS - INSPECTION/CHECK

TABLE OF CONTENTS

Para.	Page
1. General ... ..	301
2. General Inspection ... ..	301
3. Crack Detection ... ..	301
A. Magnetic Particle Crack Detection ... ..	301
B. Fluorescent Dye Crack Detection ... ..	302
4. Brackets and Mounting Link ... ..	304
A. Inspect Brackets and Mounting Link ... ..	304
5. Drains Tank ... ..	305
A. Inspect Tank Shell... ..	305
B. Inspect Overflow Vent Body Abutment Face ... ..	305
C. Inspect Mounting Attachment Points ... ..	306
D. Inspect Union Adapters ... ..	306
E. Inspect Metered Orifice in Passage to Overflow Vent Body ... ..	306
F. Check Tank for Leaks ... ..	306
6. Drain Plug ... ..	306
A. Inspect Plugs ... ..	306
B. Check Seal has been Renewed ... ..	306
7. Mounting Bracket... ..	306
A. Inspect Abutment Faces ... ..	306
8. Bracket Assembly... ..	307
A. Inspect Mounting Bracket Abutment Face ... ..	307
B. Inspect Bolt Locations ... ..	307
C. Inspect Captive Nut and Retainer ... ..	307
9. Sealing Plates ... ..	307
A. Inspect Sleeve Abutment Face and Bore ... ..	307
B. Inspect Eccentric Bolt Locations ... ..	307
10. Sleeves ... ..	307
A. Inspect Abutment Faces ... ..	307
B. Inspect Bolt Locations ... ..	307
11. Overflow Vent Body ... ..	308
A. Inspect Abutment Faces and Sleeve Location... ..	308
B. Inspect Bolt Locations ... ..	308
C. Inspect Valve Body Location ... ..	308
12. Helical Spring ... ..	308
A. Check Spring Condition ... ..	308
B. Inspect End Coil Faces ... ..	308
13. Valve Housing ... ..	309
A. Inspect Sealing Valve Seat ... ..	309
B. Inspect Retaining Ring Location ... ..	309
C. Inspect Outside Diameter... ..	309
D. Inspect Bore ... ..	309

INSPECTION/CHECK

**71-70-00**

Contents 1

Jun 1/78

PRINTED IN ENGLAND

TN3203



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



Para.	Page
14. Filter ... ..	309
A. Inspect Screen ... ..	309
B. Inspect Cage... ..	309
15. Sealing Valve ... ..	310
A. Inspect Half-ball Contact Face... ..	310
B. Inspect Valve Housing Contact Faces ... ..	310
C. Inspect Bore and Spring Location ... ..	310
D. Test Valve Assembly for Leakage ... ..	310
16. Valve Body ... ..	310
A. Inspect Attachment Flange ... ..	310
B. Inspect Valve Chamber ... ..	311
C. Inspect Overflow Body ... ..	311
17. Tee-piece, Connector, Adapter and Flanged Elbow ... ..	312
A. Inspect Threads ... ..	312
B. Inspect Attachment Flanges ... ..	312
C. Inspect Abutment Faces ... ..	312
18. Connectors, Fluid Passage Bolts and Union Adapters ... ..	312
A. Inspect Threads ... ..	312
B. Inspect Abutment Faces ... ..	312
C. Inspect Drilled Passages... ..	313
19. Tubes ... ..	313
A. Inspect Threads ... ..	313
B. Inspect Tube... ..	313
C. Inspect Connector Abutment Faces ... ..	313
D. Inspect Flange Abutment Faces ... ..	313
20. Drain Body, Upper and Lower ... ..	313
A. Inspect Abutment Faces ... ..	313
B. Inspect Bolt Locations ... ..	314
C. Inspect Valve Seats ... ..	314
D. Inspect Valve Contact Faces in Bores... ..	314
E. Inspect Washer Location ... ..	314
21. Packing Piece ... ..	314
A. Inspect Abutment Faces ... ..	314
22. Washers ... ..	314
A. Inspect Contact Faces ... ..	314
23. Springs ... ..	314
A. Check Spring Condition ... ..	314
B. Inspect End Coil Faces ... ..	315
24. Valves ... ..	315
A. Inspect Sealing Surfaces... ..	315
B. Inspect Spherical Surfaces ... ..	315
C. Inspect Spring Contact Face ... ..	315
25. Flexible Tubes ... ..	315
A. Inspect Threads ... ..	315
B. Inspect Tube End Fittings ... ..	316
C. Carry Out Pressure Test ... ..	316
D. Inspect Wire Braid... ..	316

INSPECTION/CHECK

71-70-00

Contents 2

Jun 1/78

IN3205





OLYMPUS 593

MK.610-14-28  
OVERHAUL



TABLE OF ILLUSTRATIONS

Fig.No.		Page
301	Crack Detection Test Diagram ... ..	303
302	Drains Tank Details ... ..	317
303	Drains Tank Details ... ..	318
304	This Illustration no Longer Required... ..	319
305	Fuel Drain Tubes - Component Connections to Overboard Spill (Part 1 of 5) ... ..	320
306	Fuel Drain Tubes - Component Connections to Overboard Spill (Part 2 of 5) ... ..	321
307	Fuel Drain Tubes - Component Connections to Overboard Spill (Part 3 of 5) ... ..	322
308	Fuel Drain Tubes - Component Connections to Overboard Spill (Part 4 of 5) ... ..	323
309	Fuel Drain Tubes - Component Connections to Overboard Spill (Part 5 of 5) ... ..	324
310	Fuel Drain Tube - 2nd Stage Pump to Tank ... ..	325
311	Fuel Drain Tubes - 1st Stage Pump and FCU to Connection on Tube, 2nd Stage Pump to Tank ... ..	326
312	Fuel Drain Tube - Distribution Block Dump Outlet to Tank ... ..	327
313	Engine Drains Assembly at Exhaust Diffuser Case ... ..	328
314	Drains Assembly Inspection Zones ... ..	329
315	Oil Drain Tube - CSD Elbow to Overboard Spill at Drains Tank ... ..	330
316	Oil Drain Tubes - Hydraulic Pump to Overboard Spill Connection... ..	331

LIST OF TABLES

Table No.		Page
301	Items to be Magnetic Particle Crack Tested... ..	302
302	Items to be Fluorescent Dye Crack Tested ... ..	302
303	Cross References to Illustrated Parts Catalogue ... ..	304

INSPECTION/CHECK

71-70-00

Contents 3

Jun 1/78



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



## ENGINE DRAINS - INSPECTION/CHECK

### 1. General

- A. Each item in this chapter is given a two-part identification; thus, 302-20 refers to Figure 302 and to Item 20 called out on that figure. Each item may be further identified by its Part Number by the use of Table 303, which cross-refers figures in this chapter to the equivalent chapter and figure in the Illustrated Parts Catalogue (I.P.C.); the called-out item number will be the same on both figures.
- B. All items which will be crack tested are listed in Tables 301 and 302.
- C. Dimensional checks are cross referenced to the equivalent Fits and Clearances Schedule (F.C.S.) chapter against the item concerned.
- D. When the inspection of an item discloses a minor defect that requires rectification, it is defined as 'Accept after repair'. On all such occasions the item must be rectified in accordance with Standard Practices 72-09-22 Repair. Where a Ref.No. follows 'Accept after repair' e.g. (Ref.72-21-01 Repair No.1), a specific Repair Scheme is available to which the item must be rectified. Items that are rejected, or for which a repair scheme is not currently available, should be held at the discretion of the operator, as service experience may prove the need for a repair.
- E. On completion of a repair, rectification or test, the item(s) must be inspected, to ensure that the necessary work has been satisfactorily completed.

### 2. General Inspection

- A. Inspect all items illustrated in this chapter, whether specified or not, in accordance with Standard Practices (Ref.72-09-00 Inspection/Check). In addition, carry out the inspections detailed for the specified items, from para.4 onwards.
- B. Inspection terms used in this chapter are explained in Standard Practices (Ref.72-09-00 Inspection/Check).

### 3. Crack Detection

- A. Magnetic Particle Crack Detection.

(1) Submit the items listed in Table 301 to crack detection in accordance with the process quoted.

INSPECTION/CHECK

**71-70-00**

Page 301  
Apr 1/77



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (2) Items to be crack detected by this method are illustrated in the Crack Detection Test Diagram (Fig.301). For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

No Current Requirement

Items to be Magnetic Particle Crack Tested  
Table 301

B. Fluorescent Dye Crack Detection.

- (1) Submit the items listed in Table 302 to crack detection in accordance with the process quoted. For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
302	90	Drains Tank	FlA
302	100	Drains Plug	FlA
302	140	Mounting Bracket	FlA
303	30	Sealing Plate	FlA
303	40	Sleeve	FlA
303	80	Overflow Vent Body	FlA
303	120	Filter	FlA
303	130	Sealing Valve	FlA
308	300	Tube	FlA
309	570	Tube	FlA
310	50	Tube	FlA
310	100	Tube	FlA
311	80	Flanged Elbow	FlA
312	80	Tube	FlA
313	40	Drain Body Upper	FlA
313	70	Drain Body Lower	FlA
313	100	Sealing Plate	FlA

Items to be Fluorescent Dye Crack Tested  
Table 302 (Continued)

INSPECTION/CHECK

71-70-00

Page 302

Jun 1/78

TN3291



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

No Current Requirement

TN3279

Crack Detection Test Diagram  
Figure 301

INSPECTION/CHECK  
**71-70-00**  
Page 303  
Apr 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
313	110	Plug	FlA
313	140	Valves	FlA
315	160	Tube	FlA
316	230	Tube	FlA
316	380	Tube	FlA

Items to be Fluorescent Dye Crack Tested  
Table 302 (Concluded)

FIG.NO.	ILLUSTRATED PARTS CATALOGUE EQUIVALENT
---------	--

301	Not applicable	
302	71-73-01	Fig.1
303	71-73-01	Fig.2
304	Not applicable	
305	71-73-02	Fig.1
306	71-73-02	Fig.2
307	71-73-02	Fig.3
308	71-73-02	Fig.4
309	71-73-02	Fig.5
310	71-73-03	Fig.1
311	71-73-04	Fig.1
312	71-73-05	Fig.1
313	71-73-06	Fig.1
314	Not applicable	
315	71-79-01	Fig.1
316	71-79-02	Fig.1

Cross References to Illustrated Parts Catalogue  
Table 303

4. Brackets (302-30, 309-300 and 312-110) and Mounting Link (302-60)

A. Inspect Brackets and Mounting Link.

(1) Wear.

- (a) Attachment face thickness reduced more than 5 per cent. Reject.

INSPECTION/CHECK

71-70-00

Page 304  
Jun 1/78

TN3292



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Bolt holes elongated  
less than 0.030 in.  
(0,760 mm).

Accept after  
repair.

- (2) Nicks, burrs and fretting.

Accept after repair  
providing attach-  
ment face thickness  
is not reduced  
by more than 5 per  
cent.

5. Drains Tank (302-90)

A. Inspect Tank Shell.

- (1) Punctures.

Reject.

- (2) Dents.

- (a) Small dents with smooth  
contours and no impact  
marks.

Accept.

- (3) Scores, nicks and burrs.

Accept after repair  
provided wall thick-  
ness is not re-  
duced more than  
one third.

B. Inspect Overflow Vent Body Abutment Face.

- (1) Nicks and burrs.

Accept, if repair  
will preserve  
sealing capability.

- (2) Scores.

- (a) Running into fluid passages.

Reject.

- (b) Isolated, not more than  
0.005 in. (0,130 mm) deep.

Accept, if repair  
will preserve  
sealing capability.

- (3) Wear.

Accept, if sealing  
capability  
unimpaired.

PRINTED IN ENGLAND

TN3293

INSPECTION/CHECK

71-70-00

Page 305

Jun 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



C. Inspect Mounting Attachment Points.

(1) Wear and fretting.

- |     |  |                         |
|-----|--|-------------------------|
| (a) | Bolt holes elongated<br>less than 0.030 in.<br>(0,760 mm). | Accept after<br>repair. |
| (b) | Thickness not reduced by<br>more than 5 per cent.          | Accept after<br>repair. |

D. Inspect Union Adapters (Ref.72-09-00 Inspection/Check).

E. Inspect Metered Orifice in Passage to Overflow Vent Body.

NOTE: The metered orifice is 0.46 to 0.50 in. (10,16 to 12,70 mm) in diameter.

(1) Check for damage, using inspection mirror.

- |     |             |         |
|-----|-------------|---------|
| (a) | Any damage. | Reject. |
|-----|-------------|---------|

(2) Check for obstruction (Ref.71-70-00 Testing).

F. Check Tank for Leaks (Ref.71-70-00 Testing).

6. Drain Plug (302-100), Seal (302-110) and Plug (313-110)

A. Inspect Plugs (Ref.72-09-00 Inspection/Check).

B. Check Seal has been Renewed.

7. Mounting Bracket (302-140)

A. Inspect Abutment Faces.

- |     |  |   |
|-----|--|---|
| (1) | Nicks and burrs.   | Accept after repair<br>provided attachment<br>face is not reduced<br>by more than one<br>third. |
| (2) | Wear.  |   |
| (a) | Bolt holes elongated<br>not more than 0.030 in.<br>(0,760 mm). | Accept after<br>repair.   |
| (b) | Slight wear with 90 per<br>cent contact retained.              | Accept.   |

INSPECTION/CHECK

71-70-00

Page 306  
Jun 1/78

TN3294



OLYMPUS 593

MK.610-14-28

OVERHAUL



8. Bracket Assembly (302-150)

A. Inspect Mounting Bracket Abutment Face.

- (1) Nicks and burrs. Accept after repair.

B. Inspect Bolt Locations.

(1) Wear.

- (a) Bolt holes elongated less than 0.030 in. (0,760 mm). Accept after repair.

- (b) Thickness not reduced by more than 15 per cent. Accept after repair.

C. Inspect Captive Nut and Retainer (Ref.72-09-00 Inspection/Check).

9. Sealing Plates (303-30 and 313-100)

A. Inspect Sleeve Abutment Face and Bore.

- (1) Nicks, burrs and scores. Accept after repair.

B. Inspect Eccentric Bolt Locations.

(1) Wear and fretting.

- (a) Bolt holes elongated not more than 0.030 in. (0,760 mm). Accept after repair.

10. Sleeves (303-40 and 313-90)

A. Inspect Abutment Faces.

- (1) Nicks, burrs and scores. Accept after repair.

B. Inspect Bolt Locations.

(1) Wear and fretting.

- (a) Bolt holes elongated not more than 0.030 in. (0,760 mm). Accept after repair.

INSPECTION/CHECK

71-70-00

Page 307

Jun 1/78





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



11. Overflow Vent Body (303-80) (SB.71-8)

A. Inspect Abutment Faces and Sleeve Location (Ref.Fig.304).

(1) Nicks, burrs and scores. Accept after repair  
providing sealing  
capabilities are /  
unimpaired.

(2) Wear.

(a) Sealing unimpaired. Accept.

B. Inspect Bolt Locations.

(1) Wear and fretting.

(a) Bolt holes elongated Accept after  
not more than 0.030 in. repair.  
(0,760 mm).

C. Inspect Valve Body Location.

(1) Wear.

(a) Light witness mark. Accept.

12. Helical Spring (303-110)

A. Check Spring Condition.

(1) (a) Check free length is Accept.  
1.080-1.040 in. (27,4-  
26,4 mm).

(b) Check "in position" length Accept.  
is 0.700 in. (17,8 mm) with  
applied load of 9.5-10.5 lbf  
(46,3-46,7 N).

B. Inspect End Coil Faces.

(1) Nicks and burrs. Accept if square-  
ness is retained  
after repair.

(2) Squareness.

(a) Not more than 5 deg error. Accept.

INSPECTION/CHECK

71-70-00

Page 308

Jun 1/78

TN3297



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

13. Valve Housing (303-115) (SB.71-8)

A. Inspect Sealing Valve Seat.

(1) Nicks, burrs and pitting. Reject.

B. Inspect Retaining Ring Location.

(1) Wear.

(a) Any stepped wear. Reject.

C. Inspect Outside Diameter.

(1) Wear.

(a) Not more than 0.010 in.  
(0,250 mm) in depth. Accept after repair.

(2) Nicks and burrs. Accept after repair.

D. Inspect Bore.

(1) Wear and fretting.

(a) Even, unstepped wear;  
light fretting. Accept after repair.

14. Filter (303-120)

A. Inspect Screen.

(1) Punctures, tears or separation  
from cage. Reject.

B. Inspect Cage.

(1) Cracks and distortion. Reject.

(2) Nicks, burrs and scores. Accept, if unbroken  
contact is retained  
after repair.

(3) Wear and fretting. Accept, if sealing  
capability is not  
impaired.

TN3298

INSPECTION/CHECK

71-70-00

Page 309

Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



15. Sealing Valve (303-130) (SB.71-8)

A. Inspect Half-ball Contact Face.

(1) Check witness mark.

- |   |   |
|---|---|
| (a) Broken circle, or heavy damage.               | Reject.   |
| (b) Unbroken circle with light damage detectable. | Accept if sealing unimpaired after light lapping to valve seat and testing (Ref. 71-70-00 Testing). |
| (c) Unbroken circle, no visible damage.           | Accept after test (Ref.71-70-00 Testing).   |

B. Inspect Valve Housing Contact Faces.

(1) Wear.

- |                     |                                    |
|---------------------|------------------------------------|
| (a) Unstepped wear. | Accept if operation is unimpaired. |
|---------------------|------------------------------------|

- |                      |                      |
|----------------------|----------------------|
| (2) Nicks and burrs. | Accept after repair. |
|----------------------|----------------------|

C. Inspect Bore and Spring Location.

(1) Wear and fretting.

- |   |                      |
|---|----------------------|
| (a) Even, unstepped wear; light fretting. | Accept after repair. |
|---|----------------------|

D. Test Valve Assembly for Leakage (Ref.71-70-00 Testing).

16. Valve Body (303-135) (SB.71-8)

A. Inspect Attachment Flange.

(1) Distortion.

- |                     |         |
|---------------------|---------|
| (a) Any distortion. | Reject. |
|---------------------|---------|

TN3300

INSPECTION/CHECK

**71-70-00**

Page 310

Jun 1/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



(2) Wear.

- (a) Bolt holes elongated  
not more than 0.030 in.  
(0,760 mm).

Accept after  
repair.

(3) Nicks and burrs.

Accept after  
repair.

B. Inspect Valve Chamber.

(1) Dents.

- (a) Any dents.

Reject.

(2) Nicks and burrs.

Accept after  
repair.

(3) Wear.

- (a) Unstepped, even  
wear at spring  
stop location.

Accept.

- (b) Not more than 0.010 in.  
(0,250 mm) bore wear.

Accept.

C. Inspect Overflow Body.

(1) Nicks and burrs.

Accept after  
repair.

(2) Wear.

- (a) Not more than 0.010 in.  
(0,250 mm) of unstepped  
wear at filter contact  
location.

Accept after  
repair.

(3) Obstruction.

- (a) Unobstructed valve  
chamber feed hole.

Accept.

PRINTED IN ENGLAND

TN30397

INSPECTION/CHECK

71-70-00

Page 311  
Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

17. Tee Piece (307-230), Connector (308-350), Adapter (309-480)  
and Flanged Elbow (310-80)

A. Inspect Threaded Parts (Ref.72-09-00, Inspection/Check).

B. Inspect Attachment Flanges.

(1) Wear and fretting.

(a) Bolt holes elongated less than 0.030 in. (0,760 mm).	Accept after repair.
--	-------------------------

(b) Not more than 0.020 in. (0,510 mm) in depth.	Accept after repair.
---	-------------------------

C. Inspect Abutment Faces.

(1) Nicks, burrs and scores.

(a) Not more than 0.020 in. (0,508 mm) in depth.	Accept after repair if total reduction of thick- ness is not more than 15 per cent of mounting flange thickness.
---	--

18. Connectors (305-40/90/130, 306-160/200, 307-110, 308-150 and  
309-590), Fluid Passage Bolts (305-30/120, 306-150/190,  
307-100, 308-140 and 311-10) and Union Adapters (305-80/160  
and 308-170 and Adapter 309-580)

A. Inspect Threads (Ref.72-09-00 Inspection/Check).

B. Inspect Abutment Faces.

(1) Nicks, burrs and scores.	Accept after repair if sealing capability is unimpaired.
------------------------------	---

(2) Wear and fretting.

(a) Even, unstepped, wear, sealing capability unimpaired.	Accept after repair.
---	-------------------------

INSPECTION/CHECK

71-70-00

Page 312  
Jun 1/99



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



C. Inspect Drilled Passages.

(1) Obstruction.

Reject for re-  
cleaning (Ref.  
71-73-02, 03 and  
04, Cleaning).

19. Tubes (308-300, 309-570, 310-50, 311-100, 312-80, 315-160 and 316-60/230/380)

A. Inspect Threads (Ref.72-09-00 Inspection/Check).

B. Inspect Tubes (Ref.72-09-00 Inspection/Check, Rigid Tubes).

C. Inspect Connector Abutment Faces (311-100).

(1) Nicks, burrs and scores.

Accept after repair  
if sealing  
capability is not  
impaired.

(2) Wear and fretting.

(a) Even, unstepped, wear,  
sealing capability  
unimpaired.

Accept after  
repair.

D. Inspect Flange Abutment Faces (312-80 and 316-60).

(1) Nicks, burrs and scores.

(a) Not more than 0.010 in.  
(0,250 mm) in depth at  
abutment face of flange.

Accept after  
repair if sealing  
capability is not  
impaired.

20. Drain Body Upper and Lower (313-40/70)

A. Inspect Abutment Faces.

(1) Nicks, burrs, scores and wear.

Accept after repair  
if sealing capabil-  
ity is not impaired.

PRINTED IN ENGLAND

TN3201

INSPECTION/CHECK

71-70-00

Page 313  
Jun 1/78



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



B. Inspect Bolt Locations.

(1) Wear and fretting.

(a) Flange bolt holes elongated more than 0.030 in. (0,760 mm) or any elongation of other holes. Reject.

(b) Flange bolt holes worn not more than 0.030 in. (0,760 mm). Accept after repair.

C. Inspect Valve Seats (Ref.Fig.314).

(1) Nicks, burrs and pitting. Reject.

D. Inspect Valve Contact Faces in Bores (Ref.Fig.314).

(1) Nicks and burrs. Accept, if repair preserves sealing capability.

E. Inspect Washer Location (Ref.Fig.314).

(1) Nicks and burrs. Accept after repair.

21. Packing Piece (313-80)

A. Inspect Abutment Faces.

(1) Nicks, burrs and scores. Accept after repair.

22. Washers - 2 Off (313-120)

A. Inspect Contact Faces (Ref.Fig.314).

(1) Nicks and burrs. Accept after repair.

23. Springs - 2 off (313-130)

A. Check Spring Condition.

(1) (a) Check free length is 0.560-0.530 in. (14,2-12,5 mm). Accept.

INSPECTION/CHECK

71-70-00

Page 314  
Jun 1/78

TN3202



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Check "in position" length is 0.350 in. (8,9 mm) with applied load of  $7.60 \pm 0.60$  ozf ( $2,13 \pm 0,167$  N). Accept.

B. Inspect End Coil Faces.

- (1) Nicks and burrs. Accept if squareness is retained after repair.
- (2) Squareness.
- (a) More than 5 deg error. Reject.
- (b) Not more than 5 deg error. Accept.

24. Valves - 2 Off (313-140)

A. Inspect Sealing Surfaces (Ref.Fig.314).

- (1) Nicks, burrs and scores. Accept, if sealing is unimpaired after repair.

B. Inspect Spherical Surfaces (Ref.Fig.314).

- (1) Nicks, burrs and scores. Accept, if function is satisfactory after repair.

C. Inspect Spring Contact Face (Ref.Fig.314).

- (1) Nicks and burrs. Accept after repair.
- (2) Wear and fretting.
- (a) Even wear; light fretting. Accept after repair.

25. Flexible Tubes (305-10/20/60/70/110/150, 306-140/180, 307-10/90/200, 308-80/130 and 309-440)

A. Inspect Threads (Ref.72-09-00 Inspection/Check).

INSPECTION/CHECK

71-70-00

Page 315  
Jun 1/78





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- B. Inspect Tube End Fittings (Ref.72-09-00 Inspection/Check).
- C. Carry Out Pressure Test (Ref.71-70-00 Testing).
- D. Inspect Wire Braid.

(1) Kinking.

- (a) Any kinking of strands. Reject.

(2) Damage.

- (a) Not more than two broken strands in any band along the entire length of the tube. Accept provided two adjacent bands are not affected.
- (b) Displaced strands. Accept subject to (1) (a).

(3) Distortion.

NOTE: Tubes may become permanently distorted by the previous installation, any such tubes which do not assume a reasonably straight position in the free condition must be rejected.

- (a) Any sharp bends. Reject.

(4) Dents.

- (a) Dents caused by clipping and only affecting outer braid. Accept.

TN41743

INSPECTION/CHECK

**71-70-00**

Page 316

Jun 1/78

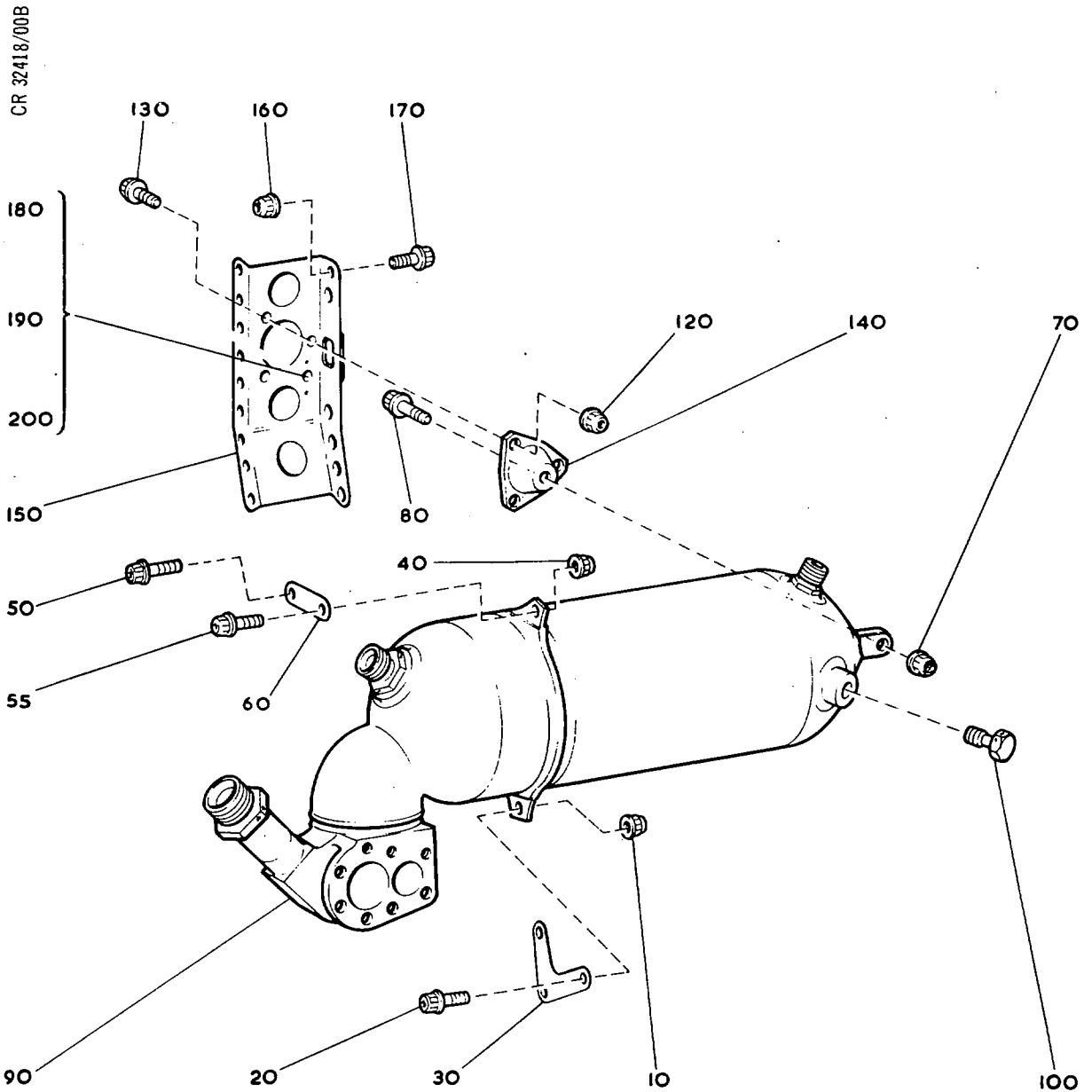


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



Drains Tank Details  
Figure 302

INSPECTION/CHECK

**71-70-00**

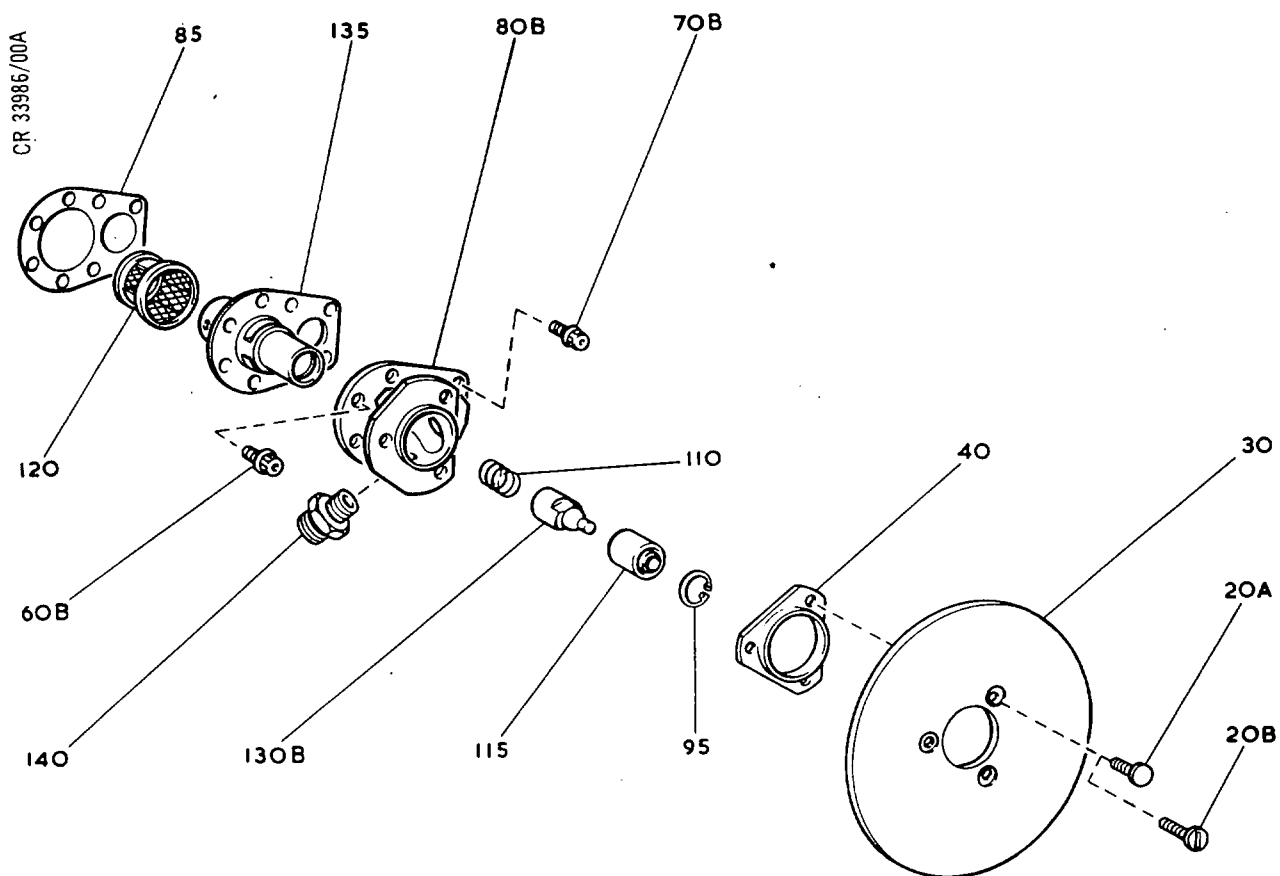
Page 317  
Aug 1/76

TN3206



OLYMPUS 593

MK. 610-14-28  
OVERHAUL



Drains Tank Details  
Figure 303

INSPECTION/CHECK

**71-70-00**

Page 318

Aug 1/76

TN3208



OLYMPUS 593

MK. 610-14-28  
OVERHAUL



PRINTED IN ENGLAND

This illustration no longer required

TN3209

Figure 304

INSPECTION/CHECK  
**71-70-00**  
Page 319  
Aug 1/76

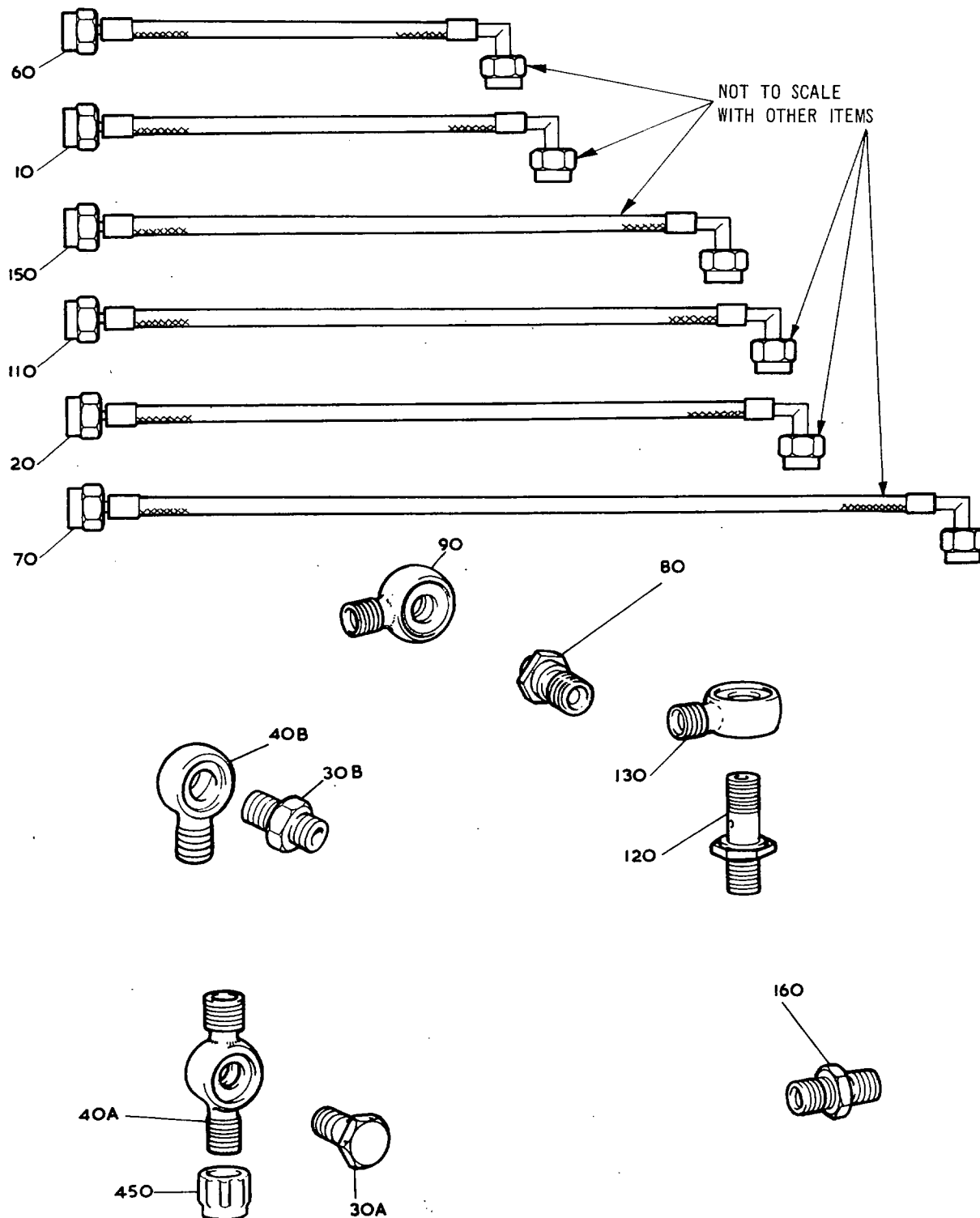


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32499/00B



Fuel Drain Tubes - Component Connections to  
Overboard Spill (Part 1 of 5)  
Figure 305

INSPECTION/CHECK

71-70-00

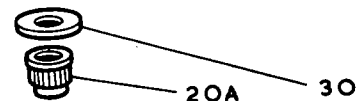
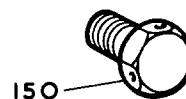
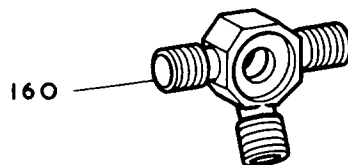
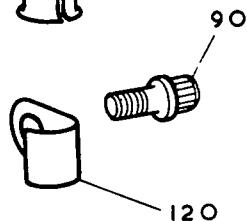
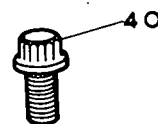
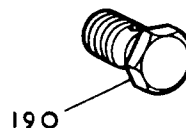
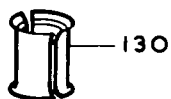
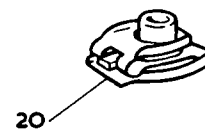
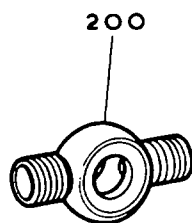
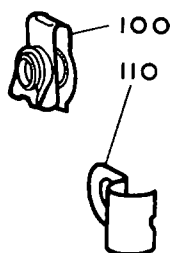
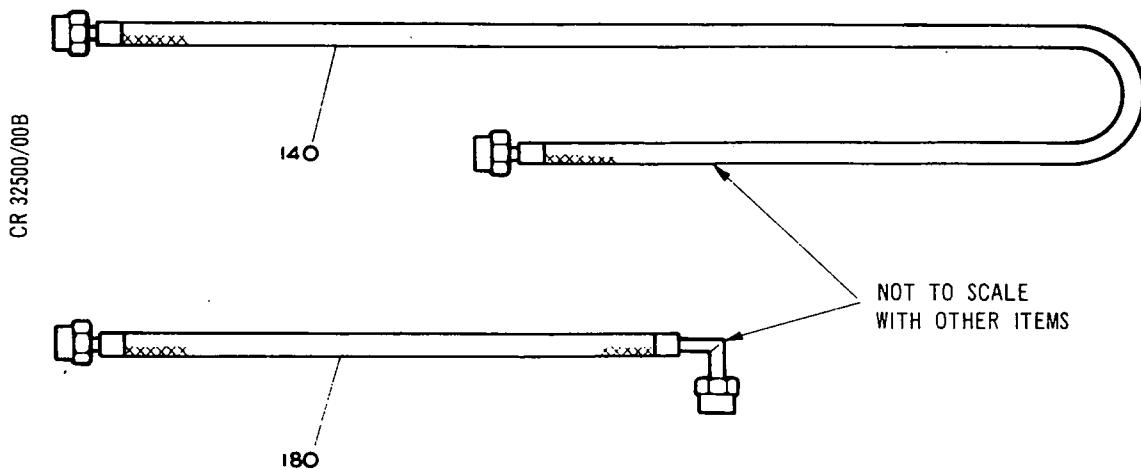
Page 320  
Aug 1/76

TN3211



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Fuel Drain Tubes - Component Connections to  
Overboard Spill (Part 2 of 5)  
Figure 306

INSPECTION/CHECK

71-70-00

Page 321  
Aug 1/76

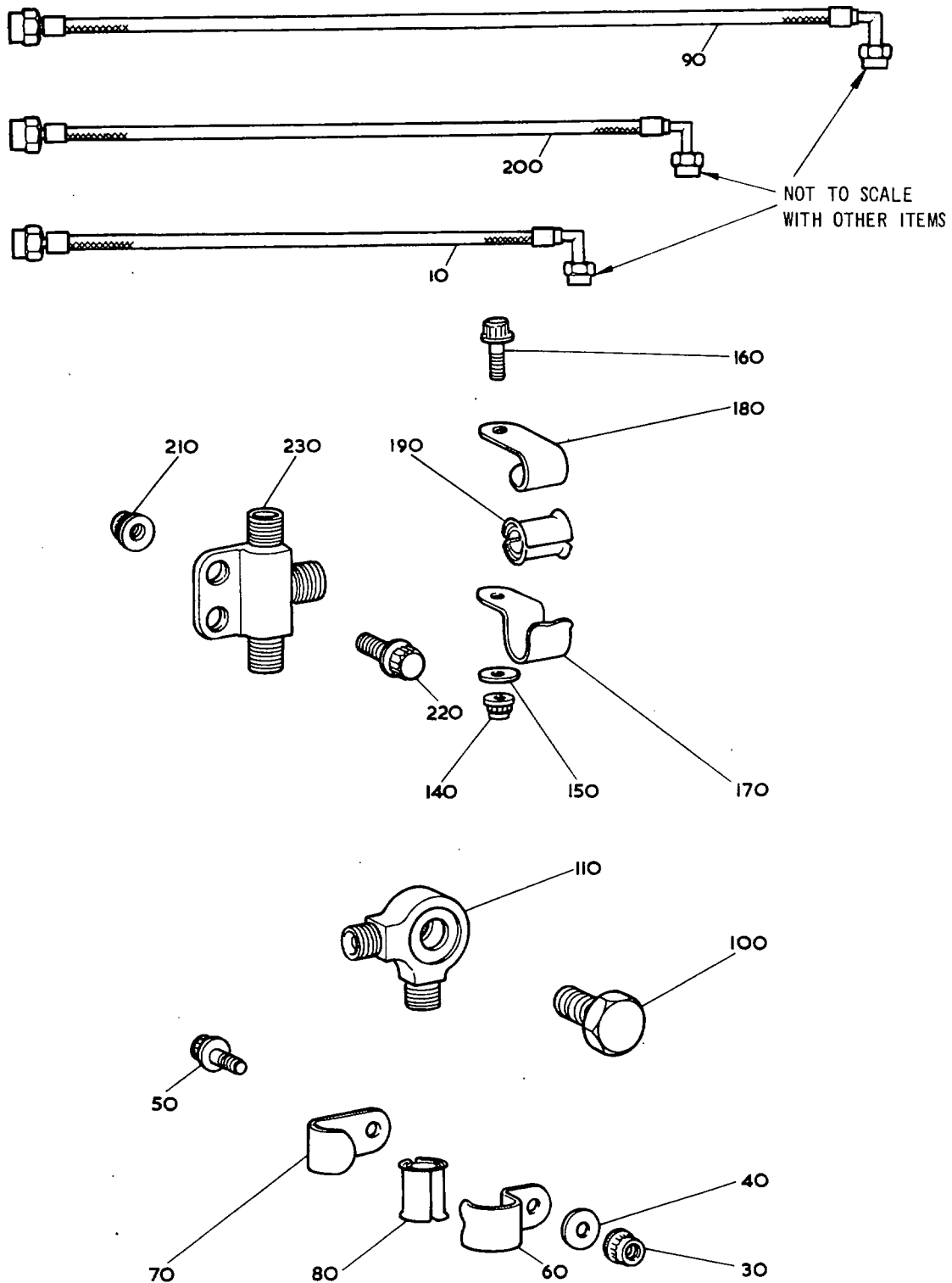


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32501/00B



Fuel Drain Tubes - Component Connections to  
Overboard Spill (Part 3 of 5)  
Figure 307

INSPECTION/CHECK

**71-70-00**

Page 322  
Aug 1/76

TN3213



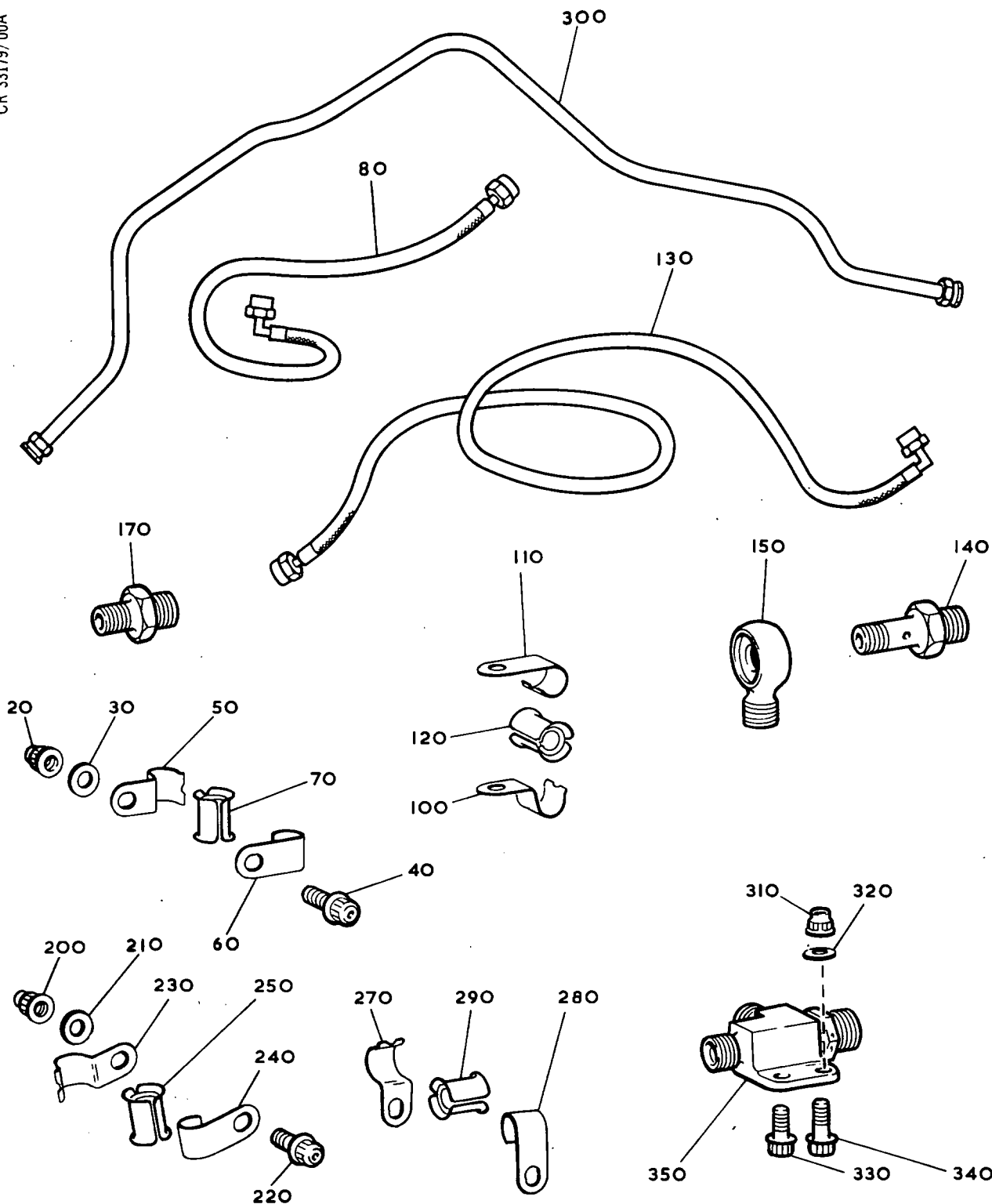
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33179/00A

PRINTED IN ENGLAND



TN3214

Fuel Drain Tubes - Component Connections to  
Overboard Spill (Part 4 of 5)  
Figure 308

INSPECTION/CHECK

71-70-00

Page 323  
Aug 1/76



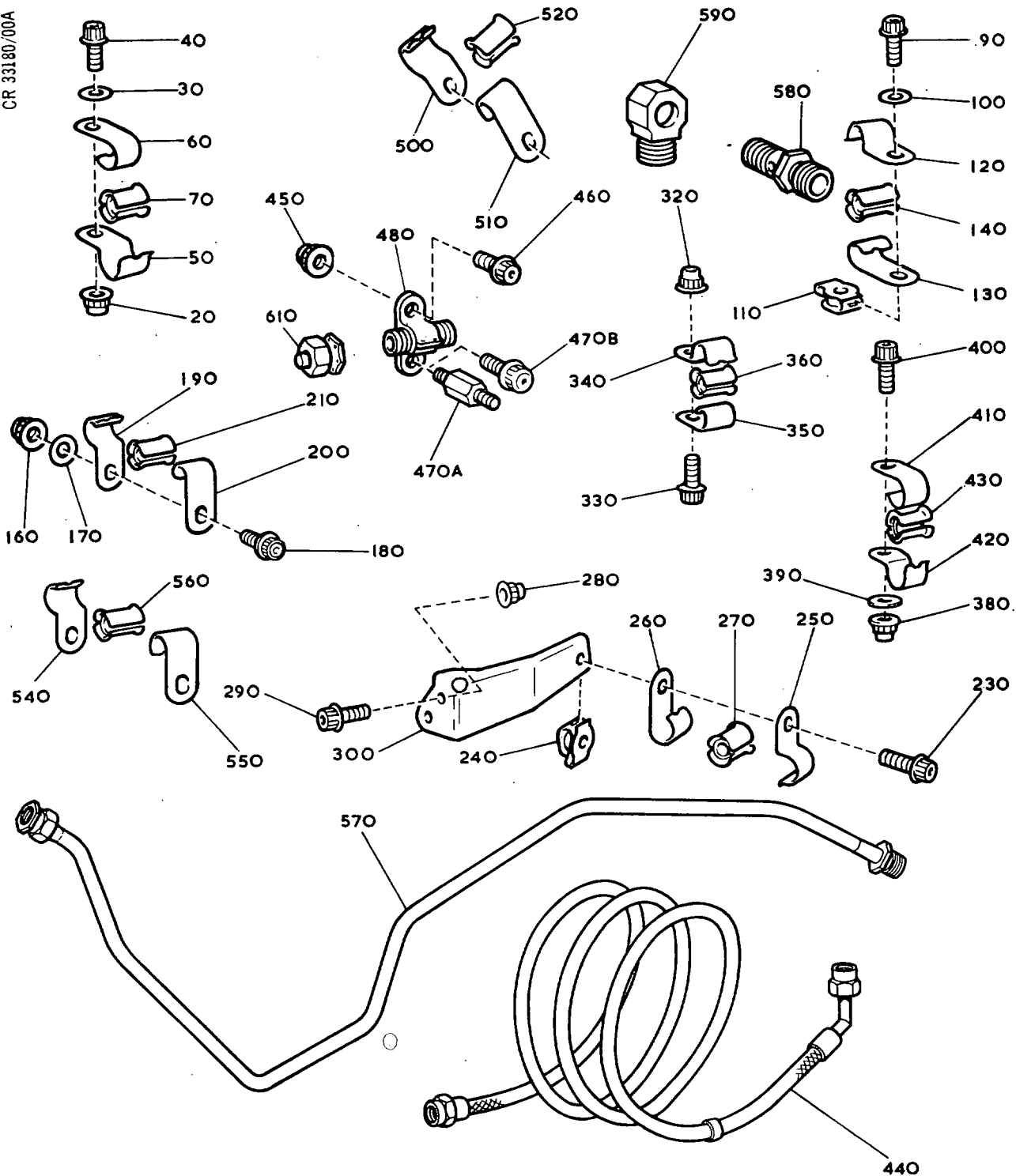


# OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33180/00A



Fuel Drain Tubes - Component Connections to  
Overboard Spill (Part 5 of 5)  
Figure 309

INSPECTION/CHECK

## 71-70-00

Page 324

Aug 1/76

IN3215



OLYMPUS 593

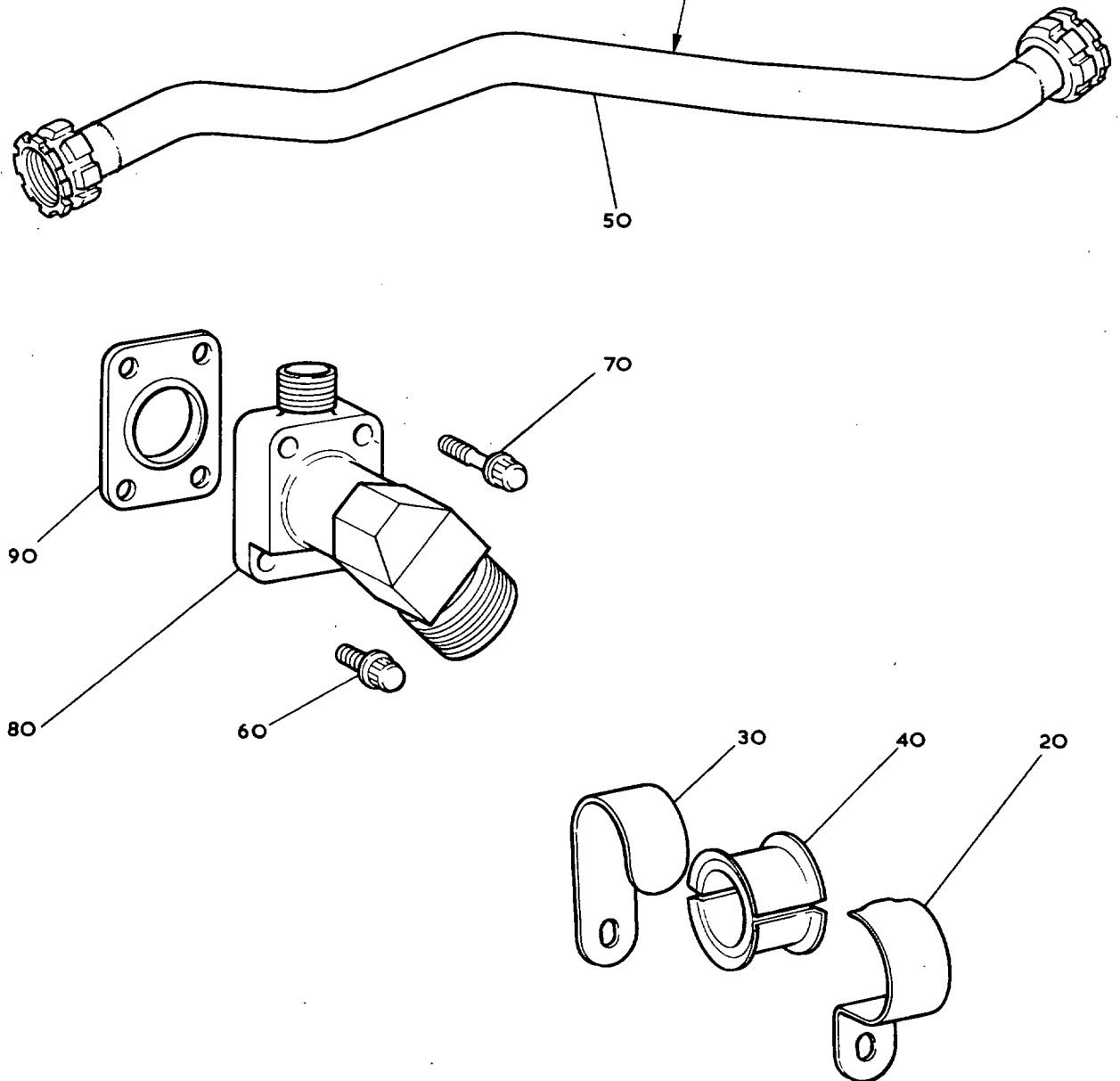
MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32504/00B

NOT TO SCALE  
WITH OTHER ITEMS



TN3216

Fuel Drain Tube - 2nd Stage Pump to Tank  
Figure 310

INSPECTION/CHECK

**71-70-00**

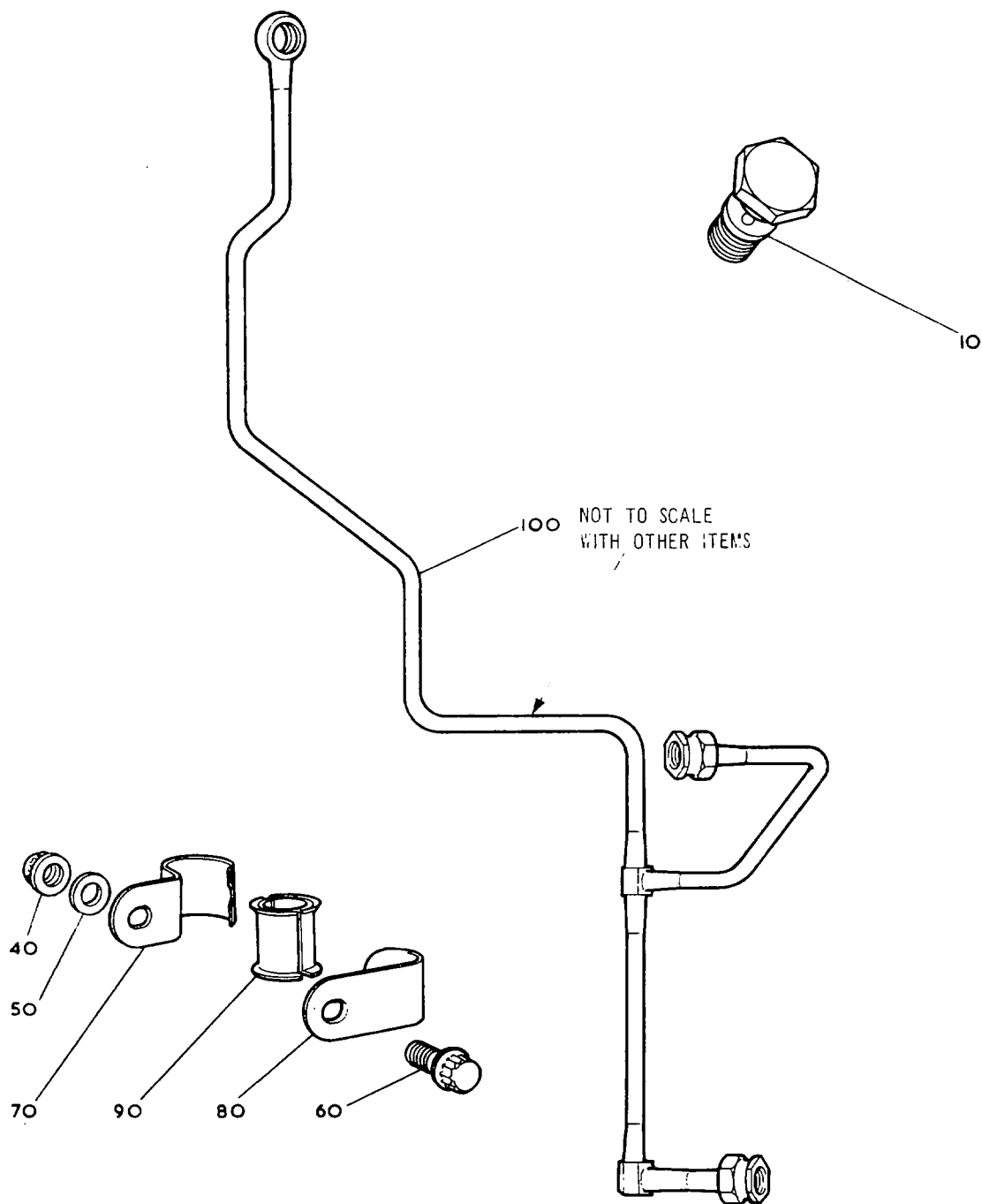
Page 325  
Aug 1/76

CR 32505/00B



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TN3217

Fuel Drain Tubes - 1st Stage Pump and FCU to  
Connection on Tube, 2nd Stage Pump to Tank  
Figure 311

INSPECTION/CHECK

**71-70-00**

Page 326  
Aug 1/76



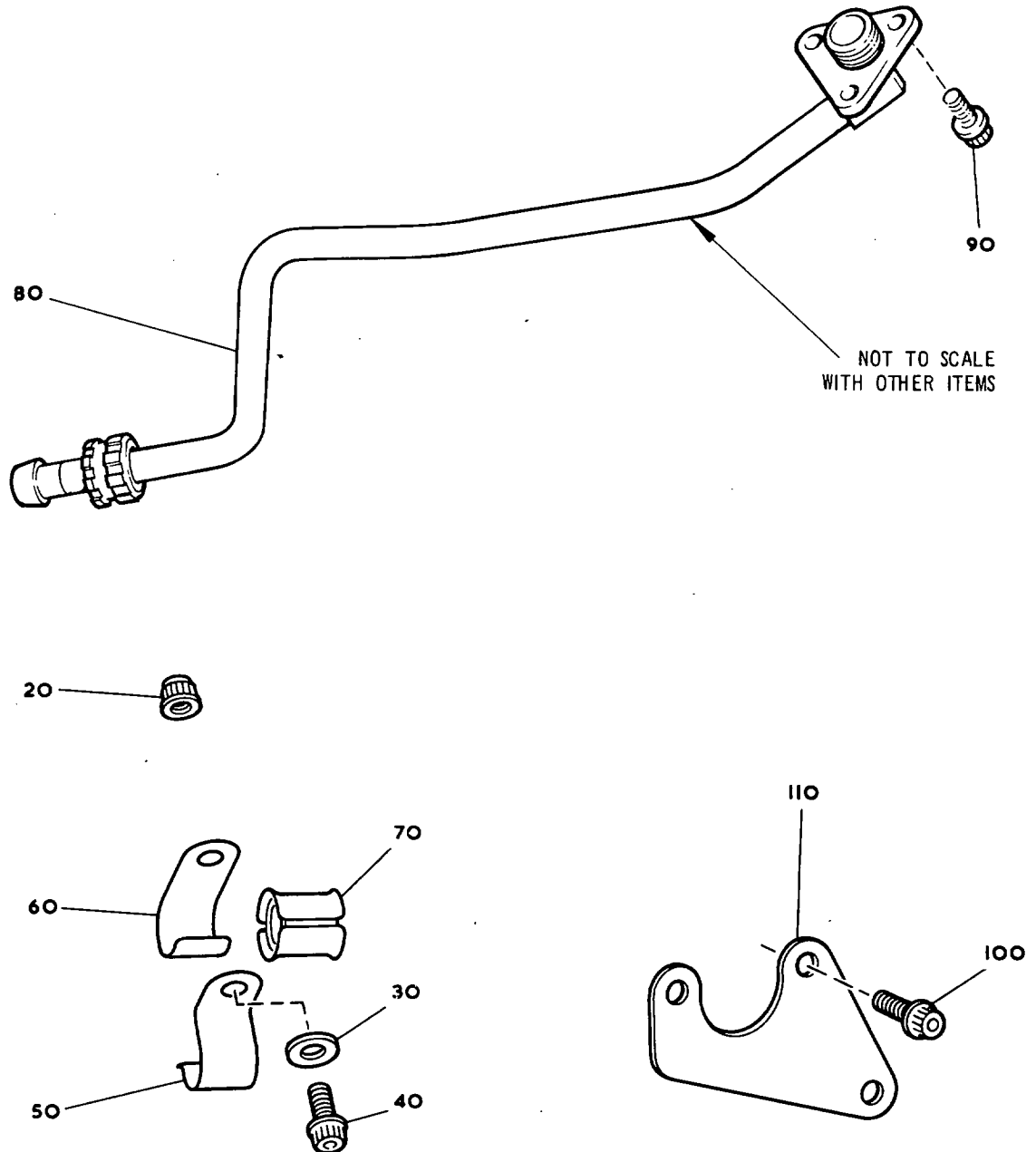
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32415/00B



TN3218

Fuel Drain Tube - Distribution Block Dump Outlet to Tank  
Figure 312

INSPECTION/CHECK

71-70-00

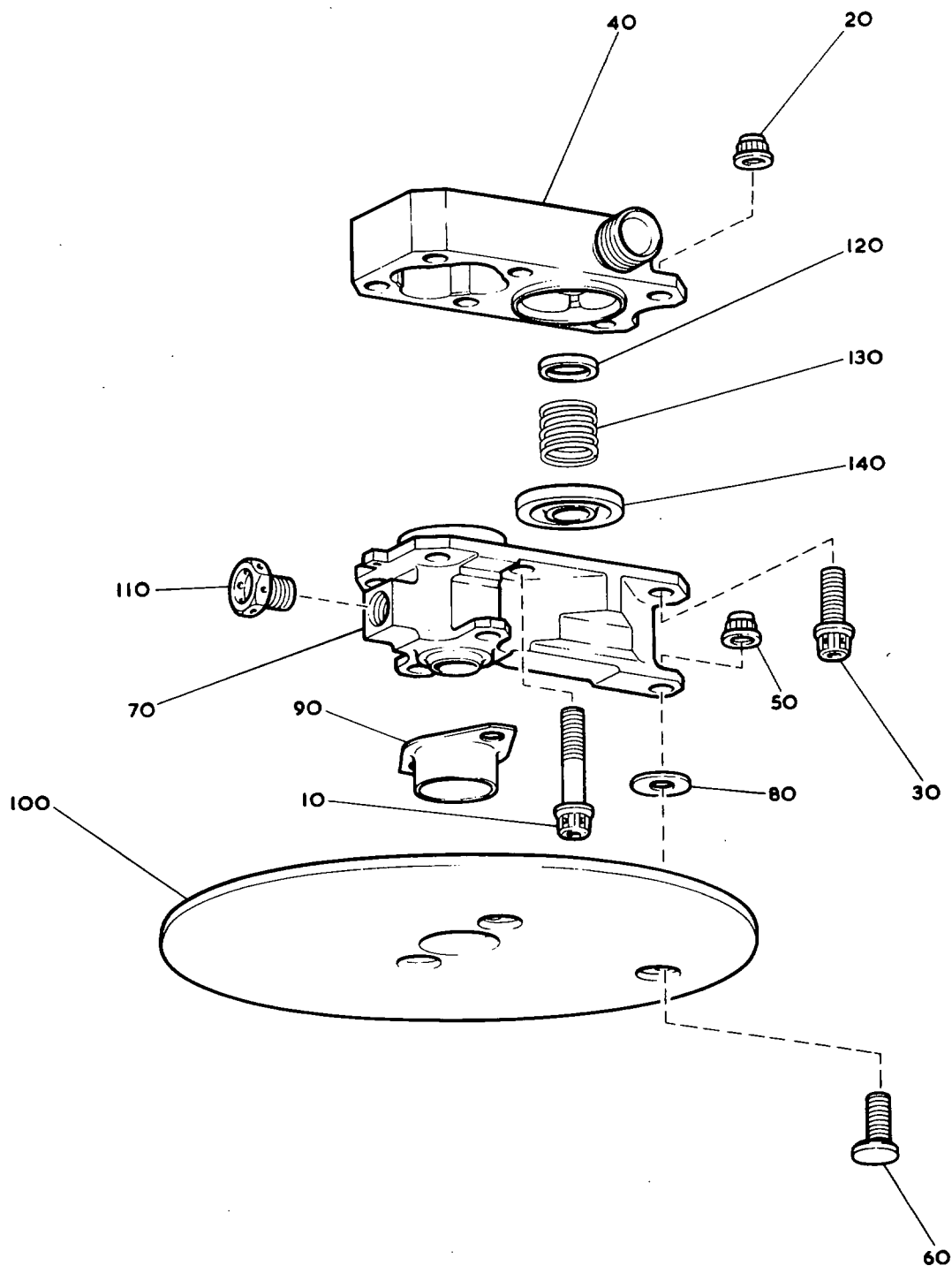
Page 327

Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32414/00B

TN3219

Engine Drains Assembly at Exhaust Diffuser Case  
Figure 313

INSPECTION/CHECK

71-70-00

Page 328

Aug 1/76

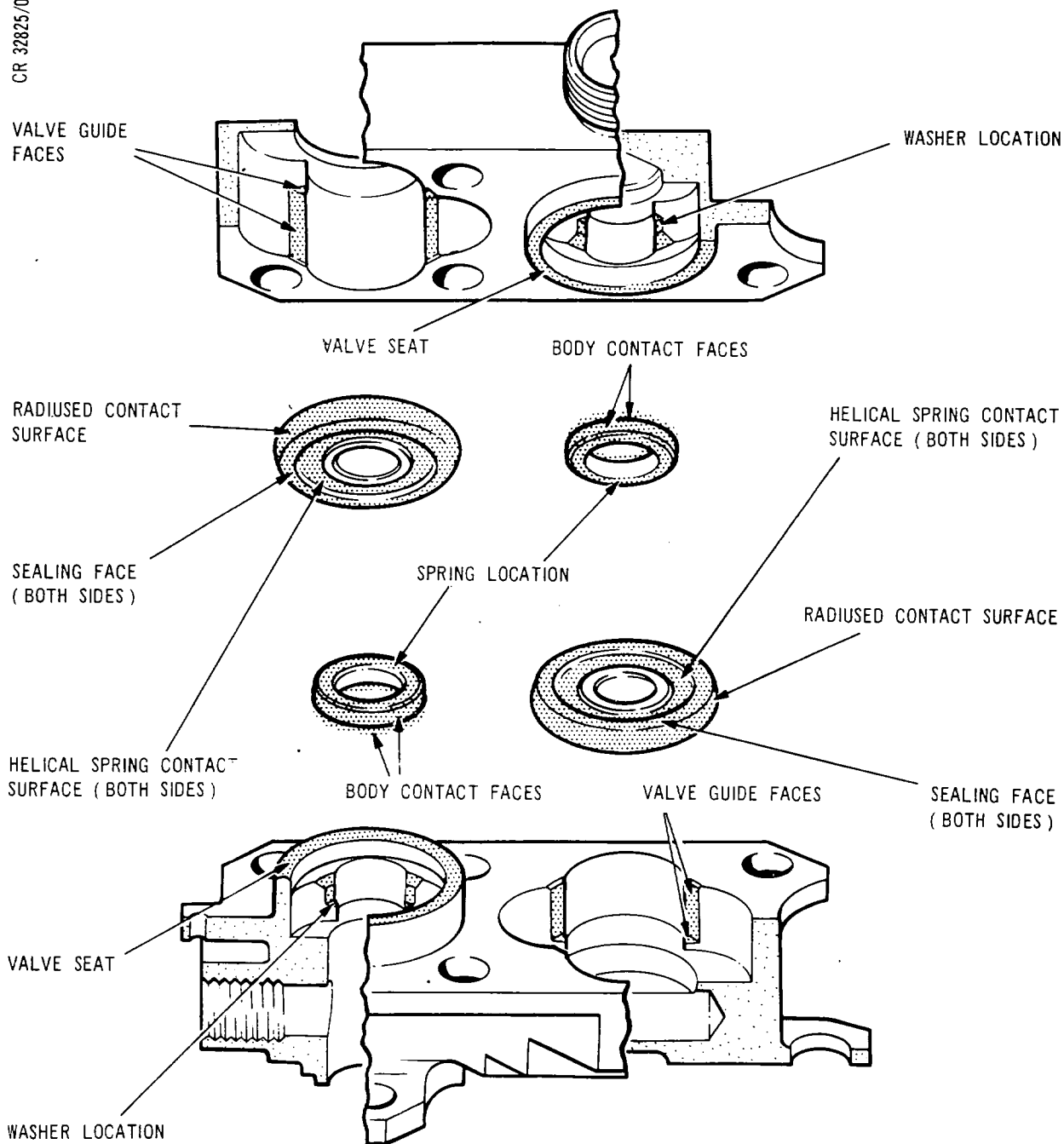


OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 32825/00A

PRINTED IN ENGLAND



TN3220

Drains Assembly Inspection Zones  
Figure 314

INSPECTION/CHECK

71-70-00

Page 329

Aug 1/76

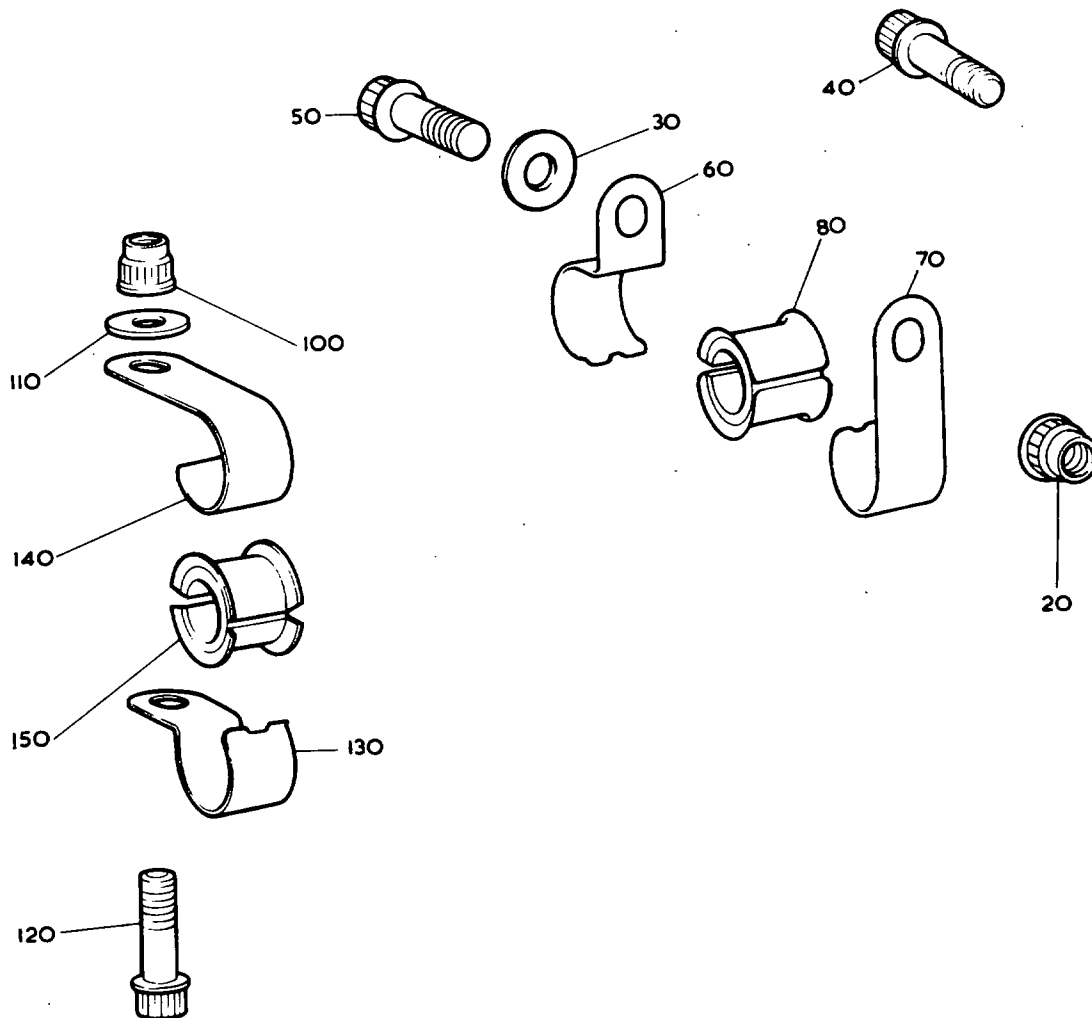
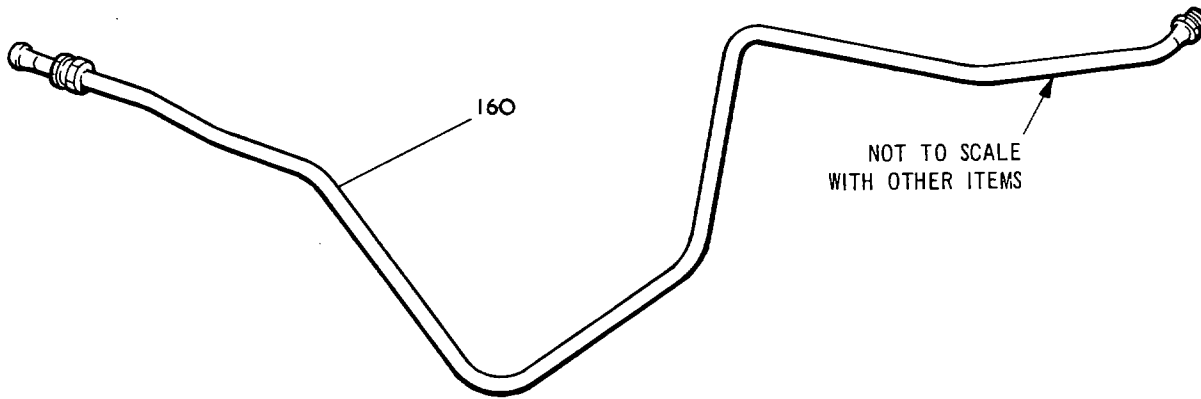


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32413/00B



Oil Drain Tube - CSD Elbow to Overboard Spill  
at Drains Tank  
Figure 315

INSPECTION/CHECK

**71-70-00**

Page 330  
Aug 1/76

TN3302



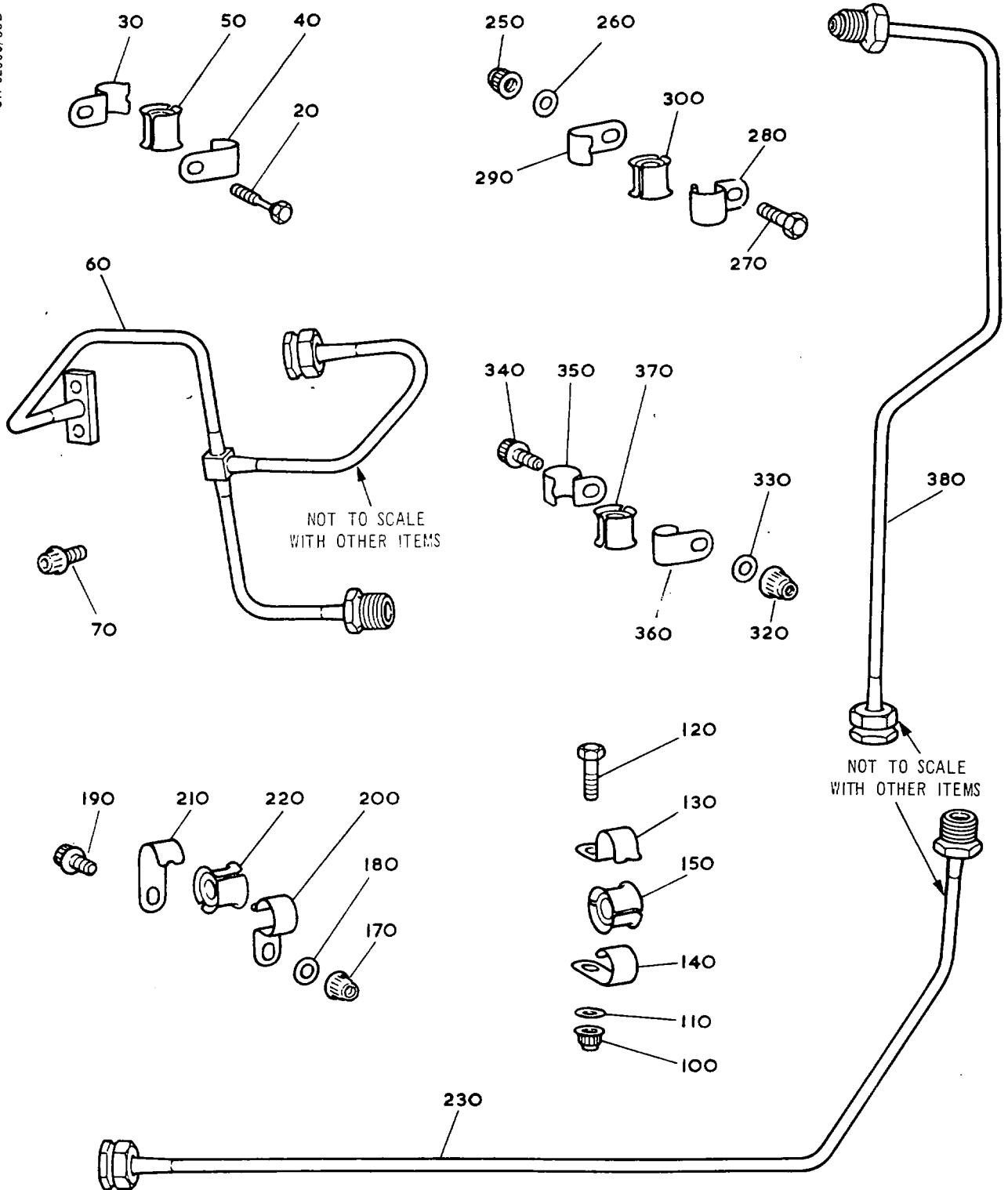
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32506/00B

PRINTED IN ENGLAND



TN575

Oil Drain Tubes - Hydraulic Pump to Overboard Spill Connection  
Figure 316

INSPECTION/CHECK

**71-70-00**

Page 331

Aug 1/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



ENGINE DRAINS - TESTING

TABLE OF CONTENTS

Para.	Page
1. General ... ..	701
2. Test Equipment ... ..	702
3. Test Sealing Valve for Leakage ... ..	702
4. Test Drains Tank Metered Orifice ... ..	703
5. Test Drains Tank for Leakage ... ..	703
6. Pressure Test Flexible Drain Tubes... ..	703

TABLE OF ILLUSTRATIONS

Fig. No.	Page
701 Drains Tank Details (Part 1 of 2) ... ..	705
702 Drains Tank Details (Part 2 of 2) ... ..	706

LIST OF TABLES

Table No.	Page
701 Cross Reference to Illustrated Parts Catalogue ... ..	701
702 Test Equipment ... ..	702

PRINTED IN ENGLAND

TN23041



OLYMPUS 593

MK.610-14-28  
OVERHAUL



ENGINE DRAINS - TESTING

1. General

- A. This testing must be carried out on completion of the work detailed in Engine Drains 71-70-00, Inspection/Check, or at any intermediate point as directed therein.
- B. It is assumed that the items making up components to be tested have been selected for compatibility and that any moving and fixed items have acceptable clearances, that mating surfaces have been correctly matched and any defective items have been repaired or replaced.
- C. Where a component forms part of a system, any later testing will be cross referenced to the Testing topic for the complete system when applicable. Testing to be carried out during assembly or installation is not cross referenced in this topic.
- D. To enable the items within this topic to be identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (IPC); thus, Fig.701-40 (701/40) in this text equates with the relevant Fig. and Item No. in the same topic in the IPC. Table 701 provides a cross reference to the equivalent IPC illustrations.
- E. Dimensional checks, when applicable, are cross referenced to the Fits and Clearances Schedule (FCS) at the relevant stage in the test procedure.
- F. Test equipment is listed in Table 702. Where specific equipment is not quoted, details of the purpose, range and accuracy of suitable equipment is provided, together with a test diagram.

---

FIG.NO.	ILLUSTRATED PARTS CATALOGUE EQUIVALENT	
---------	--	--

---

701	71-73-01	Fig.1
702	71-73-01	Fig.2

---

Cross References to Illustrated Parts Catalogue  
Table 701

TESTING  
**71-70-00**

Page 701  
Aug 14/75



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



## 2. Test Equipment

A. The equipment required is listed in Table 702.

PART NO.	DESCRIPTION	PURPOSE	REMARKS
	Container, fuel	Tank leak check	15 in. long x 12 in. depth and width (380 x 300 mm) minimum size.
	Container, fuel	Sealing valve leakage check	Shallow fuel- proof tray.
	Caps, blanking, fuel-proof	Union adapter blanking	12 UNS 14 UNS 18 UNF (1 off each)
	Plate, sealing, fuel-proof	Sealing vent body abutment face	Local manu- facture.

Test Equipment  
Table 702

## 3. Test Sealing Valve for Leakage

- A. Assemble the sealing valve (701-130), together with the helical spring (701-110) and the valve housing (701-115) into the valve body (701-135) and secure with the retaining ring (701-95) (Ref.71-00-01 Stage 2 Assembly).
- B. Place the valve body upright on a suitable container and carefully fill the valve chamber with clean fuel through the 0.150 in. (3,80 mm) diameter hole. Check valve for leakage.



OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

4. Test Drains Tank Metered Orifice

- A. Assemble the overflow vent body and sealing valve tested in para.3, to the drains tank (702/90) (Ref.71-00-01 Stage 2 Assembly).
- B. Assemble the drain plug (702/100) to the tank, using a new seal (702/110) (Ref.71-00-01 Stage 2 Assembly).
- C. Assemble a 18 UNF fuel-proof blank to the union adapter above the drain plug location.
- D. Support the tank horizontally, in the installed position, on a tray.
- E. Pour approximately one half pint of clean, filtered fuel into the tank through the unblanked adapter and check that the fuel flows freely from the metered orifice in the filter location bore. If the orifice is obstructed, reject the tank for cleaning and investigation.
- F. Drain off any remaining fuel, then remove the fuel-proof blank and ventilate the tank to dry off the interior.

5. Test Drains Tank for Leakage

- A. Assemble the fuel-proof blanking caps to the three union adapters on the tank to the face of the overflow vent body and its union adapter.
- B. Immerse the complete drains tank assembly in a bath of clean fuel and brush off any surface tension bubbles. Apply air pressure of 2-3 psi (15-20 kPa) for 5 minutes. Watch for any fresh bubbles, paying particular attention to the overflow vent body/drains tank abutment face, the welded seams and union adapter attachment welds. Reject the tank for repair if any leaks are found.
- C. Remove the tank from the bath. Dry off any fuel, using lint-free cloth or a low-pressure air line.

6. Pressure Test Flexible Drain Tubes

- A. Assemble one end of the tube to a suitable pressure source capable of producing 500 psi (3450 kPa), using clean filter paraffin.

TESTING  
**71-70-00**

Page 703  
Dec 1/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



- B. Loosely assemble a clean dry pressure blank to the free end of the tube, then raise the pressure slowly to expel air through the pressure blank. When air free flow occurs, tighten the blank and continue to raise the pressure to 500 psi (3450 kPa).
  - C. Lock the pressure in the line and hold for a period of three minutes, flex the tube six times to the minimum bend radius along the entire length of the tube.
- NOTE: The minimum bend radius of the drain tube is 2.00 in. (50 mm) measured to the inside of the bend.
- D. Inspect the tube for leaks paying particular attention to the tube end fittings. Reject the tube if any leaks are found or any drop in pressure occurs.
  - E. Release the pressure and remove the pressure blank, raise the pressure and ensure a full free flow through the tube.
  - F. Drain and dry the tube and assemble clean dry blanks.

This space left blank intentionally

TN16485

TESTING

71-70-00

Page 704

Jul 1/76

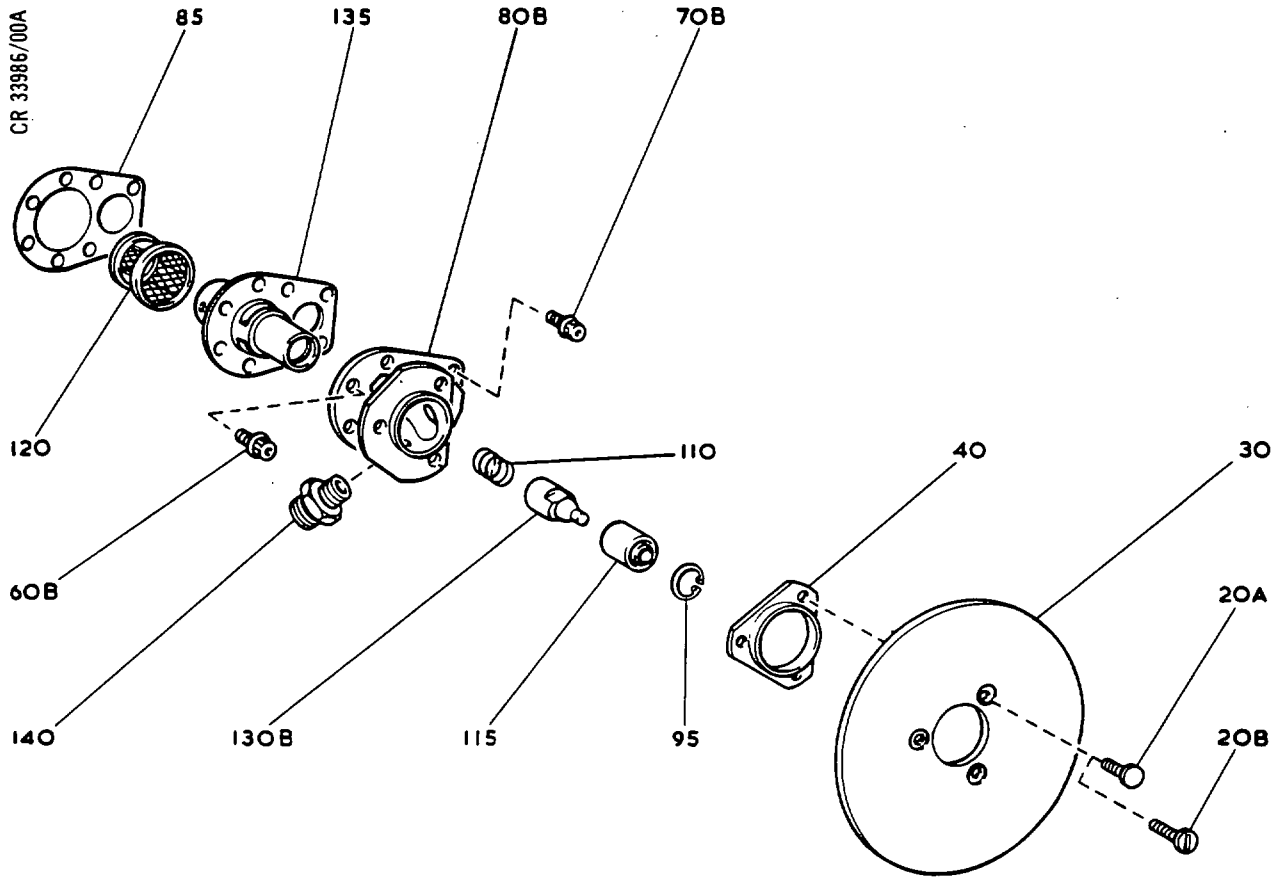


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



Drains Tank Details (Part 1 of 2)  
Figure 701

TESTING  
**71-70-00**  
Page 705  
Aug 1/76

TN7613



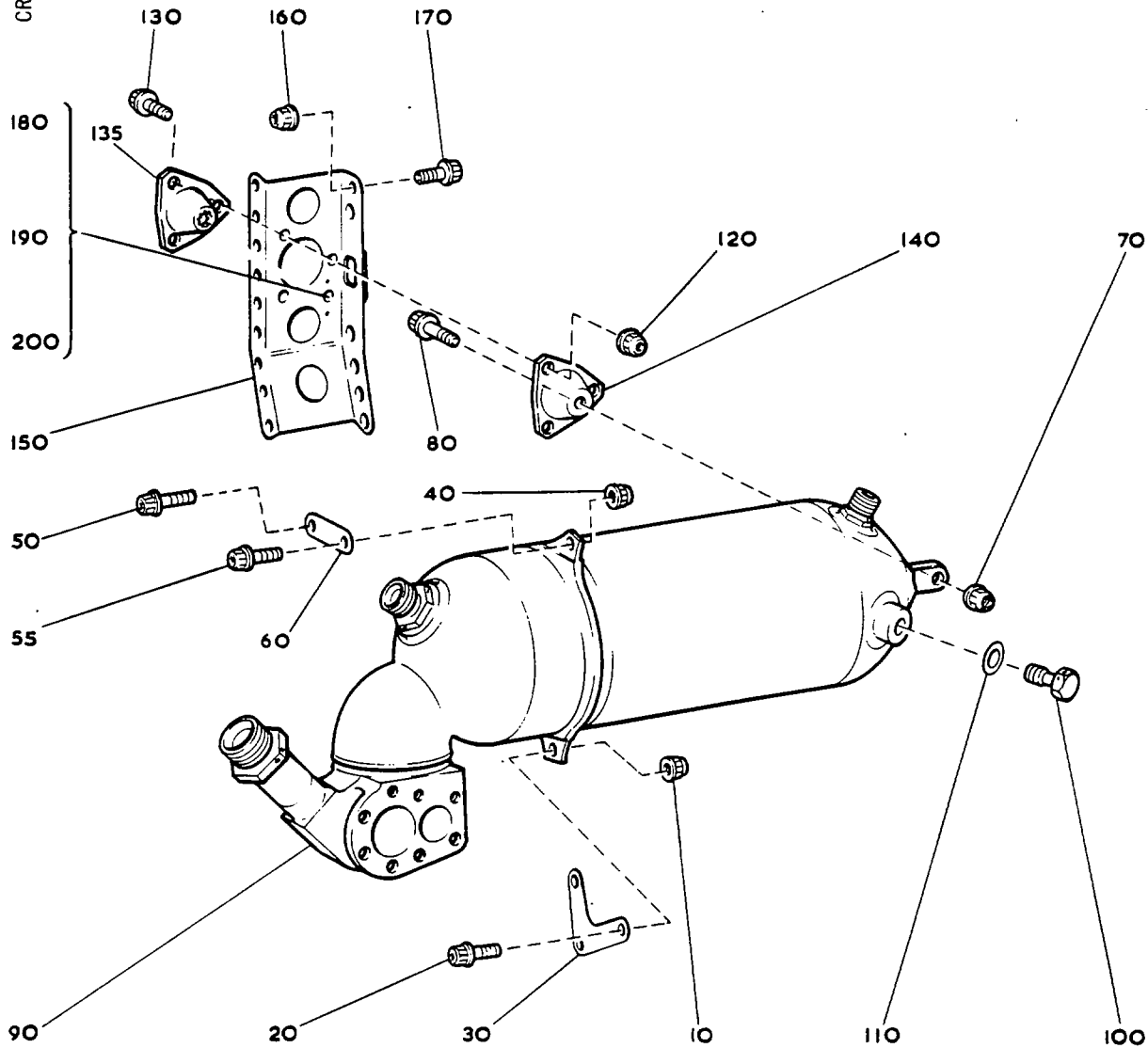
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 32418/000



Drains Tank Details (Part 2 of 2)  
Figure 702

TESTING  
**71-70-00**  
Page 706  
Dec 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TANK, DRAINS - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.
- D. Certain components are subject to Controlled Manufacturing Technique (CMT) procedures. The cleaning of these components is critical and variations from the specified cleaning procedures and solutions are prohibited without approval from the engine manufacturer. All components to which this applies are identified as such in the Remarks column of the Cleaning Processes Table.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	Ensure that the tank is emptied of all fluid after cleaning.
202	ALL		A or B	-	-

Cleaning Processes  
Table 201

FN10043

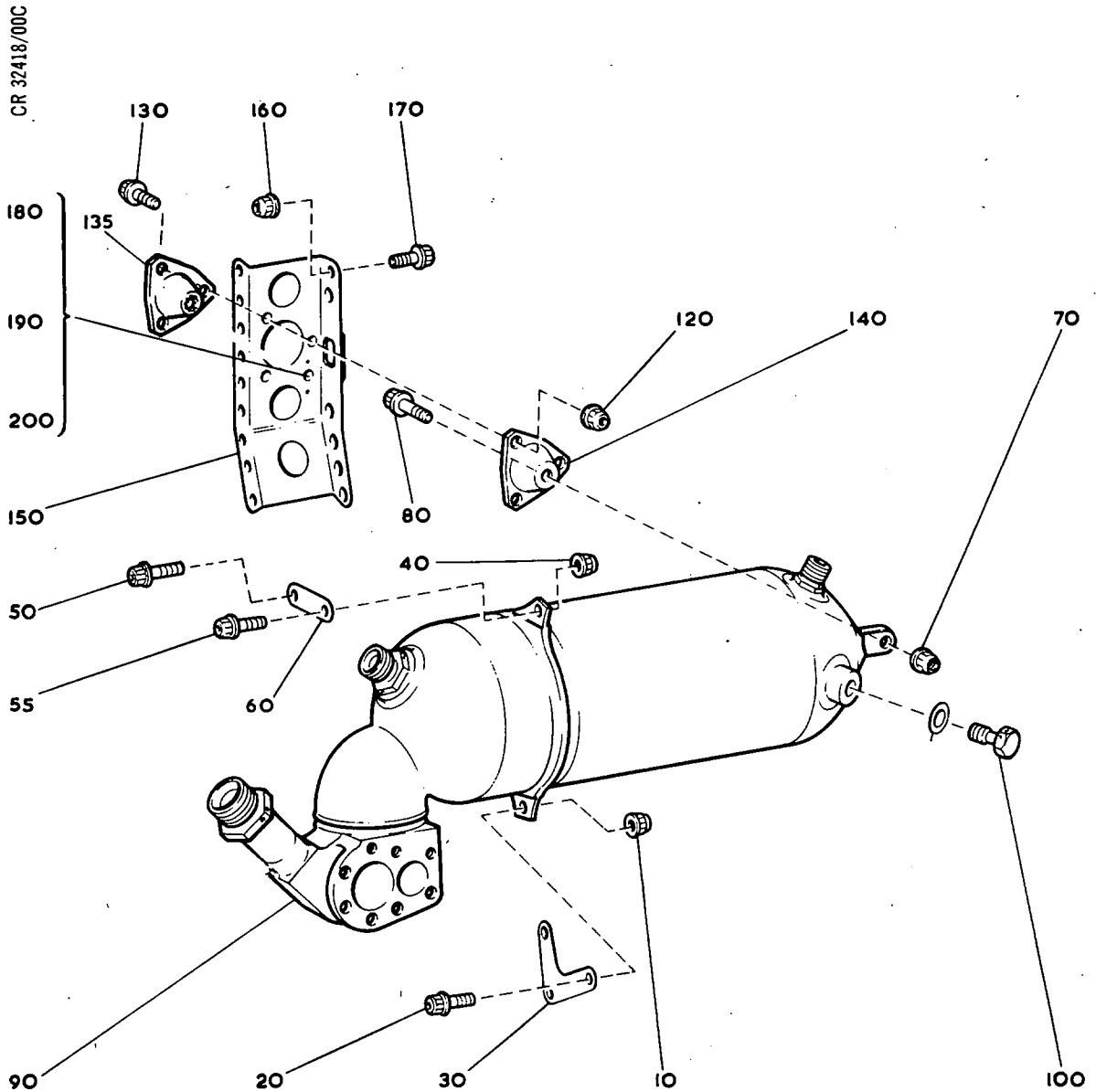


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



TN30183

Drains Tank  
Figure 201

CLEANING  
**71-73-01**  
Page 203  
Dec 1/76

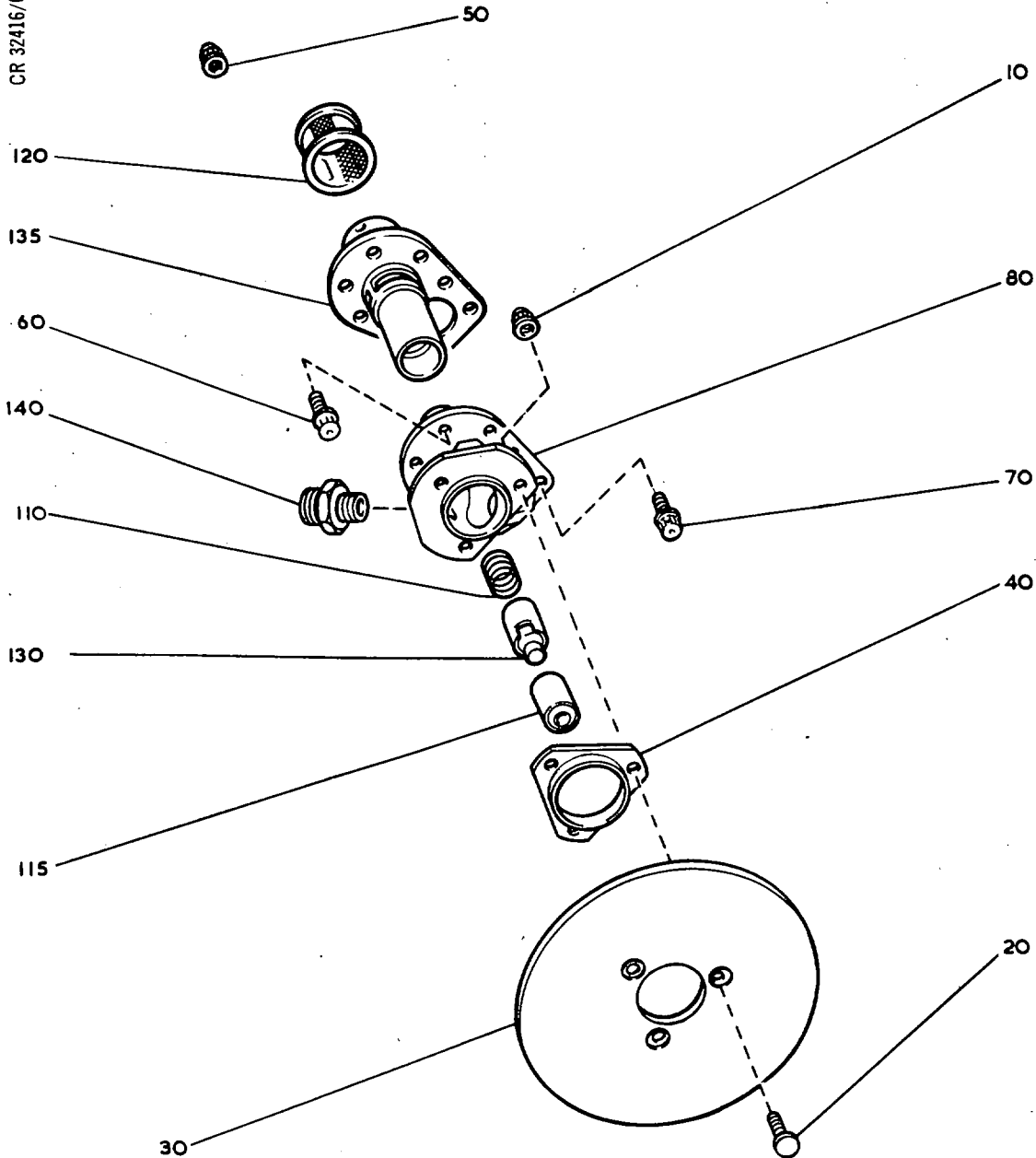


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32416/00C



Drains Tank  
Figure 202

CLEANING  
**71-73-01**  
Page 204  
Dec 1/76

TN30184



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBES - COMPONENT CONNECTIONS TO OVERBOARD SPILL - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING  
**71-73-02**

Page 201  
Dec 1/76

PRINTED IN ENGLAND

TN29300



OLYMPUS 593

MK.610-14-28

OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.
- D. Certain components are subject to Controlled Manufacturing Technique (CMT) procedures. The cleaning of these components is critical and variations from the specified cleaning procedures and solutions are prohibited without approval from the engine manufacturer. All components to which this applies are identified as such in the Remarks column of the Cleaning Processes Table.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except		A or B	-	-
	10	Tube, flexible	B	-	To be flow cleaned using white spirit, then air dried.
	20	Tube, flexible	B	-	
	60	Tube, flexible	B	-	
	70	Tube, flexible	B	-	
	110	Tube, flexible	B	-	
	150	Tube, flexible	B	-	
202	ALL except		A or B	-	-
	140	Tube, flexible	B	-	To be flow cleaned using white spirit, then air dried.
	180	Tube, flexible	B	-	
203	ALL except		A or B	-	-
	10	Tube, flexible	B	-	To be flow cleaned using white spirit, then air dried.
	90	Tube, flexible	B	-	
	200	Tube, flexible	B	-	

Cleaning Processes  
Table 201 (Continued)

FN29302



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
204	ALL		A or B	-	-
	except				
	80	Tube, flexible	B	-	To be flow cleaned using white spirit, then air dried.
	130	Tube, flexible	B	-	
205	ALL		A or B	-	-
	except				
	440	Tube, flexible	B	-	To be flow cleaned using white spirit, then air dried.

Cleaning Processes  
Table 201 (Concluded)

CLEANING  
**71-73-02**  
Page 203  
Aug 28/75

PRINTED IN ENGLAND

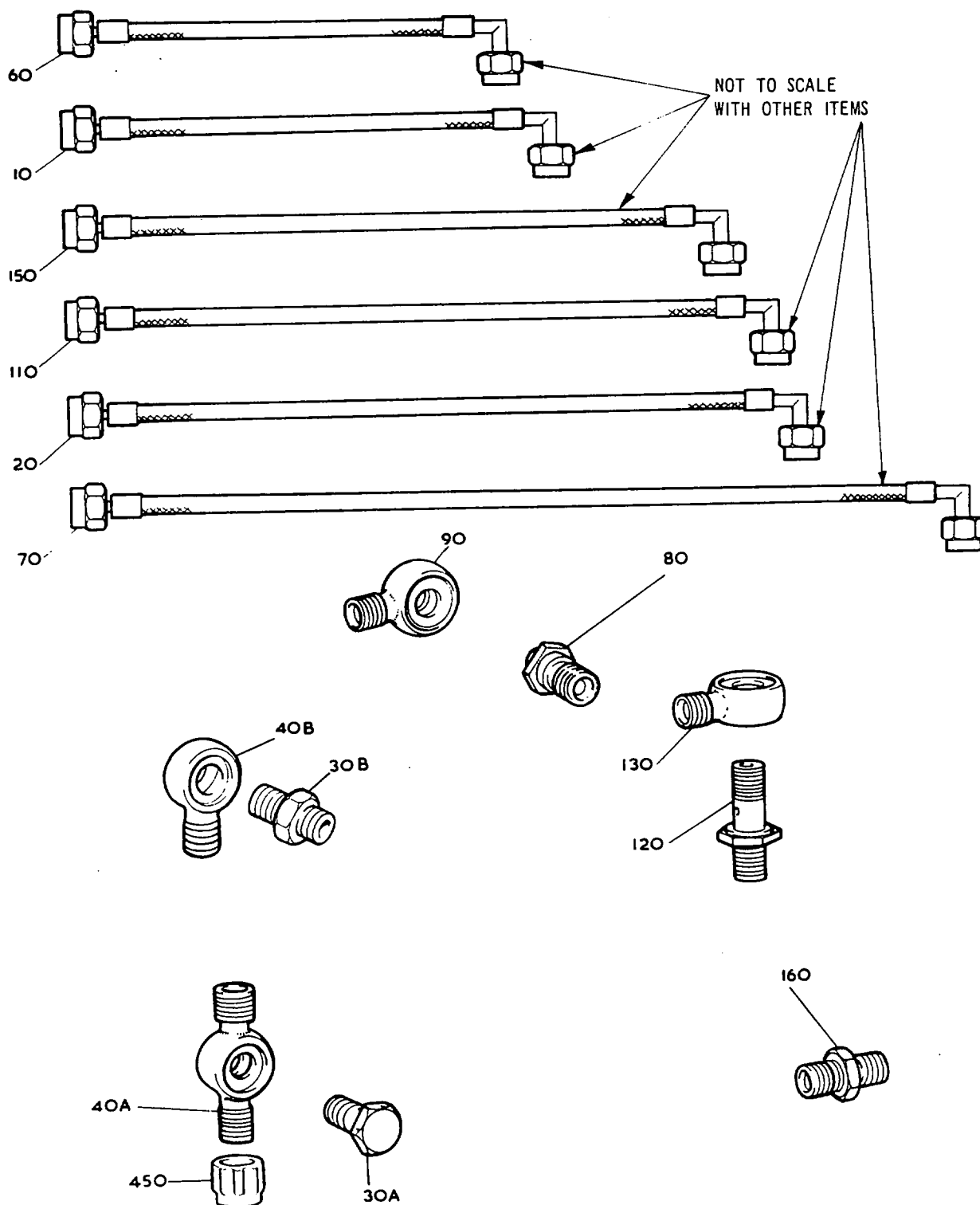
TN29304



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 32499/00B

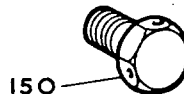
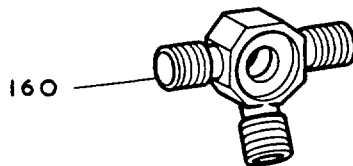
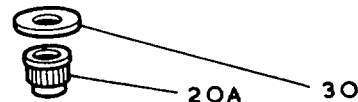
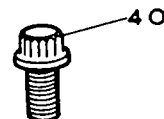
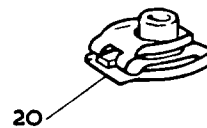
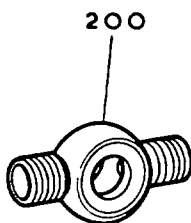
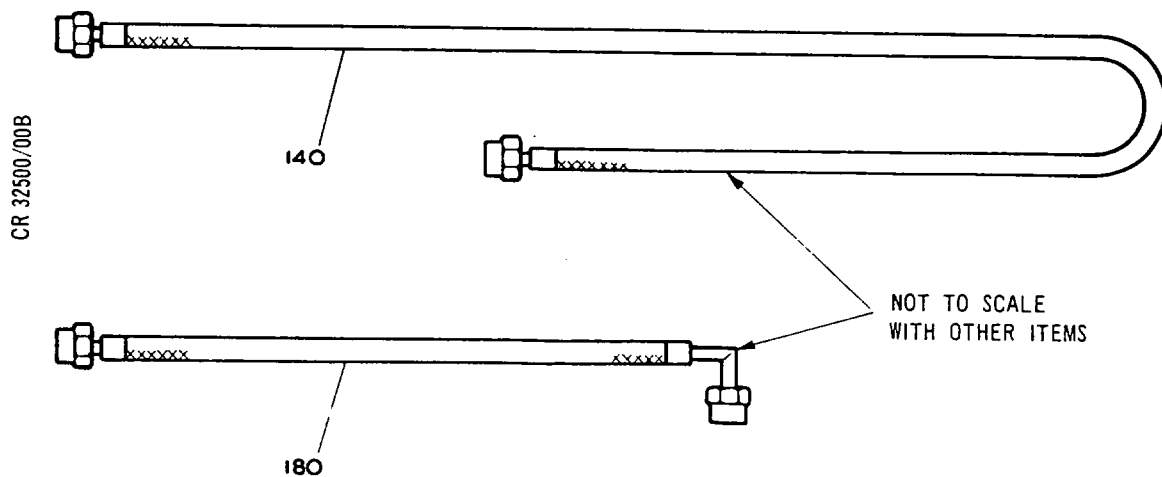


Tubes, Fuel Drain Component Connections to Overboard Spill  
Figure 201

CLEANING  
**71-73-02**  
Page 204  
Aug 28/75

TN29306

PRINTED IN ENGLAND



Tubes, Fuel Drain Component Connections to Overboard Spill  
Figure 202

CLEANING  
71-73-02

Page 205  
Aug 28/75

TN29308





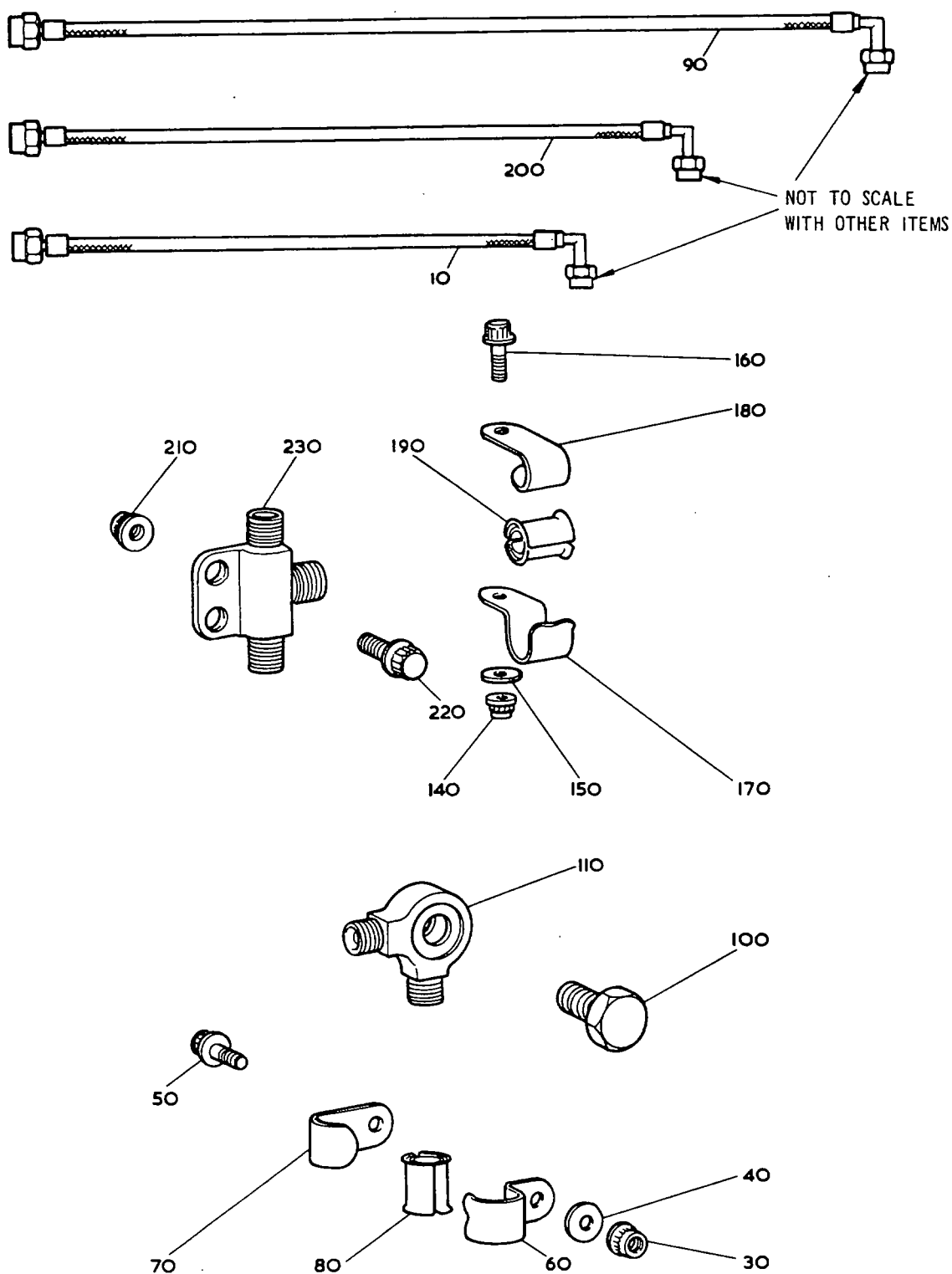
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 32501/00B



Tubes, Fuel Drain Component Connections to Overboard Spill  
Figure 203

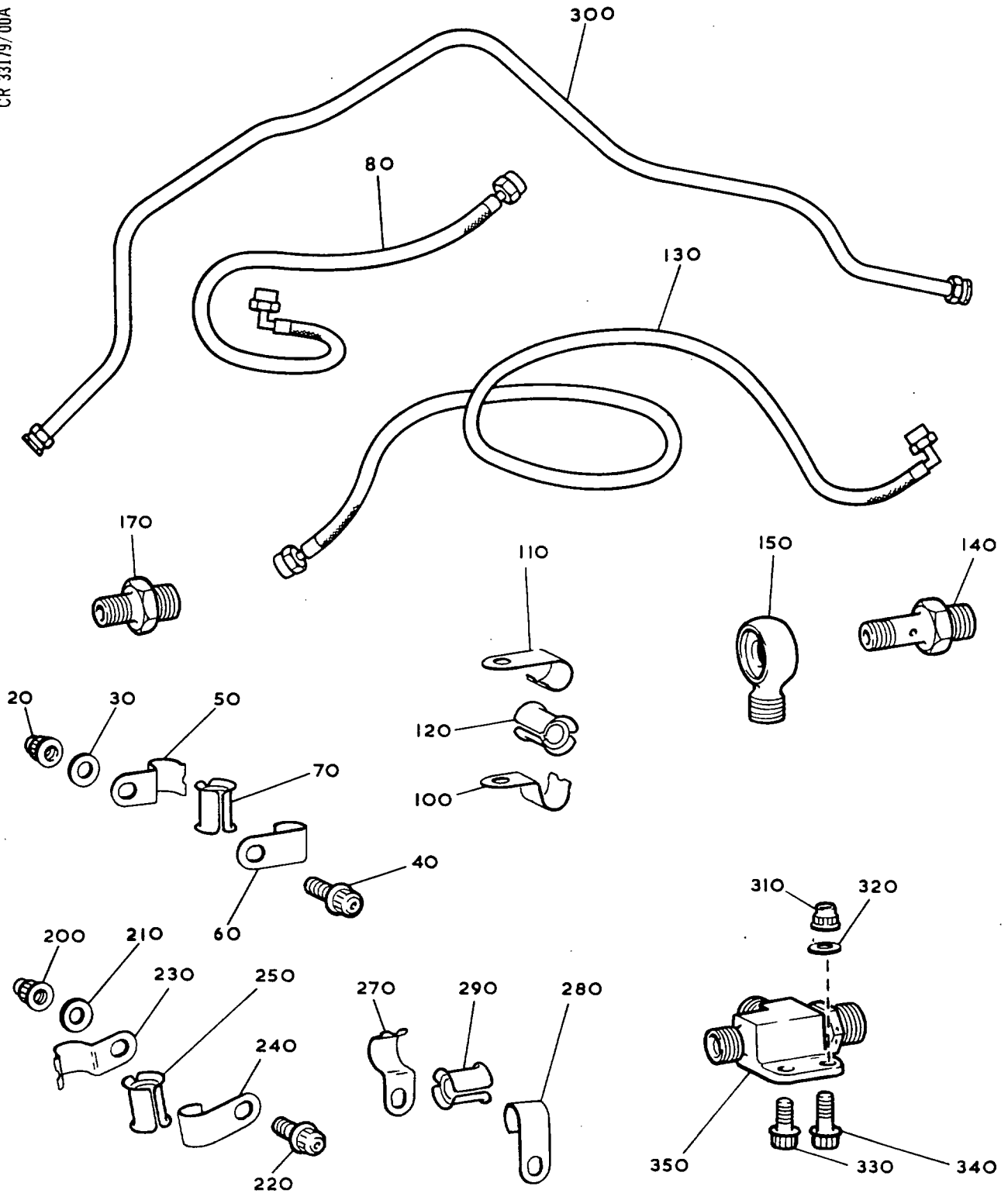
CLEANING  
**71-73-02**

Page 206  
Aug 28/75

TN29310

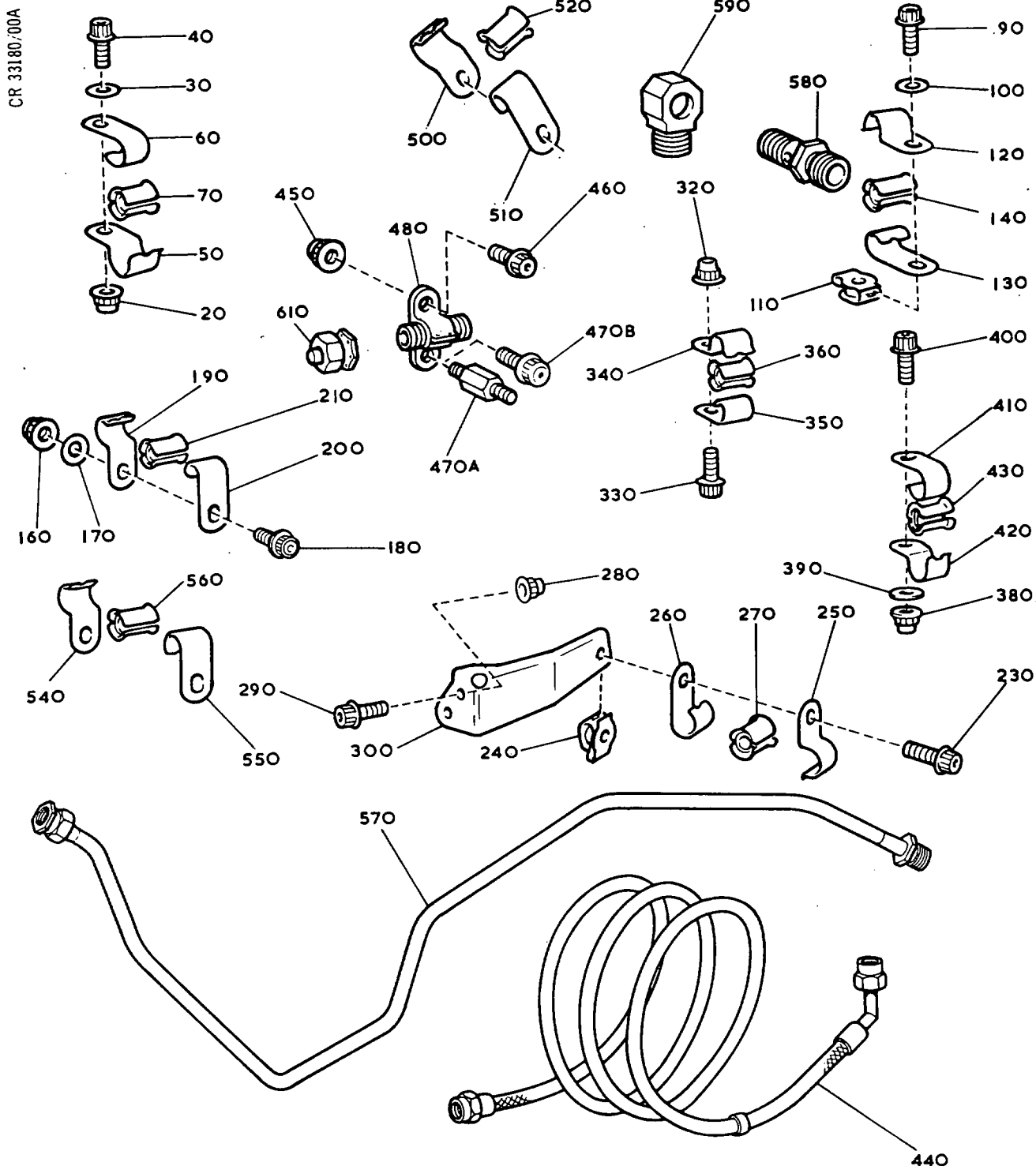
CR 33179/00A

PRINTED IN ENGLAND



TN29312

Tubes, Fuel Drain Component Connections to Overboard Spill  
Figure 204



Tubes, Fuel Drain Component Connections to Overboard Spill  
Figure 205



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBES - SECOND STAGE PUMP TO DRAINS TANK - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.
- D. Certain components are subject to Controlled Manufacturing Technique (CMT) procedures. The cleaning of these components is critical and variations from the specified cleaning procedures and solutions are prohibited without approval from the engine manufacturer. All components to which this applies are identified as such in the Remarks column of the Cleaning Processes Table.

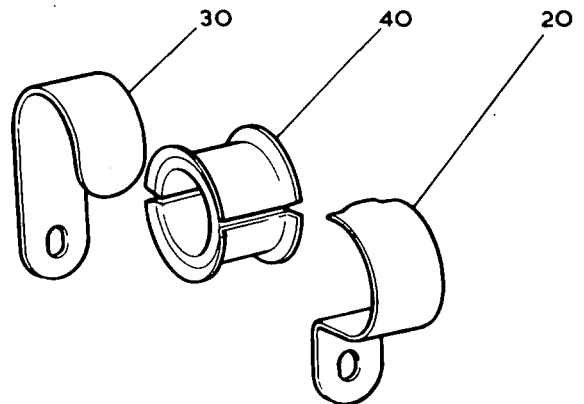
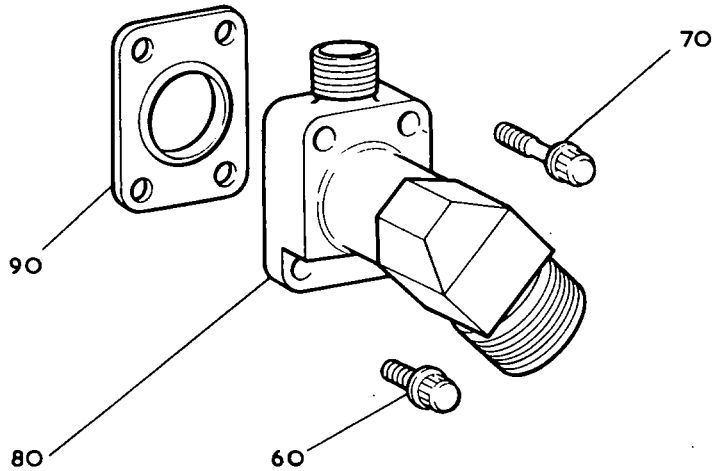
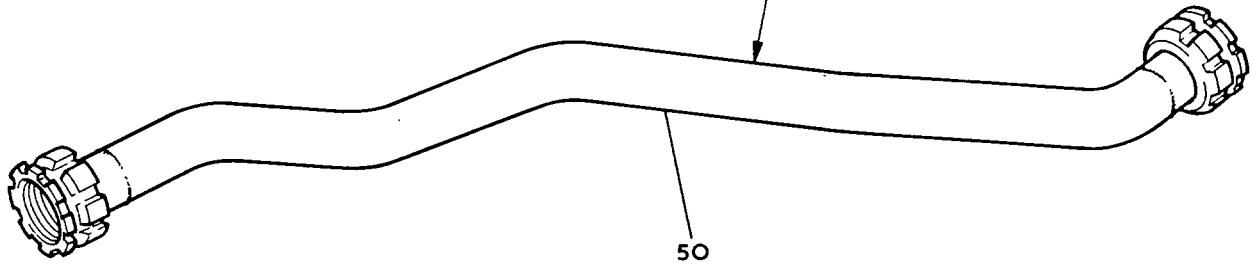
FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	-

Cleaning Processes  
Table 201

TN30186

CR 32504/00B

NOT TO SCALE  
WITH OTHER ITEMS



Tubes - Fuel Drain 2nd Stage Pump to Tank  
Figure 201

CLEANING  
**71-73-03**

Page 203  
Aug 28/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBES - FIRST STAGE PUMP AND FCU TO CONNECTION AT  
SECOND STAGE PUMP - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

71-73-04

Page 201  
Dec 1/76

PRINTED IN ENGLAND

TN31935



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.
- D. Certain components are subject to Controlled Manufacturing Technique (CMT) procedures. The cleaning of these components is critical and variations from the specified cleaning procedures and solutions are prohibited without approval from the engine manufacturer. All components to which this applies are identified as such in the Remarks column of the Cleaning Processes Table.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	-
	except 100 Tube		A or B	G	Use process G only if light cleaning fails to remove contamination. Process G will damage silver plating, therefore it must be used with caution, i.e. short period immersion.

Cleaning Processes  
Table 201

TN30904





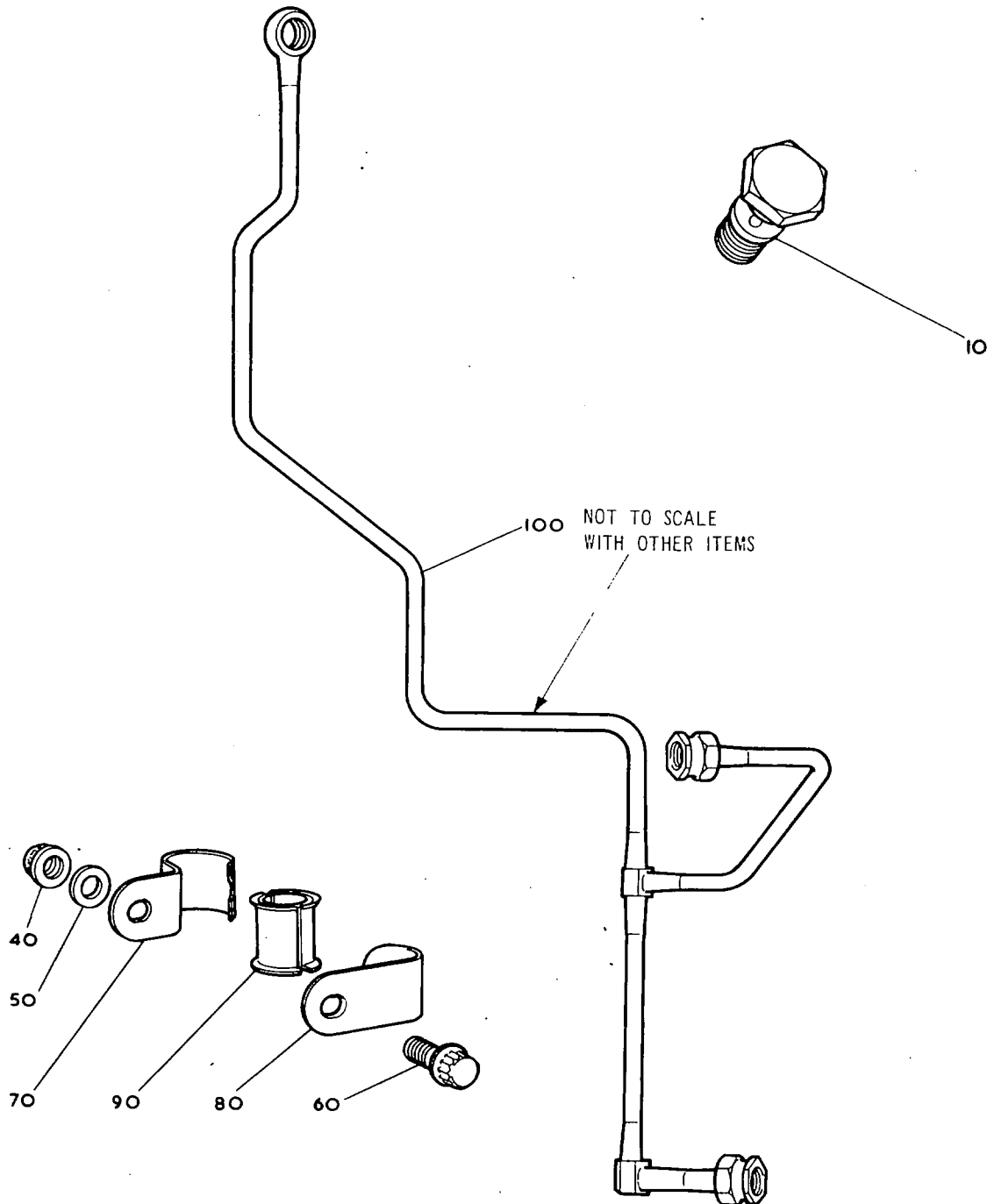
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32505/00B

PRINTED IN ENGLAND



TN30906

Tubes - Fuel Drain First Stage Pump and F.C.U. to Connection  
on Tube (Second Stage Pump to Tank)  
Figure 201



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBE - DISTRIBUTION AND DUMP VALVE TO DRAINS TANK - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00  
Cleaning for details of the cleaning processes referred  
to in Table 201.
- B. To ensure that all items within this breakdown that  
require cleaning and subsequent Inspection/Check are  
recognized, and identified by their Part Number, figures  
are provided which equate with the Illustrated Parts  
Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with  
the relevant Figure and Item Number in the same breakdown  
in the I.P.C. Items illustrated in the I.P.C. which are  
not illustrated in this breakdown, are those items which  
are either discarded at overhaul, or are normally assembled  
to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the  
figures, Table 201 does not list all items, but deals  
collectively with the items requiring the same cleaning  
process.
- D. On receipt of the items from disassembly, all protective  
blanks, covers etc. deemed necessary for the protection  
of the items will have been assembled and, in addition,  
many of the items will arrive in containers. Any special  
containers, blanks, covers etc. are listed in Table 202  
by their Tool Ref. No. (Tool 123). For the manufacturer's  
Part No. refer to the appropriate Table in Special Tools,  
Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items  
prior to cleaning and reassembled immediately afterwards.  
Items received in special cleaning containers should  
remain therein during the cleaning procedures unless  
otherwise stated.
- B. All items contained in this breakdown must be cleaned by  
the appropriate processes quoted in the table, to achieve  
a cleanliness to enable the Inspection/Check to be carried  
out correctly. Where alternative processes are quoted,  
the operator must decide what process to use depending on  
the amount of contamination of the item. Any item that is  
not cleaned satisfactorily must be recleaned by the  
appropriate process.

CLEANING

**71-73-05**

Page 201

Dec 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.
- D. Certain components are subject to Controlled Manufacturing Technique (CMT) procedures. The cleaning of these components is critical and variations from the specified cleaning procedures and solutions are prohibited without approval from the engine manufacturer. All components to which this applies are identified as such in the Remarks column of the Cleaning Processes Table.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	-

Cleaning Processes  
Table 201

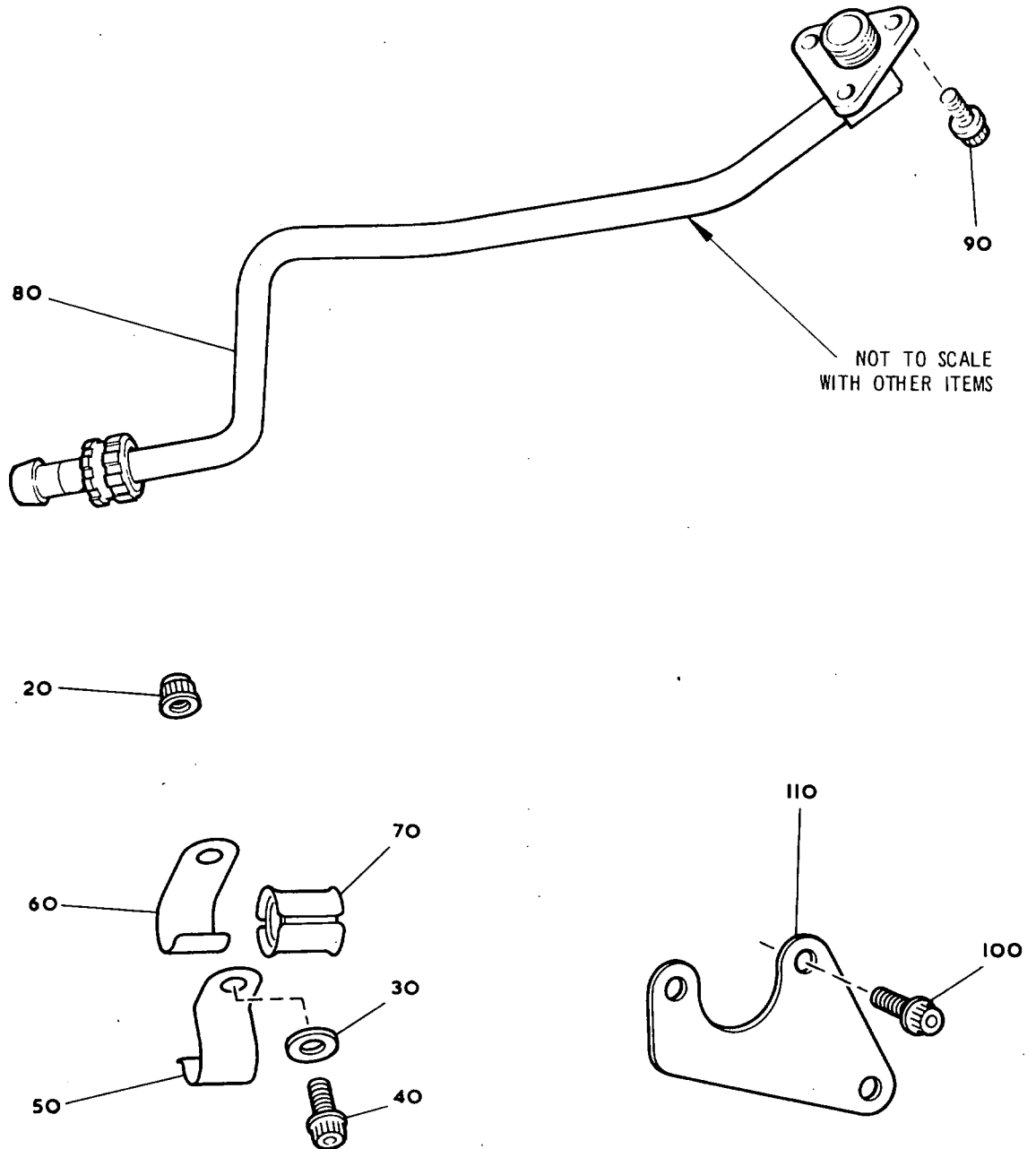
TN30908

CR 32415/00B



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Tubes - Fuel Drain, Distribution Block Dump Outlet to Tank  
Figure 201

CLEANING  
**71-73-05**



OLYMPUS 593

MK.610-14-28  
OVERHAUL



ENGINE DRAIN ASSEMBLY - DISASSEMBLY

PRINTED IN ENGLAND

For information on the disassembly of the Engine  
Drain Assembly, refer to 72-53-00 Disassembly.

TN29908

DISASSEMBLY

**71-73-06**

Page 101

Jan 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



ENGINE DRAIN ASSEMBLY AT EXHAUST DIFFUSER CASE - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

PRINTED IN ENGLAND

TN12268



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.
- D. Certain components are subject to Controlled Manufacturing Technique (CMT) procedures. The cleaning of these components is critical and variations from the specified cleaning procedures and solutions are prohibited without approval from the engine manufacturer. All components to which this applies are identified as such in the Remarks column of the Cleaning Processes Table.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		B	G	-

Cleaning Processes  
Table 201

TN29095



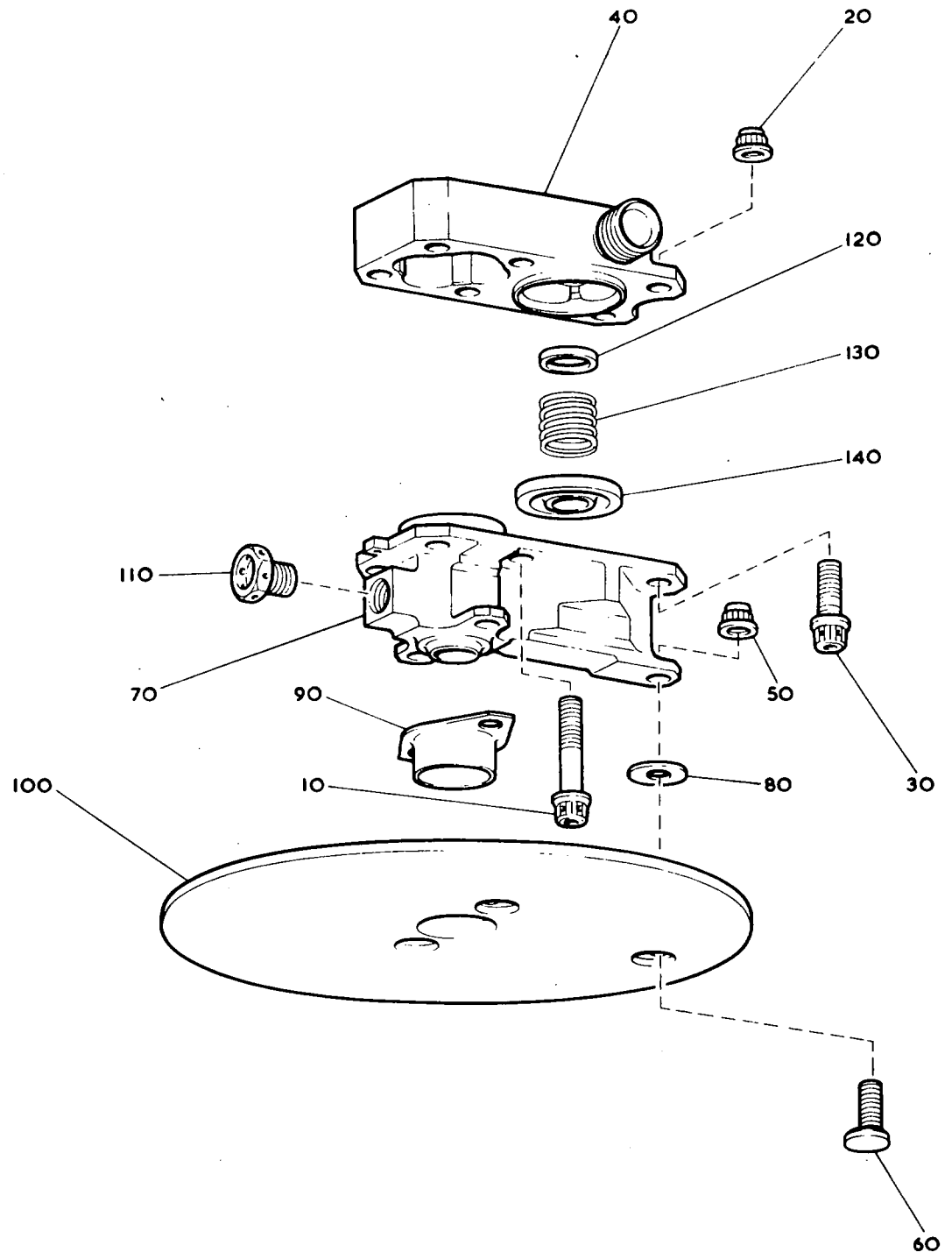
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32414/00B



TN12269

Drains Assembly, Engine  
Figure 201

CLEANING  
**71-73-06**  
Page 203  
Aug 28/75





OLYMPUS 593

MK.610-14-28  
OVERHAUL



ENGINE DRAIN ASSEMBLY - SUB-ASSEMBLY

For information on the assembly of the Engine  
Drain Assembly, refer to 72-53-00 Assembly.

PRINTED IN ENGLAND

TN29907

SUB-ASSEMBLY

**71-73-06**

Page 501

Jan 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



TUBES - IDG TO OVERBOARD SPILL AT DRAINS TANK - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

71-79-01

Page 201

Dec 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum, If the finish is damaged, then the damaged finish part will have to be replaced or reconditioned.
- D. Certain components are subject to Controlled Manufacturing Technique (CMT) procedures. The cleaning of these components is critical and variations from the specified cleaning procedures and solutions are prohibited without approval from the engine manufacturer. All components to which this applies are identified as such in the Remarks column of the Cleaning Processes Table.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	-
	except 160 Tube		A or B	G	Use process G only if light cleaning fails to remove contamination. Process G will damage silver plating, therefore it must be used with caution, i.e. short period immersion.

Cleaning Processes  
Table 201

TN32062



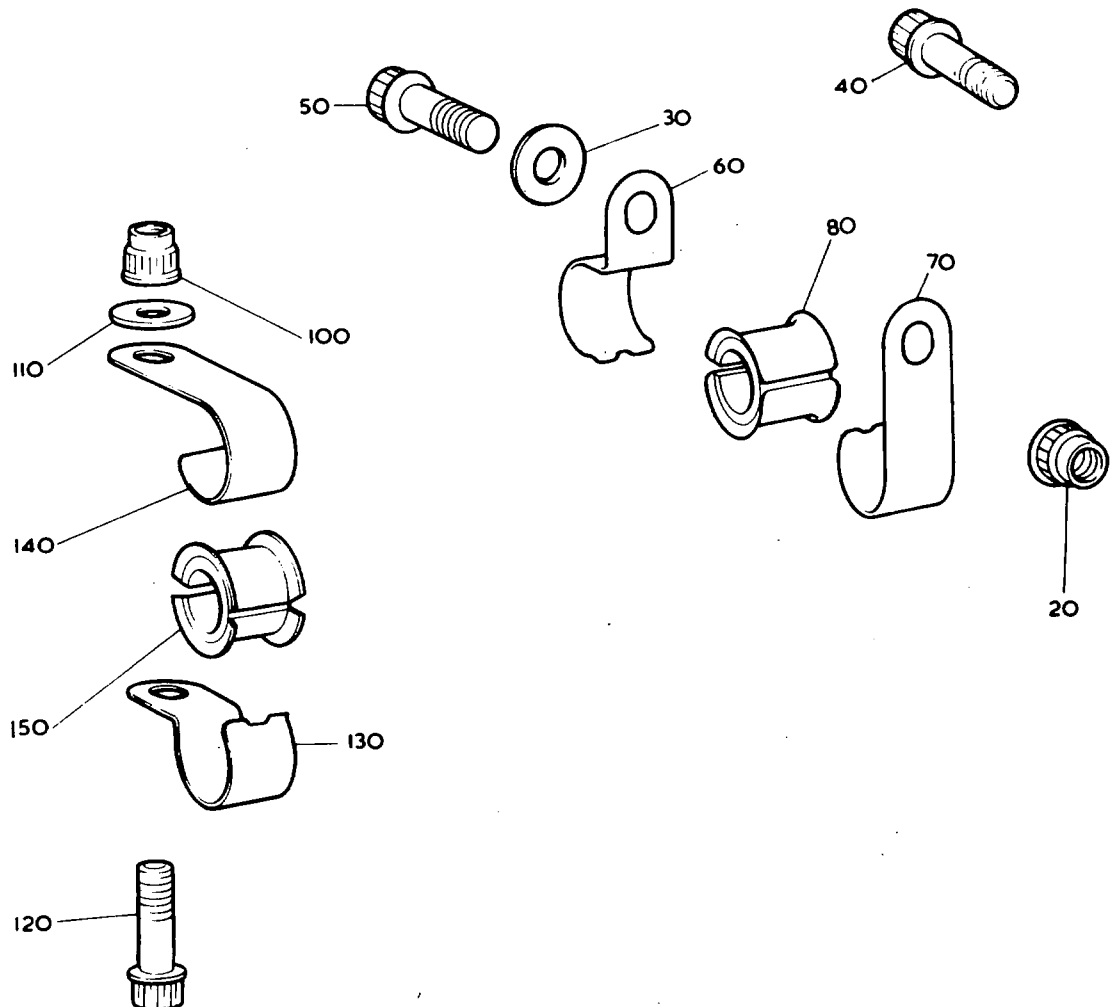
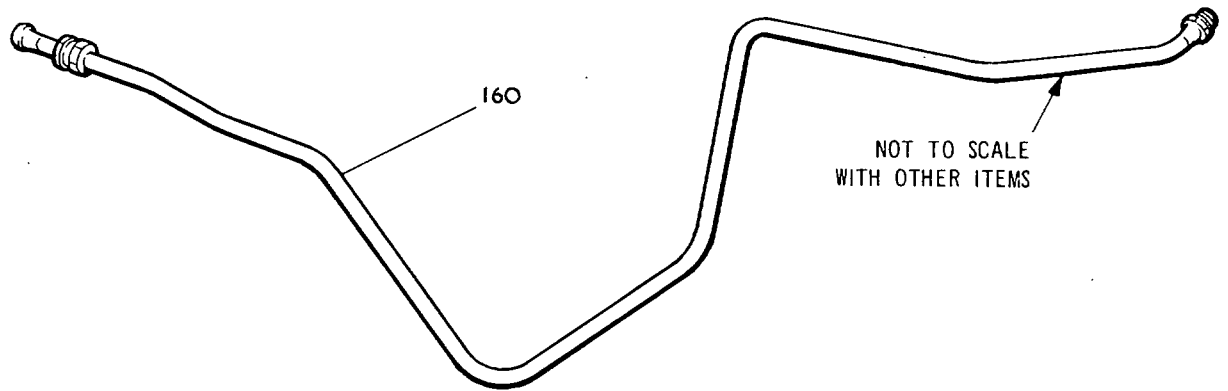
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32413/00B

PRINTED IN ENGLAND



Oil Drain Tubes, C.S.D. Elbow to  
Overboard Spill at Drains Tank  
Figure 201

CLEANING  
**71-79-01**

Page 203  
Aug 28/75

TN32064



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



## TUBES - HYDRAULIC PUMP TO OVERBOARD SPILL CONNECTION - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

71-79-02

Page 201  
Dec 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.
- D. Certain components are subject to Controlled Manufacturing Technique (CMT) procedures. The cleaning of these components is critical and variations from the specified cleaning procedures and solutions are prohibited without approval from the engine manufacturer. All components to which this applies are identified as such in the Remarks column of the Cleaning Processes Table.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	

201	ALL		A or B	-	-
-----	-----	--	--------	---	---

Cleaning Processes  
Table 201

TN29316



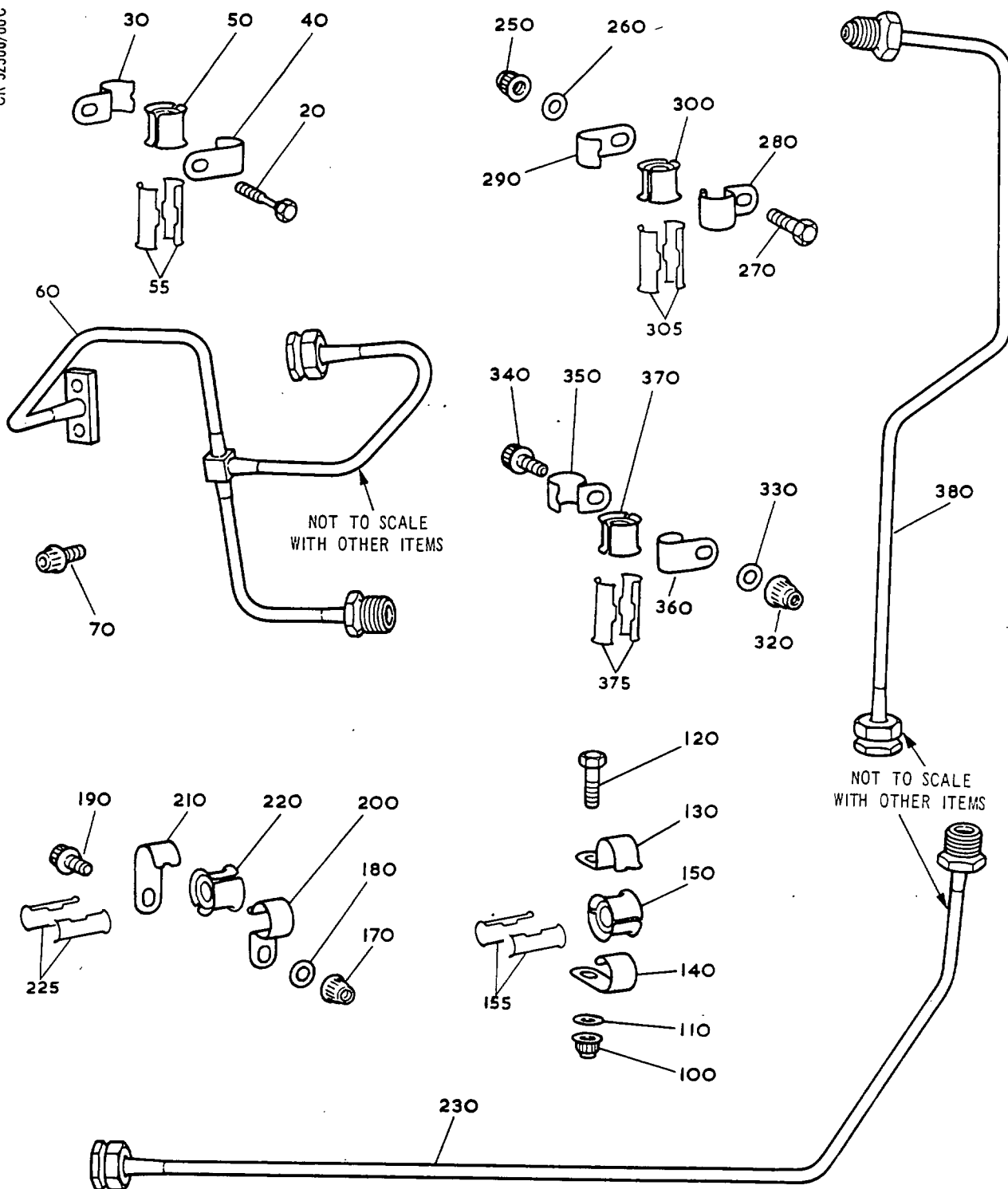
OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

CR 32506/00C



Oil Drain Tubes, Hydraulic Pump to  
Overboard Spill Connection  
Figure 201



OLYMPUS 593

MK.610-14-28

OVERHAUL



TUBES, OIL DRAIN - REPAIR

TABLE OF CONTENTS

Repair No.

Title

Scheme No.

1

Repair of fretting/damage by  
inert gas arc welding.

B.514566

PRINTED IN ENGLAND

REPAIR

71-79-02

Contents 1

Jun 1/92





OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBE A/O, OIL  
REPAIR OF FRETTING/DAMAGE BY INERT GAS ARC WELDING

REPAIR B.514566

1. EFFECTIVITY

IPC	Fig./Item	Part No.
71-79-02	01/060A	B.476818

2. REPAIR LIMITATIONS

Refer to Overhaul Manual 72-09-29 Repair.

3. GENERAL

Refer to Overhaul Manual 72-09-29 Repair.

4. REPAIR PROCEDURE

REPAIR PROCEDURE

SUPPLEMENTARY INFORMATION

(1) Weld repair

Refer to Overhaul Manual  
72-09-29 Repair.

(2) Mark SAL B.514566  
or R1 adjacent  
normal assy. of  
number using the  
electro-chemical  
marking or vibro-  
percussion engraving  
techniques.

Refer to Overhaul Manual  
72-09-00 Repair.

5. MATERIAL

COMPONENT

MATERIAL

RR CODE

B.476818

MSRR 6524

EBS



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



6. DATA

PRESSURE TEST REQUIREMENTS:

<u>PART NO.</u>	<u>PRESSURE TEST</u>	<u>MIN. GAUGE</u>
B.476818	NOT REQUIRED	0.027 (0,69)

7. TOOLS

<u>TOOL NUMBER</u>	<u>DESCRIPTION</u>	<u>ITEM</u>
NONE.		

8. REPLACEMENT PARTS

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>ITEM</u>
NONE.			

REPAIR  
71-79-02  
Repair No.1  
Page 402  
Jun 1/92



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

## CHAPTER 73

### ENGINE FUEL AND CONTROL

#### LIST OF EFFECTIVE PAGES

Printed in England

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
List of Effective Pages	1	Dec 31/01	73-10-00 (Cont'd.)	319	Jun 1/76
	2	Dec 31/01		320	Jun 1/76
	3	Dec 31/01		321	Jun 1/76
	4	Dec 31/01		322	Jun 1/76
Table of Contents	1	Dec 31/01		323	Jun 1/76
	2	Jan 2/80		324	Jun 1/76
Table of Approved Repair Schemes	1	Jan 31/94		325	Jun 1/76
73-10-00 Inspection/Check Contents	1	Sep 1/84		326	Jun 1/76
	2	Jun 1/87		327	Jun 1/76
	3	Jun 1/76		328	Dec 31/00
	4	Jun 1/87		329	Dec 31/00
301	Sep 1/84			330	Dec 31/00
302	Dec 31/00			331	Dec 31/00
303	Dec 31/00			332	Dec 31/00
304	Jun 1/76			333	Dec 31/00
304A	Dec 31/00			334	Dec 31/00
304B	Sep 1/84			335	Dec 31/00
305	Sep 1/84			336	Dec 31/00
306	Jun 1/76			337	Dec 31/00
307	Jun 1/76			338	Dec 31/00
308	Dec 31/99			339	Dec 31/00
309	Aug 14/75			340	Dec 31/00
310	Jun 1/76			341	Dec 31/00
311	Jun 1/76		Assembly Contents	342	Dec 31/00
312	Jun 1/76			343	Dec 31/00
313	Dec 31/00			344	Dec 31/00
314	Jun 1/87			345	Jun 1/76
314A	Jun 1/87			346	Jun 1/76
314B	Jun 1/87			347	Jun 1/76
315	Dec 31/99			348	Jun 1/76
316	Sep 1/84				
317	Sep 1/84				
318	Jun 1/76				
				1	Jan 2/80
				501	Jan 2/80
				502	Jan 2/80
				503	Jan 2/80
				504	Jan 2/80
				505	Jan 2/80
				506	Jan 2/80
				507	Jan 2/80
				508	Jan 2/80
				509	Jan 2/80
				510	Jan 2/80



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
Cleaning			73-12-05		
73-11-01	201	Jan 1/77	Repair No.1	408	Dec 31/01
	202	Jan 1/77	(Cont'd.)	409	Dec 31/01
	203	Aug 28/75		410	Dec 31/01
				411	Dec 31/01
73-11-02	201	Jan 1/77		412	Dec 31/01
	202	Jan 1/77		413	Dec 31/01
	203	Jan 1/77		414	Dec 31/01
				415	Dec 31/01
73-11-03	201	Jan 1/77		416	Dec 31/01
	202	Jan 1/77		417	Dec 31/01
	203	Jan 1/77		418	Dec 31/01
				419	Dec 31/01
73-12-01	201	Jan 1/77		420	Dec 31/01
	202	Jan 1/77		421	Dec 31/01
	203	Aug 28/75			
			73-12-05		
73-12-02	201	Jan 1/77	Repair No.2	401	Dec 31/01
	202	Jan 1/77		402	Dec 31/01
	203	Jan 1/77		403	Dec 31/01
				404	Dec 31/01
73-12-03	201	Jan 1/77			
	202	Jan 1/77	Cleaning		
	203	Apr 1/76	73-12-06	201	Jan 1/77
				202	Jan 1/77
73-12-04	201	Jan 1/77		203	Apr 1/76
	202	Jan 1/77			
	203	Aug 28/75	73-12-07	201	Feb 1/83
				202	Feb 1/83
73-12-05	201	Feb 1/83		203	Jun 1/86
	202	Feb 1/83			
	203	Aug 28/75	Testing	701	Jun 1/84
				702	Jun 1/86
Inspection/ Check				703	Jun 1/86
73-12-05	301	Dec 1/97	Cleaning		
	302	Dec 1/97	73-13-01	201	Jan 1/77
	303	Dec 1/97		202	Jun 1/96
				203	Dec 31/00
Repair				204	Dec 31/00
Contents	1	Apr 1/91			
Repair No.1	401	Dec 31/01	Repair		
	402	Dec 31/01	Contents	1	Jun 1/92
	403	Dec 31/01	Repair No.1	401	Jun 1/92
	404	Dec 31/01		402	Jun 1/92
	405	Dec 31/01			
	406	Dec 31/01			
	407	Dec 31/01			

LIST OF EFFECTIVE PAGES -73

Page 2  
Dec 31/01



OLYMPUS 593



MK.610-14-28

SNECMA

OVERHAUL

Printed in England

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
Cleaning			73-13-12	201	Jan 1/77
73-13-02	201	Jan 1/77		202	Jan 1/77
	202	Jan 1/77		203	Dec 31/00
	203	Dec 31/00			
	204	Dec 31/00	73-13-13	201	Jan 1/77
				202	Jun 30/95
73-13-03	201	Jan 1/77		203	Dec 31/00
	202	Jun 1/96			
	203	Dec 31/00	73-14-01	201	Jan 1/77
	204	Dec 31/00		202	Jan 1/77
				203	Aug 28/75
Repair					
Contents	1	Jun 1/92	73-14-02	201	Jan 1/77
Repair No.1	401	Jun 1/92		202	Jan 1/77
	402	Jun 1/92		203	Aug 28/75
Cleaning			73-14-04	201	Jul 1/81
73-13-04	201	Jan 1/77		202	Apr 1/77
	202	Jun 30/95		203	Jan 1/77
	203	Dec 31/00			
			73-14-05	201	Jan 1/77
73-13-05	201	Jan 1/77		202	Jan 1/77
	202	Jun 30/95		203	Aug 28/75
	203	Dec 31/00			
			73-20-00		
73-13-06	201	Jan 1/77	Inspection/Check		
	202	Jan 1/77	Contents	1	Jun 1/76
	203	Dec 31/00		301	Apr 1/77
	204	Dec 31/00		302	Jun 1/76
				303	Jun 1/76
73-13-08	201	Jan 1/77		304	Jun 1/76
	202	Jun 1/96		305	Jun 1/76
	203	Dec 31/00		306	Jun 1/76
				307	Jun 1/76
73-13-09	201	Jan 1/77		308	Jun 1/76
	202	Jan 1/77		309	Jun 1/76
	203	Dec 31/00		310	Jun 1/76
73-13-10	201	Jan 1/77	Cleaning		
	202	Jan 1/77	73-21-01	201	Jan 1/77
	203	Dec 31/00		202	Jan 1/77
				203	Aug 28/75
73-13-11	201	Jan 1/77			
	202	Jan 1/77	73-22-01	201	Jan 1/77
	203	Dec 31/00		202	Jan 1/77
	204	Dec 31/00		203	Aug 28/75



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
73-23-01	201	Jan 1/77			
	202	Jan 1/77			
	203	Aug 28/75			
73-24-01	201	Jan 1/77			
	202	Jan 1/77			
	203	Aug 28/75			
73-30-00					
Inspection/Check					
Contents	1	Apr 1/76			
	301	Apr 1/77			
	302	Apr 1/76			
	303	Apr 1/76			
	304	Aug 14/75			
	305	Aug 14/75			
	306	Aug 14/75			
	307	Aug 14/75			
	308	Aug 14/75			
Cleaning					
73-31-01	201	Jan 1/77			
	202	Apr 1/77			
	203	Jan 1/77			
73-32-01	201	Jan 1/77			
	202	Jan 1/77			
	203	Jan 1/77			
73-33-01	201	Jan 1/77			
	202	Jan 1/77			
	203	Aug 28/75			
73-33-02	201	Jan 1/77			
	202	Jan 1/77			
	203	Aug 28/75			



**OLYMPUS 593**

MK.610-14-28

OVERHAUL



## CHAPTER 73

### ENGINE FUEL AND CONTROL

#### TABLE OF CONTENTS

	CH/SEC/SUB	PAGE
List of Effective Pages ... ..	73	-
Table of Contents ... ..	73	-
Fuel Distribution System, Inspection/Check (Containing SEC/SUB 73-11-01 to 03, 73-12-01 to 07, 73-13-01 to 06, 73-13-08 to 13 and 73-14-01 to 05) ... ..	73-10-00	301
Fuel Distribution System, Assembly ... ..	73-10-00	501
First Stage Fuel Pump... ..	73-11-01	201
Second Stage Fuel Pump ... ..	73-11-02	201
Electric Starter Pump... ..	73-11-03	201
Fuel Recirculation Pump ... ..	73-12-01	201
Distribution and Dump Valve... ..	73-12-02	201
Fuel Inlet Elbow and Drain Valve ... ..	73-12-03	201
Fuel Manifold ... ..	73-12-04	201
Fuel Nozzles Assembly... ..	73-12-05	201
Reheat Injection System ... ..	73-12-06	201
Fuel Pressure Atomizing (Pilot) Nozzle ... ..	73-12-07	201
Fuel Pressure Atomizing (Pilot) Nozzle, Testing... ..	73-12-07	701
First Stage Pump to Second Stage Pump Tubes ... ..	73-13-01	201
Fuel Control Unit Supply to Fuel Manifold Tubes ... ..	73-13-02	201
First Stage Pump Supply to Repeat Injection System Tubes ... ..	73-13-03	201
Second Stage Pump Inlet to Electric Starter Pump Tubes ... ..	73-13-04	201
Electric Starter Pump Supply to Flow Control Unit Tubes ... ..	73-13-05	201
Electric Starter Pump Supply to Pilot Nozzle Tubes ... ..	73-13-06	201
Reheat Controller and Flow Control Unit Spill to First Stage Pump Inlet Elbow Tubes... ..	73-13-08	201
Second Stage Pump Inlet Elbow Return to Recirculation Valve Tubes... ..	73-13-09	201
Distribution and Dump Valve Tubes... ..	73-13-10	201
Drains Tank Return to First Stage Pump/ Recirculation Valve Tubes... ..	73-13-11	201
Oil Cooler to Air Bleed Valve Tubes ... ..	73-13-12	201
Fuel Heater and Filter Outlet to Reheat Controller Tubes ... ..	73-13-13	201
Fuel Heater and Filter ... ..	73-14-01	201



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



	<u>CH/SEC/SUB</u>	<u>PAGE</u>
Fuel Heater Control Valve ... ..	73-14-02	201
Fuel Heater Control Valve Switch... ..	73-14-04	201
Fuel Heater Control Thermometer ... ..	73-14-05	201
Fuel System Control (Containing SEC/SUB 73-21-01, 73-22-01, 73-23-01 and 73-24-01) ... ..	73-20-00	301
Engine Fuel Control Unit ... ..	73-21-01	201
LP Compressor Speed Probe Unit ... ..	73-22-01	201
Reheat Fuel Controller ... ..	73-23-01	201
Reheat Purge Solenoid Valve ... ..	73-24-01	201
Fuel System Indicating (Containing SEC/SUB 73-31-01, 73-32-01, 73-33-01 and 73-33-02)... ..	73-30-00	301
Fuel Differential Pressure Warning Switch ... ..	73-31-01	201
Fuel Nozzles Inlet Thermometer ... ..	73-32-01	201
Engine Fuel Flowmeter ... ..	73-33-01	201
Reheat Fuel Flowmeter ... ..	73-33-02	201



**OLYMPUS 593****MK.610-14-28** *sneema*  
**OVERHAUL****CHAPTER 73****ENGINE FUEL AND CONTROL****TABLE OF APPROVED REPAIR SCHEMES**

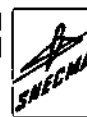
The following Repair Schemes have been approved by CAA/DGAC.

<u>Chapter/Section</u>	<u>Repair No.</u>	<u>Title</u>	<u>Salvage No.</u>
73-12-05	1	Fuel Nozzle Assembly - Repair of defects in fabrication welds and thin wall section	B.512846
73-13-01	1	Fuel Tube. - Repair of fretting/ damage by inert gas arc welding	B.514566
73-13-03	1	Fuel Tube. - Repair of fretting/ damage by inert gas arc welding	B.514566



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



## FUEL SYSTEM DISTRIBUTION - INSPECTION/CHECK

### TABLE OF CONTENTS

Para.	Page
1. General	301
2. General Inspection	301
3. Crack Detection	301
A. Magnetic Particle Crack Detection	301
B. Fluorescent Dye Crack Detection	302
C. X-ray Crack Detection	304A
4. First Stage Pump	306
5. Second Stage Pump	306
6. Starter Pump	306
7. Recirculation Valve	306
8. Distribution and Dump Valve	306
9. Drain Valve	306
A. Inspect Seal Plate Abutment Face, Locating Diameter and Pressure Cap Abutment Face	306
B. Inspect Valve Stem Head Nut	306
C. Inspect Pressure Cap	307
10. Inlet Connection Elbow	307
A. Inspect Aircraft Connection Flange	307
B. Inspect Seal Plate Abutment Faces (Drain Valve and First Stage Pump)	308
C. Inspect Mounting Flange Abutment Face	308
D. Inspect Wire Thread Inserts	308
11. Manifold, Top and Bottom	308
A. Inspect Tubes	308
B. Inspect Threads and Union Nuts	308
12. Fuel Pressure Atomising (Main) Nozzles	308
A. Inspect Tubes	308
B. Inspect Threads	308
C. Inspect Discharge Nozzles	308
D. Carry out Pressure Test	308
13. Reheat Injection System	309
14. Fuel Pressure Atomising (Pilot) Nozzles and Transfer Tubes	309
A. Inspect Threads	309
B. Inspect Adjusting Washer Abutment Face and Locating Diameter of Nozzle	309
C. Inspect Fuel Transfer Tube Locations	309
D. Inspect Fuel Transfer Tubes	309
E. Inspect Discharge Nozzles	309
15. Adjusting Washers	310
A. Inspect Abutment Faces	310
16. Brackets	310
A. Inspect Brackets	310

INSPECTION/CHECK

# 73-10-00

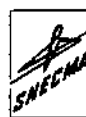
Contents 1

Sep 1/84

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



Para.		Page
17.	Bracket and Plates...	311
A.	Inspect Bracket and Plates...	311
18.	Flanged Pins...	311
A.	Inspect Pins ...	311
19.	Retaining Clips ...	311
A.	Inspect Clips ...	311
20.	Nut Plates ...	312
A.	Inspect Self-locking Nuts and Retainers ...	312
B.	Inspect Plates...	312
21.	Tube Assemblies ...	312
A.	Inspect Tubes ...	312
B.	Inspect Seal Plate Abutment Faces ...	312
C.	Inspect Bolt Locations ...	312
D.	Inspect Mounting Abutment Faces ...	312
E.	Inspect Fluid Filter Location ...	313
F.	Inspect Air Bleed Valve Location...	313
G.	Inspect Tube Lagging...	313
22.	Air Bleed Valve Components ...	314B
A.	Inspect Air Bleed Valve ...	314B
B.	Inspect Seal ...	314B
C.	Inspect Capnut...	314B
23.	Adapter, Blanking Plate and Filter Housing...	315
A.	Inspect Seal Plate Abutment Faces ...	315
B.	Inspect Bolt Locations ...	315
C.	Inspect Fluid Filter Contact Faces ...	315
24.	Fluid Filters ...	315
A.	Inspect Screen...	315
B.	Inspect Cage ...	316
C.	Inspect Seal Abutment Faces ...	316
25.	Connection Block ...	316
A.	Inspect Threads ...	316
B.	Inspect Bolt Locations ...	316
C.	Inspect Tube Seating...	316
26.	Fuel Heater ...	317
27.	Fuel Heater Control Valve ...	317
28.	Fuel Heater Control Valve Pressure Switch ...	317
29.	Fuel Heater Control Thermometer ...	317

TABLE OF ILLUSTRATIONS

Fig. No.		Page
301	Crack Detection Test Diagram ...	304
301A	Lagged Tube Inspection ...	314A
302	First Stage Fuel Pump ...	318
303	Second Stage Fuel Pump ...	319
304	Electric Starter Pump ...	320
305	Recirculation Valve ...	321
306	Distribution and Dump Valve ...	322

INSPECTION/CHECK

**73-10-00**Contents 2  
Jun 1/87

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



Fig. No.

Page

307	Inlet Elbow and Drain Valve	323
308	Fuel Manifold	324
309	Fuel Pressure Atomising (Main) Nozzles	325
310	Reheat Injection System	326
311	Fuel Pressure Atomising (Pilot) Nozzles	327
312	Tubes, First Stage Pump to Second Stage Pump (Part 1 of 2)	328
313	Tubes, First Stage Pump to Second Stage Pump (Part 2 of 2)	329
314	Tubes, Flow Control Unit to Fuel Manifold (Part 1 of 2)	330
315	Tubes, Flow Control Unit to Fuel Manifold (Part 2 of 2)	331
316	Tubes, First Stage Pump Supply to Reheat Injection System (Part 1 of 2)	332
317	Tubes, First Stage Pump Supply to Reheat Injection System (Part 2 of 2)	333
318	Tube, Second Stage Pump Inlet to Electric Starter Pump	334
319	Tubes, Electric Starter Pump Supply to Flow Control Unit	335
320	Tubes, Electric Starter Pump Supply to Pilot Nozzles (Part 1 of 2)	336
321	Tubes, Electric Starter Pump Supply to Pilot Nozzles (Part 2 of 2)	337
322	Tubes, Reheat Controller and Flow Control Unit to First Stage Pump	338
323	Tubes, Second Stage Pump Inlet Elbow Return to Recirculation Valve	339
324	Tubes, Distribution and Dump Valve (Servo and Spill).	340
325	Tubes, Drains Tank Return to First Stage Pump and Recirculation Valve (Part 1 of 2)	341
326	Tubes, Drains Tank Return to First Stage Pump and Recirculation Valve (Part 2 of 2)	342
327	Tubes, Oil Cooler to Air Bleed Valve	343
328	Tubes, Fuel Heater and Filter Outlet to Reheat Controller (Servo Supply)	344
329	Fuel Heater	345
330	Fuel Heater Control Valve	346
331	Fuel Heater Control Valve Differential Pressure Switch	347
332	Fuel Heater Control Thermometer	348

PRINTED IN ENGLAND

INSPECTION/CHECK

**73-10-00**

Contents 3

Jun 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



LIST OF TABLES

Table No.		Page
301	Items to be Magnetic Particle Crack Tested ...	302
302	Items to be Fluorescent Dye Crack Tested ...	302
303	Items to be X-ray Crack Tested ...	304A
304	Cross References to Illustrated Parts Catalogue ...	305

INSPECTION/CHECK

**73-10-00**

Contents 4

Jun 1/87

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

## FUEL SYSTEM DISTRIBUTION - INSPECTION/CHECK

### 1. General

- A. Each item in this chapter is given a two-part identification; thus, 302-20 refers to Figure 302 and to Item 20 called out on that figure. Each item may be further identified by its Part Number by the use of Table 304, which cross-refers figures in this chapter to the equivalent chapter and figure in the Illustrated Parts Catalogue (I.P.C.); the called-out item number will be the same on both figures.
- B. All items which will be crack tested are listed in Tables 301, 302 and 303.
- C. Dimensional checks are cross referenced to the equivalent Fits and Clearances Schedule (F.C.S.) chapter against the item concerned.
- D. When the inspection of an item discloses a minor defect that requires rectification, it is defined as 'Accept after repair'. On all such occasions the item must be rectified in accordance with Standard Practices 72-09-22 Repair. Where a Ref.No. follows 'Accept after repair' e.g. (Ref.72-21-01 Repair No.1), a specific Repair Scheme is available to which the item must be rectified. Items that are rejected, or for which a repair scheme is not currently available, should be held at the discretion of the operator, as service experience may prove the need for a repair.
- E. On completion of a repair, rectification or test, the item(s) must be inspected, to ensure that the necessary work has been satisfactorily completed.

### 2. General Inspection

- A. Inspect all items illustrated in this chapter, whether specified or not, in accordance with Standard Practices (Ref.72-09-00 Inspection/Check). In addition, carry out the inspections detailed for the specified items, from para.4 onwards.
- B. Inspection terms used in this chapter are explained in Standard Practices (Ref.72-09-00 Inspection/Check).

### 3. Crack Detection

- A. Magnetic Particle Crack Detection.

INSPECTION/CHECK

**73-10-00**Page 301  
Sep 1/84



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

- (1) Submit the items listed in Table 301 to crack detection in accordance with the process quoted.
- (2) Items to be crack detected by this method are illustrated in the Crack Detection Test Diagram (Fig.301). For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
No current requirement			

Items to be Magnetic Particle Crack Tested  
Table 301

B. Fluorescent Dye Crack Detection.

- (1) Submit the items listed in Table 302 to crack detection in accordance with the process quoted. On tubes that are lagged (SB.73-8787-88), apply the dye penetrant fluids to the non-lagged areas only. Avoid getting the penetrant fluids on the lagging. For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
304	60	Flanged Pin	F1A
306	30	Flanged Pin	F1A
307	10	Drain Valve	F1A
307	70	Inlet Connection Elbow	F1A
308	150	Manifold, Top	F1A
308	300	Manifold, Bottom	F1A
309	10	Fuel (Main) Nozzles	F1A
311	10	Fuel (Pilot) Nozzles	F1A
311	50	Transfer Tubes	F1A
312	10	Tube	F1A
312	230	Tube, Lagged	F1A
313	50	Tube, Lagged	F1A
314	110	Tube	F1A
314	240	Adapter	F1A

Items to be Fluorescent Dye Crack Tested  
Table 302 (Continued)

INSPECTION/CHECK

73-10-00

Page 302  
Dec 31/00

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

Printed in England

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
315	160	Tube	F1A
315	270	Tube	F1A
316	290	Blanking Plate	F1A
316	310	Fluid Filter	F1A
316	320	Tube, Lagged	F1A
317	240	Tube	F1A
318	50	Tube, Lagged	F1A
319	80	Tube, Lagged	F1A
319	90	Tube	F1A
319	110	Filter Housing	F1A
319	130	Fluid Filter	F1A
320	80	Tube	F1A
320	160	Tube	F1A
321	150	Tube	F1A
321	290	Tube	F1A
321	370	Tube	F1A
322	80	Tube	F1A
322	130	Connection Block	F1A
322	220	Tube	F1A
322	230	Tube, Lagged	F1A
322	440	Tube	F1A
322	450	Tube	F1A
323	190	Tube	F1A
324	20	Tube	F1A
324	100	Tube	F1A
324	180	Tube	F1A
324	280	Tube	F1A
325	100	Tube	F1A
325	180	Tube	F1A
325	370	Tube	F1A
325	490	Tube	F1A
325	500	Tube	F1A
326	80	Tube	F1A
326	170	Tube	F1A
327	60	Air Bleed Valve	F1A
327	70	Tube	F1A
327	180	Tube	F1A
328	10	Tube	F1A
328	150	Tube, Lagged	F1A
328	270	Tube, Lagged	F1A
328	60	Plate	F1A
329	160	Plate	F1A
329	170	Bracket	F1A

Items to be Fluorescent Dye Crack Tested  
Table 302 (Concluded)

INSPECTION/CHECK

**73-10-00**

Page 303

Dec 31/00





OLYMPUS 593

MK.610-14-28  
OVERHAUL



No current requirement

Crack Detection Test Diagram  
Figure 301

INSPECTION/CHECK  
**73-10-00**  
Page 304  
Jun 1/76

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sheema

**C. X-Ray Examination (SB 73-8787-88 standard only).**

- (1) Submit the items listed in Table 303 to X-ray examination of those welded joints covered by lagging only. The following parameters should be observed:

Film type	:	KODAK Industrex AX
Distance	:	36 in. (914 mm)
Density	:	2
Exposures	:	2 at right angles to each other, as near vertical to surface as possible

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
312	230	Tube, Lagged	X-ray
313	50	Tube, Lagged	X-ray
316	320	Tube, Lagged	X-ray
318	50	Tube, Lagged	X-ray
319	80	Tube, Lagged	X-ray
322	230	Tube, Lagged	X-ray
328	150	Tube, Lagged	X-ray
328	270	Tube, Lagged	X-ray

Items to be X-ray Crack Tested  
Table 303

INSPECTION/CHECK

**73-10-00**Page 304A  
Dec 31/00

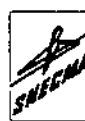


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



This page left blank intentionally

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

PRINTED IN ENGLAND

---

**FIG.NO. ILLUSTRATED PARTS CATALOGUE EQUIVALENT**

---

301	Not applicable	
302	73-11-01	Fig.1
303	73-11-02	Fig.1
304	73-11-03	Fig.1
305	73-12-01	Fig.1
306	73-12-02	Fig.1
307	73-12-03	Fig.1
308	73-12-04	Fig.1
309	73-12-05	Fig.1
310	73-12-06	Fig.1
311	73-12-07	Fig.1
312	73-13-01	Fig.1
313	73-13-01	Fig.2
314	73-13-02	Fig.1
315	73-13-02	Fig.2
316	73-13-03	Fig.1
317	73-13-03	Fig.2
318	73-13-04	Fig.1
319	73-13-05	Fig.1
320	73-13-06	Fig.1
321	73-13-06	Fig.2
322	73-13-08	Fig.1
323	73-13-09	Fig.1
324	73-13-10	Fig.1
325	73-13-11	Fig.1
326	73-13-11	Fig.2
327	73-13-12	Fig.1
328	73-13-13	Fig.1
329	73-14-01	Fig.1
330	73-14-02	Fig.1
331	73-14-04	Fig.1
332	73-14-05	Fig.1

---

**Cross References to Illustrated Parts Catalogue  
Table 304**

**CAUTION:** ENSURE THAT THE HIGHEST POSSIBLE STANDARD OF CLEANLINESS IS OBSERVED WHEN HANDLING FUEL SYSTEM COMPONENTS. BECAUSE OF THE SMALL OPERATING CLEARANCES IN THE CONTROL UNITS, ANY CONTAMINATION MAY LEAD TO MALFUNCTION OF THE SYSTEM.

INSPECTION/CHECK

**73-10-00**

Page 305

Sep 1/84



OLYMPUS 593

MK.610-14-28  
OVERHAUL



4. First Stage Pump (302-10)
  - A. Inspect in accordance with vendor's Overhaul Manual (Ref.73-11-01).
5. Second Stage Pump (303-10A or 10B)
  - A. Inspect in accordance with vendor's Overhaul Manual (Ref.73-11-02).
6. Starter Pump (304-10)
  - A. Inspect in accordance with vendor's Overhaul Manual (Ref.73-11-03).
7. Recirculation Valve (305-30)
  - A. Inspect in accordance with vendor's Overhaul Manual (Ref.73-12-01).
8. Distribution and Dump Valve (306-10)
  - A. Inspect in accordance with vendor's Overhaul Manual (Ref.73-12-02).
9. Drain Valve (307-10)
  - A. Inspect Seal Plate Abutment Face, Locating Diameter and Pressure Cap Abutment Face.
    - (1) Wear and fretting.
      - (a) Bolt holes elongated not more than 0.030 in. (0,760 mm). Accept.
    - (2) Nicks and burrs. Accept, if repair preserves sealing capability.
  - B. Inspect Valve Stem Head Nut.
    - (1) Peening.
      - (a) Cracking, or nut unsecure. Reject.
      - (b) Peening undamaged, nut secure. Accept.

INSPECTION/CHECK

73-10-00

Page 306

Jun 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



C. Inspect Pressure Cap.

- |                              |   |
|------------------------------|---|
| (1) Nicks and burrs.         | Accept, if repair preserves surface flatness and seal location profile. |
| (2) Seal ring damage.        | Reject for replacement.   |
| (3) Chain damage or missing. | Reject for replacement.   |

10. Inlet Connection Elbow (307-70)

A. Inspect Aircraft Connection Flange.

- |  |   |
|--|---|
| (1) Abutment face.   |   |
| (a) Scores.  |   |
| (i) Less than 0.005 in. (0,130 mm) deep, not extending more than half-way across face. | Accept, if repair preserves sealing capability. |
| (b) Nicks and burrs.   | Accept, if repair preserves sealing capability. |
| (c) Fretting.  | Accept, if repair preserves sealing capability. |
| (2) Locating pins condition (two off).   |   |
| (a) Damaged or loose.  | Reject.   |
| (b) Minor dressable damage; secure in locations.                                       | Accept after repair.                            |
| (3) Clamp ring abutment face.  |   |
| (a) Fretting and wear.   |   |
| (i) Less than 0.005 in. (0,130 mm) deep.   | Accept after repair.                            |

INSPECTION/CHECK

**73-10-00**

Page 307

Jun 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- B. Inspect Seal Plate Abutment Faces (Drain Valve and First Stage Pump).

(1) Nicks and burrs.

Accept, if repair preserves sealing capability.

- C. Inspect Mounting Flange Abutment Face.

(1) Nicks and burrs.

Accept, if repair preserves surface flatness.

- D. Inspect Wire Thread Inserts (Ref.72-09-00 Inspection/Check).

11. Manifold, Top (308-150) and Bottom (308-300)

- A. Inspect Tubes (Ref.72-09-00 Inspection/Check).

- B. Inspect Threads and Union Nuts (Ref.72-09-00 Inspection/Check).

12. Fuel Pressure Atomising (Main) Nozzles - 8 off (309-10)

- A. Inspect Tubes (Ref.72-09-00 Inspection/Check).

- B. Inspect Threads (Ref.72-09-00 Inspection/Check).

CAUTION: DO NOT PROBE THE DISCHARGE NOZZLES WITH HARD OBJECTS, OR DAMAGE MAY RESULT AND GIVE INCORRECT FLOW.

- C. Inspect Discharge Nozzles.

(1) Check for obstruction and carbon deposits.

(a) Obstruction, heavy deposits.

Reject for cleaning (Ref.73-12-05 Cleaning).

(2) Check for damage, using magnifier.

(a) Any damage.

Reject.

- D. Inspect Fuel Nozzles, Ref. Inspection/Check 73-12-05, Page 301.

INSPECTION/CHECK

73-10-00

Page 308  
Dec 31/99



OLYMPUS 593

MK.610-14-28  
OVERHAUL



13. Reheat Injection System (310-10)

- A. Inspect in accordance with vendor's Overhaul Manual  
(Ref.73-12-06).

14. Fuel Pressure Atomising (Pilot) Nozzles - 2 off (311-10) and  
Transfer Tubes - 2 off (311-50)

NOTE: Ensure that each Atomising Nozzle and Fuel Transfer  
Tube (311-50) are kept as a matched set.

- A. Inspect Threads (Ref.72-09-00 Inspection/Check).  
B. Inspect Adjusting Washer Abutment Face and Locating  
Diameter of Nozzle.

(1) Nicks and burrs.

Accept, if repair  
will preserve  
surface flatness  
and location  
profile.

- C. Inspect Fuel Transfer Tube Locations.

(1) Inspect for obstruction and carbon deposits.

(a) Obstruction; heavy  
deposits.

Reject for cleaning  
(Ref.73-10-00  
Cleaning).

- D. Inspect Fuel Transfer Tubes.

(1) Inspect for obstruction and carbon deposits.

(a) Obstruction, heavy  
deposits.

Reject for cleaning  
(Ref.73-10-00  
Cleaning).

- E. Inspect Discharge Nozzles.

CAUTION: DO NOT PROBE THE DISCHARGE NOZZLES WITH HARD  
OBJECTS, OR DAMAGE MAY RESULT AND GIVE  
INCORRECT FLOW.

(1) Obstruction and carbon deposits.

(a) Obstruction, heavy  
deposits.

Reject for clean-  
ing (Ref.73-12-07  
Cleaning).

INSPECTION/CHECK

**73-10-00**

Page 309  
Aug 14/75





OLYMPUS 593

MK.610-14-28  
OVERHAUL



(2) Check for damage, using magnifier.

(a) Any damage.

Reject.

15. Adjusting Washers - 2 off (311-30)

NOTE: Ensure that each Washer is retained with its correct Atomising Nozzle, as reselection may be necessary during assembly.

A. Inspect Abutment Faces.

(1) Nicks, burrs and scores.

Accept provided that repair preserves surface flatness and that designed effective thickness is maintained over 90 per cent of contact face area.

(2) Fretting and wear.

Reject.

16. Brackets (306-460, 309-50/60/70, 312-50/260, 313-80/90, 321-200, 322-280 and 330-90/120)

A. Inspect Brackets.

(1) Distortion.

Accept, if compatibility is preserved.

(2) Wear and fretting.

(a) Attachment face thickness not reduced more than 5 per cent.

Accept.

(b) Bolt-holes elongated not more than 0.030 in. (0,760 mm).

Accept after repair.

(3) Nicks and burrs.

Accept after repair.

(4) Scoring.

(a) Not more than 0.010 in. (0,250 mm) in depth.

Accept after repair providing material thickness is not reduced by more than 10 per cent.

INSPECTION/CHECK

73-10-00

Page 310  
Jun 1/76

FN16117



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



17. Bracket (329-170) and Plates (329-60/160)

A. Inspect Bracket and Plates.

- (1) Distortion or cracks. Reject.
- (2) Wear and fretting.
  - (a) Bolt-holes elongated not more than 0.030 in. (0,760 mm); bolt location thickness not reduced more than 5 per cent. Accept.
  - (b) Serrations on bracket.
    - (i) Gouging or deformation. Reject.
    - (ii) Light witness mark only. Accept.
- (3) Nicks, burrs and scores. Accept after repair.

18. Flanged Pins (304-60 - 2 off and 306-30 - 2 off)

A. Inspect Pins.

- (1) Fretting and wear.
  - (a) Smooth, unstepped, not more than 0.0005 in. (0,013 mm) deep. Accept.
- (2) Nicks and burrs. Accept, if repair maintains profile.

19. Retaining Clips - 2 off (311-40)

A. Inspect Clips.

- (1) Distortion. Accept, if repair preserves shape without cracking.
- (2) Wear and fretting.
  - (a) Location or bolt-holes elongated not more than 0.030 in. (0,760 mm). Accept after repair.

INSPECTION/CHECK

73-10-00

Page 311  
Jun 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



20. Nut Plates (314-170 and 316-370)

A. Inspect Self-locking Nuts and Retainers (Ref.72-09-00).

B. Inspect Plates.

(1) Distortion.

Accept, if repair  
maintains shape  
without cracking.

(2) Nicks and burrs.

Accept, if repair  
preserves surface  
flatness.

21. Tube Assemblies (312-10/230, 313-50, 314-110, 315-160/270,  
316-320, 317-240, 318-50, 319-80/90, 320-80/160, 321-150/290/  
370, 322-80/220/230/440/450, 323-190, 324-20/100/180/280,  
325-100/180/370/490/500, 326-80/170, 327-70/180 and 328-10/  
150/270)

A. Inspect Tubes (Ref.72-09-00 Inspection/Check).

B. Inspect Seal Plate Abutment Faces.

(1) Scores.

(a) Not more than 0.005 in.  
(0,138 mm) deep, and not  
extending across seal  
location.

Accept, if repair  
preserves surface  
flatness and seal-  
ing capability.

(2) Nicks and burrs.

Accept, if repair  
preserves surface  
flatness and seal-  
ing capability.

C. Inspect Bolt Locations.

(1) Wear and fretting.

(a) Bolt-holes elongated not  
more than 0.030 in.  
(0,760 mm).

Accept after  
repair.

D. Inspect Mounting Abutment Faces (321-150, 322-230 and  
327-70).

(1) Nicks and burrs.

Accept after  
repair.

INSPECTION/CHECK

73-10-00

Page 312  
Jun 1/76

FN16119



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

(2) Wear and fretting.

- |  |                      |
|--|----------------------|
| (a) Bolt-holes elongated not more than 0.030 in. (0,760 mm); flange thickness reduced not more than 10 per cent. | Accept after repair. |
|--|----------------------|

E. Inspect Fluid Filter Location (316-320).

- |   |   |
|---|---|
| (1) Nicks and burrs.  | Accept after repair.                            |
| (2) Scores at seating face.   |   |
| (a) Not more than 0.005 in. (0,130 mm) deep, and not extending more than one third across face. | Accept, if repair preserves sealing capability. |

F. Inspect Air Bleed Valve Location (327-70) (Ref.para.22).

NOTE: Carry out this inspection with the Air Bleed Valve components in para.22.

- |  |   |
|--|---|
| (1) Inspect thread insert (Ref.72-09-00 Inspection/Check). |   |
| (2) Inspect bleed valve seating face.                      |   |
| (a) Scored or pitted.                                      | Reject.   |
| (b) Sealing capability unimpaired.                         | Accept.   |
| (3) Inspect seal abutment face.                            |   |
| (a) Nicks, burrs and scores.                               | Accept, if repair preserves surface flatness and sealing capabilities unimpaired. |

G. Inspect Tube Lagging (Ref.SB 73-8787-88) (312-230, 313-50, 316-320, 318-50, 319-80, 322-230, 328-150/270).

- |   |         |
|---|---------|
| (1) Resin deficiency (appearing as lighter coloured areas with matt surface, fibrous and compressible). | Reject. |
|---|---------|

INSPECTION/CHECK

**73-10-00**

Page 313

Dec 31/00



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Delamination on surface and ends. Reject.
- (3) Cracks. Reject.
- (4) Handling damage, ie scores cuts, nicks and chips.
  - (a) Localised minor damage marks not directly exposed to the engine case (Zone A in Figure 301A) and no more than 0.045 ins (1.125 mm) deep Accept.
  - (b) Localised minor damage marks directly exposed to the engine case (Zone B in Figure 301A) and no more than 0.030 in. (0.75 mm) deep Accept.
- (5) Fretting and wear damage,  
(Note: excludes areas intentionally filed to avoid fouls with adjacent components).
  - (a) Frettage marks not directly exposed to the engine case (Zone A in Figure 301A) and no more than 0.045 ins (1.125 mm) deep Accept.
  - (b) Frettage marks directly exposed to the engine case (Zone B in Figure 301A) and no more than 0.030 ins (0.75 mm) deep Accept.

INSPECTION/CHECK

**73-10-00**

Page 314

Jun 1/87



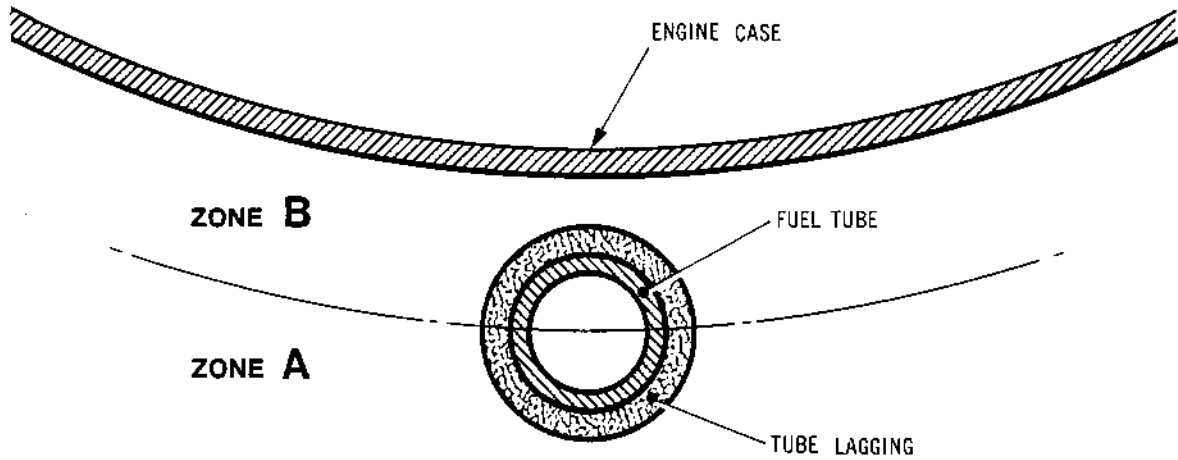
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 36085/00A



Lagged Tube Inspection  
Figure 301A

INSPECTION/CHECK

73-10-00

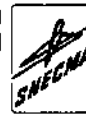
Page 314A

Jun 1/87



OLYMPUS 593

MK.610-14-28  
OVERHAUL



22. Air Bleed Valve Components (327-40/50/60)

NOTE: Carry out this inspection in conjunction with the Oil Cooler to Air Bleed Valve Tube (327-70) (Ref. para. 21.F.).

A. Inspect Air Bleed Valve (327-60).

(1) Inspect seating face.

(a) Scored or pitted. Reject.

(b) Sealing capability unimpaired. Accept.

(2) Inspect seal abutment face.

(a) Nicks, burrs and scores. Accept, if repair preserves surface flatness and sealing capability is unimpaired.

(3) Inspect drilled passages.

(a) Obstruction. Reject for re-cleaning.

(b) Damage. Accept after repair.

B. Inspect Seal (327-50).

(1) Inspect abutment faces.

(a) Nicks, burrs and scores. Accept, if repair preserves surface flatness and sealing capabilities.

C. Inspect Capnut (327-40).

(1) Inspect tube abutment face.

INSPECTION/CHECK

73-10-00

Page 314B

Jun 1/87



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

Printed in England

(a) Nicks, burrs and scores. Accept after repair.

(2) Inspect anchor ring (327-30) and chain (327-10/20).

(a) Damaged or missing. Reject for replacement.

23. Adapter (314-240), Blanking Plate (316-290) and Filter Housing (319-110)

A. Inspect Seal Plate Abutment Faces.

(1) Scores.

(a) Not more than 0.005 in. (0,130 mm) deep, and not extending across seal location. Accept, if repair preserves surface flatness and sealing capability.

(2) Nicks and burrs. Accept, if repair preserves surface flatness and sealing capability.

B. Inspect Bolt Locations.

(1) Wear and fretting.

(a) Bolt-holes elongated not more than 0.030 in. (0,760 mm). Accept after repair.

C. Inspect Fluid Filter Contact Faces (319-110 Only).

(1) Nicks and burrs. Accept after repair.

(2) Scores at seating face.

(a) Not more than 0.005 in. (0,130 mm) deep. Accept, after repair.

24. Fluid Filters (316-310 and 319-130)

A. Inspect Screen.

(1) Punctures, tears or separation from cage. Reject.

INSPECTION/CHECK

73-10-00

Page 315  
Dec 31/99





OLYMPUS 593

MK.610-14-28  
OVERHAUL



B. Inspect Cage.

(1) Distortion.

Accept, if repair-  
able without  
cracking.

(2) Nicks, burrs and scores.

(a) Not more than 0.002 in.  
(0,050 mm) deep at  
contact faces.

Accept, if unbroken  
contact is retained  
after repair.

(3) Wear and fretting.

(a) Contact faces worn.

Accept after  
repair if sealing  
capabilities are  
unimpaired.

C. Inspect Seal Abutment Faces (320-130 Only).

(1) Scores.

(a) Not more than 0.005 in.  
(0,130 mm) deep, and not  
extending across seal  
location.

Accept, if repair  
preserves sealing  
capability.

25. Connection Block (322-130)

A. Inspect Threads (Ref.72-09-00 Inspection/Check).

B. Inspect Bolt Locations.

(1) Nicks and burrs.

Accept, if repair  
preserves surface  
flatness.

C. Inspect Tube Seating.

(1) Fretting.

(a) Not more than 0.002 in.  
(0,050 mm) deep.

Accept, if sealing  
capability is  
unimpaired after  
repair.

INSPECTION/CHECK

73-10-00

Page 316  
Sep 1/84



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(2) Scores.

(a) Not more than 0.002 in.  
(0,050 mm) deep.

Accept, if sealing  
capability is  
unimpaired after  
repair.

26. Fuel Heater (329-10)

A. Inspect in accordance with vendor's Overhaul Manual  
(Ref.73-14-01).

27. Fuel Heater Control Valve (330-10)

A. Inspect in accordance with vendor's Overhaul Manual  
(Ref.73-14-02).

28. Fuel Heater Control Valve Pressure Switch (331-10)

A. Refer to SB 73-8466-41. Inspect in accordance with  
vendor's Overhaul Manual (Ref.73-14-04).

29. Fuel Heater Control Thermometer (332-10)

A. Inspect in accordance with vendor's Overhaul Manual  
(Ref.73-14-05).

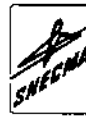
PRINTED IN ENGLAND



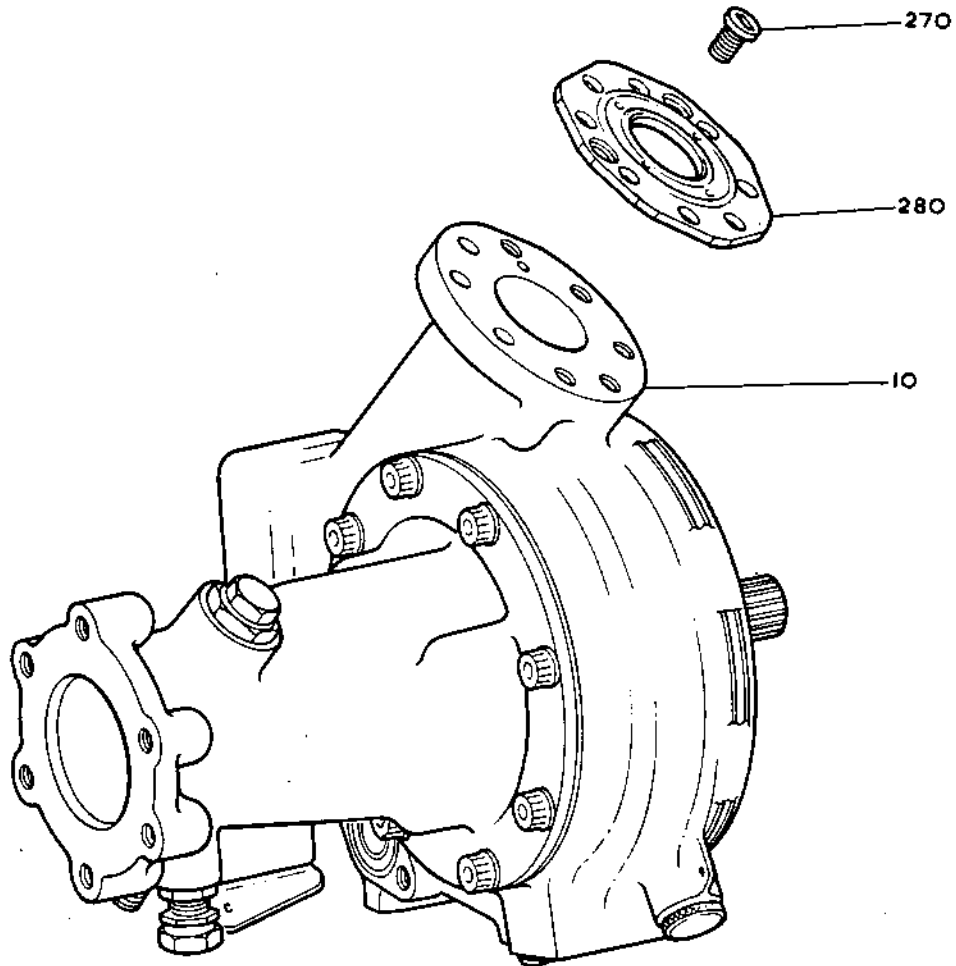
OLYMPUS 593

MK-610-14-28

OVERHAUL



CR 32512/00B



First Stage Fuel Pump  
Figure 302

INSPECTION/CHECK

**73-10-00**

Page 318

Jun 1/76



OLYMPUS 593

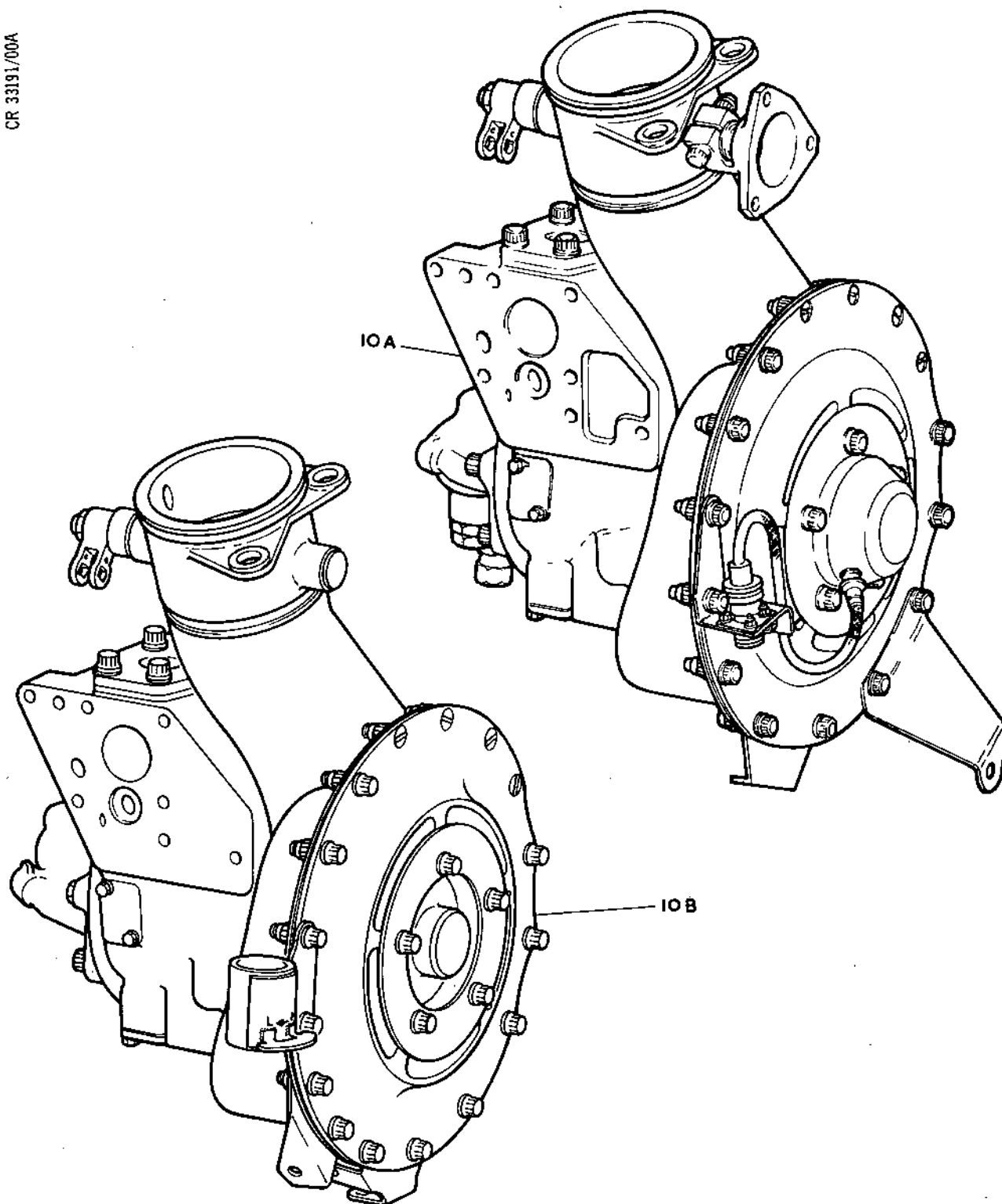
MK.610-14-28  
OVERHAUL



CR 33191/00A

PRINTED IN ENGLAND

TN16126



Second Stage Fuel Pump  
Figure 303

INSPECTION/CHECK

**73-10-00**

Page 319

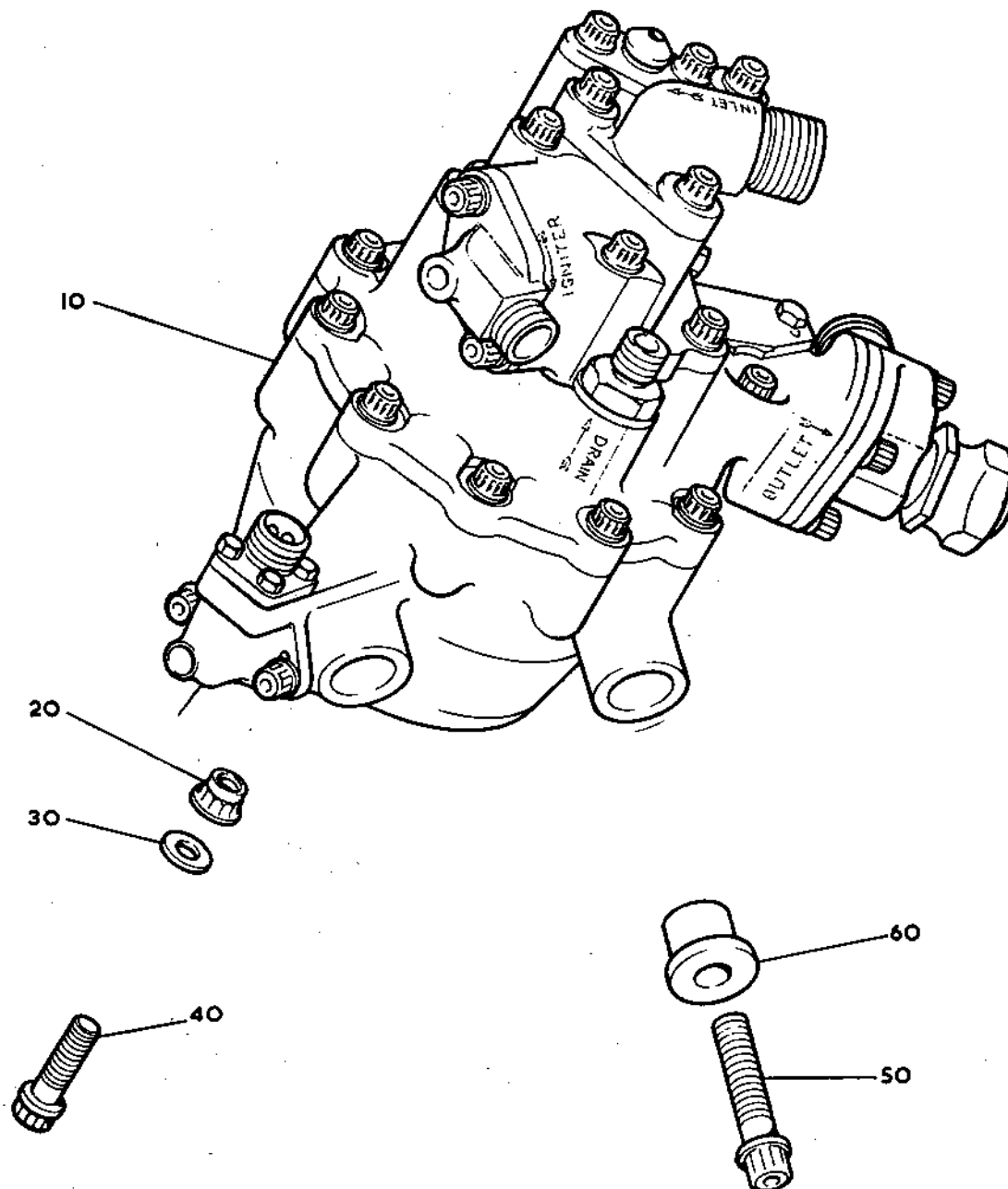
Jun 1/76



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 32407/008



TN16128

Electric Starter Pump  
Figure 304

INSPECTION/CHECK

**73-10-00**

Page 320

Jun 1/76



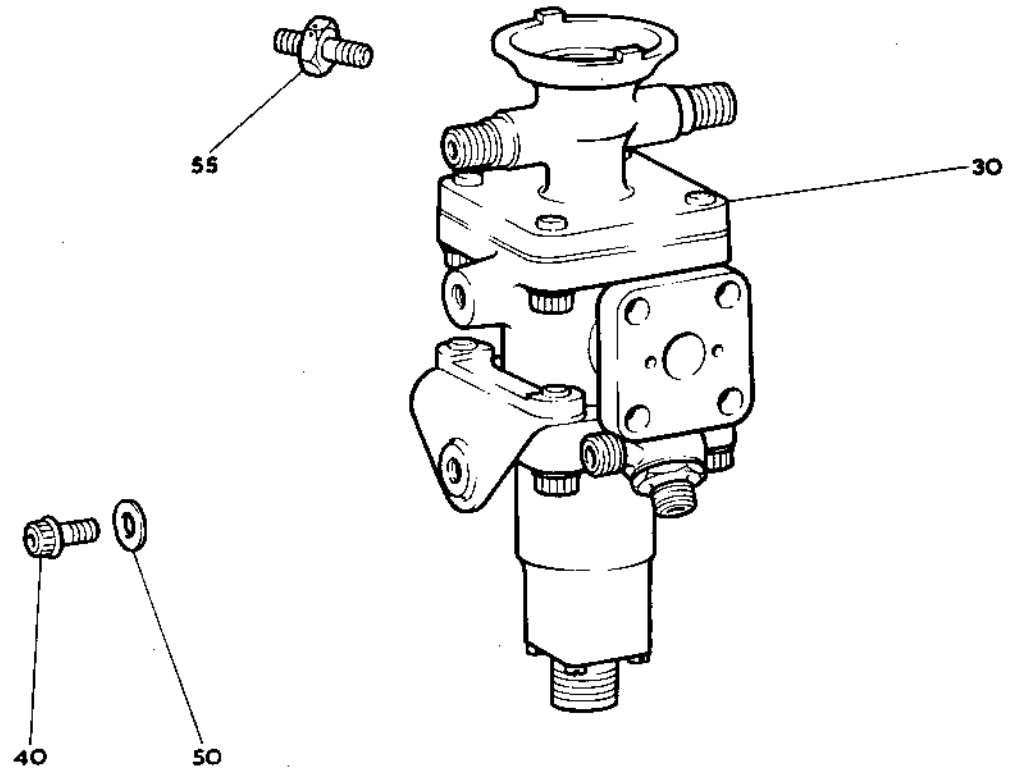
OLYMPUS 593

MK. 610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32434/00B



TN16131

Recirculation Valve  
Figure 305

INSPECTION/CHECK

73-10-00

Page 321

Jun 1/76

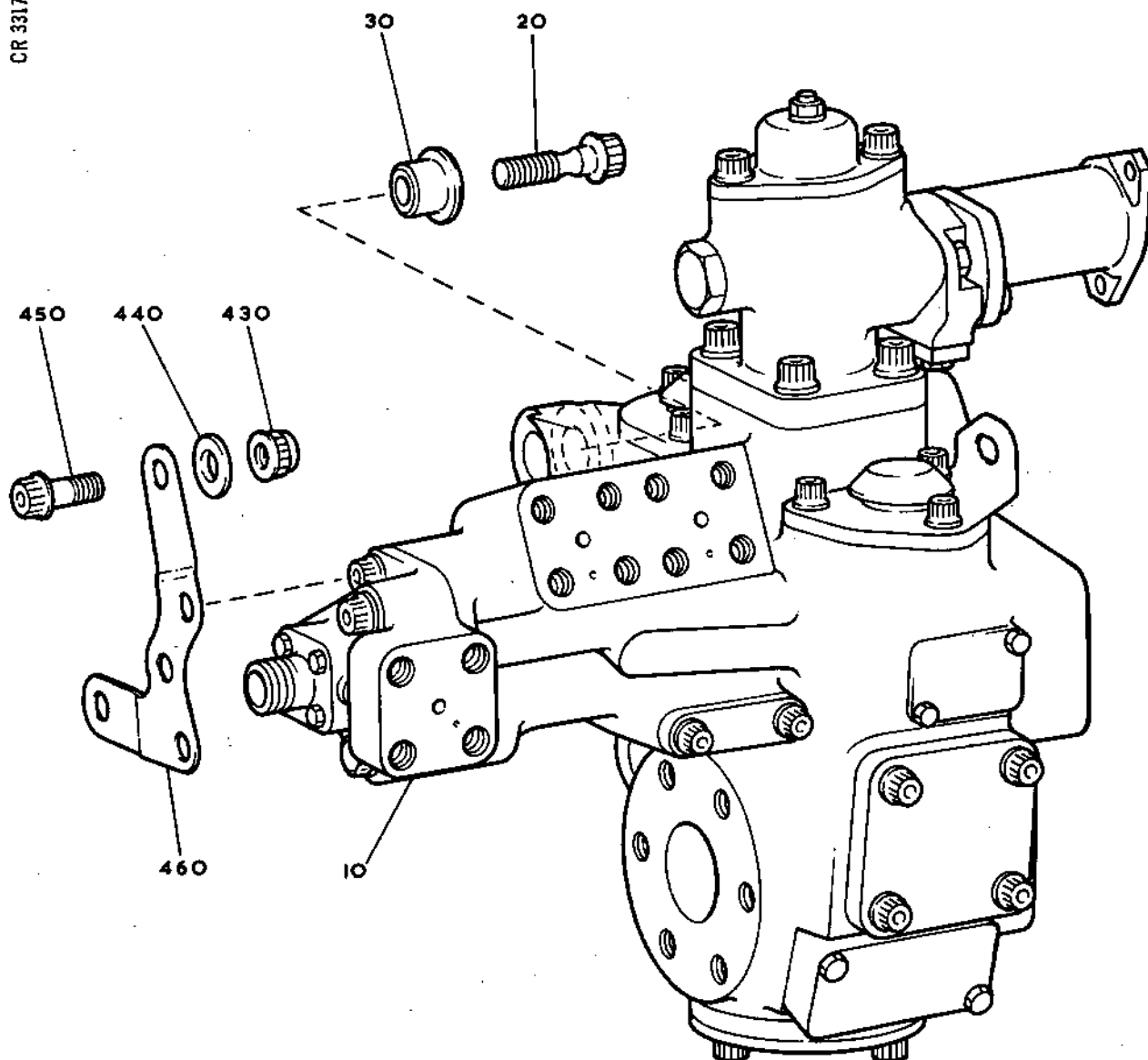


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33175/00A



TN16133

Distribution and Dump Valve  
Figure 306

INSPECTION/CHECK

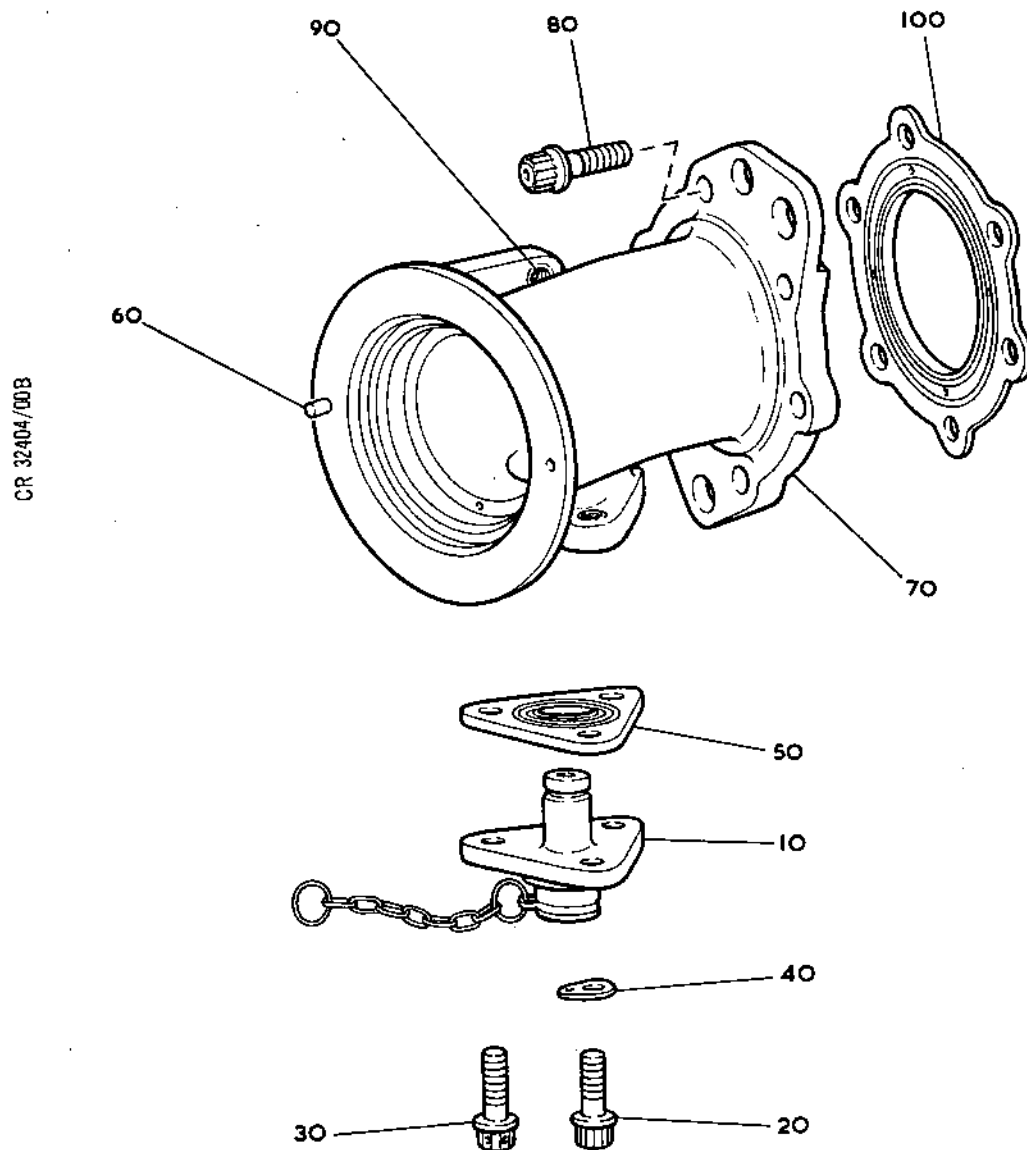
73-10-00

Page 322

Jun 1/76



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



Inlet Elbow and Drain Valve  
Figure 307

INSPECTION/CHECK

73-10-00

Page 323

Jun 1/76



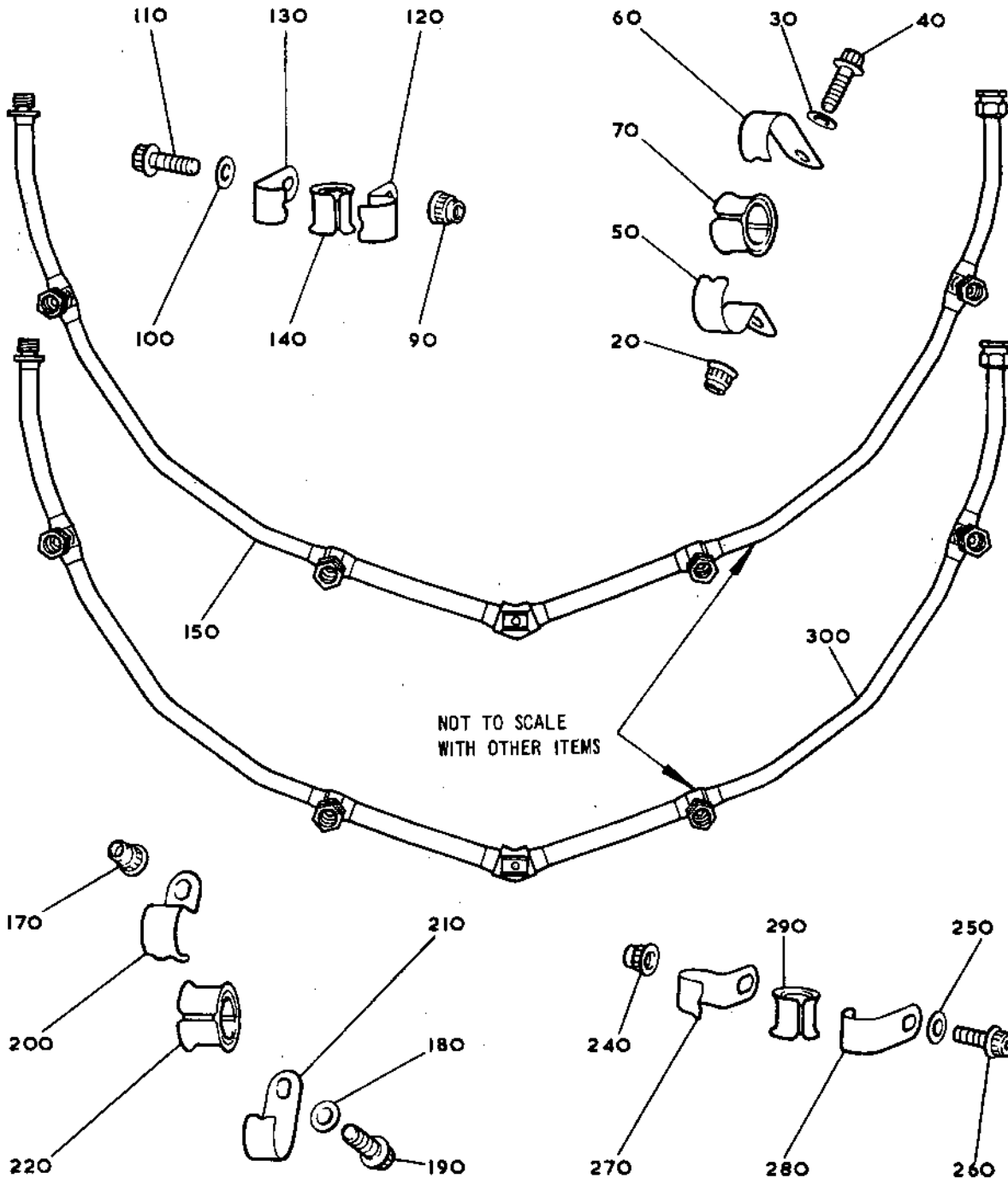


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32403/00B



TN16135

Fuel Manifold  
Figure 308

INSPECTION/CHECK

**73-10-00**

Page 324

Jun 1/76



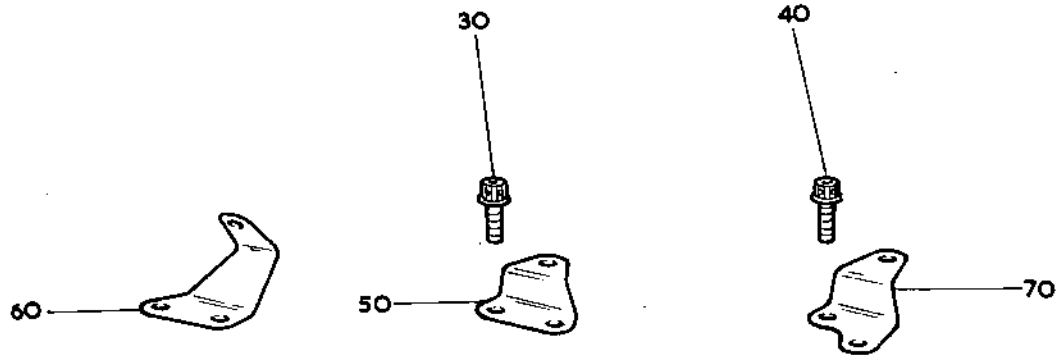
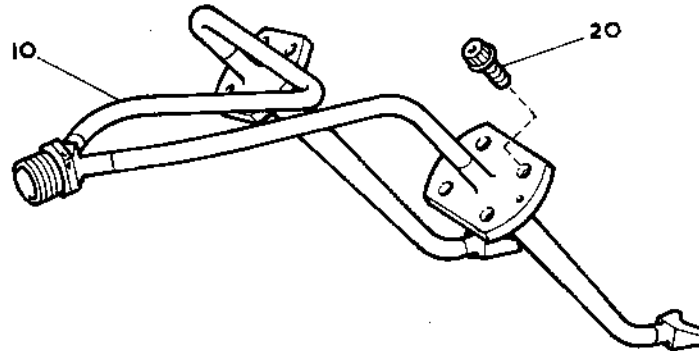
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32513/00B



Fuel Pressure Atomising (Main) Nozzles  
Figure 309

INSPECTION/CHECK

**73-10-00**

Page 325

Jun 1/76

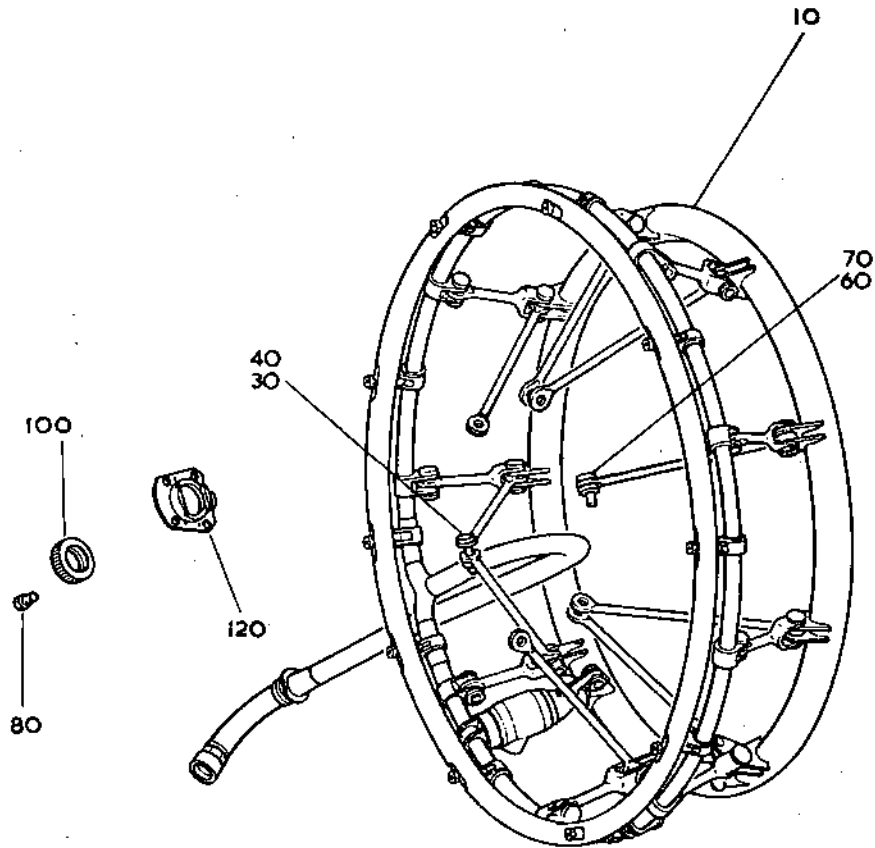
TN16136



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 33162/00A



TN16129

Reheat Injection System  
Figure 310

INSPECTION/CHECK

73-10-00

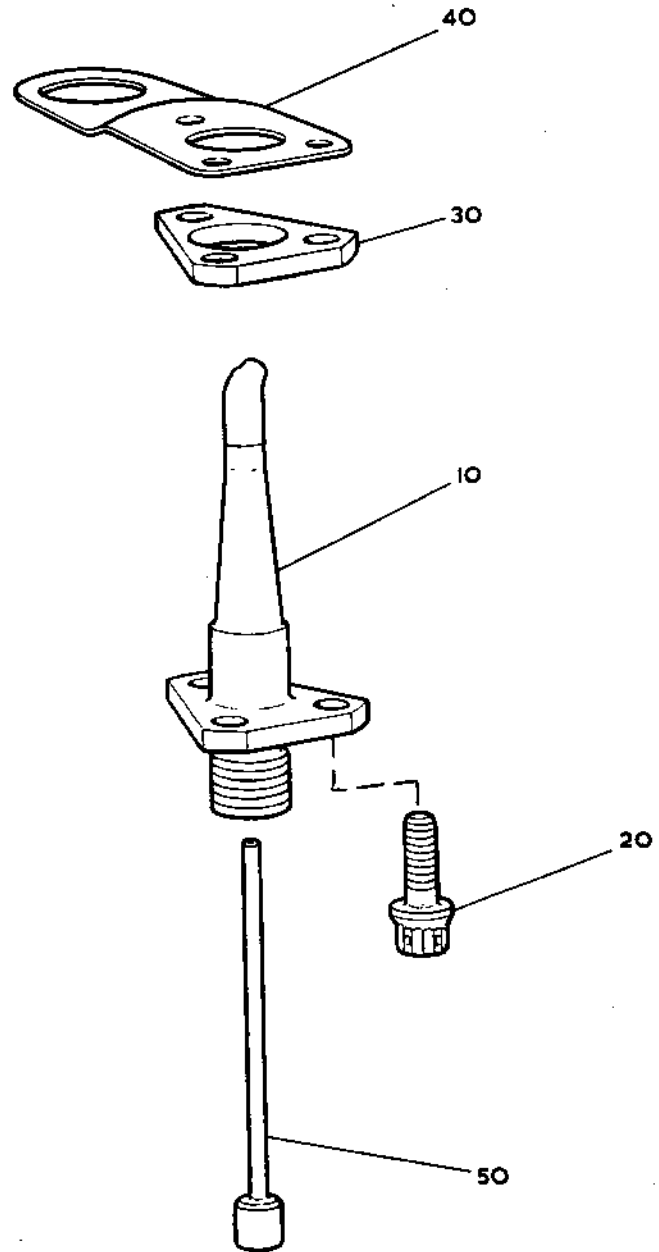
Page 326

Jun 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Fuel Pressure Atomising (Pilot) Nozzles  
Figure 311

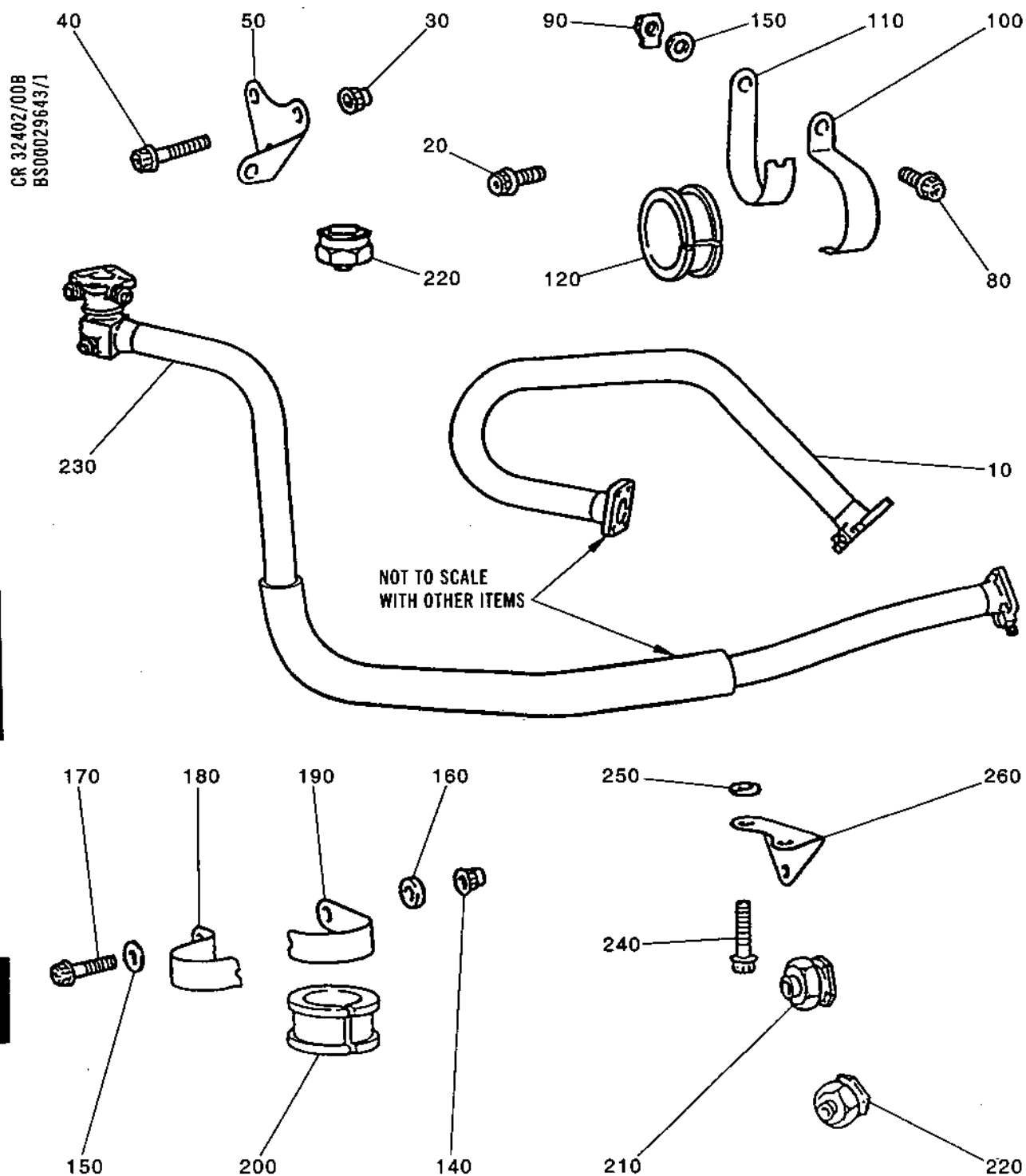


OLYMPUS 593

MK.610-14-28  
OVERHAUL



SNECMA



Tubes, First Stage Pump to Second Stage Pump (Part 1 of 2)  
Figure 312

INSPECTION/CHECK

73-10-00

Page 328

Dec 31/00

Printed in England

CR 32401/008  
BS00029644/1

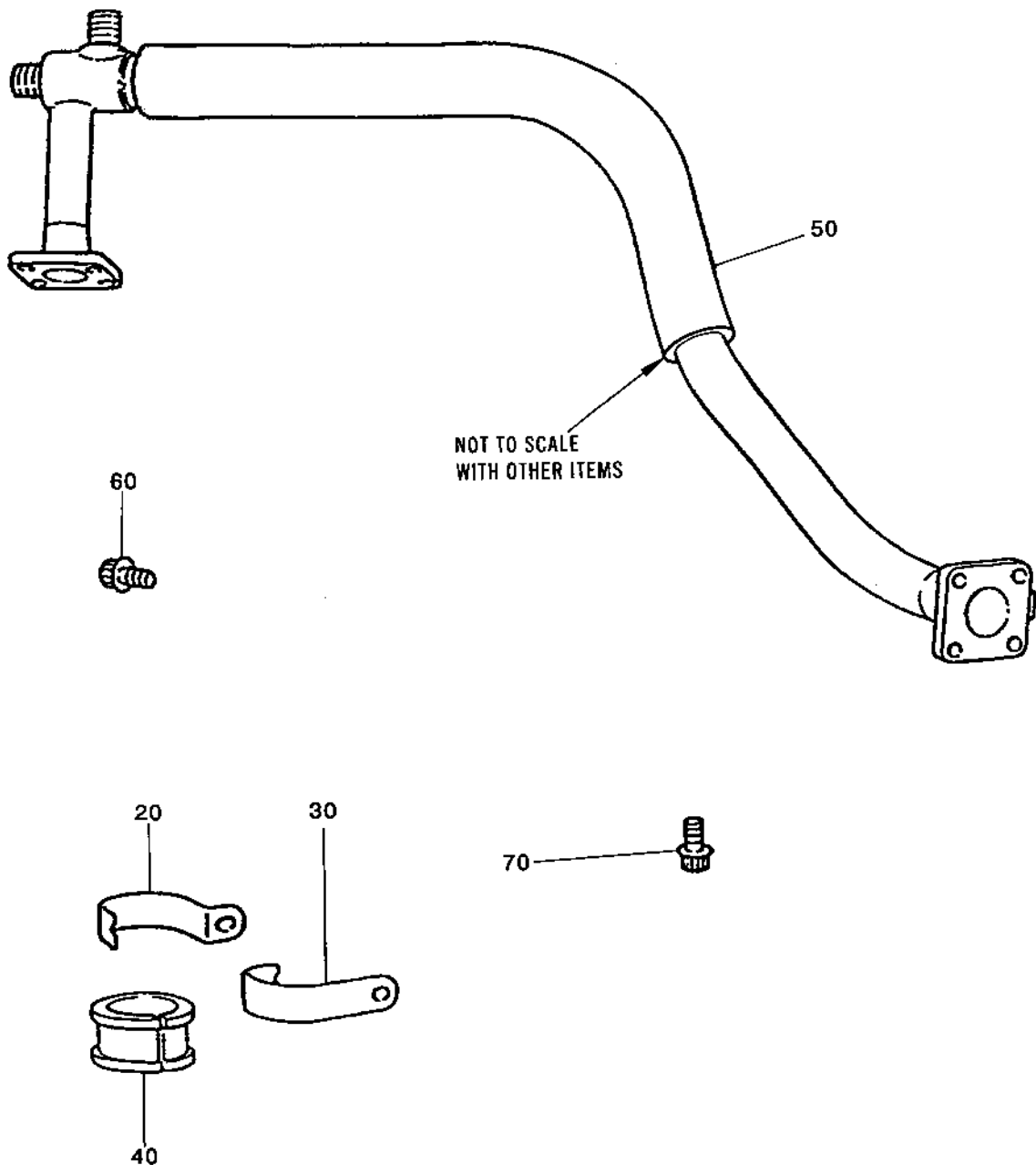


OLYMPUS 593

MK.610-14-28  
OVERHAUL



SNECMA



Tubes, First Stage Pump to Second Stage Pump (Part 2 of 2)  
Figure 313

INSPECTION/CHECK

73-10-00

Page 329

Dec 31/00

CR 32400/00B  
BS00029645/1

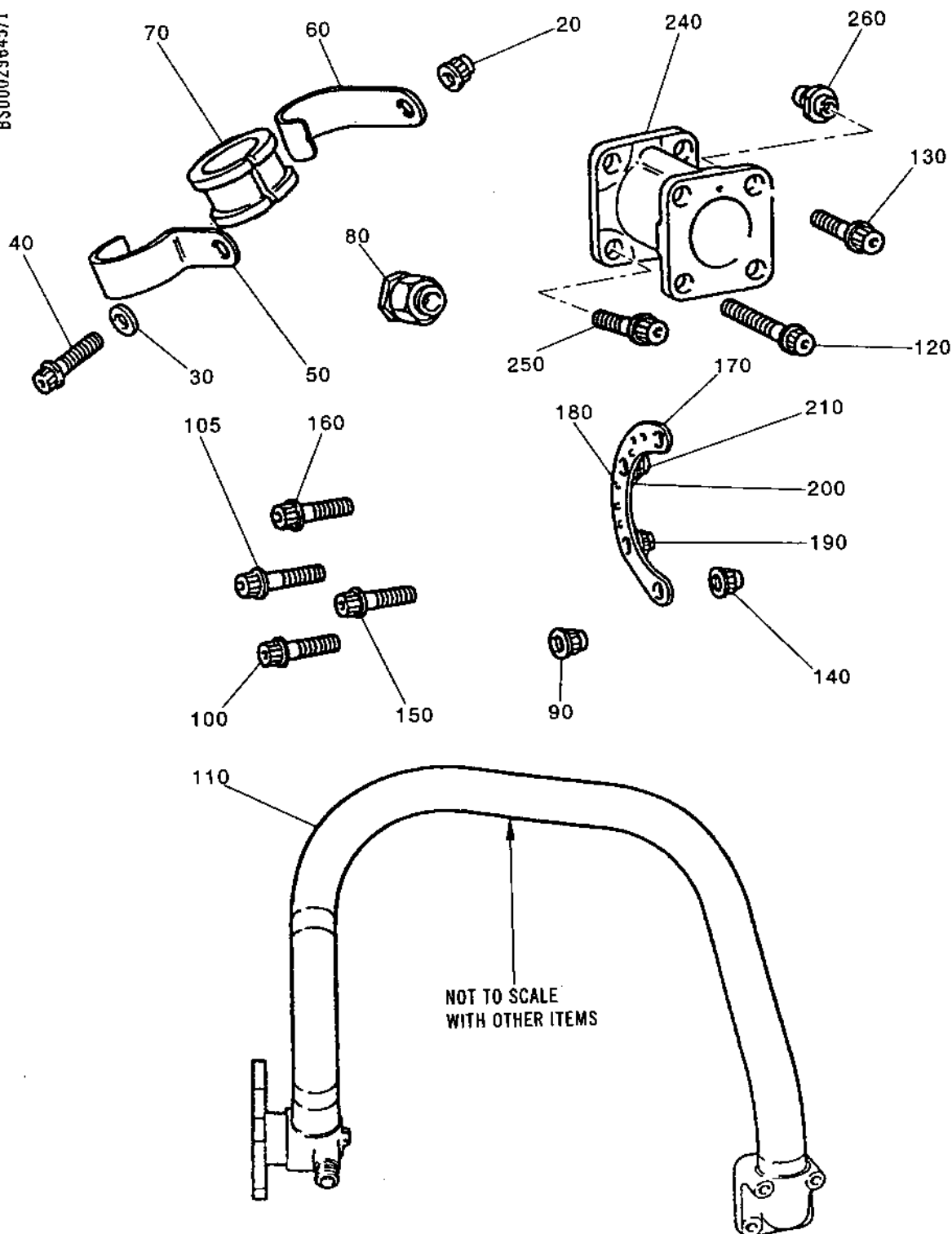


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Tubes, Flow Control Unit Supply to Fuel Manifold (Part 1 of 2)  
Figure 314

INSPECTION/CHECK

73-10-00

Page 330  
Dec 31/00



# OLYMPUS 593

MK.610-14-28

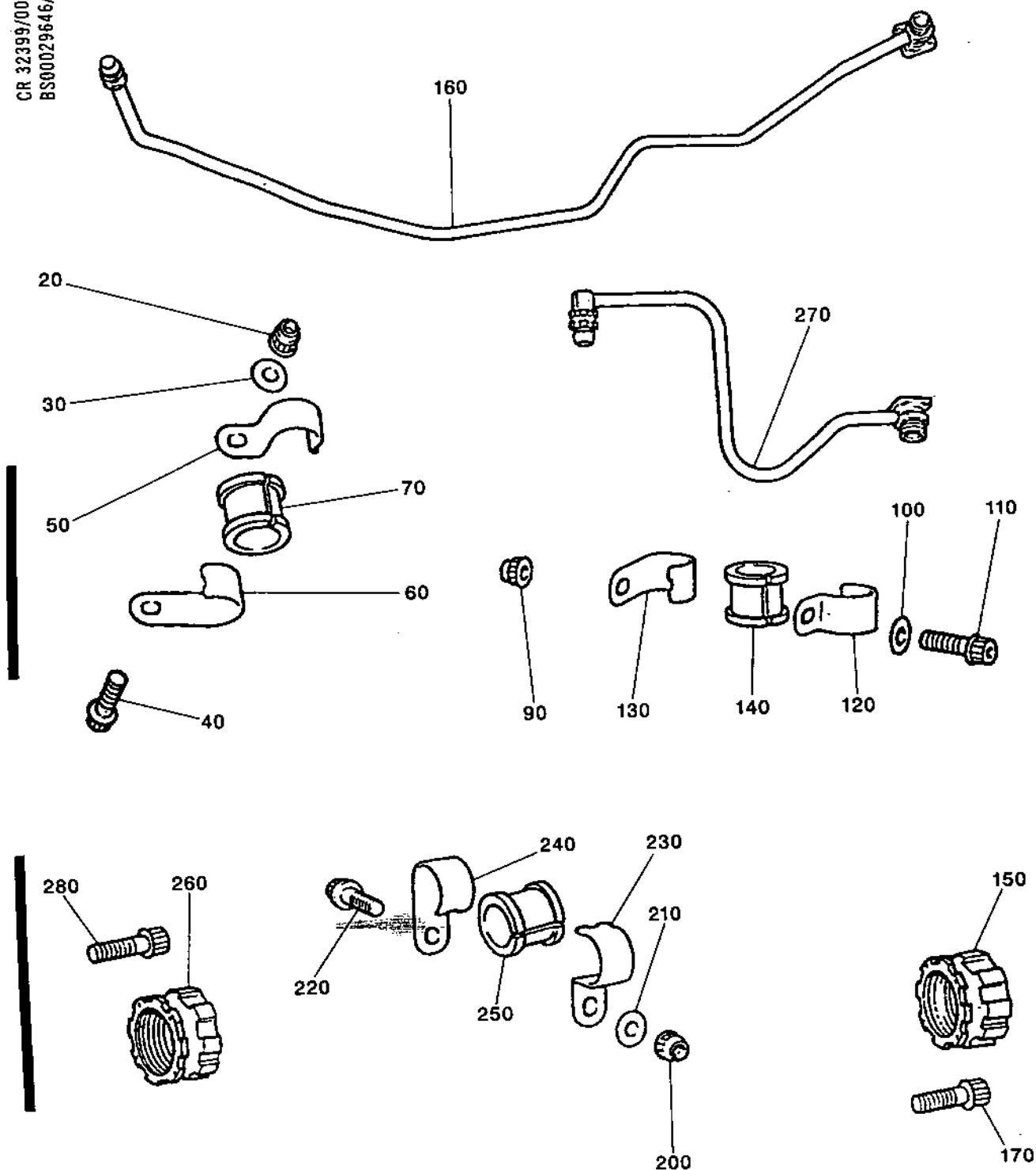
OVERHAUL



sneema

CR 32399/00B  
BS00029646/1

Printed in England



Tubes, Flow Control Unit Supply to Fuel Manifold (Part 2 of 2)  
Figure 315

INSPECTION/CHECK

73-10-00

Page 331  
Dec 31/00

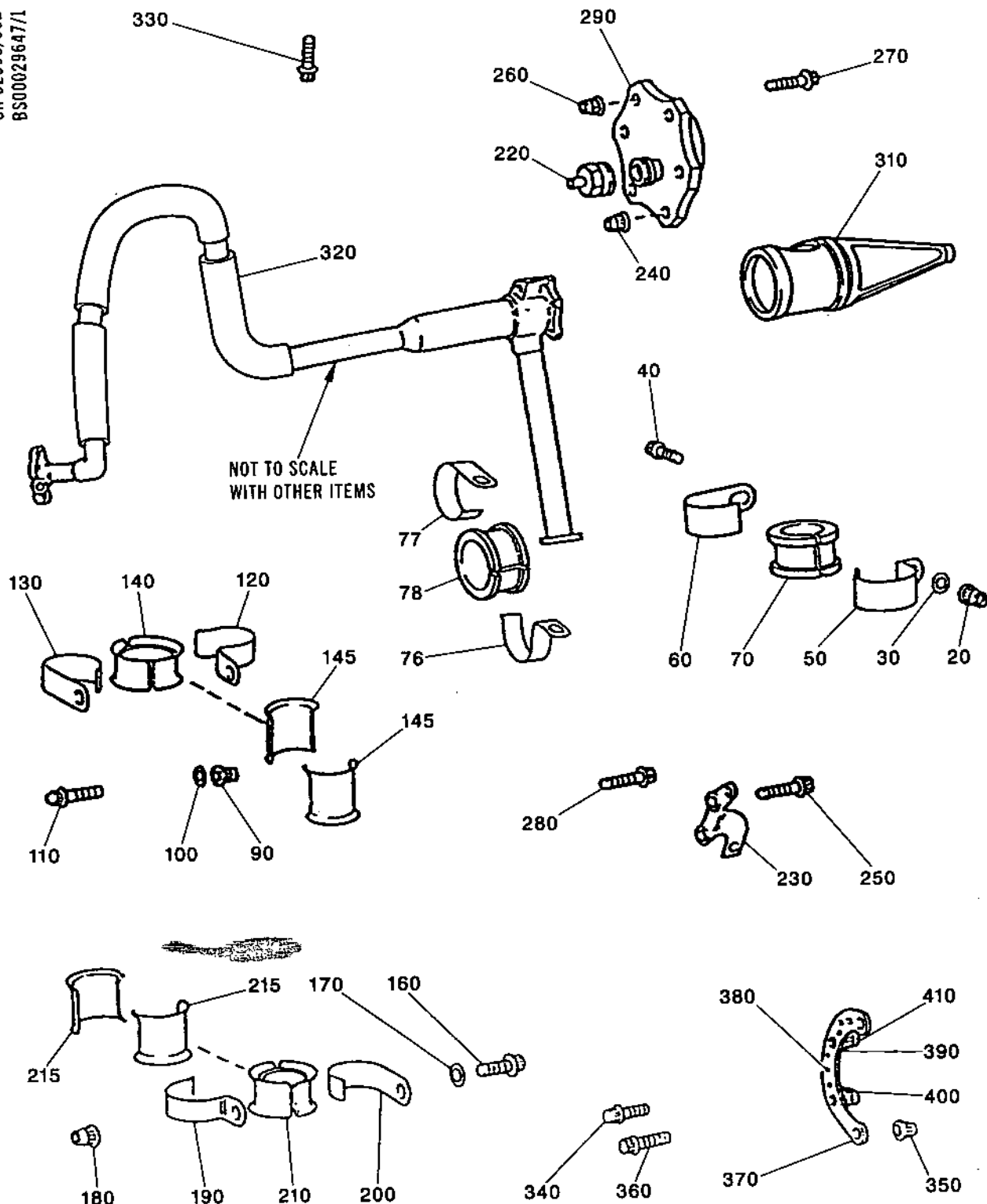


CR 32398/008  
BS00029647/1



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Tubes, First Stage Pump Supply to Reheat Injection  
System (Part 1 of 2)  
Figure 316

INSPECTION/CHECK

73-10-00

Page 332  
Dec 31/00



OLYMPUS 593

MK.610-14-28  
OVERHAUL

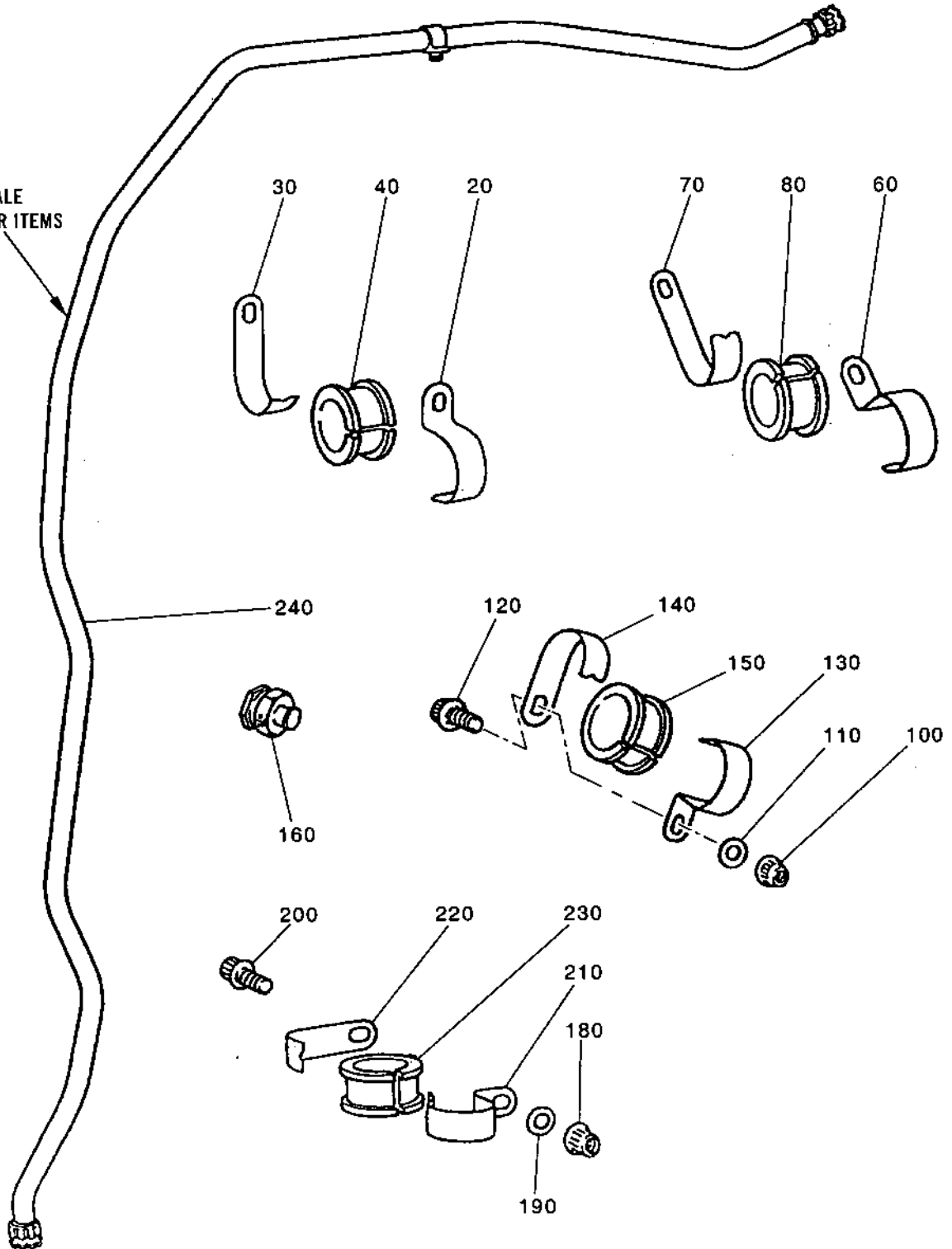


sneema

CR 32397/008  
BS00029648/1

Printed in England

NOT TO SCALE  
WITH OTHER ITEMS



Tubes, First Stage Pump Supply to Reheat Injection  
System (Part 2 of 2)  
Figure 317

INSPECTION/CHECK

73-10-00

Page 333  
Dec 31/00

Printed in England

CR 32515/00B  
BS00029666/1

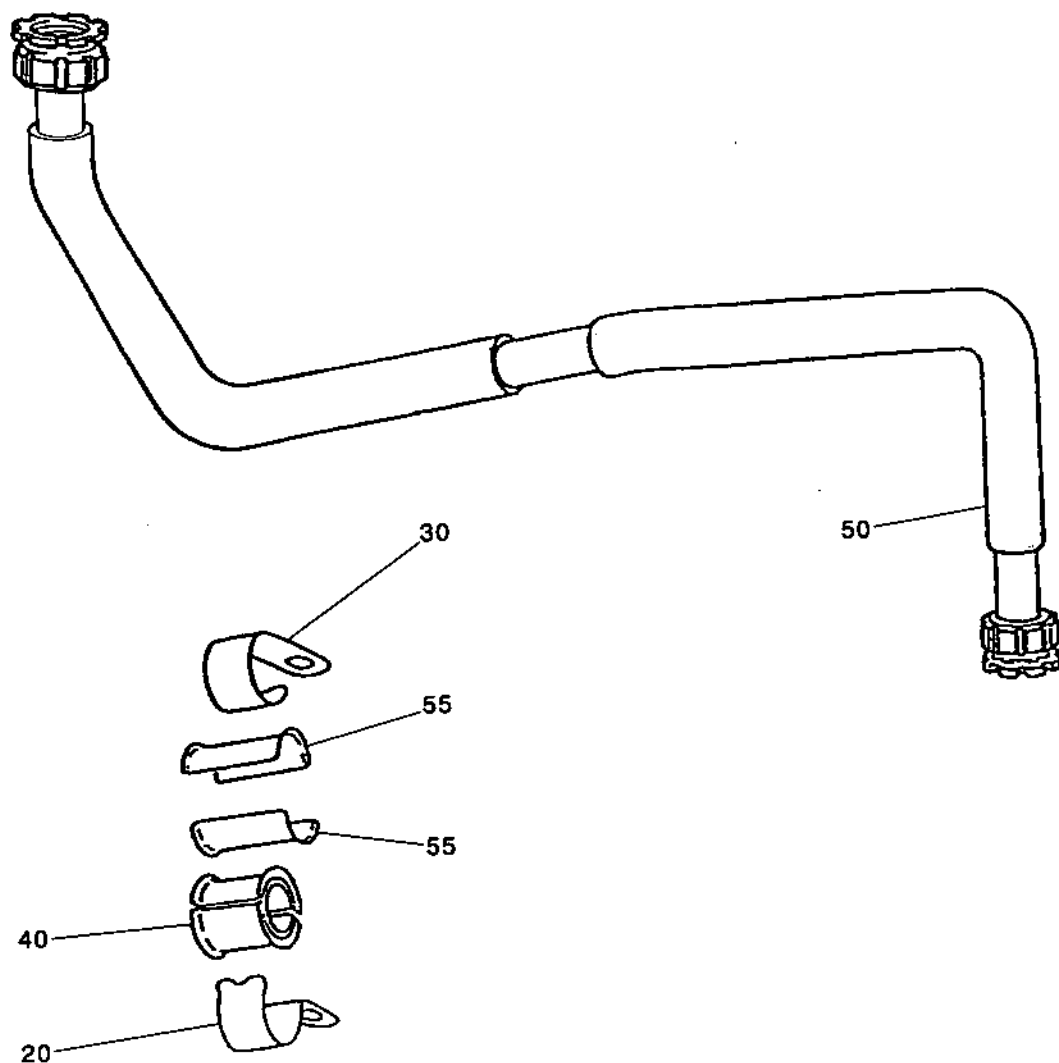


OLYMPUS 593

MK.610-14-28  
OVERHAUL



SNECMA



Tube, Second Stage Pump Inlet to Electric Starter Pump  
Figure 318

INSPECTION/CHECK

73-10-00

Page 334  
Dec 31/00

CR 32396/008  
BS00029649/1

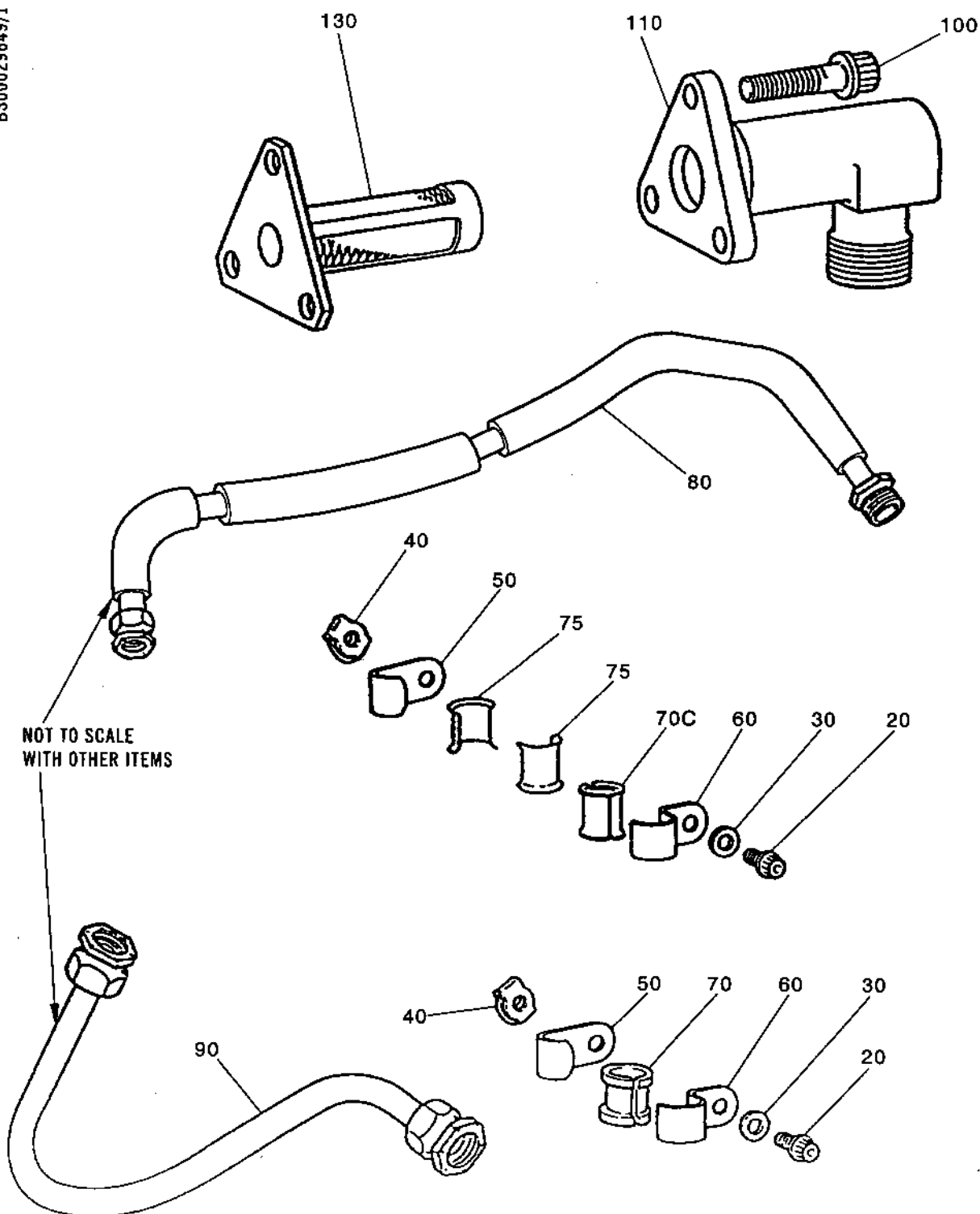


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Tubes, Electric Starter Pump Supply to Flow Control Unit  
Figure 319

INSPECTION/CHECK

73-10-00

Page 335  
Dec 31/00



OLYMPUS 593

MK.610-14-28

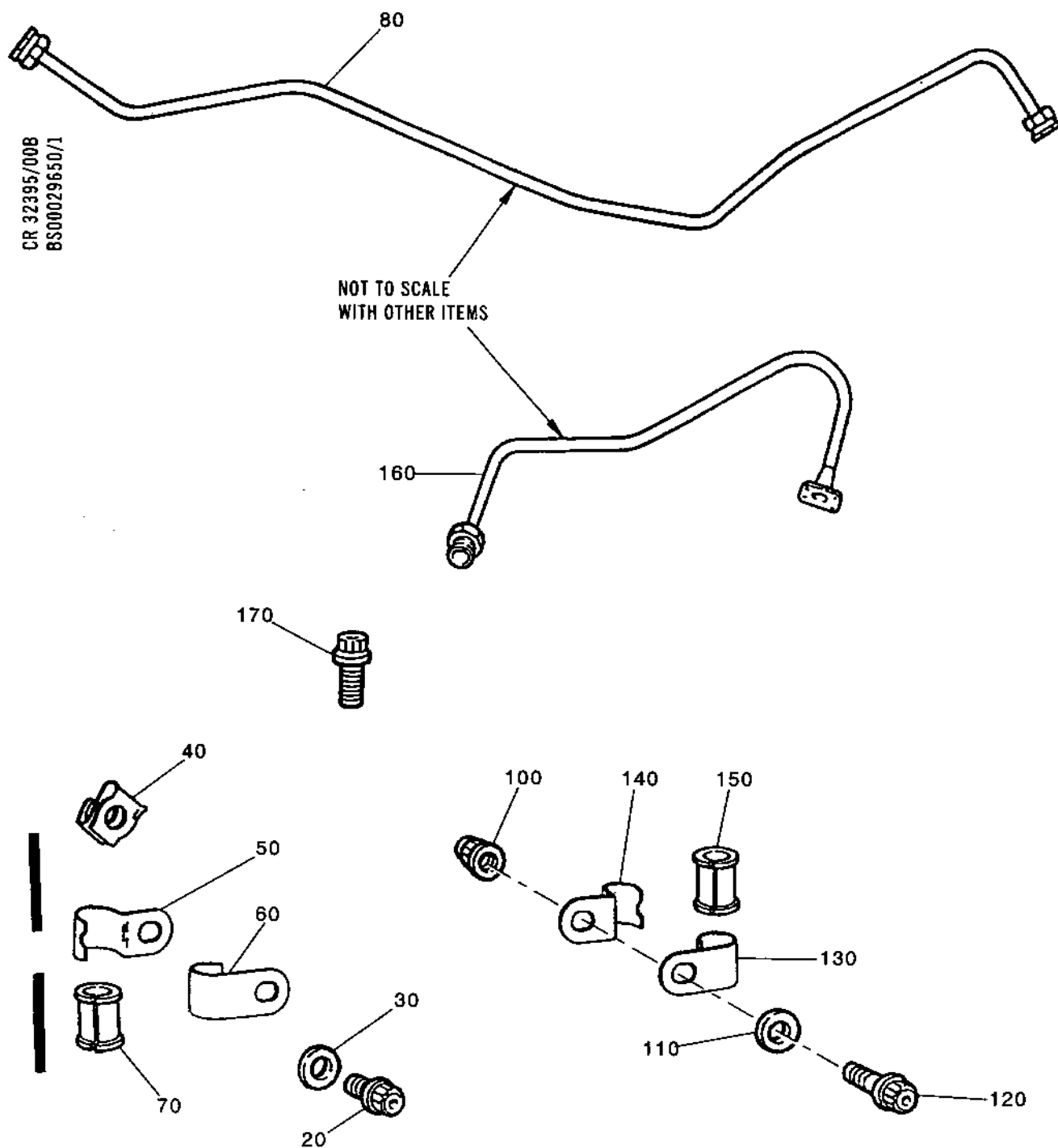
OVERHAUL



sneema

Printed in England

CR 32395/008  
BS00029650/1



Tubes, Electric Starter Pump Supply to  
Pilot Nozzles (Part 1 of 2)  
Figure 320

INSPECTION/CHECK

73-10-00

Page 336  
Dec 31/00



# OLYMPUS 593



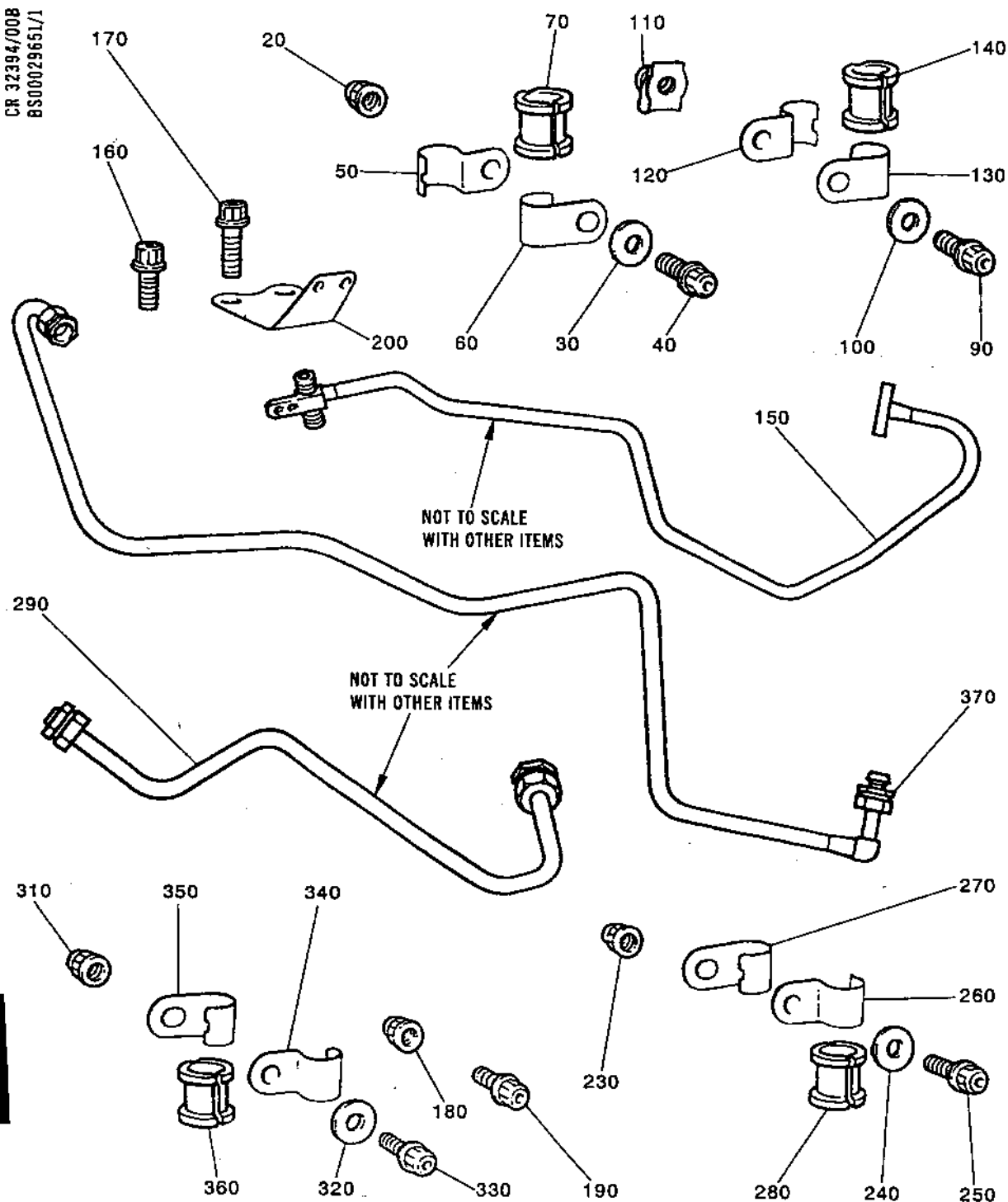
MK.610-14-28

sneema

OVERHAUL

Printed in England

CR 32394/00B  
BS00029651/1



Tubes, Electric Starter Pump Supply to  
Pilot Nozzles (Part 2 of 2)  
Figure 321

INSPECTION/CHECK

## 73-10-00

Page 337  
Dec 31/00



OLYMPUS 593

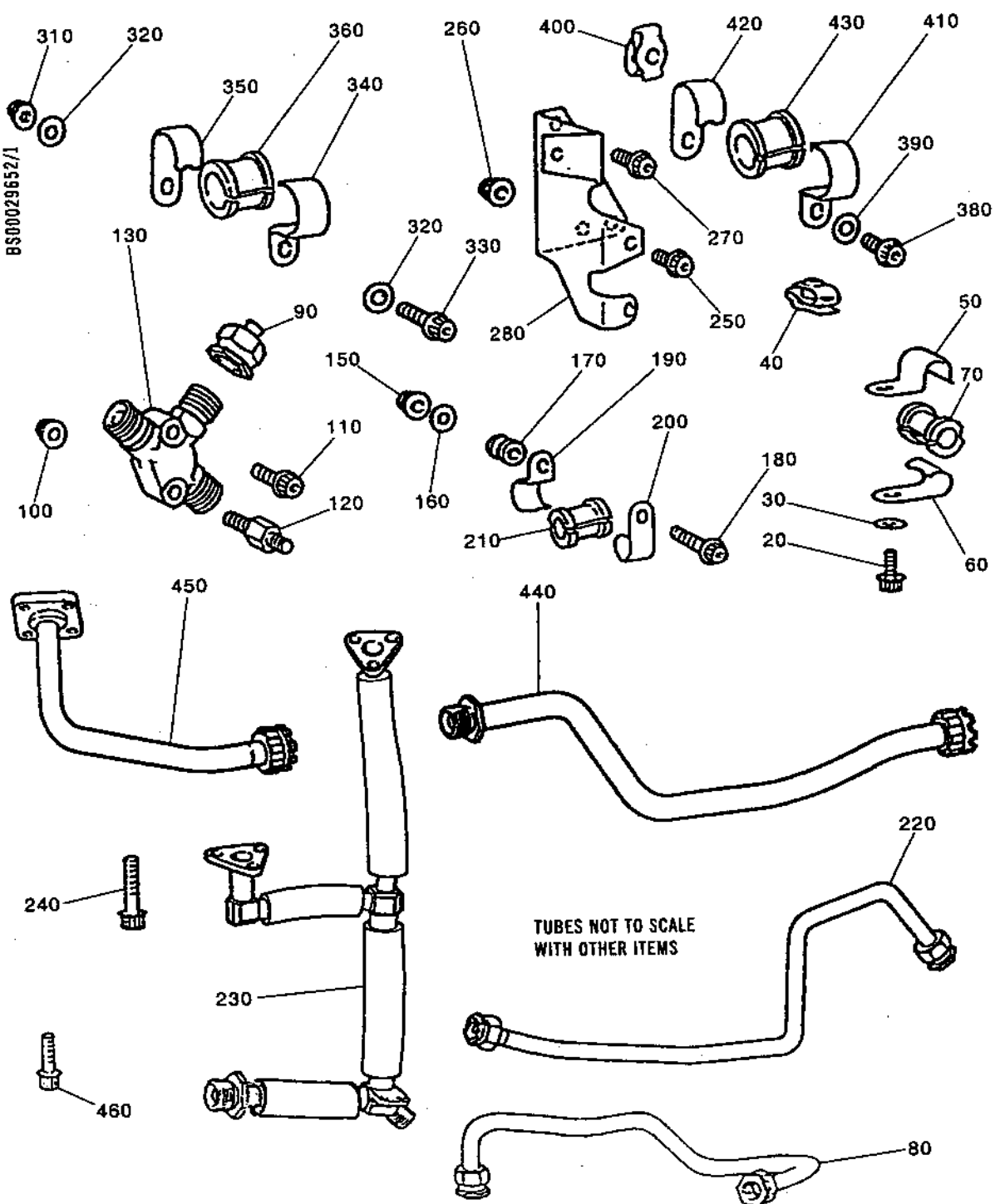


MK.610-14-28

sneema

OVERHAUL

CR 32393/008  
BS00029652/1



Tubes, Reheat Controller and Flow Control  
Unit to First Stage Pump  
Figure 322

INSPECTION/CHECK

73-10-00

Page 338

Dec 31/00

Printed in England

CR 32392/00B  
BS00029653/1

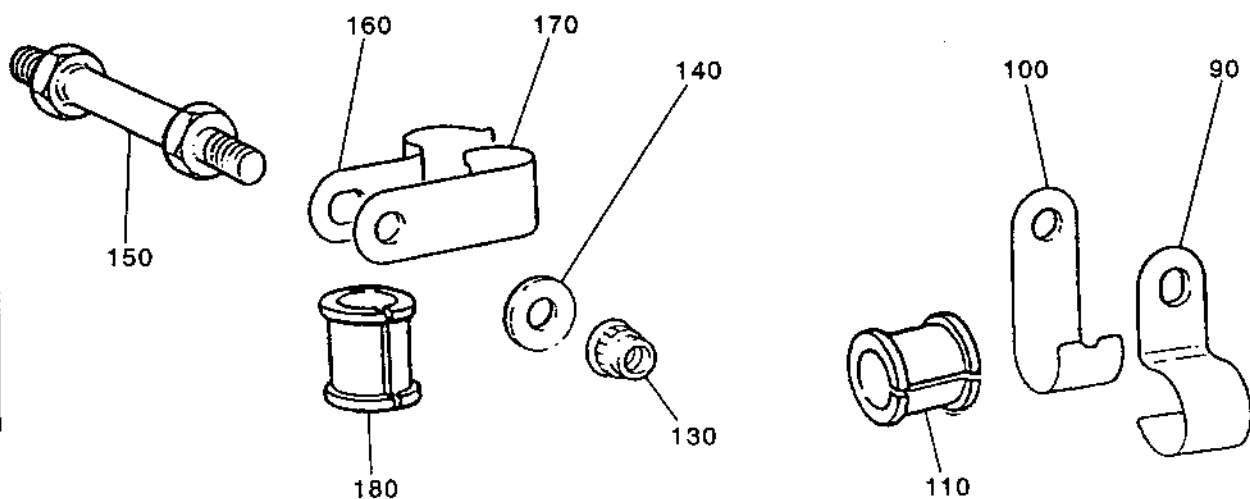
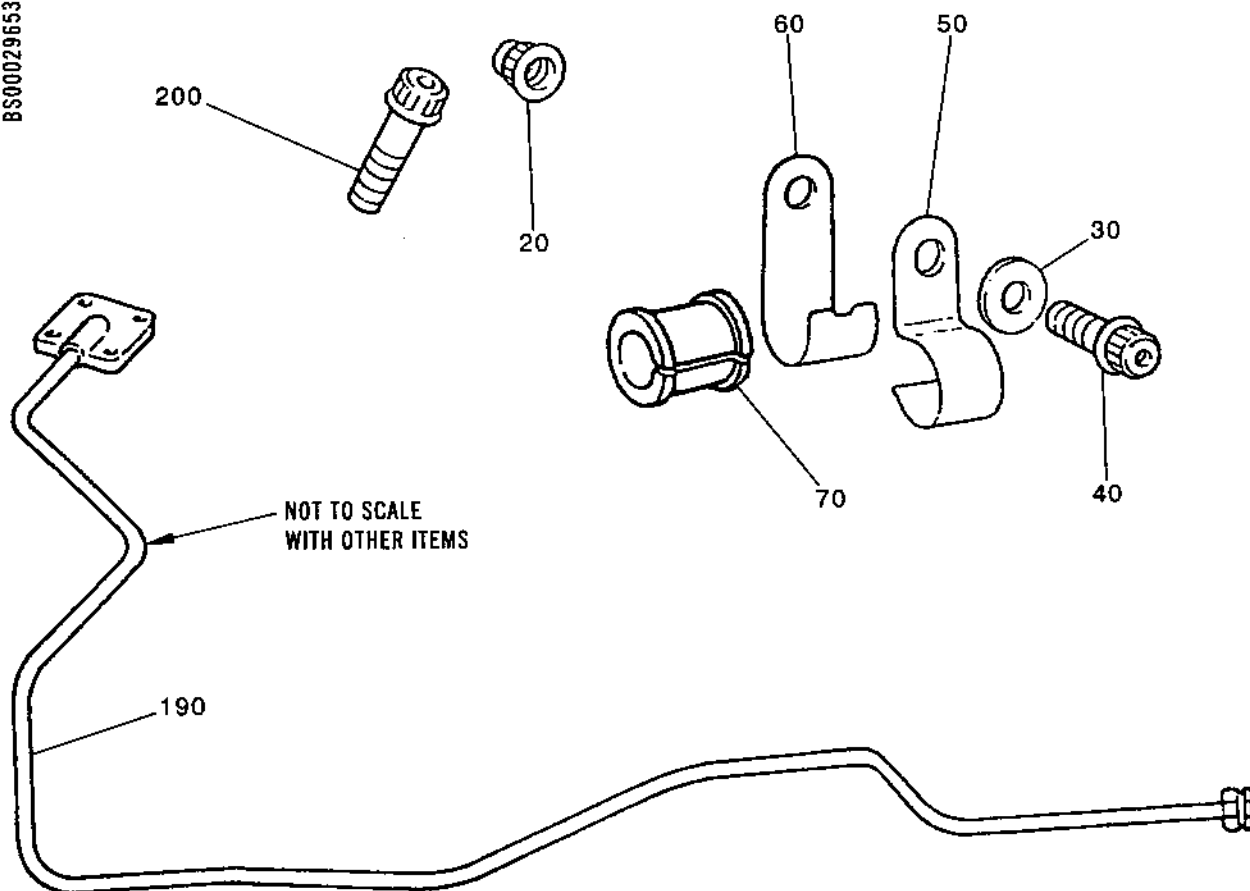


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Tubes, Second Stage Pump Inlet Elbow Return  
to Recirculation Valve  
Figure 323

INSPECTION/CHECK

73-10-00

Page 339  
Dec 31/00





OLYMPUS 593

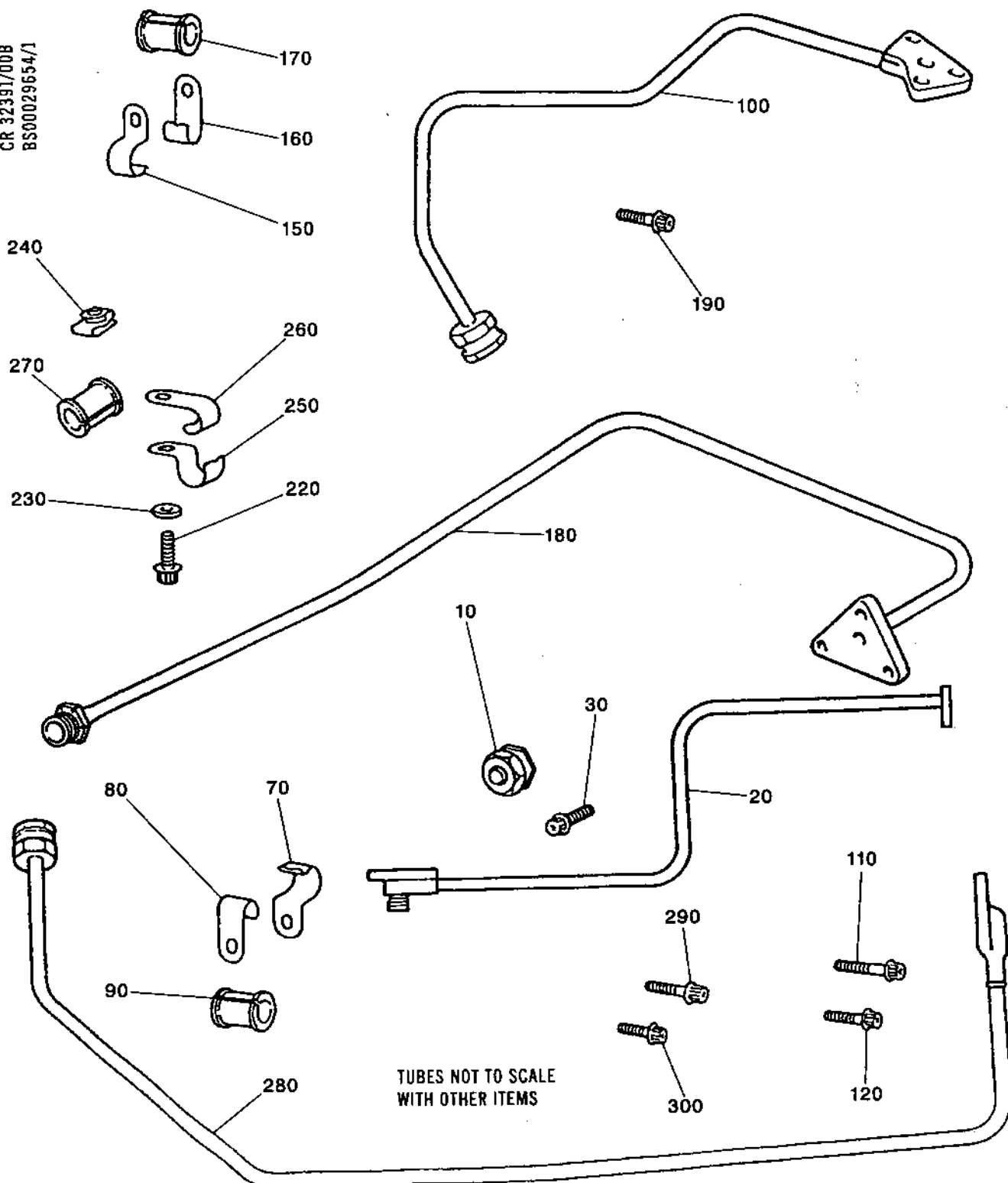
MK.610-14-28

OVERHAUL



sneema

CR 32391/00B  
BS00029654/1



Tubes, Distribution and Dump Valve (Servo and Spill)  
Figure 324

INSPECTION/CHECK

73-10-00

Page 340

Dec 31/00



OLYMPUS 593

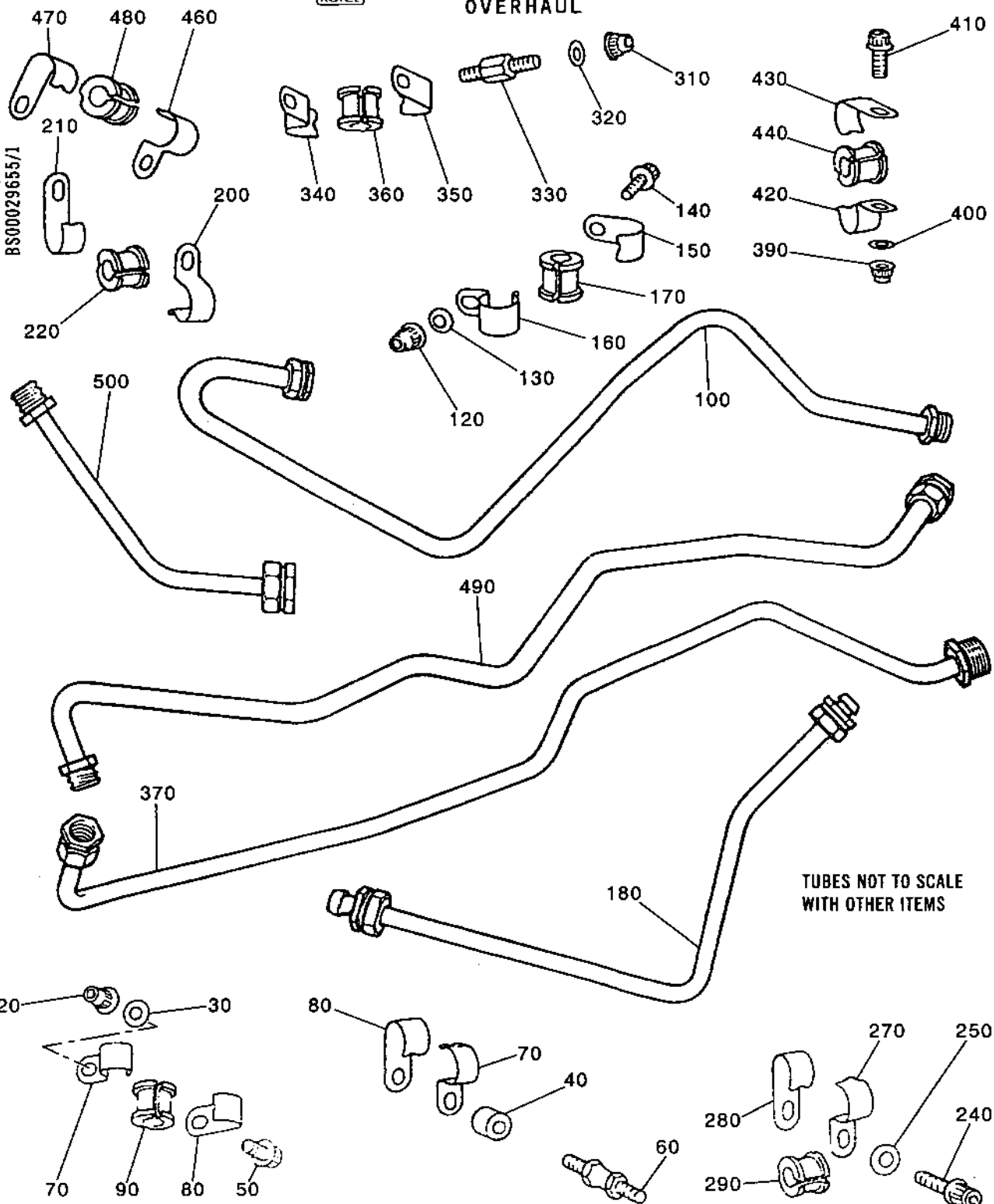


MK.610-14-28

SNECMA

OVERHAUL

CR 32390/00A  
BS00029655/1



TUBES NOT TO SCALE  
WITH OTHER ITEMS

Tubes, Drains Tank Return to First Stage  
Pump and Recirculation Valve (Part 1 of 2)  
Figure 325

INSPECTION/CHECK

73-10-00

Page 341  
Dec 31/00

CR 32389/00B  
BS00029656/1

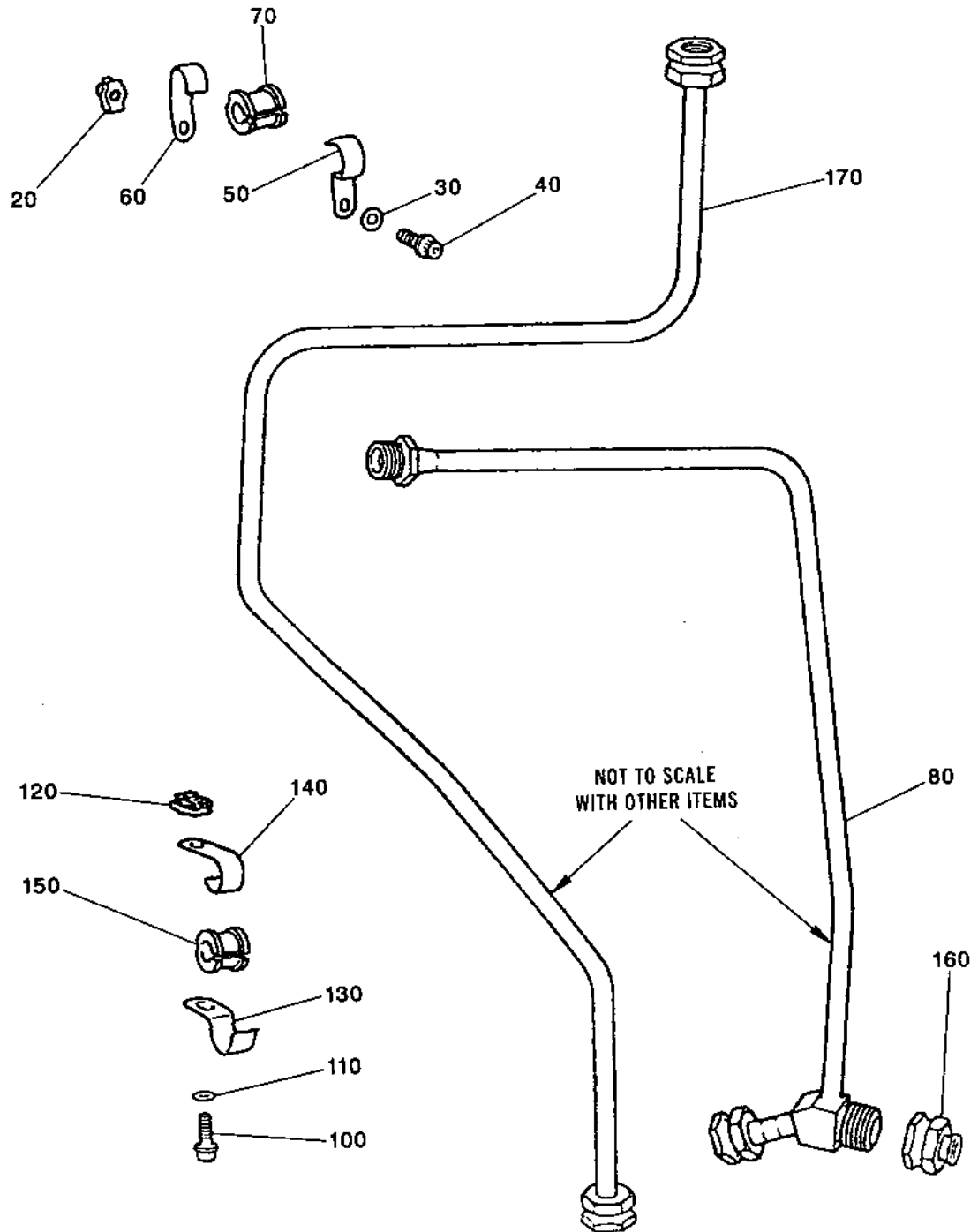


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Tubes, Drain Tank Return to First Stage  
Pump and Recirculation Valve (Part 2 of 2)  
Figure 326

INSPECTION/CHECK

73-10-00

Page 342  
Dec 31/00

CR 32388/00B  
BS00029657/1

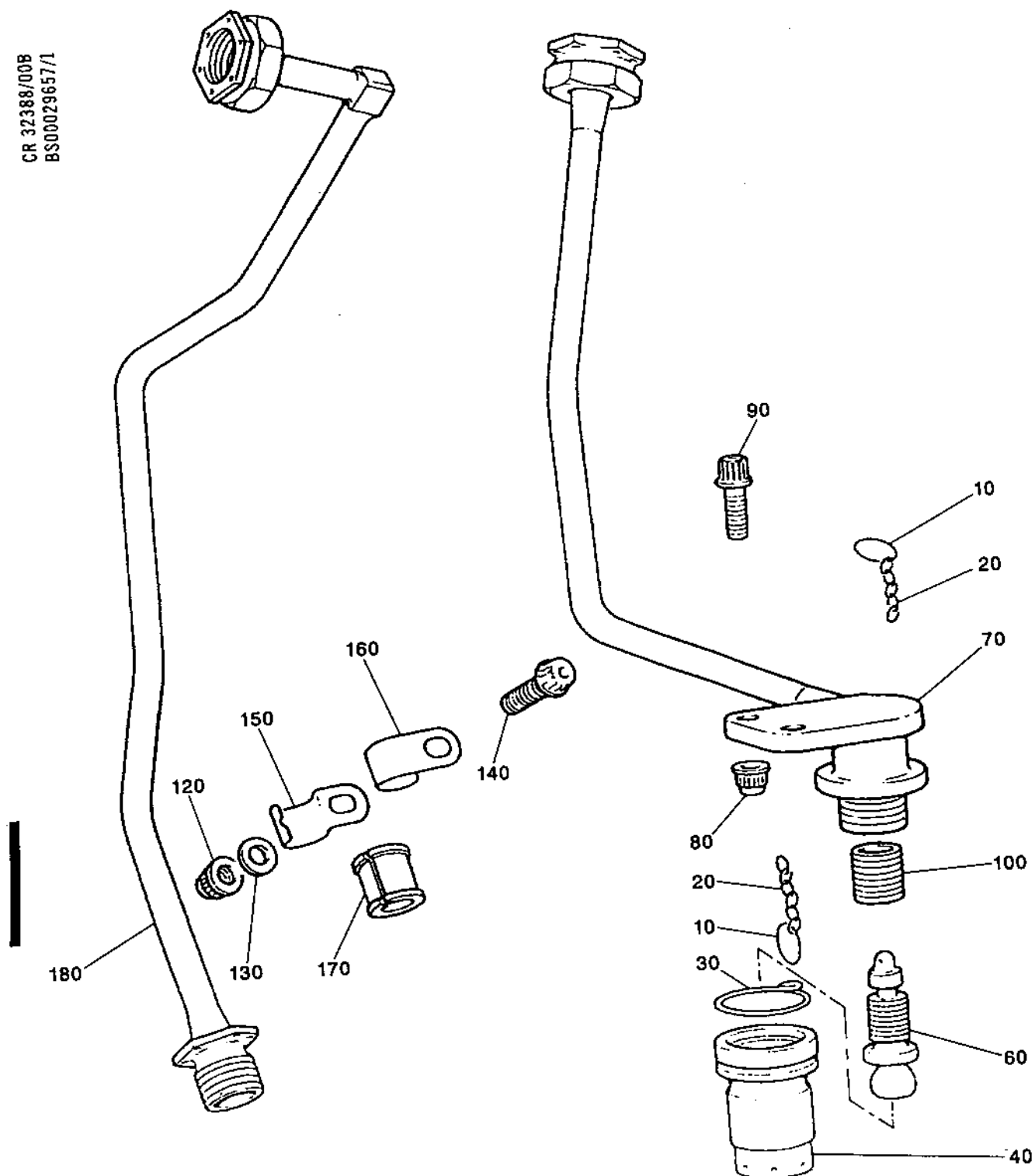


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Tubes, Oil Cooler to Air Bleed Valve  
Figure 327

INSPECTION/CHECK

73-10-00

Page 343  
Dec 31/00

CR 32387/008  
BS00029658/1



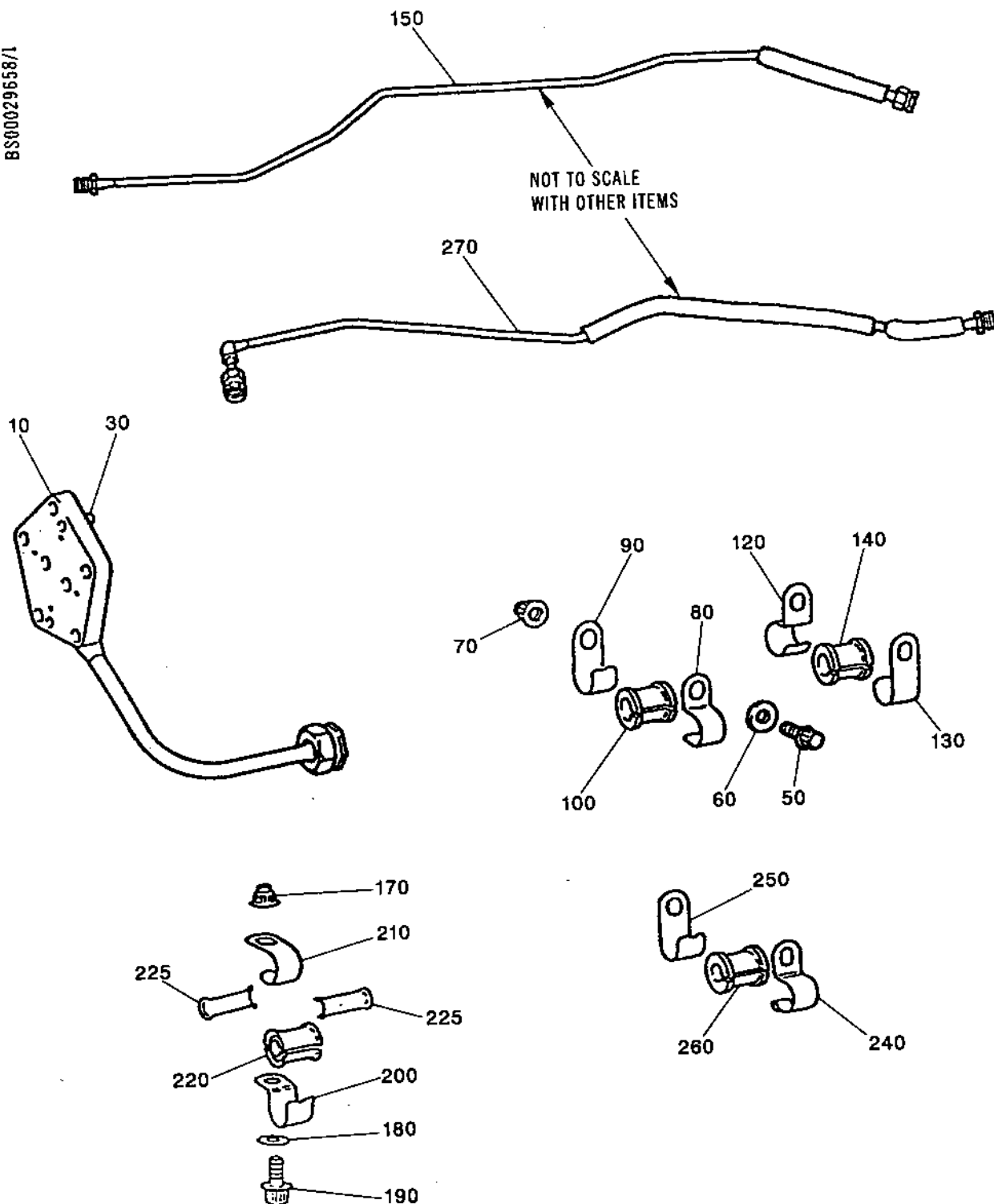
OLYMPUS 593

MK.610-14-28

OVERHAUL



SNECMA



Tubes, Fuel Heater and Filter Outlet to Reheat  
Controller (Servo Supply)  
Figure 328

INSPECTION/CHECK

73-10-00

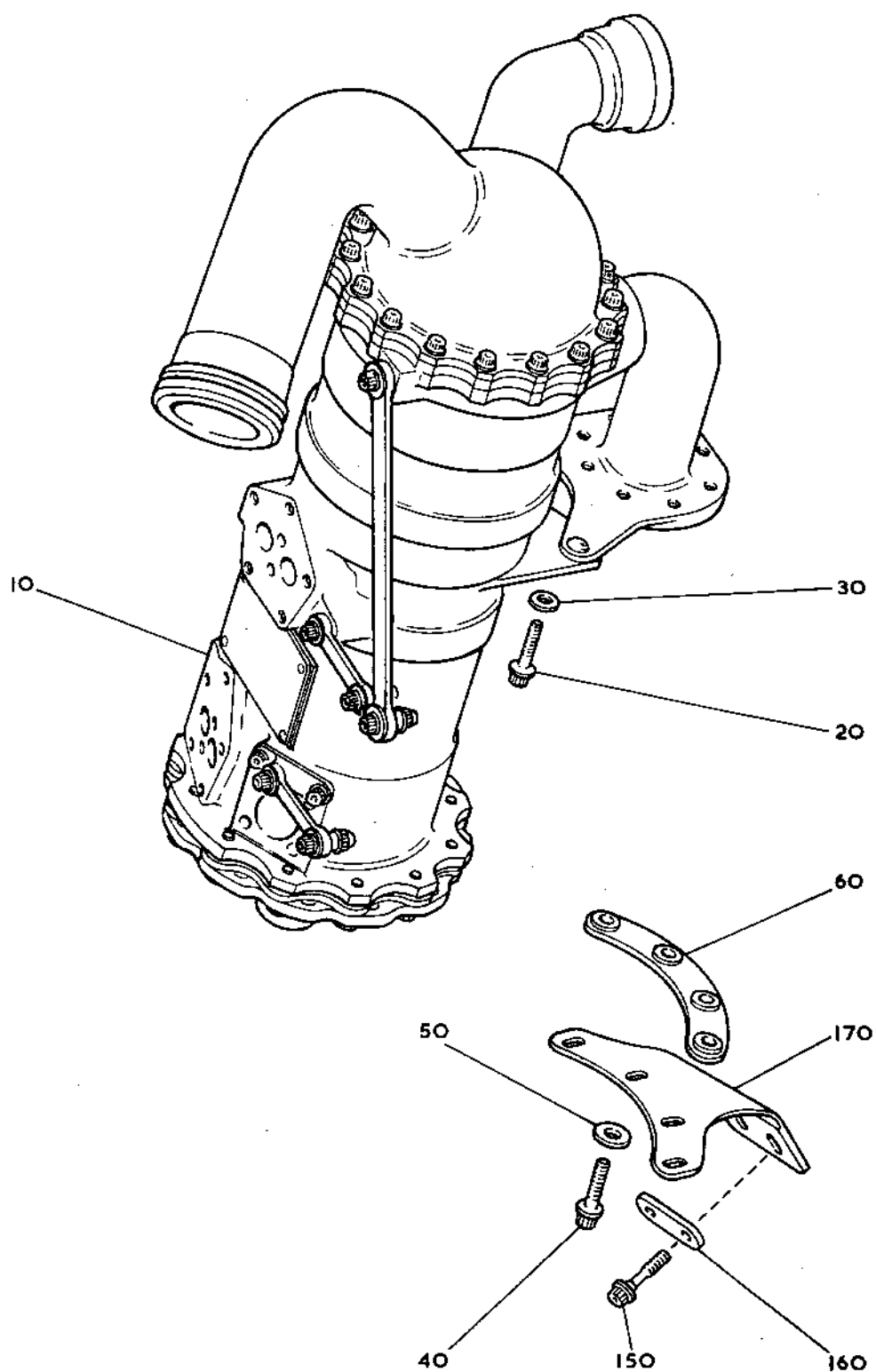
Page 344

Dec 31/00

CR 33174/00A



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



Fuel Heater  
Figure 329

INSPECTION/CHECK

**73-10-00**

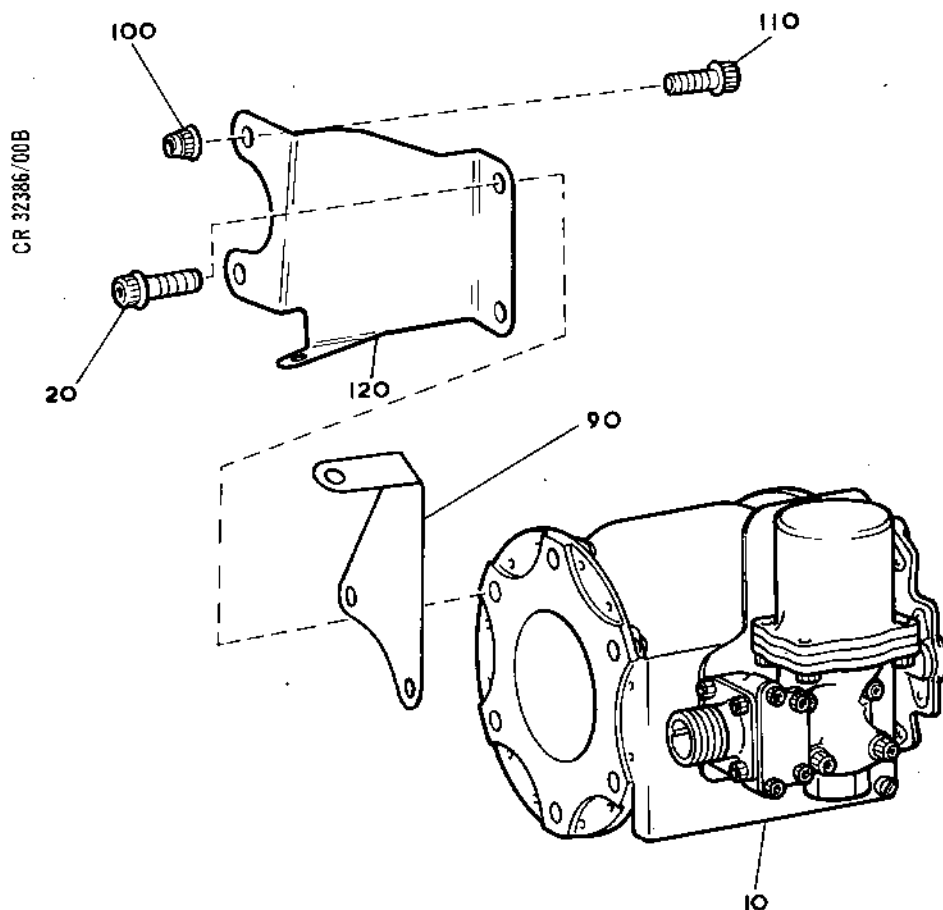
Page 345

Jun 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Fuel Heater Control Valve  
Figure 330

INSPECTION/CHECK

**73-10-00**

Page 346

Jun 1/76

TN31516



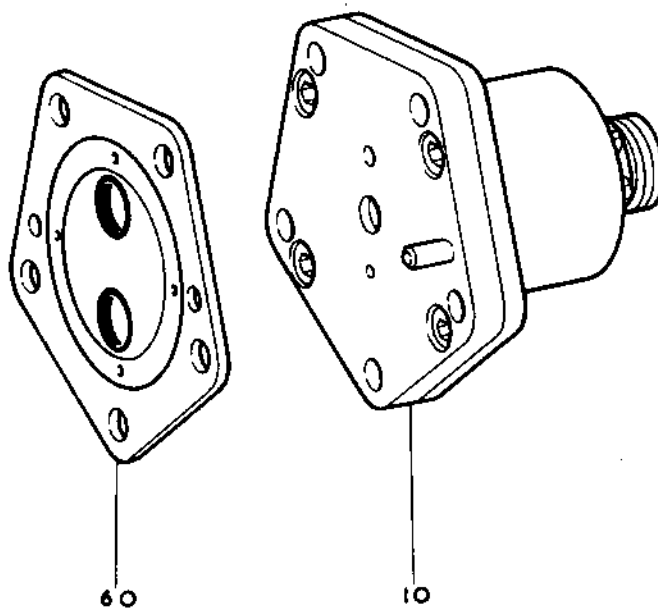
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 33172/00A



Fuel Heater Control Valve Differential Pressure Switch  
Figure 331

INSPECTION/CHECK

**73-10-00**

Page 347

Jun 1/76

TN31517



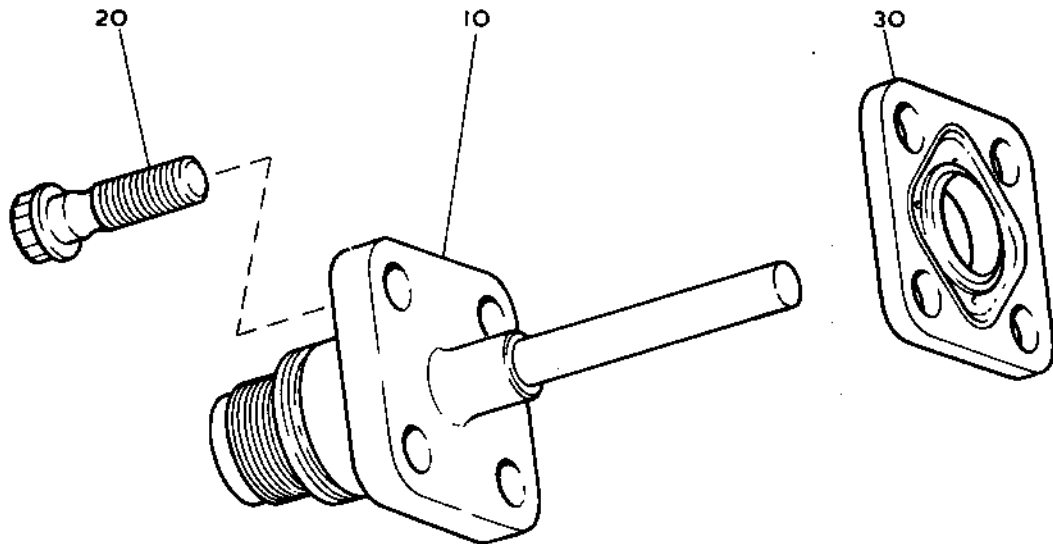


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32475/00B



Fuel Heater Control Thermometer  
Figure 332

INSPECTION/CHECK

**73-10-00**

Page 348

Jun 1/76

TN31518



OLYMPUS 593

MK.610-14-28  
OVERHAUL



FUEL SYSTEM DISTRIBUTION - ASSEMBLY

TABLE OF CONTENTS

Para.		Page
1.	General ... ..	501
2.	Assemble First Stage Fuel Pump to Fuel Heater and Filter ... ..	501
A.	Prepare for Installation ... ..	501
B.	Secure the Joint Flange Between Pump and Heater ... ..	504
C.	Install Pump to Heater Support Links ... ..	504
D.	Install Fuel Differential Pressure Switches ... ..	508

TABLE OF ILLUSTRATIONS

Fig.No.		Page
501	First Stage Pump and Fuel Heater Assembly ... ..	502
502	Install Pump to Heater Support Links ... ..	503
503	Fuel Differential Pressure Switches ... ..	507

PRINTED IN ENGLAND

TN6663

ASSEMBLY

**73-10-00**

Contents 1

Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



FUEL SYSTEM DISTRIBUTION - ASSEMBLY

1. General

- A. Prior to commencing the assembly of the first stage fuel pump to the fuel filter and heater, refer to 71-09-00 Assembly for general information.
- B. Where a part is named in the assembly procedure, the Illustrated Parts Catalogue (I.P.C.) item number is given to identify the part from those of similar appearance and description. For example, an item quoted as bolt (72-01-03/1-30) would be found in I.P.C. topic 72-01-03, Figure 1, as item 30.

2. Assemble First Stage Fuel Pump to Fuel Heater and Filter

A. Prepare for Installation.

- (1) Remove support links and their attachment items from the heater.
- (2) Assemble inlet elbow and drain valve (73-12-03/1-70-10) to first stage fuel pump inlet (Ref.Fig.501).
- (a) Assemble seal plate (73-12-03/1-100) over inlet elbow.
- (b) Align attachment holes, inlet elbow drain valve downward, and engage spigot with first stage pump.
- (c) Apply lubricant 'B' to bolts (73-12-03/1-80). Insert bolts and torque-tighten between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (3) Ensure a serviceable seal plate is secured to the fuel pump outlet mounting faces with screws (73-11-01/1-280-270). Ensure that screw heads are below face of seal when in assembled condition.

B. Secure the joint flange between pump and heater (Ref. Fig.501).

- (1) Apply lubricant 'B' to the bolts (73-14-01/1-20).
- (2) Align the heater with the pump with joint flanges/ seal plate faces in full abutment.

ASSEMBLY

**73-10-00**

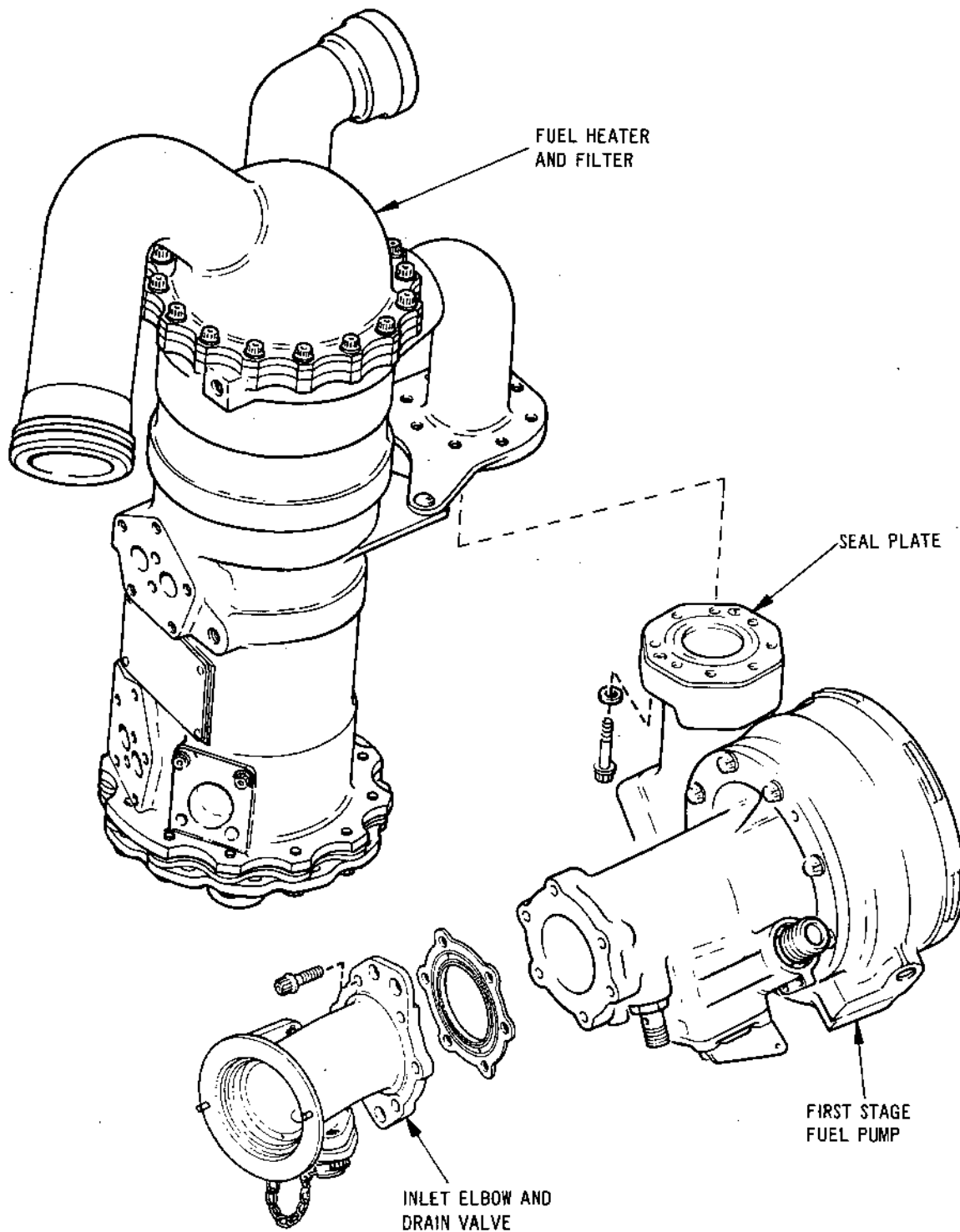
Page 501  
Jan 2/80



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 35389/00A



7N5868

First Stage Pump and Fuel Heater Assembly  
Figure 501

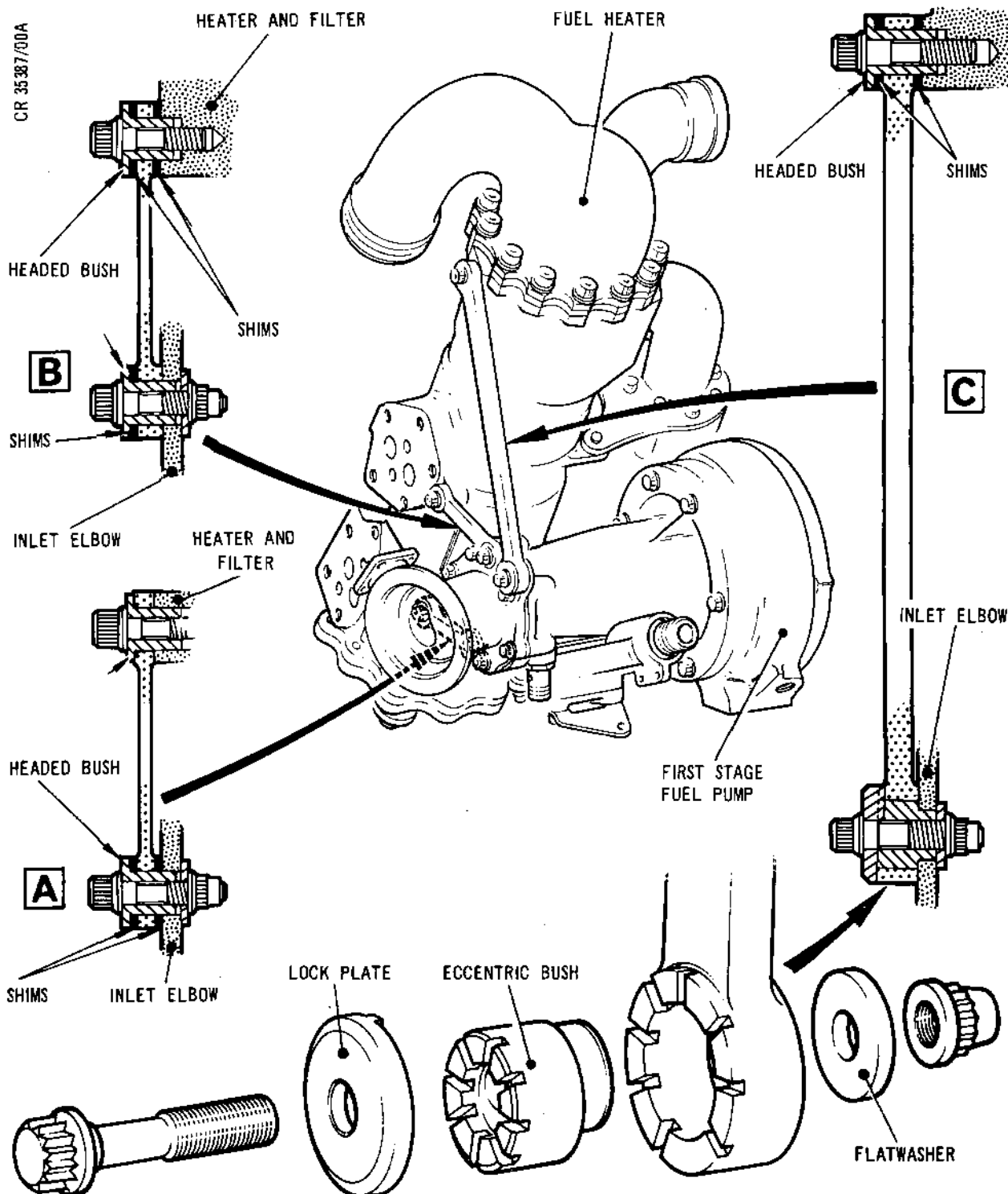
ASSEMBLY  
**73-10-00**  
Page 502  
Jan 2/80



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



TN5869

Install Pump to Heater Support Links  
Figure 502

ASSEMBLY  
**73-10-00**  
Page 503  
Jan 2/80



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (3) Verify that flange alignment is correct and screw in attachment bolts.

NOTE: Four bolts are entered downward through the heater flange and four upward through the pump outlet flange. The four bolts that are entered upward have flat washers (73-14-01/1-30) fitted.

- (4) Torque-tighten the bolts evenly, in diametrically opposed pairs, between 67 and 73 lbf in. (7,6 and 8,2 N.m).
- (5) On engines to pre SB.73-38 standard, use a 0.0015 in. (0,038 mm) feeler gauge and check for incorrect seating of boltheads.
- (6) Carry out the requirements of SB.73-38 at locations where the feeler gauge check has indicated incorrect seating.

C. Install pump to heater support links (Ref.Fig.502).

- (1) Install the upper short support link (Detail B).
  - (a) Assemble link outer end to inlet elbow.
    - (i) Assemble eight shims to headed bush.
    - (ii) Assemble headed bush to link.
    - (iii) Apply lubricant 'B' and insert attachment bolt through headed bush, link and inlet elbow then assemble flat washer and nut. Lightly tighten nut.
  - (b) Assemble link inner end to heater.
    - (i) Align attachment holes.
    - (ii) From set of eleven 0.010 in. shims removed with link, select the number required to fill gap between adjacent faces of link and heater.
    - (iii) Place remaining shims of set over headed bush and assemble bush to link with selected shims between link and heater.

TN5311



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (iv) Apply lubricant 'B' and secure the assembly with a bolt, torque-tighten between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (c) Torque-tighten nut on bolt securing link to inlet elbow between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (2) Install the lower short support link (Detail A).
- (a) Assemble link inner end to heater.
- (i) Apply lubricant 'B' to retaining bolt.
- (ii) Insert bolt through link to engage with heater and lightly tighten.
- (b) Assemble link outer end to inlet elbow.
- (i) Align attachment holes.
- (ii) From set of nine 0.010 in. shims removed with link, select the number required to fill the gap between adjacent faces of link and elbow.
- (iii) Place remaining shims of set over headed bush and assemble bush to link with selected shims between link and elbow faces.
- (iv) Insert bolt through bush from headed side, assemble washer and nut to bolt. Torque-tighten nut between 85 and 95 lbf in. (9,6 and 10,7 N.m) using lubricant 'B'.
- (c) Torque-tighten bolt securing link to heater between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (3) Install long support link (Detail C).
- (a) Determine number of shims required between link upper attachment and heater unit.
- (i) Assemble eccentric bush in link lower attachment hole, aligning one slot in bush and link face. Engage lockplate with aligned slots.



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (ii) Position link on elbow flange and secure with bolt washer and nut.
- (iii) From set of eleven 0.010 in. shims removed with link, select the number required to fill gap between adjacent faces of link and heater with attachment holes aligned as near as possible.
- (iv) Remove link for assembly of shims.
- (b) Position remaining shims of set not required to fill gap over top attachment headed bush. Insert bush through link top attachment hole with head on same side of link as slots at other end.
- (c) Place selected shims to fill gap over bush end. Apply lubricant 'B' to bolt, position link and secure with bolt lightly tightened.
- (d) Assemble link lower end to inlet elbow.
  - (i) Align holes in link and elbow.
  - (ii) Engage eccentric bush with link hole and rotate it until it freely engages with attachment hole.
  - (iii) If a slot in bush does not align with a slot in link face adjust bush to bring two nearest slots into alignment.
  - (iv) Assemble lockplate with its key engaging slot and insert bolt. Apply lubricant 'B' and assemble flat washer and nut.
- (e) Torque-tighten nut on lower attachment bolt between 85 and 95 lbf in. (9,6 and 10,7 N.m) ensuring that lockplate remains in position in slots.
- (f) Torque-tighten upper attachment bolt between 85 and 95 lbf in. (9,6 and 10,7 N.m).

IN18700

ASSEMBLY

73-10-00

Page 506  
Jan 2/80



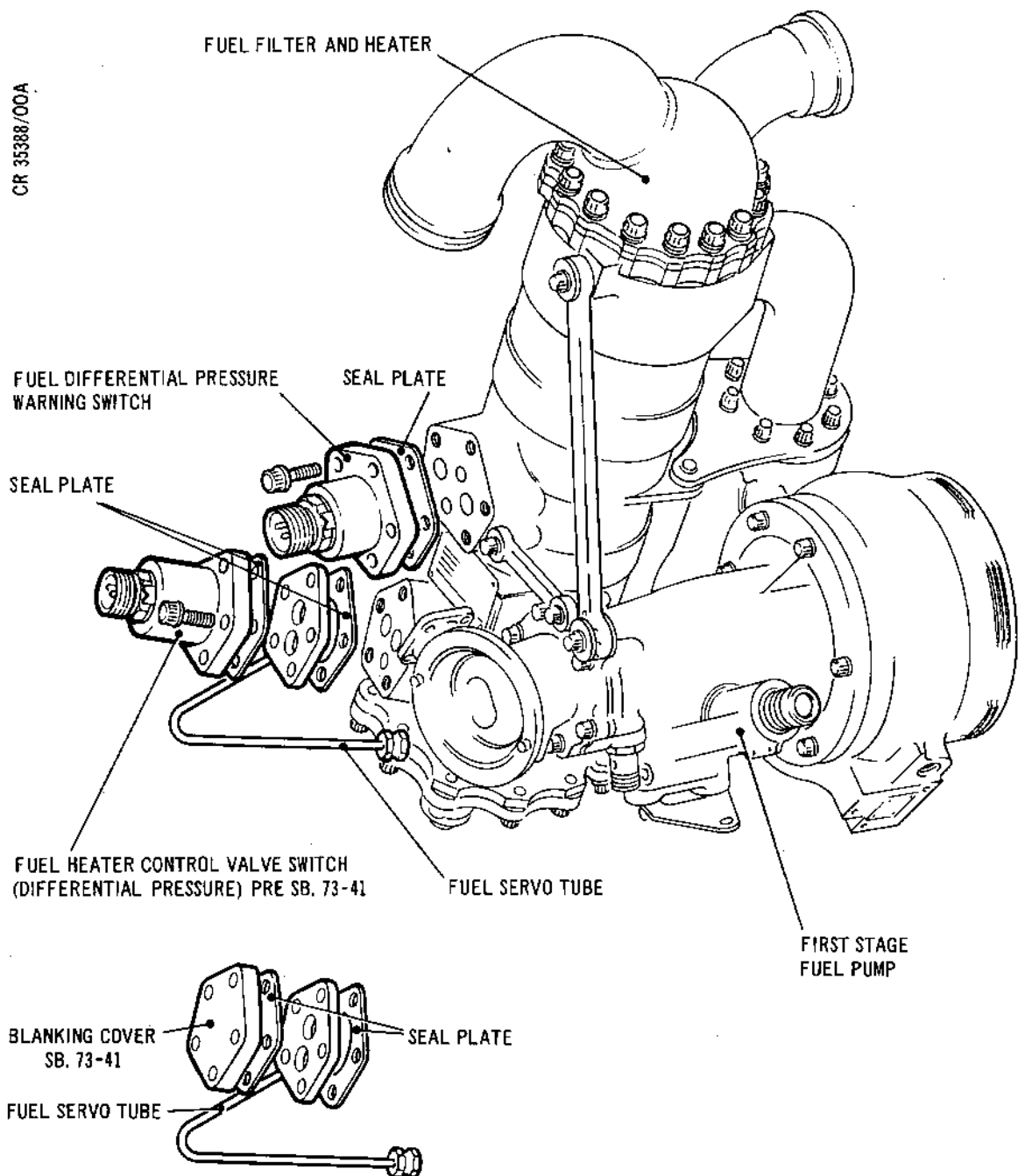


OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 35388/00A



TN10614

Fuel Differential Pressure Switches  
Figure 503



OLYMPUS 593

MK.610-14-28  
OVERHAUL



D. Install Fuel Differential Pressure Switches.

- (1) Install fuel differential pressure warning switch on heater and filter unit (Ref.Fig.503).

CAUTION: ENSURE ATTACHMENT BOLTS AND THEIR  
CORRESPONDING THREADED HOLES ARE TO THE  
SAME SERVICE BULLETIN STANDARD.

- (a) Apply lubricant 'B' to bolts (73-31-01/1-15).
  - (b) Assemble a serviceable seal plate (73-31-01/1-60) to pressure switch (73-31-01/1-10) with assembly pin engaged and attachment holes aligned.
  - (c) Locate switch and seal plate on upper location of fuel heater unit and retain in position with five bolts lightly tightened.
  - (d) Torque-tighten attachment bolts between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (2) On engines to pre SB.73-41 standard, install fuel heater control valve differential pressure switch/fuel servo tube front section on heater and filter unit (Ref.Fig.503).

CAUTION: ENSURE ATTACHMENT BOLTS AND THEIR  
CORRESPONDING THREADED HOLES ARE TO  
THE SAME SERVICE BULLETIN STANDARD.

- (a) Apply lubricant 'B' to bolts (73-14-04/1-15).
- (b) Ensure stepped pin (73-13-13/1-30) is secure in the fuel tube plate and protrudes from the face that mates with the heater.
- (c) Assemble the differential pressure switch, fuel tube and two serviceable seal plates in preparation for installation.
  - (i) Assemble the switch (73-14-04/1-10) to the fuel tube plate (73-13-13/1-10) with a seal plate (73-14-04/1-60) between the mating faces and hold with the switch assembly pin engaged and attachment holes of switch and seal and tube plates aligned.

TN5870

ASSEMBLY

73-10-00

Page 508  
Jan 2/80



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (ii) Assemble a seal plate (73-13-13/1-20) to the free face of the fuel tube plate with stepped pin engaged and attachment holes aligned.
- (iii) Insert two bolts to keep the assembled items together.
- (d) Position assembled items on heater location with fuel tube correctly orientated and stepped pin engaged. Retain items in position with two of the bolts hand tight.
- (e) Screw in the remaining bolts and secure the switch and plate with the five bolts, torque-tighten between 85 and 95 lbf in. (9,6 and 10,7 N.m).
- (3) On engines to SB.73-41 standard (Ref.Fig.503), install blanking cover/fuel servo tube front section on heater and filter unit.

**CAUTION:** ENSURE ATTACHMENT BOLTS AND THEIR CORRESPONDING THREADED HOLES ARE TO THE SAME SERVICE BULLETIN STANDARD.

- (a) Apply lubricant 'B' to bolts (73-14-04/1-55).
- (b) Ensure stepped pin (73-13-13/1-30) is secure in the fuel tube plate (73-13-13/1-10) and protrudes from the face that mates with the heater.
- (c) Assemble the blanking cover (73-14-04/1-53), fuel tube plate and two serviceable seal plates (73-14-04/1-60 and 73-13-13/1-20) in preparation for installation.
- (i) Assemble one seal plate to the fuel tube plate face with the protruding stepped pin and hold in position with pin engaged and attachment holes of both items aligned.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (ii) Locate and hold the second seal plate against the other fuel tube plate face in a position that corresponds with the first seal plate. Ensure that the two central sealed holes of the seal plates are coincident with the holes in the fuel tube plate and then position the blanking cover against the seal with the attachment holes aligned.
- (iii) Insert two bolts to keep the assembled items together in the required relative positions.
- (d) Position assembled items on heater location with fuel tube correctly orientated and stepped pin engaged. Retain items in position with the two bolts hand tight.
- (e) Screw in the remaining bolts and secure the cover and plate with the five bolts, torque-tighten between 85 and 95 lbf in. (9,6 and 10,7 N.m).

TN9831



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## FIRST STAGE FUEL PUMP - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

73-11-01

Page 201  
Jan 1/77



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except 10	Fuel pump, first stage	A or B  B	-  -	-  For cleaning details refer to vendors overhaul manual

Cleaning Processes  
Table 201

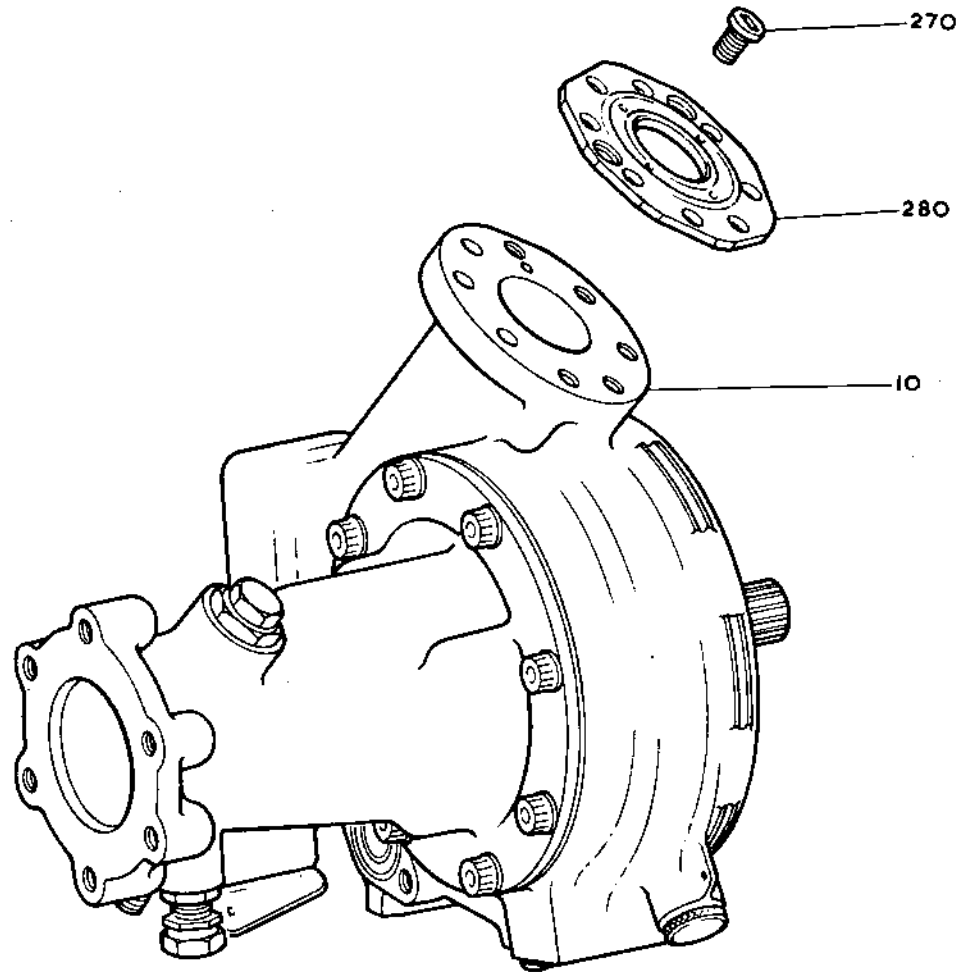
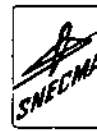
FN31814

CR 32512/00B



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Fuel Pump, First Stage  
Figure 201



OLYMPUS 593

MK.610-14-28

OVERHAUL



## SECOND STAGE FUEL PUMP - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

**73-11-02**

Page 201

Jan 1/77





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	10	Fuel pump, second stage	B	-	For cleaning details refer to vendors overhaul manual

Cleaning Processes  
Table 201

TN32382

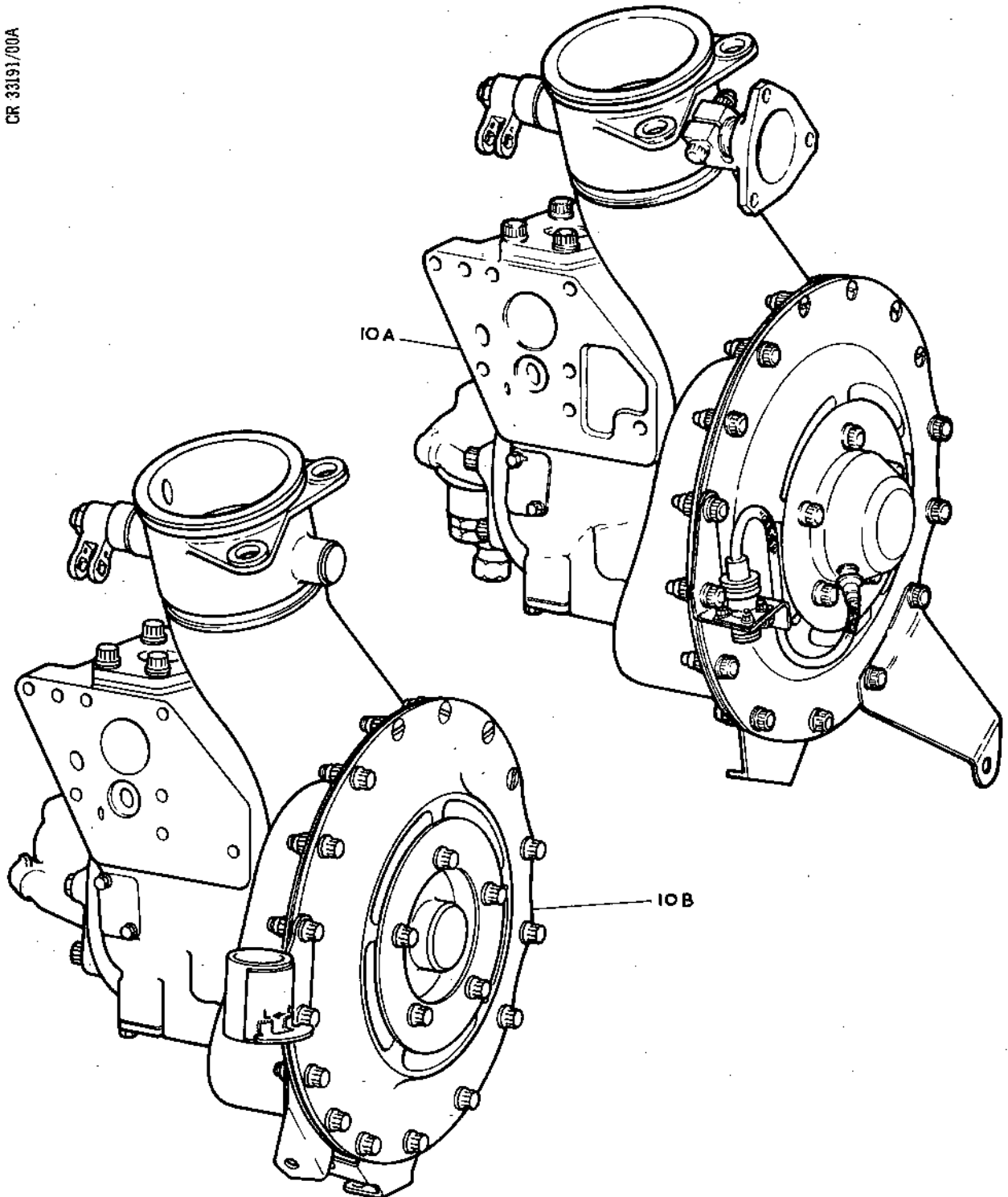


OLYMPUS 593



CR 33191/00A

PRINTED IN ENGLAND



TN32386

Pump, Fuel, Second Stage  
Figure 201

CLEANING  
**73-11-02**  
Page 203  
Jan 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except 10	Electric starter pump	A or B B	- -	- For cleaning details refer to vendors Overhaul manual

Cleaning Processes  
Table 201

TN8105



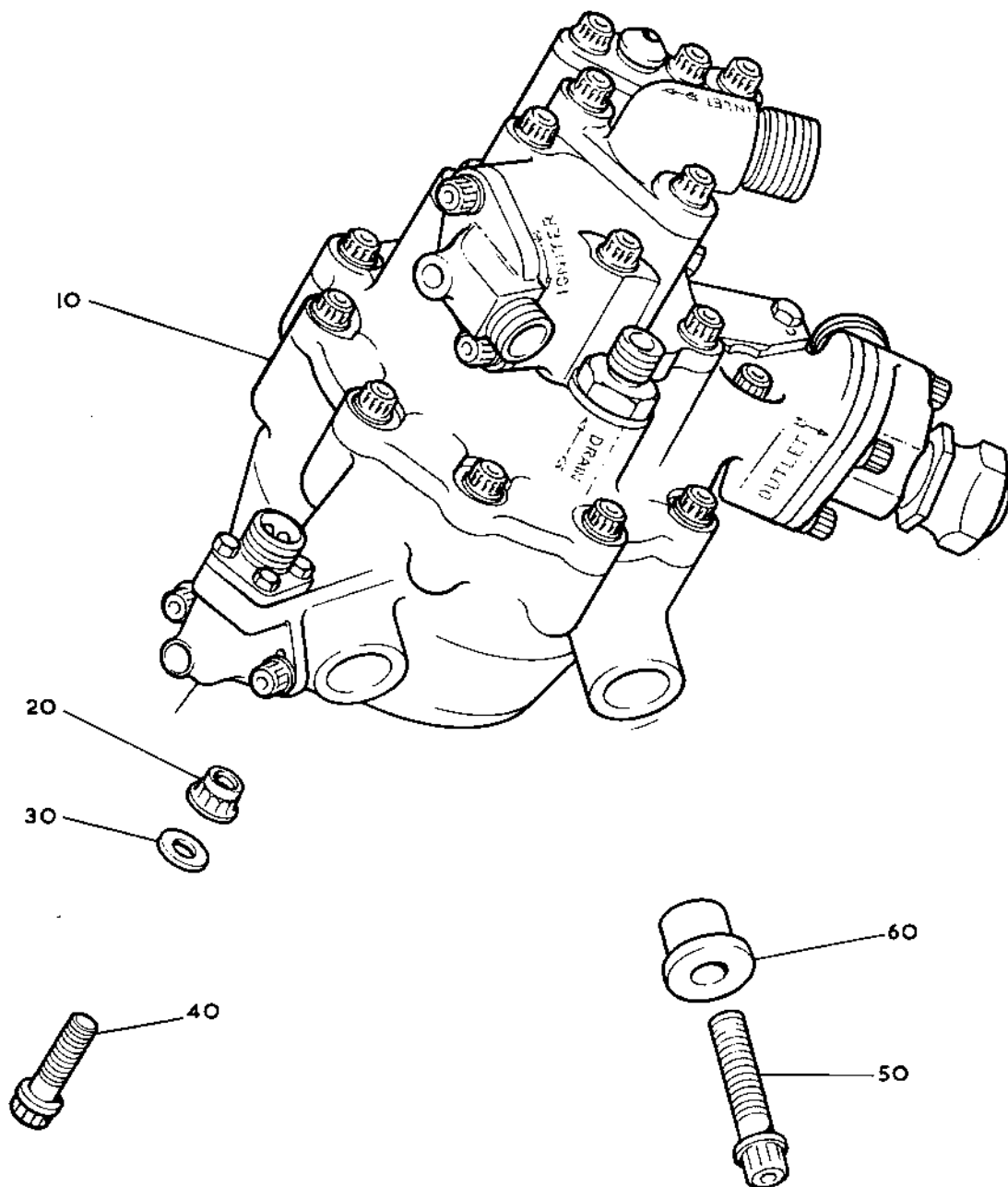
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32407/008



Starter Pump  
Figure 201

CLEANING  
**73-11-03**  
Page 203  
Aug 28/75

TN31635



OLYMPUS 593

MK.610-14-28

OVERHAUL



## FUEL RECIRCULATION VALVE - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

**73-12-01**

Page 201  
Jan 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except 30	Fuel recirculation valve	A or B B	- -	- For cleaning details refer to vendors overhaul manual (Ref.73-10-05)

Cleaning Processes  
Table 201

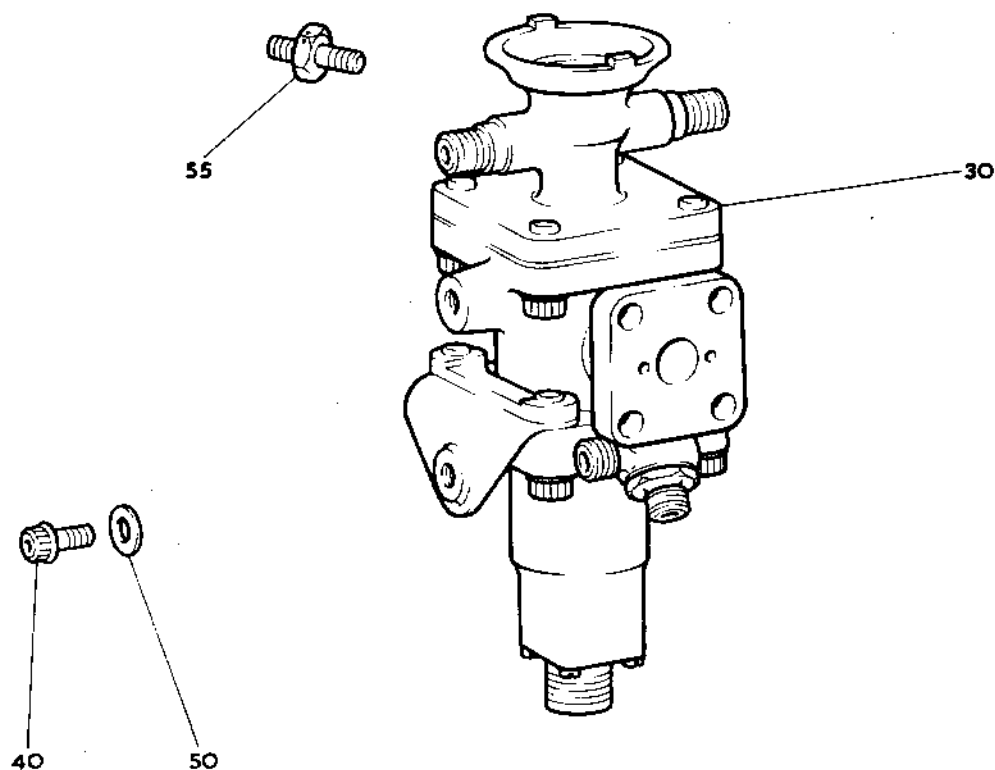
FN31818

CR 32434/00B



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TN31820

Fuel Recirculation Valve  
Figure 201



OLYMPUS 598

MK.610-14-28

OVERHAUL



## DISTRIBUTION AND DUMP VALVE - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

73-12-02

Page 201  
Jan 1/77





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except 10	Distribution block, emergency dump valve	A or B  B	-  -	-  For cleaning details refer to vendors overhaul manual.

Cleaning Processes  
Table 201

TN31637



OLYMPUS 593

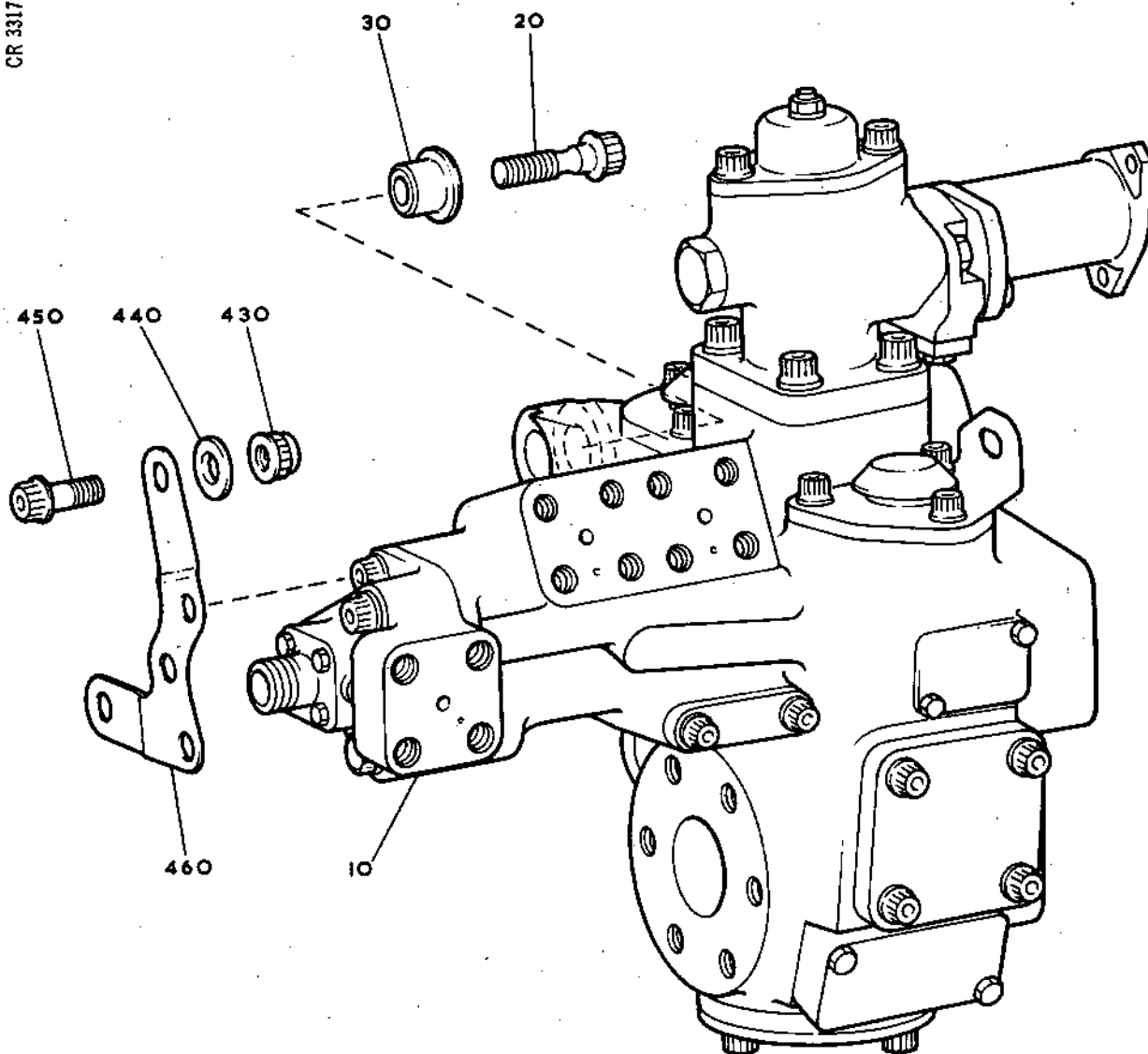
MK.610-14-28

OVERHAUL



CR 33175/00A

PRINTED IN ENGLAND



TN31639

Fuel Distribution and Dump Valve  
Figure 201

CLEANING

73-12-02

Page 203

Jan 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## FUEL INLET ELBOW AND DRAIN VALVE - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

73-12-03

Page 201  
Jan 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except		A or B	-	-
	10	Drain valve assembly	B	-	For cleaning details refer to vendors overhaul manual

Cleaning Processes  
Table 201

TN43601



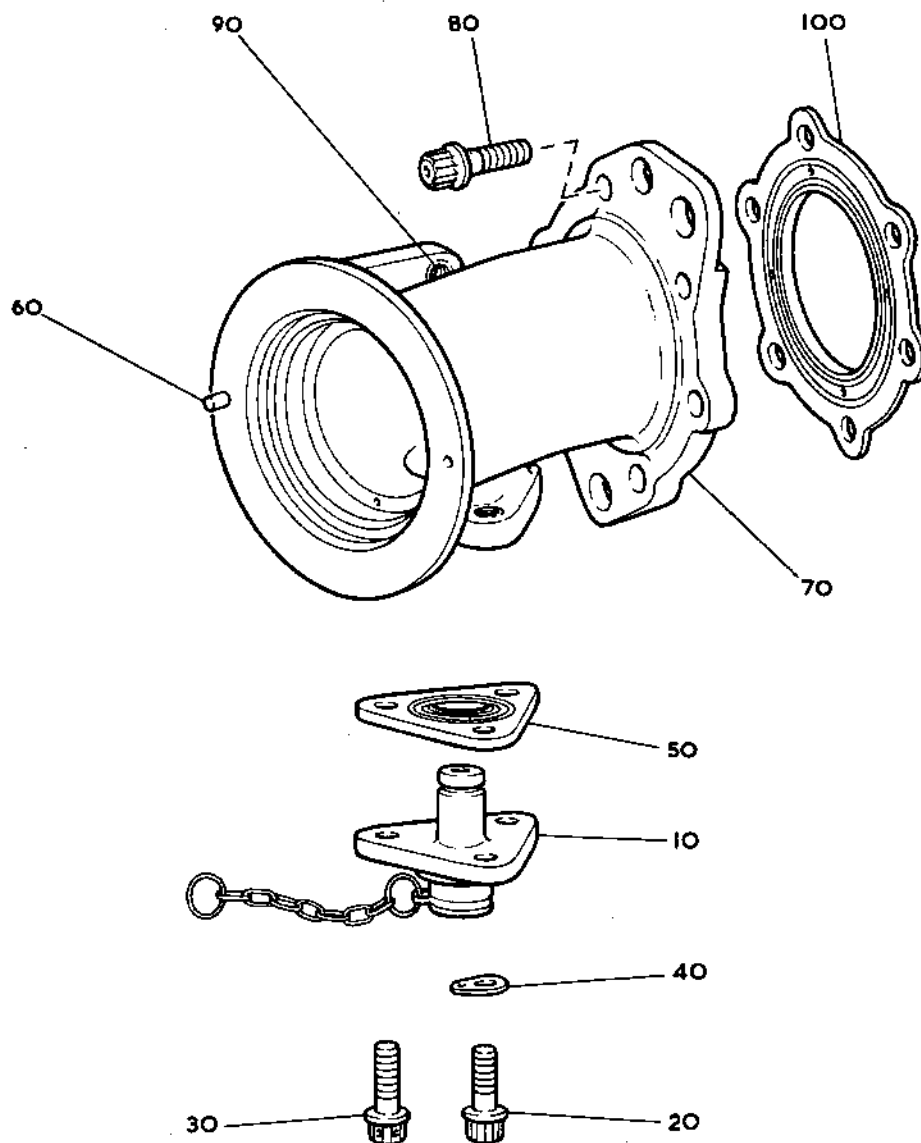
OLYMPUS 593

MK. 610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32404/00B



TN43602

Inlet Elbow and Drain Valve  
Figure 201



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



## FUEL MANIFOLD - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

73-12-04

Page 201  
Jan 1/77



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	-

Cleaning Processes  
Table 201

TN29661



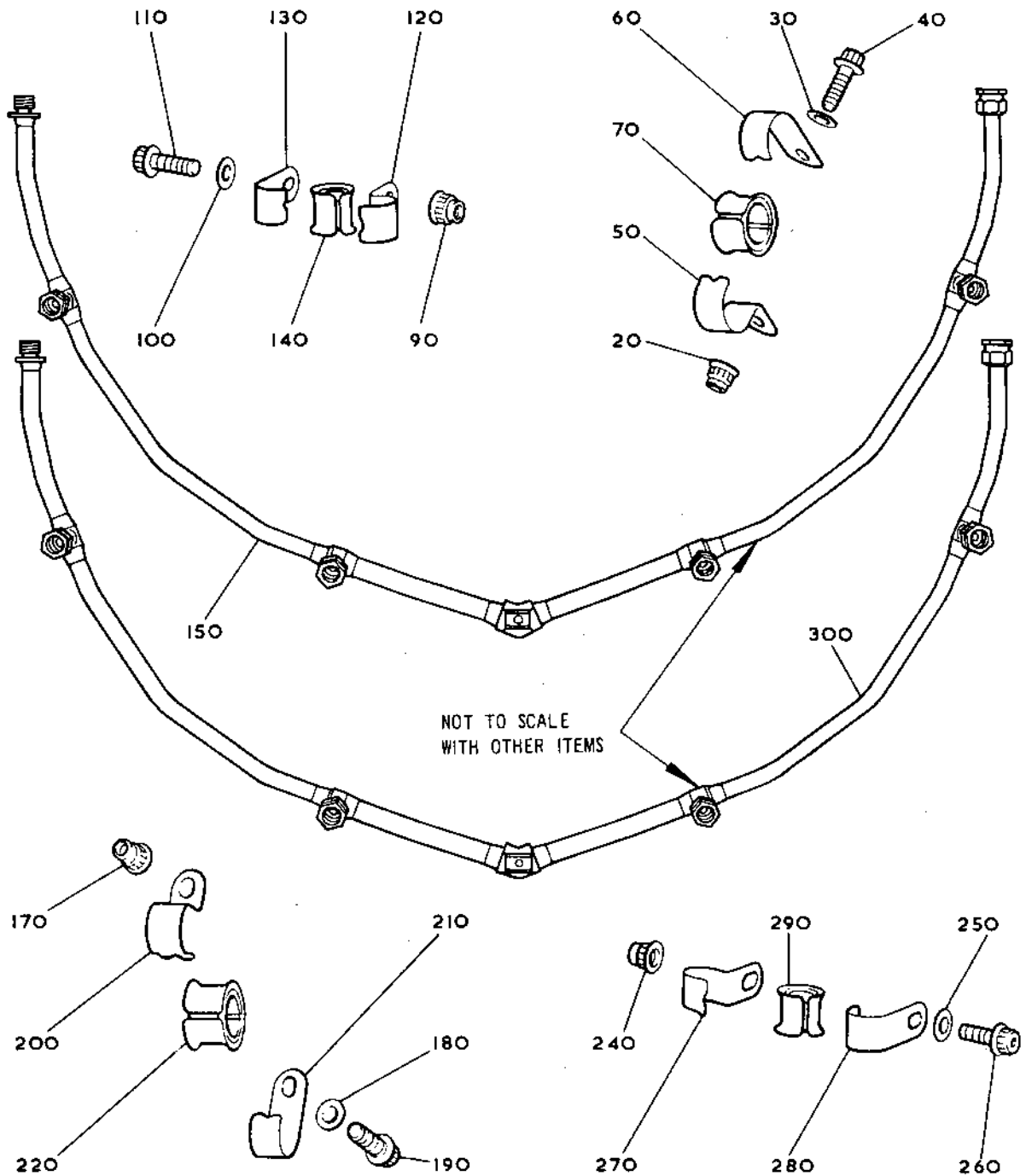
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32403/00B



TN29665

Fuel Manifold  
Figure 201

CLEANING  
**73-12-04**

Page 203  
Aug 28/75





OLYMPUS 593

MK.610-14-28  
OVERHAUL



## FUEL NOZZLES ASSEMBLY - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00  
Cleaning for details of the cleaning processes referred  
to in Table 201.
- B. To ensure that all items within this breakdown that  
require cleaning and subsequent Inspection/Check are  
recognized, and identified by their Part Number, figures  
are provided which equate with the Illustrated Parts  
Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with  
the relevant Figure and Item Number in the same breakdown  
in the I.P.C. Items illustrated in the I.P.C. which are  
not illustrated in this breakdown, are those items which  
are either discarded at overhaul, or are normally assembled  
to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the  
figures, Table 201 does not list all items, but deals  
collectively with the items requiring the same cleaning  
process.
- D. On receipt of the items from disassembly, all protective  
blanks, covers etc. deemed necessary for the protection  
of the items will have been assembled and, in addition,  
many of the items will arrive in containers. Any special  
containers, blanks, covers etc. are listed in Table 202  
by their Tool Ref. No. (Tool 123). For the manufacturer's  
Part No. refer to the appropriate Table in Special Tools,  
Fixtures and Equipment Section.

### 2. Cleaning Components

**CAUTION:** BEFORE USING HEAVY CLEANING PROCESSES J, L AND N,  
INVESTIGATE ALL REPAIRS CARRIED OUT ON EACH COM-  
PONENT TO IDENTIFY THOSE HAVING PLASMA SPRAY  
COATINGS. THE NITRIC ACID USED IN PROCESSES J, L  
AND N WILL ATTACK THE ALUMINIUM CONTENT OF SOME  
TYPES OF COATING, MAKING REPLACEMENT OF THE COATING  
NECESSARY.

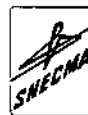
- A. All blanks, covers etc. must be removed from the items  
prior to cleaning and reassembled immediately afterwards.  
Items received in special cleaning containers should remain  
therein during the cleaning procedures unless otherwise  
stated.



OLYMPUS 593

MK.610-14-28

OVERHAUL



- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.
- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.
- D. Certain components are subject to Controlled Manufacturing Technique (CMT) procedures. The cleaning of these components is critical and variations from the specified cleaning procedures and solutions are prohibited without approval from the engine manufacturer. All components to which this applies are identified as such in the Remarks column of the Cleaning Processes Table.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	-
	except 10	Nozzle	A or B	H or J	CMT Component

Cleaning Processes  
Table 201



OLYMPUS 593

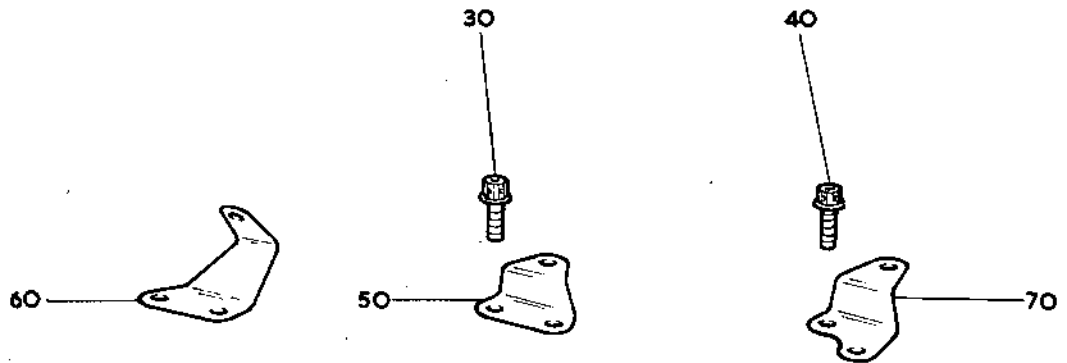
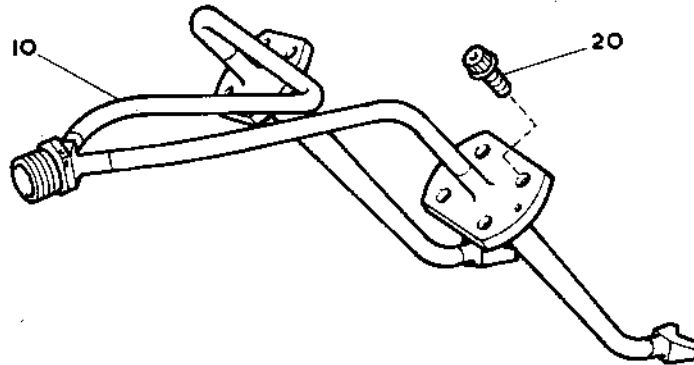
MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

CR 32513/00B



TN29546

Fuel Nozzles  
Figure 201



OLYMPUS 593

MK.610-14-28  
OVERHAUL

snecma

FUEL NOZZLES ASSEMBLY - INSPECTION/CHECK1. General

- A. Acceptance limits for inspection of fuel nozzle assemblies are given in TSD.594-409 Appendix 2.
- B. This chapter gives general X-ray examination procedure for fuel nozzle assemblies.
- C. Each item in this chapter is given a two-part identification; thus, 301-10 refers to Figure 301 and to Item 10 called out on that figure. Each item may be further identified by its Part Number by the use of Table 301, which cross-refers figures in this chapter to the equivalent chapter and figure in the Illustrated Parts Catalogue (I.P.C.); the called-out item number will be the same on both figures.

2. X-Ray Examination

- A. X-ray examination of nozzle assembly (301-10).

NOTE: The welds and wall thickness X-ray can be carried out at the same time if necessary.

- (1) X-ray data
  - Film - Ultra fine grain; to be used with lead screens
  - Shots per weld - Two at right angles to one another
  - Angle of beam - 90° to weld
  - Kilo voltage - 140-160
  - Milliamps per second - 600 approx.
  - Focal film distance - 36 in (914.4 mm)
  - Sensitivity - 2% or better
- (2) X-ray the four welds shown in Figure 1 in accordance with TSD 594-409 Appendix 2. Reject the nozzle assembly if any non-conformance with the acceptance standard of Appendix 2 is identified.

INSPECTION/CHECK

73-12-05

Page 301  
Dec 1/97



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

FIG.NO.

ILLUSTRATED PARTS CATALOGUE EQUIVALENT

301

73-12-05

Fig.1

Cross References to Illustrated Parts Catalogue  
Table 301

INSPECTION/CHECK

73-12-05

Page 302

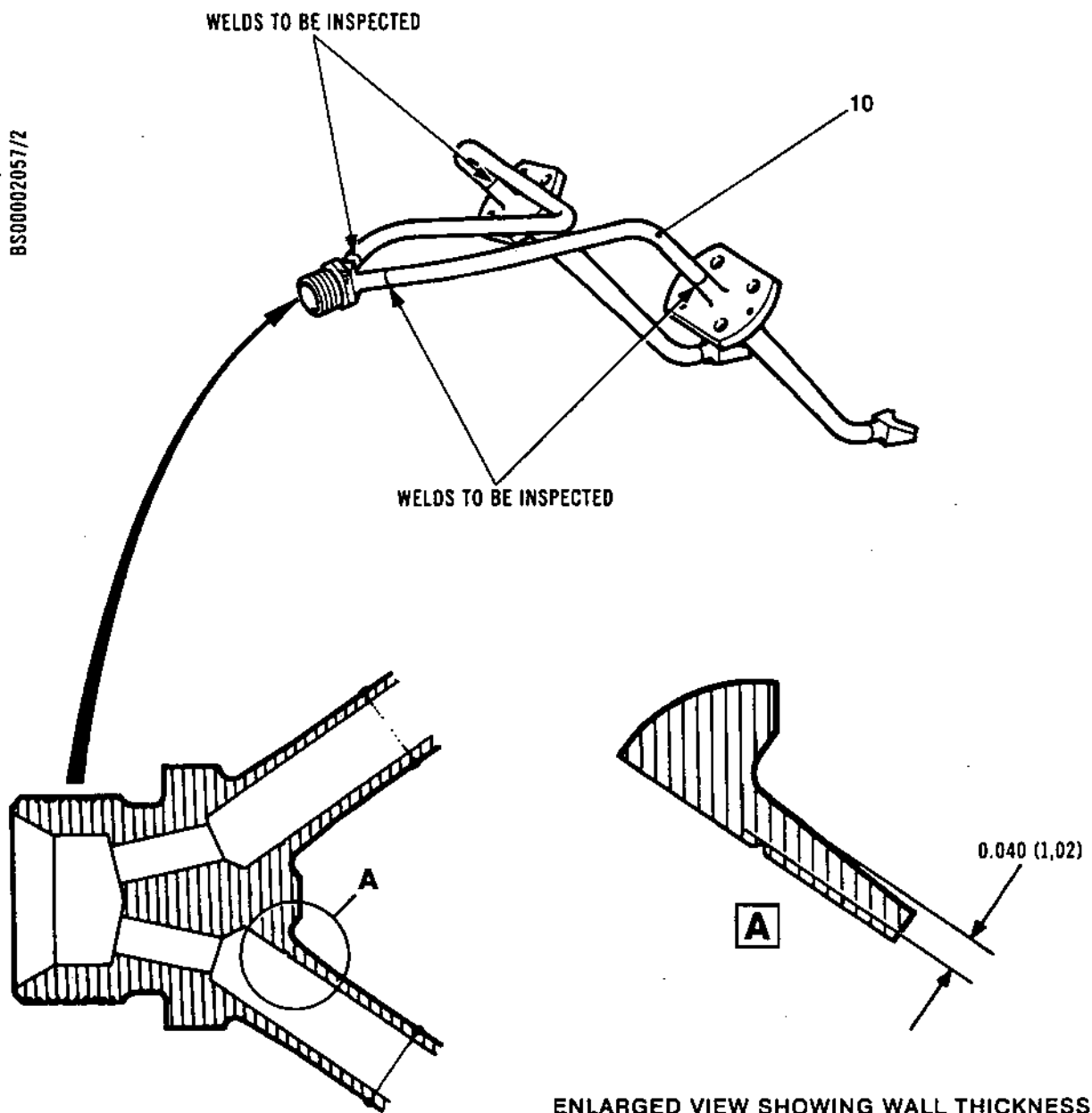
Dec 1/97

CR 35981/00A  
BS00002057/2



OLYMPUS 593

MK.610-14-28  
OVERHAUL



ENLARGED VIEW SHOWING WALL THICKNESS

DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)

Nozzle Assembly Inspection Details  
Figure 301

INSPECTION/CHECK

73-12-05

Page 303  
Dec 1/97



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

FUEL NOZZLE ASSEMBLY - REPAIR

TABLE OF CONTENTS

Repair No.

Title

Scheme No.

1 Fuel Nozzle Assembly - Repair  
of Defects in Fabrication Welds  
and Thin Wall Sections.

B512846

2 Fuel Sprayer Assembly - Repair  
of Light Impact Damage in the  
Outer Surface of Fuel Sprayers  
by Blending

B518171

Printed in England

REPAIR

73-12-05

Contents 1

Dec 31/01

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

FUEL SPRAYER ASSEMBLY -  
CRACKS AND THIN WALL SECTIONS REPAIRED BY REPLACEMENT  
OF SECTIONS  
B512846

1. EFFECTIVITY

<u>IPC</u>	<u>Fig./Item</u>	<u>Part No.</u>
73-12-05	1/10A	B481733

2. REPAIR LIMITATIONS

CAUTION: COMPLIANCE WITH ALL ASPECTS OF THIS REPAIR PROCESS SHOULD BE ACHIEVED WITHOUT DEVIATION. WHERE A NEED TO DEVIATE IS CONSIDERED NECESSARY, REFERENCE SHOULD BE MADE TO THE REPAIR AUTHORITY FOR AGREEMENT.

NOTE: Report on weld samples, for welds with and without Welding Rings, to be sent to Rolls Royce plc.

This Repair Scheme is issued to repair defects found within the fabrication welds and thin wall sections in Splitter Union after inspection to SB.0L.593-73-8827-92.

THE REPAIR PROCEDURE IS IN 4 PARTS.

PART 1: Repairs defects found within the Splitter Connector and attachment welds, (Joint A, see Fig.401), by replacing the Splitter Connector.

PART 2: Repairs defects found within the attachment weld between the convoluted tube and the sprayer attachment flange (Joint B see Fig.401) by replacing the convoluted tube, together with the Splitter Connector.

PART 3: Repairs defects found within the Disperser Head attachment weld (Joint C, see Fig.401), by replacing the Disperser Head.

PART 4: Replacement of defective sprayer(s) LH and/or RH.





# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

### 3. GENERAL

UNLESS OTHERWISE SPECIFIED

Drawing practice & tolerance interpretation to ISO1101 (JES160)

Dimensions in Inches (Millimeters)

Tolerances on machined dimensions plus/minus 0.010 (0,25)

Tolerance on angles plus/minus 2 degrees

Break sharp edges 0.004 to 0.020 (0,1 to 0,5)

Surface texture interpretation to ISO1302 (JES137)

Surface texture to be 63 (1,6) Microinches (Micrometers)

Welding symbols to ISO2553 (JES139)

3rd Angle Projection

All TASKS identified in this instruction are in the Engine Overhaul Processes Manual (TSD594-J).

To identify the consumable materials, refer to the Overhaul Materials Manual (OMat).

### 4. REPAIR PROCEDURE

### SUPPLEMENTARY INFORMATION

#### PART 1:

- |    |  |  |
|----|--|--|
| 1) | Solution heat treat at<br>980°C $\pm$ 10°C for 30 minutes<br>in a vacuum furnace. Rapid<br>cool in argon or nitrogen.  |  |
| 2) | Remove the Splitter Connector<br>and trim back convoluted tube<br>ends to centre of weld line<br>square to axis of tube centre<br>line.  | Use conventional hand tools.<br>Discard the Connector.   |
| 3) | Radiologically inspect the<br>remaining portion of weld<br>joint.  | Refer to Para.6. DATA.<br>Refer to TASK<br>70-00-00-300-409 SUBTASK<br>70-00-00-260-409-001.<br>Refer to APPENDIX B. |
| 4) | If defects are found in trimmed<br>ends during radiological<br>inspection, trim back square to<br>axis of tube centre line until<br>all defects found at OP 3) are<br>removed. | Use conventional hand tools.   |
| 5) | If required Repeat OP 3) to<br>ensure defects are removed.   | Consider reworking to Part<br>2 if defect cannot be<br>eliminated.   |

REPAIR

## 73-12-05

Repair No.1

Page 402

Dec 31/01



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

## REPAIR PROCEDURE

- 6) Fit new Splitter Connector.  
Loosely assemble to tube ends.  
Dimensionally inspect the  
assembly as shown.
- 7) Disassemble and prepare all  
items for welding.
- 8) Reassemble parts and using  
the appropriate fixtures  
orbital weld the joints.
- 9) Crack detect.
- 10) Radiologically inspect welds  
and residual wall thickness of  
the Splitter using a graticule  
scale. If thickness is less  
than 0.040 (1,02) reject assembly.
- 11) Heat treat at  $720^{\circ}\text{C} \pm 10^{\circ}\text{C}$   
for 16 hours in argon.  
Rapid cool in argon.
- 12) Polish the assembly to achieve  
a surface finish of 63 micro-  
inches (1,6 micrometres).
- 13) Calibrate the Fuel Sprayer.
- 14) Dimensionally inspect.

## SUPPLEMENTARY INFORMATION

Refer to Figs.401 to 404.  
Refer to Para.8B and 8C  
PARTS.  
If necessary remove integral  
lip on new item 3 Splitter  
Connector and fit Welding  
Ring item 8 to adjust pipe  
length. Ensure the ends  
remain square.

Refer to TASK  
70-00-00-300-409.

Refer to TASK  
70-00-00-300-409.  
Refer to Para.7. TOOLS.  
Refer to Para.6B(1).  
WELD DATA.

Refer to TASK  
70-00-00-200-213.

Refer Para.6A. DATA.  
Refer to Fig.405.  
Refer to TASK  
70-00-00-300-409 SUBTASK  
70-00-00-260-409-001.  
Refer to APPENDIX B.

Refer to APPENDIX A.

Refer to Figs.401 and 402.  
Refer to Para.7. TOOLS.

REPAIR

73-12-05

Repair No.1

Page 403

Dec 31/01



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

## REPAIR PROCEDURE

- 15) Hydraulic pressure check the Fuel Sprayer with fuel or water at a pressure of 13800 Kpa (2000 psi), for at least 1 minute. If any leaks are observed reject the assembly.
- 16) On completion of the pressure test inhibit the unit with inhibiting fluid.
- 17) Mark repair identity number B512846/1 or R1/1 adjacent the Assembly Part Number.

## SUPPLEMENTARY INFORMATION

Lubricate the threads of the Splitter with OMat 1003. Max tightening of Splitter 46.1 Nm (34 lbf/ft).

Use OMat 1003 or OMat 1003D.

Vibro Percussion engrave in accordance with chapter 72-09-00 (Repair).

## PART 2:

### REPAIR PROCEDURE

- 1) Solution heat treat at  $980^{\circ}\text{C} \pm 10^{\circ}\text{C}$  for 30 minutes in a vacuum furnace. Rapid cool in argon or nitrogen.
- 2) Remove the Splitter Connector and Convolute tube. Trim remaining parts of assy to centre of weld line square to axis of tube centre line.
- 3) Radiologically inspect the remaining portion of weld joint.
- 4) If defects are found in trimmed ends during radiological inspection, trim back square to axis of tube centre line until all defects found at OP 3) are removed.
- 5) If required Repeat OP 3) to ensure defects are removed.

### SUPPLEMENTARY INFORMATION

Use conventional hand tools. Discard the Connector/tube.

Refer to Para.6A. DATA.  
Refer to TASK  
70-00-00-300-409 SUBTASK  
70-00-00-260-409-001.  
Refer to APPENDIX B.

Use conventional hand tools.

REPAIR

# 73-12-05

Repair No.1

Page 404

Dec 31/01

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

Printed in England

REPAIR PROCEDURESUPPLEMENTARY INFORMATION

- |   |   |
|---|---|
| 6) Loosely assemble tubes to the 2 Sprayers using 2 off Welding Rings.<br>Ensure tube ends are square.<br>Disassemble components and prepare for welding.   | Refer to Para.8C. PARTS<br>Items 8 and 9.<br>Refer to TASK<br>70-00-00-300-409.                                       |
| 7) Reassemble parts and using the appropriate fixtures orbital weld the joints.   | Refer to TASK<br>70-00-00-300-409.<br>Refer to Para.7. TOOLS.<br>Refer to Para.6B(2).<br>WELD DATA.                   |
| 8) Crack detect.  | Refer to TASK<br>70-00-00-200-213.  |
| 9) Radiologically inspect the two welds.  | Refer to Para.6A. DATA.<br>Refer to TASK<br>70-00-00-300-409 SUBTASK<br>70-00-00-260-409-001.<br>Refer to APPENDIX B. |
| 10) Polish Tube/Sprayer sub-assemblies to achieve a surface finish of 63 microinches (1,6 micrometres).   |   |
| 11) Bend tubes to fixture and trim to length.   | Refer to Para.7. TOOLS.   |
| 12) Radiologically inspect Convolute tube weld joints.  | Refer to Para.6A. DATA.<br>Refer to TASK<br>70-00-00-300-409 SUBTASK<br>70-00-00-260-409-001.<br>Refer to APPENDIX B. |
| 13) Using appropriate fixture, trial assemble the Splitter and Tube/Sprayer sub-assemblies.<br>If necessary trim the tube ends to length.<br>Ensure the tube ends remain square.<br>Disassemble and clean all mating surfaces in preparation for welding. | Refer to Figs.401 and 402.<br>Refer to Para.6. TOOLS.<br>Refer to Para.8B. PARTS<br>Item 3.                           |

REPAIR

**73-12-05**

Repair No.1

Page 405

Dec 31/01



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

## REPAIR PROCEDURE

- 14) Reassemble parts and using the appropriate fixtures orbital weld the joints.
- 15) Crack detect.
- 16) Radiologically inspect.
- 17) Heat treat at  $720^{\circ}\text{C} \pm 10^{\circ}\text{C}$  for 16 hours in argon.  
Rapid cool in argon.
- 18) Polish Fuel Sprayer assembly to achieve a surface finish of 63 microinches (1,6 micrometres).
- 19) Calibrate the Fuel Sprayer.
- 20) Dimensionally inspect.
- 21) Hydraulic pressure check the Fuel Sprayer with fuel or water at a pressure of 13800 Kpa (2000 psi), for at least 1 minute. If any leaks are observed reject the assembly.
- 22) On completion of the pressure test inhibit the unit with inhibiting fluid.
- 23) Mark repair identity number B512846/2 or R1/2 adjacent the Assembly Part Number.

## SUPPLEMENTARY INFORMATION

- Refer to TASK  
70-00-00-300-409.  
Refer to Para.7. TOOLS.  
Refer to Para.6B(1).  
WELD DATA.
- Refer to TASK  
70-00-00-200-213.
- See 6A. DATA.  
Refer to TASK  
70-00-00-300-409 SUBTASK  
70-00-00-260-409-001.  
Refer to APPENDIX B.
- Refer to APPENDIX A.
- Refer to Figs.401 and 402.  
Refer to Para.7. TOOLS.
- Lubricate the threads of the Splitter with OMat 1003.  
Max tightening of Splitter 46.1 Nm (34 lbf/ft).
- Use OMat 1003 or OMat 1003D.
- Vibro Percussion engrave in accordance with chapter 72-09-00 (Repair).

REPAIR

# 73-12-05

Repair No.1

Page 406

Dec 31/01



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

PART 3:REPAIR PROCEDURESUPPLEMENTARY INFORMATION

- |  |  |
|--|--|
| 1) Solution heat treat at 980°C $\pm$ 10°C for 30 minutes in a vacuum furnace. Rapid cool in argon or nitrogen.  |  |
| 2) Remove the Spray Disperser from Sprayer assembly by cutting on the scrap side of the attachment weld and trim back to the centre of the weld line square to the axis of the tube centre line.   | Refer to Fig.401.<br>Use conventional hand tools.<br>Discard Spray Disperser.  |
| 3) Radiologically inspect the remaining portion of weld joint.   | Refer to Para.6A. DATA.<br>Refer to TASK<br>70-00-00-300-409 SUBTASK<br>70-00-00-260-409-001.<br>Refer to APPENDIX B.  |
| 4) If defects are found in trimmed ends during radiological inspection, trim back square to axis of tube centre line until all defects found at OP 3) are removed.   | Use conventional hand tools.   |
| 5) If required Repeat OP 3) to ensure defects are removed.   |  |
| 6) Loosely assemble Spray Disperser to the Sprayer assembly. Dimensionally inspect the assembly. Correct the position as necessary by trimming the ends of the tubes until the dimension has been achieved. Ensure the trimmed ends of the tubes are maintained square to the tube axis. | Refer to Figs.401 and 404.<br>Refer to Para.8B. PARTS<br>Item 1 or Item 2.<br>If necessary remove integral lip on new Spray Disperser and fit Welding Ring to adjust pipe length. Ensure the ends remain square.<br>Refer to Para.8C. PARTS<br>Item 8. |
| 7) Disassemble the parts and prepare the mating surfaces for welding.  | Refer to TASK<br>70-00-00-300-409.   |

REPAIR

73-12-05

Repair No.1

Page 407

Dec 31/01



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

## REPAIR PROCEDURE

## SUPPLEMENTARY INFORMATION

- |   |  |
|---|--|
| 8) Reassemble parts and using the appropriate fixtures orbital weld the joints.   | Refer to TASK<br>70-00-00-300-409.<br>Refer to Para.7. TOOLS.<br>Refer to Para.6B(3).<br>WELD DATA.                |
| 9) Crack detect.  | Refer to TASK<br>70-00-00-200-213.   |
| 10) Radiologically inspect.   | Refer Para.6A. DATA.<br>Refer to TASK<br>70-00-00-300-409 SUBTASK<br>70-00-00-260-409-001.<br>Refer to APPENDIX B. |
| 11) Heat treat at $7200^{\circ}\text{C} \pm 100^{\circ}\text{C}$ for 16 hours in argon.<br>Rapid cool in argon.   |  |
| 12) Polish Fuel Sprayer assembly to achieve a surface finish of 63 microinches (1,6 micrometres).   |  |
| 13) Calibrate the Fuel Sprayer.   | Refer to APPENDIX A.   |
| 14) Dimensionally inspect.  | Refer to Figs.401 and 402.   |
| 15) Hydraulic pressure check the Fuel Sprayer with fuel or water at a pressure of 13800 Kpa (2000 psi), for at least 1 minute. If any leaks are observed reject the assembly. | Lubricate the threads of the Splitter with OMat 1003.<br>Max tightening of Splitter 46.1 Nm (34 lbf/ft).           |
| 16) On completion of the pressure test inhibit the unit with inhibiting fluid.  | Use OMat 1003 or OMat 1003D.   |
| 17) Mark repair identity number B512846/3 or R1/3 adjacent the Assembly Part Number.  | Vibro Percussion engrave in accordance with chapter 72-09-00 (Repair).   |

REPAIR

## 73-12-05

Repair No.1

Page 408

Dec 31/01



OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

PART 4:

REPAIR PROCEDURE

SUPPLEMENTARY INFORMATION

- 1) Solution heat treat at 980°C  $\pm$  10°C for 30 minutes in a vacuum furnace. Rapid cool in argon or nitrogen.
- 2) Remove the Sprayer(s) from the Sprayer assembly by cutting through on the scrap side near the attachment welds. Trim back to the centre of the existing weld line(s) square to axis of tube centre line.

Refer to Fig.401.  
Use conventional hand tools.  
Discard the Sprayer tube(s).

NOTE: If existing Spray Disperser(s) are in good condition, trim the end(s) back to the centre of the existing weld line(s) square to axis of Disperser centre line(s). Retain for re-assembly. Discard if not in good condition.

- 3) Radiologically inspect the trimmed ends on both the Convolute tube(s) and Spray Disperser(s) (if required).
- 4) If defects are found in trimmed ends during radiological inspection, trim back square to axis of tube centre line until all defects found at OP 3) are removed.

Refer to Para.6A. DATA.  
Refer to TASK  
70-00-00-300-409 SUBTASK  
70-00-00-260-409-001.  
Refer to APPENDIX B.

Use conventional hand tools.

NOTE: If defects cannot be removed - replace the part(s).

- 5) If required Repeat OP 3) to ensure defects are removed.





# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

## REPAIR PROCEDURE

## SUPPLEMENTARY INFORMATION

- |   |  |
|---|--|
| 6) Using appropriate fixture trial assemble new Sprayer(s) to existing Spray Dispersers and check the Fuel Sprayer assembly dimensions. | Refer to Figs.401 and 404.<br>Refer to Para.8B. PARTS<br>Items 4, 5, 6 or 7 and 8C.<br>PARTS Item 8.<br>Refer to Para.7. TOOLS.                |
| 7) Trim the Sprayer tube ends to adjust the length if required. Ensure the trimmed ends remain square to tube axis.                     | If necessary remove the integral lip on new Spray Dispersers and assemble a Welding Ring to adjust pipe length. Ensure the ends remain square. |
| 8) Using appropriate fixture trial assemble the Splitter and Convolute tube sub-assembly(s) and check dimensions.                       | If necessary trim the tube ends to length. Ensure the ends remain square.  |
| 9) Disassemble the parts and prepare the mating surfaces for welding.   | Refer to TASK<br>70-00-00-300-409.   |
| 10) Reassemble parts and using the appropriate fixtures orbital weld the joints.  | Refer to TASK<br>70-00-00-300-409.<br>Refer to Para.7. TOOLS.<br>Refer to Para.6B.<br>WELD DATA.   |
| 11) Crack detect.   | Refer to TASK<br>70-00-00-200-213.   |
| 12) Radiologically inspect.   | Refer to Para.6A. DATA.<br>Refer to TASK<br>70-00-00-300-409 SUBTASK<br>70-00-00-260-409-001.<br>Refer to APPENDIX B.                          |
| 13) Heat treat at $720^{\circ}\text{C} \pm 10^{\circ}\text{C}$ for 16 hours in argon. Rapid cool in argon.                              |  |
| 14) Polish Fuel Sprayer assembly to achieve a surface finish of 63 microinches (1,6 micrometres).                                       |  |

REPAIR

# 73-12-05

Repair No.1

Page 410

Dec 31/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

REPAIR PROCEDURE

- 15) Calibrate the Fuel Sprayer.
- 16) Dimensionally inspect.
- 17) Hydraulic pressure check the Fuel Sprayer with fuel or water at a pressure of 13800 Kpa (2000 psi), for at least 1 minute. If any leaks are observed reject the assembly.
- 18) On completion of the pressure test inhibit the unit with inhibiting fluid.
- 19) Dimensionally inspect.
- 20) Mark repair identity number B512846/4 or R1/4 adjacent the Assembly Part Number.

SUPPLEMENTARY INFORMATION

- Refer to APPENDIX A.
- Refer to Figs.401 and 402.
- Lubricate the threads of the Splitter with OMat 1003. Max tightening of Splitter 46.1 Nm (34 lbf/ft).
- Use OMat 1003 or OMat 1003D.
- Refer to Figs.401 and 402.
- Vibro Percussion engrave in accordance with chapter 72-09-00 (Repair).

5. MATERIAL

<u>COMPONENT</u>	<u>MATERIAL</u>	<u>RR CODE</u>
Tube (2 off)	MSRR 6524	EBS
Sprayer LH and RH	MSRR 6532	ECX
Dispenser	MSRR 6532	ECX
Splitter	MSRR 6532	ECX

6. DATA

## A. RADIOLOGICAL INSPECTION.

Film - Ultra fine grain; to be used with Lead screens.  
 Shots per weld - Two at right angles to one another.  
 Angle of beam - 90° to weld.  
 Kilo voltage - 140-160.  
 Milliamps per second - 600 approx.  
 Focal film distance - 36 in (914.4 mm)  
 Sensitivity - 2% or better.

REPAIR

73-12-05

Repair No.1

Page 411

Dec 31/01

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

**B. WELD DATA****(1) Joint A (Ref Fig.401).**

Material	Splitter MSRR 6532
	Tube MSRR 6524/DTD 5016
Weld process	Argon Arc Orbital TIG Weld
Electrode Type	Thoriated Tungsten 0.062 (1,57) dia
Weld Speed	7 sec/rev
Weld Current	18 amps
Arc Gap	0.040 (1,0)
Argon Flow (Torch)	42.38 cu ft/hr (20 l/min)
Argon Flow (Backing)	16.95 cu ft/hr (8 l/min)
Pre-flow	60 sec.
Post flow	60 sec.
Downslope time	8 sec.
Tackweld	No
Fixtures	WT65008, WT59787 (Lucas)

**(2) Joint B (Ref Fig.401).**

Material	Sprayer MSRR 6532
	Tube MSRR 6524/DTD 5016
Weld process	Argon Arc Orbital TIG Weld
Electrode Type	Thoriated Tungsten 0.062 (1,57) dia
Weld Speed	7 sec/rev
Weld Current	20 amps
Arc Gap	0.040 (1,0)
Argon Flow (Torch)	23 cu ft/hr (11 l/min)
Argon Flow (Backing)	12 cu ft/hr (6 l/min)
Argon Flow (Shield Trailing)	47 cu ft/hr (22 l/min)
Pre-flow	60 sec.
Post flow	60 sec.
Downslope time	6 sec.
Tackweld	Yes
Fixtures	SP25417A (Lucas)

REPAIR

**73-12-05**

Repair No.1

Page 412

Dec 31/01

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

## (3) Joint C (Ref Fig.401).

Material	Sprayer MSRR 6532
Weld process	Spray Disperser MSRR 6532
Electrode Type	Argon Arc Orbital TIG Weld
	Thoriated Tungsten 0.062
	(1,57) dia
Weld Speed	7 sec/rev
Weld Current	25 amps
Arc Gap	0.040 (1,0)
Argon Flow (Torch)	42.38 cu ft/hr (20 l/min)
Argon Flow (Backing)	16.95 cu ft/hr (8 l/min)
Pre-flow	60 sec.
Post flow	60 sec.
Downslope time	9 sec.
Tackweld	Yes
Fixtures	DC4832 (Lucas)

7. TOOLS

<u>TOOL NUMBER</u>	<u>DESCRIPTION</u>	<u>ITEM</u>
WT65008 (Lucas)	Welding Fixture	1
WT59787 (Lucas)	Orbital Welder Base	2
DC4832 (Lucas)	Welding Fixture	3
SP25417A (Lucas)	Welding Fixture	4
WT76782	Welding Fixture	5
WT65010	Bending Fixture	6
WT64942	Inspection Fixture	7

8. PARTS

## A. STANDARD PART AFFECTED

B481733 Sprayer, Assy of.

## B. STANDARD PARTS REPLACED

		ITEM
B470692	Disperser Spray ) alternative	1
B472493	Disperser Spray ) alternative	2
B458271	Splitter	3
B481812	Sprayer LH ) alternative	4
B481734	Sprayer LH ) alternative	5
B481813	Sprayer RH ) alternative	6
B481735	Sprayer RH ) alternative	7

## C. REPAIR PARTS REQUIRED

AS52823	Welding ring	8
B518170	Tube	9

REPAIR

**73-12-05**

Repair No.1

Page 413

Dec 31/01



# OLYMPUS 593



MK.610-14-28

OVERHAUL

sneema

## APPENDIX A

### 1. Calibrate the Fuel Sprayer as follows:

- A. With a fuel feed of 100 psi, measure and record the quantity of fuel sprayed from each Disperser end hole of each injector simultaneously for a duration of 60 seconds.
- B. Taking the largest quantity of fuel sprayed from one of the four Disperser holes as (A) cc. and the lowest quantity as (B) cc then  $\frac{A - B}{A + B}$  must be less than 0.025 (0,064).  
If  $\frac{A - B}{A + B}$  is greater than 0.025 (0,064), ream hole B to achieve requirement. Record final quantities.
- C. With a fuel feed of 100 psi, measure and record the overall flow. The flow limits for each bifurcated fuel injector are between 380 and 390 gph. If the measured flow is not within this range, ream out the metering holes in the splitter block until it does. Record the final flow.

NOTE: If after this operation the fuel flow is in excess of the required figures, remove and replace the Disperser Heads in accordance with Part 3 of this Repair Scheme.

- D. Recheck paras B. and C. at 25 psi. Record the result only - do not ream any holes.
- E. Radiologically inspect residual wall thickness of the bifurcated union body, from the top as shown at Fig. 405. Using a graticule scale, measure the wall thickness. Reject the Fuel Sprayer assembly if less than 0.040 (1,02) thick. Refer to Para.6.A. DATA.

REPAIR

## 73-12-05

Repair No.1

Page 414

Dec 31/01

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

APPENDIX B

## 1. ACCEPTANCE STANDARD - RADIOGRAPHIC INSPECTION REQUIREMENT

<u>FEATURE</u>	<u>ACCEPTANCE STANDARD</u>
A. Undercutting and Shrinkage.	Up to 0.1 't' providing no sudden change of section or sharp edges are evident.
B. Stop Crater.	Up to 1 't' dia and 0.25 't' deep.
C. Malalignment.	Up to 0.15 't' or 0.005 (0,13) whichever is the greater.
D. Tungsten Inclusions.	A maximum of 2 inclusions up to 0.75 't' dia providing they are fully entrapped within the weld bead and have a minimum separation of 0.197 (5,00).
E. Pores.	Up to 0.5 't' dia in the weld bead but restricted to 0.25 't' dia in the blend of the bead to the parent material. Minimum separation 2 't' maximum number 5. Pores are not acceptable in the HAZ.
F. Weld Bead.	Up to 1 't' max height of crown or under bead providing the overall weld section does not exceed 2.25 't'. Width may vary between 2.5 't' and 5 't'. Sudden variations are not acceptable.

NOTE: Flow considerations may impose an overriding restriction relative to height of under bead.

REPAIR

**73-12-05**

Repair No.1

Page 415

Dec 31/01



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

G. Flairing.	Up to 0.15 't' radially providing no loss of wall section with a smooth blend.
H. Cracks.	None.
J. Lack of Side Fusion.	None.
K. Lack of Penetration.	None.
L. Unfused Tacks.	None.
M. Oxidation (Cokey Weld)	None.
N. Ballooning	None.

REPAIR

73-12-05

Repair No.1

Page 416

Dec 31/01



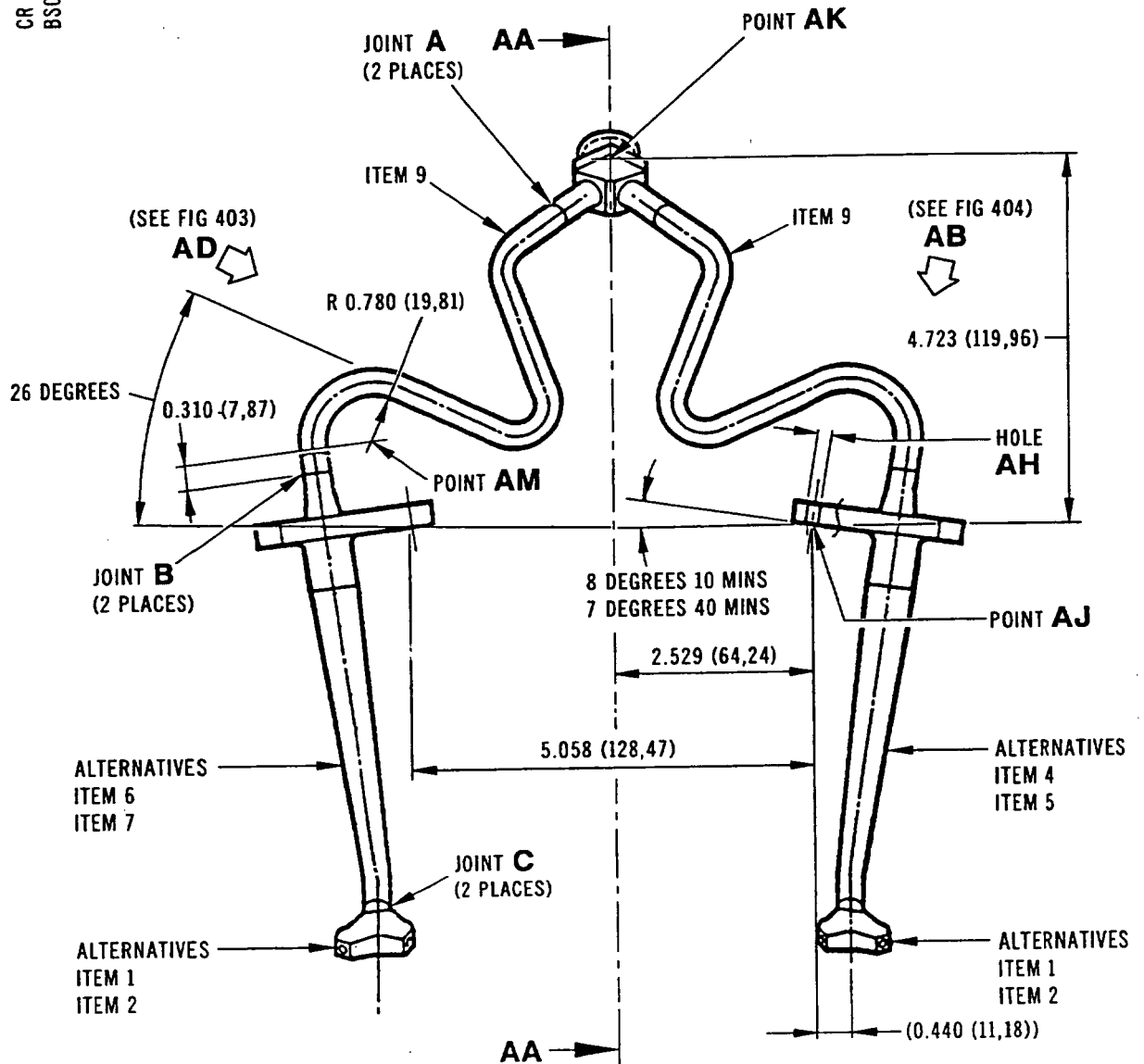
OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

CR 36295  
BS00002362/2



Nozzle Assembly Details  
Figure 401





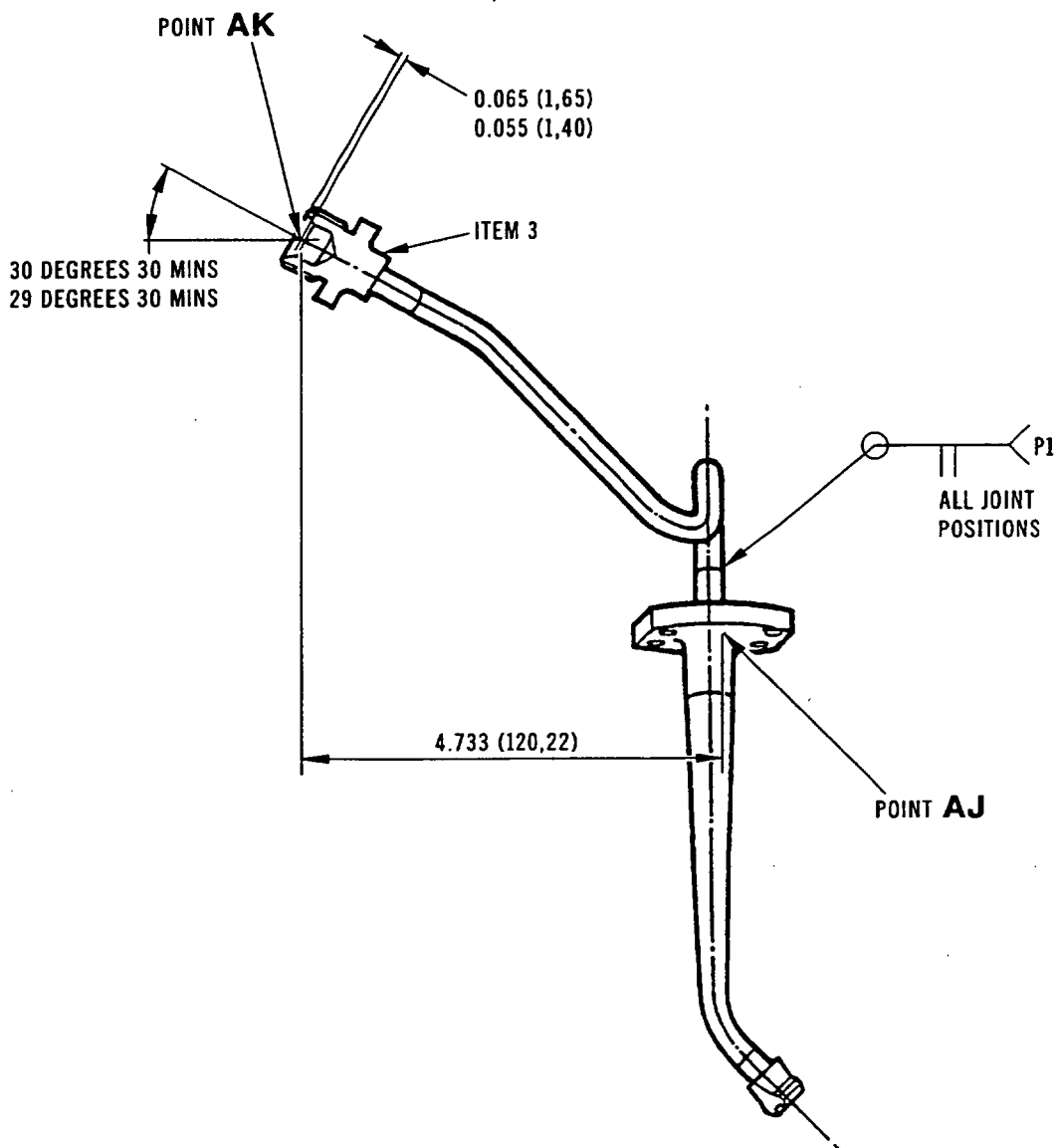
OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

CR 36296  
BS00002363/2



SECTION **AA**  
(SEE FIG 401)

Nozzle Welding Details  
Figure 402

REPAIR  
**73-12-05**  
Repair No.1  
Page 418  
Dec 31/01

CR 36297  
BS00002364/2

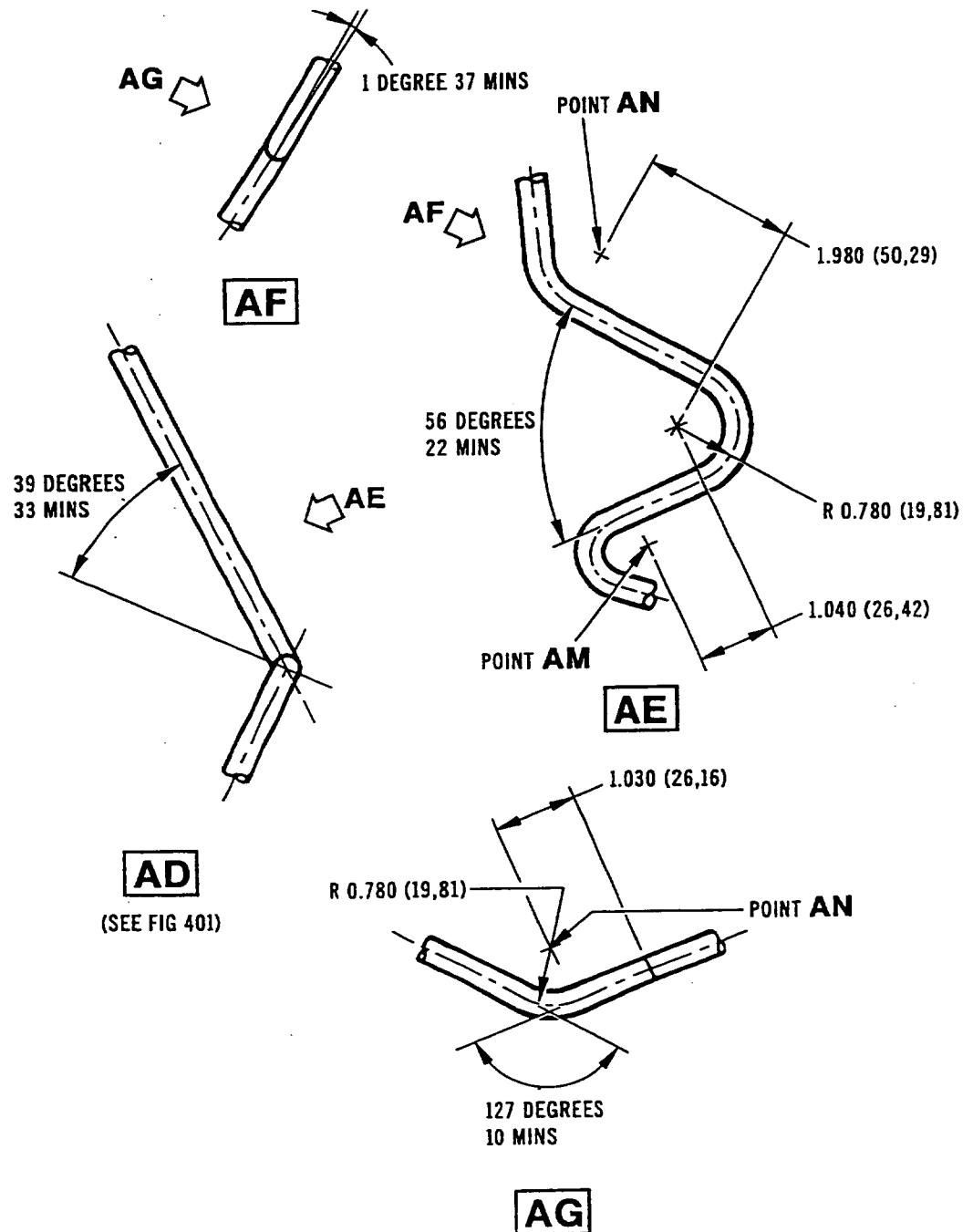


OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema



Convoluted Tubes  
Figure 403



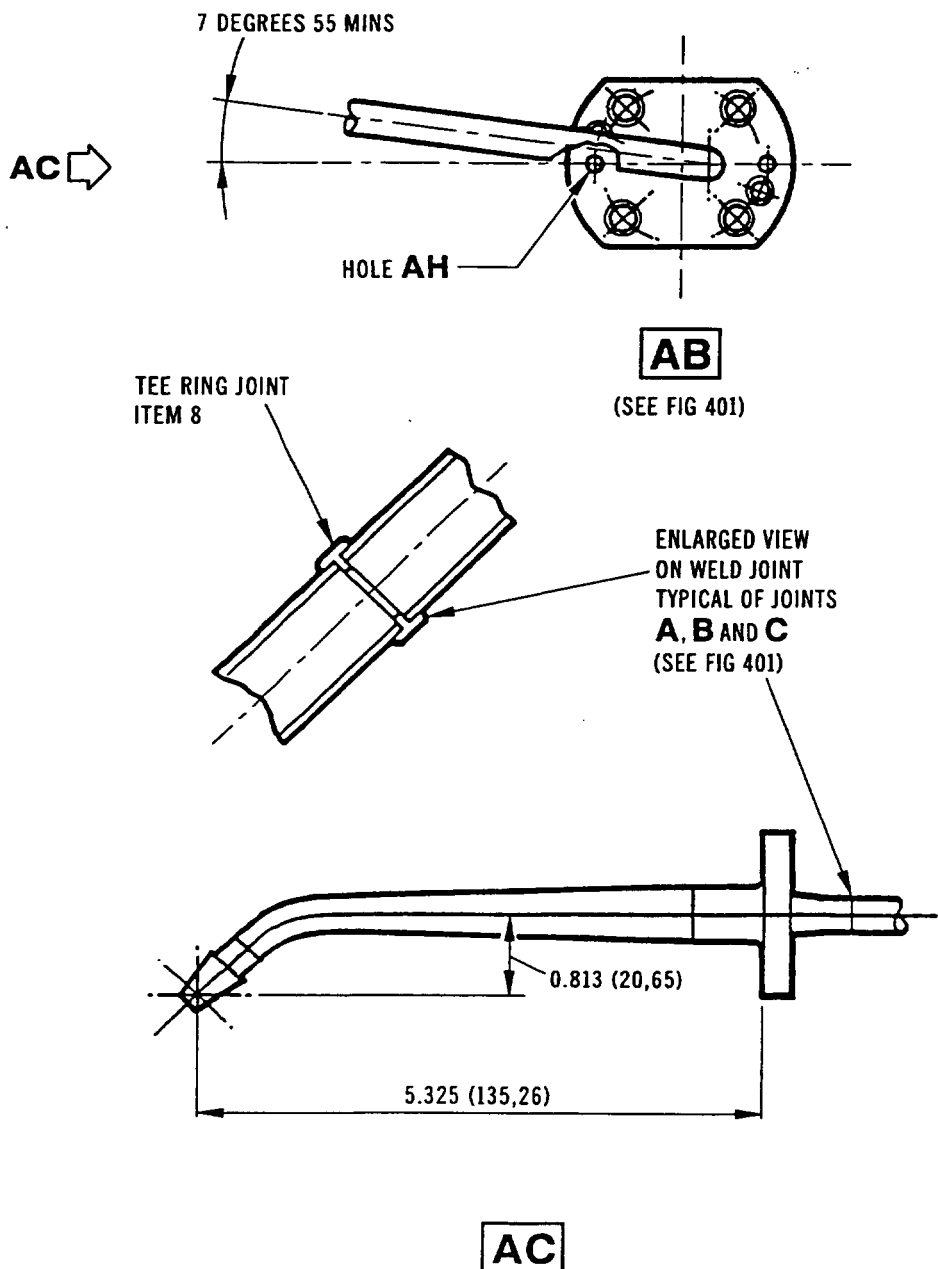
OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

CR 36298  
BS00002365/2



Disperser Welding Details  
Figure 404

REPAIR

73-12-05

Repair No.1

Page 420

Dec 31/01

CR 35981/00A  
BS00002057/1

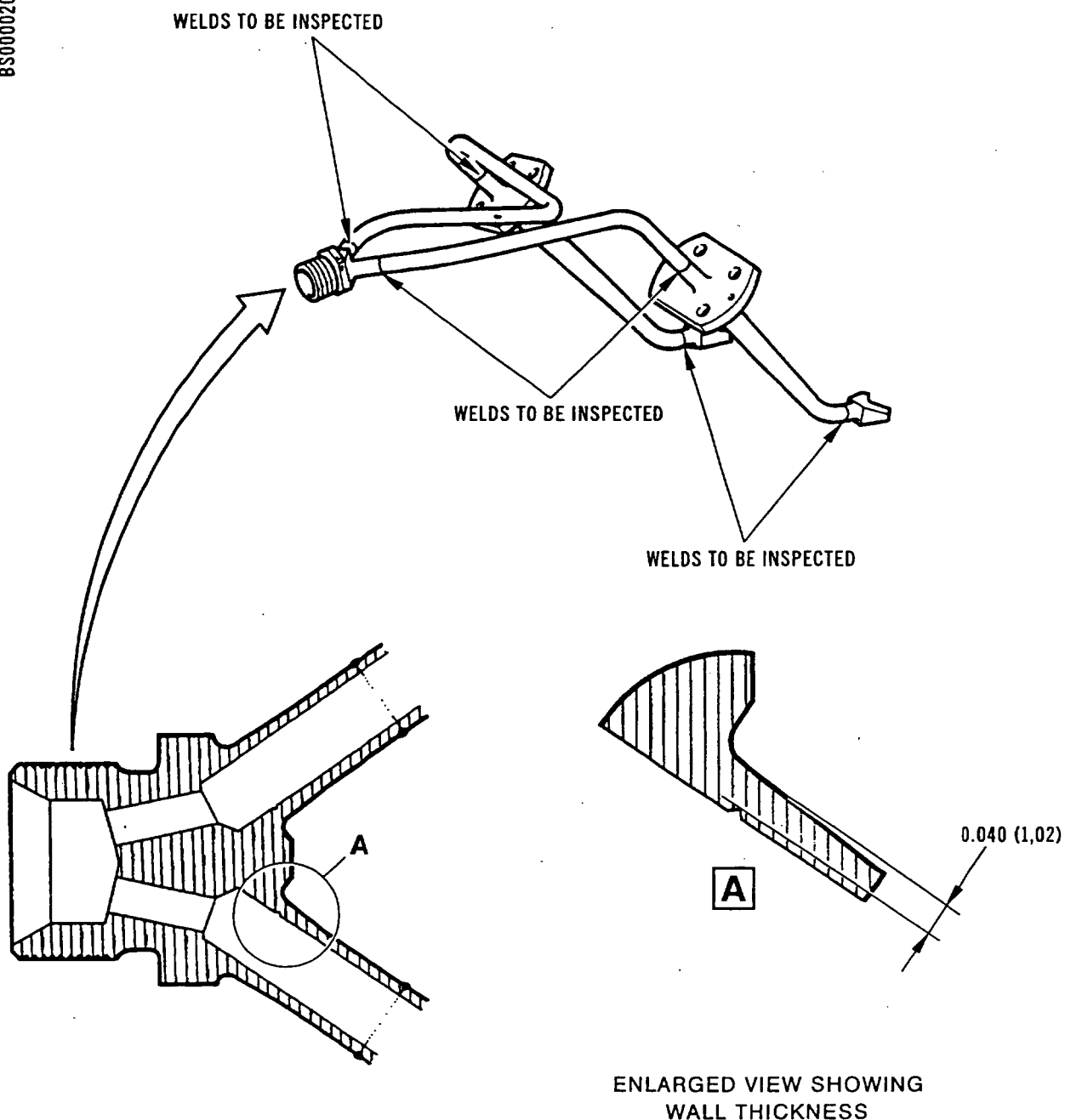


OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA



Weld Inspection  
Figure 405

REPAIR

73-12-05

Repair No.1

Page 421

Dec 31/01



# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

FUEL SPRAYER ASSEMBLY -  
REPAIR OF LIGHT IMPACT DAMAGE ON THE OUTER SURFACE OF FUEL  
SPRAYERS BY BLENDING  
B518171

1. EFFECTIVITY

<u>IPC</u>	<u>Fig./Item</u>	<u>Part No.</u>
73-12-05	1/10A	B481733

2. REPAIR LIMITATIONS

Compliance with all aspects of this Repair Process shall be achieved without deviation. Where a need to deviate is considered necessary, reference shall be made to the Repair Authority for agreement.

This instruction gives the procedure for repair of light impact damage on the outer surface of the Fuel Sprayers by blending on the Fuel Sprayer Assembly.

Validation testing is not required for this Repair Instruction.

Impact damage up to 0.005 (0,127) maximum depth x 0.150 (3,81) x 0.100 (2,54) maximum area is acceptable for repair within Sprayer(s) LH and/or RH.

Repair may be applied more than once, provided that the above limitations are not exceeded in any one area.

3. GENERAL

UNLESS OTHERWISE SPECIFIED

Drawing practice & tolerance interpretation to ISO1101 (JES160)

Dimensions in Inches (Millimeters)

Tolerances on machined dimensions plus/minus 0.010 (0,25)

Tolerance on angles plus/minus 2 degrees

Break sharp edges 0.004 to 0.020 (0,1 to 0,5)

Surface texture interpretation to ISO1302 (JES137)

Surface texture to be 63 (1,6) Microinches (Micrometers)

Welding symbols to ISO2553 (JES139)

3rd Angle Projection

All TASKS identified in this instruction are in the Engine Overhaul Processes Manual (TSD594-J).

To identify the consumable materials refer to the Overhaul Materials Manual (OMat).

REPAIR

## 73-12-05

Repair No.2

Page 401

Dec 31/01



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

## 4. REPAIR PROCEDURE

- 1) Hand blend to remove damage marks, producing smooth and continuous profiles.  
Remove a minimum amount of material.  
  
NOTE: No blending to be carried out within 0.250 (6,35) of weld joint lines.
- 2) Polish the repaired area.
- 3) Dimensionally/visually inspect repair area(s).
- 4) Do a penetrant crack test on the repair area.
- 5) Hydraulic pressure check the fuel sprayer with fuel or water at a pressure of 13800 Kpa (2000 psi), for at least 1 minute. If any leaks are observed reject the assembly.
- 6) On completion of the pressure test, inhibit the unit with inhibiting fluid.
- 7) Do a dimensional inspection of the part.
- 8) Mark repair identity number B518171 or R2 adjacent the assembly part number.

## SUPPLEMENTARY INFORMATION

Use hand held tools.  
Refer Overhaul Manual Chapter 72-09-22.  
Repair.  
Refer to Repair Limitations.  
Refer to Figure 401.

Polish to remove the scratches and give a surface finish of 63 microinches (1,6 micro-metres).

Refer to Repair Limitations.  
Use inspection equipment.  
Reject if outside limits.

Refer to TASK 70-00-00-200-213  
SUBTASK 70-00-00-230-213-002.  
Use OMat 653 Fluorescent penetrant, medium sensitivity.  
Cracks are not permitted.  
Use penetrant crack test equipment.

Lubricate the threads of the splitter with OMat 1003.  
Max tightening of splitter 46.1 Nm (34 lbf/ft).

Use OMat 1003 Mineral oil (fuel system inhibitor) or OMat 1003D Mineral oil.

Refer to existing repair instruction 73-12-05 Repair No.1.

Vibro Percussion engrave in accordance with Chapter 72-09-00 Repair.

REPAIR

# 73-12-05

Repair No.2

Page 402

Dec 31/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

5. MATERIAL

COMPONENT

MATERIAL

RR CODE

FUEL SPRAYER  
ASSEMBLY

A286 (MSRR6532)

ECX

6. DATA

NONE.

7. TOOLS

NONE.

8. REPLACEMENT PARTS

NONE.

Printed in England

REPAIR

73-12-05

Repair No.2

Page 403

Dec 31/01



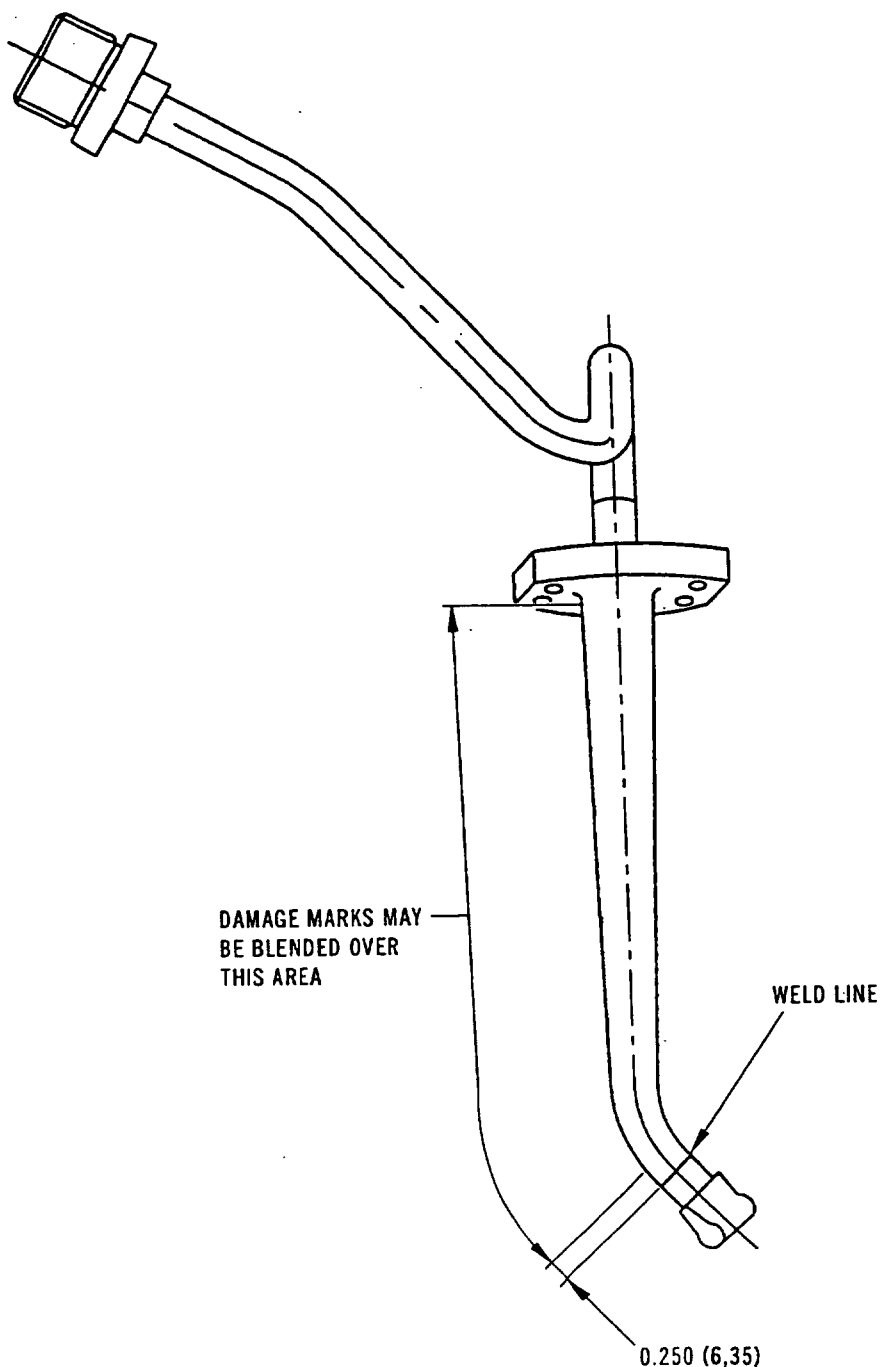
OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

BS00030741/1



Section Through Fuel Sprayer Assembly  
Figure 401

REPAIR

73-12-05

Repair No.2

Page 404

Dec 31/01





OLYMPUS 593

MK.610-14-28  
OVERHAUL



## REHEAT INJECTION SYSTEM - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

73-12-06

Page 201

Jan 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	G	For additional cleaning refer to vendors overhaul manual

Cleaning Processes  
Table 201

TN43706



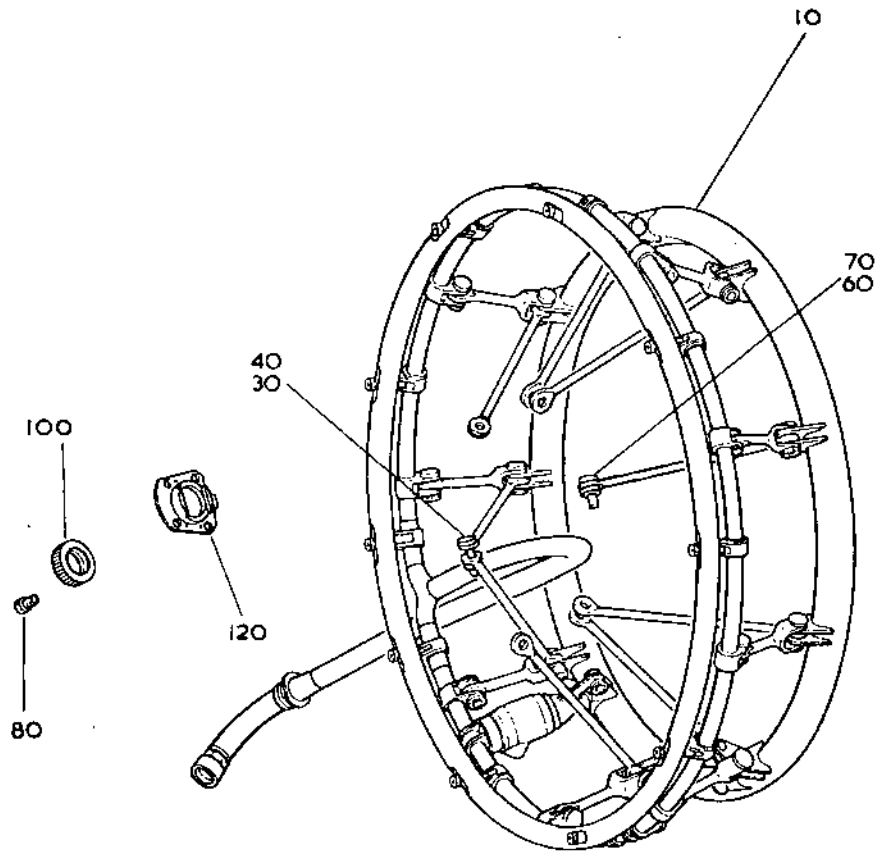
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 33162/00A



Reheat Injection System  
Figure 201

TN43707

CLEANING  
**73-12-06**  
Page 203  
Apr 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



## FUEL PRESSURE ATOMIZING (PILOT) NOZZLE - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

**CAUTION:** BEFORE USING HEAVY CLEANING PROCESSES J, L AND N, INVESTIGATE ALL REPAIRS CARRIED OUT ON EACH COMPONENT TO IDENTIFY THOSE HAVING PLASMA SPRAY COATINGS. THE NITRIC ACID USED IN PROCESSES J, L AND N WILL ATTACK THE ALUMINIUM CONTENT OF SOME TYPES OF COATING, MAKING REPLACEMENT OF THE COATING NECESSARY.

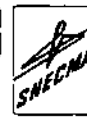
- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.



OLYMPUS 593

MK.610-14-28

OVERHAUL



- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.
- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	L	-
	except 20 Bolt		A or B	-	-

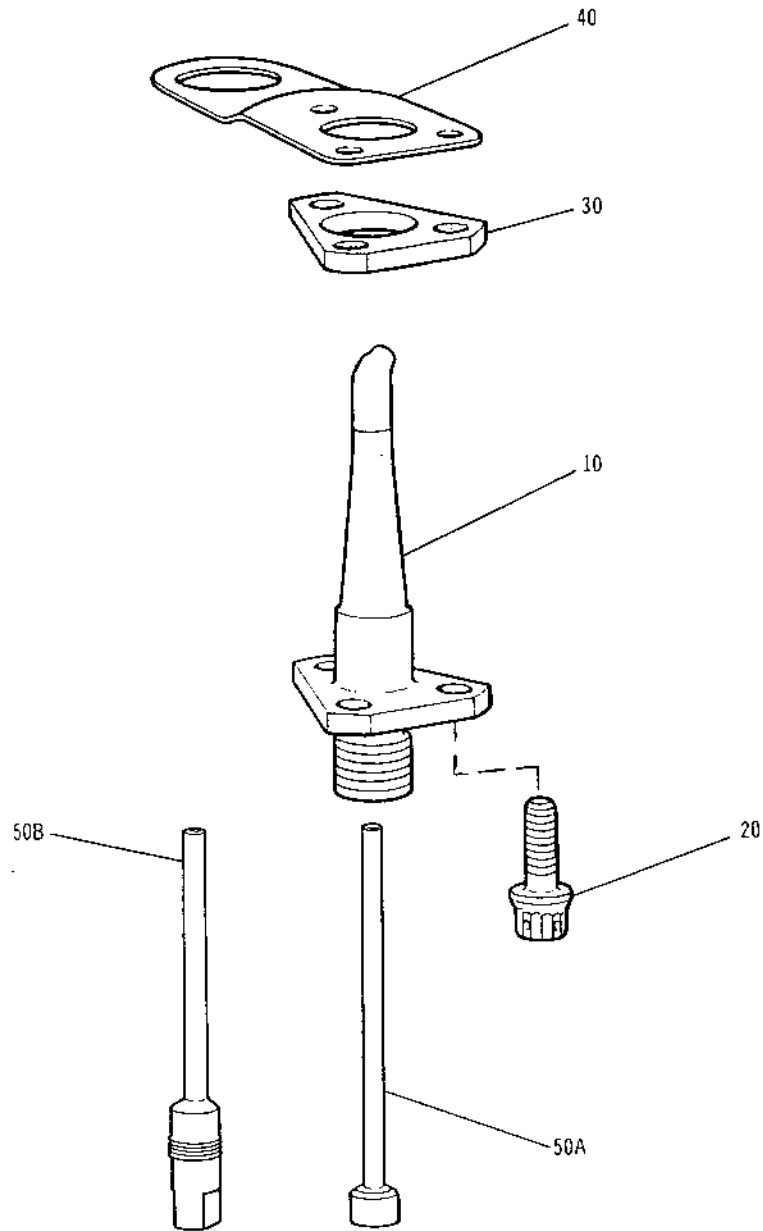
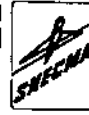
Cleaning Processes  
Table 201

CR 32514/00C



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Fuel Pressure Atomizing (Pilot) Nozzle  
Figure 201



OLYMPUS 593

MK.610-14-28

OVERHAUL



## FUEL PRESSURE ATOMISING (PILOT) NOZZLE - TESTING

### 1. General

- A. Nozzle assemblies are to be subjected to a Calibration Check after having completed a life of not more than 3000 hours, and subsequently at intervals of not more than 3000 hours.

### 2. Testing

#### A. Calibration Check

- (1) Remove all blanks, covers etc from the nozzle assembly.
- (2) Ensure the fuel transfer tube is fitted to the assembly.
- (3) Mount the nozzle assembly on a suitable fuel test rig and connect the rig inlet fuel tube to it.
- (4) Start the rig and apply a fuel pressure of 25 p.s.i. to the nozzle assembly and check:
  - (a) That the flow number is between 1.3 and 1.6 (6.5 to 8 galls./hr.).
  - (b) That the spray angle cone is between  $75^{\circ}$  and  $100^{\circ}$ .
  - (c) That the atomiser angles (ref. Figure 1) are  $40^{\circ}$  plus/minus  $10^{\circ}$  and  $15^{\circ}$  plus/minus  $5^{\circ}$ .
- (5) Release the pressure, switch off the rig and remove the nozzle assembly.
- (6) If the limits are satisfactory, no further action is required. If the limits are unsatisfactory, clean the nozzle assembly as detailed in para. B and repeat the calibration; repeat as necessary.
- (7) Repeat the calibration on the second nozzle assembly.
- (8) Reassemble all blanks, covers etc to nozzle assembly.

TESTING

73-12-07

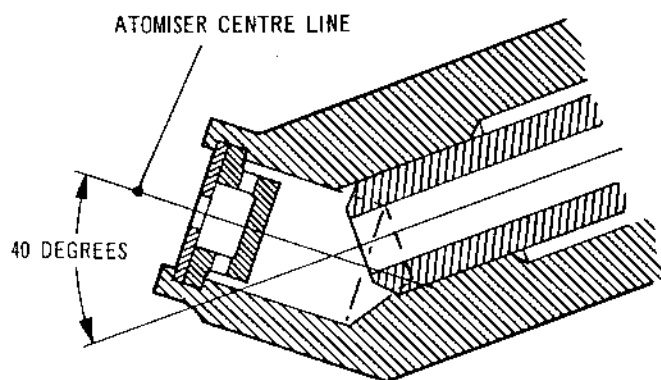
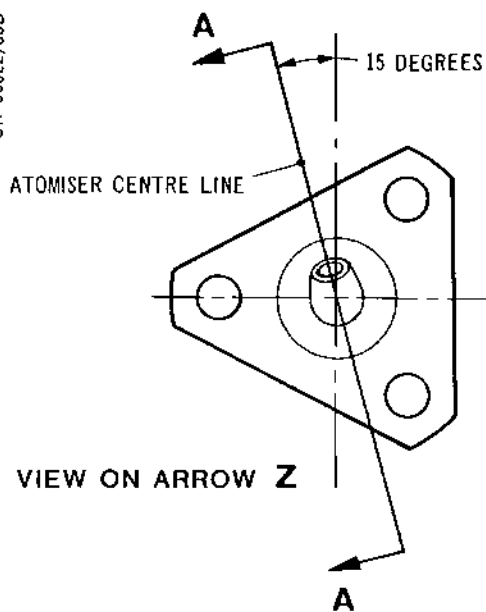


OLYMPUS 593

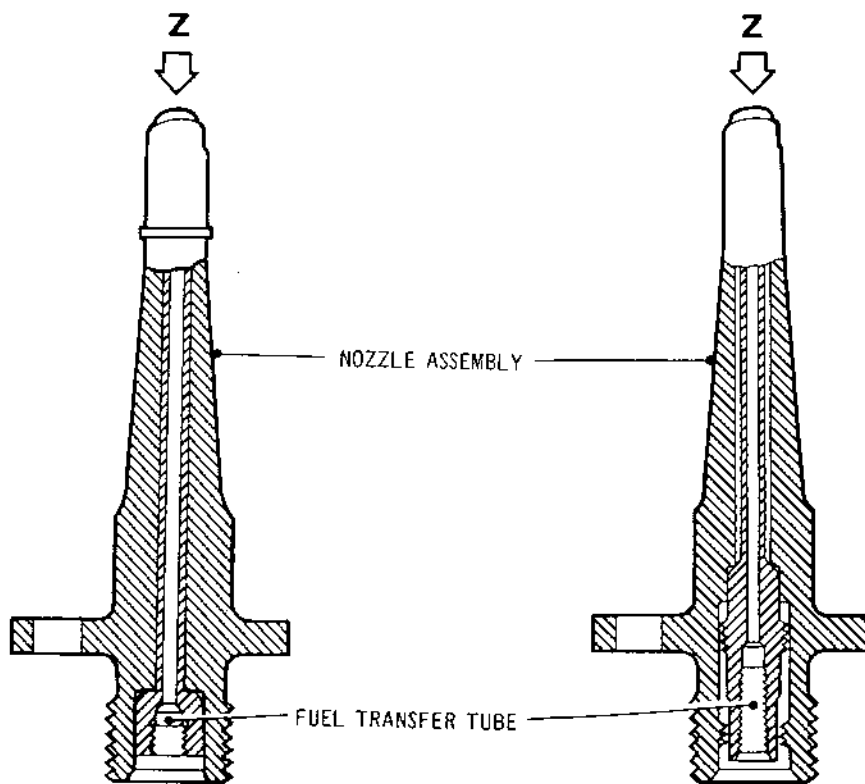
MK. 610-14-28  
OVERHAUL



CR 36022/008



SECTION A-A



PRE SB. 73-13 STANDARD

SB. 73-13 STANDARD

Fuel Pressure Atomising (Pilot) Nozzle Assembly Details  
Figure 1

TESTING  
73-12-07  
Page 702  
Jun 1/86





OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

## B. Cleaning Procedure

- (1) On engines pre SB.73-13 standard, remove the fuel transfer tube using a suitable threaded extractor.
- (2) On engines to SB.73-13 standard, withdraw the fuel transfer tube using a suitable threaded extractor, until the tube engages the internal thread in the nozzle assembly. Unscrew the tube and remove it from the nozzle assembly.
- (3) Mechanically clean the 0.050 in. (1.27 mm) bore of the tube with a suitable gauged wire, then flush out with a degreasing agent (Genklene 1:1:1).

CAUTION: DURING THE FOLLOWING OPERATION, DO NOT ATTEMPT TO CLEAN THE ATOMISER IN THE END OF THE NOZZLE ASSEMBLY WITH ANY METALLIC OBJECT.

- (4) Clean the nozzle assembly (less the fuel transfer tube) using process G or M, as detailed in the Overhaul Manual 72-09-00 but for 10 hours, then flush out with a degreasing agent.
- (5) Re-assemble the fuel transfer tube to the nozzle assembly and inhibit using fluid to specification DERD 2490 or DEF 2001A.



OLYMPUS 593

MK.610-14-28

OVERHAUL



## TUBES - FIRST STAGE PUMP TO SECOND STAGE PUMP - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

73-13-01

Page 201

Jan 1/77

**OLYMPUS 593**

MK.610-14-28

sneema

OVERHAUL

- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except 230	Tube	A or B	-	-
	230	Tube, lagged	B	-	Pre SB 73-8789-88 standard.
	230	Tube, lagged	B	-	SB 73-8789-88 standard.
202	ALL except 50	Tube	A or B	-	-
	50	Tube	A or B	-	Pre SB 73-8789-88 standard.
	50	Tube, lagged	B	-	SB 73-8789-88 standard.

Cleaning Processes  
Table 201

CLEANING

**73-13-01**

Page 202

Jun 1/96



# OLYMPUS 593

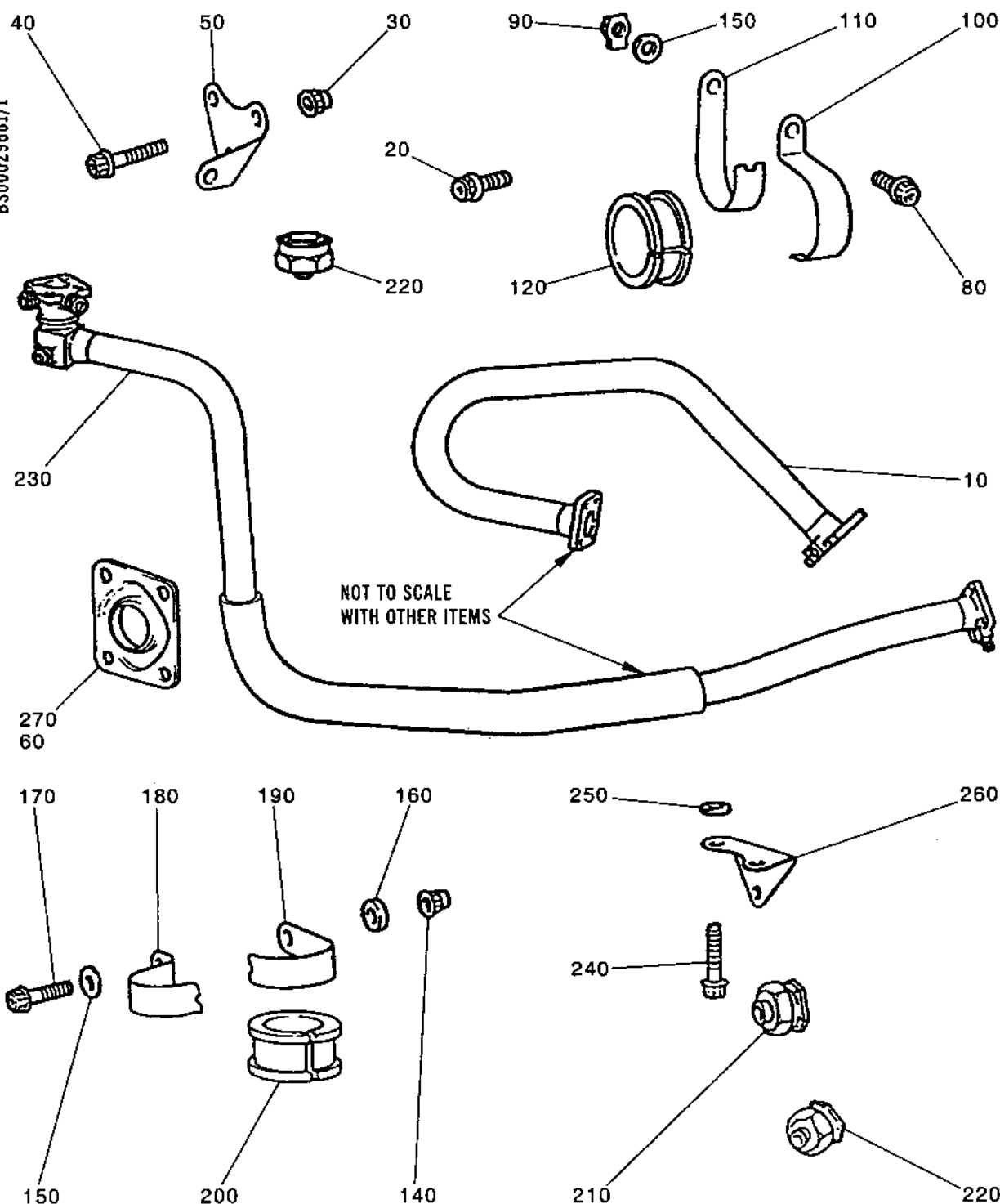
MK. 610-14-28  
OVERHAUL



sneema

Printed in England

CR 32402/00C  
BS00029661/1



Fuel Tubes, 1st Stage Pump to 2nd Stage Pump  
Figure 201



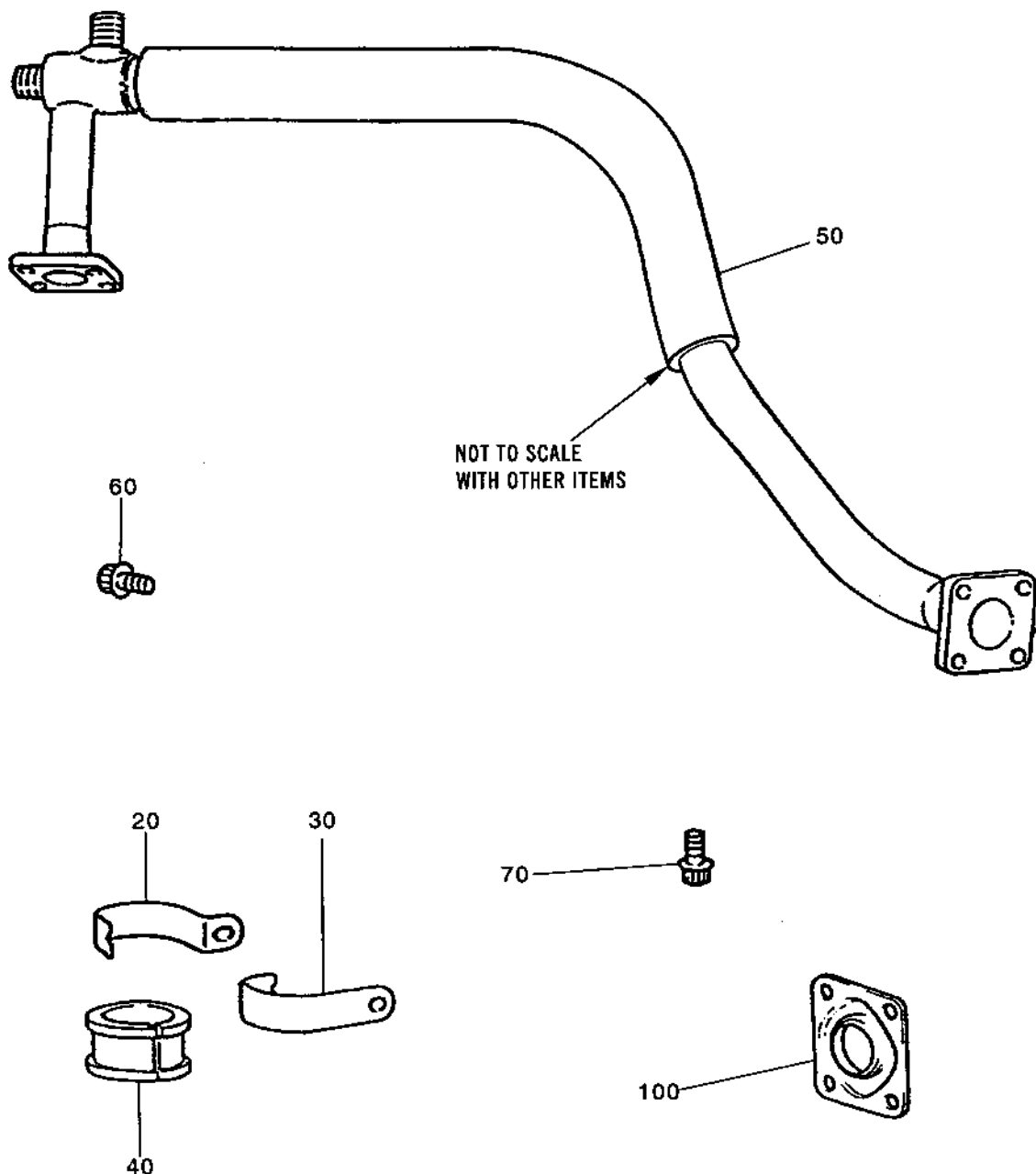
OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

CR 32401/00C  
BS00029660/1



Fuel Tubes, 1st Stage Pump to 2nd Stage Pump  
Figure 202

CLEANING

73-13-01

Page 204  
Dec 31/00



OLYMPUS 593

MK.610-14-28

OVERHAUL



TUBES - FIRST STAGE PUMP TO SECOND STAGE PUMP - REPAIR

TABLE OF CONTENTS

Repair No.	Title	Scheme No.
1	Repair of fretting/damage by inert gas arc welding.	B.514566

PRINTED IN ENGLAND

REPAIR  
73-13-01  
Contents 1  
Jun 1/92



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBE A/O, FUEL  
REPAIR OF FRETTING/DAMAGE BY INERT GAS ARC WELDING

REPAIR B.514566

1. EFFECTIVITY

IPC	Fig./Item	Part No.
73-13-01	01/230A	B.477262

2. REPAIR LIMITATIONS

Refer to Overhaul Manual 72-09-29 Repair.

3. GENERAL

Refer to Overhaul Manual 72-09-29 Repair.

4. REPAIR PROCEDURE

REPAIR PROCEDURE

(1) Weld repair

SUPPLEMENTARY INFORMATION

Refer to Overhaul Manual  
72-09-29 Repair.

(2) Mark SAL B.514566  
or R1 adjacent  
normal assy. of  
number using the  
electro-chemical  
marking or vibro-  
percussion engraving  
techniques.

Refer to Overhaul Manual  
72-09-00 Repair.

5. MATERIAL

<u>COMPONENT</u>	<u>MATERIAL</u>	<u>RR CODE</u>
B.477262	MSRR 6524	EBS

PRINTED IN ENGLAND



OLYMPUS 593

MK.610-14-28

OVERHAUL



6. DATA

PRESSURE TEST REQUIREMENTS:

TEST MEDIUM TO BE WATER

<u>PART NO.</u>	<u>PRESSURE TEST</u>	<u>MIN. GAUGE</u>
B.477262	1000 lbf/sq.in. (6,90 MPa) for 1 min.	0.027 (0,69)

7. TOOLS

<u>TOOL NUMBER</u>	<u>DESCRIPTION</u>	<u>ITEM</u>
NONE.		

8. REPLACEMENT PARTS

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>ITEM</u>
NONE.			

REPAIR

73-13-01

Repair No.1

Page 402

Jun 1/92





OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBES - FLOW CONTROL UNIT SUPPLY TO FUEL MANIFOLD - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00  
Cleaning for details of the cleaning processes referred  
to in Table 201.
- B. To ensure that all items within this breakdown that  
require cleaning and subsequent Inspection/Check are  
recognized, and identified by their Part Number, figures  
are provided which equate with the Illustrated Parts  
Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with  
the relevant Figure and Item Number in the same breakdown  
in the I.P.C. Items illustrated in the I.P.C. which are  
not illustrated in this breakdown, are those items which  
are either discarded at overhaul, or are normally assembled  
to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the  
figures, Table 201 does not list all items, but deals  
collectively with the items requiring the same cleaning  
process.
- D. On receipt of the items from disassembly, all protective  
blanks, covers etc. deemed necessary for the protection  
of the items will have been assembled and, in addition,  
many of the items will arrive in containers. Any special  
containers, blanks, covers etc. are listed in Table 202  
by their Tool Ref. No. (Tool 123). For the manufacturer's  
Part No. refer to the appropriate Table in Special Tools,  
Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items  
prior to cleaning and reassembled immediately afterwards.  
Items received in special cleaning containers should remain  
therein during the cleaning procedures unless otherwise  
stated.
- B. All items contained in this breakdown must be cleaned by  
the appropriate processes quoted in the table, to achieve  
a cleanliness to enable the Inspection/Check to be carried  
out correctly. Where alternative processes are quoted,  
the operator must decide what process to use depending on  
the amount of contamination of the item. Any item that is  
not cleaned satisfactorily must be recleaned by the  
appropriate process.

CLEANING

73-13-02

Page 201  
Jan 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except		A or B	-	-
	110	Tube	A or B	H	-
	240	Adapter	A or B	H	-
202	ALL except		A or B	-	-
	160	Tube	A or B	G	Use process G only if light cleaning fails to remove contamination. Process G will damage silver plating, therefore it must be used with caution, i.e. short period immersion.
	270	Tube	A or B	G	

Cleaning Processes  
Table 201

FN31671

CR 32400/DOC  
BS00029659/1

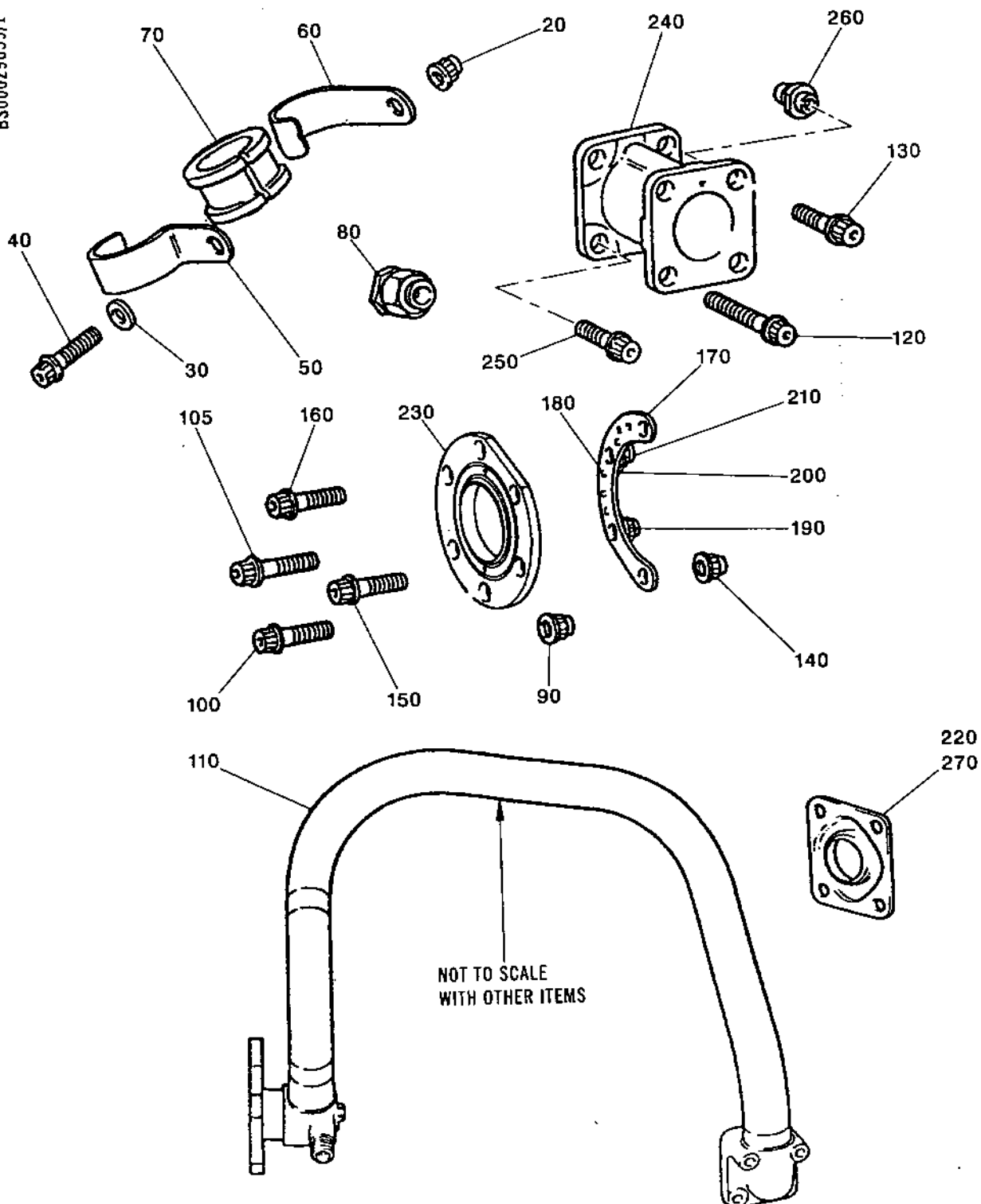


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Fuel Tubes, Fuel Control Unit Supply to Manifold  
Figure 201



OLYMPUS 593

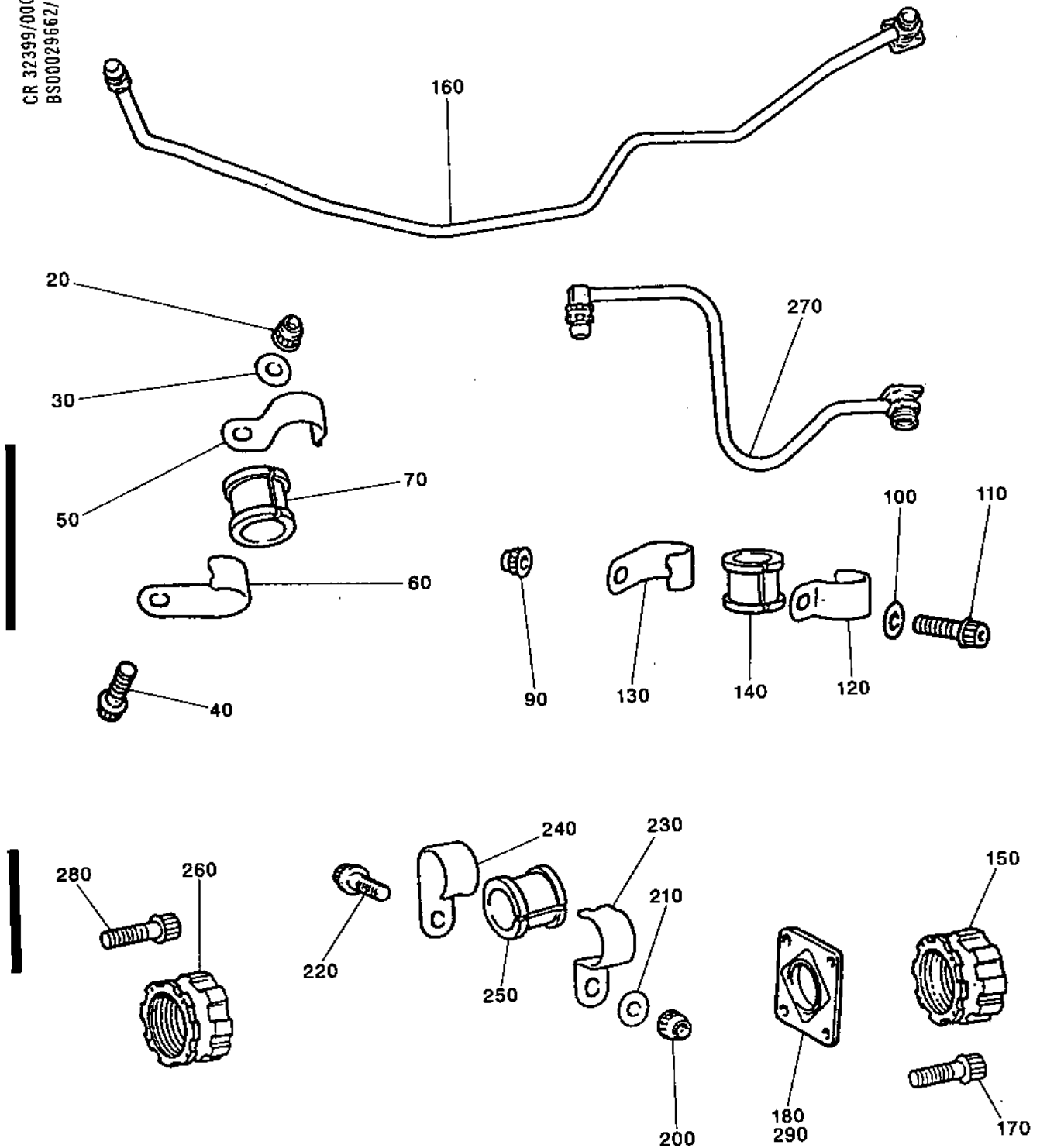
MK.610-14-28  
OVERHAUL



sneema

Printed in England

CR 32399/00C  
BS00029662/1



Fuel Tubes, Fuel Control Unit Supply to Manifold  
Figure 202

CLEANING  
73-13-02  
Page 204  
Dec 31/00



OLYMPUS 593

MK.610-14-28

OVERHAUL



TUBES - FIRST STAGE PUMP SUPPLY TO REHEAT INJECTION  
SYSTEM - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

73-13-03

Page 201

Jan 1/77

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

SNECMA

- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	-
	except				
	290	Plate, Blanking	A or B	G	-
	320	Tube	A or B	G	Pre SB 73-8789-88 standard
	320	Tube, lagged	B	-	SB 73-8789-88 standard
202	ALL		A or B	-	-
	except				
	240	Tube	A or B	G	Use process G only if light cleaning fails to remove contamination. Process G will damage silver plating, therefore it must be used with caution, ie short period immersion.

Cleaning Processes  
Table 201



# OLYMPUS 593

MK.610-14-28

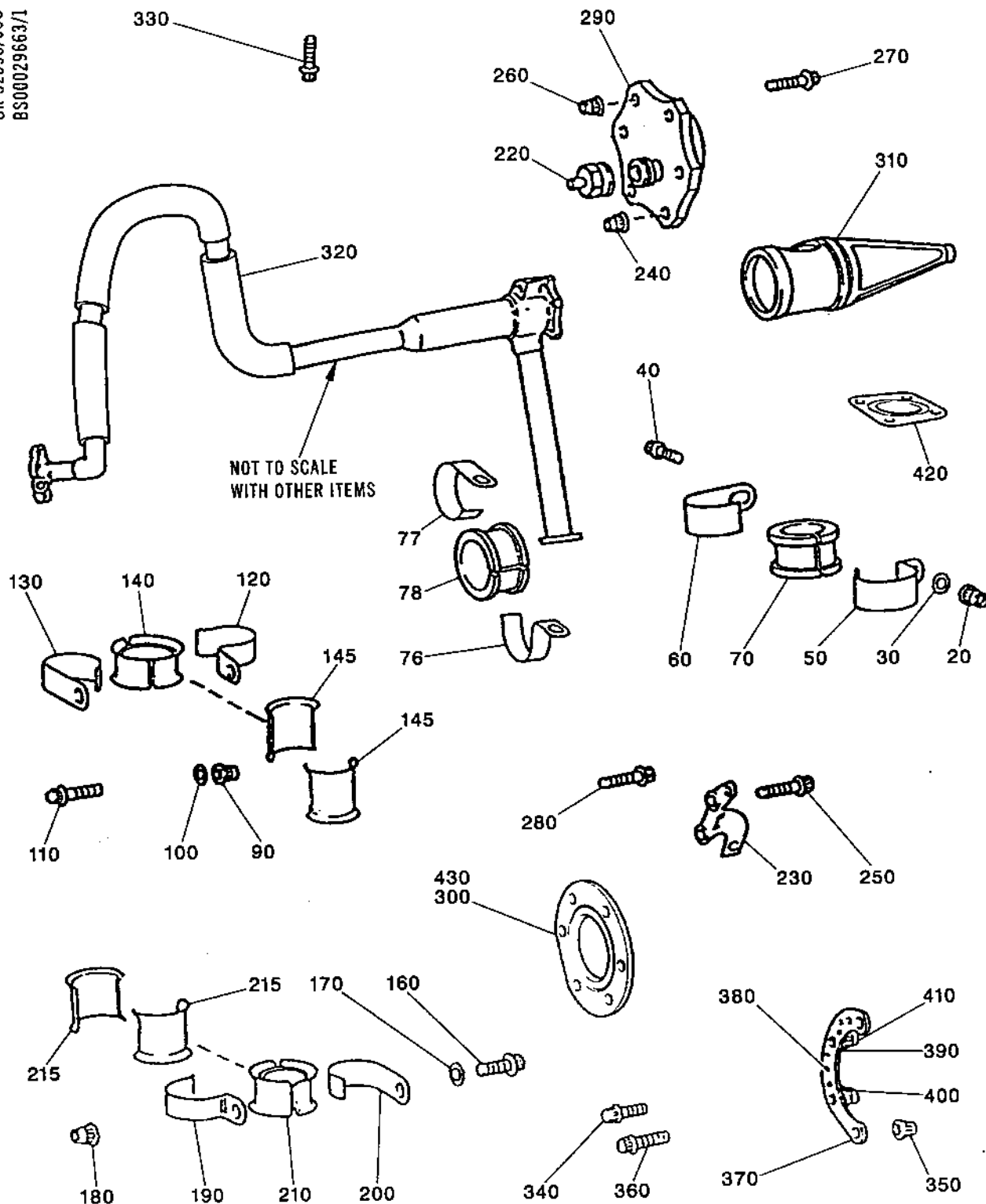
OVERHAUL



sneema

CR 32398/00C  
BS00029663/1

Printed in England



Fuel Tubes, 1st Stage Pump Supply to Reheat Spray Ring  
Figure 201

CLEANING

## 73-13-03

Page 203

Dec 31/00



OLYMPUS 593

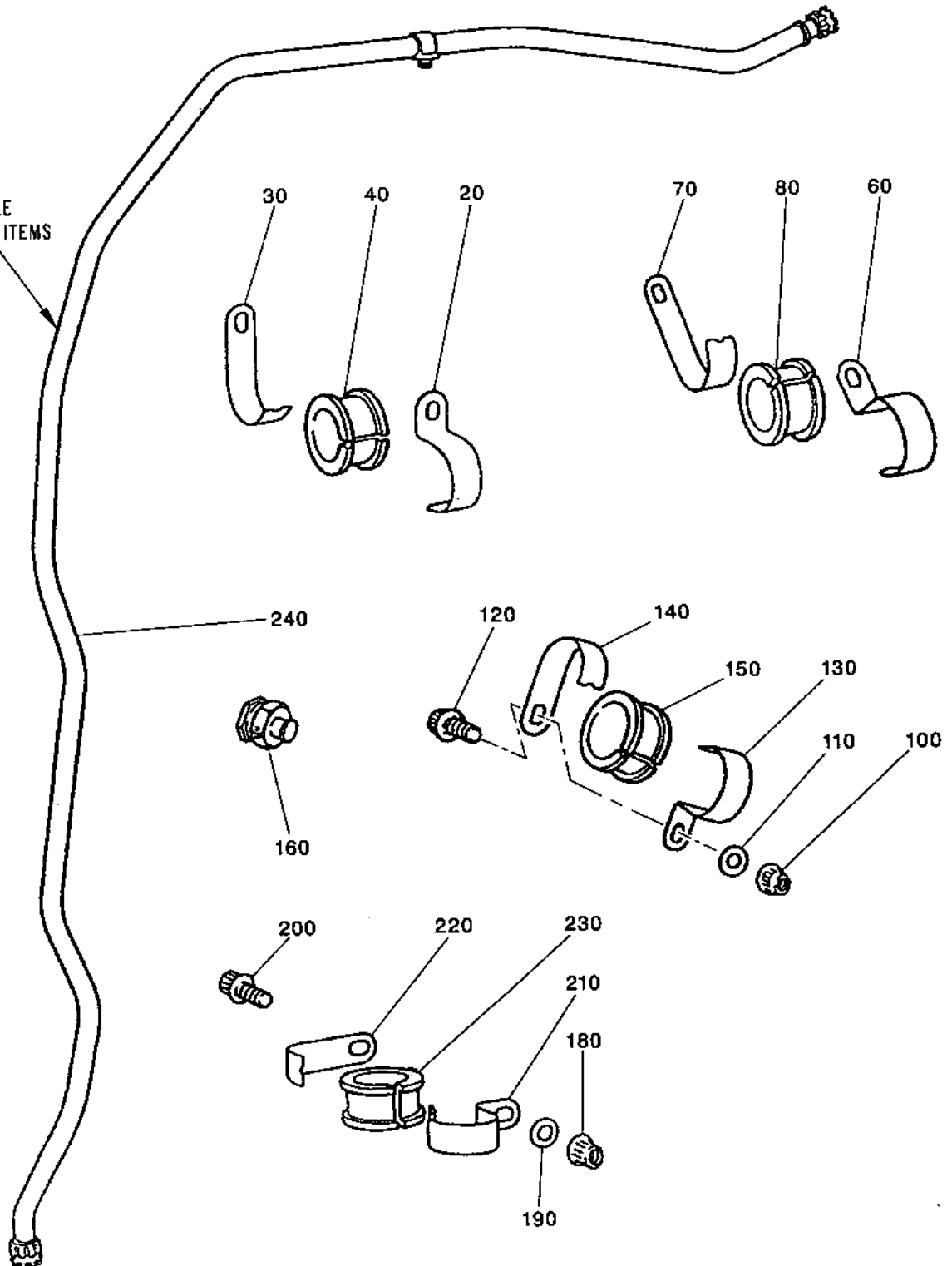
MK.610-14-28  
OVERHAUL



Printed in England

BS00029664/1

NOT TO SCALE  
WITH OTHER ITEMS



Fuel Tubes, 1st Stage Pump Supply to Reheat Spray Ring  
Figure 202





OLYMPUS 593

MK.610-14-28

OVERHAUL



TUBES - FIRST STAGE PUMP SUPPLY TO REHEAT INJECTION SYSTEM  
- REPAIR

TABLE OF CONTENTS

Repair No.

Title

Scheme No.

1

Repair of fretting/damage by  
inert gas arc welding.

B.514566

PRINTED IN ENGLAND

REPAIR  
73-13-03

Contents 1  
Jun 1/92



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBE A/O, FUEL  
REPAIR OF FRETTING/DAMAGE BY INERT GAS ARC WELDING

REPAIR B.514566

1. EFFECTIVITY

IPC	Fig./Item	Part No.
73-13-03	02/240A	B.482720

2. REPAIR LIMITATIONS

Refer to Overhaul Manual 72-09-29 Repair.

3. GENERAL

Refer to Overhaul Manual 72-09-29 Repair.

4. REPAIR PROCEDURE

REPAIR PROCEDURE

SUPPLEMENTARY INFORMATION

(1) Weld repair

Refer to Overhaul Manual  
72-09-29 Repair.

(2) Mark SAL B.514566  
or R1 adjacent  
normal assy. of  
number using the  
electro-chemical  
marking or vibro-  
percussion engraving  
techniques.

Refer to Overhaul Manual  
72-09-00 Repair.

5. MATERIAL

<u>COMPONENT</u>	<u>MATERIAL</u>	<u>RR CODE</u>
B.482720	MSRR 6524	EBS

PRINTED IN ENGLAND



OLYMPUS 593

MK.610-14-28

OVERHAUL



6. DATA

PRESSURE TEST REQUIREMENTS:

TEST MEDIUM TO BE WATER

<u>PART NO.</u>	<u>PRESSURE TEST</u>	<u>MIN. GAUGE</u>
B.482720	1000 lbf/sq.in. (6,90 MPa) for 1 min.	0.027 (0,69)

7. TOOLS

<u>TOOL NUMBER</u>	<u>DESCRIPTION</u>	<u>ITEM</u>
NONE.		

8. REPLACEMENT PARTS

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>ITEM</u>
NONE.			

REPAIR

73-13-03

Repair No.1

Page 402

Jun 1/92



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



TUBE - SECOND STAGE PUMP INLET TO ELECTRIC STARTER  
PUMP - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

73-13-04

Page 201

Jan 1/77



# OLYMPUS 593



MK.610-14-28 sheema  
OVERHAUL

- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except 50	Tube	A or B	-	-
	50	Tube, lagged	B	-	Pre SB 73-8789-88 standard. Use process G if light cleaning fails to remove contamination. Process G will damage silver plating, therefore it must be used with caution, i.e. short period immersion. SB 73-8789-88 standard.

Cleaning Processes  
Table 201

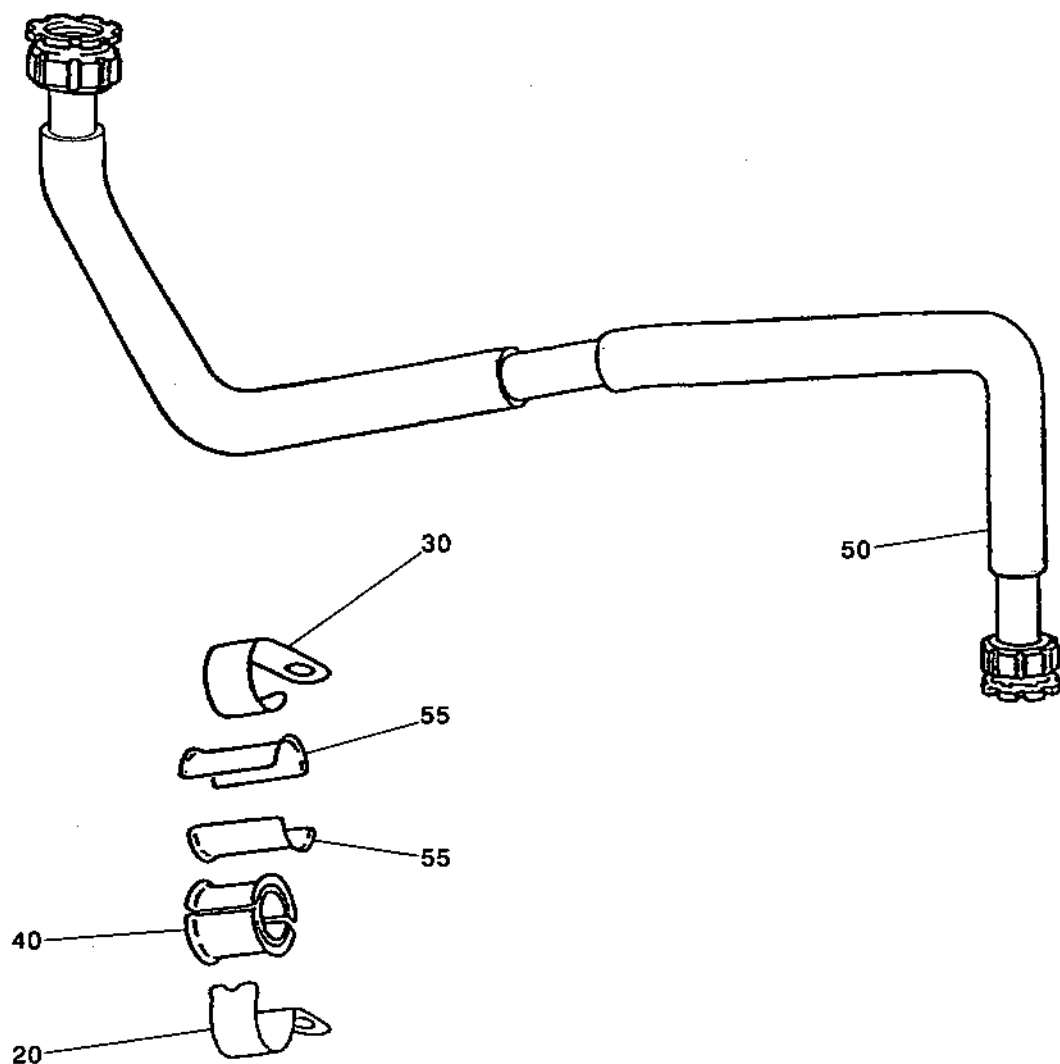


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Fuel Tube, 2nd Stage Pump Supply to Starting Pump  
Figure 201

CLEANING

73-13-04

Page 203

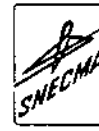
Dec 31/00



OLYMPUS 593

MK.610-14-28

OVERHAUL



TUBES - ELECTRIC STARTER PUMP SUPPLY TO FLOW CONTROL  
UNIT - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

73-13-05

Page 201

Jan 1/77



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	-
	except 80	Tube	A or B	-	Pre SB 73-8789-88 standard
	80	Tube, lagged	B	-	SB 73-8789-88 standard

Cleaning Processes  
Table 201



CR 32396/00C  
BS00029669/1

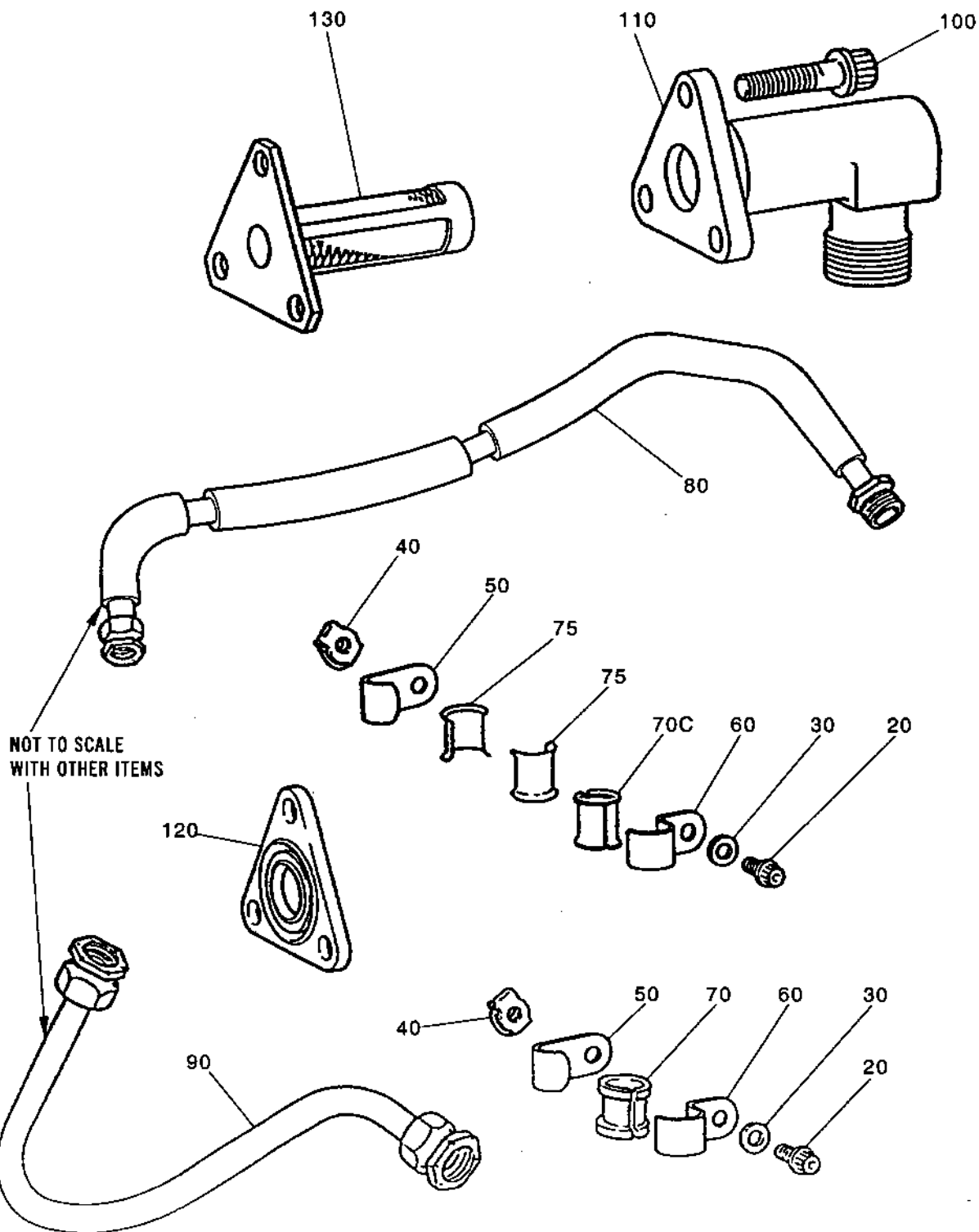


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Fuel Tubes, Starter Pump Supply to Flow Control Unit  
Figure 201



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



TUBES - ELECTRIC STARTER PUMP SUPPLY TO PILOT  
NOZZLES - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

73-13-06

Page 201

Jan 1/77



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	-
	except				
	80	Tube	A or B	G	Use process G only if light cleaning fails to remove contamination. Process G will damage silver plating, therefore it must be used with caution, i.e. short period immersion.
	160	Tube	A or B	G	-
202	ALL		A or B	-	-
	except				
	150	Tube	A or B	G	-
	290	Tube	A or B	G	Use process G only if light cleaning fails to remove contamination. Process G will damage silver plating, therefore it must be used with caution, i.e. short period immersion.
	370	Tube	A or B	G	

Cleaning Processes  
Table 201



# OLYMPUS 593

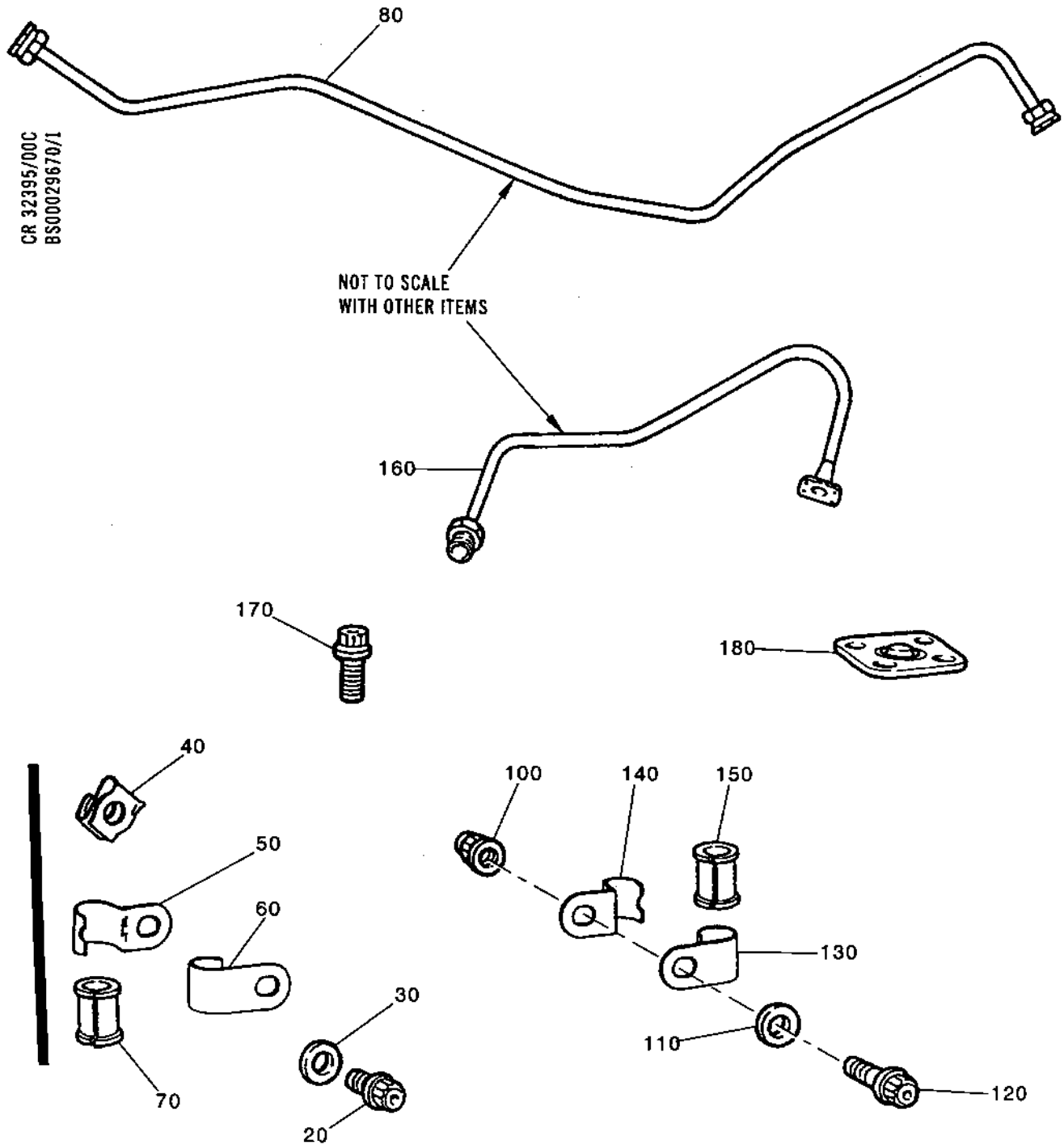


MK.610-14-28  
OVERHAUL

sneema

Printed in England

CR 32395/00C  
BS00029670/1



Fuel Tubes, Starting Pump Supply to Pilot Nozzles  
Figure 201



# OLYMPUS 593

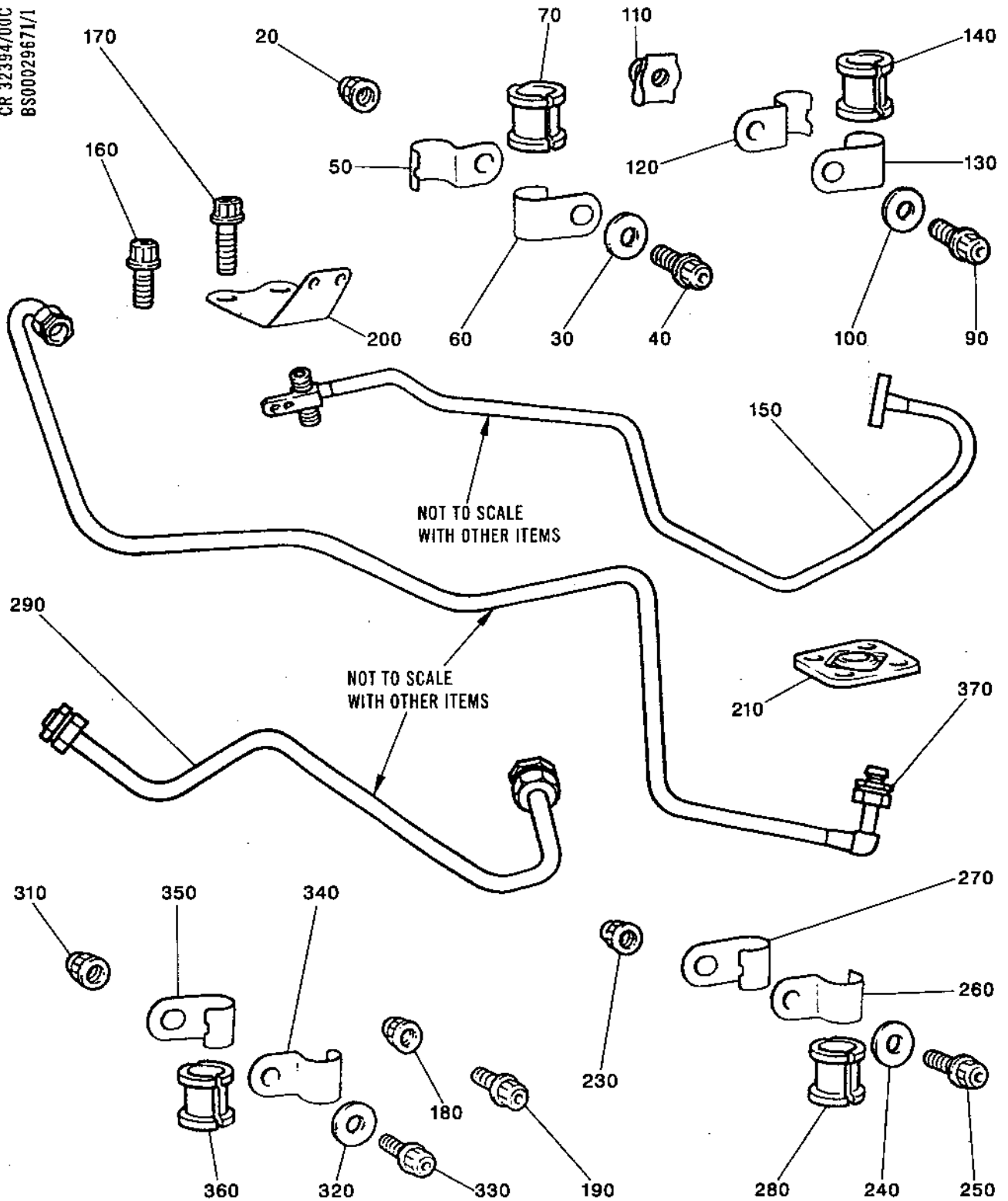


MK.610-14-28  
OVERHAUL

sneema

CR 32394/00C  
BS00029671/1

Printed in England



Fuel Tubes, Starting Pump Supply to Pilot Nozzles  
Figure 202

CLEANING

## 73-13-06

Page 204

Dec 31/00



OLYMPUS 593

MK.610-14-28

OVERHAUL



TUBES - REHEAT CONTROLLER AND FLOW CONTROL UNIT SPILL  
TO FIRST STAGE PUMP INLET ELBOW - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

73-13-08

Page 201

Jan 1/77

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



sneema

- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except		A or B	-	-
	80	Tube	A or B	G	-
	130	Block, connection	A or B	G	-
	220		A or B	G	Use process G only if light cleaning fails to remove contamination. Process G will damage silver plat- ing, therefore, it must be used with caution, i.e. short period immersion. Pre SB 73-8789-88 standard.
	440	Tube	A or B	G	
	450	Tube	A or B	G	
	230	Tube	A or B	G	SB 73-8789-88 standard.
	230	Tube, lagged	B	-	

Cleaning Processes  
Table 201

CLEANING

**73-13-08**

Page 202

Jun 1/96



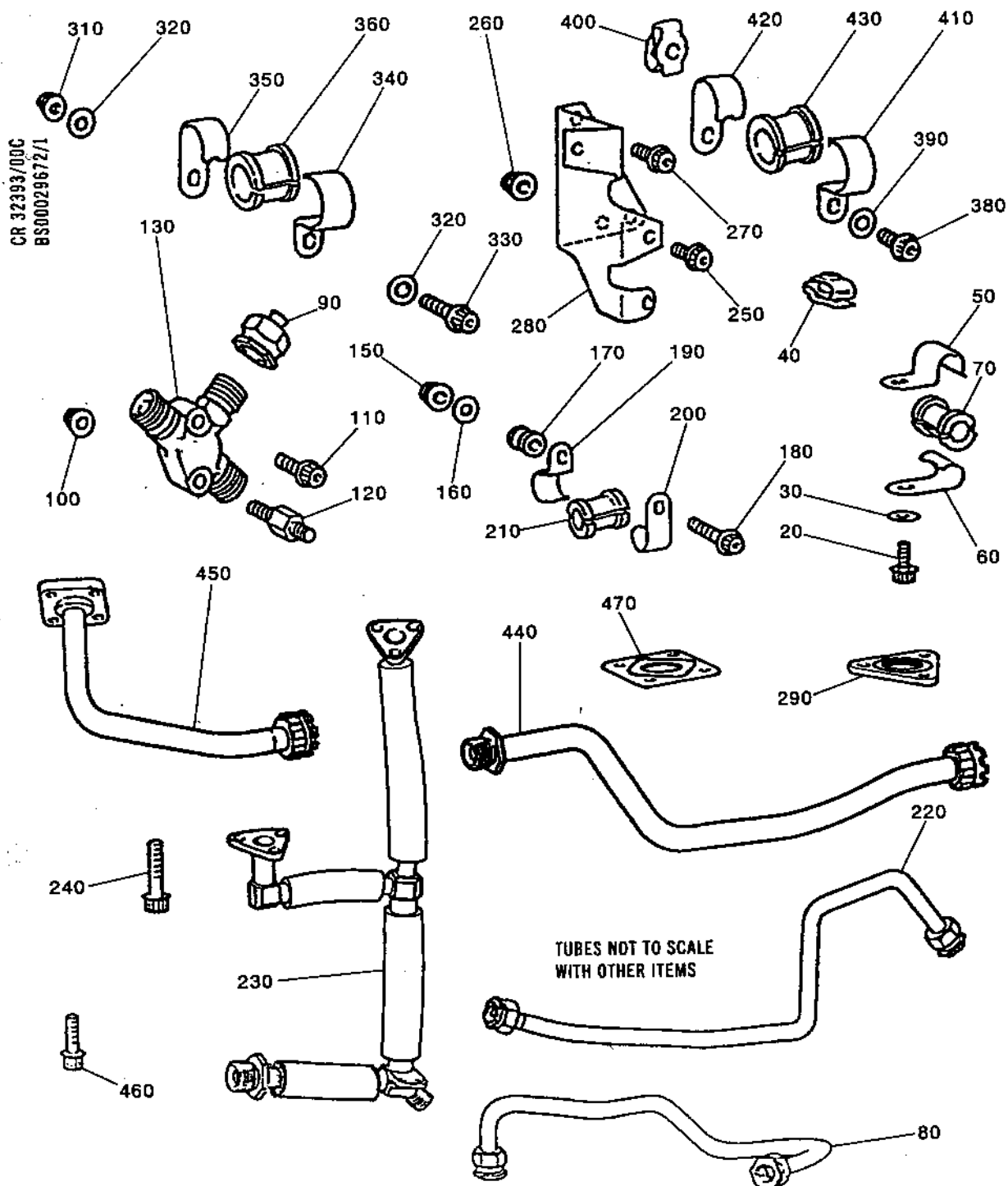
OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL



Fuel Tubes, Reheat Controller and  
FCU to 1st Stage Pump  
Figure 201

CLEANING

73-13-08

Page 203

Dec 31/00





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



TUBE - SECOND STAGE PUMP INLET ELBOW RETURN TO  
RECIRCULATION VALVE - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

73-13-09

Page 201

Jan 1/77



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	-

Cleaning Processes  
Table 201

FN32530

CR 32392/00C  
BS00029673/1

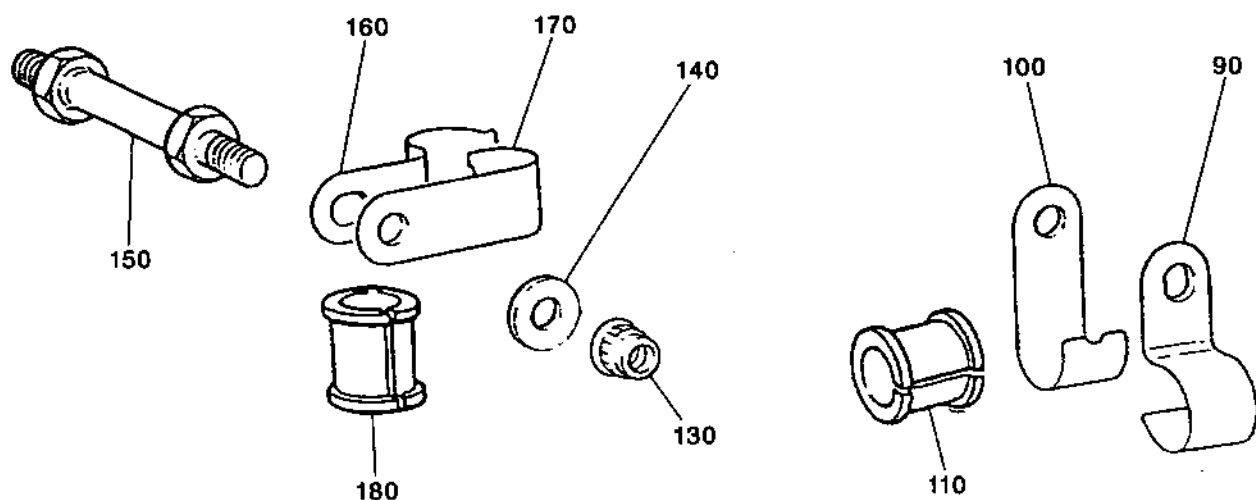
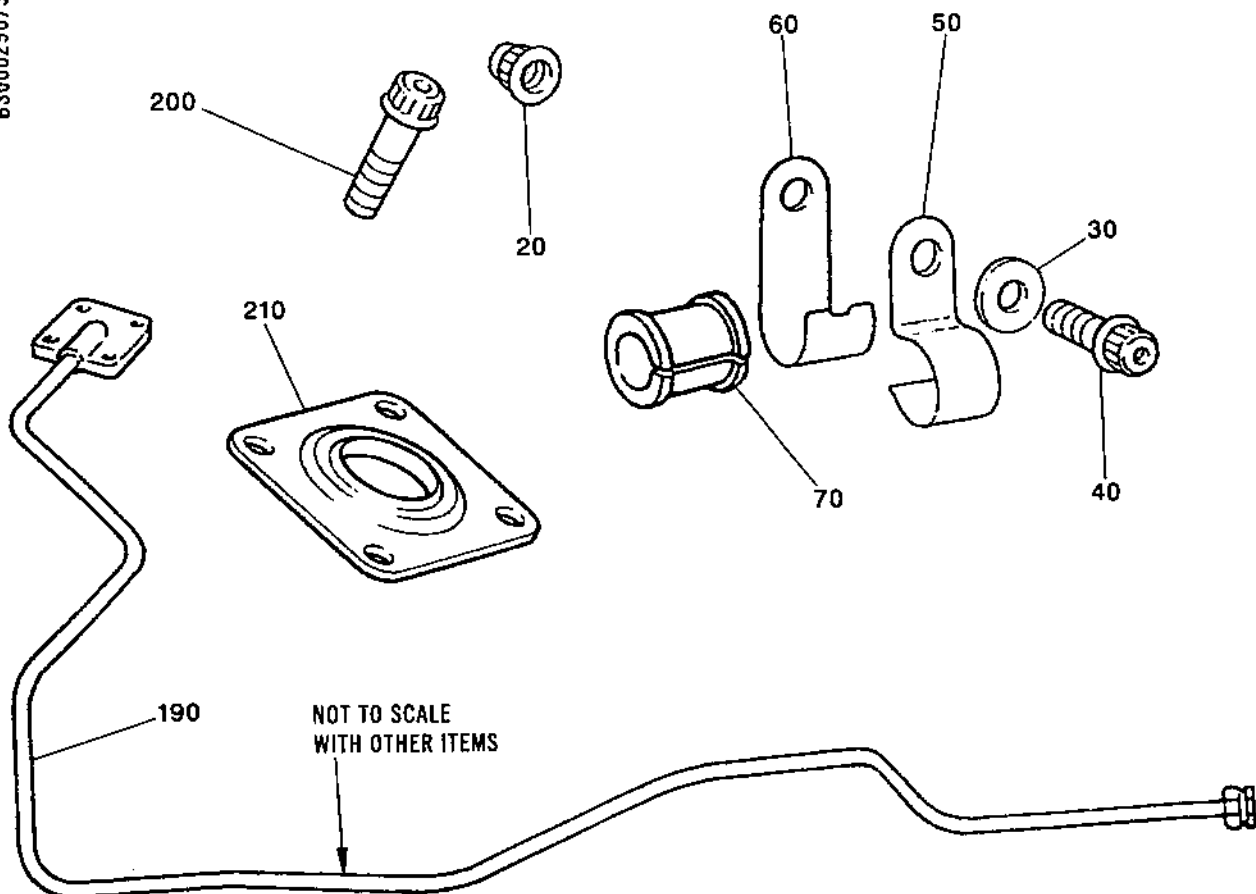


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Fuel Tube, 2nd Stage Pump  
Return to Recirculation Valve  
Figure 201



OLYMPUS 593

MK. 610-14-28

OVERHAUL



TUBES - DISTRIBUTION AND DUMP VALVE (SERVO AND  
SERVO SPILL) - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig. 201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

**73-13-10**

Page 201

Jan 1/77



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	-

Cleaning Processes  
Table 201

TN32534

CR 32391/00C  
BS00029713/1

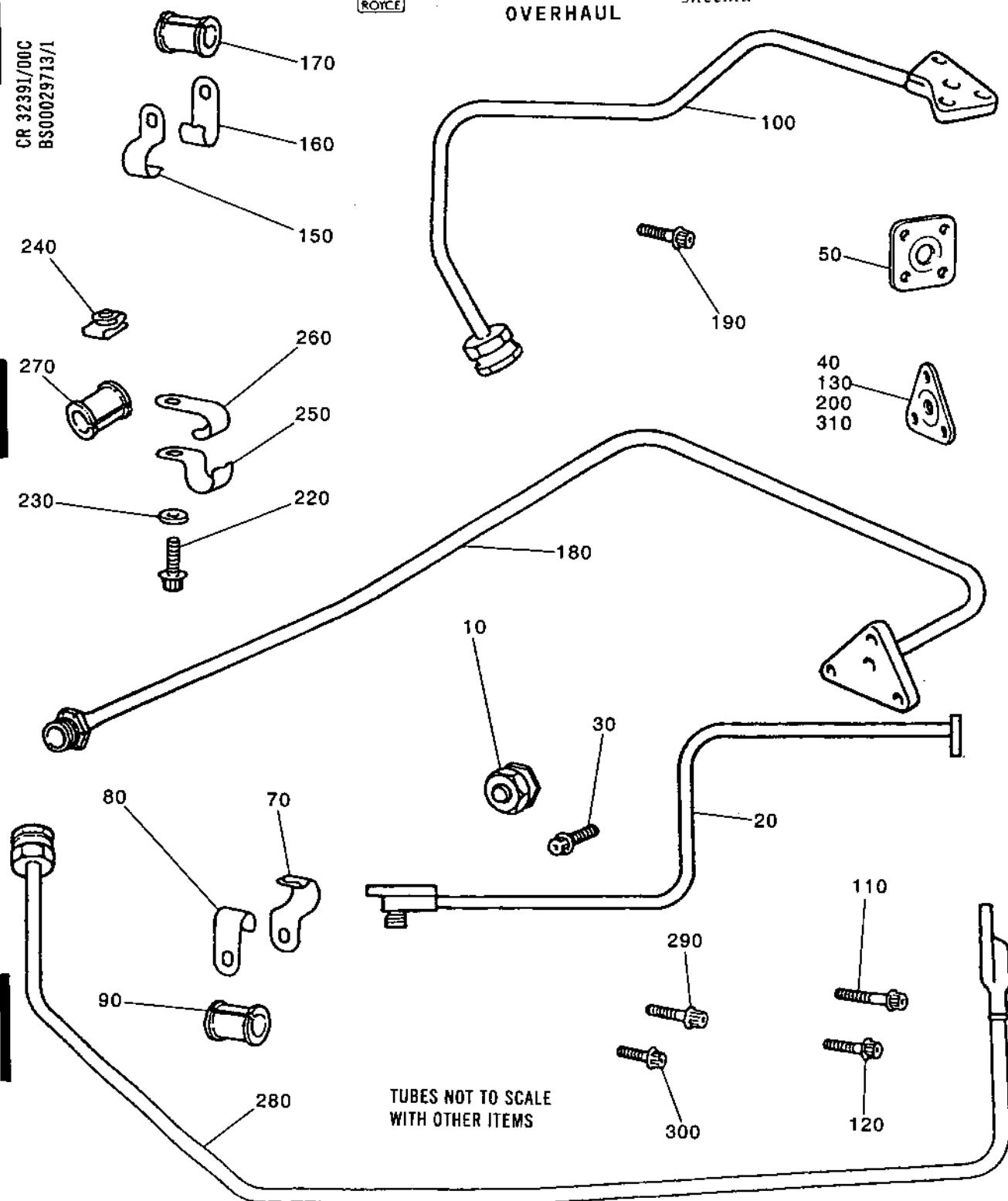


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Fuel Tubes, Distribution Block  
(Servo and Servo Spill)  
Figure 201

CLEANING

73-13-10

Page 203

Dec 31/00



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



TUBES - DRAINS TANK RETURN TO FIRST STAGE PUMP/  
RECIRCULATION VALVE - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

PRINTED IN ENGLAND

TN32537



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except		A or B	-	-
	100	Tube	A or B	G	Use process G only if light cleaning fails to remove contamination. Pro- cess G will damage silver plating, therefore it must be used with caution, i.e. short period immersion.
	180	Tube	A or B	G	
	370	Tube	A or B	G	
	490	Tube	A or B	G	
	500	Tube	A or B	G	
202	ALL		A or B	-	-

Cleaning Processes  
Table 201

TN32538





OLYMPUS 593

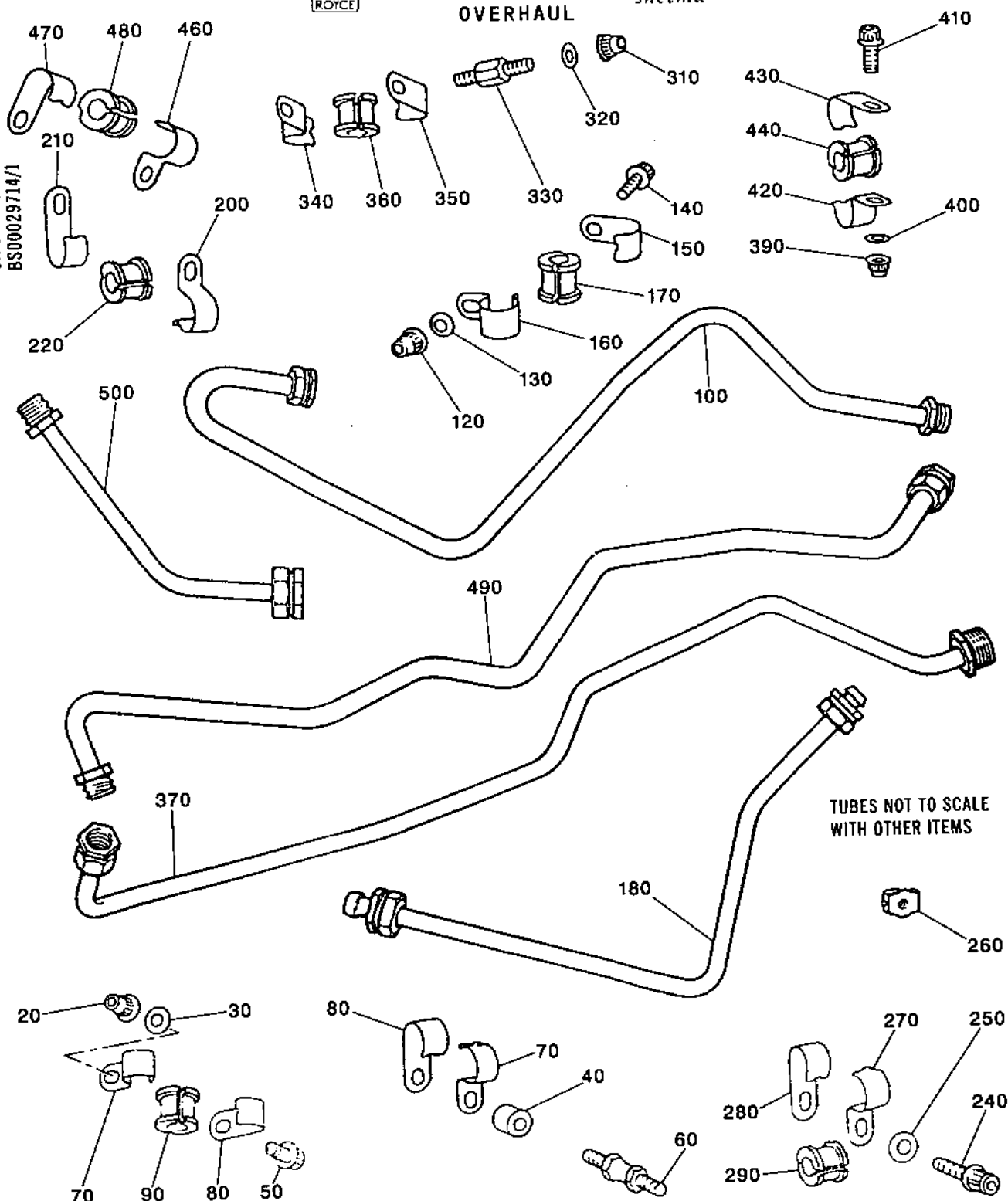


MK.610-14-28

sneema

OVERHAUL

CR 32390/008  
BS00029714/1



Fuel Drains Tube, Tank Return to 1st Stage  
Pump/Recirculation Valve  
Figure 201

CLEANING

73-13-11

Page 203

Dec 31/00

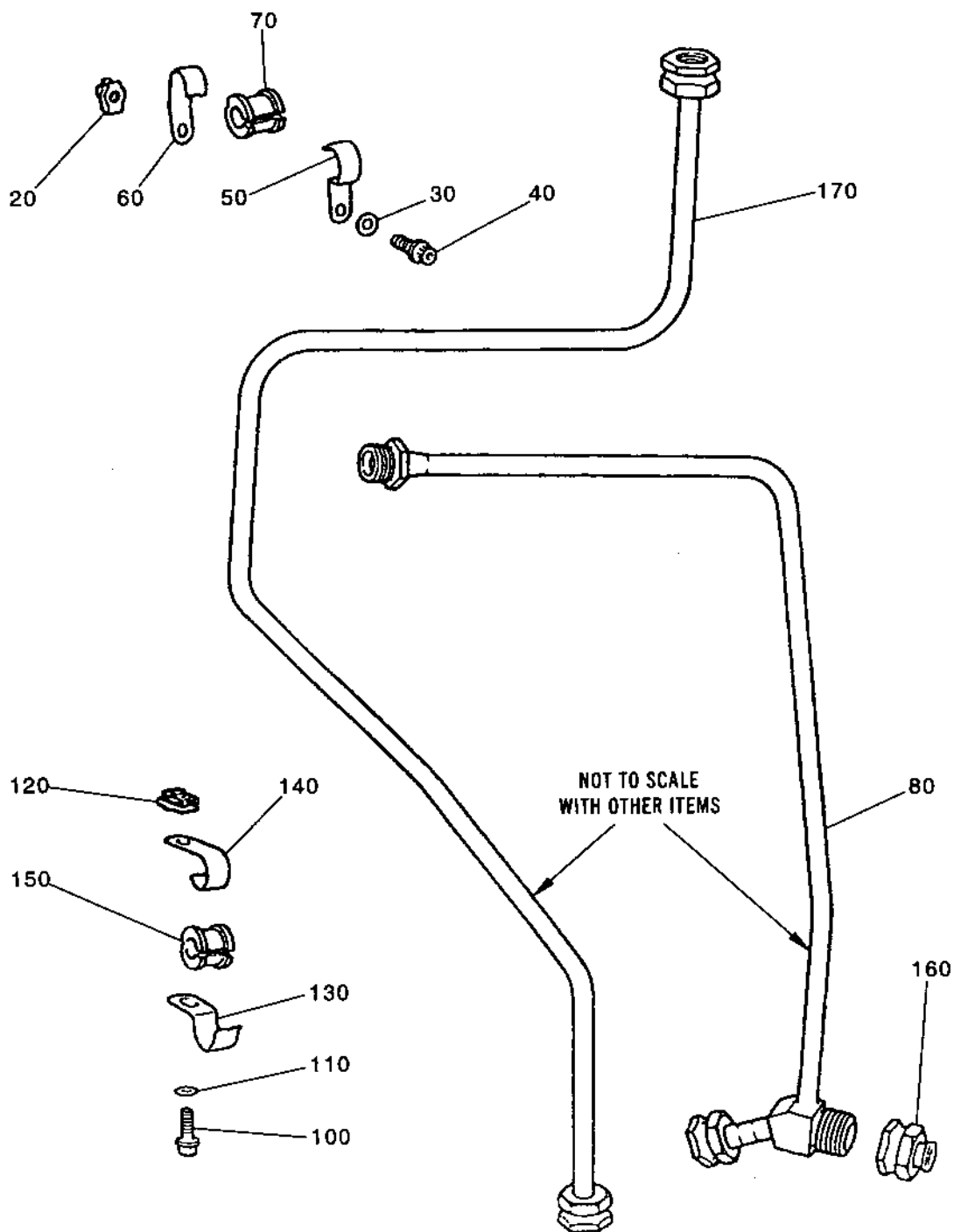


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Fuel Drains Tube, Tank Return to 1st  
Stage Pump/Recirculation Valve  
Figure 202

CLEANING

73-13-11

Page 204  
Dec 31/00



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBES - OIL COOLER TO AIR BLEED VALVE - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

PRINTED IN ENGLAND

TN32542

CLEANING

73-13-12

Page 201  
Jan 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	-

Cleaning Processes  
Table 201

TN32543

BS00029716/1



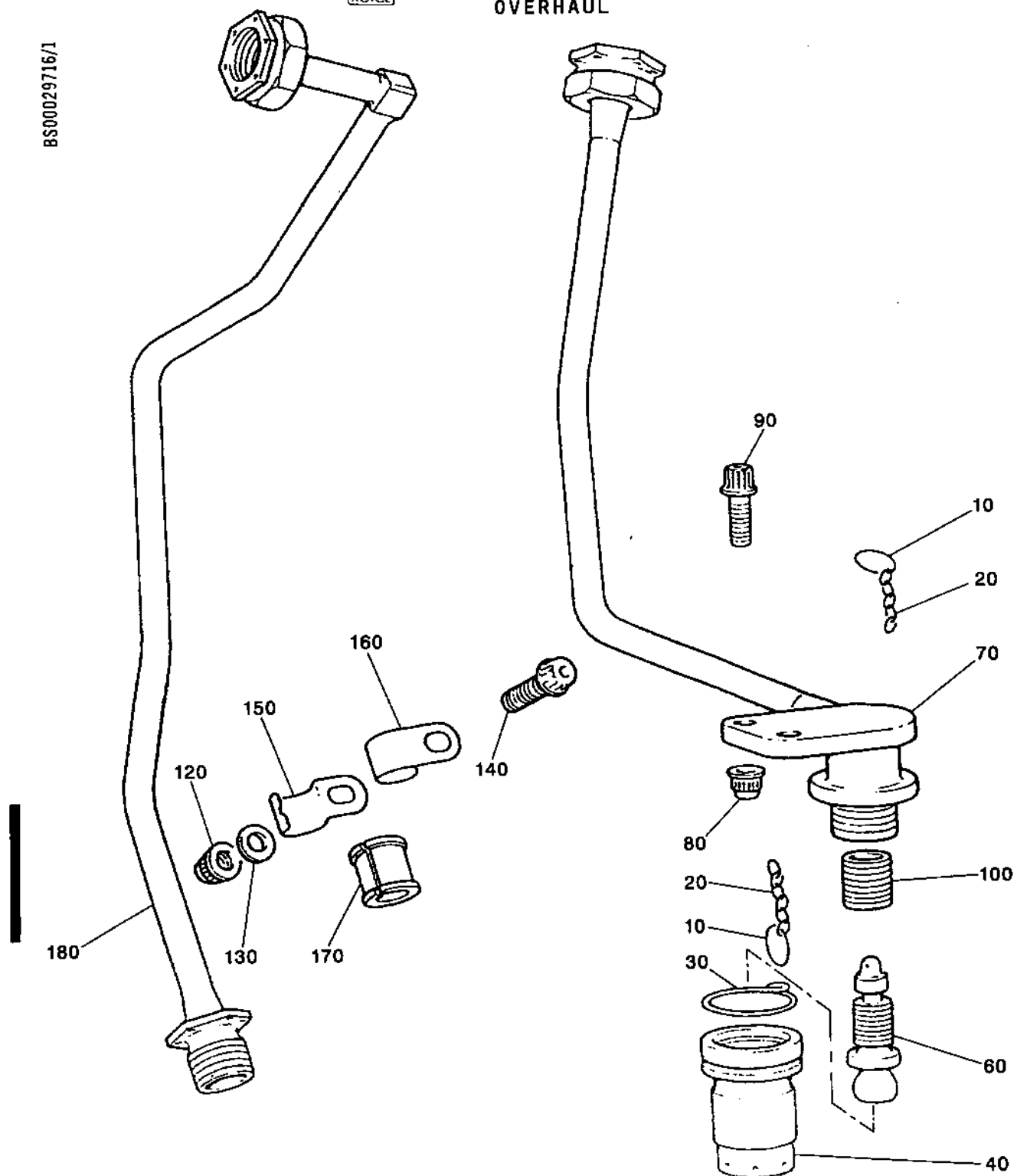
OLYMPUS 593

MK.610-14-28

OVERHAUL



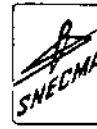
SNECMA



Fuel Tubes, Connecting Oil Cooler to  
Air Bleed Valve  
Figure 201



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



TUBES - FUEL HEATER AND FILTER OUTLET TO REHEAT CONTROLLER  
(SERVO SUPPLY) - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00  
Cleaning for details of the cleaning processes referred  
to in Table 201.
- B. To ensure that all items within this breakdown that  
require cleaning and subsequent Inspection/Check are  
recognized, and identified by their Part Number, figures  
are provided which equate with the Illustrated Parts  
Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with  
the relevant Figure and Item Number in the same breakdown  
in the I.P.C. Items illustrated in the I.P.C. which are  
not illustrated in this breakdown, are those items which  
are either discarded at overhaul, or are normally assembled  
to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the  
figures, Table 201 does not list all items, but deals  
collectively with the items requiring the same cleaning  
process.
- D. On receipt of the items from disassembly, all protective  
blanks, covers etc. deemed necessary for the protection  
of the items will have been assembled and, in addition,  
many of the items will arrive in containers. Any special  
containers, blanks, covers etc. are listed in Table 202  
by their Tool Ref. No. (Tool 123). For the manufacturer's  
Part No. refer to the appropriate Table in Special Tools,  
Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items  
prior to cleaning and reassembled immediately afterwards.  
Items received in special cleaning containers should  
remain therein during the cleaning procedures unless  
otherwise stated.
- B. All items contained in this breakdown must be cleaned by  
the appropriate processes quoted in the table, to achieve  
a cleanliness to enable the Inspection/Check to be carried  
out correctly. Where alternative processes are quoted,  
the operator must decide what process to use depending on  
the amount of contamination of the item. Any item that is  
not cleaned satisfactorily must be recleaned by the  
appropriate process.

CLEANING

**73-13-13**

Page 201

Jan 1/77



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except		A or B	-	-
	150	Tube	A or B	-	Pre SB 73-8789-88 standard.
	150	Tube, lagged	B	-	SB 73-8789-88 standard.
	270	Tube	A or B	-	Pre SB 73-8789-88 standard.
	270	Tube, lagged	B	-	SB 73-8789-88 standard.

Cleaning Processes  
Table 201

BS00029717/1

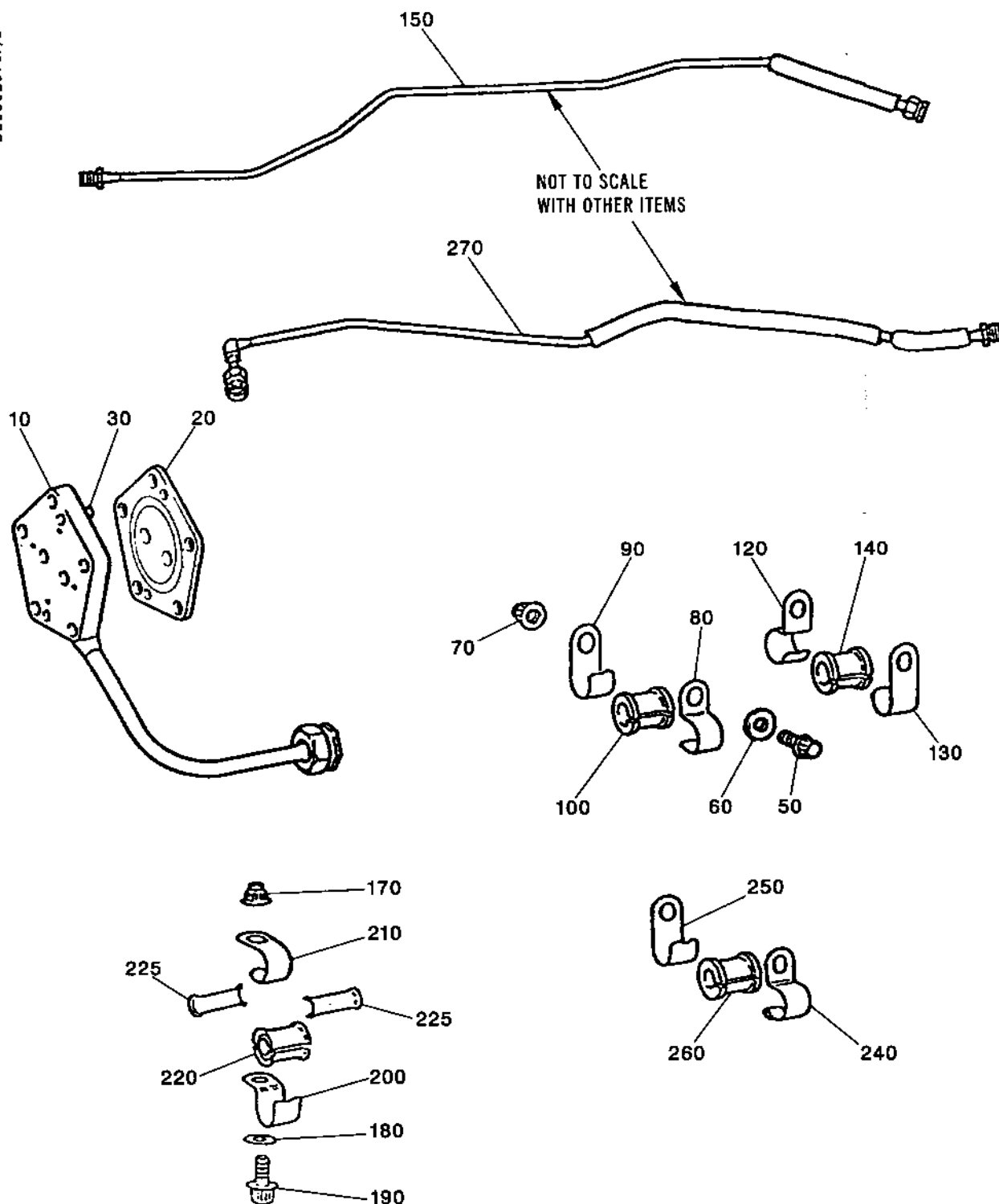


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Fuel Tube, Filter Heater Outlet to  
Reheat Control Unit (Servo Supply)  
Figure 201





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



## FUEL HEATER AND FILTER - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

PRINTED IN ENGLAND

TN29343

CLEANING

**73-14-01**

Page 201

Jan 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	-
	except				
	10	Fuel heater	B	-	For cleaning details refer to vendors overhaul manual

Cleaning Processes  
Table 201

TN29344



OLYMPUS 593

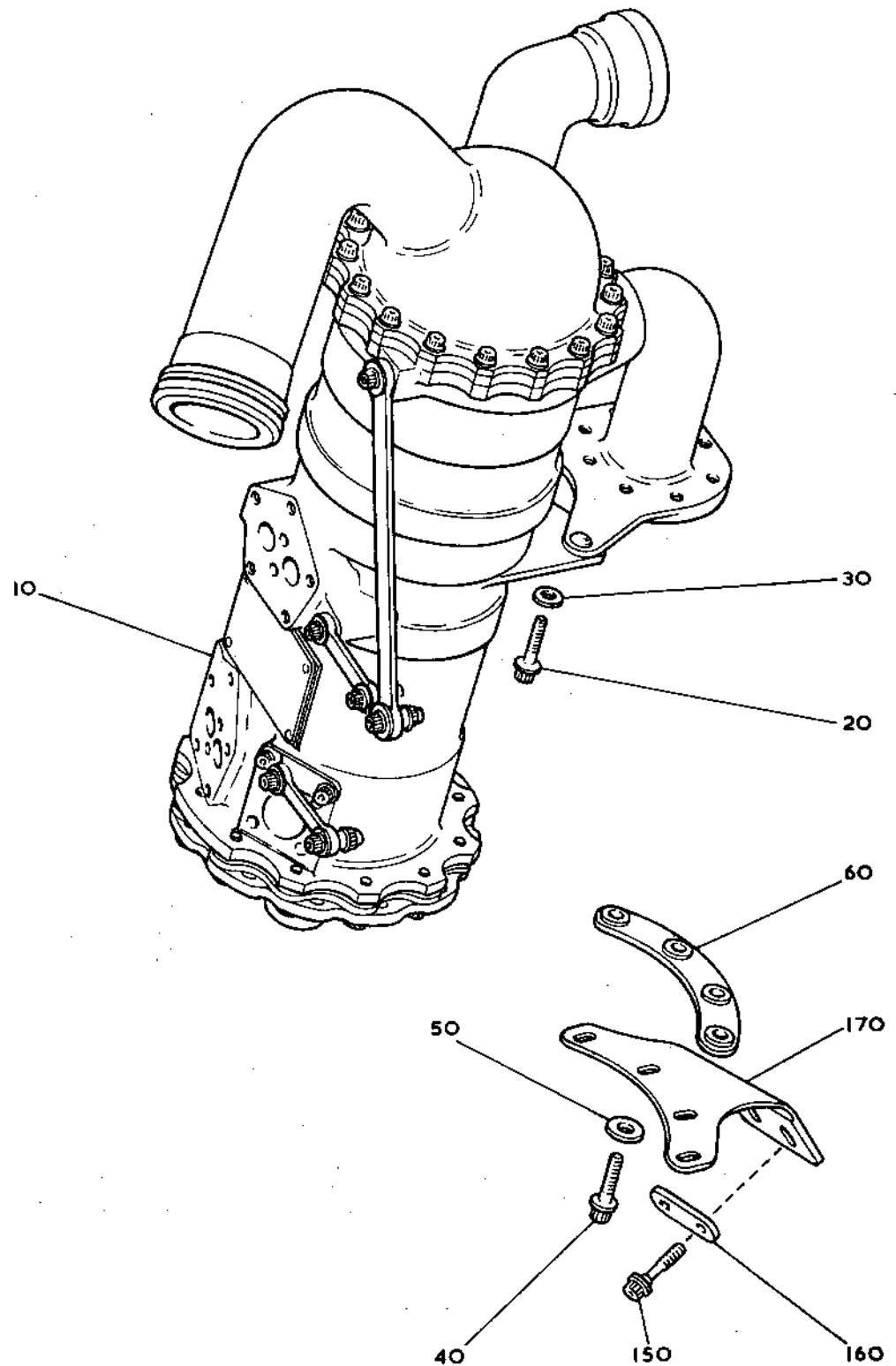
MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

CR 33174/00A



Fuel Heater Unit  
Figure 201

TN29346

CLEANING  
**73-14-01**  
Page 203  
Aug 28/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



## FUEL HEATER CONTROL VALVE - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

**73-14-02**

Page 201  
Jan 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except		A or B	-	-
	10	Fuel heater control valve	B	-	For cleaning details refer to vendors overhaul manual.

Cleaning Processes  
Table 201

TN20316

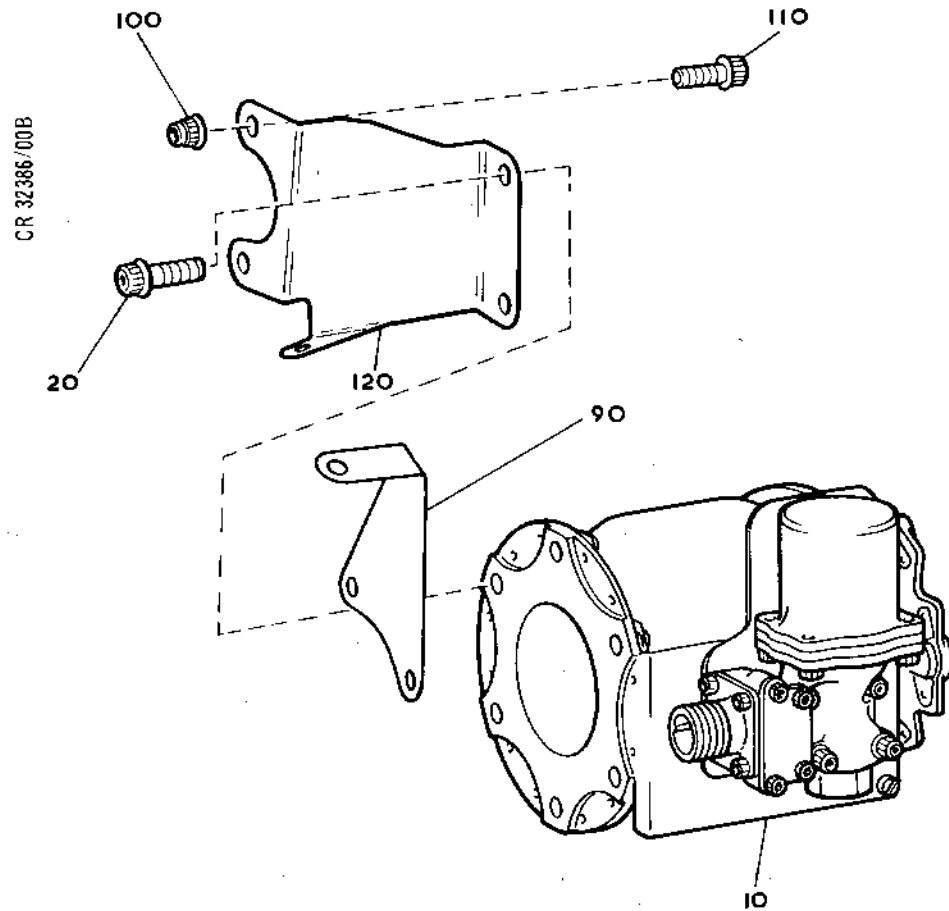


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



TN19767

Fuel Heater Control Valve  
Figure 201

CLEANING  
**73-14-02**  
Page 203  
Aug 28/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



FUEL HEATER CONTROL VALVE SWITCH - CLEANING

1. General

- A. Refer to S.B.73-8466-41. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

**73-14-04**

Page 201  
Jul 1/81



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except 10	Switch, differential pressure	A or B	-	-
			B	-	For cleaning details refer to vendors overhaul manual

Cleaning Processes  
Table 201

TN19769

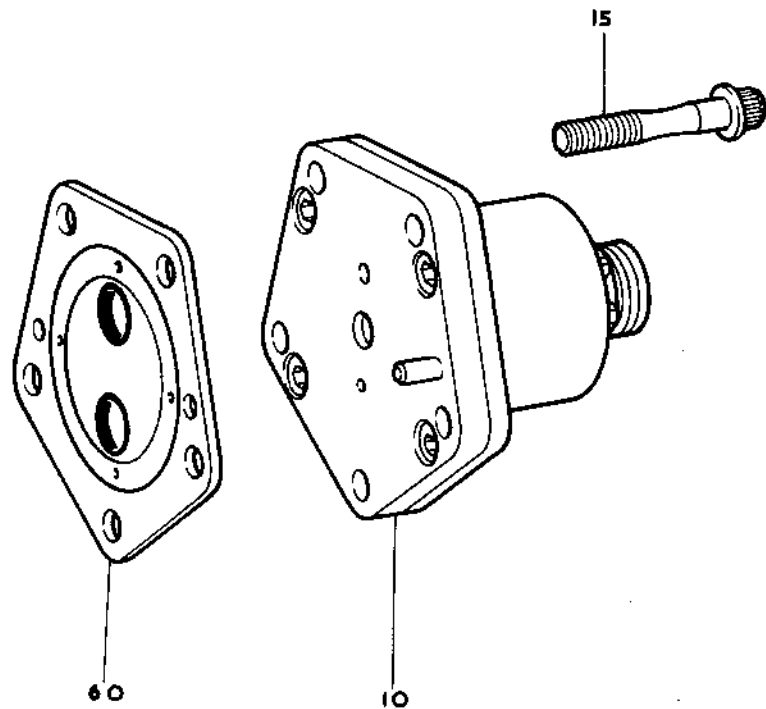


PRINTED IN ENGLAND

CR 33172/008



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



Switch, Fuel Heater Control Valve  
Figure 201

TN31877

CLEANING  
**73-14-04**  
Page 203  
Jan 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



FUEL HEATER CONTROL THERMOMETER - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except 10	Thermometer	A or B	-	-
			B	-	For cleaning details refer to vendors overhaul manual.

Cleaning Processes  
Table 201

TN32397



OLYMPUS 593

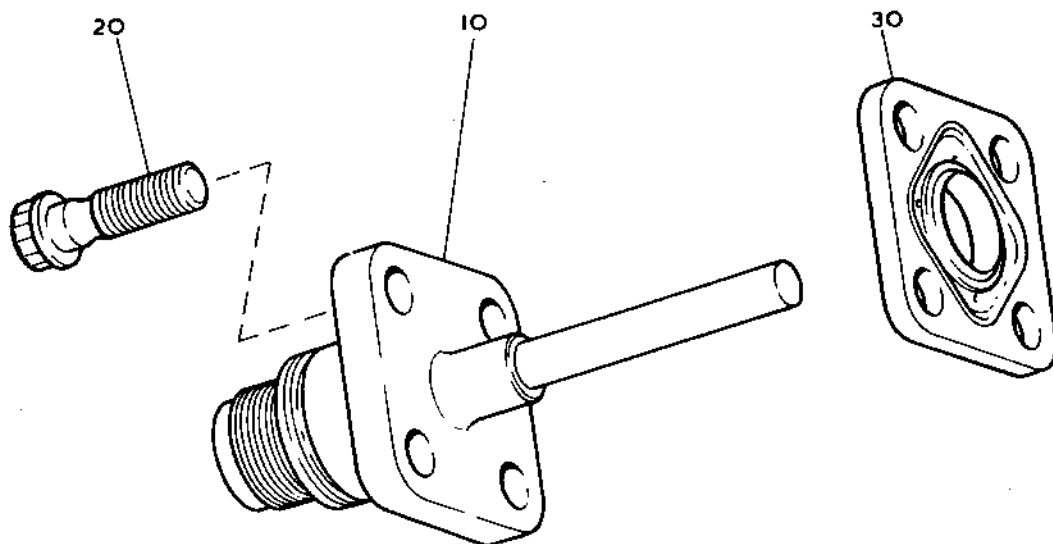
MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

CR 32475/00B



TN32399

Thermometer, Fuel Heater Control  
Figure 201

CLEANING  
**73-14-05**  
Page 203  
Aug 28/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



FUEL SYSTEM CONTROL - INSPECTION/CHECK

TABLE OF CONTENTS

Para.	Page
1. General ... ..	301
2. General Inspection ... ..	301
3. Crack Detection... ..	301
A. Magnetic Particle Crack Detection ... ..	301
B. Fluorescent Dye Crack Detection ... ..	302
4. Engine Flow Control Unit ... ..	304
5. LP Compressor Speed Probe Unit ... ..	304
6. Reheat Fuel Controller ... ..	304
7. Purge Reheat Solenoid Valve... ..	304
8. Brackets ... ..	304
A. Inspect Brackets ... ..	304
9. Flanged Pin and Distance Piece ... ..	305
A. Inspect Pin and Distance Piece ... ..	305
10. Support Cone ... ..	305
A. Inspect Abutment Face ... ..	305
B. Inspect Bolt Locations ... ..	305
C. Inspect Dowel and Dowel Location ... ..	306

TABLE OF ILLUSTRATIONS

Fig. No.	Page
301 Crack Detection Test Diagram ... ..	303
302 Engine Flow Control Unit ... ..	307
303 LP Compressor Speed Probe Unit ... ..	308
304 Reheat Fuel Controller ... ..	309
305 Purge Reheat Solenoid Valve ... ..	310

LIST OF TABLES

Table No.	Page
301 Items to be Magnetic Particle Crack Tested ... ..	302
302 Items to be Fluorescent Dye Crack Tested ... ..	302
303 Cross References to Illustrated Parts Catalogue... ..	304

INSPECTION/CHECK

73-20-00

Contents 1

Jun 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



FUEL SYSTEM CONTROL - INSPECTION/CHECK

1. General

- A. Each item in this chapter is given a two-part identification; thus, 302-20 refers to Figure 302 and to Item 20 called out on that figure. Each item may be further identified by its Part Number by the use of Table 303, which cross-refers figures in this chapter to the equivalent chapter and figure in the Illustrated Parts Catalogue (I.P.C.); the called-out item number will be the same on both figures.
- B. All items which will be crack tested are listed in Tables 301 and 302.
- C. Dimensional checks are cross referenced to the equivalent Fits and Clearances Schedule (F.C.S.) chapter against the item concerned.
- D. When the inspection of an item discloses a minor defect that requires rectification, it is defined as 'Accept after repair'. On all such occasions the item must be rectified in accordance with Standard Practices 72-09-22 Repair. Where a Ref.No. follows 'Accept after repair' e.g. (Ref.72-21-01 Repair No.1), a specific Repair Scheme is available to which the item must be rectified. Items that are rejected, or for which a repair scheme is not currently available, should be held at the discretion of the operator, as service experience may prove the need for a repair.
- E. On completion of a repair, rectification or test, the item(s) must be inspected, to ensure that the necessary work has been satisfactorily completed.

2. General Inspection

- A. Inspect all items illustrated in this chapter, whether specified or not, in accordance with Standard Practices (Ref.72-09-00 Inspection/Check). In addition, carry out the inspections detailed for the specified items, from para.4 onwards.
- B. Inspection terms used in this chapter are explained in Standard Practices (Ref.72-09-00 Inspection/Check).

3. Crack Detection

A. Magnetic Particle Crack Detection.

- (1) Submit the items listed in Table 301 to crack detection in accordance with the process quoted.

INSPECTION/CHECK

**73-20-00**

Page 301  
Apr 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Items to be crack detected by this method are illustrated in the Crack Detection Test Diagram (Fig.301). For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

No current requirement

Items to be Magnetic Particle Crack Tested  
Table 301

B. Fluorescent Dye Crack Detection.

- (1) Submit the items listed in Table 302 to crack detection in accordance with the process quoted. For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

304	50	Flanged Pin	F1A
304	120	Distance Piece	F1A
304	150	Support Cone	F1A

Items to be Fluorescent Dye Crack Tested  
Table 302

JN32672

INSPECTION/CHECK

73-20-00

Page 302

Jun 1/76



OLYMPUS 593

MK. 610-14-28

OVERHAUL



PRINTED IN ENGLAND

No current requirement

TN4814

Crack Detection Test Diagram  
Figure 301

INSPECTION/CHECK

**73-20-00**

Page 303

Jun 1/76



**OLYMPUS 593**MK.610-14-28  
OVERHAUL

FIG.NO.

ILLUSTRATED PARTS CATALOGUE EQUIVALENT

---

301	Not applicable	
302	73-21-01	Fig.1
303	73-22-01	Fig.1
304	73-23-01	Fig.1
305	73-24-01	Fig.1

---

Cross References to Illustrated Parts Catalogue  
Table 303

**CAUTION:** ENSURE THAT THE HIGHEST POSSIBLE STANDARD OF CLEANLINESS IS OBSERVED WHEN HANDLING FUEL SYSTEM COMPONENTS. BECAUSE OF THE SMALL OPERATING CLEARANCES IN THE CONTROL UNIT, ANY CONTAMINATION MAY LEAD TO MALFUNCTION OF THE SYSTEM.

4. Engine Flow Control Unit (302-10)

- A. Inspect in accordance with the vendor's Overhaul Manual (Ref.73-21-04).

5. LP Compressor Speed Probe Unit (303-10)

- A. Inspect in accordance with the vendor's Overhaul Manual (Ref.73-22-01).

6. Reheat Fuel Controller (304-10)

- A. Inspect in accordance with the vendor's Overhaul Manual (Ref.73-23-01).

7. Purge Reheat Solenoid Valve (305-10)

- A. Inspect in accordance with the vendor's Overhaul Manual (Ref.73-24-01).

8. Brackets (303-40 and 304-70)

- A. Inspect Brackets.

(1) Distortion.

Accept if compatibility is preserved.

INSPECTION/CHECK

**73-20-00**

Page 304

Jun 1/76

TN32673



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(2) Wear and fretting.

(a) Attachment face thickness reduced not more than 5 per cent. Accept

(b) Bolt-holes elongated not more than 0.030 in. (0,760 mm). Accept after repair.

(3) Nicks and burrs. Accept after repair

(4) Scores.

(a) Not more than 0.010 in. (0,250 mm) in depth. Accept after repair providing material thickness is not reduced by more than 5 per cent.

9. Flanged Pin (304-50) and Distance Piece (304-120)

A. Inspect Pin and Distance Piece.

(1) Nicks and burrs. Accept if repair preserves location profile and surface flatness.

10. Support Cone (304-150)

A. Inspect Abutment Face.

(1) Reduction of flange thickness not more than 5 per cent. Accept.

(2) Nicks and burrs. Accept if repair preserves surface flatness.

B. Inspect Bolt Locations.

(1) Nicks and burrs. Accept if repair preserves surface flatness of washer locations.

INSPECTION/CHECK

73-20-00

Page 305

Jun 1/76



OLYMPUS 598

MK.610-14-28  
OVERHAUL



- (2) Bolt-holes elongated not more than 0.030 in. (0,760 mm).

Accept after repair.

C. Inspect Dowel and Dowel Location.

NOTE: The dowel must be secure in its location.

- (1) Fretting and wear.

- (a) Any fretting of dowel holes.

Reject.

- (b) Any wear of dowel.

Reject.

TN32048

INSPECTION/CHECK

**73-20-00**

Page 306

Jun 1/76



OLYMPUS 593

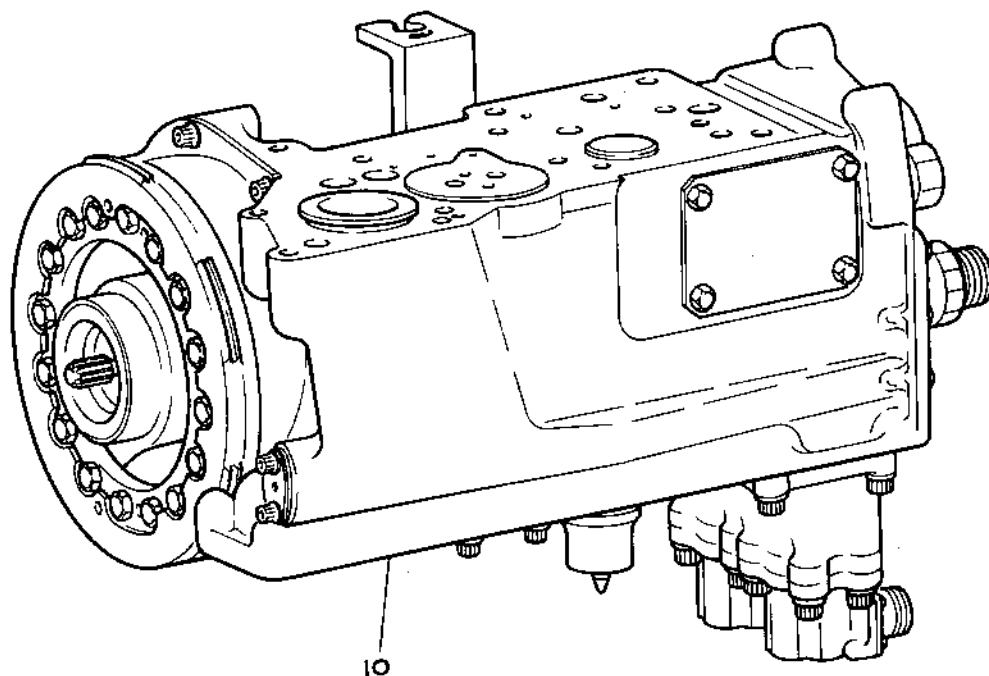
MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

CR 33171/00A



Engine Flow Control Unit  
Figure 302

INSPECTION/CHECK

**73-20-00**

Page 307

Jun 1/76

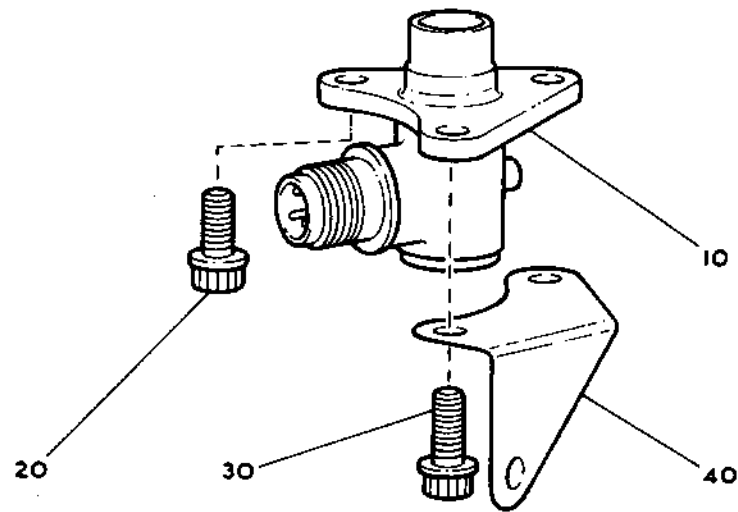
TN32675



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 32476/00B



TN32676

LP Compressor Speed Probe Unit  
Figure 303

INSPECTION/CHECK  
**73-20-00**  
Page 308  
Jun 1/76

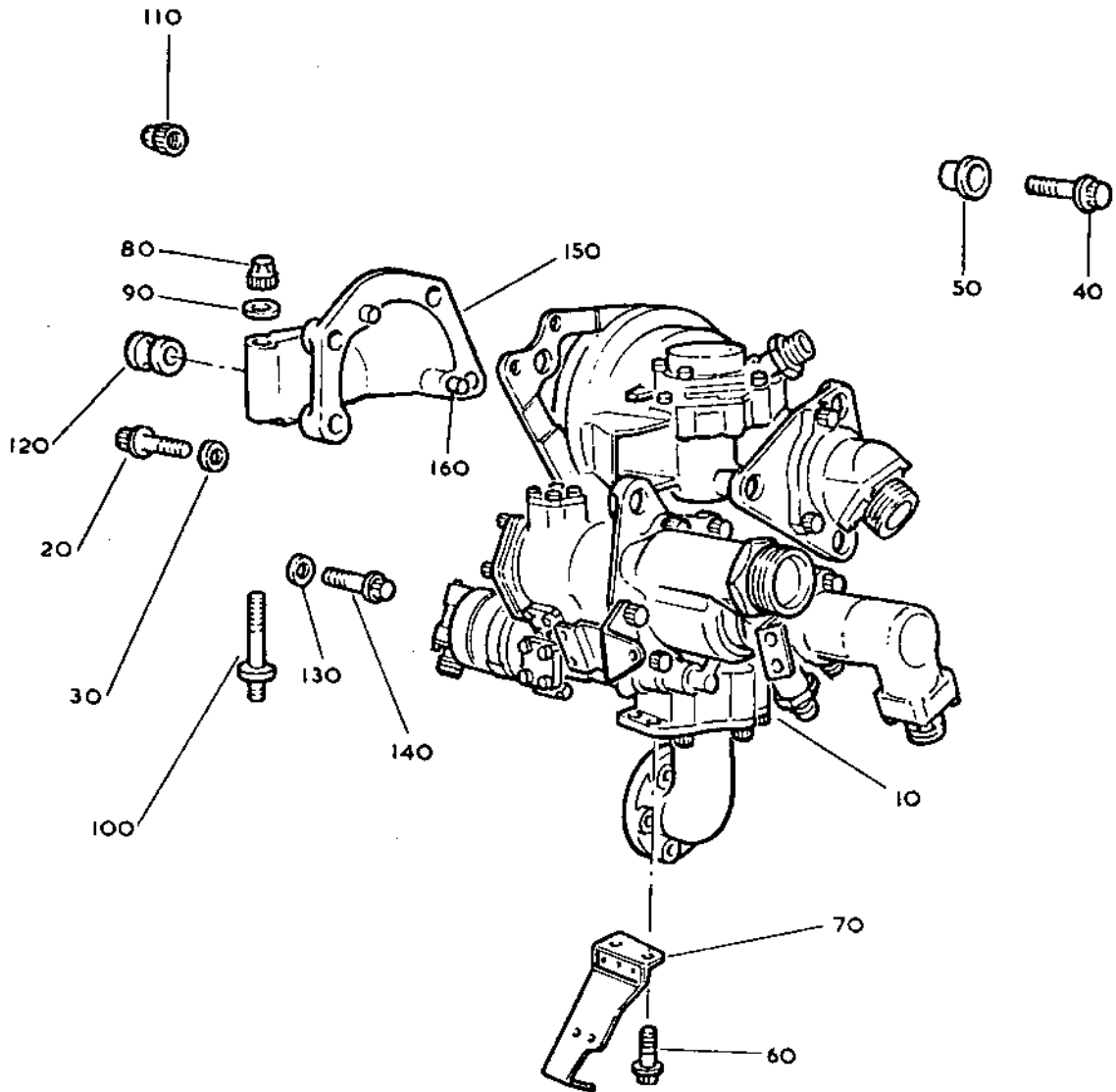


OLYMPUS 593  
MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32540/00B



Reheat Fuel Controller  
Figure 304

INSPECTION/CHECK

73-20-00

Page 309

Jun 1/76

TN32677

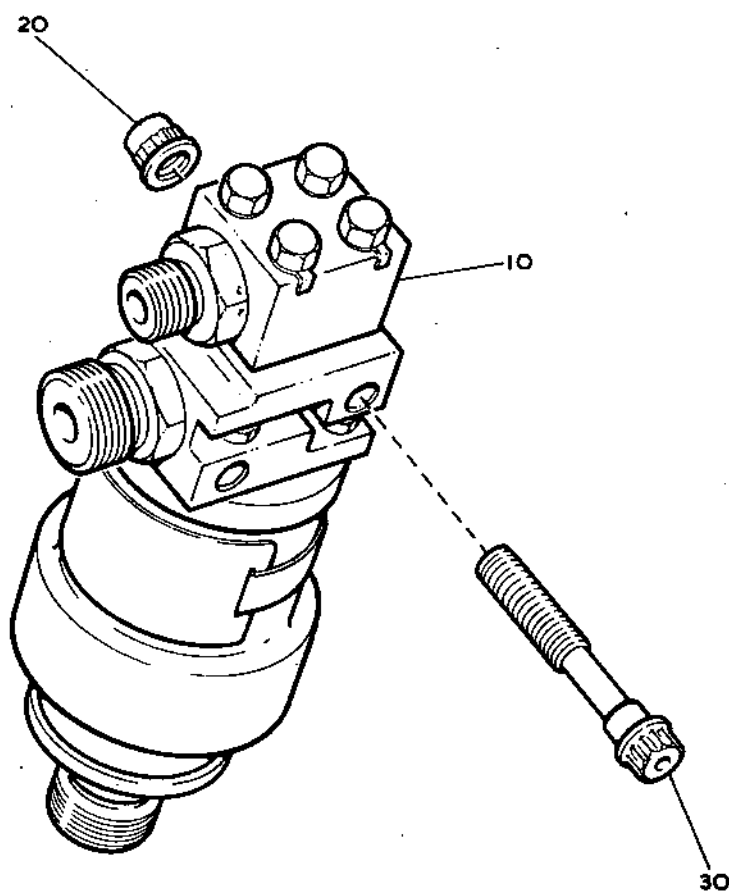


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 33170/00A



TN32678

Purge Reheat Solenoid Valve  
Figure 305

INSPECTION/CHECK  
**73-20-00**  
Page 310  
Jun 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



ENGINE FLOW CONTROL UNIT - CLEANING

L. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING  
**73-21-01**  
Page 201  
Jan 1/77

PRINTED IN ENGLAND

TN1125





OLYMPUS 593

MK.610-14-28

OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	10	Control unit	B	-	For cleaning details refer to vendors overhaul manual

Cleaning Processes  
Table 201

TN3775

CLEANING

73-21-01

Page 202

Jan 1/77



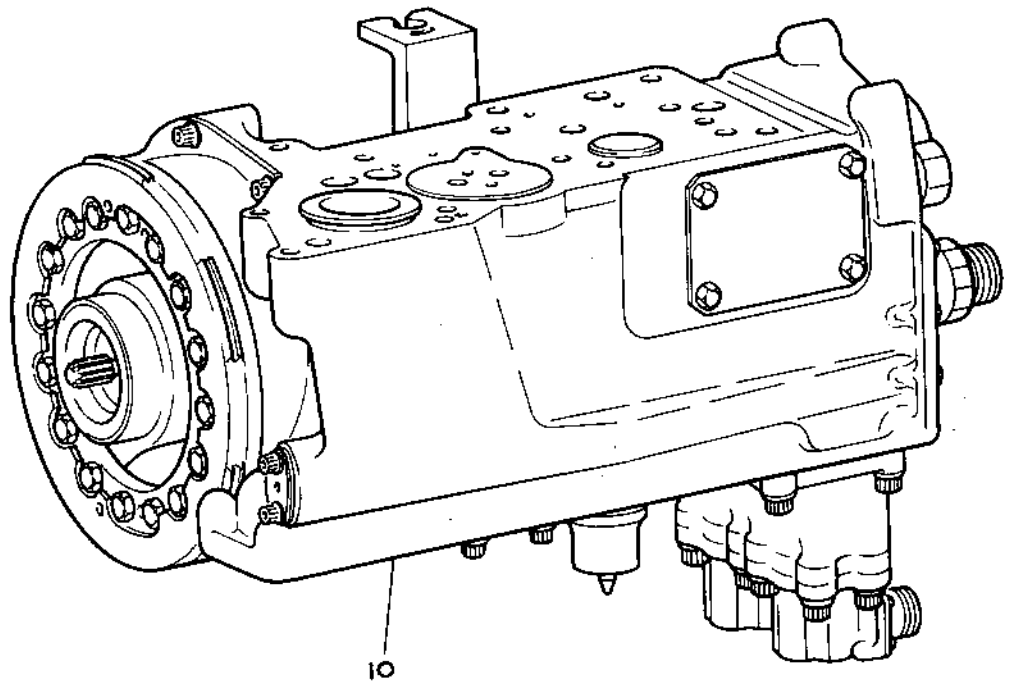
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 33171/00A



TN19799

Control, Unit, Engine Flow  
Figure 201

CLEANING

**73-21-01**

Page 203  
Aug 28/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



## LP COMPRESSOR SPEED PROBE UNIT - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

**73-22-01**

Page 201

Jan 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	-
	except				
	10	Pulse probe	B	-	For cleaning details refer to vendors overhaul manual.

Cleaning Processes  
Table 201

TN32401



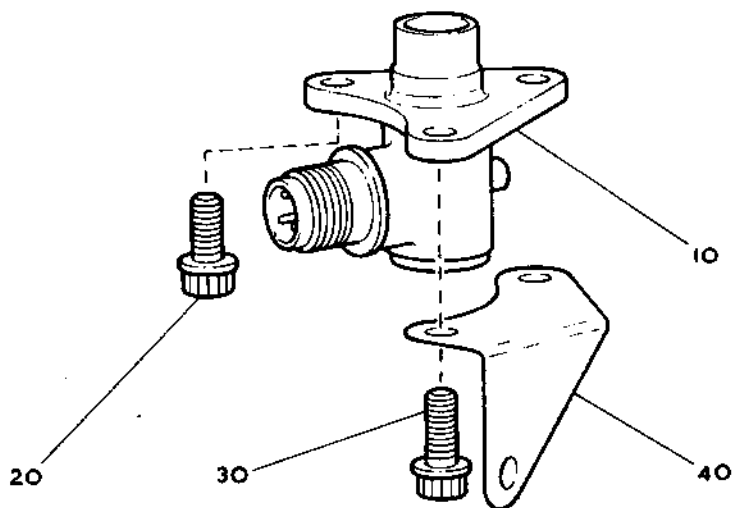
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32476/00B



TN32403

LP Compressor Probe, Overspeed Governor  
Figure 201

CLEANING  
**73-22-01**  
Page 203  
Aug 28/75



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



REHEAT FUEL CONTROLLER - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

73-23-01

Page 201

Jan 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except		A or B	-	-
	10	Fuel control, reheat	B	-	For cleaning details refer to vendors overhaul manual.

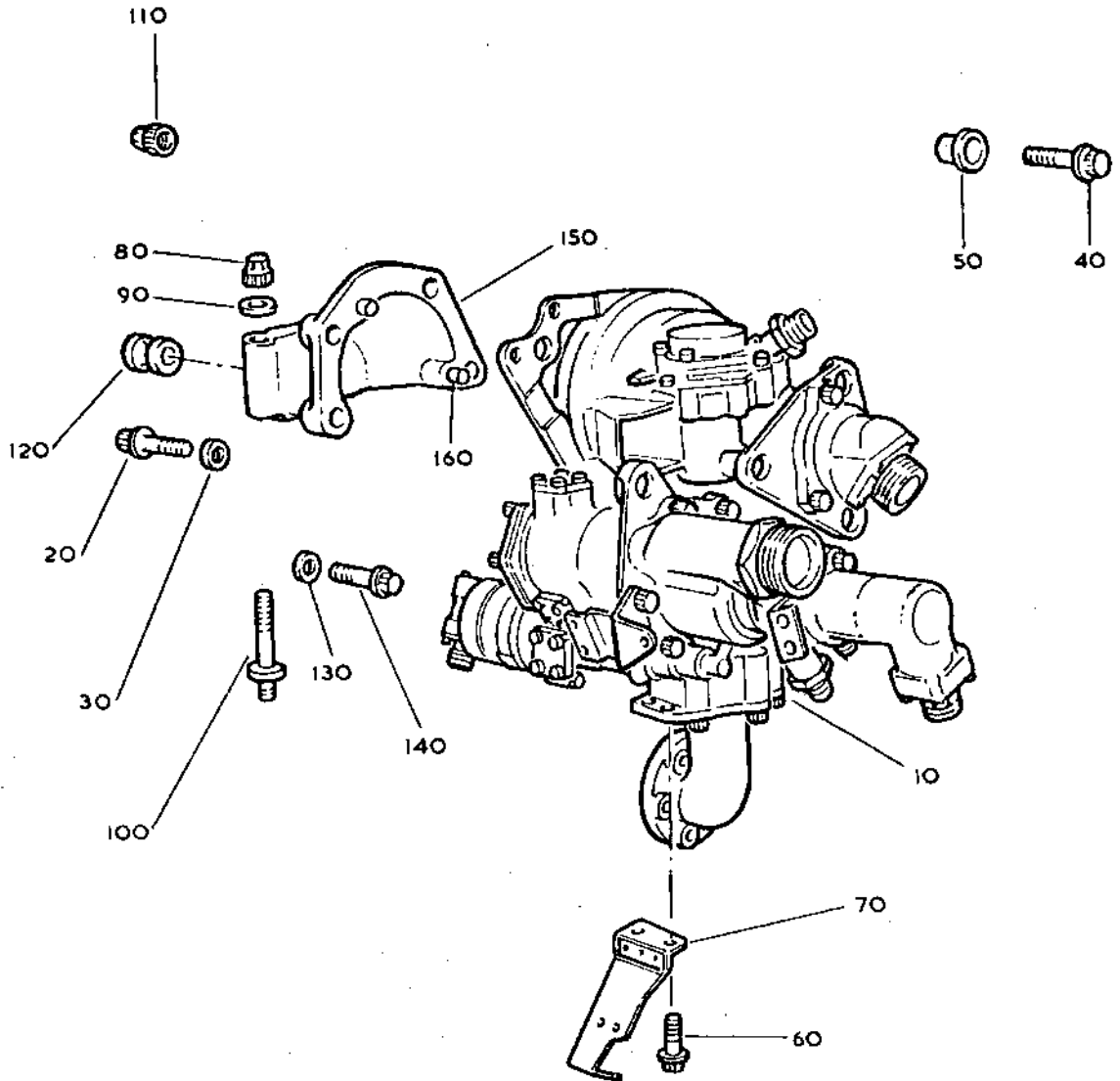
Cleaning Processes  
Table 201

TN20865



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Fuel Control Unit, Reheat  
Figure 201

CLEANING

73-23-01

Page 203

Aug 28/75





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



REHEAT PURGE SOLENOID VALVE - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

**73-24-01**

Page 201  
Jan 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except 10	Valve, solenoid	A or B B	- -	- For cleaning details refer to vendors overhaul manual

Cleaning Processes  
Table 201

TN4195

PRINTED IN ENGLAND

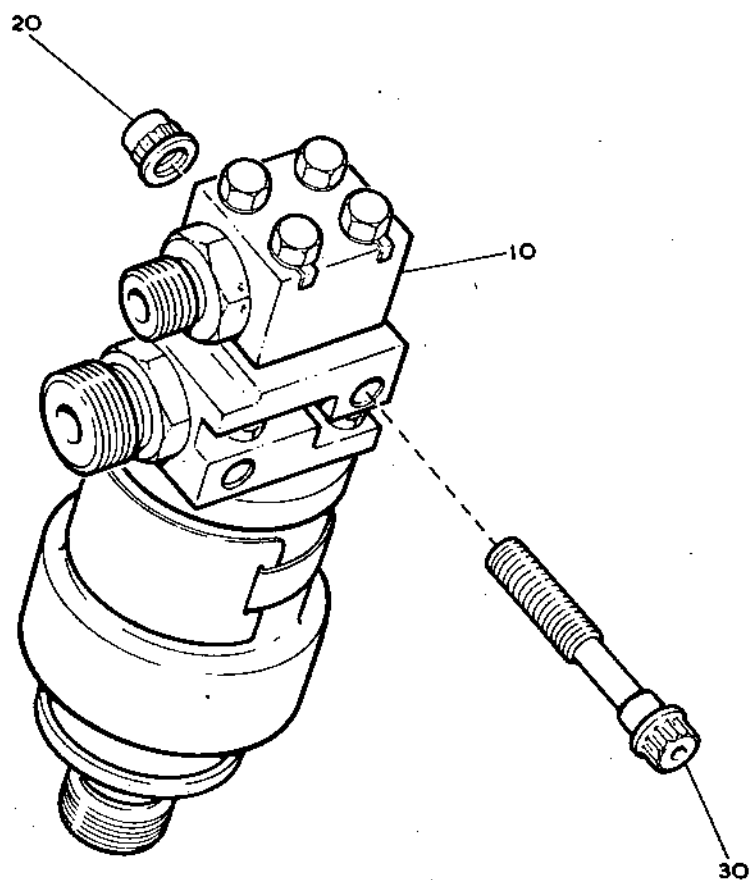
CR 33170/00A



OLYMPUS 593

MK.610-14-28

OVERHAUL



Valve, Solenoid, Purge Reheat  
Figure 201

CLEANING

73-24-01

Page 203

Aug 28/75

TN31815



OLYMPUS 593

MK.610-14-28

OVERHAUL



FUEL SYSTEM INDICATION - INSPECTION CHECK

TABLE OF CONTENTS

Para.	Page
1. General ... ..	301
2. General Inspection ... ..	301
3. Crack Detection ... ..	301
A. Magnetic Particle Crack Detection ... ..	301
B. Fluorescent Dye Crack Detection ... ..	302
4. Fuel Differential Pressure Warning Switch ... ..	304
5. Fuel Nozzle Inlet Thermometer ... ..	304
6. Engine Fuel Flowmeter ... ..	304
7. Reheat Fuel Flowmeter ... ..	304

TABLE OF ILLUSTRATIONS

Fig.No.	Page
301 Crack Detection Test Diagram ... ..	303
302 Fuel Differential Pressure Warning Switch ... ..	305
303 Fuel Nozzle Inlet Thermometer ... ..	306
304 Engine Fuel Flowmeter ... ..	307
305 Reheat Fuel Flowmeter ... ..	308

LIST OF TABLES

Table No.	Page
301 Items to be Magnetic Particle Crack Tested ... ..	302
302 Items to be Fluorescent Dye Crack Tested ... ..	302
303 Cross References to Illustrated Parts Catalogue ... ..	304

PRINTED IN ENGLAND

TN31880

INSPECTION/CHECK

**73-30-00**

Contents 1  
Apr 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



## FUEL SYSTEM INDICATION - INSPECTION/CHECK

### 1. General

- A. Each item in this chapter is given a two-part identification; thus, 302-20 refers to Figure 302 and to Item 20 called out on that figure. Each item may be further identified by its Part Number by the use of Table 303, which cross-refers figures in this chapter to the equivalent chapter and figure in the Illustrated Parts Catalogue (I.P.C.); the called-out item number will be the same on both figures.
- B. All items which will be crack tested are listed in Tables 301 and 302.
- C. Dimensional checks are cross referenced to the equivalent Fits and Clearances Schedule (F.C.S.) chapter against the item concerned.
- D. When the inspection of an item discloses a minor defect that requires rectification, it is defined as 'Accept after repair'. On all such occasions the item must be rectified in accordance with Standard Practices 72-09-22 Repair. Where a Ref.No. follows 'Accept after repair' e.g. (Ref.72-21-01 Repair No.1), a specific Repair Scheme is available to which the item must be rectified. Items that are rejected, or for which a repair scheme is not currently available, should be held at the discretion of the operator, as service experience may prove the need for a repair.
- E. On completion of a repair, rectification or test, the item(s) must be inspected, to ensure that the necessary work has been satisfactorily completed.

### 2. General Inspection

- A. Inspect all items illustrated in this chapter, whether specified or not, in accordance with Standard Practices (Ref.72-09-00 Inspection/Check). In addition, carry out the inspections detailed for the specified items, from para.4 onwards.
- B. Inspection terms used in this chapter are explained in Standard Practices (Ref.72-09-00 Inspection/Check).

### 3. Crack Detection

- A. Magnetic Particle Crack Detection.
  - (1) Submit the items listed in Table 301 to crack detection in accordance with the process quoted.

INSPECTION/CHECK

**73-30-00**

Page 301  
Apr 1/77



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (2) Items to be crack detected by this method are illustrated in the Crack Detection Test Diagram (Fig.301). For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

No current requirement

Items to be Magnetic Particle Crack Tested  
Table 301

B. Fluorescent Dye Crack Detection.

- (1) Submit the items listed in Table 302 to crack detection in accordance with the process quoted. For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

No current requirement

Items to be Fluorescent Dye Crack Tested  
Table 302

TN16172

INSPECTION/CHECK

73-30-00

Page 302

Apr 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

No current requirement

TN16171

Crack Detection Test Diagram  
Figure 301

INSPECTION/CHECK

**73-30-00**

Page 303

Apr 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



FIG.NO.

ILLUSTRATED PARTS CATALOGUE EQUIVALENT

301	Not applicable	
302	73-31-01	Fig.1
303	73-32-01	Fig.1
304	73-33-01	Fig.1
305	73-33-02	Fig.1

Cross References to Illustrated Parts Catalogue  
Table 303

**CAUTION:** ENSURE THAT THE HIGHEST POSSIBLE STANDARD OF CLEANLINESS IS OBSERVED WHEN HANDLING FUEL SYSTEM COMPONENTS. BECAUSE OF THE SMALL OPERATING CLEARANCES IN THE CONTROL UNITS, ANY CONTAMINATION MAY CAUSE MALFUNCTION OF THE SYSTEM.

4. Fuel Differential Pressure Warning Switch (302-10)

A. Inspect in accordance with the vendor's Overhaul Manual (Ref.73-31-01).

5. Fuel Nozzle Inlet Thermometer (303-10A or 10B)

A. Inspect in accordance with the vendor's Overhaul Manual (Ref.73-32-01).

6. Engine Fuel Flowmeter (304-10)

A. Inspect in accordance with the vendor's Overhaul Manual (Ref.73-33-01).

7. Reheat Fuel Flowmeter (305-10)

A. Inspect in accordance with the vendor's Overhaul Manual (Ref.73-33-02).

TN16173

INSPECTION/CHECK

**73-30-00**

Page 304  
Aug 14/75





OLYMPUS 593

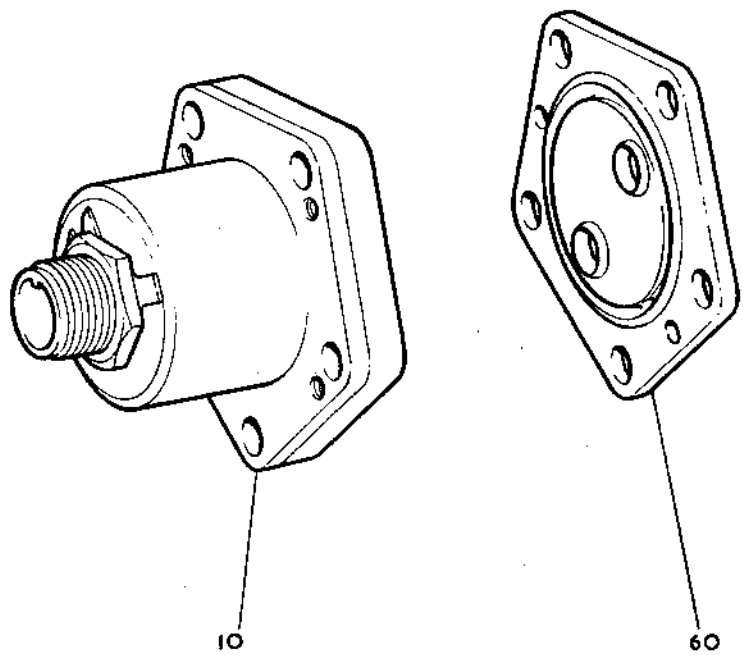
MK. 610-14-28

OVERHAUL



PRINTED IN ENGLAND

CR 33169. 00A



TN16174

Fuel Differential Pressure Warning Switch  
Figure 302

INSPECTION/CHECK

**73-30-00**

Page 305

Aug 14/75

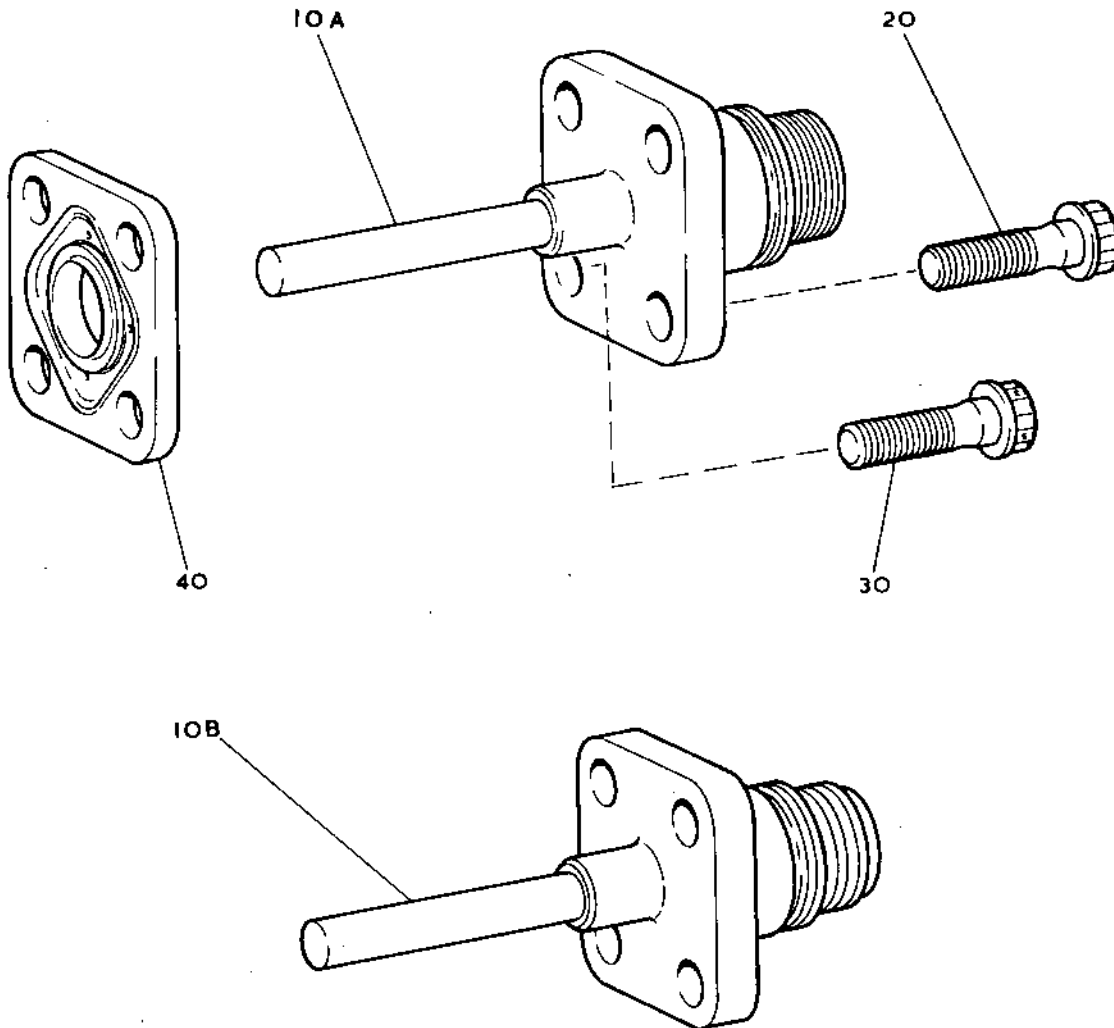


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32477/00B



TN16175

Fuel Nozzle Inlet Thermometer  
Figure 303

INSPECTION/CHECK

**73-30-00**

Page 306  
Aug 14/75



OLYMPUS 593

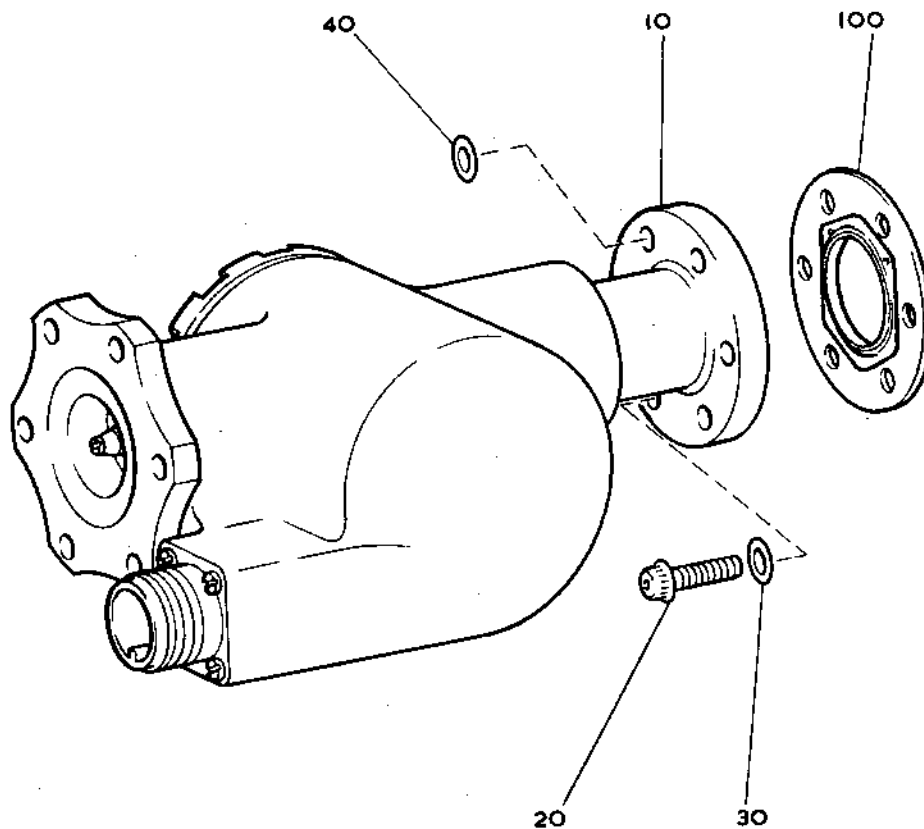
MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

CR 32478/00B



TN16176

Engine Fuel Flowmeter  
Figure 304

INSPECTION/CHECK

**73-30-00**

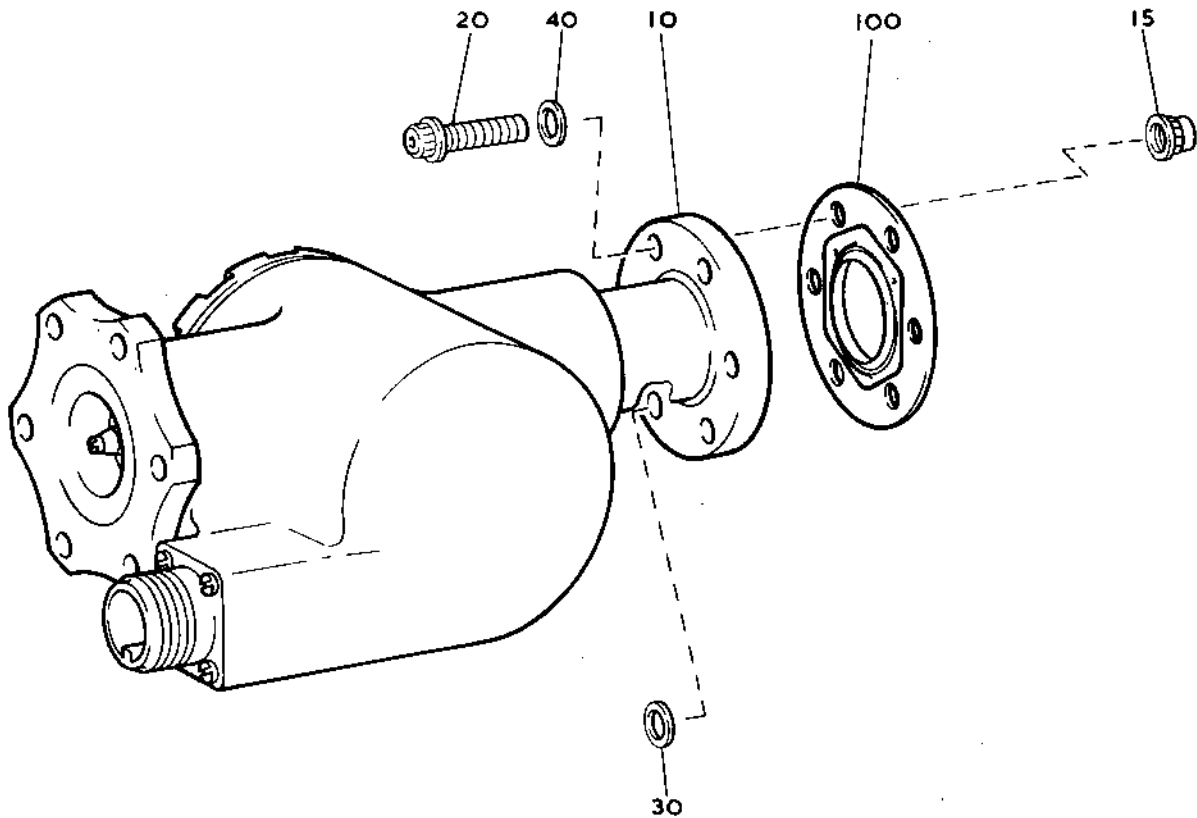
Page 307  
Aug 14/75



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 32385/008



Reheat Fuel Flowmeter  
Figure 305

INSPECTION/CHECK

**73-30-00**

Page 308  
Aug 14/75

TN16177



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



## FUEL DIFFERENTIAL PRESSURE WARNING SWITCH - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

**73-31-01**

Page 201

Jan 1/77



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except 10	Switch, pressure differential	A or B B	- -	- For cleaning details refer to vendors overhaul manual.

Cleaning Procedures  
Table 201

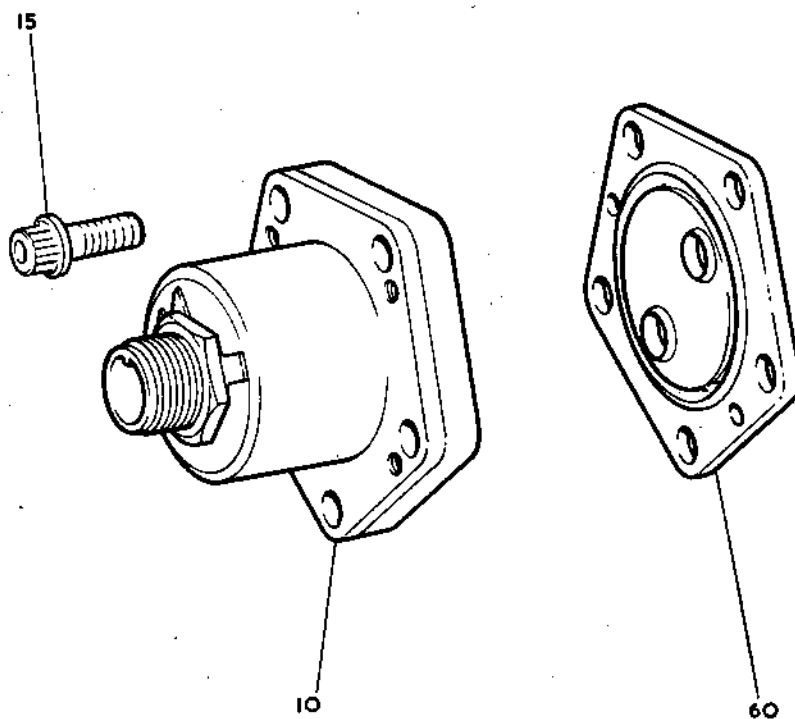
TN30905

PRINTED IN ENGLAND

CR 33169/008



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



TN16210

Switch, Fuel Differential Pressure Warning  
Figure 201

CLEANING  
**73-31-01**  
Page 203  
Jan 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



## FUEL NOZZLE INLET THERMOMETER - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

**73-32-01**

Page 201

Jan 1/77





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except 10	Thermometer	A or B	-	-
			B	-	For cleaning details refer to vendors overhaul manual

Cleaning Processes  
Table 201

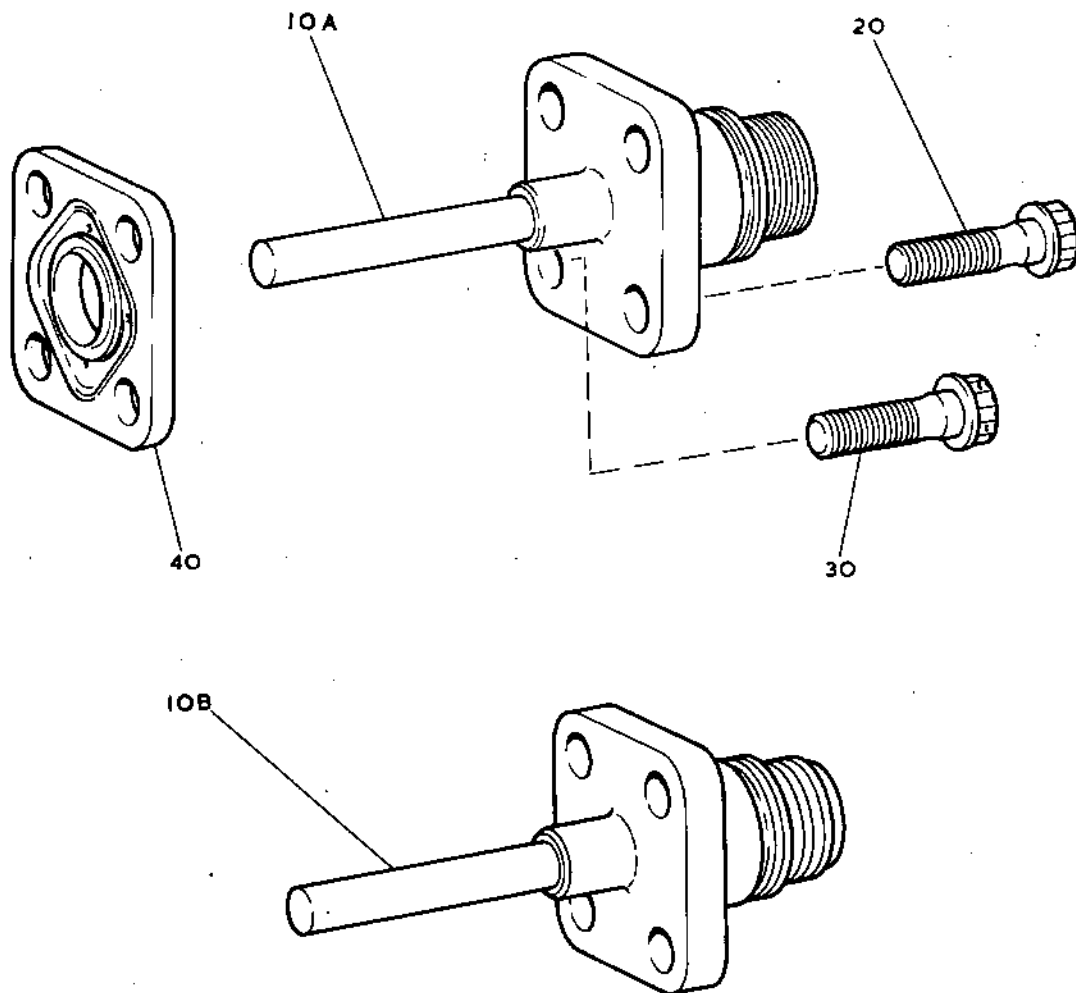
TN27363



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 32477/00B



Thermometer - Fuel Nozzle Inlet  
Figure 201



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



## ENGINE FUEL FLOWMETER - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

PRINTED IN ENGLAND

TN32388

CLEANING

73-33-01

Page 201  
Jan 1/77



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except		A or B	-	-
	10	Flowmeter	B	-	For cleaning details refer to vendors overhaul manual.

Cleaning Processes  
Table 201

TN32389

PRINTED IN ENGLAND

TN32391

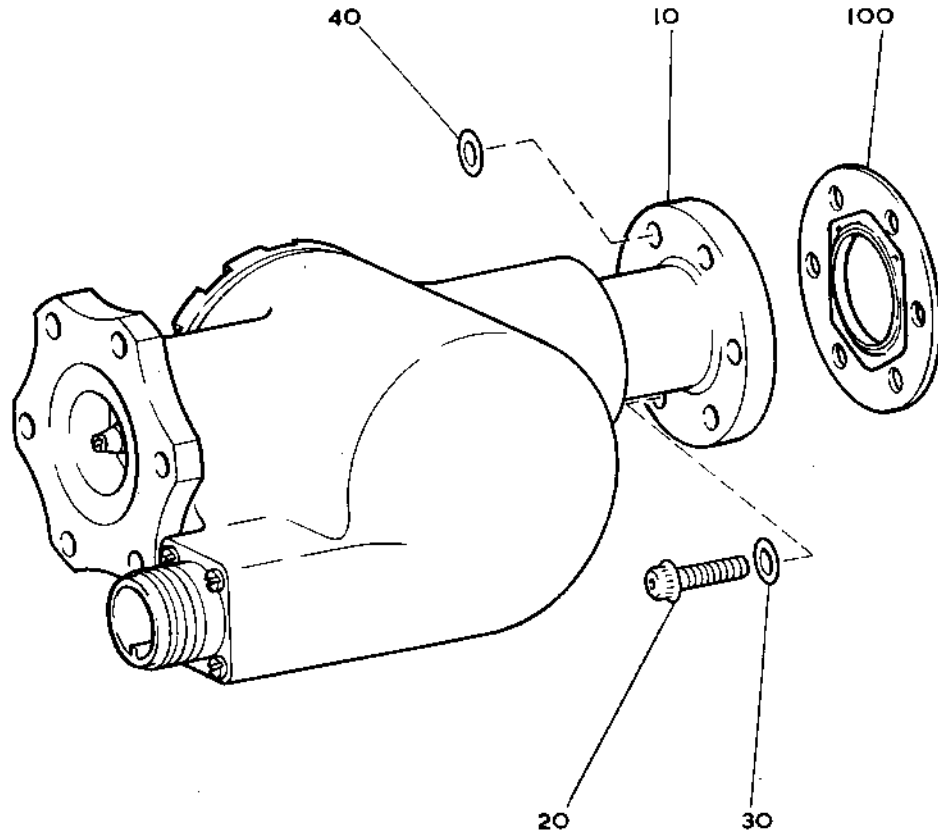


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32478/00B



Flowmeter - Engine Fuel  
Figure 201

CLEANING  
**73-33-01**  
Page 203  
Aug 28/75



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



## REHEAT FUEL FLOWMETER - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

**73-33-02**

Page 201

Jan 1/77



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	-
	except				
	10	Flowmeter	B	-	For cleaning details refer to vendors overhaul manual.

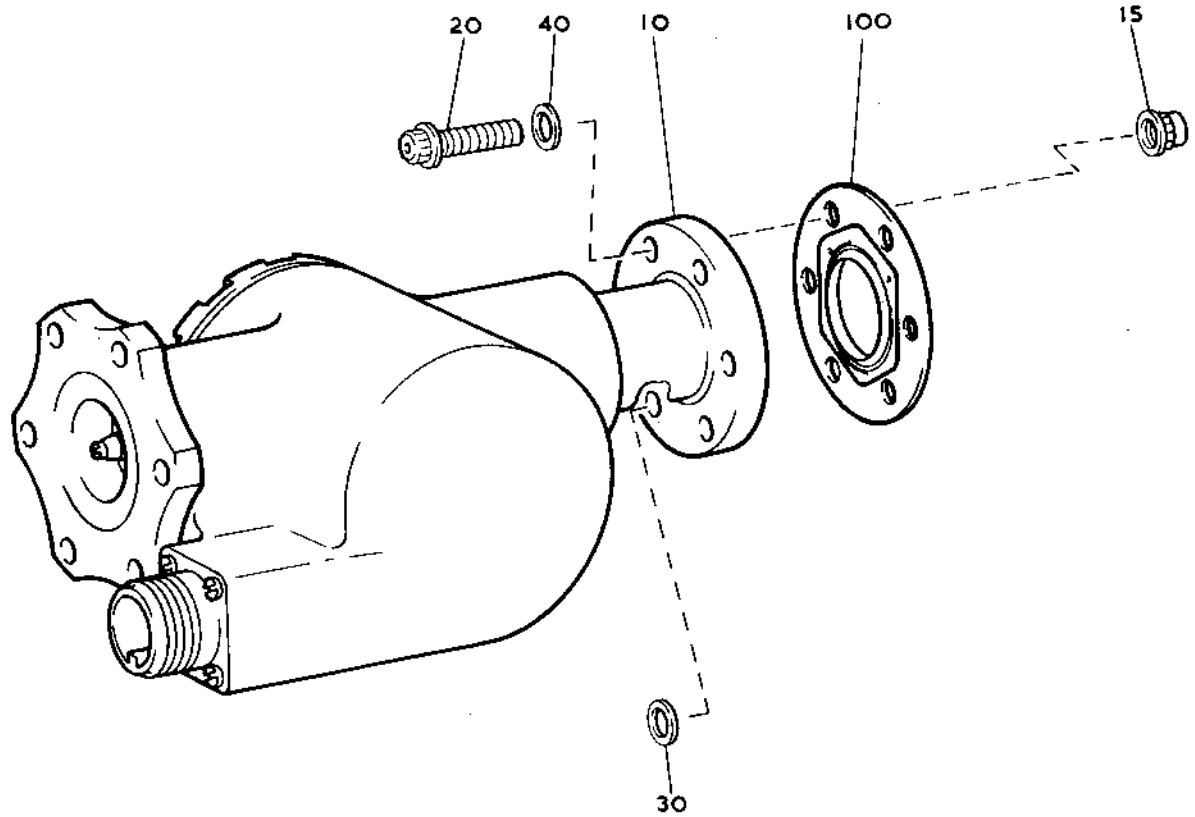
Cleaning Processes  
Table 201

TN32393



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Flowmeter - Reheat Fuel  
Figure 201



**CHAPTER**

**74**

**IGNITION**



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

## CHAPTER 74

### IGNITION

#### LIST OF EFFECTIVE PAGES

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
List of Effective Pages	1	Dec 31/00	Disassembly 74-21-01	1	Dec 31/00
	2	Dec 31/00	Contents	101	Dec 31/00
				102	Dec 31/00
Table of Contents	1	Sep 1/81	Cleaning	201	Jan 1/77
				202	Dec 31/00
Table of Approved Repair Schemes	1	Jan 31/94		203	Dec 31/00
				204	Dec 31/00
Cleaning 74-11-01	201	Jan 1/77	Repair No.1	401	Sep 1/81
	202	Jan 1/77		402	Sep 1/81
	203	Dec 1/79		403	Sep 1/81
				404	Sep 1/81
				405	Sep 1/81
				406	Dec 31/00
Inspection/Check Contents	1	Aug 1/76		407	Jun 1/99
	301	Apr 1/77		408	Sep 1/81
	302	Aug 1/76		409	Jun 1/99
	303	Aug 1/76	Assembly Contents	410	Dec 31/00
	304	Aug 1/76		411	Dec 31/00
	305	Dec 1/79			
74-20-00 Contents	1	Oct 1/79		1	Dec 31/00
	301	Oct 1/79		501	Dec 31/00
	302	Aug 1/76		502	Dec 31/00
	303	Aug 1/76		503	Oct 1/76
	304	Oct 1/79		504	Dec 31/00
	305	Oct 1/79	Testing	505	Oct 1/76
	306	Oct 1/79		506	Dec 31/00
	307	Oct 1/79		507	Dec 31/00
	308	Oct 1/79	Cleaning 74-21-02	701	Dec 31/00
	309	Oct 1/79		702	Dec 31/00
	310	Oct 1/79		201	Jan 1/77
				202	Jan 1/77
				203	Aug 28/75



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sheema

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
Cleaning					
74-22-01	201	Jan 1/77			
	202	Jan 1/77			
	203	Aug 28/75			

Printed in England



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



## CHAPTER 74

### IGNITION

#### TABLE OF CONTENTS

	CH/SEC/SUB	PAGE
List of Effective Pages ... ..	74	-
Table of Contents ... ..	74	-
Table of Approved Repair Schemes ... ..	74	-
High Energy Ignition Unit - Cleaning ... ..	74-11-01	201
Inspection/Check ... ..		301
Ignition Distribution System Inspection/Check (Containing SEC/SUB 74-21-01, 74-21-02 and 74-22-01) ... ..	74-20-00	301
High Energy Ignition Lead ... ..	74-21-01	-
Disassembly ... ..		101
Cleaning ... ..		201
Repair ... ..		401
Assembly ... ..		501
Testing ... ..		701
Engine Ignition Plugs ... ..	74-21-02	-
Cleaning ... ..		201
Reheat Igniter ... ..	74-22-01	-
Cleaning ... ..		201

PRINTED IN ENGLAND

TN33215



OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

CHAPTER 74

IGNITION

TABLE OF APPROVED REPAIR SCHEMES

The following Repair Schemes have been approved by CAA/DGAC.

<u>Chapter/Section</u>	<u>Repair No.</u>	<u>Title</u>	<u>Salvage No.</u>
74-21-01	1	HE Ignition Lead. Replacement of defective components.	B.499462



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



## HIGH ENERGY IGNITION UNIT - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

PRINTED IN ENGLAND

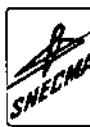
TN4888

CLEANING  
**74-11-01**

Page 201  
Jan 1/77



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except 10	High energy ignition unit	A or B	-	-
			B	-	For cleaning details refer to vendors overhaul manual

Cleaning Processes  
Table 201

TN4889

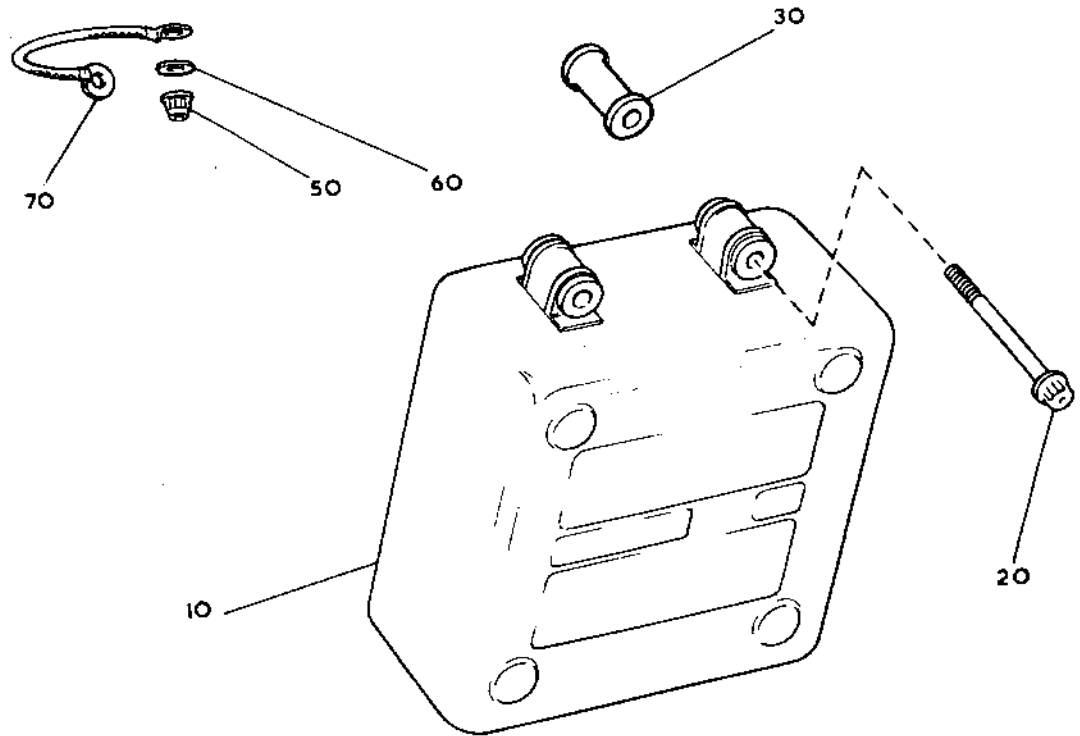


OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32479/00C



High Energy Ignition Unit  
Figure 201.

CLEANING  
**74-11-01**  
Page 203  
Dec 1/79

TN4891





OLYMPUS 593

MK.610-14-28  
OVERHAUL



HIGH ENERGY IGNITION UNIT - INSPECTION/CHECK

TABLE OF CONTENTS

Para.	Page
1. General ... ..	301
2. General Inspection...	301
3. Crack Detection ... ..	301
A. Magnetic Particle Crack Detection ... ..	301
B. Fluorescent Dye Crack Detection ... ..	302
4. High Energy Ignition Unit ... ..	304
5. Electrical Lead (Bonding) ... ..	304

TABLE OF ILLUSTRATIONS

Fig.No.	Page
301 Crack Detection Test Diagram ... ..	303
302 High Energy Ignition Unit ... ..	305

LIST OF TABLES

Table No.	Page
301 Items to be Magnetic Particle Crack Tested ... ..	302
302 Items to be Fluorescent Dye Crack Tested ... ..	302
303 Cross References to Illustrated Parts Catalogue ... ..	304

INSPECTION/CHECK

74-11-01

Contents 1

Aug 1/76

PRINTED IN ENGLAND

TN38172



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



## HIGH ENERGY IGNITION UNIT - INSPECTION/CHECK

### 1. General

- A. Each item in this chapter is given a two-part identification; thus, 302-20 refers to Figure 302 and to Item 20 called out on that figure. Each item may be further identified by its Part Number by the use of Table 303, which cross-refers figures in this chapter to the equivalent chapter and figure in the Illustrated Parts Catalogue (I.P.C.); the called-out item number will be the same on both figures.
- B. All items which will be crack tested are listed in Tables 301 and 302.
- C. Dimensional checks are cross referenced to the equivalent Fits and Clearances Schedule (F.C.S.) chapter against the item concerned.
- D. When the inspection of an item discloses a minor defect that requires rectification, it is defined as 'Accept after repair'. On all such occasions the item must be rectified in accordance with Standard Practices 72-09-22 Repair. Where a Ref.No. follows 'Accept after repair' e.g. (Ref.72-21-01 Repair No.1), a specific Repair Scheme is available to which the item must be rectified. Items that are rejected, or for which a repair scheme is not currently available, should be held at the discretion of the operator, as service experience may prove the need for a repair.
- E. On completion of a repair, rectification or test, the item(s) must be inspected, to ensure that the necessary work has been satisfactorily completed.

### 2. General Inspection

- A. Inspect all items illustrated in this chapter, whether specified or not, in accordance with Standard Practices (Ref.72-09-00 Inspection/Check). In addition, carry out the inspections detailed for the specified items, from para.4 onwards.
- B. Inspection terms used in this chapter are explained in Standard Practices (Ref.72-09-00 Inspection/Check).

### 3. Crack Detection

- A. Magnetic Particle Crack Detection.

- (1) Submit the items listed in Table 301 to crack detection in accordance with the process quoted.

INSPECTION/CHECK

74-11-01

Page 301

Apr 1/77



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (2) Items to be crack detected by this method are illustrated in the Crack Detection Test Diagram (Fig.301). For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

No current requirement

Items to be Magnetic Particle Crack Tested  
Table 301

B. Fluorescent Dye Crack Detection.

- (1) Submit the items listed in Table 302 to crack detection in accordance with the process quoted. For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

No current requirement

Items to be Fluorescent Dye Crack Tested  
Table 302

TN35848

INSPECTION/CHECK

74-11-01

Page 302  
Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

No current requirement

TN35849

Crack Detection Test Diagram  
Figure 301

INSPECTION/CHECK

**74-11-01**

Page 303

Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



---

FIG. NO.	ILLUSTRATED PARTS CATALOGUE EQUIVALENT
----------	--

---

301	Not applicable	
302	74-11-01	Fig.1

---

Cross References to Illustrated Parts Catalogue  
Table 303

4. High Energy Ignition Unit (302-10)
- A. Inspect in Accordance with Vendors Overhaul Manual  
(Ref.74-10-44).
5. Electrical Lead (Bonding) (302-70)
- A. Inspect Bonding Lead.
- (1) Damage.
- (a) Copper wires secure at connector joints;  
connectors crack-free and undistorted.
- Accept.

IN35850

INSPECTION/CHECK

74-11-01

Page 304  
Aug 1/76

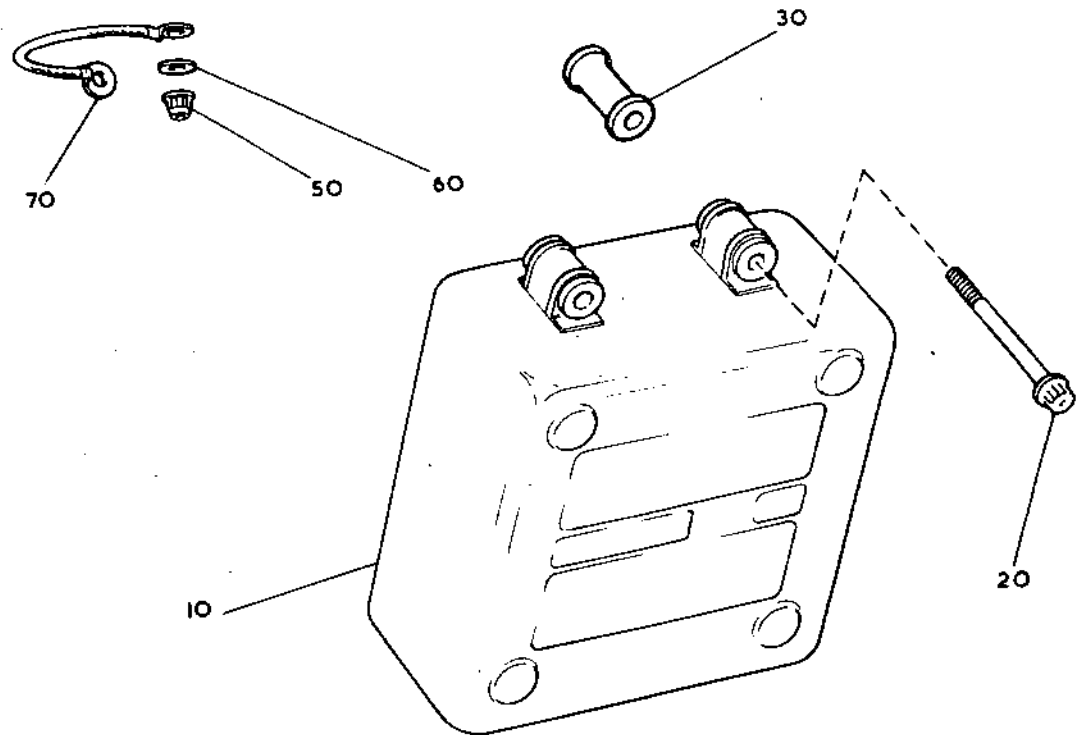


OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32479/00C



TN47427

High Energy Ignition Unit  
Figure 302

INSPECTION/CHECK

74-11-01

Page 305  
Dec 1/79



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



IGNITION DISTRIBUTION SYSTEM - INSPECTION/CHECK

TABLE OF CONTENTS

Para.	Page
1. General ... ..	301
2. General Inspection... ..	301
3. Crack Detection ... ..	301
A. Magnetic Particle Crack Detection ... ..	301
B. Fluorescent Dye Crack Detection ... ..	302
4. High Energy Ignition Lead Assemblies... ..	304
A. Inspect Contact Cap ... ..	304
B. Inspect Insulator ... ..	304
C. Inspect Connector Assembly and Ferrules ... ..	305
D. Inspect Union Nut Sealing Washer... ..	305
E. Inspect Elbow ... ..	305
F. Inspect Ferrule ... ..	305
G. Inspect Clip ... ..	305
H. Inspect Convolute Tubing ... ..	306
J. Carry Out Electrical Checks ... ..	306
5. Igniter Plugs ... ..	306
6. Spacer Washer ... ..	306
7. Reheat Igniter Assembly ... ..	306

TABLE OF ILLUSTRATIONS

Fig.No.	Page
301 Crack Detection Test Diagram ... ..	303
302 Ignition Lead Clipping (Sheet 1 of 2) ... ..	307
302 Ignition Lead Clipping (Sheet 2 of 2) ... ..	308
303 Engine Igniter Plug ... ..	309
304 Reheat Igniter Assembly ... ..	310

LIST OF TABLES

Table No.	Page
301 Items to be Magnetic Particle Crack Tested ... ..	302
302 Items to be Fluorescent Dye Crack Tested ... ..	302
303 Cross References to Illustrated Parts Catalogue ... ..	304

INSPECTION/CHECK

74-20-00

Contents 1

Oct 1/79



OLYMPUS 593

MK.610-14-28

OVERHAUL



## IGNITION DISTRIBUTION SYSTEM - INSPECTION/CHECK

### 1. General

- A. Each item in this chapter is given a two-part identification; thus, 302-10 refers to Figure 302 and to Item 10 called out on that figure. Each item may be further identified by its Part Number by the use of Table 303, which cross-refers figures in this chapter to the equivalent chapter and figure in the Illustrated Parts Catalogue (I.P.C.); the called-out item number will be the same on both figures.
- B. All items which will be crack tested are listed in Tables 301 and 302.
- C. Dimensional checks are cross referenced to the equivalent Fits and Clearances Schedule (F.C.S.) chapter against the item concerned.
- D. When the inspection of an item discloses a minor defect that requires rectification, it is defined as 'Accept after repair'. On all such occasions the item must be rectified in accordance with Standard Practices 72-09-22 Repair. Where a Ref.No. follows 'Accept after repair' e.g. (Ref.72-21-01 Repair No.1), a specific Repair Scheme is available to which the item must be rectified. Items that are rejected, or for which a repair scheme is not currently available, should be held at the discretion of the operator, as service experience may prove the need for a repair.
- E. On completion of a repair, rectification or test, the item(s) must be inspected, to ensure that the necessary work has been satisfactorily completed.

### 2. General Inspection

- A. Inspect all items illustrated in this chapter, whether specified or not, in accordance with Standard Practices (Ref.72-09-00 Inspection/Check). In addition, carry out the inspections detailed for the specified items, from para.4 onwards.
- B. Inspection terms used in this chapter are explained in Standard Practices (Ref.72-09-00 Inspection/Check).

### 3. Crack Detection

- A. Magnetic Particle Crack Detection.

(1) Submit the items listed in Table 301 to crack detection in accordance with the process quoted.

INSPECTION/CHECK

**74-20-00**

Page 301

Oct 1/79





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Items to be crack detected by this method are illustrated in the Crack Detection Test Diagram (Fig.301). For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

No current requirement

Items to be Magnetic Particle Crack Tested  
Table 301

B. Fluorescent Dye Crack Detection.

- (1) Submit the items listed in Table 302 to crack detection in accordance with the process quoted. For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

No current requirement

Items to be Fluorescent Dye Crack Tested  
Table 302

TN14386

INSPECTION/CHECK

74-20-00

Page 302

Aug 1/76



OLYMPUS 593

MK. 610-14-28

OVERHAUL



PRINTED IN ENGLAND

No current requirement

TN43749

Crack Detection Test Diagram  
Figure 301

INSPECTION/CHECK

**74-20-00**

Page 303

Aug 1/76



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



SEE TR

FIG.NO.	ILLUSTRATED PARTS CATALOGUE EQUIVALENT		
301	Not applicable		
302 Sheet 1 of 2	74-21-01	Fig.1	
302 Sheet 2 of 2	74-21-01	Fig.2	
303	74-21-02	Fig.1	
304	74-22-01	Fig.1	

Cross References to Illustrated Parts Catalogue  
Table 303

4. High Energy Ignition Lead Assemblies - 2 off (302-10)

A. Inspect Contact Cap.

(1) Check soldered cable joint.

(a) Any erosion or burning. Reject.

(b) Any independant movement of cap, or suspicion of dry joint. Reject.

(2) Security.

(a) Cap detached or missing. Reject.

B. Inspect Insulator.

(1) Cracks or chips. Reject.

TN43750

INSPECTION/CHECK

74-20-00

Page 304  
Oct 1/79

# British airways

## CONCORDE

### OLYMPUS 593 OVERHAUL MANUAL

Temporary Revision No. 74-501  
Insert in 74-20-00 after page 304

#### REASON FOR ISSUE:

Ignition leads (P/N's B479405, B487558 and B495471) which have been removed from an engine installed in an aircraft or engines located in Engine Shop, LHR, are to have the following workshop check carried out (DDA A256/10).

#### ACTION

High energy ignition leads - Workshop check

1. Ultra sonically clean the ignition lead.
2. Using genklene, clean the ceramic and button.
3. Inspect ceramic for cracks and chips.
4. Inspect button for erosion or burning.
5. Inspect ferrules and nuts for tightness and security of locking.
6. Inspect ceramic and button for security on conductor
  - A. P/N's B479405 and B487558 are brazed joint.
  - B. P/N B495471 is a crimp joint.
7. Inspect convoluted tubing for tears and punctures and clips securely locating tubing on ferrules. Ensure that seal is in position on elbow.

#### Testing.

1. High voltage test between outer metal braiding and conductor - 5KV. for 1 minute.

NOTE: Operational voltage 2KV. at 8 joules 70 sparks/minute.

2. Continuity test as per 74-21-01 page 702 paragraph 3B(2) (a), followed by bonding resistance test as per 74-21-01 page 702 paragraph 3B(3) (a).

1 May 1981

TR.74-501  
74-20-00  
TR. Page 1 of 1



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



(2) Security.

(a) Manipulate insulator to  
check security.

(i) Insulator secure                      Accept.  
on cable.

C. Inspect Connector Assembly and Ferrules (Ref.72-09-00  
Inspection/Check).

D. Inspect Union Nut Sealing Washer.

(1) Security and general condition.

(a) Washer secure in                      Accept.  
location; free of  
cracks or distortion.

E. Inspect Elbow.

(1) Security.

(a) Joint at retaining                      Accept.  
collar sound and  
intact.

(2) Distortion.

(a) No excessive                      Accept.  
misalignment.

(3) Dents.

(a) Shallow, smooth-                      Accept.  
contoured, not crush-  
ing cable.

F. Inspect Ferrule (Ref.72-09-00 Inspection/Check).

G. Inspect Clip.

(1) Security.                      Accept.

(a) Correctly positioned on  
ferrule; convoluted  
tubing secure.

PRINTED IN ENGLAND

TN44031

INSPECTION/CHECK

74-20-00

Page 305  
Oct 1/79



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



H. Inspect Convolute Tubing.

- |                         |  |
|-------------------------|--|
| (1) Tears or punctures. | Reject.  |
| (2) Burning.            | Reject.  |
| (3) Heat deformation.   | Accept, subject to<br>satisfactory<br>electrical checks. |
| (4) Compression.        | Accept, subject to<br>satisfactory<br>electrical checks. |

NOTE: Pay particular attention to clip  
locations.

J. Carry Out Electrical Checks (Ref.74-21-01 Testing).

5. Igniter Plugs - 2 off (303-10)

- A. Inspect in Accordance with the vendor's Overhaul Manual  
(Ref.74-21-02).

6. Spacer Washer (303-20)

- NOTE: This item requires selection during assembly. Used  
washers will be discarded at overhaul.

7. Reheat Igniter Assembly (304-10)

- A. Inspect in Accordance with the vendor's Overhaul Manual  
(Ref.74-22-01).

TN47426

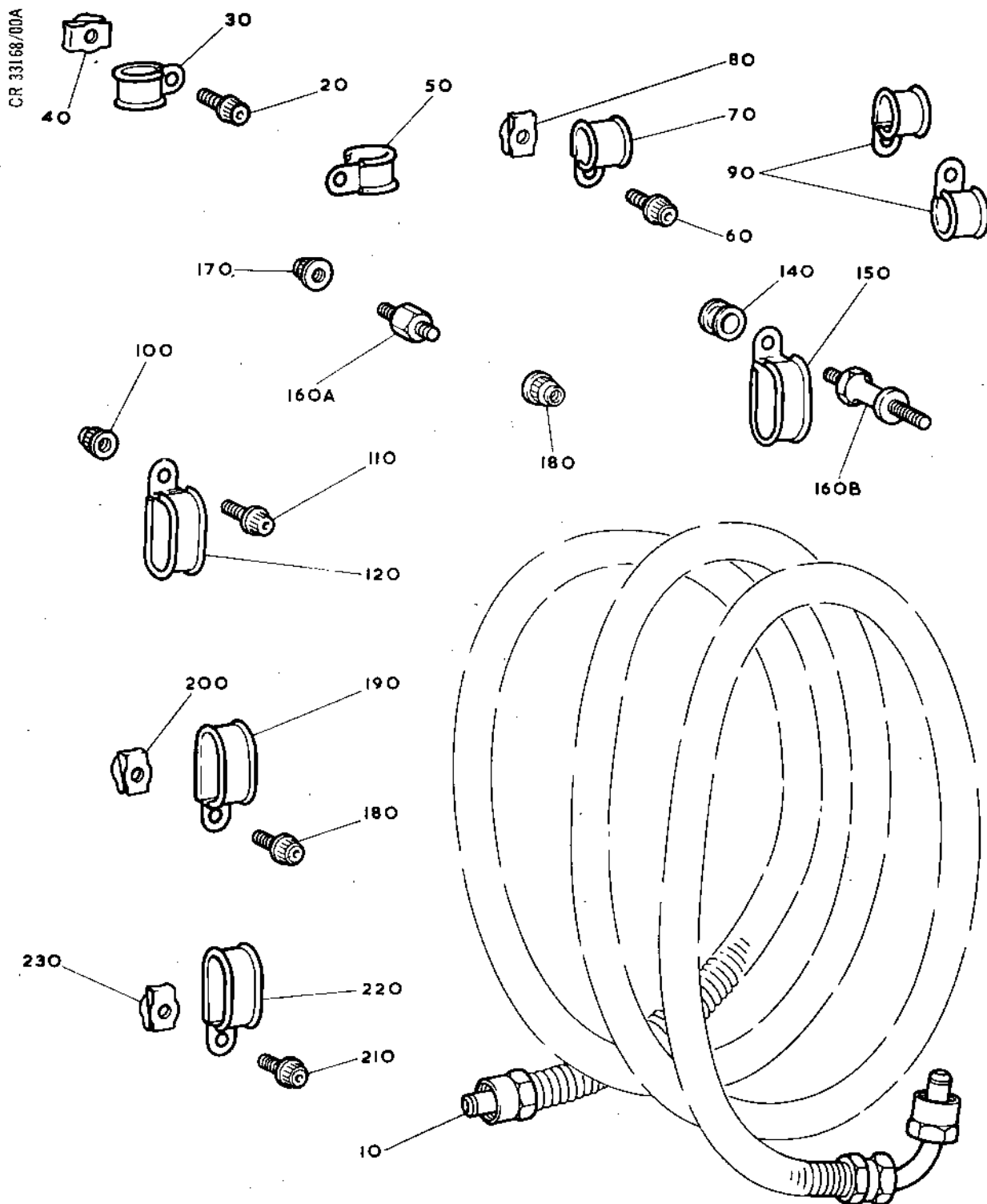
INSPECTION/CHECK

74-20-00

Page 306  
Oct 1/79



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

TN47428

Ignition Lead Clipping (Sheet 1 of 2)  
Figure 302

INSPECTION/CHECK

74-20-00

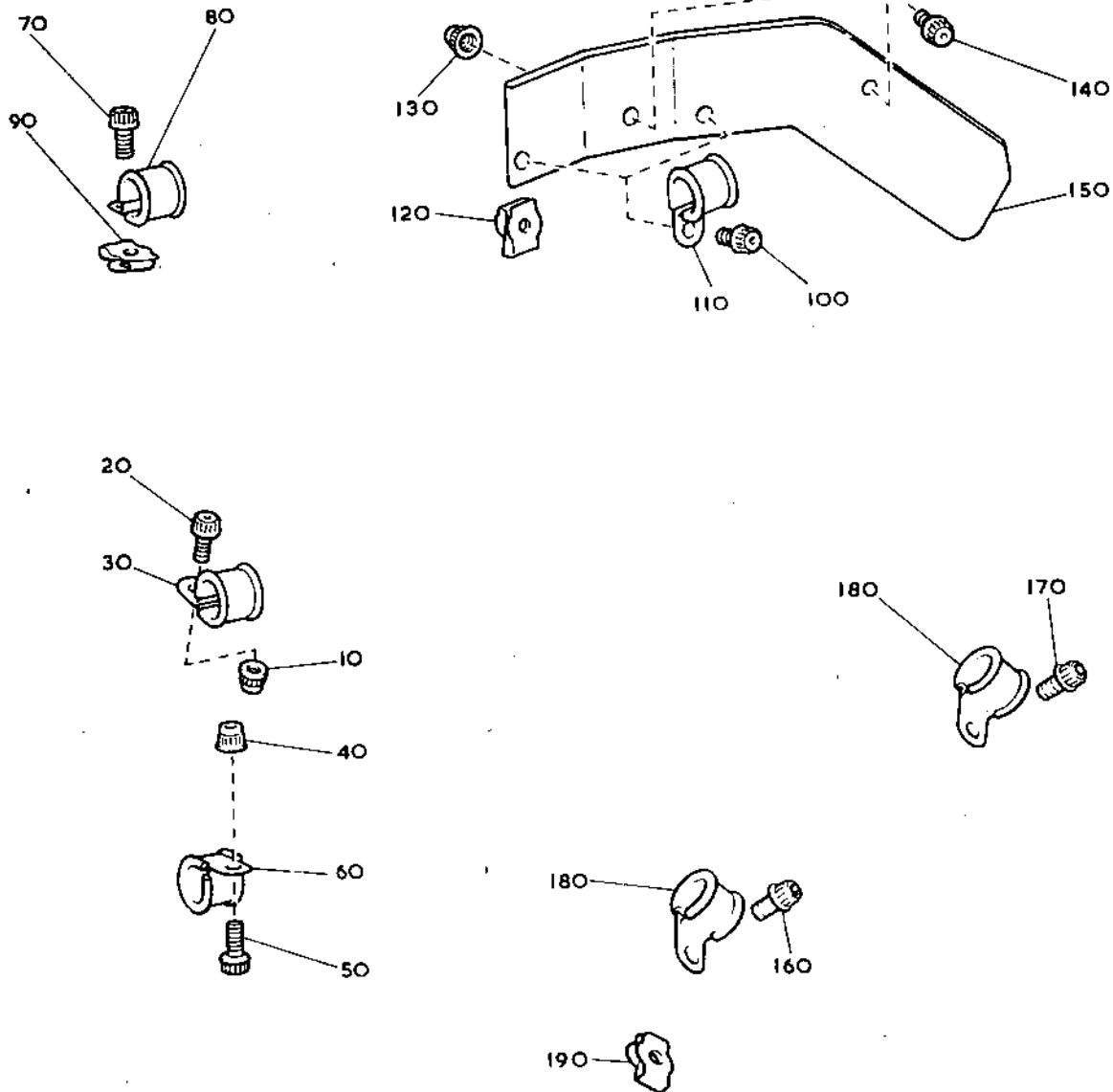
Page 307  
Oct 1/79



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 33167/00A



TN44032

Ignition Lead Clipping (Sheet 2 of 2)  
Figure 302

INSPECTION/CHECK

**74-20-00**

Page 308  
Oct 1/79



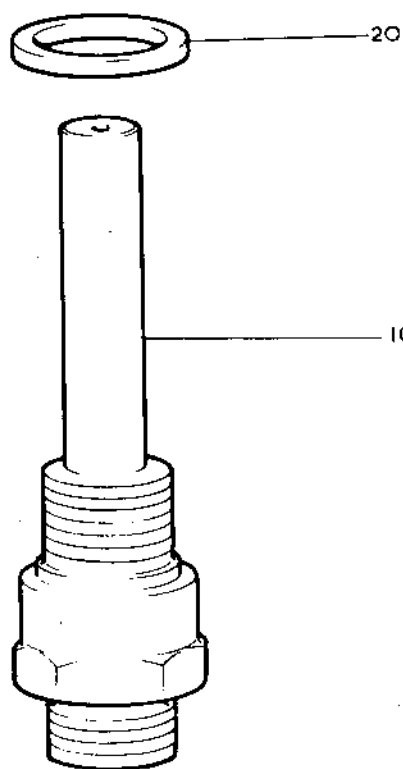
PRINTED IN ENGLAND

TN16156

CR 32481/00B



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



Engine Igniter Plug  
Figure 303

INSPECTION/CHECK

**74-20-00**

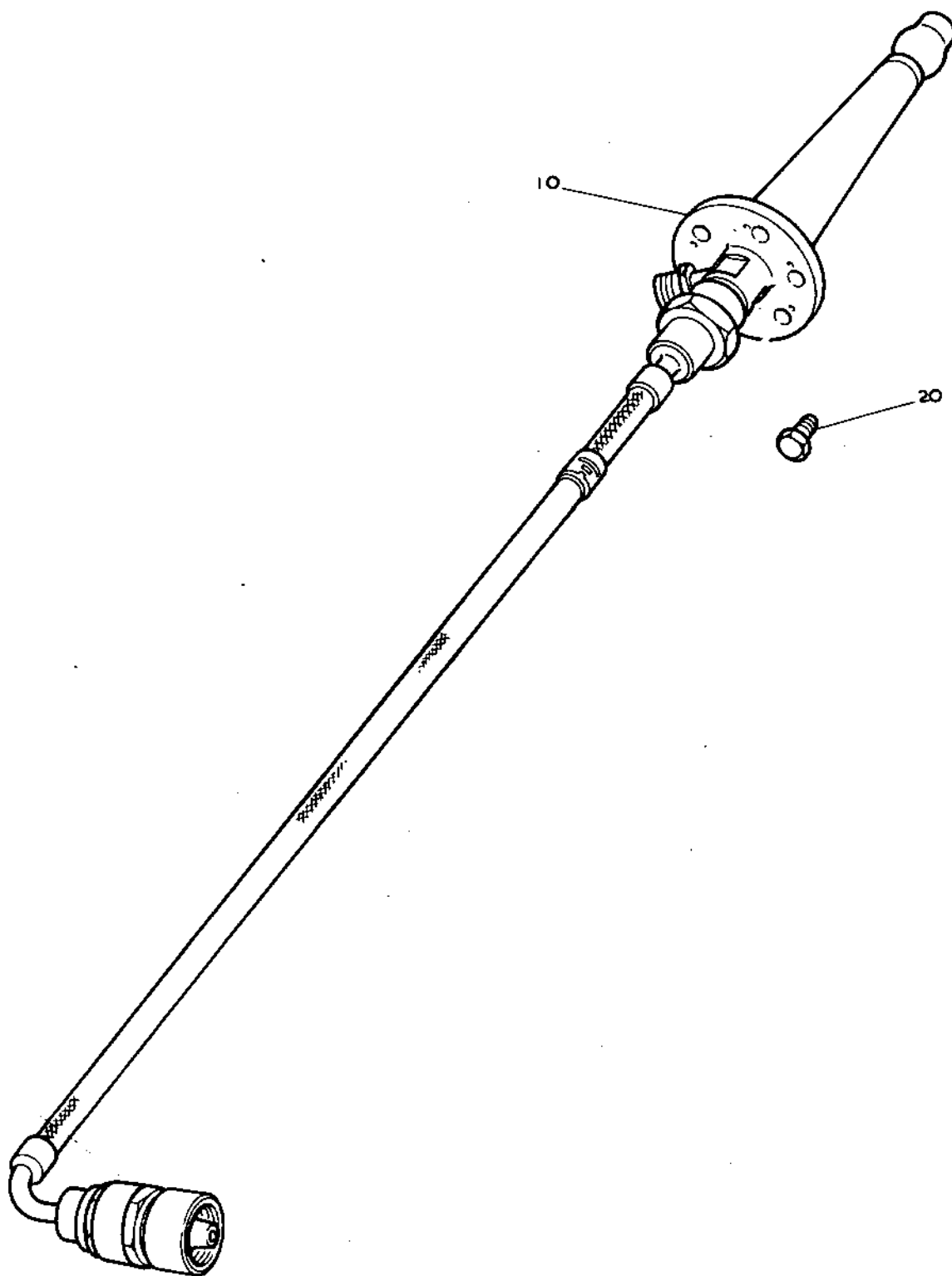
Page 309  
Oct 1/79



OLYMPUS 593

MK.610-14-28

OVERHAUL



Reheat Igniter Assembly  
Figure 304

TN16157

INSPECTION/CHECK

**74-20-00**

Page 310

Oct 1/79



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

HIGH ENERGY IGNITION LEAD - DISASSEMBLY

TABLE OF CONTENTS

Para.	Page
1. General ... ..	101
2. Disassembly of the Ignition Lead (Pre.SB.OL.593-74-9084-19 standard)...	101
A. General ... ..	101
B. Removal of the Elbow Assembly ...	101
C. Removal of the Connector Assembly ...	101

TABLE OF ILLUSTRATIONS

Fig.No.	Page
101 Disassembly of the H.E. Lead (Pre SB.OL.593-74-9084-19 standard) ... ..	102

Printed in England

**ATP  
TEMPORARY  
REVISION**

**BRITISH AIRWAYS**

TR Page 1 of 2  
11 March 1991

CONCORDE  
ENGINE  
OVERHAUL MANUAL (ATP E7925)

This Temporary Revision complies with BCAR Chapter A5-3, B5-3 and/or TSS No. 0-2 as appropriate  
for Chief Engineer (Technical & Quality Services) CAA Design Approval No.  
DAI/8566/78.

*W. Chubb*

TEMPORARY REVISION No 74-A

Manual Reference 74-21-01 Page 101

REASON FOR REVISION

To include High Energy Ignition Lead Refurbishment Schedule Specification No.  
CON 74-21-01-100 issue 1 (MCR.EPA.3.4215.20.MD).

ACTION

Refurbishment Specification

1. The work schedule listed below is to allow the High Energy Ignition Lead to be considered as a "Condition Monitored Unit". This means that this unit is considered to have no known hidden "Wear Out" features that require planned time interval specific inspections. However, such units may be required to be stripped and inspected purely to gain experience of their condition.
2. The requirement to refurbish units is controlled by the Approved Maintenance Schedule.
3. Where the term "Visual Inspection" is used it implies a visual inspection of all parts exposed arising either as a result of the minimum work content of the refurbishment schedule or to a greater extent of strip indicated by other reasons, i.e. repair of damage, embodiment of modifications etc.
4. During refurbishment of a unit, modifications are to be embodied in accordance with the BA call-up list.
5. Ultrasonically clean the unit.
6. Using Genklene, clean the ceramic insulators and contact caps.
7. Inspect the ceramic insulators for cracks and chips.
8. Inspect the contact caps for erosion or burning.
9. Inspect the ferrules and nuts for tightness and security of locking.
10. Inspect the ceramic insulators and contact caps for security on conductor. Note: part no. B487558 is a brazed joint and part No's B495471 and 4ba14333 are crimped joints.
11. Inspect the convoluted tubing for tears and punctures and that the clips are securely locating the tubing on the ferrules. Ensure that the seal is in its correct position on the elbow.

CONCORDE  
ENGINE  
OVERHAUL MANUAL (ATP E7925)  
TEMPORARY REVISION No 74-A (Cont'd)

12. Test unit as follows:-

- a) High voltage test between outer metal braiding and conductor. 5KV for 1 min.  
Note: operational voltage is 2KV at 8 joules and 70 sparks per min.
- b) Continuity test the conductor using tester. During test flex the lead to reveal discontinuities.
- c) The bonding resistance check of the outer cable is not to exceed 0.05 ohms.

13. The unit's inspection and release documentation is to state that the unit has been refurbished in accordance with Specification CON 74-21-01-100 Issue 1.



OLYMPUS 593



MK.610-14-28  
OVERHAUL

shecma

## HIGH ENERGY IGNITION LEAD - DISASSEMBLY

### 1. General

- A. The section contains the procedure for the disassembly required to replace an unacceptable item following inspection or trouble shooting.
- B. The procedures for the removal of the high energy ignition leads from the power plant are detailed in 71-00-02 Electrical Harness and Ignition Leads - Disassembly.

### 2. Disassembly of the Ignition Lead (Pre SB.0L.593-74-9084-19 standard)

#### A. General.

This procedure is only to be performed when an unacceptable item is to be replaced.

#### B. Removal of the Elbow Assembly (Ref.Fig.101).

- (1) Unsolder the contact cap from the core. Remove the contact cap and the insulator.
- (2) Remove lock wire connecting the ferrule and the elbow assembly and unscrew the connection.
- (3) Withdraw the elbow assembly from the cable and remove the seal.

#### C. Removal of the Connector Assembly (Ref.Fig.101).

- (1) Unsolder the contact cap from the core. Remove the contact cap and the insulator.
- (2) Remove the clip securing the conduit to the connector and draw back to expose the integral ferrule of the connector.
- (3) Unsolder the integral ferrule of the connector from the flexible metal tubing.
- (4) Withdraw the connector from the cable.

Printed in England

DISASSEMBLY

74-21-01

Page 101

Dec 31/00

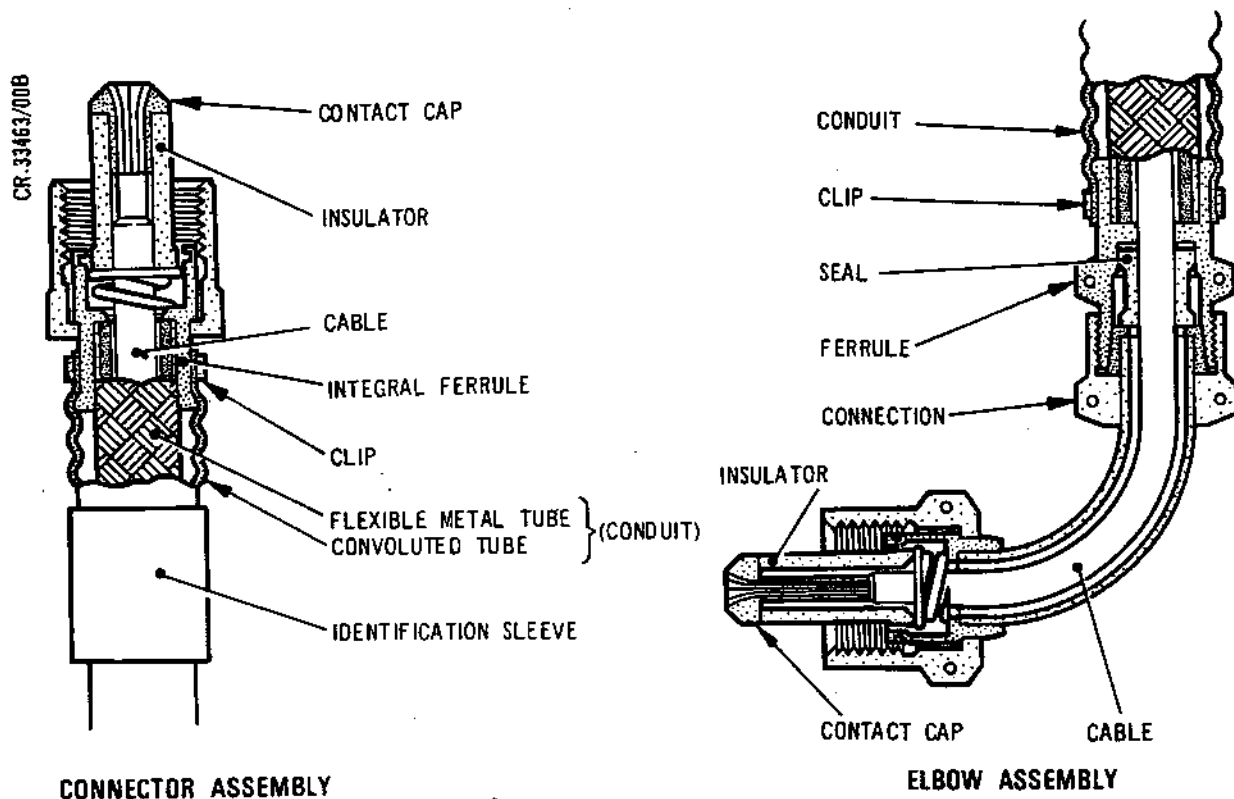


OLYMPUS 593

MK.610-14-28  
OVERHAUL



SNECMA



Disassembly of the H.E. Lead  
(Pre SB.0L.593-74-9084-19 standard)  
Figure 101



OLYMPUS 593

MK.610-14-28

OVERHAUL



## HIGH ENERGY IGNITION LEADS - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

74-21-01

Page 201

Jan 1/77





# OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except 10	Lead assembly	A or B -	- -	- Wipe clean using a clean, dry, lint- free cloth. (The lead connector components may be cleaned using Isopropyl Alcohol - Ref. Chapter 72-09-00 Cleaning, Table 214B).
202	ALL		A or B	-	-

Cleaning Processes  
Table 201

CLEANING

74-21-01

Page 202  
Dec 31/00

CR 33168/00B  
BS00029912/1

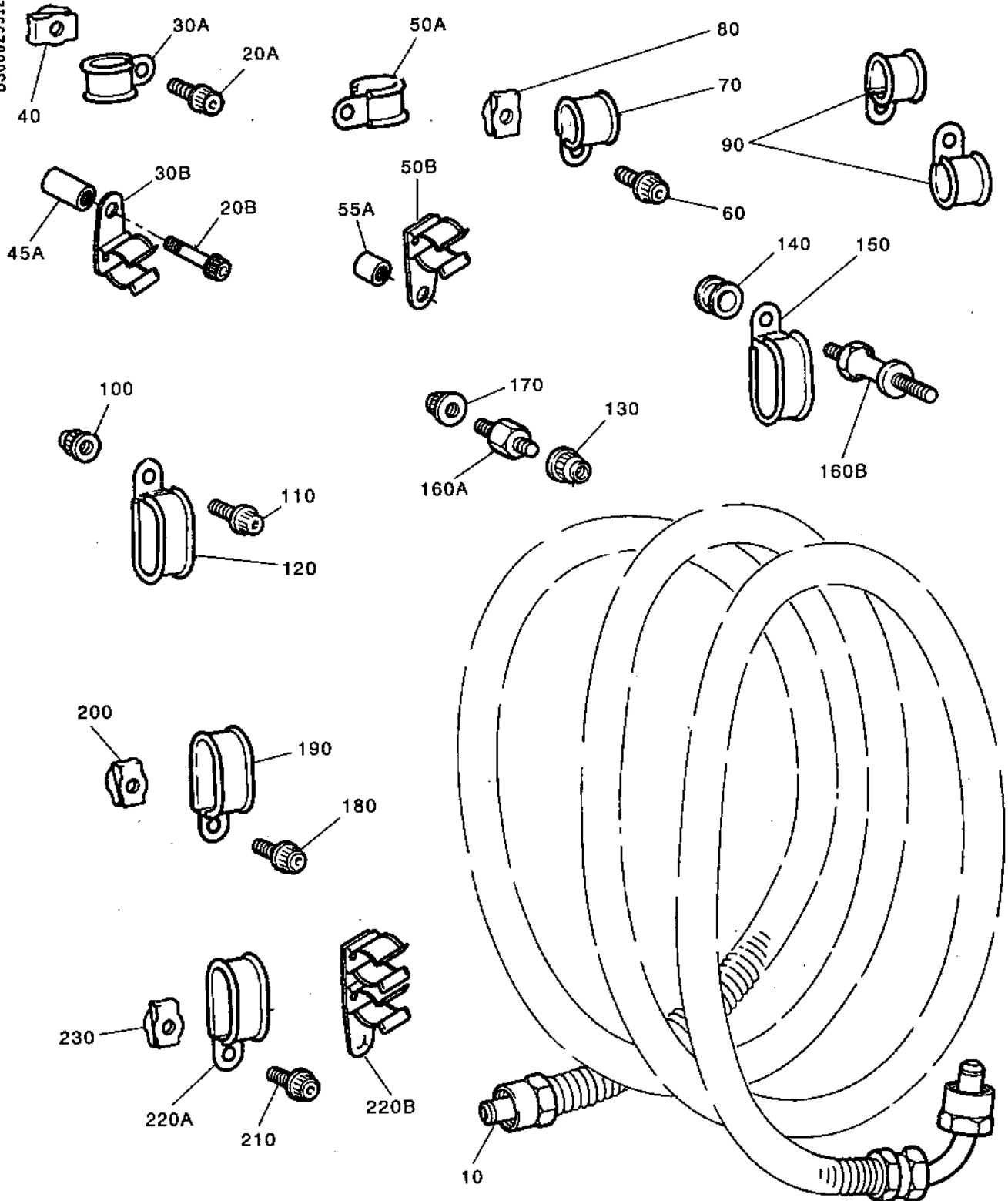


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Ignition Leads, High Energy  
Figure 201

CLEANING

74-21-01

Page 203  
Dec 31/00



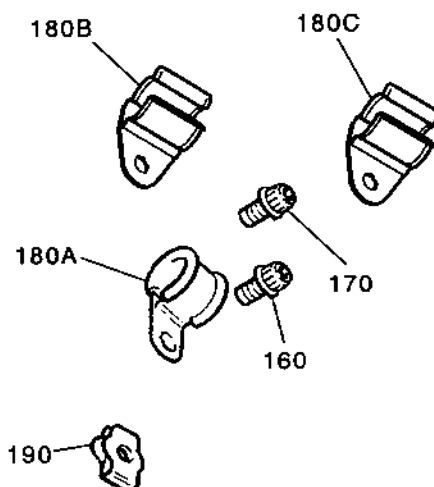
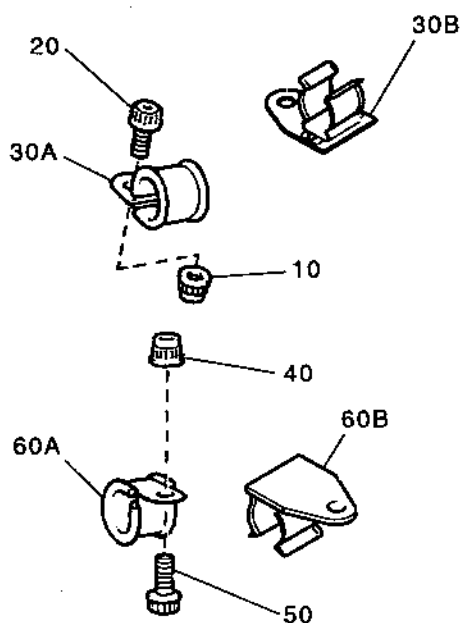
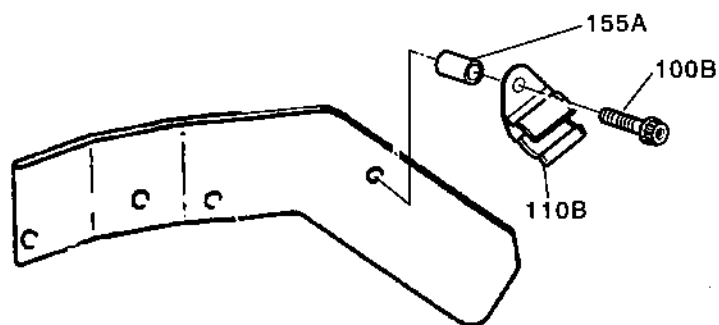
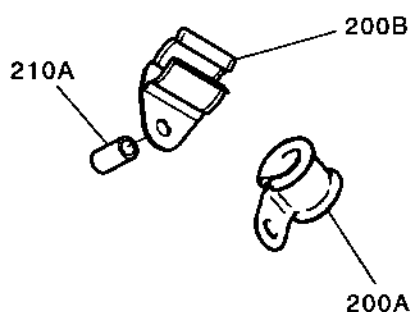
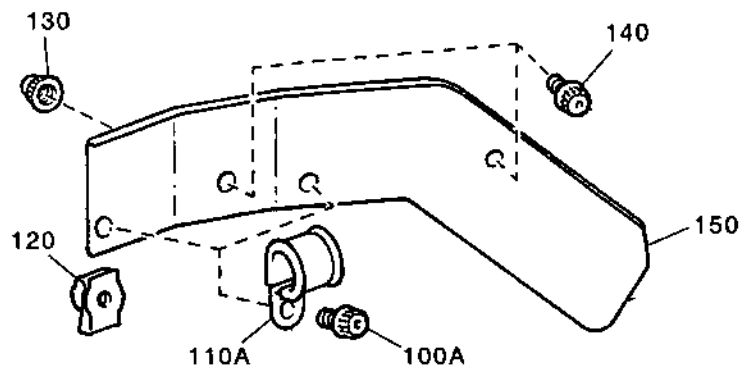
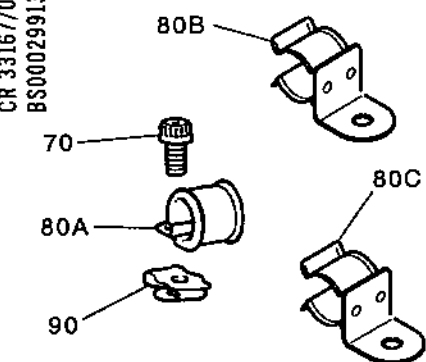
OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

CR 33167/00C  
BS00029913/1



Ignition Leads, High Energy  
Figure 202

CLEANING

74-21-01

Page 204  
Dec 31/00



HIGH ENERGY IGNITION LEAD - REPAIR  
REPLACEMENT OF DEFECTIVE COMPONENTS

MODIFICATION NO. OL.8778C

1. Effectivity

<u>I.P.C.</u>	<u>FIG./ITEM</u>	<u>PART NO.</u>
74-21-01	1 10C	B.495471

2. Introduction

A. General.

- (1) This repair applies when there is a requirement to replace one or more unacceptable items of ignition leads with cables incorporating crimped contact caps.
- (2) Items listed in Table 402 must be renewed, irrespective of condition, whenever an ignition lead is dismantled.
- (3) In the assembly procedure, component names are followed with the corresponding Fig./Item number of the Illustrated Parts Catalogue.
- (4) Dimensions on illustrations are given in INCHES followed by (MILLIMETRES).
- (5) Consumable materials required during this repair are listed in Table 401.

PRINTED IN ENGLAND

TN34973



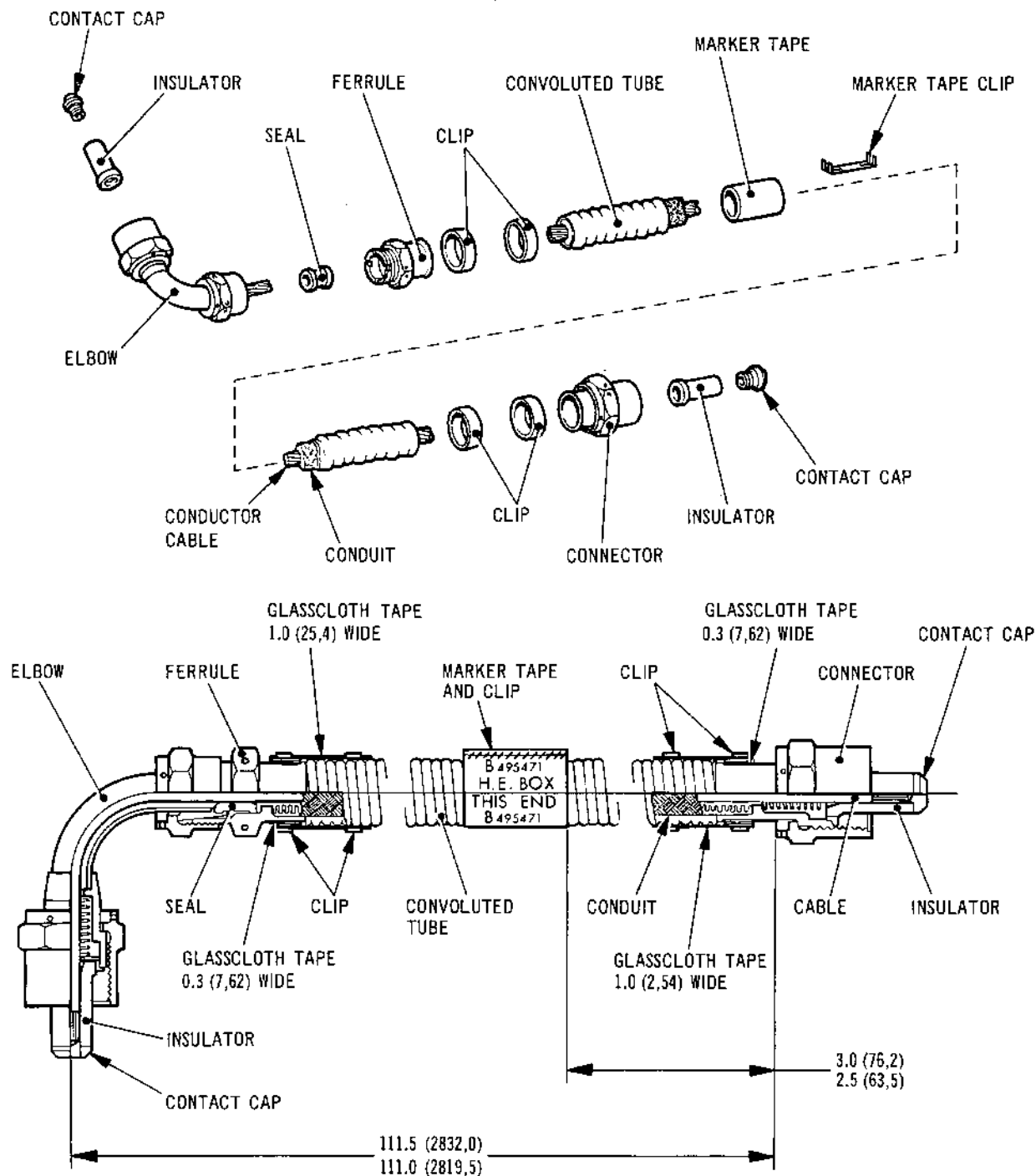
# OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 35822/00A



APPLY SILICONE VARNISH  
WHERE MARKED //

DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)

HE Ignition Lead Identification and Assembly Details  
Figure 401

REPAIR  
**74-21-01**  
Repair No.1  
Page 402  
Sep 1/81

TN25525



OLYMPUS 593

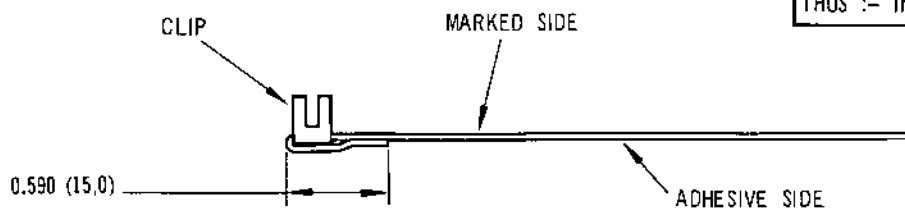
MK.610-14-28

OVERHAUL

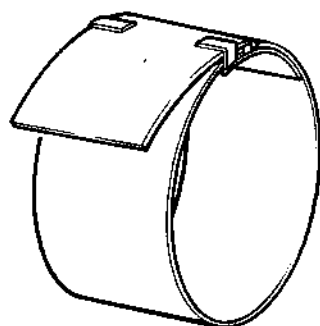


CR 35821/00A

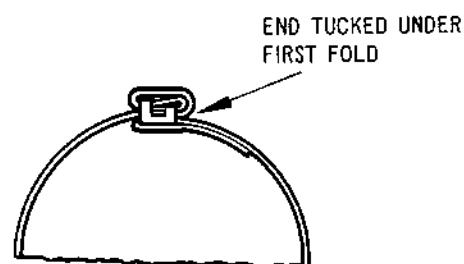
DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)



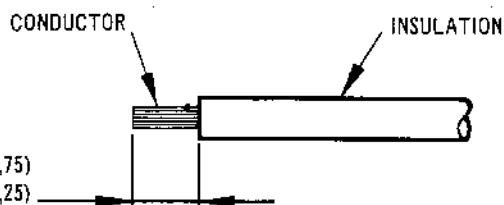
MARKER TAPE AND CLIP (DETAIL A)



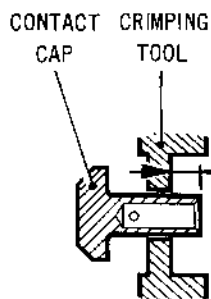
DETAIL B



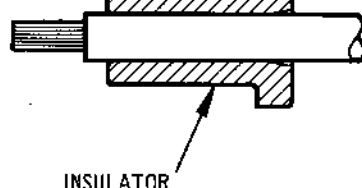
DETAIL C



DETAIL D

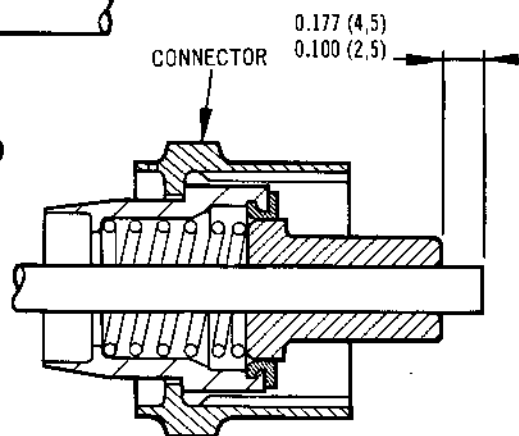


0.118 (3.0)  
0.097 (2.0)



INSULATOR

DETAIL E



DETAIL F

Marker Tape Installation and Crimping Details  
Figure 402

REPAIR  
74-21-01

Repair No.1

Page 403

Sep 1/81

PRINTED IN ENGLAND

TN25552

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

MATERIAL	TYPE	SUPPLIER
Glasscloth tape 0.3 in. and 1.00 in. (7,62 and 25,4 mm)	TYGAFLO 128 AP/10T (RR Part number U323897)	Fothergill and Harvey Ltd. Tygadure Division, Summit, Littleborough, Lancs OL 15 9QP
Solder	LS4	Fry's Ltd., Tandem Works, Merton Abbey, London W19 2PD
Flux	Flowsolder S64	Fry's Ltd.
Silicone varnish	MS.996	Midland Silicones Ltd.

Consumable Materials  
Table 401

### 3. Instructions

#### A. Disassemble HE Ignition Lead (Ref.Fig.401).

- (1) At one end of the cable, pull the contact cap to expose the conductor cable, then cut the cable and remove the contact cap.
- (2) Remove the contact cap at the other end of the cable in a similar manner.

TN25553

REPAIR

**74-21-01**

Repair No.1

Page 404  
Sep 1/81

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



- (3) Remove the lockwire connecting the ferrule to the elbow then unscrew the connection and remove the elbow.
- (4) Withdraw the cable from the flexible conduit assembly.
- (5) Remove clips and glasscloth tape, then draw back the convoluted tube to reveal the flexible metal conduit.
- (6) Unsolder the flexible metal conduit from the ferrule and connector.
- (7) Separate all items, then discard the items listed in Table 402 plus any defective items.

I.P.C. FIG./ITEM	DESCRIPTION	QUANTITY
-	Cable Size 10 ESW-O5D BA-01-050 (RR part No.U323899)	-
3-20	Contact Cap	2
3-60	Seal	1
3-80	Clip	4

Items to be Renewed Irrespective of Condition  
Table 402

B. Assemble HE Ignition Lead (Ref.Fig.401 and 402).

- (1) Obtain replacements for the defective items and the items listed in Table 402. Refer to para.5 for part numbers.





OLYMPUS 593



MK.610-14-28

SNECMA

OVERHAUL

- (2) If the convoluted tube is to be renewed measure the length of the discarded tube and cut the replacement tube to the same length. Actual length of the tube is 1.00 in. (25,4 mm) greater than the dimension between the ferrule and the connector.
- (3) If the flexible metal conduit is to be renewed, cut and prepare the replacement conduit as follows:
  - (a) Remove pre-tinned end from the replacement conduit, (Refer to Para.5).
  - (b) Measure the length of the discarded conduit and cut the replacement conduit to the same length plus a sufficient amount for trimming after both ends have been tinned.
  - (c) Solder tin both ends of the conduit.
    - (i) Insert a removeable mandrel into the conduit end to prevent solder entering the bore.
    - (ii) With the temperature of the solder pot at 300 to 325 deg.C, dip the conduit end into the solder to provide a tinned length, after final trimming, of approximately 0.5 in. (12,7 mm).
- NOTE: A layer of french chalk on the surface of the molten solder will minimise the formation of dross.
- (4) Solder the ferrule (3-50) to the end of the conduit.
- (5) Feed the convoluted tube and clips (3-80) over the conduit to abut the ferrule.
- (6) Draw back the convoluted tube to expose the other end of the conduit in readiness for installation of the connector (3-40).

REPAIR

74-21-01

Repair No.1

Page 406

Dec 31/00



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

- (7) Assemble and solder the connector to the conduit, then position the convoluted tube to abut the connector.
- (8) Wrap 0.300 in. (7,62 mm) wide glasscloth tape around the ferrule end and the connector end to obtain a diameter equal to that of the convoluted tube.
- (9) Wrap 1.00 in. (25,4 mm) wide glasscloth tape two turns overall at the positions shown.
- (10) Locate the clips on the tape, as shown and secure with the approved pliers.
- (11) If new convoluted tube has been used, attach marker tape (Ref.Fig.402).
  - (a) Attach the clip (3-85) to the marker tape (3-90C) (Detail A).
  - (b) Pass the tape around the convoluted tube, pull tight, then flatten one lug at each end of the clip (Detail B).
  - (c) Fold the tape back and flatten the two other lugs of the clip.
  - (d) Fold the tape forward then trim it, leaving sufficient length to tuck under the first fold (Detail C).
  - (e) Tuck the trimmed end under the first fold and press down firmly to ensure snug fit at the lug location.
  - (f) Apply silicone varnish to the marker tape at the clip location.
- (12) Assemble contact cap to one end of cable (Ref.Fig. 402).
  - (a) Remove the insulation from the end of the cable to expose 0.266 to 0.246 in. (6,75 to 6,25 mm) of the conductor (Detail D); use the Ideal Stripmaster.

REPAIR

74-21-01

Repair No.1

Page 407

Jun 1/99



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Assemble the insulator (3-30) to the cable end.
- (c) Lightly grip the contact cap (3-20) in the jaws of an approved crimping tool as shown (Detail E).
- (d) Insert the prepared cable into the contact cap with the insulation abutting the cap end.
- (e) Check that the conductor is visible through the inspection hole then close the crimping tool jaws and complete the crimping operation.
- (13) Feed the unprepared end of the cable into the elbow assembly (3-70) and pull it through until the cable insulator abuts the elbow.
- (14) Feed the unprepared end of the cable into the ferrule end of the conduit assembly, then connect the ferrule to the elbow and hand-tighten.
- (15) Assemble the insulator (3-30) to the unprepared end of the cable.
- (16) Straighten the cable and conduit then, with the cable lightly tensioned, cut it to length leaving 0.100 to 0.177 in. (2,50 to 4,50 mm) protruding from the insulator (Ref.Fig.402, Detail F).
- (17) Dismantle the lead and remove the insulation from the end of the cable to expose 0.266 to 0.246 in. (6,75 to 6,25 mm) of the conductor. Replace the severed bead of insulation to protect the conductor.
- (18) Finally assemble lead.
- (a) Ensure that the insulator (3-30) is assembled to the cable.
- (b) Pass the bare end of the cable into the elbow assembly (3-70) and pull it through until the cable insulator abuts the elbow.
- (c) Assemble the seal (3-60) over the cable, then feed the cable into the ferrule end of the conduit.

PRINTED IN ENGLAND

TN25587

REPAIR

74-21-01

Repair No.1

Page 408

Sep 1/81



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- (d) Connect the ferrule to the elbow and torque-tighten to between 124 and 175 lbf in. (14 and 20 N.m) then wire-lock.
  - (e) Assemble the insulator (3-30) to the cable and remove the severed bead of insulation.
  - (f) Coil the assembly and pull the cable tight.
  - (g) Ensure that there is no damage to the strands of the conductor, then install the contact cap (3-20) and follow the crimping procedure as in paragraph (12).
- (19) Inspect the lead.
- (a) Straighten the lead and check that the central conductor is not in tension (i.e. springs must not be compressed).

#### 4. Special Tools, Fixtures and Equipment

##### Supplier

Crimp tool with 33-123 die	Balmar M22520/10-01	Balmar Enterprises Inc., Palmridge Way, Orlando, Florida, U.S.A.
Oteka pliers		Palmer
Pliers	TL.46396	Plessey

REPAIR

74-21-01

Repair No.1

Page 409

Jun 1/99

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

**5. Replacement Parts**

<u>Description</u>	<u>Quantity</u>	<u>Part No.</u>	<u>I.P.C</u>	<u>Fig./Item</u>
Cable size 10, ESW-05DBA-01-050	A/R	U.323899	-	- -
Elbow assy. of, Plessey type PC/RAE/C) Altern- Smiths type HH90/58 )atives	1	B.491651	74-21-01	3 70C
Connector assy. of, Plessey type PC/S/C ) Altern- Smiths type SC/65 )atives	1	B.491660	74-21-01	3 40C
Ferrule	1	B.490069	74-21-01	3 50B
Insulator	2	B.494554	74-21-01	3 30B
Contact cap, Cannon 030-7992-000	2	2508184	74-21-01	3 20B
Seal	1	B.495472	74-21-01	3 60B
Conduit	A/R	3105851 OR 75-099-09 Supplied direct from GLENAIR INTERNATIONAL Ltd 40 Lower Oakham Way Oakham Business Park Mansfield Notts NG18 5BY	-	- -
Convoluted tubing	A/R	3105963	74-21-01	3 100B
Glasscloth tape (Fothergill & Harvey Ltd. Tygaflor type 128AP/10T)	A/R	U.323897	-	- -
Clip, Plessey 701/2/00546/003) Altern- Palmer HTH340/7 )atives	4	3502872 3501343	74-21-01 74-21-01	3 80B 3 80B
Marker tape	1	B.495714	74-21-01	3 90C
Marker tape clip	1	AGS.2091	74-21-01	3 85A

REPAIR

**74-21-01**

Repair No.1

Page 410

Dec 31/00



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

<u>Description</u>	<u>Quantity</u>	<u>Part No.</u>	<u>I.P.C</u>	<u>Fig./Item</u>
Locking wire, MSRR 7015, 0.031 in. (0,80 mm) diameter	A/R	-	-	-
Silicone Varnish, Midlands Silicones Ltd., MS 996	A/R	-	-	-

Printed in England

REPAIR

74-21-01

Repair No.1

Page 411

Dec 31/00

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

snecma

HIGH ENERGY IGNITION LEAD - ASSEMBLYTABLE OF CONTENTS

Para.	Page
1. General	501
2. Assembly of High Energy Ignition Lead (Pre SB.0L.593-74-9084-19 standard)	501
A. Preparation of Cable	501
B. Preparation of Conduit	503
C. Assembly of the Elbow Assembly End	505
D. Assembly of the Connect Assembly End	505
E. Final Assembly	507
3. Method of Soldering Ignition Leads (Pre SB.0L.593-74-9084-19 standard)	507
A. Preparation	507
B. Soldering	507

TABLE OF ILLUSTRATIONS

Fig.No.	Page
501 Preparation of HE Ignition Cable (Pre SB.0L.593-74-9084-19 standard)	502
502 Preparation of HE Ignition Conduit (Pre SB.0L.593-74-9084-19 standard)	504
503 Assembly of HE Lead (Pre SB.0L.593-74-9084-19 standard)	506

ASSEMBLY

**74-21-01**Contents  
Dec 31/00



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

HIGH ENERGY IGNITION LEAD - ASSEMBLY1. General

- A. This section contains the procedure for the assembly of the high energy ignition leads.
- B. Throughout the text special tools are quoted by their Ref.No. e.g. (Tool 1234). For a complete list of tooling required for assembly and for the Manufacturers Part No., refer to Special Tools, Fixtures and Equipment Table 1001.
- C. During the assembly procedure, reference will be made to the Illustrated Parts Catalogue (I.P.C.) to identify those items where the nomenclature does not positively identify them, due to the duplication of the title. When the item is a part of the breakdown of the text concerned, the item will be identified as insulator (3-30), the 3 referring to the I.P.C. Fig.No. and the 30 referring to the Item No.
- D. For the testing procedure following assembly, refer to 71-00-02, Testing.

 2. Assembly of High Energy Ignition Lead  
 (Pre SB.OL.593-74-9084-19 standard)

- A. Preparation of Cable (Ref.Fig.501).

NOTE: All reference to details are contained in Figure 501.

- (1) Strip the insulation from one end of the uniplug cable to a length of 1.000 in. (25,4 mm). (Detail A).
- (2) Screw the insulator (3-30) onto the cable until the insulation protrudes. (Detail C).

NOTE: It is permissible to lightly trim the leading insulation 0.500 in. (12,7 mm), if difficulty is encountered when installing the insulator onto the cable. (Detail B).

- (3) Install the contact cap (3-20) over the cable core to abut the insulation. (Detail D).
- (4) Cut off the surplus core and splay the separate wires. Solder the core to the contact cap, refer to method of soldering (Ref.para.3). Flush finish to between 0.122 and 0.130 in. (3,1 and 3,3 mm) to show witness of face of the contact cap and polish. (Detail E).

ASSEMBLY

74-21-01

Page 501

Dec 31/00



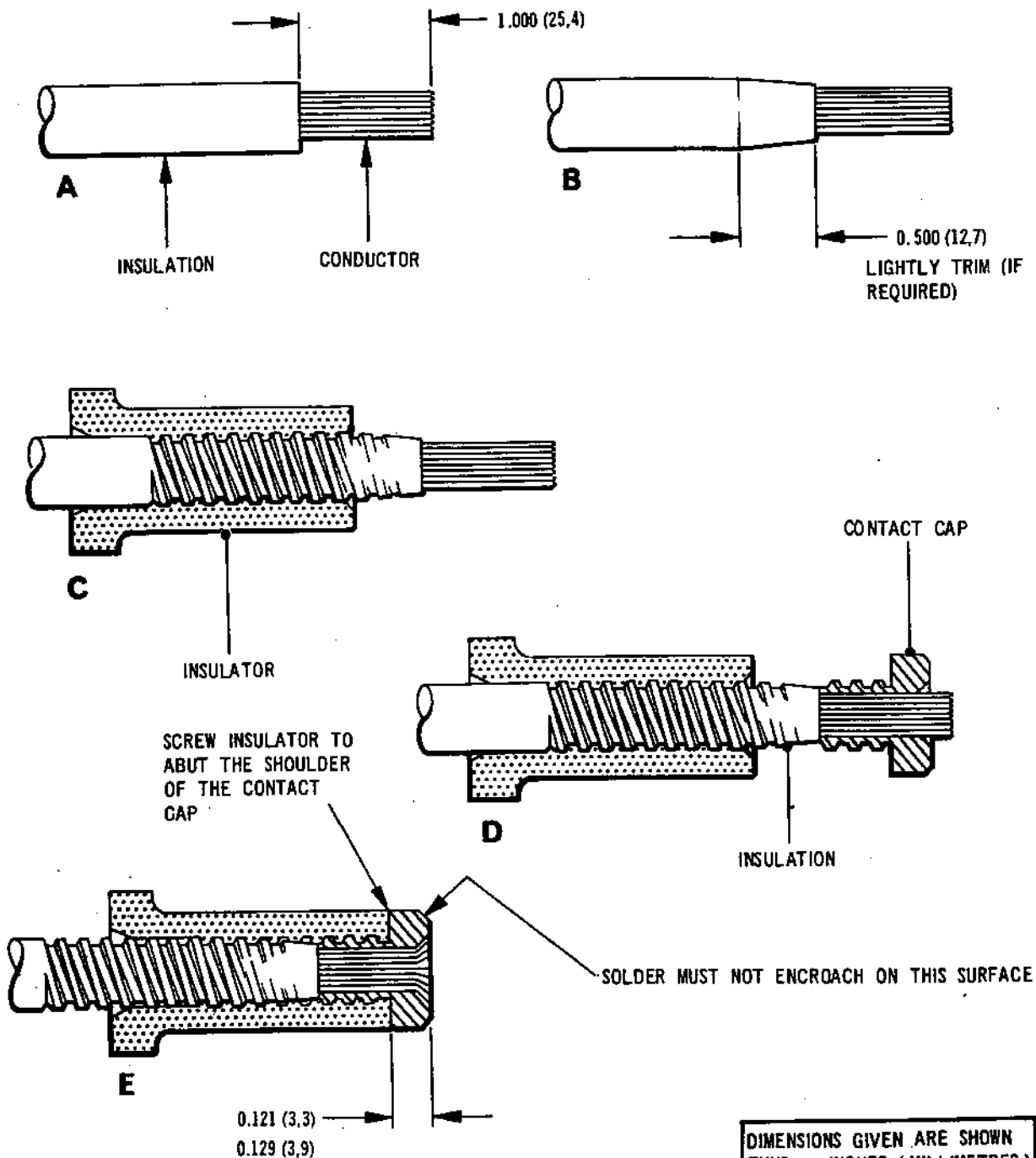


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Preparation of HE Ignition Cable  
(Pre SB.0L.593-74-9084-19 standard)  
Figure 501



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (5) Screw back the insulator to abut the shoulder of the contact cap. (Detail E).

#### B. Preparation of Conduit.

NOTE: All reference to details are contained in Figure 502.

- (1) Cut the flexible metal tubing and the convoluted tubing (3-100) to length sufficient to give a finished length between 111.000 to 111.500 in. (2832,1 to 2819,4 mm). (Ref.Fig.503).
- (2) Insert both ends of the convoluted tubing, for a length of 0.500 in. (12,7 mm) approximately, into solder for approximately 10 seconds, withdraw and shake off the excess dross. (Detail A). (Ref.Fig.502).

NOTE: Working temperature of the solder pot to be between 300° C and 325° C. It is recommended that a layer of french chalk on the molten solder will minimise the formation of dross.

- (3) Insert a mandrel of the required diameter into the tubing and smooth out the convolutions using a duster cloth.
- (4) Cut the ends square to the dimensions shown. (Detail A).
- (5) Solder tin both ends of the flexible metal tubing to a length of 0.500 in. (12,7 mm) approximately. (Detail B. Refer to the method of soldering (Ref.para.3).
- (6) Solder the flexible metal tubing to the integral ferrule of the connector (3-40). (Detail C). Refer to the method of soldering (Ref.para.3).
- (7) Install the convoluted tubing over the metal tubing with the appropriate identification sleeve (3-90) and secure in position with a clip (3-80). (Detail C).
- (8) Draw back the free end of the convoluted tubing and solder the metal tubing to the ferrule (3-50). (Detail D). Refer to the method of soldering (Ref.para.3).

ASSEMBLY

74-21-01

Page 503

Oct 1/76

CR 33461/00A

DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)

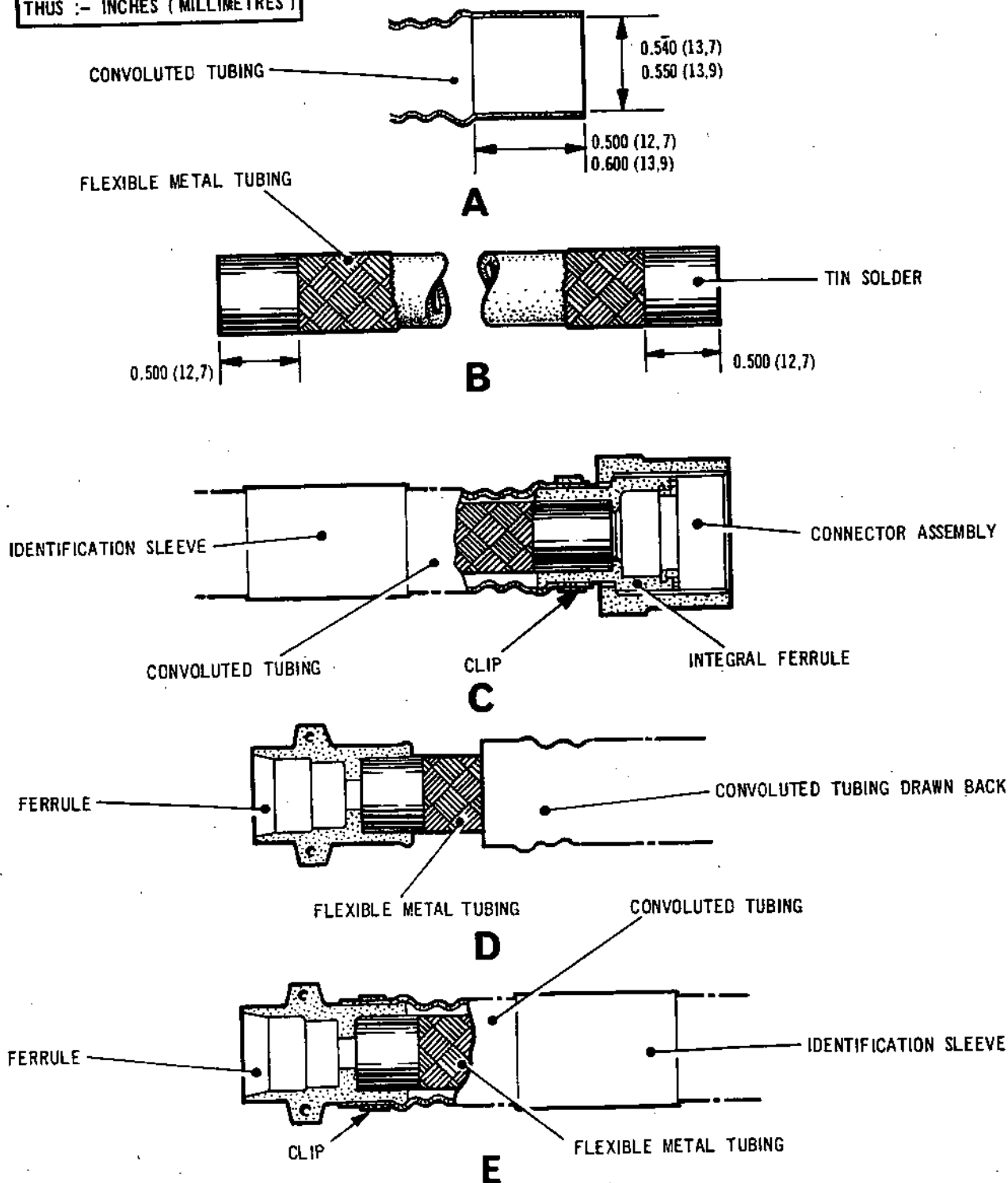


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Preparation of HE Ignition Conduit  
(Pre SB.0L.593-74-9084-19 standard)  
Figure 502



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (9) Draw convoluted tubing over the ferrule and secure in position with a clip (3-80). (Detail E).

C. Assembly of the Elbow Assembly End (Ref.Fig.503).

NOTE: All reference to details are contained in Figure 503.

- (1) Assemble the elbow assembly (3-70) over the bared end of the cable until it abuts the insulator (3-30).
- (2) Assemble the seal (3-60) over the bared end of the cable and locate in the union sleeve of the elbow assembly. (Detail A).
- (3) Insert the bared end of cable through the previously assembled conduit starting at the end with the ferrule (3-50).
- (4) Draw the elbow assembly to the ferrule, engage the threads dry and torque-tighten to between 10 and 15 lbf ft. (13,6 and 20,3 Nm). (Detail B).
- (5) Pull the cable and tubing straight, then cut off the cable to required length.

D. Assembly of the Connector Assembly End (Ref.Fig.501).

NOTE: All reference to details are contained in Figure 501.

- (1) Strip the insulation from the end of the uniplug cable to a length of 1.000 in. (24,4 mm). (Detail A).
- (2) Screw the insulator (3-30) onto the cable until the insulation protrudes. (Detail C).

NOTE: It is permissible to lightly trim the leading insulation 0.500 in. (12,7 mm), if difficulty is encountered when installing the insulator onto the cable. (Detail B).

- (3) Install the contact cap (3-20) over the cable conductor to abut the insulation. (Detail D).
- (4) Cut off the surplus conductor and splay out the separate wires. Solder the conductor to the contact cap. Refer to the method of soldering (Ref.para.3). Finish flush to between 0.122 and 0.130 in. (3,1 and 3,3 mm) to show witness of face of the contact cap and polish. (Detail E).

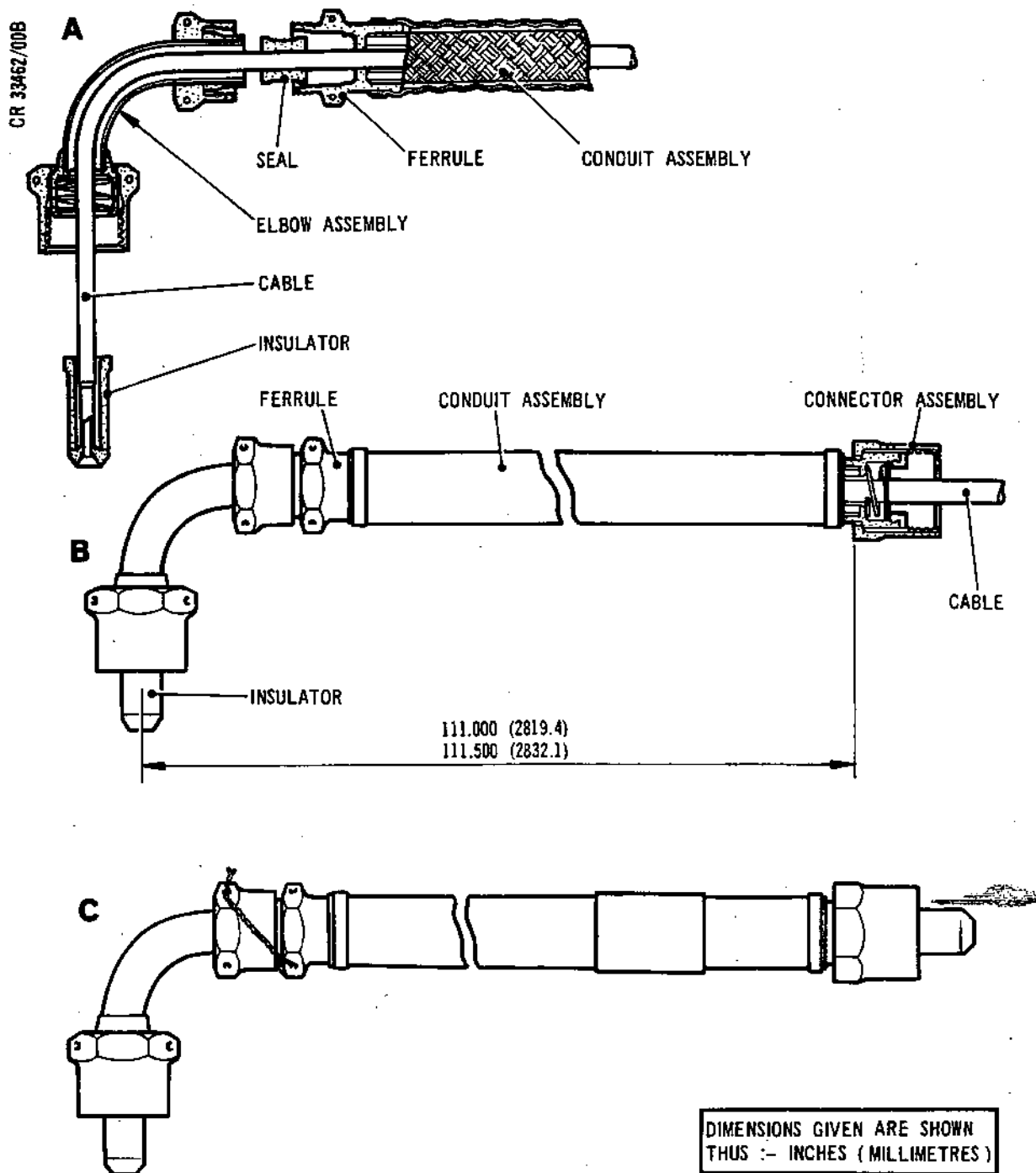
ASSEMBLY  
**74-21-01**

Page 505  
Oct 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Assembly of HE Lead  
(Pre SB.0L.593-74-9084-19 standard)  
Figure 503



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

- (5) Screw back the insulator to abut the shoulder of the contact cap. (Detail F).

E. Final Assembly (Ref.Fig.503).

NOTE: All reference to details are contained in Figure 503.

- (1) Wire-lock the ferrule (3-50) to the elbow assembly (3-70). (Detail C).
- (2) Install protective caps on the lead ends.
- (3) Install in a clean, dry container until required for use.

3. Method of Soldering Ignition Leads (Pre SB.0L.593-74-9084-19 standard)

A. Preparation.

- (1) The surfaces to be soldered are to be free from grease and cleaned by careful scraping or by use of a fine grade of emery cloth.

B. Soldering.

- (1) Use a heated copper bit of a convenient size to localise the heat and avoid damage to the adjacent components.
- (2) Use solder, type LS4 and flux, type Alcho-re.
- (3) When soldering fine wires, care is to be taken to prevent the solder running down the wire and forming a rigid sleeve.
- (4) After soldering is completed apply a neutralizer and clean the part with a dry, nap-free cloth or air blast.

ASSEMBLY

74-21-01

Page 507

Dec 31/00



OLYMPUS 593



MK.610-14-28

shecma

OVERHAUL

## HIGH ENERGY IGNITION LEAD - TESTING

### 1. General

The tests detailed in paragraph 3. are to be carried out after Inspection/Check procedures have been satisfactorily completed during overhaul or repair of the assembly.

The equipment listed in paragraph 2. is required to carry out the electrical tests detailed in paragraph 3. The high voltage test set is adjusted to a 5kV peak (0.8 mm) and consists of an induction coil with an enclosed R.A.E. 0.25 in. (6,35 mm) ball gap, with power supplied by a 12V battery.

### 2. Tools and Equipment

High voltage test set

Continuity test set

Ohmmeter.

12V battery fully charged, with associated leads.

Bonding resistance tester.

### 3. Test High Energy Ignition Lead

#### A. Pre-Test Procedures.

(1) Ensure the high energy ignition lead is free from damage.

(2) Test the high voltage test set as follows:

(a) Hold the test leads apart and switch on the high voltage test set, the ignition coil will cause a low frequency spark to take place across the ball gap. Touch the test leads together and the spark should be immediately shorted out.

TESTING

74-21-01

Page 701

Dec 31/00



OLYMPUS 593

MK.610-14-28  
OVERHAUL

SNECMA

## B. Test Procedure.

## (1) High voltage test.

- (a) Attach one test lead to the elbow of the high energy ignition lead and the other test lead to the lead terminal contact cap at one end. Switch on the high voltage power for a period of at least one minute and check the ball gap for sparking.

If the insulation of the lead under test is satisfactory a spark will take place at the ball gap, if no spark takes place the insulation is defective.

## (2) Continuity test.

- (a) Connect the leads of the continuity tester to each end of the high energy ignition lead and ensure that continuity exists. During this test gently agitate the high energy ignition lead to reveal any discontinuities.

## (3) Bonding resistance test.

- (a) Attach the leads of the bonding resistance tester, one at the rear of the ferrule at the HEIU end and the other at the elbow at the igniter end of the high energy ignition lead. With the use of an ohmmeter ensure continuity exists, the resistance should not be greater than 0.05 ohms.

## (4) Completion of test procedure.

- (a) Reject the igniton lead if it fails to meet any of the test requirements.

TESTING

74-21-01

Page 702

Dec 31/00





OLYMPUS 593

MK.610-14-28  
OVERHAUL



ENGINE IGNITER PLUGS - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

74-21-02

Page 201  
Jan 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	10	Igniter plug	B	-	For cleaning details refer to vendors overhaul manual.
	20 to 55	Washer, spacer	A or B	-	-

Cleaning Processes  
Table 201

1N32551



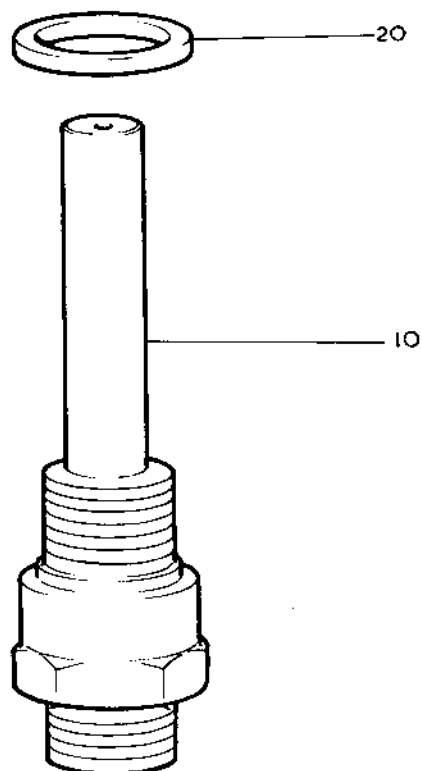
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32481/00B



TN32553

Igniter Plugs, Engine  
Figure 201



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REHEAT IGNITER - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

74-22-01

Page 201

Jan 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	20	Bolt	A or B	-	-
	10	Igniter, reheat	B	-	For cleaning details refer to vendors overhaul manual

Cleaning Processes  
Table 201

TN27872



OLYMPUS 593

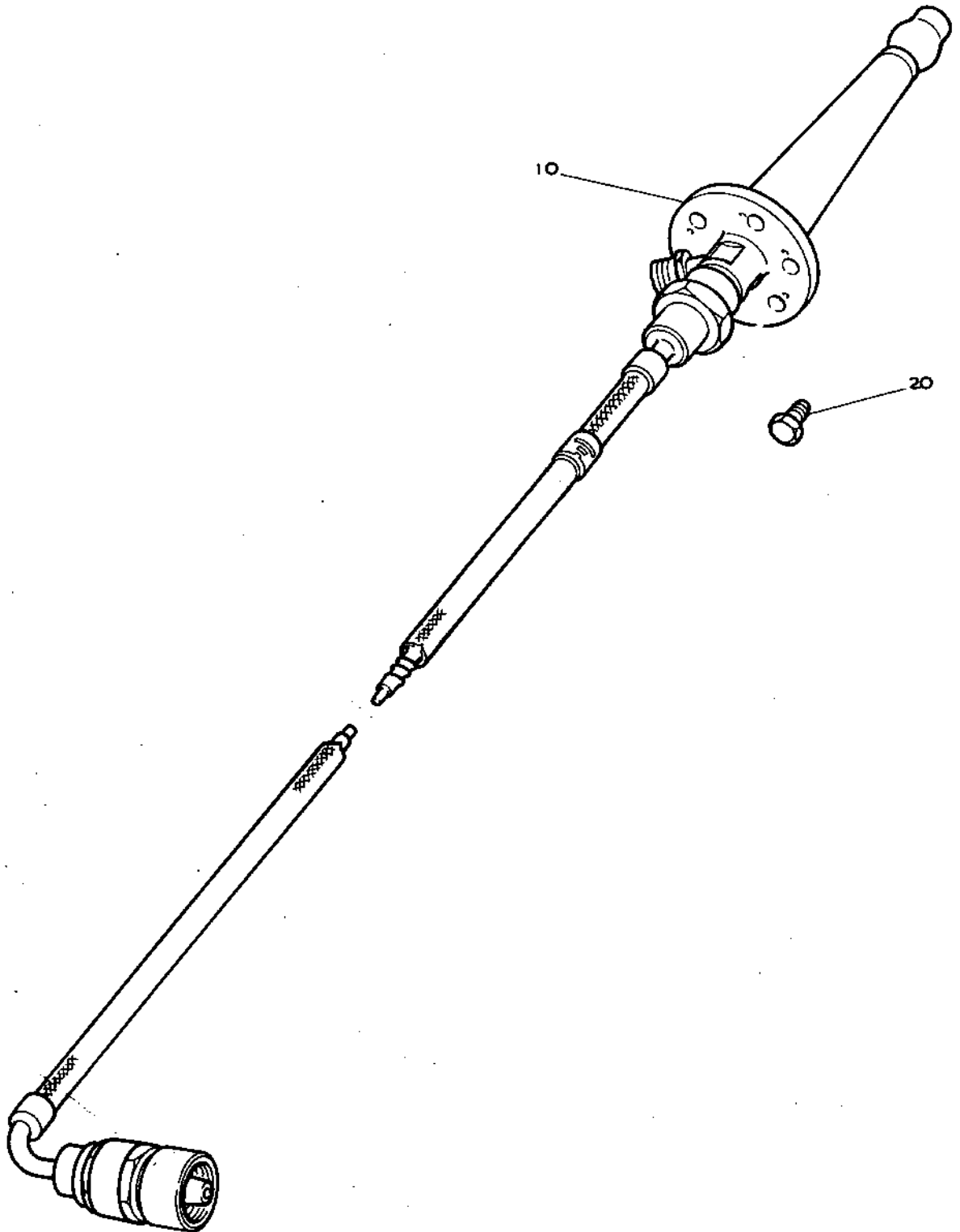
MK.610-14-28  
OVERHAUL



CR 33166/00A

PRINTED IN ENGLAND

TN27655



Igniter, Reheat Assembly  
Figure 201

CLEANING  
**74-22-01**  
Page 203  
Aug 28/75

**CHAPTER**

**75**

**AIR**

## CHAPTER 75

**AIR**

## LIST OF EFFECTIVE PAGES

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
List of			75-00-00	322	Jun 1/76
Effective			(Cont'd)	323	Jun 1/76
Pages	1	Dec 31/00		324	Jun 1/76
	2	Dec 31/00		325	Jun 1/76
	3	Jun 1/99		326	Jun 1/76
	4	Jun 30/95		327	Jun 1/76
Table of				328	Jun 1/76
Contents	1	Jul 1/79		329	Jun 1/76
	2	Aug 1/76		330	Jun 1/76
Table of				331	Jun 1/76
Approved				332	Jun 1/76
Repair				333	Jun 1/76
Schemes	1	Sep 30/94		334	Jun 1/76
	2	Sep 30/94		335	Jun 1/76
	3	Jan 31/94		336	Jun 1/76
Inspection/				337	Jun 1/76
Check				338	Jun 1/76
75-00-00				339	Jun 1/76
Contents	1	Dec 1/78	Cleaning		
Contents	2	Jun 1/76	75-01-01	201	Jan 1/77
Contents	3	Jun 1/76		202	Jan 1/77
	301	Apr 1/77		203	Aug 28/75
	302	Jun 1/76	Repair		
	303	Oct 1/81	Contents	1	Jun 1/92
	304	Jun 1/76	Repair No.1	401	Jun 1/92
	305	Jun 1/76		402	Jun 1/92
	306	Oct 1/81	Cleaning		
	307	Jun 1/76	75-01-02	201	Feb 1/83
	308	Jun 1/76		202	Feb 1/83
	309	Oct 1/81		203	Dec 1/81
	310	Dec 1/78	Repair		
	311	Dec 1/78	Contents	1	Jul 31/93
	312	Jun 1/76	Repair No.1	401	Jun 1/92
	313	Jun 1/76		402	Jun 1/92
	314	Jun 1/76	Repair No.2	401	Jul 31/93
	315	Jun 1/76		402	Jul 31/93
	316	Dec 1/81	Cleaning		
	317	Jun 1/76	75-01-03	201	Feb 1/83
	318	Jun 1/76		202	Feb 1/83
	319	Jun 1/76		203	Aug 28/75
	320	Dec 1/81			
	321	Jun 1/76			

LIST OF EFFECTIVE PAGES - 75

Page 1

Dec 31/00





# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

Printed in England

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
75-01-03 (Cont'd) Repair No.1	401	Dec 31/00	75-02-04 (Cont'd) Repair		
	402	Dec 1/88	Contents	1	Jul 31/93
	403	Dec 1/84	Repair No.1	401	Jun 1/92
	404	Jun 1/99		402	Jun 1/92
	405	Dec 1/91	Repair No.2	401	Jul 31/93
	406	Dec 31/00		402	Jul 31/93
	407	Dec 1/84	Cleaning		
	408	Dec 1/84	75-02-05	201	Feb 1/83
Cleaning				202	Feb 1/83
75-01-04	201	Feb 1/83		203	Aug 28/75
	202	Feb 1/83	Repair		
	203	Aug 28/75	Contents	1	Jun 1/92
75-01-05	201	Feb 1/83	Repair No.1	401	Jun 1/92
	202	Feb 1/83		402	Jun 1/92
	203	Apr 1/76	Cleaning		
75-02-01	201	Jan 1/77	75-02-06	201	Feb 1/83
	202	Jan 1/77		202	Feb 1/83
	203	Dec 1/81		203	Aug 28/75
Repair			75-02-07	201	Jan 1/77
Contents	1	Jun 1/92		202	Jan 1/77
Repair No.1	401	Jun 1/92		203	Aug 28/75
	402	Jun 1/92	Contents	1	Dec 1/91
Cleaning			Repair No.1	401	Dec 31/00
75-02-02	201	Jan 1/77		402	Dec 31/00
	202	Jan 1/77		403	Dec 31/00
	203	Aug 28/75		404	Dec 1/91
Repair				405	Dec 1/91
Contents	1	Jun 1/92	Cleaning		
Repair No.1	401	Jun 1/92	75-02-08	201	Jan 1/77
	402	Jun 1/92		202	Jan 1/77
Cleaning				203	Aug 28/75
75-02-03	201	Jan 1/77	75-02-09	201	Jan 1/77
	202	Jan 1/77		202	Jan 1/77
	203	Aug 28/75		203	Aug 28/75
Repair			75-02-10	201	Jan 1/77
Contents	1	Jun 1/92		202	Jan 1/77
Repair No.1	401	Jun 1/92		203	Aug 28/75
	402	Jun 1/92	75-02-11	201	Jan 1/77
Cleaning				202	Jan 1/77
75-02-04	201	Jan 4/93		203	Aug 28/75
	202	Feb 1/83			
	203	Jan 1/77			



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

Printed in England

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
75-02-12	201	Feb 1/83	75-10-00		
	202	Feb 1/83	(Cont'd)	303	Jun 1/76
	203	Apr 1/76		304	Aug 1/76
				305	Jun 1/76
75-03-01	201	Jan 1/77		306	Jun 1/76
	202	Jan 1/77		307	Jun 1/76
	203	Aug 28/75		308	Jun 1/76
	204	Aug 28/75		309	Aug 1/76
	205	Aug 28/75		310	Aug 14/75
	206	Aug 28/75		311	Aug 14/75
				312	Aug 14/75
Repair				313	Aug 14/75
Contents	1	Jul 31/93		314	Aug 14/75
Repair No.1	401	Jun 1/92			
	402	Jun 1/92	75-11-01	201	Jan 1/77
Repair No.2	401	Jul 31/93		202	Jan 1/77
	402	Jul 31/93		203	Aug 28/75
				204	Aug 28/75
75-03-02	201	Jan 1/77			
	202	Jan 1/77	Repair		
	203	Aug 28/75	Contents	1	Jun 1/92
	204	Aug 28/75	Repair No.1	401	Jun 1/99
				402	Jun 1/88
Repair				403	Jun 1/88
Contents	1	Jul 31/93		404	Jun 1/88
Repair No.1	401	Jul 31/93	Repair No.2	401	Apr 1/91
	402	Jul 31/93		402	Apr 1/91
				403	Apr 1/91
75-05-01	201	Feb 1/83		404	Apr 1/91
	202	Feb 1/83	Repair No.3	401	Jun 1/92
	203	Aug 28/75		402	Jun 1/92
75-05-02	201	Jan 1/77	75-11-02	201	Feb 1/83
	202	Jan 1/77		202	Feb 1/83
	203	Aug 28/75		203	Aug 28/75
				204	Aug 28/75
Repair			Repair		
Contents	1	Jun 1/92	Contents	1	Jul 31/93
Repair No.1	401	Jun 1/92	Repair No.1	401	Jun 1/92
	402	Jun 1/92		402	Jun 1/92
			Repair No.2	401	Jun 1/92
75-05-03	201	Jan 1/77		402	Jun 1/92
	202	Jan 1/77		403	Jun 1/92
	203	Aug 28/75		404	Jun 1/92
			Repair No.3	401	Jan 4/93
75-10-00				402	Jan 4/93
Contents	1	Jun 1/76		403	Jan 4/93
Contents	2	Aug 1/76		404	Jan 4/93
	301	Apr 1/77			
	302	Jun 1/76			

LIST OF EFFECTIVE PAGES - 75

Page 3  
Jun 1/99



# OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
75-11-02					
(Cont'd)					
Repair No.3	405	Jan 4/93			
	406	Jan 4/93			
	407	Jan 4/92			
	408	Jan 4/93			
	409	Jan 4/93			
	410	Jan 4/93			
	411	Jan 4/93			
Repair No.4	401	Jul 31/93			
	402	Jul 31/93			
	403	Jul 31/93			
	404	Jul 31/93			
	405	Jul 31/93			
	406	Jul 31/93			
	407	Jul 31/93			
	408	Jul 31/93			
75-12-01	201	Jan 1/77			
	202	Jan 1/77			
	203	Jun 30/95			
75-41-01	201	Jan 1/77			
	202	Jan 1/77			
	203	Aug 28/75			
	301	Aug 1/76			
	302	Aug 1/76			



OLYMPUS 593

MK.610-14-28  
OVERHAUL

## CHAPTER 75

## AIR

## TABLE OF CONTENTS

	CH/SEC/SUB	PAGE
List of Effective Pages	75	-
Table of Contents	75	-
Table of Approved Repair Schemes	75	-
Air Tubes (Containing SEC/SUB 75-01-01 to 05, 75-02-01 to 12, 75-03-01, 75-03-02 and 75-05-01 to 03)	75-00-00	301
Intermediate Case to Exhaust Diffuser Tubes	75-01-01	201
Intermediate Case to HP Turbine Bearing Tube	75-01-02	201
HP Compressor Case to HP Compressor Diffuser (Upper) Case Tubes	75-01-03	201
HP Compressor Case to HP Compressor Diffuser (Lower) Case Tubes	75-01-04	201
Elbow, Air Cooling, HP Turbine Bearing Feed Pipe	75-01-05	201
Intermediate Case Adapter to Aircraft Connection Tubes	75-02-01	201
Oil Tank to Outlet Seal Plate	75-02-02	201
HP Compressor Diffuser Case and Exhaust Diffuser to Multiple Connection Tubes	75-02-03	201
Exhaust Diffuser to Duct (LH) Tubes	75-02-04	201
Exhaust Diffuser to Duct (RH) Tubes	75-02-05	201
HP Compressor Diffuser Case to Aircraft Overboard Cowling (RH) Tubes	75-02-06	201
HP Compressor Diffuser Case to Aircraft Overboard Cowling (LH) Tubes	75-02-07	201
Air Intake Case Adapter to Connection on Tube (Air Intake Case Adapter to Outlet Seal Plate) Tube	75-02-08	201
Air Intake Case Adapter to Outlet Seal Plate (LH) Tube	75-02-09	201
Air Starter to Outlet Seal Plate Tube	75-02-10	201
RPM Probe Drive and Housing to Tube Connection Tube	75-02-11	201
Duct, Air Venting, HP Compressor Diffuser Case Tube to Aircraft Overboard Cowling (LH and RH)	75-02-12	201
HP Compressor Diffuser Case to Overboard Cowling Tubes	75-03-01	201
Connection on Duct (HP Compressor Case to Diffuser Case Lower) to Spherical Joint Flange Tubes	75-03-02	201
Intermediate Case Elbow Duct to Second Stage Pump Tubes	75-05-01	201



OLYMPUS 593

MK.610-14-28

OVERHAUL



	<u>CH/SEC/SUB</u>	<u>PAGE</u>
Connection on HP Compressor Case to Adapters (Gearbox Seals) Tubes ... ..	75-05-02	201
Connection on Tube (HP Compressor Case to Diffuser Case Lower) to Aircraft Connection Tubes ... ..	75-05-03	201
Engine Anti-icing Tubes and Manifold (Containing SEC/SUB 75-11-01, 75-11-02 and 75-12-01)... ..	75-10-00	301
Engine Anti-icing Manifold ... ..	75-11-01	201
Engine Anti-icing Tubes ... ..	75-11-02	201
Engine Anti-icing Air Control Valve ... ..	75-12-01	201
Engine Anti-icing Air Pressure Switch ... ..	75-41-01	201
		301

TN33358

**OLYMPUS 593**MK.610-14-28 *sheema*  
OVERHAULCHAPTER 75AIRTABLE OF APPROVED REPAIR SCHEMES

The following Repair Schemes have been approved by CAA/DGAC.

<u>Chapter/Section</u>	<u>Repair No.</u>	<u>Title</u>	<u>Salvage No.</u>
75-01-01	1	Tube. Repair of fretting/ damage by inert gas arc welding	B.514566
75-01-02	1	Tube. Repair of fretting/ damage by inert gas arc welding	B.514566
	2	Tube. Repair of damage and/or fretted areas	B.497468
75-01-03	1	Air Duct. Provision for replacement of seal housing.	B.499489
75-02-01	1	Tube. Repair of fretting/ damage by inert gas arc welding	B.514566
75-02-02	1	Tube. Repair of fretting/ damage by inert gas arc welding	B.514566
75-02-03	1	Tube. Repair of fretting/ damage by inert gas arc welding	B.514566

**OLYMPUS 593**MK.610-14-28 *sneema*  
OVERHAUL

<u>Chapter/Section</u>	<u>Repair No.</u>	<u>Title</u>	<u>Salvage No.</u>
75-02-04	1	Tube. Repair of fretting/ damage by inert gas arc welding	B.514566
	2	Tube. Repair of damaged and/or fretted areas	B.497468
75-02-05	1	Tube. Repair of fretting/ damage by inert gas arc welding	B.514566
75-02-07	1	Air Duct Assembly. Provision for replacement of worn/ damaged end fittings.	B.513488
75-03-01	1	Tube. Repair of fretting/ damage by inert gas arc welding	B.514566
	2	Tube. Repair of damaged and/or fretted areas	B.497468
75-03-02	1	Tube. Repair of damaged and/or fretted areas	B.497468

**OLYMPUS 593**MK.610-14-28 *sneema*  
OVERHAUL

Printed in England

<u>Chapter/Section</u>	<u>Repair No.</u>	<u>Title</u>	<u>Salvage No.</u>
75-05-02	1	Tube. Repair of fretting/ damage by inert gas arc welding	B.514566
75-11-01	1	Duct. Sleeve bore repaired by plasma spray.	B.507088
	2	Duct. Provision for replacement of seal housing.	B.513620
	3	Tube. Repair of fretting/ damage by inert gas arc welding	B.514566
75-11-02	1	Tube. Repair of fretting/ damage by inert gas arc welding	B.514566
	2	Tube (C263). Repair of fretting/ damage by inert gas arc welding	B.514567
	3	Tube (C263). Repair by replacement of damaged sections	B.514646
	4	Tube, Assy of. Restoration of adaptor, flanged bore by Plasma Spray	B.515275





OLYMPUS 593

MK.610-14-28

OVERHAUL



## AIR TUBES - INSPECTION/CHECK

## TABLE OF CONTENTS

Para.		Page
1.	General ... ..	301
2.	General Inspection ... ..	301
3.	Crack Detection ... ..	301
	A. Magnetic Particle Crack Detection ... ..	301
	B. Fluorescent Dye Crack Detection ... ..	302
4.	Tubes ... ..	306
	A. Inspect Tubes ... ..	306
	B. Inspect Seal Ring Location External Diameters and Adjacent Lands ... ..	306
	C. Inspect Seal Ring Location Bores ... ..	307
	D. Inspect Abutment Flanges... ..	307
	E. Inspect Bracket Attachment Flanges ... ..	307
	F. Inspect Elbow and Tee Adapter Piece ... ..	307
5.	Retaining Plates ... ..	308
	A. Inspect Retaining Plate ... ..	308
6.	Make Up Piece Assembly... ..	308
	A. Inspect Threads ... ..	308
	B. Inspect Tube Abutment Faces ... ..	308
	C. Inspect Attachment Flange ... ..	308
7.	Brackets ... ..	309
	A. Inspect Brackets ... ..	309
8.	Ducts ... ..	309
	A. Inspect Duct... ..	309
	B. Inspect Threads ... ..	309
	C. Inspect Abutment Faces ... ..	309
	D. Inspect Sealing Ring Locating Bores ... ..	310
	E. Inspect Bracket Attachment Flanges ... ..	310
	F. Inspect Seal Ring Location External Diameters and Adjacent Lands ... ..	310
	G. Inspect External Finish ... ..	310
9.	Bracket Assemblies ... ..	311
	A. Inspect Captive Nut and Retainer ... ..	311
	B. Inspect Threads ... ..	311
	C. Inspect Bracket Assembly... ..	311
10.	Elbow ... ..	311
	A. Inspect Abutment Faces ... ..	311
	B. Inspect Sealing Ring Locating Bores ... ..	312
	C. Inspect for Dents ... ..	312
11.	Thermal Insulation Blanket ... ..	312
	A. Inspect Spot Welding ... ..	312
	B. Inspect Blanket ... ..	312
12.	End Fitting Assembly ... ..	312
	A. Inspect Threads ... ..	312
	B. Inspect Attachment Flange ... ..	312
	C. Inspect Spanner Serrations ... ..	313

INSPECTION/CHECK

75-00-00

Contents 1

Dec 1/78



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



Para.		Page
	D. Inspect General Condition of Fitting....	313
13.	Seal Plate ...	313
	A. Inspect Abutment Face ...	313
	B. Inspect General Condition of Seal Plate ...	313
14.	Multiple Connector Assembly ...	313
	A. Inspect Threads ...	313
	B. Inspect Attachment Flanges ...	313
	C. Inspect General Condition of Connector ...	314
15.	Stiffener and Locating Plates...	314
	A. Inspect Plates ...	314
16.	Connection Flange...	314
	A. Inspect Thread ...	314
	B. Inspect Abutment Flange ...	314

# TABLE OF ILLUSTRATIONS

Fig.No.		Page
301	Crack Detection Test Diagram ...	305
302	Tubes, Air Cooling, Intermediate Case to Exhaust Diffuser ...	315
303	Tubes, Air Cooling, Intermediate Case to HP Turbine Bearing ...	316
304	Tubes, Air Cooling, HP Compressor Case to HP Compressor Diffuser Case (Upper) ...	317
305	Tubes, Air Cooling, HP Compressor Case to HP Compressor Diffuser Case (Lower) ...	318
306	Elbow, Air Cooling, HP Turbine Bearing Feed Tube ...	319
307	Tubes, Air Venting, Intermediate Case Adapter to Aircraft Connection ...	320
308	Tubes, Air Venting, Oil Tank to Outlet Seal Plate...	321
309	Tubes, Air Venting, HP Compressor Diffuser Case and Exhaust Diffuser to Multiple Connector ...	322
310	Tubes, Air Venting, Exhaust Diffuser to Duct RH ...	323
311	Tubes, Air Venting, Exhaust Diffuser to Duct LH ...	324
312	Tubes, Air Venting, HP Compressor Diffuser Case to Aircraft Overboard Cowling RH... ..	325
313	Tubes, Air Venting, HP Compressor Diffuser Case to Aircraft Overboard Cowling LH... ..	326
314	Tubes, Air Venting, Air Intake Case Adapter RH to Connection on Tube (Air Intake Case Adapter LH to Outlet Seal Plate) ...	327
315	Tubes, Air Venting, Air Intake Case Adapter LH to Outlet Seal Plate... ..	328
316	Tubes, Air Venting, Break Point to Outlet Seal Plate... ..	329
317	Tubes, Air Venting, Intermediate Case Sump to Tube Connection ...	330

INSPECTION/CHECK

**75-00-00**

Contents 2  
Jun 1/76

7N16385



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Fig.No.

Page

318	Duct, Air Venting, HP Compressor Diffuser Case Tube to Aircraft Overboard Cowling (LH and RH) ...	331
319	Tubes, Air, Fuel Heating, HP Compressor Diffuser Case to Overboard Cowling ...	332
320	Tubes, Air, Fuel Heating, HP Compressor Diffuser Case to Overboard Cowling ...	333
321	Tubes, Air, Fuel Heating, HP Compressor Diffuser Case to Overboard Cowling ...	334
322	Tubes, Air, Reheat Fuel Purging, Connection on Duct (HP Compressor Case to HP Compressor Diffuser Case Lower) to Spherical Joint Flange ...	335
323	Tubes, Air, Reheat Fuel Purging, Connection on Duct (HP Compressor Case to HP Compressor Diffuser Case Lower) to Spherical Joint Flange ...	336
324	Tubes, Air, Intermediate Case Elbow Duct to Second Stage Pump... ..	337
325	Tubes, Air Pressurising, Connection on HP Compressor Case to Adapters (Gearbox Seals) ...	338
326	Tube, Air, Connection on Duct (HP Compressor Case to HP Compressor Diffuser Case (Lower)) to Aircraft Connections ... ..	339

LIST OF TABLES

Table No.

Page

301	Items to be Magnetic Particle Crack Tested ... ..	302
302	Items to be Fluorescent Dye Crack Tested ... ..	302
303	Cross References to Illustrated Parts Catalogue ...	306

INSPECTION/CHECK

**75-00-00**

Contents 3  
Jun 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



## AIR TUBES - INSPECTION/CHECK

### 1. General

- A. Each item in this chapter is given a two-part identification; thus, 302-20 refers to Figure 302 and to Item 20 called out on that figure. Each item may be further identified by its Part Number by the use of Table 303, which cross-refers figures in this chapter to the equivalent chapter and figure in the Illustrated Parts Catalogue (I.P.C.); the called-out item number will be the same on both figures.
- B. All items which will be crack tested are listed in Tables 301 and 302.
- C. Dimensional checks are cross referenced to the equivalent Fits and Clearances Schedule (F.C.S.) chapter against the item concerned.
- D. When the inspection of an item discloses a minor defect that requires rectification, it is defined as 'Accept after repair'. On all such occasions the item must be rectified in accordance with Standard Practices 72-09-22 Repair. Where a Ref.No. follows 'Accept after repair' e.g. (Ref.72-21-01 Repair No.1), a specific Repair Scheme is available to which the item must be rectified. Items that are rejected, or for which a repair scheme is not currently available, should be held at the discretion of the operator, as service experience may prove the need for a repair.
- E. On completion of a repair, rectification or test, the item(s) must be inspected, to ensure that the necessary work has been satisfactorily completed.

### 2. General Inspection

- A. Inspect all items illustrated in this chapter, whether specified or not, in accordance with Standard Practices (Ref.72-09-00 Inspection/Check). In addition, carry out the inspections detailed for the specified items, from para.4 onwards.
- B. Inspection terms used in this chapter are explained in Standard Practices (Ref.72-09-00 Inspection/Check).

### 3. Crack Detection

- A. Magnetic Particle Crack Detection.
  - (1) Submit the items listed in Table 301 to crack detection in accordance with the process quoted.

INSPECTION/CHECK

**75-00-00**

Page 301  
Apr 1/77



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (2) Items to be crack detected by this method are illustrated in the Crack Detection Test Diagram (Fig.301). For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

No Current Requirement

Items to be Magnetic Particle Crack Tested  
Table 301

B. Fluorescent Dye Crack Detection.

- (1) Submit the items listed in Table 302 to crack detection in accordance with the process quoted. For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

302	150	Tube	FlA
302	260	Make-up Piece	FlA
302	300	Tube	FlA
303	80	Tube	FlA
304	10	Duct	FlA
304	40	Tube	FlA
304	60	Duct	FlA
305	10	Duct	FlA
305	70	Bracket Assy.	FlA
305	180	Duct	FlA
305	200	Duct	FlA
306	20	Elbow	FlA
306	40	Tube	FlA
307	80	Tube	FlA
307	230	Tube	FlA
307	240	End Fitting Assy.	FlA
307	290	Bracket Assy.	FlA
308	80	Seal plate	FlA
308	90	Tube	FlA

Items to be Fluorescent Dye Crack Tested  
Table 302 (Continued)

INSPECTION/CHECK

75-00-00

Page 302  
Jun 1/76

FN16066

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
308	270	Tube	FlA
308	350	Tube	FlA
308	450	Tube	FlA
309	100	Multiple Connector	FlA
309	120	Tube	FlA
309	235	Tube	FlA
309	240	Tube	FlA
310	80	Tube	FlA
311	80	Tube	FlA
312	10	Duct	FlA
313	10	Duct	FlA
314	140	Tube	FlA
315	50	Tube	FlA
315	170	Tube	FlA
315	300	Tube	FlA
316	80	Tube	FlA
316	90	Tube	FlA
316	170	Tube	FlA
317	50	Tube	FlA
317	100	Tube	FlA
318	10	Duct	FlA
318	50	Duct	FlA
319	10	Duct	FlA
319	90	Seal Ring Carrier	FlA
319	130	Elbow	FlA
319	210	Tube	FlA
320	80	Tube	FlA
320	150	Housing Seal	FlA
320	230	Tube	FlA
321	150	Tube	FlA
321	190	Duct	FlA
321	240	Tube	FlA
321	400	Tube	FlA
322	150	Tube	FlA
322	420	Tube	FlA
322	480	Connection Flange	FlA
323	80	Tube	FlA
323	180	Tube	FlA
323	280	Tube	FlA
324	10	Duct	FlA
324	100	Duct	FlA

Items to be Fluorescent Dye Crack Tested  
Table 302 (Continued)

INSPECTION/CHECK

**75-00-00**

Page 303

Oct 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
325	90	Tube	FlA
325	250	Tube	FlA
325	390	Tube	FlA
326	80	Tube	FlA

Items to be Fluorescent Dye Crack Tested  
Table 302 (Concluded)

7N32154

INSPECTION/CHECK

75-00-00

Page 304

Jun 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



No current requirement

Crack Detection Test Diagram  
Figure 301

INSPECTION/CHECK  
**75-00-00**  
Page 305  
Jun 1/76





# OLYMPUS 593

MK.610-14-28

OVERHAUL



Fig.No.

Illustrated Parts Catalogue Equivalent

301	Not applicable	
302	75-01-01	Fig.1
303	75-01-02	Fig.1
304	75-01-03	Fig.1
305	75-01-04	Fig.1
306	75-01-05	Fig.1
307	75-02-01	Fig.1
308	75-02-02	Fig.1
309	75-02-03	Fig.1
310	75-02-04	Fig.1
311	75-02-05	Fig.1
312	75-02-06	Fig.1
313	75-02-07	Fig.1
314	75-02-08	Fig.1
315	75-02-09	Fig.1
316	75-02-10	Fig.1
317	75-02-11	Fig.1
318	75-02-12	Fig.1
319	75-03-01	Fig.1
320	75-03-01	Fig.2
321	75-03-01	Fig.3
322	75-03-02	Fig.1
323	75-03-02	Fig.2
324	75-05-01	Fig.1
325	75-05-02	Fig.1
326	75-05-03	Fig.1

## Cross References to Illustrated Parts Catalogue Table 303

4. Tubes (302-150/300, 303-80, 304-40, 306-40, 307-80/230, 308-90/270/350/450, 309-120/235/240, 310-80, 311-80, 314-140, 315-50/170/300, 316-80/90/170, 317-50/100, 320-80/230, 321-150/240/400, 322-150/420, 323-80/180/280, 325-90/250/390, 326-80)  
Seal ring carrier (319-90/210), Housing seal (320-150)

- A. Inspect Tubes (Ref.72-09-00 Inspection/Check).  
B. Inspect Seal Ring Location External Diameters and Adjacent Lands.

- (1) Nicks, burrs and light scoring in seal ring locations. Accept after repair.

INSPECTION/CHECK

# 75-00-00

Page 306  
Oct 1/81

IN16068



OLYMPUS 593

MK.610-14-28

OVERHAUL



(2) Fretting on lands.

(a) Up to 0.030 in.  
(0,760 mm) reduction  
in diameter.

Accept after  
repair.

C. Inspect Seal Ring Location Bores.

(1) Fretting.

(a) Producing a step less  
than 0.005 in. (0,130 mm)  
deep.

Accept after  
repair.

(2) Nicks, burrs and light  
scoring.

Accept after  
repair.

D. Inspect Abutment Flanges.

(1) Nicks, burrs and scoring.

Accept after  
repair providing  
sealing  
capabilities are  
unimpaired.

(2) Wear.

(a) Elongation of bolt holes  
not more than 0.030 in.  
(0,760 mm).

Accept after  
repair.

E. Inspect Bracket Attachment Flanges.

(1) Nicks and burrs.

Accept after  
repair.

(2) Wear.

(a) Attachment face thickness  
reduced not more than  
10 per cent.

Accept.

(b) Bolt holes elongated  
not more than 0.030 in.  
(0,760 mm).

Accept after  
repair.

F. Inspect Elbow and Tee Adapter Piece.

(1) Nicks and burrs.

Accept after  
repair.

INSPECTION/CHECK

75-00-00

Page 307

Jun 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



5. Retaining Plates (302-170, 303-130, 308-440, 310-110/130, 311-130, 312-50, 313-40, 319-80/240, 320-110/260, 321-280)

A. Inspect Retaining Plate.

- (1) Nicks and burrs. Accept after repair.
- (2) Wear.
  - (a) Attachment face thickness reduced not more than 10 per cent. Accept after repair.
  - (b) Bolt holes elongated not more than 0.030 in. (0,760 mm). Accept after repair.

6. Make Up Piece Assembly 302-260

A. Inspect Threads (Ref.72-09-00 Inspection/Check).

B. Inspect Tube Abutment Faces.

- (1) Scoring. Accept after repair providing sealing capabilities are unimpaired.

C. Inspect Attachment Flange.

- (1) Wear.
  - (a) Reduction of flange thickness of less than 10 per cent. Accept after repair.
  - (b) Bolt holes elongated not more than 0.030 in. (0,760 mm). Accept after repair.
- (2) Nicks, burrs and light scoring.
  - (a) On the spigot location of the flange. Accept after repair providing sealing capabilities are unimpaired.

TN16069

INSPECTION/CHECK

**75-00-00**

Page 308  
Jun 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



7. Brackets (305-50/60/160/170/220, 307-180, 308-70/115, 309-90, 311-110, 313-100/110, 318-30/40/90/100, 321-180/230/390, 322-470)

A. Inspect Brackets.

(1) Wear.

- |     |  |                      |
|-----|--|----------------------|
| (a) | Attachment face thickness reduced not more than 10 per cent. | Accept.              |
| (b) | Bolt holes elongated not more than 0.030 in. (0,760 mm).     | Accept after repair. |

(2) Nicks and burrs.

Accept after repair.

(3) Distortion.

- |     |                           |                                       |
|-----|---------------------------|---------------------------------------|
| (a) | Distorted from true form. | Accept if compatibility is preserved. |
|-----|---------------------------|---------------------------------------|

(4) Scoring.

- |     |  |   |
|-----|--|---|
| (a) | Not more than 0.010 in. (0,250 mm) in depth. | Accept after repair providing material thickness is not reduced by more than 10 per cent. |
|-----|--|---|

8. Ducts (304-10/60, 305-10/180/200, 312-10, 313-10, 318-10/50, 319-10, 321-190, 324-10/100)

A. Inspect Duct (Ref.72-09-00 Inspection/Check Rigid Tubes).

B. Inspect Threads (Ref.72-09-00 Inspection/Check).

C. Inspect Abutment Faces.

(1) Nicks, burrs and scoring.

Accept after repair providing sealing capabilities are unimpaired.

(2) Wear.

- |     |  |                      |
|-----|--|----------------------|
| (a) | Elongation of bolt holes not more than 0.030 in. (0,760 mm). | Accept after repair. |
|-----|--|----------------------|

INSPECTION/CHECK

75-00-00

Page 309  
Oct 1/81



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



D. Inspect Sealing Ring Locating Bores.

(1) Fretting.

(a) Producing a step less than 0.005 in. (0,130 mm) deep. Accept after repair.

(2) Nicks, burrs and light scoring. Accept after repair providing sealing capabilities are unimpaired.

E. Inspect Bracket Attachment Flanges.

(1) Nicks and burrs. Accept after repair.

(2) Wear.

(a) Attachment face thickness reduced not more than 10 per cent. Accept.

(b) Bolt holes elongated not more than 0.030 in. (0,760 mm). Accept.

F. Inspect Seal Ring Location External Diameters and Adjacent Lands.

(1) Fretting on lands.

(a) Up to 0.030 in. (0,760 mm) in diameter. Accept after repair.

(2) Nicks, burrs and light scoring in seal ring locations. Accept after repair.

G. Inspect External Finish (304-10/60, 305-10/200, 313-10, 318-18/50) (Ref.72-09-04 Repair for Areas with External Finish and the Procedure for Application of Finish).

NOTE: To enable the crack detection (fluorescent dye) to be carried out, the high heat resisting aluminium enamel finish will have been removed during cleaning.

INSPECTION/CHECK

75-00-00

Page 310

Dec 1/78

TN16073



OLYMPUS 593

MK.610-14-28

OVERHAUL



9. Bracket Assemblies (305-70, 307-290)

- A. Inspect Captive Nut and Retainer (Ref.72-09-00 Inspection/Check).
- B. Inspect Threads (Ref.72-09-00 Inspection/Check).
- C. Inspect Bracket Assembly.
- (1) Nicks, burrs and fretting. Accept after repair.
  - (2) Wear.
    - (a) Attachment face thickness reduced more than 10 per cent. Reject.
    - (b) Bolt holes elongated not more than 0.030 in. (0,760 mm). Accept after repair.
  - (3) Damage.
    - (a) Any distortion from true form. Reject.

10. Elbow (306-20, 319-130)

- A. Inspect Abutment Faces.
- (1) Fretting.
    - (a) Reduction of flange thickness of less than 10 per cent. Accept after repair.
  - (2) Scoring, nicks and burrs. Accept after repair providing sealing capabilities are unimpaired.
  - (3) Wear.
    - (a) Attachment face thickness reduced not more than 10 per cent. Accept.
    - (b) Bolt holes elongated not more than 0.030 in. (0,760 mm). Accept after repair.

INSPECTION/CHECK

75-00-00

Page 311

Dec 1/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



B. Inspect Sealing Ring Locating Bores.

(1) Fretting.

- |  |                      |
|--|----------------------|
| (a) Producing a step less than 0.005 in.<br>(0,130 mm) deep. | Accept after repair. |
|--|----------------------|

C. Inspect for Dents (Ref.72-09-00 Inspection/Check).

11. Thermal Insulation Blanket (306-50/60)

A. Inspect Spot Welding.

(1) Damage.

- |  |         |
|--|---------|
| (a) Broken spot welds or parted seams. | Reject. |
|--|---------|

B. Inspect Blanket.

(1) Damage.

- |  |         |
|--|---------|
| (a) Tears, punctures or irregular dents. | Reject. |
| (b) Dents of smooth contour.             | Accept. |
| (c) Powdering and collapse of filler.    | Reject. |

NOTE: Press blanket with finger tips and note any lack of "cushion" effect.

12. End Fitting Assembly (307-240)

A. Inspect Threads (Ref.72-09-00 Inspection/Check).

B. Inspect Attachment Flange.

(1) Wear.

- |  |                      |
|--|----------------------|
| (a) Attachment face thickness reduced not more than 10 per cent. | Accept.              |
| (b) Bolt holes elongated not more than 0.030 in.<br>(0,760 mm).  | Accept after repair. |

INSPECTION/CHECK

75-00-00

Page 312  
Jun 1/76

TN16076



OLYMPUS 593

MK.610-14-28  
OVERHAUL



C. Inspect Spanner Serrations (Ref.72-09-00 Inspection/Check Tube End Fittings).

D. Inspect General Condition of Fitting.

(1) Nicks and burrs.

Accept after  
repair.

13. Seal Plate (308-80)

A. Inspect Abutment Face.

(1) Scoring.

(a) Less than 0.005 in.  
(0,130 mm) deep and  
not extending right  
across the sealing  
face.

Accept after  
repair providing  
the sealing  
capabilities are  
unimpaired.

(2) Wear.

(a) Bolt holes elongated  
not more than 0.020 in.  
(0,500 mm).

Accept after  
repair.

B. Inspect General Condition of Seal Plate.

(1) Nicks and burrs.

Accept after  
repair.

14. Multiple Connector Assembly (309-100)

A. Inspect Threads (Ref.72-09-00 Inspection/Check).

B. Inspect Attachment Flanges.

(1) Wear.

(a) Attachment face thickness  
reduced not more than 10  
per cent.

Accept.

(b) Bolt holes elongated  
not more than 0.030 in.  
(0,760 mm).

Accept after  
repair.

PRINTED IN ENGLAND

TN16077

INSPECTION/CHECK

75-00-00

Page 313

Jun 1/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



C. Inspect General Condition of Connector.

- (1) Nicks and burrs.

Accept after  
repair.

15. Stiffener and Locating Plates (318-80/110)

A. Inspect Plates.

- (1) Wear.

- (a) Attachment face thickness  
reduced not more than 10  
per cent.

Accept.

- (b) Bolt holes elongated  
not more than 0.030 in.  
(0,760 mm).

Accept after  
repair.

- (2) Nick and burrs.

Accept after  
repair.

16. Connection Flange (322-480)

A. Inspect Thread (Ref.72-09-00 Inspection/Check).

B. Inspect Abutment Flange.

- (1) Light scoring, nicks and  
burrs.

Accept after  
repair providing  
sealing  
capabilities are  
unimpaired.

- (2) Wear.

- (a) Attachment face thickness  
reduced not more than  
10 per cent.

Accept.

- (b) Bolt holes elongated  
not more than 0.030 in.  
(0,760 mm).

Accept after  
repair.

TN9683

INSPECTION/CHECK

**75-00-00**

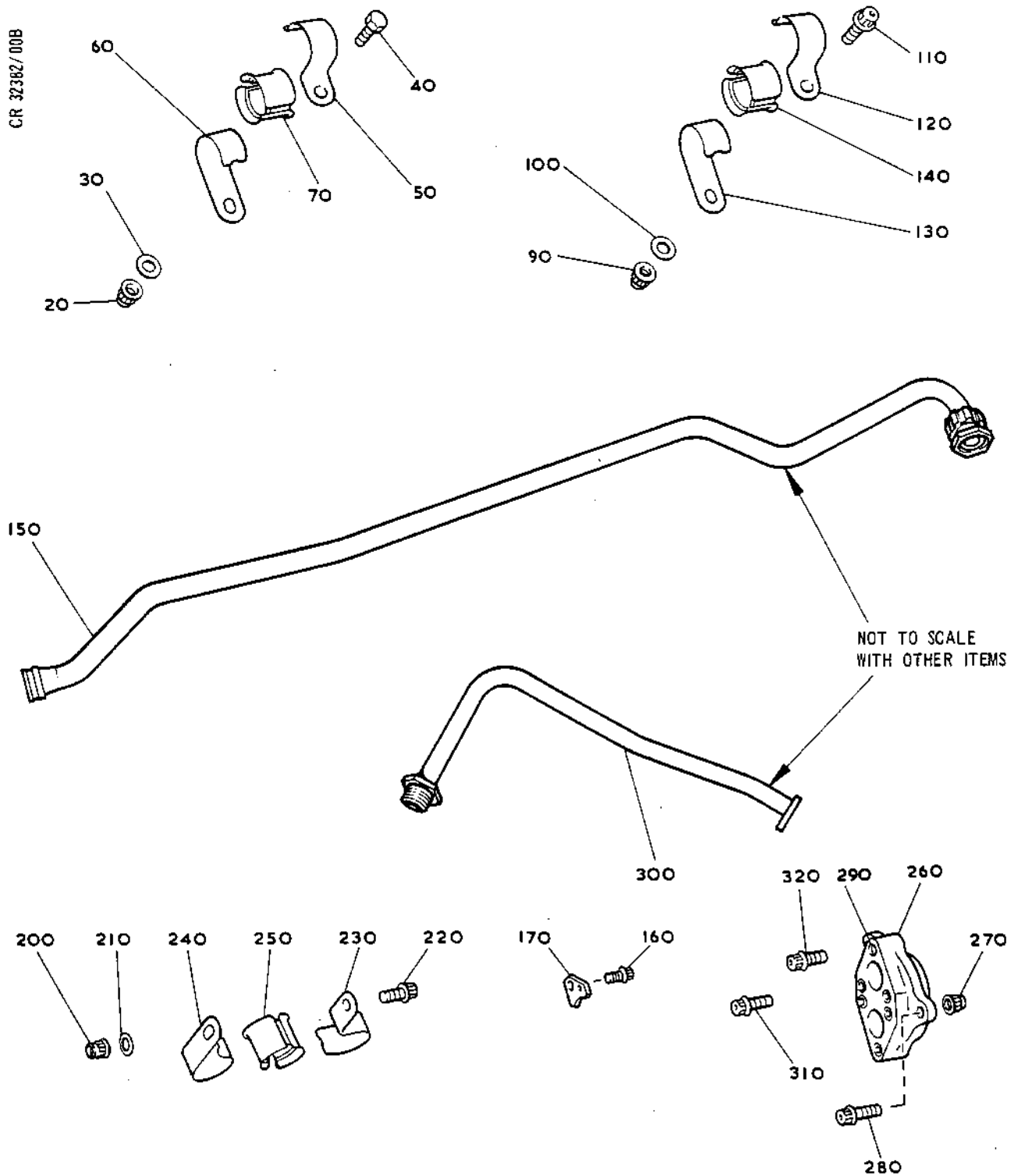
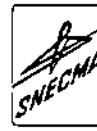
Page 314

Jun 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Tubes, Air Cooling, Intermediate Case to Exhaust Diffuser  
Figure 302

INSPECTION/CHECK  
**75-00-00**  
Page 315  
Jun 1/76

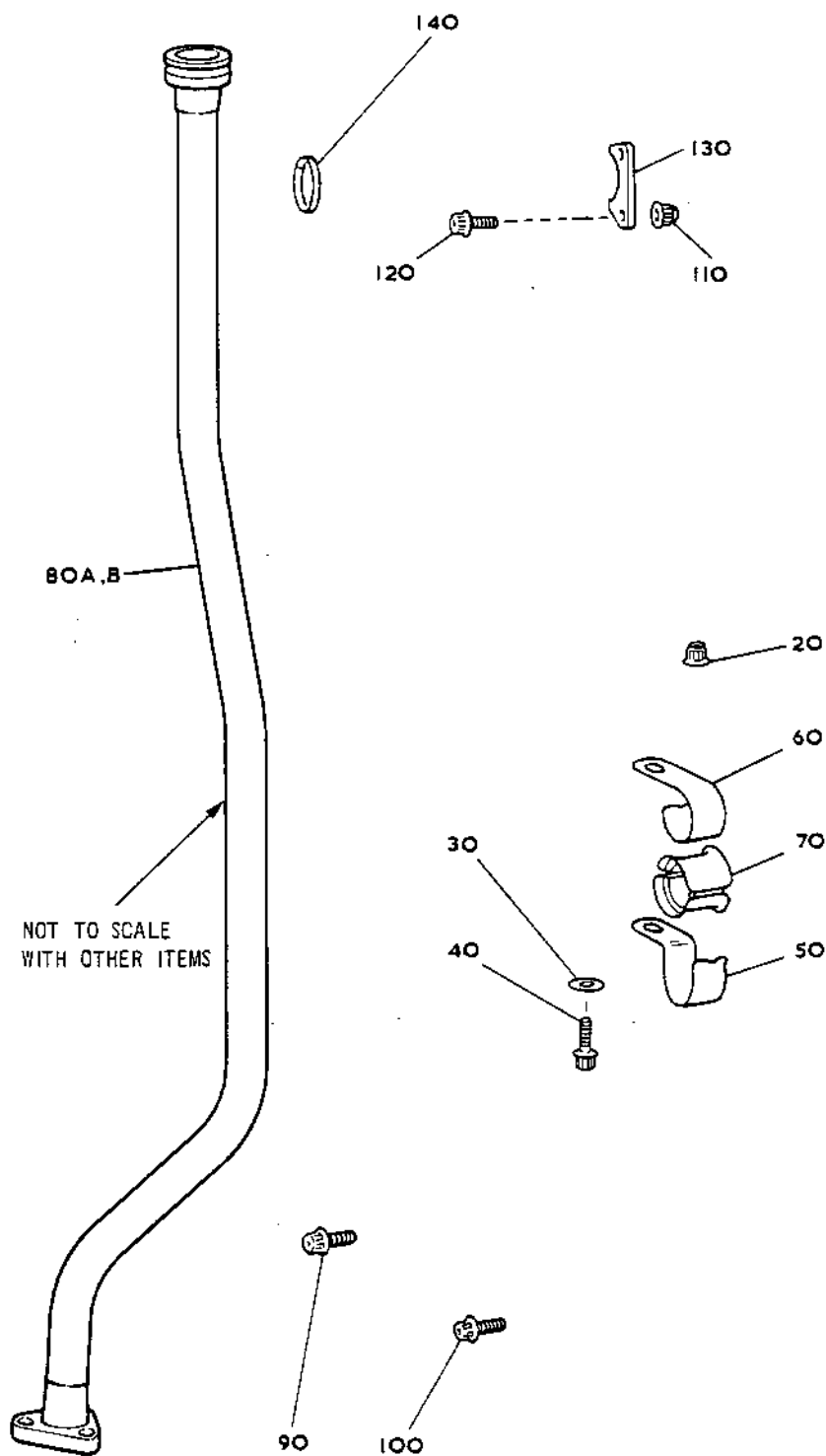


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32381/00C



Tubes, Air Cooling, Intermediate Case to HP Turbine Bearing  
Figure 303

INSPECTION/CHECK

75-00-00

Page 316

Dec 1/81



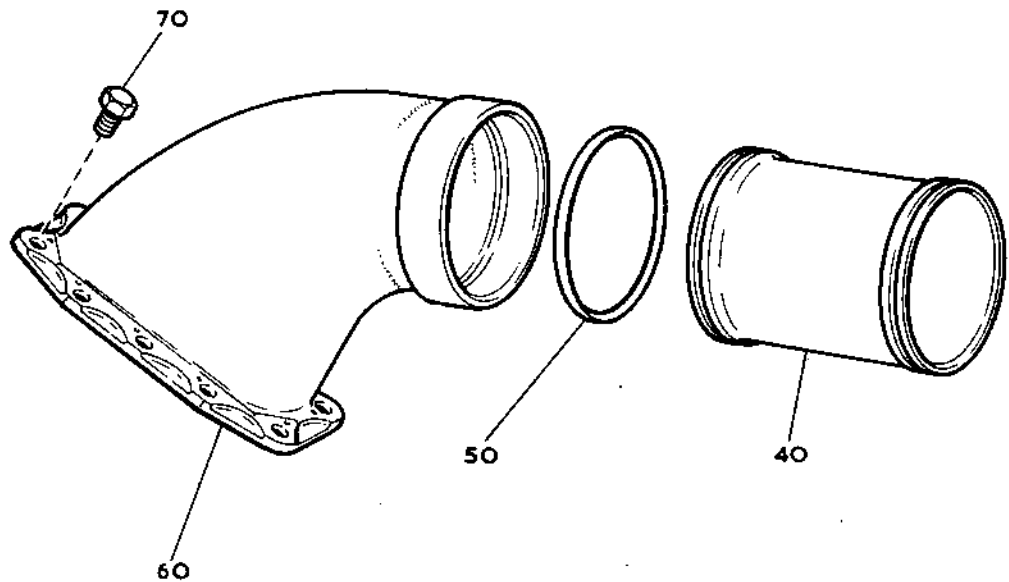
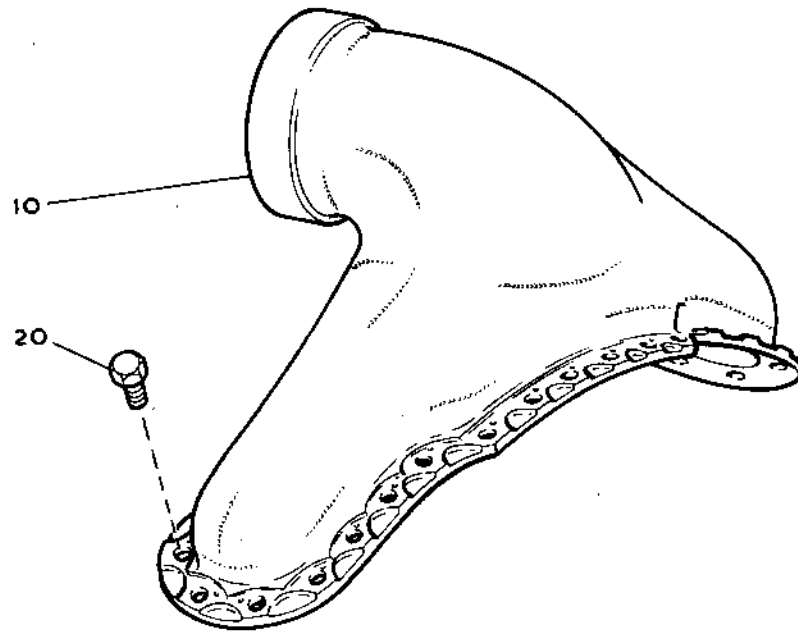
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32380/00B



TN44222

Tubes, Air Cooling, HP Compressor Case to HP Compressor  
Diffuser Case (Upper)  
Figure 304

INSPECTION/CHECK

**75-00-00**

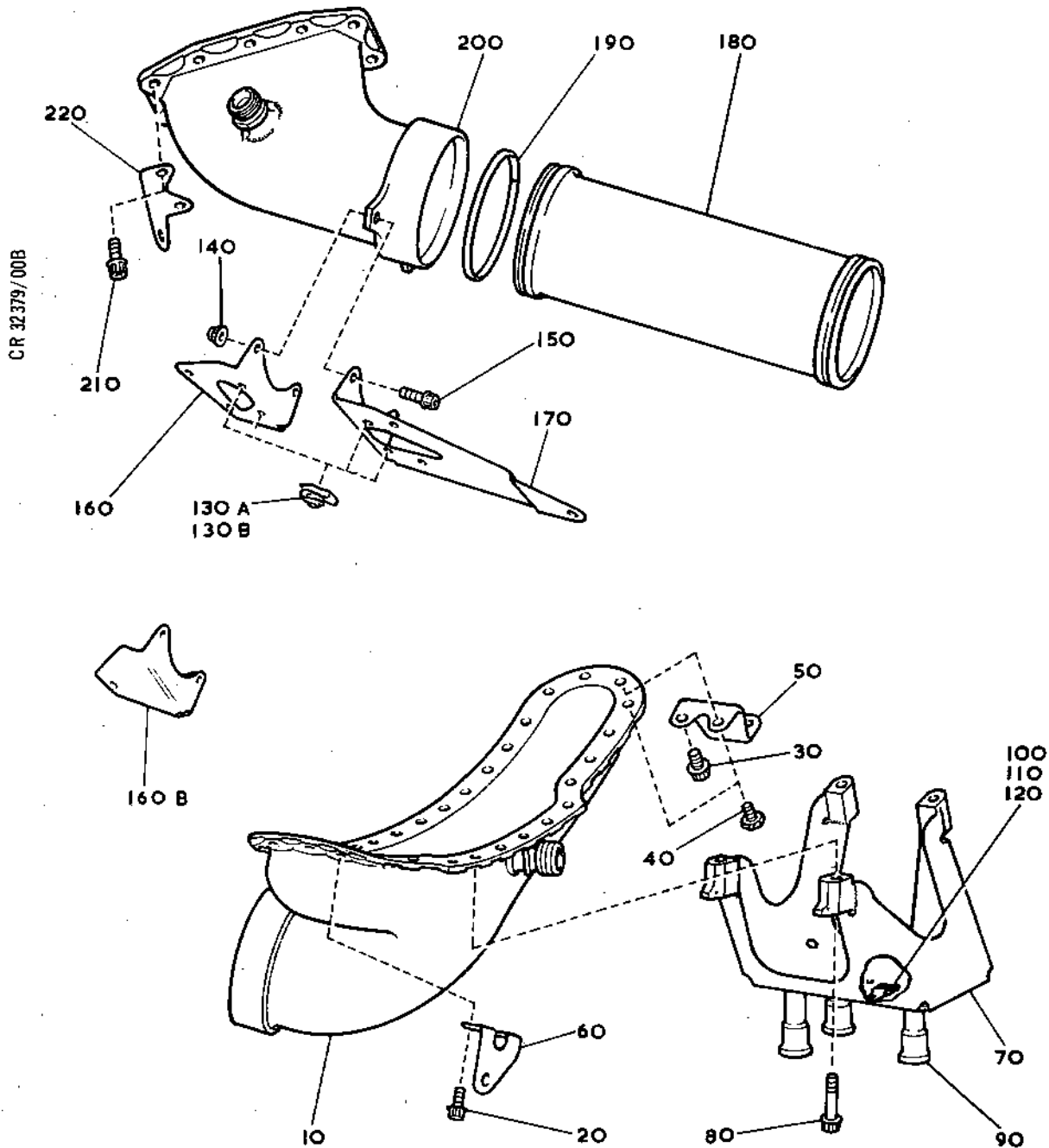
Page 317

Jun 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TN9700

Tubes, Air Cooling, HP Compressor Case to HP Compressor  
Diffuser Case (Lower)  
Figure 305

INSPECTION/CHECK

**75-00-00**

Page 318

Jun 1/76



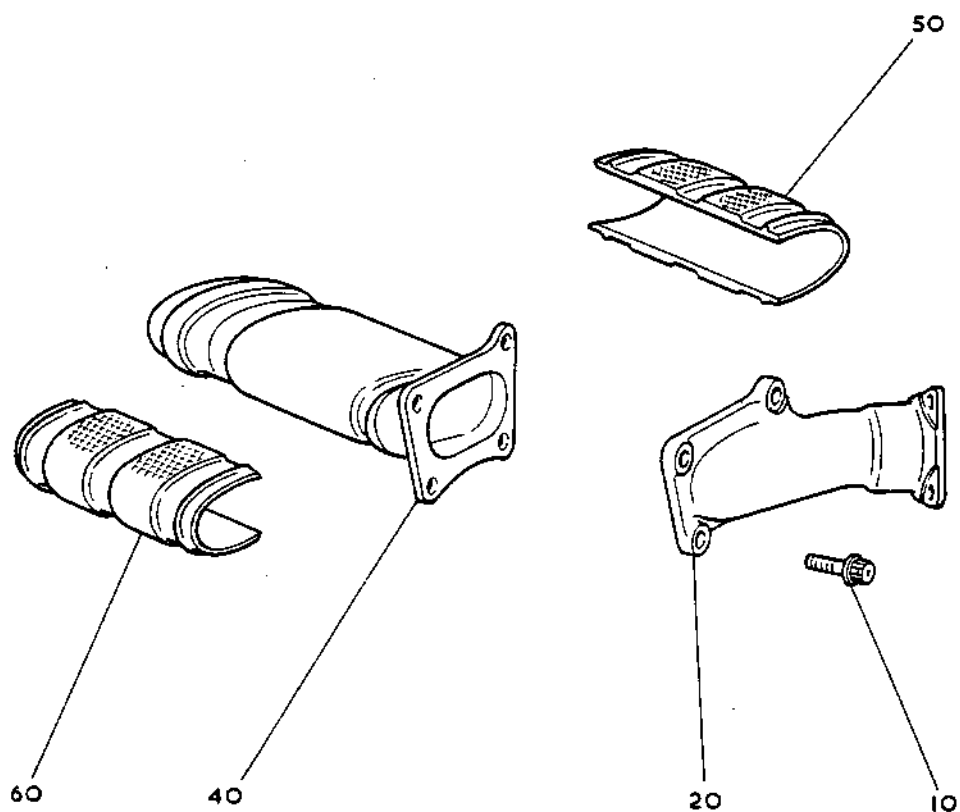
OLYMPUS 593

MK. 610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 33183/00A



Elbow, Air Cooling, HP Turbine Bearing Feed Tube  
Figure 306

INSPECTION/CHECK

75-00-00

Page 319  
Jun 1/76

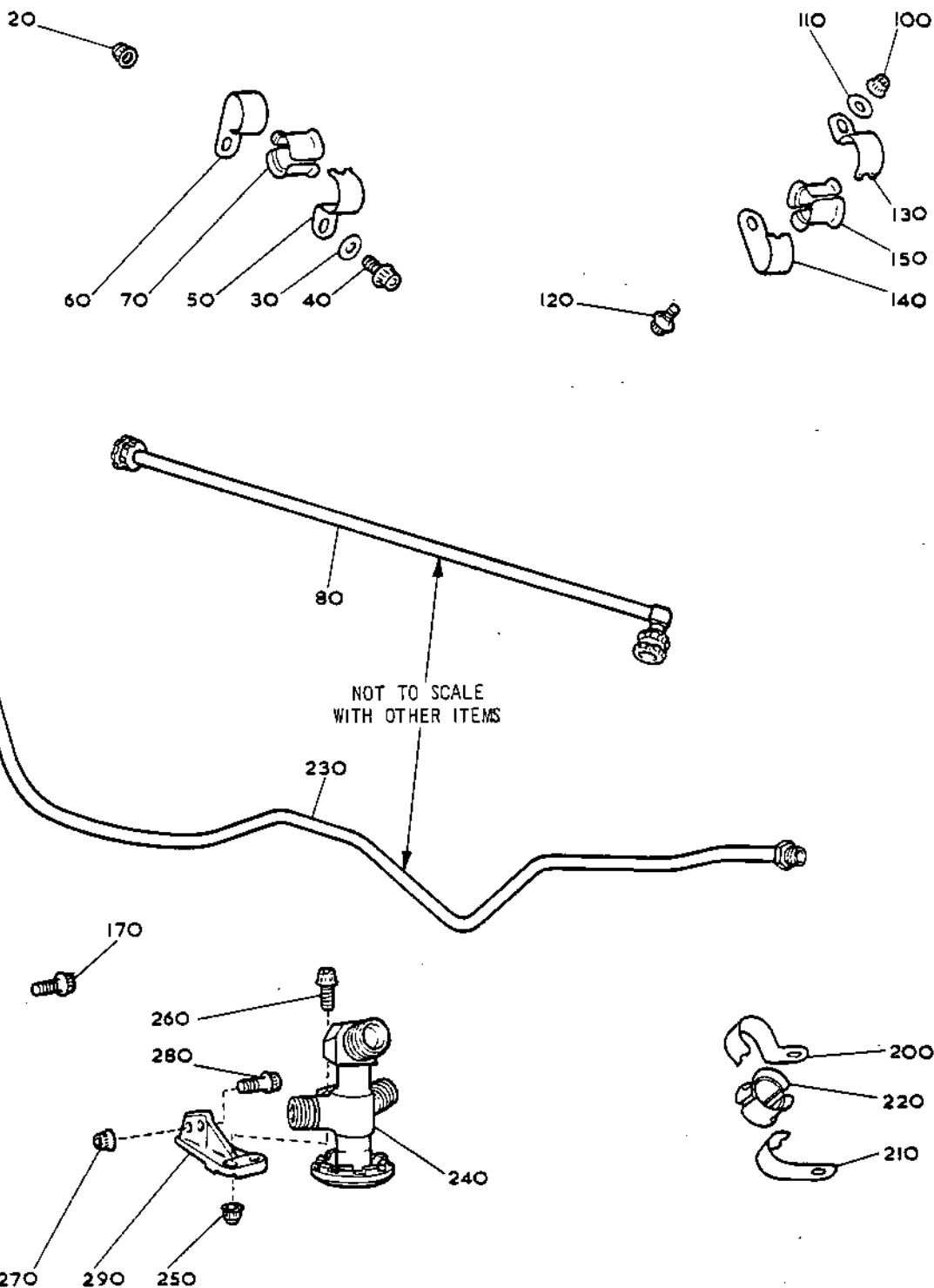
TN42704



OLYMPUS 593

MK.610-14-28

OVERHAUL



Tubes, Air Venting, Intermediate Case Adapter  
to Aircraft Connection  
Figure 307

INSPECTION/CHECK

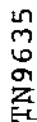
75-00-00

Page 320

Dec 1/81

CR 32378/00C

CR 32377/00A



INSPECTION/CHECK

**75-00-00**

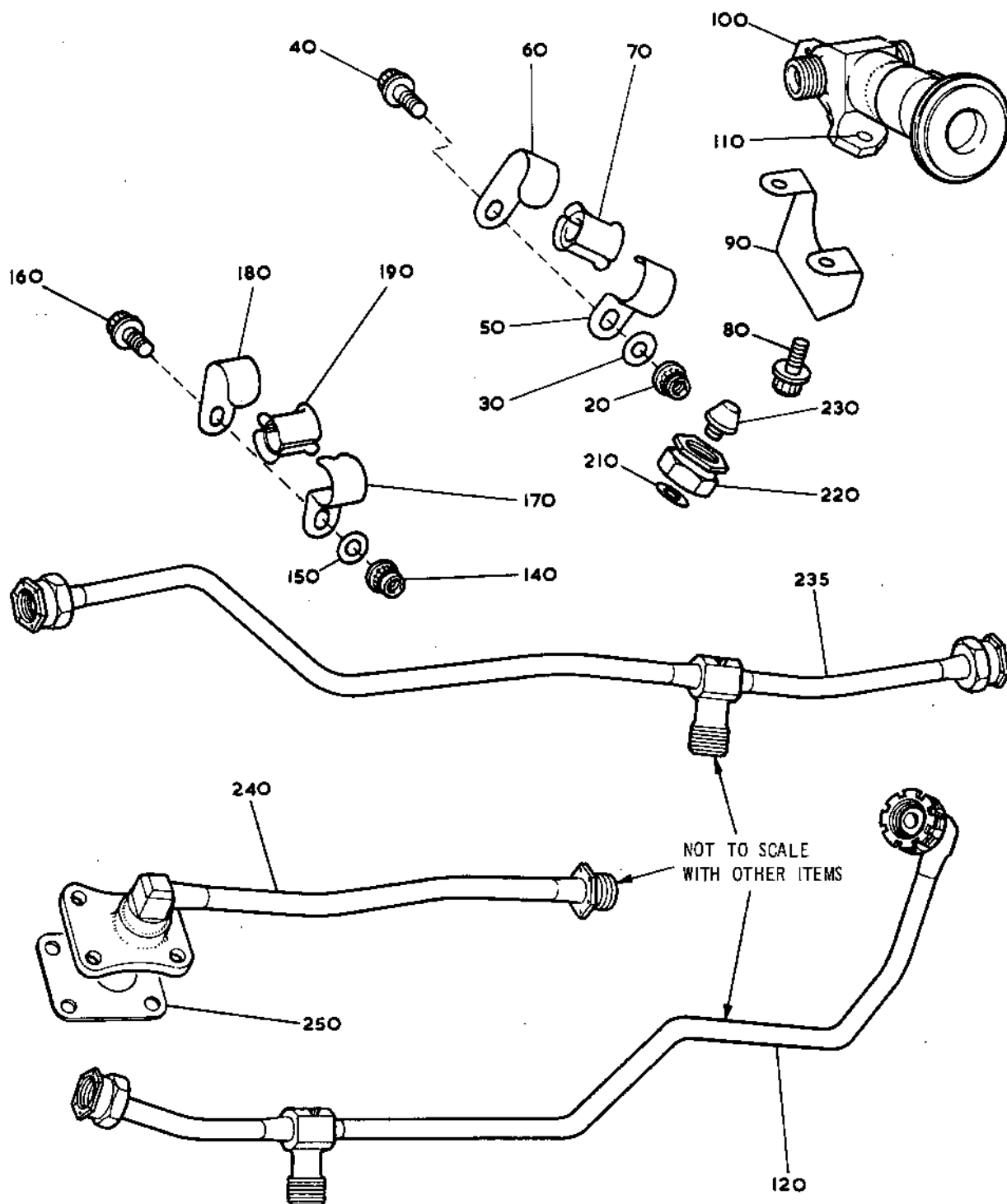
Page 321

Jun 1/76





OLYMPUS 593

MK. 610-14-28  
OVERHAUL

Tubes, Air Venting, HP Compressor Diffuser Case  
and Exhaust Diffuser to Multiple Connector  
Figure 309

INSPECTION/CHECK

**75-00-00**

Page 322

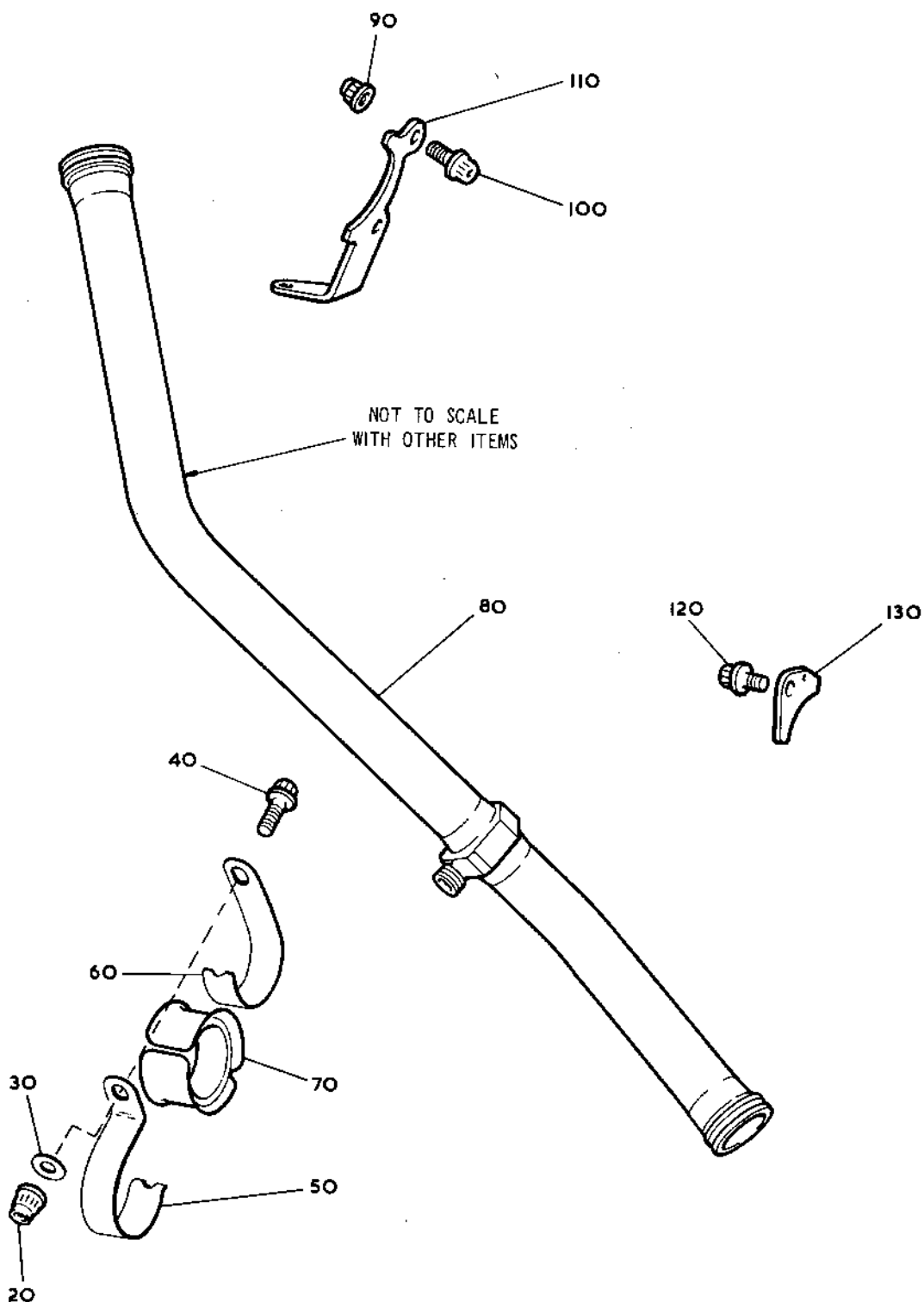
Jun 1/76

TN17778



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Tubes, Air Venting, Exhaust Diffuser to Duct RH  
Figure 310

INSPECTION/CHECK

**75-00-00**

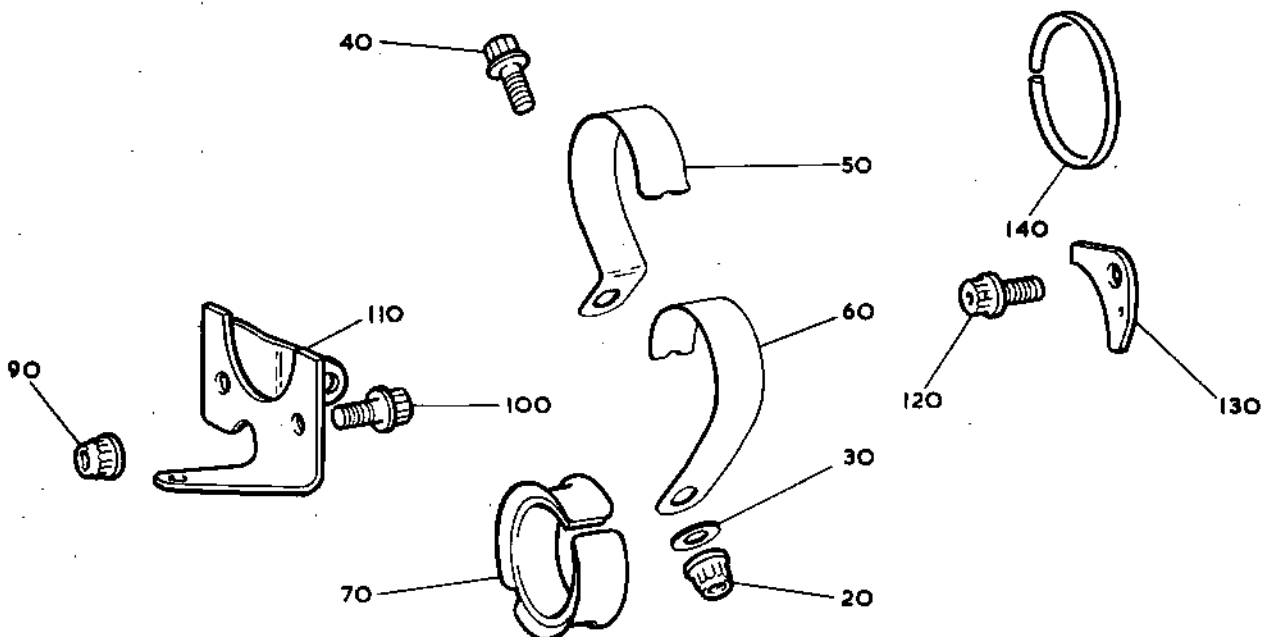
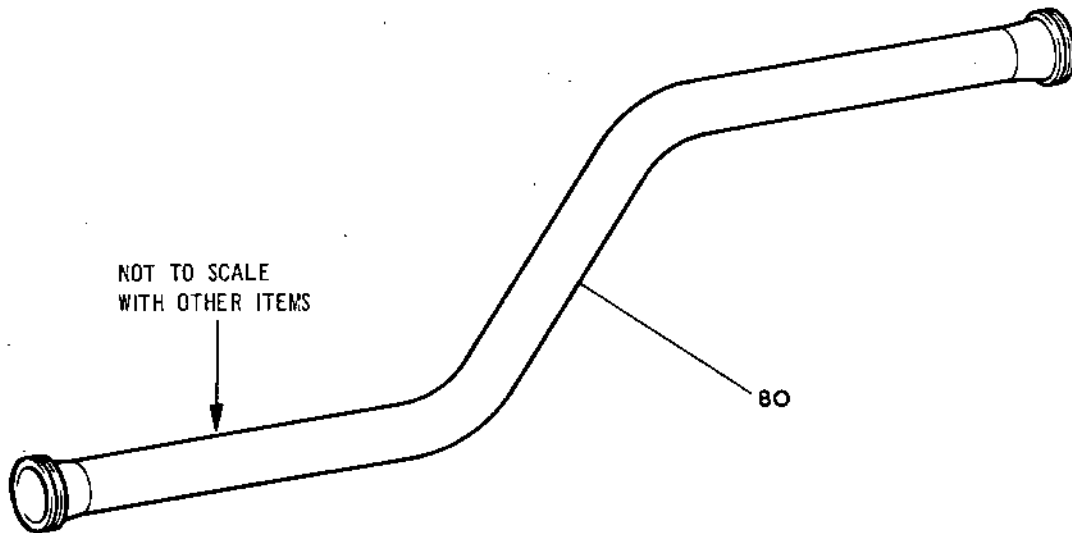


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32374/00B



Tubes, Air Venting, Exhaust Diffuser to Duct LH  
Figure 311

INSPECTION/CHECK  
**75-00-00**

Page 324  
Jun 1/76

TN16399

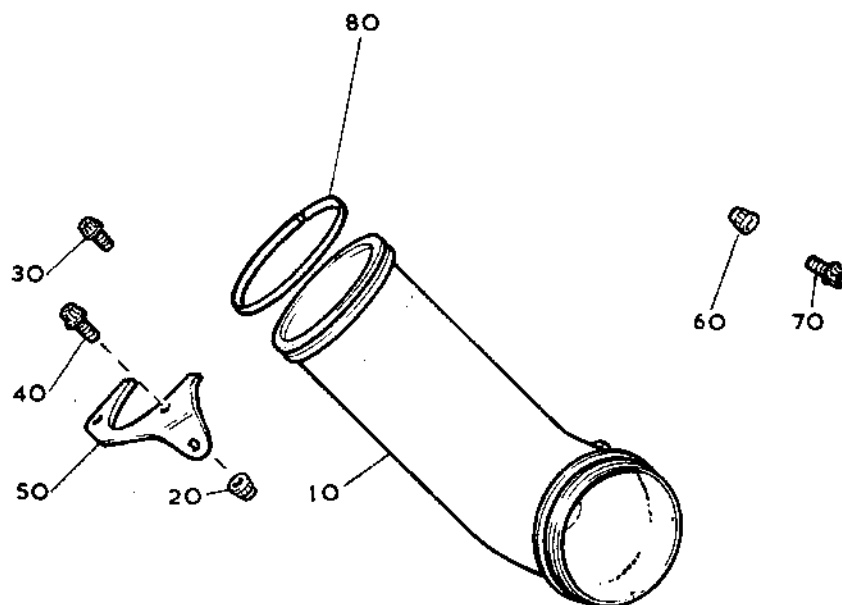


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32373/00B



TN16400

Tubes, Air Venting, HP Compressor Diffuser Case  
to Aircraft Overboard Cowling RH  
Figure 312

INSPECTION/CHECK

**75-00-00**

Page 325  
Jun 1/76

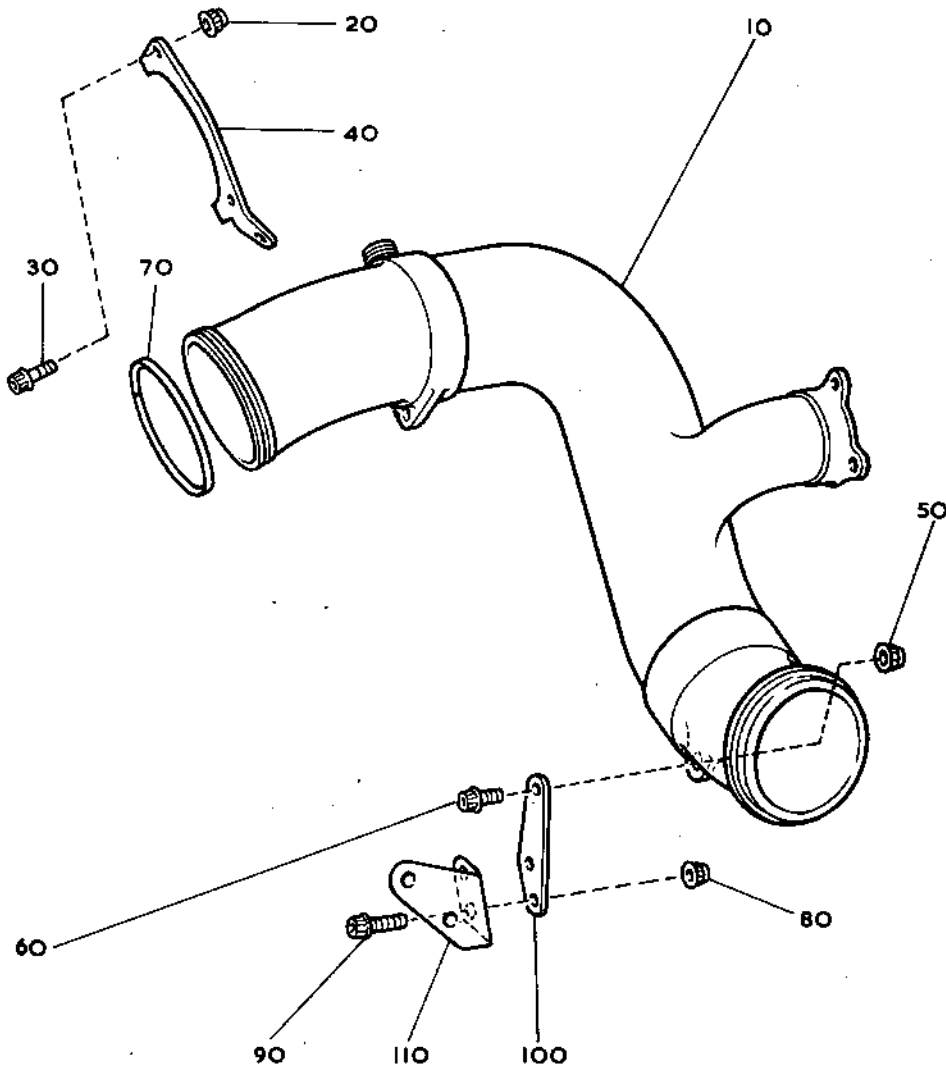


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32372/00B



TN16353

Tubes, Air Venting, HP Compressor Diffuser Case  
to Aircraft Overboard Cowling LH  
Figure 313

INSPECTION/CHECK

**75-00-00**

Page 326

Jun 1/76

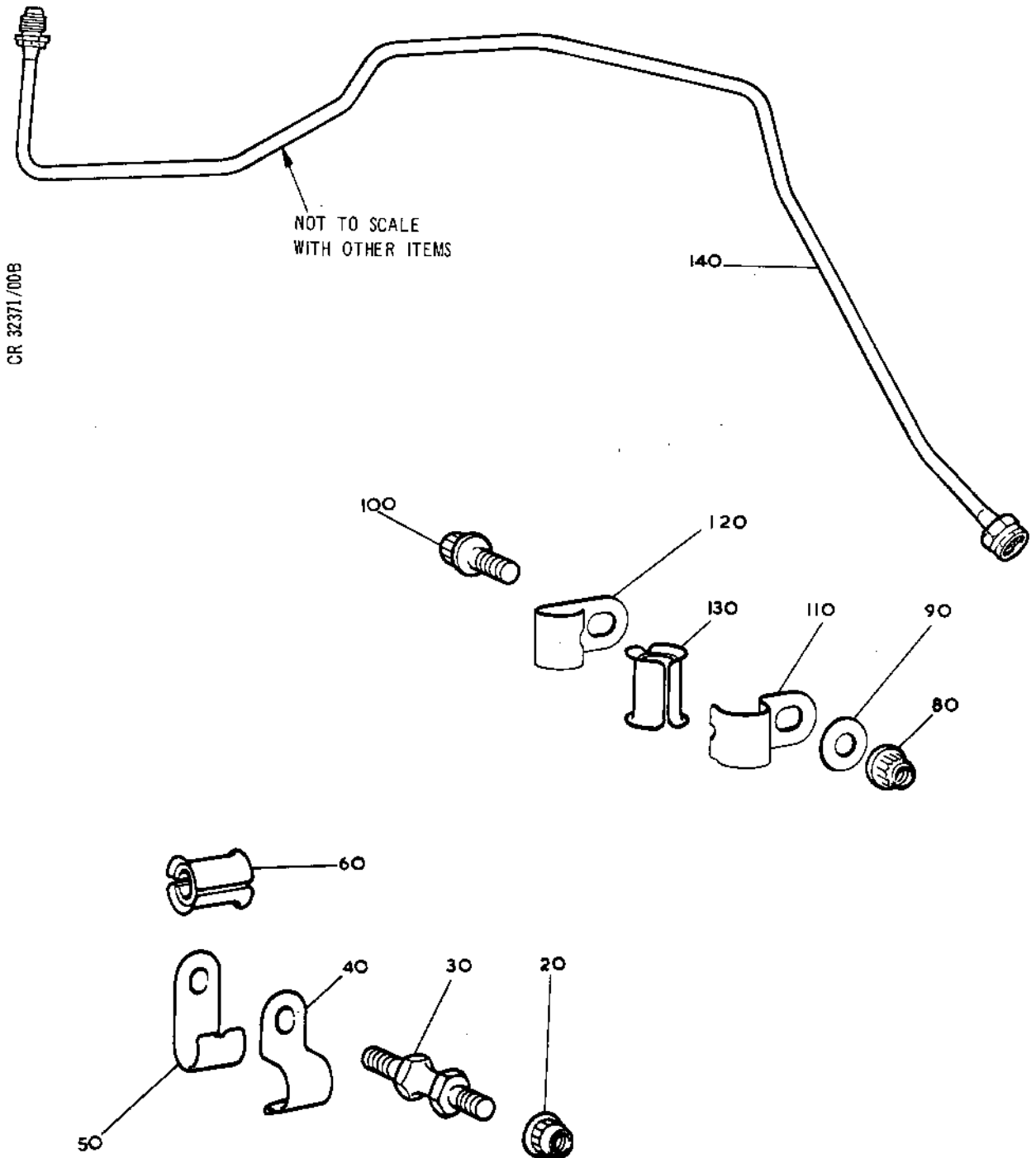


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



TN9643

Tubes, Air Venting, Air Intake Case Adapter RH  
to Connection on Tube (Air Intake Case Adapter  
LH to Outlet Seal Plate)  
Figure 314

INSPECTION/CHECK

**75-00-00**

Page 327  
Jun 1/76

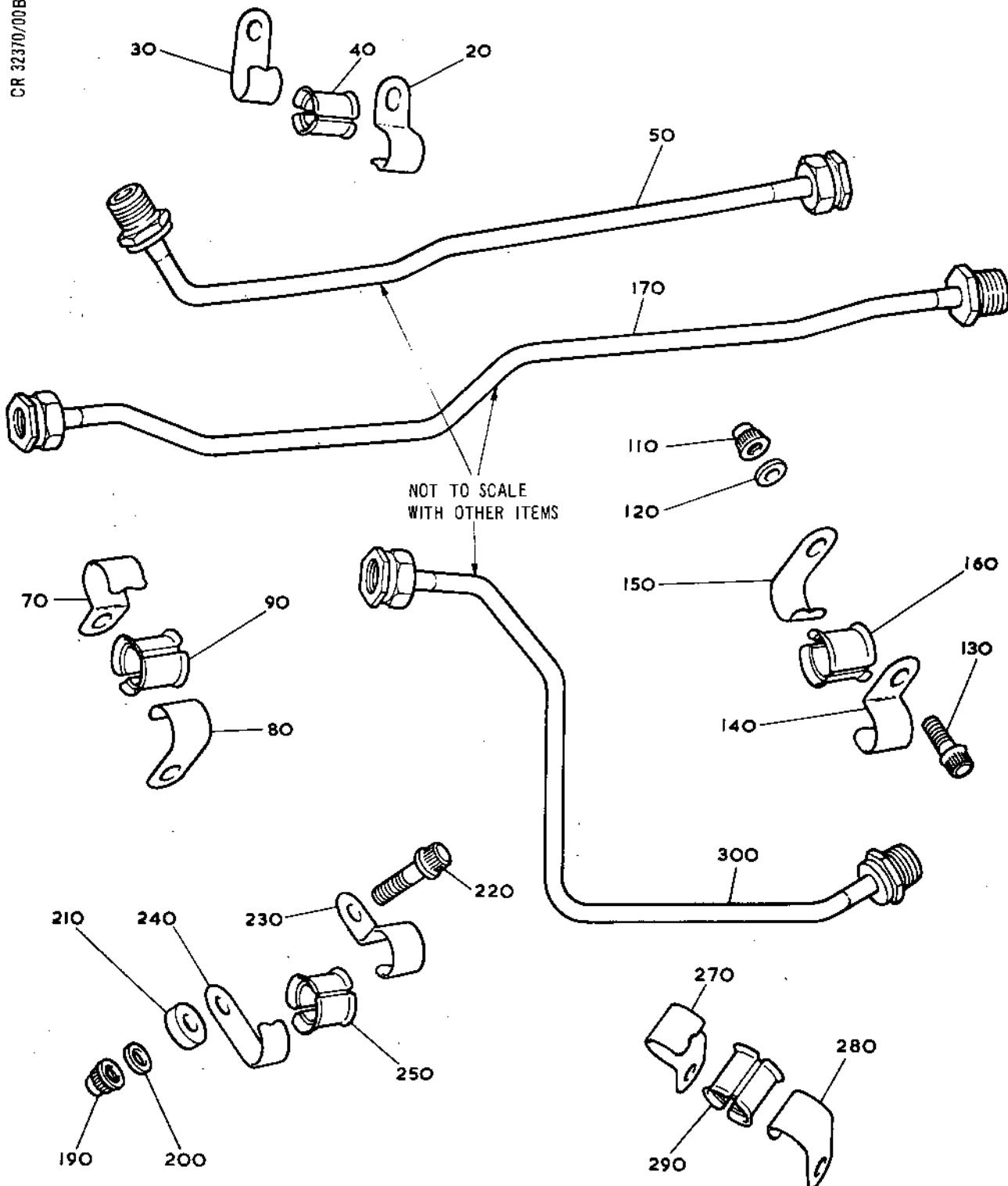


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 323/D/00B



TN9644

Tubes, Air Venting, Air Intake Case Adapter LH  
to Outlet Seal Plate  
Figure 315

INSPECTION/CHECK

75-00-00

Page 328  
Jun 1/76

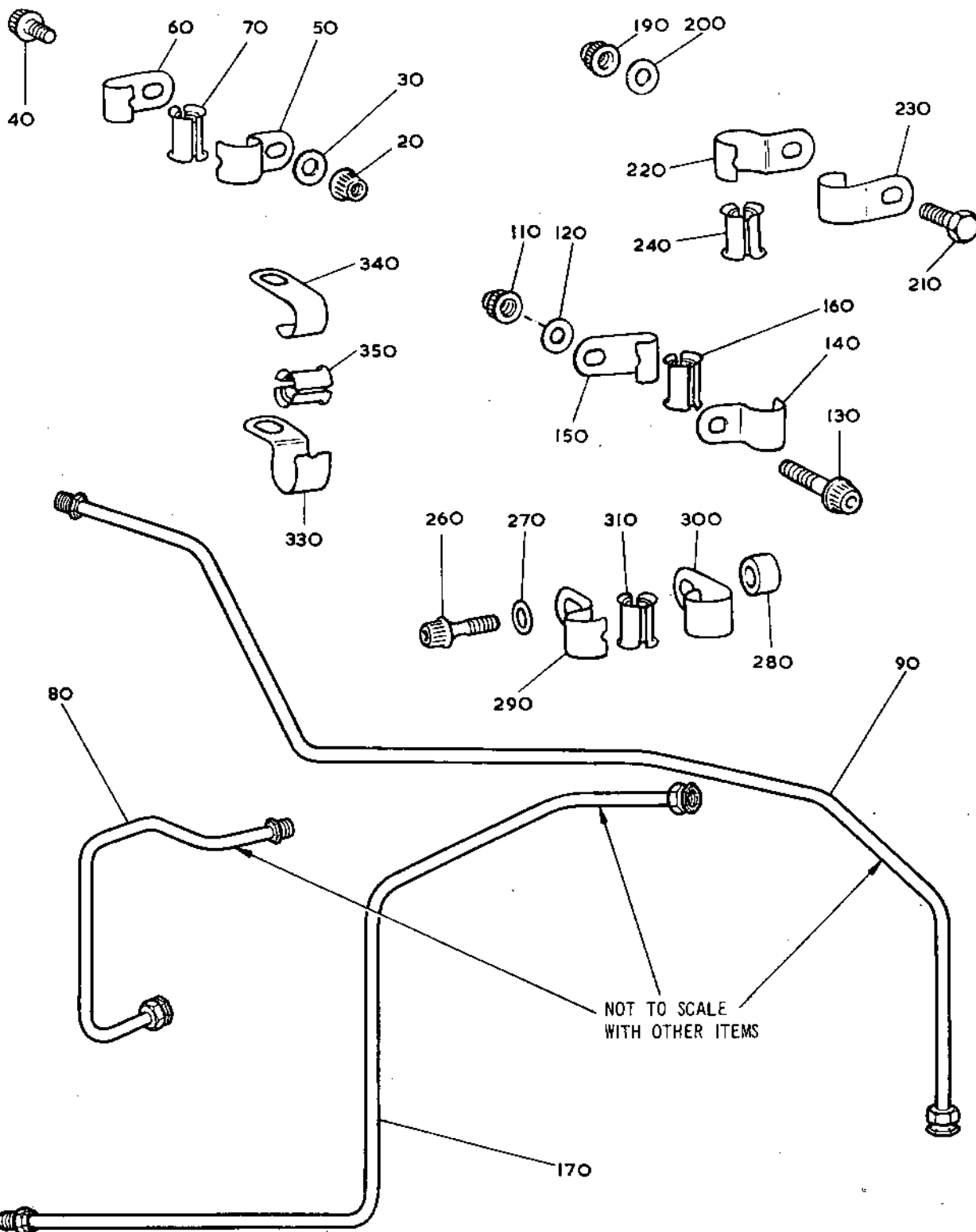


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32369/00B



Tubes, Air Venting, Break Point to Outlet Seal Plate  
Figure 316

INSPECTION/CHECK

75-00-00

Page 329

Jun 1/76

PRINTED IN ENGLAND

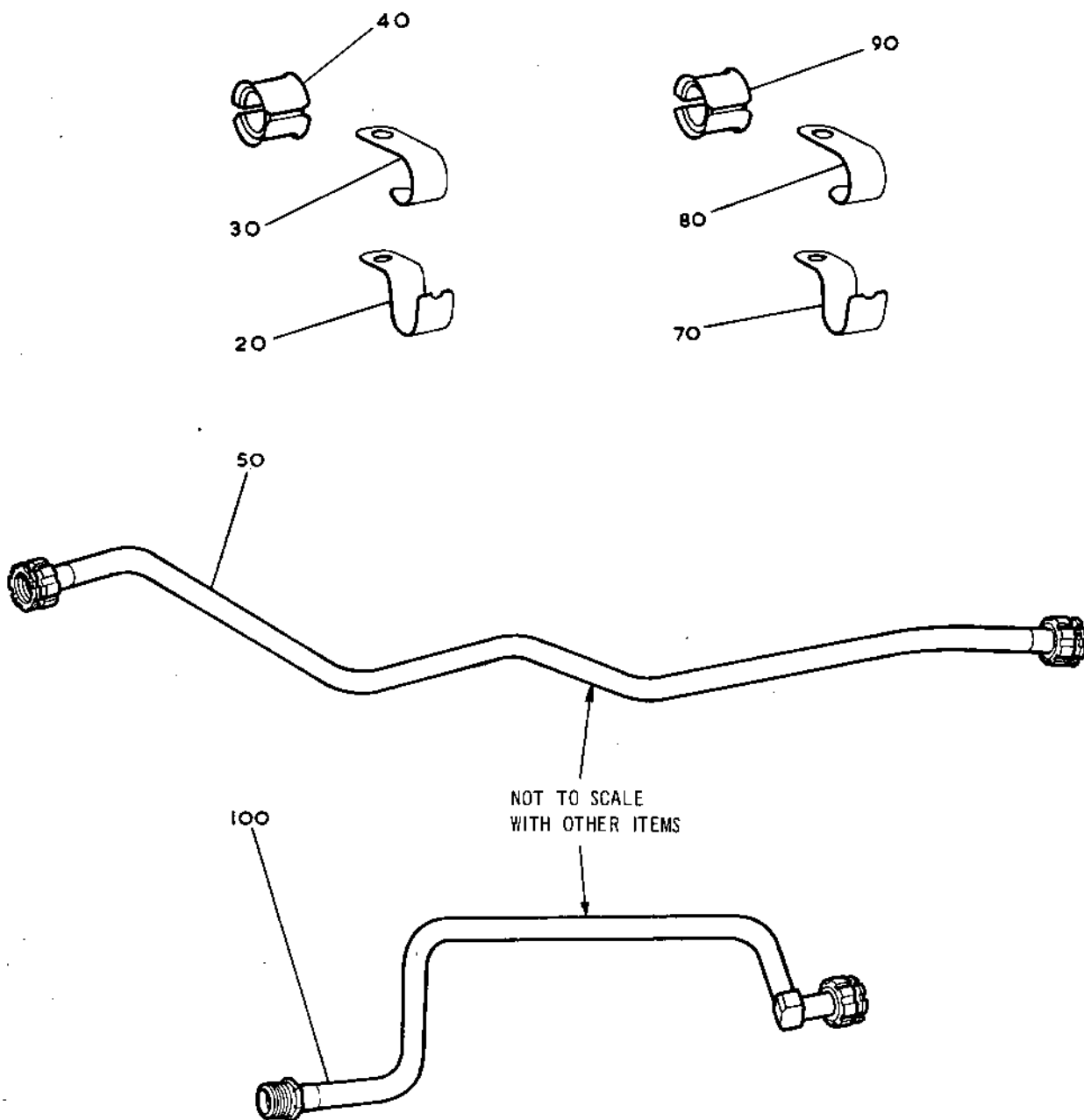
TN9645





OLYMPUS 593

MK. 610-14-28  
OVERHAUL



TN16956

Tubes, Air Venting, Intermediate Case Sump to Tube Connection  
Figure 317

INSPECTION/CHECK  
**75-00-00**  
Page 330  
Jun 1/76

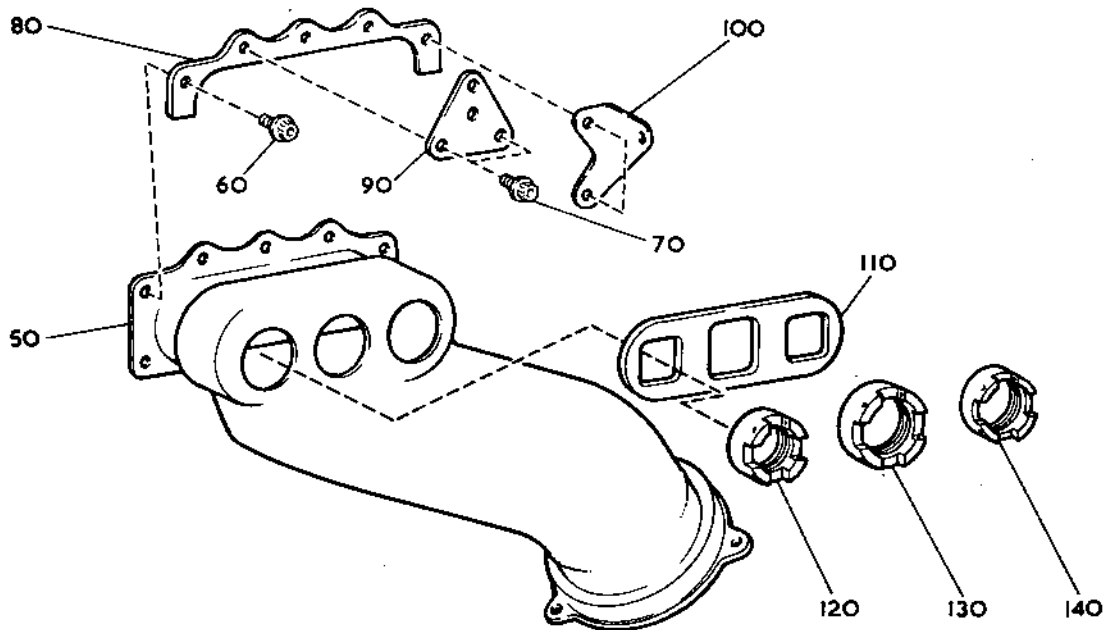
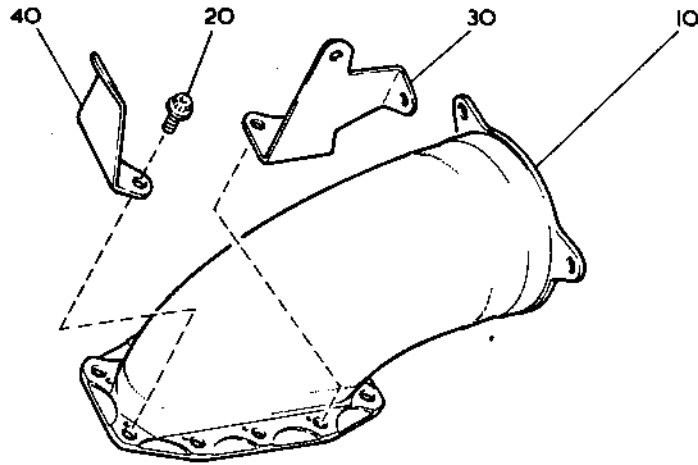


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33181/00A



Duct, Air Venting, HP Compressor Diffuser Case  
Tube to Aircraft Overboard Cowling (LH and RH)  
Figure 318

INSPECTION/CHECK

**75-00-00**

Page 331  
Jun 1/76

PRINTED IN ENGLAND

TN16958

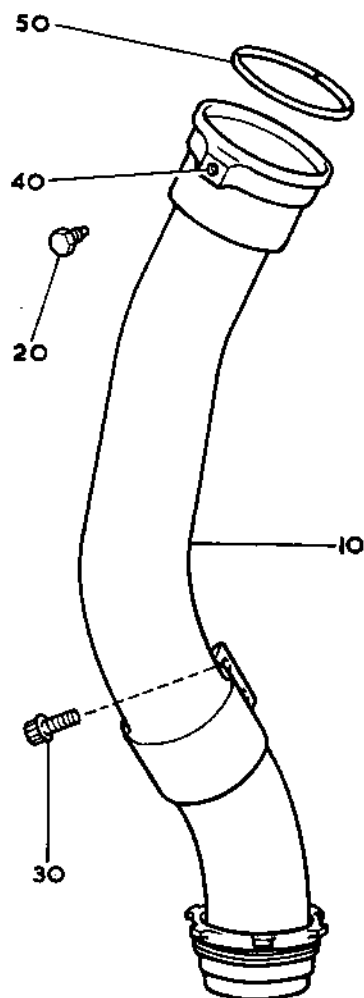
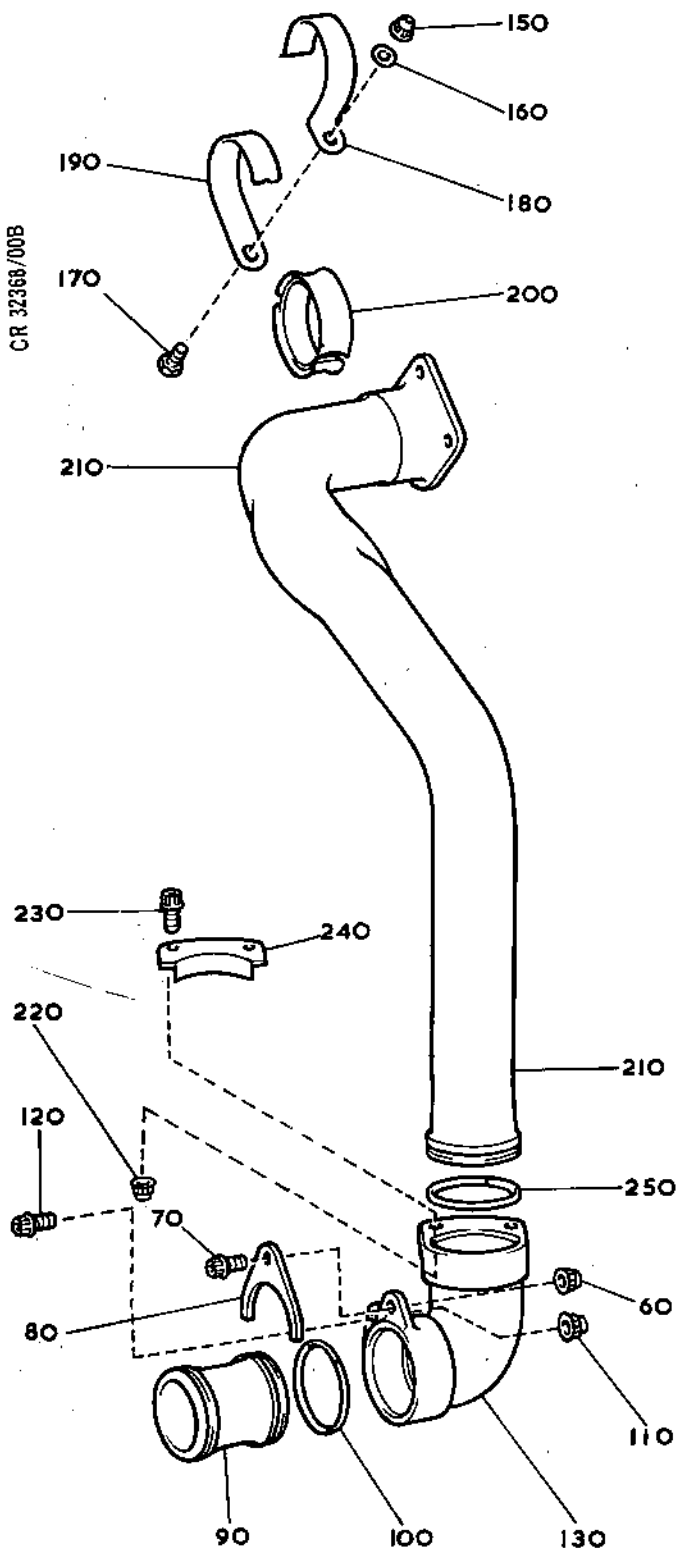


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32368/00B



Tubes, Air, Fuel Heating, HP Compressor  
Diffuser Case to Overboard Cowling  
Figure 319

TN16959

INSPECTION/CHECK

75-00-00

Page 332

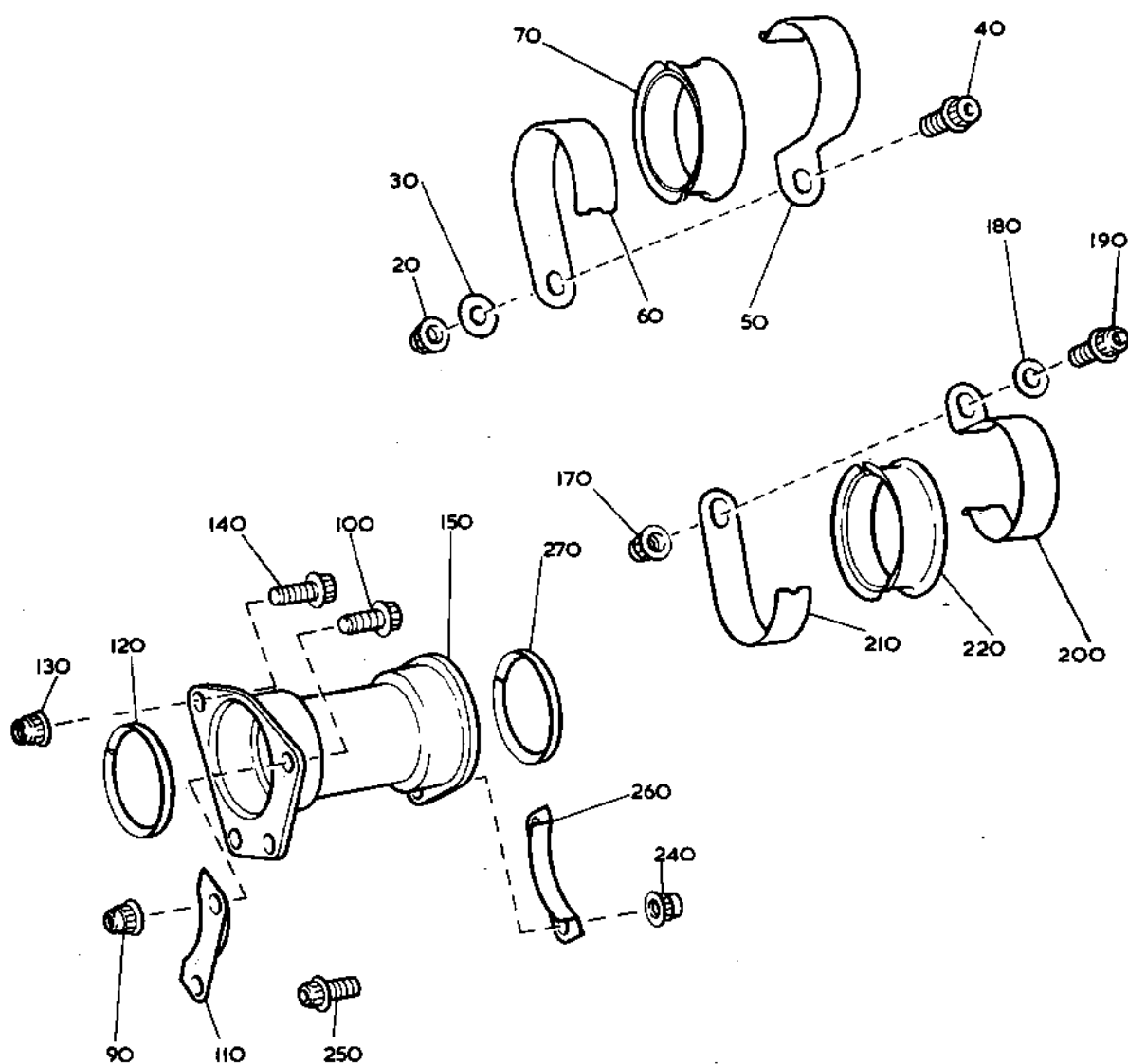
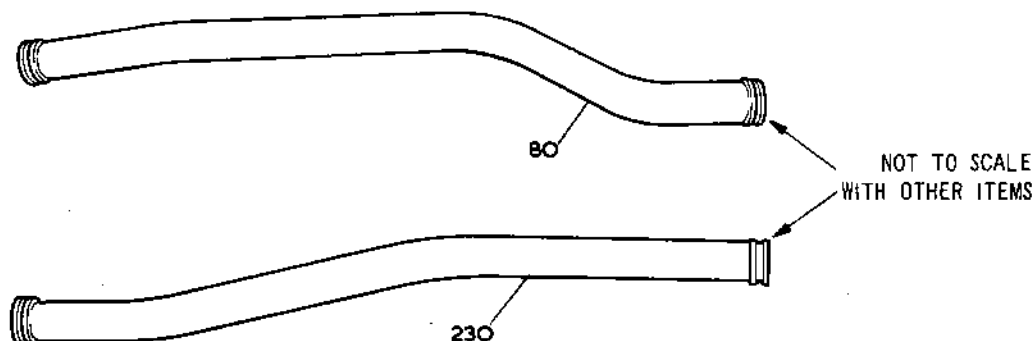
Jun 1/76

CR 32367/00B



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Tubes, Air, Fuel Heating, HP Compressor  
Diffuser Case to Overboard Cowling  
Figure 320

INSPECTION/CHECK

75-00-00

Page 333  
Jun 1/76



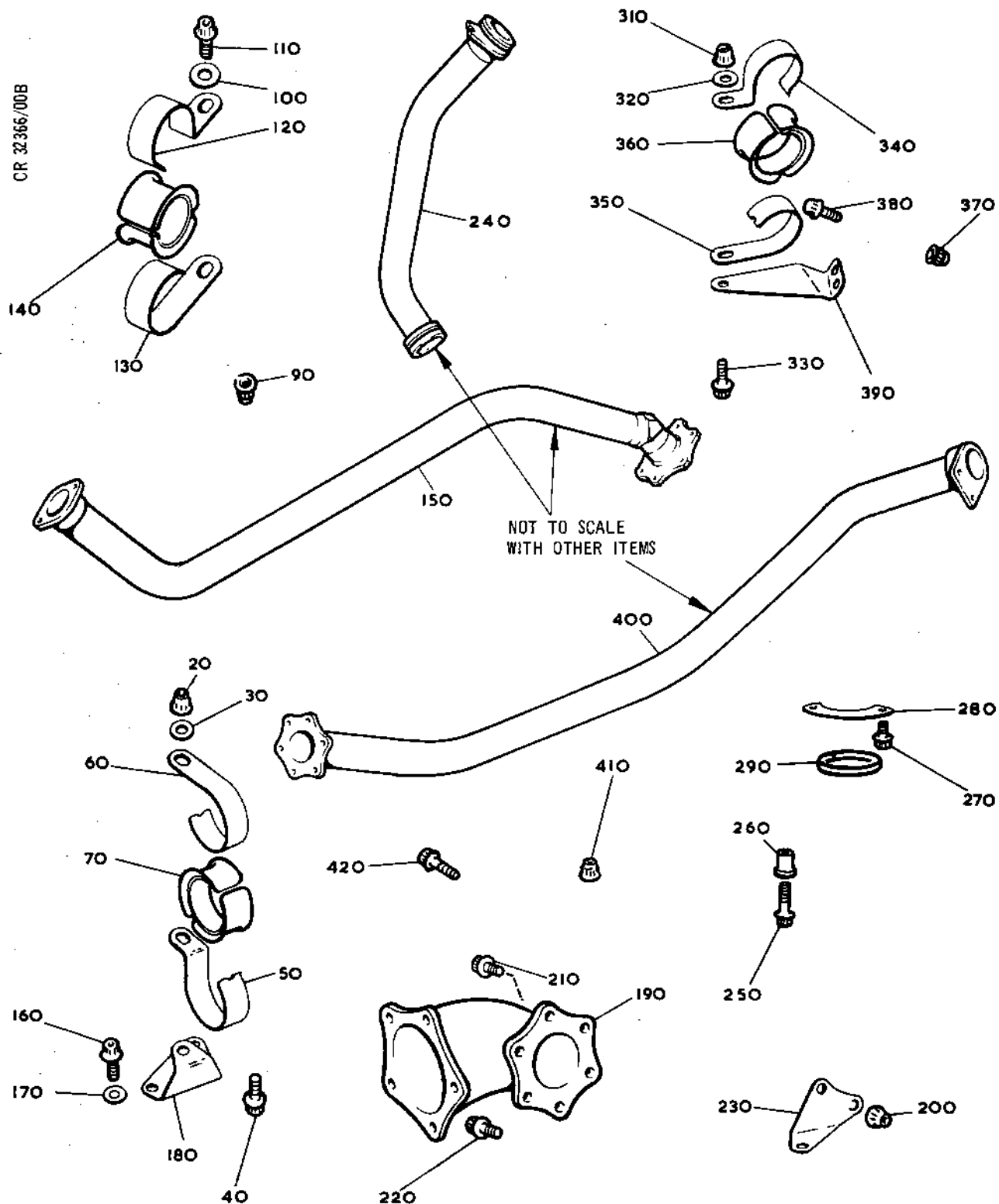
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 32366/00B



Tubes, Air, Fuel Heating, HP Compressor  
Diffuser Case to Overboard Cowling  
Figure 321

INSPECTION/CHECK

75-00-00

Page 334

Jun 1/76

FN16426



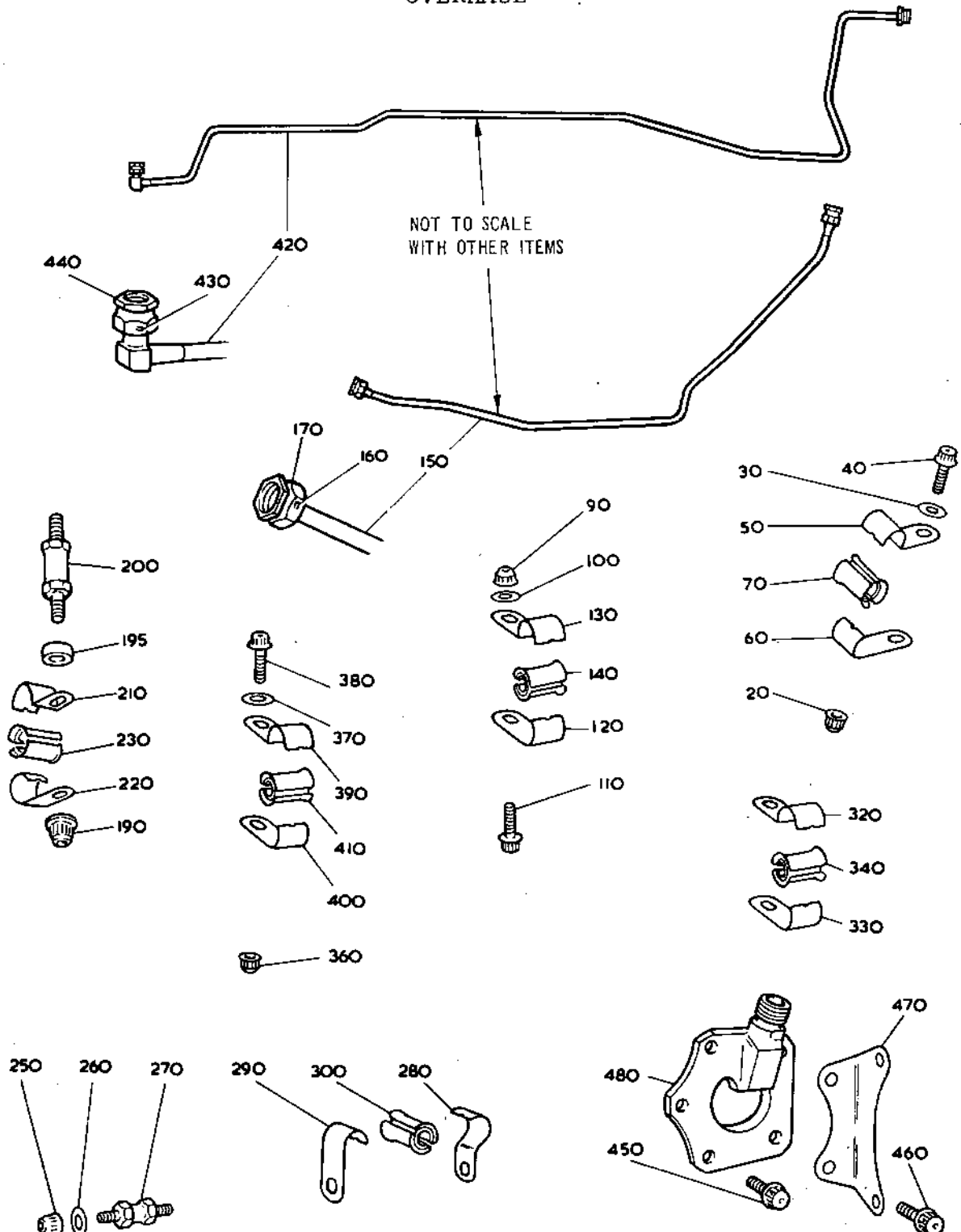
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32365/00B



Tubes, Air, Reheat Fuel Purging, Connection On Duct (HP  
Compressor Case to HP Compressor Diffuser Case Lower)  
to Spherical Joint Flange  
Figure 322

INSPECTION/CHECK

75-00-00

Page 335

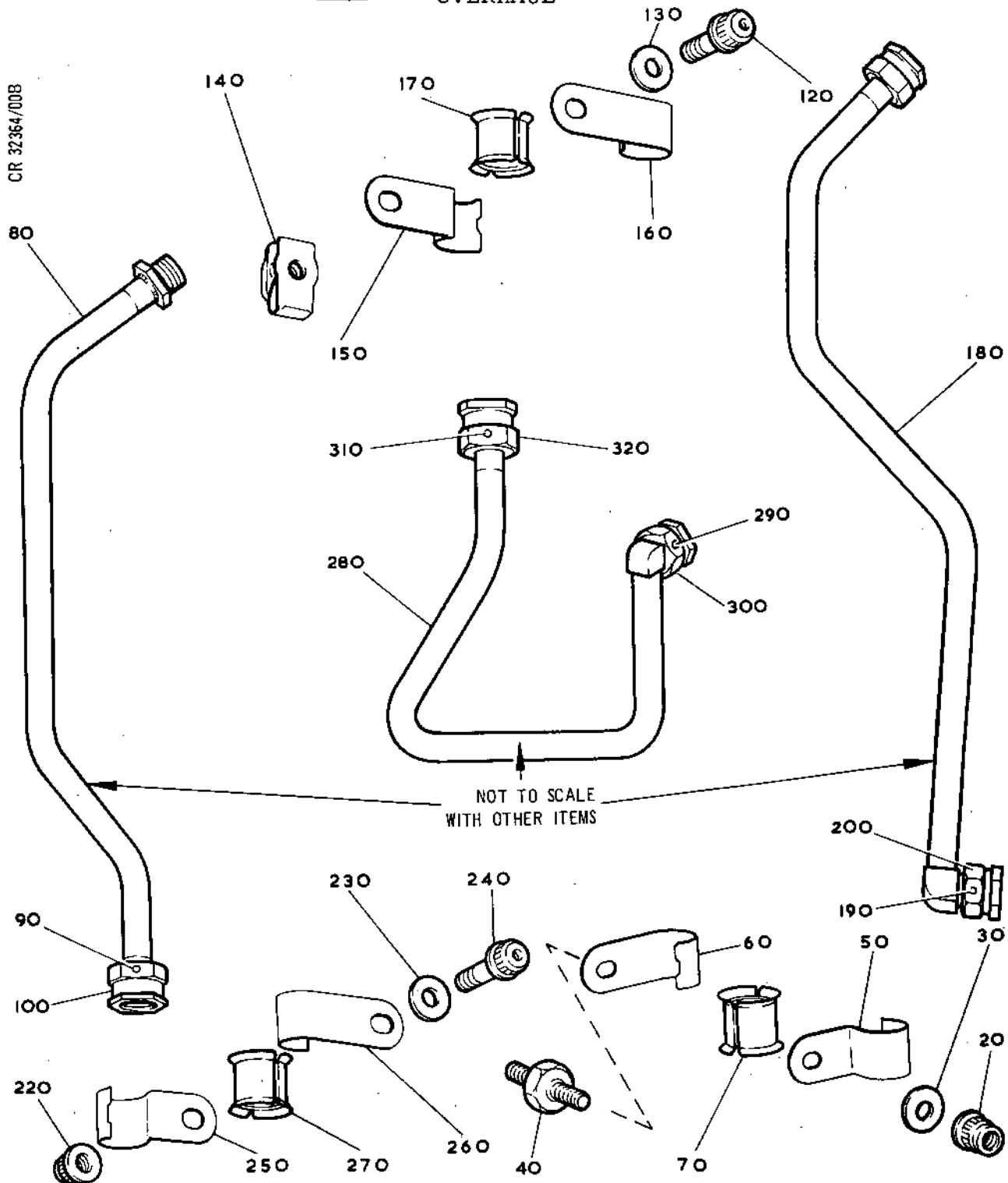
Jun 1/76

TN16427



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Tubes, Air, Reheat Fuel Purging, Connection On Duct (HP  
Compressor Case to HP Compressor Diffuser Case Lower)  
to Spherical Joint Flange  
Figure 323

INSPECTION/CHECK

**75-00-00**

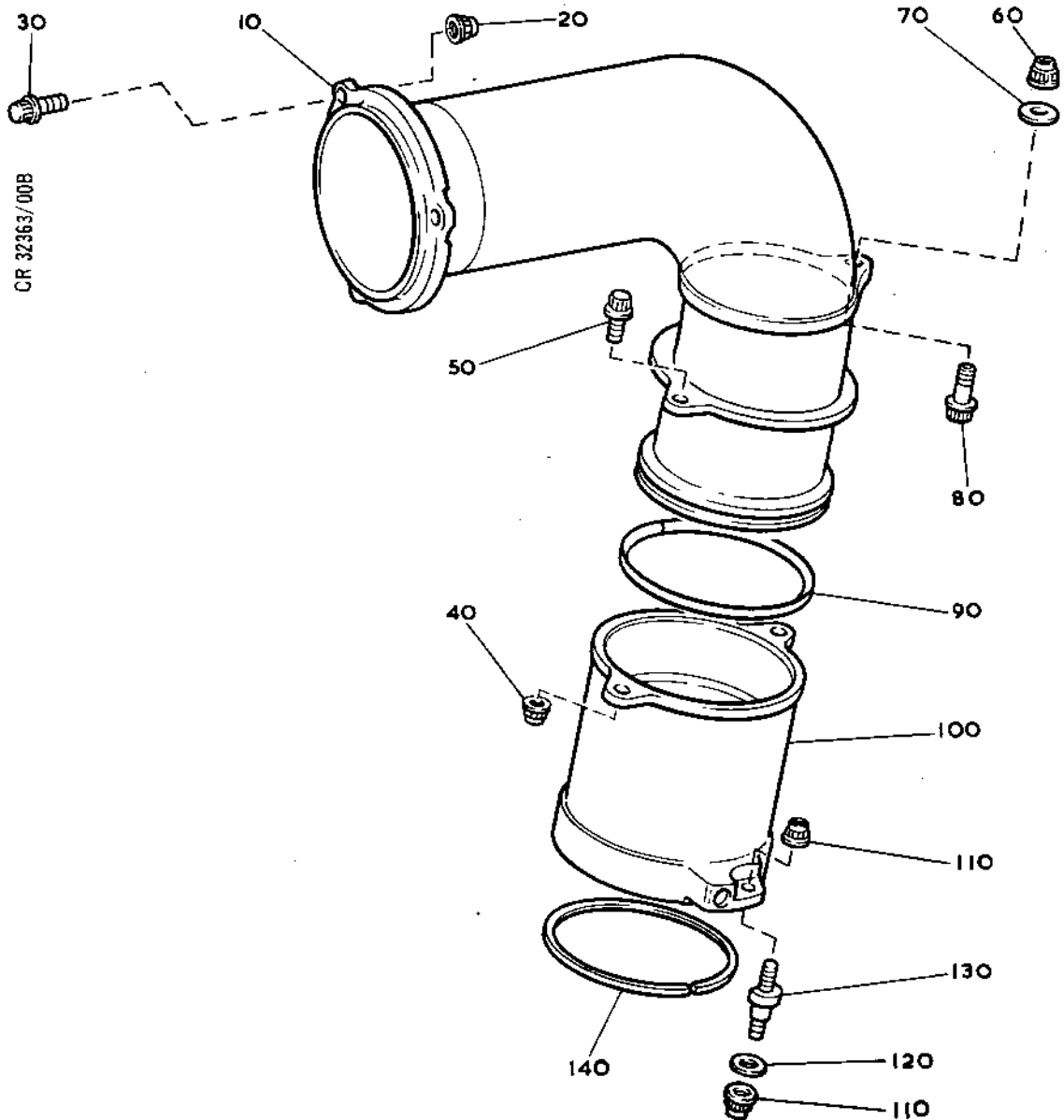
Page 336  
Jun 1/76

FN16428



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Tubes, Air, Intermediate Case Elbow Duct  
to Second Stage Pump  
Figure 324

INSPECTION/CHECK

75-00-00

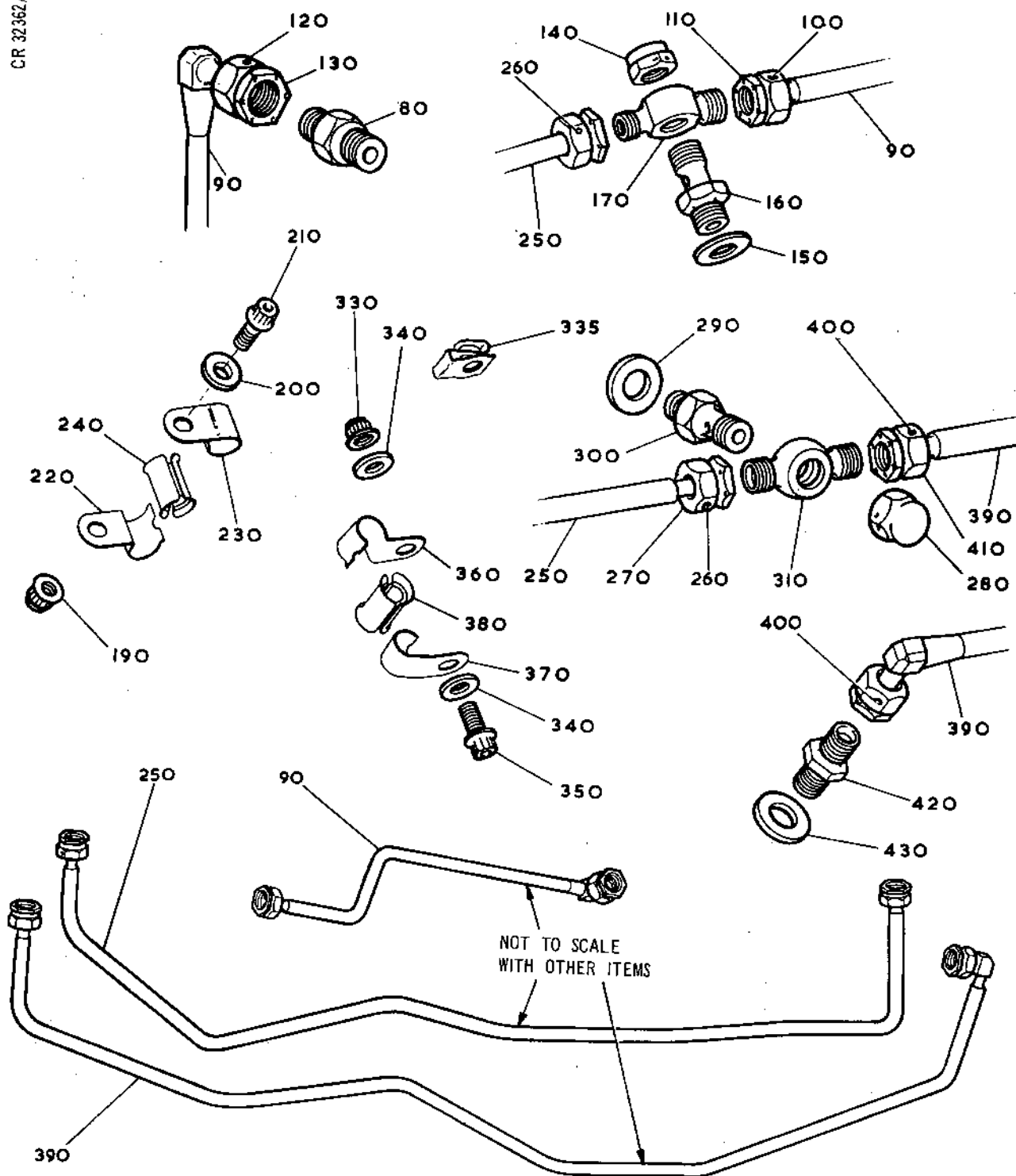
Page 337

Jun 1/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL

Tubes, Air Pressurising, Connection on HP  
Compressor Case to Adapters (Gearbox Seals)  
Figure 325

INSPECTION/CHECK

**75-00-00**

Page 338

Jun 1/76



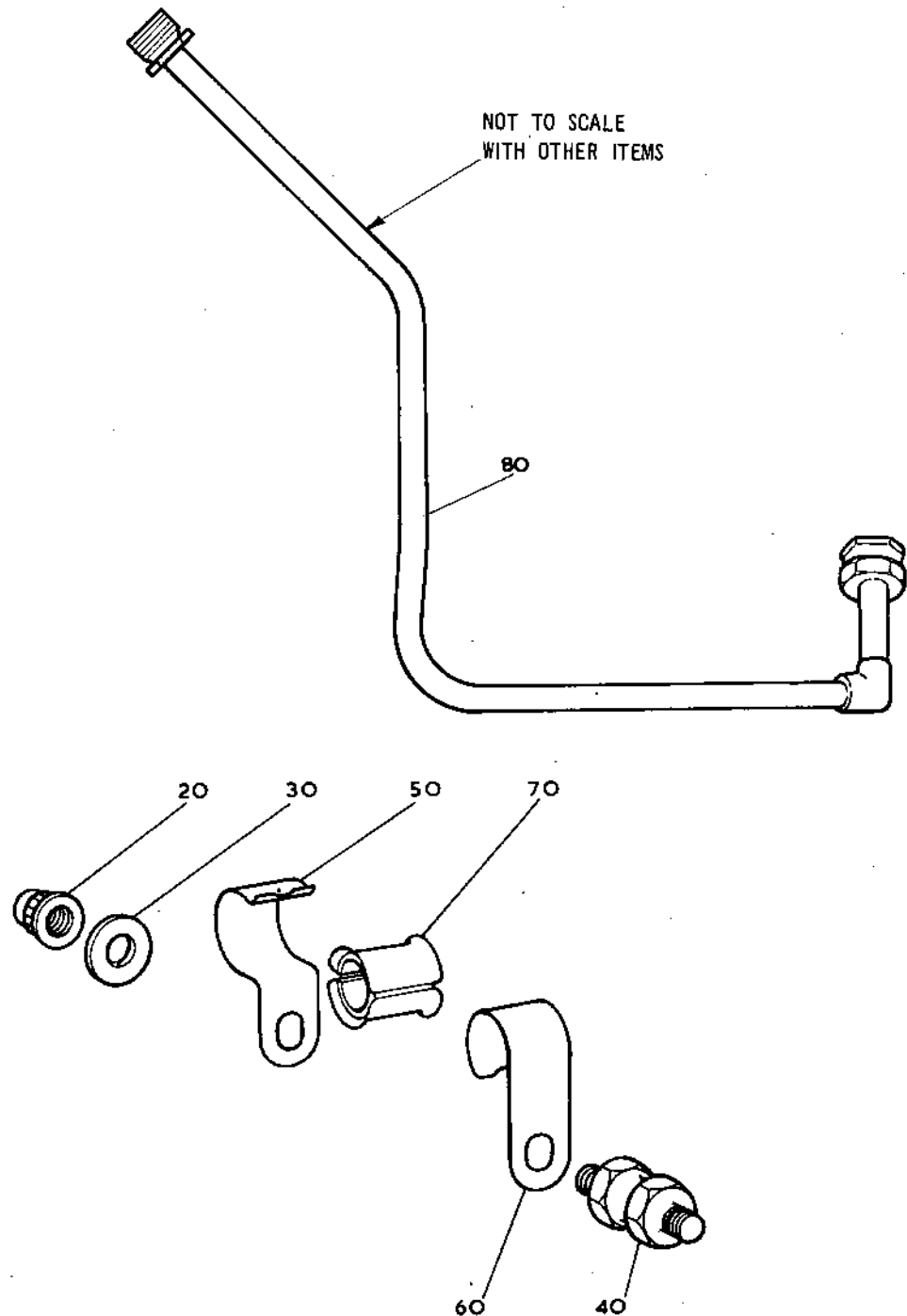
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32361/008



Tube, Air, Connection on Duct (HP Compressor Case to HP Compressor Diffuser Case (Lower)) to Aircraft Connection  
Figure 326

INSPECTION/CHECK

**75-00-00**

Page 339

Jun 1/76

TN17779



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



TUBES - INTERMEDIATE CASE TO EXHAUST DIFFUSER - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

75-01-01

Page 201

Jan 1/77

PRINTED IN ENGLAND

TN27312



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	-

Cleaning Processes  
Table 201

TN11496

CLEANING  
**75-01-01**  
Page 202  
Jan 1/77



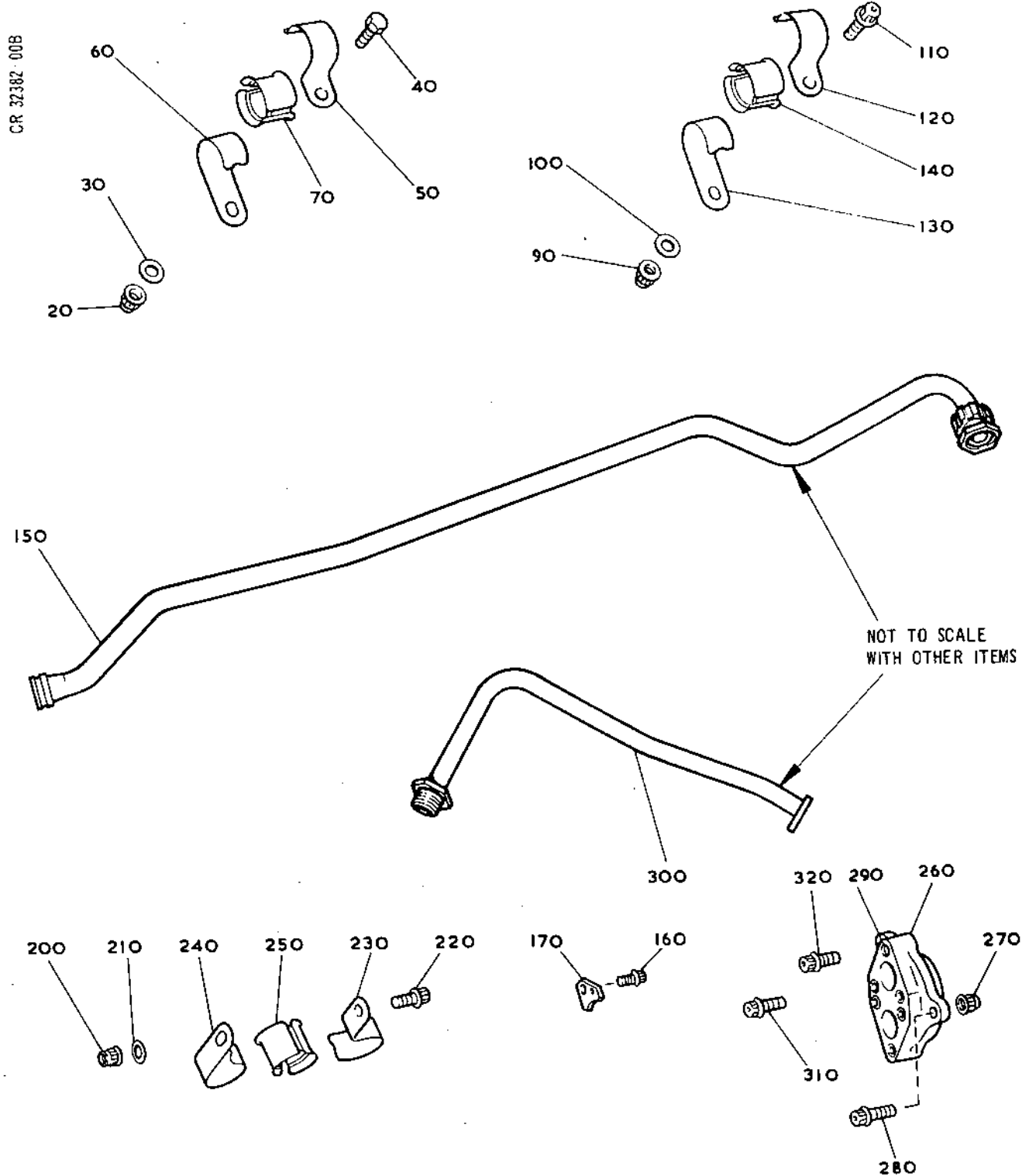
OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND



TN4196

Tubes - Air Cooling, Intermediate  
Case to Exhaust Diffuser  
Figure 201

CLEANING

75-01-01

Page 203  
Aug 28/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



TUBES - INTERMEDIATE CASE TO EXHAUST DIFFUSER - REPAIR

TABLE OF CONTENTS

Repair No.	Title	Scheme No.
1	Repair of fretting/damage by inert gas arc welding.	B.514566

PRINTED IN ENGLAND

REPAIR

75-01-01

Contents 1

Jun 1/92



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBE A/O, AIR  
REPAIR OF FRETTING/DAMAGE BY INERT GAS ARC WELDING

REPAIR B.514566

1. EFFECTIVITY

IPC	Fig./Item	Part No.
75-01-01	01/150A	B.480891

2. REPAIR LIMITATIONS

Refer to Overhaul Manual 72-09-29 Repair.

3. GENERAL

Refer to Overhaul Manual 72-09-29 Repair.

4. REPAIR PROCEDURE

REPAIR PROCEDURE

- (1) Weld repair
- (2) Mark SAL B.514566 or R1 adjacent normal assy. of number using the electro-chemical marking or vibro-percussion engraving techniques.

SUPPLEMENTARY INFORMATION

Refer to Overhaul Manual 72-09-29 Repair.

Refer to Overhaul Manual 72-09-00 Repair.

5. MATERIAL

<u>COMPONENT</u>	<u>MATERIAL</u>	<u>RR CODE</u>
B.480891	MSRR 6524	EBS



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



6. DATA

PRESSURE TEST REQUIREMENTS:

<u>PART NO.</u>	<u>PRESSURE TEST</u>	<u>MIN. GAUGE</u>
B.480891	NOT REQUIRED	0.027 (0,69)

7. TOOLS

<u>TOOL NUMBER</u>	<u>DESCRIPTION</u>	<u>ITEM</u>
NONE.		

8. REPLACEMENT PARTS

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>ITEM</u>
NONE.			

REPAIR

75-01-01

Repair No.1

Page 402

Jun 1/92





OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBE - INTERMEDIATE CASE TO HP TURBINE BEARING - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00  
Cleaning for details of the cleaning processes referred  
to in Table 201.
- B. To ensure that all items within this breakdown that  
require cleaning and subsequent Inspection/Check are  
recognized, and identified by their Part Number, figures  
are provided which equate with the Illustrated Parts  
Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with  
the relevant Figure and Item Number in the same breakdown  
in the I.P.C. Items illustrated in the I.P.C. which are  
not illustrated in this breakdown, are those items which  
are either discarded at overhaul, or are normally assembled  
to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the  
figures, Table 201 does not list all items, but deals  
collectively with the items requiring the same cleaning  
process.
- D. On receipt of the items from disassembly, all protective  
blanks, covers etc. deemed necessary for the protection  
of the items will have been assembled and, in addition,  
many of the items will arrive in containers. Any special  
containers, blanks, covers etc. are listed in Table 202  
by their Tool Ref. No. e.g. (Tool 123). For the  
manufacturer's Part No. refer to the appropriate Table in  
Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

CAUTION: BEFORE USING HEAVY CLEANING PROCESSES J, L AND N,  
INVESTIGATE ALL REPAIRS CARRIED OUT ON EACH COM-  
PONENT TO IDENTIFY THOSE HAVING PLASMA SPRAY  
COATINGS. THE NITRIC ACID USED IN PROCESSES J, L  
AND N WILL ATTACK THE ALUMINIUM CONTENT OF SOME  
TYPES OF COATING, MAKING REPLACEMENT OF THE COATING  
NECESSARY.

- A. All blanks, covers etc. must be removed from the items  
prior to cleaning and reassembled immediately afterwards.  
Items received in special cleaning containers should  
remain therein during the cleaning procedures unless  
otherwise stated.

CLEANING  
**75-01-02**

Page 201  
Feb 1/83



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.
- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	-
	except 80 Tube		A or B	J	-

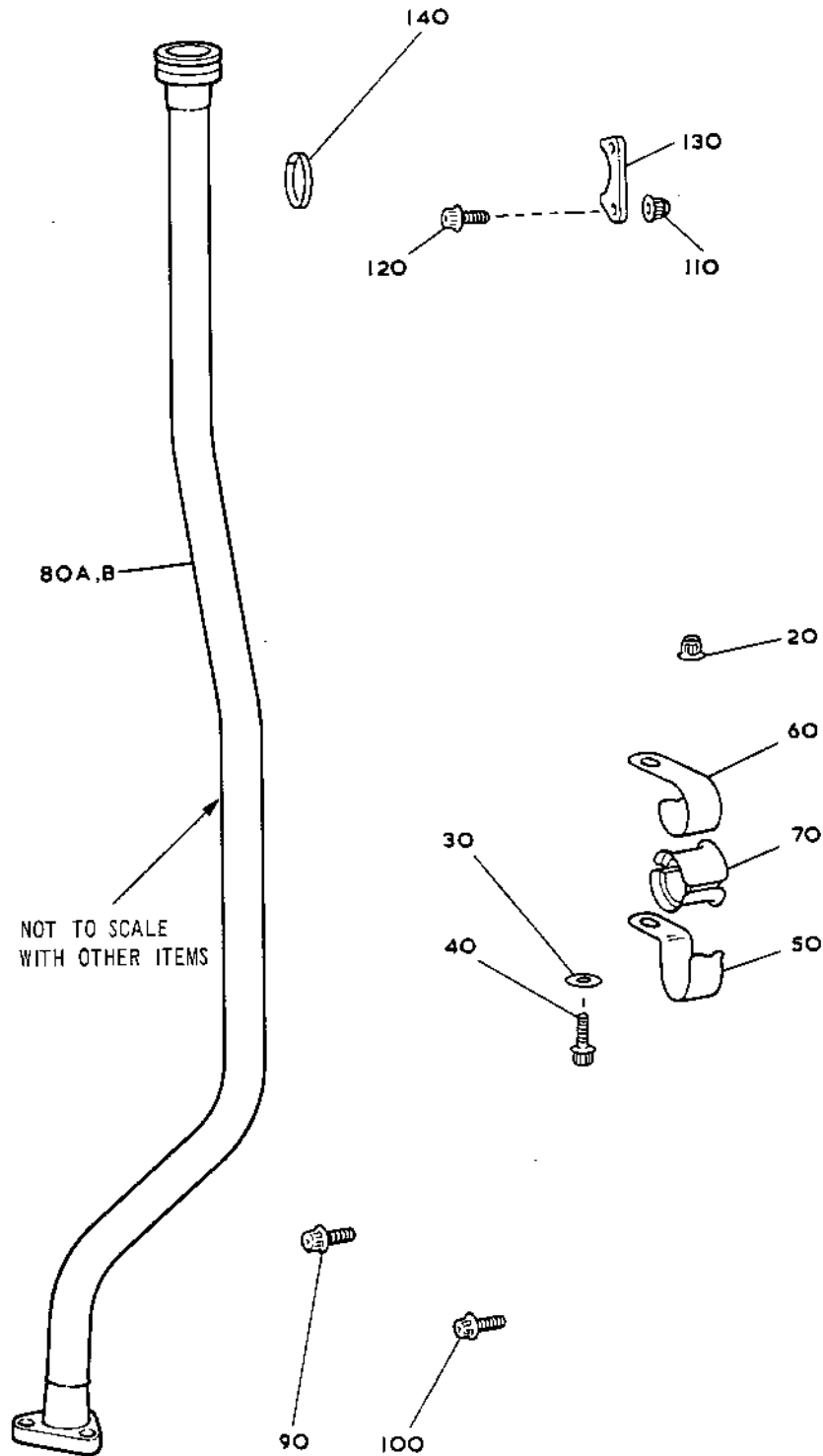
Cleaning Processes  
Table 201

CR 32381/00C



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Tubes - Air Cooling, Intermediate  
Case to HP Turbine Bearing  
Figure 201



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



TUBES - INTERMEDIATE CASE TO HP TURBINE BEARINGS - REPAIR

TABLE OF CONTENTS

Repair No.	Title	Scheme No.
1	Repair of fretting/damage by inert gas arc welding.	B.514566
2	Repair of damage and/or fretted areas	B.497468

PRINTED IN ENGLAND

REPAIR  
**75-01-02**  
Contents 1  
Jul 31/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBE A/O, AIR  
REPAIR OF FRETTING/DAMAGE BY INERT GAS ARC WELDING

REPAIR B.514566

1. EFFECTIVITY

IPC	Fig./Item	Part No.
75-01-02	01/080A	B.463684
	01/080B	B.485114

2. REPAIR LIMITATIONS

Refer to Overhaul Manual 72-09-29 Repair.

3. GENERAL

Refer to Overhaul Manual 72-09-29 Repair.

4. REPAIR PROCEDURE

REPAIR PROCEDURE

SUPPLEMENTARY INFORMATION

(1) Weld repair

Refer to Overhaul Manual  
72-09-29 Repair.

(2) Mark SAL B.514566  
or R1 adjacent  
normal assy. of  
number using the  
electro-chemical  
marking or vibro-  
percussion engraving  
techniques.

Refer to Overhaul Manual  
72-09-00 Repair.

5. MATERIAL

COMPONENT

MATERIAL

RR CODE

B.463684  
B.485114

MSRR 6524  
MSRR 6524

EBS  
EBS



OLYMPUS 593

MK.610-14-28  
OVERHAUL



6. DATA

PRESSURE TEST REQUIREMENTS:

TEST MEDIUM TO BE WATER

<u>PART NO.</u>	<u>PRESSURE TEST</u>	<u>MIN. GAUGE</u>
B.463684	240 lbf/sq.in. (1,66 MPa) for 15 sec.	0.027 (0,69)
B.485114	360 lbf/sq.in. (2,48 MPa) for 1 min.	0.027 (0,69)

7. TOOLS

<u>TOOL NUMBER</u>	<u>DESCRIPTION</u>	<u>ITEM</u>
NONE.		

8. REPLACEMENT PARTS

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>ITEM</u>
NONE.			

REPAIR

75-01-02

Repair No.1

Page 402

Jun 1/92

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



TUBE A/O, AIR  
REPAIR OF DAMAGED AND/OR FRETTED AREAS

REPAIR B.4974681. EFFECTIVITY

<u>IPC</u>	<u>FIG/ITEM</u>	<u>PART NO.</u>
75-01-02	1/ 80B	B485114

2. REPAIR LIMITATIONS

Refer to Overhaul Manual 72-09-30 Repair.

3. GENERAL

Refer to Overhaul Manual 72-09-30 Repair.

4. REPAIR PROCEDUREREPAIR PROCEDURESUPPLEMENTARY INFORMATION(1) RepairRefer to Overhaul Manual  
72-09-30 Repair(2) Mark SAL B497468 or R2  
adjacent normal assy. of  
number using the electro-  
chemical marking technique.Refer to Overhaul Manual  
72-09-00 Repair5. MATERIAL

<u>COMPONENT</u>	<u>MATERIAL</u>	<u>RR CODE</u>
B485114	MSRR 6524	EBS

6. DATAPRESSURE TEST REQUIREMENTS:

<u>PART NUMBER</u>	<u>STANDARD PRESSURE TEST REQUIREMENT</u>	<u>COMMON PRESSURE TEST REQUIREMENT</u>
B485114	100 PSI FOR 1 MINUTE	USE 360 PSI FOR 1 MINUTE

REPAIR  
**75-01-02**  
Repair No.2  
Page 401  
Jul 31/93



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



7. TOOLS

<u>TOOL NUMBER</u>	<u>DESCRIPTION</u>	<u>ITEM</u>
NONE		

8. REPLACEMENT PARTS

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>ITEM</u>
B458512	FLANGE ADAPTOR	A/R	1
B458513	SEAL CARRIER	A/R	2
B445308	TUBE JOINT	A/R	3

REPAIR  
75-01-02  
Repair No.2  
Page 402  
Jul 31/93





OLYMPUS 593

MK.610-14-28

OVERHAUL



TUBES - HP COMPRESSOR CASE TO HP COMPRESSOR DIFFUSER  
CASE (UPPER) - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

CAUTION: BEFORE USING HEAVY CLEANING PROCESSES J, L AND N, INVESTIGATE ALL REPAIRS CARRIED OUT ON EACH COMPONENT TO IDENTIFY THOSE HAVING PLASMA SPRAY COATINGS. THE NITRIC ACID USED IN PROCESSES J, L AND N WILL ATTACK THE ALUMINIUM CONTENT OF SOME TYPES OF COATING, MAKING REPLACEMENT OF THE COATING NECESSARY.

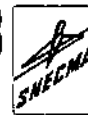
- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.



OLYMPUS 593

MK.610-14-28

OVERHAUL



- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide whpination of the item. Any item that not cleaned satisfactorily must be recleaned by the appropriate process.
- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except		A or B	-	-
	10	Duct	A or B	J	-
	40	Tube, grooved	A or B	J	-
	60	Duct	A or B	J	-

Cleaning Processes  
Table 201



OLYMPUS 593

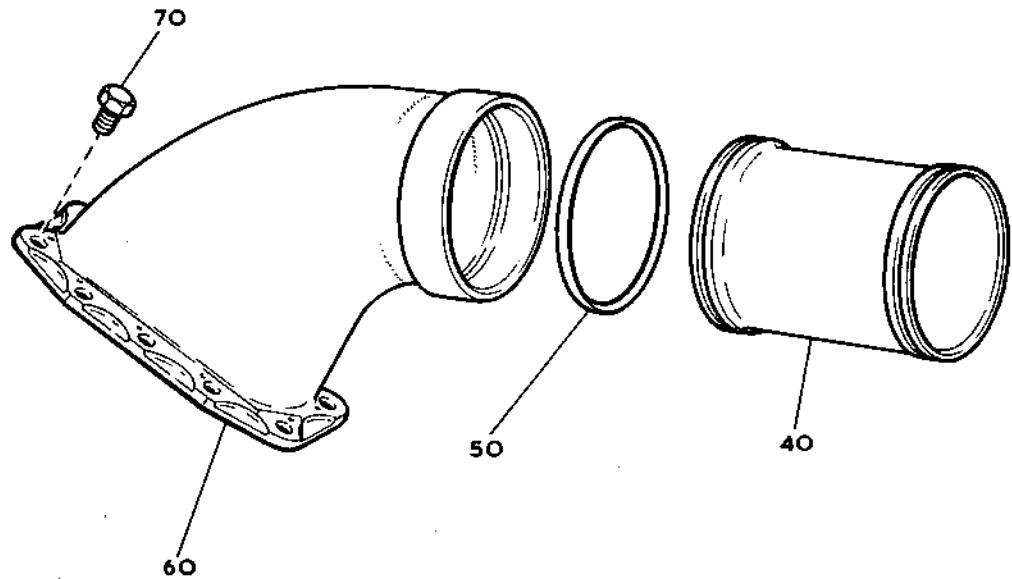
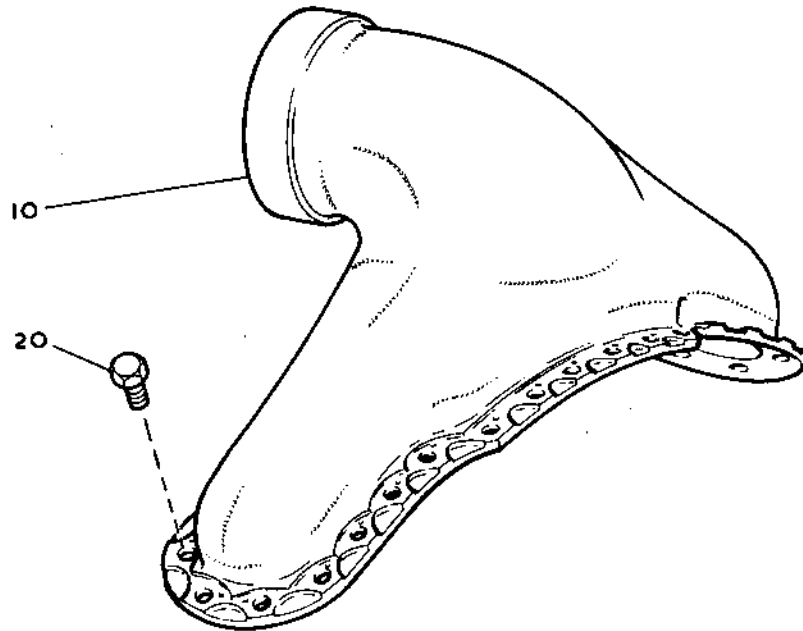
MK.610-14-28  
OVERHAUL



SEE TR

PRINTED IN ENGLAND

CR 32380/00B



Tubes - Air Cooling, HP Compressor Case.  
to HP Compressor Diffuser Case (Upper)  
Figure 201

CLEANING  
**75-01-03**

Page 203  
Aug 28/75

TN42579

# British airways

CONCORDE

## OLYMPUS 593 OVERHAUL MANUAL

Temporary Revision No. 75-501

This TR is the first RST for section 75-01-03

### REASON FOR ISSUE:

To introduce a repair scheme for repairing a fretted bore (MRA 98).

### ACTION

B.E.O.L. REPAIR

RST 4014 DUCT-AIR UNIT:-  
REPAIR TO FRETTED BORES

### PROCEDURE:- PART 1 REPAIR BY PLASMA COATING

1. Suitably secure to a machine, clock up on unworn part and machine to clean up. Observe min. wall thickness. See Fig. 1.
2. Prepare location prior to plasma spray, as per T.S.D. 594 - 704.
3. Plasma spray location as per T.S.D. 594 - 704, as follows:-
  - a) Apply Metco 450, 0.007 - 0.008 thick to MSRR 9507/5.
  - b) Apply Stellundum 52F to MSRR 2507/1 sufficiently thick to achieve final dimensions. See Fig. 1.
4. Machine to final dimensions. See Fig. 1.
5. Remove excess plasma coating.
6. Inspect coating for adhesion and cracks as per T.S.D. 594 - 704.
7. Finally inspect.

### PART 2 REPAIR BY REPLACEMENT.

1. Remove protective treatment as per overhaul manual.
2. Suitably secure duct and remove defective part, by cutting, as per Fig. 2.
3. Manufacture make-up piece, using BSEM 528 section 2 x 16 SWG (.064) x .600 wide.

1 May 1981

TR.75-501  
75-01-03  
RST 4014  
TR. Page 1 of 3

# British airways

CONCORDE

TR.NO. 75-501 (cont'd)

4. Form to existing profile the make-up piece and butt weld joint using Argon Arc process and filler rod F.I.W. Ref. MSRR/9500/5.
5. Heat treat make-up piece to  $750^{\circ}\text{C} \pm 10^{\circ}\text{C}$  for 10 mins.
6. Assembly make-up piece to duct.
7. Butt weld in position, ensuring make-up piece weld joint is at  $90^{\circ}$  to existing line using manual Argon Arc process and MSRR 9500/5 filler rod.
8. Magnetic particle inspect, as per standard practices.
9. Adjust make-up piece, by machining or grinding, to produce dimensions, after welding.
10. Assemble replacement housing seal B341032. See Fig. 3.
11. Butt weld in position, using manual Argon Arc process and MSRR 9500/5 filler rod.
12. Magnetic particle inspect, as per standard practice.
13. Heat treat for 2 hrs. at  $750^{\circ}\text{C} \pm 10^{\circ}$ , cool in air.
14. Complete to standard drawing B341042 for final machining, pressure test and protective treatment.
15. Final inspect.

THE ABOVE IS WRITTEN AS PER SEDP/CLY/317.

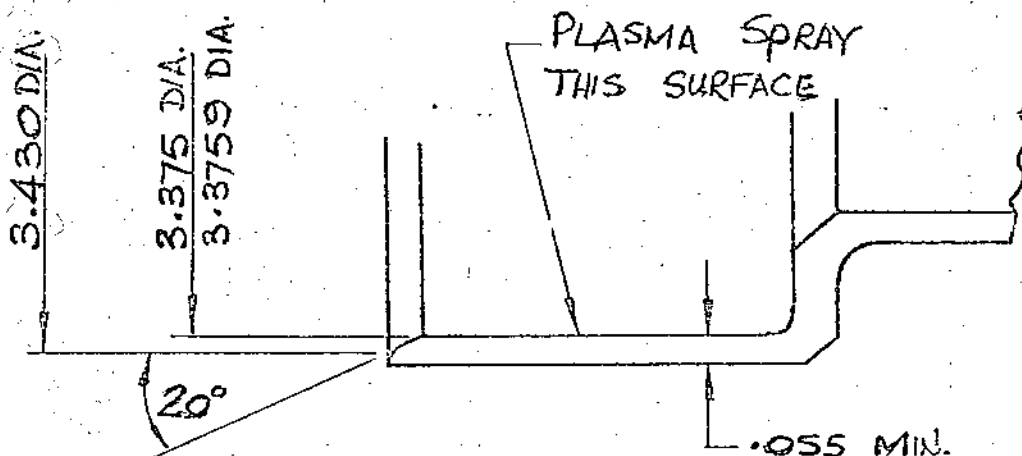
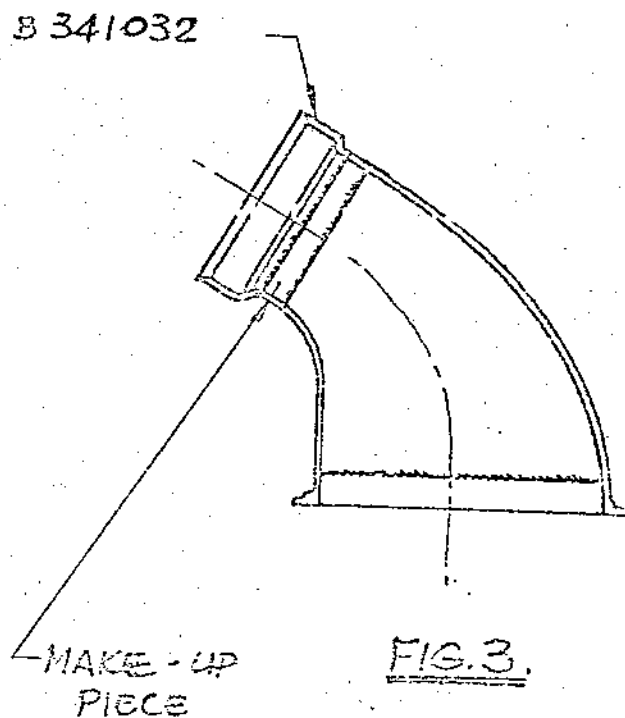
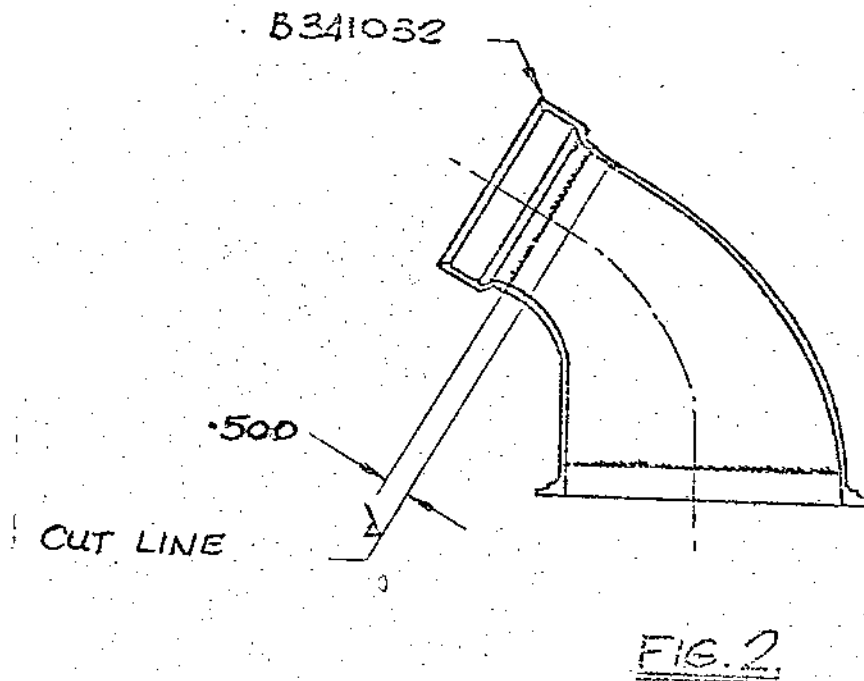


FIG. 1.

British airways  
CONCORDE

TR.NO. 75-501 (cont'd)



1 May 1981

TR.75-501  
75-01-03  
RST 4014  
TR. Page 3 of 3



OLYMPUS 593



MK.610-14-28

SNECMA

OVERHAUL

AIR DUCT ASSEMBLY - REPAIR BY REPLACEMENT  
OF SEAL HOUSING

MODIFICATION NO.0L.8804C

1. Effectivity

<u>I.P.C.</u>	<u>Fig/Item</u>	<u>Part No.</u>
75-01-03	1 60	B.925601

2. Introduction

A. General.

- (1) This repair describes the procedure for removing the seal housing and adjacent duct, and welding on replacement parts.
- (2) Dimensions are shown thus, INCHES (MILLIMETRES) in tables and illustrations.
- (3) Refer to Chapter 72-09-00, Repair, for all standard practices applicable to this repair.
- (4) Remove sharp edges 0.004 to 0.020 in. (0,10 to 0,51 mm) unless otherwise stated.
- (5) Tolerances on machined dimensions are plus/minus 0.010 in. (0,25 mm) unless otherwise stated.
- (6) Tolerances on all angles are plus/minus 2 degrees unless otherwise stated.
- (7) Surface texture is to be 125 micro-inches (3,2 micrometres).
- (8) All tools referred to by item number in procedural steps are detailed in para.4.
- (9) Protect the component against corrosion after each operation, and place in a container for protection against damage during transit between operations.
- (10) ALL TASKS identified in this instruction are in the Engine Overhaul Processes Manual (TSD 594-J).

REPAIR

75-01-03

Repair No.1

Page 401

Dec 31/00



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

## B. Repair Limitations.

None.

3. Instructions

## A. Remove Aluminium Paint.

- (1) Remove the aluminium paint using the method instructed in Chapter 72-09-00 Cleaning, and using process F.

## B. Inspect.

- (1) Crack test the duct using the fluorescent dye penetrant process specified for this component in Chapter 75-01-03 Inspection/Check.

## C. Machine.

- (1) Machine off the seal housing and part of the duct to a distance of 0.500 in. (12,7 mm) from the weld line (Ref.Fig.401). The machined end must be square to the axis of the duct to within 0.0015 in. (0,038 mm).
- (2) Remove burrs and sharp edges.
- (3) Crack test the duct using the fluorescent dye penetrant process specified for this component in Chapter 75-01-03 Inspection/Check.

## D. Produce Additional Section.

- (1) Produce additional duct section B.499490 from BSEM528 or MSRR6629 (Firth Vickers 448) sheet material 0.068/0.060 in. (1,73/1,52 mm) thick, with a width sufficient to allow finish dimensions to be achieved (Ref. Fig.401 and 402). Use inert gas arc welding with filler rod MSRR9500/5 to butt-weld the joint.
- (2) Crack test the section using the fluorescent dye penetrant process specified for the duct assembly in Chapter 75-01-03 Inspection/Check.

REPAIR

75-01-03

Repair No.1

Page 402

Dec 1/88



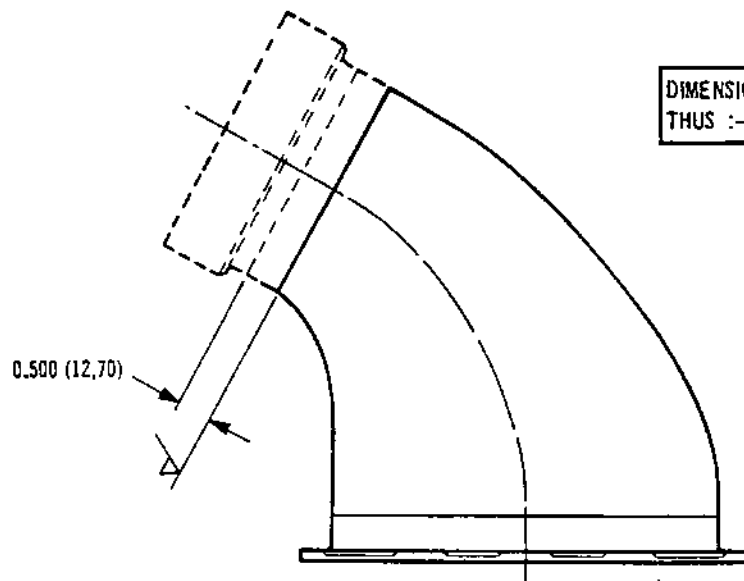


OLYMPUS 593

MK.610-14-28  
OVERHAUL

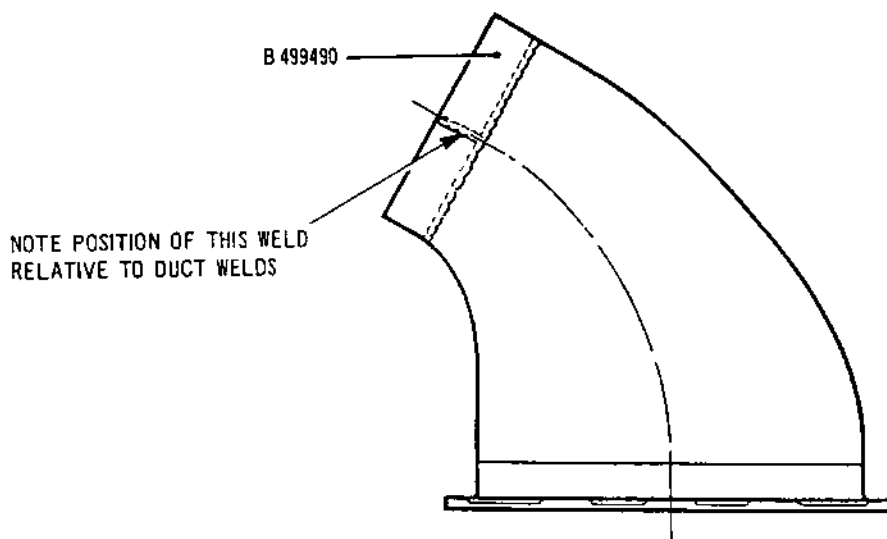


sneema



DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)

CUT-OFF DIMENSIONS



ADDITIONAL DUCT SECTION WELD DETAILS

Cut-off and Welding Details  
Figure 401

BS00025330/1

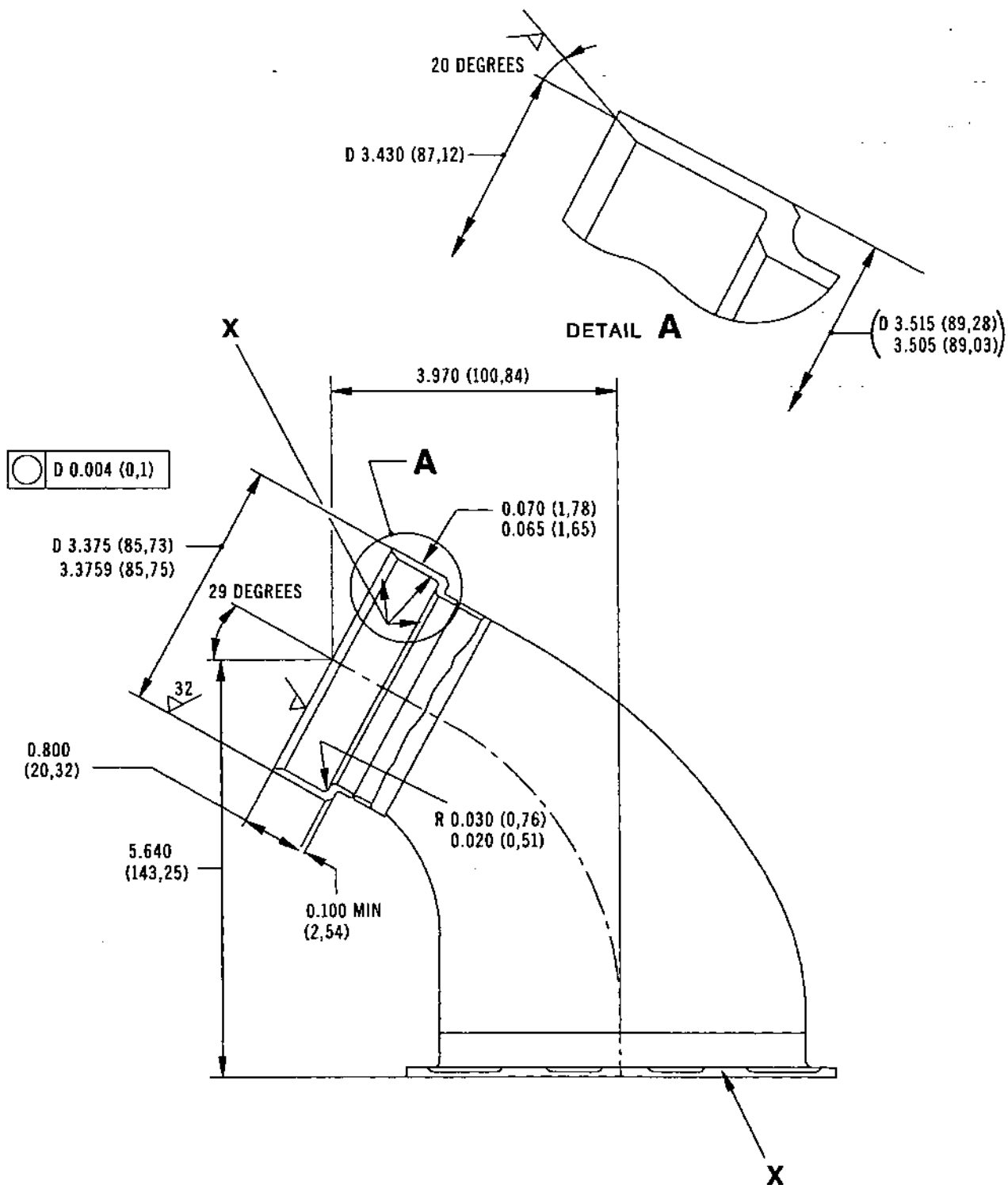


OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema



Finish Machining Details  
Figure 402

REPAIR  
75-01-03

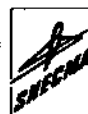
Repair No.1  
Page 404  
Jun 1/99



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (3) Heat treat the section to 750 deg.C plus/minus 10 deg.C for 30 min. Cool in air.
- (4) Mark part number B.499490 on the section, using vibro-percussion marking as instructed in Chapter 72-09-00, Repair.

E. Weld.

- (1) Tack weld section B.499490 in position, then weld complete using inert gas arc welding with filler rods MSRR9500/5. The axial weld must be at 90 deg. to the duct welds (Ref.Fig.401).

F. Inspect.

- (1) Inspect for the satisfactory completion of the welding operation.
- (2) Crack test the duct using the fluorescent dye penetrant process specified for this component in Chapter 75-00-00 Inspection/Check.

G. Machine.

- (1) Machine section B.499490 to length, if necessary, in order to obtain the correct final dimensions after welding on the replacement seal housing (Ref.Fig.402).

H. Weld.

- (1) Withdraw from stores replacement seal housing B.341032.
- (2) Tack weld the housing into position on the duct, then weld complete using inert gas arc welding with filler rods MSRR9500/5.

J. Heat Treat.

- (1) Heat treat the duct assembly to 750 deg.C plus/minus 10 deg.C for 2 hours. Cool in air.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



SNECMA

Printed in England

K. Clean.

- (1) Dry abrasive blast the duct assembly using the process instructed in Chapter 72-09-24 Repair.

L. Final Machining.

- (1) Machine the seal housing to the finish dimensions given in Fig.402. Remove burrs and sharp edges.
- (2) Crack test the duct assembly using the fluorescent dye pentrant process specified for this component in Chapter 75-00-00 Inspection/Check.

M. Pressure Test.

- (1) Assemble the pressure test tool ref. tool item 1 to the duct assembly (Ref.Fig.403).
- (2) Fill the duct with water at ambient temperature, and ensure that there is no air trapped in the duct.
- (3) Apply a steady pressure of 180 psi plus/minus 10% (1241 kPa plus/minus 10%) for 15 seconds. No leaks are allowable.
- (4) Release the pressure, then remove the pressure test tool and dry off the duct.

N. Identify.

- (1) Make SAL.B.499489 or R1 adjacent to the existing assembly part number using vibro-percussion marking as instructed in Chapter 72-09-00 Repair.

P. Apply High Heat Resisting Coating

Apply high heat resisting aluminium enamel as instructed in Chapter 72-09-04 Repair. Or apply high heat and corrosion resistant coating Type A or B, to areas designated in Chapter 72-09-04 Repair. Refer to TSD 594-J TASK 70-00-00-300-349 SUBTASK 70-00-00-380-349-001. Use OMat 7/46.

REPAIR

75-01-03

Repair No.1

Page 406

Dec 31/00



OLYMPUS 593

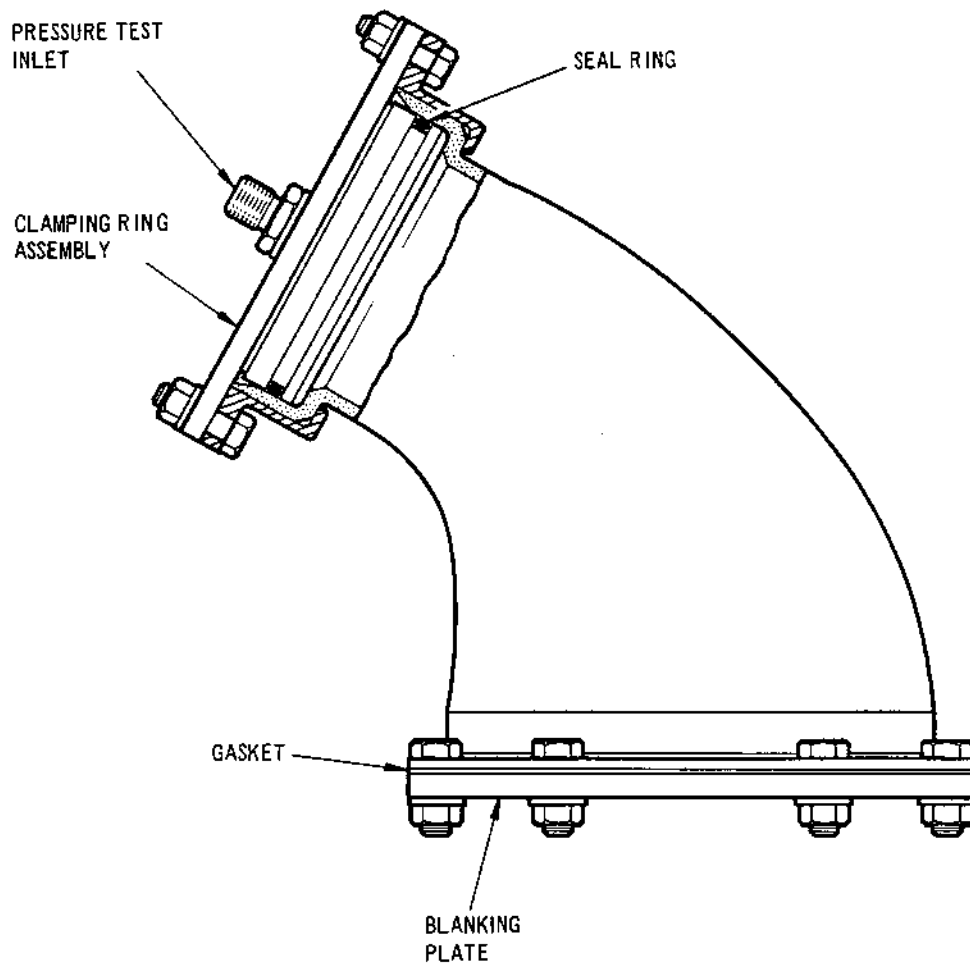
MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

CR 36037/00A

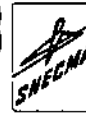


Pressure Test Equipment  
Figure 403

REPAIR  
75-01-03  
Repair No.1  
Page 407  
Dec 1/84



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



4. Special Tools, Fixtures and Equipment

<u>Description</u>	<u>Qty.</u>	<u>Tool No.</u>	<u>Item</u>
Pressure test tool	1	S3S90362000	1

5. Replacement Parts

<u>Description</u>	<u>Qty.</u>	<u>Part No.</u>
Housing, seal	1	B.341032



OLYMPUS 593

MK.610-14-28

OVERHAUL



TUBES - HP COMPRESSOR CASE TO HP COMPRESSOR  
DIFFUSER CASE (LOWER) - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

CAUTION: BEFORE USING HEAVY CLEANING PROCESSES J, L AND N, INVESTIGATE ALL REPAIRS CARRIED OUT ON EACH COMPONENT TO IDENTIFY THOSE HAVING PLASMA SPRAY COATINGS. THE NITRIC ACID USED IN PROCESSES J, L AND N WILL ATTACK THE ALUMINIUM CONTENT OF SOME TYPES OF COATING, MAKING REPLACEMENT OF THE COATING NECESSARY.

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.

CLEANING

75-01-04

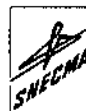
Page 201  
Feb 1/83



OLYMPUS 593

MK.610-14-28

OVERHAUL



- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.
- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except		A or B	-	-
	10	Duct	A or B	J	-
	180	Duct	A or B	J	-
	200	Duct	A or B	J	-

Cleaning Processes  
Table 201



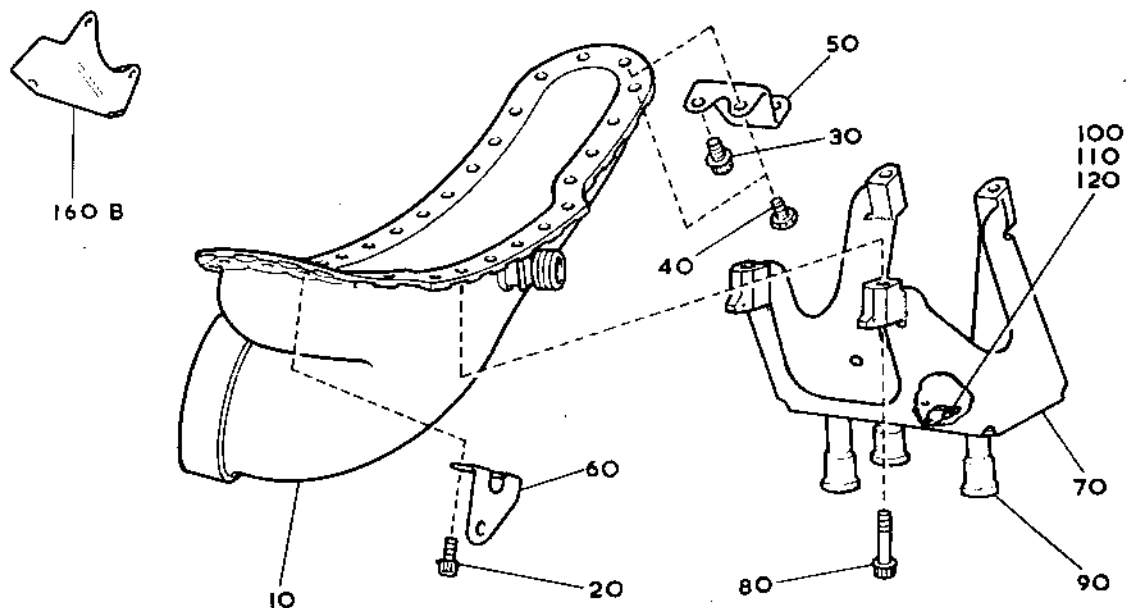
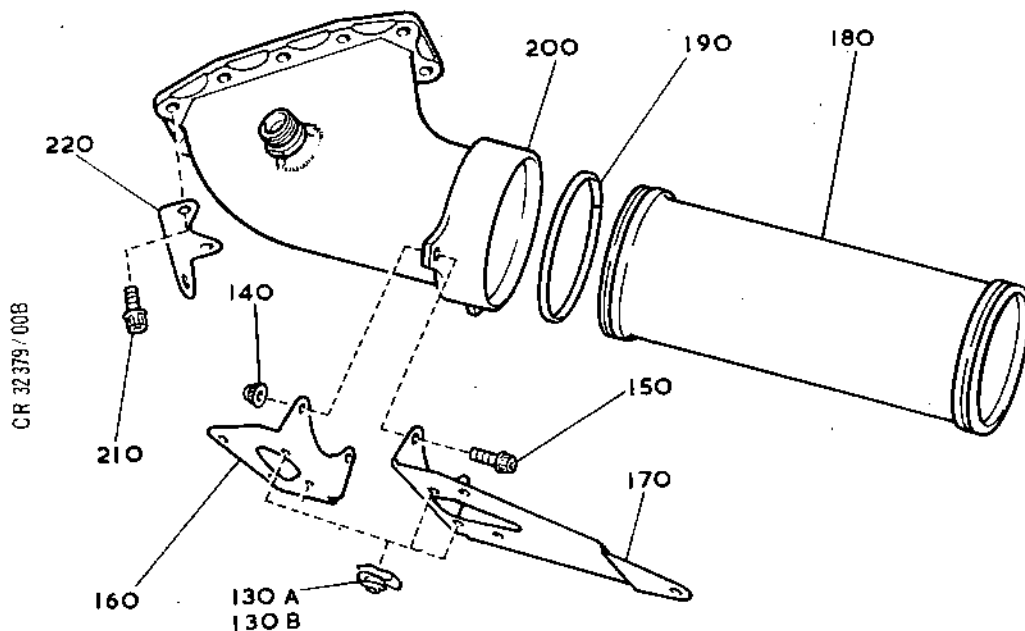


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



Tubes - Air Cooling, HP Compressor Case  
to HP Compressor Diffuser Case (Lower)  
Figure 201

CLEANING  
**75-01-04**

Page 203  
Aug 28/75

TN5264

# British airways

CONCORDE

## OLYMPUS 593 OVERHAUL MANUAL

Temporary Revision No. 75-503

This TR is the first RST for section 75-01-04

### REASON FOR ISSUE:

To introduce a repair for a cracked mounting bracket (MRA 128)

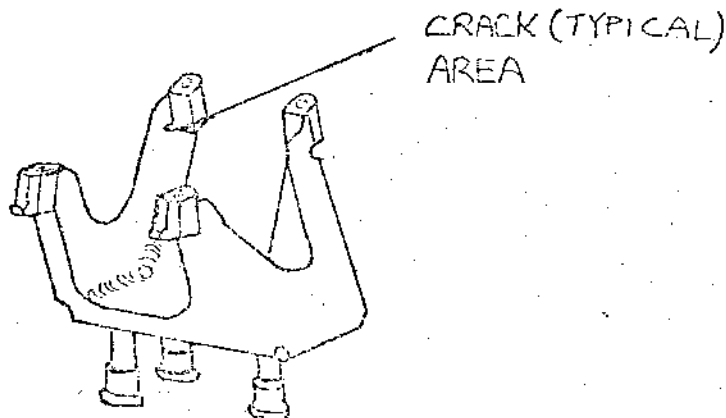
### ACTION

B.E.O.L. REPAIR

RST 4031 BRACKET, ASSEMBLY OF,  
MOUNTING REPAIR OF CRACK BY ARGON ARC  
WELDING.

### PROCEDURE

1. Clean and prepare cracked area for welding in accordance with TSD 594/Op.407.
2. Argon Arc Weld using filler rod MSRR 9500/2 as per TSD 594/Op.407.
3. Crack detect using Fluorescent Penetrant method as per Overhaul Manual.
4. Hand dress back to original contours.
5. Visually inspect.
6. Vibro engrave RST 4031 adjacent to Part Number.
7. The above is written in accordance with OLY/SEDP/980.



1 May 1981

TR.75-503  
75-01-04  
RST 4031  
TR. Page 1 of 1



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



ELBOW, AIR COOLING, HP TURBINE BEARING FEED PIPE - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

**CAUTION:** BEFORE USING HEAVY CLEANING PROCESSES J, L AND N, INVESTIGATE ALL REPAIRS CARRIED OUT ON EACH COMPONENT TO IDENTIFY THOSE HAVING PLASMA SPRAY COATINGS. THE NITRIC ACID USED IN PROCESSES J, L AND N WILL ATTACK THE ALUMINIUM CONTENT OF SOME TYPES OF COATING, MAKING REPLACEMENT OF THE COATING NECESSARY.

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.

CLEANING

**75-01-05**

Page 201  
Feb 1/83



OLYMPUS 593

MK.610-14-28

OVERHAUL



- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.
- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except		A or B	J	
	50	Blanket, insulation	-	-	Wipe clean with
	60	Blanket, insulation	-	-	white spirit

Cleaning Processes  
Table 201

CLEANING

75-01-05

Page 202

Feb 1/83



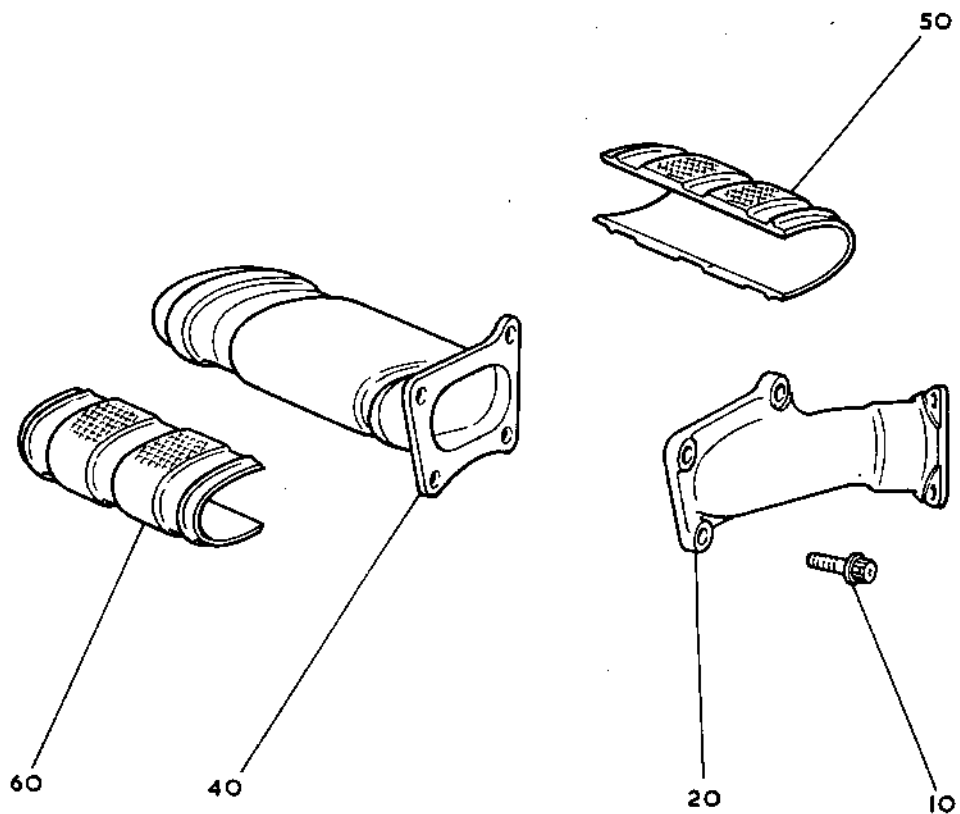
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 33183/00A



Elbow, Air Cooling, HP Turbine Bearing Feed Pipe  
Figure 201

CLEANING

75-01-05

Page 203

Apr 1/76

TN43710

# British airways

CONCORDE

## OLYMPUS 539 OVERHAUL MANUAL

Temporary Revision No. 75-504

This TR is the first RST for section 75-01-05

### REASON FOR ISSUE:

To introduce a repair to restore fretted surface in H.P. turbine bearing air duct (MRA 133).

### ACTION

B.E.O.L. REPAIR

RST 4036 DUCT ASSY:-  
RESTORATION OF FRETTED SURFACE  
BY CHROME PLATING.

### PROCEDURE:-

1. Strip chrome plate as per TSD 594-308 (if required).
2. Inspect, as per TSD 594-308.
3. If fretting still present, machine to dimensions in figure.
4. Prepare for hard chrome plate as per TSD 594-308.
5. Hard chrome plate as per TSD 594-308.
6. Inspect coating for cracking and adhesion as per TSD 594-308.
7. Machine to dimensions in figure.
8. Inspect as per Op.6.
9. Dimensionally inspect.
10. Vibro engrave RST 4036 adjacent to P/N.
11. The above is written in accordance with OLY/SEDP/912.

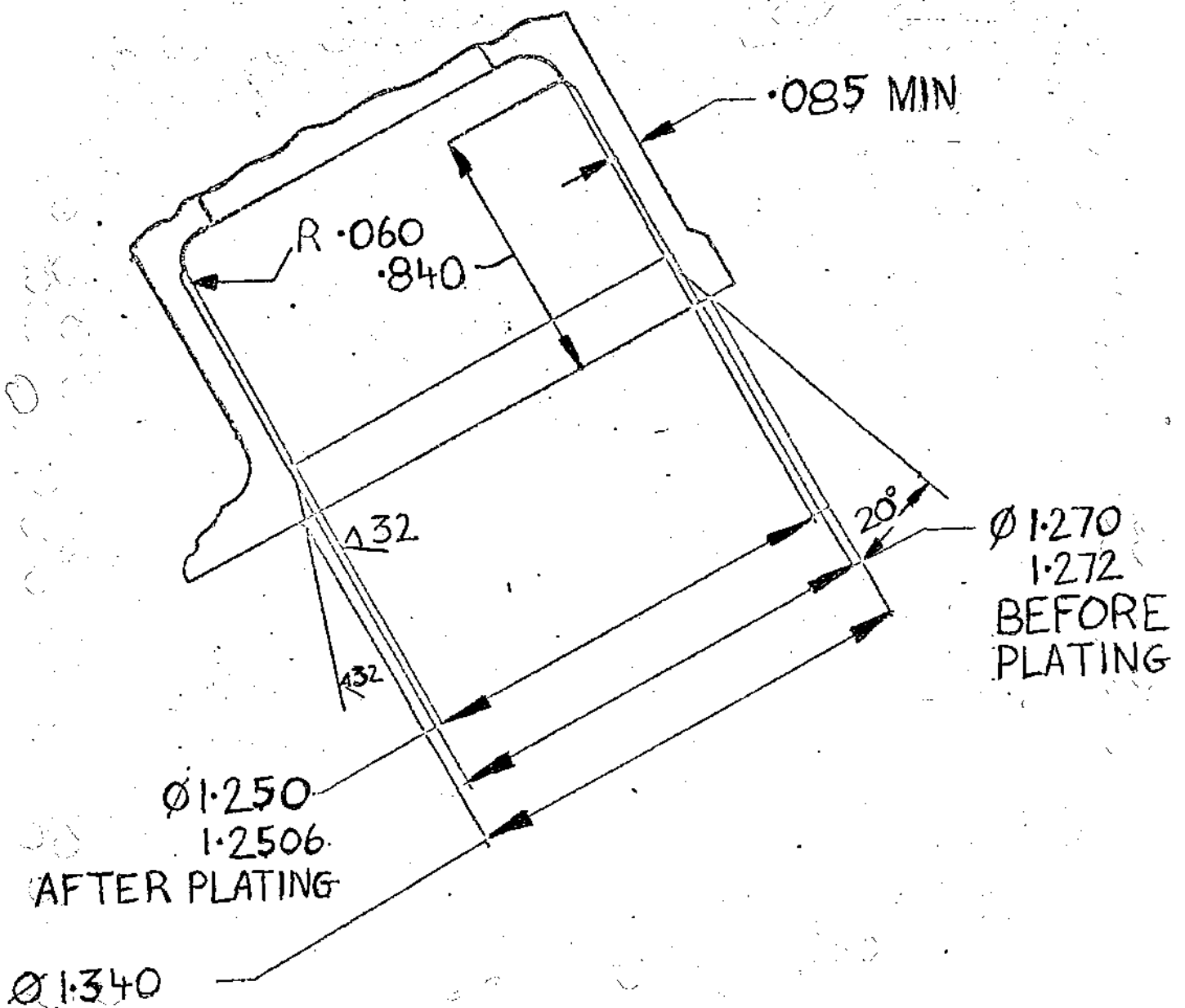
1 May 1981

TR.75-504  
75-01-05  
RST 4036  
TR. Page 1 of 2

015 1.3 3/8

**British airways**  
CONCORDE

TR.NO. 75-504 (cont'd)





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



TUBES - INTERMEDIATE CASE ADAPTER TO AIRCRAFT  
CONNECTION - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

75-02-01

Page 201  
Jan 1/77



**OLYMPUS 593**MK.610-14-28  
OVERHAUL

- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except		A or B	-	-
	80	Tube	A or B	G	Use process G only if light cleaning fails to remove con- tamination. Process G will damage silver plating, therefore it must be used with caution, i.e. short period immersion.
	230	Tube	A or B	G	
	240	Fitting, end	A or B	G	-

Cleaning Processes  
Table 201

TN42964



OLYMPUS 593

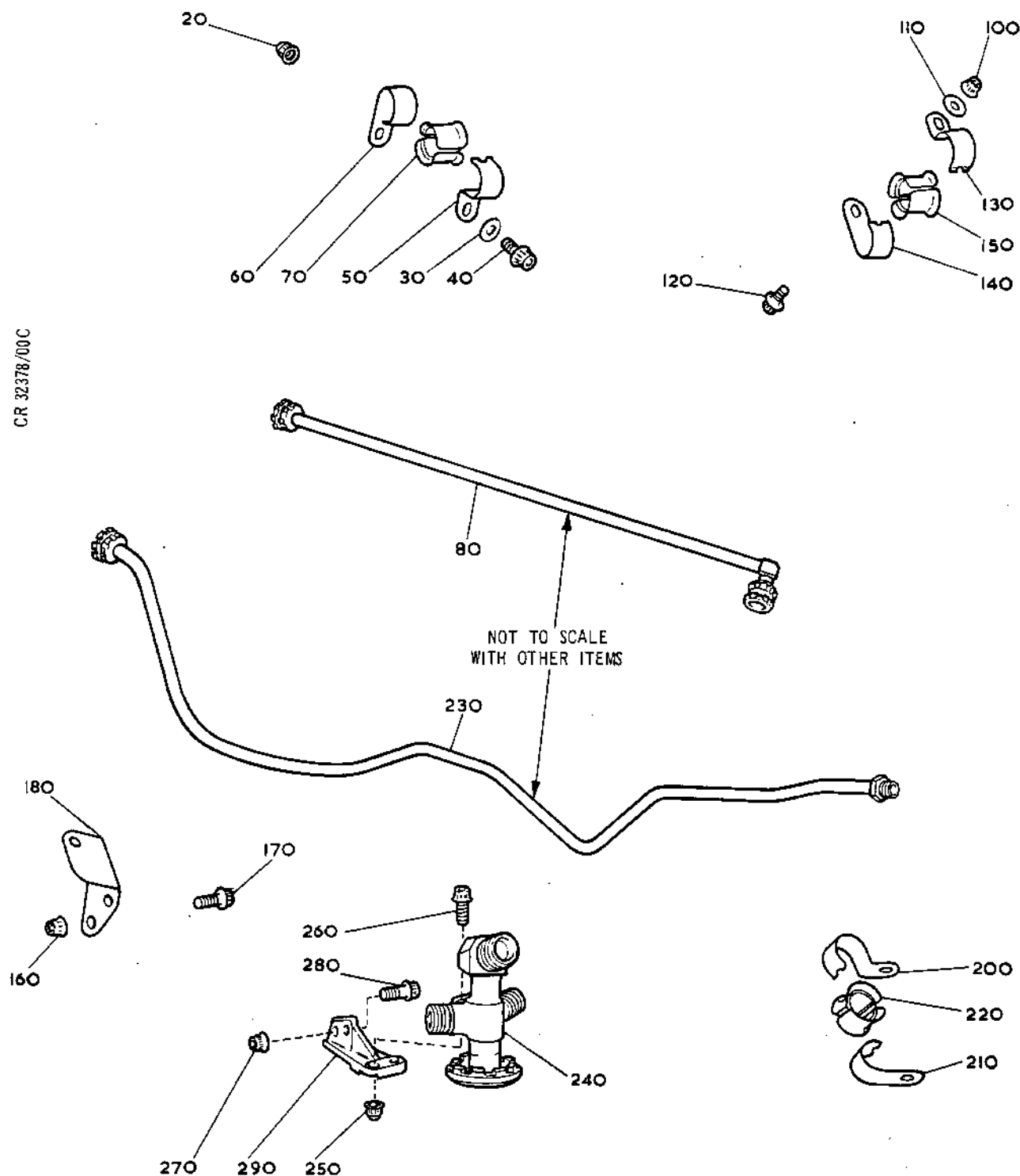
MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

CR 32378/00C



Tubes - Air Venting, Intermediate Case  
Adapter to Aircraft Connection  
Figure 201

CLEANING  
**75-02-01**

Page 203  
Dec 1/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



TUBES - INTERMEDIATE CASE ADAPTER TO AIRCRAFT CONNECTION  
- REPAIR

TABLE OF CONTENTS

Repair No.

Title

Scheme No.

1

Repair of fretting/damage by  
inert gas arc welding.

B.514566

PRINTED IN ENGLAND

REPAIR

75-02-01

Contents 1

Jun 1/92



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBE A/O, AIR  
REPAIR OF FRETTING/DAMAGE BY INERT GAS ARC WELDING

REPAIR B.514566

1. EFFECTIVITY

IPC	Fig./Item	Part No.
75-02-01	01/080A	B.476925
	01/230A	B.482678

2. REPAIR LIMITATIONS

Refer to Overhaul Manual 72-09-29 Repair.

3. GENERAL

Refer to Overhaul Manual 72-09-29 Repair.

4. REPAIR PROCEDURE

REPAIR PROCEDURE

SUPPLEMENTARY INFORMATION

(1) Weld repair

Refer to Overhaul Manual  
72-09-29 Repair.

(2) Mark SAL B.514566  
or R1 adjacent  
normal assy. of  
number using the  
electro-chemical  
marking or vibro-  
percussion engraving  
techniques.

Refer to Overhaul Manual  
72-09-00 Repair.

5. MATERIAL

<u>COMPONENT</u>	<u>MATERIAL</u>	<u>RR CODE</u>
B.476925	MSRR 9524	EBS
B.482678	MSRR 9524	EBS

REPAIR  
75-02-01  
Repair No.1  
Page 401  
Jun 1/92



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



6. DATA

PRESSURE TEST REQUIREMENTS:

<u>PART NO.</u>	<u>PRESSURE TEST</u>	<u>MIN. GAUGE</u>
B.476925	NOT REQUIRED	0.027 (0,69)
B.482678	NOT REQUIRED	0.027 (0,69)

7. TOOLS

<u>TOOL NUMBER</u>	<u>DESCRIPTION</u>	<u>ITEM</u>
NONE.		

8. REPLACEMENT PARTS

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>ITEM</u>
NONE.			



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



## TUBES - OIL TANK TO OUTLET SEAL PLATE - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

75-02-02

Page 201  
Jan 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish part will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except		A or B	-	-
	80	Plate, seal	A or B	C	-
	90	Tube	A or B	G	Use process G only
	270	Tube	A or B	G	if light cleaning
	350	Tube	A or B	G	fails to remove con-
	450	Tube	A or B	G	tamination. Process
					G will damage silver
					plating, therefore
					it must be used with
					caution, i.e. short
					period immersion

Cleaning Processes  
Table 201

IN5266



OLYMPUS 593

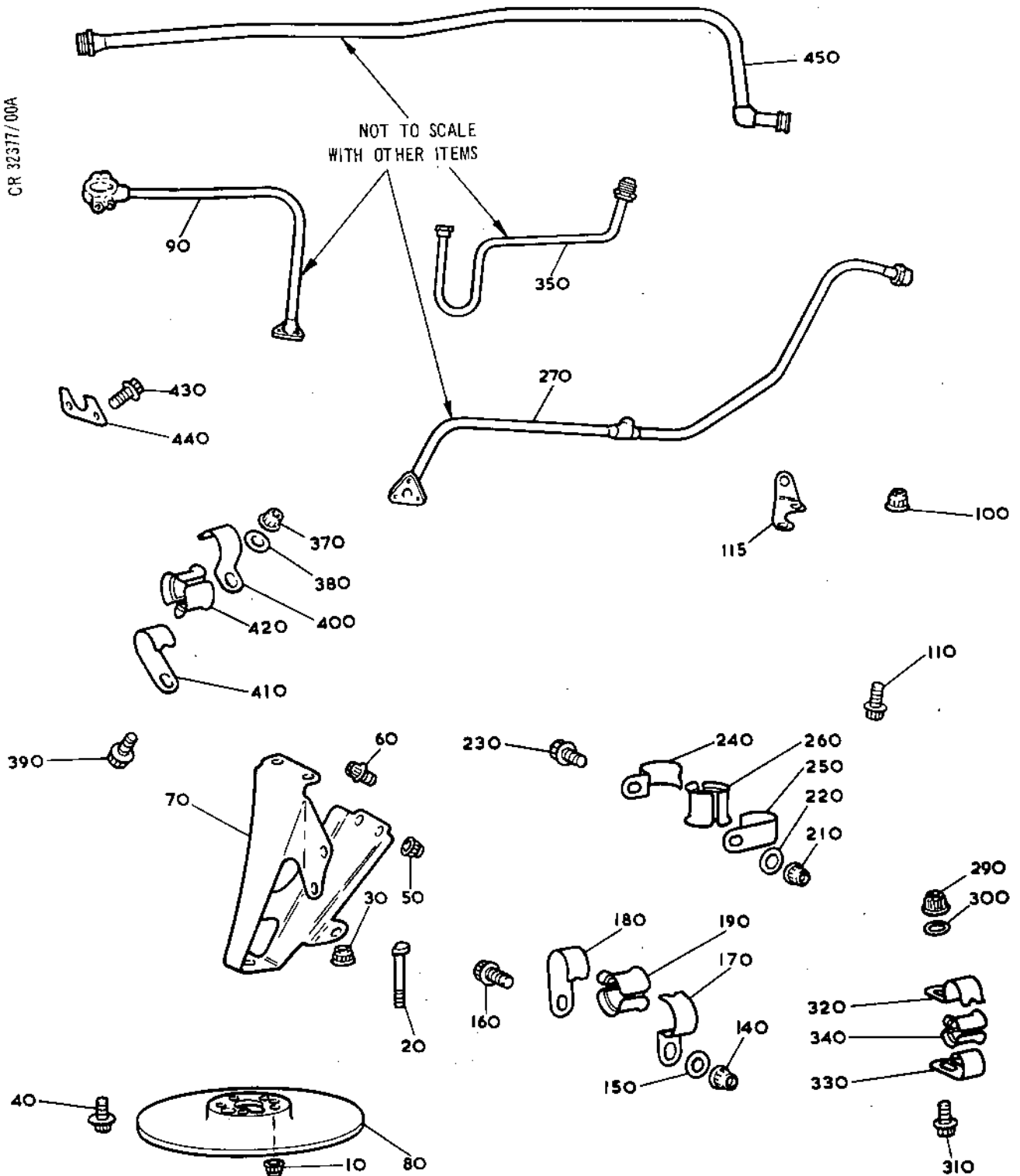
MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

CR 32377/00A



Tubes - Air Venting, Oil Tank  
to Outlet Seal Plate  
Figure 201

TN5268

CLEANING  
**75-02-02**

Page 203

Aug 28/75



# British airways

CONCORDE

## OLYMPUS 593 OVERHAUL MANUAL

Temporary Revision No. 75-502

This TR is the first RST for section 75-02-02

### REASON FOR ISSUE:

To introduce a repair for a cracked bracket (MRA 126)

### ACTION

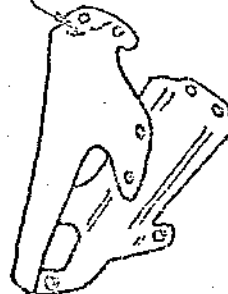
B.E.O.L. REPAIR

RST 4029 BRACKET, ASSEMBLY OF.  
REPAIR OF CRACK BY ARGON ARC WELDING

### PROCEDURE:-

1. Clean and prepare cracked area for welding in accordance with TSD 594/Op.407.
2. Argon Arc Weld using filler rod MSRR 9500/2 as per TSD 594/Op.407.
3. Crack detect using Fluorescent penetrant method as per Overhaul Manual.
4. Hand dress back to original contours.
5. Visually inspect.
6. Vibro engrave RST 4029 adjacent to Part Number.

TYPICAL REPAIR  
AREA.



1 May 1981

TR.75-502  
75-02-02  
RST 4029  
TR. Page 1 of 1



OLYMPUS 593

MK.610-14-28

OVERHAUL



TUBES - OIL TANK TO OUTLET SEAL PLATE - REPAIR

TABLE OF CONTENTS

Repair No.

Title

Scheme No.

1

Repair of fretting/damage by  
inert gas arc welding.

B.514566

PRINTED IN ENGLAND

REPAIR

75-02-02

Contents 1

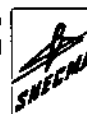
Jun 1/92



# OLYMPUS 593

MK.610-14-28

OVERHAUL



TUBE A/O, AIR

REPAIR OF FRETTING/DAMAGE BY INERT GAS ARC WELDING

REPAIR B.514566

1. EFFECTIVITY

IPC	Fig./Item	Part No.
75-02-02	01/270A	B.477188
	01/450A	B.477453

2. REPAIR LIMITATIONS

Refer to Overhaul Manual 72-09-29 Repair.

3. GENERAL

Refer to Overhaul Manual 72-09-29 Repair.

4. REPAIR PROCEDURE

REPAIR PROCEDURE

SUPPLEMENTARY INFORMATION

(1) Weld repair

Refer to Overhaul Manual  
72-09-29 Repair.

(2) Mark SAL B.514566  
or R1 adjacent  
normal assy. of  
number using the  
electro-chemical  
marking or vibro-  
percussion engraving  
techniques.

Refer to Overhaul Manual  
72-09-00 Repair.

5. MATERIAL

<u>COMPONENT</u>	<u>MATERIAL</u>	<u>RR CODE</u>
B.477188	MSRR 6524	EBS
B.477453	MSRR 6524	EBS

PRINTED IN ENGLAND

REPAIR  
**75-02-02**  
Repair No.1  
Page 401  
Jun 1/92



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



6. DATA

PRESSURE TEST REQUIREMENTS:

<u>PART NO.</u>	<u>PRESSURE TEST</u>	<u>MIN. GAUGE</u>
B.477188	NOT REQUIRED	0.027 (0,69)
B.477453	NOT REQUIRED	0.027 (0,69)

7. TOOLS

<u>TOOL NUMBER</u>	<u>DESCRIPTION</u>	<u>ITEM</u>
NONE.		

8. REPLACEMENT PARTS

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>ITEM</u>
NONE.			



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBES - HP COMPRESSOR DIFFUSER CASE AND EXHAUST DIFFUSER  
TO MULTIPLE CONNECTOR (LESS INTERNAL TUBE) - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00  
Cleaning for details of the cleaning processes referred  
to in Table 201.
- B. To ensure that all items within this breakdown that  
require cleaning and subsequent Inspection/Check are  
recognized, and identified by their Part Number, figures  
are provided which equate with the Illustrated Parts  
Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with  
the relevant Figure and Item Number in the same breakdown  
in the I.P.C. Items illustrated in the I.P.C. which are  
not illustrated in this breakdown, are those items which  
are either discarded at overhaul, or are normally assembled  
to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the  
figures, Table 201 does not list all items, but deals  
collectively with the items requiring the same cleaning  
process.
- D. On receipt of the items from disassembly, all protective  
blanks, covers etc. deemed necessary for the protection  
of the items will have been assembled and, in addition,  
many of the items will arrive in containers. Any special  
containers, blanks, covers etc. are listed in Table 202  
by their Tool Ref. No. e.g. (Tool 123). For the  
manufacturer's Part No. refer to the appropriate Table in  
Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items  
prior to cleaning and reassembled immediately afterwards.  
Items received in special cleaning containers should  
remain therein during the cleaning procedures unless  
otherwise stated.
- B. All items contained in this breakdown must be cleaned by  
the appropriate processes quoted in the table, to achieve  
a cleanliness to enable the Inspection/Check to be carried  
out correctly. Where alternative processes are quoted,  
the operator must decide what process to use depending on  
the amount of contamination of the item. Any item that is  
not cleaned satisfactorily must be recleaned by the  
appropriate process.

CLEANING

75-02-03

Page 201  
Jan 1/77

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except		A or B	-	-
	100	Connector assembly	A or B	G	Use process G only if light cleaning fails to remove con- tamination. Process G will damage silver plating, therefore it must be used with caution, i.e. short period immersion.
	120	Tube	A or B	G	
	235	Tube	A or B	G	
	240	Tube	A or B	G	

Cleaning Processes  
Table 201

TN43149



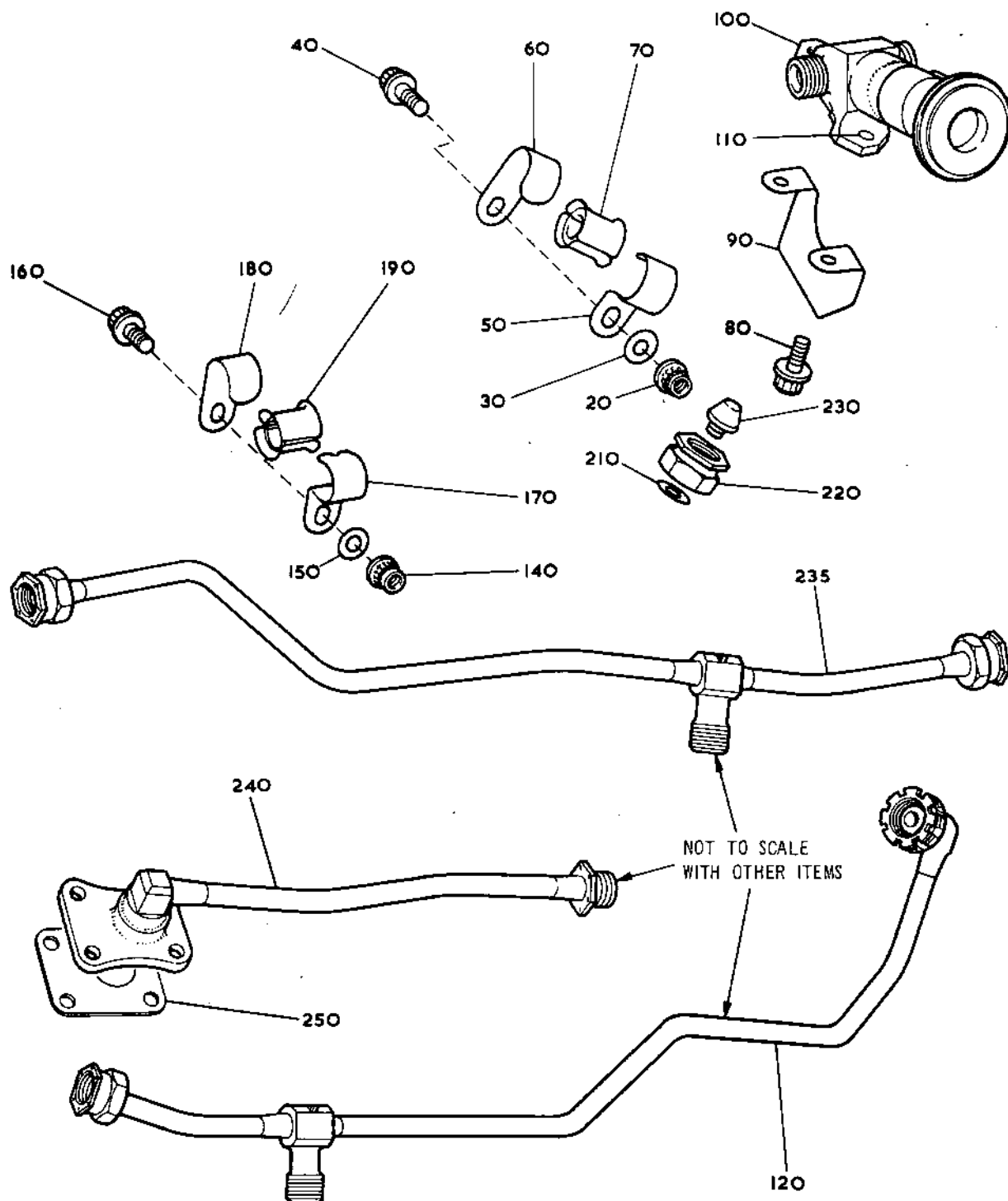
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32376/008

PRINTED IN ENGLAND



Tubes - Air Venting, HP Compressor Diffuser Case  
and Exhaust Diffuser to Multiple Connection  
Figure 201

CLEANING  
**75-02-03**

Page 203  
Aug 28/75

TN44040



OLYMPUS 593

MK.610-14-28

OVERHAUL



TUBES - HP COMPRESSOR DIFFUSER CASE AND EXHAUST DIFFUSER  
TO MULTIPLE CONNECTOR (LESS INTERNAL TUBE) - REPAIR

TABLE OF CONTENTS

Repair No.

Title

Scheme No.

1

Repair of fretting/damage by  
inert gas arc welding.

B.514566

PRINTED IN ENGLAND

REPAIR  
**75-02-03**

Contents 1  
Jun 1/92





# OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBE A/O, AIR  
REPAIR OF FRETTING/DAMAGE BY INERT GAS ARC WELDING

REPAIR B.514566

1. EFFECTIVITY

IPC	Fig./Item	Part No.
75-02-03	01/240A	B.481911
	01/235A	B.481913
	01/120A	B.481916
	01/150A	B.481956
	01/240B	B.496165

2. REPAIR LIMITATIONS

Refer to Overhaul Manual 72-09-29 Repair.

3. GENERAL

Refer to Overhaul Manual 72-09-29 Repair.

4. REPAIR PROCEDURE

REPAIR PROCEDURE

SUPPLEMENTARY INFORMATION

(1) Weld repair

Refer to Overhaul Manual  
72-09-29 Repair.

(2) Mark SAL B.514566  
or R1 adjacent  
normal assy. of  
number using the  
electro-chemical  
marking or vibro-  
percussion engraving  
techniques.

Refer to Overhaul Manual  
72-09-00 Repair.

5. MATERIAL

COMPONENT

MATERIAL

RR CODE

B.481911 )  
B.481913 )  
B.481916 )  
B.481956 )  
B.496165 )

MSRR 6524

EBS

REPAIR  
**75-02-03**  
Repair No.1  
Page 401  
Jun 1/92



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



6. DATA

PRESSURE TEST REQUIREMENTS:

TEST MEDIUM TO BE WATER

<u>PART NO.</u>	<u>PRESSURE TEST</u>	<u>MIN. GAUGE</u>
B.481911	NOT REQUIRED	0.027 (0,69)
B.481913	NOT REQUIRED	0.027 (0,69)
B.481916	NOT REQUIRED	0.027 (0,69)
B.481956	360 lbf/sq.in. (2,48 MPa) for 1 min.	0.027 (0,69)
B.496165	NOT REQUIRED	0.027 (0,69)

7. TOOLS

<u>TOOL NUMBER</u>	<u>DESCRIPTION</u>	<u>ITEM</u>
NONE.		

8. REPLACEMENT PARTS

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>ITEM</u>
NONE.			



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



## TUBE - EXHAUST DIFFUSER TO DUCT (RIGHT-HAND) - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

CAUTION: BEFORE USING HEAVY CLEANING PROCESSES J, L AND N, INVESTIGATE ALL REPAIRS CARRIED OUT ON EACH COMPONENT TO IDENTIFY THOSE HAVING PLASMA SPRAY COATINGS. THE NITRIC ACID USED IN PROCESSES J, L AND N WILL ATTACK THE ALUMINIUM CONTENT OF SOME TYPES OF COATING, MAKING REPLACEMENT OF THE COATING NECESSARY.

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.

CLEANING

75-02-04

Page 201

Jan 4/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.
- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

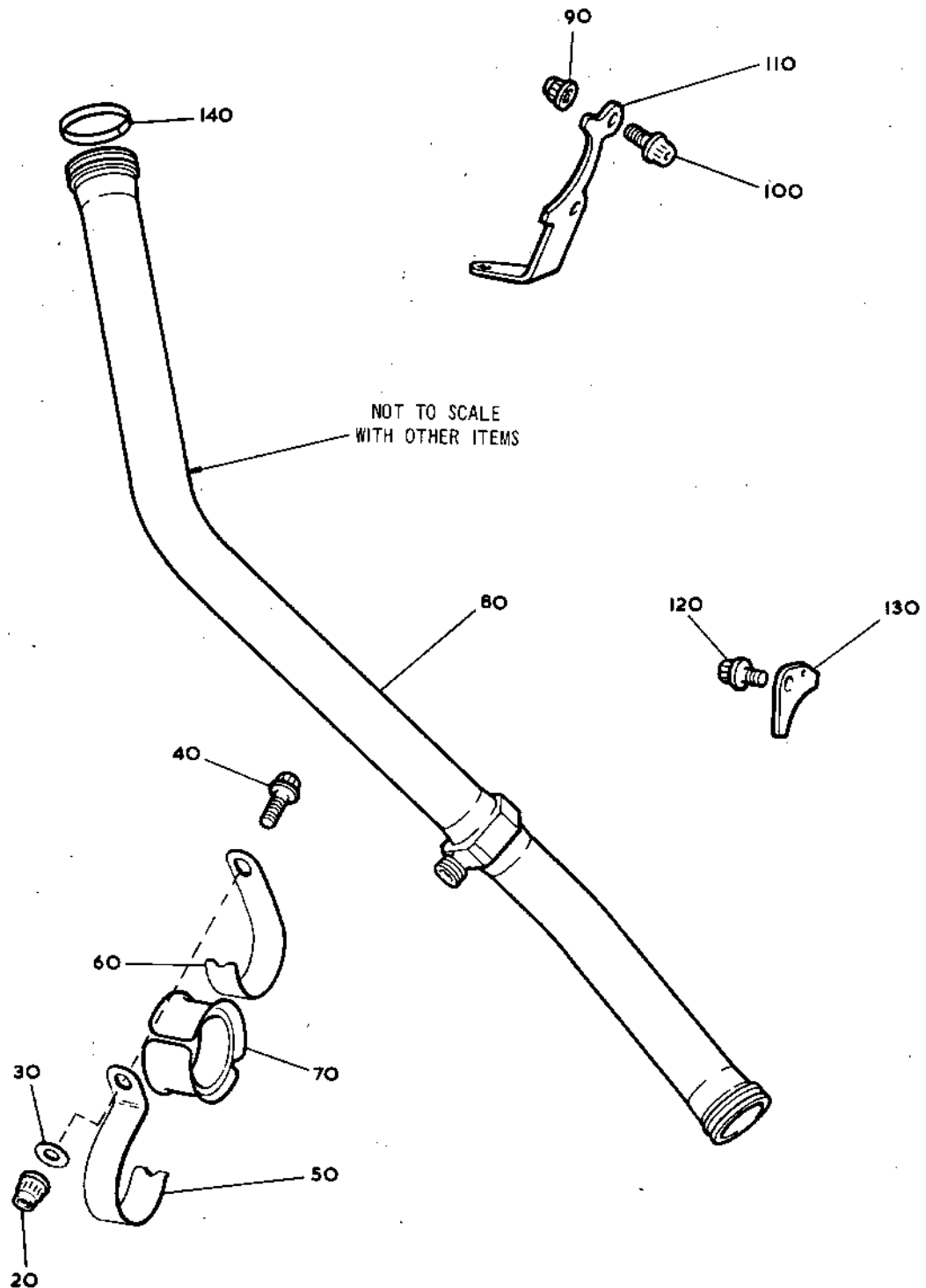
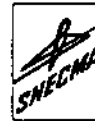
FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	-
	except 80	Tube	A or B	J	-

Cleaning Processes  
Table 201



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Tubes - Air Venting Exhaust  
Diffuser to Duct RH  
Figure 201



OLYMPUS 593

MK.610-14-28

OVERHAUL



TUBE - EXHAUST DIFFUSER TO DUCT (RIGHT-HAND) - REPAIR

TABLE OF CONTENTS

Repair No.	Title	Scheme No.
1	Repair of fretting/damage by inert gas arc welding.	B.514566
2	Repair of damage and/or fretted areas.	B.497468

PRINTED IN ENGLAND

REPAIR

75-02-04

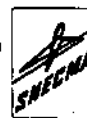
Contents 1

Jul 31/93



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBE A/O, AIR  
REPAIR OF FRETTING/DAMAGE BY INERT GAS ARC WELDING

REPAIR B.514566

1. EFFECTIVITY

IPC	Fig./Item	Part No.
75-02-04	01/080A	B.458493

2. REPAIR LIMITATIONS

Refer to Overhaul Manual 72-09-29 Repair.

3. GENERAL

Refer to Overhaul Manual 72-09-29 Repair.

4. REPAIR PROCEDURE

REPAIR PROCEDURE

(1) Weld repair

SUPPLEMENTARY INFORMATION

Refer to Overhaul Manual  
72-09-29 Repair.

(2) Mark SAL B.514566  
or R1 adjacent  
normal assy. of  
number using the  
electro-chemical  
marking or vibro-  
percussion engraving  
techniques.

Refer to Overhaul Manual  
72-09-00 Repair.

5. MATERIAL

COMPONENT

MATERIAL

RR CODE

B.458493

MSRR 6524

EBS

PRINTED IN ENGLAND



OLYMPUS 593

MK.610-14-28

OVERHAUL



6. DATA

PRESSURE TEST REQUIREMENTS:

TEST MEDIUM TO BE WATER

<u>PART NO.</u>	<u>PRESSURE TEST</u>	<u>MIN. GAUGE</u>
B.458493	240lbf/sq.in. (1,66 MPa) for 15 sec.	0.031 (0,79)

7. TOOLS

<u>TOOL NUMBER</u>	<u>DESCRIPTION</u>	<u>ITEM</u>
NONE.		

8. REPLACEMENT PARTS

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>ITEM</u>
NONE.			



**OLYMPUS 593**

MK.610-14-28

OVERHAUL



TUBE A/O, AIR  
REPAIR OF DAMAGED AND/OR FRETTED AREAS

REPAIR B.4974681. EFFECTIVITY

<u>IPC</u>	<u>FIG/ITEM</u>	<u>PART NO.</u>
75-02-04	1/ 80B	B458493

2. REPAIR LIMITATIONS

Refer to Overhaul Manual 72-09-30 Repair.

3. GENERAL

Refer to Overhaul Manual 72-09-30 Repair.

4. REPAIR PROCEDUREREPAIR PROCEDURESUPPLEMENTARY INFORMATION

(1) Repair

Refer to Overhaul Manual  
72-09-30 Repair(2) Mark SAL B497468 or R2  
adjacent normal assy. of  
number using the electro-  
chemical marking technique.Refer to Overhaul Manual  
72-09-00 Repair5. MATERIAL

<u>COMPONENT</u>	<u>MATERIAL</u>	<u>RR CODE</u>
B458493	MSRR 6524	EBS

6. DATAPRESSURE TEST REQUIREMENTS:

<u>PART NUMBER</u>	<u>STANDARD PRESSURE TEST REQUIREMENT</u>	<u>COMMON PRESSURE TEST REQUIREMENT</u>
B458493	60 PSI FOR 15 SECONDS	USE 240 PSI FOR 15 SECONDS

PRINTED IN ENGLAND

REPAIR

**75-02-04**

Repair No.2

Page 401

Jul 31/93



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



7. TOOLS

<u>TOOL NUMBER</u>	<u>DESCRIPTION</u>	<u>ITEM</u>
NONE		

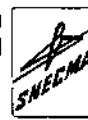
8. REPLACEMENT PARTS

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>ITEM</u>
B458489	SEAL CARRIER	A/R	1
B435874	ADAPTOR	A/R	2
B497486	TUBE JOINT	A/R	3



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBE - EXHAUST DIFFUSER TO DUCT (LEFT-HAND) - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00  
Cleaning for details of the cleaning processes referred  
to in Table 201.
- B. To ensure that all items within this breakdown that  
require cleaning and subsequent Inspection/Check are  
recognized, and identified by their Part Number, figures  
are provided which equate with the Illustrated Parts  
Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with  
the relevant Figure and Item Number in the same breakdown  
in the I.P.C. Items illustrated in the I.P.C. which are  
not illustrated in this breakdown, are those items which  
are either discarded at overhaul, or are normally assembled  
to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the  
figures, Table 201 does not list all items, but deals  
collectively with the items requiring the same cleaning  
process.
- D. On receipt of the items from disassembly, all protective  
blanks, covers etc. deemed necessary for the protection  
of the items will have been assembled and, in addition,  
many of the items will arrive in containers. Any special  
containers, blanks, covers etc. are listed in Table 202  
by their Tool Ref. No. e.g. (Tool 123). For the  
manufacturer's Part No. refer to the appropriate Table in  
Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

CAUTION: BEFORE USING HEAVY CLEANING PROCESSES J, L AND N,  
INVESTIGATE ALL REPAIRS CARRIED OUT ON EACH COM-  
PONENT TO IDENTIFY THOSE HAVING PLASMA SPRAY  
COATINGS. THE NITRIC ACID USED IN PROCESSES J, L  
AND N WILL ATTACK THE ALUMINIUM CONTENT OF SOME  
TYPES OF COATING, MAKING REPLACEMENT OF THE COATING  
NECESSARY.

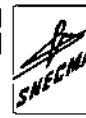
- A. All blanks, covers etc. must be removed from the items  
prior to cleaning and reassembled immediately afterwards.  
Items received in special cleaning containers should  
remain therein during the cleaning procedures unless  
otherwise stated.



OLYMPUS 593

MK.610-14-28

OVERHAUL



- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.
- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	-
	except 80 Tube		A or B	J	-

Cleaning Processes  
Table 201



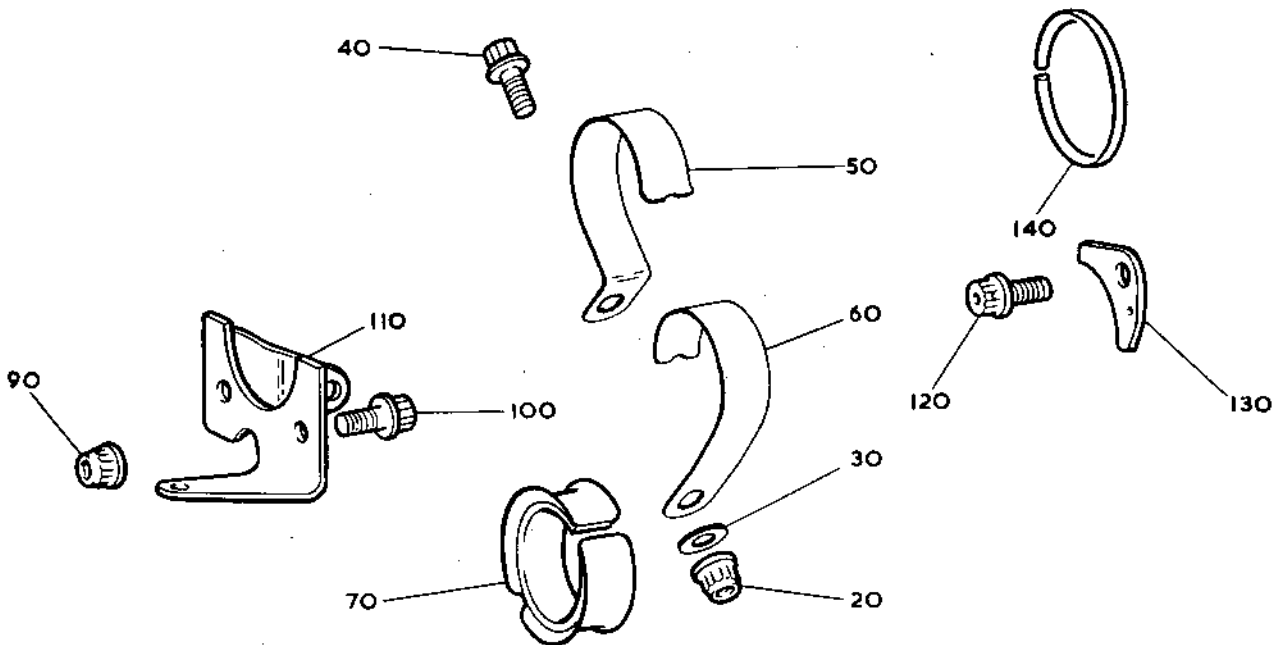
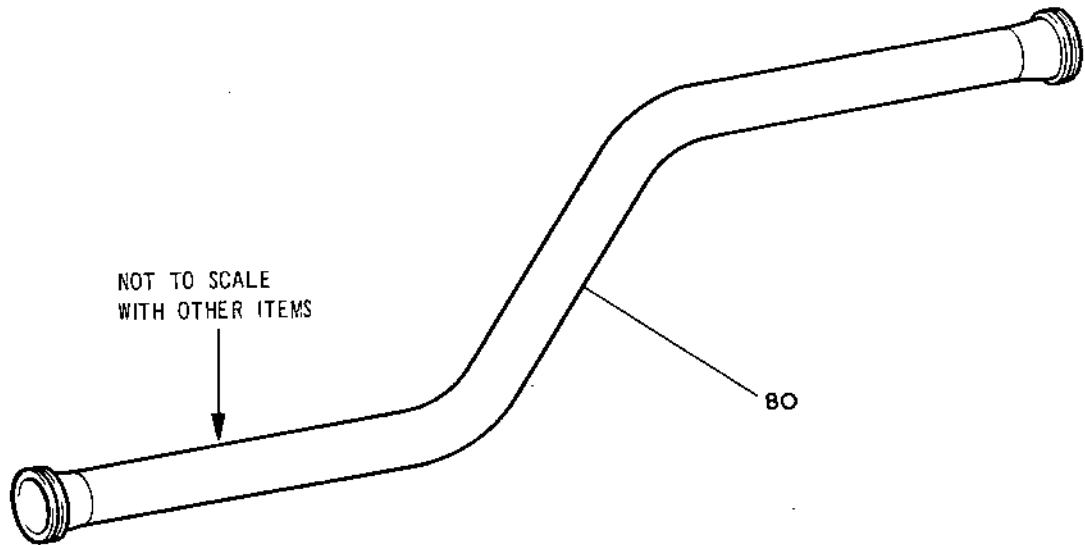
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32374 008

PRINTED IN ENGLAND



Tubes - Air Venting, Exhaust Diffuser to Duct LH  
Figure 201

CLEANING  
**75-02-05**  
Page 203  
Aug 28/75

TN27350



OLYMPUS 593

MK.610-14-28

OVERHAUL



TUBE - EXHAUST DIFFUSER TO DUCT (LEFT-HAND) - REPAIR

TABLE OF CONTENTS

Repair No.

Title

Scheme No.

1

Repair of fretting/damage by  
inert gas arc welding.

B.514566

PRINTED IN ENGLAND

REPAIR

75-02-05

Contents 1

Jun 1/92



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBE A/O, AIR  
REPAIR OF FRETTING/DAMAGE BY INERT GAS ARC WELDING

REPAIR B.514566

1. EFFECTIVITY

IPC	Fig./Item	Part No.
75-02-05	01/080A	B.473973

2. REPAIR LIMITATIONS

Refer to Overhaul Manual 72-09-29 Repair.

3. GENERAL

Refer to Overhaul Manual 72-09-29 Repair.

4. REPAIR PROCEDURE

REPAIR PROCEDURE

(1) Weld repair

SUPPLEMENTARY INFORMATION

Refer to Overhaul Manual  
72-09-29 Repair.

(2) Mark SAL B.514566  
or R1 adjacent  
normal assy. of  
number using the  
electro-chemical  
marking or vibro-  
percussion engraving  
techniques.

Refer to Overhaul Manual  
72-09-00 Repair.

5. MATERIAL

COMPONENT

MATERIAL

RR CODE

B.473973

MSRR 6524

EBS

PRINTED IN ENGLAND



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



6. DATA

PRESSURE TEST REQUIREMENTS:

<u>PART NO.</u>	<u>PRESSURE TEST</u>	<u>MIN. GAUGE</u>
B.473973	NOT REQUIRED	0.027 (0,69)

7. TOOLS

<u>TOOL NUMBER</u>	<u>DESCRIPTION</u>	<u>ITEM</u>
NONE.		

8. REPLACEMENT PARTS

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>ITEM</u>
NONE.			

REPAIR  
75-02-05  
Repair No.1  
Page 402  
Jun 1/92





OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBES - HP COMPRESSOR DIFFUSER CASE TO AIRCRAFT  
OVERBOARD COWLING (RH) - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00  
Cleaning for details of the cleaning processes referred  
to in Table 201.
- B. To ensure that all items within this breakdown that  
require cleaning and subsequent Inspection/Check are  
recognized, and identified by their Part Number, figures  
are provided which equate with the Illustrated Parts  
Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with  
the relevant Figure and Item Number in the same breakdown  
in the I.P.C. Items illustrated in the I.P.C. which are  
not illustrated in this breakdown, are those items which  
are either discarded at overhaul, or are normally assembled  
to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the  
figures, Table 201 does not list all items, but deals  
collectively with the items requiring the same cleaning  
process.
- D. On receipt of the items from disassembly, all protective  
blanks, covers etc. deemed necessary for the protection  
of the items will have been assembled and, in addition,  
many of the items will arrive in containers. Any special  
containers, blanks, covers etc. are listed in Table 202  
by their Tool Ref. No. e.g. (Tool 123). For the  
manufacturer's Part No. refer to the appropriate Table in  
Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

CAUTION: BEFORE USING HEAVY CLEANING PROCESSES J, L AND N,  
INVESTIGATE ALL REPAIRS CARRIED OUT ON EACH COM-  
PONENT TO IDENTIFY THOSE HAVING PLASMA SPRAY  
COATINGS. THE NITRIC ACID USED IN PROCESSES J, L  
AND N WILL ATTACK THE ALUMINIUM CONTENT OF SOME  
TYPES OF COATING, MAKING REPLACEMENT OF THE COATING  
NECESSARY.

- A. All blanks, covers etc. must be removed from the items  
prior to cleaning and reassembled immediately afterwards.  
Items received in special cleaning containers should  
remain therein during the cleaning procedures unless  
otherwise stated.

PRINTED IN ENGLAND



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.
- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	-
	except 10 Duct		A or B	J	-

Cleaning Processes  
Table 201

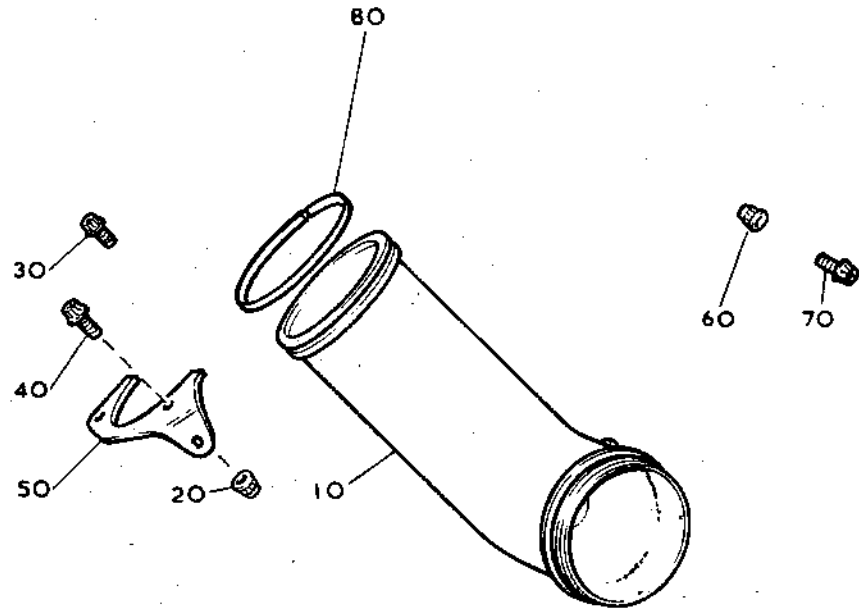


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32373/00B



TN27356

Tubes - Air Venting, HP Compressor Diffuser  
Case to Aircraft Overboard Cowling RH.  
Figure 201

CLEANING

75-02-06

Page 203

Aug 28/75



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



TUBES - HP COMPRESSOR DIFFUSER CASE TO AIRCRAFT  
OVERBOARD COWLING (LH) - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

75-02-07

Page 201

Jan 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	-
	except				
	10	Duct	A or B	F	Process F will remove the paint from this item

Cleaning Processes  
Table 201

TN11356

CLEANING  
**75-02-07**  
Page 202  
Jan 1/77



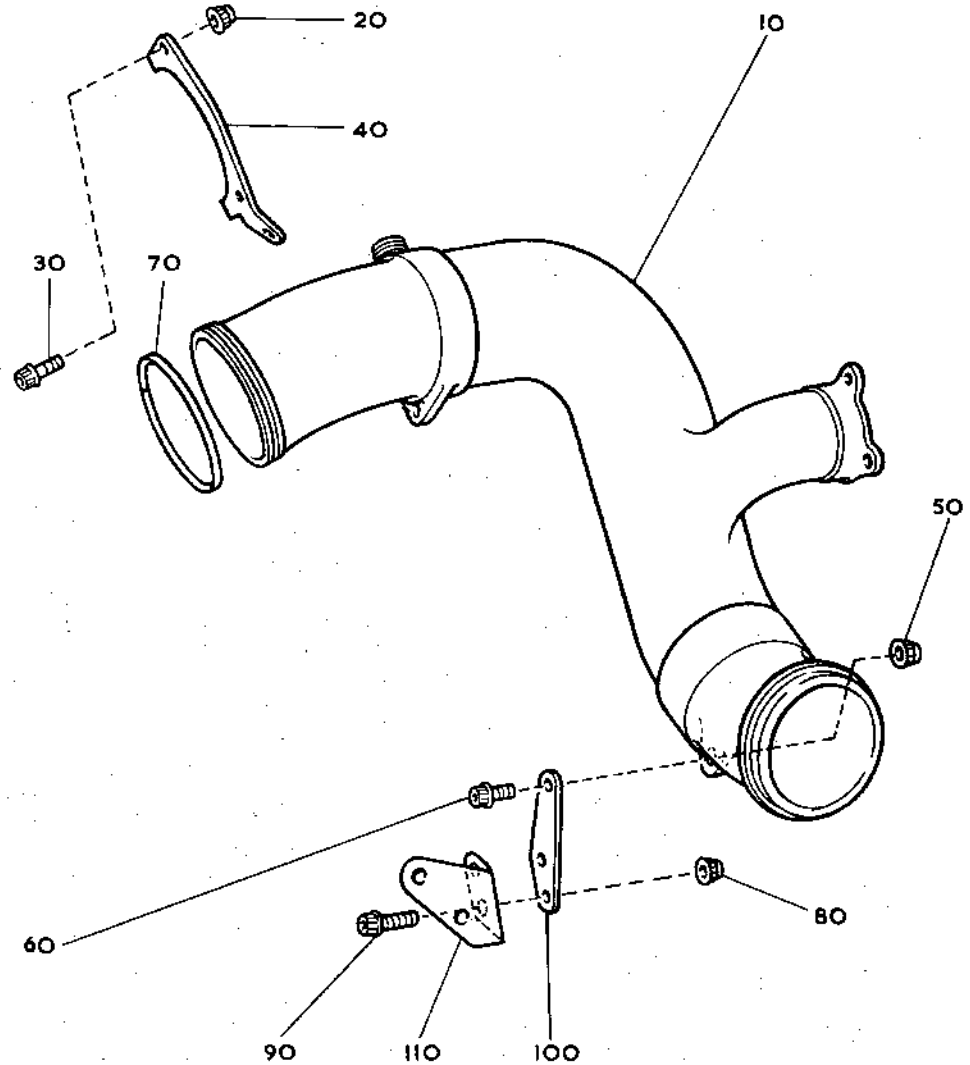
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32372/008



TN11020

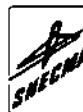
Tubes - Air Venting, HP Compressor Diffuser Case  
to Aircraft Overboard Cowling LH  
Figure 201

CLEANING  
**75-02-07**  
Page 203  
Aug 28/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



AIR DUCT ASSEMBLY - REPAIR

TABLE OF CONTENTS

Repair No.

Title

Scheme No.

1

Air Duct Assembly. Provision for  
Replacement of Worn/Damaged End  
Fittings

SAL.B.513488

PRINTED IN ENGLAND

REPAIR

75-02-07

Contents 1

Dec 1/91

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

AIR DUCT ASSEMBLYPROVISION FOR REPLACEMENT OF WORN/DAMAGED END FITTINGSREPAIR NO. B5134881. EFFECTIVITY

IPC	Fig./Item	Part No.
75-02-07	1 010A	B473939

2. REPAIR LIMITATIONS

Compliance with all aspects of this repair process should be achieved without deviation. Where a need to deviate is considered necessary reference should be made to the Repair Authority for agreement.

3. GENERAL

## UNLESS OTHERWISE SPECIFIED

Drawing practice & tolerance interpretation to ISO1101 (JES160)  
Dimensions in Inches (Millimeters)

Tolerances on machined dimensions plus/minus .010 (0,25)

Tolerance on angles plus/minus 2 degrees

Break sharp edges .004 to .020 (0,1 to 0,5)

Surface texture interpretation to ISO1302 (JES137)

Surface texture to be 125 Microinches (3,2 Micrometers)

Welding symbols to ISO2553 (JES139)

All TASKS identified in this instruction are in the Engine  
Overhaul Processes Manual (TSD 594-J)

4. REPAIR PROCEDURE

## REPAIR PROCEDURE

- 1) Remove paint and clean as necessary.
- 2) Inspect to determine position and extent of damage.

## SUPPLEMENTARY INFORMATION

Refer Overhaul Manual  
Chapter 72-09-00  
Process F. Cleaning.

Refer fig.401 and 402.

REPAIR

**75-02-07**

Repair No. 1

Page 401

Dec 31/00





OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

- |   |  |
|---|--|
| 3) Part off through defective end fitting(s) adjacent to weld joint. Dress back to near weld centreline, allowing for weld shrinkage. Restore Duct Outside Diameter and ensure squareness to pipe axis. | Refer fig.401 and 402.   |
| 4) Inspect for cracking.  | Refer Overhaul Manual Chapter 72-09-00 Inspection/Check.   |
| 5) Clean weld joint prior to welding.   | Refer TSD 594 OP 409 and TSD 594 OP 101.   |
| 6) Assemble replacement End Fittings and Mechanised Argon arc weld new End Fittings to Duct Assembly.   | Refer TSD 594 OP 409. Filler Rods to MSRR 9500/5. Refer Fig.401 and 402. Refer Para. 8 Replacement Parts.                      |
| 7) Dimensionally inspect.   | Refer fig.401 and 402.   |
| 8) Inspect for cracking.  | Refer Overhaul manual Chapter 72-09-00 Inspection/Check).  |
| 9) Radiologically inspect Group 1 welds.  | Refer TSD 594 OP 409.  |
| 10) Heat treat at $750^{\circ}\text{C} \pm 10^{\circ}\text{C}$ for 2 Hrs. Cool in air.  |  |
| 11) Dye Check.  | Refer Overhaul Manual Chapter 72-09-00 Inspection/Check.   |
| 12) Apply high heat resisting enamel or high heat end corrosion resistant coating all over except holes, threads, bores, sealing diameters/faces and undercuts.   | Refer Overhaul Manual Chapter 72-09-00 Repair or TSD 594-J, TASK 70-00-00-300-349 SUBTASK 70-00-00-380-349-001. Use OMAT 7/46. |
| 13) Mark on SAL B513488 or R1 adjacent to existing part number using vibro-percussion engraving.  | Refer Overhaul Manual Chapter 72-09-00 Repair.   |

REPAIR

75-02-07

Repair No. 1

Page 402

Dec 31/00



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

5. MATERIAL

COMPONENT.

MATERIAL.

RR CODE.

AIR DUCT ASSEMBLY

Corrosion Resistant Steel

( MSRR 6629 )

EFU

( MSRR 6596 )

EFW

6. DATA

NONE.

7. TOOLS

NONE.

8. REPLACEMENT PARTS

DESCRIPTION

QUANTITY

PART No.

END FITTING

1

B473950

END FITTING

1

B413973

Printed in England

REPAIR

75-02-07

Repair No. 1

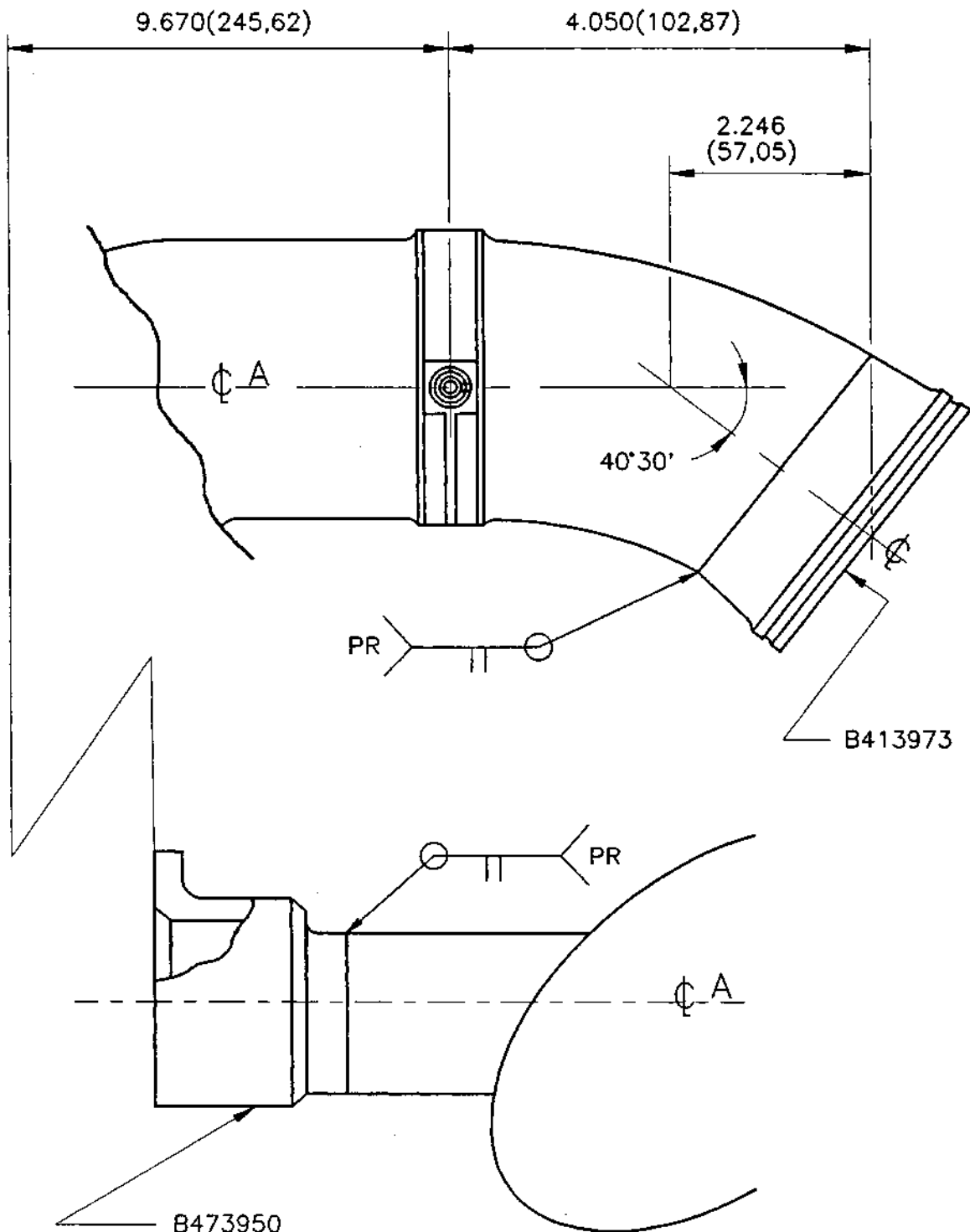
Page 403

Dec 31/00



OLYMPUS 593

MK.610-14-28  
OVERHAUL



GENERAL SECTION THRU DUCT  
FIG.401

REPAIR  
75-02-07  
Repair No. 1  
Page 404  
Dec 1/91

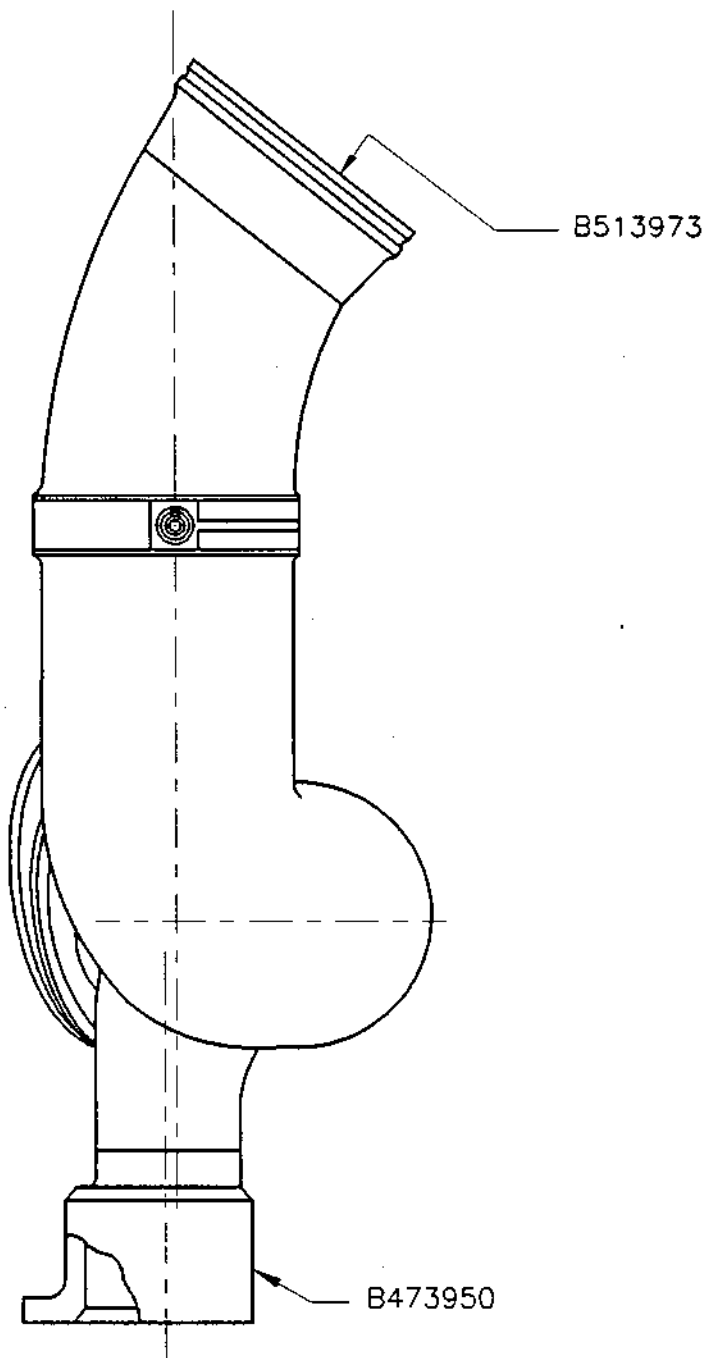
PRINTED IN ENGLAND



OLYMPUS 593

MK.610-14-28

OVERHAUL



GENERAL VIEW OF DUCT  
FIG.402

REPAIR  
**75-02-07**  
Repair No. 1  
Page 405  
Dec 1/91



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



TUBE - AIR INTAKE CASE ADAPTER TO CONNECTION ON TUBE (AIR  
INTAKE CASE ADAPTER TO OUTLET SEAL PLATE) - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00  
Cleaning for details of the cleaning processes referred  
to in Table 201.
- B. To ensure that all items within this breakdown that  
require cleaning and subsequent Inspection/Check are  
recognized, and identified by their Part Number, figures  
are provided which equate with the Illustrated Parts  
Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with  
the relevant Figure and Item Number in the same breakdown  
in the I.P.C. Items illustrated in the I.P.C. which are  
not illustrated in this breakdown, are those items which  
are either discarded at overhaul, or are normally assembled  
to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the  
figures, Table 201 does not list all items, but deals  
collectively with the items requiring the same cleaning  
process.
- D. On receipt of the items from disassembly, all protective  
blanks, covers etc. deemed necessary for the protection  
of the items will have been assembled and, in addition,  
many of the items will arrive in containers. Any special  
containers, blanks, covers etc. are listed in Table 202  
by their Tool Ref. No. e.g. (Tool 123). For the  
manufacturer's Part No. refer to the appropriate Table in  
Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items  
prior to cleaning and reassembled immediately afterwards.  
Items received in special cleaning containers should  
remain therein during the cleaning procedures unless  
otherwise stated.
- B. All items contained in this breakdown must be cleaned by  
the appropriate processes quoted in the table, to achieve  
a cleanliness to enable the Inspection/Check to be carried  
out correctly. Where alternative processes are quoted,  
the operator must decide what process to use depending on  
the amount of contamination of the item. Any item that is  
not cleaned satisfactorily must be recleaned by the  
appropriate process.

CLEANING

75-02-08

Page 201

Jan 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	-

Cleaning Processes  
Table 201

TN27208

CLEANING  
**75-02-08**  
Page 202  
Jan 1/77



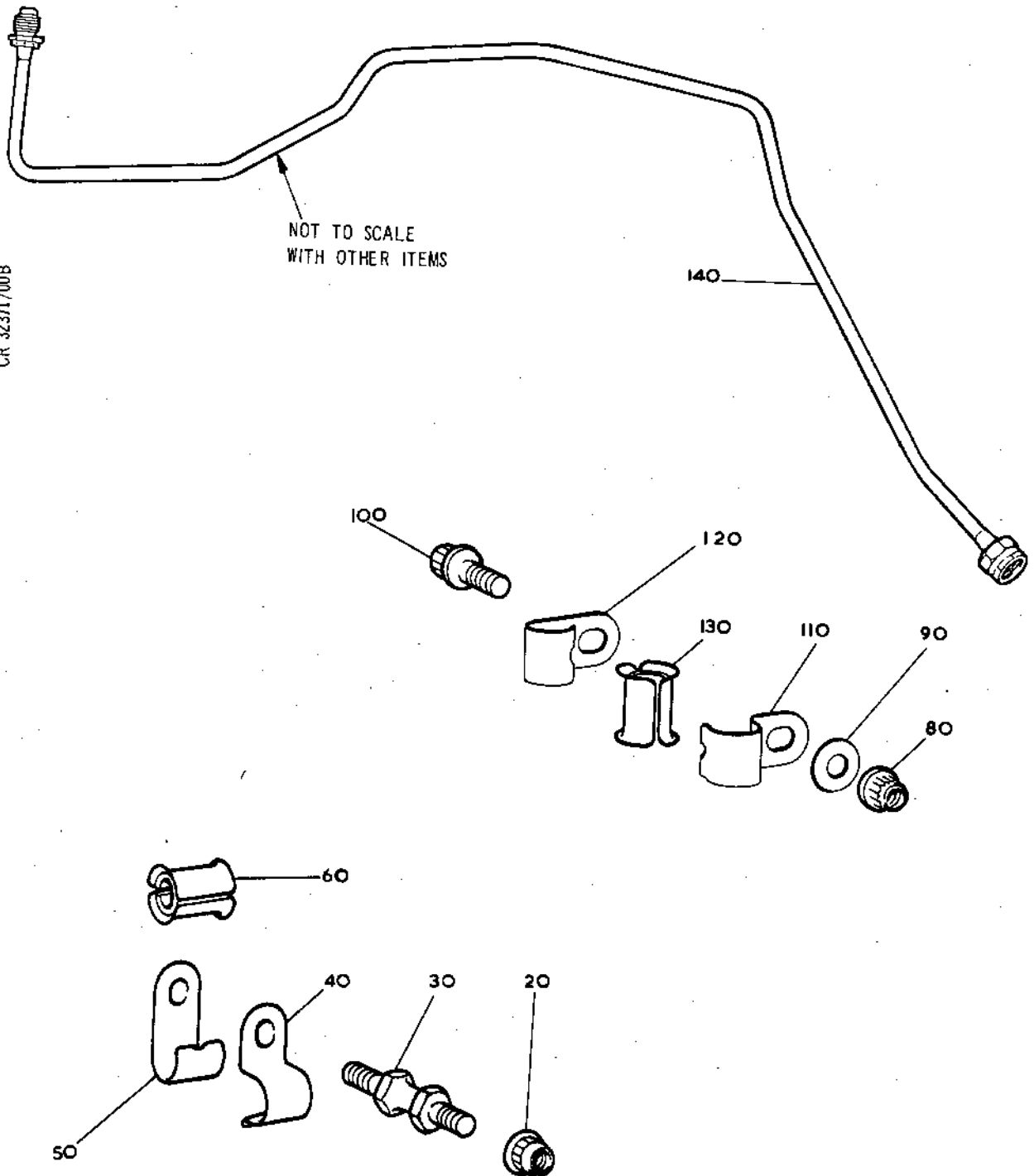
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32371/00B



Tubes - Air Venting, Air Intake Case  
Adapter RH to Connection on Tube  
(Air Intake Case Adapter LH to Outlet Seal Plate)  
Figure 201

CLEANING  
**75-02-08**

Page 203  
Aug 28/75

TN27210



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBES - AIR INTAKE CASE ADAPTER TO OUTLET SEAL  
PLATE (LH) - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

**75-02-09**

Page 201

Jan 1/77





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except		A or B	-	-
	50	Tube	A or B	G	Use process G only if light cleaning fails to remove con- tamination. Process G will damage silver plating, therefore it must be used with caution, i.e. short period immersion.
	170	Tube	A or B	G	
	300	Tube	A or B	G	

Cleaning Processes  
Table 201

TN27213

CLEANING  
**75-02-09**  
Page 202  
Jan 1/77



OLYMPUS 593

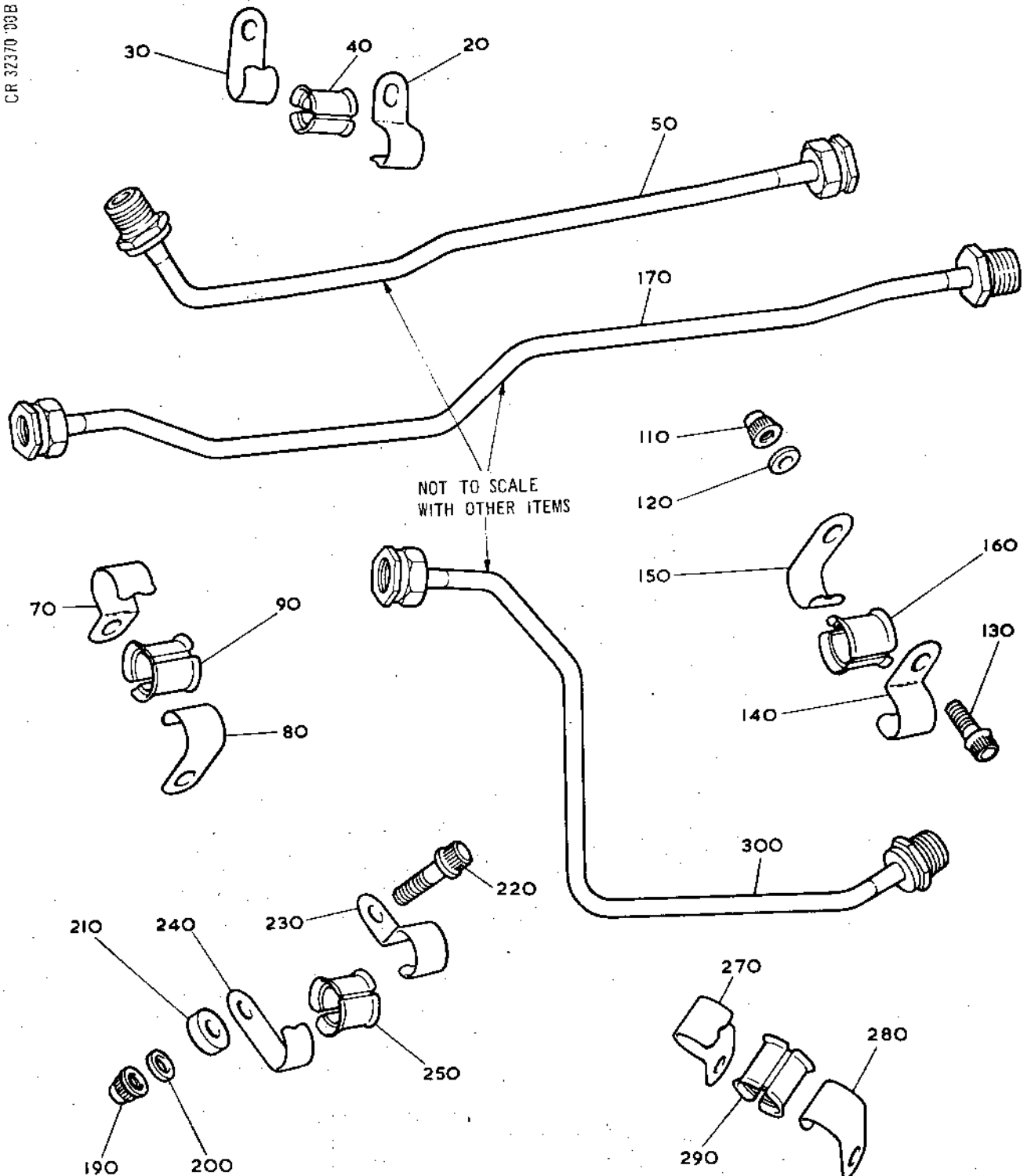
MK.610-14-28

OVERHAUL



CR 32370 03B

PRINTED IN ENGLAND



Tubes - Air Venting, Air Intake Case Adapter  
LH to Outlet Seal Plate  
Figure 201

TN44213

CLEANING  
75-02-09

Page 203  
Aug 28/75



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



TUBES - AIR STARTER TO OUTLET SEAL PLATE - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

PRINTED IN ENGLAND

TN17837

CLEANING  
**75-02-10**  
Page 201  
Jan 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except		A or B	-	-
	80	Tube	A or B	G	Use process G only
	90	Tube	A or B	G	if light cleaning
	170	Tube	A or B	G	fails to remove con- tamination. Process G will damage silver plating, therefore it must be used with caution, i.e. short period immersion.

Cleaning Processes  
Table 201

TN23260

CLEANING  
**75-02-10**  
Page 202  
Jan 1/77

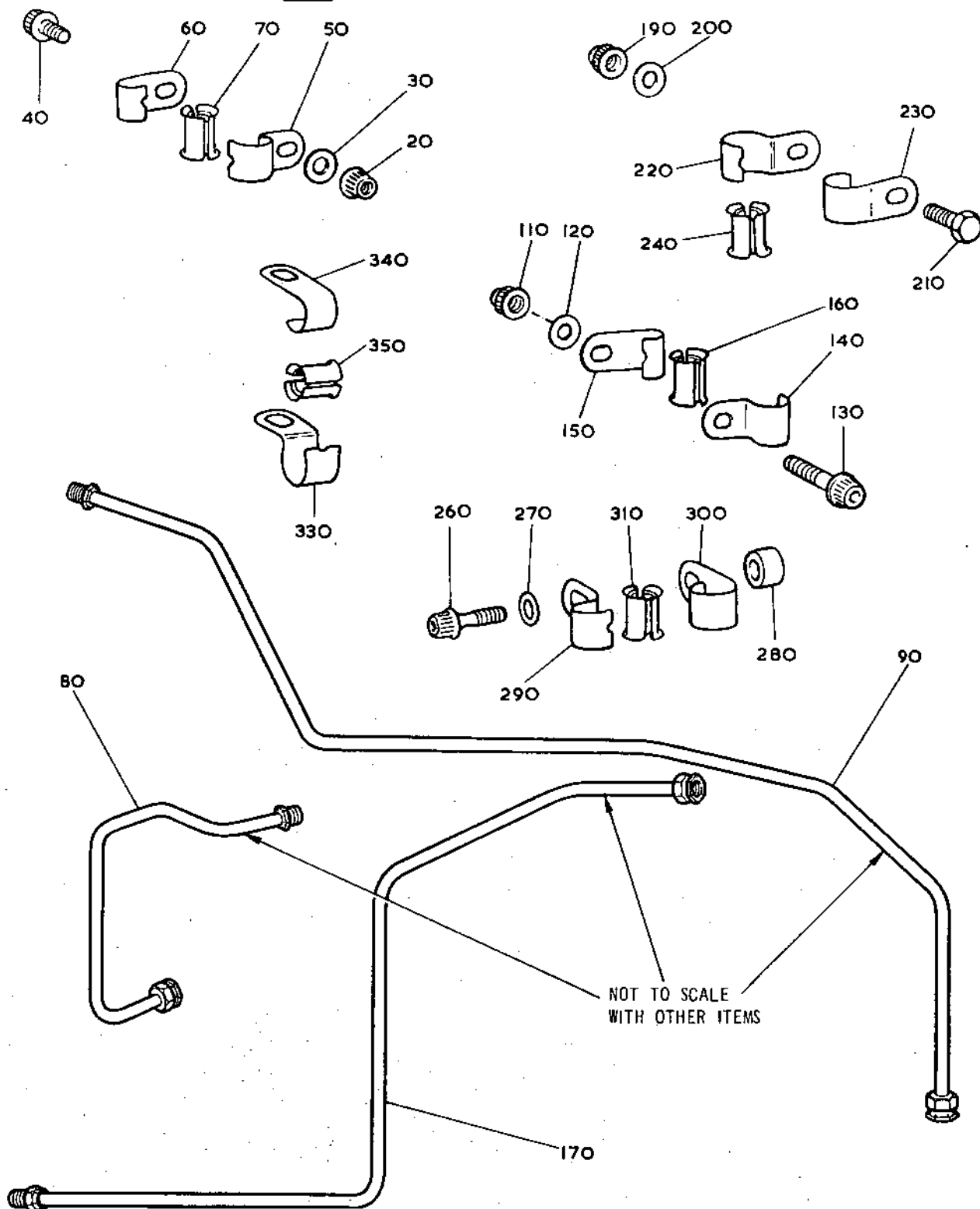


# OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32369 00B



Tubes - Air Venting, Air Starter  
to Outlet Seal Plate  
Figure 201



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBES - RPM PROBE DRIVE AND HOUSING TO TUBE  
CONNECTION - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

75-02-11

Page 201  
Jan 1/77



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except		A or B	-	-
	50	Tube	A or B	G	Use process G only if light cleaning fails to remove con- tamination. Process G will damage silver plating, therefore it must be used with caution, i.e. short period immersion.
	100	Tube	A or B	G	

Cleaning Processes  
Table 201

IN28956



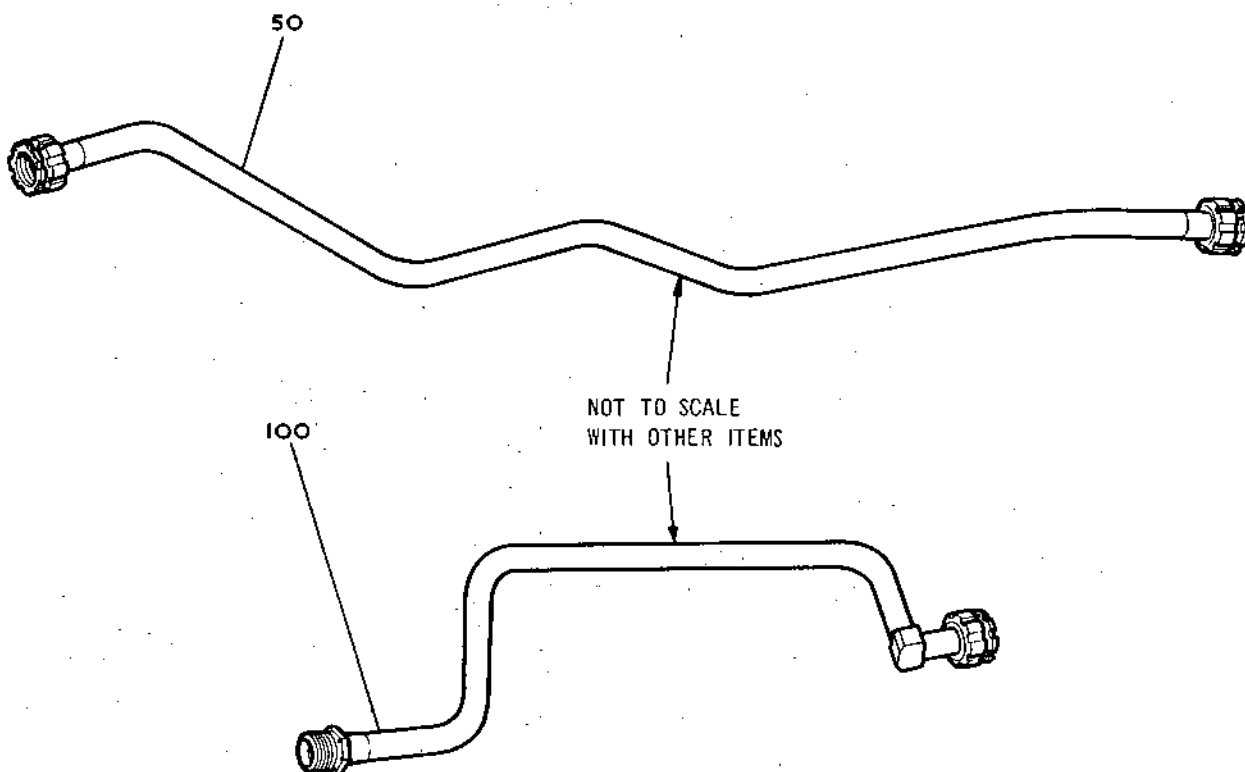
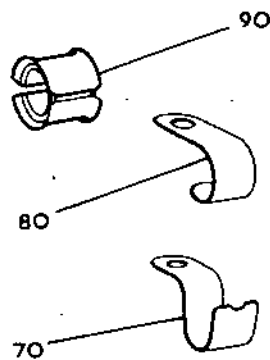
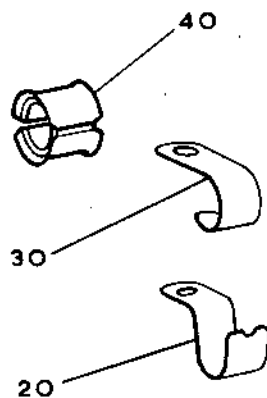
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32 482 /00B

PRINTED IN ENGLAND



Tubes - Air Venting, Intermediate Case  
Sump to Tube Connection  
Figure 201

TN28958





OLYMPUS 593

MK.610-14-28

OVERHAUL



DUCT - AIR VENTING, HP COMPRESSOR DIFFUSER CASE TUBE  
TO AIRCRAFT OVERBOARD COWLING (LH AND RH) - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00  
Cleaning for details of the cleaning processes referred  
to in Table 201.
- B. To ensure that all items within this breakdown that  
require cleaning and subsequent Inspection/Check are  
recognized, and identified by their Part Number, figures  
are provided which equate with the Illustrated Parts  
Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with  
the relevant Figure and Item Number in the same breakdown  
in the I.P.C. Items illustrated in the I.P.C. which are  
not illustrated in this breakdown, are those items which  
are either discarded at overhaul, or are normally assembled  
to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the  
figures, Table 201 does not list all items, but deals  
collectively with the items requiring the same cleaning  
process.
- D. On receipt of the items from disassembly, all protective  
blanks, covers etc. deemed necessary for the protection  
of the items will have been assembled and, in addition,  
many of the items will arrive in containers. Any special  
containers, blanks, covers etc. are listed in Table 202  
by their Tool Ref. No. e.g. (Tool 123). For the  
manufacturer's Part No. refer to the appropriate Table in  
Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

CAUTION: BEFORE USING HEAVY CLEANING PROCESSES J, L AND N,  
INVESTIGATE ALL REPAIRS CARRIED OUT ON EACH COM-  
PONENT TO IDENTIFY THOSE HAVING PLASMA SPRAY  
COATINGS. THE NITRIC ACID USED IN PROCESSES J, L  
AND N WILL ATTACK THE ALUMINIUM CONTENT OF SOME  
TYPES OF COATING, MAKING REPLACEMENT OF THE COATING  
NECESSARY.

- A. All blanks, covers etc. must be removed from the items  
prior to cleaning and reassembled immediately afterwards.  
Items received in special cleaning containers should  
remain therein during the cleaning procedures unless  
otherwise stated.



OLYMPUS 593

MK.610-14-28

OVERHAUL



- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.
- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	-
	except				
	10		A or B	F	-
	50		A or B	L	-

Cleaning Processes  
Table 201

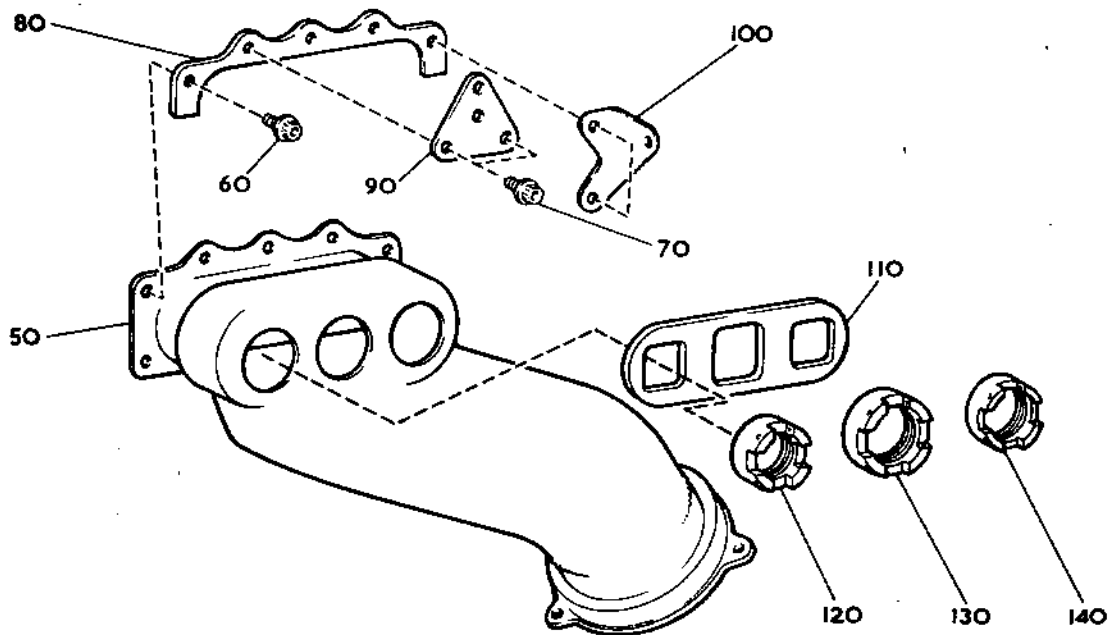
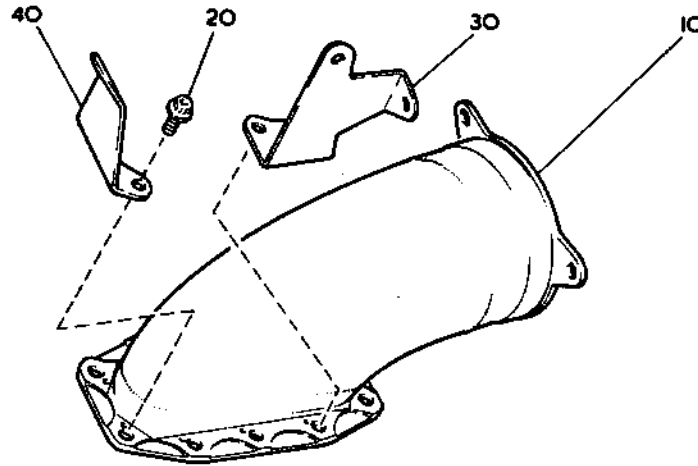


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33181/00A



Duct - Air Venting, HP Compressor Diffuser Case Tube  
to Aircraft Overboard Cowling (LH and RH)  
Figure 201

CLEANING

75-02-12

Page 203

Apr 1/76

PRINTED IN ENGLAND

TN43596



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBES - HP COMPRESSOR DIFFUSER CASE TO OVERBOARD  
COWLING - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

75-03-01

Page 201

Jan 1/77

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except 10	Duct	A or B	-	-
			A or B	G	Item 40 is fitted to item 10. Use process G only if light cleaning fails to remove contamination. Process G will damage silver plating, therefore it must be used with caution, i.e. short period immersion.
	90	Carrier, seal ring	A or B	G	-
	130	Elbow	A or B	G	-
	210	Tube	A or B	G	-
202	ALL except		A or B	-	-
	80	Tube	A or B	G	-
	150	Housing, seal	A or B	G	-
	230	Tube	A or B	G	-

Cleaning Processes  
Table 201 (Continued)

TN29352



OLYMPUS 593

MK.610-14-28  
OVERHAUL



FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
203	ALL		A or B	-	-
	except				
	150	Tube	A or B	G	-
	190	Elbow	A or B	G	-
	240	Tube	A or B	G	-
	400	Tube	A or B	G	-

Cleaning Processes  
Table 201 (Concluded)

PRINTED IN ENGLAND

TN29353

CLEANING  
**75-03-01**  
Page 203  
Aug 28/75



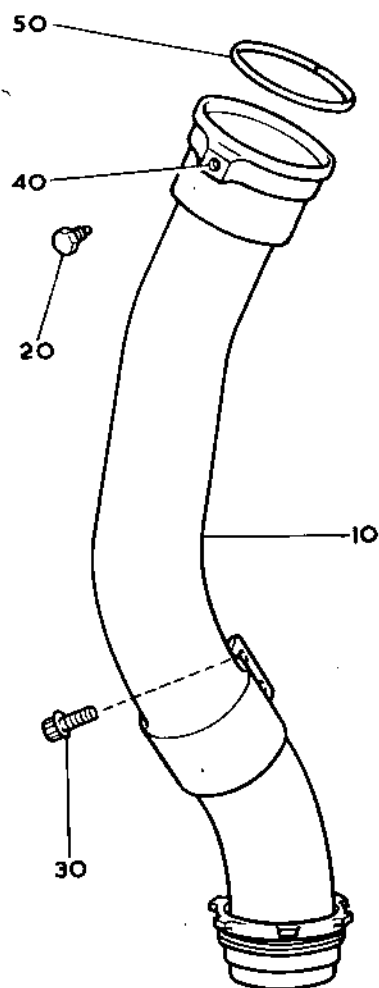
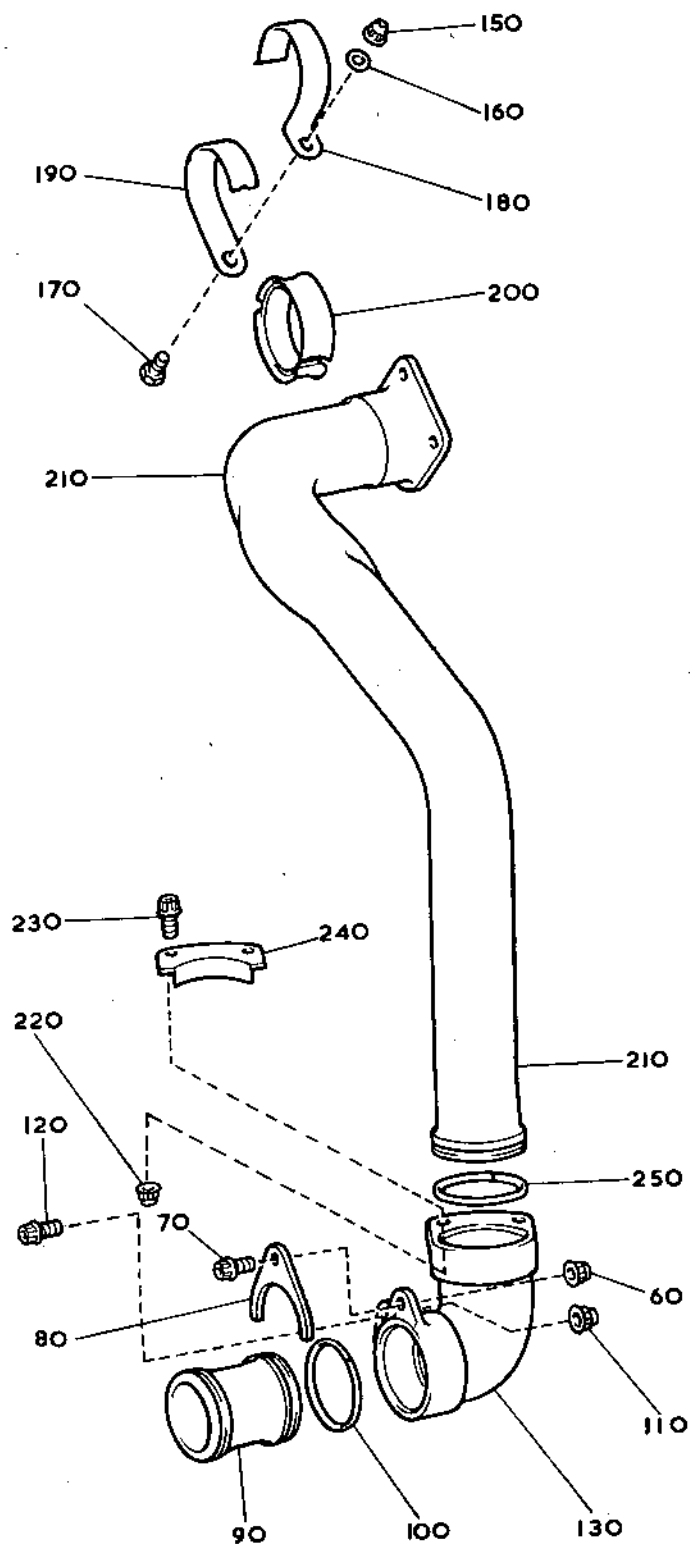
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 32368/00B



Tubes - Air, Fuel Heating, HP Compressor Diffuser  
Case to Overboard Cowling  
Figure 201

TN29354

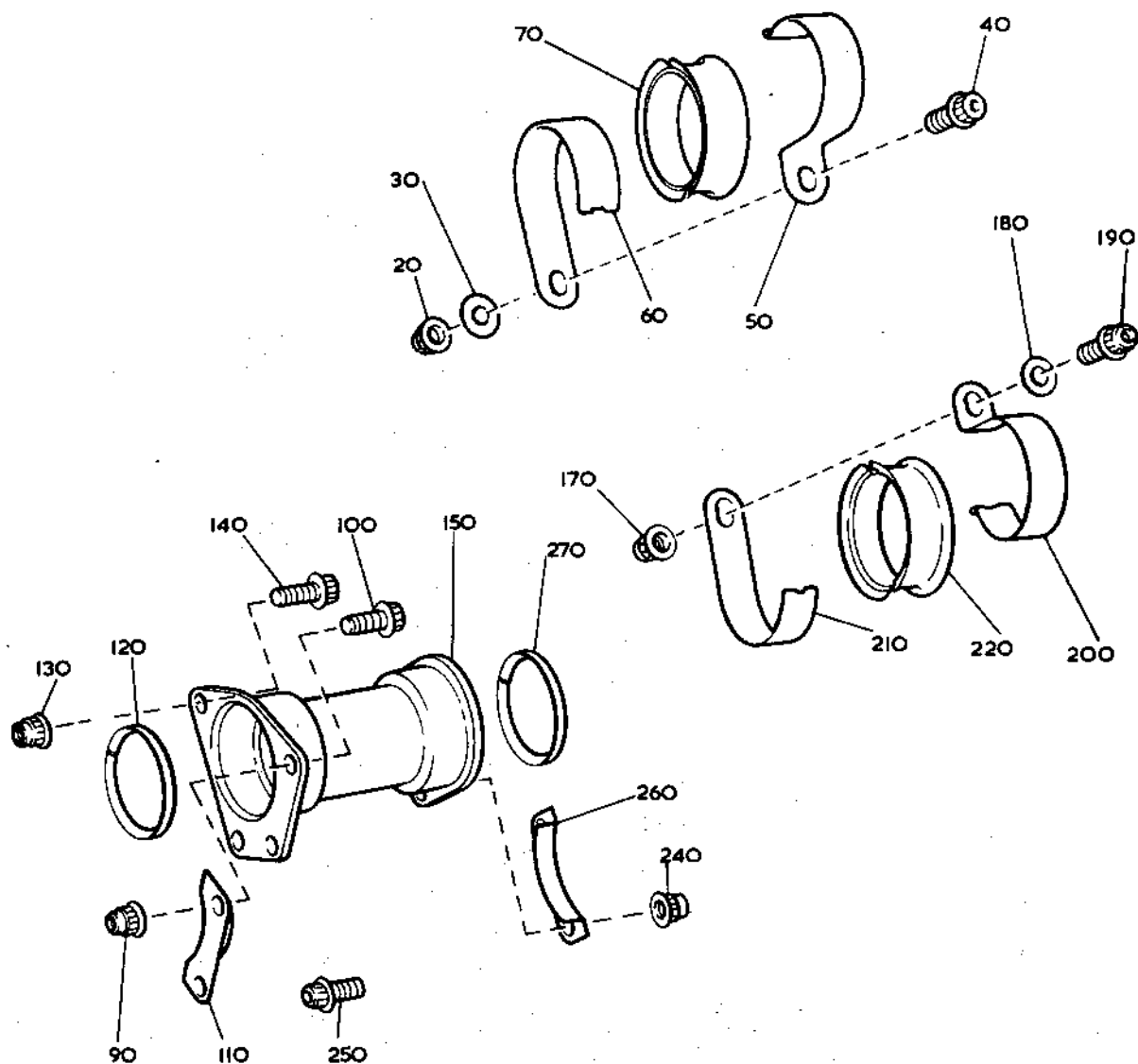
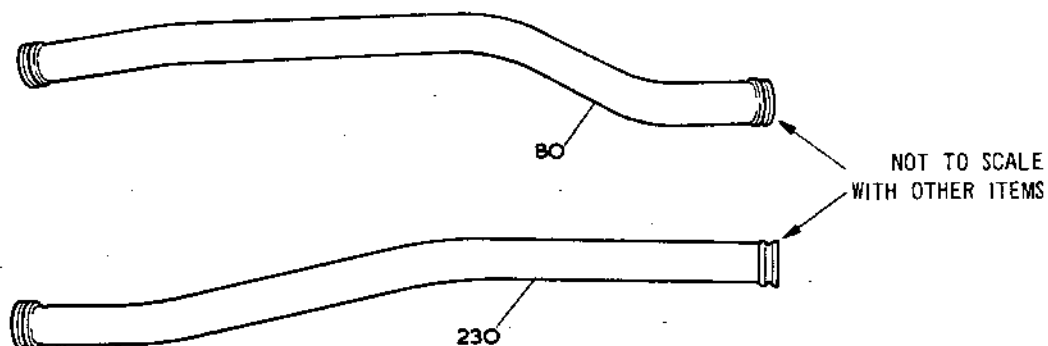
CLEANING  
**75-03-01**

Page 204  
Aug 28/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Tubes - Air, Fuel Heating, HP Compressor Diffuser  
Case to Overboard Cowling  
Figure 202



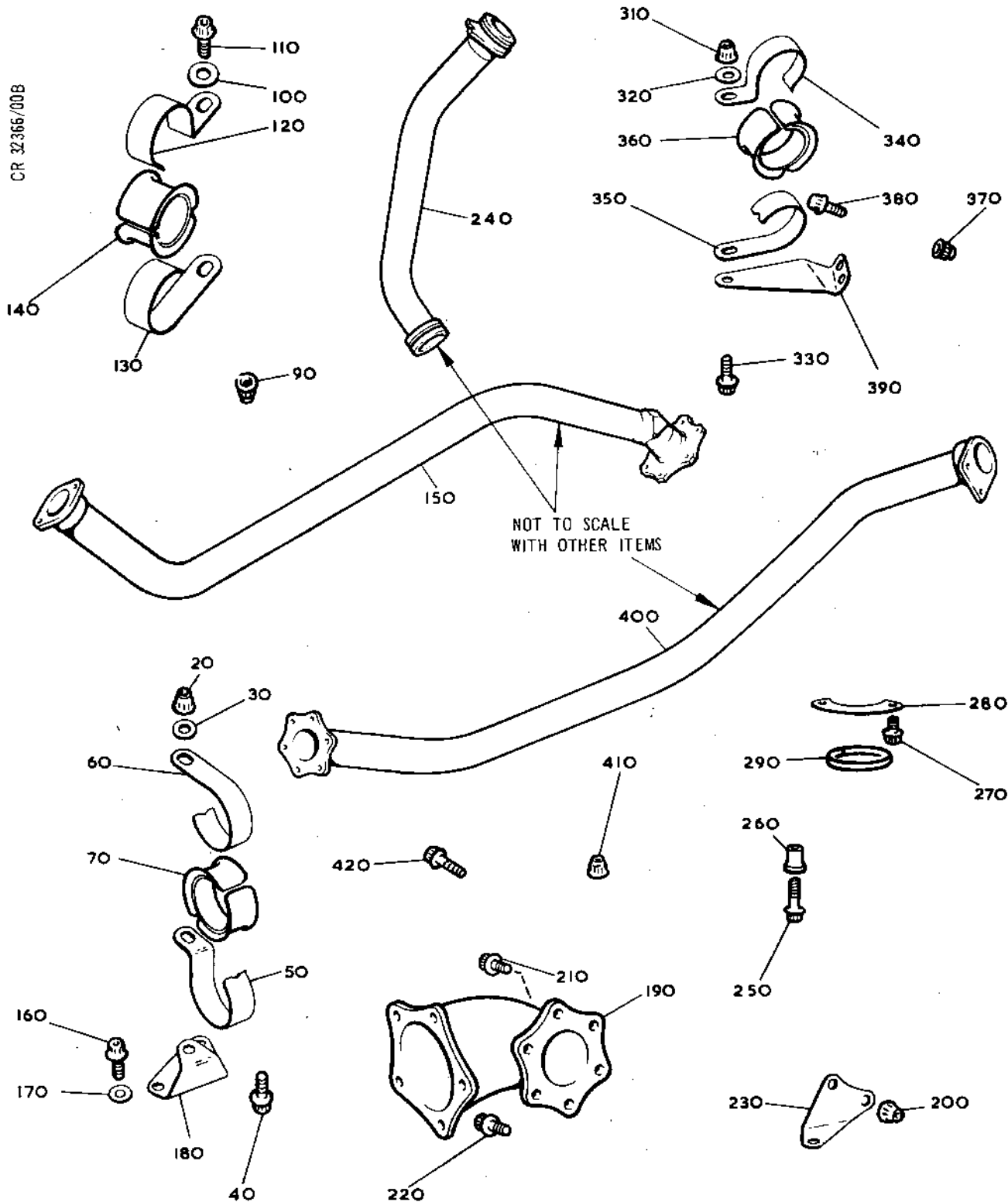


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32365/008



Tubes - Air, Fuel Heating, HP Compressor Diffuser  
Case to Overboard Cowling  
Figure 203

7N29357



OLYMPUS 593

MK.610-14-28

OVERHAUL



TUBES - HP COMPRESSOR DIFFUSER CASE TO OVERBOARD COWLING  
- REPAIR

TABLE OF CONTENTS

Repair No.	Title	Scheme No.
1	Repair of fretting/damage by inert gas arc welding.	B.514566
2	Repair of damaged and/or fretted areas	B.497468

PRINTED IN ENGLAND

REPAIR

75-03-01

Contents 1  
Jul 31/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBE A/O, AIR  
REPAIR OF FRETTING/DAMAGE BY INERT GAS ARC WELDING

REPAIR B.514566

1. EFFECTIVITY

IPC	Fig./Item	Part No.
75-03-01	01/010A	B.466601
	01/010A	B.466604
	01/210A	B.477491
	02/230A	B.482732
	02/230A	B.485241
	03/150A	B.482736
	03/400A	B.484446
	03/400A	B.485045

2. REPAIR LIMITATIONS

Refer to Overhaul Manual 72-09-29 Repair.

3. GENERAL

Refer to Overhaul Manual 72-09-29 Repair.

4. REPAIR PROCEDURE

REPAIR PROCEDURE

(1) Weld repair

(2) Mark SAL B.514566  
or R1 adjacent  
normal assy. of  
number using the  
electro-chemical  
marking or vibro-  
percussion engraving  
techniques.

SUPPLEMENTARY INFORMATION

Refer to Overhaul Manual  
72-09-29 Repair.

Refer to Overhaul Manual  
72-09-00 Repair.



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



5. MATERIAL

<u>COMPONENT</u>	<u>MATERIAL</u>	<u>RR CODE</u>
B.466601	BSEM 511	-
B.466604	MSRR 6524	EBS
B.477491	MSRR 6524	EBS
B.482732	MSRR 6524	EBS
B.485241	MSRR 6524	EBS
B.482736	MSRR 6524	EBS
B.484446	MSRR 6524	EBS
B.485045	MSRR 6524	EBS

6. DATA

PRESSURE TEST REQUIREMENTS:

TEST MEDIUM TO BE WATER

<u>PART NO.</u>	<u>PRESSURE TEST</u>	<u>MIN. GAUGE</u>
B.466601	240 lbf/sq.in. (1,66 MPa) for 15 sec.	0.031 (0,79)
B.466604	240 lbf/sq.in. (1,66 MPa) for 15 sec.	0.031 (0,79)
B.477491	360 lbf/sq.in. (2,48 MPa) for 1 min.	0.027 (0,69)
B.482732	360 lbf/sq.in. (2,48 MPa) for 1 min.	0.027 (0,69)
B.485241	360 lbf/sq.in. (2,48 MPa) for 1 min.	0.027 (0,69)
B.482736	360 lbf/sq.in. (2,48 MPa) for 1 min.	0.027 (0,69)
B.484446	NOT REQUIRED	0.027 (0,69)
B.485045	NOT REQUIRED	0.027 (0,69)

7. TOOLS

<u>TOOL NUMBER</u>	<u>DESCRIPTION</u>	<u>ITEM</u>
NONE.		

8. REPLACEMENT PARTS

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>ITEM</u>
NONE.			

REPAIR  
75-03-01  
Repair No.1  
Page 402  
Jun 1/92

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



TUBE A/O, AIR  
REPAIR OF DAMAGED AND/OR FRETTED AREAS

REPAIR B.4974681. EFFECTIVITY

<u>IPC</u>	<u>FIG/ITEM</u>	<u>PART NO.</u>
75-03-01	2/230A	B482732
	3/150A	B482736

2. REPAIR LIMITATIONS

Refer to Overhaul Manual 72-09-30 Repair.

3. GENERAL

Refer to Overhaul Manual 72-09-30 Repair.

4. REPAIR PROCEDUREREPAIR PROCEDURESUPPLEMENTARY INFORMATION

(1) Repair

Refer to Overhaul Manual  
72-09-30 Repair(2) Mark SAL B497468 or R2  
adjacent normal assy. of  
number using the electro-  
chemical marking technique.Refer to Overhaul Manual  
72-09-00 Repair5. MATERIAL

<u>COMPONENT</u>	<u>MATERIAL</u>	<u>RR CODE</u>
B482732	MSRR 6524	EBS
B482736	MSRR 6524	EBS

6. DATAPRESSURE TEST REQUIREMENTS:

<u>PART NUMBER</u>	<u>STANDARD PRESSURE TEST REQUIREMENT</u>	<u>COMMON PRESSURE TEST REQUIREMENT</u>
B482732	340 PSI FOR 1 MINUTE	USE 360 PSI FOR 1 MINUTE
B482736	340 PSI FOR 1 MINUTE	USE 360 PSI FOR 1 MINUTE

REPAIR

**75-03-01**

Repair No.2

Page 401

Jul 31/93



OLYMPUS 593

MK-610-14-28

OVERHAUL



7. TOOLS

<u>TOOL NUMBER</u>	<u>DESCRIPTION</u>	<u>ITEM</u>
NONE		

8. REPLACEMENT PARTS

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>ITEM</u>
<u>FOR TUBE B482732</u>			
B477362	SEAL CARRIER	A/R	1
B497487	TUBE JOINT	A/R	2
<u>FOR TUBE B482736</u>			
B482740	FLANGE	A/R	3
B482738	SEAL HOUSING	A/R	4
B497487	TUBE JOINT	A/R	5

REPAIR

75-03-01

Repair No.2

Page 402

Jul 31/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBES - CONNECTION ON DUCT (HP COMPRESSOR CASE TO DIFFUSER  
CASE LOWER) TO SPHERICAL JOINT FLANGE - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00  
Cleaning for details of the cleaning processes referred  
to in Table 201.
- B. To ensure that all items within this breakdown that  
require cleaning and subsequent Inspection/Check are  
recognized, and identified by their Part Number, figures  
are provided which equate with the Illustrated Parts  
Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with  
the relevant Figure and Item Number in the same breakdown  
in the I.P.C. Items illustrated in the I.P.C. which are  
not illustrated in this breakdown, are those items which  
are either discarded at overhaul, or are normally assembled  
to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the  
figures, Table 201 does not list all items, but deals  
collectively with the items requiring the same cleaning  
process.
- D. On receipt of the items from disassembly, all protective  
blanks, covers etc. deemed necessary for the protection  
of the items will have been assembled and, in addition,  
many of the items will arrive in containers. Any special  
containers, blanks, covers etc. are listed in Table 202  
by their Tool Ref. No. e.g. (Tool 123). For the  
manufacturer's Part No. refer to the appropriate Table in  
Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items  
prior to cleaning and reassembled immediately afterwards.  
Items received in special cleaning containers should  
remain therein during the cleaning procedures unless  
otherwise stated.
- B. All items contained in this breakdown must be cleaned by  
the appropriate processes quoted in the table, to achieve  
a cleanliness to enable the Inspection/Check to be carried  
out correctly. Where alternative processes are quoted,  
the operator must decide what process to use depending on  
the amount of contamination of the item. Any item that is  
not cleaned satisfactorily must be recleaned by the  
appropriate process.

CLEANING

75-03-02

Page 201  
Jan 1/77



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	G	-
202	ALL		A or B	G	-

Cleaning Processes  
Table 201

TN21446





# OLYMPUS 593

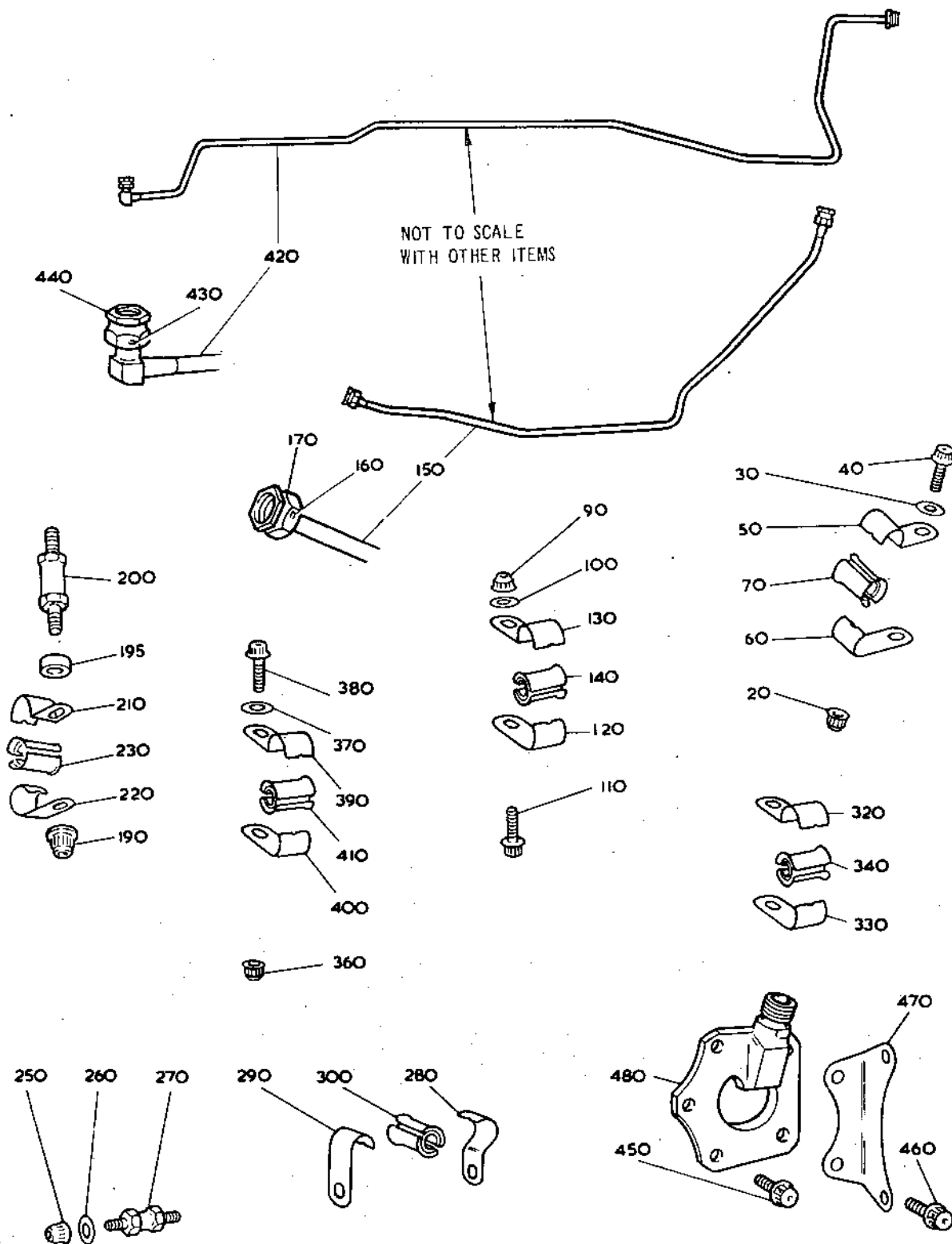
MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

CR 32365/00B



Tubes, Air, Reheat Fuel Purging  
Figure 201

CLEANING  
**75-03-02**

Page 203  
Aug 28/75

TN11498

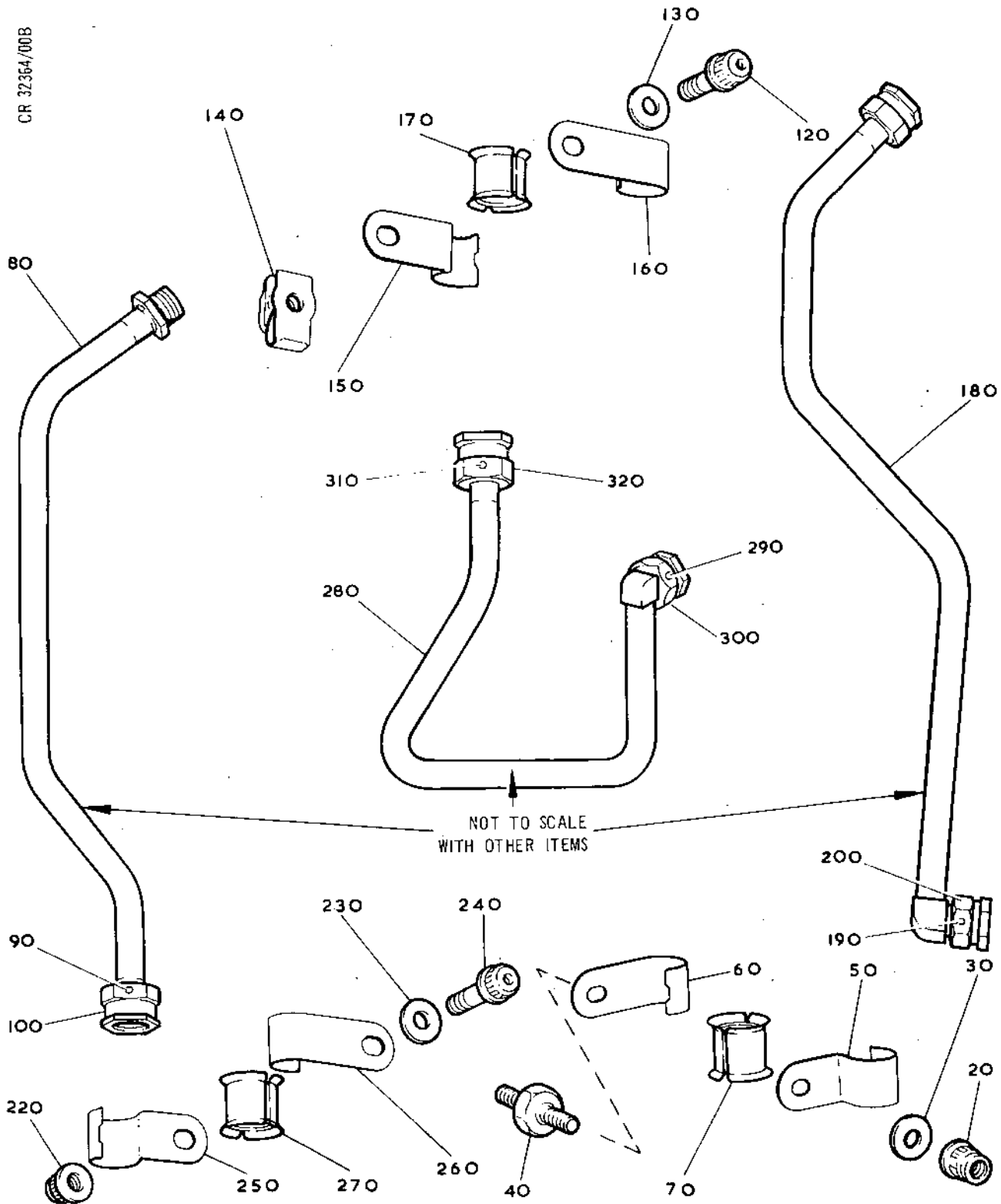


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32364/00B



Tubes, Air, Reheat Fuel Purging  
Figure 202

CLEANING  
**75-03-02**  
Page 204  
Aug 28/75

TN2365



OLYMPUS 593

MK.610-14-28

OVERHAUL



TUBES - CONNECTION ON DUCT (HP COMPRESSOR  
CASE TO DIFFUSER CASE LOWER) TO SPHERICAL  
JOINT FLANGE - REPAIR

TABLE OF CONTENTS

Repair No.

Title

Scheme No.

1

Repair of damaged and/or fretted  
areas

B.497468

PRINTED IN ENGLAND

REPAIR

75-03-02

Contents 1

Jul 31/93



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



TUBE A/O, AIR  
REPAIR OF DAMAGED AND/OR FRETTED AREAS

REPAIR B.497468

1. EFFECTIVITY

<u>IPC</u>	<u>FIG/ITEM</u>	<u>PART NO.</u>
75-03-02	1/150A	B481956

2. REPAIR LIMITATIONS

Refer to Overhaul Manual 72-09-30 Repair.

3. GENERAL

Refer to Overhaul Manual 72-09-30 Repair.

4. REPAIR PROCEDURE

REPAIR PROCEDURE

(1) Repair

(2) Mark SAL B497468 or R1  
adjacent normal assy. of  
number using the electro-  
chemical marking technique.

SUPPLEMENTARY INFORMATION

Refer to Overhaul Manual  
72-09-30 Repair

Refer to Overhaul Manual  
72-09-00 Repair

5. MATERIAL

<u>COMPONENT</u>	<u>MATERIAL</u>	<u>RR CODE</u>
B481956	MSRR 6524	EBS

6. DATA

PRESSURE TEST REQUIREMENTS:

<u>PART NUMBER</u>	<u>STANDARD PRESSURE TEST REQUIREMENT</u>	<u>COMMON PRESSURE TEST REQUIREMENT</u>
B481956	300 PSI FOR 1 MINUTE	USE 360 PSI FOR 1 MINUTE

PRINTED IN ENGLAND

REPAIR  
**75-03-02**  
Repair No.1  
Page 401  
Jul 31/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



7. TOOLS

<u>TOOL NUMBER</u>	<u>DESCRIPTION</u>	<u>ITEM</u>
NONE		

8. REPLACEMENT PARTS

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>ITEM</u>
B427861	UNION NUT	A/R	1
B427856	FERRULE	A/R	2
B481958	FERRULE	A/R	3
AS15777	THRUST - TUBE AND HOSE COUPLING NUT WIRE	A/R	4
AS15701	UNION - TUBE AND HOSE COUPLING NUT	A/R	5
B445301	TUBE JOINT	A/R	6

REPAIR

75-03-02

Repair No.1

Page 402

Jul 31/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBES - INTERMEDIATE CASE ELBOW DUCT TO SECOND STAGE  
PUMP - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00  
Cleaning for details of the cleaning processes referred  
to in Table 201.
- B. To ensure that all items within this breakdown that  
require cleaning and subsequent Inspection/Check are  
recognized, and identified by their Part Number, figures  
are provided which equate with the Illustrated Parts  
Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with  
the relevant Figure and Item Number in the same breakdown  
in the I.P.C. Items illustrated in the I.P.C. which are  
not illustrated in this breakdown, are those items which  
are either discarded at overhaul, or are normally assembled  
to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the  
figures, Table 201 does not list all items, but deals  
collectively with the items requiring the same cleaning  
process.
- D. On receipt of the items from disassembly, all protective  
blanks, covers etc. deemed necessary for the protection  
of the items will have been assembled and, in addition,  
many of the items will arrive in containers. Any special  
containers, blanks, covers etc. are listed in Table 202  
by their Tool Ref. No. e.g. (Tool 123). For the  
manufacturer's Part No. refer to the appropriate Table in  
Special Tools Fixtures and Equipment Section.

2. Cleaning Components

CAUTION: BEFORE USING HEAVY CLEANING PROCESSES J, L AND N,  
INVESTIGATE ALL REPAIRS CARRIED OUT ON EACH COM-  
PONENT TO IDENTIFY THOSE HAVING PLASMA SPRAY  
COATINGS. THE NITRIC ACID USED IN PROCESSES J, L  
AND N WILL ATTACK THE ALUMINIUM CONTENT OF SOME  
TYPES OF COATING, MAKING REPLACEMENT OF THE COATING  
NECESSARY.

- A. All blanks, covers etc. must be removed from the items  
prior to cleaning and reassembled immediately afterwards.  
Items received in special cleaning containers should  
remain therein during the cleaning procedures unless  
otherwise stated.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.
- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	-
	except				
	10	Duct	A or B	J	-
	100	Duct	A or B	J	-

Cleaning Processes  
Table 201

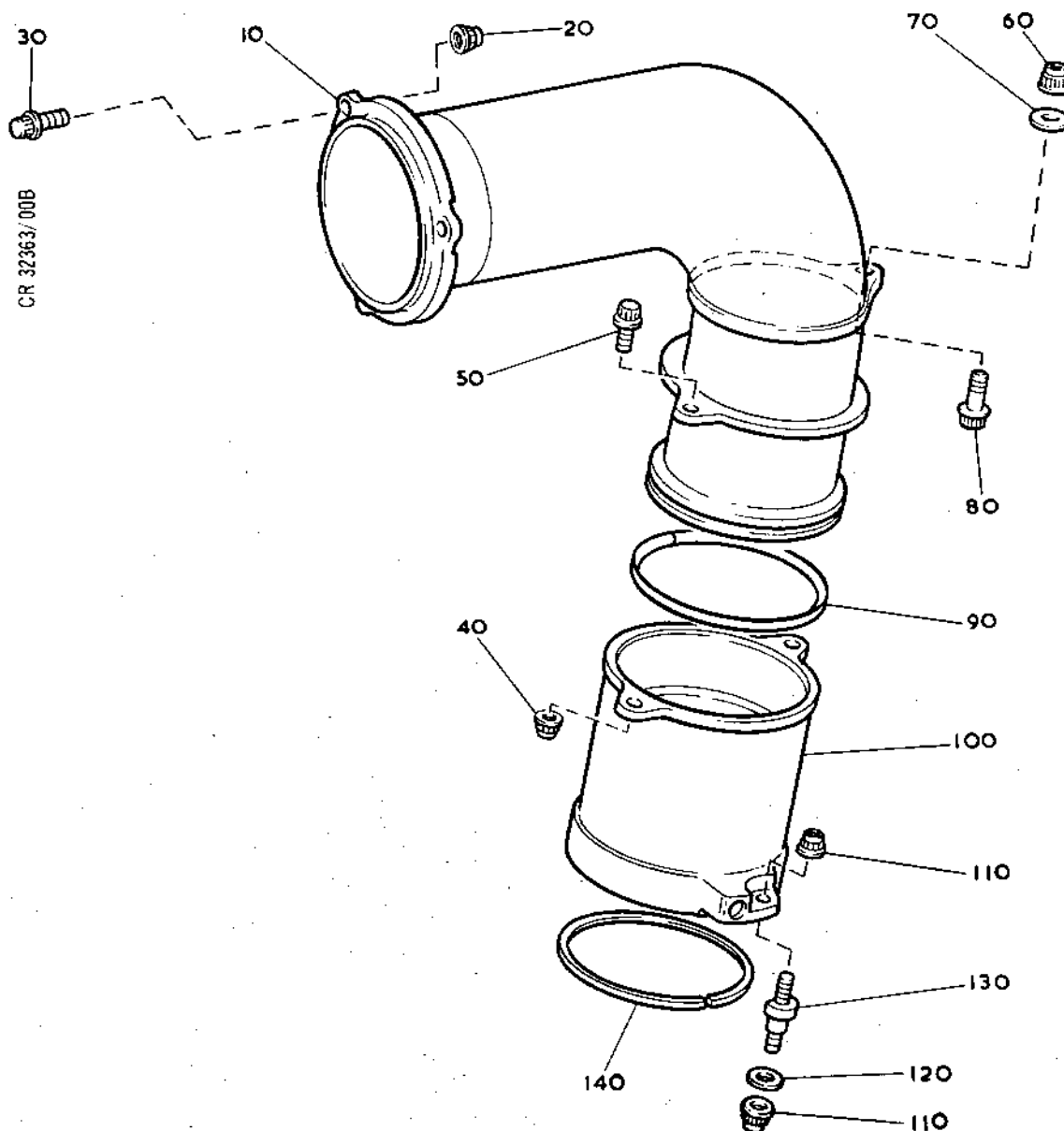


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



Tubes - Air, Intermediate Case  
Elbow Duct to 2nd Stage Turbo Pump  
Figure 201

CLEANING  
**75-05-01**

Page 203  
Aug 28/75

TN28962





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



TUBES - CONNECTION ON HP COMPRESSOR CASE TO ADAPTERS  
(GEARBOX SEALS) - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g.(Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

75-05-02

Page 201  
Jan 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except		A or B	-	-
	90	Tube	A or B	G	Use process G only if light cleaning fails to remove contamination. Process G will damage silver plating, therefore it must be used with caution, i.e. short period immersion.
	250	Tube	A or B	G	
	390	Tube	A or B	G	

Cleaning Processes  
Table 201

TN20862



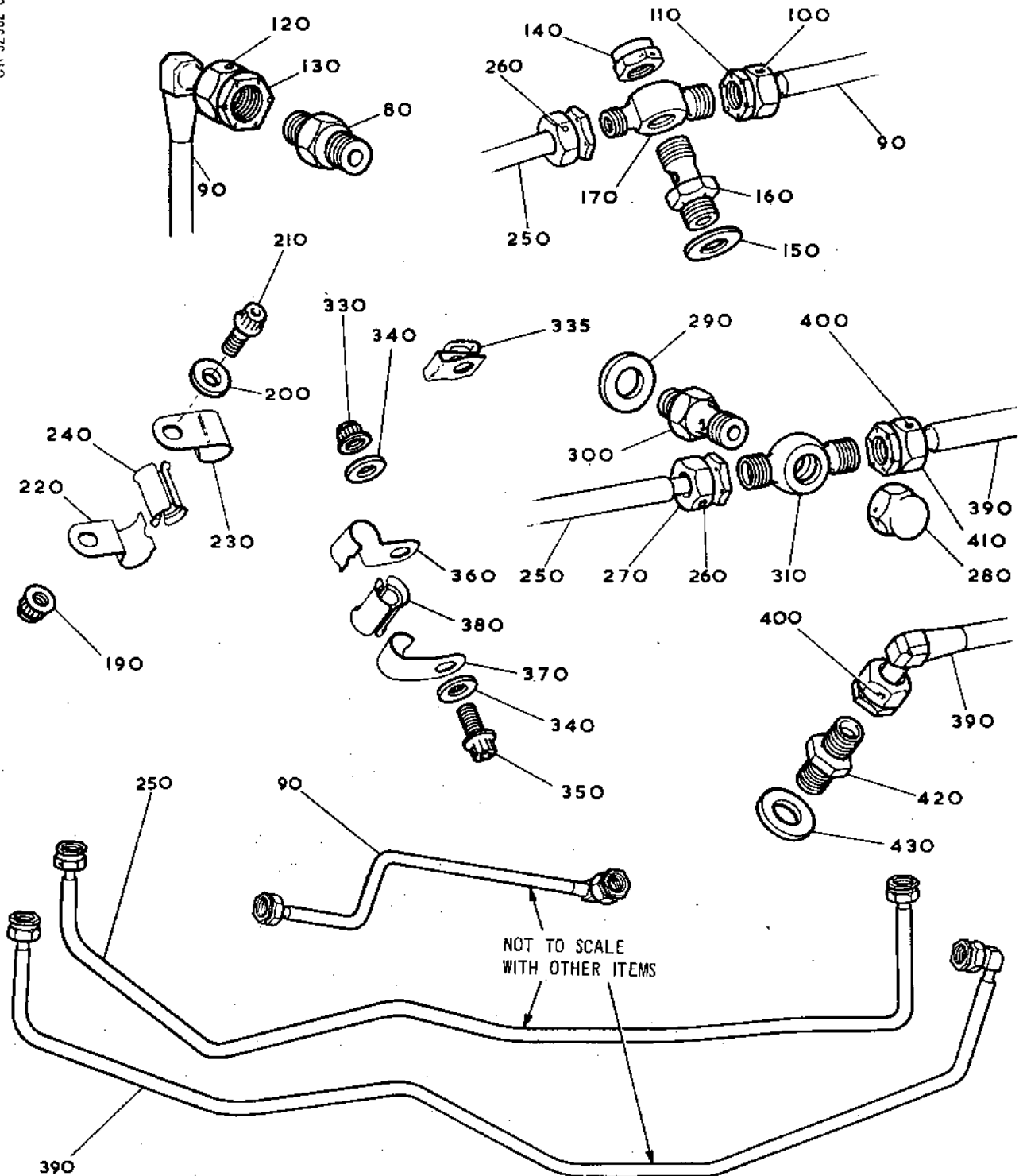
# OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32362 00B

PRINTED IN ENGLAND



Tubes - Air Pressurising, Connection on HP Compressor  
Case to Adapters  
Figure 201

CLEANING  
**75-05-02**

Page 203  
Aug 28/75

TN20864



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



TUBES - CONNECTION ON HP COMPRESSOR CASE TO ADAPTERS  
(GEARBOX SEALS) - REPAIR

TABLE OF CONTENTS

Repair No.	Title	Scheme No.
1	Repair of fretting/damage by inert gas arc welding.	B514566

PRINTED IN ENGLAND

REPAIR  
**75-05-02**  
Contents 1  
Jun 1/92

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

TUBE A/O, AIR  
REPAIR OF FRETTING/DAMAGE BY INERT GAS ARC WELDING

REPAIR B.5145661. EFFECTIVITY

IPC	Fig./Item	Part No.
75-05-02	01/250A	B.479695
	01/390A	B.479696

2. REPAIR LIMITATIONS

Refer to Overhaul Manual 72-09-29 Repair.

3. GENERAL

Refer to Overhaul Manual 72-09-29 Repair.

4. REPAIR PROCEDUREREPAIR PROCEDURE

(1) Weld repair

SUPPLEMENTARY INFORMATIONRefer to Overhaul Manual  
72-09-29 Repair.(2) Mark SAL B.514566  
or R1 adjacent  
normal assy. of  
number using the  
electro-chemical  
marking or vibro-  
percussion engraving  
techniques.Refer to Overhaul Manual  
72-09-00 Repair.5. MATERIAL

<u>COMPONENT</u>	<u>MATERIAL</u>	<u>RR CODE</u>
B.479695	MSRR 6524	EBS
B.479696	MSRR 6524	EBS

REPAIR  
**75-05-02**  
Repair No.1  
Page 401  
Jun 1/92



OLYMPUS 593

MK.610-14-28

OVERHAUL



6. DATA

PRESSURE TEST REQUIREMENTS:

<u>PART NO.</u>	<u>PRESSURE TEST</u>	<u>MIN. GAUGE</u>
B.479695	NOT REQUIRED	0.027 (0,69)
B.479696	NOT REQUIRED	0.027 (0,69)

7. TOOLS

<u>TOOL NUMBER</u>	<u>DESCRIPTION</u>	<u>ITEM</u>
NONE.		

8. REPLACEMENT PARTS

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>ITEM</u>
NONE.			

REPAIR

75-05-02

Repair No.1

Page 402

Jun 1/92



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBE - CONNECTION ON TUBE (HP COMPRESSOR CASE TO DIFFUSER  
CASE LOWER) TO AIRCRAFT CONNECTION - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

PRINTED IN ENGLAND

TN28963



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except 80	Tube	A or B	-	-
			A or B	G	Use process G only if light cleaning fails to remove contamination. Process G will damage silver plating therefore it must be used with caution, i.e. short period immersion.

Cleaning Processes  
Table 201

TN29340

CLEANING  
**75-05-03**  
Page 202  
Jan 1/77





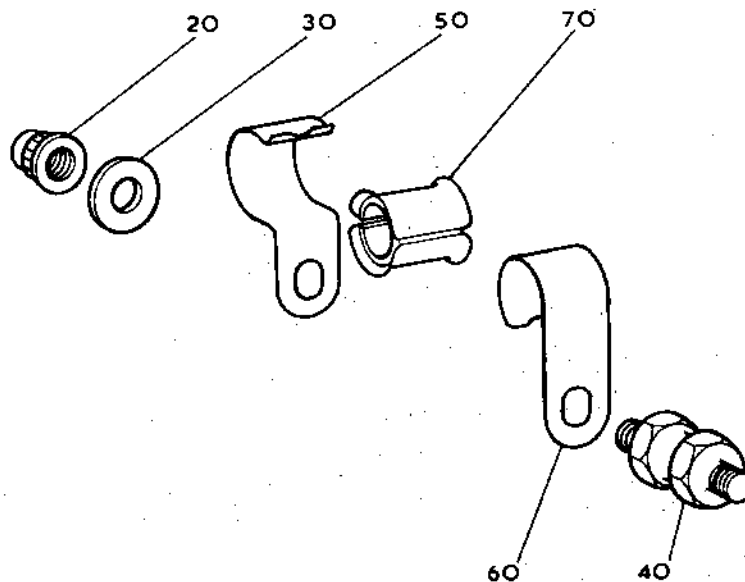
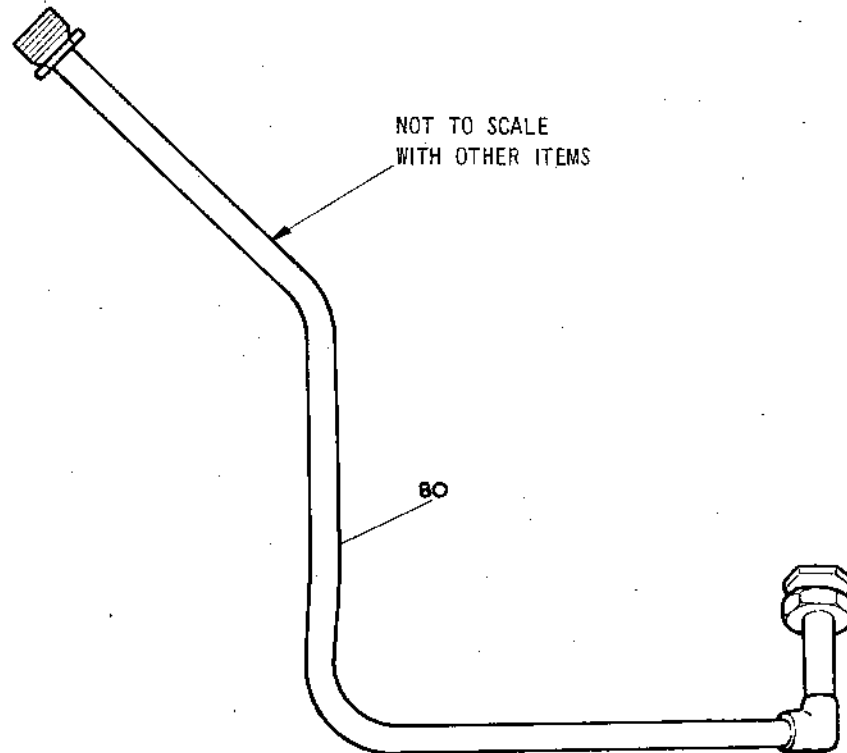
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32351/00B



Tube - Air, Connection on Duct  
(HP Compressor) Case to HP Compressor  
Diffuser Case (Lower) to Aircraft Connection  
Figure 201

TN29342



OLYMPUS 593

MK.610-14-28

OVERHAUL

ENGINE ANTI-ICING TUBES AND MANIFOLD - INSPECTION/CHECKTABLE OF CONTENTS

Para.		Page
1.	General ... ..	301
2.	General Inspection ... ..	301
3.	Crack Detection... ..	301
	A. Magnetic Particle Crack Detection ... ..	301
	B. Fluorescent Dye Crack Detection ... ..	302
4.	Ducts ... ..	304
	A. Inspect Threaded Components ... ..	304
	B. Inspect Ducts ... ..	304
	C. Inspect External Diameters of Sealing Ring Locations... ..	304
	D. Inspect Bore at Sealing Ring Locations ... ..	304
	E. Inspect Air Inlet Mounting Flanges ... ..	305
	F. Inspect Retaining Plate Location ... ..	305
5.	Retainer ... ..	305
	A. Inspect Retainer ... ..	305
6.	Connector Assembly ... ..	305
	A. Inspect Thread Inserts ... ..	305
	B. Inspect Attachment Flanges ... ..	306
7.	Elbow Assembly ... ..	306
	A. Inspect Tube... ..	306
	B. Inspect Attachment Flanges ... ..	306
8.	Sediment Strainer Assembly ... ..	306
	A. Inspect Attachment Flanges ... ..	306
	B. Inspect Strainer ... ..	307
9.	Tubes ... ..	307
	A. Inspect Tubes. ... ..	307
	B. Inspect External Diameters of Sealing Ring Locations... ..	307
	C. Inspect Bore of Sealing Ring Locations ... ..	307
	D. Inspect Retaining Plate Locations ... ..	307
	E. Inspect Abutment Flanges.. ... ..	308
10.	Brackets ... ..	308
	A. Inspect Brackets ... ..	308
11.	Air Pressure Control Valve ... ..	309
	A. Inspect in Accordance with Vendors Overhaul Manual ... ..	309
12.	Anti-Icing Pressure Switch ... ..	309
	A. Inspect in Accordance with Vendors Overhaul Manual ... ..	309

PRINTED IN ENGLAND

TN45062

INSPECTION/CHECK

**75-10-00**

Contents 1

Jun 1/76

**OLYMPUS 593**

MK.610-14-28

OVERHAUL

TABLE OF ILLUSTRATIONS

Fig.No.		Page
301	Crack Detection Test Diagram ... ..	303
302	Engine Anti-Icing Manifold ... ..	310
303	Engine Anti-Icing Manifold ... ..	311
304	Engine Anti-Icing Tubes ... ..	312
305	Engine Anti-Icing Tubes ... ..	313
306	Engine Anti-Icing Air Pressure Control Valve ...	314

LIST OF TABLES

Table No.		Page
301	Items to be Magnetic Particle Crack Tested.. ...	302
302	Items to be Fluorescent Dye Crack Tested ... ..	302
303	Cross References to Illustrated Parts Catalogue... ..	304

TN4393

INSPECTION/CHECK

**75-10-00**

Contents 2

Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



ENGINE ANTI-ICING TUBES AND MANIFOLD - INSPECTION/CHECK

1. General

- A. Each item in this chapter is given a two-part identification; thus, 302-20 refers to Figure 302 and to Item 20 called out on that figure. Each item may be further identified by its Part Number by the use of Table 303, which cross-refers figures in this chapter to the equivalent chapter and figure in the Illustrated Parts Catalogue (I.P.C.); the called-out item number will be the same on both figures.
- B. All items which will be crack tested are listed in Tables 301 and 302.
- C. Dimensional checks are cross referenced to the equivalent Fits and Clearances Schedule (F.C.S.) chapter against the item concerned.
- D. When the inspection of an item discloses a minor defect that requires rectification, it is defined as 'Accept after repair'. On all such occasions the item must be rectified in accordance with Standard Practices 72-09-22 Repair. Where a Ref.No. follows 'Accept after repair' e.g. (Ref.72-21-01 Repair No.1), a specific Repair Scheme is available to which the item must be rectified. Items that are rejected, or for which a repair scheme is not currently available, should be held at the discretion of the operator, as service experience may prove the need for a repair.
- E. On completion of a repair, rectification or test, the item(s) must be inspected, to ensure that the necessary work has been satisfactorily completed.

2. General Inspection

- A. Inspect all items illustrated in this chapter, whether specified or not, in accordance with Standard Practices (Ref.72-09-00 Inspection/Check). In addition, carry out the inspections detailed for the specified items, from para.4 onwards.
- B. Inspection terms used in this chapter are explained in Standard Practices (Ref.72-09-00 Inspection/Check).

3. Crack Detection

A. Magnetic Particle Crack Detection.

- (1) Submit the items listed in Table 301 to crack detection in accordance with the process quoted.

INSPECTION/CHECK

**75-10-00**

Page 301

Apr 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Items to be crack detected by this method are illustrated in the Crack Detection Test Diagram (Fig.301). For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

No current requirement

Items to be Magnetic Particle Crack Tested  
Table 301

B. Fluorescent Dye Crack Detection.

- (1) Submit the items listed in Table 302 to crack detection in accordance with the process quoted. For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
302	10	Duct	FlA
302	80	Duct	FlA
303	10	Duct	FlA
303	70	Duct	FlA
303	150	Duct	FlA
303	200	Connector	FlA
304	10	Elbow	FlA
304	160	Tube	FlA
305	110	Tube	FlA
305	220	Tube	FlA

Items to be Fluorescent Dye Crack Tested  
Table 302

INSPECTION/CHECK

75-10-00

Page 302

Jun 1/76

TN7817

PRINTED IN ENGLAND



OLYMPUS 593

MK.610-14-28  
OVERHAUL



No Current Requirement

Crack Detection Test Diagram  
Figure 301

INSPECTION/CHECK

**75-10-00**

Page 303

Jun 1/76



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



FIG.NO.

ILLUSTRATED PARTS CATALOGUE EQUIVALENT

301	Not applicable	
302	75-11-01	Fig.1
303	75-11-01	Fig.2
304	75-11-02	Fig.1
305	75-11-02	Fig.2
306	75-12-01	Fig.1

Cross Reference to Illustrated Parts Catalogue  
Table 303

4. Ducts (302-10/80, 303-10/70/150)

- A. Inspect Threaded Components (Ref.72-09-00, Inspection/Check).
- B. Inspect Ducts (Ref.72-09-00, Inspection/Check Rigid Tubes).
- C. Inspect External Diameters of Sealing Ring Locations.

(1) Fretting.

- (a) Not more than 0.010 in.  
(0,250 mm) deep. Accept after  
repair.

(2) Scoring.

- (a) Not more than 0.010 in.  
(0,250 mm) deep. Accept after  
repair.

D. Inspect Bore at Sealing Ring Locations.

(1) Fretting.

- (a) Not more than 0.005 in.  
(0,130 mm) deep. Accept after  
repair.

(2) Scoring.

- (a) Not more than 0.005 in.  
(0,130 mm) deep and not  
extending right across  
the face. Accept after  
repair.

IN8484

INSPECTION/CHECK

75-10-00

Page 304  
Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



E. Inspect Air Inlet Mounting Flanges.

- |  |  |
|--|--|
| (1) Nicks and burrs.   | Accept after repair providing sealing capabilities are unimpaired. |
| (2) Scoring.   | Accept after repair providing sealing capabilities are unimpaired. |
| (3) Wear on abutment face.                                   | Accept if compatibility is preserved.                              |
| (4) Wear at bolt locations.                                  |  |
| (a) Bolt-holes elongated not more than 0.030 in. (0,760 mm). | Accept   |
| (b) Bolt-holes slightly worn.                                | Accept after repair.   |

F. Inspect Retaining Plate Location.

- |  |                      |
|--|----------------------|
| (1) Fretting and wear.                           |                      |
| (a) Thickness not reduced more than 15 per cent. | Accept after repair. |

5. Retainer (302-70/140, 303-50/120, 305-30/140)

A. Inspect Retainer.

- |  |                      |
|--|----------------------|
| (1) Wear and fretting.                                       |                      |
| (a) Thickness not reduced more than 15 per cent.             | Accept after repair. |
| (b) Bolt-holes elongated not more than 0.030 in. (0,760 mm). | Accept after repair. |

6. Connector Assembly (303-200)

A. Inspect Thread Inserts (Ref.72-09-00, Inspection/Check).

INSPECTION/CHECK

**75-10-00**

Page 305

Jun 1/76





OLYMPUS 593

MK.610-14-28

OVERHAUL



B. Inspect Attachment Flanges.

- |  |  |
|--|--|
| (1) Fretting and wear on abutment faces.                       | Accept after repair if compatability is preserved.                 |
| (2) Fretting and wear at bolt locations.                       |  |
| (a) Bolt holes elongated not more than 0.030 in. (0,760 mm)... | Accept after repair.   |
| (3) Nicks and burrs.   | Accept after repair providing sealing capabilities are unimpaired. |

7. Elbow Assembly (304-10)

A. Inspect Tube (Ref.72-09-00, Inspection/Check).

B. Inspect Attachment Flanges.

- |  |  |
|--|--|
| (1) Fretting and wear.   | Accept after repair if compatability is preserved.                 |
| (2) Fretting and wear at bolt locations.                       |  |
| (a) Bolt holes elongated not more than 0.030 in. (0,760 mm)... | Accept after repair.   |
| (3) Scoring.   | Accept after repair providing sealing capabilities are unimpaired. |

8. Sediment Strainer Assembly (304-30)

A. Inspect Attachment Flanges.

- |  |  |
|--|--|
| (1) Fretting and wear.   | Accept after repair if compatability is preserved. |
| (2) Fretting and wear at bolt locations.                       |  |
| (a) Bolt holes elongated not more than 0.030 in. (0,760 mm)... | Accept after repair.                               |

INSPECTION/CHECK

**75-10-00**

Page 306

Jun 1/76

TN36872



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



(3) Nicks, burrs and scores.

Accept after repair  
providing sealing  
capabilities are  
unimpaired.

B. Inspect Strainer.

(1) Any damage other than  
surface defects.

Reject.

9. Tubes (304-160, 305-110/220)

A. Inspect Tubes (Ref.72-09-00, Inspection/Check).

B. Inspect External Diameters of Sealing Ring Locations.

(1) Fretting.

(a) Not more than 0.010 in.  
(0,250 mm) deep.

Accept after  
repair.

(2) Scoring.

(a) Not more than 0.010 in.  
(0,250 mm) deep.

Accept after  
repair.

C. Inspect Bore of Sealing Ring Locations.

(1) Fretting.

(a) Not more than 0.005 in.  
(0.130 mm) deep.

Accept after  
repair.

(2) Scoring.

(a) Not more than 0.005 in.  
(0,130 mm) deep and not  
extending right across  
the face.

Accept after  
repair.

D. Inspect Retaining Plate Locations.

(1) Fretting and wear.

(a) Thickness reduced not  
more than 15 per cent.

Accept after  
repair.

PRINTED IN ENGLAND

TN40058

INSPECTION/CHECK

75-10-00

Page 307

Jun 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



E. Inspect Abutment Flanges.

- |  |  |
|--|--|
| (1) Nicks and burrs.   | Accept after repair providing sealing capabilities are unimpaired. |
| (2) Scoring.   | Accept after repair providing sealing capabilities are unimpaired. |
| (3) Wear on abutment face.                                   | Accept if compatability is preserved.                              |
| (4) Wear on bolt locations.                                  |  |
| (a) Bolt-holes elongated not more than 0.003 in. (0,080 mm). | Accept.  |
| (b) Bolt-holes slightly worn.                                | Accept after repair.   |

10. Brackets (303-180, 306-100/110)

A. Inspect Brackets.

- |   |                      |
|---|----------------------|
| (1) Wear and fretting.  |                      |
| (a) Attachment face thickness reduced not more than 5 per cent. | Accept.              |
| (b) Bolt-holes elongated not more than 0.030 in. (0,760 mm).    | Accept after repair. |
| (2) Nicks and burrs.  | Accept after repair. |

TN39900

INSPECTION/CHECK

75-10-00

Page 308

Jun 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



(3) Scoring.

- (a) Not more than 0.010 in. (0,250 mm) in depth. Accept after repair providing material thickness is not reduced by more than 5 per cent.

(4) Distortion.

Accept if compatibility is preserved.

11. Air Pressure Control Valve (306-10)

- A. Inspect in accordance with vendors Overhaul Manual (Ref.75-10-05).

PRINTED IN ENGLAND

TN40059

INSPECTION/CHECK

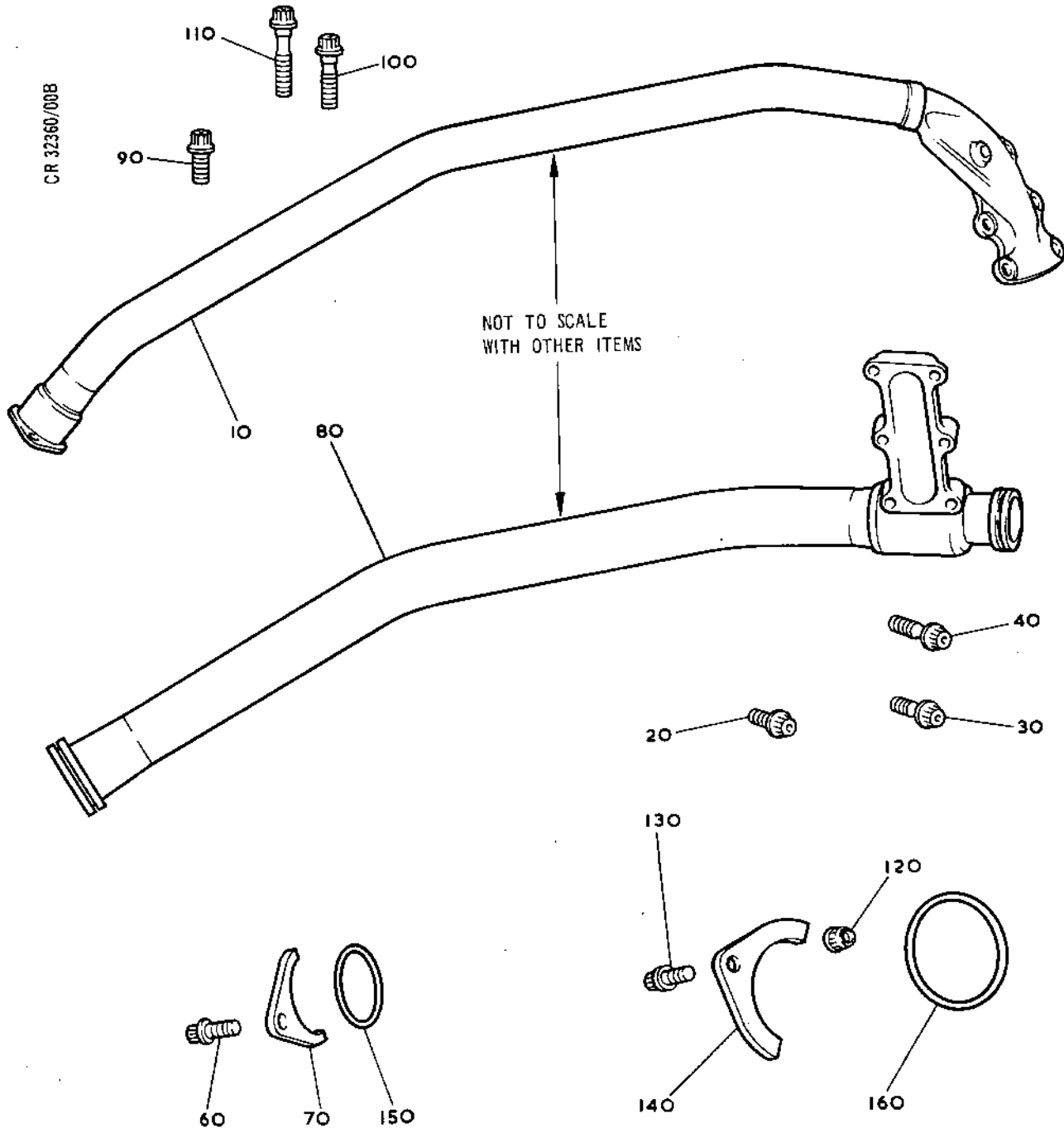
**75-10-00**

Page 309

Aug 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



TN40268

Engine Anti-Icing Manifold  
Figure 302

INSPECTION/CHECK

**75-10-00**

Page 310  
Aug 14/75

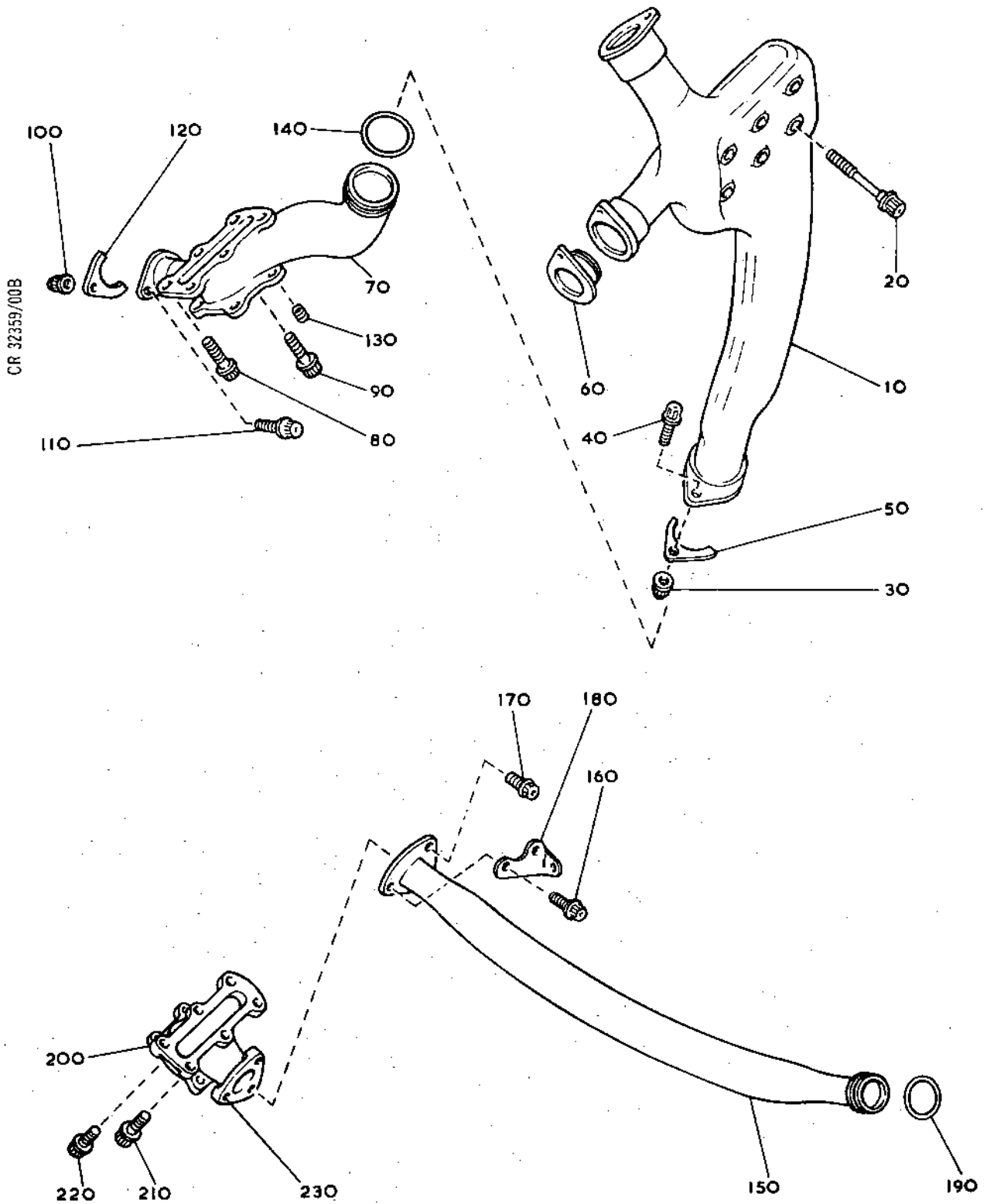


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



Engine Anti-Icing Manifold  
Figure 303

INSPECTION/CHECK

75-10-00

Page 311  
Aug 14/75

TN40826



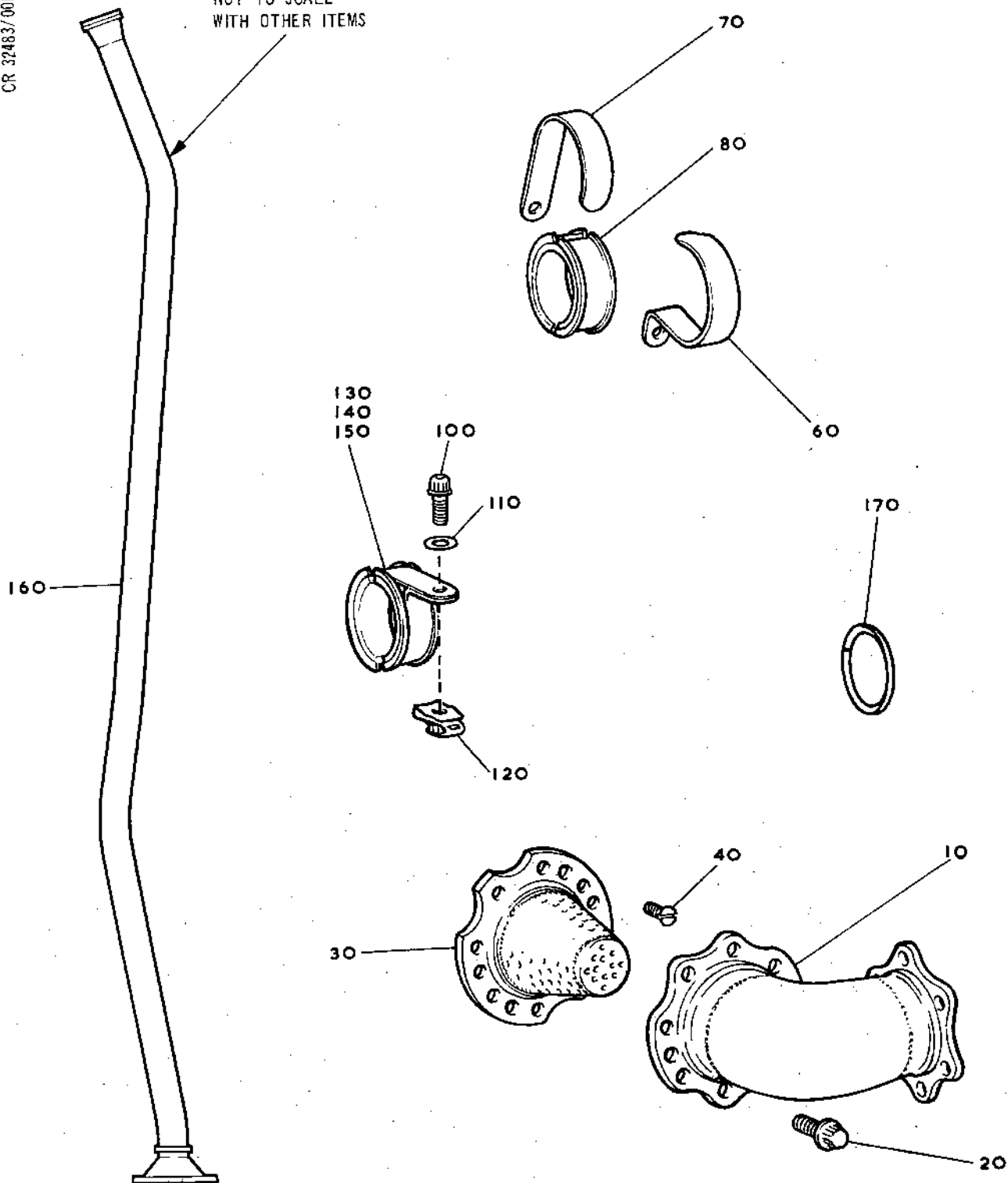
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32483/00B

NOT TO SCALE  
WITH OTHER ITEMS



Engine Anti-Icing Tubes  
Figure 304

INSPECTION/CHECK

75-10-00

Page 312  
Aug 14/75

TN40327



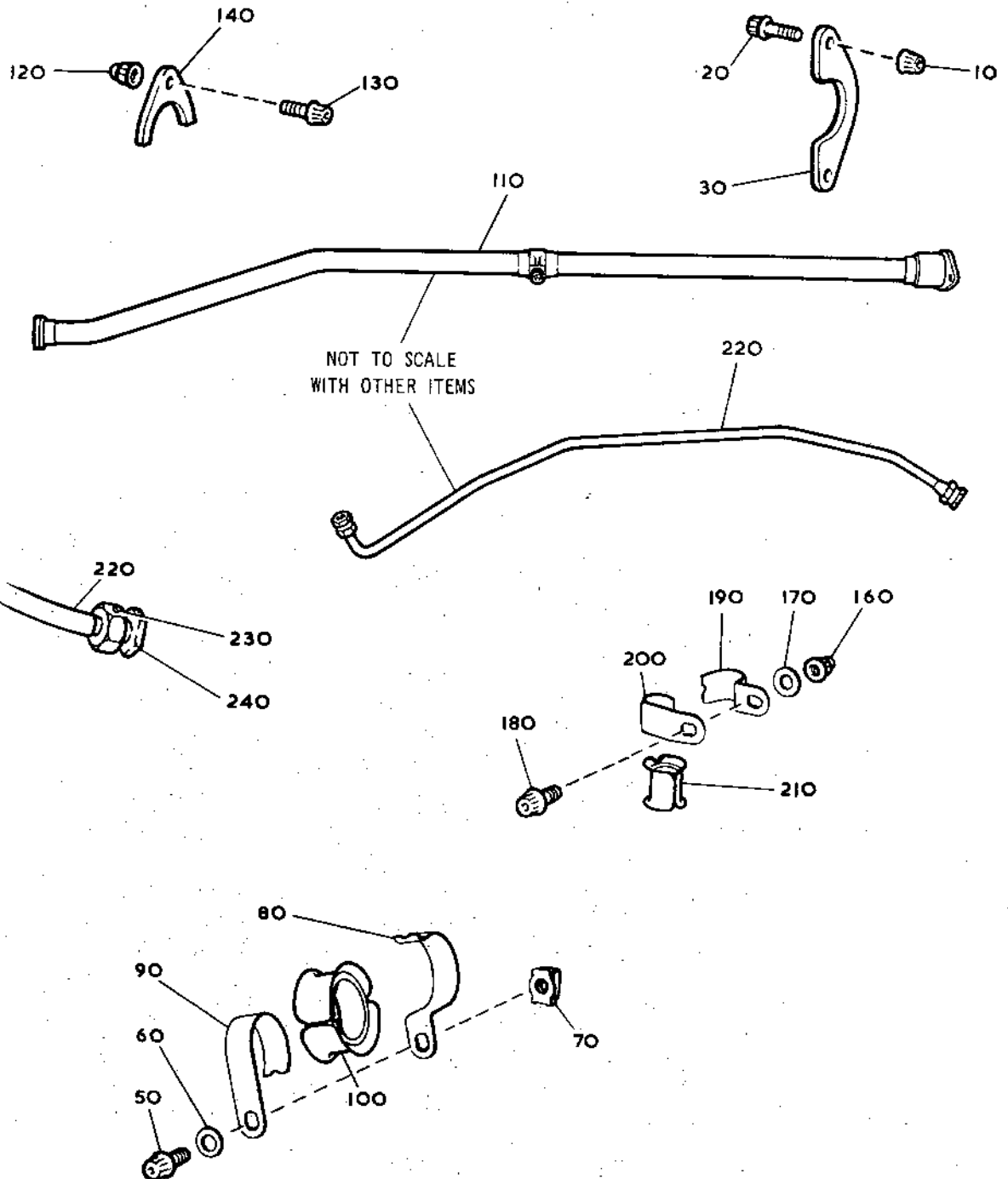
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32358, 00B

PRINTED IN ENGLAND



TN44929n

Engine Anti-Icing Tubes  
Figure 305

INSPECTION/CHECK

**75-10-00**

Page 313

Aug 14/75



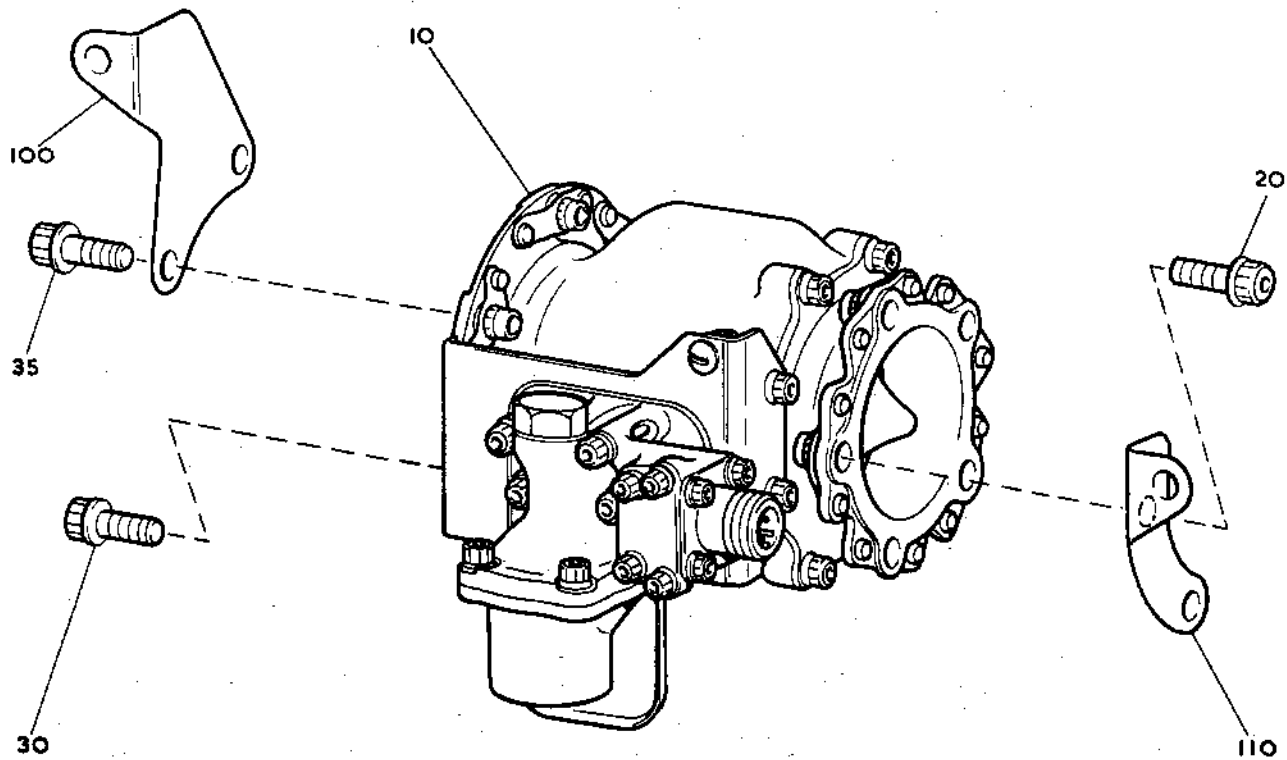


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32357/00B



TN45060

Engine Anti-Icing Air Pressure Control Valve  
Figure 306

INSPECTION/CHECK

**75-10-00**

Page 314

Aug 14/75



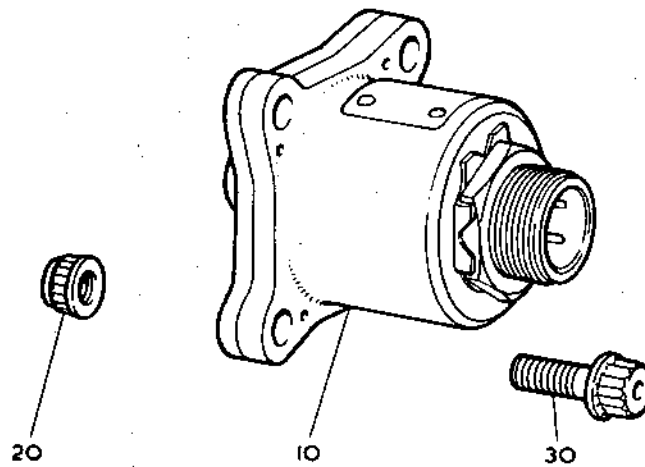
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32484/008



TN45061

Engine Anti-Icing Air Pressure Switch  
Figure 307

INSPECTION/CHECK

**75-10-00**

Page 315  
Aug 14/75



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



## ENGINE ANTI-ICING MANIFOLD - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

PRINTED IN ENGLAND

TN29358

CLEANING

**75-11-01**

Page 201  
Jan 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	-
202	ALL		A or B	-	-

Cleaning Processes  
Table 201

TN29359

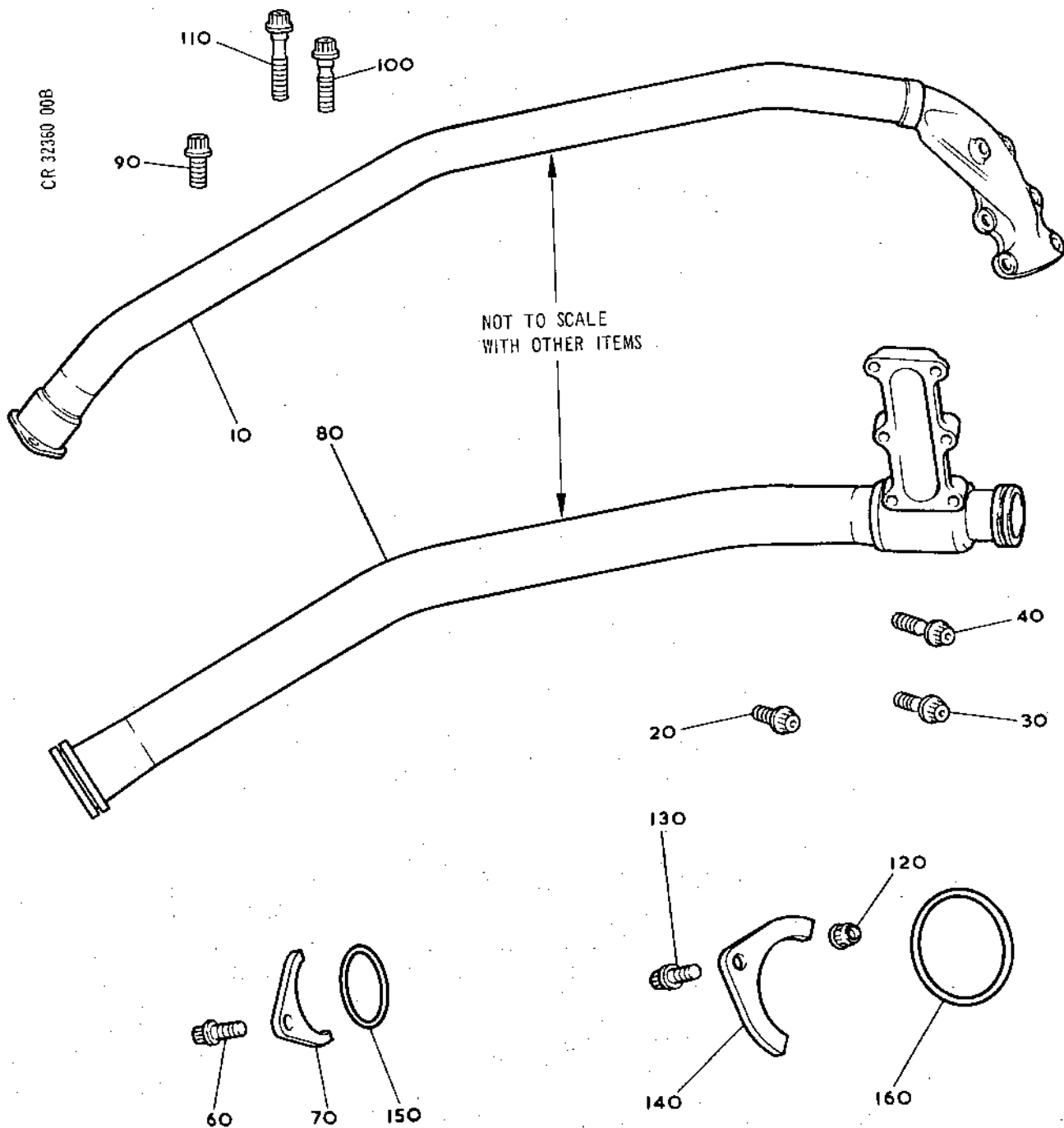


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



TN29386

Manifold, Engine Anti-icing  
Figure 201

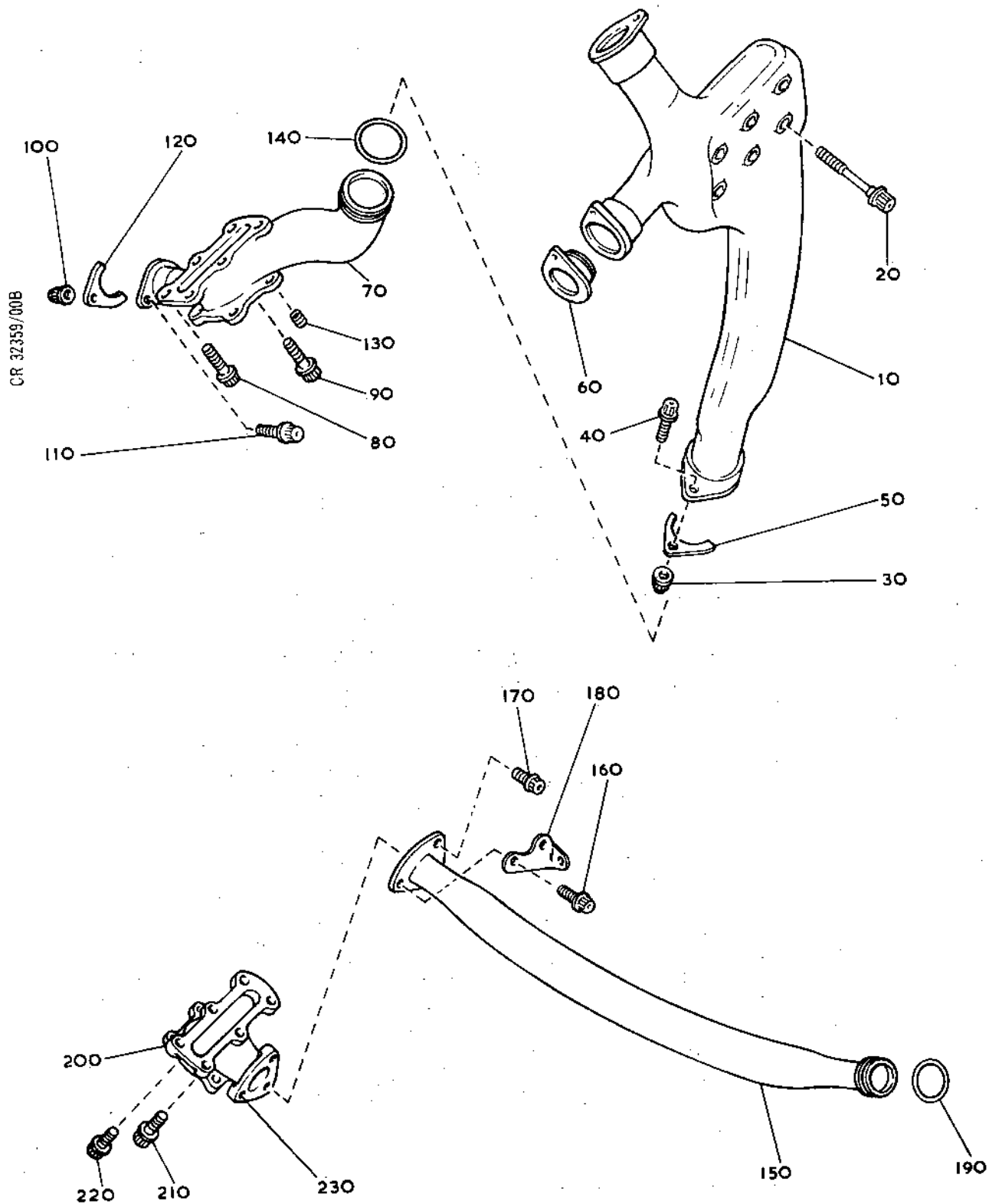
CLEANING  
**75-11-01**

Page 203  
Aug 28/75



OLYMPUS 593

MK. 610-14-28  
OVERHAUL



Manifold, Engine Anti-icing  
Figure 202

CLEANING

75-11-01

Page 204  
Aug 28/75

TN29387



OLYMPUS 593

MK.610-14-28  
OVERHAUL



ENGINE ANTI-ICING MANIFOLD - REPAIR

TABLE OF CONTENTS

Repair No.	Title	Scheme No.
1	Air Duct Assembly - Sleeve Bore Repaired by Plasma Spray	SAL.B.507088
2	Air Duct Assembly - Vane No.5 Repair of Fretted Housing Seal by Replacement	SAL.B.513620
3	Tube - Repair of fretting/damage by inert gas arc welding	SAL.B.514566

PRINTED IN ENGLAND

REPAIR  
75-11-01  
Contents 1  
Jun 1/92



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TABLE OF CONTENTS

Repair No.	Title	Scheme No.
1	Air Duct Assembly - Sleeve Bore Repaired by Plasma Spray	SAL.B.507088
2	Air Duct Assembly - Vane No.5 Repair of Fretted Housing Seal by Replacement	SAL.B.513620

PRINTED IN ENGLAND

REPAIR

75-11-01

Contents 1  
Apr 1/91





OLYMPUS 593

MK.610-14-28  
OVERHAUL

AIR DUCT ASSEMBLY - SLEEVE BORE REPAIRED  
BY PLASMA SPRAY

MODIFICATION No. OL.8888C

1. Effectivity

<u>I.P.C.</u>	<u>Fig./Item</u>	<u>Part No.</u>
75-11-01	2 135	B.455109 B.479535

2. Introduction

A. General.

- (1) This repair describes the procedure for restoring the worn bore of the air duct assembly sleeve by plasma spray.
- (2) Dimensions are shown thus: INCHES (MILLIMETRES) in tables and illustrations.
- (3) Refer to Chapter 72-09-00 Repair, for all standard practices applicable to this repair procedure.
- (4) Remove sharp edges 0.004 to 0.020 in. (0,10 to 0,51 mm) unless otherwise stated.
- (5) Tolerances on machined dimensions are plus/minus 0.010 in. (0,25 mm) unless otherwise stated.
- (6) Tolerances on all angles are plus/minus 2 degrees unless otherwise stated.
- (7) Surface texture is to be 125 micro-inches (3,2 micro-metres) unless otherwise stated.
- (8) All tools referred to by item number in procedural steps are detailed in para.4.
- (9) Protect the component against corrosion after each operation, and place in a container for protection against damage during transit between operations.

B. Repair Limitations.

- (1) Wear remaining in the bore after machining prior to plasma spray must not exceed 0.010 in. (0,25 mm) in depth.

REPAIR

75-11-01

Repair No.1

Page 401

Jun 1/99



OLYMPUS 593

MK.610-14-28  
OVERHAUL



### 3. Instructions

#### A. Machine.

- (1) Locate the sleeve on a grinding machine, and set true.
- (2) Grind the bore to achieve the 1.512/1.510 in. (38,40/38,35 mm) dimension. Refer to Repair Limitations in para.2.B(1), and Figure 401.
- (3) Remove burrs and sharp edges.

#### B. Inspect.

- (1) Inspect for the satisfactory completion of the machining operation.
- (2) Inspect for cracks using the fluorescent dye penetrant process F1A detailed in Chapter 72-09-00 Inspection/Check, or TSD 594 0P213.

#### C. Remove Corrosion.

NOTE: This operation applies to sleeve B.455109 only.

- (1) Remove any remaining corrosion as detailed in TSD 594 0P121.

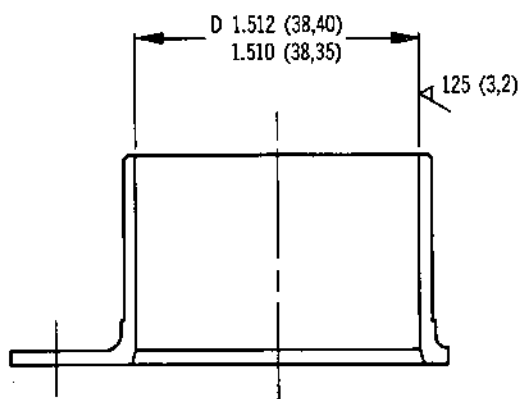
#### D. Plasma Spray.

- (1) Degrease the sleeve using vapour or liquid degreasing, as instructed in TSD 594 0P704.
- (2) Mask off the areas not to be sprayed, as instructed in TSD 594 0P704.
- (3) Dry abrasive blast the areas to be sprayed, as instructed in TSD 594 0P704.
- (4) Plasma spray the sleeve bore with Metco 447NS (MSRR 9507/35) to a depth sufficient to achieve the final bore diameter of 1.5016/1.5000 in. (38,141/38,100 mm). Refer to TSD 594 0P704 and Figure 401.



OLYMPUS 593

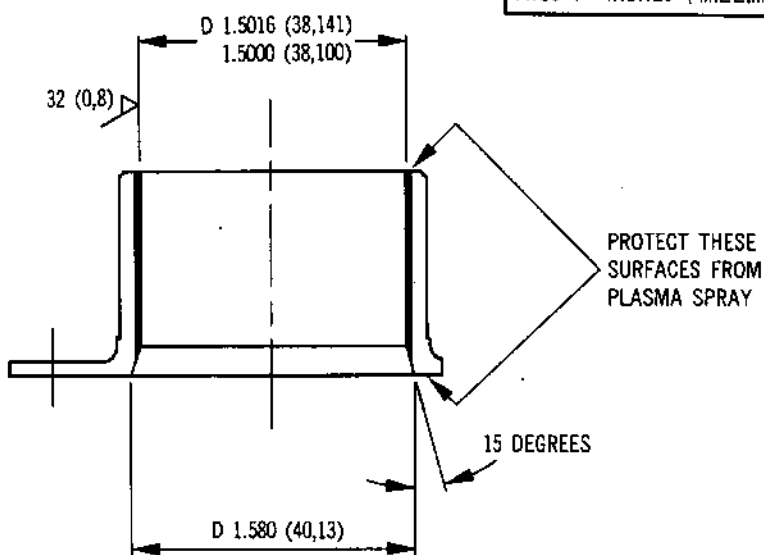
MK.610-14-28  
OVERHAUL



MACHINING DIMENSIONS  
BEFORE PLASMA SPRAY

SURFACE ROUGHNESS VALUES ARE SHOWN  
THUS :- MICRO-INCHES (MICROMETRES) ✓

DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)



FINISH MACHINING  
DIMENSIONS

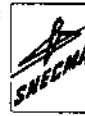
Sleeve Machining Details  
Figure 401



OLYMPUS 593

MK.610-14-28

OVERHAUL



E. Machine.

- (1) Locate the sleeve on a grinding machine and set true.
- (2) Grind the bore to achieve the finish machining dimensions given in Figure 401.
- (3) Remove burrs, sharp edges and overspray.

F. Inspect.


- (1) Inspect for the satisfactory completion of the machining operation.
- (2) Visually inspect the coating for cracking and lack of adhesion as instructed in TSD 594 OP704.

G. Apply Protective Coating.

NOTE: This operation applies to sleeve B455109 only.

- (1) Apply a seal coating of clear varnish (MSRR 9064) to the plasma spray coating as instructed in TSD 594 OP323.

H. Identify.

- (1) Mark SAL B.507088  or R1 adjacent to the existing part number using vibro-percussion engraving as instructed in Chapter 72-09-00 Repair.

J. Final Inspection.

- (1) Finally inspect the sleeve to ensure that the repair has been carried out satisfactorily, and that the sleeve is in a serviceable condition.

4. Special Tools, Fixtures and Equipment

None.

5. Replacement Parts

None.

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

ANTI-ICING MANIFOLD NO.5 VANE DUCT ASSEMBLY - REPAIR  
REPAIR FRETTED SEAL HOUSING BY REPLACEMENT

MODIFICATION NO. OL.89631. Effectivity

<u>I.P.C.</u>	<u>Fig./Item</u>	<u>Part No.</u>
75-11-01	1 10A	B455100

2. Introduction

## A. General.

- (1) This repair describes the procedure for replacement of a fretted Seal Housing on the anti-icing manifold No.5 Vane Duct Assembly.
- (2) Dimensions are shown thus, INCHES (MILLIMETRES), in tables and illustrations.
- (3) Refer to Chapter 72-09-00, Repair, for all standard practices applicable to this repair procedure.
- (4) Remove all sharp edges 0.004 to 0.020 in. (0,10 to 0,50 mm) unless otherwise stated.
- (5) Tolerances on machined dimensions are plus/minus 0.010 in (0,25 mm) unless otherwise stated.
- (6) Tolerances on angles are plus/minus 2 degrees.
- (7) All welding and X-ray processes are to be in accordance with those laid down in TSD 594-409.

## B. Repair Limitations.

- (1) Compliance with all aspects of this repair should be achieved without deviation. Where a need to deviate is considered necessary then reference should be made to the Repair Authority.

3. Instructions

## A. Preparation.

- (1) Using hand tools only, and working at the waste (housing) side of the weld line, remove defective Seal Housing Part No. B455104 from Duct Part No. B455103. Discard defective housing.

REPAIR

**75-11-01**Repair No.2  
Page 401  
Apr 1/91



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Dress back duct end face to reproduce pre-weld conditions. Duct end face after preparation is to be square to the axis of the duct to within 0.0015 in. (0,038 mm).

NOTE: Thinning of duct wall is not acceptable.

- (3) Remove any burrs/sharp edges on duct joint face.
- (4) Referring to Figure 401, check dimensions of prepared duct and new seal housing.
- (5) Offer new seal housing to duct and ensure a clearance fit of 0.001 to 0.005 in. (0,003 to 0,13 mm). If necessary, using hand tools only, dress circumference of duct to obtain final fit.

B. Inspect.

- (1) Inspect the worked area of the duct for cracks using the fluorescent dye penetrant process specified for this component in Chapter 72-09-00, (Inspection).

C. Assemble.

- (1) Referring to TSD 594-409, prepare duct and new seal housing for welding.
- (2) Assemble new seal housing and duct (Ref. Fig. 401) and butt weld in position using mechanised Argon Arc procedure as specified in TSD 594-409.

D. Inspect.

- (1) Inspect the repaired area for cracks using the fluorescent dye penetrant process F1A as specified in Chapter 72-09-00, Inspection.
- (2) Inspect the repaired area using X-ray procedures specified in TSD 594-409 for weld classification Group 1.

E. Test.

- (1) Carry out pressure test of repaired duct assembly using water to a pressure of 75 p.s.i. for a minimum period of 15 seconds. No leaks are permissible.

F. Inspect.

- (1) Referring to Figure 401, inspect all dimensions and ensure correct.

REPAIR

75-11-01

Repair No.2  
Page 402  
Apr 1/91



OLYMPUS 593

MK.610-14-28  
OVERHAUL



G. Identify.

- (1) Mark SAL B513620 adjacent to the existing part number using vibro-percussion marking as specified in Chapter 72-09-00, Repair.

4. Special Tools, Fixtures and Equipment

None.

5. Replacement Parts

<u>Part Number</u>	<u>Description</u>	<u>Quantity</u>
B455104	Housing, Seal	1-off

PRINTED IN ENGLAND

REPAIR

75-11-01

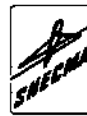
Repair No.2  
Page 403  
Apr 1/91



OLYMPUS 593

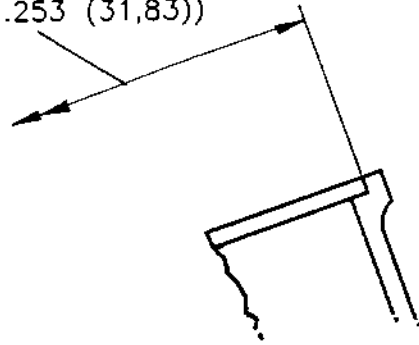
MK.610-14-28

OVERHAUL

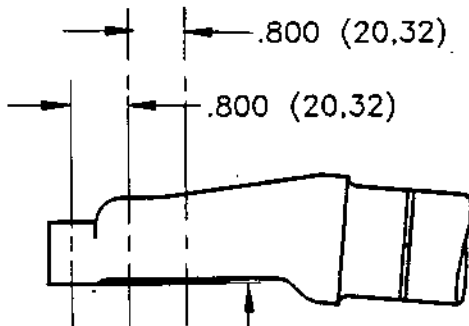


CR 36303 00A

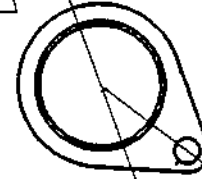
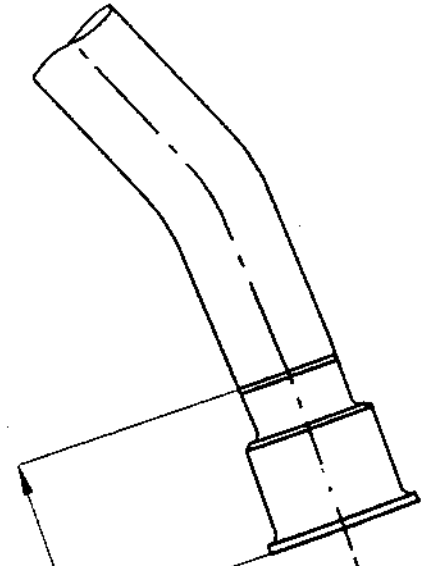
( 1.255 (31,88))  
(ø 1.253 (31,83))



ENLARGED VIEW AT **AC**  
PRIOR TO ASSY AND WELDING

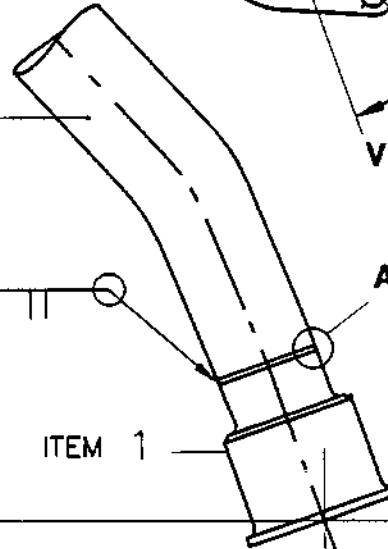


(1.920 (48,77))



30°  
V → **AB**

B 455103



API

ITEM 1

**AC**

14.350 (364,49)

22.550 (572,77)

67°

**AB**

DIMENSIONS GIVEN ARE SHOWN  
THUS:- INCHES (MILLIMETRES)

Seal Housing to Duct Assembly - Dimensions  
Fig. 401

REPAIR

75-11-01

Repair No.2

Page 404

Apr 1/91





# OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBE A/O, ANTI-ICING  
REPAIR OF FRETTING/DAMAGE BY INERT GAS ARC WELDING

REPAIR B.514566

1. EFFECTIVITY

IPC	Fig./Item	Part No.
75-11-01	01/080A	B.455095
	01/010A	B.455100

2. REPAIR LIMITATIONS

Refer to Overhaul Manual 72-09-29 Repair.

3. GENERAL

Refer to Overhaul Manual 72-09-29 Repair.

4. REPAIR PROCEDURE

REPAIR PROCEDURE

(1) Weld repair

SUPPLEMENTARY INFORMATION

Refer to Overhaul Manual  
72-09-29 Repair.

(2) Mark SAL B.514566  
or R3 adjacent  
normal assy. of  
number using the  
electro-chemical  
marking or vibro-  
percussion engraving  
techniques.

Refer to Overhaul Manual  
72-09-00 Repair.

5. MATERIAL

<u>COMPONENT</u>	<u>MATERIAL</u>	<u>RR CODE</u>
B.455095	MSRR 6524	EBS
B.455100	MSRR 6524	EBS

PRINTED IN ENGLAND



OLYMPUS 593

MK-610-14-28

OVERHAUL



6. DATA

PRESSURE TEST REQUIREMENTS:

TEST MEDIUM TO BE WATER

<u>PART NO.</u>	<u>PRESSURE TEST</u>	<u>MIN. GAUGE</u>
B.455095	75 lbf/sq.in. (0,52 MPa) for 15 sec.	0.027 (0,69)
B.455100	75 lbf/sq.in. (0,52 MPa) for 15 sec.	0.027 (0,69)

7. TOOLS

<u>TOOL NUMBER</u>	<u>DESCRIPTION</u>	<u>ITEM</u>
NONE.		

8. REPLACEMENT PARTS

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>ITEM</u>
NONE.			

REPAIR

75-11-01

Repair No.3

Page 402

Jun 1/92



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



## ENGINE ANTI-ICING TUBES - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

**CAUTION:** BEFORE USING HEAVY CLEANING PROCESSES J, L AND N, INVESTIGATE ALL REPAIRS CARRIED OUT ON EACH COMPONENT TO IDENTIFY THOSE HAVING PLASMA SPRAY COATINGS. THE NITRIC ACID USED IN PROCESSES J, L AND N WILL ATTACK THE ALUMINIUM CONTENT OF SOME TYPES OF COATING, MAKING REPLACEMENT OF THE COATING NECESSARY.

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.

CLEANING

# 75-11-02

Page 201

Feb 1/83



OLYMPUS 593

MK.610-14-28

OVERHAUL



- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.
- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except		A or B	-	-
	10	Elbow	A or B	F	-
	30	Strainer	A or B	F	-
	160	Tube	A or B	J	-
202	ALL except		A or B	-	-
	110	Tube	A or B	G	-
	220	Tube	A or B	G	Use process G only if light cleaning fails to remove con- tamination. Process G will damage silver plating, therefore it must be used with caution, i.e. short period immersion.

Cleaning Processes  
Table 201



OLYMPUS 593

MK.610-14-28  
OVERHAUL

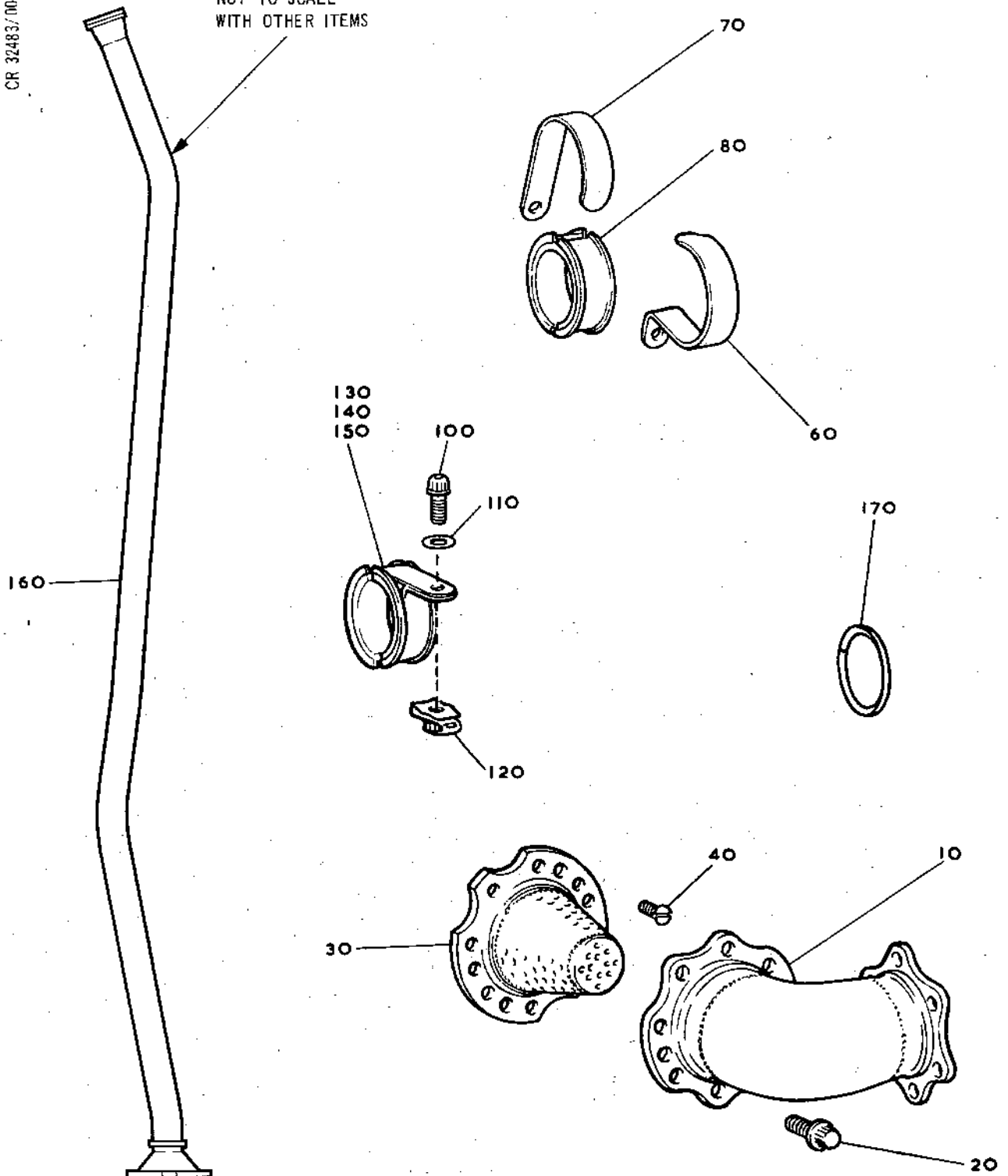


CR 32483/00B

PRINTED IN ENGLAND

TN19188

NOT TO SCALE  
WITH OTHER ITEMS



Tubes, Engine Anti-icing  
Figure 201

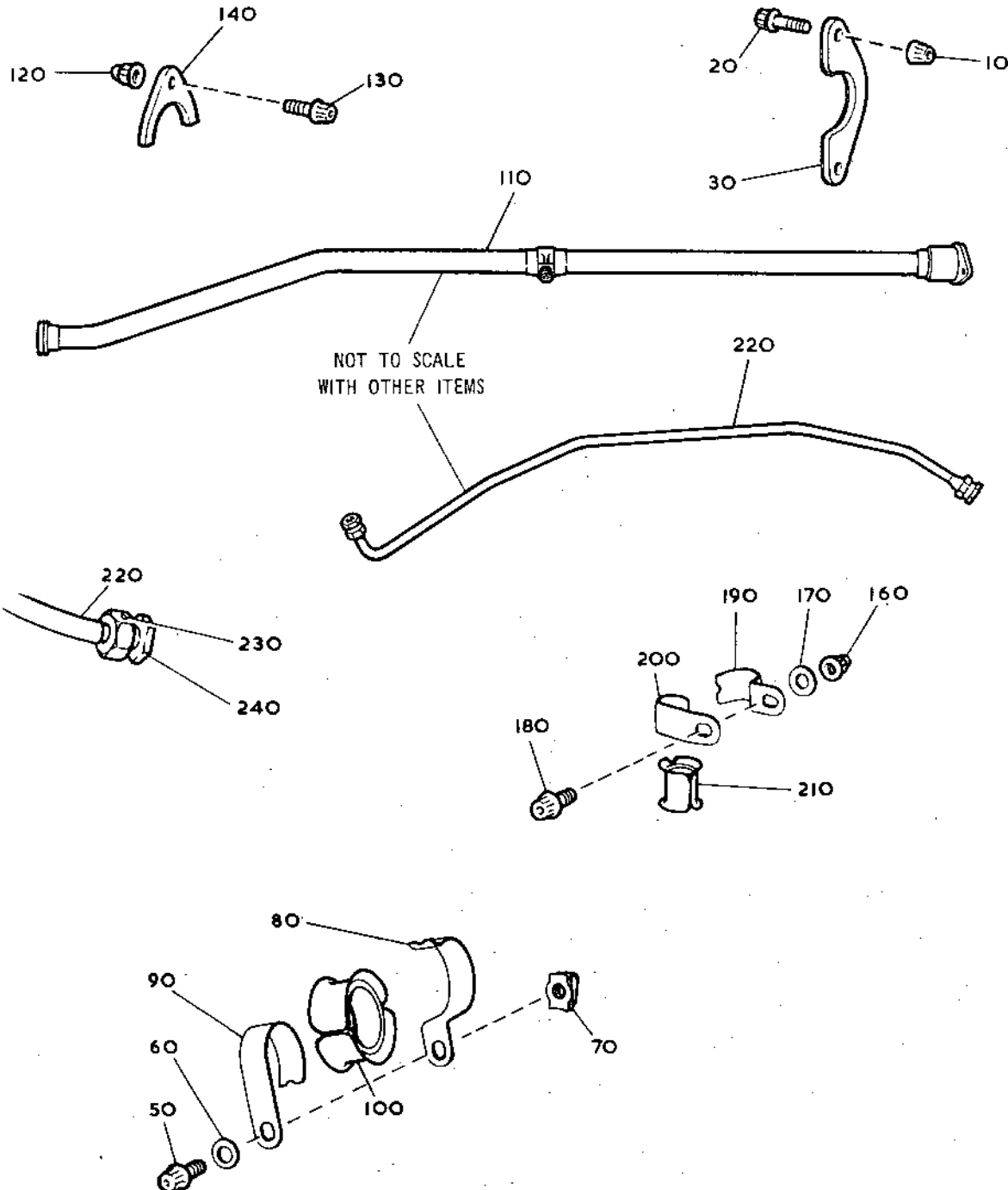
CLEANING  
**75-11-02**

Page 203  
Aug 28/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Tubes, Engine Anti-icing  
Figure 202

CLEANING  
**75-11-02**

Page 204  
Aug 28/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



ENGINE ANTI-ICING TUBES - REPAIR

TABLE OF CONTENTS

Repair No.	Title	Scheme No.
1	Repair of fretting/damage by inert gas arc welding	B.514566
2	Tube (C263). Repair of fretting/damage by inert gas arc welding	B.514567
3	Tube (C263) Repair by replacement of damaged sections	B.514646
4	Tube, Assy. of. Restoration of adaptor, flanged bore by Plasma Spray	B.515275

PRINTED IN ENGLAND

REPAIR

75-11-02

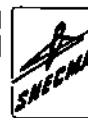
Contents 1

Jul 31/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TUBE A/O, AIR  
REPAIR OF FRETTING/DAMAGE BY INERT GAS ARC WELDING

REPAIR B.514566

1. EFFECTIVITY

IPC	Fig./Item	Part No.
75-11-02	01/160A	B.480967

2. REPAIR LIMITATIONS

Refer to Overhaul Manual 72-09-29 Repair.

3. GENERAL

Refer to Overhaul Manual 72-09-29 Repair.

4. REPAIR PROCEDURE

REPAIR PROCEDURE

(1) Weld repair

SUPPLEMENTARY INFORMATION

Refer to Overhaul Manual  
72-09-29 Repair.

(2) Mark SAL B.514566  
or R1 adjacent  
normal assy. of  
number using the  
electro-chemical  
marking or vibro-  
percussion engraving  
techniques.

Refer to Overhaul Manual  
72-09-00 Repair.

5. MATERIAL

COMPONENT

MATERIAL

RR CODE

B.480967

MSRR 6524

EBS

PRINTED IN ENGLAND

REPAIR  
75-11-02  
Repair No.1  
Page 401  
Jun 1/92





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



6. DATA

PRESSURE TEST REQUIREMENTS:

TEST MEDIUM TO BE WATER

<u>PART NO.</u>	<u>PRESSURE TEST</u>	<u>MIN. GAUGE</u>
B.480967	435 lbf/sq.in. (3,00 MPa) for 1 min.	0.048 (1,22)

7. TOOLS

<u>TOOL NUMBER</u>	<u>DESCRIPTION</u>	<u>ITEM</u>
NONE.		

8. REPLACEMENT PARTS

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>ITEM</u>
NONE.			

REPAIR

75-11-02

Repair No.1

Page 402

Jun 1/92



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



TUBE, ASSEMBLY OF (C263)

REPAIR OF FRETTING/DAMAGE BY INERT GAS ARC WELDING

REPAIR NO. B514567

1. EFFECTIVITY

IPC	Fig./Item	Part No.
75-11-02		B477653
	2/110A	B481899
	1/160B	B491619

2. REPAIR LIMITATIONS

Compliance with all aspects of this repair process should be achieved without deviation. Where a need to deviate is considered necessary, reference should be made to the Repair Authority for agreement.

Direct welding of fretting/damage is limited to a maximum depth of 50% of the gauge thickness of the individual tube.

Maximum size of repairable fret/damage mark to be contained within an envelope measuring 0.350 x 0.350 (8,90 x 8,90) (Refer fig.401).

This repair does not cover welding of fittings, which must be replaced to the appropriate repair instruction.

3. GENERAL

UNLESS OTHERWISE SPECIFIED

Drawing practice & tolerance interpretation to ISO1101 (JES160)

Dimensions in Inches (Millimetres)

Tolerances on machined dimensions plus/minus 0.010 (0,25)

Tolerance on angles plus/minus 2 degrees

Break sharp edges 0.004 to 0.020 (0,1 to 0,5)

Surface texture interpretation to ISO1302 (JES137)

Surface texture to be 125 (3,2) Microinches (Micrometres)

Welding symbols to ISO2553 (JES139)

3rd Angle Projection

4. REPAIR PROCEDURE

SUPPLEMENTARY INFORMATION

- 1) Clean fretted/damaged areas and prepare for welding.

Refer TSD 594 OP.409

REPAIR

75-11-02

Repair No. 2

Page 401

Jun 1/92

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



- |     |  |   |
|-----|--|---|
| 2)  | Degrease areas to be welded immediately prior to welding.  | Refer TSD 594 OP.101  |
| 3)  | Build up fretted/damaged area by inert gas arc welding. Apply sufficient weld metal to restore outer diameter of tube. Group 1 weld classification.              | Refer TSD 594 OP.409<br>Use filler rods to OMat 3/62.             |
| 4)  | Radiographically inspect weld for defects.   | Refer TSD 594 OP.409<br>Appendix 2.                               |
| 5)  | Dress weld to restore diameter, adjacent parent material is not to be impaired. Maintain surface finish.   | Note: Use adjacent undressed areas as a guide for surface finish. |
| 6)  | Polish tube diameter to remove discolouration.   |   |
| 7)  | Locally inspect repair area for cracks.  | Refer TSD 594 OP.210  |
| 8)  | Visually inspect on completion of repair.  | Refer TSD 594 OP.409<br>Appendix 2.                               |
| 9)  | Pressure test tube as directed.  | Refer Para.6. DATA  |
| 10) | Vapour degrease tube.  | Refer TSD 594 OP.101  |
| 11) | Re-lubricate threads using engine oil.   |   |
| 12) | Fit blanks as required.  |   |
| 13) | Mark Repair Instruction number RI B514567 or R2 adjacent to normal 'assy of' number using the electro-chemical marking or vibro-percussion engraving techniques. | Refer Overhaul Manual<br>Chapter 72-09-00 Repair                  |

## 5. MATERIAL

COMPONENT	MATERIAL	RR CODE
Tube, Assembly of	C263 MSRR7037	QAY

REPAIR  
**75-11-02**  
Repair No. 2  
Page 402  
Jun 1/92



OLYMPUS 593

MK.610-14-28

OVERHAUL



6. DATA

PRESSURE TEST REQUIREMENTS:

TEST MEDIUM TO BE WATER.

PART NO.	PRESSURE TEST	MIN. GAUGE
B477653	435 lbf/sq.in.(3,00MPa) FOR 1 MIN.	0.027(0,69)
B481899	435 lbf/sq.in.(3,00MPa) FOR 1 MIN.	0.027(0,69)
B491619	535 lbf/sq.in.(3,69MPa) FOR 1 MIN.	0.027(0,69)

7. TOOLS

TOOL NUMBER	DESCRIPTION	ITEM
NONE.		

8. REPLACEMENT PARTS

PART NUMBER	DESCRIPTION	QUANTITY	ITEM
NONE.			

PRINTED IN ENGLAND

REPAIR

75-11-02

Repair No. 2

Page 403

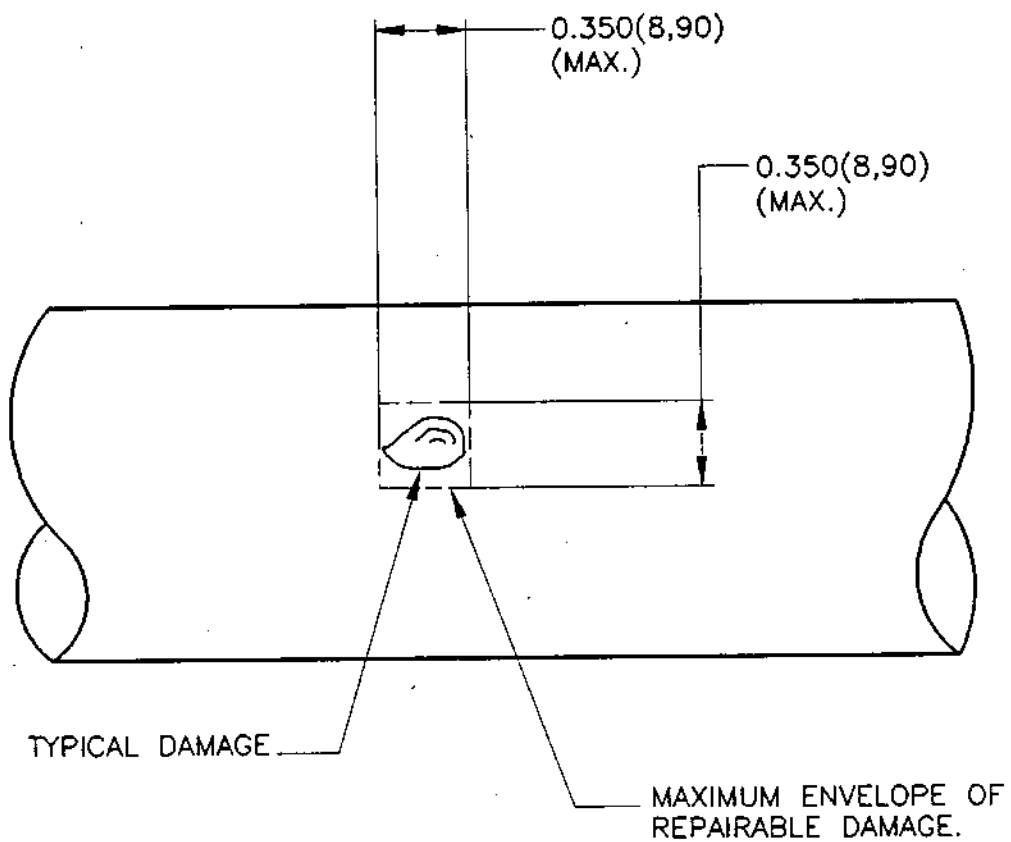
Jun 1/92



OLYMPUS 593

MK.610-14-28

OVERHAUL



TYPICAL TUBE REPAIR  
FIG.401



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



TUBE, ASSY OF (C263)

REPAIR OF TUBES BY REPLACEMENT OF DAMAGED SECTIONS

REPAIR NO. B514646

1. EFFECTIVITY

IPC	Fig./Item	Part No.
75-11-02		B477653
75-11-02	2/110A	B481899
75-11-02	1/160B	B491619

2. REPAIR LIMITATIONS

Compliance with all aspects of this repair process should be achieved without deviation. Where a need to deviate is considered necessary, reference should be made to the Repair Authority for agreement.

This Repair instruction covers repair of tubes damaged by fretting from pipe clips or other forms of damage.

Damage may be repaired according to the following basic requirements:-

Where edge of fretted area is not less than 1.650 (41,91) from commencement of a bend or curve the use of a 'tube joint' will normally be sufficient on 1.250 (31,75) diameter tube. Standard length to be used is L20, ie 2.000 (50,80) at clip positions. Refer figs.403, 404, 405, 406 and 407.

Where edge of fretted area is less than 1.650 (41,91) from commencement of a bend or curve, or damage is to a 2.000 (50,80) diameter tube this will require a new (or cannibalised) section of tube to be fitted with suitable tube joints and formed in accordance with a standard tube assembly (where applicable). Refer figs.402, 408, 409, 410 and 411.

A repair weld line must not occur in an area which will be covered by a clip. Refer fig.405.

Six lengths of tube joint B514643 are available for 1.250 (31,75) diameter tubes from L05 to L30 i.e 0.500(12,70) to 3.000 (76,20) in 0.500(12,70) increments.

REPAIR

75-11-02

Repair No. 3

Page 401

Jan 4/93

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



Tube joints B514644 and B514645 are available for 2.000(50,80) diameter tubes. Tube joint B514645 should be used when replacing lengths of tube.

The use of 'Reel' type tube joints, shorter than the outside diameter of the tube being repaired, greatly increase the chance of distortion or collapse of the repair area. Wherever limitations permit, use 'Reel' type tube joints which are greater in length than the outside diameter of the tube or 'Tee' type tube joints with a make up tube length equal to or greater than the outside diameter of the tube.

### 3. GENERAL

#### UNLESS OTHERWISE SPECIFIED

Drawing practice & tolerance interpretation to ISO1101 (JES160)  
Dimensions in Inches (Millimetres)

Tolerances on machined dimensions plus/minus 0.010 (0,25)

Tolerance on angles plus/minus 2 degrees

Break sharp edges 0.004 to 0.020 (0,1 to 0,5)

Surface texture interpretation to ISO1302 (JES137)

Surface texture to be 125 (3,2) Microinches (Micrometres)

Welding symbols to ISO2553 (JES139)

3rd Angle Projection

### 4. REPAIR PROCEDURE

### SUPPLEMENTARY INFORMATION

- |    |   |   |
|----|---|---|
| 1) | Mark off section of tube to be replaced.                                  | Refer fig.401 to 411.   |
| 2) | a) Cut away defective portion of tube. Cut to scrap side of marked lines. | Use hand tools.<br>Refer fig.401 to 411.  |
|    | b) Dress tube ends square to accept correct diameter tube joint(s).       | Refer fig.413.<br>Use jig to ensure overall length of tube is correct.<br>Refer Para.7. TOOLS item 1.                                   |
|    | c) Deburr tube ends using abrasive matt. Do not chamfer.                  | Use OMat 583.   |
|    | d) Prepare areas for welding and locally degrease.                        | Refer to TSD 594 OP.101 and 409.  |
| 3) | Assemble tube portions and/or joint(s) in jig, and tack weld.             | Refer to TSD 594 OP.409.<br>Use filler wire OMAT 3/62.<br>Refer Para.7. TOOLS item 1.<br>Refer Para.8. REPLACEMENT PARTS, items 2 to 7. |

REPAIR

**75-11-02**

Repair No. 3

Page 402

Jan 4/93



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

- |     |   |  |
|-----|---|--|
| 4)  | Check for position/alignment of components.   | Refer to TSD 594 OP.409.<br>Refer Para.7. TOOLS item 1.              |
| 5)  | Prepare areas for welding and locally degrease.   | Refer to TSD 594 OP.101 and 409.                                     |
| 6)  | Automatic inert gas weld. All welds are Group 1.  | Refer to Para.6.a) DATA<br>Refer to TSD 594 OP.409.<br>Refer fig.412 |
| 7)  | Remove weld discolouration by lightly polishing.  | Use fine grade abrasive tape OMat 525.                               |
| 8)  | Visually and dimensionally inspect using jig.   | Refer to TSD 594 OP.409<br>Appendix 2.<br>Refer Para.7. TOOLS item 1 |
| 9)  | Locally inspect welds for cracks.   | Refer to TSD 594 OP.210.   |
| 10) | Radiographically inspect weld for defects.  | Refer to TSD 594 OP.409<br>Appendix 2.                               |
| 11) | Pressure test tube.   | Refer to Para 6.b) DATA.   |
| 12) | Vapour degrease tube.   | Refer to TSD 594 OP.101.   |
| 13) | Mark Repair Instruction number RI B514646 or R3 adjacent to the existing 'assy. no.' using the Electro-Chemical marking or vibro-percussion engraving techniques. | Refer to Overhaul Manual<br>Chapter 72-09-00 Repair<br>Para. 3.      |

5. MATERIAL

COMPONENT	MATERIAL	RR CODE
TUBE, ASSY OF (VARIOUS)	C263 MSRR 7035 MSRR 7037	QAH QAY



**OLYMPUS 593**

MK.610-14-28

OVERHAUL

**6. DATA****a) WELDING DATA**

Type of weld	Automatic Argon arc D.C.
Filler wire	OMAT 3/62 (if required).
Torch	Orbital welding torch
Electrode	2% thoriated tungsten.
Argon backing flow)	
Argon torch flow )	Determine by suitable test pieces.
Current )	

**b) PRESSURE TEST**

PRESSURE TEST MEDIUM TO BE WATER. DURATION 1 MINUTE.

PART NO.	PRESSURE	TUBE WALL THICKNESS
B477653	435 lbf/sq.in (3MPa)	0.036/0.040(0,91/1,02)
B481899	435 lbf/sq.in (3MPa)	0.036/0.040(0,91/1,02)
B491619	535 lbf/sq.in (3,69MPa)	0.036/0.040(0,91/1,02)

**7. TOOLS**

TOOL NUMBER	DESCRIPTION	ITEM
---	Locally Manufactured Alignment Jig	1

**8. REPLACEMENT PARTS**

PART NUMBER	DESCRIPTION	QUANTITY	ITEM
B514643	TUBE JOINT	AS REQ'D	2
B514644	TUBE JOINT	AS REQ'D	3
B514645	TUBE JOINT	AS REQ'D	4
B477654ND	TUBE (MSRR7037) 1.250 O/D X 0.036/0.040 (31,75 O/D X 0,91/1,02)	---	5
B477655ND	TUBE (MSRR7037) 1.250 O/D X 0.036/0.040 (31,75 O/D X 0,91/1,02)	---	6

REPAIR

**75-11-02**

Repair No. 3

Page 404

Jan 4/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



B485057ND

TUBE (MSRR7037) ---  
1.250 O/D X 0.036/0.040  
(31,75 O/D X 0,91/1,02)

7

B485060ND

TUBE (MSRR7037) ---  
2.000 O/D X 0.036/0.040  
(50,80 O/D X 0,91/1,02)

8

PRINTED IN ENGLAND

REPAIR

75-11-02

Repair No. 3

Page 405

Jan 4/93

## RE-USE OF FITTINGS.

TO REDUCE COST, SERVICEABLE FITTINGS REMOVED DURING REPAIR SHOULD BE RE-USED WHEREVER POSSIBLE (eg. NUTS, FERRULES, END FITTINGS, JUNCTIONS, TEE-PIECES, SEAL CARRIERS etc.).

FOR RE-USE, THE ORIGINAL AUTOGENOUS LIPS PROVIDED FOR NEW MANUFACTURE (REFER FIGURE 401) ARE REPLACED BY SUITABLE PIPE JOINTS (REFER FIGURE 402).

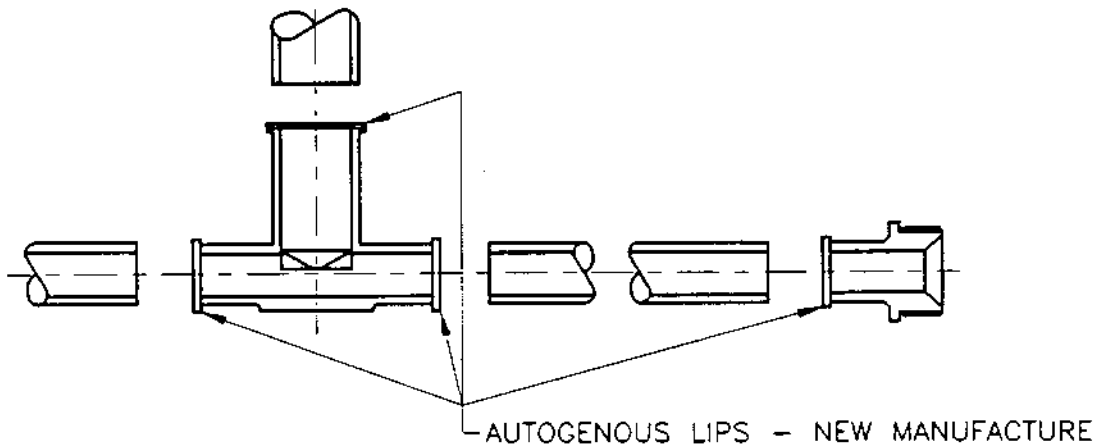


FIG.401

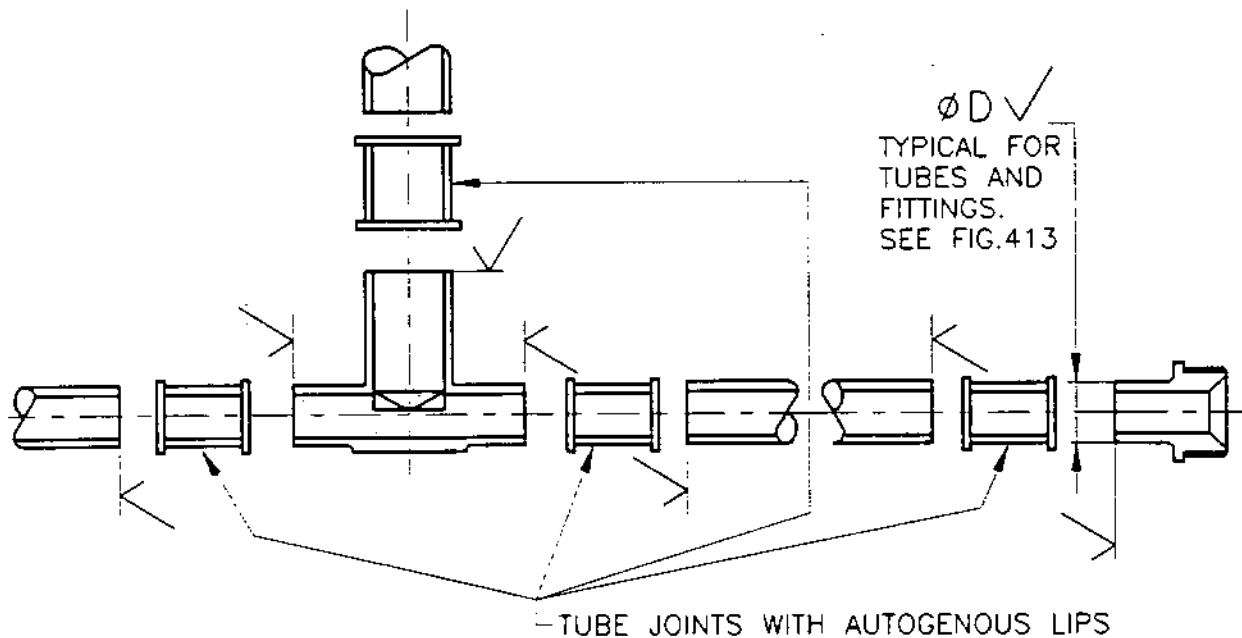


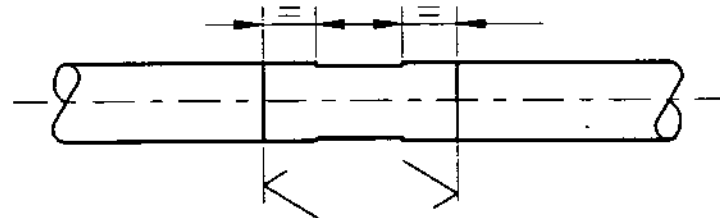
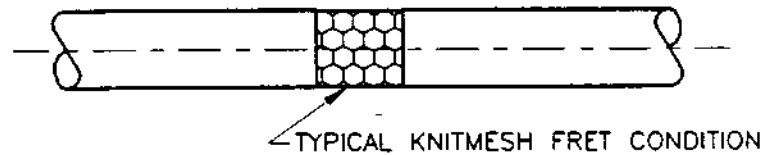
FIG.402



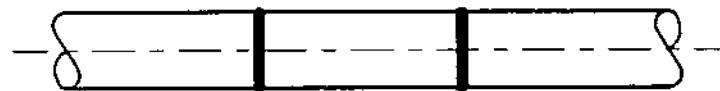
OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



## REPAIR TO STRAIGHT SECTION AT CLIP POSITIONS



DAMAGED AREA TO BE REMOVED  
FIG.403

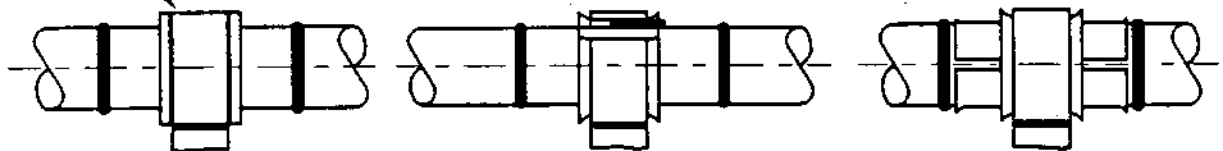


TYPICAL TUBE JOINT WELDED IN  
FIG.404

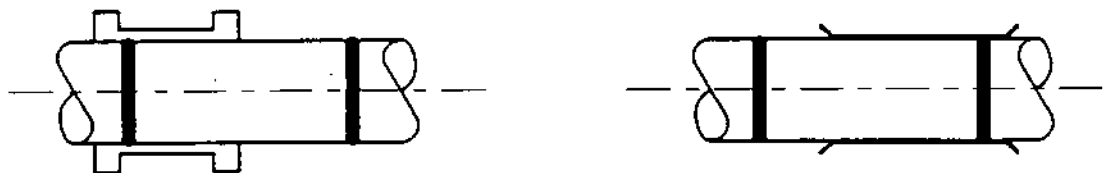


WELD PENETRATION  
DETAIL

DIFFERENT CLIPPING MEDIUMS



PREFERRED REPAIRED CONDITION



THESE CONDITIONS WILL NOT BE ACCEPTABLE,  
IRRESPECTIVE OF PIPE FORM.

REPAIR CONDITIONS  
FIG.405

REPAIR

75-11-02

Repair No. 3

Page 407

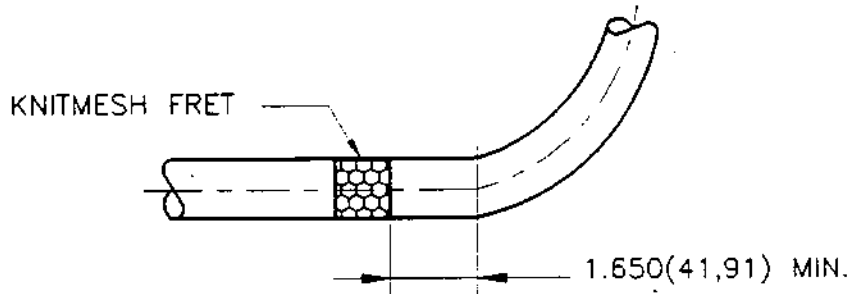
Jan 4/93



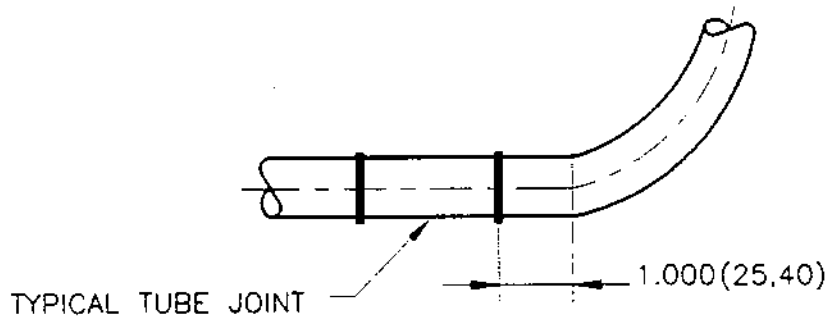
OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



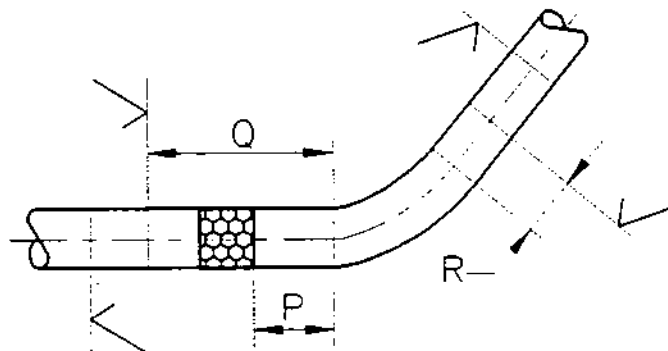
## REPAIRS ADJACENT TO BENDS.



WHERE BENDS ARE INVOLVED THIS IS THE MINIMUM  
DIMENSION CONDITION FOR REPAIR WITH TUBE JOINT ONLY.  
FIG.406



MINIMUM DIMENSION TO A WELD JOINT.  
FIG.407



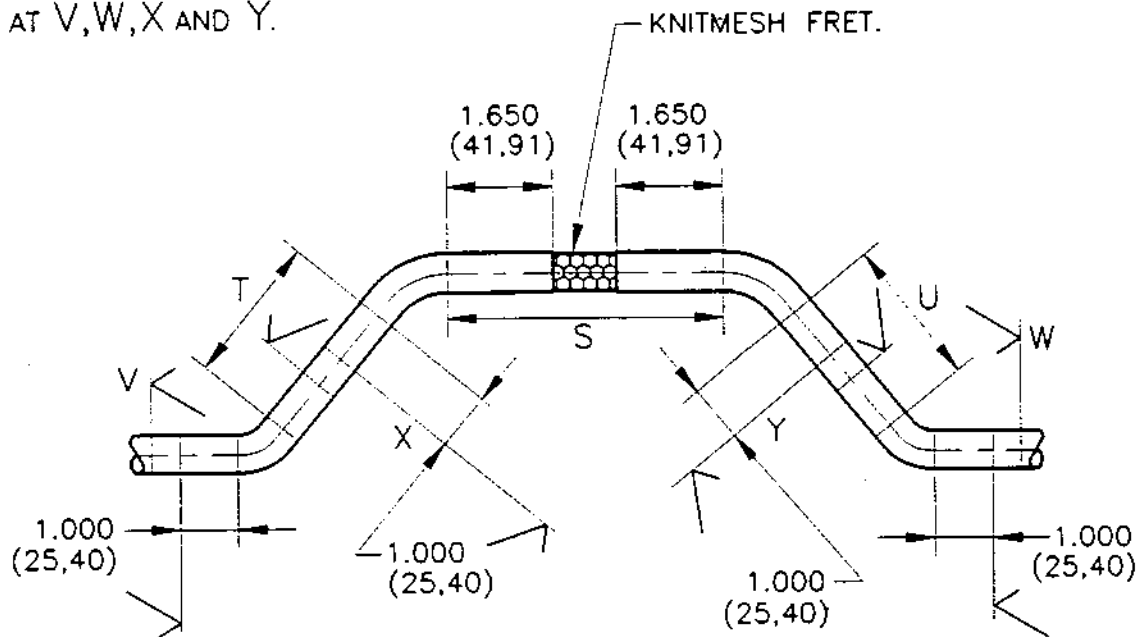
WHERE DIMENSION P IS LESS THAN 1.650(41,91) A COMPLETE BEND  
WITH 2.250(57,15) MIN. STRAIGHT SECTION AT Q AND 1.000(25,40)  
MIN. AT R WILL BE REQUIRED PLUS TWO SUITABLE TUBE JOINTS.

FIG.408

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

## REPAIRS ADJACENT TO MULTIPLE BENDS.

SUITABLE TUBE JOINT MAY BE  
USED AT V,W,X AND Y.



ALL DIMENSIONS ARE MINIMUM PERMISSIBLE LENGTHS.

IF FRETTING IS IN AN AREA SHOWN ABOVE AND DIMENSION **S** IS LESS THAN 4.000(101,60) AND DIMENSION **T** AND **U** ARE LESS THAN 2.500(63,50), RENEWAL OF THE WHOLE SECTION FROM **V** TO **W** WILL BE REQUIRED (BECAUSE DIMENSIONS 1,650(41,91) AND 1.000(25,40) MIN. ARE NOT ATTAINABLE).

IF DIMENSION **T** EXCEEDS 2.500(63,50) THE CUT WILL BE AT **X** AND **W** OR CONVERSELY, FOR DIMENSION **U** CUT AT **Y** AND **V**. WHEN **T** AND **U** BOTH EXCEED 2.500(63,50) CUT WILL BE AT **X** AND **Y**.

FIG.409



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## REPAIRS ADJACENT TO BENDS AND FITTINGS.

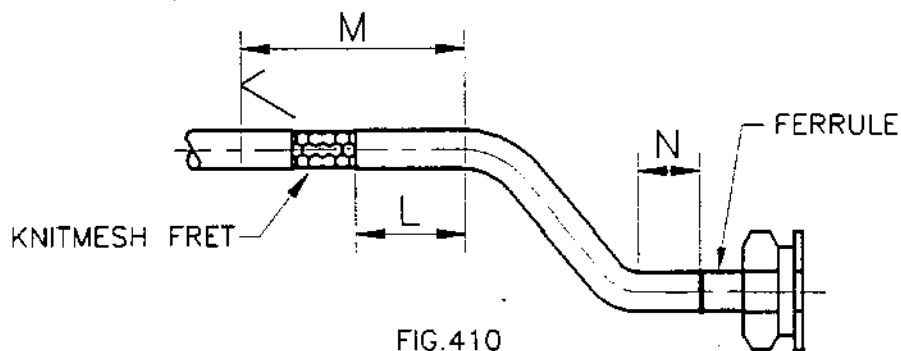


FIG. 410

FIG. 410 AND 411 :

WHERE  $L$  IS LESS THAN 1.650(41,91) AND  
 $N$  IS LESS THAN 1.500(38,10) A NEW BEND  
PLUS  $M$  (SEE Q FIG. 408) AND FERRULE  
ARE REQUIRED. OTHERWISE REPAIR AS  
FIGS. 402 AND 407.

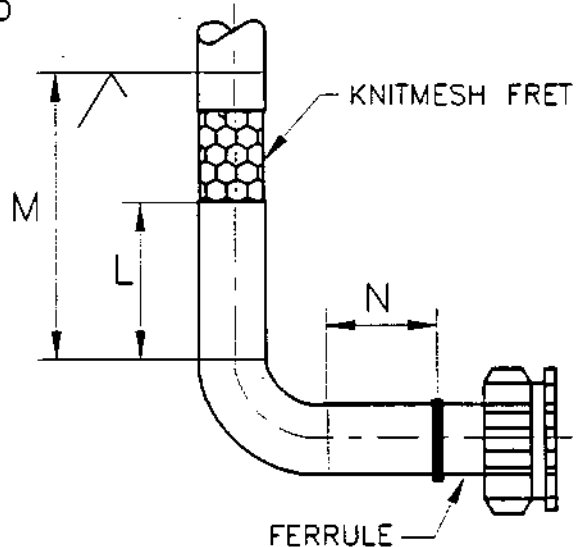


FIG. 411

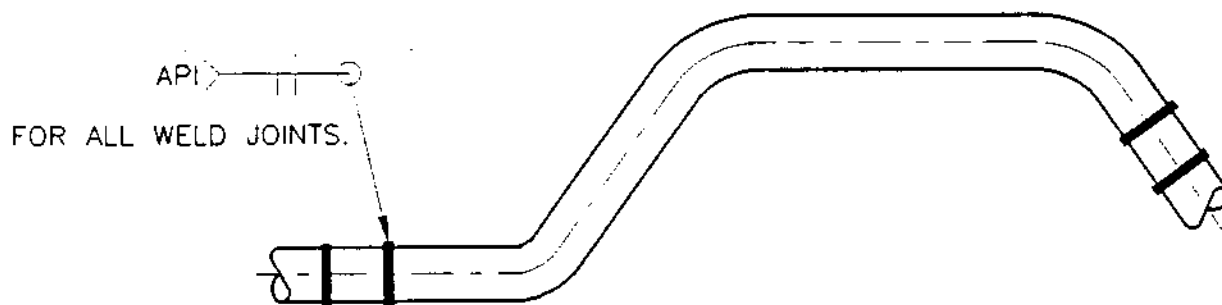


FIG. 412

REPAIR  
**75-11-02**  
Repair No. 3  
Page 410  
Jan 4/93

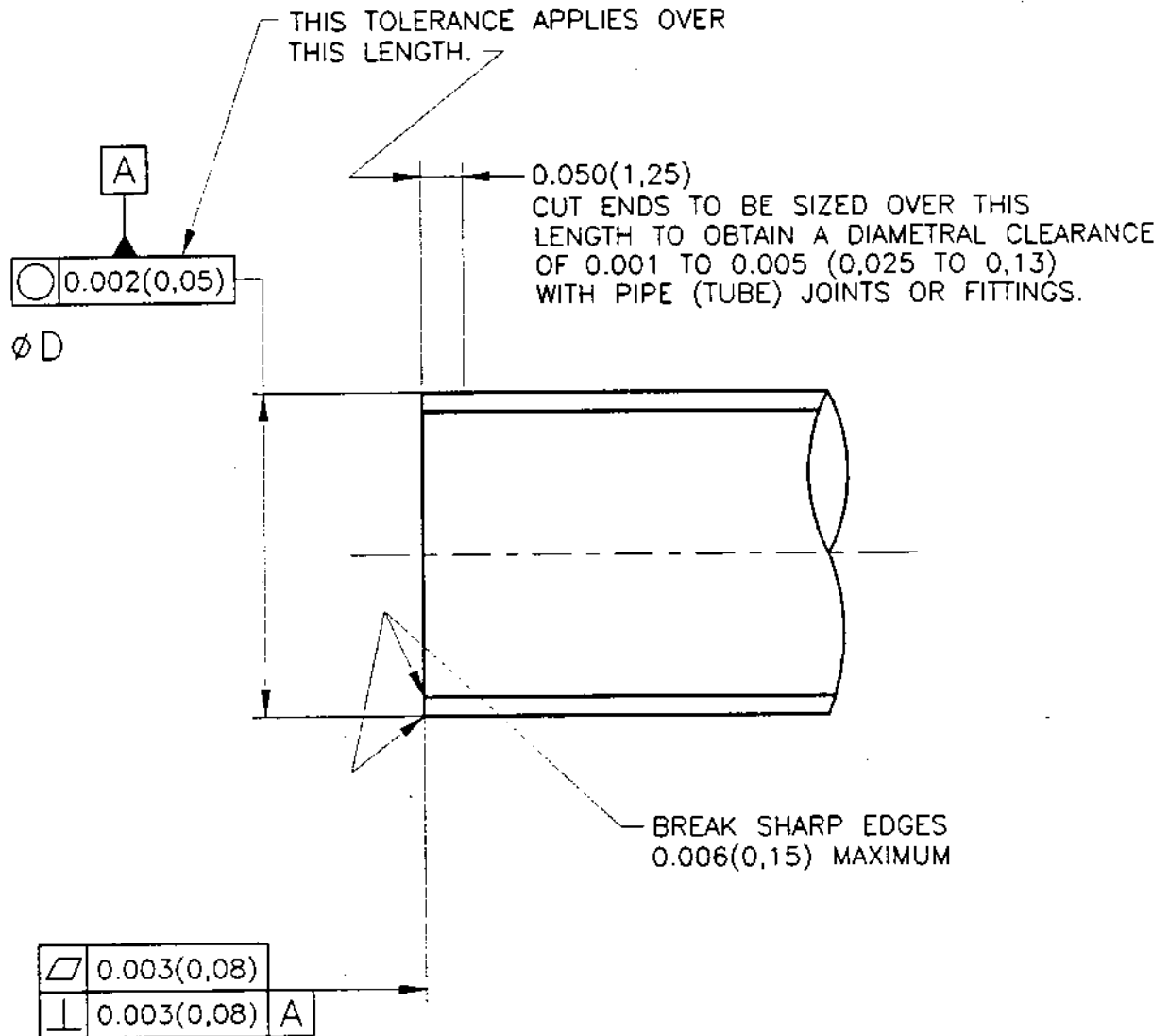


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



TYPICAL TUBE END PREPARATION  
FIG.413





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



TUBE, ASSY OF.

RESTORATION OF ADAPTOR, FLANGED BORE BY PLASMA SPRAY

REPAIR NO. B515275

1. EFFECTIVITY

<u>IPC</u>	<u>Fig./Item</u>	<u>Part No.</u>
75-11-02	2 110A	B481899
		B481792
	110B	B491503
		B491504
		B491505
		B491506

2. REPAIR LIMITATIONS

Compliance with all aspects of this repair process should be achieved without deviation. Where a need to deviate is considered necessary, reference should be made to the Repair Authority for agreement.

This repair may be embodied any number of times provided that stated dimensions are not exceeded (refer fig.403 to 405).

3. GENERAL

UNLESS OTHERWISE SPECIFIED

Drawing practice & tolerance interpretation to ISO1101 (JES160)

Dimensions in Inches (Millimetres)

Tolerances on machined dimensions plus/minus 0.010 (0,25)

Tolerance on angles plus/minus 2 degrees

Break sharp edges 0.004 to 0.020 (0,1 to 0,5)

Surface texture interpretation to ISO1302 (JES137)

Surface texture to be 125 (3,2) Microinches (Micrometres)

Welding symbols to ISO2553 (JES139)

3rd Angle Projection

4. REPAIR PROCEDURE

SUPPLEMENTARY INFORMATION

- 1) Clamp Tube, Assy Of. using locally manufactured machining fixture to a suitable machine (as required).

Refer Para.7. Tools, item 1.

- 2) Set true to datum A.

Refer fig.403.

REPAIR

75-11-02

Repair No. 4

Page 401

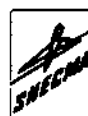
Jul 31/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



- |     |   |  |
|-----|---|--|
| 3)  | Machine defective location bore diameter to Pre Spray dimensions shown. Remove the minimum amount of material to remove fretting. If a repeat repair is being carried out ensure all existing coating is removed. Ensure pre-coating diameter limitations are maintained. | Refer fig.401 to 403.  |
| 4)  | Locally etch area AD to ensure complete removal of coating. Note: This operation is required for repeat repairs only.   | Refer Overhaul Manual Chapter 72-09-14 Repair Solution E. Refer fig.404. |
| 5)  | Dimensionally inspect repair area.  | Refer fig.403.   |
| 6)  | Locally crack detect repair area.   | Refer Overhaul Manual Chapter 75-10-00 Inspection/Check                  |
| 7)  | Plasma spray bore at location AD to a sufficient thickness to ensure the final machined diameter is achievable. Coating must not be deposited within area designated AE.  | Refer TSD 594 OP 704. Use powder OMat 3/179. Refer fig.404 and 405.      |
| 8)  | Clamp Tube, Assy Of. using locally manufactured machining fixture to a suitable machine (as required).  | Refer Para.7. Tools, item 1.   |
| 9)  | Set true to datum A.  | Refer fig.405.   |
| 10) | Finish machine repair area.   | Refer fig.405.   |
| 11) | Dimensionally inspect.  | Refer fig.405.   |
| 12) | Visually inspect coating for defects.   | Refer TSD 594 OP 704.  |
| 13) | Locally crack detect machined areas.  | Refer Overhaul Manual Chapter 75-10-00 Inspection/Check                  |
| 14) | Vapour degrease tube.   | Refer TSD 594 OP 101.  |

REPAIR

75-11-02

Repair No. 4

Page 402

Jul 31/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



- 15) Mark Repair Instruction number RI B515275 or R4 and coating identity symbol adjacent to the normal 'assy of' no. Use the electro-chemical marking or vibro-percussion engraving techniques.

Refer Overhaul Manual  
Chapter 72-09-00 Repair  
Refer fig.401.

Coating identity symbol



5. MATERIAL

COMPONENT

MATERIAL

RR CODE

TUBE, ASSY OF. (ADAPTOR, FLANGED)  
(Pt. No.s B481899, B491503 and  
B491505).

NICKEL ALLOY  
C263  
MSRR7035

QAH

TUBE, ASSY OF. (ADAPTOR, FLANGED)  
(Pt. No.s B481792, B491504 and  
B491506).

STAINLESS STEEL  
18/8  
MSRR6522

EAF

6. DATA

NONE.

7. TOOLS

TOOL NUMBER

DESCRIPTION

ITEM

LOCALLY MANUFACTURED MACHINING FIXTURE.

1

8. REPLACEMENT PARTS

PART NUMBER

DESCRIPTION

QUANTITY

ITEM

NONE.

PRINTED IN ENGLAND

REPAIR

75-11-02

Repair No. 4

Page 403

Jul 31/93



OLYMPUS 593  
MK.610-14-28  
OVERHAUL

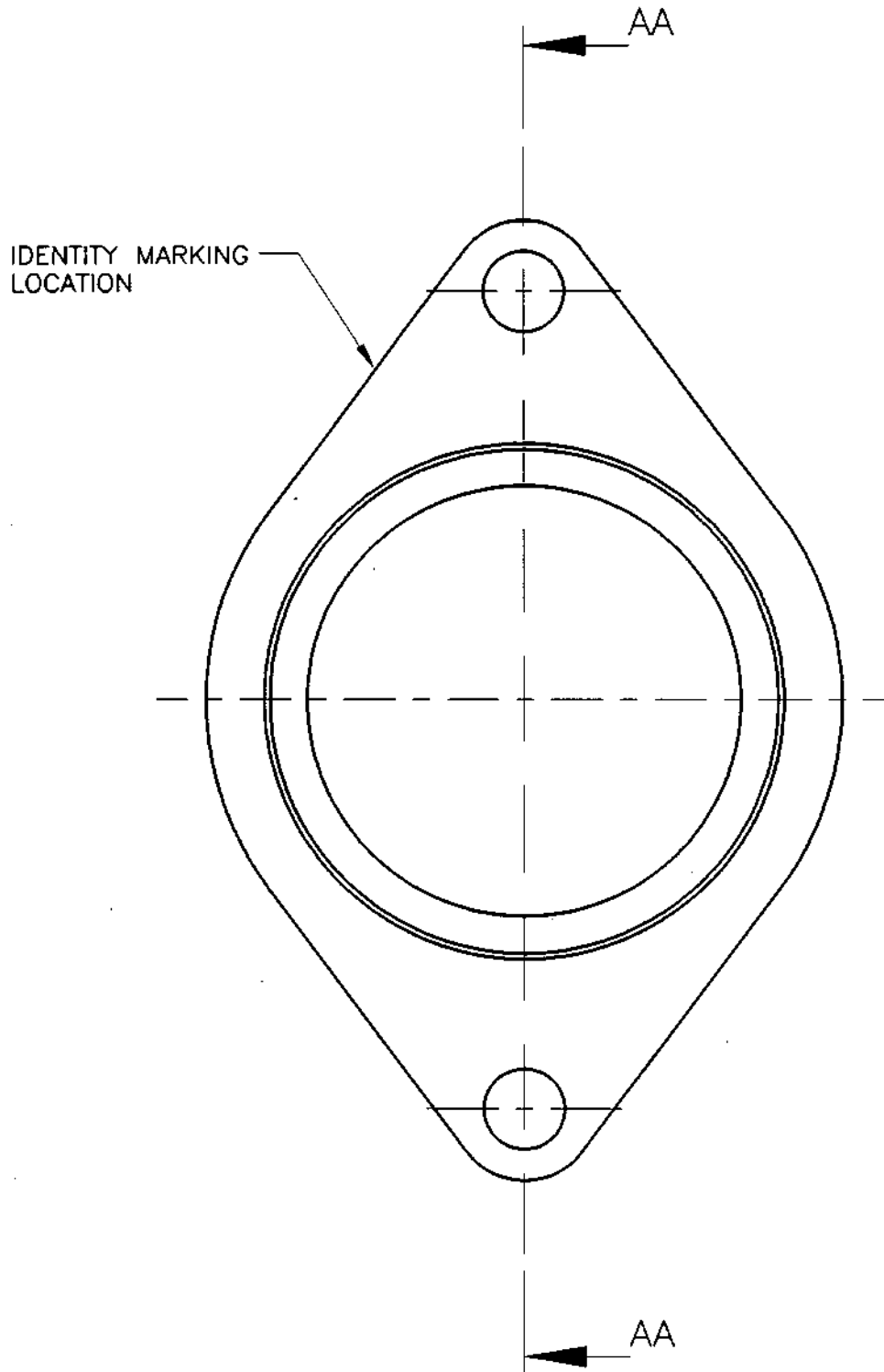


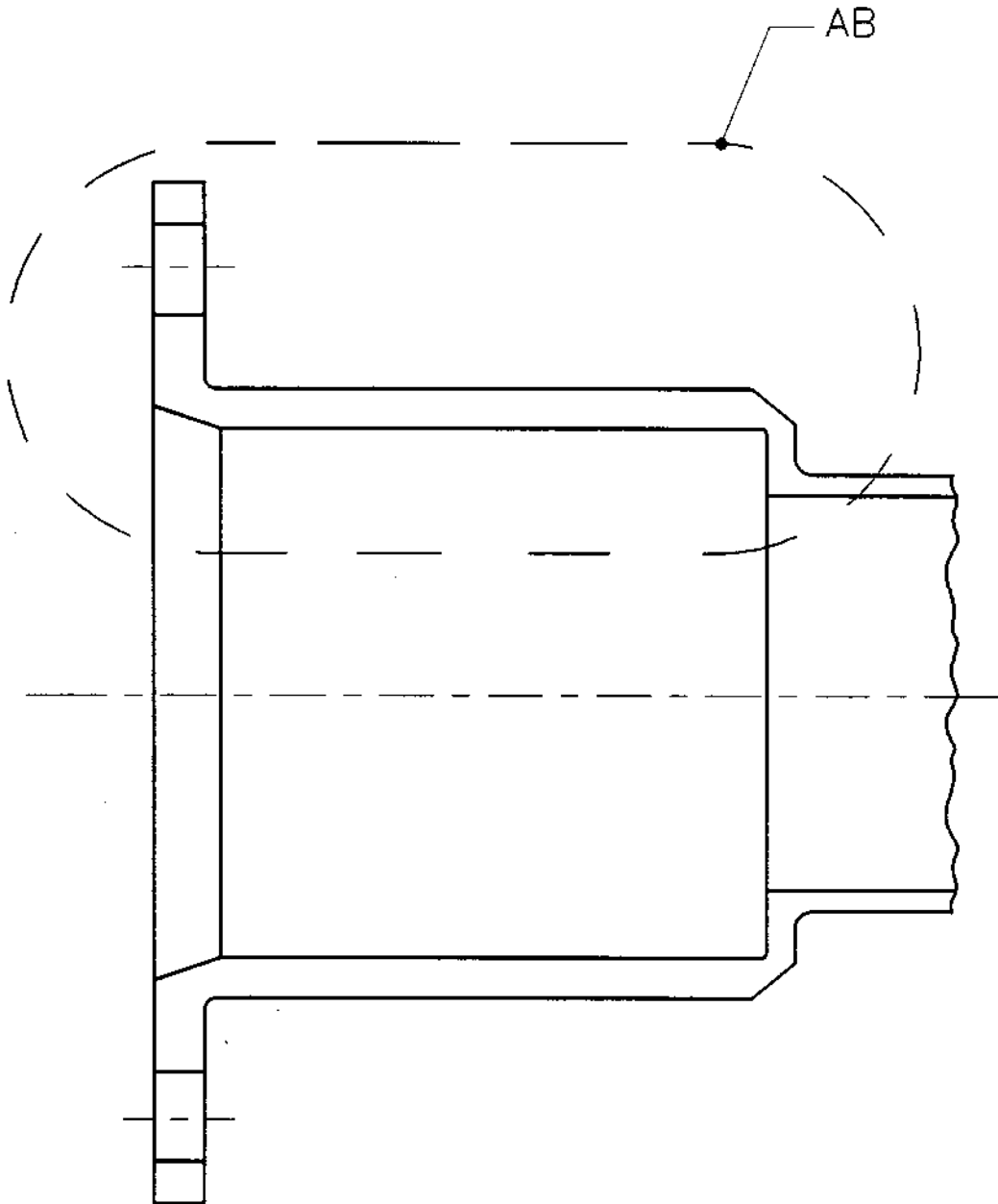
FIG.401



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



SECTION AA

FIG.402

REPAIR

75-11-02

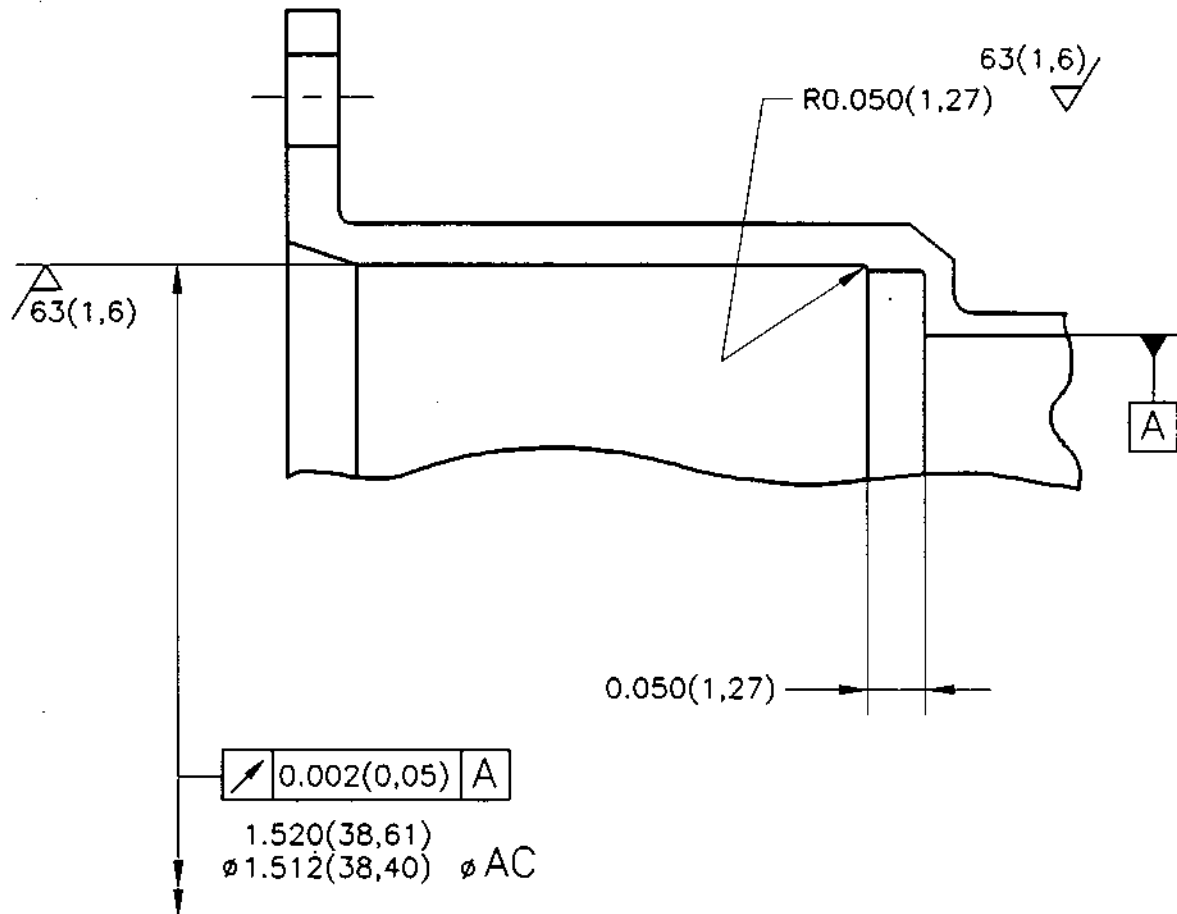
Repair No. 4

Page 405

Jul 31/93



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



DETAIL AB

PRE-SPRAY MACHINING DETAILS  
FIG.403

REPAIR  
75-11-02  
Repair No. 4  
Page 406  
Jul 31/93



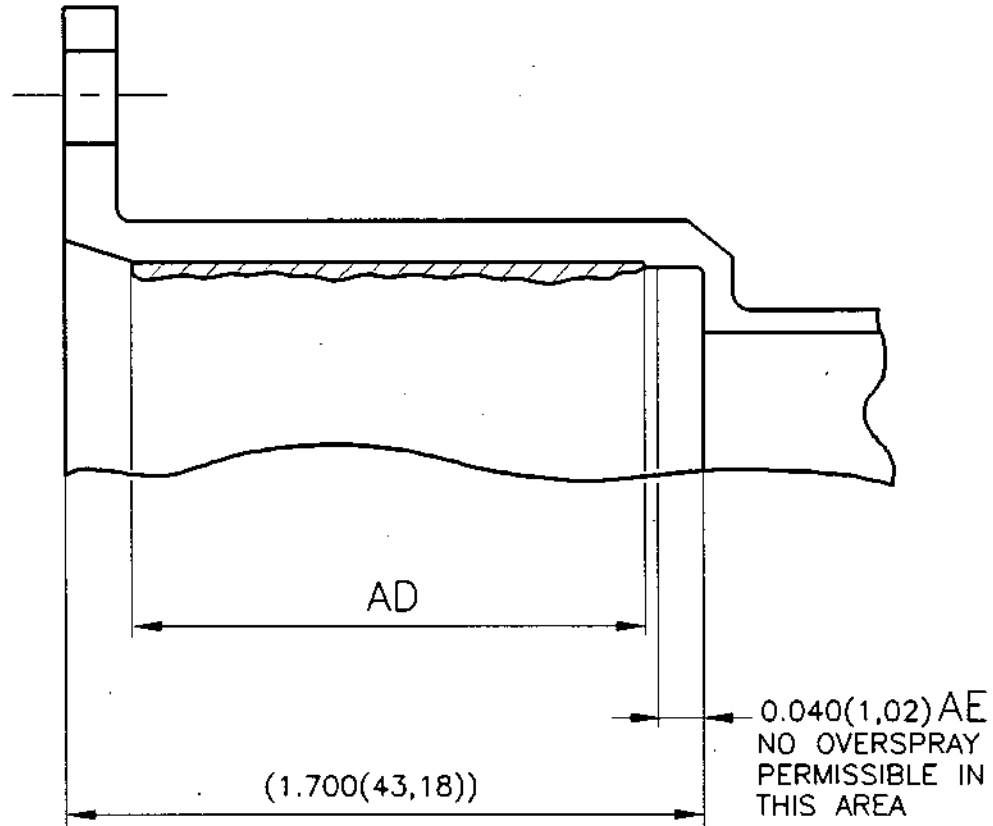
OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND



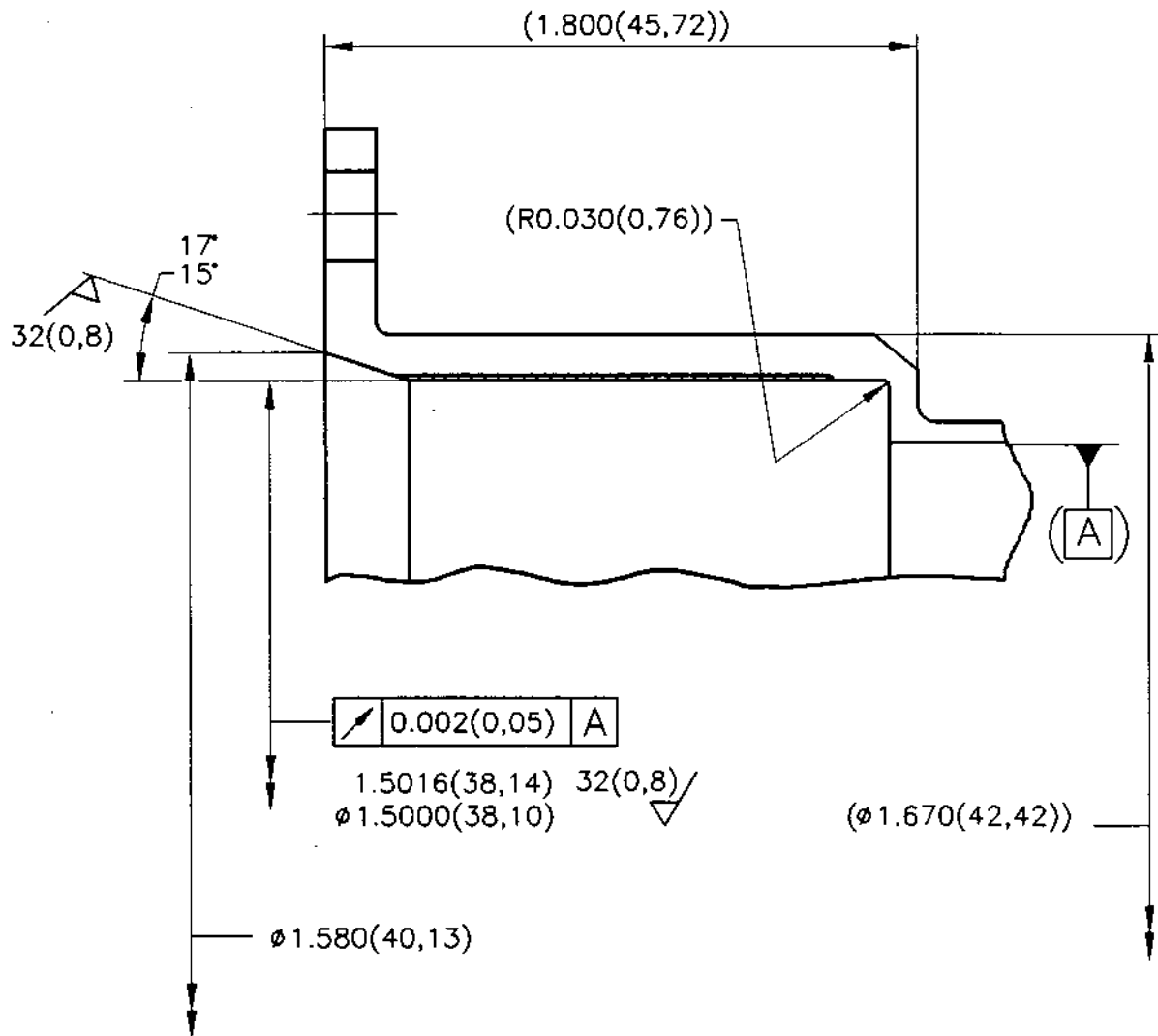
REPEAT DETAIL AB

APPLICATION OF PLASMA SPRAY  
FIG.404

REPAIR  
**75-11-02**  
Repair No. 4  
Page 407  
Jul 31/93



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



REPEAT DETAIL AB

FINAL MACHINING DETAILS  
FIG.405

REPAIR  
**75-11-02**  
Repair No. 4  
Page 408  
Jul 31/93





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



## ENGINE ANTI-ICING AIR CONTROL VALVE - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

PRINTED IN ENGLAND

TN27653

CLEANING

75-12-01

Page 201  
Jan 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except 10	Anti-icing valve control	A or B	-	-
			B	-	For cleaning details refer to vendors overhaul manual

Cleaning Processes  
Table 201

TN27654



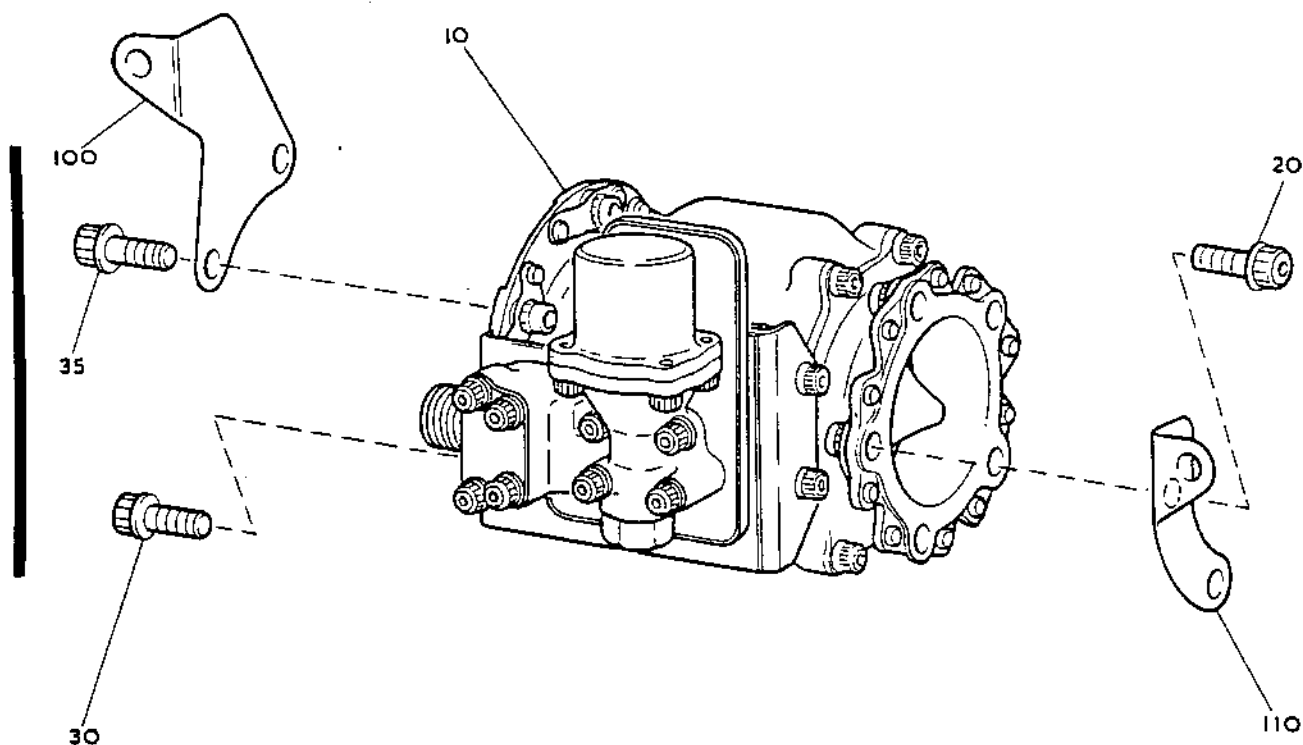
OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

CR 32357/00C



Valve, Air Pressure Control, Engine Anti-icing  
Figure 201



OLYMPUS 593

MK.610-14-28

OVERHAUL



## ENGINE ANTI-ICING AIR PRESSURE SWITCH - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

**75-41-01**

Page 201

Jan 1/77



OLYMPUS 593

MK,610-14-28

OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except 10	Anti-icing pressure switch	A or B	-	-
			B	-	For cleaning details refer to vendors overhaul manual

Cleaning Processes  
Table 201

TN27354



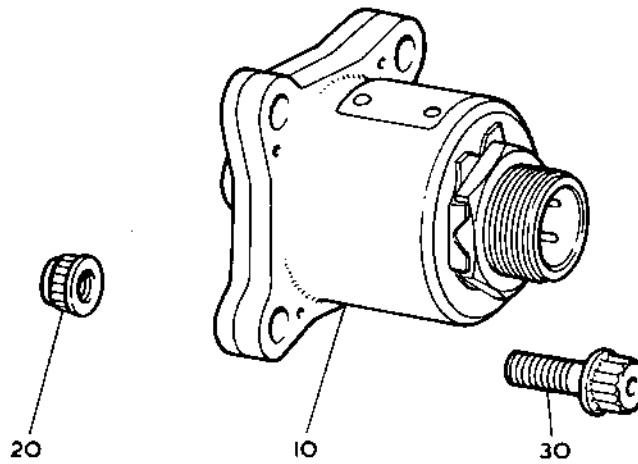
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32484/00B



TN27314

Switch, Air Pressure, Engine Anti-icing  
Figure 201

CLEANING  
**75-41-01**  
Page 203  
Aug 28/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



ENGINE ANTI-ICING AIR PRESSURE SWITCH - INSPECTION/CHECK

PRINTED IN ENGLAND

Anti-Icing Pressure Switch (Fig.301-10)

This item is to be inspected in accordance  
with the vendors Overhaul Manual (Ref.75-10-03).

TN38473

INSPECTION/CHECK

**75-41-01**

Page 301  
Aug 1/76

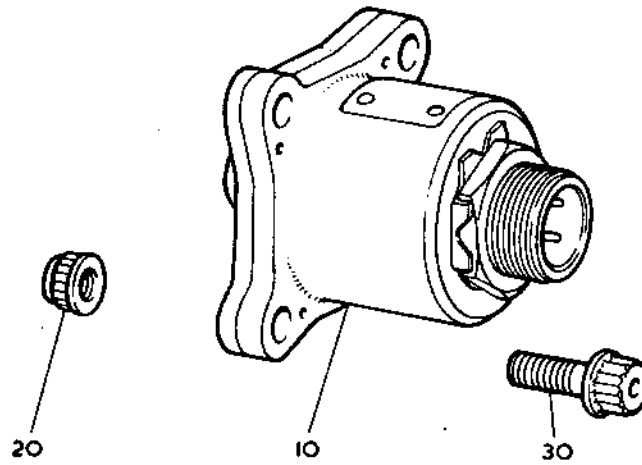


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32484/008



TN45061

Engine Anti-Icing Air Pressure Switch  
Figure 301

INSPECTION/CHECK

**75-41-01**

Page 302  
Aug 1/76



**CHAPTER**

**76**

**ENGINE  
CONTROLS**



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

## CHAPTER 76

### ENGINE CONTROLS

#### LIST OF EFFECTIVE PAGES

Printed in England

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
List of Effective Pages	1	Dec 31/01	76-12-02 (Cont'd.)	201	Jan 1/77
	2	Dec 31/01		202	Jan 1/77
				203	Aug 28/75
Table of Contents	1	Dec 1/96	Disassembly 76-13-03 Contents	1	Dec 1/96
				101	Dec 1/96
Table of Approved Repair Schemes	1	Jun 1/96		102	Dec 1/96
			Cleaning	201	Jun 1/96
				202	Jan 1/77
				203	Jun 1/96
Inspection/Check 76-10-00 Contents	1	Aug 1/76	Inspection/Check Contents	1	Dec 1/96
	2	Aug 1/76		301	Dec 1/96
	301	Apr 1/77		302	Dec 1/96
	302	Aug 1/76			
	303	Dec 1/75	Assembly Contents	1	Dec 1/96
	304	Aug 1/76		501	Dec 1/96
	305	Aug 1/76		502	Dec 1/96
	306	Aug 1/76		503	Dec 31/01
	307	Aug 1/76			
	308	Aug 1/76			
	309	Aug 1/76	Cleaning 76-15-02	201	Jan 1/77
	310	Aug 1/76		202	Jan 1/77
	311	Aug 1/76		203	Aug 28/75
	312	Aug 1/76			
Cleaning 76-11-01	201	Jan 1/77	Disassembly 76-21-01 Contents	1	Jun 30/95
	202	Jan 1/77		101	Apr 1/77
	203	Aug 28/75		102	Mar 1/76
76-12-01	201	Jan 1/77		103	Mar 1/76
	202	Jan 1/77		104	Mar 1/76
	203	Aug 28/75		105	Mar 1/76



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
76-21-01 (Cont'd.) Cleaning	201 202 203 204	Apr 1/77 Jan 1/77 Jun 1/96 Dec 1/96	76-21-01 (Cont'd.) Assembly Contents	1 501 502 503 504 505 506 507 508	Jun 1/98 Dec 1/95 Feb 1/81 Feb 1/81 Feb 1/81 Feb 1/81 Feb 1/81 Feb 1/81 Dec 31/01
Inspection/ Check Contents	1 2 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317	Apr 1/77 Jun 1/96 Apr 1/77 Apr 1/77 Apr 1/77 Apr 1/77 Jun 1/98 Jun 1/98 Jun 1/98 Jun 1/98 Apr 1/77 Apr 1/77 Jun 1/98 Jun 1/98 Jun 1/98 Dec 31/00 Jun 1/96 Jun 1/96 Jun 1/96	Special Tools etc.	1001	Apr 1/77
			Disassembly 76-21-02	101	Jun 1/96
			Cleaning	201 202 203	Jun 1/96 Jan 1/77 Jun 1/96
			Inspection/ Check Contents	1 2 301 302 303 304 305 306 307 308 309 310	Jun 1/96 Jun 1/96 Jun 1/96 Apr 1/77 Apr 1/77 Apr 1/77 Jun 1/98 Jun 1/98 Jun 1/98 Jun 1/98 Jun 1/98 Jun 1/96
Contents	1	Jun 1/98			
Repair No.1	CANCELLED				
Repair No.2	CANCELLED				
Repair No.3	401 402 403 404 405	Dec 1/91 Dec 1/91 Dec 1/91 Dec 1/91 Dec 1/91			
Repair No.4	401 402 403 404	Dec 30/98 Jul 31/93 Jul 31/93 Jul 31/93	Assembly	501	Jun 1/96



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

## CHAPTER 76

### ENGINE CONTROLS

#### TABLE OF CONTENTS

	CH/SEC/SUB	PAGE
List of Effective Pages ... ..	76	-
Table of Contents ... ..	76	-
Table of Approved Repair Schemes ... ..	76	-
Engine Controls (Containing SEC/SUB		
76-11-01, 76-12-01, 76-12-02,		
76-13-03 and 76-15-02) ... ..	76-10-00	301
Throttle Valve Control Actuator ... ..	76-11-01	201
LP Compressor RPM Probe ... ..	76-12-01	201
HP Compressor RPM Probe ... ..	76-12-02	201
Primary Nozzle Control Signal Pitot ... ..	76-13-03	101
		201
		301
		501
		1001
Reheat Flame Detector... ..	76-15-02	201
LP Shaft Signal System - Cylinder Piston		
Section with Front and Centre Cable		
Assemblies ... ..	76-21-01	101
		201
		301
		401
		501
		1001
LP Shaft Signal System - Rear Cable Assembly ...	76-21-02	101
		201
		301
		501

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



sneema

CHAPTER 76ENGINE CONTROLSTABLE OF APPROVED REPAIR SCHEMES

The following Repair Schemes have been approved by CAA/DGAC.

<u>Chapter/Section</u>	<u>Repair No.</u>	<u>Title</u>	<u>Salvage No.</u>
76-21-01	1	Deleted.	
	2	Deleted.	
	3	Piston. Provision for removal of fretting/wear on outside diameter.	B.513491
	4	Block, Front. Worn slotted conduit locations repaired by welding.	B.515457



OLYMPUS 593

MK.610-14-28

OVERHAUL

ENGINE CONTROLS - INSPECTION/CHECKTABLE OF CONTENTS

Para.		Page
1.	General ... ..	301
2.	General Inspection ... ..	301
3.	Crack Detection... ..	301
	A. Magnetic Particle Crack Detection ... ..	301
	B. Fluorescent Dye Crack Detection ... ..	302
4.	Gearbox Actuator ... ..	304
5.	LP Compressor RPM Probe ... ..	304
6.	HP Compressor RPM Probe ... ..	304
7.	Pitot Union ... ..	304
	A. Inspect Thread ... ..	304
	B. Inspect Abutment Flange... ..	304
	C. Inspect Bore of Pitot Union ... ..	305
8.	Restrictor ... ..	305
	A. Inspect General Condition of Restrictor ... ..	305
	B. Inspect Restrictor Orifice ... ..	305
9.	Filter Assembly... ..	306
	A. Inspect Gauze ... ..	306
10.	Spring ... ..	306
	A. Inspect Spring ... ..	306
11.	Pitot ... ..	306
	A. Inspect Bore ... ..	306
	B. Inspect Pitot Probe ... ..	306
	C. Inspect Abutment Flange... ..	307
12.	Connector... ..	307
	A. Inspect Thread ... ..	307
	B. Inspect Abutment Flange... ..	307
13.	Reheat Flame Detector... ..	307

TABLE OF ILLUSTRATIONS

Fig.No.		Page
301	Crack Detection Test Diagram ... ..	303
302	Gearbox Actuator ... ..	308
303	LP Compressor RPM Probe... ..	309
304	HP Compressor RPM Probe... ..	310
305	PNC Signal Pitot ... ..	311
306	Reheat Flame Detector ... ..	312

INSPECTION/CHECK

**76-10-00**

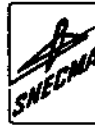
Contents 1

Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



LIST OF TABLES

Table No.		Page
301	Items to be Magnetic Particle Crack Tested ...	302
302	Items to be Fluorescent Dye Crack Tested ...	302
303	Cross References to Illustrated Parts Catalogue...	304

FN15610

INSPECTION/CHECK

**76-10-00**

Contents 2

Aug 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



## ENGINE CONTROLS - INSPECTION/CHECK

### 1. General

- A. Each item in this chapter is given a two-part identification; thus, 302-20 refers to Figure 302 and to Item 20 called out on that figure. Each item may be further identified by its Part Number by the use of Table 303, which cross-refers figures in this chapter to the equivalent chapter and figure in the Illustrated Parts Catalogue (I.P.C.); the called-out item number will be the same on both figures.
- B. All items which will be crack tested are listed in Tables 301 and 302.
- C. Dimensional checks are cross referenced to the equivalent Fits and Clearances Schedule (F.C.S.) chapter against the item concerned.
- D. When the inspection of an item discloses a minor defect that requires rectification, it is defined as 'Accept after repair'. On all such occasions the item must be rectified in accordance with Standard Practices 72-09-22 Repair. Where a Ref.No. follows 'Accept after repair' e.g. (Ref.72-21-01 Repair No.1), a specific Repair Scheme is available to which the item must be rectified. Items that are rejected, or for which a repair scheme is not currently available, should be held at the discretion of the operator, as service experience may prove the need for a repair.
- E. On completion of a repair, rectification or test, the item(s) must be inspected, to ensure that the necessary work has been satisfactorily completed.

### 2. General Inspection

- A. Inspect all items illustrated in this chapter, whether specified or not, in accordance with Standard Practices (Ref.72-09-00 Inspection/Check). In addition, carry out the inspections detailed for the specified items, from para.4 onwards.
- B. Inspection terms used in this chapter are explained in Standard Practices (Ref.72-09-00 Inspection/Check).

### 3. Crack Detection

- A. Magnetic Particle Crack Detection.

(1) Submit the items listed in Table 301 to crack detection in accordance with the process quoted.

INSPECTION/CHECK

**76-10-00**

Page 301

Apr 1/77



**OLYMPUS 593**MK.610-14-28  
OVERHAUL

- (2) Items to be crack detected by this method are illustrated in the Crack Detection Test Diagram (Fig.301). For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

No current requirement

Items to be Magnetic Particle Crack Tested  
Table 301

B. Fluorescent Dye Crack Detection.

- (1) Submit the items listed in Table 302 to crack detection in accordance with the process quoted. For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
305	20	Pitot Union	FlA
305	80	Pitot	FlA
305	110	Pitot Union	FlA

Items to be Fluorescent Dye Crack Tested  
Table 302

TN22092

INSPECTION/CHECK

**76-10-00**

Page 302

Aug 1/76

PRINTED IN ENGLAND



OLYMPUS 593

MK.610-14-28  
OVERHAUL



No Current Requirment

TN22093

Crack Detection Test Diagram  
Figure 301

INSPECTION/CHECK

**76-10-00**

Page 303  
Dec 1/75

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



FIG.NO.	ILLUSTRATED PARTS CATALOGUE EQUIVALENT	
301	Not applicable	
302	76-11-01	Fig.1.
303	76-12-01	Fig.1.
304	76-12-02	Fig.1.
305	76-13-03	Fig.1.
306	76-15-02	Fig.1.

Cross References to Illustrated Parts Catalogue  
Table 303

4. Gearbox Actuator (302-10)

- A. Inspect in Accordance with Vendors Overhaul Manual  
(Ref.76-11-01).

5. LP Compressor RPM Probe (303-10)

- A. Inspect in Accordance with Vendors Overhaul Manual  
(Ref.77-10-10).

6. HP Compressor RPM Probe (304-10)

- A. Inspect in Accordance with Vendors Overhaul Manual  
(Ref.77-10-09).

7. Pitot Union (305-20)

- A. Inspect Thread (Ref.72-09-00 Inspection/Check).  
B. Inspect Abutment Flange.

(1) Nicks and burrs.

Accept after  
repair.

TN22094

INSPECTION/CHECK

**76-10-00**

Page 304

Aug 1/76



OLYMPUS 598

MK.610-14-28

OVERHAUL



(2) Wear.

- |     |  |                      |
|-----|--|----------------------|
| (a) | Not more than 10 per cent reduction in flange thickness. | Accept.              |
| (b) | Bolt holes elongated not more than 0.030 in. (0,760 mm). | Accept after repair. |
| (c) | Slight witness mark in tube nipple seating.              | Accept after repair. |

C. Inspect Bore of Pitot Union.

(1) Scores.

- |     |  |                      |
|-----|--|----------------------|
| (a) | Not more than 0.002 in. (0,050 mm) in depth. | Accept after repair. |
|-----|--|----------------------|

(2) Wear.

- |     |                      |                      |
|-----|----------------------|----------------------|
| (a) | Slight witness mark. | Accept after repair. |
|-----|----------------------|----------------------|

8. Restrictor (305-40)

CAUTION: THE ORIFICE IS A METERING ORIFICE, DO NOT USE HARD OBJECTS TO CLEAR OBSTRUCTIONS.

A. Inspect General Condition of Restrictor.

- |     |  |                      |
|-----|--|----------------------|
| (1) | Nicks and burrs.   | Accept after repair. |
| (2) | Scores.  |                      |
| (a) | Not more than 0.002 in. (0,050 mm) in depth on the outside diameter. | Accept after repair. |

B. Inspect Restrictor Orifice.

NOTE: Orifice diameter must be between 0.029 and 0.041 in. (0,7366 and 1,0414 mm).

INSPECTION/CHECK

76-10-00

Page 305  
Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



9. Filter Assembly (305-60)

A. Inspect Gauze.

(1) Damage.

(a) Tears and punctures. Reject.

(2) Nicks and burrs.

(a) Not more than 0.002 in.  
(0,050 mm) deep on the  
outside diameter. Accept after  
repair.

10. Spring (305-70)

A. Inspect Spring.

(1) Check spring compression load. Use spring test  
equipment (Ref.72-09-00 Inspection/Check).

(a) Free length Accept.  
0.500 in. + 0.015 in.  
(12,700  $\pm$  0,3810 mm).

(b) Installed length 0.250 in. Accept.  
(6,350 mm) minimum.

(c) Load rate 3.24 lb/in. Accept.  
(0,56 N/mm).

11. Pitot (305-80)

A. Inspect Bore.

CAUTION: DO NOT USE HARD OBJECTS TO CLEAR OBSTRUCTION.

(1) Obstruction.

(a) Any obstruction. Reject for  
cleaning  
investigation.

B. Inspect Pitot Probe.

(1) Damage.

TN8184

INSPECTION/CHECK

76-10-00

Page 306  
Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(a) Uninterrupted contour.

Accept.

C. Inspect Abutment Flange.

(1) Nicks and burrs.

Accept after  
repair.

(2) Wear.

(a) Not more than 10 per cent  
reduction in flange  
thickness.

Accept.

(b) Bolt holes elongated not  
more than 0.030 in.  
(0,760 mm).

Accept after  
repair.

12. Connector (305-110)

A. Inspect Thread (Ref.72-09-00 Inspection/Check).

B. Inspect Abutment Flange.

(1) Nicks and burrs.

Accept after  
repair.

(2) Wear.

(a) Not more than 10 per cent  
reduction in flange  
thickness.

Accept.

(b) Bolt holes elongated  
not more than 0.030 in.  
(0,760 mm).

Accept after  
repair.

(c) Slight witness mark in  
tube nipple seating.

Accept after  
repair.

13. Reheat Flame Detector (306-80)

A. Inspect in Accordance with Vendors Overhaul Manual  
(Ref.76-15-02).

PRINTED IN ENGLAND

TN12853

INSPECTION/CHECK

76-10-00

Page 307

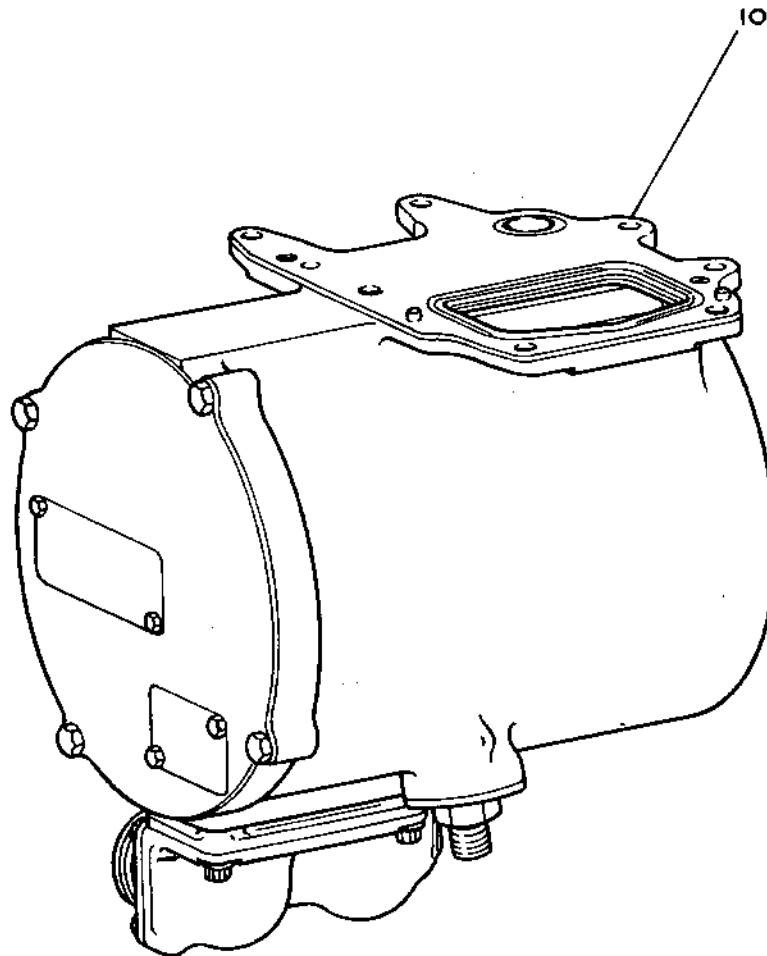
Aug 1/76



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 33182/00A



TN9159

Gearbox Actuator  
Figure 302

INSPECTION/CHECK

**76-10-00**

Page 308-  
Aug 1/76

PRINTED IN ENGLAND

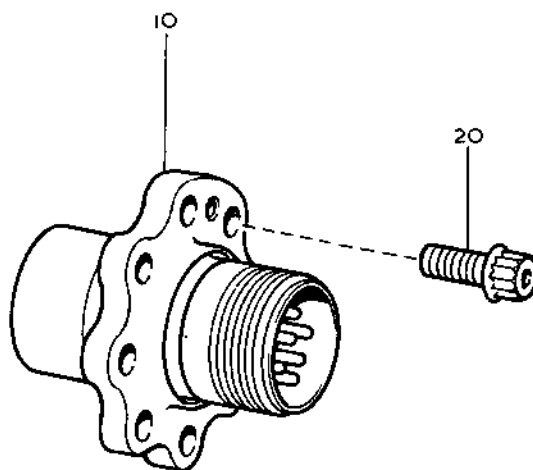
TN14252



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 32485/00B



LP Compressor RPM Probe  
Figure 303

INSPECTION/CHECK

**76-10-00**

Page 309  
Aug 1/76



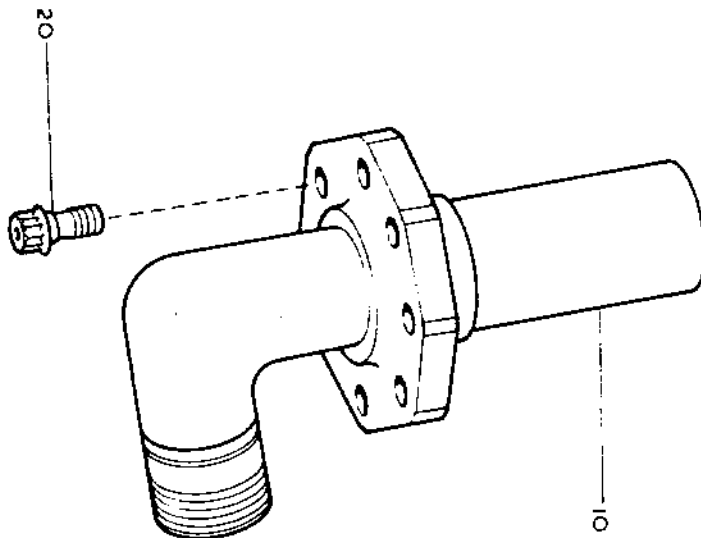


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32486 00B



TN14253

HP Compressor RPM Probe  
Figure 304

INSPECTION/CHECK

**76-10-00**

Page 310  
Aug 1/76

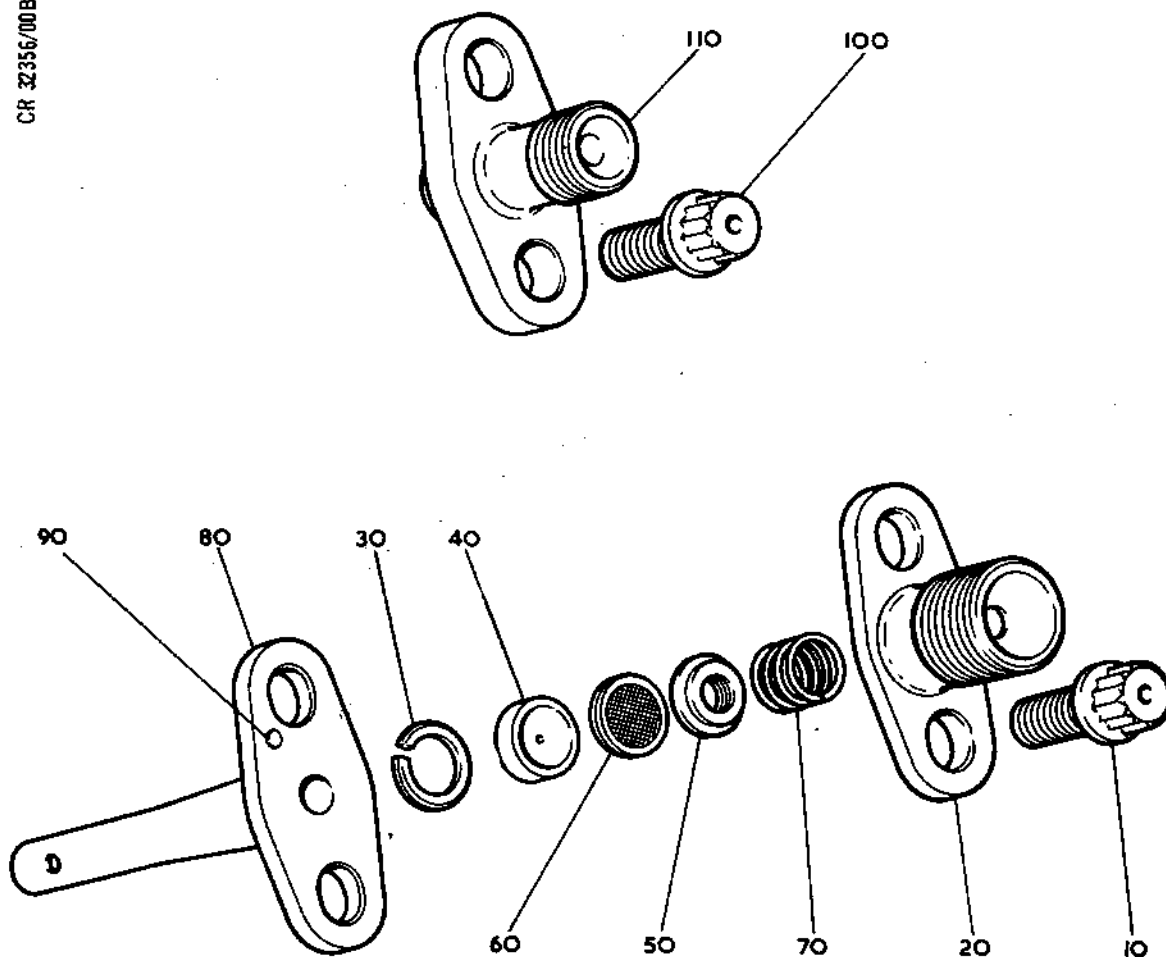


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32356/00B



PNC Signal Pitot  
Figure 305

INSPECTION/CHECK

**76-10-00**

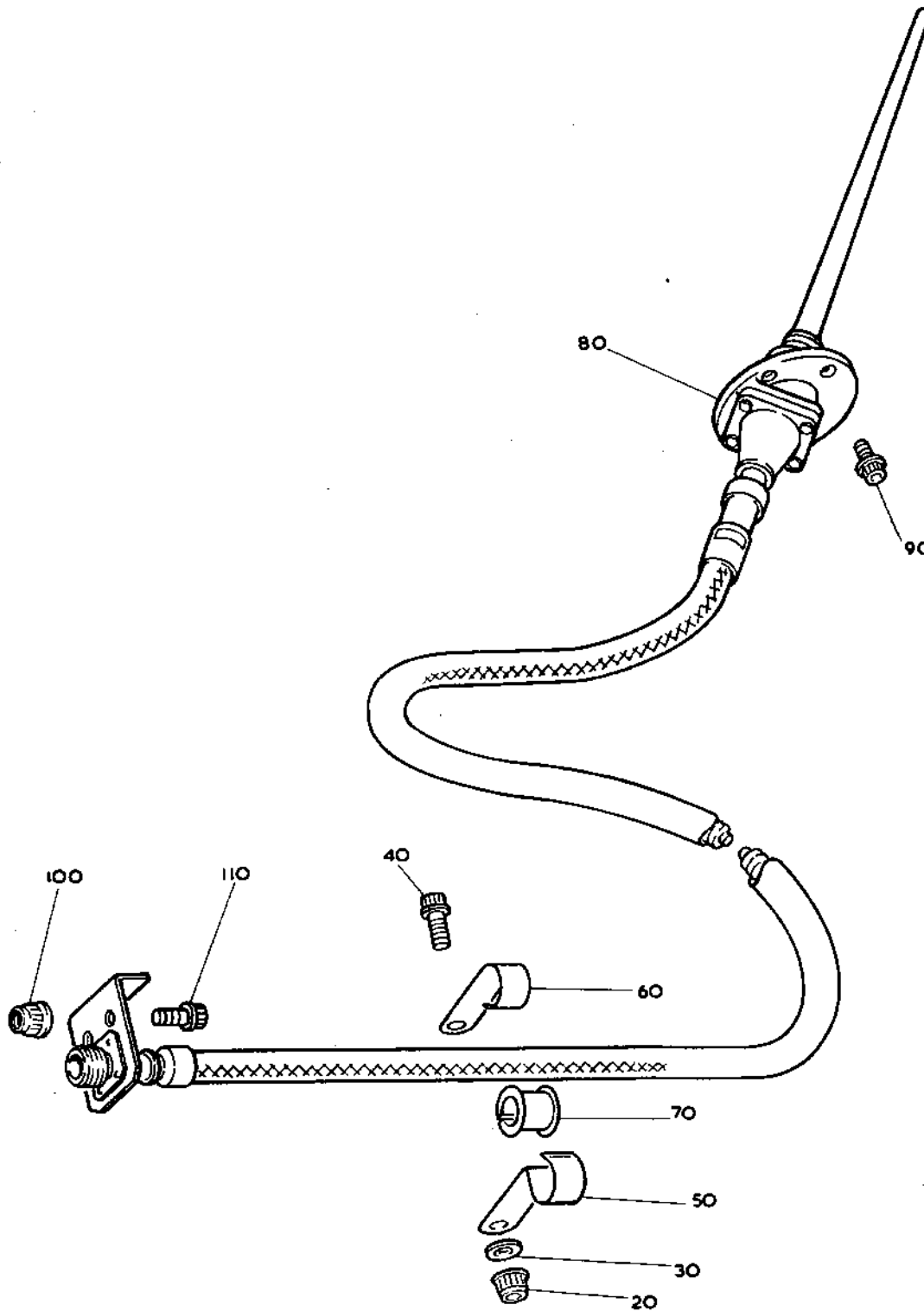
Page 311  
Aug 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 32538/00B



TN14257

Reheat Flame Detector  
Figure 306

INSPECTION/CHECK

76-10-00

Page 312  
Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## THROTTLE VALVE CONTROL ACTUATOR - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

PRINTED IN ENGLAND

TN27104



OLYMPUS 593

MK.610-14-28

OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	10	Actuator gearbox	B	-	For cleaning details refer to vendors overhaul manual

Cleaning Processes  
Table 201

TN27343



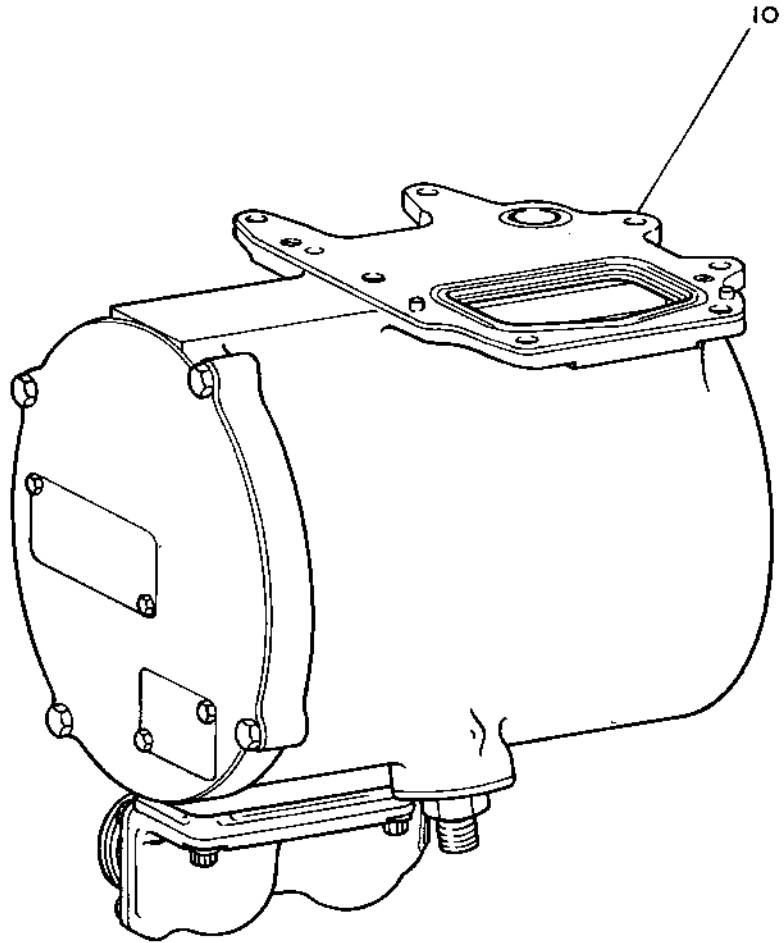
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 33182/00A



Actuator, Gearbox  
Figure 201

TN19794

CLEANING  
**76-11-01**  
Page 203  
Aug 28/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



LP COMPRESSOR RPM PROBE - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

76-12-01

Page 201

Jan 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	10	RPM probe, LP compressor	B	-	For cleaning details refer to vendors overhaul manual.
	20	Bolt	A or B	-	

Cleaning Processes  
Table 201

IN27316





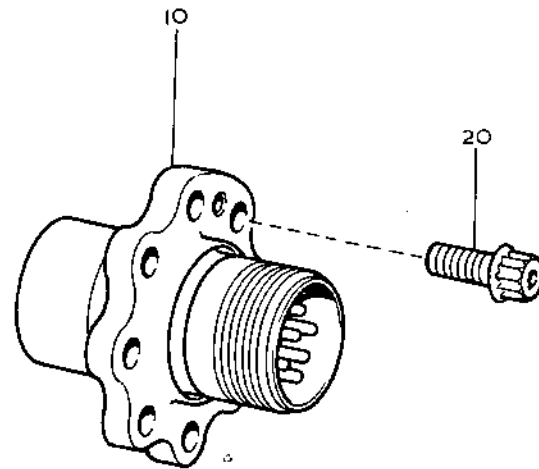
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32485/00B



TN27652

LP Compressor, RPM Probe  
Figure 201

CLEANING  
**76-12-01**  
Page 203  
Aug 28/75



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



HP COMPRESSOR RPM PROBE - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

76-12-02

Page 201  
Jan 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	10	RPM probe, HP compressor	B	-	For cleaning details refer to vendors overhaul manual.
	20	Bolt	A or B	-	-

Cleaning Processes  
Table 201

TN19700



OLYMPUS 593

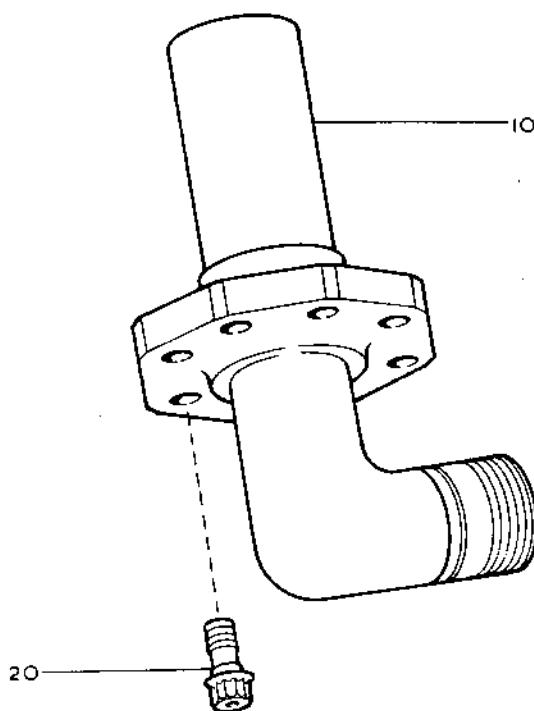
MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

CR 32486/00B



TN19762

HP Compressor RPM Probe  
Figure 201

CLEANING  
**76-12-02**  
Page 203  
Aug 28/75



OLYMPUS 593



MK.610-14-28

sneema

OVERHAUL

PRIMARY NOZZLE CONTROL SIGNAL PITOT AND REHEAT PRESSURE  
DETECTOR CONNECTOR - DISASSEMBLY

TABLE OF CONTENTS

Para.	Page
1. General	101
2. Disassemble the Signal Pitot	101
A. Remove Pitot	101
B. Disassemble Pitot Union, Restrictor and Filters	101
3. Disassemble the Reheat Pressure Detector Connector	101
A. Remove Connector	101

TABLE OF ILLUSTRATIONS

Fig.No.	Page
101 Pitot and Reheat Pressure Detector Location.	
Detail	102

Printed in England

DISASSEMBLY

76-13-03

Contents 1

Dec 1/96

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

sneema

PRIMARY NOZZLE CONTROL SIGNAL PITOT AND REHEAT PRESSURE  
DETECTOR CONNECTOR - DISASSEMBLY

1. General

- A. Before commencing the disassembly, refer to 72-09-00 Disassembly, for general information.
- B. The pitot is located on the spherical joint flange and is installed on the left or right-hand side depending on the engine position in the nacelle. The alternative location is used for the installation of the reheat pressure detector connector.
- C. Filters and a restrictor are retained in the pitot union by a circlip. The filters are withdrawn from the pitot union for inspection/check or renewal after pitot union removal from the engine (Ref.para.2.C.).
- D. The removal and installation of the primary nozzle control signal pitot and reheat pressure detector connector is also detailed in 72-53-00.

2. Disassemble the Signal Pitot (Ref.Fig.101)

- A. Remove Pitot.
  - (1) Remove wire-locking and unscrew tube union nut.
  - (2) Remove and discard the securing bolts, then remove the pitot union.
  - (3) Withdraw pitot from mounting on spherical joint flange.
- B. Disassemble Pitot Union, Restrictor and Filters.
  - (1) Extract circlip and remove loose items from the pitot union in the sequence shown.

3. Disassemble the Reheat Pressure Detector Connector (Ref.Fig.101)

- A. Remove Connector.
  - (1) Remove wire-locking.
  - (2) Unscrew tube union nut.
  - (3) Remove and discard the securing bolts, then remove the connector.

DISASSEMBLY

**76-13-03**

Page 101

Dec 1/96

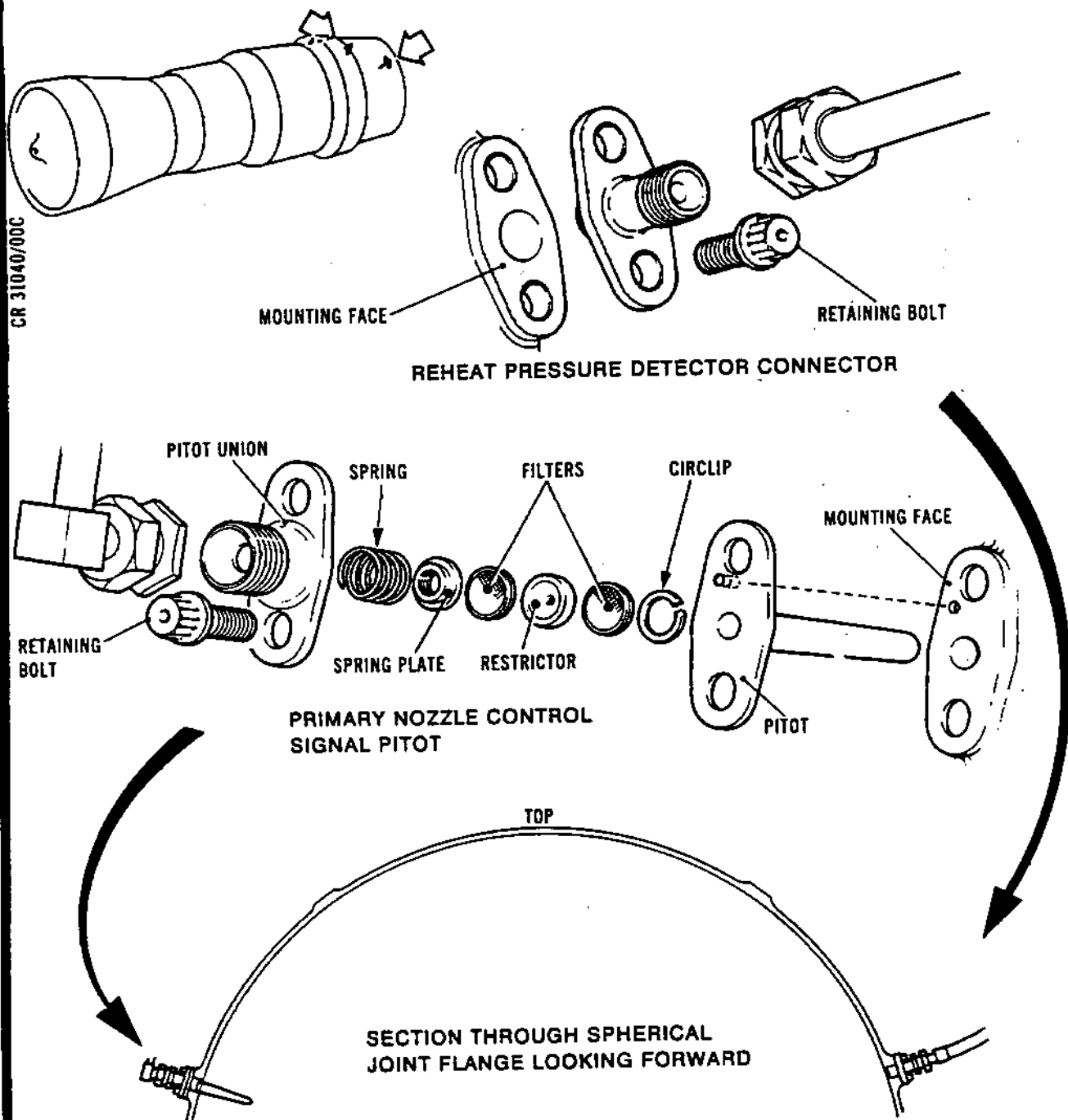


# OLYMPUS 593



MK.610-14-28  
OVERHAUL

SHEEMA



THE POSITIONS OF THE SIGNAL PITOT  
AND REHEAT PRESSURE DETECTOR DEPENDS  
ON THE ENGINE POSITION IN THE NACELLE.  
THE POSITIONS COULD BE THE REVERSE  
OF THAT SHOWN.

Pitot and Reheat Pressure Detector Location Detail  
Figure 101

DISASSEMBLY  
**76-13-03**  
Page 102  
Dec 1/96



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

PRIMARY NOZZLE CONTROL SIGNAL PITOT AND REHEAT PRESSURE  
DETECTOR CONNECTOR - INSPECTION/CHECK

TABLE OF CONTENTS

Para.	Page
1. General ... ..	301
2. General Inspection...	301
3. Inspect Filters ...	301
4. Inspect Restrictors ...	301

TABLE OF ILLUSTRATIONS

Fig.No.	Page
301 Pitot - PNC Signal and Reheat Pressure Detector Connector ... ..	302

LIST OF TABLES

Fig.No.	Page
301 Cross References to Illustrated Parts Catalogue ...	301

INSPECTION/CHECK

76-13-03

Contents 1  
Dec 1/96





OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

PRIMARY NOZZLE CONTROL SIGNAL PITOT AND REHEAT PRESSURE  
DETECTOR CONNECTOR - INSPECTION/CHECK

1. General

- A. Each item in this chapter is given a two-part identification; thus, 301-20 refers to Figure 301 and to Item 20 called out on that figure. Each item may be further identified by its Part Number by the use of Table 301, which cross-refers figures in this chapter to the equivalent chapter and figure in the Illustrated Parts Catalogue (I.P.C.); the called-out item number will be the same on both figures.

2. General Inspection

- A. Inspect all items illustrated in this chapter, whether specified or not, in accordance with Standard Practices (Ref.72-09-00 Inspection/Check). In addition, carry out the inspections detailed for the specified items, from para.3 onwards.

---

FIG. NO.      ILLUSTRATED PARTS CATALOGUE EQUIVALENT

---

301

76-13-03

Fig.1

---

Cross References to Illustrated Parts Catalogue  
Table 301

3. Inspect Filters (301-60)

- A. Inspect the filter for freedom from damage.

4. Inspect Restrictors (301-40)

- A. Inspect the restrictor for obstructions.

INSPECTION/CHECK

76-13-03

Page 301  
Dec 1/96



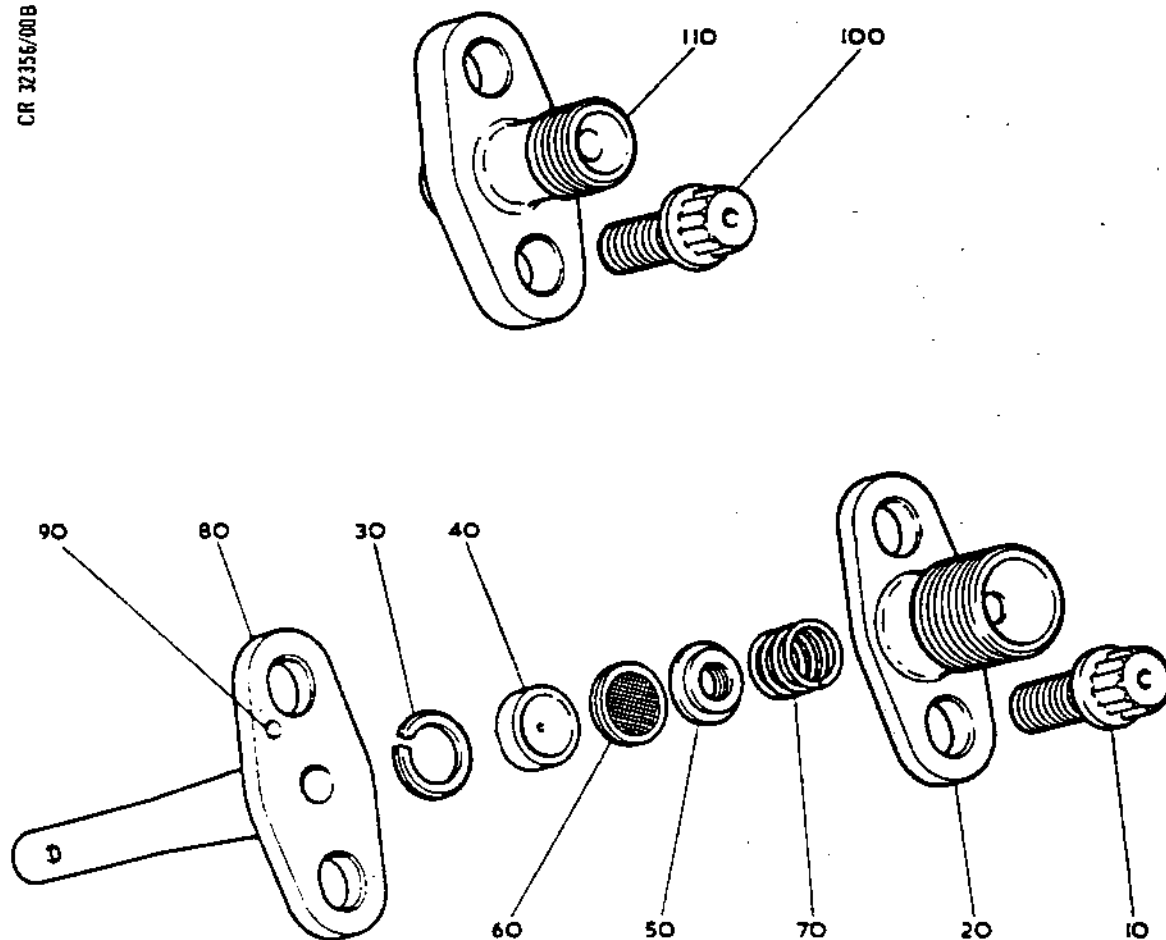
OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

CR 32356/00B



Pitot - PNC Signal and Reheat Pressure Detector Connector  
Figure 301

INSPECTION/CHECK

76-13-03

Page 302  
Dec 1/96



OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

PRIMARY NOZZLE CONTROL SIGNAL PITOT AND REHEAT  
DETECTOR CONNECTOR - ASSEMBLY

TABLE OF CONTENTS

Para.	Page
1. General	501
2. Assemble the Signal Pitot	501
A. Assemble Pitot Union and Associated Loose Items	501
B. Install Pitot and Pitot Union Assembly...	503
3. Assemble the Reheat Pressure Detector Connector	503
A. Install Connector	503

TABLE OF ILLUSTRATIONS

Fig.No.	Page
501 Pitot and Reheat Pressure Detector Location.	
Detail	502

Printed in England

ASSEMBLY

76-13-03

Contents 1

Dec 1/96

**OLYMPUS 593**

MK.610-14-28

SNECMA

OVERHAUL

PRIMARY NOZZLE CONTROL SIGNAL PITOT AND REHEAT  
DETECTOR CONNECTOR - ASSEMBLY

1. General

- A. Before commencing the assembly, refer to 72-09-00 Assembly, for general information.
- B. The pitot is located on the spherical joint flange and is installed on the left or right-hand side depending on the engine position in the nacelle. The alternative location is used for the installation of the reheat pressure detector connector.
- C. Filters and a restrictor are retained in the pitot union by a circlip. The filters are withdrawn from the pitot union for inspection/check or renewal after pitot union removal from the engine (Ref. para.2.C.).
- D. The removal and installation of the primary nozzle control signal pitot and reheat pressure detector connector is also detailed in 72-53-00.
- E. During the assembly procedure, reference will be made to the Illustrated Parts Catalogue (I.P.C.) 76-21-01, to identify those items where the nomenclature does not positively identify them, due to the duplication of the title, e.g. nuts, bolts and washers etc. When the item is a part of the breakdown of the text concerned, the item will be identified as nut (1-10), the 1 referring to the I.P.C. Fig.No. and the 10 referring to the Item No.

2. Assemble the Signal Pitot (Ref. Fig.501)

- A. Assemble Pitot Union and Associated Loose Items.
  - (1) Insert spring and spring plate in pitot union.
  - (2) Place the restrictor between the two filters and insert the group in the pitot union against the spring plate.
  - (3) Verify that the assembly sequence has conformed to that shown in Figure 501 and install the retaining circlip.

ASSEMBLY

**76-13-03**

Page 501

Dec 1/96



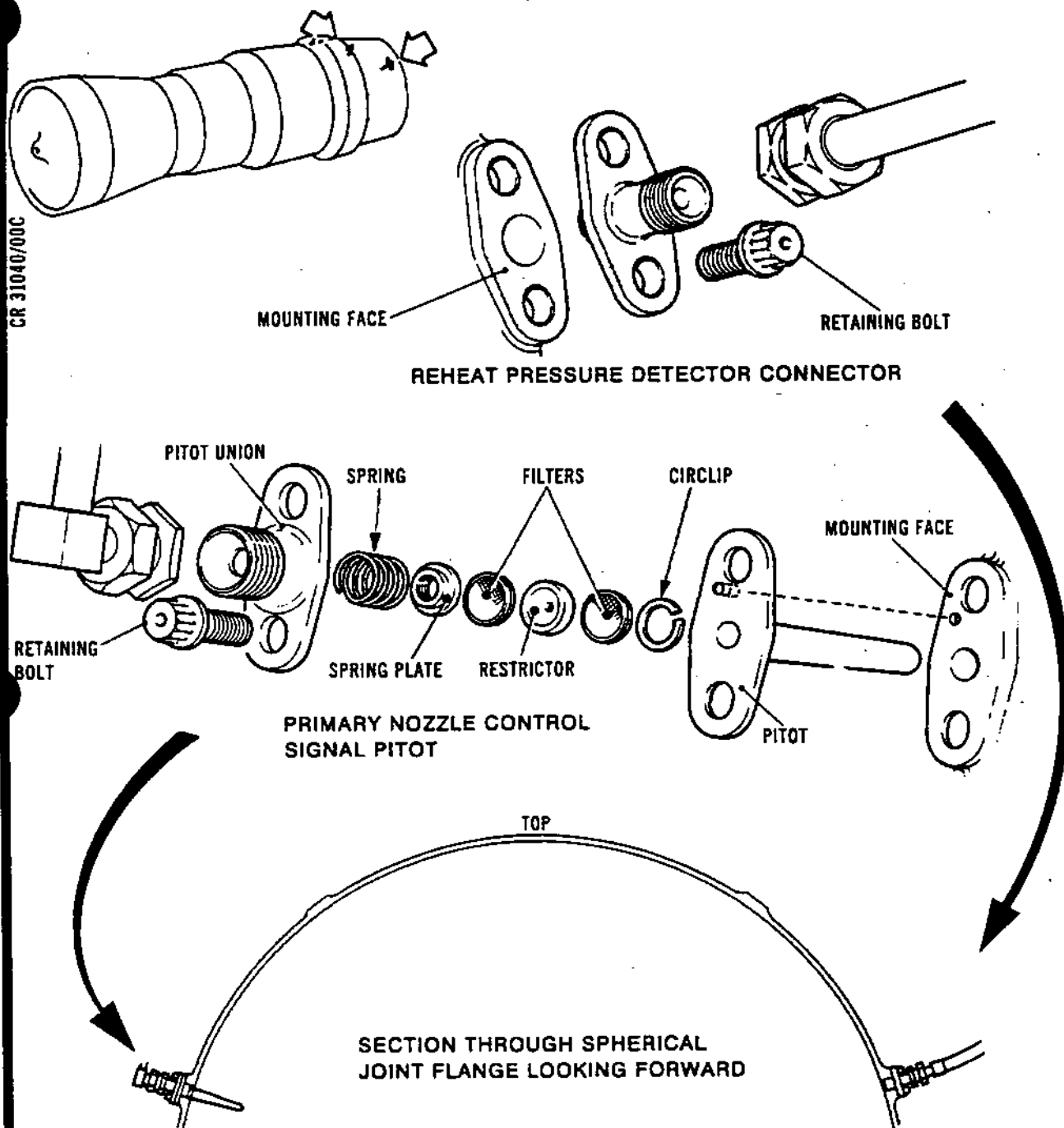
# OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema

CR 31040/00C



THE POSITIONS OF THE SIGNAL PITOT  
AND REHEAT PRESSURE DETECTOR DEPENDS  
ON THE ENGINE POSITION IN THE NACELLE.  
THE POSITIONS COULD BE THE REVERSE  
OF THAT SHOWN.

Pitot and Reheat Pressure Detector Location Detail  
Figure 501

ASSEMBLY  
**76-13-03**  
Page 502  
Dec 1/96



OLYMPUS 593

MK.610-14-28  
OVERHAUL



snecma

B. Install Pitot and Pitot Union Assembly.

- (1) Apply lubricant B (Ref.70-00-01, Servicing and Storage Materials) to the tube union connections and lubricant C to two new securing bolts (1/10A).
- (2) Position the pitot in its location with the assembly pin engaging the locating hole at the mating faces.
- (3) Position union assembly on pitot and secure pitot and pitot union assembly with the two new bolts and torque-tighten to 100 lbf in. (11,5 N.m.).
- (4) Screw on tube union nut and torque-tighten to between 190 and 210 lbf in. (21,5 and 23,5 N.m.).
- (5) Wire-lock union nut and securing bolts together.

3. Assemble the Reheat Pressure Detector Connector (Ref. Fig.501)

A. Install connector.

- (1) Apply lubricant A to two new securing bolts (1/100A).
- (2) Position the connector on its location face and secure with the two new bolts. Torque-tighten to 100 lbf in. (11,5 N.m.).
- (3) Screw on tube union nut and torque-tighten to between 190 and 210 lbf in. (21,5 and 23,5 N.m.).
- (4) Wire-lock union nut and securing bolts together.

ASSEMBLY

76-13-03

Page 503

Dec 31/01



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

PRIMARY NOZZLE CONTROL SIGNAL PITOT AND REHEAT PRESSURE  
DETECTOR CONNECTOR - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

76-13-03

Page 201

Jun 1/96



OLYMPUS 593

MK.610-14-28

OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		B	G	-

Cleaning Processes  
Table 201

CLEANING

76-13-03

Page 202  
Jan 1/77

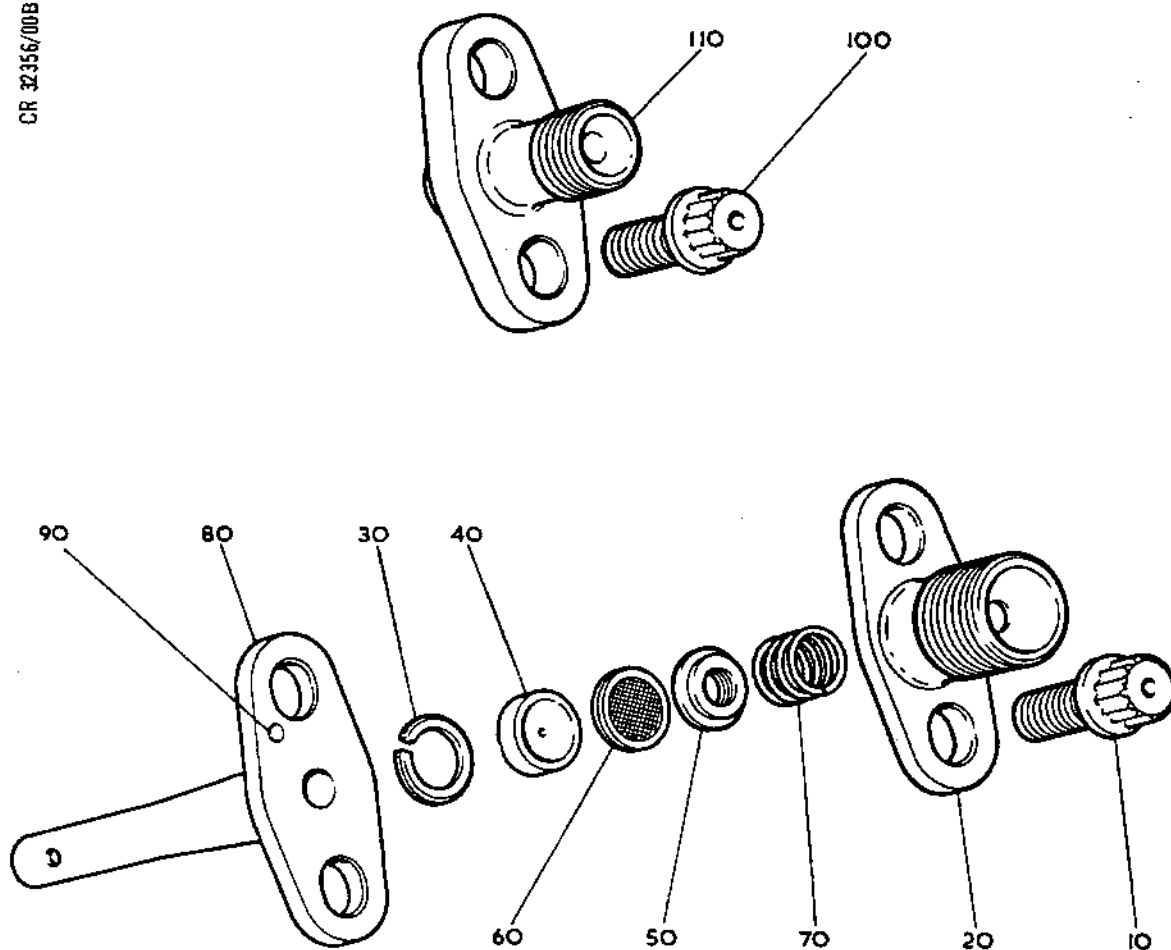




**OLYMPUS 593**  
MK.610-14-28  
OVERHAUL



CR 32356/00B



Pitot - PNC Signal and Reheat Pressure Detector Connector  
Figure 201



OLYMPUS 593

MK.610-14-28

OVERHAUL



REHEAT FLAME DETECTOR - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

76-15-02

Page 201

Jan 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except 80	Reheat flame detector	A or B	-	-
			B	-	For cleaning details refer to vendors overhaul manual.

Cleaning Processes  
Table 201

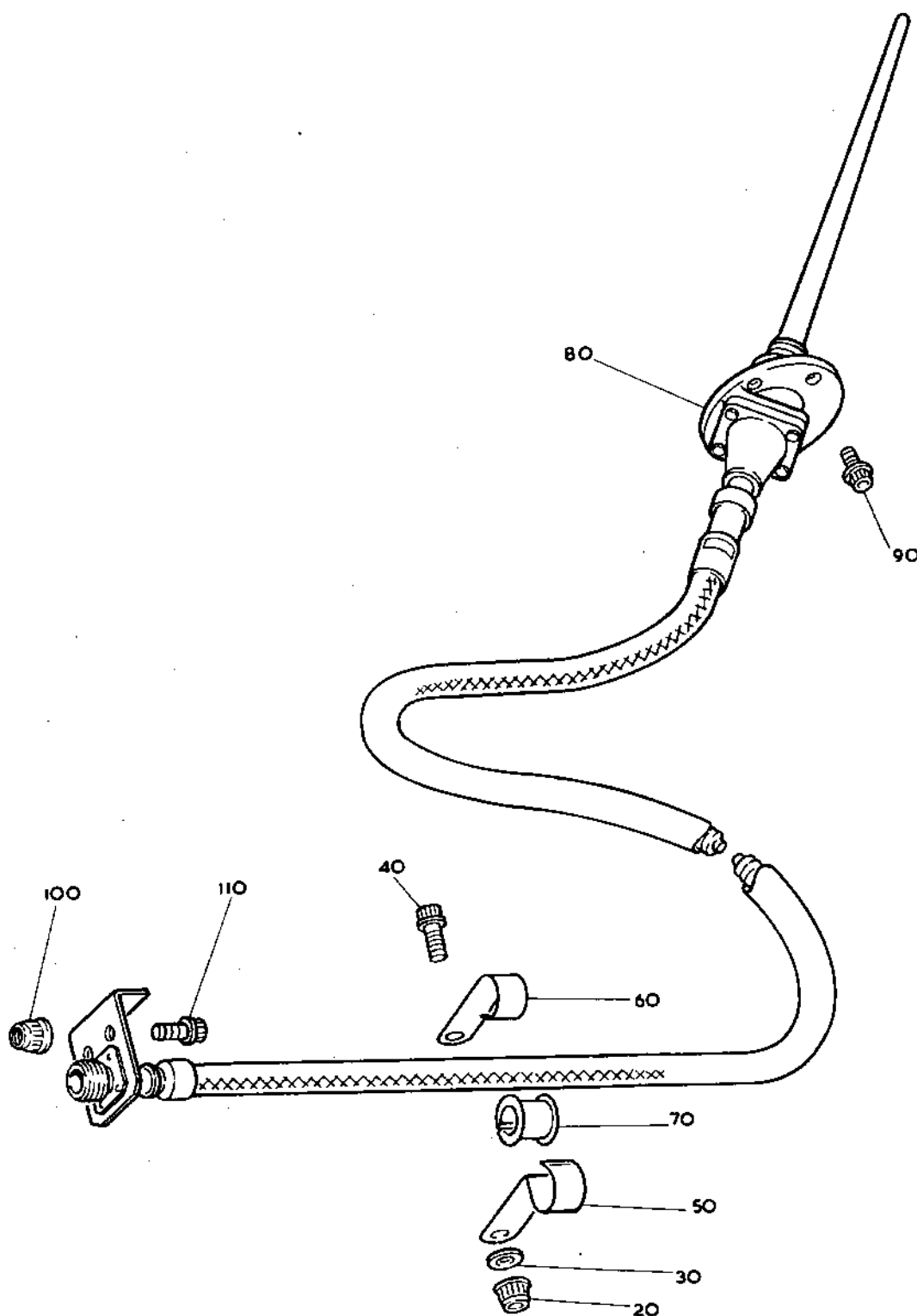
TN19764



OLYMPUS 593

MK.610-14-28

OVERHAUL



Reheat Flame Detector  
Figure 201



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



LP SHAFT SIGNAL SYSTEM - INSPECTION/CHECK

TABLE OF CONTENTS

Para.	Page
1. General ... ..	301
2. General Inspection ... ..	301
3. Crack Detection... ..	302
A. Magnetic Particle Crack Detection ... ..	302
B. Fluorescent Dye Crack Detection ... ..	302
4. Flanged Adapter Assembly ... ..	304
A. Inspect Abutment Flanges ... ..	304
B. Inspect Shield Tube Location ... ..	305
C. Inspect Split Guide Bushes ... ..	305
5. Shield Tube ... ..	305
A. Inspect Tube ... ..	305
6. Cable Assembly ... ..	305
A. Inspect Threads ... ..	305
B. Inspect End Fittings ... ..	305
C. Inspect Shouldered Pin Locations ... ..	306
D. Inspect Cable ... ..	306
7. Base Plate ... ..	306
A. Inspect Abutment Face ... ..	306
B. Inspect Flanged Adapter Locating Recess ... ..	307
C. Inspect External Diameter of Piston Spigot ... ..	307
D. Inspect Bore of Spigot ... ..	307
8. Sliding Guard Assembly ... ..	308
A. Inspect Sliding Guard Assembly ... ..	308
B. Inspect Abutment Flange ... ..	308
9. Cylinder ... ..	308
A. Inspect Abutment Flange... ..	308
B. Inspect Cylinder Bore ... ..	309
C. Inspect Piston Shaft Diameter of Cylinder Bore ... ..	309
D. Inspect Spring Stop Flange in Cylinder Bore ... ..	309
E. Inspect Strap Assembly Location ... ..	310
F. Inspect Sliding Guard Assembly Location ... ..	310
10. Piston ... ..	310
A. Inspect Piston Shaft ... ..	310
B. Inspect Spring Location Flange ... ..	311
C. Inspect Nut and Retaining Ring Location ... ..	311
11. Spring ... ..	311
A. Inspect Spring ... ..	311
12. Catch Plate ... ..	312
A. Inspect Catch Plate ... ..	312

PRINTED IN ENGLAND

TN12861

INSPECTION/CHECK

**76-20-00**

Contents 1

Aug 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



Para.	Page
13. Fixed Guard ... ..	312
A. Inspect Abutment Flanges ... ..	312
B. Inspect Sliding Guard Locating Spigot ... ..	312
14. Conduit ... ..	312
A. Inspect Conduit ... ..	312
B. Inspect Strap Locations... ..	312
15. Cover ... ..	313
A. Inspect Cover ... ..	313
16. Support Bracket... ..	313
A. Inspect Support Bracket... ..	313
17. Block Assembly and Roller Carrier... ..	314
A. Inspect Cable Lead-out Spigots ... ..	314
B. Inspect Roller Locations ... ..	314
C. Inspect General Condition of Block Assembly ... ..	315
D. Inspect Captive Nut ... ..	315
18. Roller and Grooved Roller ... ..	315
A. Inspect Rollers ... ..	315
19. Shoulder Pin and Grooved Shoulder Pin ... ..	315
A. Inspect Shoulder Pins ... ..	315
B. Inspect Shoulder Pins ... ..	316
20. Bracket ... ..	316
A. Inspect Bracket ... ..	316
21. Pulley Shroud ... ..	316
A. Inspect Threads ... ..	316
B. Inspect Pulley Shroud ... ..	316
22. Bracket ... ..	317
A. Inspect Bracket ... ..	317
23. Adjusting Washer ... ..	317
A. Inspect Adjusting Washer ... ..	317
24. Special Bolt ... ..	318
A. Inspect Bolt Head... ..	318
25. Actuator Shaft Retainer ... ..	318
A. Inspect Actuator Shaft Retainer ... ..	318
26. Sleeve ... ..	318
A. Inspect Sleeve ... ..	318
27. Actuator Arm Shaft ... ..	319
A. Inspect Splines ... ..	319
B. Inspect Threads ... ..	319
C. Inspect Shoulder Pin Holes ... ..	319
D. Inspect Actuator Arm Shaft ... ..	319
28. Actuator Arm ... ..	319
A. Inspect Splines ... ..	319
B. Inspect Actuator Arm ... ..	319

IN38178

INSPECTION/CHECK

76-20-00

Contents 2

Aug 1/76

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

Para.	Page
C. Inspect Actuator Shaft and Actuator Shaft Retainer Locations ... ..	320
D. Inspect LP Shaft Signal Mechanism Location ...	320

#### TABLE OF ILLUSTRATIONS

Fig.No.	Page
301 Crack Detection Test Diagram ... ..	303
302 LP Shaft Signal System, Cylinder Piston Section with Front and Centre Cable Assemblies ... ..	321
303 LP Shaft Signal System, Cylinder Piston Section with Front and Centre Cable Assemblies ... ..	322
304 LP Shaft Signal System, Exhaust Diffuser Section, Rear Cable Assembly and Pulley... ..	323

#### LIST OF TABLES

Table No.	Page
301 Items to be Magnetic Particle Crack Tested ...	302
302 Items to be Fluorescent Dye Crack Tested ...	302
303 Cross References to Illustrated Parts Catalogue...	304

PRINTED IN ENGLAND

TN38179

INSPECTION/CHECK

**76-20-00**

Contents 3

Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



B. Inspection terms used in this chapter are explained in Standard Practices (Ref.72-09-00 Inspection/Check).

### 3. Crack Detection

#### A. Magnetic Particle Crack Detection.

- (1) Submit the items listed in Table 301 to crack detection in accordance with the process quoted.
- (2) Items to be crack detected by this method are illustrated in the Crack Detection Test Diagram (Fig.301). For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

No current requirement

Items to be Magnetic Particle Crack Tested  
Table 301

#### B. Fluorescent Dye Crack Detection.

- (1) Submit the items listed in Table 302 to crack detection in accordance with the process quoted. For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

302	110	Base Plate	FlA
302	230	Cylinder	FlA
302	240	Piston	FlA
302	260	Catch Plate	FlA
303	110	Support Bracket	FlA
304	520	Actuator Shaft	FlA
		Retainer	FlA
304	570	Actuator Arm Shaft	FlA
304	580	Actuator Arm	FlA

Items to be Fluorescent Dye Crack Tested  
Table 302

INSPECTION/CHECK

76-20-00

Page 302

Aug 1/76

FN38174





OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

No Current Requirement

TN38175

Crack Detection Test Diagram  
Figure 301

INSPECTION/CHECK

**76-20-00**

Page 303  
Aug 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



---

FIG.NO.	ILLUSTRATED PARTS CATALOGUE EQUIVALENT
---------	--

---

301	Not applicable
302	76-21-01      Fig.1.
303	76-21-01      Fig.2.
304	76-21-02      Fig.1 and 1A.

---

Cross References to Illustrated Parts Catalogue  
Table 303

CAUTION: IF LP SHAFT SIGNAL SYSTEM CHOPPER MECHANISM HAS OPERATED DURING ENGINE RUN THE FOLLOWING COMPONENTS MUST BE REJECTED, FLANGED ADAPTERS (302-70/80), CABLE ASSEMBLY (302-100, 303-380, 304-150), BASE PLATE (302-110), CYLINDER (302-230), PISTON (302-240), SPRING (302-250), SHOULDERED PINS (303-370, 304-140), ACTUATOR ARM SHAFT (304-570) AND ACTUATOR ARM (304-580).

NOTE: Inspect all components related to the LP Shaft Signal System for compatibility. Ensure that all sliding assemblies function smoothly with the mating component and without any undue force.

4. Flanged Adapter Assembly (302-70/80)

A. Inspect Abutment Flanges.

- |  |                      |
|--|----------------------|
| (1) Nicks and burrs.   | Accept after repair. |
| (2) Wear.  |                      |
| (a) Not more than 10 per cent reduction in flange thickness. | Accept.              |

TN38176

INSPECTION/CHECK

76-20-00

Page 304

Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Bolt holes elongated not more than 0.030 in. (0,760 mm).

Accept after repair.

(3) Scores.

- (a) Not more than 0.010 in. (0,250 mm) in depth.

Accept after repair.

B. Inspect Shield Tube Location.

- (1) Nicks and burrs.

Accept after repair.

(2) Scores.

- (a) Not more than 0.010 in. (0,250 mm) in depth.

Accept after repair.

C. Inspect Split Guide Bushes.

- (1) Nicks and burrs.

Accept after repair.

(2) Wear.

- (a) Not more than 0.010 in. (0,250 mm) in guide bore.

Accept after repair.

NOTE: Where split bushes are removed for inspection they must be retained as a matched pair.

5. Shield Tube (302-90)

- A. Inspect Tube (Ref.72-09-00 Inspection/Check).

6. Cable Assembly (302-100, 303-380, 304-150)

- A. Inspect Threads (Ref.72-09-00 Inspection/Check).

- B. Inspect End Fittings.

INSPECTION/CHECK

76-20-00

Page 305  
Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(1) Security.

- (a) Any indication of defective swaging.

Reject.

(2) Nicks and burrs.

Accept after repair.

C. Inspect Shouldered Pin Locations.

(1) Wear.

- (a) Pin holes elongated not more than 0.025 in. (0,630 mm).

Accept after repair.

- (b) Slight witness mark.

Accept after repair.

D. Inspect Cable.

NOTE: The operating cables consist of seven strands each strand being made up of 14 wires.

(1) Damage.

- (a) Not more than 14 wires broken along the complete length of each cable.

Accept.

- (b) Wire flattening.

Accept.

(2) Wear.

- (a) Thinning of cable.

Accept subject to acceptance standard in (1)(a).

7. Base Plate (302-110)

A. Inspect Abutment Face.

(1) Nicks and burrs.

Accept after repair.

TN14341

INSPECTION/CHECK

76-20-00

Page 306

Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(2) Wear.

- |     |  |                      |
|-----|--|----------------------|
| (a) | Not more than 10 per cent reduction in flange thickness. | Accept.              |
| (b) | Bolt holes elongated not more than 0.030 in. (0,760 mm). | Accept after repair. |

(3) Scores.

- |     |  |                      |
|-----|--|----------------------|
| (a) | Not more than 0.010 in. (0,250 mm) in depth. | Accept after repair. |
|-----|--|----------------------|

B. Inspect Flanged Adapter Locating Recess.

(1) Scores.

- |     |   |                      |
|-----|---|----------------------|
| (a) | Not more than 0.010 in. (0,250 mm) of radial scoring.         | Accept after repair. |
| (b) | Not more than 0.010 in. (0,250 mm) in depth of axial scoring. | Accept after repair. |

C. Inspect External Diameter of Piston Spigot.

- |     |                  |                      |
|-----|------------------|----------------------|
| (1) | Nicks and burrs. | Accept after repair. |
|-----|------------------|----------------------|

D. Inspect Bore of Spigot.

(1) Scores.

- |     |  |                      |
|-----|--|----------------------|
| (a) | Not more than 0.010 in. (0,250 mm) in depth. | Accept after repair. |
|-----|--|----------------------|

PRINTED IN ENGLAND

TN14342

INSPECTION/CHECK

**76-20-00**

Page 307

Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(2) Wear.

- (a) Not more than 0.005 in.  
(0,130 mm) of diametric  
wear.

Accept after  
repair.

8. Sliding Guard Assembly (302-220)

A. Inspect Sliding Guard Assembly (Ref.72-09-00 Inspection/  
Check, Rigid Tubes).

B. Inspect Abutment Flange.

(1) Nicks and burrs.

Accept after  
repair.

(2) Wear.

- (a) Not more than 10 per cent  
reduction in flange  
thickness.

Accept after  
repair.

- (b) Bolt-holes elongated not  
more than 0.030 in.  
(0,760 mm).

Accept after  
repair.

9. Cylinder (302-230)

A. Inspect Abutment Flange.

(1) Nicks and burrs.

Accept after  
repair.

(2) Wear.

- (a) Not more than 10 per cent  
reduction of flange  
thickness.

Accept after  
repair.

- (b) Bolt-holes elongated not  
more than 0.030 in.  
(0,760 mm).

Accept after  
repair.

FN493

INSPECTION/CHECK

76-20-00

Page 308

Aug 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



B. Inspect Cylinder Bore.

- (1) Nicks and burrs. Accept after repair.
- (2) Scores. Accept after repair if compatibility is unimpaired.
  - (a) Not more than 0.010 in. (0,250 mm) deep.
- (3) Wear. Accept.
  - (a) Smooth unstepped wear.
  - (b) Stepped wear. Accept after repair providing material thickness is not reduced by more than 20 per cent.

C. Inspect Piston Shaft Diameter of Cylinder Bore.

- (1) Nicks and burrs. Accept after repair.
- (2) Scores. Accept after repair if compatibility is unimpaired.
  - (a) Not more than 0.010 in. (0,250 mm) deep.
- (3) Wear. Accept.
  - (a) Not more than 0.010 in. (0,250 mm) on diameter.

D. Inspect Spring Stop Flange in Cylinder Bore.

- (1) Nicks and burrs. Accept after repair.
- (2) Wear. Accept.
  - (a) Not more than 0.010 in. (0,250 mm) in depth.

INSPECTION/CHECK

76-20-00

Page 309

Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



E. Inspect Strap Assembly Location.

- |                      |                      |
|----------------------|----------------------|
| (1) Nicks and burrs. | Accept after repair. |
|----------------------|----------------------|

F. Inspect Sliding Guard Assembly Location.

- |                      |                      |
|----------------------|----------------------|
| (1) Nicks and burrs. | Accept after repair. |
|----------------------|----------------------|

(2) Wear.

- |   |                      |
|---|----------------------|
| (a) Not more than 0.010 in.<br>(0,250 mm) deep. | Accept after repair. |
|---|----------------------|

(3) Scores.

- |   |                      |
|---|----------------------|
| (a) Not more than 0.010 in.<br>(0,250 mm) deep. | Accept after repair. |
|---|----------------------|

10. Piston (302-240)

A. Inspect Piston Shaft.

- |                      |                      |
|----------------------|----------------------|
| (1) Nicks and burrs. | Accept after repair. |
|----------------------|----------------------|

(2) Wear.

- |                            |         |
|----------------------------|---------|
| (a) Smooth unstepped wear. | Accept. |
|----------------------------|---------|

- |                   |   |
|-------------------|---|
| (b) Stepped wear. | Accept after repair<br>providing material<br>thickness is not<br>reduced by more<br>than 10 per cent. |
|-------------------|---|

(3) Scores.

- |   |                      |
|---|----------------------|
| (a) Not more than 0.010 in.<br>(0,250 mm) deep. | Accept after repair. |
|---|----------------------|

TN9713

INSPECTION/CHECK

76-20-00

Page 310  
Aug 1/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL

## B. Inspect Spring Location Flange.

- (1) Nicks and burrs. Accept after repair.
- (2) Wear.
  - (a) Not more than 0.010 in. Accept after repair.  
(0,250 mm) in depth.

## C. Inspect Nut and Retaining Ring Location.

- (1) Nicks and burrs. Accept after repair.
- (2) Wear.
  - (a) Not more than 0.010 in. Accept after repair.  
(0,250 mm) in depth.

11. Spring (302-250)

## A. Inspect Spring.

- (1) Check spring compression load. Use spring test equipment (Ref.72-09-00 Inspection/Check).
  - (a) Free length Accept.  
5.000 in.  $\pm$  0.045 in.  
(127,000 mm  $\pm$  1,143 mm).
  - (b) Installed length is 4.200 in. Accept.  
(96,680 mm).
  - (c) Load at installed length Accept.  
14.500  $\pm$  0.750 lb  
(6,575 kg  $\pm$  0,338 kg).
- (2) Wear.
  - (a) Flats on spring coil Accept.  
not more than 0.030 in.  
(0,760 mm) in depth.



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



12. Catch Plate (302-260)

A. Inspect Catch Plate.

- (1) Nicks and burrs.

Accept after  
repair.

13. Fixed Guard (302-310)

A. Inspect Abutment Flanges.

- (1) Nicks and burrs.

Accept after  
repair.

- (2) Wear.

- (a) Not more than 10 per cent  
reduction in flange  
thickness.

Accept after repair  
providing compati-  
bility is unim-  
paired.

- (b) Bolt holes elongated not  
more than 0.030 in.  
(0,760 mm).

Accept after  
repair.

B. Inspect Sliding Guard Locating Spigot.

- (1) Nicks and burrs.

Accept after  
repair.

- (2) Wear.

- (a) Not more than 0.010 in.  
(0,250 mm) in depth.

Accept after  
repair.

14. Conduit (303-50/200/340)

A. Inspect Conduits (Ref.72-09-00 Inspection/Check, Rigid  
Tubes).

B. Inspect Strap Locations.

- (1) Wear.

- (a) Not more than 10 per cent  
reduction in material  
thickness.

Accept after  
repair.

IN9126

INSPECTION/CHECK

76-20-00

Page 312

Aug 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



(2) Nicks, burrs and scoring.

(a) Not more than 0.010 in.  
(0,250 mm) deep.

Accept after  
repair.

(3) Distortion.

(a) Any distortion.

Accept providing  
compatibility is  
unimpaired.

# 15. Cover (303-60/80)

A. Inspect Cover.

(1) Nicks and burrs.

Accept after  
repair.

(2) Wear.

(a) Not more than 10 per cent  
reduction in flange  
thickness.

Accept after  
repair.

(b) Bolt-holes elongated not  
more than 0.030 in.  
(0,760 mm).

Accept after  
repair.

# 16. Support Bracket (303-110)

A. Inspect Support Bracket.

(1) Nicks and burrs.

Accept after  
repair.

(2) Wear.

(a) Not more than 10 per cent  
reduction in flange  
thickness.

Accept after  
repair.

INSPECTION/CHECK

76-20-00

Page 313

Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Bolt-holes elongated not more than 0.030 in. (0,760 mm).

Accept after repair.

(3) Distortion.

- (a) Any distortion.

Accept after repair providing repair does not induce cracking and compatibility is preserved.

17. Block Assembly (303-140/210) and Roller Carrier (304-70)

A. Inspect Cable Lead-out Spigots.

- (1) Nicks and burrs.

Accept after repair.

- (2) Wear.

- (a) Not more than 0.010 in. (0,250 mm) deep in cable groove.

Accept after repair.

- (3) Scores.

- (a) Not more than 0.010 in. (0,250 mm) deep.

Accept after repair.

B. Inspect Roller Locations.

- (1) Nicks and burrs.

Accept after repair.

- (2) Wear.

- (a) Slight witness mark inside block.

Accept.

- (b) Not more than 0.010 in. (0,250 mm) elongation of shoulder pin holes.

Accept after repair.

FN9129

INSPECTION/CHECK

76-20-00

Page 314  
Aug 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (c) Bolt-holes elongated not  
more than 0.030 in.  
(0,760 mm).

Accept after  
repair.

C. Inspect General Condition of Block Assembly.

- (1) Nicks and burrs.

Accept after  
repair.

D. Inspect Captive Nut (Ref.72-09-00 Inspection/Check).

18. Roller and Grooved Roller (303-180/190/280/290, 304-100)

A. Inspect Rollers.

- (1) Nicks and burrs.

Accept after  
repair.

- (2) Wear.

- (a) Elongation of shoulder  
pin holes not more than  
0.010 in. (0,250 mm).

Accept after  
repair.

- (b) Any witness mark of  
cable on roller.

Accept.

- (3) Scores.

- (a) Not more than 0.010 in.  
(0,250 mm).

Accept after  
repair.

19. Shoulder Pin (303-170/270/370, 304-140) and Grooved Shoulder  
Pin (309-90)

A. Inspect Shoulder Pins (303-170/270 and 304-90).

- (1) Nicks and burrs.

Accept after  
repair.

- (2) Wear.

- (a) Any witness mark.

Accept.

PRINTED IN ENGLAND

TN9133

INSPECTION/CHECK

76-20-00

Page 315

Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(3) Scores.

- (a) Not more than 0.005 in. Accept after  
(0,130 mm). repair.

B. Inspect Shoulder Pins (303-370 and 304-140).

- (1) Nicks and burrs. Accept after  
repair.

(2) Wear.

- (a) Grooves or scores not Accept.  
more than 0.030 in.  
(0,760 mm) deep.

20. Bracket (304-40)

A. Inspect Bracket.

- (1) Nicks and burrs. Accept after  
repair.

(2) Wear.

- (a) Not more than 10 per cent Accept after  
reduction in flange repair.  
thickness.

- (b) Bolt-holes elongated not Accept after  
more than 0.030 in. repair.  
(0,760 mm).

- (3) Distortion. Accept after repair  
providing compati-  
bility is preserved  
and repair does not  
induce cracking.

21. Pulley Shroud (304-50)

A. Inspect Threads (Ref.72-09-00 Inspection/Check).

B. Inspect Pulley Shroud.

- (1) Nicks and burrs. Accept after  
repair.

TN9153

INSPECTION/CHECK

76-20-00

Page 316

Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(2) Wear.

- |  |                      |
|--|----------------------|
| (a) Not more than 10 per cent reduction in attachment flange thickness.                | Accept after repair. |
| (b) Attachment flange bolt-holes elongated not more than 0.030 in. (0,760 mm).         | Accept after repair. |
| (c) Roller carrier attachment bolt-holes elongated not more than 0.010 in. (0,250 mm). | Accept after repair. |

(3) Dents.

- |   |                      |
|---|----------------------|
| (a) Dents of smooth contour and not fouling the roller carrier. | Accept after repair. |
|---|----------------------|

22. Bracket (304-190)

A. Inspect Bracket.

- |  |                      |
|--|----------------------|
| (1) Nicks and burrs.   | Accept after repair. |
| (2) Wear.  |                      |
| (a) Not more than 10 per cent reduction in flange thickness. | Accept after repair. |
| (b) Bolt-holes elongated not more than 0.030 in. (0,760 mm). | Accept after repair. |

23. Adjusting Washer (304-200)

NOTE: This is a select item on assembly.

A. Inspect Adjusting Washer.

- |                      |                      |
|----------------------|----------------------|
| (1) Nicks and burrs. | Accept after repair. |
|----------------------|----------------------|

INSPECTION/CHECK

**76-20-00**

Page 317

Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(2) Wear.

- |  |                      |
|--|----------------------|
| (a) Any longitudinal wear.                                   | Reject.              |
| (b) Bolt-holes elongated not more than 0.030 in. (0,760 mm). | Accept after repair. |

24. Special Bolt (304-490)

A. Inspect Bolt Head.

(1) Wear.

- |  |                      |
|--|----------------------|
| (a) Not more than 0.030 in. (0,760 mm) of smooth unstepped wear. | Accept after repair. |
|--|----------------------|

25. Actuator Shaft Retainer (304-520)

A. Inspect Actuator Shaft Retainer.

(1) Nicks and burrs.

Accept after repair.

(2) Scores.

- |  |  |
|--|--|
| (a) Not more than 0.005 in. (0,130 mm) in depth on sealing face. | Accept after repair providing sealing capabilities are unimpaired. |
|--|--|

(3) Wear.

- |   |         |
|---|---------|
| (a) Slight witness mark in bore and outside diameter of spigot. | Accept. |
|---|---------|

26. Sleeve (304-560)

NOTE: This item is assembled when shaft 304-570B is used.

A. Inspect Sleeve.

- |                      |                      |
|----------------------|----------------------|
| (1) Nicks and burrs. | Accept after repair. |
|----------------------|----------------------|

TN42894

INSPECTION/CHECK

76-20-00

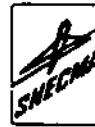
Page 318

Aug 1/76





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



(2) Wear.

(a) Any wear.

Reject.

27. Actuator Arm Shaft (304-570)

A. Inspect Splines (Ref.72-09-00 Inspection/Check).

B. Inspect Threads (Ref.72-09-00 Inspection/Check).

C. Inspect Shoulder Pin Holes.

(1) Wear.

(a) Pin holes elongated not  
more than 0.050 in.  
(1,270 mm).

Accept after  
repair.

D. Inspect Actuator Arm Shaft.

(1) Nicks and burrs.

Accept after  
repair.

(2) Wear.

(a) Not more than 0.005 in.  
(0,130 mm) on special  
bolt location.

Accept after  
repair.

(3) Scores.

(a) Not more than 0.005 in.  
(0,130 mm) on sealing  
face.

Accept after repair  
providing sealing  
capabilities are  
unimpaired.

28. Actuator Arm (304-580)

A. Inspect Splines (Ref.72-09-00 Inspection/Check).

B. Inspect Actuator Arm.

(1) Nicks and burrs.

Accept after  
repair.

PRINTED IN ENGLAND

TN17311

INSPECTION/CHECK

76-20-00

Page 319

Aug 1/76



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



(2) Distortion.

(a) Any distortion.

Reject.

C. Inspect Actuator Shaft and Actuator Shaft Retainer Locations.

(1) Wear.

(a) Slight witness mark.

Accept.

D. Inspect LP Shaft Signal Mechanism Location.

(1) Wear.

(a) Not more than 0.030 in.  
(0,760 mm).

Accept after  
repair.

TN38177

INSPECTION/CHECK

76-20-00

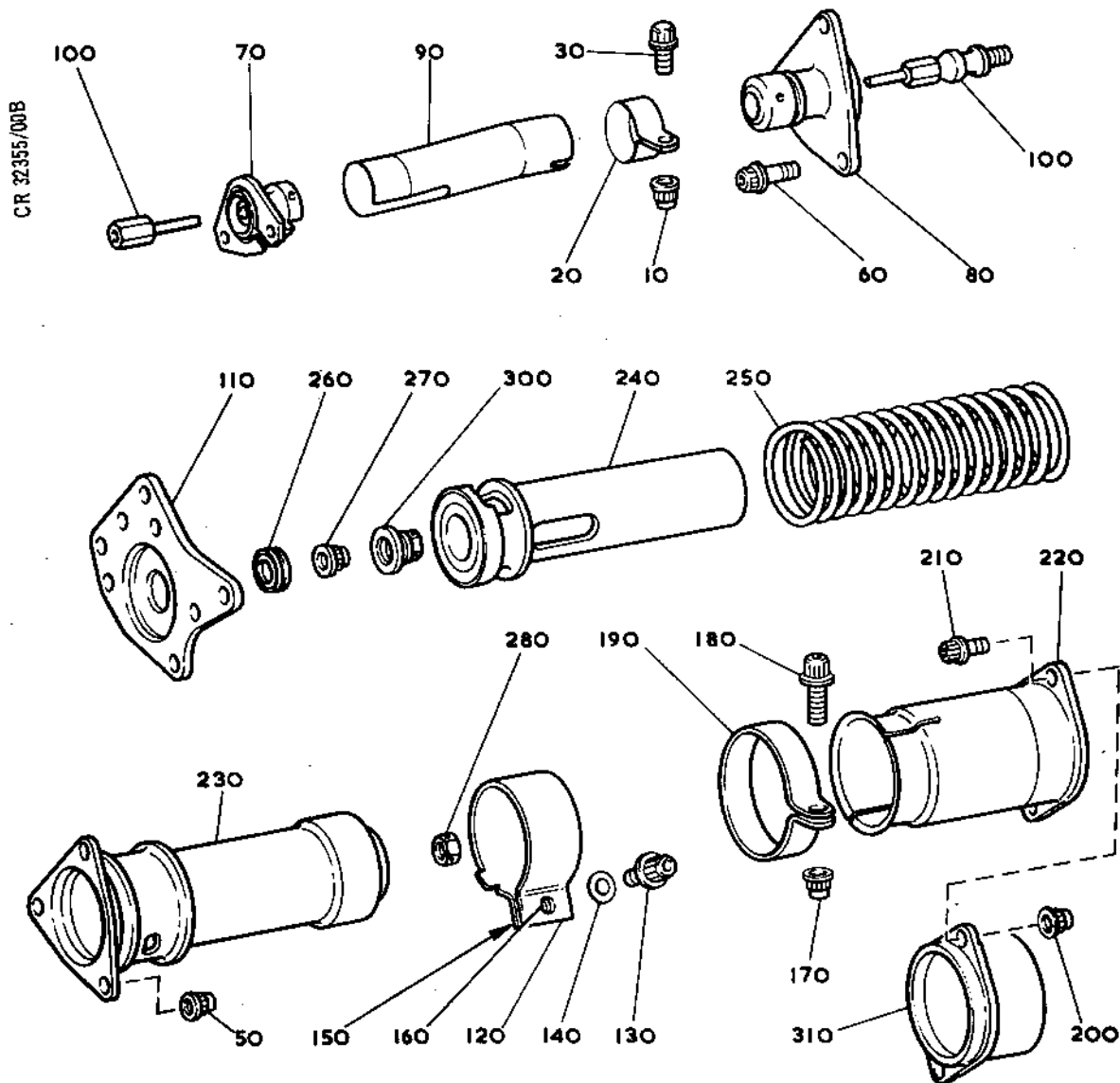
Page 320

Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



LP Shaft Signal System, Cylinder Piston Section  
with Front and Centre Cable Assemblies  
Figure 302

INSPECTION/CHECK

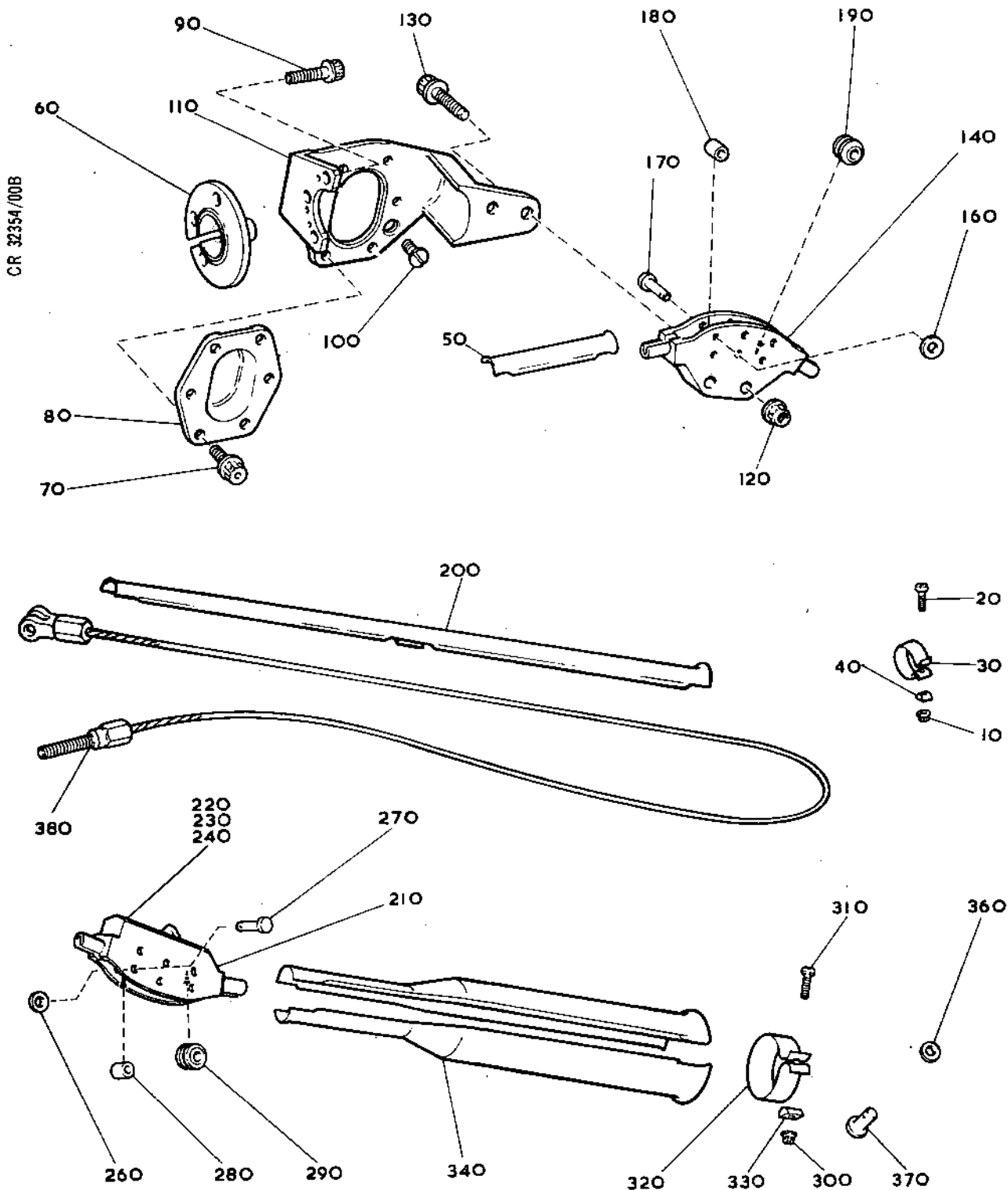
76-20-00

Page 321  
Aug 1/76



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



LP Shaft Signal System, Cylinder Piston Section  
with Front and Centre Cable Assemblies  
Figure 303

INSPECTION/CHECK

**76-20-00**

Page 322

Aug 1/76

TN16450

CR 32354/00B



OLYMPUS 593

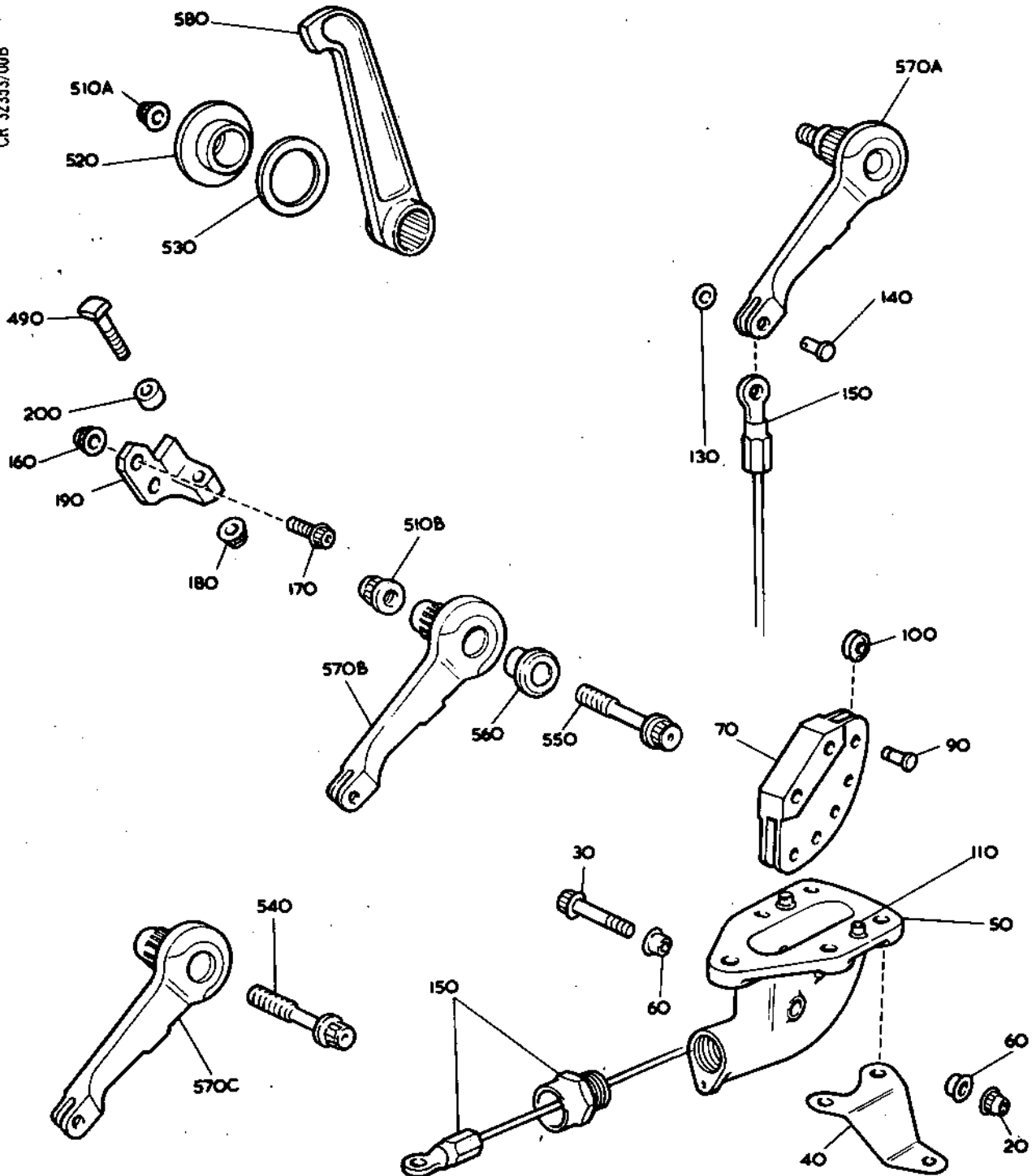
MK.610-14-28  
OVERHAUL



CR 32353/00B

PRINTED IN ENGLAND

TN14258



LP Shaft Signal System, Exhaust Diffuser Section,  
Rear Cable Assembly and Pulley  
Figure 304

INSPECTION/CHECK

76-20-00

Page 323  
Aug 1/76



OLYMPUS 593



MK.610-14-28 snecma  
OVERHAUL

LP SHAFT SIGNAL SYSTEM - CYLINDER PISTON SECTION WITH  
FRONT AND CENTRE CABLE ASSEMBLIES - DISASSEMBLY

TABLE OF CONTENTS

Para.	Page
1. General	101
2. Disassembly of the Cylinder Piston Assembly	101
A. Disassemble the Guards	101
B. Disassemble the Cylinder and Piston Assemblies	101
C. Disassemble the Shield Tube Assembly	105

TABLE OF ILLUSTRATIONS

Fig.No.	Page
101 Disassembly of the Guards	102
102 Disassembly of the Piston and Cylinder	103
103 Disassembly of the Shield Tube	104

Printed in England



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



LP SHAFT SIGNAL SYSTEM - CYLINDER PISTON SECTION WITH  
FRONT AND CENTRE CABLE ASSEMBLIES - DISASSEMBLY

1. General

- A. Before commencing the disassembly, refer to 72-09-00 Disassembly, for general information.
- B. Throughout the text, special tools are quoted by their reference number; e.g. Tool 1234. For a complete list of tooling required for disassembly and for the Manufacturers Part Number, refer to Special Tools, Fixtures and Equipment, Table 1001.

2. Disassembly of the Cylinder Piston Assembly

- A. Disassemble the Guards (Ref.Fig.101).
- (1) Remove the nut and bolt securing the clip on the sliding guard and then withdraw the sliding guard together with the fixed guard away from the cylinder and centre cable.
  - (2) Remove the two nuts and bolts securing the fixed guard to the sliding guard. Separate the two guards and remove the clip.
- B. Disassemble the Cylinder and Piston Assemblies (Ref.Fig.102).
- (1) Remove the bolt and washer securing the strap to the cylinder and remove the strap.
  - (2) Install the assembly tool (Tool 1299) on the cylinder.

CAUTION: DO NOT UNSCREW THE BASEPLATE NUTS AND BOLTS UNLESS THE ASSEMBLY TOOL IS INSTALLED AND THE SPRING TENSION IS RELIEVED.

- (a) Screw the nut on the thrust screw towards the small tommy bar end using the large tommy bar.
- (b) Install the base of the tool onto the cylinder and using the small tommy bar, screw the thrust screw into the piston nut.

PRINTED IN ENGLAND

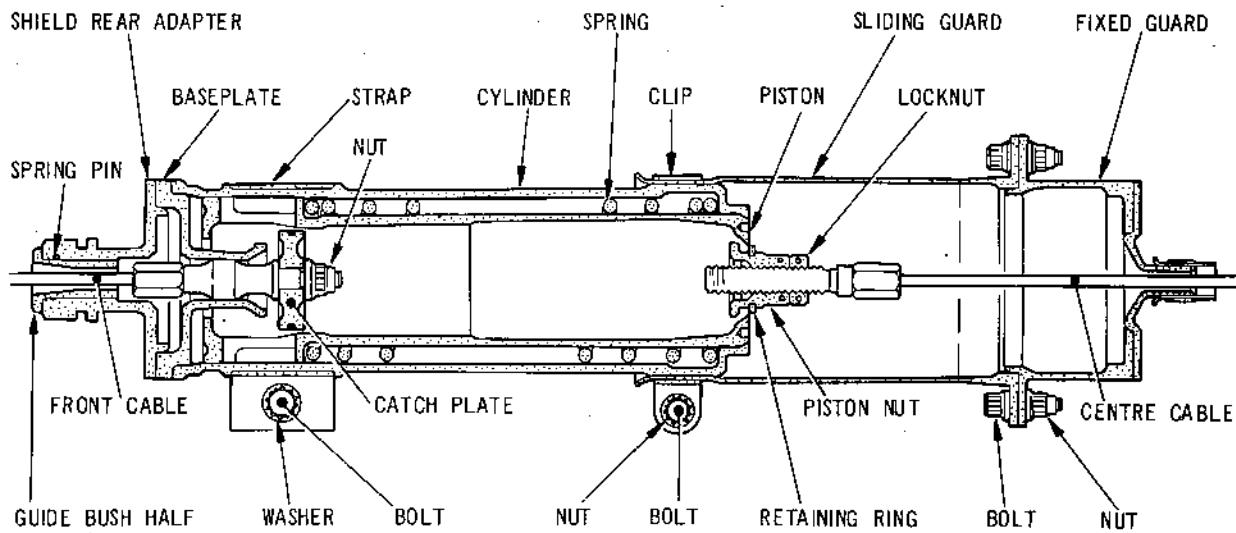
TN13902



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 33467/00A



TN13903

Disassembly of the Guards  
Figure 101

DISASSEMBLY  
**76-21-01**  
Page 102  
Mar 1/76





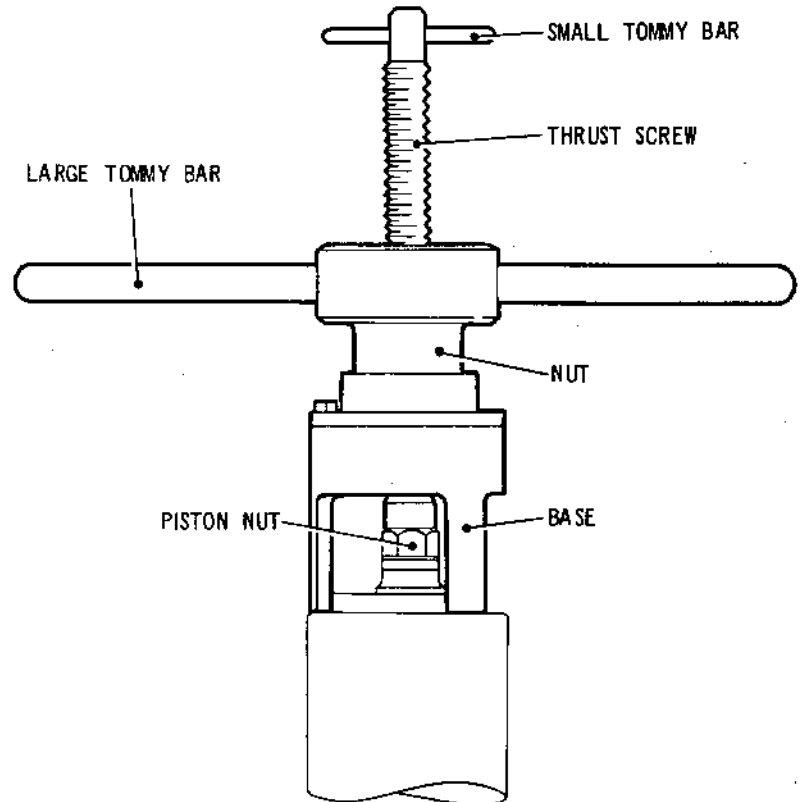
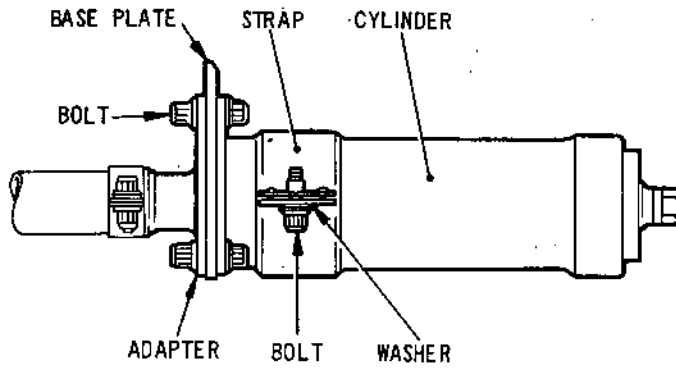
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 33466/00A



Disassembly of the Piston and Cylinder  
Figure 102

DISASSEMBLY  
**76-21-01**  
Page 103  
Mar 1/76

TN13904

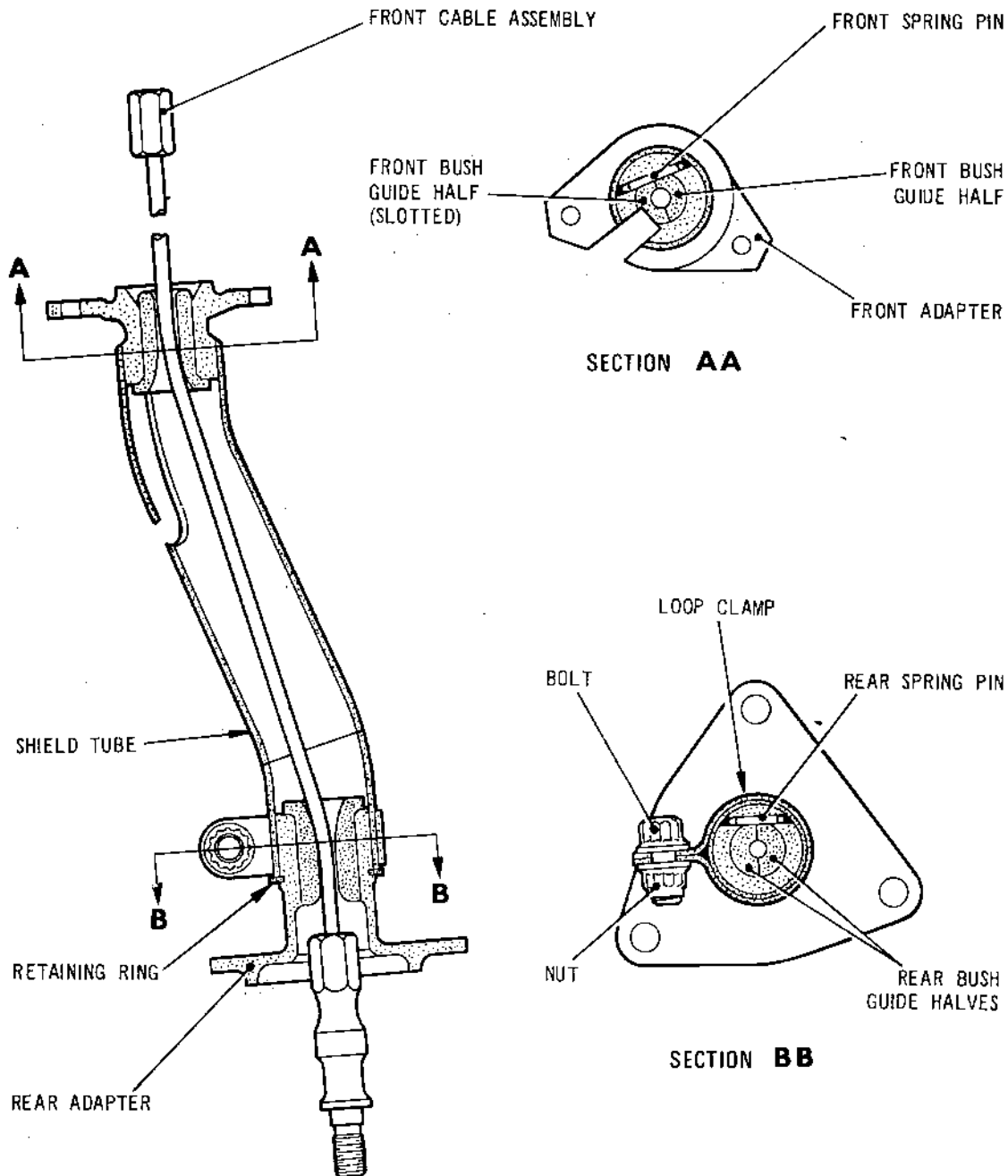


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 33464/00A



7N13905

Disassembly of the Shield Tube  
Figure 103

DISASSEMBLY  
**76-21-01**  
Page 104  
Mar 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

(c) Hold the base and small tommy bar steady. Using the large tommy bar, screw away from the small tommy bar. This action will tend to pull the piston towards the cylinder head and so compress the spring.

- (3) Remove the three nuts and bolts securing the cylinder to the baseplate.
- (4) Remove the tool by unscrewing the large tommy bar towards the small tommy bar until the spring pressure is relieved, then unscrew the thrust screw from the piston using the small tommy bar.
- (5) Separate the cylinder and spring from the piston.
- (6) Remove the retaining ring securing the nut to the piston and remove the nut.
- (7) Remove the nut securing the catch plate and remove the baseplate.

C. Disassemble the Shield Tube Assembly (Ref.Fig.103).

- (1) Remove the nut and bolt securing the loop clamp.
- (2) Move the rear adapter away from the shield tube and then remove the rear spring pin securing the bush guide halves. Remove the bush guides from the adapter.
- (3) Remove the rear adapter from the cable.
- (4) Withdraw the shield tube from the cable.
- (5) Remove the front spring pin securing the bush guide halves and then remove the bush guides from the front adapter.
- (6) Remove the front adapter from the cable.

TN13906



OLYMPUS 593

MK.610-14-28

OVERHAUL



CYLINDER PISTON SECTION, WITH FRONT AND CENTRE  
CABLE ASSEMBLIES - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00  
Cleaning for details of the cleaning processes referred  
to in Table 201.
- B. To ensure that all items within this breakdown that  
require cleaning and subsequent Inspection/Check are  
recognized, and identified by their Part Number, figures  
are provided which equate with the Illustrated Parts  
Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with  
the relevant Figure and Item Number in the same breakdown  
in the I.P.C. Items illustrated in the I.P.C. which are  
not illustrated in this breakdown, are those items which  
are either discarded at overhaul, or are normally assembled  
to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the  
figures, Table 201 does not list all items, but deals  
collectively with the items requiring the same cleaning  
process.
- D. On receipt of the items from disassembly, all protective  
blanks, covers etc. deemed necessary for the protection  
of the items will have been assembled and, in addition,  
many of the items will arrive in containers. Any special  
containers, blanks, covers etc. are listed in Table 202  
by their Tool Ref. No. e.g. (Tool 123). For the  
manufacturer's Part No. refer to the appropriate Table in  
Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items  
prior to cleaning and reassembled immediately afterwards.  
Items received in special cleaning containers should  
remain therein during the cleaning procedures unless  
otherwise stated.
- B. All items contained in this breakdown must be cleaned by  
the appropriate processes quoted in the table, to achieve  
a cleanliness to enable the Inspection/Check to be carried  
out correctly. Where alternative processes are quoted,  
the operator must decide what process to use depending on  
the amount of contamination of the item. Any item that is  
not cleaned satisfactorily must be recleaned by the  
appropriate process.

CLEANING

76-21-01

Page 201

Jan 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	-
202	ALL		A or B	-	-

Cleaning Processes  
Table 201

TN20320



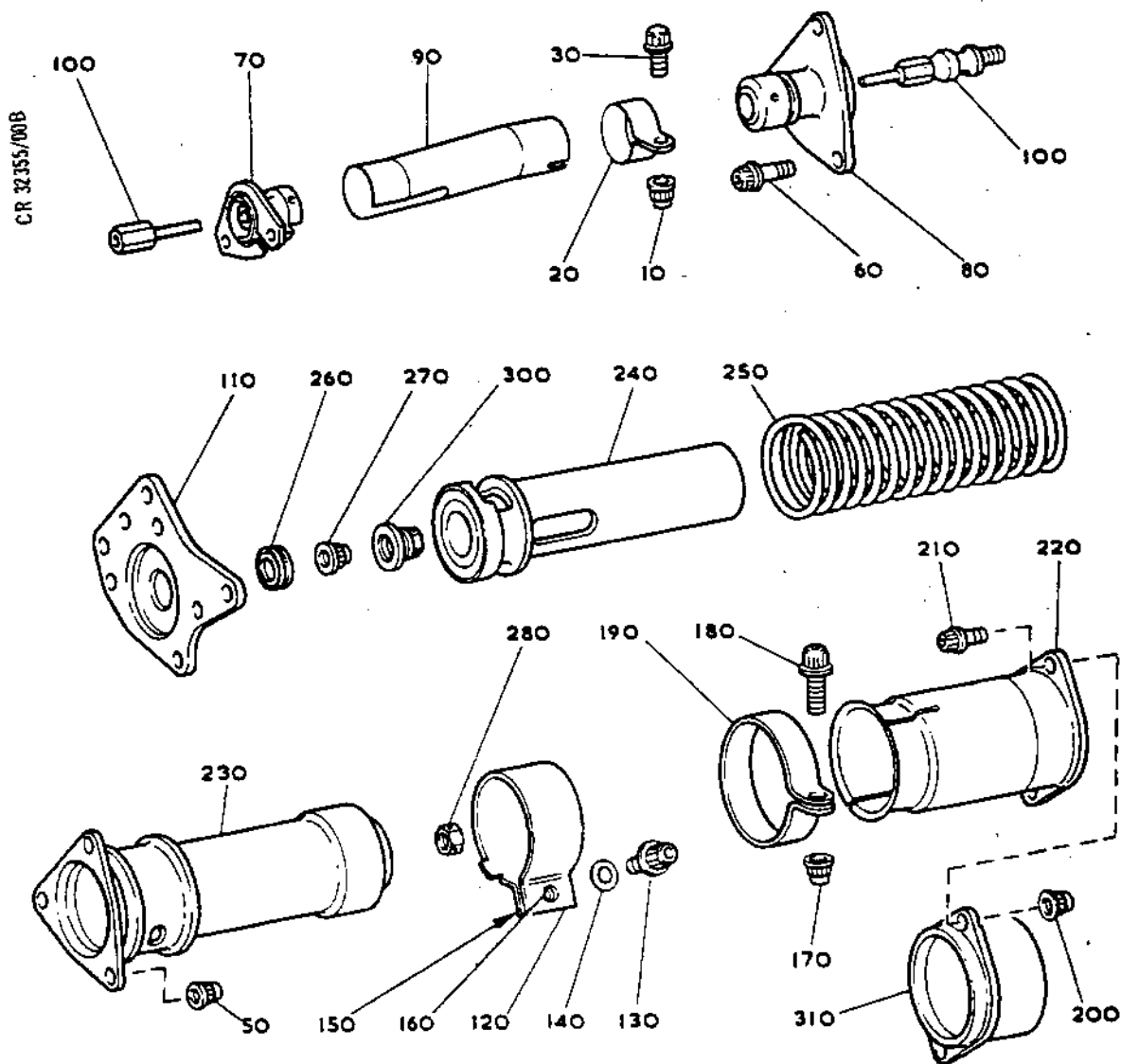
OLYMPUS 593

MK.610-14-28

OVERHAUL



SHEEMA



Signal System, LP Shaft, Cylinder Piston  
Section with Front Cable Assembly  
Figure 201

CLEANING

76-21-01

Page 203

Jun 1/96

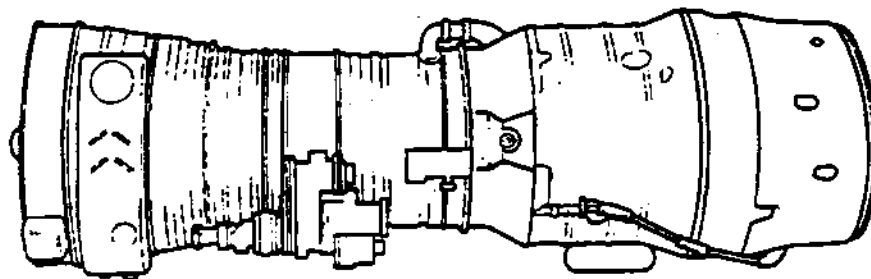


# OLYMPUS 593

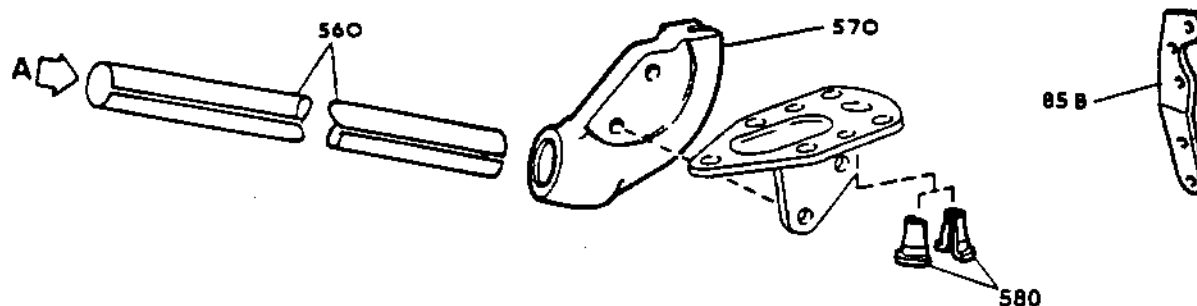
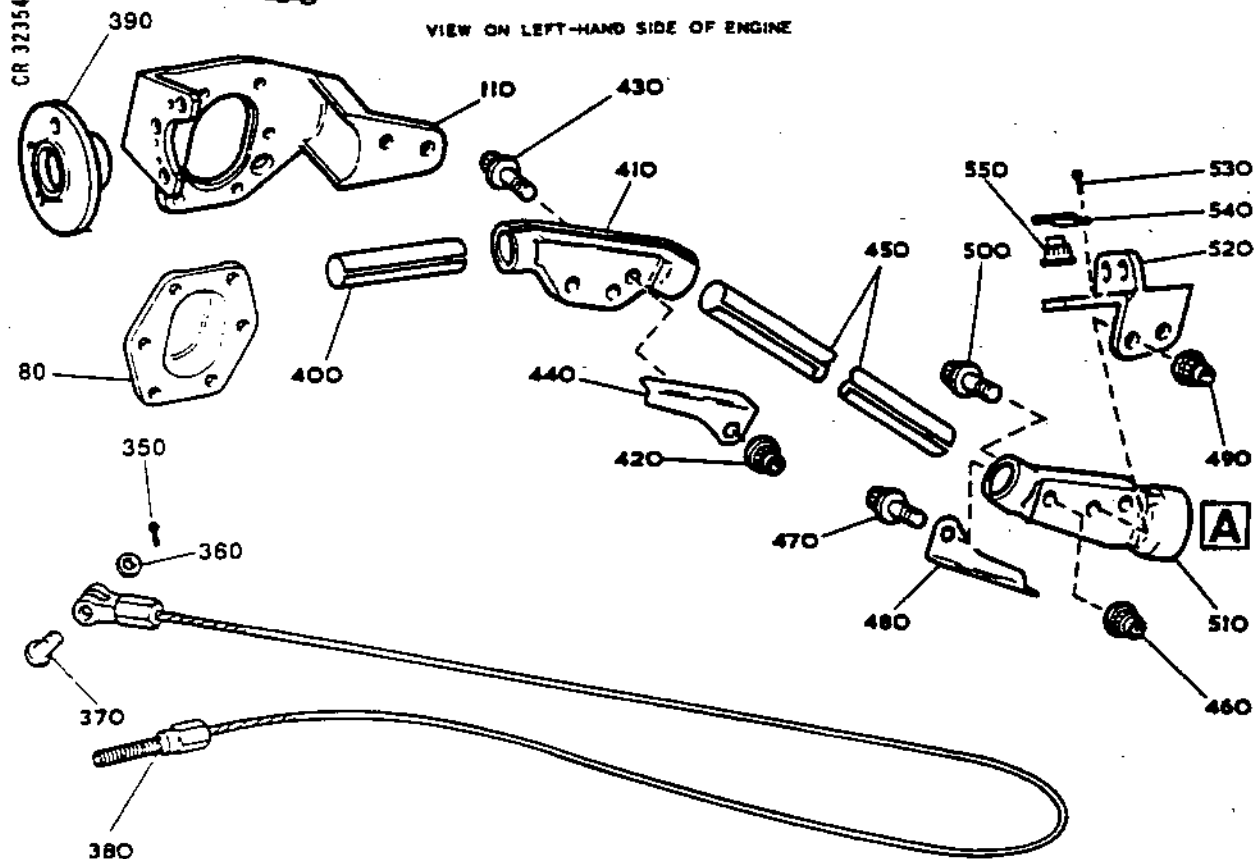


MK.610-14-28  
OVERHAUL

sneema



VIEW ON LEFT-HAND SIDE OF ENGINE



Signal System, LP Shaft, Centre and Rear  
Cable Guide Assemblies  
Figure 202

CLEANING

## 76-21-01

Page 204  
Dec 1/96



OLYMPUS 593

MK.610-14-28

OVERHAUL



LP SHAFT SIGNAL SYSTEM - CYLINDER PISTON SECTION  
WITH FRONT AND CENTRE CABLE ASSEMBLIES -  
INSPECTION/CHECK

TABLE OF CONTENTS

Para.	Page
1. General ... ..	301
2. General Inspection ... ..	301
3. Crack Detection... ..	302
A. Magnetic Particle Crack Detection ... ..	302
B. Fluorescent Dye Crack Detection ... ..	302
4. Flanged Adapter Assembly ... ..	304
A. Inspect Abutment Flanges ... ..	304
B. Inspect Shield Tube Location ... ..	305
C. Inspect Split Guide Bushes ... ..	305
5. Shield Tube ... ..	305
A. Inspect Tube ... ..	305
6. Cable Assembly ... ..	305
A. Inspect Threads ... ..	305
B. Inspect End Fittings ... ..	305
C. Inspect Shouldered Pin Locations ... ..	306
D. Inspect Cable ... ..	306
7. Base Plate ... ..	306
A. Inspect Abutment Face ... ..	306
B. Inspect Flanged Adapter Locating Recess ... ..	307
C. Inspect External Diameter of Piston Spigot ... ..	307
D. Inspect Bore of Spigot ... ..	307
8. Sliding Guard Assembly ... ..	308
A. Inspect Sliding Guard Assembly ... ..	308
B. Inspect Abutment Flange ... ..	308
9. Cylinder ... ..	308
A. Inspect Abutment Flange... ..	308
B. Inspect Cylinder Bore ... ..	309
C. Inspect Piston Shaft Diameter of Cylinder Bore ... ..	309
D. Inspect Spring Stop Flange in Cylinder Bore ... ..	309
E. Inspect Strap Assembly Location ... ..	310
F. Inspect Sliding Guard Assembly Location ... ..	310
10. Piston ... ..	310
A. Inspect Piston Shaft ... ..	310
B. Inspect Spring Location Flange ... ..	311
C. Inspect Nut and Retaining Ring Location ... ..	311
11. Spring ... ..	311
A. Inspect Spring ... ..	311
12. Catch Plate ... ..	312
A. Inspect Catch Plate ... ..	312

INSPECTION/CHECK

**76-21-01**

Contents 1

Apr 1/77



**OLYMPUS 593**

MK.61D-14-28

OVERHAUL



sneema

13.	Fixed Guard	...	...	...	...	...	...	312
	A. Inspect Abutment Flanges	...	...	...	...	...	...	312
	B. Inspect Sliding Guard Locating Spigot	...	...	...	...	...	...	312
14.	Conduit	...	...	...	...	...	...	312
	A. Inspect Conduits	...	...	...	...	...	...	312
	B. Inspect Strap Locations...	...	...	...	...	...	...	312
15.	Cover	...	...	...	...	...	...	313
	A. Inspect Cover	...	...	...	...	...	...	313
16.	Clamp Block and Support Bracket	...	...	...	...	...	...	313
	A. Inspect Clamp Block and Support Bracket	...	...	...	...	...	...	313
17.	Shoulder Pin	...	...	...	...	...	...	314
	A. Inspect Shoulder Pins	...	...	...	...	...	...	314
18.	Block Assembly	...	...	...	...	...	...	314
	A. Inspect Cable Lead-out Spigots	...	...	...	...	...	...	314
	B. Conduit Locations...	...	...	...	...	...	...	317
	C. Inspect General Condition of Block Assembly	...	...	...	...	...	...	317
	D. Inspect Captive Nut	...	...	...	...	...	...	317

#### TABLE OF ILLUSTRATIONS

Fig.No.		Page
301	Crack Detection Test Diagram	303
302	LP Shaft Signal System, Cylinder Piston Section with Front Cable Assembly	315
303	LP Shaft Signal System, Rear Centre Cable Guide Assemblies	316

#### LIST OF TABLES

Table No.		Page
301	Items to be Magnetic Particle Crack Tested	302
302	Items to be Fluorescent Dye Crack Tested	302
303	Cross References to Illustrated Parts Catalogue...	304

INSPECTION/CHECK

**76-21-01**

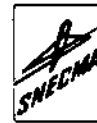
Contents 2

Jun 1/96



OLYMPUS 593

MK.610-14-28  
OVERHAUL



LP SHAFT SIGNAL SYSTEM - CYLINDER PISTON SECTION  
WITH FRONT AND CENTRE CABLE ASSEMBLIES -  
INSPECTION/CHECK

1. General

- A. Each item in this chapter is given a two-part identification; thus, 302-20 refers to Figure 302 and to Item 20 called out on that figure. Each item may be further identified by its Part Number by the use of Table 303, which cross-refers figures in this chapter to the equivalent chapter and figure in the Illustrated Parts Catalogue (I.P.C.); the called-out item number will be the same on both figures.
- B. All items which will be crack tested are listed in Tables 301 and 302.
- C. Dimensional checks are cross referenced to the equivalent Fits and Clearances Schedule (F.C.S.) chapter against the item concerned.
- D. When the inspection of an item discloses a minor defect that requires rectification, it is defined as 'Accept after repair'. On all such occasions the item must be rectified in accordance with Standard Practices 72-09-22 Repair. Where a Ref.No. follows 'Accept after repair' e.g. (Ref.72-21-01 Repair No.1), a specific Repair Scheme is available to which the item must be rectified. Items that are rejected, or for which a repair scheme is not currently available, should be held at the discretion of the operator, as service experience may prove the need for a repair.
- E. On completion of a repair, rectification or test, the item(s) must be inspected, to ensure that the necessary work has been satisfactorily completed.

2. General Inspection

- A. Inspect all items illustrated in this chapter, whether specified or not, in accordance with Standard Practices (Ref.72-09-00 Inspection/Check). In addition, carry out the inspections detailed for the specified items, from para.4 onwards.

INSPECTION/CHECK

**76-21-01**

Page 301  
Apr 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



B. Inspection terms used in this chapter are explained in Standard Practices (Ref.72-09-00 Inspection/Check).

### 3. Crack Detection

#### A. Magnetic Particle Crack Detection.

- (1) Submit the items listed in Table 301 to crack detection in accordance with the process quoted.
- (2) Items to be crack detected by this method are illustrated in the Crack Detection Test Diagram (Fig.301). For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

No current requirement

Items to be Magnetic Particle Crack Tested  
Table 301

#### B. Fluorescent Dye Crack Detection.

- (1) Submit the items listed in Table 302 to crack detection in accordance with the process quoted. For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

302	110	Base Plate	F1A
302	230	Cylinder	F1A
302	240	Piston	F1A
302	260	Catch Plate	F1A
303	110	Support Bracket	F1A

Items to be Fluorescent Dye Crack Tested  
Table 302

INSPECTION/CHECK

76-21-01

Page 302

Apr 1/77

TN38174

PRINTED IN ENGLAND



OLYMPUS 593

MK. 610-14-28

OVERHAUL



No Current Requirement

TN38175

Crack Detection Test Diagram  
Figure 301

INSPECTION/CHECK

**76-21-01**

Page 303

Apr 1/77

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

FIG.NO.	ILLUSTRATED PARTS CATALOGUE EQUIVALENT	
301	Not applicable	
302	76-21-01	Fig.1.
303	76-21-01	Fig.2 and 2A.

Cross References to Illustrated Parts Catalogue  
Table 303

**CAUTION:** IF LP SHAFT SIGNAL SYSTEM HAS OPERATED DURING ENGINE RUN THE FOLLOWING COMPONENTS MUST BE REJECTED, FLANGED ADAPTERS (302-70/80), CABLE ASSEMBLY (302-100, 303-380), BASE PLATE (302-110), CYLINDER (302-230), PISTON (302-240), SPRING (302-250), SHOULDERED PINS (303-370).

**NOTE:** Inspect all components related to the LP Shaft Signal System for compatibility. Ensure that all sliding assemblies function smoothly with the mating component and without any undue force.

4. Flanged Adapter Assembly (302-70/80)

A. Inspect Abutment Flanges.

- |     |  |                      |
|-----|--|----------------------|
| (1) | Nicks and burrs.   | Accept after repair. |
| (2) | Wear.  |                      |
| (a) | Not more than 10 per cent reduction in flange thickness. | Accept.              |

TN38176

INSPECTION/CHECK

**76-21-01**Page 304  
Apr 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

- (b) Bolt holes elongated not more than 0.030 in. (0,760 mm). Accept.
- (3) Scores.
  - (a) Not more than 0.010 in. (0,250 mm) in depth. Accept after repair.
- B. Inspect Shield Tube Location.
  - (1) Nicks and burrs. Accept after repair.
  - (2) Scores.
    - (a) Not more than 0.010 in. (0,250 mm) in depth. Accept after repair.
- C. Inspect Split Guide Bushes.
  - (1) Nicks and burrs. Accept after repair.
  - (2) Wear.
    - (a) Not more than 0.010 in. (0,250 mm) in guide bore. Accept.

NOTE: Where split bushes are removed for inspection they must be retained as a matched pair.

5. Shield Tube (302-90)

A. Inspect Tube (Ref.72-09-00 Inspection/Check).

6. Cable Assembly (302-100, 303-380)

A. Inspect Threads (Ref.72-09-00 Inspection/Check).

B. Inspect End Fittings.

INSPECTION/CHECK

76-21-01

Page 305  
Jun 1/98



OLYMPUS 593

MK.610-14-28  
OVERHAUL



SNECMA

(1) Security.

- |  |         |
|--|---------|
| (a) Any indication of defective swaging. | Reject. |
|--|---------|

- |                      |                      |
|----------------------|----------------------|
| (2) Nicks and burrs. | Accept after repair. |
|----------------------|----------------------|

C. Inspect Shouldered Pin Locations.

(1) Wear.

- |   |         |
|---|---------|
| (a) Pin holes elongated not more than 0.025 in. (0,630 mm). | Accept. |
|---|---------|

- |                          |         |
|--------------------------|---------|
| (b) Slight witness mark. | Accept. |
|--------------------------|---------|

D. Inspect Cable.

NOTE: The operating cables consist of seven strands each strand being made up of 14 wires.

- |  |         |
|--|---------|
| (1) Any broken wires.                                      | Reject. |
| (2) Any wire flattening.                                   | Reject. |
| (3) Any polishing of cables without noticeable flattening. | Accept. |

INSPECTION/CHECK

76-21-01

Page 306  
Jun 1/98



OLYMPUS 593

MK.610-14-28  
OVERHAUL



snecma

7. Base Plate (302-110)

A. Inspect Abutment Face.

- |  |                      |
|--|----------------------|
| (1) Nicks and burrs.   | Accept after repair. |
| (2) Wear.  |                      |
| (a) Not more than 10 per cent reduction in flange thickness. | Accept.              |
| (b) Bolt holes elongated not more than 0.030 in. (0,760 mm). | Accept.              |
| (3) Scores.  |                      |
| (a) Not more than 0.010 in. (0,250 mm) in depth.             | Accept after repair. |

B. Inspect Flanged Adapter Locating Recess.

- |   |                      |
|---|----------------------|
| (1) Scores.   |                      |
| (a) Not more than 0.010 in. (0,250 mm) of radial scoring.         | Accept after repair. |
| (b) Not more than 0.010 in. (0,250 mm) in depth of axial scoring. | Accept after repair. |

C. Inspect External Diameter of Piston Spigot.

- |                      |                      |
|----------------------|----------------------|
| (1) Nicks and burrs. | Accept after repair. |
|----------------------|----------------------|

D. Inspect Bore of Spigot.

- |  |                      |
|--|----------------------|
| (1) Scores.                                      |                      |
| (a) Not more than 0.010 in. (0,250 mm) in depth. | Accept after repair. |

INSPECTION/CHECK

76-21-01

Page 307  
Jun 1/98





OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

(2) Wear.

- (a) Not more than 0.005 in.  
(0,130 mm) of diametric  
wear. Accept.

8. Sliding Guard Assembly (302-220)

A. Inspect Sliding Guard Assembly (Ref.72-09-00 Inspection/  
Check, Rigid Tubes).

B. Inspect Abutment Flange.

- (1) Nicks and burrs. Accept after  
repair.

(2) Wear.

- (a) Not more than 10 per cent  
reduction in flange  
thickness. Accept.

- (b) Bolt-holes elongated not  
more than 0.030 in.  
(0,760 mm). Accept.

9. Cylinder (302-230)

A. Inspect Abutment Flange.

- (1) Nicks and burrs. Accept after  
repair.

(2) Wear.

- (a) Not more than 10 per cent  
reduction of flange  
thickness. Accept.

- (b) Bolt-holes elongated not  
more than 0.030 in.  
(0,760 mm). Accept.

INSPECTION/CHECK

76-21-01

Page 308  
Jun 1/98



OLYMPUS 593

MK.610-14-28

OVERHAUL



B. Inspect Cylinder Bore.

(1) Nicks and burrs.

Accept after  
repair.

(2) Scores.

(a) Not more than 0.010 in.  
(0,250 mm) deep.

Accept after repair  
if compatibility is  
unimpaired.

(3) Wear.

(a) Smooth unstepped wear.

Accept.

(b) Stepped wear.

Accept after repair  
providing material  
thickness is not  
reduced by more  
than 20 per cent.

C. Inspect Piston Shaft Diameter of Cylinder Bore.

(1) Nicks and burrs.

Accept after  
repair.

(2) Scores.

(a) Not more than 0.010 in.  
(0,250 mm) deep.

Accept after repair  
if compatibility is  
unimpaired.

(3) Wear.

(a) Not more than 0.010 in.  
(0,250 mm) on diameter.

Accept.

D. Inspect Spring Stop Flange in Cylinder Bore.

(1) Nicks and burrs.

Accept after  
repair.

(2) Wear.

(a) Not more than 0.010 in.  
(0,250 mm) in depth.

Accept.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



E. Inspect Strap Assembly Location.

- (1) Nicks and burrs. Accept after repair.

F. Inspect Sliding Guard Assembly Location.

- (1) Nicks and burrs. Accept after repair.

(2) Wear.

- (a) Not more than 0.010 in.  
(0,250 mm) deep. Accept after repair.

(3) Scores.

- (a) Not more than 0.010 in.  
(0,250 mm) deep. Accept after repair.

10. Piston (302-240)

A. Inspect Piston Shaft.

- (1) Nicks and burrs. Accept after repair.

(2) Wear.

- (a) Smooth unstepped wear. Accept.

- (b) Stepped wear. Accept after repair providing material thickness is not reduced by more than 10 per cent.

(3) Scores.

- (a) Not more than 0.010 in.  
(0,250 mm) deep. Accept after repair.

FN9713

INSPECTION/CHECK

76-21-01

Page 310

Apr 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

B. Inspect Spring Location Flange.

- (1) Nicks and burrs. Accept after repair.
- (2) Wear.
  - (a) Not more than 0.010 in. Accept.  
(0,250 mm) in depth.

C. Inspect Nut and Retaining Ring Location.

- (1) Nicks and burrs. Accept after repair.
- (2) Wear.
  - (a) Not more than 0.010 in. Accept.  
(0,250 mm) in depth.

11. Spring (302-250)

A. Inspect Spring.

- (1) Check spring compression load. Use spring test equipment (Ref.72-09-00 Inspection/Check).
  - (a) Free length Accept.  
5.000 in.  $\pm$  0.045 in.  
(127,000 mm  $\pm$  1,143 mm).
  - (b) Installed length is 4.200 in. Accept.  
(106,680 mm).
- (2) Wear.
  - (a) Flats on spring coil Accept.  
not more than 0.030 in.  
(0,760 mm) in depth.

INSPECTION/CHECK

76-21-01

Page 311  
Jun 1/98



OLYMPUS 593



MK.610-14-28  
OVERHAUL

snecma

12. Catch Plate (302-260)

A. Inspect Catch Plate.

- (1) Nicks and burrs.

Accept after  
repair.

13. Fixed Guard (302-310)

A. Inspect Abutment Flanges.

- (1) Nicks and burrs.

Accept after  
repair.

- (2) Wear.

- (a) Not more than 10 per cent  
reduction in flange  
thickness.

Accept after repair  
providing compati-  
bility is unim-  
paired.

- (b) Bolt holes elongated not  
more than 0.030 in.  
(0,760 mm).

Accept.

B. Inspect Sliding Guard Locating Spigot.

- (1) Nicks and burrs.

Accept after  
repair.

- (2) Wear.

- (a) Not more than 0.010 in.  
(0,250 mm) in depth.

Accept.

14. Conduit (303-400/450/560)

A. Inspect Conduits (Ref.72-09-00 Inspection/Check, Rigid  
Tubes).

B. Inspect End Locations.

- (1) Wear.

- (a) Not more than 0.004 in.  
(0,1 mm) reduction in  
material thickness.

Accept.

INSPECTION/CHECK

76-21-01

Page 312  
Jun 1/98



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

(2) Nicks, burrs and scoring.

(a) Not more than 0.010 in.  
(0,250 mm) deep.

Accept after  
repair.

(3) Distortion.

(a) Any distortion.

Accept providing  
compatibility is  
unimpaired.

15. Cover (303-80)

A. Inspect Cover.

(1) Nicks and burrs.

Accept after  
repair.

(2) Wear.

(a) Not more than 10 per cent  
reduction in flange  
thickness.

Accept.

(b) Bolt-holes elongated not  
more than 0.030 in.  
(0,760 mm).

Accept.

16. Clamp Block (303-85) and Support Bracket (303-110)

A. Inspect Clamp Block and Support Bracket.

(1) Nicks and burrs.

Accept after  
repair.

(2) Wear.

(a) Not more than 10 per cent  
reduction in flange  
thickness.

Accept.

(b) Bolt-holes elongated not  
more than 0.030 in.  
(0,760 mm).

Accept.

INSPECTION/CHECK

76-21-01

Page 313  
Jun 1/98



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

(3) Distortion.

(a) Any distortion.

Accept after repair  
providing repair  
does not induce  
cracking and  
compatibility is  
preserved.

17. Shoulder Pin (303-370)

A. Inspect Shoulder Pin.

(1) Nicks and burrs.

Accept after  
repair.

(2) Wear.

(a) Grooves or scores not  
more than 0.005 in.  
(0,130 mm) deep.

Accept.

18. Block Assembly (303-410/510/570)

A. Inspect Cable Lead-out Spigots.

(1) Nicks and burrs.

Accept after  
repair.

(2) Wear.

(a) No wear permitted.

Submit details  
to Rolls-Royce,  
Bristol, for  
repair.

(3) Scores.

(a) No scores permitted.

Submit details  
to Rolls-Royce,  
Bristol, for  
repair.

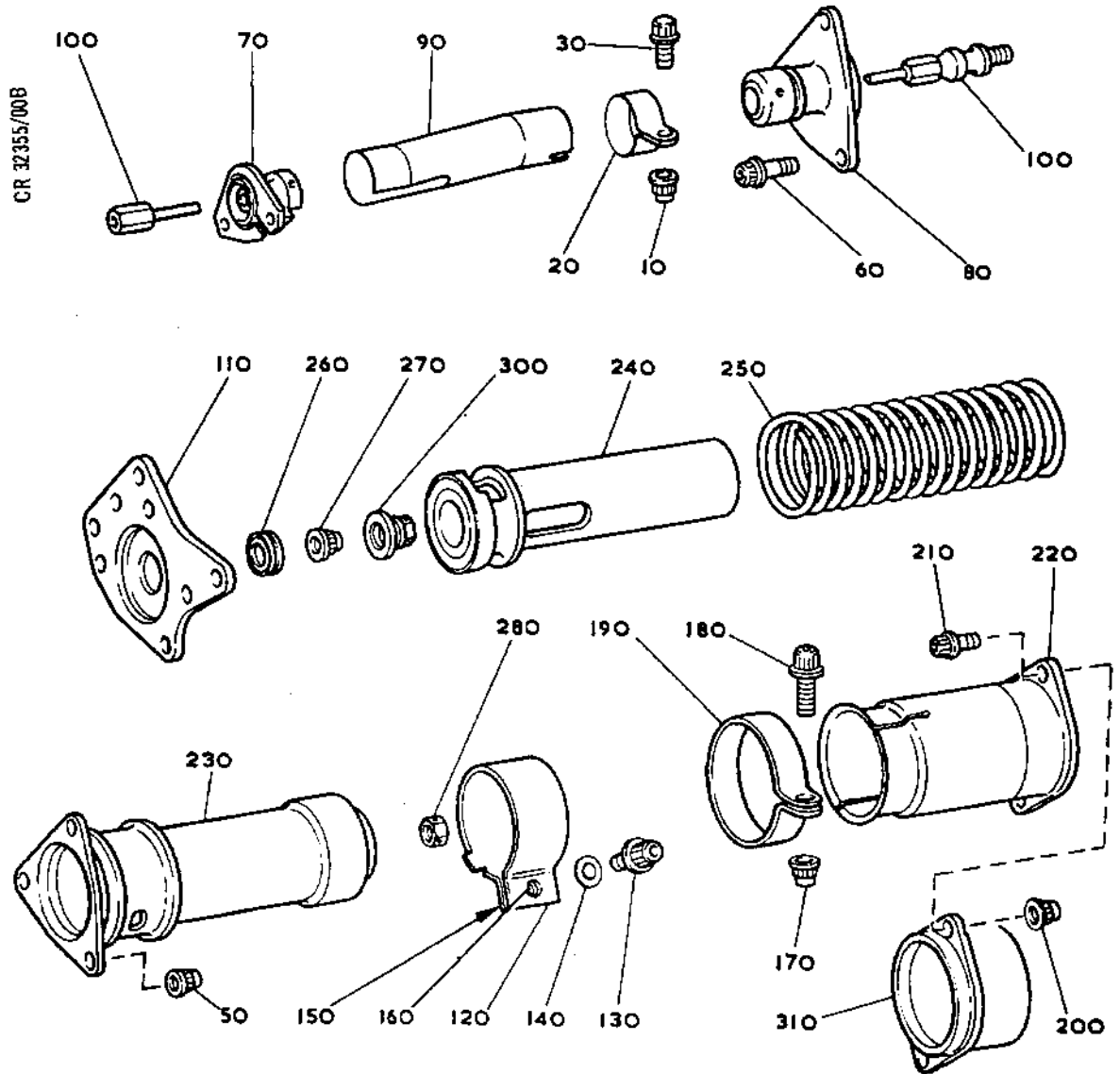
INSPECTION/CHECK

76-21-01

Page 314  
Dec 31/00



**OLYMPUS 593**  
MK.610-14-28  
OVERHAUL



LP Shaft Signal System, Cylinder Piston Section  
with Front Cable Assembly  
Figure 302

INSPECTION/CHECK

**76-21-01**

Page 315

Jun 1/96





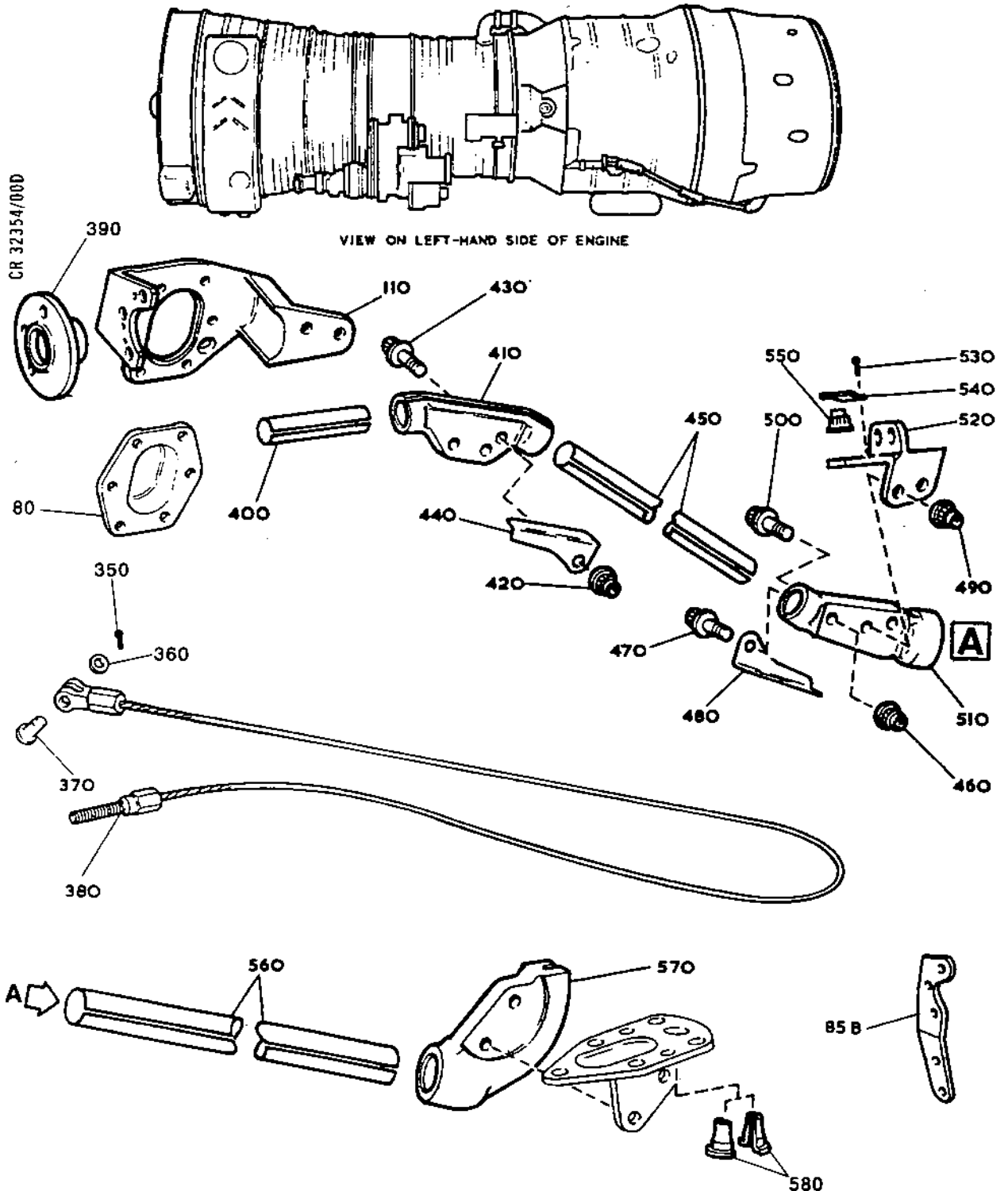
OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema



LP Shaft Signal System, Rear Centre Cable  
Guide Assemblies  
Figure 303

INSPECTION/CHECK

76-21-01

Page 316

Jun 1/96



OLYMPUS 593

MK.610-14-28

OVERHAUL



SNECMA

B. Conduit Locations.

NOTE: Hole wear is usually oval, therefore measurement must be taken at a number of locations to ascertain the maximum diameter.

(1) Maximum acceptable hole diameter.

- |                        |                 |
|------------------------|-----------------|
| (a) Block (303-410) -  | Reject if       |
| 0.615 in. (15,621 mm). | outside limits. |
| (b) Block (303-510) -  | Reject if       |
| Front hole -           | outside limits. |
| 0.615 in. (15,621 mm)  |                 |
| Rear hole -            |                 |
| 0.865 in. (21,971 mm)  |                 |
| (c) Block (303-570) -  | Reject if       |
| 0.865 in. (21,971 mm). | outside limits. |

C. Inspect General Condition of Block Assembly.

- |                      |              |
|----------------------|--------------|
| (1) Nicks and burrs. | Accept after |
|                      | repair.      |

D. Inspect Captive Nut (Ref.72-09-00 Inspection/Check).

INSPECTION/CHECK

76-21-01

Page 317

Jun 1/96



OLYMPUS 593



MK.610-14-28

SNECMA

OVERHAUL

LP SHAFT SIGNAL SYSTEM - CYLINDER PISTON SECTION WITH  
FRONT CABLE ASSEMBLIES - REPAIR

TABLE OF CONTENTS

Repair No.	Title	Scheme No.
1	Deleted	
2	Deleted	
3	Piston. Provision for Removal of Fretting/Wear on Outside Diameter	B.513491
4	Block, Front. Worn slotted conduit locations repaired by welding	B.515457

Printed in England

REPAIR

76-21-01

Contents 1

Jun 1/98



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



LP SHAFT SIGNAL SYSTEM - REPAIR OF BLOCK BY  
RESTORATION OF ROLLER PIN LOCATION HOLES

MODIFICATION NO. OL.8642C

1. Effectivity

<u>I.P.C.</u>	<u>Fig./Item</u>	<u>Part No.</u>
76-21-01	2 140A	B.395528

2. Introduction

A. General.

- (1) This repair describes the procedure for restoring the block roller pin location holes to their original standard.
- (2) The worn holes are filled with weld, then after suitable inspection and heat treatment are re-produced by drilling and their adjacent faces machined to basic drawing requirements.
- (3) Dimensions are shown thus in tables and illustrations: INCHES (MILLIMETRES).
- (4) Refer to Chapter 72-09-00 Repair, for all Standard Practices applicable to this repair procedure.
- (5) Details of the tools, referred to by item number in this repair procedure, can be found in para.4.
- (6) Remove all sharp edges 0.004 in. to 0.020 in. (0,1 mm to 0,5 mm) unless otherwise stated.
- (7) The tolerance on machined dimensions is plus/minus 0.010 in. (0,25 mm) unless otherwise stated.
- (8) The tolerance on angles is plus/minus 2 degrees unless otherwise stated.

REPAIR

**76-21-01**

Repair No.1

Page 401

Jul 1/79

PRINTED IN ENGLAND

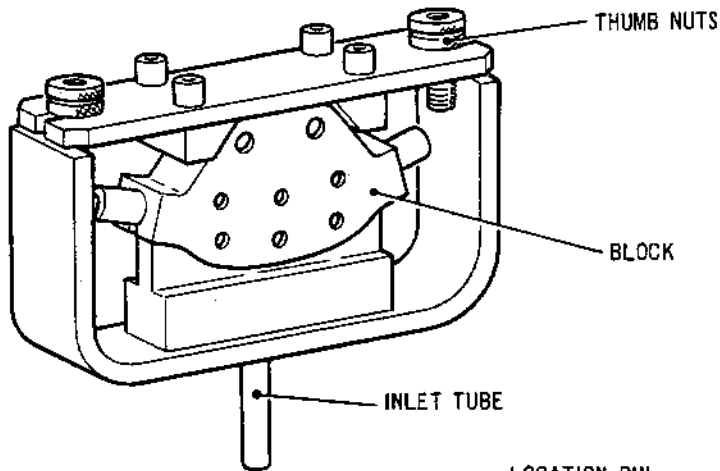
TN12244



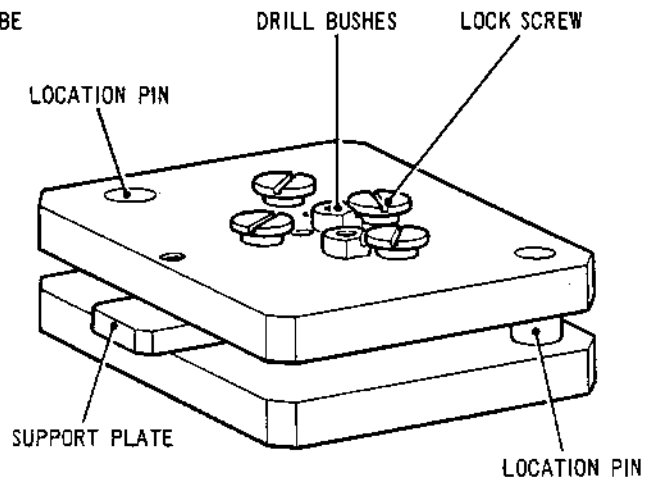
OLYMPUS 593  
MK.610-14-28  
OVERHAUL



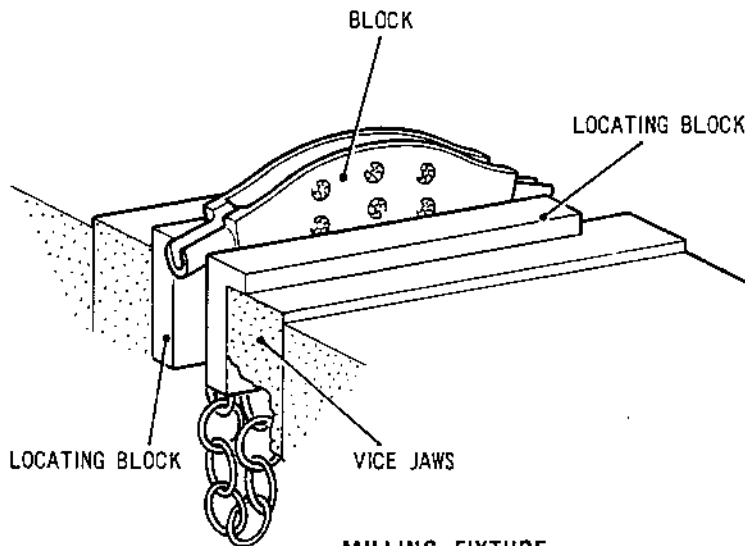
CR 35149/00A



WELDING FIXTURE  
S3S 15690000



DRILL JIG  
S3S 15692000



MILLING FIXTURE  
S3S 15691000

Tooling Details  
Figure 401

691169

REPAIR  
**76-21-01**  
Repair No.1  
Page 402  
Jul 1/79



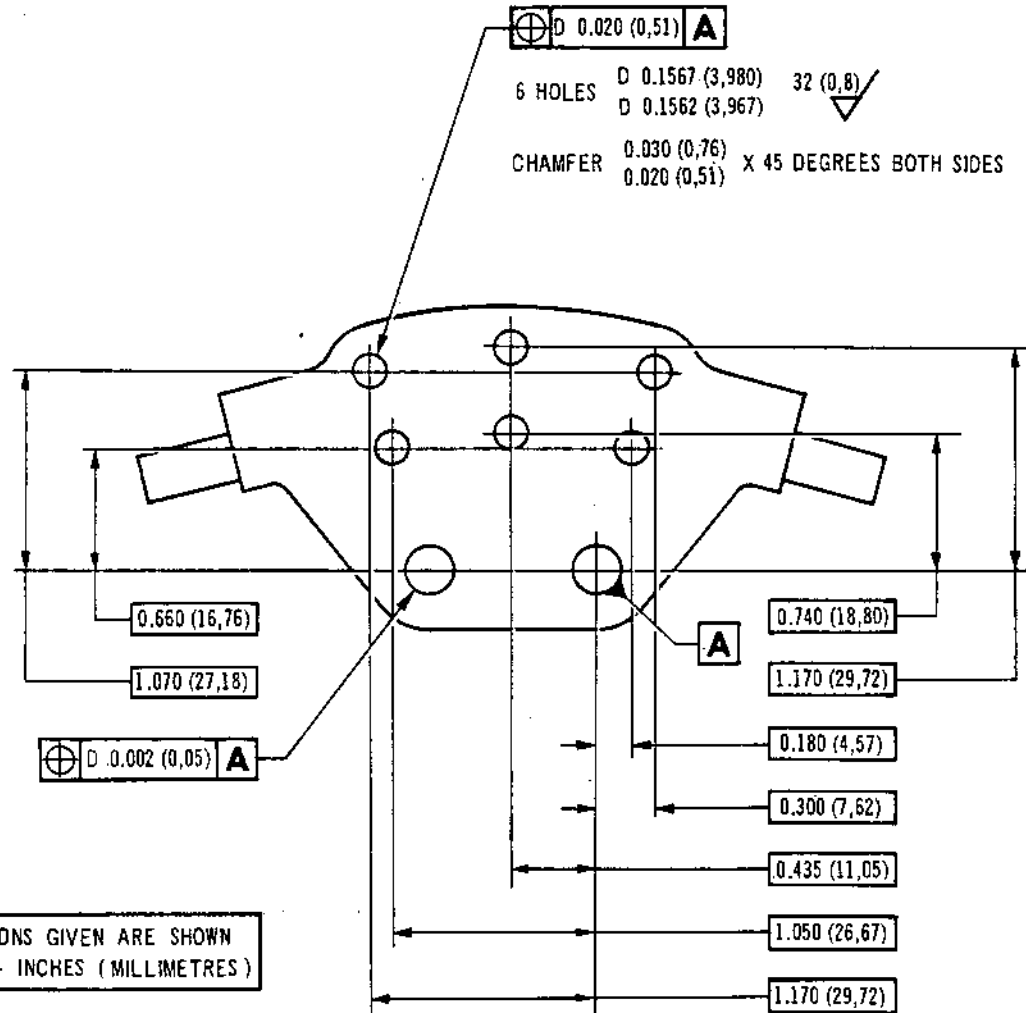
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 35147/00A

PRINTED IN ENGLAND



Machining Details  
Figure 402

TN1179

REPAIR

76-21-01

Repair No.1

Page 403

Jul 1/79



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (9) To avoid damage, ensure the block is placed in a suitable protective container during transit between operations.

### 3. Instructions

#### A. Weld-fill Defective Holes.

- (1) Clean the areas to be welded using clean, fine grade Scotchbrite and degrease with Genklene.
- (2) Locate the block in fixture, ref. tool item 1 (Fig.401) and fill the six 0.1567 in./0.1562 in. (3,98 mm/3,97 mm) diameter holes with weld (Fig.402); refer to para.6, Process A for manual welding recommendations.
- (3) Reverse the block in the fixture and repeat operations (1) and (2).

#### B. Inspect and Heat Treat.

- (1) Test the block for cracks using the magnetic particle examination method detailed in Chapter 72-09-00, Inspection/Check; refer to Fig.403 for test diagram.
- (2) Place the block in a furnace and heat treat to 650 deg.C. plus/minus 5 deg.C. for 1 hour. Cool in air.
- (3) Check the block for distortion. If necessary, true-up the block using conventional workshop tools. Care must be taken not to damage the block.
- (4) Repeat the test for cracks using the method detailed at para.(1).

#### C. Machine Block.

- (1) Locate the block in fixture, ref. tool item 2 (Fig.401).
- (2) Locate the block/fixture assy. to a suitable milling machine, and mill to produce the 0.306 in./0.300 in. (7,77 mm/7,62 mm) wide slot, then mill to produce the 0.450 in./0.438 in. (11,43 mm/11,13 mm) overall width (Fig.404).

FN1180

REPAIR

76-21-01

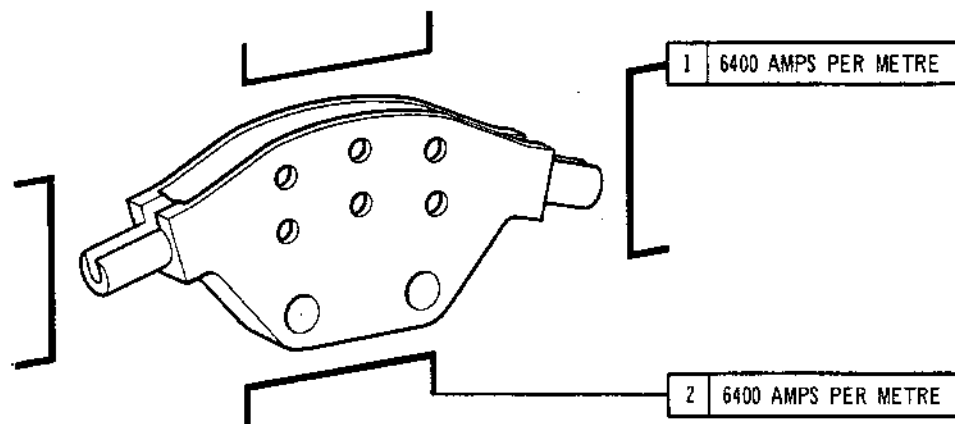
Repair No.1

Page 404

Jul 1/79



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



Magnetic Particle Crack Test Diagram  
Figure 403



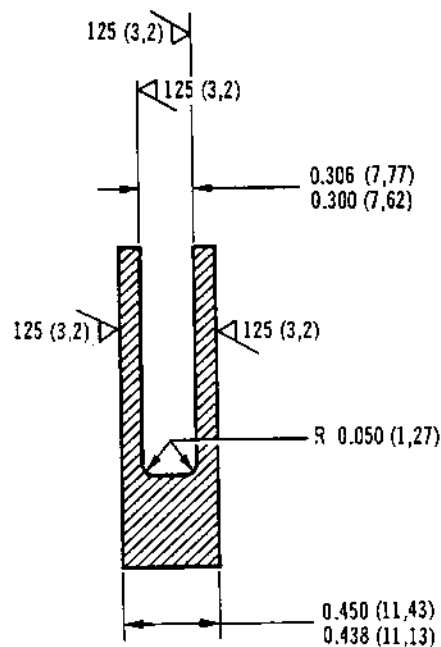


OLYMPUS 593

MK.610-14-28  
OVERHAUL



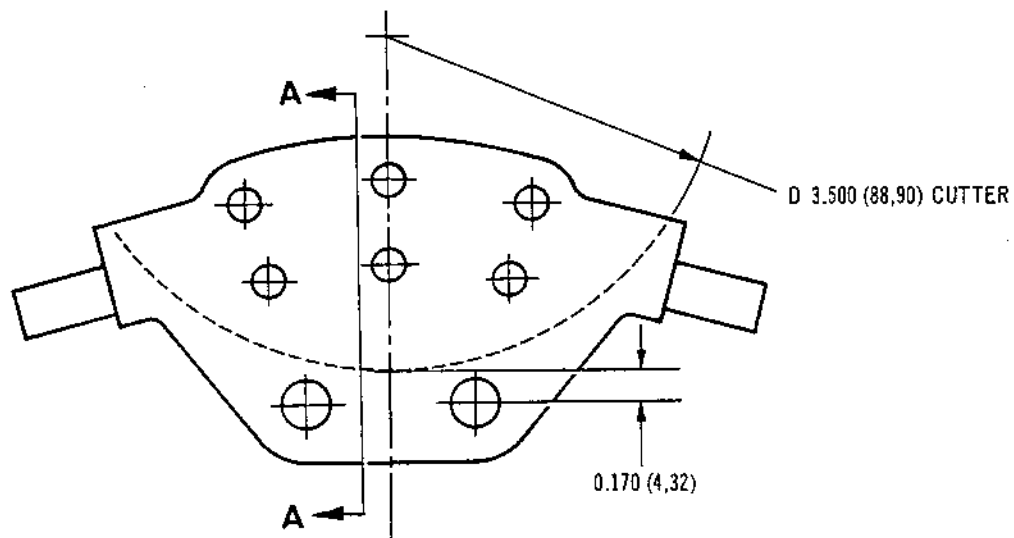
CR 35148/00A



DIMENSIONS GIVEN ARE SHOWN  
THUS :- INCHES (MILLIMETRES)

SECTION AA

SURFACE ROUGHNESS VALUES ARE SHOWN  
THUS :- MICRO-INCHES (MICROMETRES) ✓



Machining Details  
Figure 404

FN1183

REPAIR  
**76-21-01**  
Repair No.1  
Page 406  
Jul 1/79



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (3) Remove the block from fixture.
- (4) Locate the block in drill jig, ref. tool item 3 (Fig.401).
- (5) Locate the block/drill jig assy. to a suitable drilling machine, and reproduce the six 0.1567 in./0.1562 in. (3,980 mm/3,967 mm) diameter holes. Chamfer the holes 0.030 in./0.020 in. (0,76 mm/0,51 mm) x 45 degrees both sides (Fig.402).
- (6) Remove the block from drill jig.
- (7) Remove burrs using conventional hand tools.

D. Inspect and Identify.

- (1) Check the block for cracks using the magnetic particle examination method detailed in Chapter 72-09-00, Inspection/Check; refer to Fig.403 for test diagram.
- (2) Mark the repair scheme number B.495641, or R1 adjacent to the standard part number; use the electro-chemical engraving method (Ref.72-09-00, Repair).
- (3) Finally inspect the block to ensure the repair has been carried out satisfactorily and that the block is in a serviceable condition.
- (4) Generally clean the block to remove grease and foreign bodies, then place in a suitable protection container.

4. Special Tools, Fixtures and Equipment

<u>Description</u>	<u>Quantity</u>	<u>Tool No.</u>	<u>Item/Fig.No.</u>	
Welding Fixture	1	S3S.15690000	1	401
Milling Fixture	1	S3S.15691000	2	401
Drill Jig	1	S3S.15692000	3	401

REPAIR

**76-21-01**

Repair No.1

Page 407

Jul 1/79



OLYMPUS 593

MK.610-14-28  
OVERHAUL



5. Replacement Parts

None.

6. Welding Recommendations

A. Process A.

- (1) Method of welding:

Manual

- (2) Machine:

Interlas SR200 BOC ADR300 and DC250

- (3) Torch:

Air cooled HW17

- (4) Current:

55 - 60 amps D.C.

- (5) Electrode:

Negative 0.09375 in. (2,36 mm) dia.

Tungsten thoriated

- (6) Filler wire:

MSRR 9500/10, 0.064 in. (1,62 mm) dia.

- (7) Argon to torch:

7 litres/min. (15 cu ft/hr)

- (8) Argon to backing:

5 litres/min. (10 cu ft/hr)

- (9) Crater eliminator or variable current to be used at all times.

TN1174

REPAIR

76-21-01

Repair No.1

Page 408

Jul 1/79



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

LP SHAFT SIGNAL SYSTEM - REPAIR OF REAR BLOCK BY  
RESTORATION OF ROLLER PIN LOCATION HOLES

Printed in England

THIS REPAIR HAS BEEN DELETED

REPAIR

**76-21-01**

Repair No.2

Page 401

Dec 1/95

**OLYMPUS 593**MK.610-14-28  
OVERHAULPISTONPROVISION FOR REMOVAL OF FRETTING/WEAR ON OUTSIDE DIAMETER.REPAIR NO. B5134911. EFFECTIVITY

IPC	Fig./Item	Part No.
76-21-01		B459348

2. REPAIR LIMITATIONS

Compliance with all aspects of this repair process should be achieved without deviation. Where a need to deviate is considered necessary reference should be made to the Repair authority for agreement.

Work to either PART A or B of this repair depending on type and position of fretting/wear:-

PART A: Blending of fretting over area AA. Refer fig.401.  
Maximum blend depth 0.020(0,51) provided minimum wall section is not less than 0.047(1,19).

PART B: Repair Piston end wear, over area AB by flame spraying, Refer fig.401. Minimum repairable diameter 1.273(32,33).

3. GENERAL

## UNLESS OTHERWISE SPECIFIED

Drawing practice &amp; tolerance interpretation to ISO1101 (JES160)

Dimensions in Inches (Millimeters)

Tolerances on machined dimensions plus/minus .010 (0,25)

Tolerance on angles plus/minus 2 degrees

Break sharp edges .004 to .020 (0,1 to 0,5)

Surface texture interpretation to ISO1302 (JES137)

Surface texture to be 125 (3,2) Microinches (Micrometers)

Welding symbols to ISO2553 (JES139)

3rd Angle Projection

PRINTED IN ENGLAND

REPAIR  
**76-21-01**  
Repair No. 3  
Page 401  
Dec 1/91



OLYMPUS 593

MK.610-14-28  
OVERHAUL



#### 4. REPAIR PROCEDURE

##### REPAIR PROCEDURE

##### SUPPLEMENTARY INFORMATION

###### PART A:

- 1) Visually inspect to verify position of fretting on area AA. Refer fig.401
- 2) Using conventional hand tools only, blend to remove fretting. Produce a smooth and continuous profile, removing only the minimum of material.
- 3) Dimensionally inspect to ensure repair limitations have not been exceeded. Refer REPAIR LIMITATIONS and fig.401
- 4) Inspect for cracking. Refer Overhaul Manual Chapter 76-21-01 Inspection/Check.
- 5) Mark SAL.B513491 'A' or R3 adjacent to existing part number using the vibro-percussion engraving. Refer Overhaul Manual Chapter 72-09-00 Repair.

###### PART B:

- 1) Visually inspect to verify position and extent of wear to area AB. Refer fig.401
- 2) Set component on a lathe and set true to datum A. Machine to dimensions shown. Refer fig.401
- 3) Dimensionally inspect repair area. Refer fig.401
- 4) Crack detect repair area. Refer Overhaul Manual, Chapter 76-21-01. Inspection/Check
- 5) Mask off areas not to be coated. Refer fig.401
- 6) Apply bond coat to a thickness of 0.003/0.005(0,07/0,13). Refer TSD 594 OP 704. Bond coat MSRR9507/5 Metco 450 NS.



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

- |     |   |  |
|-----|---|--|
| 7)  | Apply top coat to a thickness of 0.010/0.015(0,25/0,38).  | Refer TSD 594 OP 704.<br>Top coat MSRR9507/23<br>Metco 45 VF-NS. |
| 8)  | Inspect coating integrity.  | Refer TSD 594 OP 704,<br>Section 8.                              |
| 9)  | Set component on a universal grinder and set true to datum A. Machine to finished dimensions. Overspray is not permissible.           | Refer fig.401 and 402  |
| 10) | Dimensionally inspect repair area.  | Refer fig.402  |
| 11) | Visually inspect coating for defects.   | Refer TSD 594 704,<br>Section 8.                                 |
| 12) | Mark SAL.B513491 'B' or R3 and coating identity symbols HA CO adjacent to existing part number, using the vibro-percussion engraving. | Refer Overhaul Manual<br>Chapter 72-09-00<br>Repair.             |

## 5. MATERIAL

COMPONENT.	MATERIAL.	RR CODE.
PISTON	CORROSION RESISTING STEEL S.62	--

## 6. DATA

NONE

## 7. TOOLS

NONE

## 8. REPLACEMENT PARTS

NONE

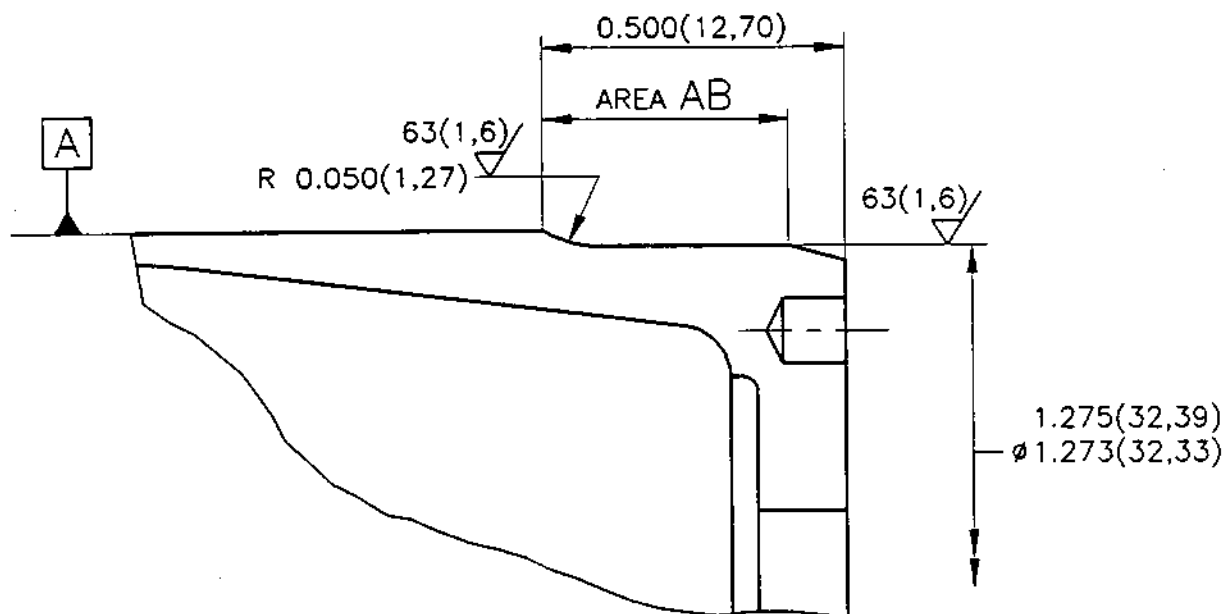
REPAIR  
**76-21-01**  
Repair No. 3  
Page 403  
Dec 1/91



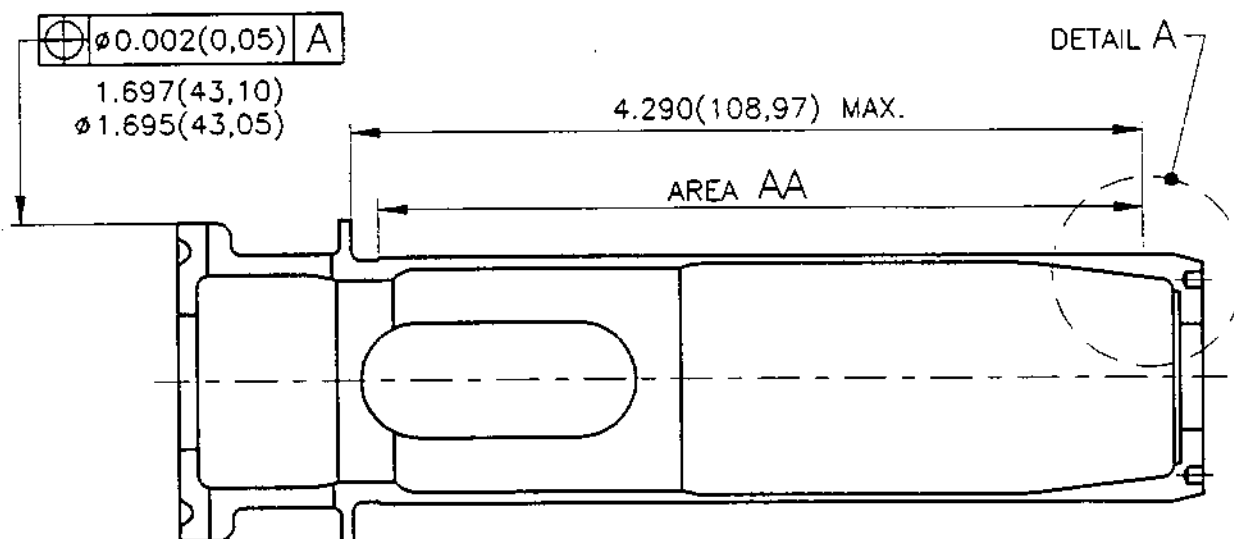
OLYMPUS 593

MK.610-14-28

OVERHAUL



DETAIL A SHOWING PRE-SPRAY DIMENSIONS



TYPICAL SECTION THROUGH PISTON

FIG.401

REPAIR  
76-21-01  
Repair No. 3  
Page 404  
Dec 1/91



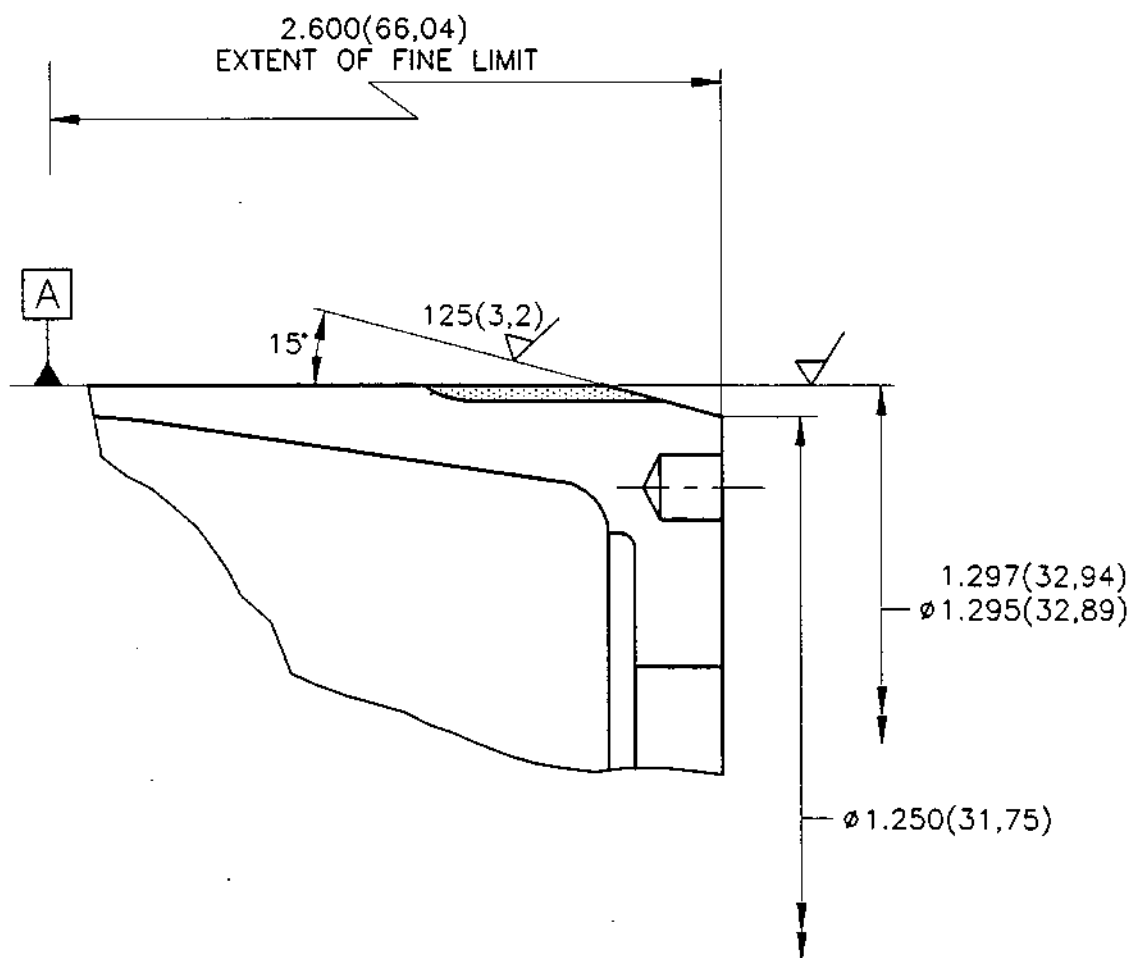


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



REPEAT DETAIL A

VIEW SHOWING POST PLATING MACHINING  
FIG.402

REPAIR  
76-21-01  
Repair No. 3  
Page 405  
Dec 1/91



OLYMPUS 593

MK.610-14-28

OVERHAUL



SNECMA

BLOCK, FRONT.

WORN SLOTTED CONDUIT LOCATIONS  
REPAIRED BY WELDING.

REPAIR NO. B5154571. EFFECTIVITYIPC

76-21-01

Fig./Item

2B /410A

Part No.

B496696

2. REPAIR LIMITATIONS

Compliance with all aspects of this repair process should be achieved without deviation. Where a need to deviate is considered necessary, reference should be made to the Repair Authority for agreement.

This repair is applicable to both conduit ends of the component and may be restored together or individually as required.

This repair may be embodied any number of times provided stated dimensions are maintained.

3. GENERAL

UNLESS OTHERWISE SPECIFIED

Drawing practice & tolerance interpretation to ISO1101 (JES160)  
Dimensions in Inches (Millimetres)

Tolerances on machined dimensions plus/minus 0.010 (0,25)

Tolerance on angles plus/minus 2 degrees

Break sharp edges 0.004 to 0.020 (0,1 to 0,5)

Surface texture interpretation to ISO1302 (JES137)

Surface texture to be 125 (3,2) Microinches (Micrometres)

Welding symbols to ISO2553 (JES139)

3rd Angle Projection

4. REPAIR PROCEDURESUPPLEMENTARY INFORMATION

1) Clean Front Block.

Refer Overhaul Manual  
Chapter 72-09-00 Cleaning,  
Process F.

2) Dye penetrant inspect component.

Refer TSD 594 OP.213

3) Prepare worn location(s) for  
welding. Ensure any burring at  
at edges of cable groove are  
removed.

Refer TSD 594 OP.409.

REPAIR

**76-21-01**

Repair No. 4

Page 401

Dec 30/98



# OLYMPUS 593

MK.610-14-28

OVERHAUL



- 4) Inert gas arc weld build up worn location(s). Apply the minimum amount of weld metal sufficient to clean up on final machining. Refer TSD 594 OP.409. Use filler wire OMat 333. Refer Fig.401.
- 5) Re-machine conduit location features. Refer Fig.402.
- 6) Machine and/or hand dress to remove excess weld metal and to restore cable groove dimensions. Remove sharp edges. Refer Fig.402.
- 7) Locally dye penetrant inspect repair area(s). No cracking is permissible. Refer TSD 594 OP.213.
- 8) Mark Repair Instruction number RI B515457 or R4 adjacent to normal 'assy.of' number using the vibro-percussion engraving technique. Refer Overhaul Manual Chapter 72-09-00 Repair. Refer Fig.401 for identity marking location.

## 5. MATERIAL

<u>COMPONENT</u>	<u>MATERIAL</u>	<u>RR CODE</u>
BLOCK, FRONT	MSRR9538	EQW

## 6. DATA

NONE.

## 7. TOOLS

<u>TOOL NUMBER</u>	<u>DESCRIPTION</u>	<u>ITEM</u>
NONE.		

## 8. REPLACEMENT PARTS

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>ITEM</u>
NONE.		

REPAIR

# 76-21-01

Repair No. 4

Page 402

Jul 31/93



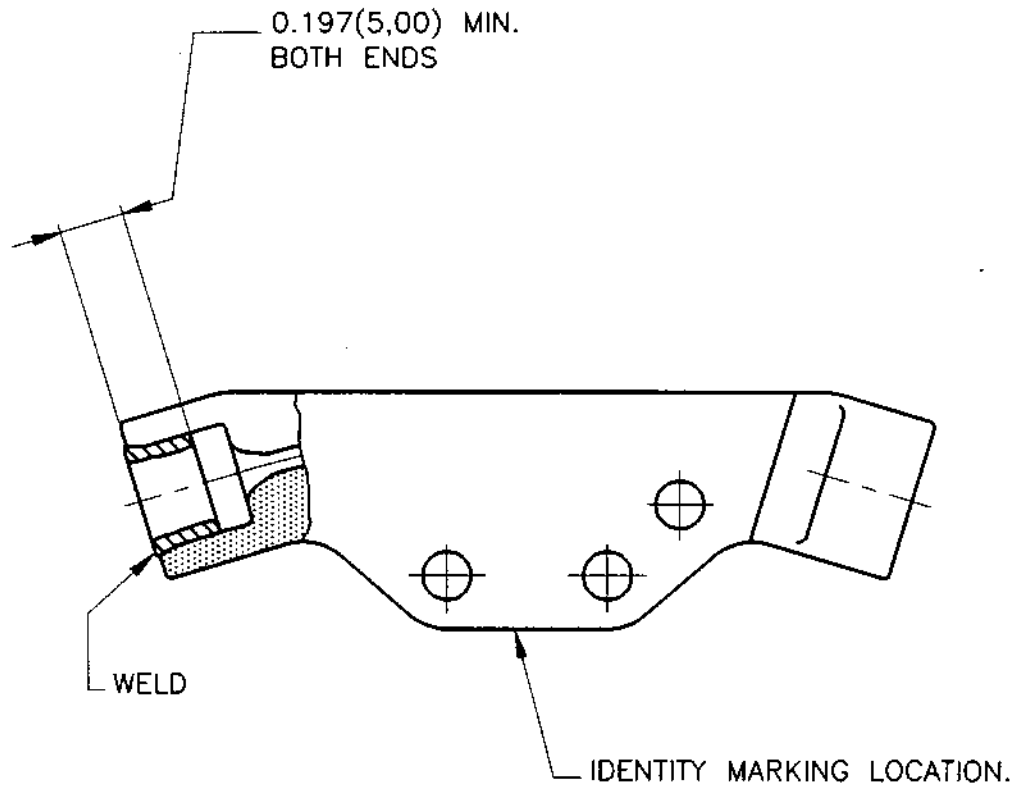
OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND



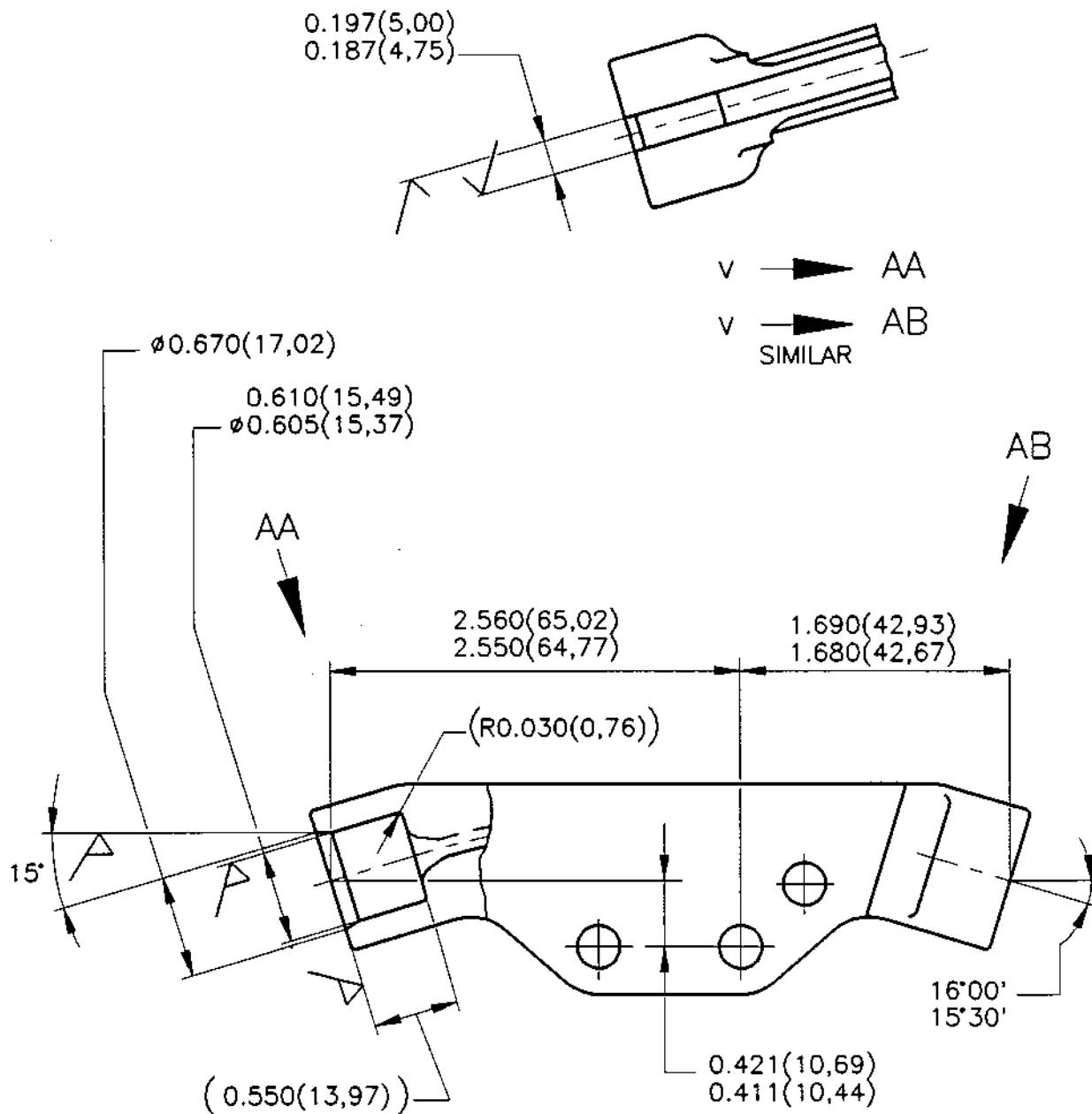
WELD BUILD-UP REQUIREMENT  
FIG.401



OLYMPUS 593

MK-610-14-28

OVERHAUL



DIMENSIONS APPLY TO BOTH ENDS OF  
BLOCK (UNLESS OTHERWISE STATED)

FINISH MACHINING DIMENSIONS  
FIG.402

REPAIR  
**76-21-01**  
Repair No. 4  
Page 404  
Jul 31/93



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



LP SHAFT SIGNAL SYSTEM - CYLINDER AND PISTON SECTION WITH  
FRONT AND CENTRE CABLE ASSEMBLIES - ASSEMBLY

TABLE OF CONTENTS

Para.	Page
1. General ... ..	501
2. Assembly the Cable to the Flanged Adapter Assemblies and Shield ... ..	501
A. Prepare the Cables ... ..	501
B. Assemble the Front Adapter to the Cable Assembly..	501
C. Assemble the Rear Adapter to the Cable Assembly...	501
3. Assemble Piston to Cylinder... ..	503
A. Assemble the Front Cable and Catch Plate to the Piston ... ..	503
B. Assemble Piston to the Cylinder ... ..	506
C. Assemble the Guards to the Cylinder... ..	508

TABLE OF ILLUSTRATIONS

Fig.No.	Page
501 Assembly of the Flanged Adapters to the Cable Assembly ... ..	502
502 Assembly of the Piston ... ..	504
503 Assembly of the Cylinder.. ... ..	505
504 Detail of the Guards ... ..	507

PRINTED IN ENGLAND

TN25522



OLYMPUS 593

MK.610-14-28 *sneema*  
OVERHAUL

LP SHAFT SIGNAL SYSTEM - CYLINDER AND PISTON SECTION  
WITH FRONT AND CENTRE CABLE ASSEMBLIES - ASSEMBLY

1. General

- A. Before commencing the assembly refer to 72-09-00 Assembly, for general information.
- B. Throughout the text, special tools are quoted by their reference number; e.g. Tool 1234. For a complete list of tooling required for assembly and for the Manufacturer's Part Number, refer to Special Tools, Fixtures and Equipment, Table 1002.
- C. During the assembly procedure, reference will be made to the Illustrated Parts Catalogue (I.P.C.) 76-21-01, to identify those items where the nomenclature does not positively identify them, due to the duplication of the title, e.g. nuts, bolts and washers etc. When the item is a part of the breakdown of the text concerned, the item will be identified as nut (1-10), the 1 referring to the I.P.C. Fig.No. and the 10 referring to the Item No.

2. Assemble the Cable to the Flanged Adapter Assemblies and Shield (Ref.Fig.501)

A. Prepare the Cables.

- (1) Immerse the front and centre cables in lubricant 'T', allow to soak and then drip dry.

B. Assemble the Front Adapter to the Cable Assembly.

- (1) Insert the cable (1-100A), dump valve end first, through the front adapter (1-70).
- (2) Assemble the bush guide halves (1-75-79) over the cable and insert into the adapter. Align the slot in the bush half with the adapter slot.

ASSEMBLY

76-21-01

Page 501  
Dec 1/95

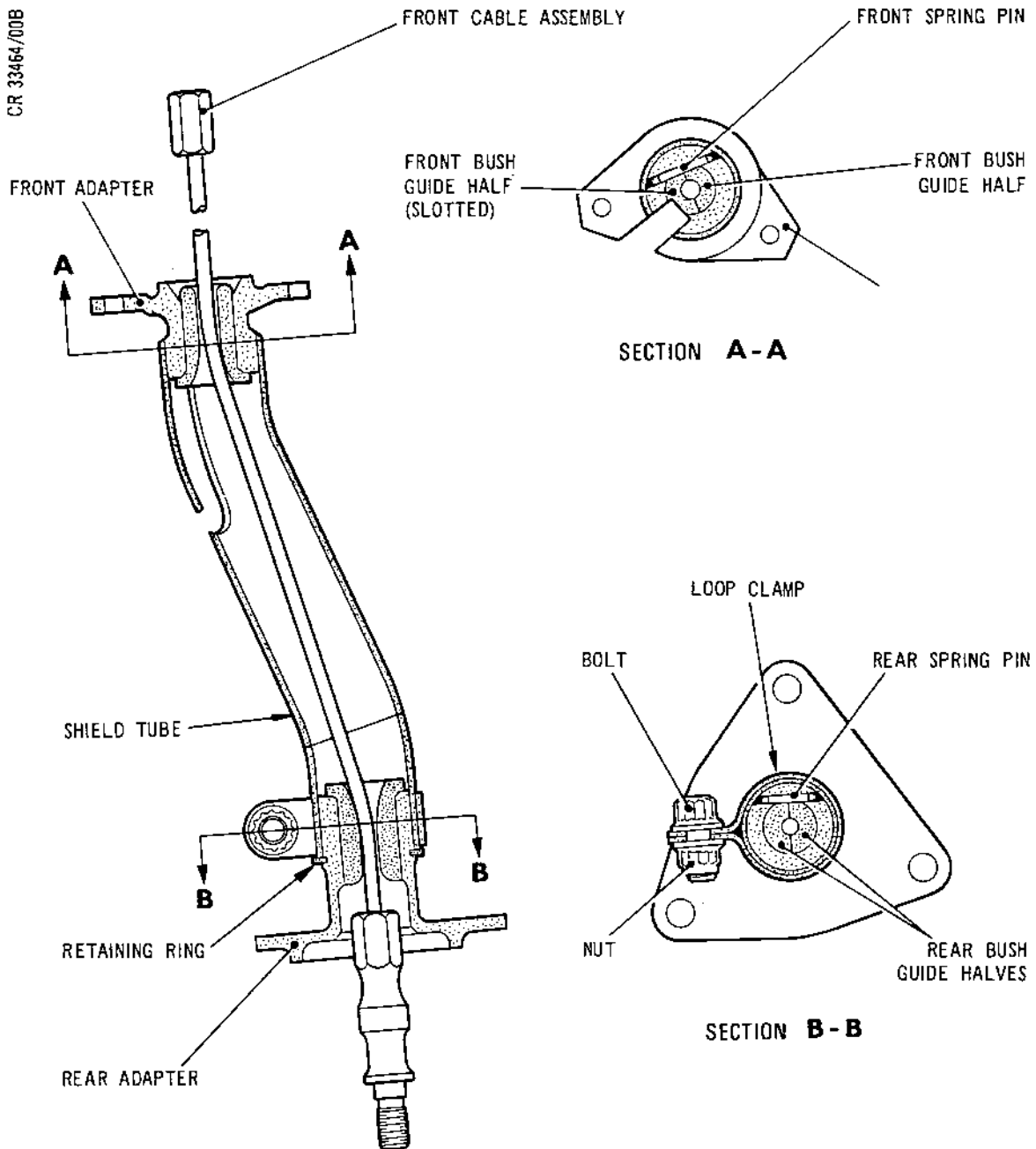


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 33464/00B



Assembly of the Flanged Adapters to the Cable Assembly  
Figure 501

ASSEMBLY  
**76-21-01**  
Page 502  
Feb 1/81





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (3) Retain the bush guide halves in position by inserting the spring pin into the adapter.
- (4) Slide the shield tube (1-90) (S.B.76-8 standard) over the cable and the adapter and align the slots. Install the loop-clamp (1-20) on the shield tube.

C. Assemble the Rear Adapter to the Cable Assembly.

- (1) Slide the adapter (1-80) over the cable.
- (2) Assemble the bush guide halves over the cable and insert into the adapter and align the guide halves.
- (3) Retain the bush guide in position by inserting the spring pin into the adapter.
- (4) Assemble the adapter (1-80) to the shield tube and install the retaining ring (1-40).
- (5) Secure the adapter (1-80) to the shield tube with the loop-clamp (1-20), bolt (1-30) and nut (1-10). Lubricate the threads with lubricant 'B' then ensuring that the locking (run-down) torque is a minimum of 3.5 lbf in. (0,4 N.m) torque-tighten the nut to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

3. Assemble Piston to Cylinder

A. Assemble the Front Cable and Catch Plate to the Piston (Ref.Fig.502).

- (1) Coat the bore of the baseplate (1-110) with lubricant 'G'.
- (2) Slide the baseplate over the cable and temporarily secure to the adapter (1-80) with three bolts (1-60) and nuts (1-50).
- (3) Install the nut (1-300) on the piston (1-240) and secure in position with the retaining ring (1-290).

PRINTED IN ENGLAND

TN25515

ASSEMBLY

76-21-01

Page 503

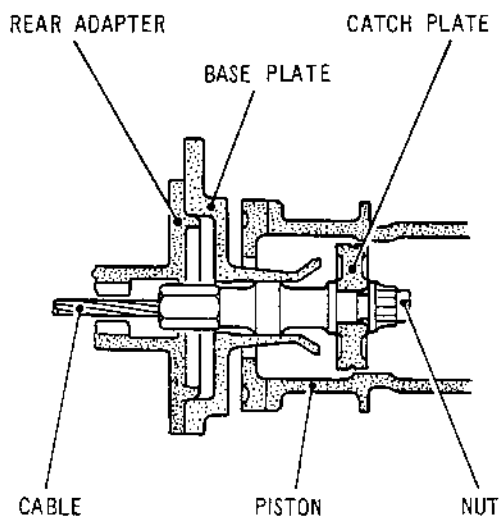
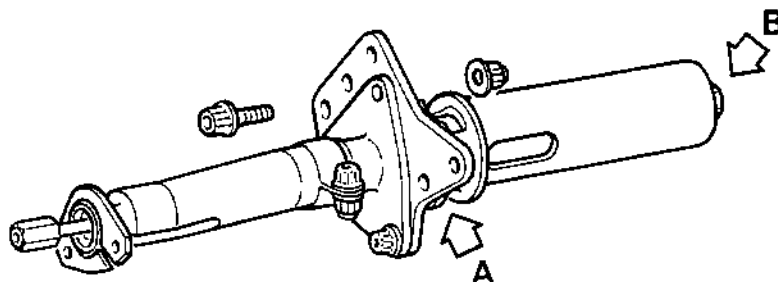
Feb 1/81



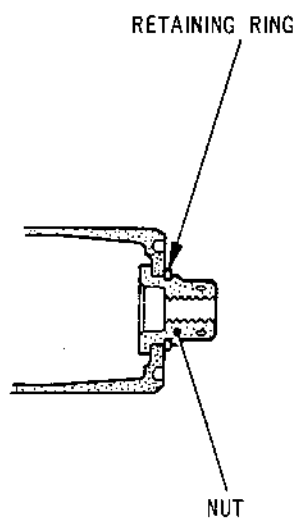
OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 33465/00B



**A**



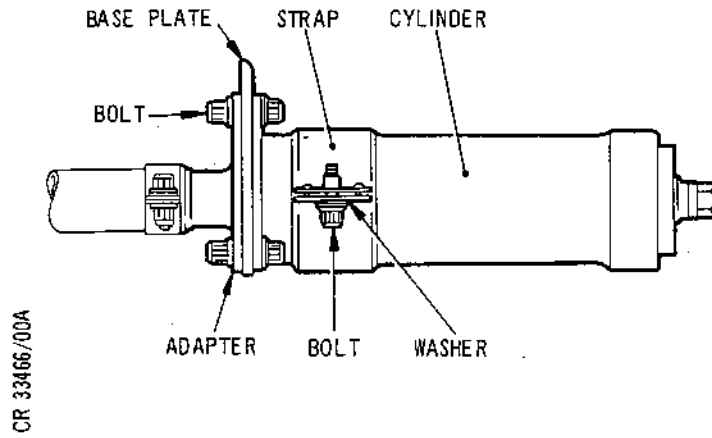
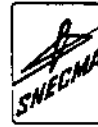
**B**

Assembly of the Piston  
Figure 502

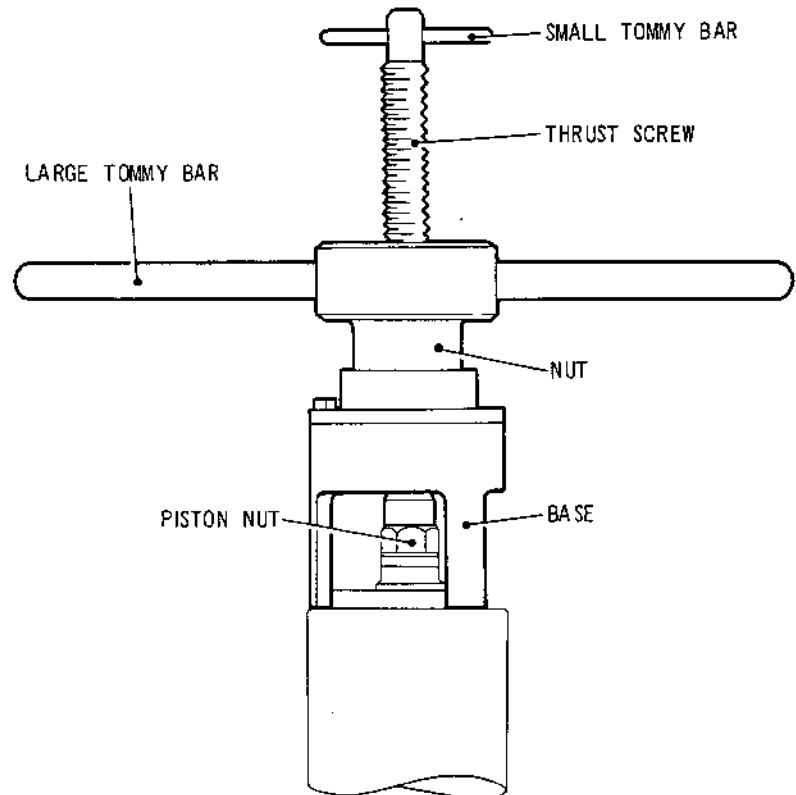
TN25518



**OLYMPUS 593**  
MK.610-14-28  
OVERHAUL



CR 33466/00A



Assembly of the Cylinder  
Figure 503



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (4) Slide the piston over the cable and using the slot in the piston, position the catchplate (1-260) and secure with the nut (1-270). Apply lubricant 'B' to threads of nut then ensuring that the locking (run-down) torque is a minimum of 3.5 lbf in. (0,4 N.m) torque-tighten the nut to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

**B. Assemble the Piston to the Cylinder (Ref.Fig.503).**

- (1) Coat the outside diameter of the piston and the inside diameter of the cylinder (1-230) with lubricant 'G'.
- (2) Remove the nuts and bolts temporarily used to secure the baseplate to the adapter.
- (3) Slide the spring (1-250) and the cylinder (1-230) over the piston and using the assembly tool (Tool 1299), centralize and compress the spring as follows:
  - (a) Screw the nut on the thrust screw towards the small tommy bar end using the large tommy bar.
  - (b) Install the base of the tool onto the cylinder and using the small tommy bar, screw the thrust screw into the piston nut.
  - (c) Hold the base and small tommy bar steady. Using the large tommy bar, screw away from the small tommy bar. This action will tend to pull the piston towards the cylinder head and so compress the spring.
- (4) Secure the adapter, baseplate and cylinder together with three bolts (1-60) and nuts (1-50). Apply lubricant 'B' to the threads then ensuring that the locking (run-down) torque is a minimum of 3.5 lbf in. (0,4 N.m) torque-tighten the nuts to between 67 and 73 lbf in. (7,6 and 8,2 N.m).

FN25516



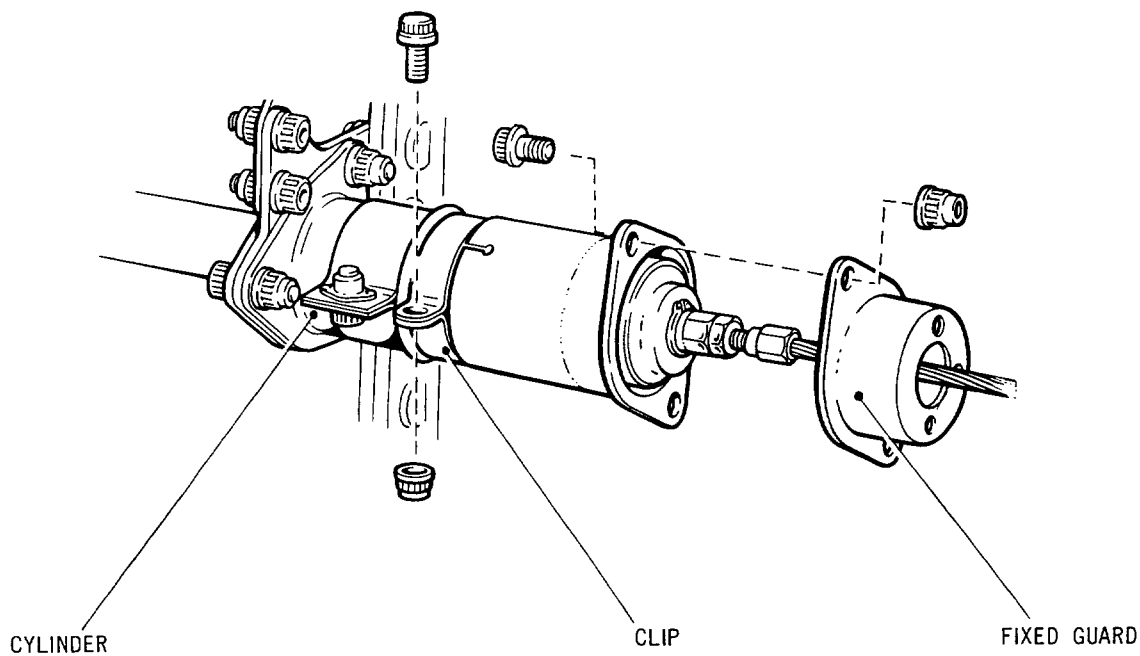
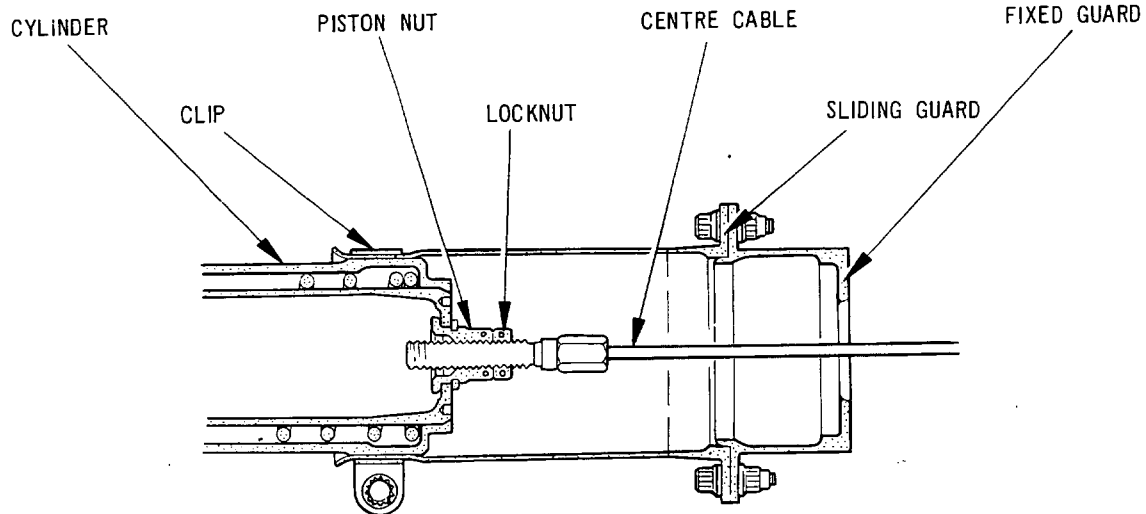
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 33551/00A



Detail of the Guard Assembly  
Figure 504

ASSEMBLY

76-21-01

Page 507

Feb 1/81



# OLYMPUS 593



MK.610-14-28  
OVERHAUL

SNECMA

- (5) Remove the tool by unscrewing the large tommy bar towards the small tommy bar until the spring pressure is relieved then unscrew the thrust screw from the piston nut using the small tommy bar.
- (6) Assemble the strap (1-120) to the cylinder and ensure the dog positions correctly. Secure with a washer (1-140) and bolt (1-130). Apply lubricant 'A' to the threads then ensuring that the locking (run-down) torque is a minimum of 2.0 lbf in. (0,23 N.m) torque-tighten the bolt to 40 lbf in. (4,5 N.m).

C. Assemble the Guards to the Cylinder (Ref. Fig.504).

- (1) Install the locknut (1-280) on the centre cable assembly (2-380) and screw the cable end into the piston nut.
- (2) Assemble the fixed guard (1-310) to the sliding guard (1-220) and secure together with two bolts (1-210) and nuts (1-200). Coat the threads with lubricant 'B' then ensuring that the locking (run-down) torque is a minimum of 2.0 lbf in. (0,23 N.m) torque-tighten the nuts to between 28 and 32 lbf in. (3,2 and 3,6 N.m).
- (3) Assemble the clip (1-190) and the guards on the cable and on the cylinder.
- (4) Secure the sliding guard to the cylinder using the clip, bolt (1-180) and nut (1-170). Coat the threads with lubricant 'A' then ensuring that the locking (run-down) torque is a minimum of 3.5 lbf in. (0,4 N.m), torque-tighten the nut to 100 lbf in. (11,5 N.m).

ASSEMBLY

## 76-21-01

Page 508  
Dec 31/01



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



LP SHAFT SIGNAL SYSTEM - CYLINDER PISTON SECTION WITH  
FRONT AND CENTRE CABLE ASSEMBLIES - SPECIAL TOOLS,  
FIXTURES AND EQUIPMENT

1. General

- A. The special tools, fixtures and equipment listed in Table 1001 and 1002 are those required to disassemble and assemble the cylinder piston assembly.
- B. The tools have been listed in order of usage and the Tool Ref.No. is the number quoted in the text. Tools marked with an \* are used in more than one aspect of the overhaul and will be duplicated in the tables.
- C. The tools have been illustrated in order of usage but tools used in more than one aspect of overhaul will be illustrated once. Additional illustrations of tooling in operation (as thought necessary), are included in the text in the appropriate section.

2. Cylinder Piston Section, Disassembly Tools

TOOL REF.NO.	MANUFACTURER PART NO.	DESCRIPTION
*1299	PJ.869231	Tool, Assembly

Disassembly Tools  
Table 1001

3. Cylinder Piston Section, Assembly Tools

TOOL REF.NO.	MANUFACTURER PART NO.	DESCRIPTION
*1299	PJ.869231	Tool, Assembly

Assembly Tools  
Table 1002

SPECIAL TOOLS ETC.

76-21-01

Page 1001  
Apr 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



SNECMA

LP SHAFT SIGNAL SYSTEM - REAR CABLE ASSEMBLY - DISASSEMBLY

Printed in England

For information on the disassembly of the  
LP Shaft Signal System - Rear Cable Assembly  
and Pulley, refer to 72-53-00 Disassembly.

DISASSEMBLY

**76-21-02**

Page 101

Jun 1/96





OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

## LP SHAFT SIGNAL SYSTEM - REAR CABLE ASSEMBLY - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

76-21-02

Page 201

Jun 1/96



OLYMPUS 593

MK.610-14-28

OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		B	G	-

Cleaning Processes  
Table 201





OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

LP SHAFT SIGNAL SYSTEM - REAR CABLE ASSEMBLY -  
INSPECTION/CHECK

TABLE OF CONTENTS

Para.		Page
1.	General ... ..	301
2.	General Inspection ... ..	301
3.	Crack Detection... ..	302
	A. Magnetic Particle Crack Detection ... ..	302
	B. Fluorescent Dye Crack Detection ... ..	302
4.	Cable Assembly ... ..	304
	A. Inspect Threads ... ..	304
	B. Inspect End Fittings ... ..	304
	C. Inspect Shouldered Pin Locations ... ..	305
	D. Inspect Cable ... ..	305
5.	Bracket ... ..	305
	A. Inspect Bracket ... ..	305
6.	Bracket ... ..	306
	A. Inspect Bracket ... ..	306
7.	Adjusting Washer ... ..	306
	A. Inspect Adjusting Washer ... ..	306
8.	Special Bolt ... ..	307
	A. Inspect Bolt Head... ..	307
9.	Actuator Shaft Retainer ... ..	307
	A. Inspect Actuator Shaft Retainer ... ..	307
10.	Sleeve ... ..	307
	A. Inspect Sleeve ... ..	307
11.	Actuator Arm Shaft ... ..	308
	A. Inspect Splines ... ..	308
	B. Inspect Threads ... ..	308
	C. Inspect Shoulder Pin Holes ... ..	308
	D. Inspect Actuator Arm Shaft ... ..	308
12.	Actuator Arm ... ..	308
	A. Inspect Splines ... ..	308
	B. Inspect Actuator Arm ... ..	308
	C. Inspect Actuator Shaft and Actuator Shaft Retainer Locations ... ..	309
	D. Inspect LP Shaft Signal Mechanism Location ... ..	309
13.	Shoulder Pin ... ..	309
	A. Inspect Shoulder Pins ... ..	309

INSPECTION/CHECK

76-21-02

Contents 1

Jun 1/96



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

TABLE OF ILLUSTRATIONS

Fig.No.		Page
301	Crack Detection Test Diagram ... ..	303
302	LP Shaft Signal System, Exhaust Diffuser Section, Rear Cable Assembly ... ..	310

LIST OF TABLES

Table No.		Page
301	Items to be Magnetic Particle Crack Tested ...	302
302	Items to be Fluorescent Dye Crack Tested ...	302
303	Cross References to Illustrated Parts Catalogue...	304

INSPECTION/CHECK

**76-21-02**

Contents 2

Jun 1/96

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



SNECMA

LP SHAFT SIGNAL SYSTEM - REAR CABLE ASSEMBLY -  
INSPECTION/CHECK

1. General

- A. Each item in this chapter is given a two-part identification; thus, 302-20 refers to Figure 302 and to Item 20 called out on that figure. Each item may be further identified by its Part Number by the use of Table 303, which cross-refers figures in this chapter to the equivalent chapter and figure in the Illustrated Parts Catalogue (I.P.C.); the called-out item number will be the same on both figures.
- B. All items which will be crack tested are listed in Tables 301 and 302.
- C. Dimensional checks are cross referenced to the equivalent Fits and Clearances Schedule (F.C.S.) chapter against the item concerned.
- D. When the inspection of an item discloses a minor defect that requires rectification, it is defined as 'Accept after repair'. On all such occasions the item must be rectified in accordance with Standard Practices 72-09-22 Repair. Where a Ref.No. follows 'Accept after repair' e.g. (Ref.72-21-01 Repair No.1), a specific Repair Scheme is available to which the item must be rectified. Items that are rejected, or for which a repair scheme is not currently available, should be held at the discretion of the operator, as service experience may prove the need for a repair.
- E. On completion of a repair, rectification or test, the item(s) must be inspected, to ensure that the necessary work has been satisfactorily completed.

2. General Inspection

- A. Inspect all items illustrated in this chapter, whether specified or not, in accordance with Standard Practices (Ref.72-09-00 Inspection/Check). In addition, carry out the inspections detailed for the specified items, from para.4 onwards.

INSPECTION/CHECK

**76-21-02**

Page 301

Jun 1/96



OLYMPUS 593

MK.610-14-28

OVERHAUL



B. Inspection terms used in this chapter are explained in Standard Practices (Ref.72-09-00 Inspection/Check).

### 3. Crack Detection

#### A. Magnetic Particle Crack Detection.

- (1) Submit the items listed in Table 301 to crack detection in accordance with the process quoted.
- (2) Items to be crack detected by this method are illustrated in the Crack Detection Test Diagram (Fig.301). For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

No current requirement

Items to be Magnetic Particle Crack Tested  
Table 301

#### B. Fluorescent Dye Crack Detection.

- (1) Submit the items listed in Table 302 to crack detection in accordance with the process quoted. For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

302	520	Actuator Shaft Retainer	FlA
302	570	Actuator Arm Shaft	FlA
302	580	Actuator Arm	FlA

Items to be Fluorescent Dye Crack Tested  
Table 302

INSPECTION/CHECK

76-21-02

Page 302

Apr 1/77

PRINTED IN ENGLAND



OLYMPUS 593

MK.610-14-28  
OVERHAUL



No Current Requirement

TN12747

Crack Detection Test Diagram  
Figure 301

INSPECTION/CHECK

**76-21-02**

Page 303  
Apr 1/77





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



---

FIG.NO.	ILLUSTRATED PARTS CATALOGUE EQUIVALENT
---------	--

---

301	Not applicable
302	76-21-02      Fig.1 and 1A.

---

Cross References to Illustrated Parts Catalogue  
Table 303

CAUTION: IF LP SHAFT SIGNAL SYSTEM HAS OPERATED DURING  
ENGINE RUN THE FOLLOWING COMPONENTS MUST BE  
REJECTED, CABLE ASSEMBLY (302-150), SHOULDERED  
PINS (302-140), ACTUATOR ARM SHAFT (302-570) AND  
ACTUATOR ARM (302-580).

NOTE: Inspect all components related to the LP Shaft Signal  
System for compatibility. Ensure that all sliding  
assemblies function smoothly with the mating component  
and without any undue force.

4. Cable Assembly (302-150)

A. Inspect Threads (Ref.72-09-00 Inspection/Check).

B. Inspect End Fittings.

(1) Security.

(a) Any indication of defective swaging.	Reject.
---	---------

(2) Nicks and burrs.	Accept after repair.
----------------------	-------------------------

TN12748

INSPECTION/CHECK

**76-21-02**

Page 304

Apr 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL

sneema

## C. Inspect Shouldered Pin Locations.

## (1) Wear.

(a) Pin holes elongated not more than 0.025 in. (0,630 mm).	Accept.
---	---------

(b) Slight witness mark.	Accept.
--------------------------	---------

## D. Inspect Cable.

NOTE: The operating cables consist of seven strands each strand being made up of 14 wires.

(1) Any broken wires.	Reject.
-----------------------	---------

(2) Any wire flattening.	Reject.
--------------------------	---------

(3) Any polishing of cables without noticeable flattening.	Accept.
--	---------

5. Bracket (302-45)

## A. Inspect Bracket.

(1) Nicks and burrs.	Accept after repair.
----------------------	----------------------

## (2) Wear.

(a) Not more than 10 per cent reduction in flange thickness.	Accept.
--	---------

(b) Bolt-holes elongated not more than 0.030 in. (0,760 mm).	Accept.
--	---------

INSPECTION/CHECK

76-21-02

Page 305

Jun 1/98



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

(3) Distortion.

Accept after repair  
providing compati-  
bility is preserved  
and repair does not  
induce cracking.

6. Bracket (302-190)

A. Inspect Bracket.

(1) Nicks and burrs.

Accept after  
repair.

(2) Wear.

(a) Not more than 10 per cent  
reduction in flange  
thickness.

Accept.

(b) Bolt-holes elongated not  
more than 0.030 in.  
(0,760 mm).

Accept.

7. Adjusting Washer (302-200)

NOTE: This is a select item on assembly.

A. Inspect Adjusting Washer.

(1) Nicks and burrs.

Accept after  
repair.

(2) Wear.

(a) Any longitudinal wear.

Reject.

(b) Bolt holes elongated not  
more than 0.030 in.  
(0,760 mm).

Accept.

INSPECTION/CHECK

76-21-02

Page 306  
Jun 1/98



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

8. Special Bolt (302-490)

A. Inspect Bolt Head.

(1) Wear.

(a) Not more than 0.030 in.  
(0,760 mm) of smooth  
unstepped wear.

Accept.

9. Actuator Shaft Retainer (302-520)

A. Inspect Actuator Shaft Retainer.

(1) Nicks and burrs.

Accept after  
repair.

(2) Scores.

(a) Not more than 0.005 in.  
(0,130 mm) in depth  
on sealing face.

Accept after repair  
providing sealing  
capabilities are  
unimpaired.

(3) Wear.

(a) Slight witness mark in  
bore and outside  
diameter of spigot.

Accept.

10. Sleeve (302-560) (SB.76-2 Part 2 only)

A. Inspect Sleeve.

(1) Nicks and burrs.

Accept after  
repair.

INSPECTION/CHECK

76-21-02

Page 307

Jun 1/98



OLYMPUS 593

MK.610-14-28  
OVERHAUL



snecma

(2) Wear.

(a) Any wear.

Reject.

11. Actuator Arm Shaft (302-570)

A. Inspect Splines (Ref.72-09-00 Inspection/Check).

B. Inspect Threads (Ref.72-09-00 Inspection/Check) (Pre SB.76-2 only).

C. Inspect Shoulder Pin Holes.

(1) Wear.

(a) Pin holes elongated not more than 0.050 in. (1,270 mm).

Accept.

D. Inspect Actuator Arm Shaft.

(1) Nicks and burrs.

Accept after repair.

(2) Wear.

(a) Not more than 0.005 in. (0,130 mm) on special bolt location.

Accept.

(3) Scores.

(a) Not more than 0.005 in. (0,130 mm) on sealing face.

Accept after repair providing sealing capabilities are unimpaired.

12. Actuator Arm (302-580)

A. Inspect Splines (Ref.72-09-00 Inspection/Check).

B. Inspect Actuator Arm.

(1) Nicks and burrs.

Accept after repair.

INSPECTION/CHECK

76-21-02

Page 308  
Jun 1/98



OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

(2) Distortion.

(a) Any distortion. Reject.

C. Inspect Actuator Shaft and Actuator Shaft Retainer Locations.

(1) Wear.

(a) Slight witness mark. Accept.

D. Inspect LP Shaft Signal Mechanism Location.

(1) Wear.

(a) Not more than 0.030 in.  
(0,760 mm). Accept.

### 13. Shoulder Pin (302-140)

A. Inspect Shoulder Pins.

(1) Nicks and burrs. Accept after repair.

(2) Wear.

(a) Any witness mark. Accept.

(3) Scores.

(a) Not more than 0.005 in.  
(0,130 mm). Accept after repair.

INSPECTION/CHECK

76-21-02

Page 309  
Jun 1/98



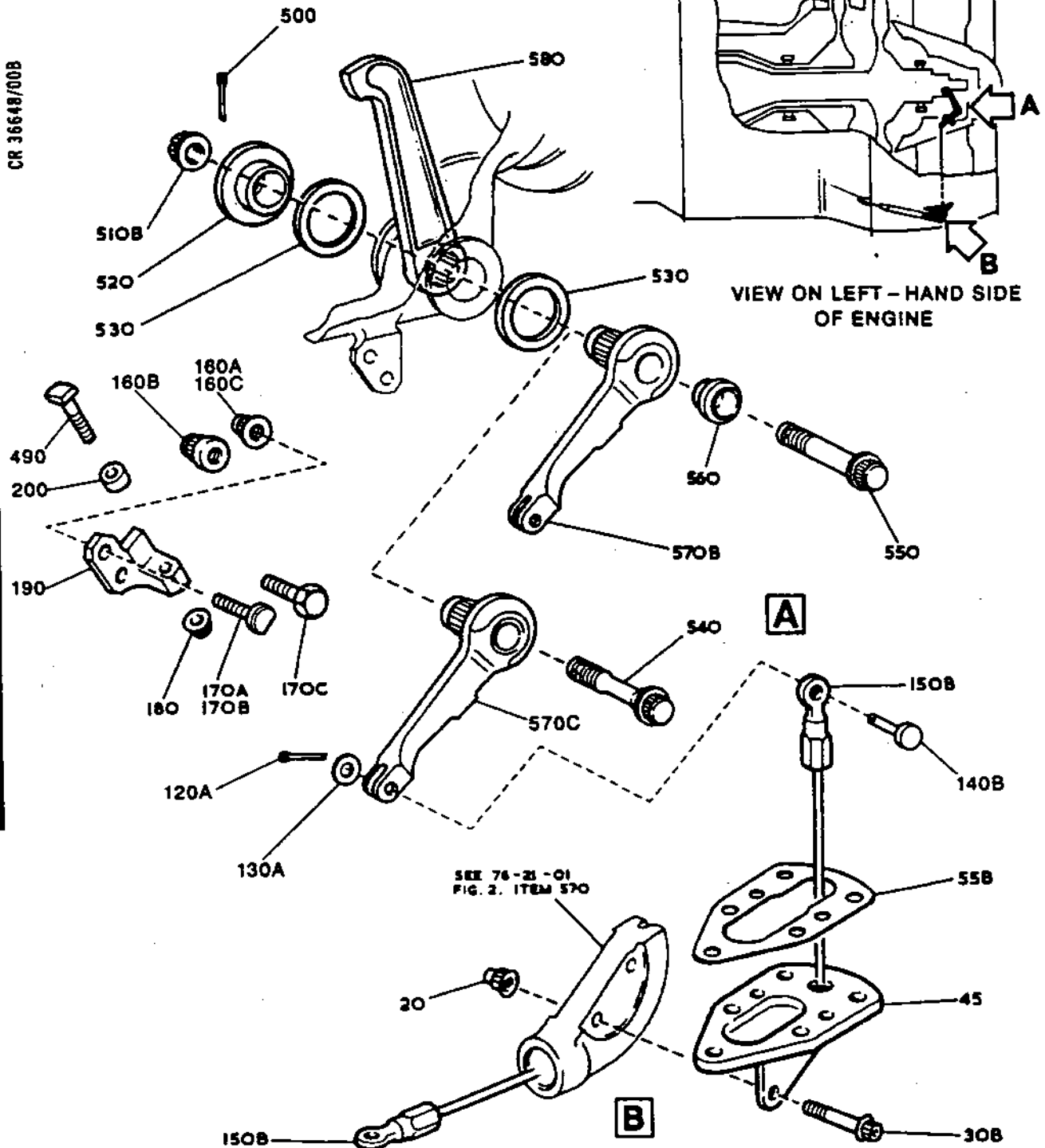
OLYMPUS 593

MK.610-14-28  
OVERHAUL



sneema

CR 36648/00B



LP Shaft Signal System, Exhaust Diffuser Section,  
Rear Cable Assembly  
Figure 302

INSPECTION/CHECK

76-21-02

Page 310

Jun 1/96



OLYMPUS 593

MK.610-14-28

OVERHAUL



sneema

LP SHAFT SIGNAL SYSTEM - REAR CABLE ASSEMBLY -  
SUB-ASSEMBLY

Printed in England

For information on the assembly of the  
LP Shaft Signal System - Rear Cable Assembly  
and Pulley, refer to 72-53-00 Assembly.

SUB-ASSEMBLY

**76-21-02**

Page 501

Jun 1/96



**CHAPTER**

**77**

**ENGINE  
INDICATING**



# OLYMPUS 593



MK.610-14-28 SNECMA  
OVERHAUL

## CHAPTER 77

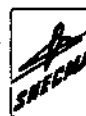
### ENGINE INDICATING

#### LIST OF EFFECTIVE PAGES

Printed in England	CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
	List of Effective Pages	1	Jun 1/94	77-20-00 (Cont'd.)	309	Aug 1/76
		2	Jan 4/93		310	Dec 1/81
	Table of Contents	1	Jul 1/79		311	Aug 1/76
					312	Aug 1/76
	Table of Approved Repair Schemes	1	Jan 31/94		313	Aug 1/76
					314	Aug 1/76
	77-12-03	201	Jan 1/77		315	Aug 1/76
		202	Jan 1/77		316	Aug 1/76
		203	Jun 1/94		317	Aug 1/76
				77-21-02	201	Jan 1/77
	Contents	1	Aug 1/76		202	Jan 1/77
		301	Apr 1/77		203	Aug 28/75
		302	Aug 1/76		204	Jan 1/77
		303	Aug 1/76	77-21-03	201	Jan 1/77
		304	Aug 1/76		202	Jan 1/77
		305	Aug 1/76		203	Aug 28/75
		306	Dec 1/81			
				77-22-02	201	Jan 1/77
	Repair Contents	1	Jun 1/92		202	Jan 1/77
	Repair No.1	401	Jun 1/92		203	Aug 28/75
		402	Jun 1/92	77-22-03	201	Jan 1/77
					202	Dec 1/81
	77-20-00				203	Dec 1/81
	Contents	1	Aug 1/76	77-22-04	201	Jan 1/77
		2	Aug 1/76		202	Jan 1/77
		301	Apr 1/77		203	Aug 28/75
		302	Dec 1/76	77-22-05	201	Jan 1/77
		303	Aug 1/76		202	Jan 1/77
		304	Dec 1/81		203	Aug 28/75
		305	Dec 1/81	77-22-06	201	Jan 1/77
		306	Aug 1/76		202	Jan 1/77
		307	Aug 1/76		203	Aug 28/75
		308	Aug 1/76			



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SEC/SUB</u>	<u>PAGE</u>	<u>DATE</u>
77-22-07	201	Jan 1/77	77-33-01		
	202	Jan 1/77	(Cont'd.)		
	203	Aug 28/75	Contents	1	Feb 1/81
				501	Jan 4/93
77-22-08	201	Jan 1/77		502	Aug 1/76
	202	Jan 1/77		503	Aug 1/76
	203	Aug 28/75		504	Aug 1/76
				505	Aug 1/76
77-22-09	201	Jan 1/77		506	Aug 1/76
	202	Jan 1/77		507	Aug 1/76
	203	Aug 28/75		508	Aug 1/81
				509	Feb 1/81
77-23-02	201	Jan 1/77		510	Feb 1/81
	202	Jan 1/77		511	Feb 1/81
	203	Aug 28/75			
				1001	Aug 1/81
77-30-00					
Contents	1	Jun 1/86	77-33-02	201	Jan 1/77
	301	Apr 1/77		202	Jan 1/77
	302	Aug 1/76		203	Aug 28/75
	303	Aug 1/76			
	304	Jun 1/86	Contents	1	Aug 1/76
	305	Aug 1/76		701	Aug 1/76
	306	Jun 1/86		702	Aug 1/76
	307	Aug 1/76		703	Aug 1/76
	308	Aug 1/76		704	Aug 1/76
				705	Aug 1/76
				706	Aug 1/76
77-33-01					
Contents	1	Aug 1/76			
	101	Feb 1/77			
	102	Aug 1/76			
	103	Aug 1/76			
	104	Aug 1/76			
	201	Jan 1/77			
	202	Jan 1/77			
	203	Aug 28/75			



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



## CHAPTER 77

### ENGINE INDICATING

### TABLE OF CONTENTS

	CH/SEC/SUB	PAGE
List of Effective Pages ... ..	77	-
Table of Contents ... ..	77	-
Table of Approved Repair Schemes ... ..	77	-
Engine Power Pitots ... ..	77-12-03	201 301
Engine Temperature Indication (Containing SEC/SUB 77-21-02, 77-21-03, 77-22-02 to 09 and 77-23-02) ... ..	77-20-00	301
Jet Pipe Thermocouples ... ..	77-21-02	201
Jet Pipe Thermocouple Lead-outs ... ..	77-21-03	201
Thermocouples, Turbine Cooling Air ... ..	77-22-02	201
Thermocouple Leads, Turbine Cooling Air... ..	77-22-03	201
Thermocouple, LP and HP Turbine Bearings Cold Vent ... ..	77-22-04	201
Thermocouple, LP Turbine Bearing Hot Vent ... ..	77-22-05	201
Thermocouple, Intermediate Case Bearings Cold Vents ... ..	77-22-06	201
Thermocouple, HP Compressor Rear Labyrinth Seal Hot Vents ... ..	77-22-07	201
Junction Box, Engine Thermocouple Termination... ..	77-22-08	201
Thermocouple HP Compressor Delivery Air... ..	77-22-09	201
Thermometers, Oil Inlet and Outlet ... ..	77-23-02	201
Engine Vibration Indication (Containing SEC/SUB 77-33-01 to 03) ... ..	77-30-00	301
Engine Vibration Transducer Cable... ..	77-33-01	101 201 501 1001
Engine Vibration Transducer... ..	77-33-02	201 701
Reheat Chamber Vibration Transducer ... ..	77-33-03	201



OLYMPUS 593



MK.610-14-28 *sneema*  
OVERHAUL

CHAPTER 77

ENGINE INDICATING

TABLE OF APPROVED REPAIR SCHEMES

The following Repair Schemes have been approved by CAA/DGAC.

<u>Chapter/Section</u>	<u>Repair No.</u>	<u>Title</u>	<u>Salvage No.</u>
77-12-03	1	Repair of fretting/ damage by inert gas arc welding	B.514566

Printed in England

**OLYMPUS 593**

MK.610-14-28

OVERHAUL

ENGINE INDICATION - INSPECTION/CHECKTABLE OF CONTENTS

Para.	Page
1. General ... ..	301
2. General Inspection...	301
3. Crack Detection ... ..	301
A. Magnetic Particle Crack Detection ... ..	301
B. Fluorescent Dye Crack Detection ... ..	302
4. Tube Assembly ... ..	304
A. Inspect Tubes ... ..	304
B. Inspect Threads, Union Nuts and Thrust Wires...	304
C. Inspect Mounting Brackets ... ..	304
5. Pitot Assemblies ... ..	304
A. Inspect Threads and Insert...	304
B. Inspect Probe ... ..	304
C. Inspect Attachment Flange Faces ... ..	305
D. Inspect Locating Diameter ... ..	305
6. Brackets ... ..	305
A. Inspect Brackets ... ..	305
7. Thermocouple Harness Assembly ... ..	305
8. Jet Pipe Thermocouple Lead-out and Junction Box ... ..	305
9. Turbine Cooling Air Thermocouples ... ..	305
10. Lead-out and Junction Box Assemblies...	305
11. LP and HP Turbine Bearing Cold Air Vent Thermocouple Lead-out and Junction Box ... ..	306
12. LP Turbine Bearing Hot Vent Thermocouple Lead-out and Junction Box ... ..	306
13. Intermediate Case Bearings Cold Vent Thermocouple Lead-out and Junction Box ... ..	306
14. HP Compressor Rear Labyrinth Seal Hot Vent Thermocouple Lead-out and Junction Box ... ..	306
15. Junction Box Cover and Mounting Plate ... ..	306
A. Inspect Captive Nuts and Retainers ... ..	306
B. Inspect Cover and Plate ... ..	306
16. HP Compressor Delivery Air Thermocouple Lead-out and Junction Box ... ..	306
17. Oil Inlet and Outlet Thermometers ... ..	307
18. Engine Vibration Transducer Cable ... ..	307
19. Bracket ... ..	307
A. Inspect Bracket ... ..	307
20. Inner and Outer Glands ... ..	307
A. Inspect Glands... ..	307
21. Engine Vibration Transducer ... ..	308
22. Reheat Chamber Transducer Cable ... ..	308
23. Reheat Chamber Transducer ... ..	308

INSPECTION/CHECK

**77-10-00**

Contents 1

Jun 1/76

**OLYMPUS 593**

MK.610-14-28

OVERHAUL

TABLE OF ILLUSTRATIONS

Fig.No.		Page
301	Crack Detection Test Diagram ... ..	303
302	Engine Power Pitots ... ..	309
303	Thermocouple Harness Assemblies ... ..	310
304	Jet Pipe Thermocouple Lead-out and Junction Box ...	311
305	Turbine Cooling Air Thermocouple ... ..	312
306	Turbine Cooling Air Thermocouple Leads... ..	313
307	Turbine Bearing Cold Vent Thermocouple Lead-out and Junction Box... ..	314
308	LP Turbine Bearing Hot Vent Thermocouple Lead-out and Junction Box ... ..	315
309	Intermediate Case Bearings Cold Vent Thermocouple Lead-out and Junction Box ... ..	316
310	HP Compressor Rear Labyrinth Seal Thermocouple Lead-out and Junction Box ... ..	317
311	Engine Thermocouple Termination Junction Box... ..	318
312	HP Compressor Delivery Air Thermocouple ... ..	319
313	Oil Inlet and Outlet Thermometers ... ..	320
314	Engine Vibration Transducer Cable ... ..	321
315	Engine Vibration Transducer ... ..	322
316	Reheat Chamber Transducer and Cable ... ..	323

LIST OF TABLES

Table No.		Page
301	Items to be Magnetic Particle Crack Tested ... ..	302
302	Items to be Fluorescent Dye Crack Tested ... ..	302
303	Cross References to Illustrated Parts Catalogue ...	304

TN39936

INSPECTION/CHECK

**77-10-00**

Contents 2

Jun 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## ENGINE INDICATION - INSPECTION/CHECK

### 1. General

- A. Each item in this chapter is given a two-part identification; thus, 302-20 refers to Figure 302 and to Item 20 called out on that figure. Each item may be further identified by its Part Number by the use of Table 303, which cross-refers figures in this chapter to the equivalent chapter and figure in the Illustrated Parts Catalogue (I.P.C.); the called-out item number will be the same on both figures.
- B. All items which will be crack tested are listed in Tables 301 and 302.
- C. Dimensional checks are cross referenced to the equivalent Fits and Clearances Schedule (F.C.S.) chapter against the item concerned.
- D. When an item is defined as being 'Acceptable after repair', rectify the defect in accordance with Standard Practices (Ref.72-09-00) and the equivalent Repair chapter. Items that are rejected, or for which a repair scheme is not currently available, should be held at the discretion of the operator, as service experience may prove the need for repair.
- E. On completion of a repair, rectification or test, the item(s) must be inspected, to ensure that the necessary work has been satisfactorily completed.

### 2. General Inspection

- A. Inspect all items illustrated in this chapter, whether specified or not, in accordance with Standard Practices (Ref.72-09-00 Inspection/Check). In addition, carry out the inspections detailed for the specified items, from para.4 onwards.
- B. Inspection terms used in this chapter are explained in Standard Practices (Ref.72-09-00 Inspection/Check).

### 3. Crack Detection

- A. Magnetic Particle Crack Detection.

(1) Submit the items listed in Table 301 to crack detection in accordance with the process quoted.

INSPECTION/CHECK

**77-10-00**

Page 301  
Jun 1/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Items to be crack detected by this method are illustrated in the Crack Detection Test Diagram (Fig.301). For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

No current requirement

Items to be Magnetic Particle Crack Tested  
Table 301

B. Fluorescent Dye Crack Detection.

- (1) Submit the items listed in Table 302 to crack detection in accordance with the process quoted. For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

302	180	Tube	F1A
302	210	Pitot Assemblies	F1A
303	10	Thermocouple Harness	F1A

Items to be Fluorescent Dye Crack Tested  
Table 302

FN39931

INSPECTION/CHECK

77-10-00

Page 302

Jun 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

No current requirement

TN39930

Crack Detection Test Diagram  
Figure 301

INSPECTION/CHECK

**77-10-00**

Page 303

Jun 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



FIG.NO.

ILLUSTRATED PARTS CATALOGUE EQUIVALENT

302	77-12-03	Fig.1
303	77-21-02	Fig.1
304	77-21-03	Fig.1
305	77-22-02	Fig.1
306	77-22-03	Fig.1
307	77-22-04	Fig.1
308	77-22-05	Fig.1
309	77-22-06	Fig.1
310	77-22-07	Fig.1
311	77-22-08	Fig.1
312	77-22-09	Fig.1
313	77-23-02	Fig.1
314	77-33-01	Fig.1
315	77-33-02	Fig.1
316	77-33-03	Fig.1

Cross References to Illustrated Parts Catalogue  
Table 303

4. Tube Assembly (302-180)

- A. Inspect Tubes (Ref.72-09-00, Inspection/Check).
- B. Inspect Threads, Union Nuts and Thrust Wires (Ref. 72-09-00, Inspection/Check).
- C. Inspect Mounting Brackets.

(1) Wear and fretting.

- (a) Bolt-holes elongated  
not more than 0.030 in.  
(0,760 mm).

Accept after  
repair.

(2) Nicks and burrs.

Accept after  
repair.

5. Pitot Assemblies - 4 Off (302-210)

- A. Inspect Threads and Insert (Ref.72-09-00, Inspection/Check).
- B. Inspect Probe.
  - (1) Bore or orifice obstructed.

Reject for re-  
cleaning.

INSPECTION/CHECK

77-10-00

Page 304

Jun 1/76

TN39932



OLYMPUS 593

MK.610-14-28  
OVERHAUL



C. Inspect Attachment Flange Faces.

- (1) Nicks, burrs and scores.

Accept, if repair  
preserves surface  
flatness.

D. Inspect Locating Diameter.

- (1) Nicks and burrs.

Accept, if repair  
preserves profile.

6. Brackets - 2 Off (302-230)

A. Inspect Brackets.

- (1) Distortion.

Accept, if repair  
preserves profile  
without cracking.

- (2) Wear and fretting.

- (a) Bolt-holes elongated  
not more than 0.030 in.  
(0,760 mm).

Accept after  
repair.

- (3) Nicks and burrs.

Accept after  
repair.

7. Thermocouple Harness Assembly (303-10)

- A. Inspect in accordance with the vendor's Overhaul Manual  
(Ref.OH 77-20-34).

8. Jet Pipe Thermocouple Lead-out and Junction Box (304-70)

- A. Inspect in accordance with the vendor's Overhaul Manual  
(Ref.OH 77-20-34).

9. Turbine Cooling Air Thermocouples - 2 Off (305-10)

- A. Inspect in accordance with the vendor's Overhaul Manual  
(Ref.OH 77-20-31).

10. Lead-out and Junction Box Assemblies (306-140/160)

- A. Inspect in accordance with the vendor's Overhaul Manual  
(Ref.OH 77-20-31).

INSPECTION/CHECK

**77-10-00**

Page 305

Jun 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



11. LP and HP Turbine Bearing Cold Air Vent Thermocouple Lead-out and Junction Box (307-10)
  - A. Inspect in accordance with the vendor's Overhaul Manual (Ref.OH 77-20-32).
12. LP Turbine Bearing Hot Vent Thermocouple Lead-out and Junction Box (308-50)
  - A. Inspect in accordance with the vendor's Overhaul Manual (Ref.OH 77-20-32).
13. Intermediate Case Bearings Cold Vent Thermocouple Lead-out and Junction Box (309-120)
  - A. Inspect in accordance with the vendor's Overhaul Manual (Ref.OH 77-20-33).
14. HP Compressor Rear Labyrinth Seal Hot Vent Thermocouple Lead-out and Junction Box (310-90)
  - A. Inspect in accordance with the vendor's Overhaul Manual (Ref.OH 77-20-33).
15. Junction Box Cover (311-10A, B or C) and Mounting Plate (311-60A or B)
  - A. Inspect Captive Nuts and Retainers (Ref.72-09-00, Inspection/Check).
  - B. Inspect Cover and Plate.
    - (1) Distortion. Accept, if repairable without cracking.
    - (2) Wear and fretting.
      - (a) Bolt-holes elongated not more than 0.030 in. (0,760 mm). Accept after repair.
16. HP Compressor Delivery Air Thermocouple Lead-out and Junction Box (312-160)
  - A. Inspect in accordance with the vendor's Overhaul Manual (Ref.OH 77-20-32).

INSPECTION/CHECK

77-10-00

Page 306

Jun 1/76

TN39934



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



17. Oil Inlet and Outlet Thermometers (313-10 and 40)

- A. Inspect in accordance with the vendor's Overhaul Manual (Ref.OH 31-09-41/93).

18. Engine Vibration Transducer Cable (314-200)

NOTE: This cable must be severed during removal and is replaced during assembly (Ref.77-22-01, Assembly).

19. Bracket (314-90)

- A. Inspect Bracket.

(1) Wear and fretting.

(a) Attachment face thickness reduced by not more than 5 per cent. Accept.

(b) Bolt-holes elongated not more than 0.030 in. (0,760 mm). Accept after repair.

(2) Scoring.

(a) Not more than 0.010 in. (0,250 mm) in depth. Accept after repair providing material thickness is not reduced by more than 5 per cent.

(3) Nicks and burrs. Accept after repair.

(4) Distortion. Accept if compatibility is preserved.

20. Inner and Outer Glands (314-100/110)

- A. Inspect Glands.

(1) Compatibility. Assemble gland with bracket (314-90); secure temporarily.

(a) Cable holes misaligned. Reject.

(2) Nicks and burrs. Accept after repair.

INSPECTION/CHECK

77-10-00

Page 307

Jun 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



21. Engine Vibration Transducer (315-10)

- A. Inspect in accordance with the vendor's Overhaul Manual  
(Ref.OH 77-33-02).

22. Reheat Chamber Transducer Cable (316-280)

- A. Inspect in accordance with vendor's Overhaul Manual  
(Ref.OH 77-33-03).

23. Reheat Chamber Transducer (316-290)

- A. Inspect in accordance with the vendor's Overhaul Manual  
(Ref.OH 77-33-03).

TN32049

INSPECTION/CHECK

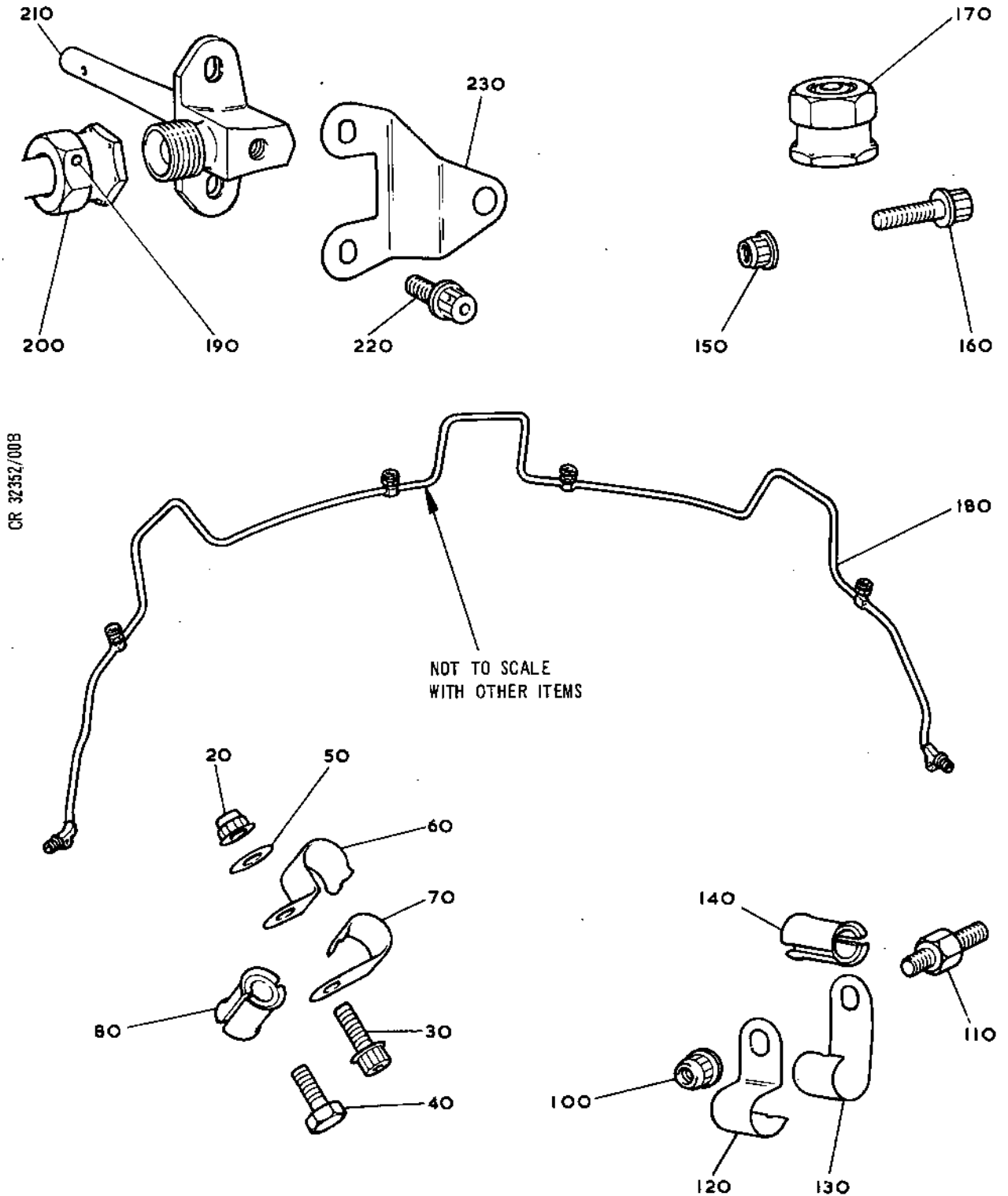
**77-10-00**

Page 308

Jun 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



Engine Power Pitots  
Figure 302

INSPECTION/CHECK

**77-10-00**

Page 309

Jun 1/76

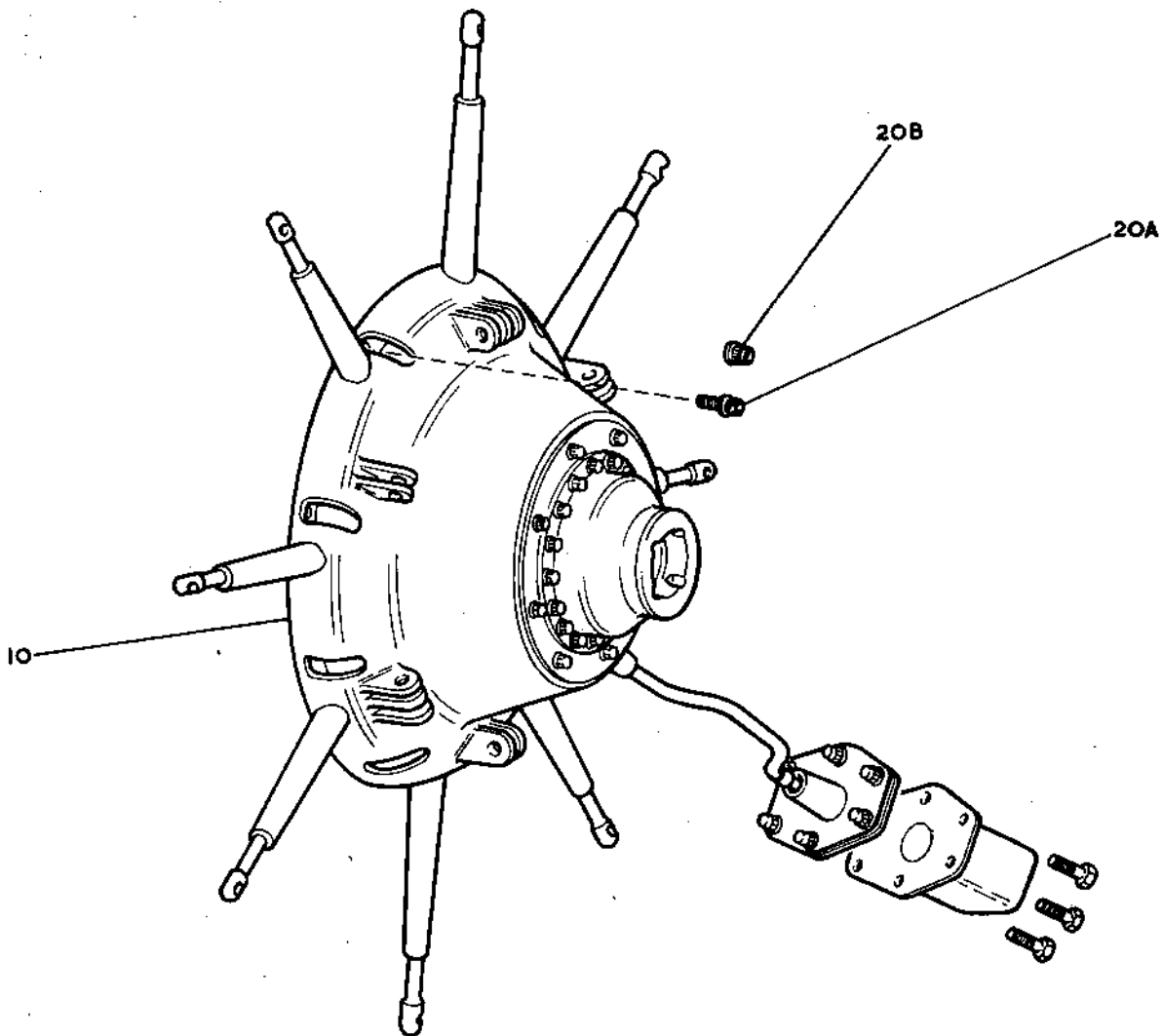




OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 32487/00B



TN39938

Thermocouple Harness Assemblies  
Figure 303

INSPECTION/CHECK

**77-10-00**

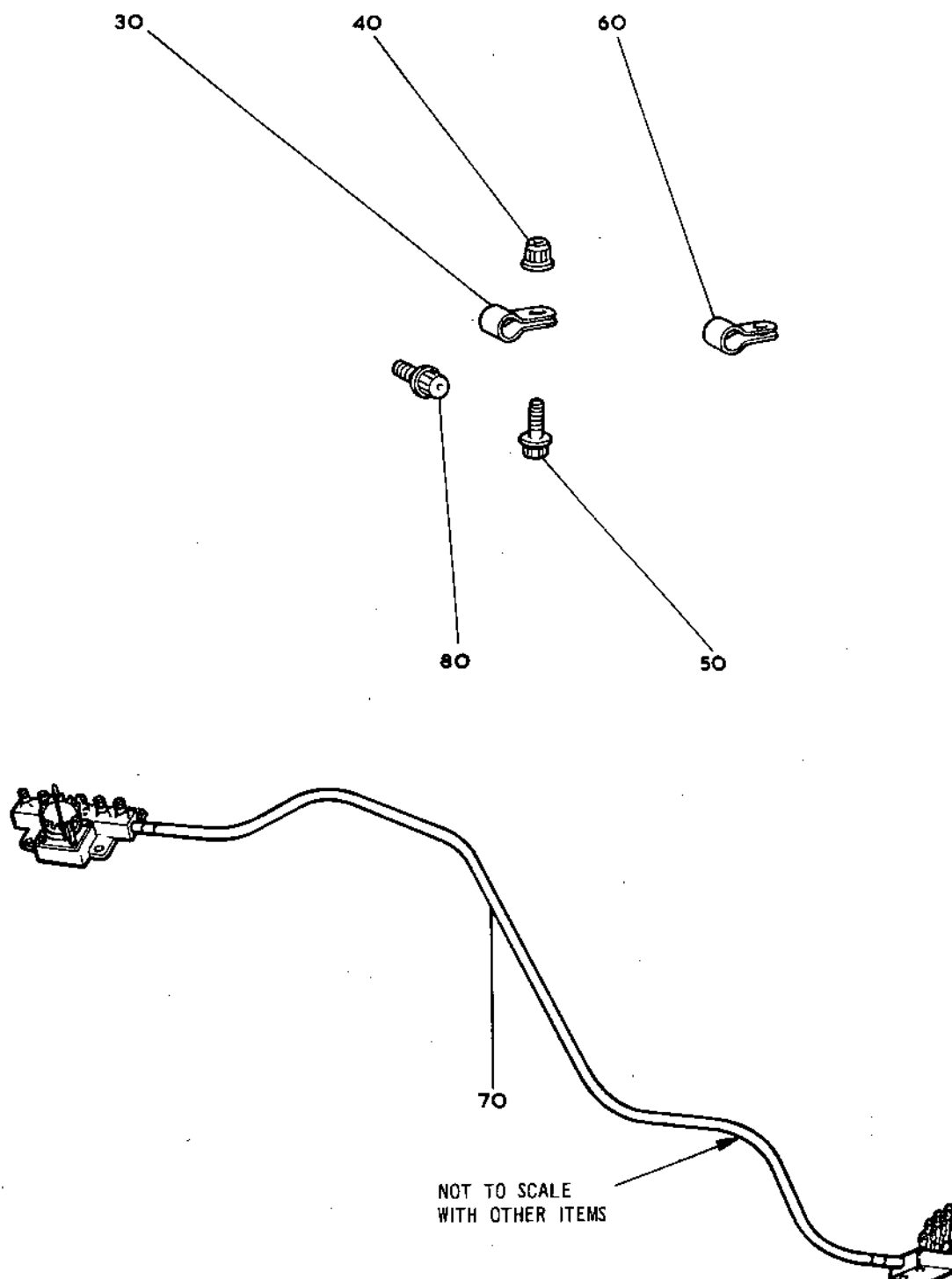
Page 310

Jun 1/76

PRINTED IN ENGLAND

CR 32351/00B

TN39939



Jet Pipe Thermocouple Lead-out and Junction Box  
Figure 304

INSPECTION/CHECK

**77-10-00**

Page 311  
Jun 1/76

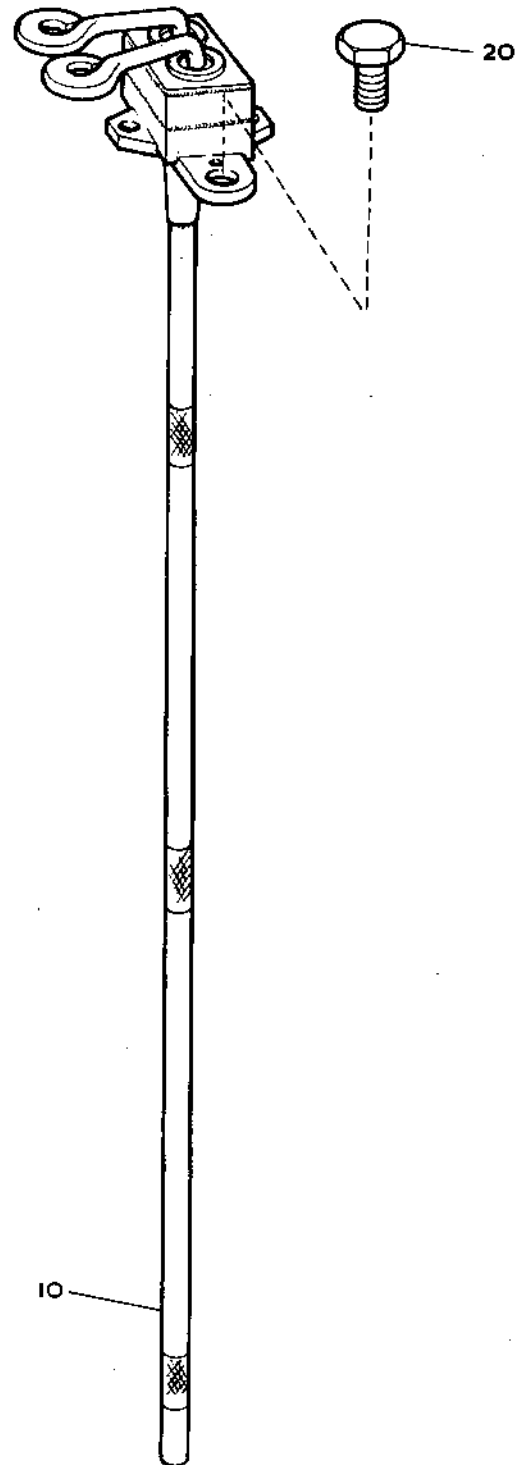


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32350/00B



Turbine Cooling Air Thermocouple  
Figure 305

INSPECTION/CHECK

**77-10-00**

Page 312

Jun 1/76

TN39940

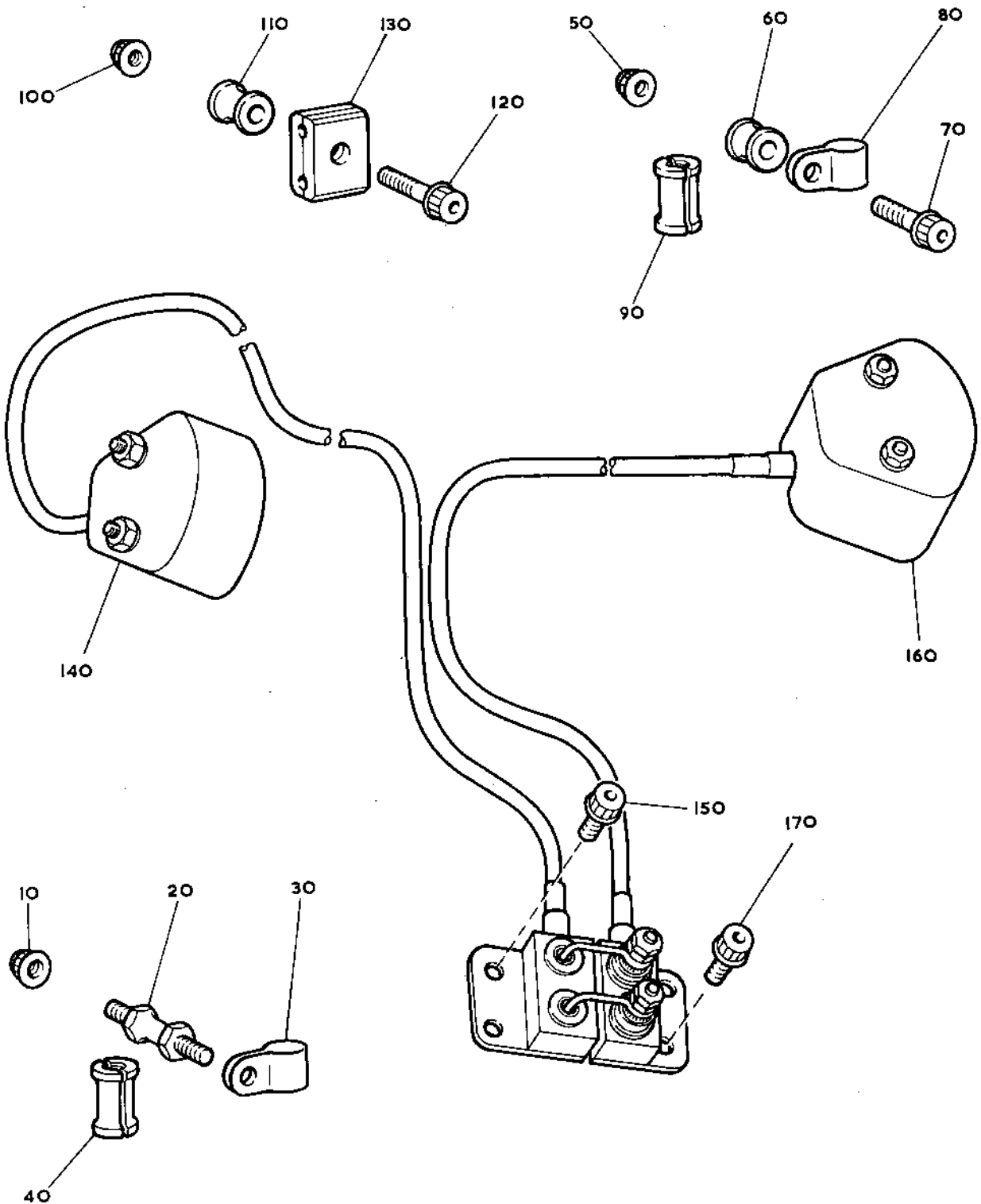


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32349/00B



Turbine Cooling Air Thermocouple Leads  
Figure 306

INSPECTION/CHECK

77-10-00

Page 313  
Jun 1/76

PRINTED IN ENGLAND

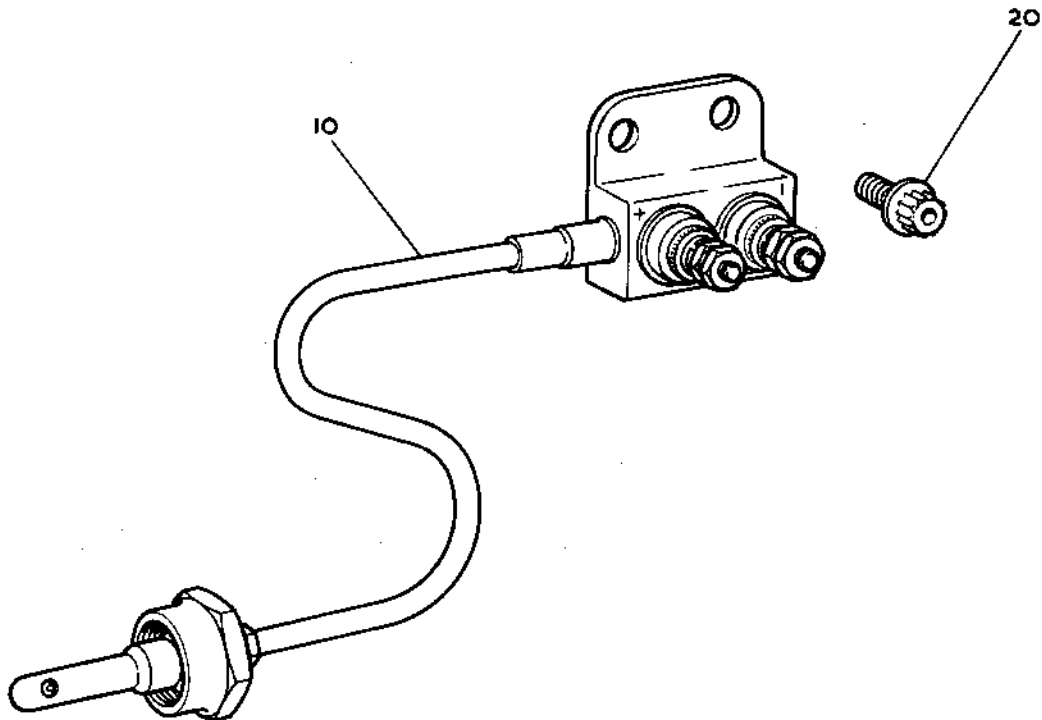
TN39941



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 32488/00B



TN39942

Turbine Bearing Cold Vent Thermocouple  
Lead-out and Junction Box  
Figure 307

INSPECTION/CHECK

**77-10-00**

Page 314

Jun 1/76



OLYMPUS 593

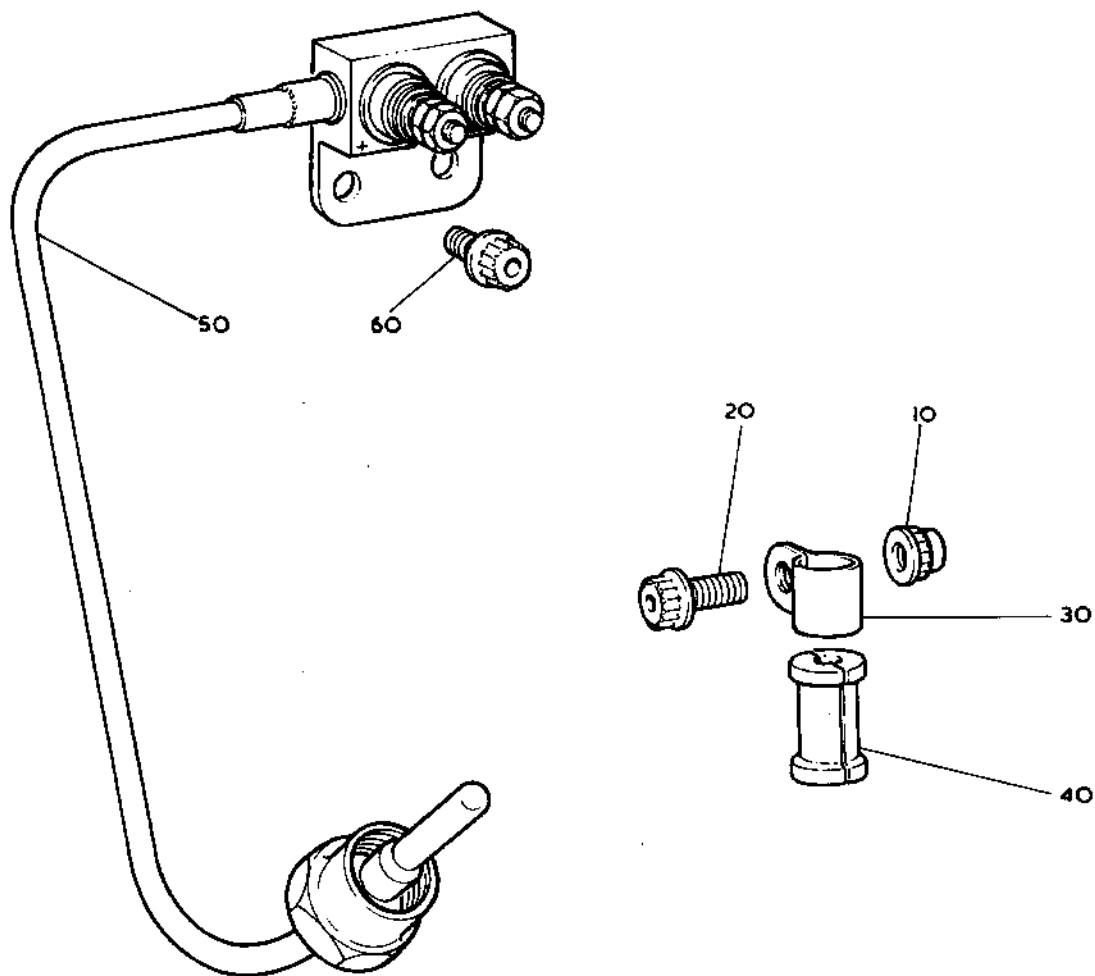
MK.610-14-28

OVERHAUL



CR 32489/008

PRINTED IN ENGLAND



TN39943

LP Turbine Bearing Hot Vent Thermocouple  
Lead-out and Junction Box  
Figure 308

INSPECTION/CHECK

77-10-00

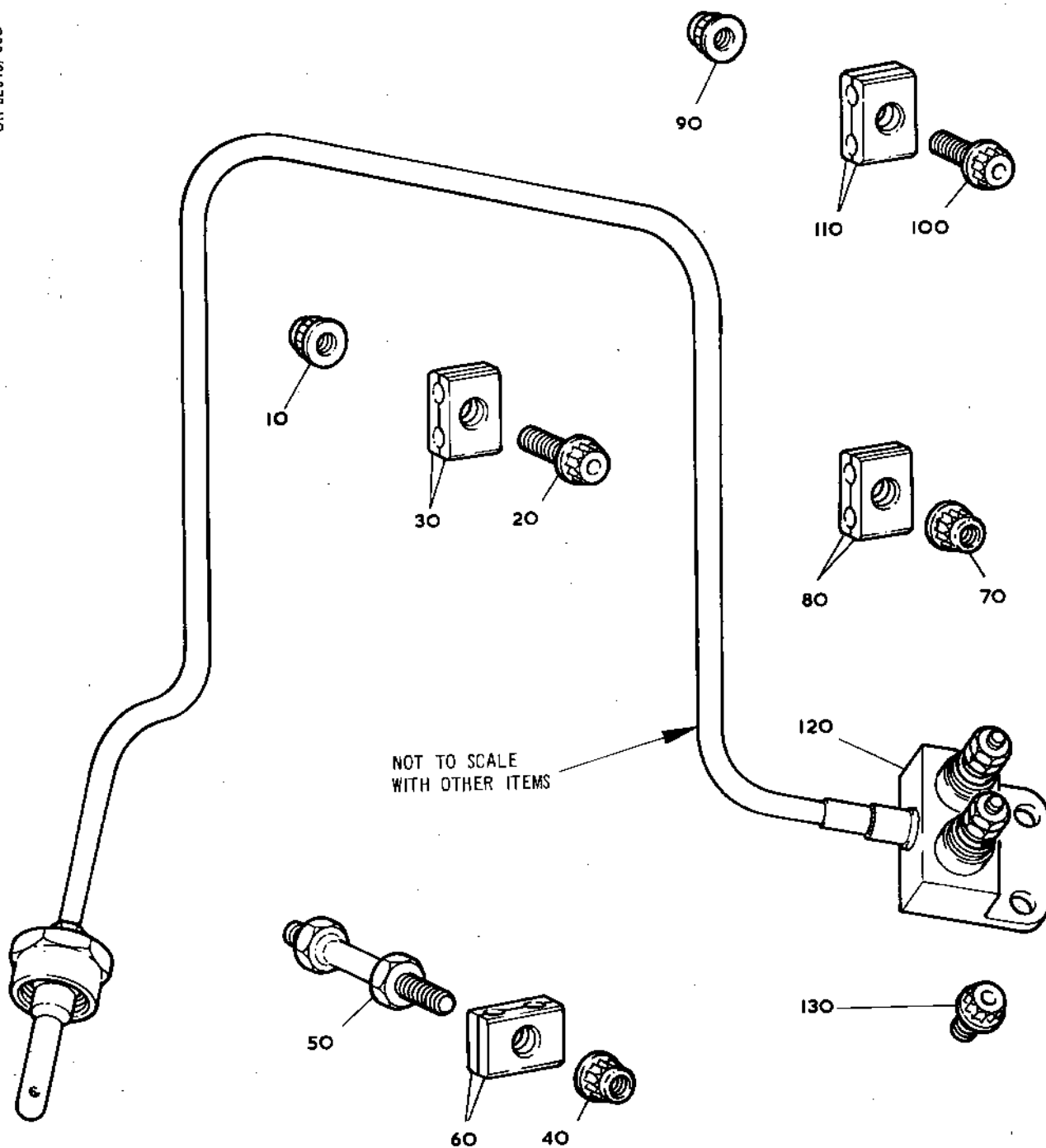
Page 315  
Jun 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 32348/00B



TN39944

Intermediate Case Bearings Cold Vent  
Thermocouple Lead-out and Junction Box  
Figure 309

INSPECTION/CHECK

77-10-00

Page 316

Jun 1/76



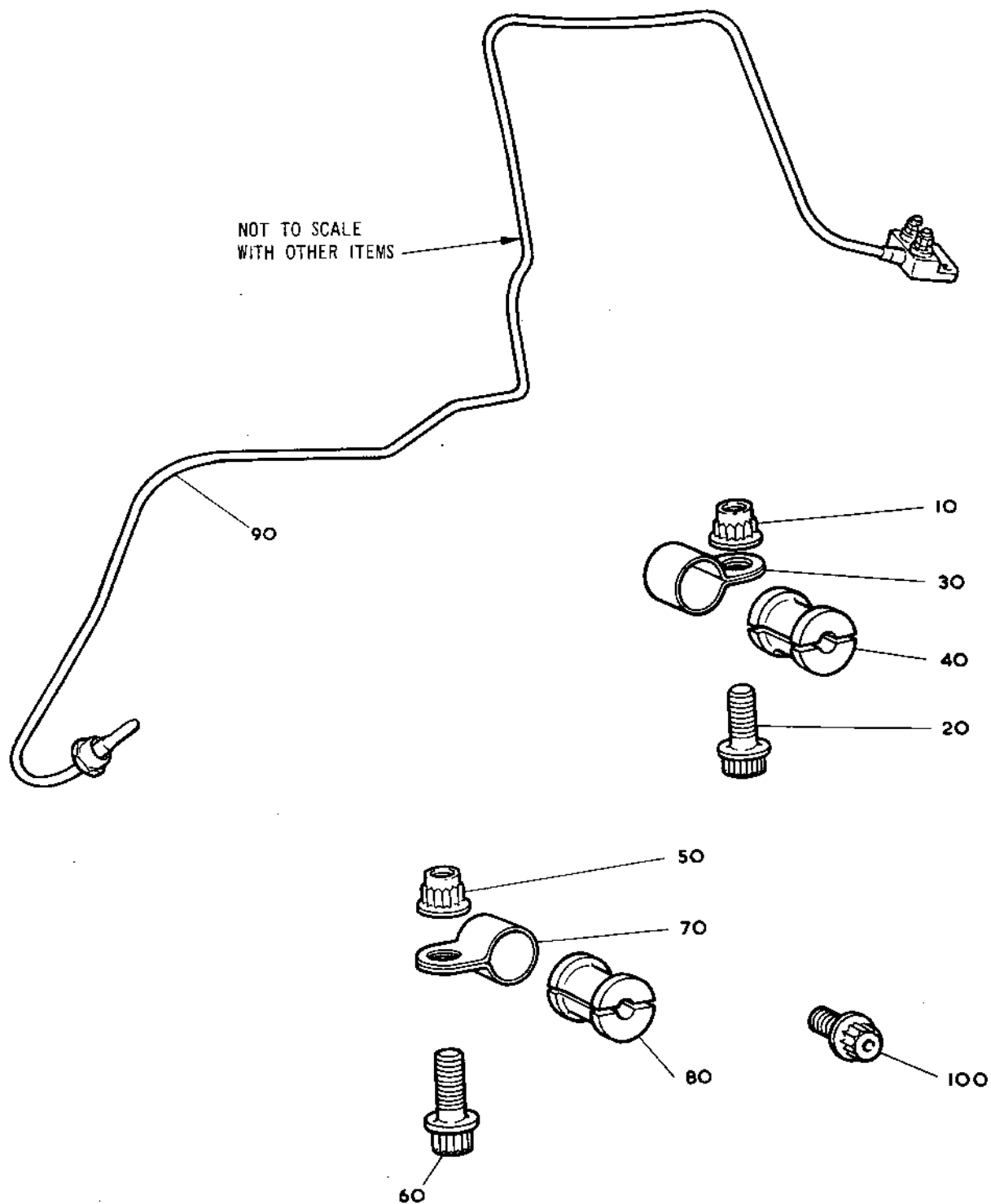
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32347/008

PRINTED IN ENGLAND



TN39946

HP Compressor Rear Labyrinth Seal Thermocouple  
Lead-out and Junction Box  
Figure 310

INSPECTION/CHECK

77-10-00

Page 317  
Jun 1/76



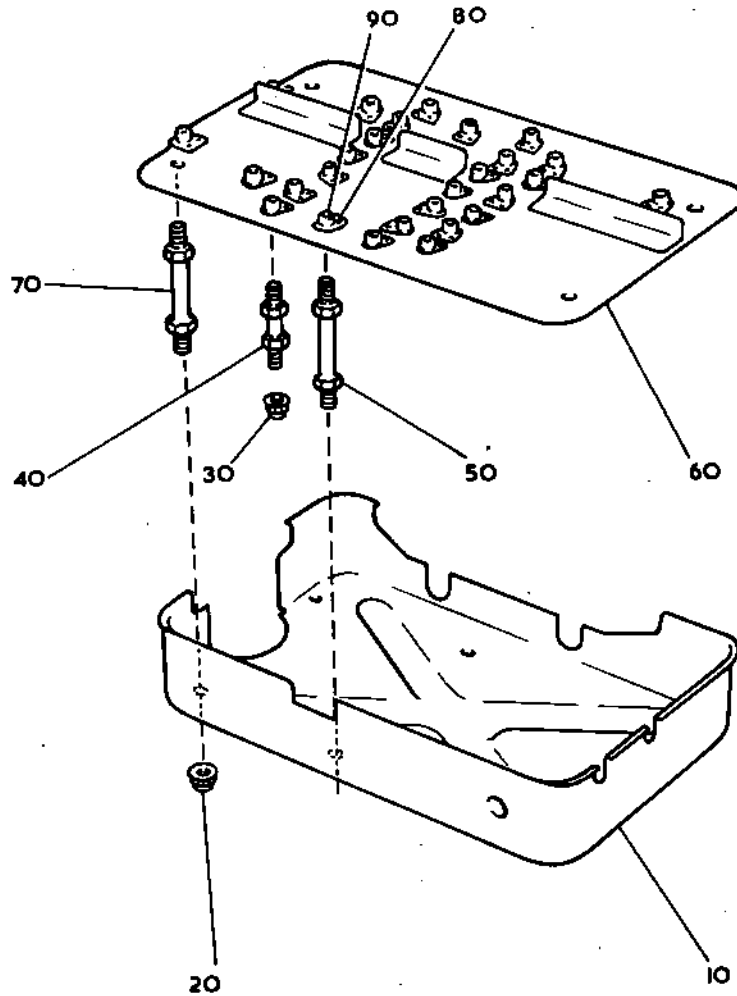


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 32346/00B



TN39947

Engine Thermocouple Termination Junction Box  
Figure 311

INSPECTION/CHECK

**77-10-00**

Page 318

Jun 1/76

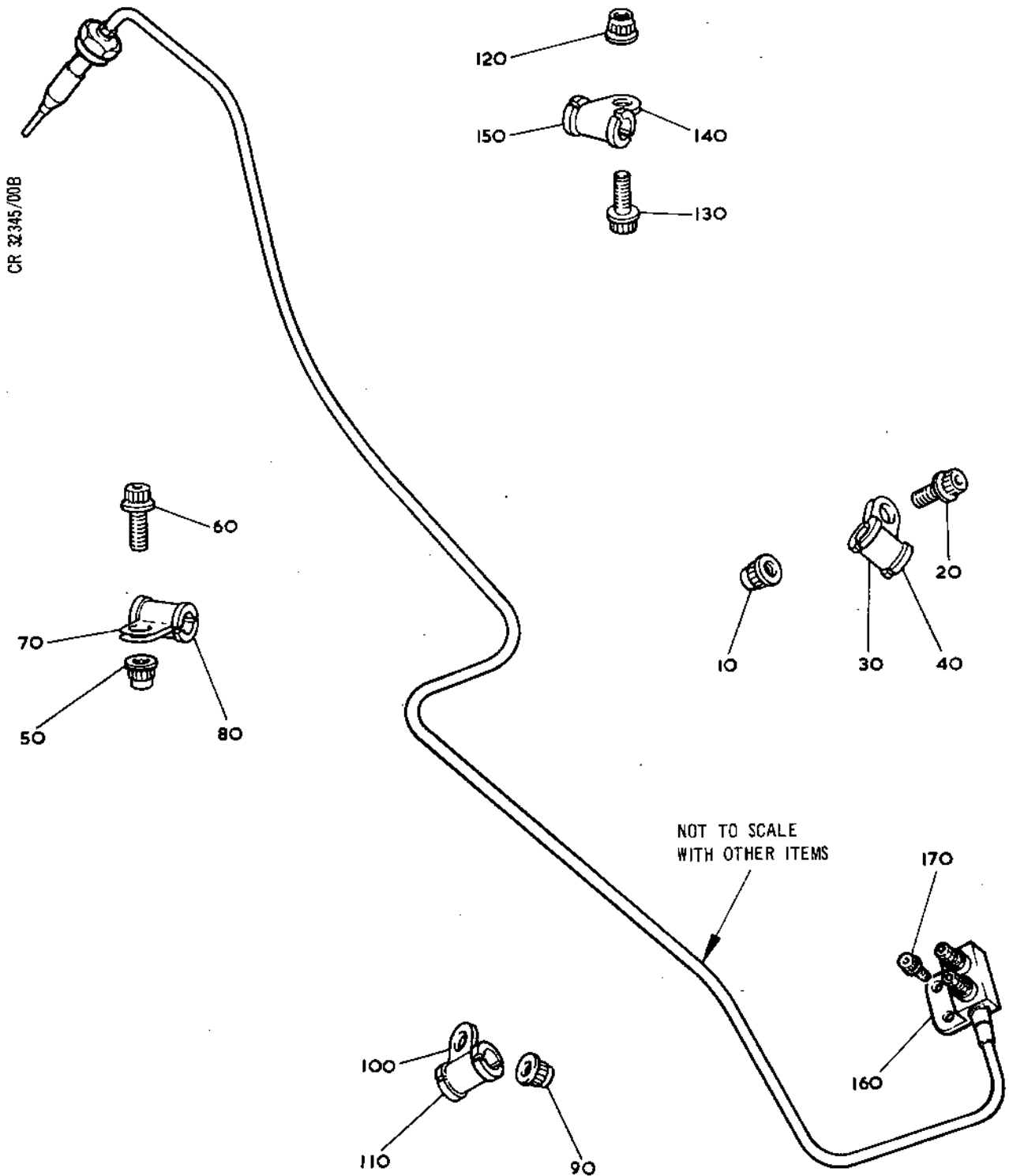


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND



HP Compressor Delivery Air Thermocouple  
Figure 312

INSPECTION/CHECK

77-10-00

Page 319  
Jun 1/76

TN39948



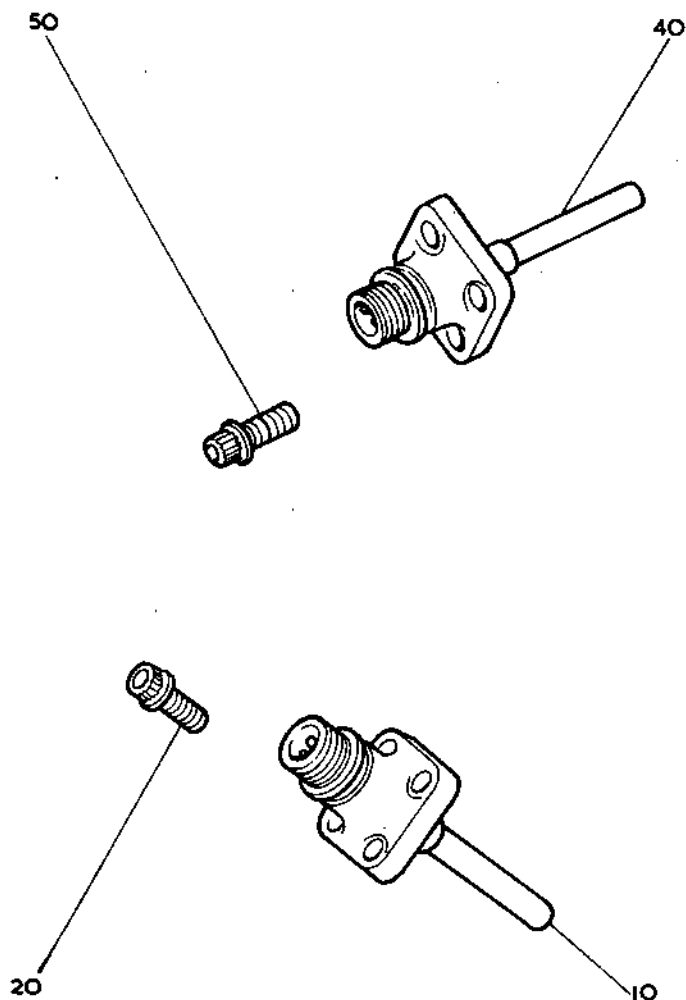
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 32344/00B



Oil Inlet and Outlet Thermometers  
Figure 313

INSPECTION/CHECK

77-10-00

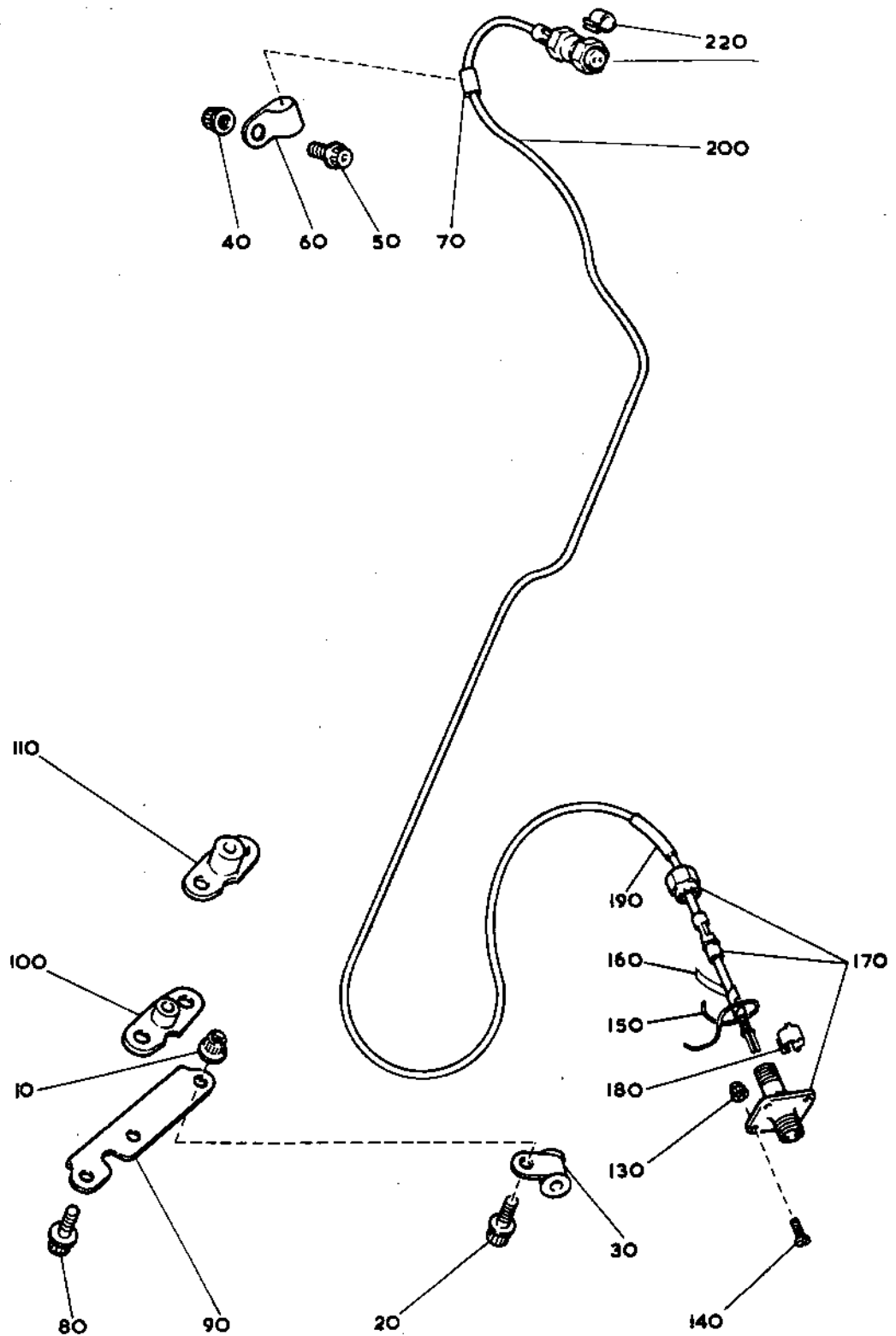
Page 320

Jun 1/76

TN39991



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



Engine Vibration Transducer Cable  
Figure 314

INSPECTION/CHECK

**77-10-00**

Page 321  
Jun 1/76



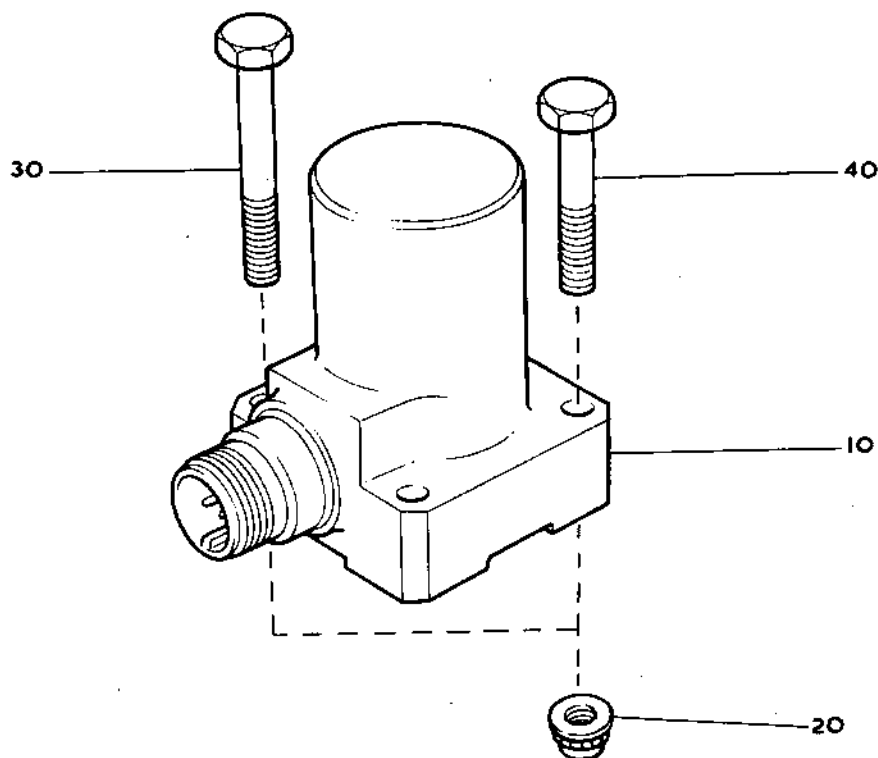
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 32343/00B



TN39993

Engine Vibration Transducer  
Figure 315

INSPECTION/CHECK

**77-10-00**

Page 322

Jun 1/76

PRINTED IN ENGLAND

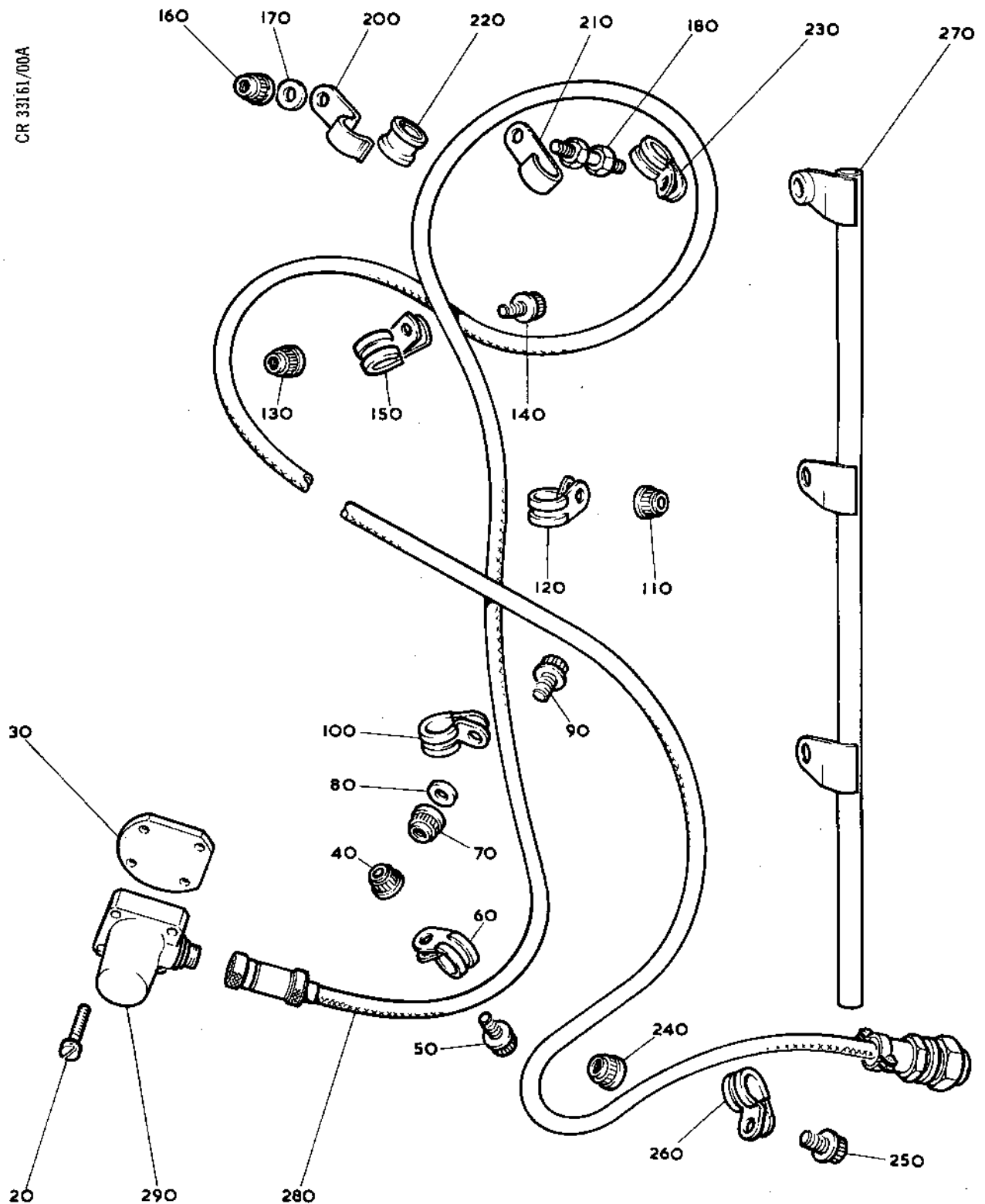
TN39994

CR 33161/00A



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Reheat Chamber Vibration Transducer and Cable  
Figure 316

INSPECTION/CHECK

77-10-00

Page 323

Jun 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## ENGINE POWER PITOTS - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

77-12-03

Page 201  
Jan 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL	-	B	G	-

Cleaning Processes  
Table 201

TN15791



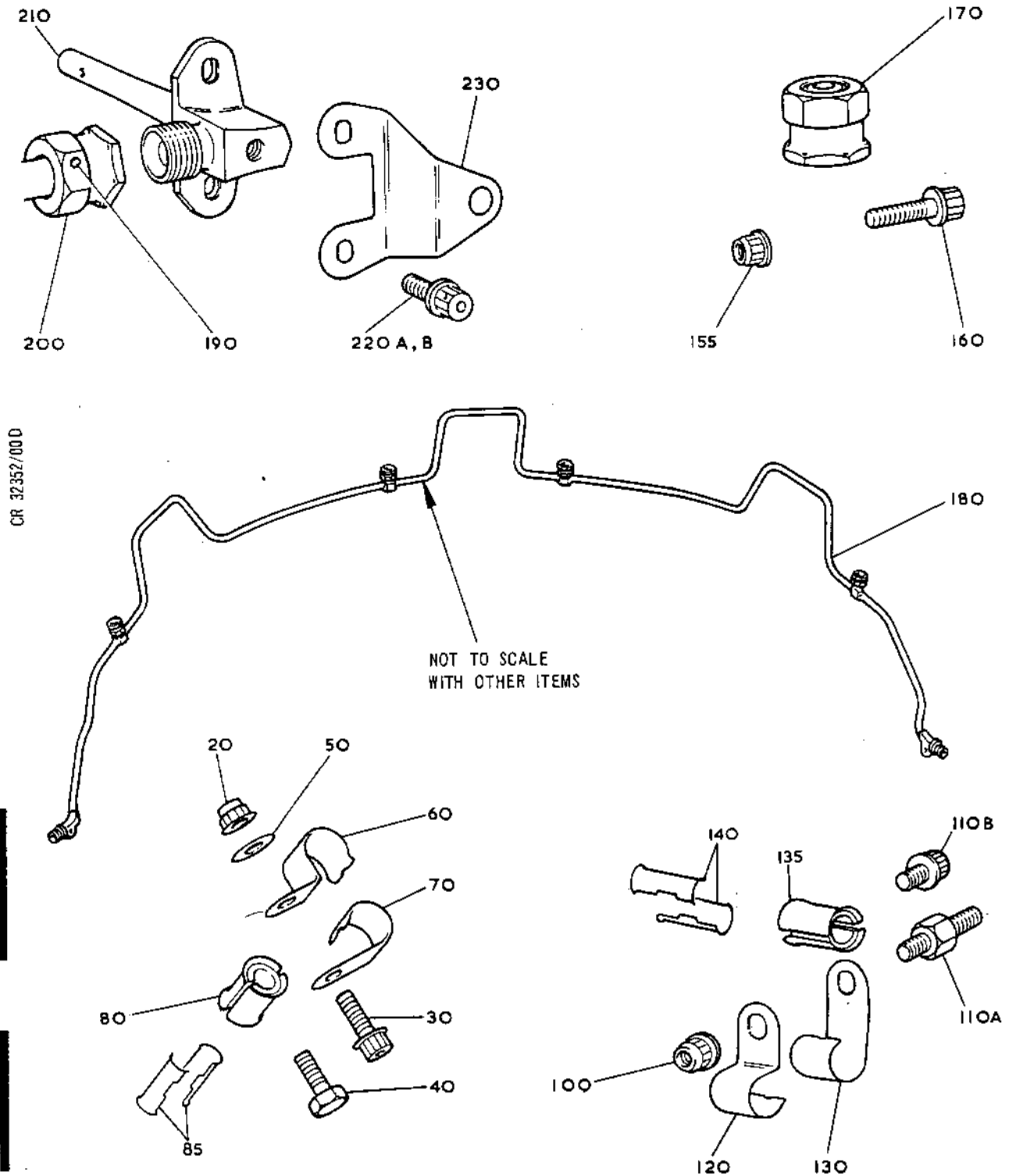


OLYMPUS 593



MK.610-14-28  
OVERHAUL

sneema



Pitots - Engine Power  
Figure 201

**OLYMPUS 593**

MK.610-14-28

OVERHAUL

ENGINE POWER PITOTS - INSPECTION/CHECKTABLE OF CONTENTS

Para.	Page
1. General ... ..	301
2. General Inspection... ..	301
3. Crack Detection ... ..	302
A. Magnetic Particle Crack Detection ... ..	302
B. Fluorescent Dye Crack Detection ... ..	302
4. Tube Assembly ... ..	304
A. Inspect Tubes ... ..	304
B. Inspect Threads, Union Nuts and Thrust Wires... ..	304
C. Inspect Mounting Brackets ... ..	304
5. Pitot Assemblies ... ..	304
A. Inspect Threads and Insert... ..	304
B. Inspect Probe ... ..	304
C. Inspect Attachment Flange Faces ... ..	305
D. Inspect Locating Diameter ... ..	305
6. Brackets ... ..	305
A. Inspect Brackets ... ..	305

TABLE OF ILLUSTRATIONS

Fig.No.	Page
301 Crack Detection Test Diagram ... ..	303
302 Engine Power Pitots ... ..	306

LIST OF TABLES

Table No.	Page
301 Items to be Magnetic Particle Crack Tested ... ..	302
302 Items to be Fluorescent Dye Crack Tested ... ..	302
303 Cross References to Illustrated Parts Catalogue ... ..	304

INSPECTION/CHECK

**77-12-03**

Contents

Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



ENGINE POWER PITOTS - INSPECTION/CHECK

1. General

- A. Each item in this chapter is given a two-part identification; thus, 302-20 refers to Figure 302 and to Item 20 called out on that figure. Each item may be further identified by its Part Number by the use of Table 303, which cross-refers figures in this chapter to the equivalent chapter and figure in the Illustrated Parts Catalogue (I.P.C.); the called-out item number will be the same on both figures.
- B. All items which will be crack tested are listed in Tables 301 and 302.
- C. Dimensional checks are cross referenced to the equivalent Fits and Clearances Schedule (F.C.S.) chapter against the item concerned.
- D. When the inspection of an item discloses a minor defect that requires rectification, it is defined as 'Accept after repair'. On all such occasions the item must be rectified in accordance with Standard Practices 72-09-22 Repair. Where a Ref.No. follows 'Accept after repair' e.g. (Ref.72-21-01 Repair No.1), a specific Repair Scheme is available to which the item must be rectified. Items that are rejected, or for which a repair scheme is not currently available, should be held at the discretion of the operator, as service experience may prove the need for a repair.
- E. On completion of a repair, rectification or test, the item(s) must be inspected, to ensure that the necessary work has been satisfactorily completed.

2. General Inspection

- A. Inspect all items illustrated in this chapter, whether specified or not, in accordance with Standard Practices (Ref.72-09-00 Inspection/Check). In addition, carry out the inspections detailed for the specified items, from para.4 onwards.
- B. Inspection terms used in this chapter are explained in Standard Practices (Ref.72-09-00 Inspection/Check).

INSPECTION/CHECK

**77-12-03**

Page 301  
Apr 1/77

PRINTED IN ENGLAND

TN5697



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



### 3. Crack Detection

#### A. Magnetic Particle Crack Detection.

- (1) Submit the items listed in Table 301 to crack detection in accordance with the process quoted.
- (2) Items to be crack detected by this method are illustrated in the Crack Detection Test Diagram (Fig.301). For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

No current requirement

Items to be Magnetic Particle Crack Tested  
Table 301

#### B. Fluorescent Dye Crack Detection.

- (1) Submit the items listed in Table 302 to crack detection in accordance with the process quoted. For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

302	180	Tube	F1A
302	210	Pitot Assemblies	F1A

Items to be Fluorescent Dye Crack Tested  
Table 302

INSPECTION/CHECK

**77-12-03**

Page 302  
Aug 1/76

TN5698

PRINTED IN ENGLAND



OLYMPUS 593

MK.610-14-28  
OVERHAUL



No current requirement

TN5700

Crack Detection Test Diagram  
Figure 301

INSPECTION/CHECK

**77-12-03**

Page 303  
Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



FIG.NO.

ILLUSTRATED PARTS CATALOGUE EQUIVALENT

301	Not applicable	
302	77-12-03	Fig.1

Cross References to Illustrated Parts Catalogue  
Table 303

4. Tube Assembly (302-180)

- A. Inspect Tubes (Ref.72-09-00, Inspection/Check).
- B. Inspect Threads, Union Nuts and Thrust Wires (Ref. 72-09-00, Inspection/Check).
- C. Inspect Mounting Brackets.
  - (1) Wear and fretting.
    - (a) Bolt-holes elongated not more than 0.030 in. (0,760 mm). Accept after repair.
  - (2) Nicks and burrs. Accept after repair.

5. Pitot Assemblies - 4 Off (302-210)

- A. Inspect Threads and Insert (Ref.72-09-00, Inspection/Check).
- B. Inspect Probe.
  - (1) Bore or orifice obstructed. Reject for re-cleaning.

FN5701

INSPECTION/CHECK

77-12-03

Page 304  
Aug 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



C. Inspect Attachment Flange Faces.

- (1) Nicks, burrs and scores.

Accept, if repair preserves surface flatness.

D. Inspect Locating Diameter.

- (1) Nicks and burrs.

Accept, if repair preserves profile.

6. Brackets - 2 Off (302-230)

A. Inspect Brackets.

- (1) Distortion.

Accept, if repair preserves profile without cracking.

- (2) Wear and fretting.

- (a) Bolt-holes elongated  
not more than 0.030 in.  
(0,760 mm).

Accept after repair.

- (3) Nicks and burrs.

Accept after repair.

PRINTED IN ENGLAND

TN24133

INSPECTION/CHECK

**77-12-03**

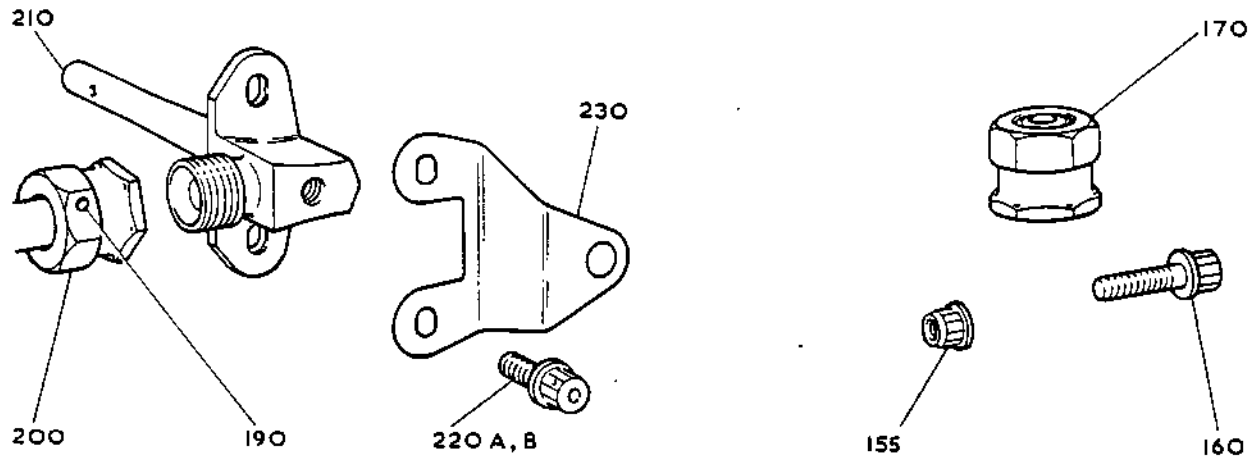
Page 305  
Aug 1/76



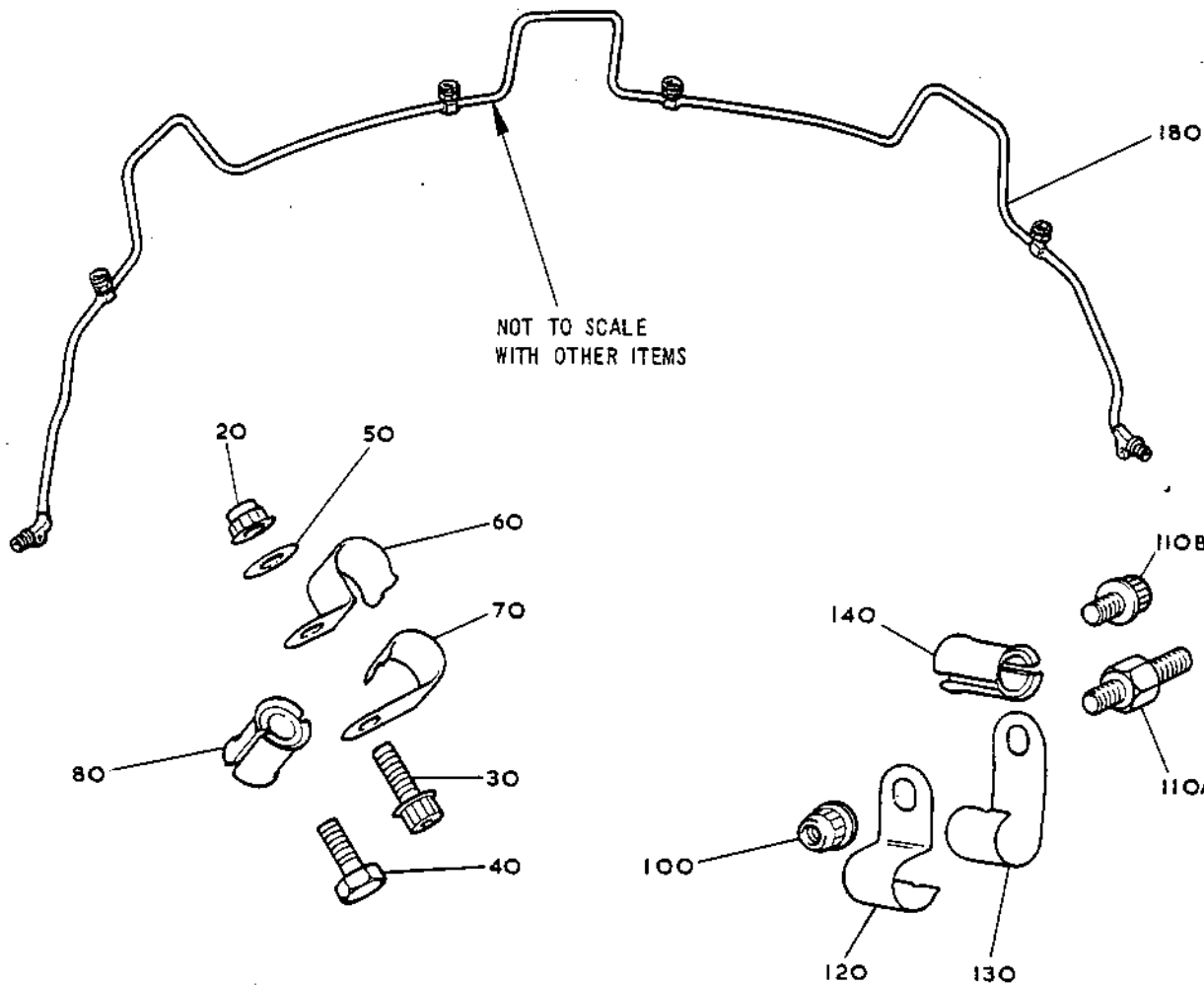
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 32352/000C



TN39937

Engine Power Pitots  
Figure 302

INSPECTION/CHECK

77-12-03

Page 306

Dec 1/81



# British airways

CONCORDE

## OLYMPUS 593 OVERHAUL MANUAL

Temporary Revision No. 77-501

Insert in 77-12-03 after page 306

This TR is the first RST for section 77-12-03

### REASON FOR ISSUE:

To repair a cracked lug or replace a broken lug as applicable.  
(MRA 117).

### ACTION

B.E.O.L. REPAIR

RST 4025 ADAPTOR UNION: REPAIR  
OF CRACKED LUG OR REPLACEMENT OF  
BROKEN LUG BY ARGON ARC WELDING.

### PROCEDURE

This repair scheme is in two parts:

PART 1. Covers a cracked lug which may be welded and dressed  
back to original contours.

PART 2. Covers the replacement of a broken lug.

#### PART 1.

1. Cold straighten lug to original position.
2. Clean and prepare crack area for welding in accordance with  
TSD 594/Op.407.
3. Argon Arc weld crack using filler rod (see weld data sheet 2)  
as per TSD 594/Op.407.
4. Crack detect as per standard practices manual 72-20-10.
5. Dress lug back to original contours as per fig. 1. sheet 3.
6. Visually inspect.
7. Vibro engrave RST 4025/1 adjacent to Part No.

#### PART 2.

1. Machine or hand dress to dimensions indicated in Fig.2.
2. Produce new lug to conform to Fig.1 dimensions.

1 May 1981

TR.77-501  
77-12-03  
RST 4025  
TR. Page 1 of 3

**British airways**  
CONCORDE

TR.NO. 77-501 (cont'd)

3. Match new lug to adaptor union to give a good fit.
4. Prepare new lug and lug location for welding per TSD 594 - 407.
5. Argon Arc weld lug in position using filler rod (see weld data below) as per TSD 594 - 407.
6. Crack detect as per standard practices manual 72-20-10.
7. Machine and hand dress lug to conform to dimensions shown Fig.1.
8. Crack detect as per Op.6.
9. Vibro engrave RST 4025/2 adjacent to Part No.
10. Final inspect.

WELD DATA

Part No.	Filler Rod.	New Lug Material.
B471440	MSRR 9500/213	MSRR 6532
B484295	MSRR 9500/2	MSRR 6523 or S/CNT.

# British airways CONCORDE

TR.NO. 77-501 (cont'd)

## NOTE

NEW LUG DIMENSIONS TO INCLUDE 0.375 RADIUS

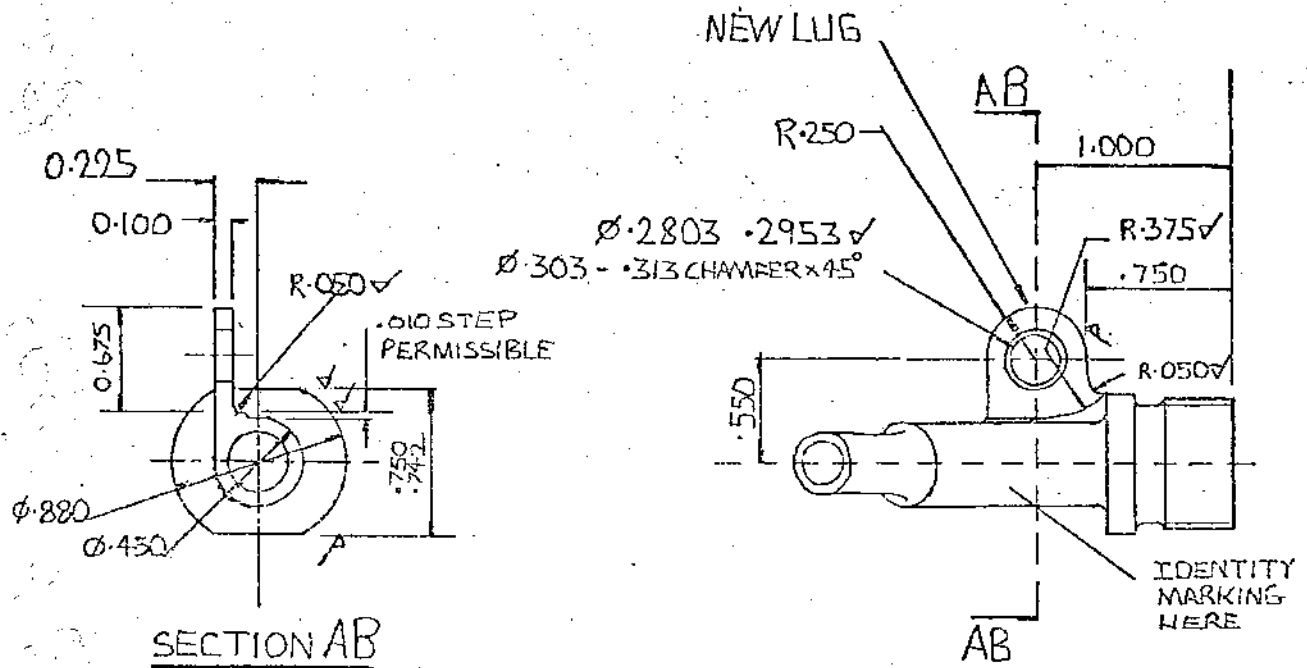


FIG 1

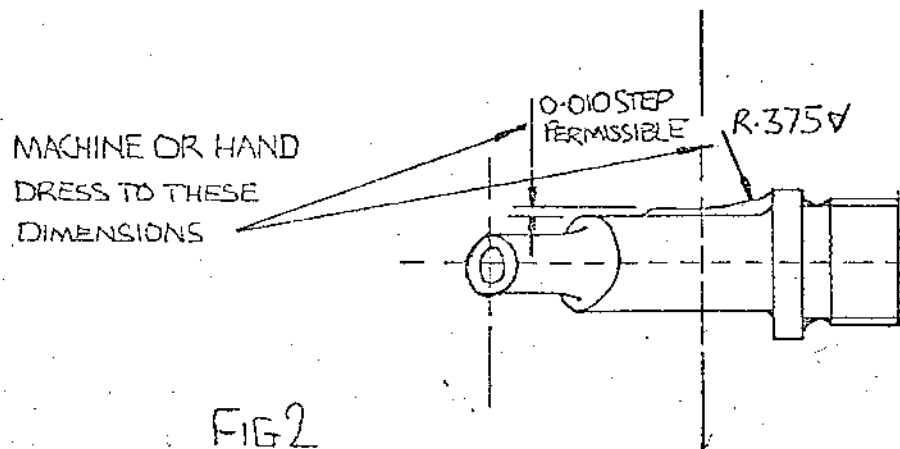


FIG 2

11/1/81

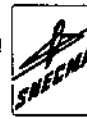
1 May 1981

TR.77-501  
77-12-03  
RST 4025  
TR. Page 3 of 3



OLYMPUS 593

MK.610-14-28  
OVERHAUL



ENGINE POWER PITOTS - REPAIR

TABLE OF CONTENTS

Repair No.

Title

Scheme No.

1

Repair of fretting/damage by  
inert gas arc welding.

B.514566

PRINTED IN ENGLAND

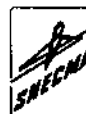
REPAIR  
77-12-03  
Contents 1  
Jun 1/92



OLYMPUS 593

MK.610-14-28

OVERHAUL



TUBE A/O, AIR  
REPAIR OF FRETTING/DAMAGE BY INERT GAS ARC WELDING

REPAIR B.514566

1. EFFECTIVITY

IPC	Fig./Item	Part No.
77-12-03	01/180B	B.484295

2. REPAIR LIMITATIONS

Refer to Overhaul Manual 72-09-29 Repair.

3. GENERAL

Refer to Overhaul Manual 72-09-29 Repair.

4. REPAIR PROCEDURE

REPAIR PROCEDURE

SUPPLEMENTARY INFORMATION

(1) Weld repair

Refer to Overhaul Manual  
72-09-29 Repair.

(2) Mark SAL B.514566  
or R1 adjacent  
normal assy. of  
number using the  
electro-chemical  
marking or vibro-  
percussion engraving  
techniques.

Refer to Overhaul Manual  
72-09-00 Repair.

5. MATERIAL

<u>COMPONENT</u>	<u>MATERIAL</u>	<u>RR CODE</u>
B.484295	MSRR 6524	EBS

PRINTED IN ENGLAND



OLYMPUS 593

MK.610-14-28

OVERHAUL



6. DATA

PRESSURE TEST REQUIREMENTS:

<u>PART NO.</u>	<u>PRESSURE TEST</u>	<u>MIN. GAUGE</u>
B.484295	NOT REQUIRED	0.027 (0,69)

7. TOOLS

<u>TOOL NUMBER</u>	<u>DESCRIPTION</u>	<u>ITEM</u>
NONE.		

8. REPLACEMENT PARTS

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>ITEM</u>
NONE.			

REPAIR

77-12-03

Repair No.1

Page 402

Jun 1/92

**OLYMPUS 593**MK.610-14-28  
OVERHAULENGINE TEMPERATURE INDICATION - INSPECTION/CHECKTABLE OF CONTENTS

Para.	Page
1. General ... ..	301
2. General Inspection... ..	301
3. Crack Detection ... ..	302
A. Magnetic Particle Crack Detection ... ..	302
B. Fluorescent Dye Crack Detection ... ..	302
4. Thermocouple Harness Assembly ... ..	304
5. Jet Pipe Thermocouple Lead-out and Junction Box ... ..	304
6. Turbine Cooling Air Thermocouples ... ..	304
7. Lead-out and Junction Box Assemblies... ..	304
8. LP and HP Turbine Bearing Cold Air Vent Thermocouple Lead-out and Junction Box ... ..	305
9. LP Turbine Bearing Hot Vent Thermocouple Lead-out and Junction Box ... ..	305
10. Intermediate Case Bearings Cold Vent Thermocouple Lead-out and Junction Box ... ..	305
11. HP Compressor Rear Labyrinth Seal Hot Vent Thermocouple Lead-out and Junction Box ... ..	305
12. Junction Box Cover and Mounting Plate ... ..	305
A. Inspect Captive Nuts and Retainers ... ..	305
B. Inspect Cover and Plate ... ..	305
13. HP Compressor Delivery Air Thermocouple Lead-out and Junction Box ... ..	306
14. Oil Inlet and Outlet Thermometers ... ..	306

TABLE OF ILLUSTRATIONS

Fig.No.	Page
301 Crack Detection Test Diagram ... ..	303
302 Thermocouple Harness Assemblies ... ..	307
303 Jet Pipe Thermocouple Lead-out and Junction Box ... ..	308
304 Turbine Cooling Air Thermocouple ... ..	309
305 Turbine Cooling Air Thermocouple Leads... ..	310
306 Turbine Bearing Cold Vent Thermocouple Lead-out and Junction Box... ..	311

INSPECTION/CHECK

**77-20-00**

Contents 1

Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Fig.No.		Page
307	LP Turbine Bearing Hot Vent Thermocouple Lead-out and Junction Box ...	312
308	Intermediate Case Bearings Cold Vent Thermocouple Lead-out and Junction Box ...	313
309	HP Compressor Rear Labyrinth Seal Thermocouple Lead-out and Junction Box ...	314
310	Engine Thermocouple Termination Junction Box...	315
311	HP Compressor Delivery Air Thermocouple ...	316
312	Oil Inlet and Outlet Thermometers ...	317

LIST OF TABLES

Table No.		Page
301	Items to be Magnetic Particle Crack Tested ...	302
302	Items to be Fluorescent Dye Crack Tested ...	302
303	Cross References to Illustrated Parts Catalogue ...	304

TN39936

INSPECTION/CHECK  
**77-20-00**  
Contents 2  
Aug 1/76





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



## ENGINE TEMPERATURE INDICATION - INSPECTION/CHECK

### 1. General

- A. Each item in this chapter is given a two-part identification; thus, 302-20 refers to Figure 302 and to Item 20 called out on that figure. Each item may be further identified by its Part Number by the use of Table 303, which cross-refers figures in this chapter to the equivalent chapter and figure in the Illustrated Parts Catalogue (I.P.C.); the called-out item number will be the same on both figures.
- B. All items which will be crack tested are listed in Tables 301 and 302.
- C. Dimensional checks are cross referenced to the equivalent Fits and Clearances Schedule (F.C.S.) chapter against the item concerned.
- D. When the inspection of an item discloses a minor defect that requires rectification, it is defined as 'Accept after repair'. On all such occasions the item must be rectified in accordance with Standard Practices 72-09-22 Repair. Where a Ref.No. follows 'Accept after repair' e.g. (Ref.72-21-01 Repair No.1), a specific Repair Scheme is available to which the item must be rectified. Items that are rejected, or for which a repair scheme is not currently available, should be held at the discretion of the operator, as service experience may prove the need for a repair.
- E. On completion of a repair, rectification or test, the item(s) must be inspected, to ensure that the necessary work has been satisfactorily completed.

### 2. General Inspection

- A. Inspect all items illustrated in this chapter, whether specified or not, in accordance with Standard Practices (Ref.72-09-00 Inspection/Check). In addition, carry out the inspections detailed for the specified items, from para.4 onwards.
- B. Inspection terms used in this chapter are explained in Standard Practices (Ref.72-09-00 Inspection/Check).

INSPECTION/CHECK

**77-20-00**

Page 301  
Apr 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



### 3. Crack Detection

#### A. Magnetic Particle Crack Detection.

- (1) Submit the items listed in Table 301 to crack detection in accordance with the process quoted.
- (2) Items to be crack detected by this method are illustrated in the Crack Detection Test Diagram (Fig.301). For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

No current requirement

Items to be Magnetic Particle Crack Tested  
Table 301

#### B. Fluorescent Dye Crack Detection.

- (1) Submit the items listed in Table 302 to crack detection in accordance with the process quoted. For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

302	10	Thermocouple Harness	FlA
-----	----	----------------------	-----

Items to be Fluorescent Dye Crack Tested  
Table 302

INSPECTION/CHECK

77-20-00

Page 302  
Dec 1/76

IN39931



OLYMPUS 593

MK.610-14-28

OVERHAUL



No current requirement

Crack Detection Test Diagram  
Figure 301

INSPECTION/CHECK

**77-20-00**

Page 303

Aug 1/76

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



FIG.NO.

ILLUSTRATED PARTS CATALOGUE EQUIVALENT

301	Not applicable	
302	77-21-02	Fig.1
303	77-21-03	Fig.1
304	77-22-02	Fig.1
305	77-22-03	Fig.1
306	77-22-04	Fig.1
307	77-22-05	Fig.1
308	77-22-06	Fig.1
309	77-22-07	Fig.1
310	77-22-08	Fig.1
311	77-22-09	Fig.1
312	77-23-02	Fig.1

Cross References to Illustrated Parts Catalogue  
Table 303

4. Thermocouple Harness Assembly (302-10)

- A. Inspect in accordance with the vendor's Overhaul Manual  
(Ref.OH 77-20-34).

5. Jet Pipe Thermocouple Lead-out and Junction Box (303-70)

- A. Inspect in accordance with the vendor's Overhaul Manual  
(Ref.OH 77-20-34).

6. Turbine Cooling Air Thermocouples - 2 Off (304-10)

- A. Inspect in accordance with the vendor's Overhaul Manual  
(Ref.OH 77-20-31).

7. Lead-out and Junction Box Assemblies (305-140/290)

- A. Inspect in accordance with the vendor's Overhaul Manual  
(Ref.OH 77-20-31).

TN39932

INSPECTION/CHECK

**77-20-00**

Page 304

Dec 1/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



8. LP and HP Turbine Bearing Cold Air Vent Thermocouple Lead-out and Junction Box (306-10)
- A. Inspect in accordance with the vendor's Overhaul Manual (Ref.OH 77-20-32).
9. LP Turbine Bearing Hot Vent Thermocouple Lead-out and Junction Box (307-50)
- A. Inspect in accordance with the vendor's Overhaul Manual (Ref.OH 77-20-32).
10. Intermediate Case Bearings Cold Vent Thermocouple Lead-out and Junction Box (308-120)
- A. Inspect in accordance with the vendor's Overhaul Manual (Ref.OH 77-20-33).
11. HP Compressor Rear Labyrinth Seal Hot Vent Thermocouple Lead-out and Junction Box (309-90)
- A. Inspect in accordance with the vendor's Overhaul Manual (Ref.OH 77-20-33).
12. Junction Box Cover (310-10A or B and Mounting Plate (310-60A or B)
- A. Inspect Captive Nuts and Retainers (Ref.72-09-00, Inspection/Check).
- B. Inspect Cover and Plate.
- (1) Distortion. Accept, if repairable without cracking.
- (2) Wear and fretting.
- (a) Bolt-holes elongated not more than 0.030 in. (0,760 mm). Accept after repair.

INSPECTION/CHECK

77-20-00

Page 305

Dec 1/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



13. HP Compressor Delivery Air Thermocouple Lead-out and Junction Box (311-160)

- A. Inspect in accordance with the vendor's Overhaul Manual (Ref.OH 77-20-32).

14. Oil Inlet and Outlet Thermometers (312-10 and 40)

- A. Inspect in accordance with vendor's Overhaul Manual (Ref.OH 31-09-41/98).

This space left blank intentionally

TN39934

INSPECTION/CHECK

77-20-00

Page 306

Aug 1/76



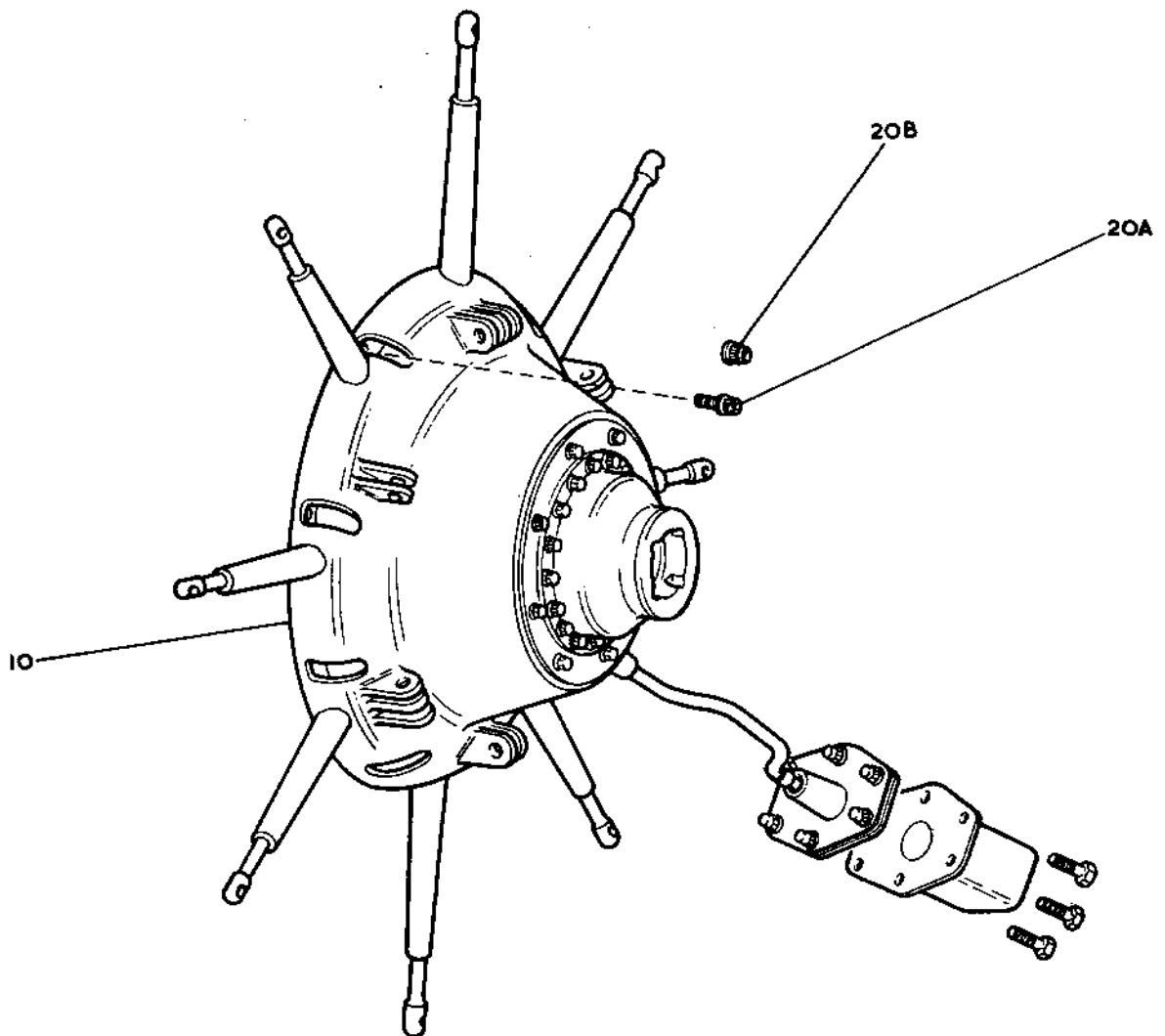
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32487/00B

PRINTED IN ENGLAND



TN39938

Thermocouple Harness Assemblies  
Figure 302

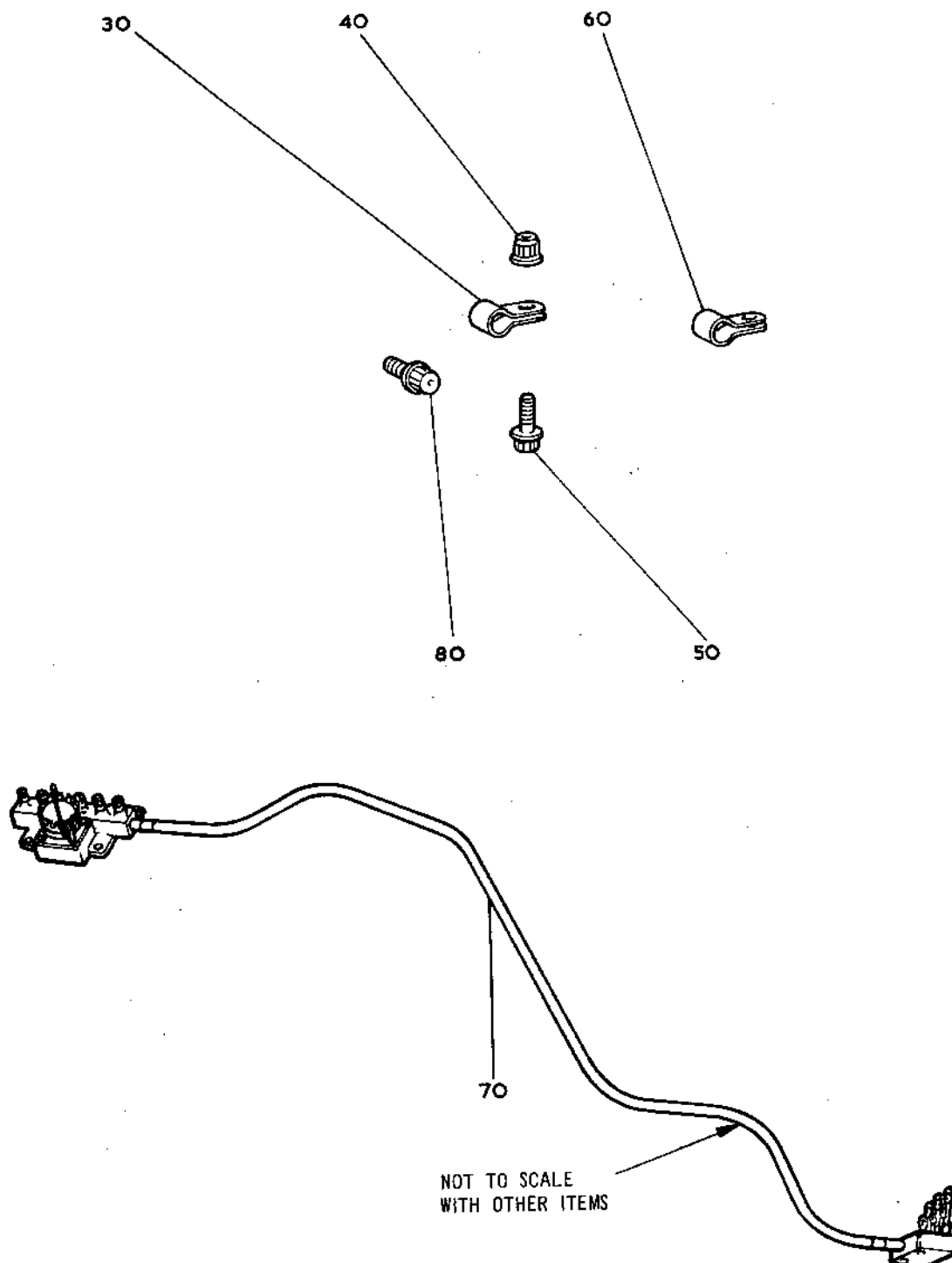
INSPECTION/CHECK

**77-20-00**

Page 307  
Aug 1/76



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 32351/00B

TN39939

Jet Pipe Thermocouple Lead-out and Junction Box  
Figure 303

INSPECTION/CHECK

77-20-00

Page 308

Aug 1/76

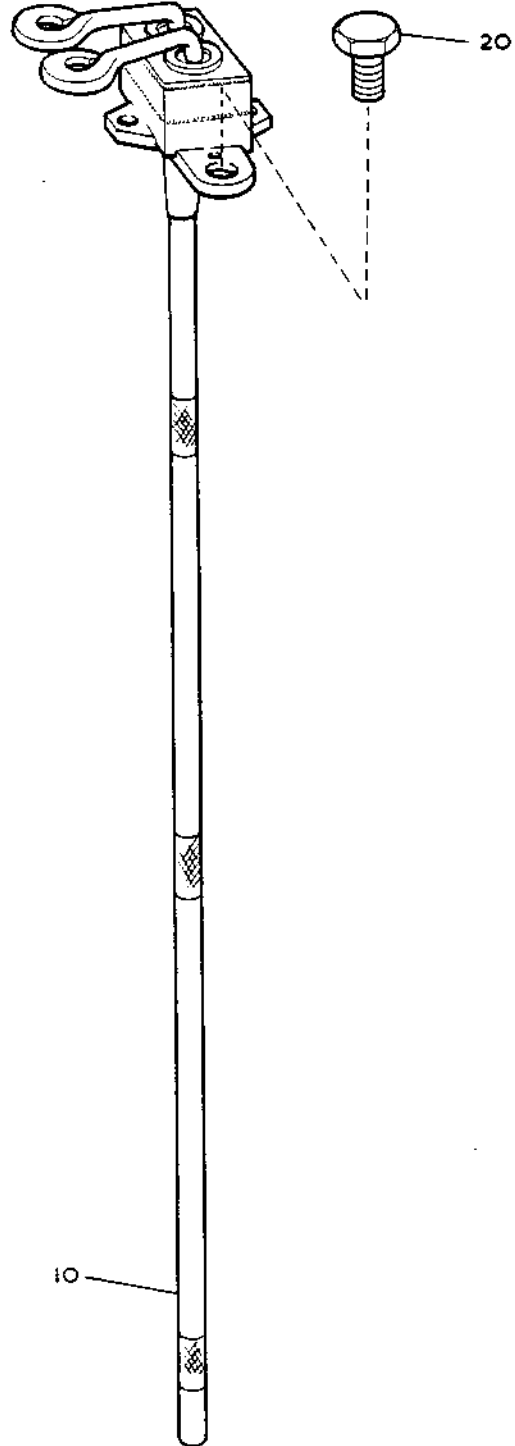


CR 32350/00B



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Turbine Cooling Air Thermocouple  
Figure 304

INSPECTION/CHECK

**77-20-00**

Page 309

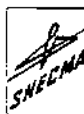
Aug 1/76



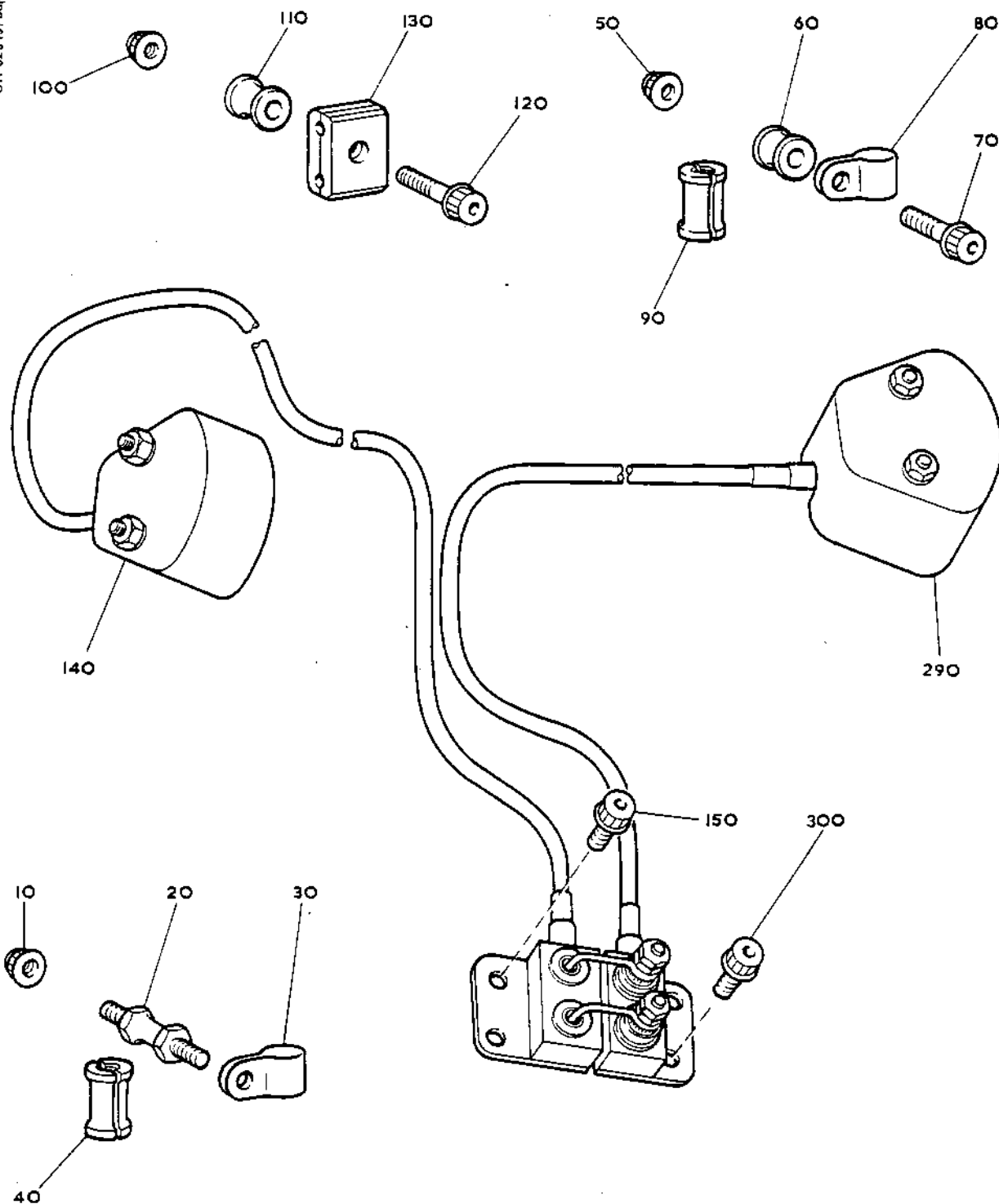
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 32349/001C



Turbine Cooling Air Thermocouple Leads  
Figure 305

INSPECTION/CHECK

77-20-00

Page 310

Dec 1/81

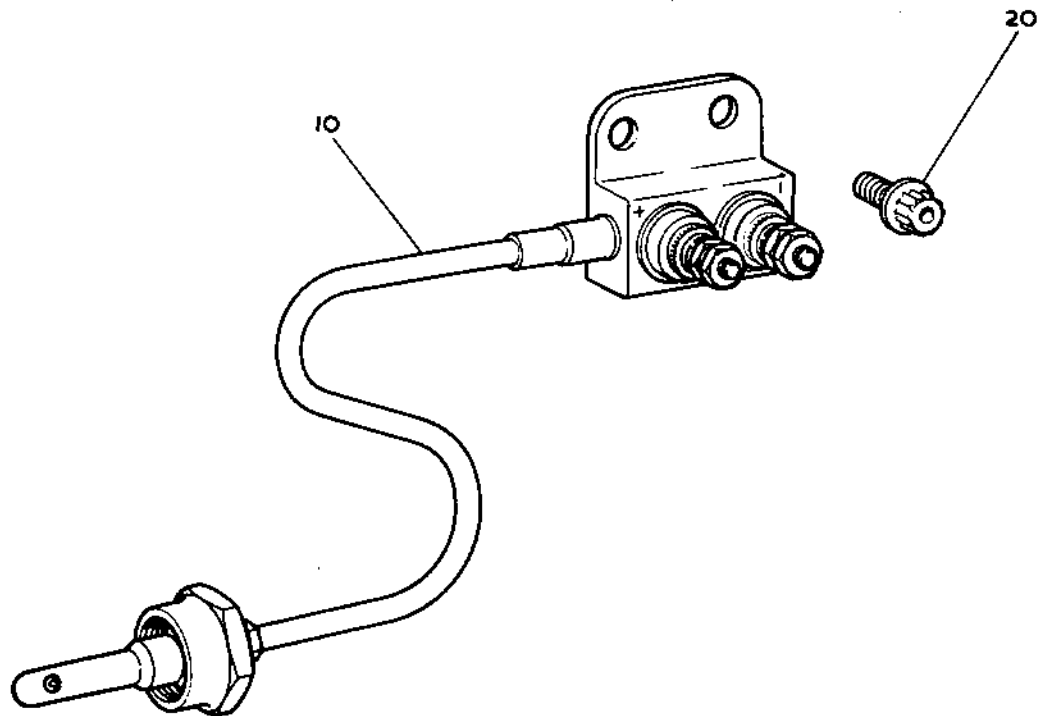
TN39941

PRINTED IN ENGLAND

CR 32488/00B



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



TN39942

Turbine Bearing Cold Vent Thermocouple  
Lead-out and Junction Box  
Figure 306

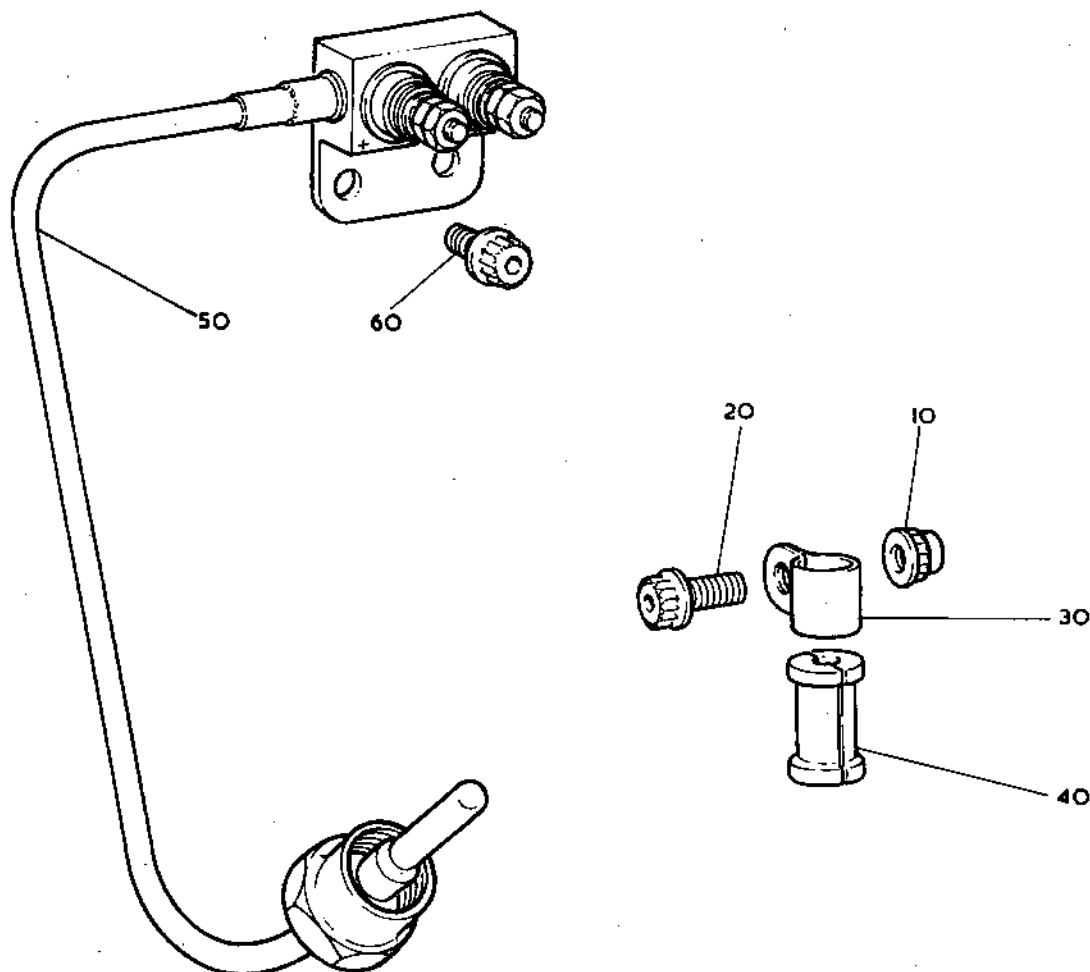
INSPECTION/CHECK

**77-20-00**

Page 311  
Aug 1/76



**OLYMPUS 593**  
MK. 610-14-28  
OVERHAUL



LP Turbine Bearing Hot Vent Thermocouple  
Lead-out and Junction Box  
Figure 307

INSPECTION/CHECK

**77-20-00**

Page 312  
Aug 1/76

IN39943



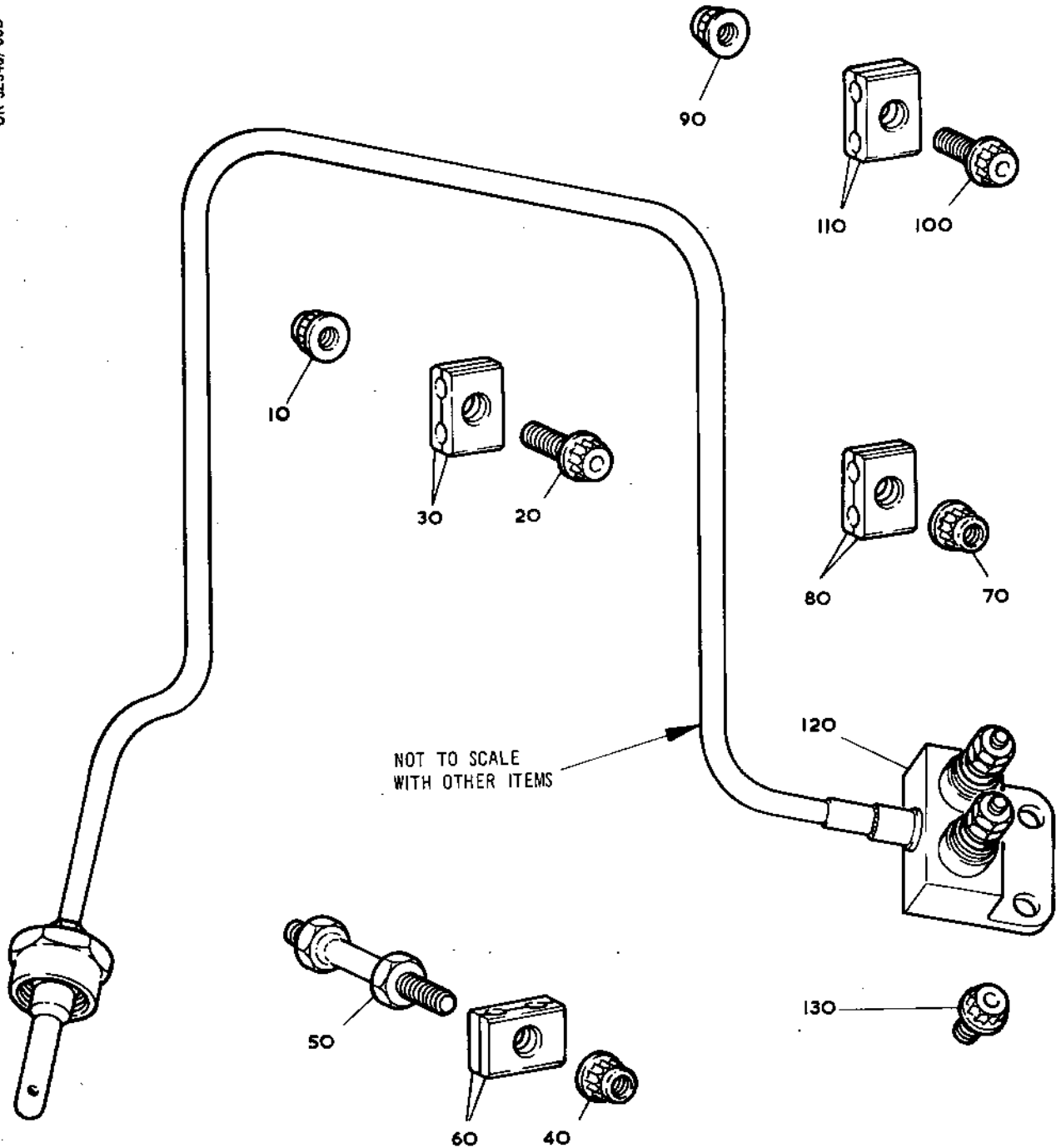
OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 32348/00B

PRINTED IN ENGLAND

TN39944



Intermediate Case Bearings Cold Vent  
Thermocouple Lead-out and Junction Box  
Figure 308

INSPECTION/CHECK

77-20-00

Page 313  
Aug 1/76

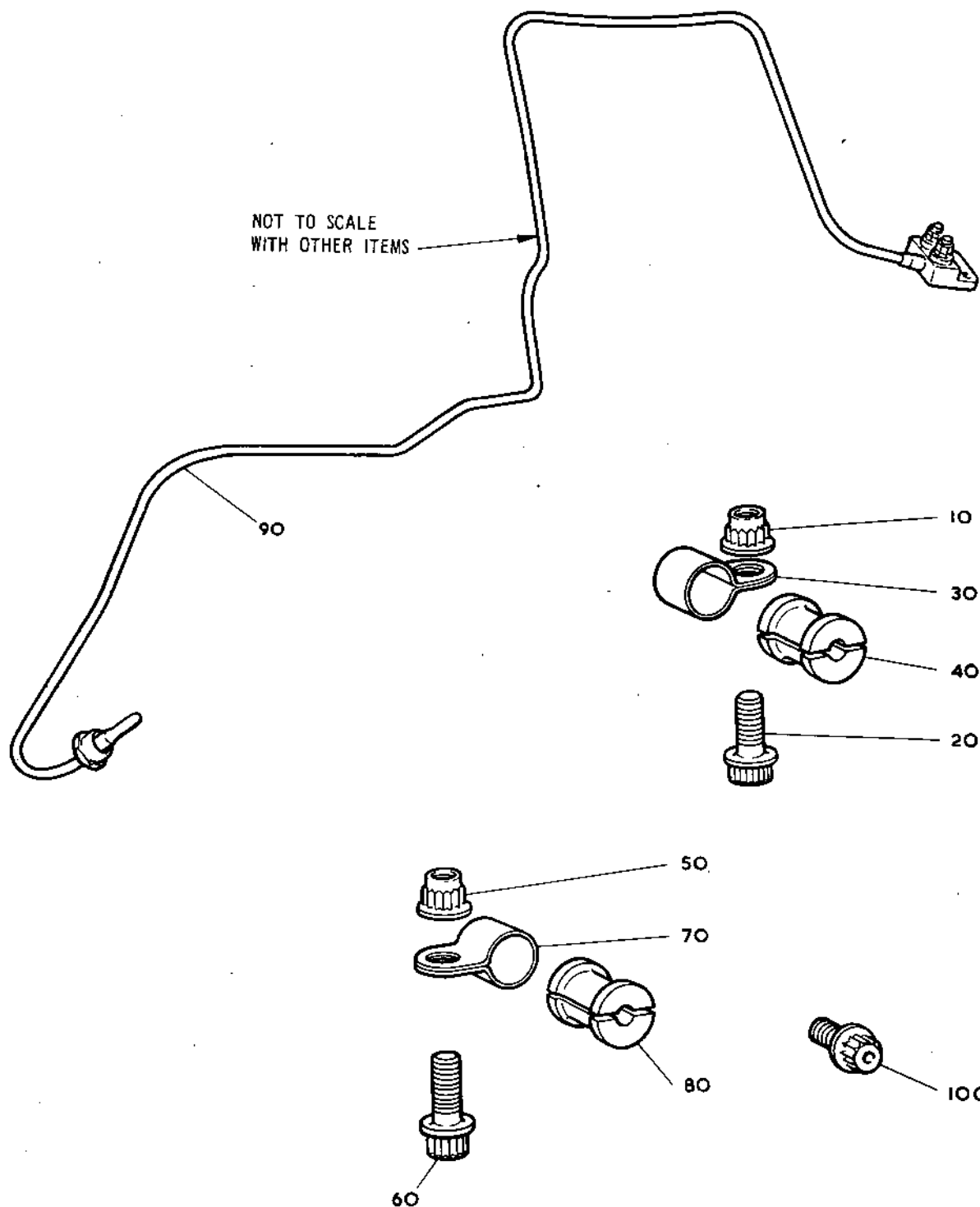


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32347/008



TN39946

HP Compressor Rear Labyrinth Seal Thermocouple  
Lead-out and Junction Box  
Figure 309

INSPECTION/CHECK

77-20-00

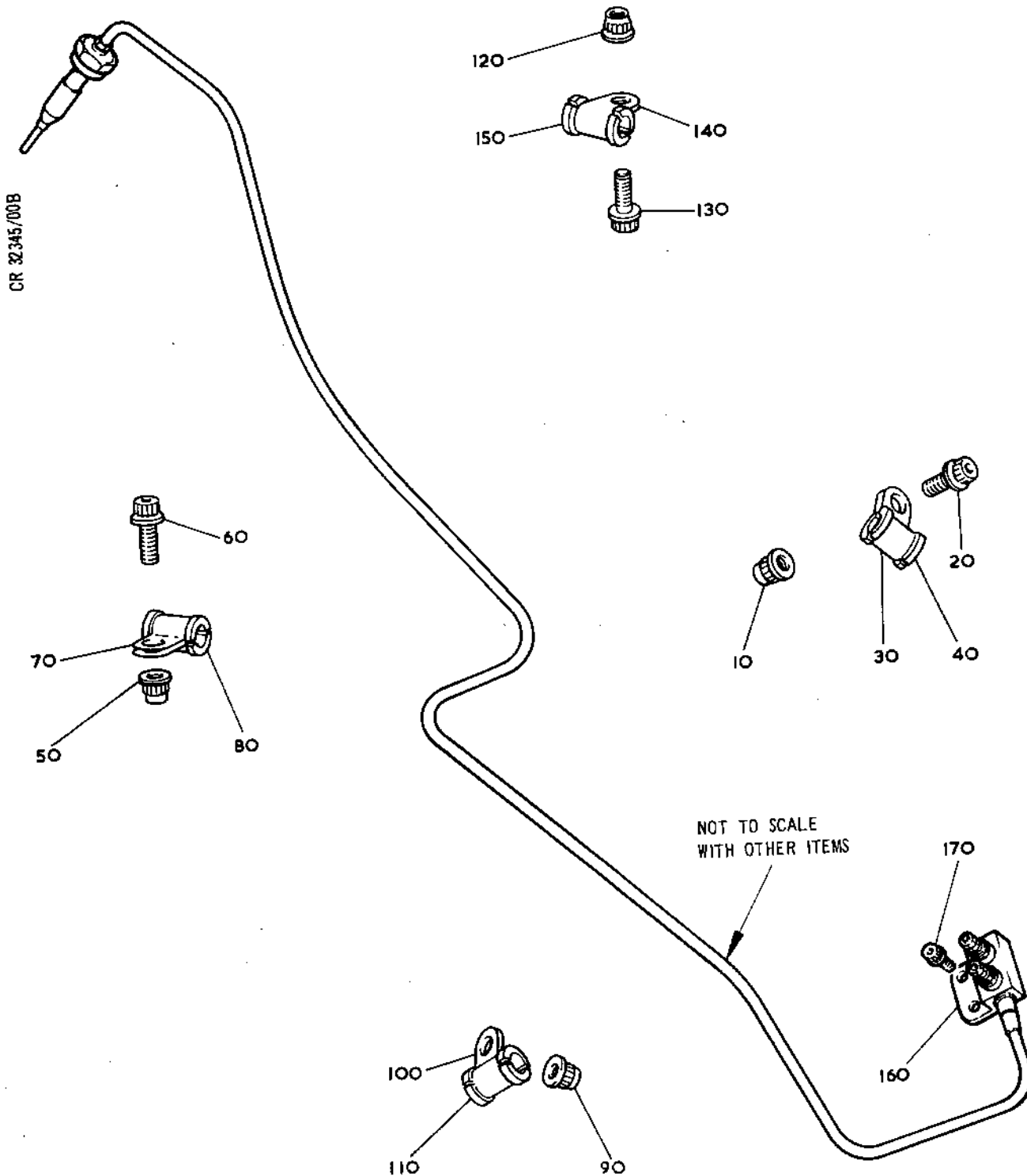
Page 314

Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



HP Compressor Delivery Air Thermocouple  
Figure 311

INSPECTION/CHECK

**77-20-00**

Page 316  
Aug 1/76

TN39948

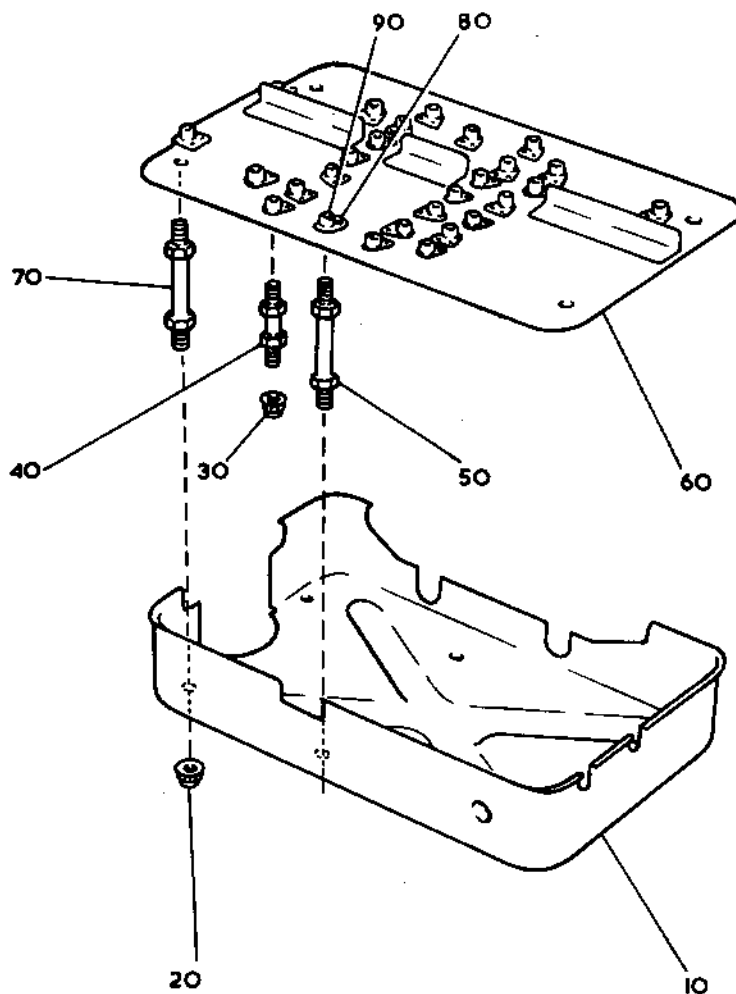


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CR 32346/00B



Engine Thermocouple Termination Junction Box  
Figure 310

INSPECTION/CHECK

**77-20-00**

Page 315  
Aug 1/76





OLYMPUS 593

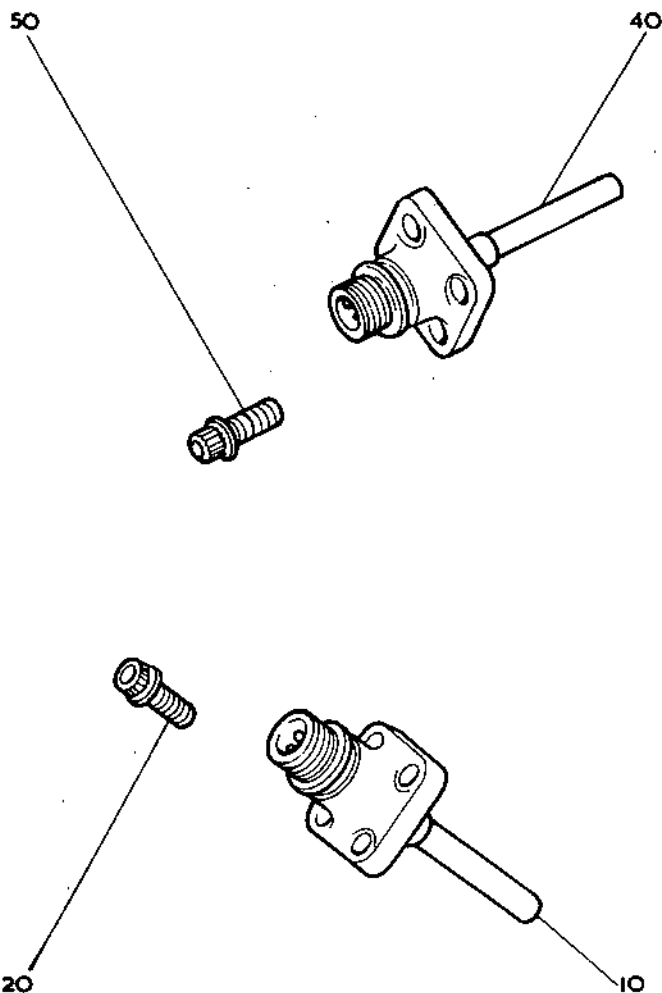
MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

CR 32344/00B



TN39991

Oil Inlet and Outlet Thermometers  
Figure 312

INSPECTION/CHECK

**77-20-00**

Page 317

Aug 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



## JET PIPE THERMOCOUPLES - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

PRINTED IN ENGLAND

TN31721



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except 10 Thermocouple harness assembly		A or B	-	-
			B	-	For cleaning details refer to vendors overhaul manual
202	ALL		A or B	-	-

Cleaning Processes  
Table 201

FN31722

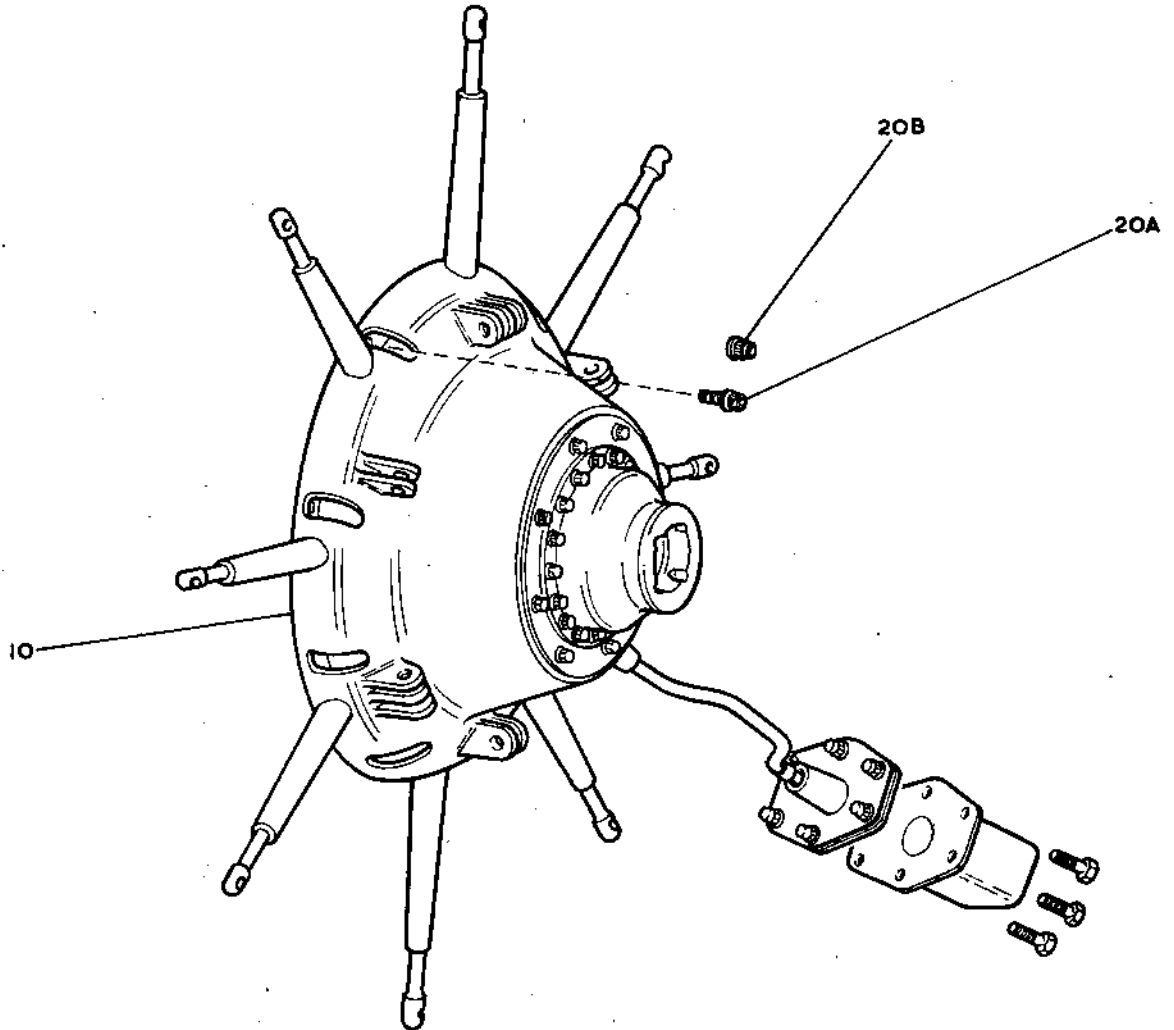


OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32487/00B

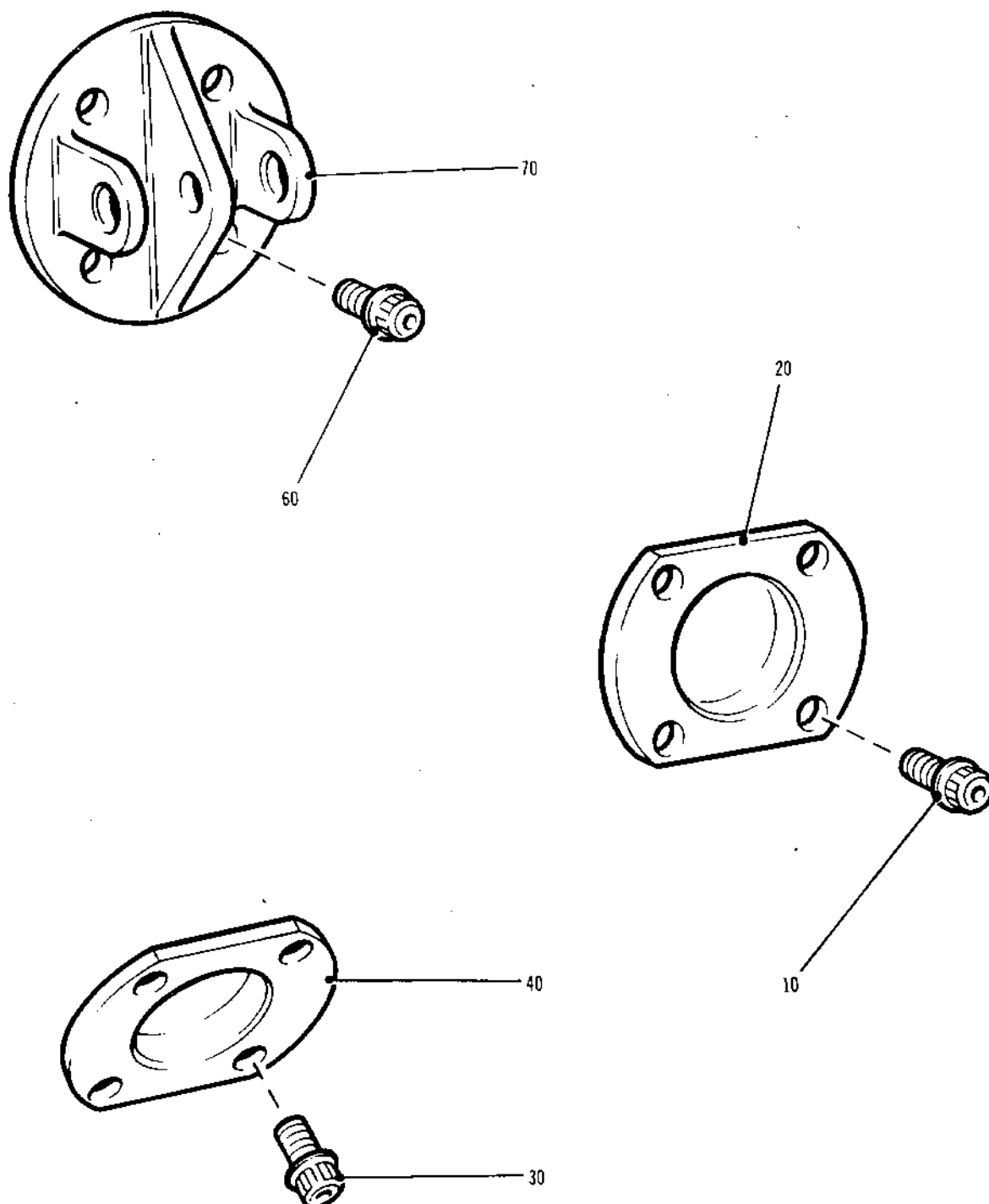


TN31724

Thermocouples - Jet Pipe  
Figure 201



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



TN27232

Jet Pipe Thermocouples - Blanking Covers  
Figure 202

CLEANING  
**77-21-02**  
Page 204  
Jan 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



THERMOCOUPLE LEADS, TURBINE COOLING AIR - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

77-22-03

Page 201

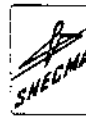
Jan 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except		A or B	-	-
	140	Lead out assembly and junction box	B	-	For cleaning details refer to vendors
	290	Lead out and junc- tion box	B	-	overhaul manuals

Cleaning Processes  
Table 201

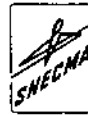
TN3774



OLYMPUS 593

MK.610-14-28

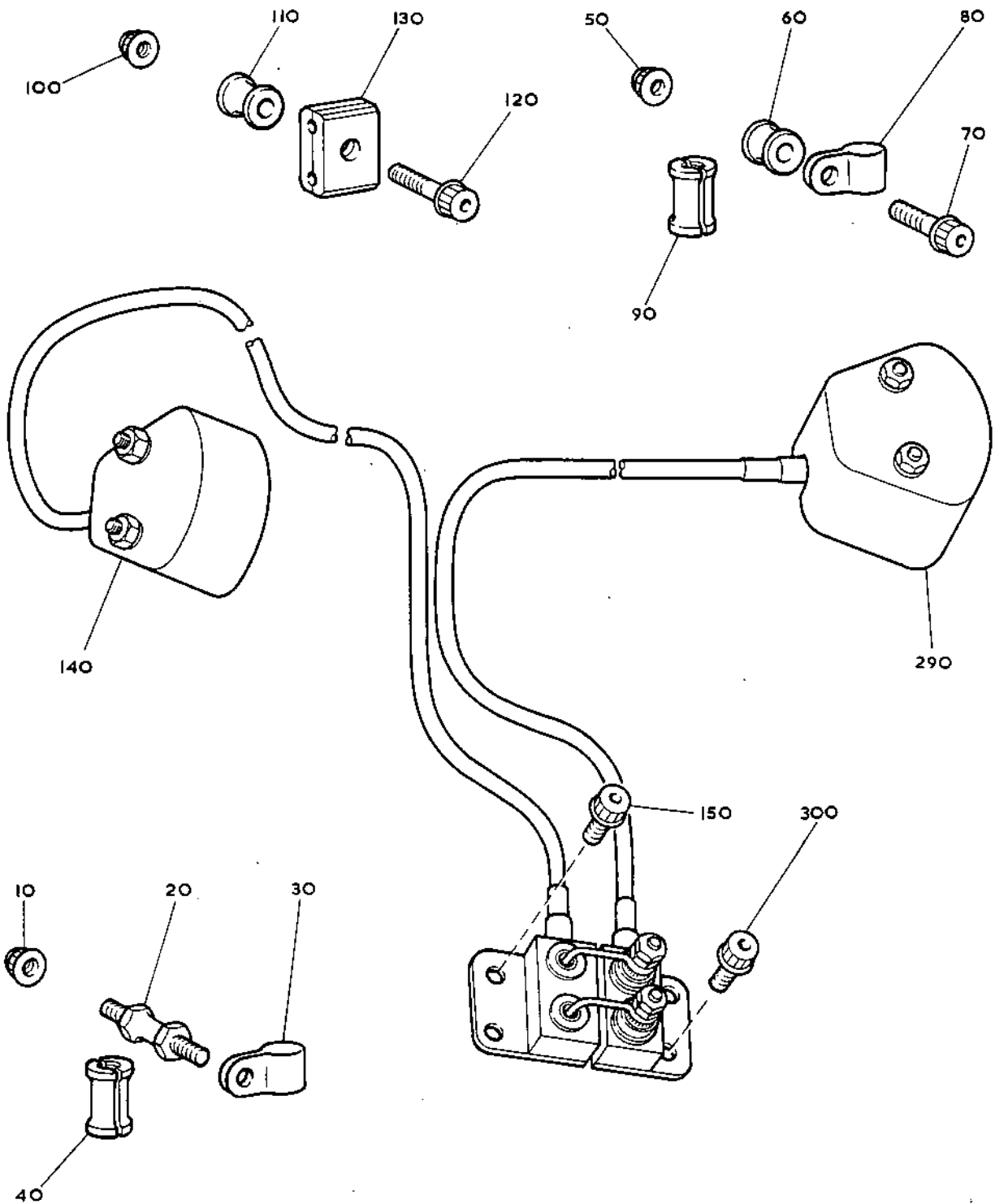
OVERHAUL



CR 32349/00C

PRINTED IN ENGLAND

TN3776



Leads, Thermocouple, Turbine Cooling Air  
Figure 201

CLEANING  
**77-22-03**

Page 203

Dec 1/81





OLYMPUS 593

MK.610-14-28  
OVERHAUL



THERMOCOUPLE, LP AND HP TURBINE BEARINGS, COLD VENT - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

PRINTED IN ENGLAND

TN27102

CLEANING  
**77-22-04**

Page 201  
Jan 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	10	Lead out, thermo- couple and junction box	B	-	For cleaning details refer to Vendors Overhaul Manual
	20	Bolt	A or B	-	-

Cleaning Processes  
Table 201

TN27103



OLYMPUS 593

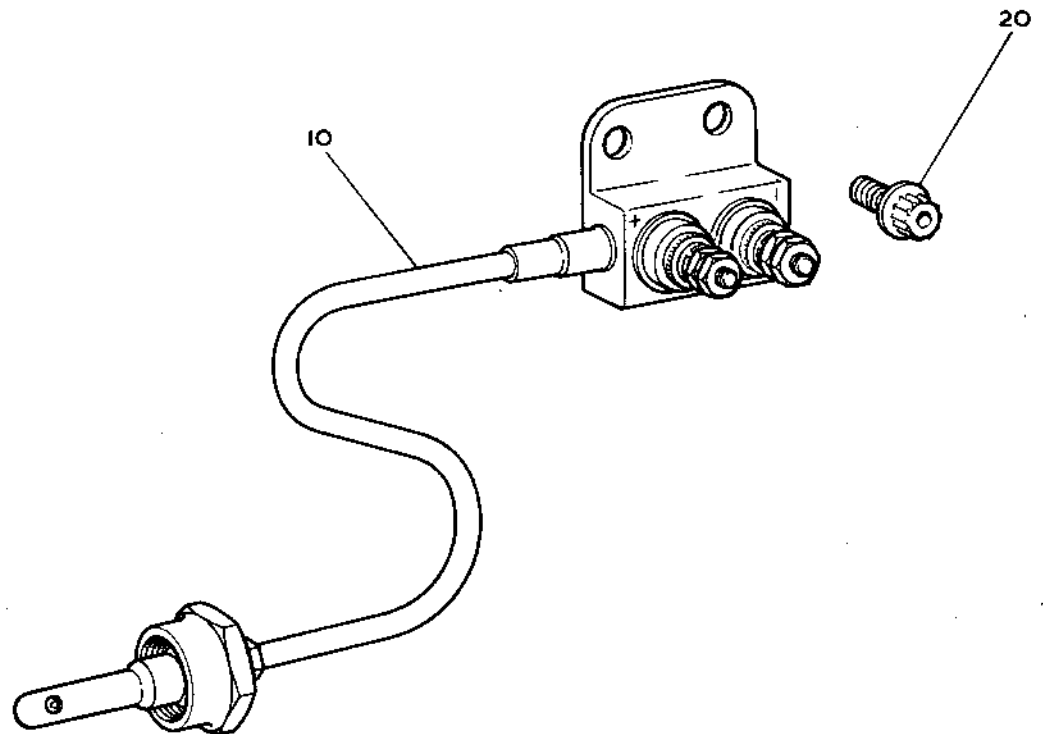
MK.610-14-28

OVERHAUL



PRINTED IN ENGLAND

CR 32488/00B



TN27438

Thermocouple LP and HP Turbine Bearing Vent  
Figure 201



OLYMPUS 593

MK.610-14-28  
OVERHAUL



THERMOCOUPLE, LP TURBINE BEARING, HOT VENT - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

PRINTED IN ENGLAND

TN45843



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except 50	Thermocouple lead-out and junction box	A or B	-	-
			B	-	For cleaning details refer to vendors overhaul manual

Cleaning Processes  
Table 201

TN45844



OLYMPUS 593

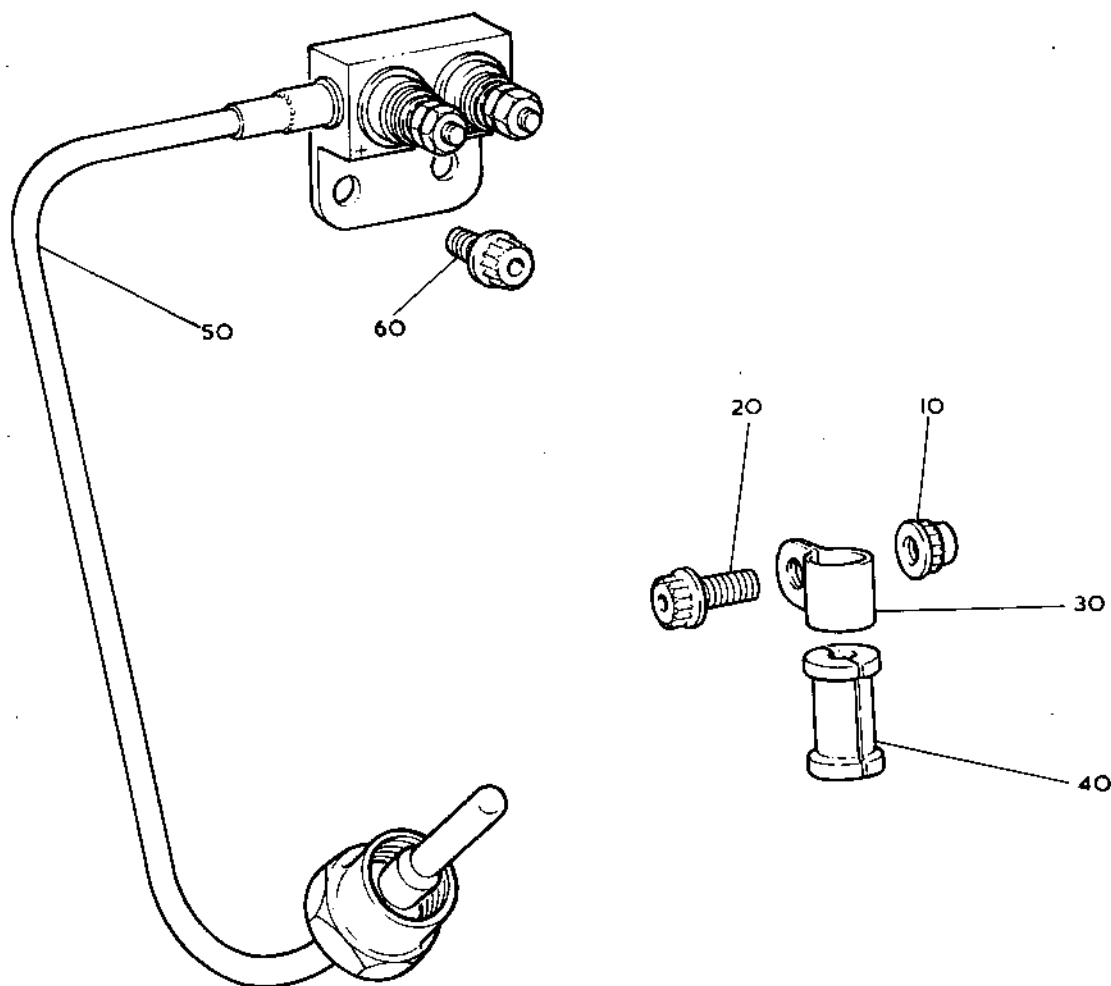
MK. 610-14-28

OVERHAUL



PRINTED IN ENGLAND

CR 32489/00B



TN45846

Thermocouple Lead-out and Junction Box,  
LP Turbine Bearing, Hot Vent  
Figure 201



OLYMPUS 593

MK.610-14-28

OVERHAUL



THERMOCOUPLE, INTERMEDIATE CASE BEARINGS, COLD VENTS - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

77-22-06

Page 201

Jan 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except 120	Thermocouple lead-out and junction box	A or B	-	-
			B	-	For cleaning details refer to vendors overhaul manual

Cleaning Processes  
Table 201

TN31782





OLYMPUS 593

MK.610-14-28

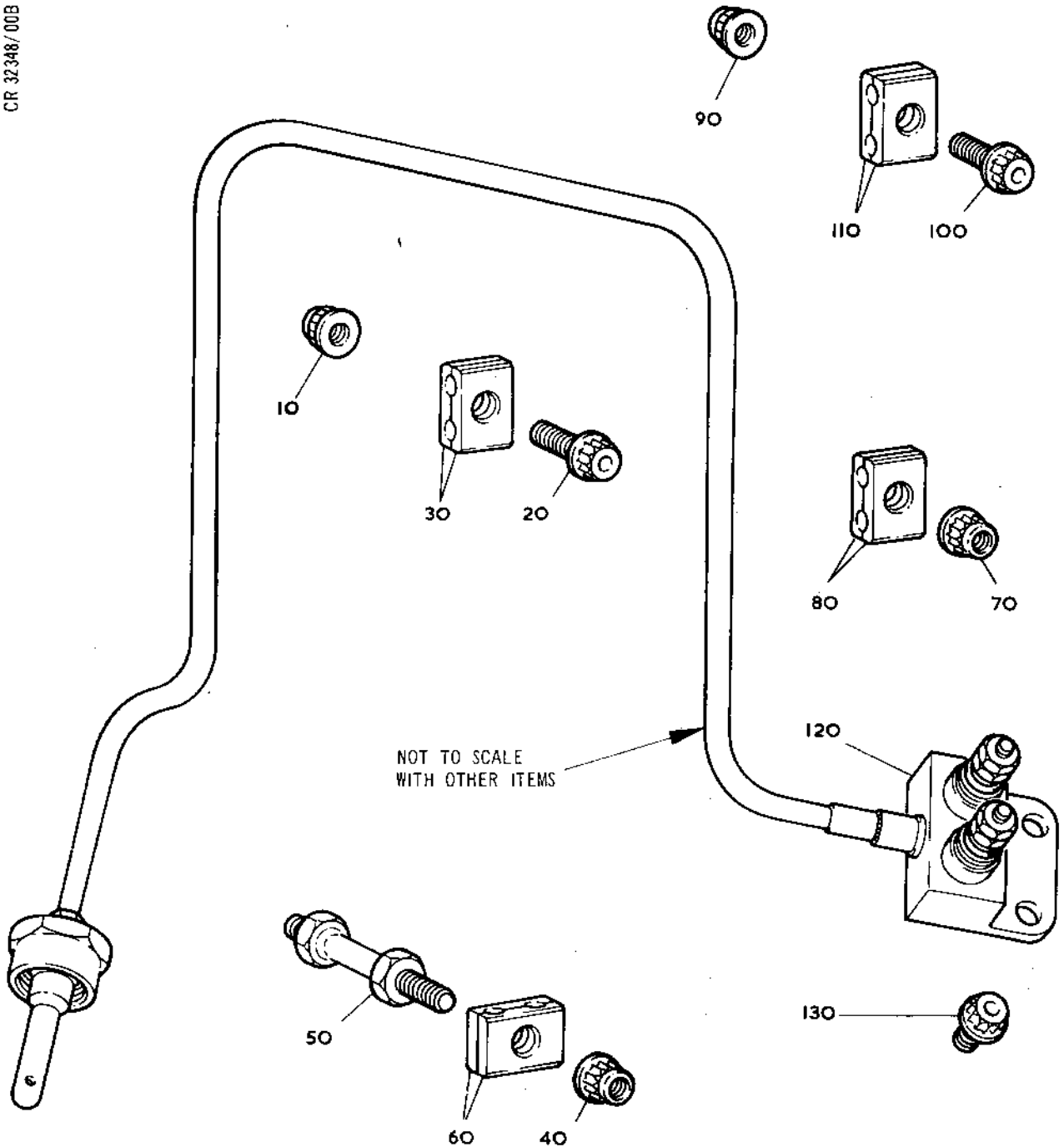
OVERHAUL



CR 32348/00B

PRINTED IN ENGLAND

TN31784



Thermocouple Lead-out and Junction Box,  
Intermediate Case Bearings, Cold Vent  
Figure 201

CLEANING

77-22-06

Page 203

Aug 28/75



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



THERMOCOUPLE, HP COMPRESSOR REAR LABYRINTH SEAL,  
HOT VENTS - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

77-22-07

Page 201

Jan 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except 90	Thermocouple lead-out and junction box	A or B B	- -	- For cleaning details refer to vendors overhaul manual

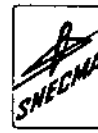
Cleaning Processes  
Table 201

FN31786

CLEANING  
77-22-07  
Page 202  
Jan 1/77

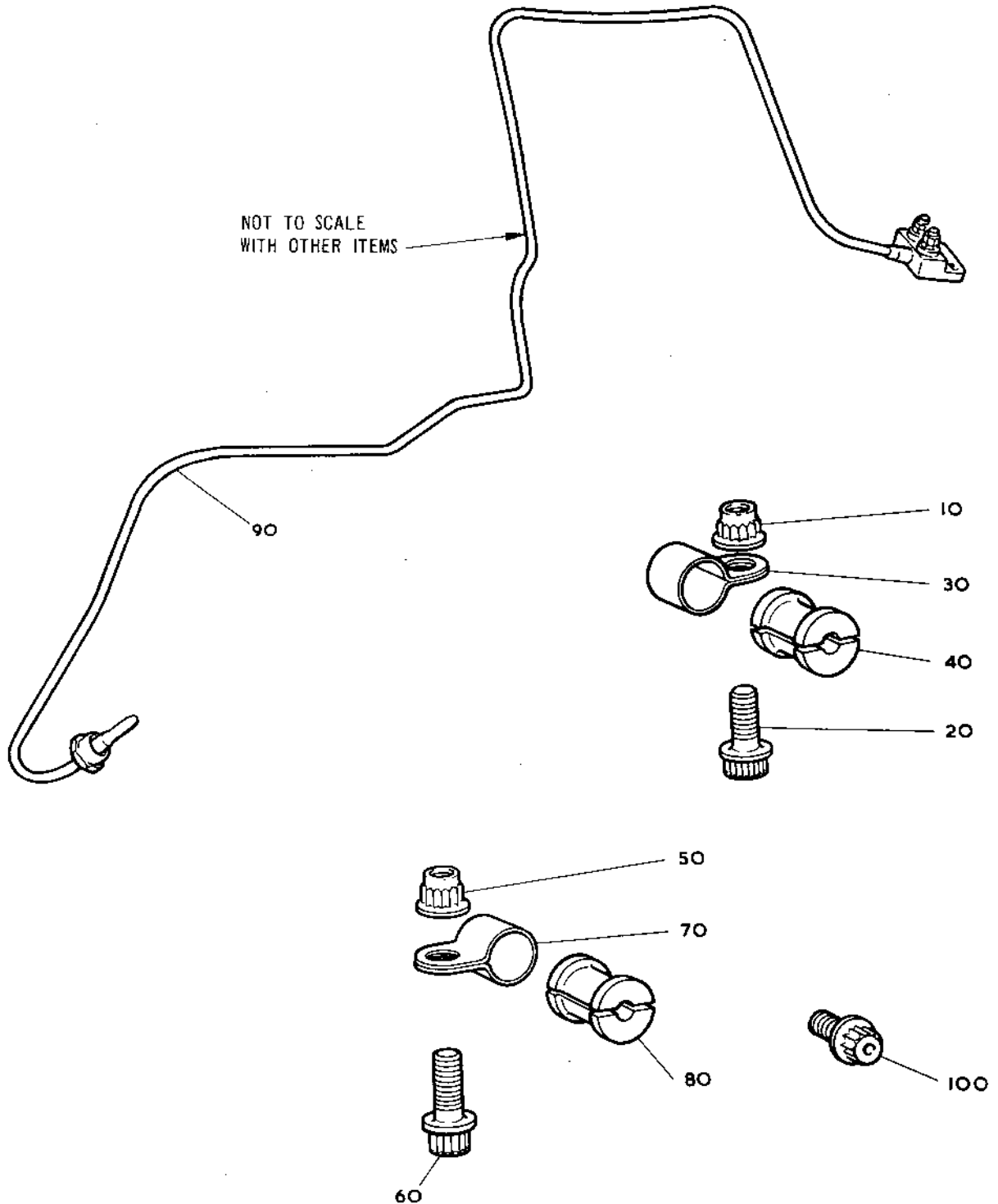


OLYMPUS 593  
MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32347/00B



Thermocouple Lead-out and Junction Box,  
HP Compressor Rear Labyrinth Seal, Hot Vent  
Figure 201

TN31788

CLEANING  
**77-22-07**  
Page 203  
Aug 28/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## JUNCTION BOX, ENGINE THERMOCOUPLE TERMINATION - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

77-22-08

Page 201

Jan 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		B	-	-

Cleaning Processes  
Table 201

TN31790



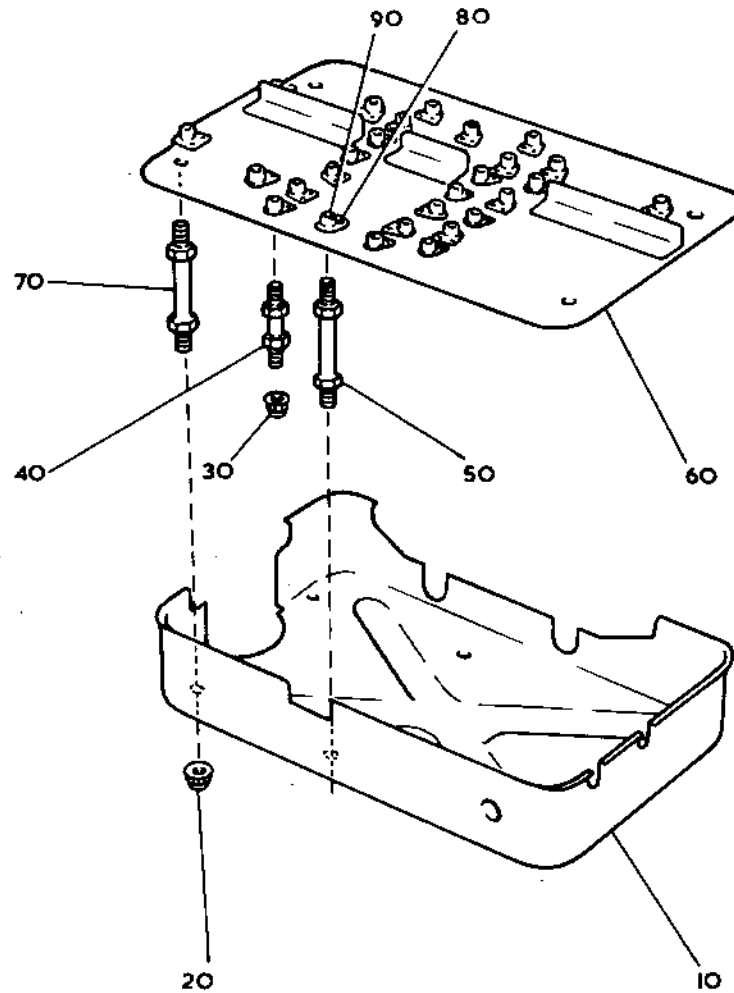
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32346/00B



TN31792

Junction Box, Engine Thermocouple Termination  
Figure 201

CLEANING  
**77-22-08**

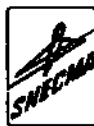
Page 203  
Aug 28/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



THERMOCOUPLE HP COMPRESSOR DELIVERY AIR - CASING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

PRINTED IN ENGLAND

TN45847

CLEANING

77-22-09

Page 201

Jan 1/77





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except 160	Thermocouple, lead out and junction box	A or B B	- -	- For cleaning details refer to vendors overhaul manual

Cleaning Processes  
Table 201

TN45848

PRINTED IN ENGLAND

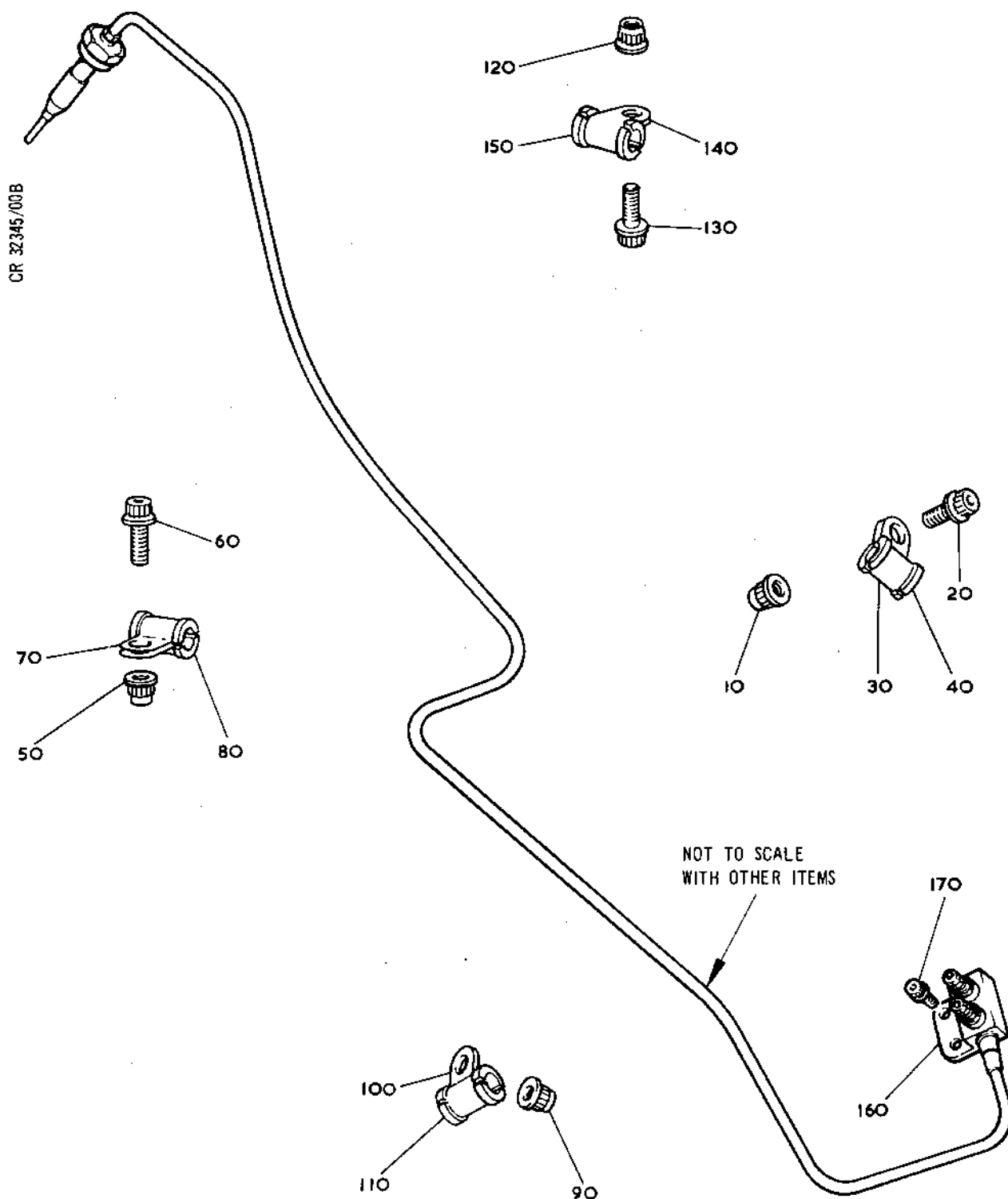
TN31878



OLYMPUS 593

MK.610-14-28

OVERHAUL



Thermocouple, HP Compressor Air Delivery  
Figure 201

CLEANING

77-22-09

Page 203

Aug 28/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



THERMOMETERS, OIL INLET AND OUTLET - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

77-23-02

Page 201

Jan 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL		A or B	-	-
	except				
	10	Thermometer, oil inlet	B	-	For cleaning details refer to vendors
	40	Thermometer, oil outlet	B	-	overhaul manual

Cleaning Processes  
Table 201

TN4893

CLEANING  
77-23-02  
Page 202  
Jan 1/77



OLYMPUS 593

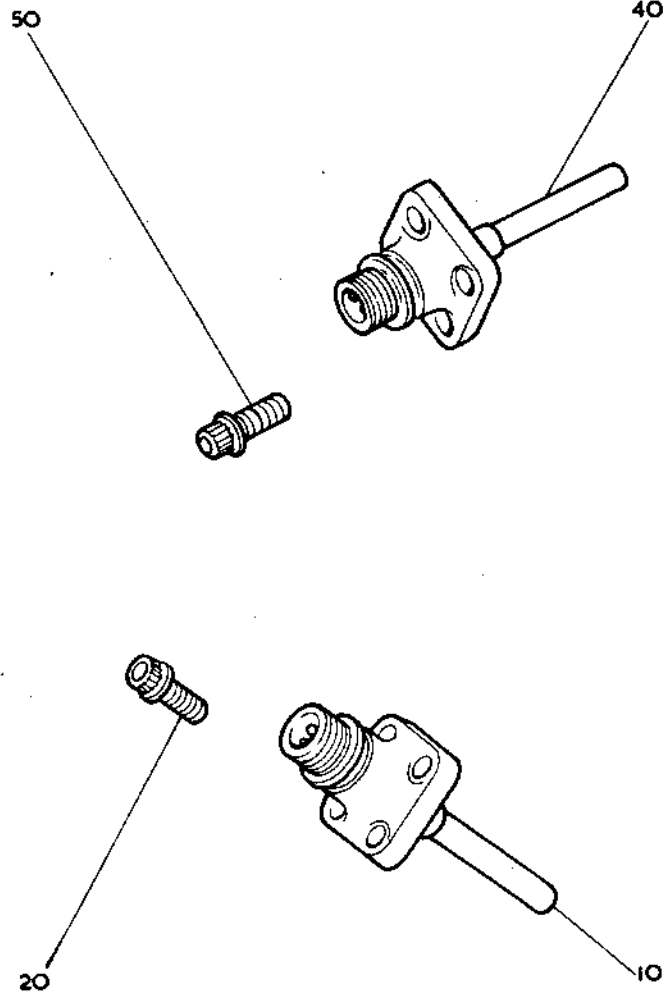
MK.610-14-28

OVERHAUL



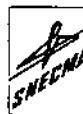
PRINTED IN ENGLAND

CR 32344/00B



TN4895

Thermometers, Oil Inlet and Outlet  
Figure 201

**OLYMPUS 593**MK.610-14-28  
OVERHAULENGINE VIBRATION INDICATION - INSPECTION/CHECKTABLE OF CONTENTS

Para.	Page
1. General	301
2. General Inspection	301
3. Crack Detection	302
A. Magnetic Particle Crack Detection	302
B. Fluorescent Dye Crack Detection	302
4. Engine Vibration Transducer Cable	304
5. Bracket	304
A. Inspect Bracket	304
6. Inner and Outer Glands	305
A. Inspect Glands	305
7. Engine Vibration Transducer	305
A. Inspect Threads	305
B. Inspect Vibration Transducer	305
C. Inspect Contact Pins	306
D. Inspect Insulator	306
E. Carry Out Insulation Checks	306
F. Carry Out Rig Test	306

TABLE OF ILLUSTRATIONS

Fig.No.	Page
301 Crack Detection Test Diagram	303
302 Engine Vibration Transducer Cable	307
303 Engine Vibration Transducer	308

LIST OF TABLES

Table No.	Page
301 Items to be Magnetic Particle Crack Tested	302
302 Items to be Fluorescent Dye Crack Tested	302
303 Cross References to Illustrated Parts Catalogue	304

INSPECTION/CHECK

**77-30-00**

Contents

Jun 1/86



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



## ENGINE VIBRATION INDICATION - INSPECTION/CHECK

### 1. General

- A. Each item in this chapter is given a two-part identification; thus, 302-20 refers to Figure 302 and to Item 20 called out on that figure. Each item may be further identified by its Part Number by the use of Table 303, which cross-refers figures in this chapter to the equivalent chapter and figure in the Illustrated Parts Catalogue (I.P.C.); the called-out item number will be the same on both figures.
- B. All items which will be crack tested are listed in Tables 301 and 302.
- C. Dimensional checks are cross referenced to the equivalent Fits and Clearances Schedule (F.C.S.) chapter against the item concerned.
- D. When the inspection of an item discloses a minor defect that requires rectification, it is defined as 'Accept after repair'. On all such occasions the item must be rectified in accordance with Standard Practices 72-09-22 Repair. Where a Ref.No. follows 'Accept after repair' e.g. (Ref.72-21-01 Repair No.1), a specific Repair Scheme is available to which the item must be rectified. Items that are rejected, or for which a repair scheme is not currently available, should be held at the discretion of the operator, as service experience may prove the need for a repair.
- E. On completion of a repair, rectification or test, the item(s) must be inspected, to ensure that the necessary work has been satisfactorily completed.

### 2. General Inspection

- A. Inspect all items illustrated in this chapter, whether specified or not, in accordance with Standard Practices (Ref.72-09-00 Inspection/Check). In addition, carry out the inspections detailed for the specified items, from para.4 onwards.
- B. Inspection terms used in this chapter are explained in Standard Practices (Ref.72-09-00 Inspection/Check).

INSPECTION/CHECK

**77-30-00**

Page 301  
Apr 1/77



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



### 3. Crack Detection

#### A. Magnetic Particle Crack Detection.

- (1) Submit the items listed in Table 301 to crack detection in accordance with the process quoted.
- (2) Items to be crack detected by this method are illustrated in the Crack Detection Test Diagram (Fig.301). For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

No current requirement

Items to be Magnetic Particle Crack Tested  
Table 301

#### B. Fluorescent Dye Crack Detection.

- (1) Submit the items listed in Table 302 to crack detection in accordance with the process quoted. For details of the processes, refer to 72-09-00 Inspection/Check.

FIG.NO.	ITEM NO.	DESCRIPTION	PROCESS
---------	----------	-------------	---------

No current requirement

Items to be Fluorescent Dye Crack Tested  
Table 302

TN5693

INSPECTION/CHECK

**77-30-00**

Page 302

Aug 1/76





OLYMPUS 593

MK. 610-14-28  
OVERHAUL



No current requirement

Crack Detection Test Diagram  
Figure 301

INSPECTION/CHECK

**77-30-00**

Page 303

Aug 1/76

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



FIG.NO.

ILLUSTRATED PARTS CATALOGUE EQUIVALENT

301	Not applicable	
302	77-33-01	Fig.1
303	77-33-02	Fig.1

Cross References to Illustrated Parts Catalogue  
Table 303

4. Engine Vibration Transducer Cable (302-200)

NOTE: This cable must be severed during removal and is renewed during assembly (Ref.77-33-01, Assembly).

5. Bracket (302-90)

A. Inspect Bracket.

(1) Wear and fretting.

- |  |                      |
|--|----------------------|
| (a) Attachment face thickness reduced by not more than 5 per cent. | Accept.              |
| (b) Bolt-holes elongated not more than 0.030 in. (0,760 mm).       | Accept after repair. |

(2) Scoring.

- |  |  |
|--|--|
| (a) Not more than 0.010 in. (0,250 mm) in depth. | Accept after repair providing material thickness is not reduced by more than 5 per cent. |
|--|--|

INSPECTION/CHECK

**77-30-00**Page 304  
Jun 1/86



OLYMPUS 598

MK.610-14-28  
OVERHAUL



(3) Nicks and burrs.

Accept after  
repair.

(4) Distortion.

Accept if compat-  
ibility is  
preserved.

6. Inner and Outer Glands (302-100/110)

A. Inspect Glands.

(1) Compatibility. Assemble gland with bracket (302-90);  
secure temporarily.

(a) Cable holes misaligned.

Reject.

(2) Nicks and burrs.

Accept after  
repair.

7. Engine Vibration Transducer (303-10)

A. Inspect Threads (Ref.72-09-00 Inspection/Check).

B. Inspect Vibration Transducer.

(1) Wear.

(a) Bolt holes elongated  
not more than 0.030 in.  
(0,760 mm).

Accept after  
repair.

(2) Nicks and burrs.

Accept after  
repair.

(3) Flatness.

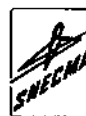
(a) Mounting surface flat.

Accept.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



C. Inspect Contact Pins.

(1) Damage.

(a) Any damaged or bent pins. Reject.

(2) Wear.

(a) Slight witness mark. Accept.

D. Inspect Insulator.

(1) Cracks.

(a) Any cracks or chipping around connector pins. Reject.

E. Carry Out Insulation Checks.

NOTE: Using a 50 V insulation tester, measure the insulation resistance between the transducer body and each pin and measure the insulation resistance across the pins.

(1) Resistance.

(a) Not less than 20 megohms. Accept.

F. Carry Out Rig Test (Ref.77-33-02 Testing).

INSPECTION/CHECK

77-30-00

Page 306  
Jun 1/86



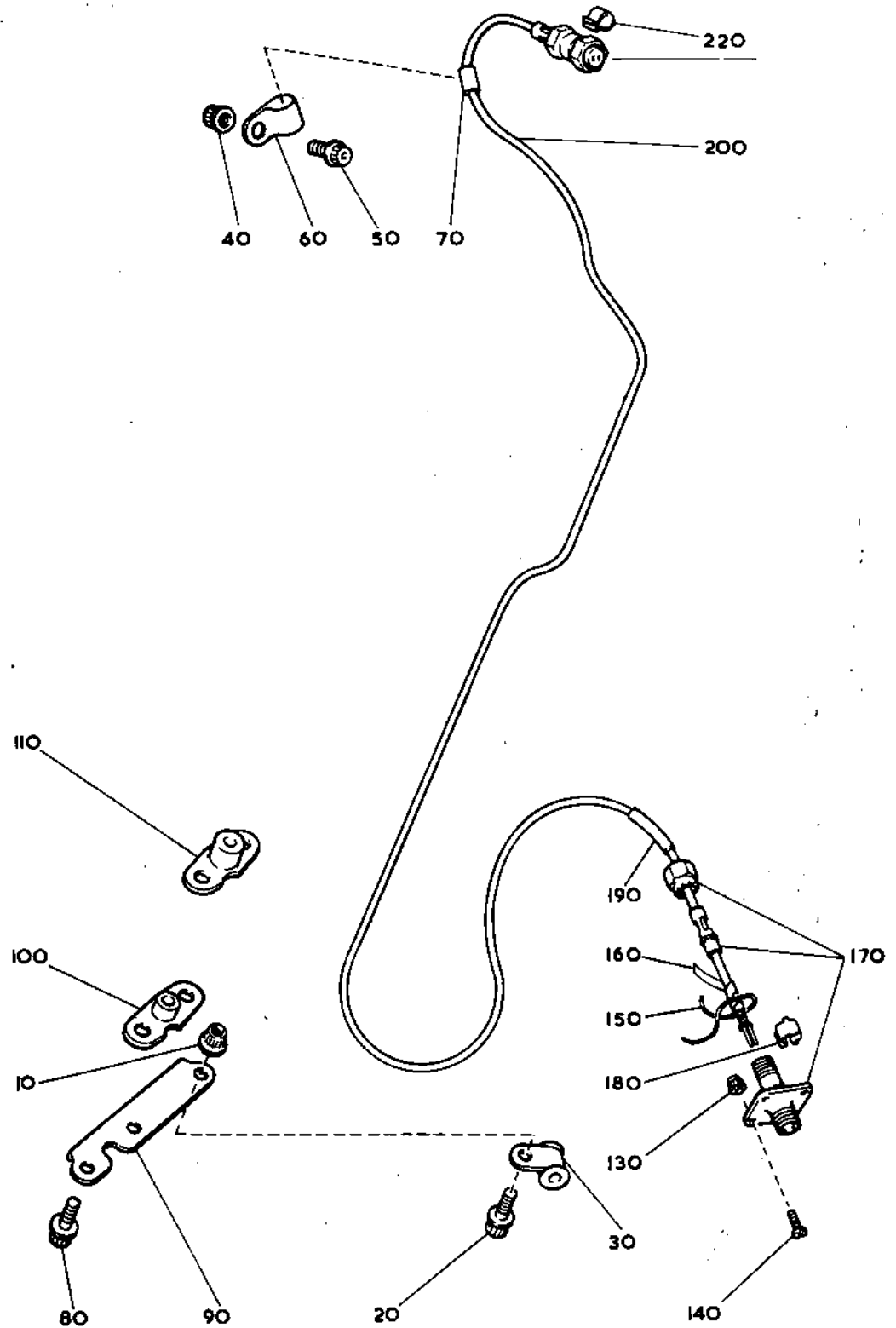
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 32528/008



Engine Vibration Transducer Cable  
Figure 302

INSPECTION/CHECK

77-30-00

Page 307

Aug 1/76

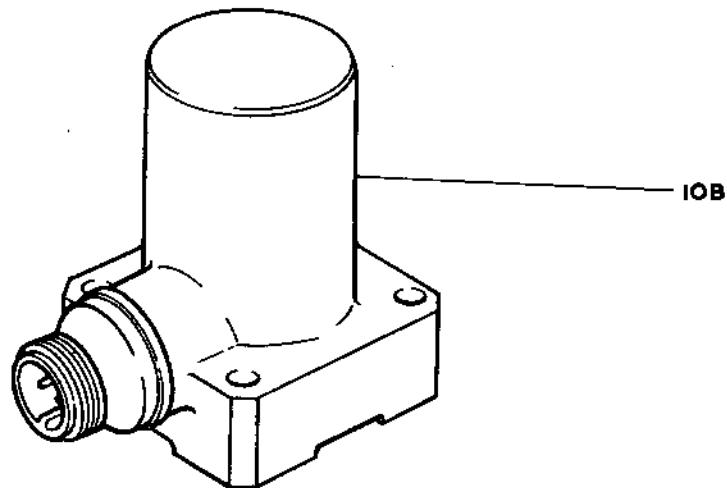
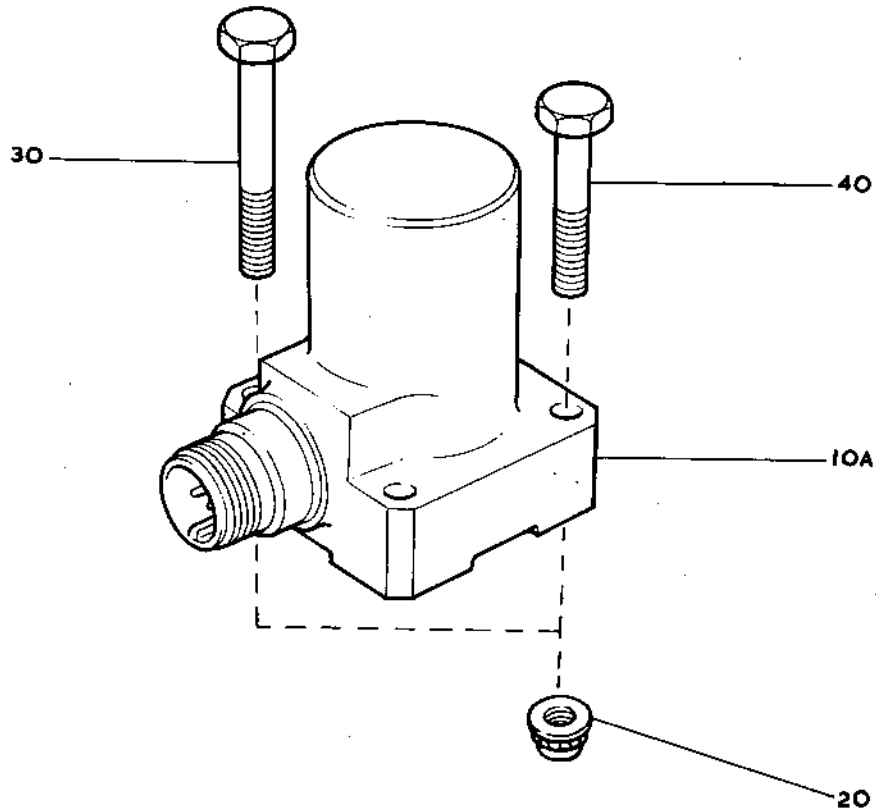


OLYMPUS 593

MK.610-14-28  
OVERHAUL;



CR 32343/00C



TN39993

Engine Vibration Transducer  
Figure 303

INSPECTION/CHECK

**77-30-00**

Page 308

Aug 1/76

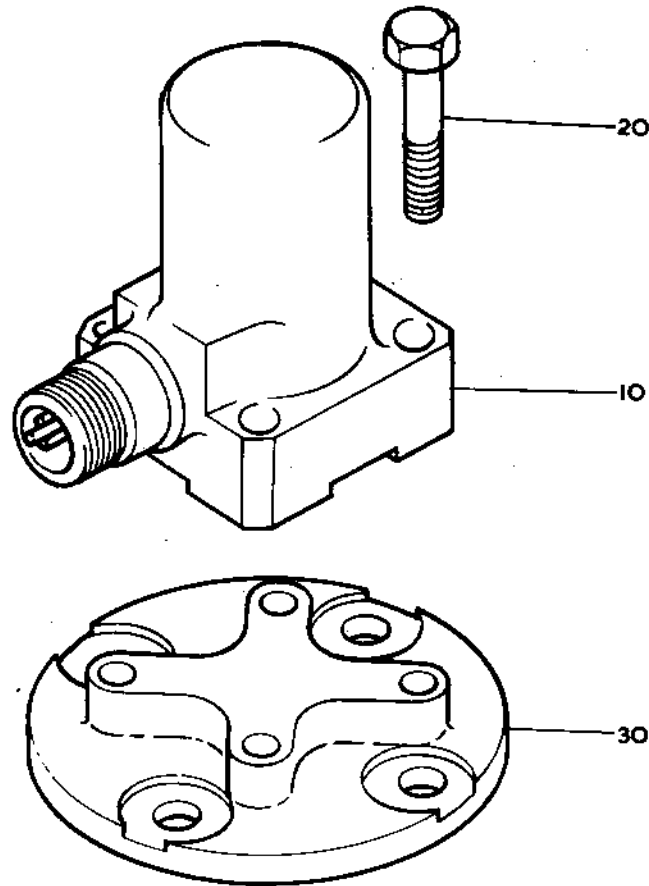
Aug 1/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



CR 33979/00A



TN43683

Spherical Flange Vibration Transducer  
Figure 305

INSPECTION/CHECK

**77-30-00**

Page 310

Aug 1/76





OLYMPUS 593

MK.610-14-28

OVERHAUL



ENGINE VIBRATION TRANSDUCER CABLE - DISASSEMBLY

TABLE OF CONTENTS

Para.	Page
1. General	101
2. Disassembly of Engine Vibration Cable (Pre SB.77-8)	101
3. Disassembly of Engine Vibration Cable (SB.77-8 and SB.71-11)	101
A. General	101
B. Disassembly of the Wall Mounting Receptacle	102
C. Disassembly of the Connector (Transducer End)	102

TABLE OF ILLUSTRATIONS

Fig.No.	Page
101 Disassembly of Wall Mounting Receptacle	103
102 Disassembly of Connector...	104

PRINTED IN ENGLAND

TN21718

**77-33-01**

Contents 1

Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



ENGINE VIBRATION TRANSDUCER CABLE - DISASSEMBLY

1. General

- A. Prior to commencing the disassembly, refer to 71-09-00 Disassembly for general information.
- B. Throughout the test special tools are quoted by their Ref.No. e.g. (Tool 1234). For a complete list of tooling required for disassembly and for the Manufacturers Part No., refer to Special Tools, Fixtures and Equipment Table 1001.
- C. This section contains the procedure for the disassembly of the engine vibration transducer cable after removal from the engine.
- D. The procedure for the removal of the transducer cable from the engine is detailed in 71-00-01.

2. Disassembly of the Engine Vibration Cable (Pre.SB.77-8)

- A. To effect removal of the engine vibration cable from the engine, the cable is cut close to the connector at the bracket end.
- B. There is no provision for the installation of a cable or connector to this standard on the engine, discard the cable and remove any serviceable parts from the connector at the transducer end (Ref. para.3.C).

3. Disassembly of the Engine Vibration Cable (SB.77-8 and SB.71-11)

A. General.

- (1) To effect removal of the engine vibration cable from the engine, the cable is cut close to the wall mounting receptacle.
- (2) The connector at the transducer end of the cable is not normally required to be disassembled from the cable providing the length of cable is sufficient to be within acceptable limits after installation on the engine (Ref.71-00-02 Assembly, para.5.).

77-33-01

Page 101  
Feb 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



B. Disassembly of the Wall Mounting Receptacle (Ref.Fig.101).

- (1) Remove the lockwire from the wall mounting receptacle.
- (2) Remove the two clamp screws and clamps.
- (3) Remove the telescopic bushes.
- (4) Unscrew and remove the plug end bell from the plug body.
- (5) Withdraw the three contacts from the plug body using the insert/extractor tool (Tool 2701).
- (6) Discard the remaining cut cable with the contacts.

C. Disassembly of the Connector (Transducer End) (Ref.Fig.102).

NOTE: Before disassembly, refer to para.3.A.(2).

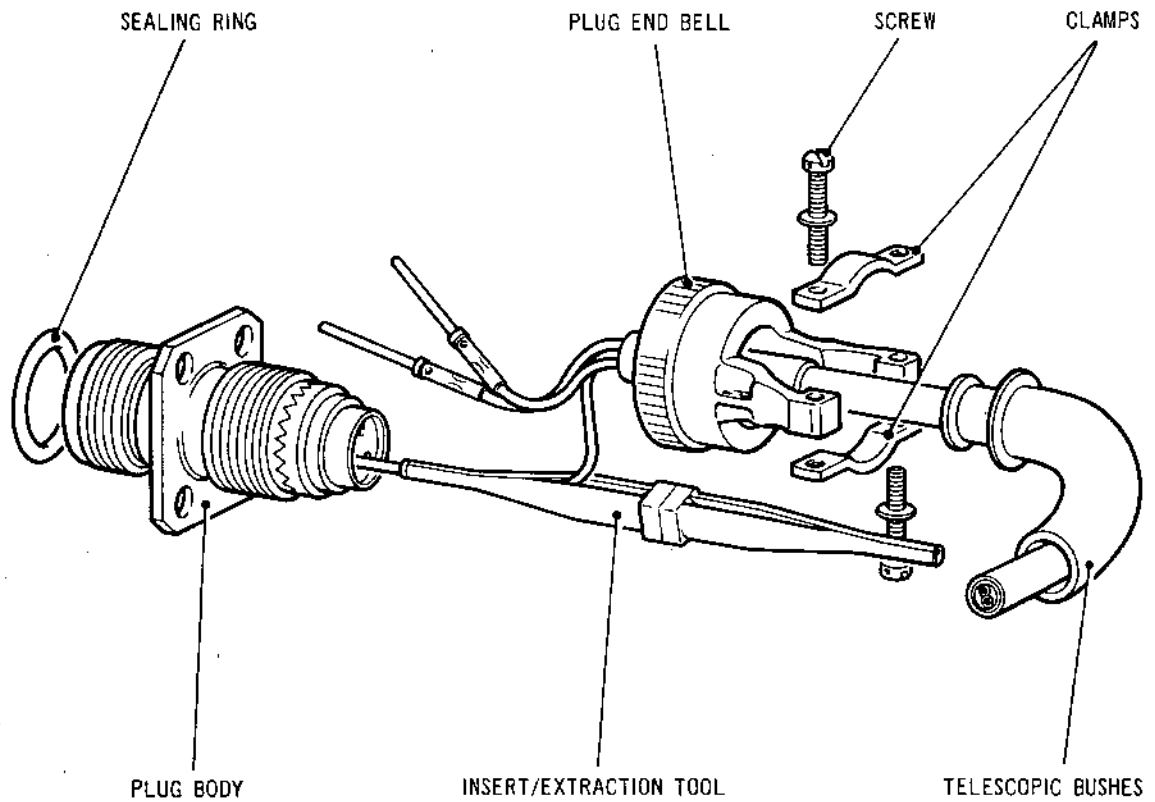
- (1) Remove and discard the sealing ring.
- (2) Remove the locking clip.
- (3) Cut and remove the whipping.
- (4) Unscrew the clamp nut and remove.
- (5) Remove the connecting nut and housing.

NOTE: Further disassembly will damage the components, if the cable is outside the limit for re-assembly to the engine, discard the cable and remaining attached components.

TN19669



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



Disassembly of Wall Mounting Receptacle  
Figure 101

77-33-01

Page 103  
Aug 1/76



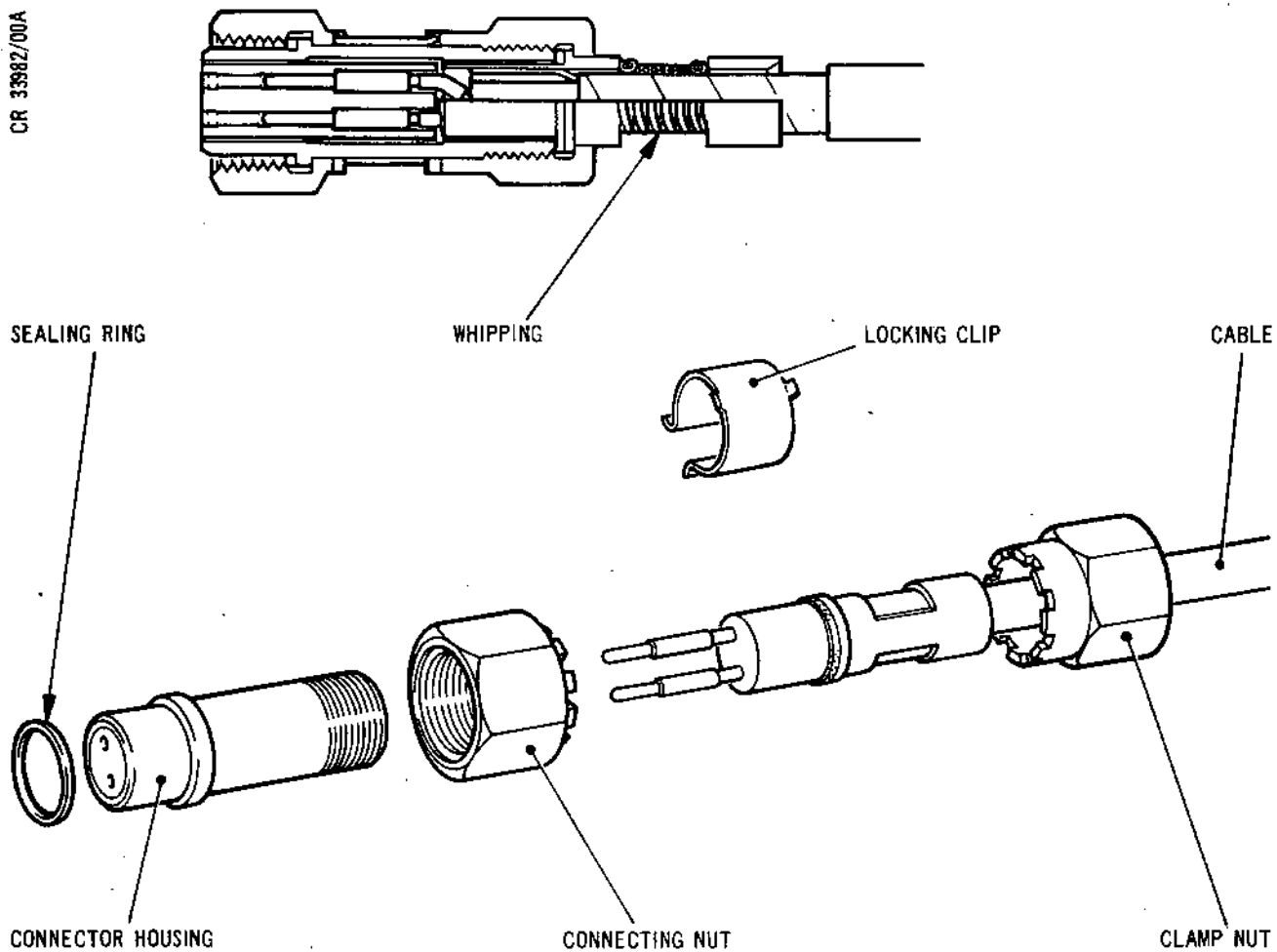
OLYMPUS 593

MK.610-14-28

OVERHAUL



CR 3392/00A



TN3586

Disassembly of Connector  
Figure 102

77-33-01

Page 104  
Aug 1/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



## ENGINE VIBRATION TRANSDUCER CABLE - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

PRINTED IN ENGLAND

TN611

CLEANING

77-33-01

Page 201

Jan 1/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except		A or B	-	-
	170	Connector	-	-	Wipe clean using a
	180	Clip, locking	-	-	clean, dry, lint-
	200	Cable assembly	-	-	free cloth

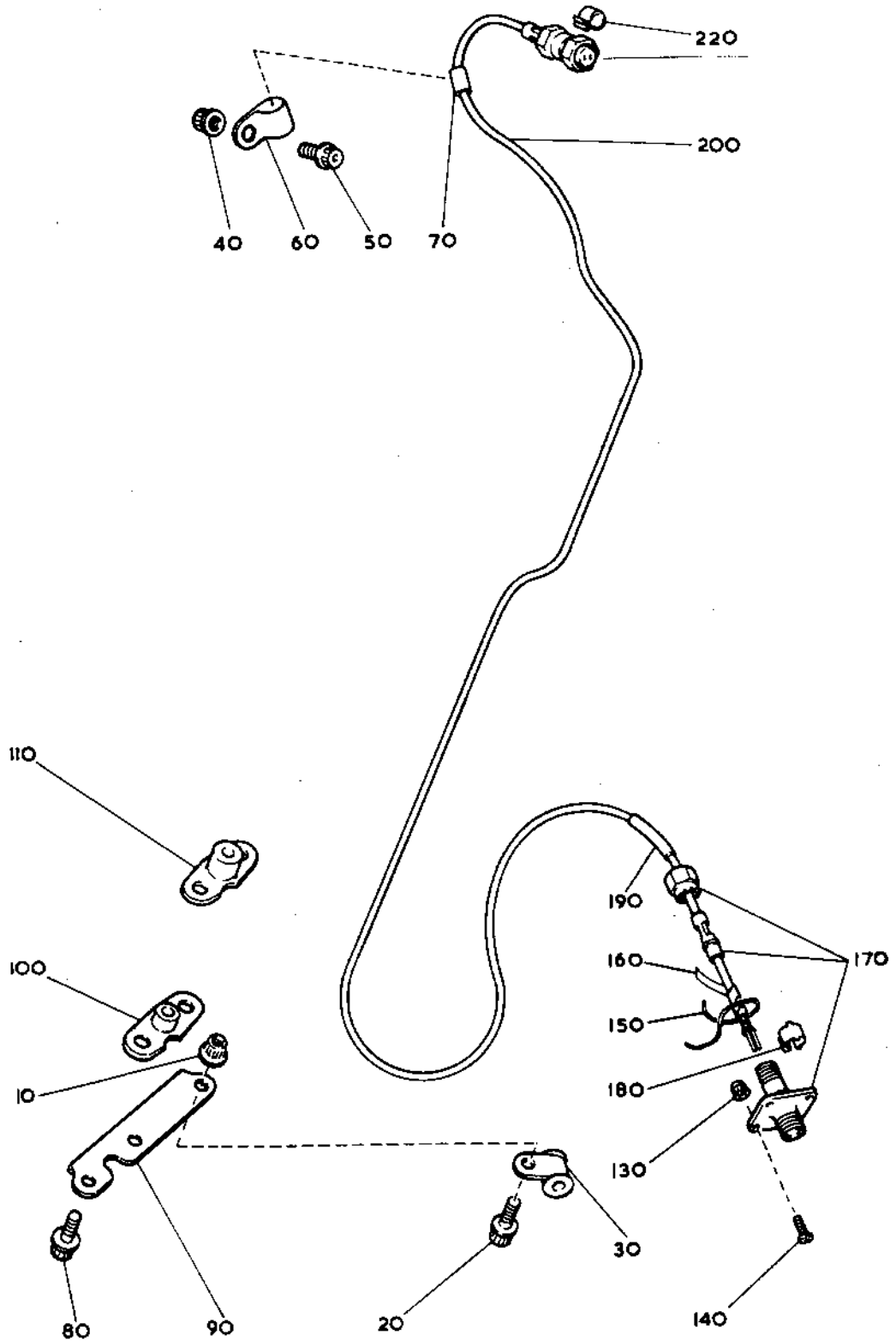
Cleaning Processes  
Table 201

TN612



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Cable, Transducer, Engine Vibration  
Figure 201





OLYMPUS 593

MK.610-14-28  
OVERHAUL



ENGINE VIBRATION TRANSDUCER CABLE - ASSEMBLY

TABLE OF CONTENTS

Para.	Page
1. General ...	501
2. Assembly of Engine Vibration Cable (Pre-SB.77-8) ...	501
3. Assembly of Engine Vibration Cable (SB.77-8 and SB.71-11) ...	501
4. Assembly of Engine Vibration Transducer Cable (SB.77-8611-26 or 77-8661-28) ...	508

TABLE OF ILLUSTRATIONS

Fig.No.	Page
501 Assembly of Connector to Cable End (SB.77-8 and SB.71-11)...	503
502 Crimping Contact Pin to Core Wire ...	505
503 West Country Whipping ...	507
504 Assembly of Connector to Cable (SB.77-26 and 77-28 Standard)...	509

PRINTED IN ENGLAND

TN3371

ASSEMBLY  
**77-33-01**  
Contents 1  
Feb 1/81



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



## ENGINE VIBRATION TRANSDUCER CABLE - ASSEMBLY

### 1. General

- A. This section contains the procedure for the assembly of a new engine vibration transducer cable prior to assembly to the engine as detailed in 71-00-01.
- B. Throughout the text special tools are quoted by their Ref.No., e.g. (Tool 1234). For a complete list of tooling required for assembly and for the Manufacturer's Part No., refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.
- C. During the assembly procedure, reference will be made to the Illustrated Parts Catalogue (I.P.C.) 77-33-01 to identify those items where the nomenclature does not positively identify them due to the duplication of the title. When the item is part of the breakdown of the text concerned, the item will be identified as (1-210), the 1 referring to the I.P.C. Fig.No. and the 210 referring to the Item No.
- D. Approved materials used during the assembly will be identified by the nomenclature and a suffix letter, e.g. tape E. Refer to 71-09-00, Table 501 for the specification and manufacturer, where applicable, for the approved materials used.

### 2. Engine Vibration Cable (Pre SB.77-8)

There is no provision for the installation of a cable or connector to this standard on the engine.

### 3. Assembly of Engine Vibration Cable (SB.77-8 and SB.71-11)

#### A. Prepare to Assemble Connector.

- (1) Cut a length of electrical cable 42 in. (1066,8 mm) long to the following specification.
  - (a) Specification 33655 EDT N2 or CD 1401 (Engines to SB.77-8, pre SB.71-11 standard).
  - (b) Specification ETUDE 45671 (Engines to SB.71-11 standard).
- (2) Disassemble a new connector (1-210) or, using serviceable parts removed from the original connector plus new parts (1-220 through 1-260), proceed to assemble the connector to the cable end.

ASSEMBLY

77-33-01

Page 501

Jan 4/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



B. Assemble Connector to the Cable End (Ref.Fig.501).

NOTE: All references to details are contained in Fig.501.

- (1) Slide the clamp nut (1-225) on to the cable with the castellation towards the end being terminated (detail A).
- (2) Ensure that the bore and chamfer of the outer screen clamp (1-240) are smooth and free from burrs (detail A).
- (3) Feed the outer screen clamp on to the cable with the split end first (detail A).
- (4) Remove the outer glass fibre jacket for a distance of 1.97 in. (50,0 mm) from the cable end (detail A).
- (5) Remove the Kapton (orange/brown) layer for a distance of 1.97 in. (50,0 mm) from cable end (detail A).

CAUTION: DO NOT DAMAGE OR CUT THE METALLIC BRAIDED SCREEN LAYER OR INDIVIDUAL KAPTON LAYERS SURROUNDING TWO CORE WIRES.

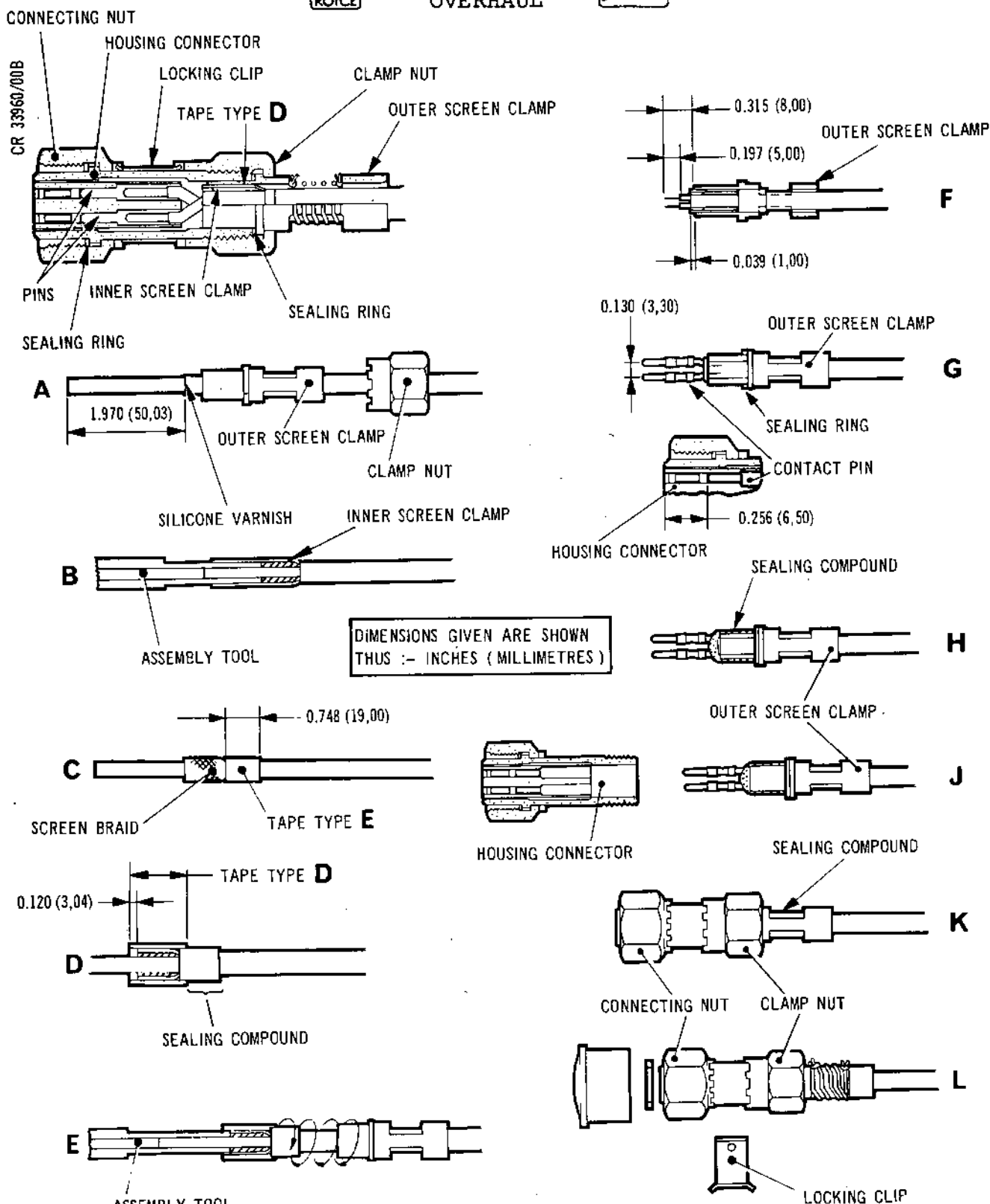
- (6) Apply silicone varnish at the position shown (detail A) to prevent the outer braid from fraying. Allow the varnish to dry.
- (7) Concertina the screen braid sufficiently to allow the insertion of the inner screen clamp (1-250) over the cores and under the screen braid, chamfered end first, using assembly tool (Tool 2705) (detail B). Pull the braid tight, then remove the tool.
- (8) Apply tape E to the position shown (detail C) to achieve the same diameter as the screen braid over the screen clamp.
- (9) Apply a temporary wrapping of tape D over the screen braid flush with forward face of the inner screen clamp.



OLYMPUS 593

MK.610-14-28

OVERHAUL



Assembly of Connector to Cable End (SB.77-8 and SB.71-11)  
Figure 501



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (10) Trim the strands of the screen braid flush with the forward face of the inner screen clamp. Remove the temporary wrapping of tape D.

CAUTION: SCREEN BRAID MUST NOT BE ALLOWED TO FRAY.

- (11) Wrap a 1.26 in. (32,0 mm) length of tape D to give two full turns over the screen braid, overlapping tape E and the forward face of the inner screen clamp by 0.12 in. (3,0 mm) (detail D).

CAUTION: MAKE SURE THERE ARE NO LOOSE STRANDS OF BRAID PRESENT.

- (12) Apply sealing compound A over tape E as shown (detail D).
- (13) Using assembly tool (Tool 2705), advance the outer screen clamp (1-240) with a circular motion (detail E) until its forward edge is 0.039 in. (1,0 mm) rearward of the forward edge of the tape D (detail F). Remove the assembly tool.
- (14) Using any solid state transistorised resistance tester on the 50 volt range, ensure that the insulation resistance between the outer screen clamp and the screen braid is above 20 megohms.
- (15) Crimp the inner and outer screen clamps together using the crimping tool (Tool 2709) with 0.213 in. (5,4 mm) A/F dies (detail F). Repeat the insulation test (Ref. para. (14)).
- (16) Remove the second Kapton layer and glass-fibre fillers flush with the forward edge of tape B.
- (17) Cut individual core wires to a length of 0.315 in. (8,0 mm) from the forward edge of the outer screen clamp (detail F).

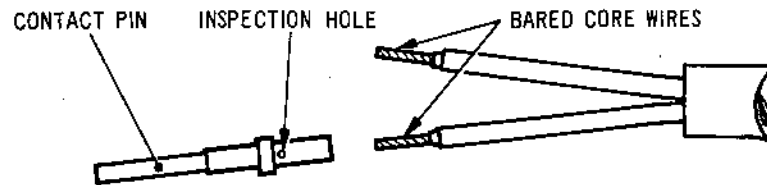
TN38493



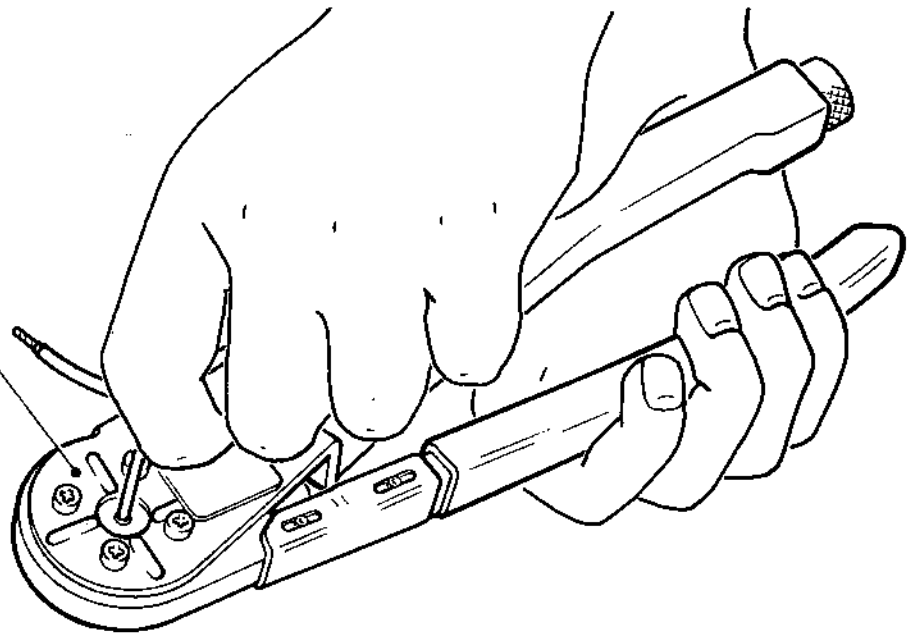
OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 33963/00B



CRIMPING TOOL



Crimping Contact Pin to Core Wire  
Figure 502

ASSEMBLY  
**77-33-01**  
Page 505  
Aug 1/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (18) Remove the individual Kapton insulation from each of the two core wires for a distance of 0.197 in. (5,0 mm) from the end of the cable (detail F).
- (19) Assemble the contact pins (1-227) to the core wires (detail G) using the crimping tool (Tool 2703) and positioner (Tool 2704), or the crimping tool (Tool 2707) and insert (Tool 2708) (Ref.Fig.502).
  - (a) Insert a core wire into the rear of a contact pin so that the insulation on the core wire abuts the rear of the contact.
  - (b) Ensure that the core wire is visible through the inspection hole of the contact pin.
  - (c) Crimp the contact pin using the crimping tool ensuring that the shoulder of the contact pin abuts the crimping tool before pressure is applied.
  - (d) Crimp a contact pin onto the remaining core wire in the same manner (Ref.(a) to (c)).
- (20) Slide the sealing ring (1-260) over the pins and onto the outer screen clamp until it abuts the step. Space the contact pins approx. 0.130 in. (3,3 mm) apart, then enter them into their inserts in the housing connector and push the screen clamps into the housing (1-270). Ensure that the distance from the ends of the pins and the face of the housing is not more than 0.256 in. (6,5 mm) (detail G). Withdraw the screen clamps and pins from the housing.
- (21) Coat the crimped area of the screen clamps with sealing compound A and also fill the front recess as shown (detail H).
- (22) With the contact pins spaced 0.130 in. (3,3 mm) apart, enter the pins into their inserts in the housing connector and push the screen clamps into the housing (detail J). Remove any surplus sealing compound. Slide the clamp nut (1-225) along the cable and over the outer screen clamp, then screw the (left-hand threaded) nut onto the housing connector and torque-tighten between 40 and 60 lbf in. (4,5 and 6,8 N.m) until the castellations of the clamp nut align with those of the connecting nut. Engage the locking clip (1-220) in the castellations (detail L).

FN38494

ASSEMBLY

**77-33-01**

Page 506

Aug 1/76



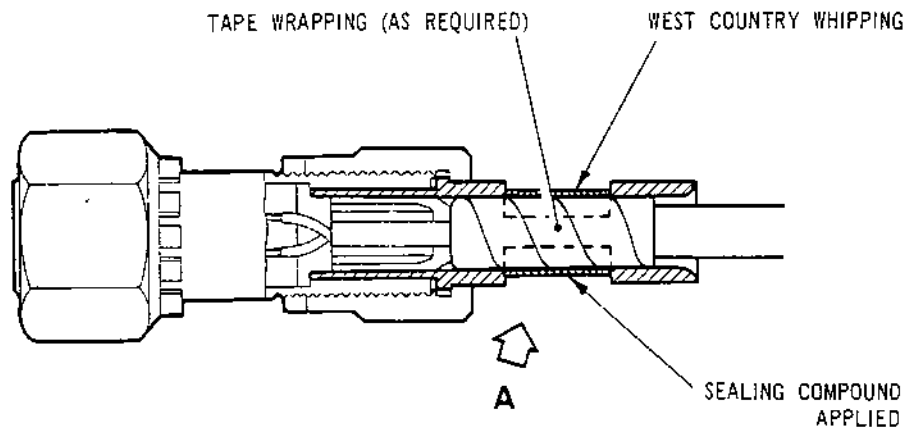
OLYMPUS 593

MK.610-14-28  
OVERHAUL

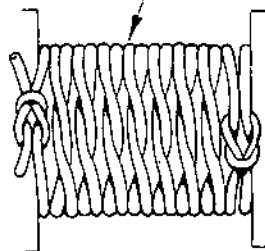


PRINTED IN ENGLAND

CR 33445/00A



WEST COUNTRY WHIPPING



A

7N38491

West Country Whipping  
Figure 503

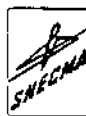




OLYMPUS 593

MK.610-14-28

OVERHAUL



(23) Apply sealing compound A to the split in the outer screen clamp (detail K), then West Country whip to the area indicated (Ref.Fig.503) as follows:

- (a) Middle the lacing braid A, then pass the ends around the split in the outer screen and tie a reef knot.
- (b) Half-knot the lacing braid on alternative sides until the end of the split is reached.
- (c) Reef knot the ends of the braid securely, then cut off the ends of the braid leaving free ends 0.315 in. (8,0 mm) in length.

NOTE: All the knots are to be on the cable.

- (d) Cement the finished ends with silicone varnish A.

4. Assembly of Engine Vibration Transducer Cable (SB.77-8611-26 or 77-8661-28)

A. Assemble Transducer Connector to Cable (Ref.Fig.504).

- (1) Remove outer sheath for a distance of between 25,0 and 28,0 mm from one end of a suitable length (107 cm) of replacement cable (1A-350) (Detail A). Avoid damaging screen braid.
- (2) Comb out screen braid, fold back over outer sheath and trim to leave 6,0 mm of exposed braid. (Detail B).
- (3) On engines to SB.77-8661-28 standard cut off drain wire flush with braid fold edge and trim off fillers to fold edge.
- (4) Assemble sleeve (1A-340) to cable and heat shrink over the back fold of screen braid. (Detail C).
  - (a) Set thermo-gun (Tool 2603), with reflector (Tool 2605) attached, to give a minimum temperature of 380°C. Switch on and allow to heat for 5 minutes to reach required temperature.

ASSEMBLY

77-33-01

Page 508

Aug 1/81

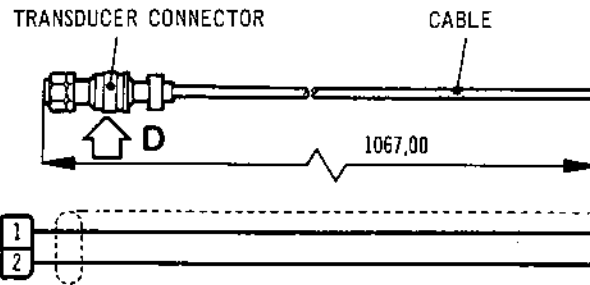


OLYMPUS 593

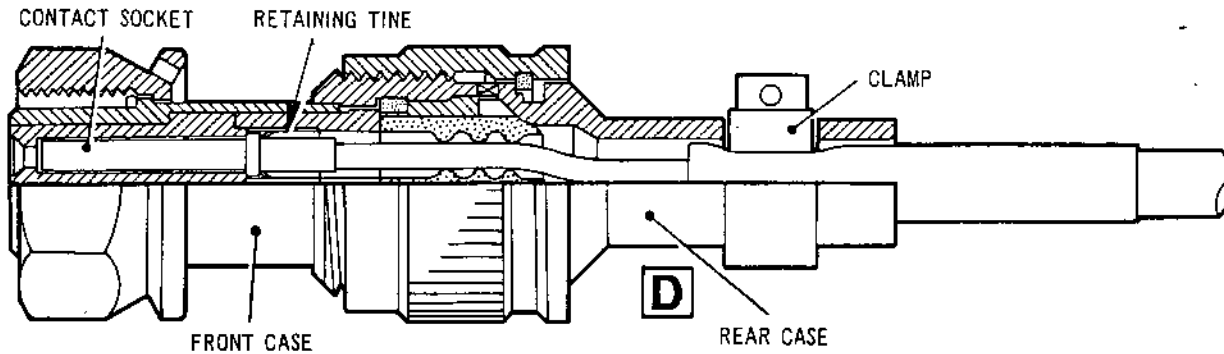
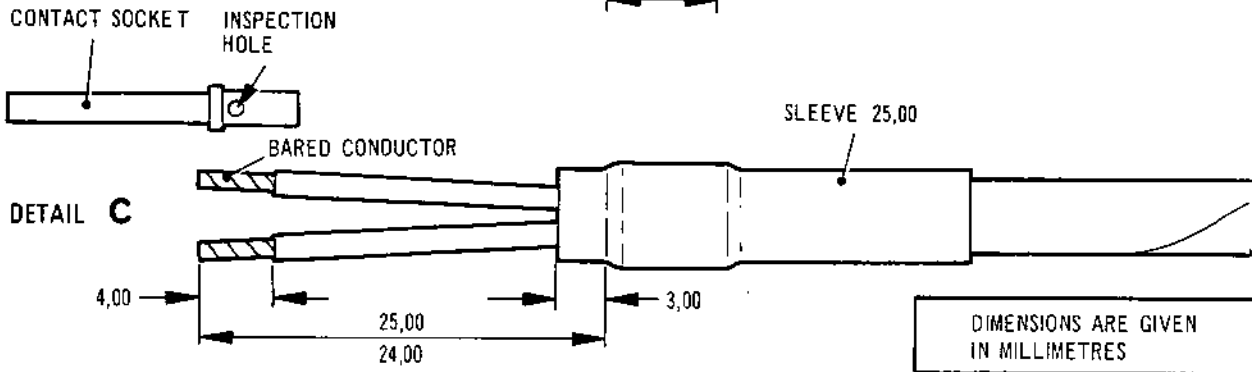
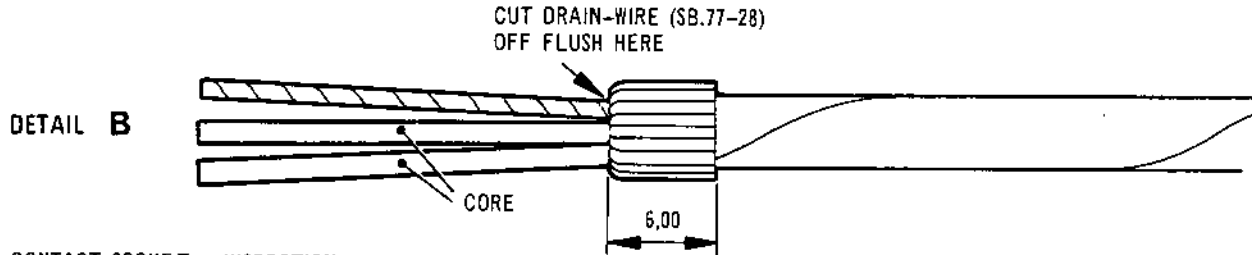
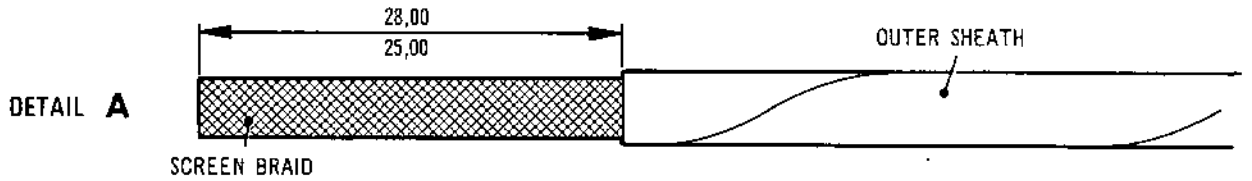
MK.610-14-28  
OVERHAUL



CR 35722/00A



WIRING DIAGRAM



Assembly of Connector to Cable (SB.77-26 and 77-28 Standard)  
Figure 504



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Position sleeve over the back fold of screen braid with a 3,0 mm projection from braid fold edge over the cores.
  - (c) Direct hot air all round sleeve until sleeve becomes transparent and shrinks to grip the cable and then remove heat source and allow sleeve to cool. Heat application may be from 8 to 20 seconds but should not exceed 50 seconds.
  - (d) Check visually that there are no splits in the sleeve and that there are no signs of heat damage.
- (5) Assemble contacts to cable cores and insert into insulator.
- (a) Remove insulation from end 4 mm of core to be crimped. (Detail C).
  - (b) Assemble contact socket (1A-320) to end of cores, ensure that insulation abuts end of contact socket and conductor is visible through inspection hole, then crimp the contacts with the crimping tool (Tool 2703).
  - (c) Insert core into coloured end of insert tool (Tool 3128).
  - (d) Using firm even pressure, press tool against contact shoulder and insert contact and tool into connector front case (1A-310A) until retaining tines snap into place behind contact shoulder.
  - (e) Withdraw tool from insulator, lightly pull core to ensure contact socket is properly seated.
- (6) Assemble connector front case to connector rear case (1A-330) and firmly hand-tighten.
- (7) Assemble clamp bar (1A/290) to rear case and secure with two screws tightened until the sleeve is firmly gripped and there is no visible gap at the clamp bar mating face.
- (8) Wire-lock the back nut to the fixed clamp bar or to one of the clamp bar screws.

TN55121

ASSEMBLY

77-33-01

Page 510

Feb 1/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



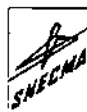
- (9) Wire-lock clamp bar screws together.
- (10) Check the insulation resistance of the transducer connector between the connector body and the screening braid using the 50V range.

Minimum acceptance resistance ... 20 megohms

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



ENGINE VIBRATION TRANSDUCER CABLE - SPECIAL  
TOOLS, FIXTURE AND EQUIPMENT

1. General

- A. The special tools, fixtures and equipment listed in Table 1001 are those required to assemble the engine vibration transducer cable prior to installation on the engine.
- B. The tools have been listed in their order of usage and the Tool Ref.No. is the number quoted in the text. Tools with an \* are used in more than one aspect of overhaul, and will be duplicated in the tables. Tools used other than those supplied by Rolls-Royce (1971) Limited are indicated by the component manufacturer and part number.

TOOL REF.NO.	MANUFACTURERS PART NO.	DESCRIPTION
* 2701	CANNON NAS.1664-16	Insert/Extractor Tool

Disassembly Tools  
Table 1001

TOOL REF.NO.	MANUFACTURERS PART NO.	DESCRIPTION
2705	812-004	Assembly Tool
2709	Type FW-C31-2-1000	Crimping Tool (Amphenol)
2703	Buchanan Type 3191-A (MS 3191)	Crimping Tool
2704	Buchanan, 20A	Locator Tool
2707	Daniels Type M22520/2-01	Crimping Tool
2708	Type, Vibrometer SEL,5	Insert Tool
2603	Raychem CV 1511	Thermo Gun
2605	Raychem PR 13C	Reflector for use with 2603
3128	Cannon NAS 1664-20	Insert Extractor Tool

Assembly Tools  
Table 1002

SPECIAL TOOLS

**77-33-01**

Page 1001

Aug 1/81



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



## ENGINE VIBRATION TRANSDUCER - CLEANING

### 1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

### 2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

PRINTED IN ENGLAND

TN31567

CLEANING  
**77-33-02**  
Page 201  
Jan 1/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except 10	Transducer, engine vibration	A or B B	- -	- Wipe clean using a clean, dry, lint- free cloth

Cleaning Processes  
Table 201

TN31568



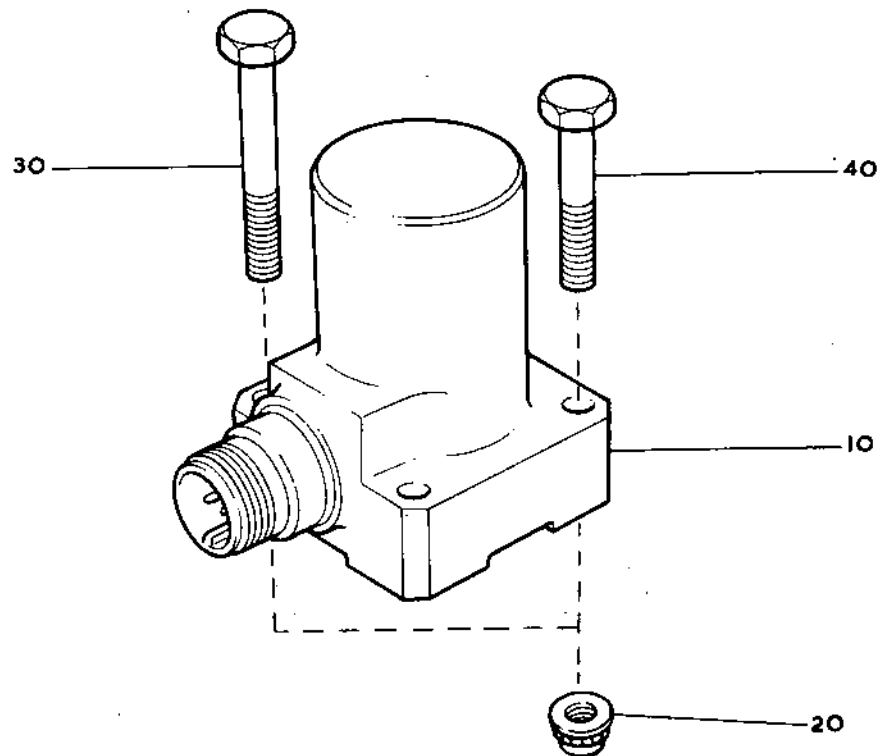
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN ENGLAND

CR 32343/00B



TN31570

Transducer, Engine Vibration  
Figure 201

CLEANING  
**77-33-02**  
Page 203  
Aug 28/75





OLYMPUS 593

MK.610-14-28  
OVERHAUL



ENGINE VIBRATION TRANSDUCER - TESTING

TABLE OF CONTENTS

Para.	Page
1. General ... ..	701
2. Test Equipment ... ..	702
3. Rig Test Vibration Transducer ... ..	702
A. Prepare Test Equipment ... ..	702
B. Carry Out Rig Test... ..	705

TABLE OF ILLUSTRATIONS

Fig.No.	Page
701 Engine Vibration Transducer ... ..	703
702 Test Layout ... ..	704

LIST OF TABLES

Table No.	Page
701 Cross References to Illustrated Parts Catalogue ...	701
702 Test Equipment ... ..	702

PRINTED IN ENGLAND

TN38467



OLYMPUS 598

MK.610-14-28

OVERHAUL



ENGINE VIBRATION TRANSDUCER - TESTING

1. General

- A. This testing must be carried out on completion of the work detailed in Engine Indicating, 77-10-00 Inspection/Check, or at any intermediate point as directed therein.
- B. It is assumed that the items making up components to be tested have been selected for compatibility and that any moving and fixed items have acceptable clearances, that mating surfaces have been correctly matched and any defective items have been repaired or replaced.
- C. Where a component forms part of a system, any later testing will be cross referenced to the Testing topic for the complete system when applicable. Testing to be carried out during assembly or installation is not cross referenced in this topic.
- D. To enable the items within this topic to be identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (IPC); thus, Fig.701-40 (701/40) in this text equates with the relevant Fig. and Item No. in the same topic in the IPC. Table 701 provides a cross reference to the equivalent IPC illustrations.
- E. Dimensional checks (when applicable) are cross referenced to the Fits and Clearances Schedule (FCS) at the relevant stage in the test procedure.
- F. Test equipment is listed in Table 702. Where specific equipment is not quoted, details of the purpose, range and accuracy of suitable equipment are provided, together with a test diagram.

FIG.NO.	ILLUSTRATED PARTS CATALOGUE EQUIVALENT	
701	77-33-02	Fig.1
702	Not applicable	

Cross References to Illustrated Parts Catalogue  
Table 701



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## 2. Test Equipment

A. The test equipment required is listed in Table 702.

DESCRIPTION	PURPOSE
Vibration table (moving coil vibrator) with a Power Amplifier and Variable Audio Oscillator.	Simulate operating conditions and provide vibration levels for transducers.
Master Accelerometer - to be used in conjunction with:	Comparator.
Endevco Accelerometer Calibrator Type 28350F and an A.C. Valve or Transistor Voltmeter.	Calibration.
Precision Voltage Ratio Box of 10 K ohms impedance.	Calibration.
Digital Frequency Meter.	Monitoring oscillator frequency.
Double Beam Oscilloscope.	Monitoring sinusoidal waveform.
Millivoltmeter	Setting vibration levels and comparing master accelerometer and transducer under test.

Test Equipment  
Table 702

## 3. Rig Test Vibration Transducer (701-10)

NOTE: Ensure the Vibration Transducer has been inspected and cleared for rig test (Ref.77-10-00 Inspection/Check).

A. Prepare Test Equipment.

- (1) Ensure that the mounting surface of the vibration table is flat and free from burrs around the threaded holes.

TN42758

TESTING  
**77-33-02**  
Page 702  
Aug 1/76

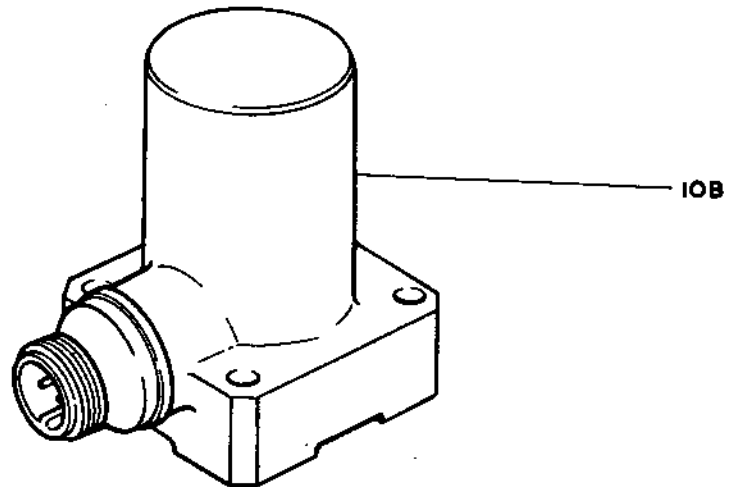
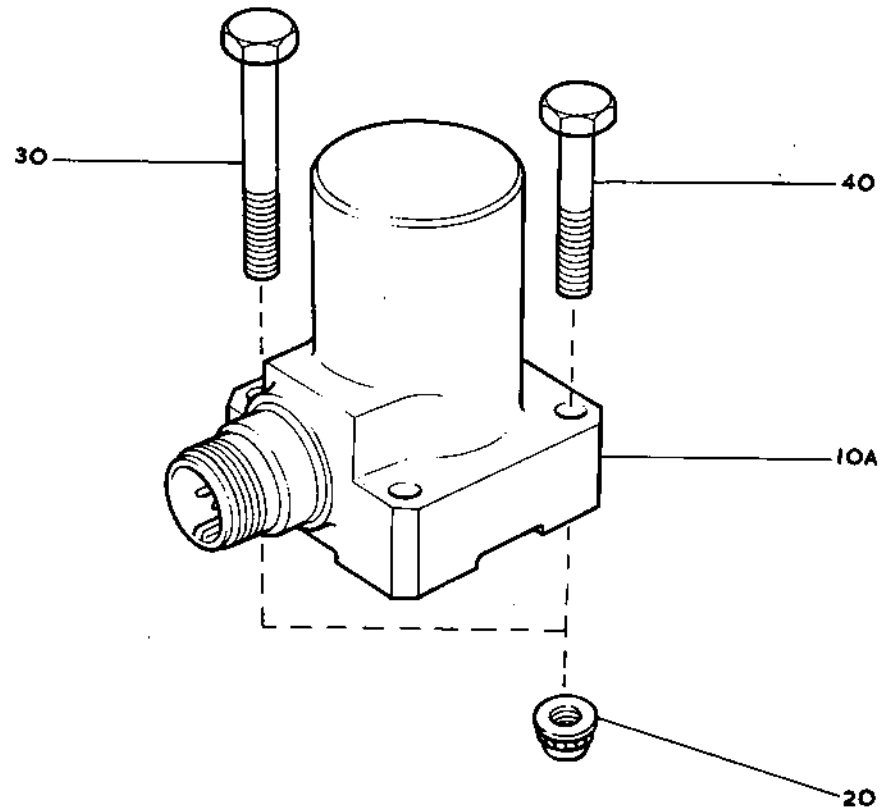


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CR 32343/00C



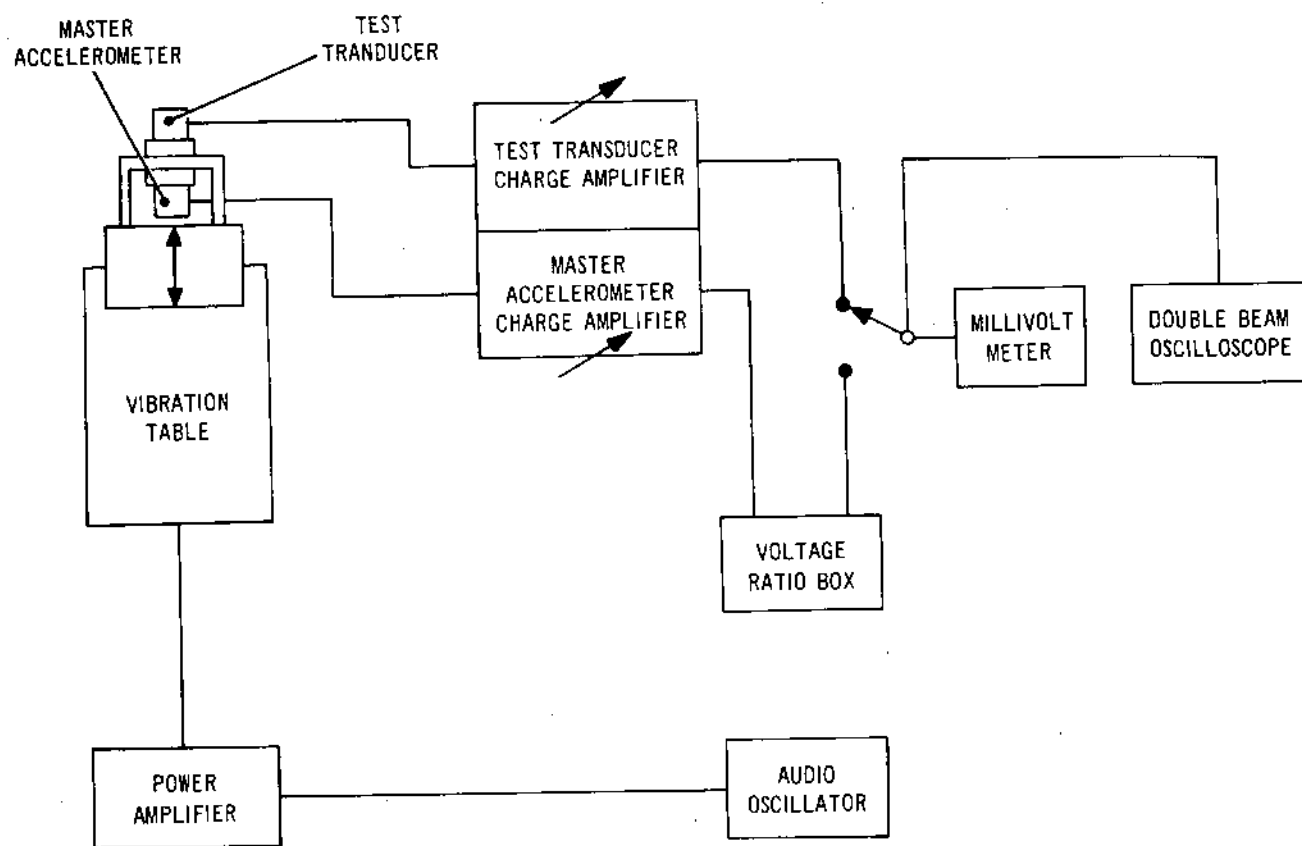
Engine Vibration Transducer  
Figure 701



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



CR 33985/00A



TN34752

Test Layout  
Figure 702



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (2) Clean the mounting surface of the vibration table and the transducer mounting face.
- (3) Assemble the transducer to the vibration table using the four attachment bolts provided and ensuring that the bolts are tightened evenly.

NOTE: Uneven tightening can cause a resonance at certain frequencies which will produce a distorted waveform from the master accelerometer and the transducer under test giving incorrect results.

- (4) With reference to Fig.702 for the layout of the equipment, install the equipment and connect up in accordance with the manufacturers instructions.

NOTE: It is essential that the vibration table movement is sinusoidal and free from resonance.

NOTE: The waveform of the output from the master accelerometer and the vibration transducer under test must be displayed on the double beam oscilloscope and monitored throughout the test. Any deviation from a sine wave will adversely affect the test/calibration.

B. Carry Out Rig Test (Ref.Fig.702).

- (1) Using the proprietary test equipment, calibrate the vibration transducer to the following acceptance standards.
- (2) Basic sensitivity.
  - (a) At a frequency of 123 Hz and an acceleration level of 10 g (peak) the basic charge sensitivity must be within  $10 \text{ pC/g} \pm 0.2 \text{ pC/g}$ .
- (3) Linearity of sensitivity.
  - (a) At a frequency of 123 Hz and at acceleration levels of 1, 2, 5, 15 and 20 g (peak) the charge sensitivity must be  $10 \text{ pC/g} \pm 0.3 \text{ pC/g}$ .



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (4) Frequency response.
- (a) At a maintained acceleration level of 3 g (peak) and at frequencies of 20, 40, 70, 100 and 123 Hz the charge sensitivity must be 10 pC/g  $\pm$  0.3 pC/g.
  - (b) At a maintained acceleration level of 20 g (peak) and at frequencies of 123, 200, 400, 700, 1000 and 1500 Hz the charge sensitivity must be 10 pC/g  $\pm$  0.3 pC/g.
- (5) Record all test data on the transducer work sheet.

TN42760



OLYMPUS 593

MK.610-14-28

OVERHAUL



REHEAT CHAMBER VIBRATION TRANSDUCER  
AND CABLE - CLEANING

1. General

- A. Prior to commencing the cleaning refer to 72-09-00 Cleaning for details of the cleaning processes referred to in Table 201.
- B. To ensure that all items within this breakdown that require cleaning and subsequent Inspection/Check are recognized, and identified by their Part Number, figures are provided which equate with the Illustrated Parts Catalogue (I.P.C.). Thus, Fig.201 Item 10 equates with the relevant Figure and Item Number in the same breakdown in the I.P.C. Items illustrated in the I.P.C. which are not illustrated in this breakdown, are those items which are either discarded at overhaul, or are normally assembled to another item and are only called up by number.
- C. As all items requiring cleaning are illustrated in the figures, Table 201 does not list all items, but deals collectively with the items requiring the same cleaning process.
- D. On receipt of the items from disassembly, all protective blanks, covers etc. deemed necessary for the protection of the items will have been assembled and, in addition, many of the items will arrive in containers. Any special containers, blanks, covers etc. are listed in Table 202 by their Tool Ref. No. e.g. (Tool 123). For the manufacturer's Part No. refer to the appropriate Table in Special Tools, Fixtures and Equipment Section.

2. Cleaning Components

- A. All blanks, covers etc. must be removed from the items prior to cleaning and reassembled immediately afterwards. Items received in special cleaning containers should remain therein during the cleaning procedures unless otherwise stated.
- B. All items contained in this breakdown must be cleaned by the appropriate processes quoted in the table, to achieve a cleanliness to enable the Inspection/Check to be carried out correctly. Where alternative processes are quoted, the operator must decide what process to use depending on the amount of contamination of the item. Any item that is not cleaned satisfactorily must be recleaned by the appropriate process.

CLEANING

77-33-03

Page 201

Jan 1/77





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- C. When an assembly item has attached parts that have certain protective finishes e.g. silver plating, the cleaning process for the assembly item may damage the finish of the part. To minimize the effect on the finish of the part, reduce the process immersion time to a minimum. If the finish is damaged, then the damaged finish will have to be replaced or reconditioned.

FIG. NO.	ITEM NO.	NOMENCLATURE	CLEANING PROCESSES		REMARKS
			LIGHT	HEAVY	
201	ALL except 290	Transducer, vibration, reheat jet pipe	A or B	-	-
			B	-	For cleaning details refer to vendors overhaul manual.

Cleaning Processes  
Table 201

TN945

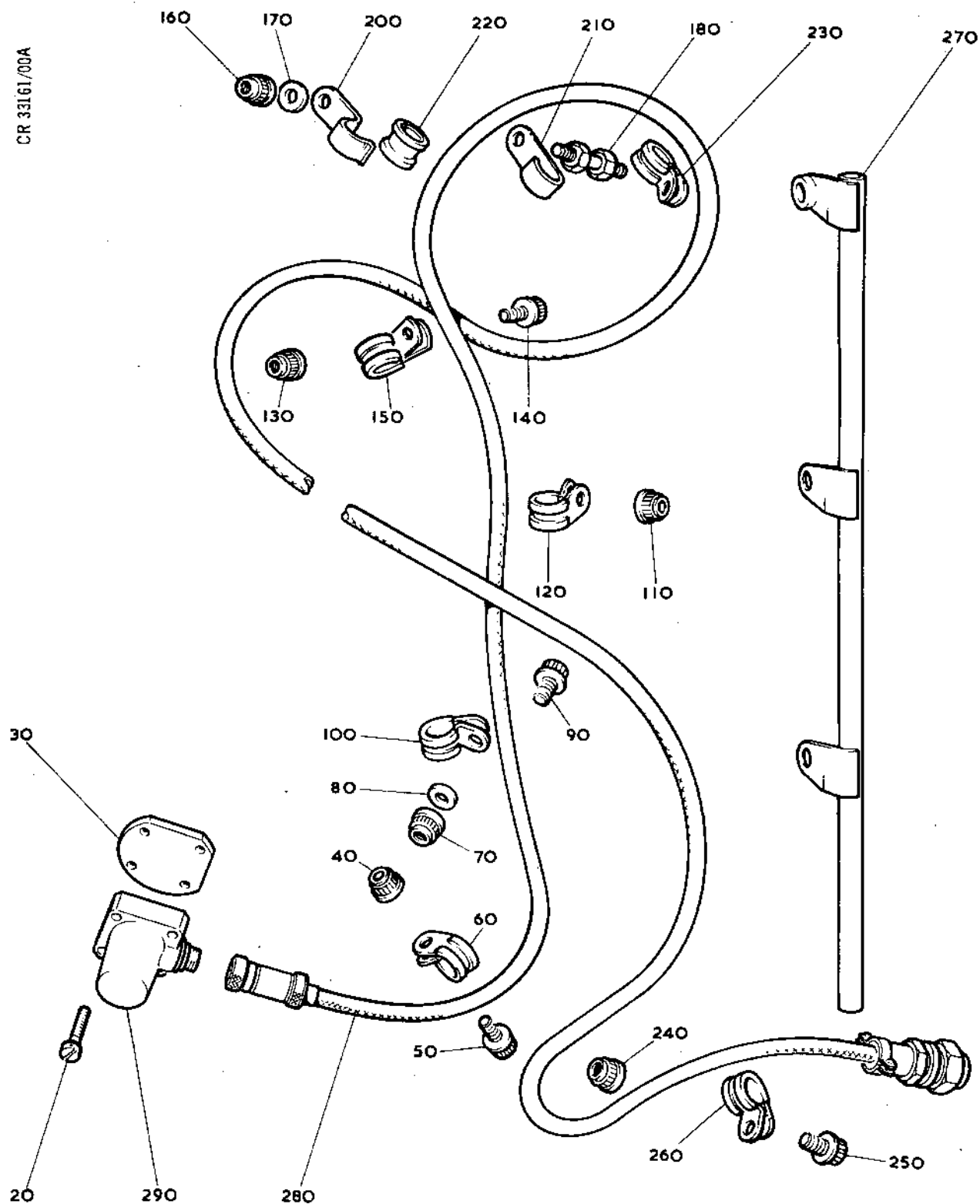
CR 33161/00A



OLYMPUS 593

MK. 610-14-28

OVERHAUL



Transducer, Vibration, Reheat Jet Pipe Assembly  
Figure 201

CLEANING

77-33-03

Page 203

Aug 28/75

**CHAPTER**

**78**

**EXHAUST**



# **OLYMPUS 593 MK 610-14-28**

## **OVERHAUL MANUAL**

### **BOOK 2**

#### **EXHAUST SYSTEM**

**78-00-00**

#### **VOLUME 1**

#### **REHEAT JET PIPE**

**78-11-01**

#### **PRIMARY NOZZLE**

**78-12-01**

#### **TWIN SECONDARY NOZZLE**

**78-13-01**

#### **BUCKET**

**78-31-01**

**TECHNICAL PUBLICATION No.TP.187/2/RR/SN**



1975

The information contained in this document is the property of Rolls-Royce Limited and SNECMA and may not be copied or used for any purpose other than that for which it is supplied without the express written authority of Rolls-Royce Limited and SNECMA. (This does not preclude use by engine and aircraft operators for normal instructional maintenance or overhaul purposes).

**ROLLS-ROYCE (1971) LIMITED**  
AERO DIVISION

TECHNICAL PUBLICATIONS DEPARTMENT  
P.O. BOX 3, FULTON, BRISTOL, BS12 7QE, ENGLAND

**SNECMA**  
APRES VENTE CIVILE  
SITE DE MELUN MONTEREAU  
AERODROME DE VILLAROCHE  
BP 1936 - 77019 MELUN CEDEX (FRANCE)



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



REVISION No. 26 DATED DECEMBER 31, 2001

EXPLANATORY NOTE

The table bellow lists the pages concerned in this revision, and gives the type of revision applied:

Cancel the old pages affected by the revision, and insert the revised or re-edited and new pages.

Complete the list of revisions (date and person making the insertion).

Chapter/Section	Delete	Insert	Reason for Revision
Book 2, volume 1			
List of Effective Pages	Pages 1 thru 38	Pages 1 thru 38	REVISED
78-11-01 Inspection	Page 302	Page 302	Addition of ARDOX 396/1E8 and RUSTILO DW 377
Storage	Page 901	Page 901	Modification of the procedure
78-12-01 List of Chapters	Page 4	Page 4	Addition of REP 4-120-2
Inspection	Page 302	Page 302	Addition of ARDOX 396/1E8 and RUSTILO DW 377
Storage	Page 901	Page 901	Modification of the procedure
78-13-01 Inspection	Page 304	Page 304	Addition of ARDOX 396/1E8 and RUSTILO DW 377
Assembly	Pages 568,570, 572 thru 578	Pages 568,570, 572 thru 578	Modification of the procedure
NI NUM	Pages 1 thru 74	Pages 1 thru 74	Addition of part numbers



# OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

Chapter/Section	Delete	Insert	Reason for Revision
78-13-01 Detailed Parts List	Pages 1117-1 thru 1118-0	Pages 1117-1 thru 1118-0	Incorporate SB's OL593-78-14066-42 OL593-78-14066-43 OL593-78-28235-47 OL593-78-28236-48
78-31-01 List of Chapters	Page 1	Page 1	Correction of a page number
	Pages 3 and 4	Pages 3 and 4	Addition of REP 1-460-19
Inspection	Page 305/306	Page 305/306	Addition of ARDOX 396/1E8 and RUSTILO DW 377
Bucket assy- Removable parts	Page 305	Page 305	Modification of acceptance criteria
Basic Bucket - Inspection Method	Pages 301/302	Pages 301/302	Addition of a NOTE
REP 1-460-11	Pages 401, 403 and 405/406	Pages 401, 403 and 405/406	Modification of the procedure

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



## SERVICE BULLETIN LIST

SERVICE BULLETIN	MOD STATE IDENT	DATE	DESCRIPTION
OL-593-78-8	14027	Dec 15/76	78-12-01 - Reinforcement of convergent section.
OL-593-78-9	14029	Dec 15/76	78-11-01 - Installation of a seal on the frame heat shield.
OL-593-78-25	14034	Dec 15/76	78-11-01 - Reinforcement of ventilation shroud by addition of a rolled edge.
OL-593-78-13	14030	Sep 30/78	78-13-01- Improvement in safety of thrust reverser actuation system.
OL-593-78-16	28220	Sep 30/78	78-13-01 - Improvement in the removal of access doors to Garrett accessories.
OL-593-78-19	28208	Sep 30/78	78-13-01- Protection of bucket ballscrew gearbox flexible shafts
OL-593-78-20	28209	Sep 30/78	78-13-01- Protection of side walls.
OL-593-78-21	28210	Sep 30/78	78-13-01- Protection of bucket ballscrew gearbox flexible shafts
OL-593-78-22	28211	Sep 30/78	78-31-01- Adjunction of a sealing silicone bead at the periphery of the access door to the bucket position transmitters.
OL-593-78-26	14035	Sep 30/78	78-31-01- Improvement of attachment of the bucket deflectors.
OL-593-78-29	28212	Sep 30/78	78-31-01- Addition of a film of elastomer on the access cover plates to the bucket ballscrew gearbox attachment bolts.

**78-00-00**

SBL Page 2

Aug 31/79

PRINTED IN FRANCE

PRINTED IN FRANCE

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

## SERVICE BULLETIN LIST

SERVICE BULLETIN	MOD STATE IDENT	DATE	DESCRIPTION
OL-593-78-32	28213	Sep 30/78	78-13-01- Suppression of 13 attachments bolts out of the access doors to the bucket position transmitters (indicators)
OL-593-78-33	28214	Sep 30/78	78-13-01- Modification to the drain tube.
OL-593-78-34	14039	Sep 30/78	78-13-01- Improvement in safety of thrust reverser actuation system.
OL-593-78-35	28217	Sep 30/78	78-13-01- Doubler-Reinforcing the vertical panels of the ballscrew gearbox recesses.
OL-593-78-36	28218	Sep 30/78	78-13-01- Blanking of ballscrew gearbox recesses.
OL-593-78-39	28222	Jul.25/79	78-13-01- Replacement of lower and upper panel downstream sections by titanium elements.
OL-593-78-40	28224	Nov.21/79	78-13-01- Installation of two quick-removal access doors on upper actuators centre access panels.
OL-593-78-41	/	Sep.15/80	78-12-01- Replacement of attachment bolts on actuated petals twin-yokes.

PRINTED IN FRANCE

**78-00-00**SBL Pages 3/4  
Oct 31/81





OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

LIST OF EFFECTIVE PAGES  
OVERHAUL  
CHAPTER 78

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
Book 2			List of	15	Dec 31/01
Volume 1			Effective	16	Dec 31/01
Title Page		1975	Pages	17	Dec 31/01
			(Cont'd)	18	Dec 31/01
Record of				19	Dec 31/01
Revisions	1	Jan 15/76		20	Dec 31/01
	2	Blank		21	Dec 31/01
				22	Dec 31/01
Record of				23	Dec 31/01
Temporary				24	Dec 31/01
Revisions	1	Jan 15/76		25	Dec 31/01
	2	Blank		26	Dec 31/01
				27	Dec 31/01
List of				28	Dec 31/01
Effective				29	Dec 31/01
Temporary				30	Dec 31/01
Revisions	1	Jan 15/76		31	Dec 31/01
	2	Blank		32	Dec 31/01
				33	Dec 31/01
Service				34	Dec 31/01
Bulletin	1	Jan 31/77		35	Dec 31/01
	2	Aug 31/79		36	Dec 31/01
	3	Oct 31/81		37	Dec 31/01
	4	Blank		38	Blank
List of			List of		
Effective	1	Dec 31/01	Approved		
Pages	2	Dec 31/01	Repair		
	3	Dec 31/01	Facilities	1	Apr 30/93
	4	Dec 31/01		2	Blank
	5	Dec 31/01	List of		
	6	Dec 31/01	Products and		
	7	Dec 31/01	Compounds	1	Jan 15/76
	8	Dec 31/01		2	Blank
	9	Dec 31/01			
	10	Dec 31/01	78-11-01		
	11	Dec 31/01	Divider		
	12	Dec 31/01	Title Page		1975
	13	Dec 31/01			
	14	Dec 31/01			



OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

## CHAPTER 78

## OVERHAUL

## LIST OF EFFECTIVE PAGES

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
List of Chapters	1	Mar 31/78	Inspection (Cont'd)	314	Mar 31/78
	2	Mar 31/78		315	Mar 31/78
	3	Apr 15/87		316	Apr 30/93
	4	Jan 31/81		317	Mar 31/78
	5	Sep 30/78		318	Mar 31/78
	6	Blank			
Foreword Description			Repair Foreword	401	Dec 30/74
	1	Dec 15/76		402	Dec 30/74
	2	Blank		403	May 31/77
				404	May 31/77
Description/ Operation	1	Dec 30/74	Repair Parts List	401	Apr 30/93
	2	Dec 30/74		402	Jun 30/97
	3	Dec 30/74		403	Jun 30/97
	4	Blank		404	Blank
Disassembly	101	Dec 30/74	REP 1-10-1	401	Dec 30/74
	102	Dec 30/74		402	Blank
	103	Dec 30/74	REP 1-10-2	401	Apr 30/93
	104	Dec 30/74		402	Dec 15/75
Cleaning	201	Dec 30/74		403	Oct 31/81
	202	Apr 30/93		404	Dec 15/75
	203	Dec 30/74		405	Jan 31/81
	204	Dec 30/74		406	Jan 31/81
Inspection	301	Dec 30/74		407	Dec 15/75
	302	Dec 31/01		408	Dec 15/75
	303	Dec 30/74	REP 1-10-3	401	Dec 15/75
	304	Dec 30/74		402	Blank
	305	Dec 30/74	REP 1-100-1	401	Dec 30/74
	306	Mar 31/78		402	Blank
	307	Mar 31/78	REP 1-100-2	401	May 31/84
	308	Mar 31/78		402	Oct 31/81
	309	Mar 31/78		403	Dec 15/75
	310	Mar 31/78		404	Jun 30/97
	311	Mar 31/78		405	Jun 30/97
	312	Mar 31/78			
	313	Mar 31/78			

**OLYMPUS 593****MK. 610-14-28****OVERHAUL****sneema**

## CHAPTER 78

## OVERHAUL

## LIST OF EFFECTIVE PAGES

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
REP 1-100-2 (Cont'd)	406	Jun 30/97	REP 3-130-2 (Cont'd)	417	Jun 30/97
	407	Jan 31/81		418	Apr 30/93
	408	Dec 15/75		419	Jan 31/77
	409	Oct 31/81		420	Jun 30/97
	410	Oct 31/81	REP 3-130-3	401	Apr 30/93
	411	Dec 15/75		402	Jan 31/77
	412	Blank		403	Jan 31/77
REP 1-100-3	401	May 31/84		404	Jan 31/77
	402	Blank	REP 4-50-1	401	Dec 30/74
REP 1-100-4	401	Apr 30/93		402	Blank
	402	Oct 31/81	REP 4-60-1	401	Dec 15/75
	403	Oct 31/81		402	Dec 15/75
	404	Oct 31/81	REP 4-110-1	401	Dec 30/74
	405	Oct 31/81		402	Blank
	406	Blank	REP 4-120-1	401	Dec 30/74
REP 3-90-1	401	Apr 30/93		402	Dec 30/74
	402	Apr 30/93	REP 4-120-2	401	Jun 30/97
REP 3-130-1	401	Jan 31/77		402	Blank
	402	Jan 31/77	REP 4-130-1	401	Dec 30/74
REP 3-130-2	401	Apr 30/93		402	Blank
	402	Jan 31/77	REP 4-130-2	401	May 31/77
	403	Jan 31/77		402	Dec 15/75
	404	Oct 31/81		403	Dec 15/75
	405	Apr 30/93		404	Dec 15/75
	406	Jan 31/77		405	Dec 15/75
	407	Jun 30/97		406	Blank
	408	Jun 30/97	REP 4-200-1	401	Dec 30/74
	409	Apr 30/93		402	Blank
	410	Jan 31/77	REP 5-10-1	401	Dec 30/74
	411	Jun 30/97		402	Blank
	412	Jan 31/77			
	413	Apr 30/93			
	414	Jan 31/77			
	415	Apr 30/93			
	416	Jan 31/77			

**OLYMPUS 593****MK. 610-14-28****OVERHAUL***sneema*

## CHAPTER 78

## OVERHAUL

## LIST OF EFFECTIVE PAGES

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
REP 5-10-2	401	Dec 15/75	REP 5-240-5	401	Sep 30/78
	402	Dec 15/75		402	Sep 30/78
REP 5-10-3	401	Dec 30/74		403	Sep 30/78
	402	Dec 30/74		404	Sep 30/78
	403	Dec 30/74		405	Sep 30/78
	404	Blank		406	Blank
REP 5-10-4	401	Dec 30/74	REP 5-240-9	401	Jan 31/81
	402	Dec 30/74		402	Apr 30/93
REP 5-160-1	401	Mar 31/78		403	Jan 31/81
	402	Dec 15/75		404	Jan 31/81
	403	Mar 31/78		405	Jan 31/81
	404	Blank		406	Jan 31/81
REP 5-240-1	401	Dec 30/74		407	Jan 31/81
	402	Blank		408	Blank
REP 5-240-2	401	Jun 30/78	Assembly	501	Dec 30/74
	402	Jun 30/78		502	Dec 30/74
REP 5-240-3	401	Jun 30/97		503	May 31/84
	402	Jun 30/78		504	Dec 30/74
	403	Jun 30/78		505	Dec 30/74
	404	Jun 30/78		506	May 31/84
	405	Jun 30/78		507	Dec 30/74
	406	Jun 30/78		508	Dec 30/74
	407	Jun 30/78		509	Apr 30/93
	408	Jun 30/78		510	Dec 30/74
	409	Jun 30/78		511	Jun 15/82
	410	Jun 30/78		512	Blank
	411	Jun 30/78	Fits and Clearances	601	Dec 15/76
	412	Blank		602	Dec 15/76
REP 5-240-4	401	Sep 30/78		603	Oct 31/81
	402	Apr 30/93		604	Oct 31/81
	403	Sep 30/78		605	Apr 30/93
	404	Sep 30/78		606	Apr 30/93
	405	Sep 30/78		607	Dec 15/76
	406	Sep 30/78		608	Dec 15/76
				609	Dec 15/76
				610	Dec 15/76



OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

## CHAPTER 78

## OVERHAUL

## LIST OF EFFECTIVE PAGES

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
Storage	901	Dec 31/01	Intro. (Cont'd)	4	Dec 30/74
	902	Dec 30/74		5	Apr 30/93
	903	Dec 30/74		6	Blank
	904	Dec 30/74	NI ALPHA 1001		
	905	Dec 30/74		1	Apr 30/93
	906	Dec 30/74		2	Blank
	907	Dec 30/74			
	908	Blank			
STE (List)	1001	Dec 15/75	NI/NUM 1101	1	Dec 15/76
	1002	Blank		2	Apr 30/93
				3	Dec 15/76
				4	Blank
Special Tools Fixtures and Equipment	1001	Dec 15/75	Detailed Parts List	1101-0	Dec 30/74
	1002	Dec 15/75		1101-1	Dec 15/76
	1003	Dec 15/75		1102-0	Dec 30/74
	1004	Dec 15/75		1102-1	Dec 15/76
	1005	Dec 15/75		1103-0	Dec 30/74
	1006	Dec 15/75		1103-1	Apr 30/93
	1007	Dec 15/75		1104-0	Dec 30/74
	1008	Dec 15/75		1104-1	Dec 15/76
	1009	Dec 15/75		1105-0	Dec 30/74
	1010	Dec 15/75		1105-1	Dec 15/76
	1011	Dec 15/75		1105-2	Blank
	1012	Dec 15/75	78-12-01 Divider Title Page		
	1013	Dec 15/75			
	1014	Dec 15/75			1975
	1015	Dec 15/75			
	1016	Dec 15/75	List of Chapters	1	Dec 15/76
	1017	Dec 15/75		2	Mar 31/78
	1018	Dec 15/75		3	Mar 31/78
Illustrated Parts List TP 1001				4	Dec 31/01
				5	Jan 31/81
	1	Dec 30/74		6	Oct 31/81
Intro. 1011	1	Dec 30/74	Foreword	1	Dec 15/76
	2	Dec 30/74		2	Blank
	3	Dec 30/74			



OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

## LIST OF EFFECTIVE PAGES

## OVERHAUL

## CHAPTER 78

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
Description/ Operation	1	Dec 30/74	Inspection (Cont'd)	317	Sep 30/99
	2	Dec 30/74		318	Sep 30/99
	3	Dec 30/74		319	Jun 30/00
	4	Dec 30/74		320	Jun 30/00
	5	Dec 30/74	Repair Foreword		
	6	Dec 30/74		401	Dec 30/74
	7	Dec 30/74		402	Dec 30/74
	8	Dec 30/74		403	Dec 15/75
Disassembly				404	Dec 15/75
	101	Dec 15/75	Repair Parts List		
	102	Dec 15/75		401	Apr 30/93
	103	Dec 15/75		402	Apr 30/93
	104	Dec 15/75		403	Apr 30/93
	105	Dec 15/75		404	Blank
	106	Dec 15/75			
Cleaning	201	Dec 30/74	REP 1-10-1	401	Dec 30/74
	202	Nov 30/77		402	Blank
	203	Nov 30/77	REP 1-100-1	401	Dec 30/74
	204	Apr 30/93		402	Dec 30/74
	205	Nov 30/77			
	206	Blank			
Inspection	301	Dec 30/74	REP 1-100-2A	401	Apr 30/76
	302	Dec 31/01		402	Apr 30/76
	303	Dec 30/74		403	Apr 30/76
	304	Apr 30/93		404	Apr 30/76
	305	Dec 30/74		405	Apr 30/76
	306	Dec 30/74		406	Apr 30/76
	307	Dec 15/75	REP 1-100-2B	401	May 31/77
	308	Dec 15/75		402	Dec 15/75
	309	Dec 15/75		403	Dec 15/75
	310	Dec 15/75		404	Dec 15/75
	311	Dec 15/75		405	Dec 15/75
	312	Jun 30/97		406	Dec 15/75
	313	Mar 31/78	REP 1-180-0	401	Dec 30/74
	314	Mar 31/78		402	Blank
	315	Apr 30/93			
	316	Dec 15/75			



# OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

## LIST OF EFFECTIVE PAGES

### OVERHAUL

### CHAPTER 78

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
REP 2-60A-1	401	Jan 31/77	REP 4-50-1 (Cont'd)	404	Jun 30/97
	402	Jan 31/77		405	Jun 30/97
	403	Jan 31/77		406	Jun 30/97
	404	Blank		407	Jun 30/97
REP 2-120-1	401	Dec 15/75		408	Jun 30/97
	402	Dec 15/75		409	Jun 30/97
REP 3-30-1	401	Dec 30/74		410	Jun 30/97
	402	Blank		411	Jun 30/97
REP 3-30-2	401	Dec 30/74	REP 4-110-1	412	Jun 30/97
	402	Blank		401	Dec 30/74
REP 3-100-1	401	Dec 30/74	REP 4-110-2	402	Blank
	402	Blank		401	Jun 30/78
REP 3-170-1	401	Dec 30/74	REP 4-110A-3	402	Jun 30/78
	402	Blank		403	Jun 30/78
REP 3-220-1	401	Dec 30/74		404	Dec 15/75
	402	Blank		405	Dec 15/75
REP 3-220-2	401	Dec 30/74		406	Blank
	402	Blank	REP 4-110A-4	401	Dec 15/75
REP 3-220-3	401	Dec 30/74		402	Dec 15/75
	402	Blank	REP 4-110B-3	401	Jun 30/78
REP 3-220-4	401	Dec 30/74		402	Jun 30/78
	402	Dec 30/74		403	Dec 15/75
REP 3-230-1	401	Dec 30/74		404	Blank
	402	Blank	REP 4-110B-4	401	Apr 30/76
REP 3-320-1	401	Mar 31/78		402	Apr 30/76
	402	Mar 31/78		403	Apr 30/76
	403	Mar 31/78		404	Blank
	404	Mar 31/78	REP 4-110-5	401	Deleted
REP 4-50-1	401	Jun 30/97		402	Deleted
	402	Jun 30/97	REP 4-110A-5	401	Apr 30/76
	403	Jun 30/97		402	Mar 31/78



OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

## LIST OF EFFECTIVE PAGES

## OVERHAUL

## CHAPTER 78

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
REP 4-110-6	401	Sep 30/78	REP 5-90-2 (Cont'd)	409	Jan 31/81
	402	Sep 30/78		410	Blank
	403	Sep 30/78	REP 5-150-1	401	Dec 15/75
	404	Sep 30/78		402	Dec 15/75
	405	Sep 30/78	REP 6-110-1	401	Dec 30/74
	406	Blank		402	Blank
REP 4-120-1	401	Apr 30/93	REP 6-190-1	401	Dec 30/74
	402	Blank		402	Blank
REP 4-120-2	401	Apr 30/93	REP 6-190-2	401	Dec 15/75
	402	Blank		402	Dec 15/75
REP 5-10-1	401	Dec 30/74		403	Dec 15/75
	402	Blank		404	Dec 15/75
REP 5-10-2	401	Dec 15/75		405	Dec 15/75
	402	Dec 15/75		406	Dec 15/75
	403	Dec 15/75		407	Mar 31/78
	404	Dec 15/75		408	Dec 15/75
	405	Dec 15/75	REP 6-190-3	401	Apr 30/93
	406	Dec 15/75		402	Dec 30/74
	407	Dec 15/75		403	Dec 30/74
	408	Dec 15/75		404	Dec 30/74
	409	Dec 15/75	REP 6-190C-4	401	Dec 15/75
	410	Oct 31/81		402	Dec 15/75
REP 5-10-3	401	Dec 30/74	REP 6-190-5	401	Jan 31/81
	402	Blank		402	Jan 31/81
REP 5-90-1	401	Dec 30/74		403	Jan 31/81
	402	Blank		404	Blank
REP 5-90-2	401	Jan 31/81	REP 6-190-6	401	Oct 31/81
	402	Jan 31/81		402	Oct 31/81
	403	Jan 31/81	Assembly	501	Dec 15/75
	404	Jan 31/81		502	Dec 30/74
	405	Jan 31/81		503	Apr 30/93
	406	Jan 31/81		504	Apr 30/93
	407	Jan 31/81			
	408	Jan 31/81			





OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

## LIST OF EFFECTIVE PAGES

## OVERHAUL

## CHAPTER 78

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
Assembly (Cont'd)	504A	Apr 30/93	Fits and Clearances (Cont'd)	612	Dec 15/75
	504B	Blank		613	Dec 15/75
	505	Apr 30/93		614	Dec 15/75
	506	Dec 30/74		615	Dec 15/75
	507	Apr 30/93		616	Oct 31/81
	508	Apr 30/93		617	Dec 15/75
	508A	Apr 30/93		618	Dec 15/75
	508B	Blank		619	Dec 15/75
	509	Apr 30/93		620	Dec 15/75
	510	Dec 30/74		621	Dec 15/75
	509A	Apr 30/93		622	Dec 15/75
	509B	Blank		623	Dec 15/75
	511	Apr 30/93		624	Dec 15/75
	512	Apr 30/93		625	Dec 15/75
	512A	Apr 30/93		626	Blank
	512B	Blank	Testing	701	Dec 15/75
	513	Dec 15/75		702	Oct 31/81
	514	May 31/77		703	Dec 15/75
	513A	Dec 15/75		704	Blank
	513B	Blank	Storage	901	Dec 31/01
	515	Oct 31/81		902	Dec 15/75
	516	Dec 30/74		903	Dec 30/74
	517	Apr 30/93		904	Dec 15/75
	518	Dec 30/74		905	Dec 15/75
	519	Dec 30/74		906	Blank
	520	Apr 30/93	STE (List)	1001	May 31/84
	521	Dec 15/75		1002	Blank
	522	Dec 15/75	Special Tools Fixtures and Equipment		
Fits and Clearances	601	Dec 30/74		1001	Dec 15/75
	602	Dec 30/74		1002	Dec 15/75
	603	Oct 31/81		1003	Dec 15/75
	604	Oct 31/81		1004	Dec 15/75
	605	Oct 31/81		1005	Dec 15/75
	606	Blank		1006	Dec 15/75
	607	Dec 15/75		1007	Dec 15/75
	608	Dec 15/75			
	609	Dec 15/75			
	610	Oct 31/81			
	611	Oct 31/81			



OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

## LIST OF EFFECTIVE PAGES

## OVERHAUL

## CHAPTER 78

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
Special	1008	Dec 15/75	NI/NUM 1101	2	Aug 31/77
Tools	1009	Dec 15/75	(Cont'd)	3	Apr 30/93
Fixtures and	1010	Dec 15/75		4	Apr 30/93
Equipment	1011	Dec 15/75		5	Apr 30/93
(Cont'd)	1012	Dec 15/75		6	Apr 30/93
	1013	Dec 15/75			
	1014	Dec 15/75	Detailed		
	1015	Dec 15/75	Parts List	1101-0	Dec 30/74
	1016	Dec 15/75		1101-1	Apr 30/93
	1017	Apr 30/93		1102-0	Dec 30/74
	1018	Dec 15/75		1102-1	Apr 30/93
	1019	Dec 15/75		1102-2	Apr 30/93
	1020	Dec 15/75		1103-0	Dec 30/74
	1021	Apr 30/93		1103-1	Apr 30/93
	1022	Dec 15/75		1103-2	Apr 30/93
	1023	Apr 30/93		1104-0	Dec 15/76
	1024	Dec 15/75		1104-1	Aug 31/77
	1025	Dec 15/75		1105-0	Dec 30/74
	1026	Dec 15/75		1105-1	Dec 15/76
	1027	Dec 15/75		1106-0	Dec 30/74
	1028	Dec 15/75		1106-1	Sep 30/78
	1029	May 31/84		1106-2	Sep 30/78
	1030	May 31/84			
			Book 2		
			Volume 2		
Illustrated					
Parts List					
TP 1101	1	Dec 30/74	78-13-01		
			Divider		
Intro.	1	Dec 30/74			
1101	2	Dec 30/74	Title Page		1975
	3	Dec 30/74			
	4	Dec 30/74	List of		
	5	Apr 30/93	Chapters	1	Dec 15/76
	6	Blank		2	Aug 31/79
				3	Jun 15/82
NI/ALPHA				4	Apr 30/93
1101	1	Apr 30/93		5	Apr 30/93
	2	Blank		6	Apr 30/93
				7	Apr 30/93
NI/NUM 1101	1	Apr 30/93		8	Jun 30/97



# OLYMPUS 593

## MK. 610-14-28

### OVERHAUL



sneema

#### LIST OF EFFECTIVE PAGES

#### OVERHAUL

#### CHAPTER 78

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
List of Chapters (Cont'd)	9	Apr 30/93	Disassembly (Cont'd)	105	Oct 31/81
	10	Apr 30/93		106	May 31/76
	11	Apr 30/93		107	May 31/76
	12	Blank		108	May 31/76
Foreword	1	Dec 15/76		109	May 31/76
	2	Blank		110	May 31/76
Description/ Operation				111	May 31/76
				112	May 31/76
	1	Dec 30/74		113	May 31/76
	2	Dec 30/74		114	May 31/76
	3	Apr 30/93		115	May 31/76
	4	Dec 30/74		116	May 31/76
	5	Dec 30/74		117	Aug 31/79
	6	Dec 30/74		118	May 31/76
	7	Dec 30/74		119	Aug 31/79
	8	Dec 30/74		120	May 31/76
	9	Dec 30/74		121	May 31/76
	10	Dec 30/74		122	May 31/76
	11	Dec 30/74		123	May 31/76
	12	Dec 30/74		124	May 31/76
	13	Dec 30/74		125	May 31/76
	14	Dec 30/74		126	May 31/76
	15	Dec 30/74		127	May 31/76
	16	Dec 30/74		128	Oct 31/81
	17	Dec 30/74		129	May 31/76
	18	Dec 15/75		130	May 31/76
	19	Dec 15/75		131	May 31/76
	20	Dec 15/75		132	May 31/76
	21	Dec 15/75		133	May 31/77
	22	Dec 15/75		134	May 31/76
	23	Dec 15/75		135	May 31/76
	24	Dec 15/75		136	Apr 30/93
	25	Dec 15/75		137	Apr 30/93
	26	Dec 15/75		138	Apr 30/93
Disassembly				139	Apr 30/93
	101	May 31/76		140	Apr 30/93
	102	May 31/76		141	Aug 31/79
	103	May 31/76		142	Aug 31/79
	104	May 31/76		143	Aug 31/79
				144	Aug 31/79
				145	Apr 30/93



OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

## LIST OF EFFECTIVE PAGES

## OVERHAUL

## CHAPTER 78

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
Disassembly (Cont'd)	146	Aug 31/79	Twin Sec. Nozzle Assy Removable (Cont'd)	308	Aug 31/79
	147	Aug 31/79		309	Jun 15/82
	148	Apr 30/93		310	Jun 15/82
	149	Aug 31/79		311	Jun 15/82
	150	Aug 31/79		312	Jun 15/82
	151	Aug 31/79		313	Apr 30/93
	152	Aug 31/79		314	Apr 30/93
	153	Aug 31/79		315	Apr 30/93
	154	Aug 31/79		316	Aug 31/79
	155	Aug 31/79		317	Aug 31/79
	156	Aug 31/79		318	Jun 15/82
	157	Aug 31/79		319	Apr 30/93
	158	Blank		320	Apr 30/93
				321	Jun 15/82
				322	Jun 15/82
Cleaning	201	May 31/76		323	Jun 15/82
	202	May 31/76		324	Jun 15/82
	203	May 31/76		325	Apr 30/93
	204	Apr 30/93		326	Apr 30/93
	205	Dec 15/76		327	Jun 15/82
	206	Apr 30/93		328	Apr 30/93
	207	May 31/76		329	Jun 15/82
	208	May 31/76		330	Jun 15/82
	209	Aug 31/79		331	Jun 15/82
	210	Apr 30/93		332	Jun 15/82
				333	Jun 15/82
Inspection/ Check General				334	Apr 30/93
	301	Jan 15/76		335	Jun 15/82
	302	Apr 30/93		336	Jun 15/82
	303	Jan 15/76			
	304	Dec 31/01			
Twin Sec. Nozzle Assy Removable			Basic Twin Sec. Nozzle	301	Jan 15/76
				302	Blank
	301	Jan 15/76	Identi- fication		
	302	Jan 15/76		301	Jan 15/76
	303	Aug 31/79		302	May 31/77
	304	Aug 31/79		303	Jan 15/76
	305	Apr 30/93		304	Nov 30/77
	306	Aug 31/79		305	Nov 30/77
	307	Aug 31/79		306	Nov 30/77
				307	Nov 30/77



# OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

## LIST OF EFFECTIVE PAGES

### OVERHAUL

### CHAPTER 78

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
Identi- fication (Cont'd)	308	Nov 30/77	Identi- fication (Cont'd)	349	Nov 30/77
	309	Nov 30/77		350	Nov 30/77
	310	Nov 30/77		351	Nov 30/77
	311	Nov 30/77		352	Nov 30/77
	312	Nov 30/77		353	Nov 30/77
	313	Nov 30/77		354	Nov 30/77
	314	Nov 30/77		355	Nov 30/77
	315	Nov 30/77		356	Nov 30/77
	316	Nov 30/77		357	Nov 30/77
	317	Nov 30/77		358	Nov 30/77
	318	Nov 30/77		359	Nov 30/77
	319	Nov 30/77		360	Nov 30/77
	320	Nov 30/77		361	Nov 30/77
	321	Nov 30/77		362	Nov 30/77
	322	Nov 30/77		363	Nov 30/77
	323	Nov 30/77		364	Nov 30/77
	324	Nov 30/77		365	Nov 30/77
	325	Nov 30/77		366	Nov 30/77
	326	Apr 30/93		367	Nov 30/77
	327	Nov 30/77		368	Nov 30/77
	328	Nov 30/77		369	Nov 30/77
	329	Nov 30/77		370	Nov 30/77
	330	Nov 30/77		371	Nov 30/77
	331	Nov 30/77		372	Nov 30/77
	332	Nov 30/77		373	Nov 30/77
	333	Nov 30/77		374	Nov 30/77
	334	Nov 30/77		375	Nov 30/77
	335	Nov 30/77		376	Nov 30/77
	336	Nov 30/77		377	Nov 30/77
	337	Nov 30/77		378	Nov 30/77
	338	Nov 30/77		379	Nov 30/77
	339	Nov 30/77		380	Nov 30/77
	340	Nov 30/77		381	Nov 30/77
	341	Nov 30/77		382	Nov 30/77
	342	Nov 30/77		383	Nov 30/77
	343	Nov 30/77		384	Nov 30/77
	344	Nov 30/77		385	Nov 30/77
	345	Nov 30/77		386	Nov 30/77
	346	Nov 30/77		387	Nov 30/77
	347	Nov 30/77		388	Nov 30/77
	348	Nov 30/77		389	Nov 30/77



OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

## LIST OF EFFECTIVE PAGES

## OVERHAUL

## CHAPTER 78

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
Identi- fication (Cont'd)	390	Nov 30/77	Permissible Damage	301	Jan 31/77
	391	Nov 30/77		302	Jan 31/77
	392	Nov 30/77		303	Jan 31/77
	393	Nov 30/77		304	Jan 31/77
	394	Nov 30/77		305	Jan 31/77
	395	Nov 30/77		306	Jan 31/77
	396	Nov 30/77		307	Jan 31/77
	397	Nov 30/77		308	Jan 31/77
	398	Blank		309	Jan 31/77
				310	Jan 31/77
Restricted Areas	301	Jan 15/76		311	Jan 31/77
	302	Jan 15/76		312	Jan 31/77
	303	Jan 15/76		313	Jan 31/77
	304	Jan 15/76		314	Jan 31/77
	305	Jan 15/76		315	Jan 31/77
	306	Jan 15/76		316	Jan 31/77
	307	Jan 15/76		317	Jan 31/77
	308	Jan 15/76		318	Jan 31/77
	309	Jan 15/76		319	Jan 31/77
	310	Jan 15/76		320	Jan 31/77
	311	Jan 15/76		321	Jan 31/77
	312	Jan 15/76		322	Jun 15/82
	313	Jan 15/76		323	Jun 30/97
	314	Jan 15/76		324	Apr 30/93
	315	Jan 15/76		325	Jun 15/82
	316	Jan 15/76		326	Jun 15/82
Inspection Methods				327	Jun 15/82
	301	Jan 15/76		328	Jun 15/82
	302	Jan 15/76		329	Jun 15/82
	303	Jan 15/76		330	Apr 30/93
	304	Jan 15/76		331	Jun 15/82
	305	Jan 15/76		332	Jun 15/82
	306	Jan 15/76	Repair Foreword		
	307	Jan 15/76		401	May 31/76
	308	Jan 15/76		402	May 31/76
	309	Jan 15/76		403	May 31/76
	310	Blank		404	May 31/76



# OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

## LIST OF EFFECTIVE PAGES

OVERHAUL

CHAPTER 78

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
Repair Parts List	401	Apr 30/93	REP 3-10-1	401	May 31/76
	402	Apr 30/93		402	May 31/76
	403	Apr 30/93		403	May 31/76
	404	Apr 30/93		404	May 31/76
	405	Apr 30/93	REP 3-10-2	401	May 31/76
	406	Apr 30/93		402	May 31/76
	407	Apr 30/93			
	408	Jun 30/97	REP 3-10-3	401	Apr 30/93
	409	Jun 30/97		402	Jan 31/81
	410	Jun 30/97		403	Jan 31/81
	411	Jun 30/97		404	Jan 31/81
	412	Jun 30/97		405	Jan 31/81
	413	Jun 30/97		406	Jan 31/81
	414	Jun 30/97		407	Jan 31/81
	415	Jun 30/97		408	Jan 31/81
	416	Jun 30/97		409	Apr 30/93
	417	Jun 30/97		410	Apr 30/93
	418	Jun 30/97		411	Jan 31/81
REP 1-10-1	401	Apr 30/93		412	Jan 31/81
	402	Jan 31/81		413	Jan 31/81
	403	Jan 31/81		414	Jan 31/81
	404	Blank		415	Jan 31/81
REP 1-10-2	401	Jun 15/82		416	Jan 31/81
	402	Jun 15/82		417	Jan 31/81
	403	Jun 15/82	REP 3-10-4	418	Jan 31/81
	404	Jun 15/82		401	Apr 30/93
	405	Jun 15/82		402	Sep 30/78
	406	Jun 15/82		403	Apr 30/93
	407	Jun 15/82		404	Sep 30/78
	408	Jun 15/82		405	Sep 30/78
	409	Jun 15/82		406	Sep 30/78
	410	Jun 15/82		407	Sep 30/78
	411	Jun 15/82		408	Sep 30/78
	412	Jun 15/82		409	Sep 30/78
	413	Jun 15/82		410	Sep 30/78
	414	Jun 15/82		411	Sep 30/78
	415	Jun 15/82		412	Sep 30/78
	416	Blank			

78



OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

## LIST OF EFFECTIVE PAGES

## OVERHAUL

## CHAPTER 78

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
REP 5-130-1	401	Mar 31/77	REP 8-100-1	401	May 31/76
	402	Mar 31/77		402	May 31/76
	403	Mar 31/77	REP 9-10-1	401	Apr 30/93
	404	Mar 31/77		402	Aug 31/77
	405	Mar 31/77		403	Aug 31/77
	406	Mar 31/77		404	Aug 31/77
REP 5-260-1	401	Apr 30/93		405	Aug 31/77
	402	Apr 30/93		406	Aug 31/77
	403	Apr 30/93		407	Apr 30/93
	404	Apr 30/93		408	Blank
	405	Apr 30/93	REP 9-10-2	401	Apr 30/93
	406	Apr 30/93		402	Sep 30/78
	407	Apr 30/93		403	Sep 30/78
	408	Apr 30/93		404	Sep 30/78
	409	Apr 30/93		405	Sep 30/78
	410	Blank		406	Sep 30/78
REP 5-260-2	401	Apr 30/93		407	Sep 30/78
	402	Oct 31/81		408	Sep 30/78
REP 5-260-3	401	Apr 30/93		409	Sep 30/78
	402	Oct 31/81		410	Sep 30/78
	403	Oct 31/81	REP 9-530-1	401	Apr 30/93
	404	Blank		402	Mar 31/78
REP 7-10-1	401	Aug 31/77	REP 11-10-1	401	Apr 30/93
	402	Aug 31/77		402	May 31/76
REP 8-10-1	401	Apr 30/93		403	May 31/76
	402	Apr 30/93		404	May 31/76
	403	Apr 30/93		405	May 31/76
	404	Apr 30/93		406	May 31/76
	405	Apr 30/93		407	May 31/76
	406	Blank		408	Apr 30/93
REP 8-50-1	401	Oct 31/81		409	Apr 30/93
	402	Oct 31/81		410	Blank
REP 8-90-1	401	May 31/76	REP 11-10-2	401	May 31/76
	402	May 31/76		402	May 31/76



**OLYMPUS 593****MK. 610-14-28****OVERHAUL****sneema****LIST OF EFFECTIVE PAGES****OVERHAUL****CHAPTER 78**

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
REP 11-10-3	401	Jan 31/81	REP 18-110-2	401	Mar 31/78
	402	Jan 31/81		402	Blank
	403	Apr 30/93	REP 18-110-3	401	Apr 30/93
	404	Jan 31/81		402	Apr 30/93
	405	Jan 31/81		403	Apr 30/93
	406	Jan 31/81		404	Apr 30/93
	407	Jan 31/81			
	408	Jan 31/81			
	409	Jan 31/81	REP 18-110-4	401	Apr 30/93
	410	Jan 31/81		402	Apr 30/93
REP 11-130-1	401	May 31/76	REP 18-270-1	401	Mar 31/77
	402	May 31/76		402	Mar 31/77
	403	May 31/76	REP 18-340-1	401	Mar 31/77
	404	Blank		402	Mar 31/77
REP 12-10B-1	401	Mar 31/77	REP 18-340-2	401	Mar 31/77
	402	Mar 31/77		402	Apr 30/93
	403	Mar 31/77	REP 18-340-3	401	Mar 31/78
	404	Mar 31/77		402	Blank
	405	Mar 31/77	REP 18-340-4	401	Apr 30/93
	406	Mar 31/77		402	Apr 30/93
	407	Mar 31/77	REP 19-40-1	401	Mar 31/77
	408	Oct 30/77		402	Blank
REP 16-220-1	401	Mar 31/77	REP 19-100-1	401	Apr 30/93
	402	Mar 31/77		402	Mar 31/77
REP 17-110-1	401	Mar 31/77	REP 19-100-2	401	Apr 30/93
	402	Mar 31/77		402	Mar 31/77
REP 17-110-2	401	Mar 31/78	REP 19-100-3	401	Apr 30/93
	402	Blank		402	Blank
REP 17-150-1	401	Mar 31/78	REP 19-100-4	401	Apr 30/93
	402	Blank		402	Apr 30/93
REP 18-110-1	401	Mar 31/77			
	402	Mar 31/77			



# OLYMPUS 593

MK. 610-14-28

OVERHAUL



## LIST OF EFFECTIVE PAGES

### OVERHAUL

### CHAPTER 78

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
REP 20-150-1	401	Mar 31/78	REP 29-190-1	401	Apr 30/93
	402	Mar 31/78		402	Mar 31/77
REP 20-170-1	401	Mar 31/77		403	Mar 31/77
	402	Mar 31/77		404	Mar 31/77
REP 22-20-1	401	Mar 31/78		405	Mar 31/77
	402	Blank		406	Mar 31/77
REP 22-30-1	401	Mar 31/77		407	Mar 31/77
	402	Mar 31/77		408	Blank
REP 22-85-1	401	Oct 31/81	REP 29-190-2	401	Apr 30/93
	402	Blank		402	Mar 31/77
REP 22-85-2	401	Jun 15/82		403	Mar 31/77
	402	Jun 15/82		404	Mar 31/77
	403	Jun 15/82		405	Mar 31/77
	404	Jun 15/82		406	Apr 30/93
	405	Jun 15/82		407	Mar 31/77
	406	Jun 15/82		408	Mar 31/77
	407	Jun 15/82		409	Mar 31/77
	408	Jun 15/82		410	Mar 31/77
	409	Jun 15/82		411	Mar 31/77
	410	Jun 15/82		412	Mar 31/77
	411	Jun 15/82		413	Mar 31/77
	412	Jun 15/82		414	Mar 31/77
	413	Jun 15/82		415	Mar 31/77
	414	Jun 15/82		416	Mar 31/77
	415	Jun 15/82		417	Mar 31/77
	416	Jun 15/82		418	Mar 31/77
	417	Jun 15/82		419	Mar 31/77
	418	Blank		420	Mar 31/77
REP 23-10-1	401	Mar 31/77		421	Mar 31/77
	402	Mar 31/77		422	Mar 31/77
REP 25-10-1	401	Mar 31/77		423	Mar 31/77
	402	Mar 31/77		424	Mar 31/77
	403	Mar 31/77		425	Mar 31/77
	404	Blank		426	Mar 31/77
				427	Mar 31/77
				428	Mar 31/77
				429	Mar 31/77
				430	Mar 31/77
				431	Mar 31/77
				432	Blank



# OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

## LIST OF EFFECTIVE PAGES

OVERHAUL

CHAPTER 78

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
REP 29-190-3	401	Jun 30/97	REP 29-190-6 (Cont'd)	409	Jan 31/81
	402	Apr 30/93		410	Jan 31/81
	403	Aug 31/79		411	Jan 31/81
	404	Aug 31/79		412	Jan 31/81
	405	Mar 31/77		413	Jan 31/81
	406	Aug 31/79		414	Jan 31/81
	407	Jun 30/97		415	Jan 31/81
	408	Aug 31/79		416	Jan 31/81
	409	Jun 30/97		417	Jan 31/81
	410	Aug 31/79		418	Jan 31/81
	411	Jun 30/97		419	Jan 31/81
	412	Aug 31/79		420	Jan 31/81
	413	Aug 31/79		421	Jan 31/81
	414	Jun 30/97		422	Jan 31/81
	415	Aug 31/79	REP 29-190-7	401	Mar 31/77
	416	Aug 31/79		402	Mar 31/77
	417	Jun 30/97		403	Mar 31/77
	418	Mar 31/77		404	Mar 31/77
	419	Aug 31/79		405	Mar 31/77
	420	Blank		406	Mar 31/77
REP 29-190-4	401	Jun 30/97	REP 19-190-8	401	Apr 30/93
	402	Mar 31/77		402	Apr 30/93
	403	Mar 31/77		403	Mar 31/78
	404	Mar 31/77		404	Mar 31/78
	405	Mar 31/77		405	Mar 31/78
	406	Mar 31/77		406	Mar 31/78
	407	Jun 30/97		407	Mar 31/78
	408	Blank		408	Mar 31/78
REP 29-190-5	401	Mar 31/77		409	Mar 31/78
	402	Mar 31/77		410	Mar 31/78
REP 29-190-6	401	Jan 31/81		411	Mar 31/78
	402	Jan 31/81		412	Mar 31/78
	403	Jan 31/81		413	Mar 31/78
	404	Jan 31/81		414	Mar 31/78
	405	Jan 31/81		415	Mar 31/78
	406	Jan 31/81		416	Mar 31/78
	407	Jan 31/81		417	Mar 31/78
	408	Jan 31/81		418	Mar 31/78
				419	Mar 31/78

**OLYMPUS 593****MK. 610-14-28****OVERHAUL****sneema**

## LIST OF EFFECTIVE PAGES

## OVERHAUL

## CHAPTER 78

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
REP 19-190-8 (Cont'd)	420	Mar 31/78	REP 29-190-9 (Cont'd)	436	Oct 31/81
	421	Mar 31/78		437	Oct 31/81
	422	Mar 31/78		438	Oct 31/81
	423	Mar 31/78		439	Oct 31/81
	424	Mar 31/78		440	Oct 31/81
REP 29-190-9				441	Oct 31/81
	401	Oct 31/81		442	Oct 31/81
	402	Mar 31/78		443	Oct 31/81
	403	Apr 30/93		444	Oct 31/81
	404	Oct 31/81		445	Oct 31/81
	405	Oct 31/81		446	Oct 31/81
	406	Oct 31/81		447	Oct 31/81
	407	Oct 31/81		448	Oct 31/81
	408	Oct 31/81		449	Oct 31/81
	409	Oct 31/81		450	Oct 31/81
	410	Oct 31/81		451	Oct 31/81
	411	Apr 30/93		452	Oct 31/81
	412	Oct 31/81		453	Oct 31/81
	413	Oct 31/81		454	Oct 31/81
	414	Oct 31/81		455	Oct 31/81
	415	Apr 30/93		456	Oct 31/81
	416	Oct 31/81		457	Oct 31/81
	417	Oct 31/81		458	Oct 31/81
	418	Oct 31/81		459	Oct 31/81
	419	Oct 31/81		460	Oct 31/81
	420	Oct 31/81	REP 29-190-10	401	May 31/84
	421	Oct 31/81		402	Jan 31/81
	422	Oct 31/81		403	Jan 31/81
	423	Oct 31/81		404	May 31/84
	424	Oct 31/81		405	May 31/84
	425	Oct 31/81		406	May 31/84
	426	Oct 31/81		407	May 31/84
	427	Oct 31/81		408	May 31/84
	428	Oct 31/81		409	May 31/84
	429	Oct 31/81		410	May 31/84
	430	Oct 31/81		411	May 31/84
	431	Oct 31/81		412	May 31/84
	432	Oct 31/81		413	May 31/84
	433	Oct 31/81		414	May 31/84
	434	Oct 31/81			
	435	Oct 31/81			



# OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

## LIST OF EFFECTIVE PAGES

### OVERHAUL

### CHAPTER 78

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
REP 29-190-11	401	Aug 31/77	REP 29-190-16 (Cont'd)	412	Jan 31/81
	402	Aug 31/77		413	Jan 31/81
	403	Aug 31/77		414	Jan 31/81
	404	Aug 31/77		415	Jan 31/81
	405	Aug 31/77		416	Jan 31/81
	406	Blank		417	Jan 31/81
REP 29-190-12	401	Sep 30/78		418	Jan 31/81
	402	Sep 30/78		419	Jan 31/81
	403	Sep 30/78		420	Jan 31/81
	404	Sep 30/78		421	Jan 31/81
	405	Sep 30/78		422	Jan 31/81
	406	Sep 30/78		423	Jan 31/81
	407	Sep 30/78		424	Jan 31/81
	408	Blank		425	Jan 31/81
REP 29-190-13	401	Sep 30/78	REP 29-190-17	426	Blank
	402	Sep 30/78		401	Apr 30/93
	403	Sep 30/78		402	Apr 30/93
	404	Blank		403	Sep 30/78
REP 29-190-14	401	Aug 31/77		404	Sep 30/78
	402	Aug 31/77		405	Sep 30/78
	403	Aug 31/77		406	Sep 30/78
	404	Aug 31/77		407	Sep 30/78
	405	Aug 31/77		408	Sep 30/78
	406	Aug 31/77		409	Sep 30/78
	407	Aug 31/77		410	Sep 30/78
	408	Aug 31/77		411	Sep 30/78
REP 29-190-16	401	Jan 31/81		412	Sep 30/78
	402	Jan 31/81		413	Sep 30/78
	403	Jan 31/81		414	Sep 30/78
	404	Jan 31/81		415	Sep 30/78
	405	Jan 31/81		416	Sep 30/78
	406	Jan 31/81		417	Sep 30/78
	407	Jan 31/81		418	Sep 30/78
	408	Jan 31/81		419	Sep 30/78
	409	Jan 31/81		420	Sep 30/78
	410	Jan 31/81		421	Sep 30/78
	411	Jan 31/81		422	Sep 30/78
				423	Sep 30/78
				424	Sep 30/78

**OLYMPUS 593****MK. 610-14-28****OVERHAUL****sneema****LIST OF EFFECTIVE PAGES****OVERHAUL****CHAPTER 78**

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
REP 29-190-17 (Cont'd)	425	Sep 30/78	REP 29-190-19 (Cont'd)	404	Sep 30/78
	426	Sep 30/78		405	Sep 30/78
	427	Sep 30/78		406	Sep 30/78
	428	Sep 30/78		407	Sep 30/78
	429	Sep 30/78		408	Sep 30/78
	430	Sep 30/78		409	Sep 30/78
	431	Sep 30/78		410	Sep 30/78
	432	Sep 30/78		411	Sep 30/78
REP 29-190-18	401	Jan 31/81		412	Sep 30/78
	402	Jan 31/81		413	Sep 30/78
	403	Jan 31/81		414	Sep 30/78
	404	Jan 31/81		415	Sep 30/78
	405	Jan 31/81		416	Sep 30/78
	406	Jan 31/81		417	Sep 30/78
	407	Jan 31/81		418	Sep 30/78
	408	Jan 31/81		419	Sep 30/78
	409	Jan 31/81		420	Sep 30/78
	410	Jan 31/81		421	Sep 30/78
	411	Jan 31/81		422	Sep 30/78
	412	Jan 31/81		423	Sep 30/78
	413	Jan 31/81		424	Sep 30/78
	414	Jan 31/81		425	Sep 30/78
	415	Jan 31/81		426	Sep 30/78
	416	Jan 31/81		427	Sep 30/78
	417	Jan 31/81		428	Sep 30/78
	418	Jan 31/81		429	Sep 30/78
	419	Jan 31/81		430	Sep 30/78
	420	Jan 31/81		431	Sep 30/78
	421	Jan 31/81		432	Sep 30/78
	422	Jan 31/81		433	Sep 30/78
	423	Jan 31/81		434	Sep 30/78
	424	Jan 31/81		435	Sep 30/78
	425	Jan 31/81		436	Sep 30/78
	426	Jan 31/81		437	Sep 30/78
	427	Jan 31/81		438	Sep 30/78
	428	Jan 31/81		439	Sep 30/78
REP 29-190-19	401	Sep 30/78		440	Sep 30/78
	402	Sep 30/78		441	Sep 30/78
	403	Sep 30/78		442	Sep 30/78
				443	Sep 30/78



# OLYMPUS 593



MK. 610-14-28

sneema

OVERHAUL

## LIST OF EFFECTIVE PAGES

### OVERHAUL

### CHAPTER 78

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
REP 29-190-19 (Cont'd)	444	Sep 30/78	REP 29-190-21	401	Jun 15/82
	445	Sep 30/78		402	Jun 15/82
	446	Sep 30/78		403	Jun 15/82
	447	Sep 30/78		404	Jun 15/82
	448	Sep 30/78		405	Jun 15/82
	449	Sep 30/78		406	Jun 15/82
	450	Sep 30/78		407	Jun 15/82
	451	Sep 30/78		408	Jun 15/82
	452	Sep 30/78		409	Jun 15/82
	453	Sep 30/78		410	Jun 15/82
REP 29-190-20	454	Sep 30/78		411	Jun 15/82
				412	Jun 15/82
	401	Jun 15/82		413	Jun 15/82
	402	Jun 15/82		414	Jun 15/82
	403	Jun 15/82		415	Jun 15/82
	404	Jun 15/82		416	Jun 15/82
	405	Jun 15/82		417	Jun 15/82
	406	Jun 15/82		418	Jun 15/82
	407	Jun 15/82		419	Jun 15/82
	408	Jun 15/82		420	Jun 15/82
	409	Jun 15/82		421	Jun 15/82
	410	Jun 15/82		422	Jun 15/82
	411	Jun 15/82		423	Jun 15/82
	412	Jun 15/82		424	Jun 15/82
	413	Jun 15/82		425	Jun 15/82
	414	Jun 15/82		426	Jun 15/82
	415	Jun 15/82		427	Jun 15/82
	416	Jun 15/82		428	Jun 15/82
	417	Jun 15/82		429	Jun 15/82
	418	Jun 15/82		430	Jun 15/82
	419	Jun 15/82		431	Jun 15/82
	420	Jun 15/82		432	Jun 15/82
	421	Jun 15/82		433	Jun 15/82
	422	Jun 15/82		434	Jun 15/82
	423	Jun 15/82		435	Jun 15/82
	424	Jun 15/82		436	Jun 15/82
	425	Jun 15/82		437	Jun 15/82
	426	Jun 15/82		438	Jun 15/82
	427	Jun 15/82		439	Jun 15/82
	428	Blank		440	Jun 15/82
				441	Jun 15/82

**OLYMPUS 593****MK. 610-14-28****OVERHAUL****sneema****LIST OF EFFECTIVE PAGES****OVERHAUL****CHAPTER 78**

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
REP 29-190-21 (Cont'd)	442	Jun 15/82	REP 29-190-24 (Cont'd)	415	Apr 30/93
	443	Jun 15/82		416	Apr 30/93
	444	Jun 15/82		417	Apr 30/93
	445	Jun 15/82		418	Apr 30/93
	446	Jun 15/82		419	Apr 30/93
	447	Jun 15/82		420	Apr 30/93
	448	Jun 15/82	REP 29-190-25	401	Jun 30/97
	449	Jun 15/82		402	Jun 30/97
	450	Jun 15/82		403	Jun 30/97
	451	Jun 15/82		404	Jun 30/97
	452	Jun 15/82		405	Jun 30/97
	453	Jun 15/82		406	Jun 30/97
	454	Jun 15/82		407	Jun 30/97
	455	Jun 15/82		408	Jun 30/97
	456	Jun 15/82	REP 29-190-26	401	Jun 30/97
	457	Jun 15/82		402	Jun 30/97
	458	Jun 15/82		403	Jun 30/97
	459	Jun 15/82		404	Jun 30/97
	460	Jun 15/82		405	Jun 30/97
	461	Jun 15/82		406	Jun 30/97
	462	Blank		407	Jun 30/97
				408	Jun 30/97
REP 29-190-23	401	Apr 30/93	Assembly	501	Dec 30/74
	402	Jan 31/81		502	Jan 15/76
	403	Jan 31/81		503	May 31/76
	404	Blank		504	Oct 31/81
REP 29-190-24	401	Apr 30/93		505	May 31/76
	402	Apr 30/93		506	Oct 31/81
	403	Apr 30/93		507	May 31/76
	404	Apr 30/93		508	Oct 31/81
	405	Apr 30/93		509	May 31/76
	406	Apr 30/93		510	May 31/76
	407	Apr 30/93		511	Apr 30/93
	408	Apr 30/93		512	May 31/76
	409	Apr 30/93		513	May 31/76
	410	Apr 30/93		514	May 31/76
	411	Apr 30/93		515	May 31/76
	412	Apr 30/93		516	May 31/76
	413	Apr 30/93			
	414	Apr 30/93			



**OLYMPUS 593****MK. 610-14-28****OVERHAUL****sneema****LIST OF EFFECTIVE PAGES****OVERHAUL****CHAPTER 78**

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
Assembly (Cont'd)	517	May 31/76	Assembly (Cont'd)	553	Jun 30/97
	518	May 31/76		554	Jun 30/97
	519	May 31/76		555	Aug 31/79
	520	Jan 15/88		556	Jun 30/97
	520A	Jan 15/88		557	Jun 30/97
	520B	Jan 15/88		558	Apr 30/93
	521	May 31/76		559	Jun 30/97
	522	May 31/76		560	Jun 30/97
	523	May 31/76		561	Jun 30/97
	524	May 31/76		562	Aug 31/79
	525	Aug 31/77		563	Aug 31/79
	526	Aug 31/77		564	Aug 31/79
	527	May 31/76		565	Aug 31/79
	528	Aug 31/77		566	Aug 31/79
	529	Aug 31/77		567	Aug 31/79
	529-1	Aug 31/77		568	Dec 31/01
	529-2	Aug 31/77		569	Aug 31/79
	529-3	Aug 31/77		570	Dec 31/01
	530	Aug 31/77		571	Oct 31/81
	531	Aug 31/79		572	Dec 31/01
	532	Aug 31/79		573	Dec 31/01
	533	Aug 31/79		574	Dec 31/01
	534	Aug 31/79		575	Dec 31/01
	535	Aug 31/79		576	Dec 31/01
	536	Aug 31/79		577	Dec 31/01
	537	Aug 31/79		578	Dec 31/01
	538	Apr 30/93		579	Oct 31/81
	539	Apr 30/93		580	Jun 30/97
	540	Aug 31/79		581	Jun 30/97
	541	Aug 31/79		582	Oct 31/81
	542	Aug 31/79		583	Jun 30/97
	543	Aug 31/79		584	Jun 30/97
	544	Aug 31/79		585	Jun 30/97
	545	Aug 31/79		586	Jun 30/97
	546	Aug 31/79		587	Oct 31/81
	547	Aug 31/79		588	Oct 31/81
	548	Aug 31/79		589	Oct 31/81
	549	Aug 31/79		590	Oct 31/81
	550	Aug 31/79		591	Oct 31/81
	551	Apr 30/93		592	Oct 31/81
	552	Aug 31/79		593	Oct 31/81



# OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

## LIST OF EFFECTIVE PAGES

### OVERHAUL

### CHAPTER 78

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
Assembly (Cont'd)	594	Oct 31/81	Fit and Clearances (Cont'd)	616	Oct 31/81
	595	Oct 31/81		617	Oct 31/81
	596	Oct 31/81		618	Oct 31/81
	597	Oct 31/81		619	Oct 31/81
	598	Oct 31/81		620	Oct 31/81
	598-1	Oct 31/81		621	Oct 31/81
	598-2	Apr 30/93		622	Oct 31/81
	598-3	Apr 30/93		623	Oct 31/81
	598-4	Oct 31/81		624	Oct 31/81
	598-5	Oct 31/81		625	Oct 31/81
	598-6	Oct 31/81		626	Oct 31/81
	598-7	Jun 30/97		627	Oct 31/81
	598-8	Oct 31/81		628	Oct 31/81
	598-9	Oct 31/81		629	Oct 31/81
	598-10	Oct 31/81		630	Blank
	598-11	Oct 31/81	Testing	701	May 31/76
	598-12	Oct 31/81		702	May 31/76
	598-13	Oct 31/81		703	Dec 15/75
	598-14	Oct 31/81		704	May 31/76
	598-15	Oct 31/81		705	Dec 15/76
	598-16	Oct 31/81		706	Dec 15/76
	598-17	Oct 31/81		707	Dec 15/76
	598-18	Apr 30/93		708	May 31/76
	598-19	Oct 31/81		709	May 31/76
	598-20	Blank		710	May 31/76
Fit and Clearances	601	Dec 30/74	Trouble Shooting	801	Dec 15/76
	602	Dec 30/74		802	Dec 15/76
	603	Oct 31/81		803	Dec 15/76
	604	Oct 31/81		804	Dec 15/76
	605	Oct 31/81	Storage instructions	901	Dec 15/76
	606	Oct 31/81		902	Dec 30/74
	607	Oct 31/81		903	Dec 15/76
	608	Oct 31/81		904	Dec 15/76
	609	Oct 31/81		905	Dec 15/76
	610	Oct 31/81		906	Dec 15/76
	611	Oct 31/81		907	Dec 30/74
	612	Oct 31/81		908	Blank
	613	Oct 31/81			
	614	Oct 31/81			
	615	Oct 31/81			

78

**OLYMPUS 593****MK. 610-14-28****OVERHAUL***sneema*

## LIST OF EFFECTIVE PAGES

## OVERHAUL

## CHAPTER 78

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
STE (List)	1001	Dec 15/76	Special Tools, Fixture and Equipment (Cont'd)	1037	Aug 31/77
	1002	Oct 31/81		1038	Aug 31/77
	1003	Jun 15/82		1039	Aug 31/77
	1004	Blank		1040	Aug 31/77
Special Tools, Fixture and Equipment	1001	Dec 15/75	Illustrated Parts List TP 1101  Intro. 1101  NI ALPHA 1101	1041	Dec 15/76
	1002	Dec 15/75		1042	Dec 15/76
	1003	May 31/76		1043	Dec 15/76
	1004	May 31/76		1044	Dec 15/76
	1005	Dec 15/75		1045	Dec 15/76
	1006	May 31/76		1046	Dec 15/76
	1007	Dec 15/75		1047	Nov 30/77
	1008	May 31/76		1048	Nov 30/77
	1009	May 31/77		1049	Oct 31/81
	1010	Dec 15/75		1050	Oct 31/81
	1011	Dec 15/75		1051	Jun 15/82
	1012	Dec 15/75		1052	Blank
	1013	Dec 15/75			
	1014	Dec 15/75			
	1015	Dec 15/75		1	Dec 30/74
	1016	May 31/76			
	1017	Dec 15/75			
	1018	Dec 15/75		1	Dec 30/74
	1019	Dec 15/75		2	Dec 30/74
	1020	May 31/76		3	Dec 30/74
	1021	Aug 31/77		4	Dec 30/74
	1022	Aug 31/77		5	Apr 30/93
	1023	Aug 31/77		6	Apr 30/93
	1024	Aug 31/77			
	1025	Aug 31/77			
	1026	Aug 31/77		1	Jan 31/81
	1027	Aug 31/77		2	Jan 31/81
	1028	Aug 31/77		3	Jan 31/81
	1029	Aug 31/77		4	Jan 31/81
	1030	Aug 31/77		5	Jan 31/81
	1031	Aug 31/77		6	Jan 31/81
	1032	Aug 31/77		7	Jan 31/81
	1033	Aug 31/77		8	Jan 31/81
	1034	Aug 31/77		9	Jan 31/81
	1035	Aug 31/77		10	Jan 31/81
	1036	Oct 31/81		11	Jan 31/81

**OLYMPUS 593****MK. 610-14-28****OVERHAUL****sneema****LIST OF EFFECTIVE PAGES****OVERHAUL****CHAPTER 78**

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
NI ALPHA 1101 (Cont'd)	12	Jan 31/81	NI NUM 1101 (Cont'd)	29	Dec 31/01
	13	Jan 31/81		30	Dec 31/01
	14	Jan 31/81		31	Dec 31/01
	15	Jan 31/81		32	Dec 31/01
	16	Jan 31/81		33	Dec 31/01
	17	Jan 31/81		34	Dec 31/01
	18	Jan 31/81		35	Dec 31/01
	19	Jan 31/81		36	Dec 31/01
	20	Jan 31/81		37	Dec 31/01
	21	Jan 31/81		38	Dec 31/01
	22	Jan 31/81		39	Dec 31/01
	23	Jan 31/81		40	Dec 31/01
	24	Blank		41	Dec 31/01
NI NUM 1101	1	Dec 31/01		42	Dec 31/01
	2	Dec 31/01		43	Dec 31/01
	3	Dec 31/01		44	Dec 31/01
	4	Dec 31/01		45	Dec 31/01
	5	Dec 31/01		46	Dec 31/01
	6	Dec 31/01		47	Dec 31/01
	7	Dec 31/01		48	Dec 31/01
	8	Dec 31/01		49	Dec 31/01
	9	Dec 31/01		50	Dec 31/01
	10	Dec 31/01		51	Dec 31/01
	11	Dec 31/01		52	Dec 31/01
	12	Dec 31/01		53	Dec 31/01
	13	Dec 31/01		54	Dec 31/01
	14	Dec 31/01		55	Dec 31/01
	15	Dec 31/01		56	Dec 31/01
	16	Dec 31/01		57	Dec 31/01
	17	Dec 31/01		58	Dec 31/01
	18	Dec 31/01		59	Dec 31/01
	19	Dec 31/01		60	Dec 31/01
	20	Dec 31/01		61	Dec 31/01
	21	Dec 31/01		62	Dec 31/01
	22	Dec 31/01		63	Dec 31/01
	23	Dec 31/01		64	Dec 31/01
	24	Dec 31/01		65	Dec 31/01
	25	Dec 31/01		66	Dec 31/01
	26	Dec 31/01		67	Dec 31/01
	27	Dec 31/01		68	Dec 31/01
	28	Dec 31/01		69	Dec 31/01
				70	Dec 31/01
				71	Dec 31/01



# OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

LIST OF EFFECTIVE PAGES  
OVERHAUL  
CHAPTER 78

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
NI NUM	72	Dec 31/01	Detailed	1106-4	Jun 30/78
1101	73	Dec 31/01	Parts List	1106-5	Jun 30/78
(Cont'd)	74	Dec 31/01	(Cont'd)	1106-6	Jun 30/78
				1106-7	Jun 30/78
Detailed				1107-0	May 31/76
Parts List				1107-1	Jun 30/78
	1101-0	Jan 31/77		1107-2	Jun 30/78
	1101-1	Jun 30/78		1107-3	Jun 30/78
	1101-2	Jun 30/78		1108-0	Dec 30/74
	1101-3	Jun 30/78		1108-1	Jun 30/78
	1101-4	Jun 30/78		1108-2	Apr 30/93
	1101-5	Jun 30/78		1108-3	Apr 30/93
	1102-0	Dec 30/74		1109-0	Apr 30/93
	1102-1	Jun 30/78		1109-A	Aug 31/77
	1102-2	Jun 30/78		-0	
	1102-3	Jun 30/78		1109-B	Aug 31/77
	1103-0	Apr 15/87		-0	
	1103-1	Jun 30/78		1109-1	Jun 30/78
	1103-2	May 31/84		1109-2	Jun 30/78
	1103-3	Jan 15/88		1109-3	Jun 30/78
	1103-4	Apr 30/93		1109-4	Jun 30/78
	1103-5	Apr 30/93		1109-5	Jun 30/78
	1103-6	Apr 15/87		1109-6	Jun 30/78
	1104-0	Apr 30/93		1109-7	Jun 30/78
	1104-1	Jun 30/78		1109-8	Jun 30/78
	1104-2	Apr 30/93		1109-9	Jun 30/78
	1104-3	Apr 30/93		1109-10	Jun 30/78
	1104-4	Apr 30/93		1110-0	May 31/76
	1104-5	May 31/84		1110-1	Jun 30/78
	1105-0	Jun 30/97		1110-2	Jan 31/81
	1105-1	Jun 30/78		1110-3	Jan 31/81
	1105-2	Jun 30/78		1110-4	Jan 31/81
	1105-3	Jun 30/78		1110-5	Jan 31/81
	1105-4	Jun 30/78		1111-0	Apr 30/93
	1105-5	Jun 30/78		1111-1	Jun 30/78
	1105-6	Jun 30/78		1111-2	Jan 15/88
	1105-7	Jun 30/78		1112-0	Apr 30/93
	1106-0	Jun 30/97		1112-1	Jun 30/78
	1106-1	Jun 30/78		1112-2	Jun 30/78
	1106-2	Jun 30/78		1113-0	Jun 30/97
	1106-3	Jun 30/78		1113-1	Jun 30/78

**OLYMPUS 593****MK. 610-14-28****OVERHAUL****sneema****LIST OF EFFECTIVE PAGES****OVERHAUL****CHAPTER 78**

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
Detailed Parts List (Cont'd)	1113-2	Jun 30/78	Detailed Parts List (Cont'd)	1122-A	Aug 31/79
	1113-3	Jun 30/78		-0	
	1114-0	Apr 30/93		1122-B	Jun 30/78
	1114-1	Jun 30/78		-0	
	1114-2	Jun 30/78		1122-C	Aug 31/79
	1115-0	May 31/76		-0	
	1115-1	Jun 30/78		1122-D	Jun 30/78
	1115-2	Jun 30/78		-0	
	1115-3	Jun 30/78		1122-1	Jun 30/78
	1115-4	Jun 30/78		1122-2	Jun 30/78
	1115-5	Jun 30/78		1122-3	Jun 30/78
	1115-6	Jun 30/78		1122-4	Jun 30/78
	1115-7	Jun 30/78		1122-5	Apr 30/93
	1116-0	May 31/76		1122-6	Jun 30/78
	1116-1	Jun 30/78		1122-7	Jun 30/78
	1116-2	Jun 30/78		1123-0	Dec 30/74
	1116-3	Jun 30/78		1123-1	Jun 30/78
	1117-0	Jun 30/78		1123-2	Jun 30/78
	1117-1	Jun 30/78		1123-3	Jun 30/78
	1117-2	Dec 31/01		1124-0	Dec 30/74
	1117-3	Dec 31/01		1124-1	Jun 30/78
	1117-4	Dec 31/01		1124-2	Jun 30/78
	1118-0	Jun 30/78		1125-0	May 31/76
	1118-1	Jun 30/78		1125-A	May 31/76
	1118-2	Jun 30/78		-0	
	1118-3	Jun 30/78		1125-1	Jun 30/78
	1118-4	Jun 30/78		1125-2	Jun 30/78
	1119-0	Jun 30/78		1125-3	Jun 30/78
	1119-1	Jun 30/78		1126-0	May 31/76
	1119-2	Jun 30/78		1126-1	Jun 30/78
	1119-3	Jun 30/78		1126-2	Jun 30/78
	1119-4	Jun 30/78		1127-0	May 31/76
	1120-0	May 31/76		1127-1	Jun 30/78
	1120-1	Jun 30/78		1127-2	Jun 30/78
	1120-2	Apr 30/93		1128-0	Jun 30/00
	1120-3	Apr 30/93		1128-1	Jun 30/78
	1121-0	Dec 30/74		1128-2	Jun 30/00
	1121-1	Jun 30/78		1128-3	Jun 30/78
	1121-2	Apr 30/93		1129-0	Dec 30/74
	1121-3	Apr 30/93		1129-1	Jun 30/78
	1122-0	Dec 30/74		1129-2	Jun 30/78



OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

## LIST OF EFFECTIVE PAGES

## OVERHAUL

## CHAPTER 78

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
Detailed Parts List (Cont'd)	1129-3 1130-0 1130-1 1131-0 1131-1 1131-2	Jun 30/78 May 31/76 May 31/76 Oct 31/81 Apr 30/93 Oct 31/81	Bucket Assy Removable Parts	301 302 303 304 305 306 307 308	Dec 15/76 Dec 15/76 Dec 15/76 Jun 30/97 Dec 31/01 Jun 30/97 Apr 30/93 Apr 30/93
Book 2 Volume 3					
78-31-01 Divider Title Page		1975	Basic Bucket Introduction	301 302	Dec 15/76 Blank
List of Chapters	1 2 3 4	Dec 31/01 Jun 30/97 Dec 31/01 Dec 31/01	Basic Bucket Indentification	301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322	Dec 15/76 Blank
Description/ Operation	1 2 3 4	Dec 30/74 Dec 30/74 Dec 30/74 Dec 30/74			
Disassembly	101 102 103 104	Dec 30/74 Nov 30/77 Nov 30/77 Blank			
Cleaning	201 202 203 204	May 31/76 May 31/76 May 31/76 Blank			
Inspection/ Check General	301 302 303 304 305 306	Dec 15/76 Dec 15/76 Dec 15/76 Dec 15/76 Dec 31/01 Blank			



OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

## LIST OF EFFECTIVE PAGES

## OVERHAUL

## CHAPTER 78

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
Restricted Areas	301	Dec 15/76	Repair Foreword	401	May 31/76
	302	Dec 15/76		402	May 31/76
	303	Dec 15/76		403	May 31/76
	304	Dec 15/76		404	May 31/76
	305	Dec 15/76			
	306	Dec 15/76	Repair Parts List	401	Jun 30/97
	307	Dec 15/76		402	Jun 30/97
	308	Blank		403	Jun 30/97
Inspection Methods				404	Jun 30/97
	301	Dec 31/01		405	Jun 30/97
	302	Dec 31/01		406	Jun 30/97
	303	Jun 30/97		407	Jun 30/97
	304	Dec 15/76		408	Jun 30/97
	305	Dec 15/76		409	Jun 30/97
	306	Dec 15/76		410	Jun 30/97
	307	Dec 15/76			
	308	Dec 15/76	REP 1-10-1	401	Aug 31/77
	309	Aug 31/79		402	Aug 31/77
	310	Blank			
			REP 1-10-2	401	Aug 31/77
Permissible Damage				402	Aug 31/77
	301	Dec 15/76			
	302	Dec 15/76	REP 1-20-1	401	Dec 30/74
	302A	Mar 31/78		402	Dec 30/74
	302B	Blank			
	303	Dec 15/76	REP 1-20-2	401	Dec 30/74
	304	Dec 15/76		402	Dec 30/74
	305	Apr 30/93			
	306	Apr 30/93	REP 1-30-1	401	Jan 31/81
	307	Dec 15/76		402	Jan 31/81
	308	Apr 30/93		403	Jan 31/81
	309	Dec 15/76		404	Jan 31/81
	310	Dec 15/76		405	Jan 31/81
	311	Dec 15/76		406	Blank
	312	Dec 15/76			
	313	Dec 15/76			
	314	Blank			





# OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

## LIST OF EFFECTIVE PAGES

### OVERHAUL

### CHAPTER 78

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
REP 1-30-2	401	Mar 31/78	REP 1-50-3	401	Apr 15/87
	402	Mar 31/78		402	Jun 30/97
	403	Mar 31/78		403	Jan 31/81
	404	Mar 31/78		404	Apr 15/87
	405	Mar 31/78		405	Apr 30/93
	406	Mar 31/78		406	Jan 31/81
REP 1-30-3	401	Jun 30/97	REP 1-50-4	407	Jan 31/81
	402	Jun 30/97		408	Jan 31/81
	403	Jun 30/97		409	Jan 31/81
	404	Jun 30/97		410	Jun 30/97
REP 1-40-1	401	Apr 30/93		411	Jan 31/81
	402	Jun 30/97		412	Apr 15/87
	403	Jun 30/97		413	Jun 30/97
	404	Blank		414	Jan 31/81
REP 1-40-2	401	Jun 30/97		401	Apr 30/93
	402	Apr 30/93		402	Apr 15/87
	403	Mar 31/78		403	Apr 15/87
	404	Mar 31/78		404	Apr 15/87
REP 1-50-1	401	Apr 30/93	REP 1-330-1	401	Dec 30/74
	402	Apr 30/93		402	Dec 30/74
	403	Dec 30/74	REP 1-340-2	401	Apr 30/93
	404	Blank		402	Apr 30/93
REP 1-50-2	401	Apr 30/93	REP 1-340-3	401	Apr 30/93
	402	Apr 30/93		402	Apr 30/93
	403	Dec 30/74	REP 1-350-2	401	Apr 30/93
	404	Jun 30/97		402	Apr 30/93
	405	Dec 30/74	REP 1-350-3	401	Apr 30/93
	406	Apr 30/93		402	Apr 30/93
	407	Dec 30/74	REP 1-460-1	401	Dec 30/74
	408	Blank		402	Dec 30/74

**OLYMPUS 593****MK. 610-14-28****OVERHAUL***sneema*

## LIST OF EFFECTIVE PAGES

## OVERHAUL

## CHAPTER 78

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
REP 1-460-2	401	May 31/76	REP 1-460-6 (Cont'd)	410	Aug 31/79
	402	May 31/76		411	Aug 31/79
	403	May 31/76		412	Aug 31/79
	404	May 31/76		413	Aug 31/79
	405	May 31/76		414	Aug 31/79
	406	May 31/76		415	Aug 31/79
	407	May 31/76		416	Aug 31/79
	408	May 31/76		417	Aug 31/79
	409	May 31/76		418	Aug 31/79
	410	Blank		419	Aug 31/79
REP 1-460-3	401	Jun 30/97		420	Aug 31/79
	402	Jun 30/97		421	Aug 31/79
	403	Jun 30/97		422	Apr 30/93
	404	Jun 30/97		423	Aug 31/79
	405	Jun 30/97		424	Aug 31/79
	406	Jun 30/97		425	Aug 31/79
	407	Jun 30/97		426	Aug 31/79
	408	Apr 30/93		427	Aug 31/79
REP 1-460-4	401	Jun 30/97		428	Aug 31/79
	402	Jun 30/97		429	Aug 31/79
	403	Jun 30/97		430	Aug 31/79
	404	Jun 30/97		431	Apr 30/93
	405	Jun 30/97		432	Aug 31/79
	406	Jun 30/97		433	Aug 31/79
	407	Jun 30/97		434	Aug 31/79
	408	Jun 30/97	REP 1-460-7	401	Apr 30/93
	409	Jun 30/97		402	May 31/77
	410	Jun 30/97		403	May 31/77
REP 1-460-6	401	Aug 31/79		404	May 31/77
	402	Aug 31/79		405	May 31/77
	403	Aug 31/79		406	May 31/77
	404	Aug 31/79		407	May 31/77
	405	Apr 30/93		408	May 31/77
	406	Aug 31/79		409	May 31/77
	407	Aug 31/79		410	May 31/77
	408	Aug 31/79		411	May 31/77
	409	Aug 31/79		412	Aug 31/79
				413	Aug 31/79
				414	Aug 31/79



# OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

## LIST OF EFFECTIVE PAGES

### OVERHAUL

### CHAPTER 78

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
REP 1-460-8	401	Aug 31/79	REP 1-460-13	401	May 31/77
	402	Apr 30/93		402	May 31/77
	403	Apr 30/93		403	May 31/77
	404	Apr 30/93		404	Blank
REP 1-460-9	401	Apr 30/93	REP 1-460-14	401	Jan 31/81
	402	Aug 31/77		402	Jan 31/81
	403	Aug 31/77		403	Jan 31/81
	404	Aug 31/77		404	Jan 31/81
	405	Aug 31/77		405	Jan 31/81
	406	Aug 31/77		406	Jan 31/81
	407	Aug 31/77		407	Jan 31/81
	408	Aug 31/77		408	Blank
	409	Aug 31/77	REP 1-460-15	401	Apr 30/93
	410	Aug 31/77		402	Jan 31/81
	411	Aug 31/77		403	Jan 31/81
	412	Aug 31/77		404	Jan 31/81
	413	Aug 31/77		405	Jan 31/81
	414	Apr 30/93		406	Jan 31/81
REP 1-460-11	401	Dec 31/01	REP 1-460-16	407	Jan 31/81
	402	Jan 31/81		408	Jan 31/81
	403	Dec 31/01		409	Jan 31/81
	404	Jan 31/81		410	Jan 31/81
	405	Dec 31/01		401	Apr 30/93
	406	Blank		402	Oct 31/81
REP 1-460-12	401	May 31/77		403	Oct 31/81
	402	May 31/77		404	Oct 31/81
	403	May 31/77		405	Oct 31/81
	404	May 31/77		406	Oct 31/81
	405	May 31/77		407	Oct 31/81
	406	May 31/77		408	Oct 31/81
	407	May 31/77		409	Oct 31/81
	408	May 31/77		410	Oct 31/81
	409	May 31/77		411	Oct 31/81
	410	May 31/77		412	Oct 31/81
	411	May 31/77		413	Oct 31/81
	412	May 31/77		414	Oct 31/81
	413	May 31/77		415	Oct 31/81
	414	May 31/77		416	Blank

**OLYMPUS 593****MK. 610-14-28****OVERHAUL**

## LIST OF EFFECTIVE PAGES

## OVERHAUL

## CHAPTER 78

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
REP 1-460-17	401	Apr 30/93	Fits and Clearances	601	Dec 30/74
	402	Apr 30/93		602	Dec 30/74
	403	Apr 30/93		603	Oct 31/81
	404	Apr 30/93		604	Apr 30/93
	405	Apr 30/93		605	Jun 15/82
	406	Apr 30/93		606	Jun 15/82
	407	Apr 30/93		607	Jun 15/82
	408	Apr 30/93		608	Jun 15/82
REP 1-460-18	401	Apr 30/93		609	Jun 15/82
	402	Apr 30/93		610	Jun 15/82
REP 1-460-19	401	Jun 30/97	Storage Instructions	901	Dec 30/74
	402	Jun 30/97		902	Dec 30/74
	403	Jun 30/97		903	Dec 30/74
	404	Jun 30/97		904	Dec 30/74
	405	Jun 30/97		905	Dec 30/74
	406	Jun 30/97		906	Dec 30/74
Assembly	501	Nov 30/77	STE (LIST)	1001	Jun 30/97
	502	Nov 30/77		1002	Blank
	503	Apr 30/93	Special Tools Fixtures and Equipment		
	504	Nov 30/77			
	505	Nov 30/77			
	506	Nov 30/77		1001	Dec 15/76
	507	Nov 30/77		1002	Dec 15/76
	508	Nov 30/77		1003	Dec 15/76
	509	Nov 30/77		1004	Dec 15/76
	510	Nov 30/77		1005	Dec 15/76
	511	Nov 30/77		1006	Jun 30/97
	512	Apr 30/93		1007	Jun 30/97
	513	Nov 30/77		1008	Nov 30/77
	514	Nov 30/77		1009	Nov 30/77
	515	Nov 30/77		1010	Nov 30/77
	516	Jun 30/97		1011	Nov 30/77
	517	Apr 30/93		1012	Nov 30/77
	518	Blank		1013	May 31/84
				1014	May 31/84



# OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

## LIST OF EFFECTIVE PAGES

### OVERHAUL

### CHAPTER 78

CH/SEC/SUB	PAGE	DATE	CH/SEC/SUB	PAGE	DATE
Illustrated Part Listed TP 1101	1	Dec 30/74			
	2	Blank			
Intro. 1101	1	Dec 30/74			
	2	Dec 30/74			
	3	Dec 30/74			
	4	Dec 30/74			
	5	Apr 30/93			
	6	Blank			
NI ALPHA	1101-1	Apr 30/93			
	1101-2	Blank			
NI NUM	1101-1	Jun 30/78			
	1101-2	Jun 30/78			
Detailed Part List	1101-0	Jan 15/88			
	1101-1	Jan 31/81			
	1101-2	Apr 30/93			
	1101-3	Apr 30/93			



OLYMPUS 593

MK.610-14-28  
OVERHAUL



LIST OF APPROVED REPAIR FACILITIES

TRADE NAME	ADDRESS
SNECMA	Après-Vente Civile Site de MELUN MONTEREAU Aérodrome de VILLAROCHE BP 1936 77019 MELUN CEDEX (FRANCE)

PRINTED IN FRANCE

78-00-00

LARF Pages 1/2  
Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



LIST OF PRODUCTS AND COMPOUNDS

DESIGNATION OF PRODUCTS AND COMPOUNDS	CODE	SUPPLIERS TRADE-NAME AND ADDRESS	UTILIZATION					
			TESTING	DISASSEMBLY	CLEANING	CHECK	REPAIR	ASSY./STOR

PRINTED IN FRANCE

78-00-00

LFC Pages 1/2  
Jan 15/76



# **OLYMPUS 593 MK 610-14-28**

## **OVERHAUL MANUAL**

### **BOOK 2**

**EXHAUST SYSTEM**

**VOLUME 1**

**REHEAT JET PIPE**  
**78-11-01**

**PRIMARY NOZZLE**  
**78-12-01**

**TECHNICAL PUBLICATION No.TP.187/2/RR/SN**



1975

The information contained in this document is the property of Rolls-Royce Limited and SNECMA and may not be copied or used for any purpose other than that for which it is supplied without the express written authority of Rolls-Royce Limited and SNECMA. (This does not preclude use by engine and aircraft operators for normal instructional maintenance or overhaul purposes).

**ROLLS-ROYCE (1971) LIMITED**  
AERO DIVISION

TECHNICAL PUBLICATIONS DEPARTMENT  
P.O. BOX 3, FULTON, BRISTOL, BS12 7QE, ENGLAND

**SNECMA**  
APRES VENTE CIVILE  
SITE DE MELUN MONTEREAU  
AERODROME DE VILLAROCHE  
BP 1936 - 77019 MELUN CEDEX (FRANCE)





# **OLYMPUS 593 MK 610-14-28 OVERHAUL MANUAL**

## **EXHAUST SYSTEM**

### **REHEAT JET PIPE 78-11-01**



1975

The information contained in this document is the property of Rolls-Royce limited and SNECMA and may not be copied or used for any purpose other than that for which it is supplied without the express written authority of Rolls-Royce limited and SNECMA. (This does not preclude use by engine and aircraft operators for normal instructional maintenance or overhaul purposes).

**ROLLS-ROYCE (1971) LIMITED**  
AERO DIVISION

TECHNICAL PUBLICATIONS DEPARTMENT  
P.O. BOX 3, FULTON, BRISTOL, BS12 7QE, ENGLAND

**SNECMA**  
APRES VENTE CIVILE  
SITE DE MELUN MONTEREAU  
AERODROME DE VILLAROCHE  
BP 1936 - 77019 MELUN CEDEX (FRANCE)



OLYMPUS 593

MK.610-14-28

OVERHAUL



## LIST OF CHAPTERS

FOREWORD	1
DESCRIPTION AND OPERATION	
1. Description .....	1
2. Operation .....	3
DISASSEMBLY	
1. General .....	101
2. Disassembling the reheat jet pipe .....	101
A. Placing on the work bench .....	101
B. Removal of half-deflectors .....	101
C. Removal of the ventilation shroud .....	102
D. Disassembling the reheat duct .....	102
CLEANING	
1. General .....	201
2. Specific recommendations .....	201
3. Cleaning processes .....	203
INSPECTION	
1. Introduction .....	301
A. Inspection - General .....	301
B. Prepare for "Estimate" inspection .....	301
C. "Estimate" inspection .....	301
D. Protection against corrosion following inspection.	302
2. Visual inspection .....	302
3. Inspection for soundness .....	303
4. Dimensional inspection .....	305
5. Inspection of parts .....	306

78-11-01

LC Page 1  
Mar 31/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



A. Upper half-deflector .....	306
B. Lower half-deflector .....	307
C. Flexible spacer assembly .....	308
D. Ventilation shroud assy .....	308
E. Spherical joint box .....	309
F. Angular position box .....	311
G. Anti-roll box .....	311
H. Connecting link .....	311
I. Fuel collector tube .....	312
J. Support .....	313
K. Anti-screach liner .....	313
L. Slide .....	314
M. Clamp support .....	315
N. Reheat duct .....	315

#### REPAIR

FOREWARD .....	401
----------------	-----

REPAIR PARTS LIST .....	401
-------------------------	-----

#### UPPER HALF DEFLECTOR

REP 1-10-1	Cracks filler welding
REP 1-10-2	Patch welding repair
REP 1-10-3	Renewal of eyelets and rivets faste- ning the various elements on deflector

#### LOWER HALF DEFLECTOR

REP 1-100-1	Cracks filler welding
REP 1-100-2	Patch welding repair
REP 1-100-3	Renewal of eyelets and rivets faste- ning the various elements on deflector
REP 1-100-4	Replacing the draining tube

PRINTED IN FRANCE

78-11-01

LC Page 2

Mar 31/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



#### FLEXIBLE SPACER ASSEMBLY

REP 3-90-1 Reconditioning of the spacer hinge pin by weld build up.

#### VENTILATION SHROUD

REP 3-130-1 Filler welding cracks in the outer metal sheet.  
REP 3-130-2 Reconditioning the ventilation shroud by means of riveted patches or by renewing damaged parts.  
REP 3-130-3 Repairing the heat insulating metal sheet (heat shield) with resistance welded patches.

#### SPHERICAL JOINT BOX

REP 4-50-1 Reshaping of the attaching flange.

#### ANGULAR POSITION STOP

REP 4-60-1 Reshaping.  
REP 4-60-2 Fusion (weld) hard facing of the stop contact faces.

#### ANTI-ROLL BOX

REP 4-110-1 Crack filler welding.

#### CONNECTING LINK

REP 4-120-1 Reshaping.  
REP 4-120-2 Re-application of anti-seize.

#### FUEL COLLECTOR TUBE

REP 4-130-1 Crack filler welding.  
REP 4-130-2 Renewal of a segment of tube.

#### SUPPORT

REP 4-200-1 Reshaping the attaching flange.

#### ANTI-SCREECH LINER

REP 5-10-1 Crack removal using a grinding wheel.  
REP 5-10-2 Renewal of spacers.  
REP 5-10-3 Liner patch weld repair.  
REP 5-10-4 Renewal of one or several liner corrugations.

## LUG

REP 5-160-1           Renewal of the floating anchor nut, and/or  
renewal of the nut retaining rivets

## REHEAT DUCT

REP 5-240-1           Reshaping of the duct central liner  
 REP 5-240-2           Crack filler welding  
 REP 5-240-3           Duct patch weld repair  
 REP 5-240-4           Reconditioning the front and Rear Flanges  
                           Outer Contact Surfaces through Metal Spraying  
                           (Metallizing)  
 REP 5-240-5           Reconditioning Tapped Holes in Bosses through  
                           Bush Installation  
 REP 5-240-9           Reshaping the front and rear flanges

## ASSEMBLY

1. General.....	501
2. Location.....	501
3. Preparation for assembly.....	501
A. Recommendations.....	501
B. Preparation of ventilation shroud.....	503
C. Preparation of the reheat duct.....	503
4. Final assembly.....	505
A. Fitting the anti-screech liner.....	505
B. Fitting the ventilation shroud.....	509

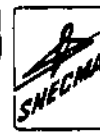
## FITS AND CLEARANCES

1. General.....	601
A. Layout.....	601
B. Max. after wear.....	602
2. Torques values.....	603



OLYMPUS 593

MK.610-14-28  
OVERHAUL



3. Table of fits and clearances.....	604
TESTING.....	Not applicable
TROUBLE SHOOTING.....	NOT applicable
STORAGE	
1. Storage.....	901
A. Storage in the container.....	901
B. Storage out of the container.....	901
2. Removal of the reheat jet pipe from the container.....	901
A. Positioning on the storage stand.....	901
B. Returning empty containers.....	905
3. Placing the equipment in the container.....	905
A. Preparation of the container.....	905
B. Preparation of the reheat jet pipe.....	906
C. Packing.....	906
SPECIAL TOOLS, FIXTURE AND EQUIPMENT.....	1001
ILLUSTRATED PARTS LIST.....	1101

**OLYMPUS 593**

MK.610-14-28

OVERHAUL

FOREWORD1. Effectivity

Some procedures described in this manual such as assembly, repair procedures, etc... specifically relate to given types of equipment. Hence, effectivity reference numbers are used which relate equipment to procedures.

These effectivity reference numbers can take the form of either a manufacturer's reference number or a serial number.

The table drawn up below will enable you to make the association between the two sets of numbers.

Manufacturer's ref No.	Serial No.
301-218-000-0	6001 to 6020
301-218-004-0	6021 to 6028
301-218-005-0	6029 to 6082 etc

PRINTED IN FRANCE



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## DESCRIPTION - OPERATION

### 1. Description

#### A. Composition

The reheat jet-pipe basically comprises :

- The reheat duct,
- The anti-screech liner.
- The ventilation shroud.

The major component is the reheat duct which is made of austenitic alloy. The anti-screech liner is mounted in the front section and can move within the rear section on slides. The ventilation shroud, which surrounds the reheat duct, carries, on its upper half, a heat shield composed of quartz glass fiber sandwiched between two wafered stainless steel sheets. The ventilation shroud is attached to the front of reheat duct by 10 lugs, and located at the rear by 8 flexible spacers.

The reheat duct is fitted "floating" between the primary nozzle and the engine.

The connecting link connects the spherical joint-flange, secured to the basic engine rear flange - and the reheat jet-pipe. It transmits the axial pull of the jet-pipe and prevents its longitudinal movement. Angular movement of reheat duct is prevented by a stop fixed to the reheat duct. The angular position stop prevents rotation of the reheat duct by bearing on two bosses on the spherical joint flange.

The rear flange of the reheat duct is surrounded by two half-deflectors, which project rearwards any gas which may leak around the reheat duct/primary nozzle joint face. The lower half deflector is fitted with a fuel drain pipe connection, which serves to drain any fuel which may accumulate, for example, after a false start.

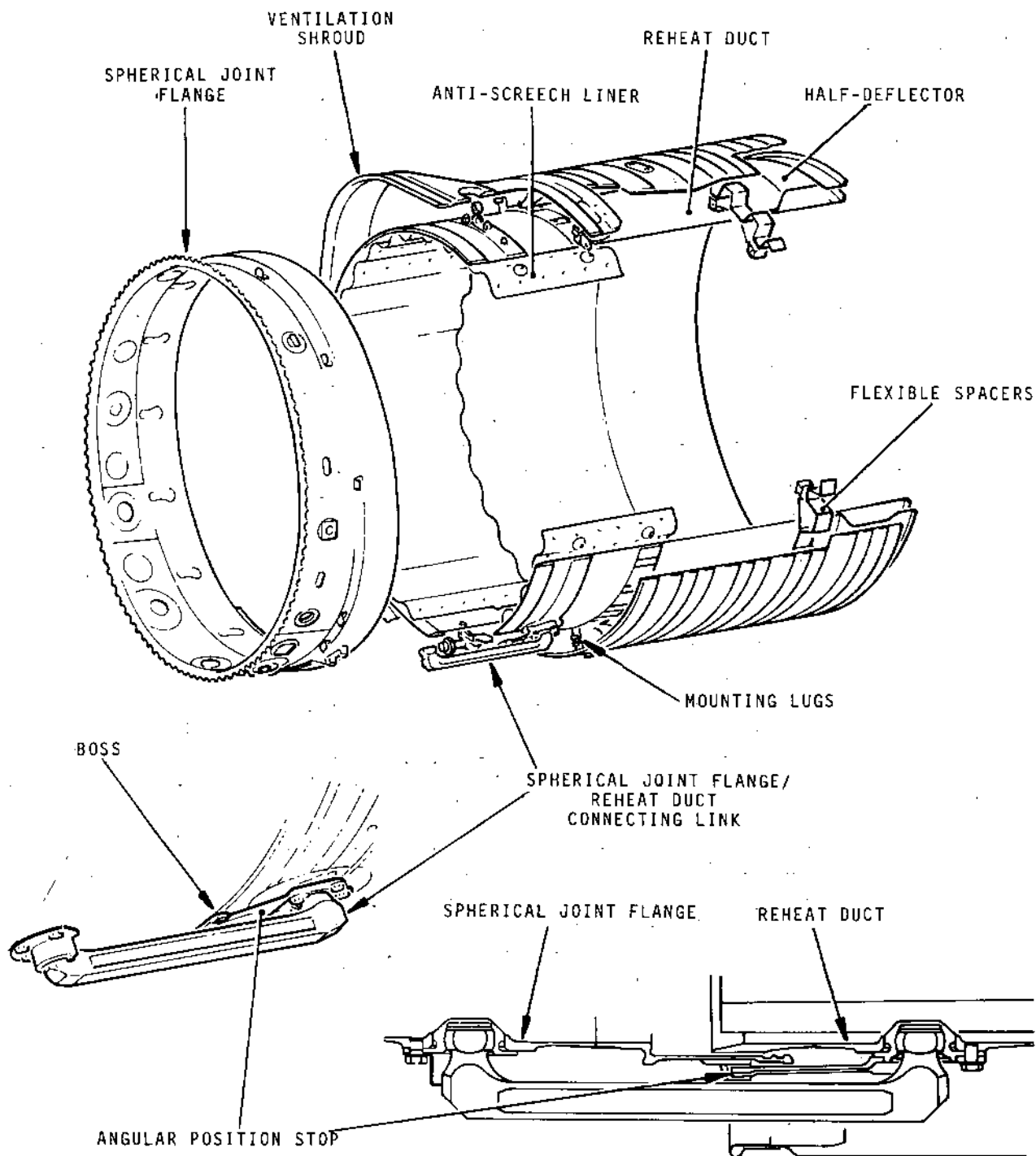
78-11-01





OLYMPUS 593

MK.610-14-28  
OVERHAUL



Reheat Duct to Spherical Joint Flange Assembly  
Figure 1

78-11-01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## 2. Operation

The reheat duct, at whose inlet the reheat fuel is burnt, channels the gas flow from the engine to the primary nozzle.

The "floating" assembly of the duct allows :

- the absorption of the expansion of the basic engine and the reheat jet pipe as well as wing deflections.
- correct alignment of the jet pipes despite the differences in geometry dependent upon whether they are fitted in a left or right hand nacelle.
- easy installation and removal of the reheat jet pipe.

To avoid random movement, the rear section of the reheat duct is slightly conical, which imposes a rearward force on the duct during operation.

The anti-screach liner reduces the level of the vibration phenomena during operation. This is achieved by the nature of its corrugations and dilution holes.

The ventilation shroud protects the nacelle and the wing from heat radiation.

**78-11-01**

Pages 3/4  
Dec 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## DISASSEMBLY

### 1. General

- A. During dismantling, follow the recommendations given in chapter 70-05-00 of the manual of Standard Practices and in the working procedures section of the Overhaul manual.
- B. Use only tools and other special equipment nominated in the dismantling procedures, and identified by a number SC... The tools are shown in the Illustrated Tools and Equipment Manual (I.T.E.M).
- C. During dismantling, visually inspect all parts removed and report, to the inspection department, any defects found which could be obliterated by cleaning (scratches, burning etc.) and which may result from incorrect operation. Also report any broken parts or any missing locking devices.
- D. In the working procedures section of the manual, parts are referenced to the I.P.C by two numbers in brackets, the first of which is the figure number in the I.P.C, the second being the item number within that figure.

### 2. Disassembling reheat jet pipe

NOTE : The reheat jet pipe is assumed to be upright on its rear flange on the transport trolley - tool SC 97 -

#### A. Placing on the work bench - tool SC9 -

- (1) Fit the two "clamps" - tool SC7 - to the reheat jet pipe.
- (2) With a hoist, bring up lifting beam - tool SC8 - and lock its attachment points to the reheat jet pipe.
- (3) Lift the reheat jet pipe onto the work bench - tool SC9 - It is to be stood on the anti-screach liner end flange of the reheat duct.

#### B. Removal of half-deflectors

- (1) Remove the 10 off 12 pointed head bolts (2-20).
- (2) Collect the 10 washers (2-30).
- (3) Gently lower the ventilation shroud and rest it on the brackets on the table - tool SC9 -

78-11-01

Page 101  
Dec 30/74



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (4) Unscrew the nut connecting the fuel collector tube (4-130) to the lower half-deflector (1-100) - tool SC 20 -
- (5) Removing the upper lifting ring (1-50).
  - (a) Remove the self-locking nuts (1-20).
  - (b) Remove the hexagon head bolts (1-30) and washers (1-40).
- (6) Removing the upper half-deflector (1-10).
  - (a) Remove the self-locking nuts (1-60).
  - (b) Remove the hexagon head bolts (1-70), washers (1-80) and bushes (1-90).
- (7) Removing the two lower lifting rings (1-140).
  - (a) Remove the self-locking nuts (1-110).
  - (b) Remove the hexagon head bolts (1-120) and washers (1-130).
- (8) Removing the lower half-deflector.
  - (a) Remove the self-locking nuts (1-150).
  - (b) Remove the hexagon head bolts (1-160), washers (1-170) and bushes (1-180).

C. Removal of the ventilation shroud (2-10)

- (1) Fit the clamps - tool SC 11 to the ventilation shroud.
- (2) Compress the flexible spacers (3-90) using 8 clamps - tool SC 13 -
- (3) Position 10 spades - tool SC 14 - to displace the mounting lugs (5-160).
- (4) Using a hoist and 3 branch sling, remove the ventilation shroud (2-10).

D. Disassembling reheat duct

- (1) Removal of fuel collector tube (4-130).
  - (a) Remove the 12 point head bolts (4-140) and the collar (4-150).
  - (b) Remove the hexagon headed bolts (4-160).

78-11-01

Page 102  
Dec 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL



NOTE : The locking plates (4-170) will be removed at the same time as the anti-screech liner (5-10).

- (2) Removal of the connecting link (4-120).
  - (a) Remove the link protector - tool SC 19 -
  - (b) Disengage the link by rotating it through 90°.
  - (c) Dismantling the link.
    - 1) Remove the slave nut (4-70) and collect bolts (4-80) and lock washers (4-90).
    - 2) Remove the anti-roll housing (4-110).
    - 3) Disengage the spherical joint housing (4-100) by rotating it by 90°.
  - (d) Remove the hexagon head bolts (4-10) and (4-30), lock washers (4-20) and (4-40).
  - (e) Remove the angular position stop (4-60).
  - (f) Extract spherical joint housing (4-50) using extractors - tool SC 10 -
- (3) Removal of the support (4-200)
  - (a) Remove the hexagonal head bolts (4-180) and lock-washers (4-190).
- (4) Removal of lifting ring (4-240)
  - (a) Remove the self-locking nuts (4-210).
  - (b) Collect the hexagonal head bolts (4-220) and washers (4-230).
- (5) Removal of lifting rings (5-50)
  - (a) Remove blind nuts (5-20)
  - (b) Withdraw bolts (5-30) and locking plates (5-40).
- (6) Removal of the anti-screech liner (5-10)
  - (a) Remove blind nuts (5-60) and hexagonal nuts (5-90).
  - (b) Withdraw bolts (5-70), (5-100) and locking plates (5-80), (5-110).

78-11-01

Page 103  
Dec 30/74

- (c) Remove hexagon head bolts (5-120).
  - (d) Remove locking plates (5-130) and (4-170).
  - (e) Remove the reheat duct (5-240).
  - (f) Collect up spacers (5-140).
  - (g) Remove slides (5-150) from the anti-screech liner by rotating them through 90°.
- (7) Dismantling of the reheat duct
- (a) Remove self locking nuts (5-170).
  - (b) Collect up the hexagon head bolts (5-180) and washers (5-190).
  - (c) Remove lugs (5-160).
  - (d) Remove self locking nuts (5-200).
  - (e) Collect the hexagon head bolts (5-210) and washers (5-220).
  - (f) Remove the clamp support (5-230).
- (8) Dismantling the ventilation shroud
- (a) Remove the flexible spacers (3-90).
    - 1) Remove the self-locking nuts (3-100).
    - 2) Collect the 12 point head bolts (3-110) and the internal plates (3-120).
  - (b) Removal of blanks.
    - 1) Remove self-locking nuts (3-10).
    - 2) Collect up washers (3-20), hexagon head bolts (3-30) and washers (3-40).
    - 3) Remove the hexagon head bolts (3-50).
    - 4) Collect up washers (3-60) and covers (3-70).



OLYMPUS 593

MK.610-14-28

OVERHAUL

CLEANING



## 1. General

- A. At completion of disassembly, clean thoroughly all the parts of the reheat jet pipe so as to remove all surface contamination such as oils, greases, carbon deposits, corrosion and oxidation marks.
- B. The purpose of cleaning is to :
  - (1) Contribute to exhaustive visual inspection of parts.
  - (2) Disclose cracks due to operation through use of fluorescent penetrant inspection methods.
  - (3) Prepare surfaces in view of future repair work.

## 2. Specific recommendations

- A. Any cleaning method selected by an operator shall comply with the following requirements to avoid penalization on the parts service life.
  - (1) Do not degrease titanium parts, either welded or not, using halogen products such as chlorinated solvents, trichlorethylene etc...
  - (2) Do not strip in acid solutions parts having complex shapes or featuring blind holes, i.e. parts on which rinsing or neutralization are particularly difficult to carry out properly.
  - (3) Do not use cleaning agents the action of which may induce generalized or intergranular corrosion of materials, specially on those materials showing aging due to operation on engine.
- B. Limitations related to electro-platings, chemical surface treatments, paints, varnishes and hardface metal coatings.
  - (1) The cleaning methods recommended in this chapter are normally not harmful to the protective surface treatments applied on the reheat jet pipe constitutive parts.

78-11-01

Page 201  
Dec 30/74

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



- (2) To avoid deterioration to surface treatments of parts or allow their future refurbishing, a list of the coated parts and their location (identification in regards of the Illustrated Parts List) is given hereunder.

(a) Silver coated parts nomenclature

Description	IPL Fig.item	Coated part base metal
Self-locking nut	1-20, 60, 110, 150	Austenitic alloy
Lower half deflector	1 - 100	Austenitic steel (nut on part)
Self-locking nut	3 - 10, 100	Austenitic alloy
Hexagonal head bolt	4 - 10, 30, 80, 160, 180	Austenitic alloy
Hexagonal nut	4 - 70	Austenitic alloy
12 point head bolt	4 - 140	Austenitic steel
Self-locking nut	4 - 210	Austenitic alloy
Blind nut	5 - 20, 60	Austenitic steel
Hexagonal nut	5 - 90	Austenitic steel
Hexagonal head bolt	5 - 120	Austenitic alloy
Self-locking nut	5 - 170, 200	Austenitic alloy

(b) Varnished parts nomenclature

Heat-resistant varnish D85 Ter (P 426)

Connecting link	4 - 120	Austenitic alloy
-----------------	---------	---------------------

**78-11-01**Page 202  
Apr 30/93



**OLYMPUS 593**MK.610-14-28  
OVERHAUL

## (c) Sulfinuzed parts nomenclature

Description	IPL Fig.item	Coated Part base metal
Clamp	4 - 150	Austenitic ferrous alloy
Clamp support	5 - 230	Austenitic ferrous alloy

3. Cleaning processes

A. The following table gives the cleaning processes specified in chapter 70-15-20 of the standard practices manual and applicable to parts described and itemized in relation to the IPL.

<u>Description</u>	<u>IPL Fig.item</u>	<u>Process</u>	<u>Remarks</u>
Upper half deflector	1 - 10	M100A	
Hoisting ring	- 50	M100C	
Bushing	- 90	M100C or M100D	
Lower half deflector	-100	M100A	
Bushing	-180	M100C or M100D	
Cover	3 - 70	M100A	
Flexible spacer	- 90	M100A	
Internal plate	-120	M100A	
Ventilation shroud	-130	M116	
Spherical joint box	4 - 50, 100	M100A	
Angular position stop	- 60	M100A	
Anti-roll box	-110	M100A	
Connecting link	-120	M100A M100E	If cleaned as per M100E mask the spherical joints during blasting operations
Fuel collector	-130	M100A	In addition, perform alternate flowing in the tube

**78-11-01**Page 203  
Dec 30/74

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

<u>Description</u>	<u>IPL Fig.item</u>	<u>Process</u>	<u>Remarks</u>
Clamp	- 150	M100A	
Support	- 200	M100A	
Hoisting ring	- 240	M100A	
Anti-screach liner	5 - 10	M100C or M100D	
Hoisting ring	- 50	M100A	
Spacer	- 140	M100C or M100D	
Slide	- 150	M100C or M100D	
Lug	- 160	M100A	
Clamp support	- 230	M100A	
Reheat duct	- 240	M100C or M100D	

NOTE : Cleaning of bolts, nuts, washers : M100A

**78-11-01**Page 204  
Dec 30/74

# ATP TEMPORARY REVISION

## BRITISH AIRWAYS

OLYMPUS 593 OVERHAUL MANUAL  
EXHAUST SYSTEM REHEAT JET PIPE

This Temporary Revision complies with BCAR's Chapter A6-2 and TSS No. 0-2.



for Chief Engineer (Technical & Quality Services) CAA Design Approval No.  
DA1/8566/78

### TEMPORARY REVISION 78-523

Insert in 78-11-01 facing page 301

#### REASON FOR ISSUE

To introduce a refurbishment specification to the reheat Jet Pipe Overhaul (MCR.EPO.451/MD).

#### ACTION

#### Concorde Exhaust System Refurbishment

##### Introduction

The exhaust system consists of four main components:-

- (a) The Reheat Jet Pipe
- (b) The Primary Nozzle
- (c) The Twin Secondary Nozzle
- (d) The Thrust Reverser Bucket

Their Refurbishment Specifications are as follows:-

Reheat Jet Pipe	CON 78.11.01.100 Issue 1
Primary Nozzle	CON 78.12.01.100 Issue 1
Twin Secondary Nozzle	CON 78.13.01.100 Issue 1
Thrust Reverser Bucket	CON 78.31.01.100 Issue 1

These refurbishment schedules fulfil the life development requirements of the Approved Maintenance Schedule (A.M.S.).

The work listed in the Refurbishment Schedule is to allow the unit to be considered as a "Condition Monitored" (C.M.) unit.

This means that such units are currently considered to have no known hidden "wear out" features that require planned time interval specific inspections. However, such units may be required to be stripped and inspected purely to gain experience of their condition, i.e. life samples when it is considered that opportunity arisings of strip and inspection are inadequate. Such life sampling requirements will be indicated by an A.M.S. revision.

#### Notes

Where the term "visual inspection" is used, it implies a visual inspection of all parts exposed arising either as a result of the minimum work content of the Refurbishment Schedule or to a greater depth of strip dictated by other reasons, i.e. repair of damage embodiment of modifications, etc.

When in the course of visual inspection evidence exists, e.g. wear witness, distortion, etc. that requires further stripping, it must be referred to Propulsion Engineering for a review of acceptance standards and agreement to further strip

# BRITISH AIRWAYS

## OLYMPUS 593 OVERHAUL MANUAL EXHAUST SYSTEM REHEAT JET PIPE

TEMPORARY REVISION No. 78-523 (Cont'd.)

### Concorde Exhaust System Refurbishment Schedule Reheat Jet Pipe

#### Specification No. CON 78.11.01-100 Issue 1

1. The Jet pipe is to be disassembled IAW OHM ref. 78-11-01 P/B 100.
2. At the completion of disassembly, clean thoroughly all the parts of the Reheat Jet Pipe so as to remove all surface contamination such as oils, greases, carbon deposits, corrosion and oxidisation marks IAW OHM 78-11-01 P/B 200.
3. Crack detect parts listed in OHM 78-11-01 page 304, using Fluorescent penetrant method. All parts failing to meet the required standard must be held for possible repair development.
4. Visually inspect all parts IAW OHM 78-11-01 P/B 300 and repair as required. Any parts that is damaged beyond the repair limits must be held for possible repair development. Any part that is damaged and has no cleared repair scheme must be held for possible repair development.
5. Embody Modifications IAW the BA Modification call up list.
6. Inform Propulsion Engineering of any defects found during refurbish.
7. Re-assemble the Jet Pipe IAW OHM 78-11-01 P/B 500.
8. The Jet Pipe inspection and release documentation is to state the specification number to which the unit has been refurbished.



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



## INSPECTION

### 1. Introduction

#### A. Inspection - General

(1) The "Estimate" inspection carried out on items removed from the accessory during overhaul aims at:

- eliminating worn-out or damaged items too expensive or impossible to be repaired.  
However these items may be kept as the parts remaining sound may be used to repair an identical item,
- indicating the modifications to be applied to bring to a new standard,
- indicating the repairs to be carried out.  
If the case has not been foreseen - Apply to the SNECMA repair office,
- eliminating parts having reached life limit.

#### B. Prepare for "Estimate" inspection

(1) Following disassembly clean each item according to the appropriate method defined in the "cleaning" section of the overhaul manual.

NOTE: Make sure that any assembly "awaiting inspection" be stored in "boxes" or containers provided for this purpose.

This inspection must be carried out on thoroughly clean parts.

Place all the parts making up the sub-assembly on the inspection tables covered with anti-shock material (Lino or similar material).

(2) Make a list of the modifications to be applied for each sub-assembly.

(3) Inspect the parts.

#### C. "Estimate" Inspection

CAUTION: DURING INSPECTION OPERATIONS THE PARTS MUST BE HANDLED WITH THE GREATEST CARE TO AVOID BLOWS, SCRATCHES, ETC...

**78-11-01**

Page 301  
Dec 30/74



- (1) Personnel carrying out this inspection must have a thorough knowledge of the instructions given in Inspection and Repair sections of this manual and in the corresponding chapter 70.  
It must be conscious of the importance of its decisions and of their consequences. A good technical and functional knowledge of the accessory will enable this personnel to carry out an efficient and intelligent inspection, particularly in vital zones.
- (2) The inspection methods to be used are the following:

- Visual inspection.
- Inspection for soundness.
- Dimensional inspection.

NOTE: These inspections are best carried out in the order given so that faulty, not repairable parts detected during visual or soundness inspection may be discarded before the geometrical inspection is undertaken.

Should new defects be detected the repairer will request the study of a repair scheme from SNECMA.

- (3) During inspection each part will be labelled (see chapter 70-10-00) so as to indicate:
  - if it is fit for putting back in service,
  - if it requires repair,
  - if it must be replaced.

The labelling of parts can be used to record dimensions that may affect a play or a tolerance. This record will enable inspection to check the play or tolerance on final assembly.

#### D. Protection against corrosion following inspection

- (1) After inspection, when 3 months elapses before re-assembly, apply a temporary protection to carbon steel, alloy steel and martensitic alloy parts using a dehydrating oil such as Ensis Fluid 254 (P309) or ARDROX 396/1E8 (P373) or RUSTILO DW377 (P373).

## 2. Visual inspection

- A. Visual inspection is an operation which starts on reception of the accessory (inventory) and continues during disassembly, on table inspections, re-assembly, testing and dispatching.



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (1) Visual inspection generally concerns the following points :
- each part is examined to ascertain its general condition and make sure it is fit for service. Refer to chapter 70-21-00.
  - parts featuring sheet metal elements must be devoid of nicks, metal rips, heavy distortion and/or, burning marks.
  - threads and tapped holes must not be damaged.
  - hinged parts (such as, pin/bush bores, link rod spherical joint inner/outer liners...) must be free from seizing or scratching indications ; if not, remove defects using fine emery cloth.
  - parts featuring areas with hard-face protection must not show flaking.
  - rivets securing various elements on riveted assemblies, must not be loosened, rotating, or missing, otherwise change rivets.
  - self-locking nuts, must have a satisfactory locking torque. Refer to chapter 70-21-00 ; otherwise, renew nuts.
  - crimped self-locking nuts must have satisfactory locking torque. Refer to chapter 70-21-00 ; otherwise, renew nuts.
- (2) Steps to be taken, with regard to damages found on parts, are given in paragraph 5, "Inspection of parts".

### 3. Inspection for soundness

- A. The main purpose of the inspection for soundness is to ascertain that the accessory parts are not cracked. The inspection methods used are the following :
- Visual inspection
  - Dye penetrant inspection - refer to chapter 70-20-10
- M 502 B : Water washable fluorescent penetrant inspection (except for titanium parts)
- P : penetrant spraying
  - T : immersion in penetrant

78-11-01

Page 303

Dec 30/74

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

M 504 B : Post-emulsified fluorescent penetrant inspection (except for titanium parts).

B. The following table gives the list of parts and the relevant inspection methods :

PARTS TO BE INSPECTED		INSPECTION METHOD	REMARKS and zones requiring careful examination
IPL	DESCRIPTION		
1-10	Upper half deflector	Visual	
1-100	Lower half deflector	Visual +	Locally, level with the fuel collector tube.
3-90	Flexible spacer assy	M 502B (P)	If cracked, scrap
3-130	Ventilation shroud	Visual	
4-50,100	Spherical joint box	M 504B	If cracked, scrap
4-60	Angular position stop	M 504B	If cracked, scrap
4-110	Anti-roll box	Visual	
4-120	Link	Visual	If cracked, scrap
4-130	Fuel collector tube	M 502B (P)	
4-150	Clamp	M 502B (T)	If cracked, scrap

**78-11-01**Page 304  
Dec 30/74





# OLYMPUS 593

MK.610-14-28

OVERHAUL



PARTS TO BE INSPECTED		INSPECTION METHODS	REMARKS and zones requiring careful examination
IPL	DESCRIPTION		
4-200	Support	M 502 B (T)	If cracked, scrap
5-10	Anti-screech liner	M 502 B (P)	
5-140	Spacer	M 502 B (T)	If cracked, scrap
5-150	Slide	M 502 B (T)	If cracked, scrap
5-160	Lug	M 502 B (P)	If cracked, scrap
5-230	Clamp support	M 502 B (T)	If cracked, scrap
5-240	Reheat duct	M 502 B (P)	
<u>Miscellaneous parts</u>			
	Hoisting rings M 502 B (T) If cracked, scrap		

#### 4. Dimensional inspection

##### A. General

##### (1) Measuring instruments

The selection of any measuring instrument is to be made in relation to the precision desired.

##### (a) Instrument classification

Two kinds of measuring instruments are to be distinguished :

- standard and universal measuring instruments such as : slide gages, micrometers, depth gages, dial indicators of various types, miscellaneous gages, etc...

This equipment is part of the provisioning items that are procurable in the trade and require no particular comment provided that they are available in the required quantity and precision, and satisfy to the requirements for the work to be undertaken.

- special inspection equipment such as : bases, supports, rigs, jigs, etc...

## 78-11-01



OLYMPUS 593

MK.610-14-28

OVERHAUL



These tools are identified by a type number in the manual text at the exact place where they are used.

(b) Calibration

Measuring instruments used in overhaul are to be checked periodically according to a procedure defined in relation to master instruments (SNECMA to be informed of procedure), themselves checked in relation to the official master instruments of the country concerned.

The Official Control Authorities of the countries where repairs are carried out will have to take steps to ensure that the repairer has set up suitable facilities and equipment.

In the absence of a procedure in the countries concerned the repairer will request from SNECMA the procedure applied in their own workshop.

B. Dimensional Inspection of Parts

Details concerning the dimensional inspection and the acceptance criteria are given in paragraph 5 "Parts Inspection".

5. Inspection of Parts

A. Upper Half-Deflector (1-10)

(1) Visual inspection

- (a) A local distortion of the half-deflector sheet metal is acceptable provided it is devoid of cracks ; if not, patch repair the half deflector per REP 1-10-2 and BOR 17.
- (b) Rents in the half-deflector sheeting are unacceptable. Repair as instructed under REP 1-10-2 or BOR 17.
- (c) Wear of the grommets to a depth of less than 0,3 mm (0.012 in.) is admissible. In excess of that value, the grommets are to be replaced as directed under REP 1-10-3 and BOR 19.
- (d) Marks of wear on the upstream and downstream stiffeners and the side reinforcement plates are acceptable unless compounded by cracks or punctures. If so, replace the impaired elements as directed under REP 1-10-3 and BOR 19.

PRINTED IN FRANCE



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(2) Soundness inspection

- (a) Cracks in the half-deflector sheeting are repaired by :
  - 1 Weld filling, as directed under REP 1-10-1, if isolated and within an unoxidized area.
  - 2 Patching, as directed under REP 1-10-2, if ramified or lying in an oxidized area.
- (b) Cracks affecting the various riveted parts (grommets, reinforcement plates, etc..) require, under REP 1-10-3, the cracked item to be replaced.

B. Lower Half-Deflector (1-100)

(1) Visual inspection

- (a) Any damage to the thread of the union nut and/or to the nipple is cause, under REP 1-100-4, for the replacement of the draining tube.
- (b) A localized distortion of the half-deflector sheeting is acceptable provided it is free from cracks ; if it isn't, patch-repair the half-deflector as directed under REP 1-100-2 and BOR 18.
- (c) Rents in the half-deflector sheeting are unacceptable. Repair as directed in :
  - 1 REP 1-100-2 In all segments except for the draining-tube region.
  - 2 REP 1-100-4 In the draining-tube area.
- (d) Wear of the grommets a depth of less than 0.3 mm (0.012 in.) is acceptable. In excess of that value, the grommets are to be replaced as instructed under REP 1-100-3 and BOR 20.
- (e) Marks of wear on the upstream and downstream stiffeners, and the side reinforcement plates are admissible unless compounded by cracks or punctures. If so, replace the damaged elements as described under REP 1-100-3 and BOR 20.

78-11-01

Page 307



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(2) Soudness inspection

- (a) Cracks in weld beads are to be repaired by weld filling, as directed under REP 1-100-3 and BOR 16.
- (b) Cracks affecting the half-deflector sheeting are repaired by :
  - 1 Weld-filling, as described under REP 1-100-1, if isolated, and lying outside an oxidized area and the draining-tube region.
  - 2 Patching, as described under REP 1-100-2, if ramified or lying in an oxidized area. BOR 18 may also be used.
  - 3 Replacement of the draining-tube, as directed under REP 1-100-4, if adjoining its region.
- (c) Cracks affecting the various riveted parts (grommets, reinforcement plates, etc.) call, under REP 1-100-3, for the cracked item to be replaced. BOR 16 may also be used.

C. Flexible Spacer Assembly (3-90)

(1) Visual inspection

- (a) Signs of wear on the flexible spacers are acceptable unless their extent threatens perforation. If so, scrap the spacer.
- (b) Check that the weld bead joining the hinge to the block is not broken. If it is, restore the weld bead as directed under REP 3-90-1.
- (c) Repair worn internal end pads by applying BOR 37.

D. Ventilation Shroud Assy (3-130)

(1) Visual inspection

- (a) A localized distortion in the outer web sheet of the shroud is acceptable so long as the affected area shows no cracks or burns. If it does, repair by patching, as directed under REP 3-130-2.
- (b) Rents in the outer shroud sheeting are acceptable and must be patch-repaired as directed under REP 3-130-2.

PRINTED IN FRANCE

78-11-01

Page 308



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) In the wafered sheet metal of shroud thermal insulation, deteriorations caused by over temperature or tears resulting from mis-handling are unacceptable.

Depending on how large is the damaged area, the wafered sheet metal must be either locally patch repaired in accordance with REP 3-130-3 or the damaged segment must be renewed, in accordance with REP 3-130-2.

(2) Inspection for soundness

- (a) If cracks spread on top of the outer sheet metal circular webs, repair cracks by filler welding, in accordance with REP 3-130-1.
- (b) If cracks spreading in bottom of the circular webs featuring lines of rivets are found or if a crack concentration or cracks progressing in a star-shaped pattern are disclosed, repair by installation of riveted patches, in accordance with REP 3-130-2.
- (c) If cracks are found in wafered sheet metal of the thermal insulation liner, repair by patch welding in accordance with REP 3-130-3.

E. Spherical Joint Box (4-50, 100)

(1) Visual inspection

Deterioration affecting threads of both tapped (extraction) holes located in the pad flange entails scrapping of the spherical joint box.

(2) Dimensional check

- (a) Wear condition of the spherical bore housing is acceptable if its inner dia. is smaller than or equal to 32,05 mm (1.26181 in.). Beyond this value, scrap the part.
- (b) Out-of-flatness condition of the spherical joint box attaching flange is acceptable if less than 0,5 mm (0.020 in.). Beyond this limit, perform re-shaping of the flange, in accordance with REP 4-50-1.

78-11-01

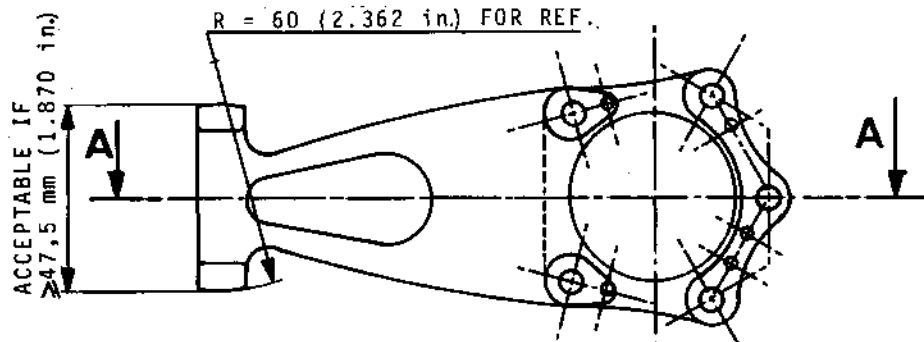
Page 309  
Mar 31/78



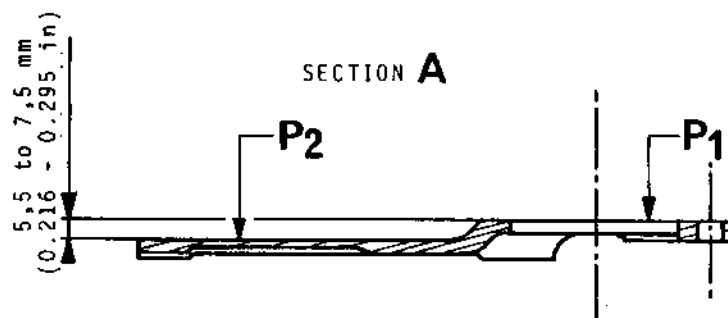
OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN FRANCE



Angular Position Stop Dimensional Check  
Figure 301

78-11-01

Page 310  
Mar 31/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



F. Angular Position Stop (4-60)

(1) Dimensional check (see fig. 301)

- (a) Distortion due to bending of the angular position flange arm is acceptable if distance measured between planes P1 and P2 is within 5,5 and 7,5 mm (0.216 and 0.295 in. respectively).

Above this value, perform re-shaping of arm, in accordance with REP 4-60-1.

- (b) Peening wear of the stop contact faces is acceptable so long as width of the stop is higher or equal to 47,5 mm (1.870 in.). Under this value, repair the stop contact faces by filler welding, in accordance with REP4-60-2.

G. Anti-Roll Box (4-110)

(1) Inspection for soundness

If cracks are found in the box parent metal or in weld beads of bosses, repair by filler welding, in accordance with REP 4-110-1.

H. Connecting Link (4-120)

CAUTION : THE ANTI SEIZE TREATMENT MUST BE RE-APPLIED SYSTEMATICALLY AT EACH OVERHAUL, IN ACCORDANCE WITH REP 4-120-2.

(1) Dimensional check

- (a) Buckling of the connector link body is acceptable if the measured sag (deflection) is less than 0,3 mm (0.012 in.). Above this limit, re-shape the body, in accordance with REP 4-120-1.

CAUTION : IF THE CONNECTING LINK HAS ALREADY BEEN SUBJECTED TO A PREVIOUS RE-SHAPING (AS INDICATED BY INDEX SCRIBED AFTER THE PART NUMBER) IT MUST BE SCRAPPED.

- (b) Wear condition of the spherical diameter of joints :

1 Is acceptable if diameter is higher or equal to 31,95 mm (1.25787 in.).

78-11-01

Page 311  
Mar 31/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



- 2 Entails reconditioning the spherical joint by metallization if dia. is within 31,70 and 31,95 mm (1.24802 and 1.25787 in.respectively).
- 3 Entails scrapping of the part if dia. is less than 31,70 mm (1.24802 in.).

#### I. Fuel Collector Tube (4-130)

##### (1) Visual inspection

- (a) Thread deterioration of threaded unions at tube ends, entails renewal of damaged union(s) in accordance with REP 4-130-2.
- (b) Conical contact surface of unions must be free from scratches ; if not the case, renew damaged union(s), in accordance with REP 4-130-2.
- (c) Tube surface must be devoid of chafing or scratching marks :  
Otherwise :
  - 1 If depth of defects is less than 0,15 mm (0.00590 in.) remove defects using fine grit emery cloth or paste.
  - 2 If defects are deeper than 0,15 mm (0.00590 in.) machine out and renew the deteriorated segment of the tube, in accordance with REP 4-130-2 or BOR 21.
- (d) Distortions in the support are admissible if unattended with cracks. If cracked, the support is to be replaced in accordance with REP 4-130-2.
- (e) Signs of wear on the square anti-rotation fitting are acceptable after smoothing out the surface.
- (f) A dislocation of the bushes limiting the movement of the sliding guide is unacceptable. Repair by fitting new bushes in accordance with REP 4-130-2.

##### (2) Inspection for Soundness

- (a) If cracks are disclosed in welds joining together the various elements of the tube, repair by filler welding cracks, in accordance with REP 4-130-1.

PRINTED IN FRANCE

78-11-01

Page 312



# ATP TEMPORARY REVISION

## British airways

CONCORDE

OLYMPUS OVERHAUL MANUAL

This Temporary Revision complies with BCAR's Chapter A6-2 and TSS No. 0-2

*P. Munn* for Chief Engineer (Technical & Quality Services) CAA Design Approval No. DA1/8566/78

TEMPORARY REVISION 78-503

Insert in 78-11-01 facing page 313

### REASON FOR ISSUE

To increase wear limits for units not subject to overhaul - DDA A516-27  
(TIS Ref Conc 704).

### ACTION

Reference: "K. Anti-Screech Liner"

Read paragraph (1) (a) as follows:

(a) Spacers showing contact surface wear are acceptable as follows:

1. After overhaul - wear not greater than 0.012 in.
2. After repair - up to ten spacers with wear not exceeding 0.040 in. are acceptable provided that not more than two are adjacent and provided that the wear on the remaining spacers does not exceed 0.018 in.

Beyond these limits, perform spacer renewal in accordance with REP 5-10-2.

TR.78-503

78-11-01

TR Page 1 of 1



OLYMPUS 593

MK.610-14-28  
OVERHAUL



SEE TR

- (b) Cracks affecting the various tube parts (sliding guide, support, etc..) are cause for replacing the cracked item, in accordance with REP 4-130-2.

J. Support (4-200)

(1) Visual inspection

Thread deterioration of the support tapped holes entails scrapping the part.

(2) Dimensional check

Out-of-flatness condition of the support attaching flange is acceptable if less than 0,5 mm (0.020 in.). Beyond this limit, perform re-shaping of the flange in accordance with REP 4-200-1.

K. Anti-Screech Liner (5-10)

(1) Visual inspection

- (a) Spacers showing contact surfaces which, through battering, are worn on a depth from 0,2 to 0,3 mm (0.008 to 0.012 in.) are acceptable. Beyond these limits, perform spacer renewal, in accordance with REP 5-10-2.
- (b) Burn marks, hot-spot indications or missing portion of liner material are unacceptable. Depending on how large is the damaged area, it must be either machined out and patch repaired in accordance with REP 5-10-3 or one or several liner corrugations be renewed, in accordance with REP 5-10-4.
- (c) Impact marks, if unattended with cracks, are acceptable after smoothing out the surface. If cracked, see soundness inspection below.

(2) Inspection for soundness

- (a) Cracked spacers are to be renewed, in accordance with REP 5-10-2.
- (b) Cracks affecting the anti-screach liner sheet metal are to be removed as follows :

78-11-01

Page 313  
Mar 31/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



- 1 Remove cracks originating and spreading on less than 2,5 mm (0.098 in.) from the air passages by elongation of these holes, provided that surrounding sheet metal material is sound, in accordance REP 5-10-1.
- 2 Using an abrasive wheel, remove cracks starting from liner front or rear edges and spreading on a length less than 2,5 mm (0.098 in.) provided that surrounding sheet metal material is sound, in accordance REP 5-10-1.
- 3 By cutting put the damaged area and installing a patch in accordance with REP 5-10-3 replace one or several liner corrugations (this, depending on how heavy is the damage) in accordance with REP 5-10-4, remove the following cracks :
  - a Cracks originating from air passages, longer than 2,5 mm (0.098 in.) or located in a burnt area.
  - b Cracks starting from the liner front or rear edges, longer than 2,5 mm or located in a burnt area.
  - c Cracks originating or located all around the liner front fastening holes.
  - d Cracks originating or located all around the liner rear fastening holes.
  - e Cracks or shrinkage cracks adjacent to existing weld beads.

L. Slide (5-150)

(1) Visual inspection

- (a) Scrap part if tapped holes are damaged.
- (b) On the slide contact surfaces, wear marks 0,2 to 0,3 mm (0.008 to 0.012 in.) resulting from battering, are acceptable. Beyond those limits repair in accordance with BOR 46.

LA. Lug (5-160)

Repair fretting on lug flexible spacer in accordance with BOR 42.

PRINTED IN FRANCE

**ATP  
TEMPORARY  
REVISION**

**British airways**

CONCORDE

OLYMPUS OVERHAUL MANUAL

TR Page 1 of 1  
12 April 1984

This Temporary Revision complies with BCAR's Chapter A6-2 and TSS No. 0-2

*P. [signature]* for Chief Engineer (Technical & Quality Services) CAA Design Approval No. DA1/8566/78

TEMPORARY REVISION 78-502

Insert in 78-11-01 facing page 315

**REASON FOR ISSUE**

Permissible chafing limit added - MCR.ETP.2/125/SM (TIS Ref Conc 676)

**ACTION:**

Reference: Paragraph N "(1) Visual Inspection"

Add paragraph (f) to read as follows:

- (f) Localised chafing of the front or rear spherical bearing surfaces is permitted to a depth not exceeding 0.050 in.

Persons performing a supervisory function are responsible for informing their appropriate staff of the substance of this ATP Temporary Revision.

78-11-01  
Page 315



OLYMPUS 593

MK.610-14-28

OVERHAUL



M. Clamp support (5-230)

(1) Visual inspection

Thread deterioration of tapped holes in support, entails reworking the part by insertion of a bush.

N. Reheat Duct (5-240)

(1) Visual inspection

- (a) On central liner of reheat duct, locally bulged distortions are unacceptable, and must be removed by re-shaping if not located in a burnt or cracked area, in accordance with REP 5-240-1. Otherwise, patch repair the central liner of duct in accordance with REP 5-240-3).
- (b) Thread deterioration of tapped holes located in duct pads entails rework of the duct by installation of bushes.
- (c) Signs of wear or seizure on the front and rear spherical joints are acceptable after smoothing out the surface on condition that the dimensional requirements specified below are complied with.
- (d) Impact marks are admissible after smoothing out the surface if they are localized dents without cracks or sharp-edged bottoms. If not, repair the central liner by patching, as described in accordance with REP 5-240-3.
- (e) Surface defects caused by contact with the flexible spacer blocks on the ventilation shroud are acceptable after smoothing out the surface provided they are not deeper than 0,2 mm (0.008 in.). In excess of this value, repair the central liner by metallization.

(2) Inspection for soundness

- (a) If cracks are present in joint weld beads of flanges, pads, liners, weld fill cracks in accordance with REP 5-240-2.
- (b) If cracks originate from any weld bead and progress through the duct sheet metal, remove them by filler welding in accordance with REP 5-240-2 or if cracks feature ramifications, and/or, affect a burnt area, remove cracks by installing patch(es), in accordance with REP 5-240-3.

78-11-01

Page 315

Mar 31/78

**ATP  
TEMPORARY  
REVISION**

**BRITISH AIRWAYS**

CONCORDE OLYMPUS 593  
OVERHAUL MANUAL

TR Page 1 of 1  
21 September 1993

THIS TEMPORARY REVISION IS ISSUED BY BRITISH AIRWAYS TECHNICAL SERVICES AND COMPLIES WITH BCAR'S CHAPTER A5-3, B5-3 AND/OR TSS No. 0-2 AS REQUIRED. CAA DESIGN APPROVAL No. DAI/8566/78.



FOR CHIEF ENGINEER TECHNICAL SERVICES

TEMPORARY REVISION NO. 78-529

Manual Reference 78-11-01 Page 316

**REASON FOR REVISION**

British Airways information (BA Page 316) re-issued to align with manufacturers Revision No.22.

**ACTION**

1. Reference Para 5.N. (3) Dimensional check

A. Add to Sub Para (a) 2 the following:

Plasma spray in accordance with BOR 36.

B. Add Sub Para (a) 3 as follows:

3 BOR 30 may be used on fretted front and rear flanges by direct welding.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) If cracks radiate from a hole, weld fill remove cracks, in accordance with REP 5-240-2.
- (d) If cracks are present in one spherical joint box mounting pad, perform pad renewal.

(3) Dimensional check

CAUTION : A 10°C VARIATION IN TEMPERATURE, RESULTS IN AN APPROXIMATIVE LINEAR CHANGE OF 0,13 mm (0.00512 in.) OF THE FLANGE DIAMETER.

- (a) A reduction of the average outer diameter of the duct front flange spherical bearing surface, measured in Plane P1, materializing the spherical bearing surface largest diameter, in a room at 20°C ambient temperature, is :

- 1 Acceptable if average diameter is higher or equal to 1035,8 mm (40.779 in.).
- 2 Unacceptable if average diameter is less than 1035,8 mm (40.779 in.) and requires flange re-conditioning through metallization in accordance with REP 5-240-4.

- (b) Check procedure (refer to figure 302)

The average diameter of the duct front flange spherical bearing surface is obtained by computing the mean arithmetical value of the eighteen (18) measurements taken in Plane P1.

To take these measurements, proceed as follows :

- 1 On the flange outer front rim, scribe 18 generatrix equally spaced on the half circumference.

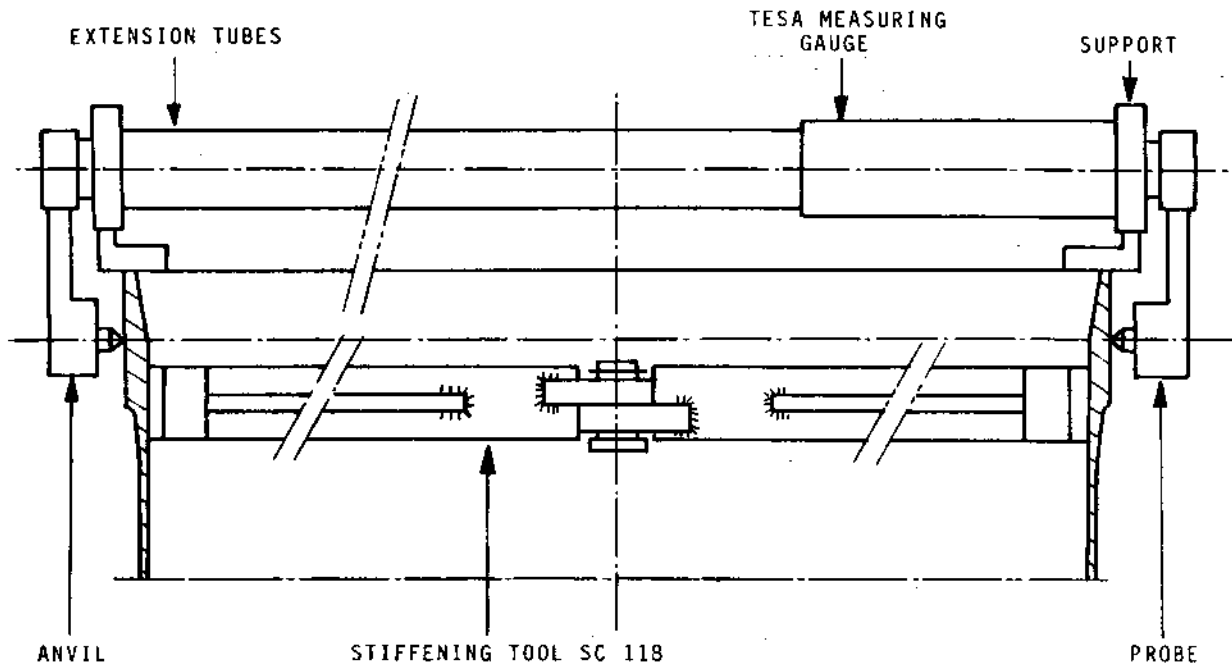
CAUTION : UNDER ANY CIRCUMSTANCE, SHOULD THE MARKS SCRIBED BE DETRIMENTAL TO THE SURFACE CONDITION OF THE SPHERICAL BEARING SURFACE.

- 2 Using the stiffening tool SC 118, correct the duct front flange out-of-round.
- 3 Calibrate the measuring gauge TESA UNIMASTER (TESA - S.A. 1020 RENENS - VD/Switzerland-Agent for France: SYNERGIE, 29, avenue Philippe Auguste - 75540 PARIS CEDEX 11 - tel: 44-93-10-00.

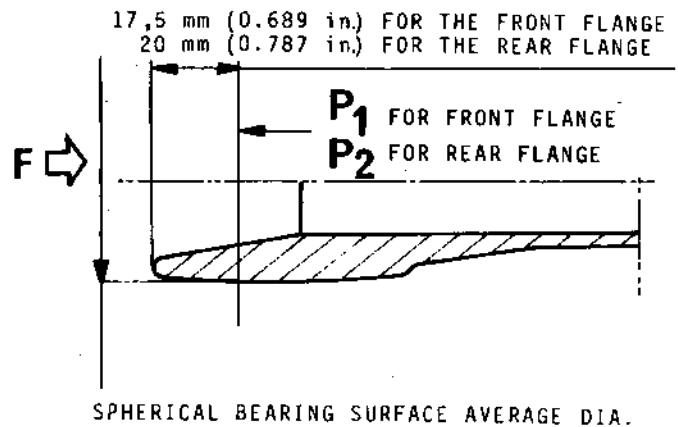
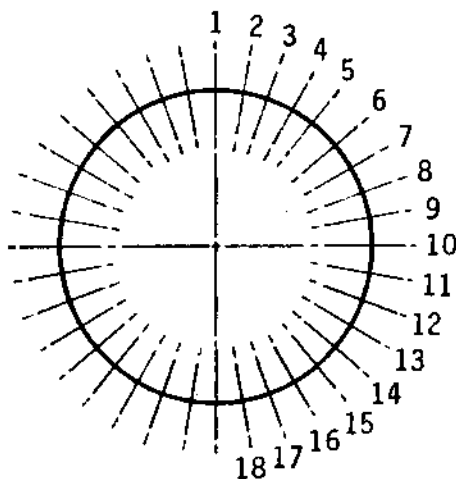


# OLYMPUS 593

MK.610-14-28  
OVERHAUL



SCHEMATIC VIEW IN DIRECTION **F**



## FRONT FLANGE

$D = 1036 \text{ mm}$  (40.787 in.) NOMINAL  
 $D \geq 1035,8 \text{ mm}$  (40.779 in.) ACCEPTABLE  
 $D < 1035,8 \text{ mm}$  (40.779 in.) UNACCEPTABLE

## REAR FLANGE

$D = 1019 \text{ mm}$  (40.118 in.) NOMINAL  
 $D \geq 1018,8 \text{ mm}$  (40.110 in.) ACCEPTABLE  
 $D < 1018,8 \text{ mm}$  (40.110 in.) UNACCEPTABLE

Checking the Spherical Bearing Surface  
Average Diameter, For the Reheat Duct  
Front and Rear Flanges  
Figure 302

# 78-11-01

Page 317  
Mar 31/78





OLYMPUS 593

MK.610-14-28

OVERHAUL



Fit the gauge with :

- a The necessary extension tubes to obtain the dimension to be checked.
  - b The supports adjusted properly to determine the measuring geometrical plane.
- 4 Rest the gauge supports on the flange rim ; then, perform measurement.
- 5 Repeat this operation in line with the 18 scribed marks.
- (c) A reduction of the average outer diameter of the duct rear flange spherical bearing surface, measured in Plane P2, materializing the spherical bearing surface largest diameter, in a room at 20°C ambient temperature, is :
- 1 Acceptable if the average diameter is higher or equal to 1018,8 mm (40.110 in.).
  - 2 Unacceptable if average diameter is less than 1018,8 mm (40.110 in.) and requires flange reconditioning through metallization, in accordance with REP 5-240-4.
- (d) Check procedure (refer to figure 302)

Procedure same as for the front flange.

PRINTED IN FRANCE

78-11-01

Page 318  
Mar 31/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## REPAIR

### 1. Format of the repair schemes

Each repair scheme (REP) describes only one operation to be carried out on a single part.

#### A. Repair scheme identification and classification

Any one part is identified by :

- its nomenclature
- its classification in the Illustrated Parts List (Figure-Item)

A repair scheme is identified by :

- the part to which it relates
- the purpose of this repair

These various criteria have been used for identification and classification purposes.

##### (1) Identification

The identification of a repair scheme is given by :

- the nomenclature of the part with its IPL reference No. (Figure-Item)
- the purpose of the repair preceded by its numerical order

##### (2) Classification

The classification of a repair scheme is given by :

- the A.T.A. breakdown system
- the number of the repair scheme which is given by :
  - (a) The part IPL classification (Figure-Item) and the repair numerical order.
- the page number, proper to any repair scheme (re-starts from page 401 for each repair scheme)
- the date

##### (3) Sample of identification and classification

**78-11-01**

FOREWORD

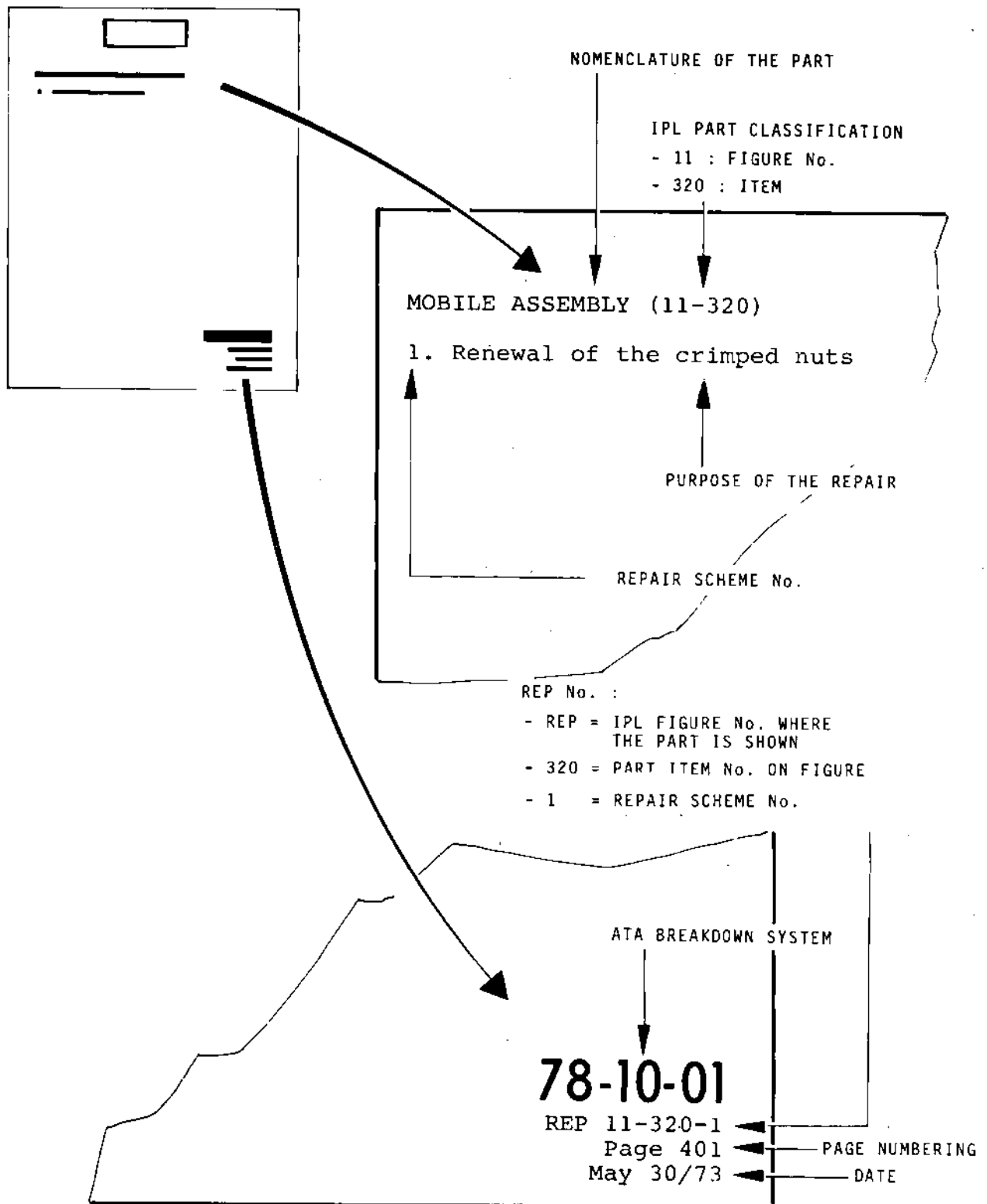
Page 401

Dec 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL

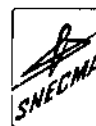


**78-11-01**

FOREWORD  
Page 402  
Dec 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL

NOTE : The REP numbering system uses the repair scheme identification criteria in order to establish the direct identification/classification relationship.

(4) Particular case

(a) Identical parts

When n identical parts are installed on a same assembly, the numbering of the REP will be made by using the IPL classification of the first part.

Example :

Identification of the  
thrust reverser cascades : CASCADE (2-10, 11, 30, 31,  
50, 51, 70, 90, 110, 111,  
130, 150, 170, 190)

REP No. : REP. 2-10-1

(b) Optional parts

In the case of the I.P.L. making mention of optional parts (OPT TO ...) and should these parts require a special repair scheme, the said scheme shall be identified as follows :

- 1 The nomenclature of the part with its IPL reference No. (Figure - Item) of the basic part (and, if required, the manufacturer's part number).
- 2 The purpose of the repair preceded by its numerical order number.  
  
and classified as follows :
- 3 A.T.A. breakdown system.
- 4 The number of the repair scheme which is given by the IPL classification of the basic part (Figure - Item) and the repair scheme numerical order number followed by an alphabetical variant.
- 5 Page numbered 401 and onward.
- 6 The date.

78-11-01

FOREWORD  
Page 403  
May 31/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## 2. Updating

- A. The revisions, entailed by the technical evolution of the repair scheme, will affect its classification only as far as the date is concerned.
- B. Modification of the alternate part

An alpha variant is introduced in the IPL and modifies the figure-item No.

- (1) This modification has no effect on the repair scheme :  
the REP remains unchanged
- (2) This modification introduces a new REP :

Elaboration of a new repair scheme in which appears the alpha variant issue letter introducing this new REP.

Example : The modification introduces a REP with issue letter C, the previous REP is valid for the parts A and B.

REP 4-20-3 : valid for alpha variant A and B

REP 4-20C-3: valid from alpha variant C.

PRINTED IN FRANCE

78-11-01

FOREWORD  
Page 404  
May 31/77

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



PART NUMBER	DESCRIPTION	REPAIR NUMBER
LA579-4	FLOATING NUT	REP 5-160-1
LA579-4K	FLOATING NUT	REP 3-130-2
MLSPM4-1	BLIND RIVET	REP 3-130-2
21215TB2405	RIVET	REP 1- 10-2
21215TB2405	RIVET	REP 1- 10-3
21215TB2405	RIVET	REP 1-100-2
21215TB2405	RIVET	REP 1-100-3
21215TB2405	RIVET	REP 1-100-4
21215TB2405	RIVET	REP 3-130-2
21215TB2406	RIVET	REP 3-130-2
21215TB2408	RIVET	REP 3-130-2
21215TB2408	RIVET	REP 5-160-1
21215TB3206	RIVET	REP 1- 10-2
21215TB3206	RIVET	REP 1- 10-3
21215TB3206	RIVET	REP 1-100-2
21215TB3206	RIVET	REP 1-100-3
21215TB3206	RIVET	REP 1-100-4
21215TB3206	RIVET	REP 3-130-2
21215TB3207	RIVET	REP 3-130-2
21215TB3209	RIVET	REP 1-100-2
21215TB3209	RIVET	REP 1-100-4
21215TB3209	RIVET	REP 3-130-2
21215TB3209	RIVET	REP 5-160-1
21215TB4007	RIVET	REP 1- 10-2
21215TB4007	RIVET	REP 1- 10-3
21215TB4008	RIVET	REP 3-130-2
21215TB4010	RIVET	REP 1-100-2
21215TB4010	RIVET	REP 1-100-3
21215TB4010	RIVET	REP 1-100-4
21215TB4811	RIVET	REP 1-100-3
21217TB2406	RIVET	REP 1- 10-2
21217TB2406	RIVET	REP 1- 10-3
21217TB2406	RIVET	REP 1-100-2
21217TB2406	RIVET	REP 1-100-3
21217TB2406	RIVET	REP 1-100-4
21217TB2406	RIVET	REP 3-130-2
21217TB2407	RIVET	REP 3-130-2
21217TB2408	RIVET	REP 3-130-2
21217TB2409	RIVET	REP 1- 10-2
21217TB2409	RIVET	REP 1- 10-3
21217TB2409	RIVET	REP 1-100-2
21217TB2409	RIVET	REP 1-100-3
21217TB2409	RIVET	REP 1-100-4
21217TB3207	RIVET	REP 1- 10-2
21217TB3207	RIVET	REP 1- 10-3
21217TB3207	RIVET	REP 1-100-2

**78-11-01**

REPAIR PARTS LIST

Page 401

Apr 30/93

**OLYMPUS 593****MK. 610-14-28****OVERHAUL****sneema**

PART NUMBER	DESCRIPTION	REPAIR NUMBER
21217TB3207	RIVET	REP 1-100-3
21217TB3207	RIVET	REP 1-100-4
21217TB3207	RIVET	REP 3-130-2
21217TB3208	RIVET	REP 3-130-2
21217TB3209	RIVET	REP 3-130-2
21217TB3210	RIVET	REP 1- 10-2
21217TB3210	RIVET	REP 1- 10-3
21217TB3210	RIVET	REP 1-100-2
21217TB3210	RIVET	REP 1-100-4
21217TB3210	RIVET	REP 5-240-3
21217TC2407	RIVET	REP 5-240-3
21217TC3207	RIVET	REP 5-240-3
301-174-200-0	FRONT REINFORCING BAND	REP 5-240-3
301-178-100-0	IDENTIFICATION PLATE	REP 5-240-3
301-178-800-0	EDGING	REP 3-130-2
301-180-200-0	REAR STIFFENER	REP 1-100-3
301-180-301-0	REINFORCING STOP	REP 1-100-3
301-180-401-0	REINFORCING STOP	REP 1-100-3
301-180-600-0	RETAINING RING	REP 1-100-3
301-183-600-0	INNER FERRULE	REP 3-130-2
525-203-026-0	RIVETING WASHER	REP 3-130-2
525-203-033-0	EYELET	REP 1- 10-3
525-203-033-0	EYELET	REP 1-100-3
525-203-037-0	JUNCTION PLATE	REP 3-130-2
525-203-042-0	REAR REINFORCING PLATE	REP 3-130-2
525-203-043-0	RETAINING MEMBER	REP 3-130-2
525-203-044-0	RIVETING PLATE	REP 3-130-2
525-203-045-0	RIVETING PLATE	REP 3-130-2
525-203-055-0	REAR REINFORCING PLATE	REP 3-103-2
525-203-057-0	REINFORCING RING	REP 3-130-2
525-203-108-0	BRACKET	REP 4-130-2
525-203-135-0	RETAINING SLEEVE	REP 4-130-2
525-203-146-0	PAD	REP 4-130-0
525-203-162-0	RIVET	REP 5- 10-3
525-203-162-0	RIVET	REP 5- 10-4
525-203-164-0	REAR REINFORCING PLATE	REP 3-130-2
525-400-062-0	PLATE	REP 3-130-2
525-400-064-0	PLATE	REP 3-130-2
525-400-065-0	PIN	REP 3-130-2
525-400-066-0	PLATE	REP 3-130-2
525-400-066-0	PLATE	REP 3-130-2
525-400-066-0	PLATE	REP 3-130-2
525-400-066-0	PLATE	REP 3-130-2
525-400-084-0	IDENTIFICATION PLATE	REP 5-240-3
525-400-091-0	REINFORCING PLATE	REP 3-130-2
525-600-033-0	BARE ANTI-SCREECH LINER	REP 5- 10-3

**78-11-01**

REPAIR PARTS LIST

Page 402

June 30/97

**OLYMPUS 593****MK. 610-14-28****OVERHAUL****SHEEMA**

PART NUMBER	DESCRIPTION	REPAIR NUMBER
525-600-033-0	BARE ANTI-SCREECH LINER	REP 5- 10-4
525-600-081-0	BARE ANTI-SCREECH LINER	REP 5- 10-3
525-600-081-0	BARE ANTI-SCREECH LINER	REP 5- 10-4
525-600-101-0	SPACER	REP 5- 10-2
525-600-101-0	SPACER	REP 5- 10-3
525-600-101-0	SPACER	REP 5- 10-4
525-600-110-0	REAR STIFFENER	REP 1- 10-3
525-600-111-0	FRONT STIFFENER	REP 1- 10-3
525-600-112-0	BOX-CHAPED STIFFENER	REP 1- 10-3
525-600-115-0	FRONT STIFFENER	REP 1-100-3
525-600-118-0	REINFORCING SPACER	REP 1-100-3
525-600-128-0	INNER EDGING	REP 3-130-2
525-600-129-0	OUTER EDGING	REP 3-130-2
525-600-136-0	REAR REINFORCING PLATE	REP 3-130-2
525-600-137-0	REINFORCING PLATE	REP 3-130-2
525-600-138-0	REINFORCING PLATE	REP 3-130-2
525-600-139-0	REINFORCING PLATE	REP 3-130-2
525-600-147-0	FRONT REINFORCING PLATE	REP 3-130-2
525-600-194-0	LINER	REP 5-240-3
525-600-219-0	RIVETING WASHER	REP 3-130-2
525-600-223-0	TUBE END ASSY	REP 4-130-2
525-609-724-0	PAD SUPPORT	REP 3-130-2
649-473-028-0	UNION	REP 1-100-4
649-474-008-0	UNION	REP 4-130-2
649-478-008-0	UNION NUT	REP 1-100-4
650-335-012-0	RIVETING WASHER	REP 3-130-2
650-772-020-0	RIVET	REP 5- 10-2

**78-11-01**

REPAIR PARTS LIST

Pages 403/404

June 30/97





OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

UPPER HALF DEFLECTOR (1-10)

1. Cracks filler welding

---

PARTS REQUIRED FOR REPAIR

---

Filler welding wire P 3002 or P 3009

---

A. Crack welding

Filler weld cracks as per instructions of chapter 70-35-10.

- Filler welding wire : P 3002 or P 3009
- Weld class B1

B. Inspection for soundness

Inspect welds, class B1, as per instructions of chapter 70-35-80.

- Water washable fluorescent penetrant inspect as per process M 502 B of chapter 70-20-10.

**78-11-01**

REP 1-10-1  
Pages 401/402  
Dec 30/74

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



## REPAIR

UPPER HALF DEFLECTOR (1-10)

## 2. Patch welding repair

---

PARTS REQUIRED FOR REPAIR

---

Sheet metal P 3301, thickness 0,6 mm (0.024 in.)  
Rivet No. BNAE 21215 TB 2405 (650-012-041-0)  
or No. BNAE 21215 TB 3206 (650-012-072-0)  
Rivet No. BNAE 21215 TB 3206 (650-012-072-0)  
or No. BNAE 21215 TB 4007 (650-012-100-0)  
Rivet No. BNAE 21217 TB 2406 (650-022-042-0)  
or No. BNAE 21217 TB 3207 (650-022-073-0)  
Rivet No. BNAE 21217 TB 2409 (650-022-045-0)  
or No. BNAE 21217 TB 3210 (650-022-076-0)  
Filler welding wire P 3002 or P 3009

---

## A. General

In some instances, the fitting of a welded patch may necessitate the removal of riveted parts in order to facilitate the repair work or to comply with specifications related to installation of patches.

## B. Specifications related to patch installation

These specifications are given in chapter 70-35-10.  
Moreover, if deteriorations are located at less than 15 mm (0.591 in) from a riveted part, cut out the sheet metal so that patch fits snug in the riveted part.

## C. Patch preparation

- (1) Patches may be cut out from sound metal portions of any scrapped half deflector or manufactured from a piece of sheet metal P 3301, 0,6 mm (0.024 in) thick, pre-shaped to contour of area to be patch repaired (refer to figure 401).
- (2) Dimensions of patches are function of damages found. However, they must be formed in accordance with specifications given in chapter 70-35-10.

## D. Patch installation

- (1) As required, remove rivets fastening parts adjacent to the deteriorated zone in order to facilitate repair

**78-11-01**

REP 1-10-2

Page 401

Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



work or to fit the patch element.

- (2) Argon arc weld the patch in accordance with instructions of chapter 70-35-10.
  - filler welding wire P 3002 or P 3009
  - weld class : B1
- (3) Inspect weld, class B1, as per instructions of chapter 70-35-80.
  - water washable fluorescent penetrant inspect as per process M 502 B of chapter 70-20-10.

E. Re-installation of previously unriveted parts

The following instructions give all pertinent information required for re-installation of unriveted parts.

- (1) For each case, two methods are provided :
  - 1st method : riveting as per drawing requirements for new parts
  - 2nd method : riveting with 0,8 mm (0.031 in) oversized diameter rivets in relation to nominal (original) dia. of rivets.
- (2) Preparation and riveting of parts is to be performed in accordance with instructions of chapter 70-50-10 and dimensional requirements shown on figure 401. Data concerning rivets are given in table I.

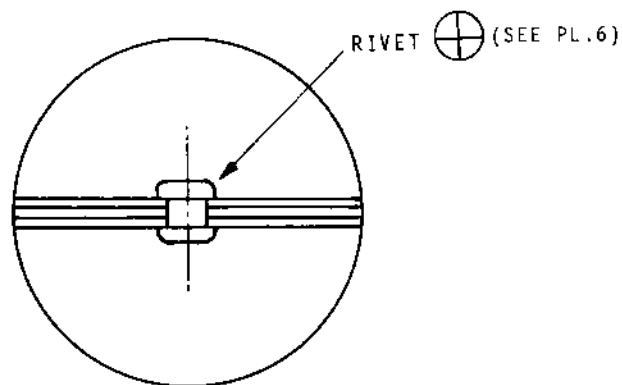
NOTA : Working lengthwise, radius the edges of the sheet metal to 0,2 mm (0.008 in.).
- (3) After riveting, inspect rivets in accordance with instructions of chapter 70-50-80.

78-11-01

REP 1-10-2

Page 402

Dec 15/75



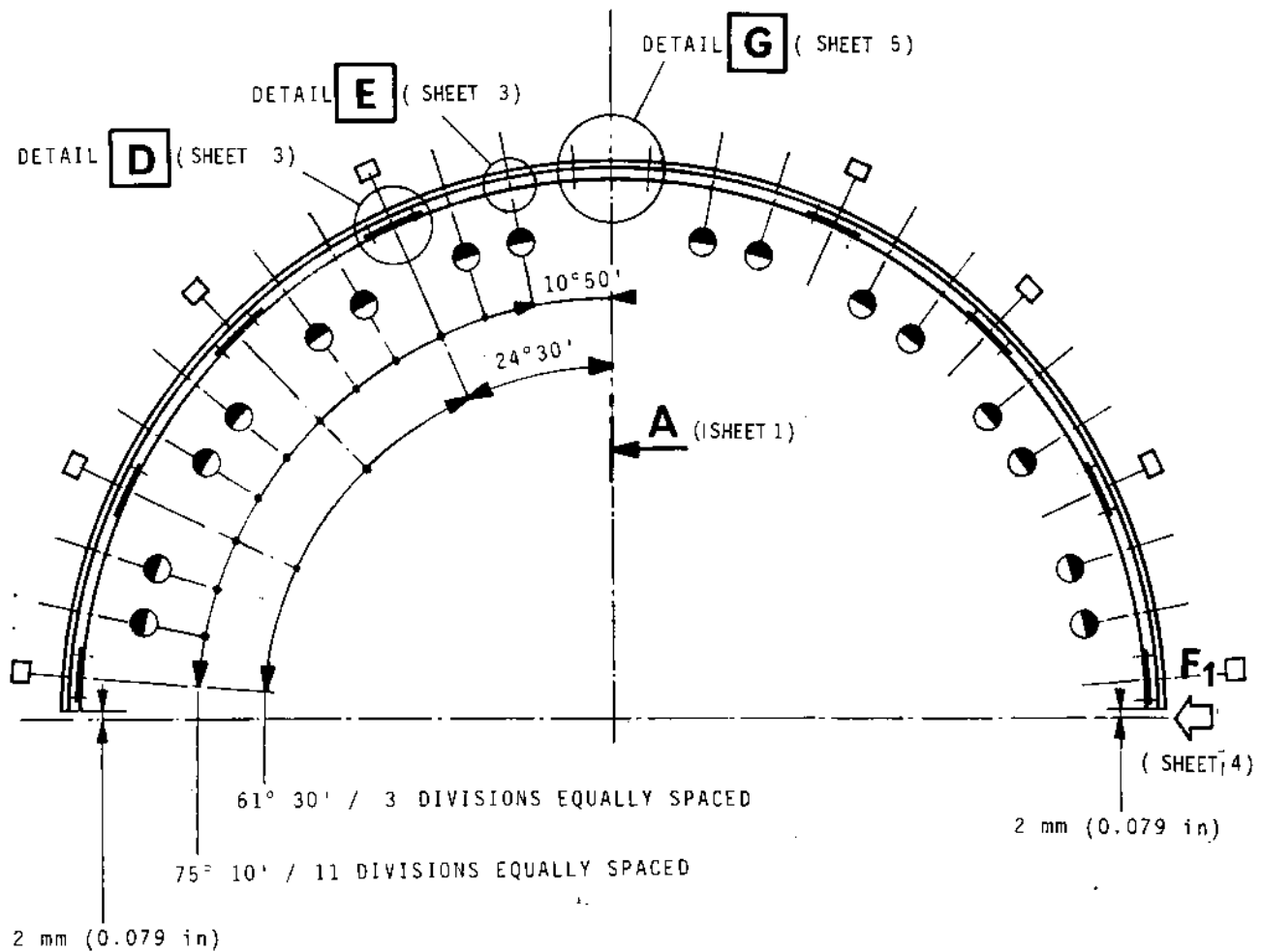


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CROSS-SECTION **B** (SHEET 1)



Patch Installation  
Figure 401 - (Sheet 2 of 6)

78-11-01

REP 1-10-2

Page 404

Dec 15/75

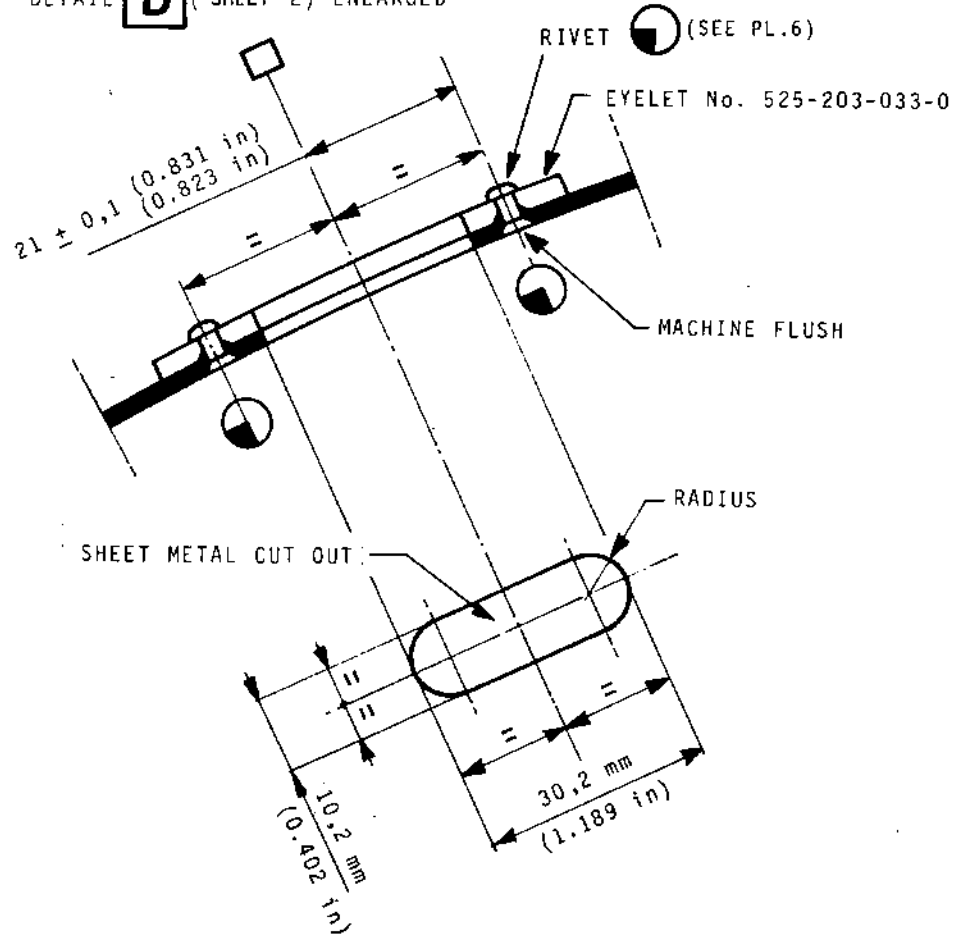


OLYMPUS 593

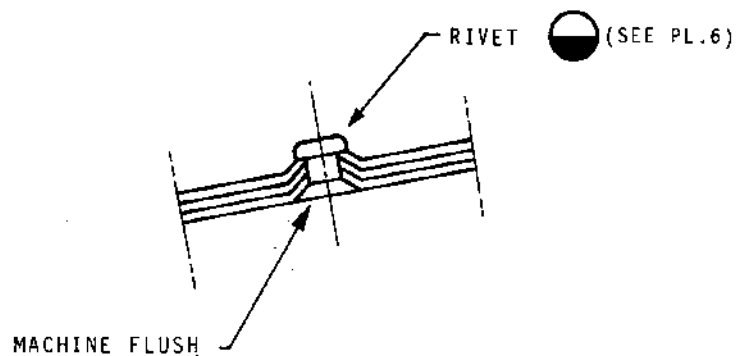
MK.610-14-28  
OVERHAUL



DETAIL **D** (SHEET 2) ENLARGED



DETAIL **E** (SHEET 2) ENLARGED



Patch Installation  
Figure 401 - (Sheet 3 of 6)

78-11-01

REP 1-10-2

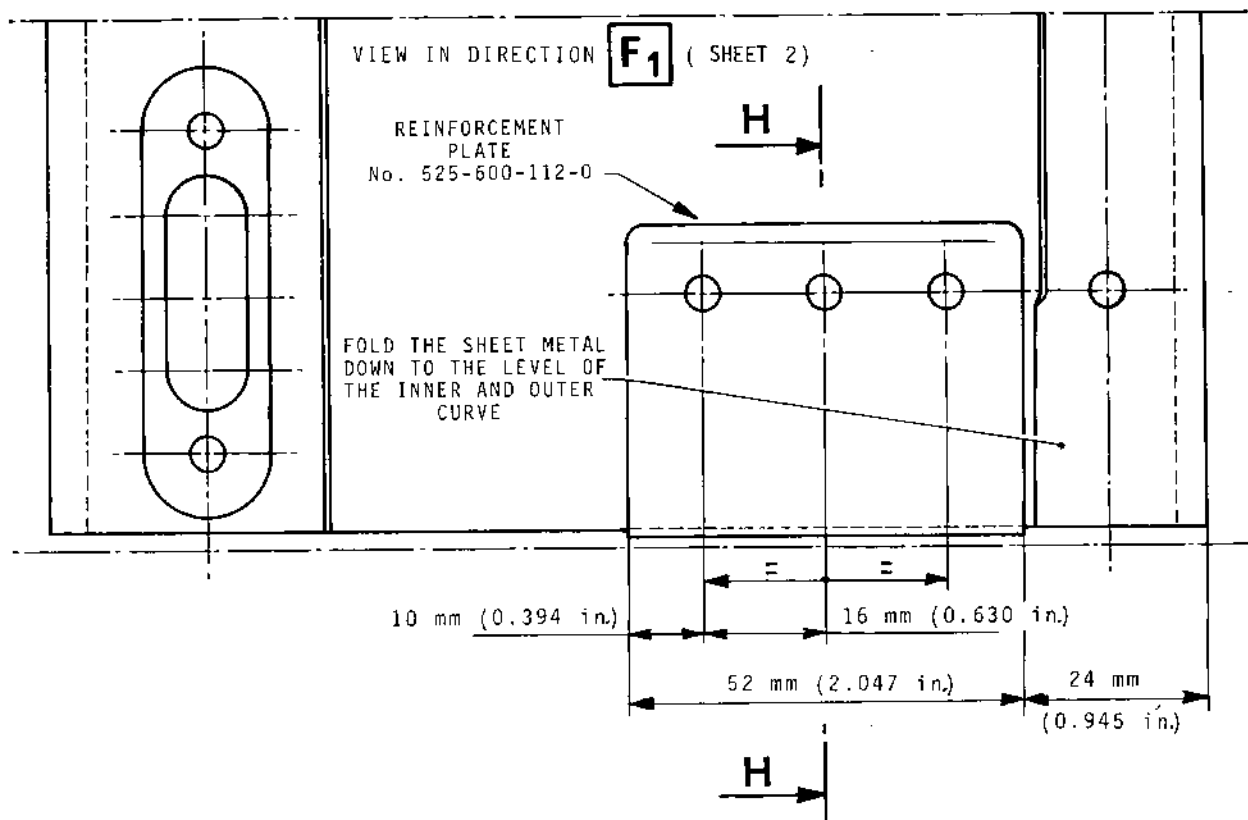
Page 405

Jan 31/81

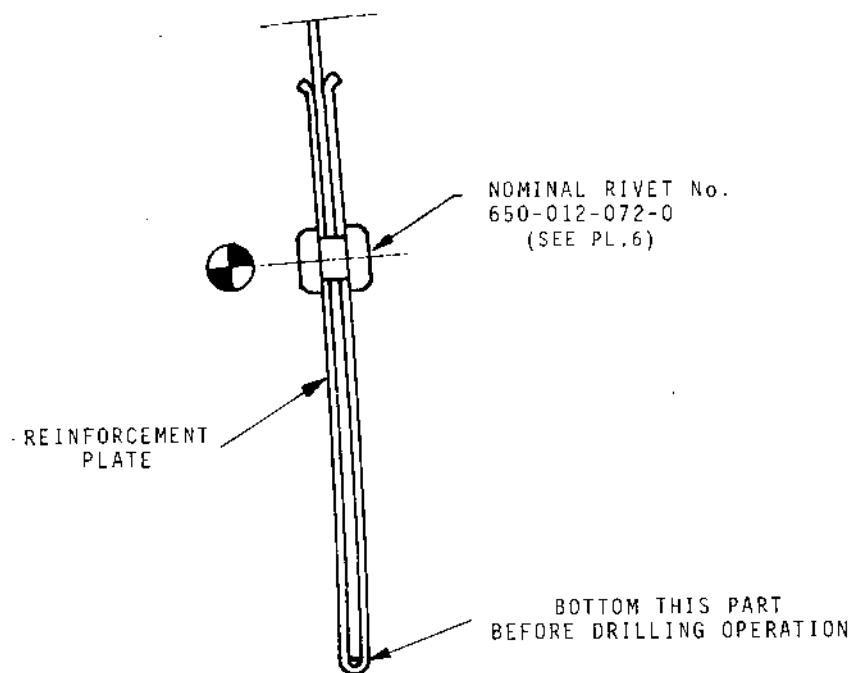


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CROSS-SECTION **H**



Patch Installation  
Figure 401 - (Sheet 4 of 6)

78-11-01

REP 1-10-2

Page 406

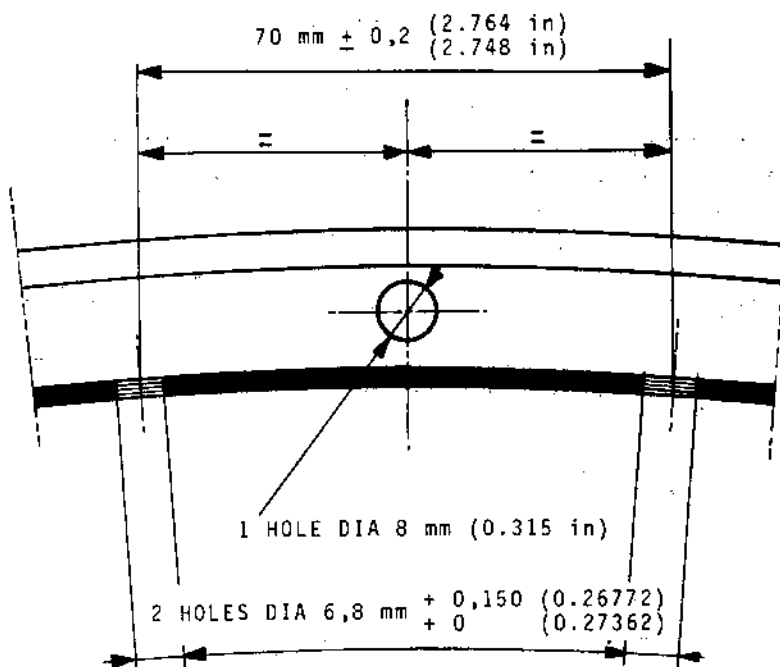
Jan 31/81



OLYMPUS 593

MK.610-14-28

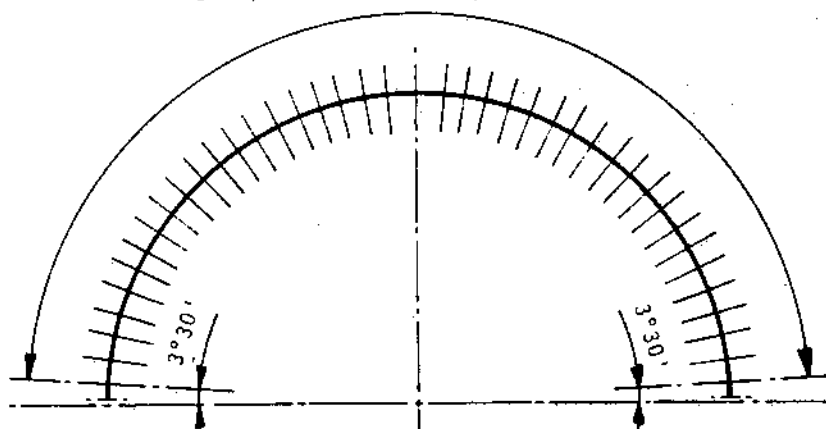
OVERHAUL



DETAIL **G** ( SHEET 2) ENLARGED

SCHEMATIC CROSS-SECTION **J**  
( SHEET 1)

173°/40 DIVISIONS EQUALLY SPACED



Patch Installation  
Figure 401 - (Sheet 5 of 6)

78-11-01

REP 1-10-2

Page 407

Dec 15/75



**OLYMPUS 593**MK.610-14-28  
OVERHAUL**RIVET DATA**

Table I - Rivet Data

Nominal size rivet	Diameter	Length	Material	Head	Assembly
Oversize rivet	mm (in)	mm (in)		Shape	symbols
21215 TB 2405	2,4 (0.094)	5 (0.197)	NU 30	U	
21215 TB 3205	3,2 (0.126)	6 (0.236)	NU 30	U	
21215 TB 3206	3,2 (0.126)	6 (0.236)	NU 30	U	
21215 TB 4007	4,0 (0.157)	7 (0.276)	NU 30	U	
21217 TB 2406	2,4 (0.094)	6 (0.236)	NU 30	F 100	
21217 TB 3207	3,2 (0.126)	7 (0.276)	NU 30	F 100	
21217 TB 2409	2,4 (0.094)	9 (0.354)	NU 30	F 100	
21217 TB 3210	3,2 (0.126)	10 (0.394)	NU 30	F 100	

Patch Installation  
Figure 401 - Sheet 6 of 6)**78-11-01**REP 1-10-2  
Page 408  
Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

UPPER HALF DEFLECTOR (1-10)

3. Renewal of the riveted detail parts

---

PARTS REQUIRED FOR REPAIR

---

Eyelet No. 525-203-033-0  
Front stiffener No. 525-600-111-0  
Rear stiffener No. 525-600-110-0  
Box-shaped stiffener No. 525-600-112-0  
Rivet No. BNAE 21215 TB 2405 (650-012-041-0)  
or No. BNAE 21215 TB 3206 (650-012-072-0)  
Rivet No. BNAE 21215 TB 3206 (650-012-072-0)  
or No. BNAE 21215 TB 4007 (650-012-100-0)  
Rivet No. BNAE 21217 TB 2406 (650-022-042-0)  
or No. BNAE 21217 TB 3207 (650-022-073-0)  
Rivet No. BNAE 21217 TB 2409 (650-022-045-0)  
or No. BNAE 21217 TB 3210 (650-022-076-0)

---

A. Renewal of the riveted detail parts

- (1) Remove the riveted detail parts by grinding off their attaching rivets.
- (2) Inspect the rivets holes as instructed in chapter 70-50-10, "RIVETING" of the Standard Practices manual.
- (3) If necessary, counter drill both the component to be riveted and half-deflector to provide for installation of an oversized rivet.

NOTE : Working lengthwise, radius edges of the sheet metal to 0,2 mm (0.008 in.)

- (4) Re-install and rivet a new detail part as instructed in chapter 70-50-10, "RIVETING" of the Standard Practices manual and as indicated on figure 401, REP 1-10-2.

B. Inspect riveting

- (1) Ensure that rivets are properly installed, as instructed in chapter 70-50-80, "RIVETING" of the Standard Practices manual.

PRINTED IN FRANCE

78-11-01

REP 1-10-3  
Pages 401/402  
Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

LOWER HALF DEFLECTOR (1-100)

1. Cracks filler welding

---

PARTS REQUIRED FOR REPAIR

---

Filler welding wire P 3002 or P 3009

---

A. Crack welding

Filler weld cracks as per instructions of chapter 70-35-10.

- Filler welding wire P 3002 or P 3009
- Weld class B2

B. Inspection for soundness

Inspect welds, class B2, as per instructions of chapter 70-35-80.

- Water washable fluorescent penetrant inspect according to process M 502 B of chapter 70-20-10.
- X ray inspect as per chapter 70-20-30.

**78-11-01**

REP 1-100-1  
Pages 401/402  
Dec 30/74

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

## REPAIR

LOWER HALF DEFLECTOR (1-100)2. Patch welding repair

---

PARTS REQUIRED FOR REPAIR

---

Sheet metal P 3301, thickness 0,6 mm (0.024 in.)  
Rivet No. BNAE 21215 TB 2405 (650-012-041-0)  
or No. BNAE 21215 TB 3206 (650-012-072-0)  
Rivet No. BNAE 21215 TB 3209 (650-012-075-0)  
or No. BNAE 21215 TB 4010 (650-012-103-0)  
Rivet No. BNAE 21217 TB 2406 (650-022-042-0)  
or No. BNAE 21217 TB 3207 (650-022-073-0)  
Rivet No. BNAE 21217 TB 2409 (650-022-045-0)  
or No. BNAE 21217 TB 3210 (650-022-076-0)  
Filler welding wire P 3002 or P 3009

---

## A. General

In some instances, the fitting of a welded patch may require riveted parts to be removed in order to facilitate repair work or to comply with specifications related to installation of patches.

## B. Specifications related to patch installation

These specifications are given in chapter 70-35-10. Moreover, if deteriorations are located at less than 15 mm (0.591 in) from a riveted part, cut out the sheet metal so that patch fits snug with the riveted part.

In case of damage at the fuel collector, the bushing assy must be replaced and the surrounding area shall be repaired as per REP 1-100-4.

## C. Patch preparation

- (1) Patches may be cut out from sound metal portions of any scrapped deflector or manufactured from a piece of sheet metal P 3301, 0,6 mm (0.024 in) thick, pre-shaped to geometrical contour of area to be patch repaired (refer to figure 401).
- (2) Dimensions of patches are function of importance of damages found. However, they must be formed in accordance with requirements of chapter 70-35-10.

**78-11-01**

REP 1-100-2

Page 401

May 31/84



OLYMPUS 593

MK.610-14-28  
OVERHAUL



#### D. Patch installation

- (1) As required, remove rivets fastening parts adjacent to the deteriorated zone in order to facilitate repair work or locate the patch element.
- (2) Argon arc weld patch as per instructions of chapter 70-35-10.
  - Filler welding wire P 3002 or P 3009
  - Weld class, B2.
- (3) Inspect weld, class B2, as per instructions of chapter 70-35-80.
  - Water washable fluorescent penetrant inspect per process M 502 B of chapter 70-20-10
  - X ray inspect as per chapter 70-20-30.

#### E. Re-installation of the previously unriveted parts

- (1) The following instructions give all pertinent data required for re-installation of unriveted parts.
  - (a) For each case, two methods are provided :
    - 1st method : riveting as per drawing requirements for new parts
    - 2nd method : riveting using 0,8 mm (0.031 in) oversized diameter rivets compared to rivets of nominal diameter.
  - (b) Preparation and riveting of parts must be performed in accordance with instructions of chapter 70-50-10 and dimensional requirements shown on figure 401.  
Data concerning rivets are given in table I.  
NOTE : Working lengthwise, radius edges of sheet metal to 0,2 mm (0.008 in.).
  - (c) After riveting, inspect rivets in accordance with instructions of chapter 70-50-80.

#### F. Installation of retaining rings

- (1) Install the retaining rings as shown in figure 401, sheet 5.
- (2) Crimp the rings by flattening the rim of the rear reinforcement.
- (3) Ascertain that the rings do not rotate and/or do not slide in the recess.

PRINTED IN FRANCE

**78-11-01**

REP 1-100-2

Page 402

Oct 31/81

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

Table I - Rivet Data

Nominal size rivet	Diameter	Length	Material	Head	Assembly
Oversize rivet	mm (in)	mm (in)		Shape	symbols
21215 TB 2405	2,4 (0.094)	5 (0.197)	NU 30	U	
21215 TB 3206	3,2 (0.126)	6 (0.236)	NU 30	U	
21215 TB 3209	3,2 (0.126)	9 (0.354)	NU 30	U	
21215 TB 4010	4,0 (0.157)	10 (0.394)	NU 30	U	
21217 TB 2406	2,4 (0.094)	6 (0.236)	NU 30	F 100	
21217 TB 3207	3,2 (0.126)	7 (0.276)	NU 30	F 100	
21217 TB 2409	2,4 (0.094)	9 (0.354)	NU 30	F 100	
21217 TB 3210	3,2 (0.126)	10 (0.394)	NU 30	F 100	

PRINTED IN FRANCE

Patch Installation  
Figure 401 - (Sheet 1 of 9)**78-11-01**

REP 1-100-2

Page 403

Dec 15/75



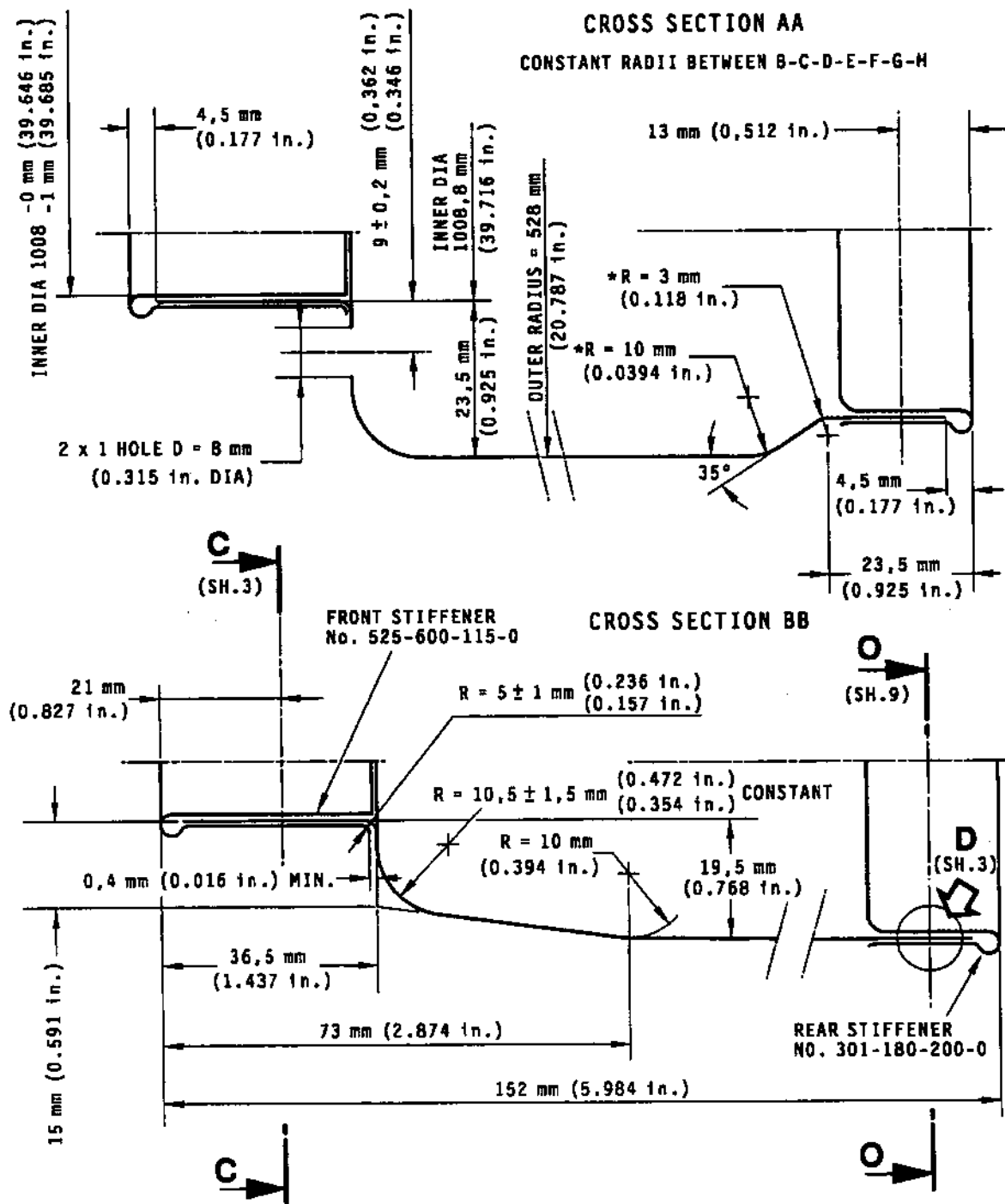
# OLYMPUS 593

MR. 610-14-28

OVERHAUL



SNECMA



Patch Installation  
Figure 401 (Sheet 2 of 9)

## 78-11-01

REP 1-100-2

Page 404

Jun 30/97



# OLYMPUS 593

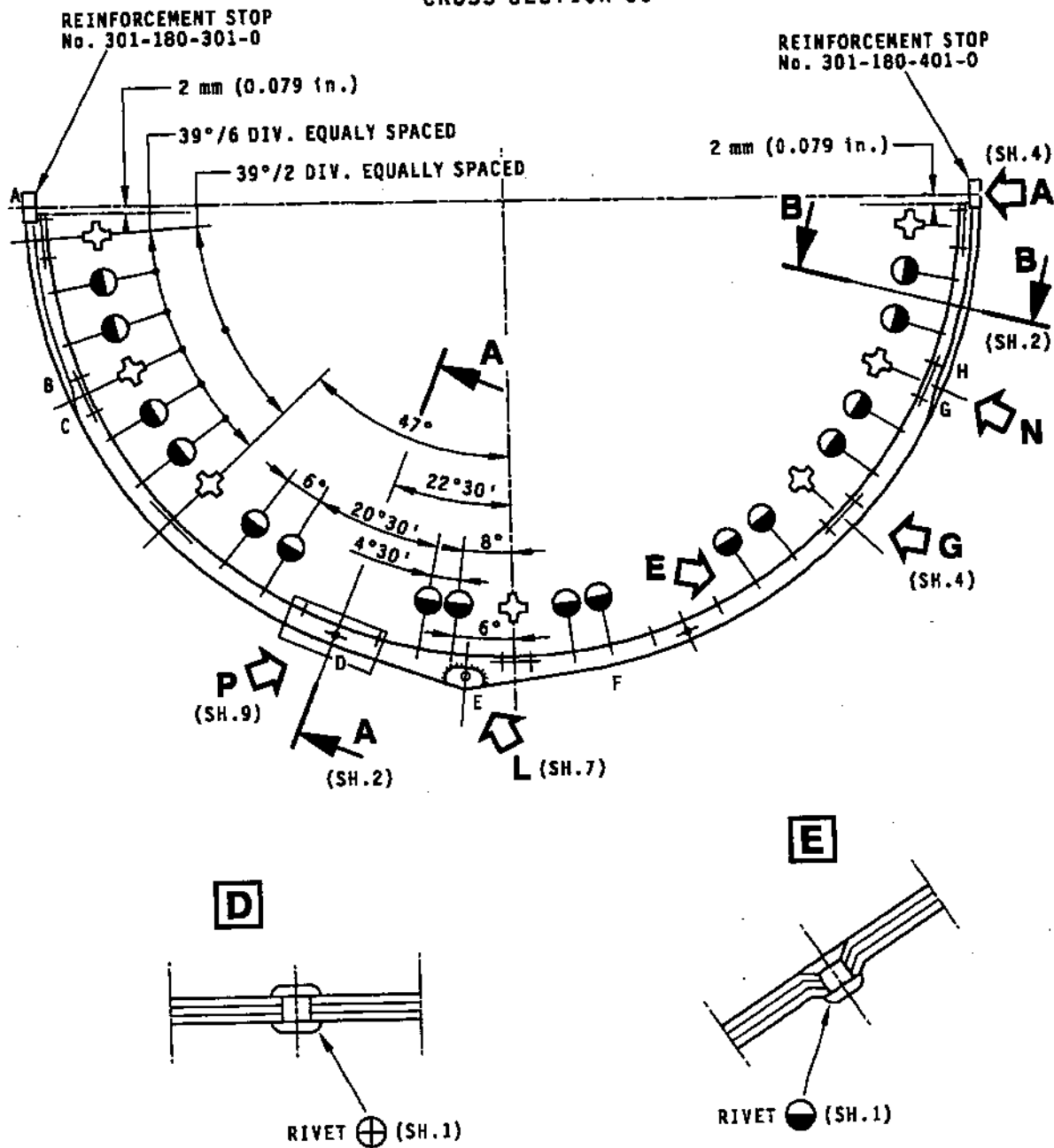
MK. 610-14-28

OVERHAUL



sneema

## CROSS SECTION CC



S-OLY-SM-00047-00-B

Patch Installation  
Figure 401 (Sheet 3 of 9)

### 78-11-01

REP 1-100-2

Page 405

Jun 30/97





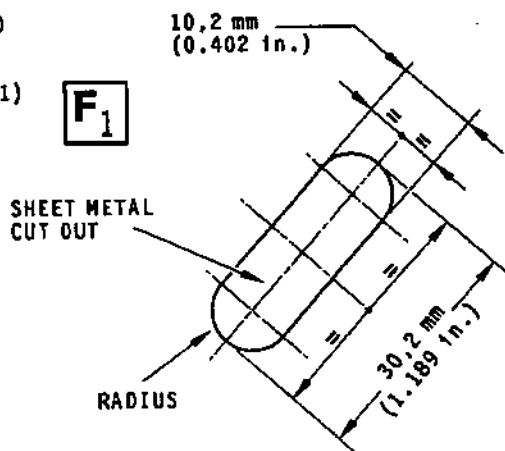
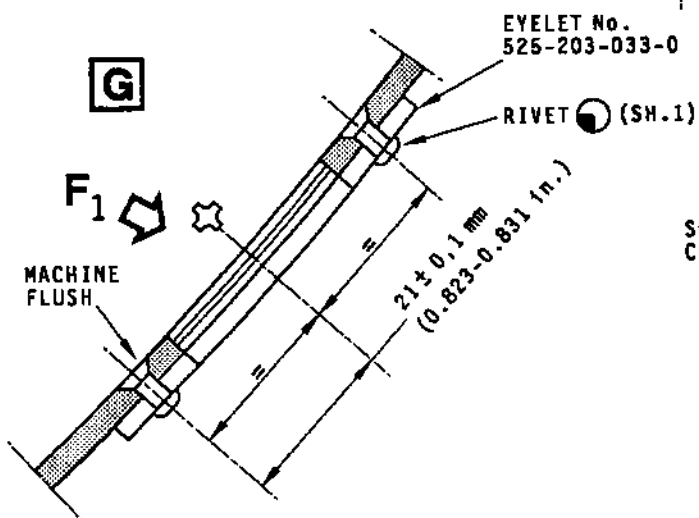
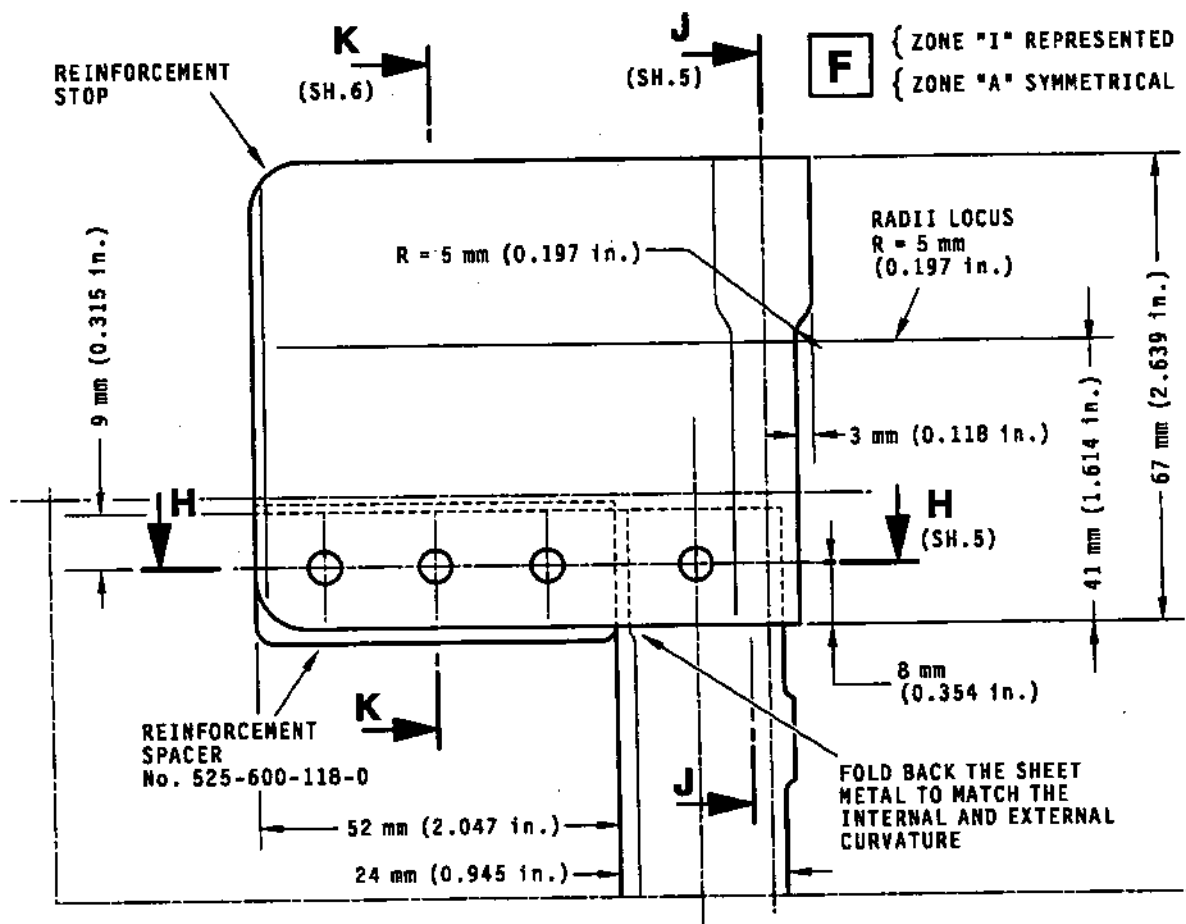
# OLYMPUS 593

MK. 610-14-28

OVERHAUL



SNECMA



S-OLY-SM-00048-00-B

Patch Installation  
Figure 401 (Sheet 4 of 9)

## 78-11-01

REP 1-100-2

Page 406

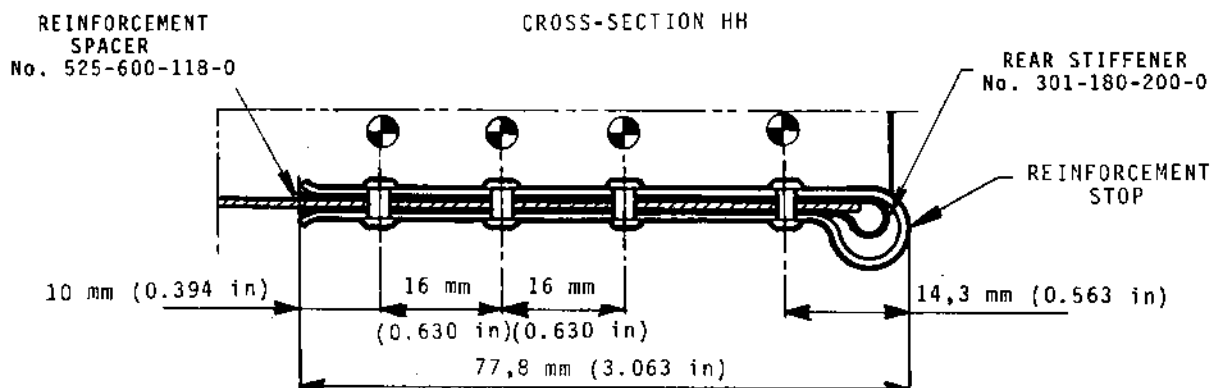
Jun 30/97

PRINTED IN FRANCE

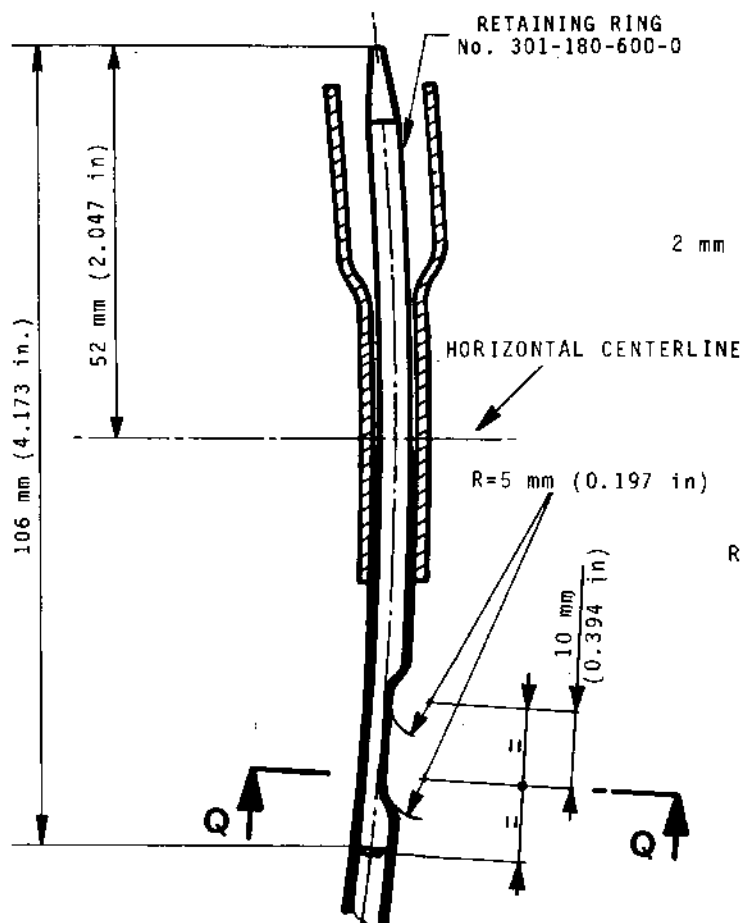


OLYMPUS 593

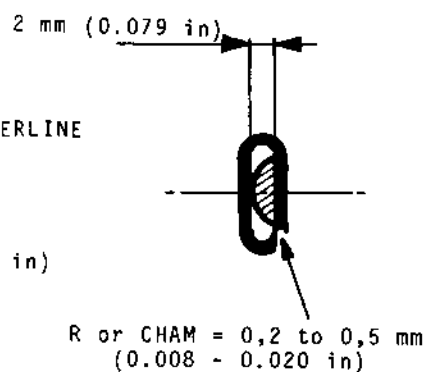
MK.610-14-28  
OVERHAUL



CROSS-SECTION J-J



CROSS-SECTION Q-Q



Patch Installation  
Figure 401 - (Sheet 5 of 9)

78-11-01

REP 1-100-2

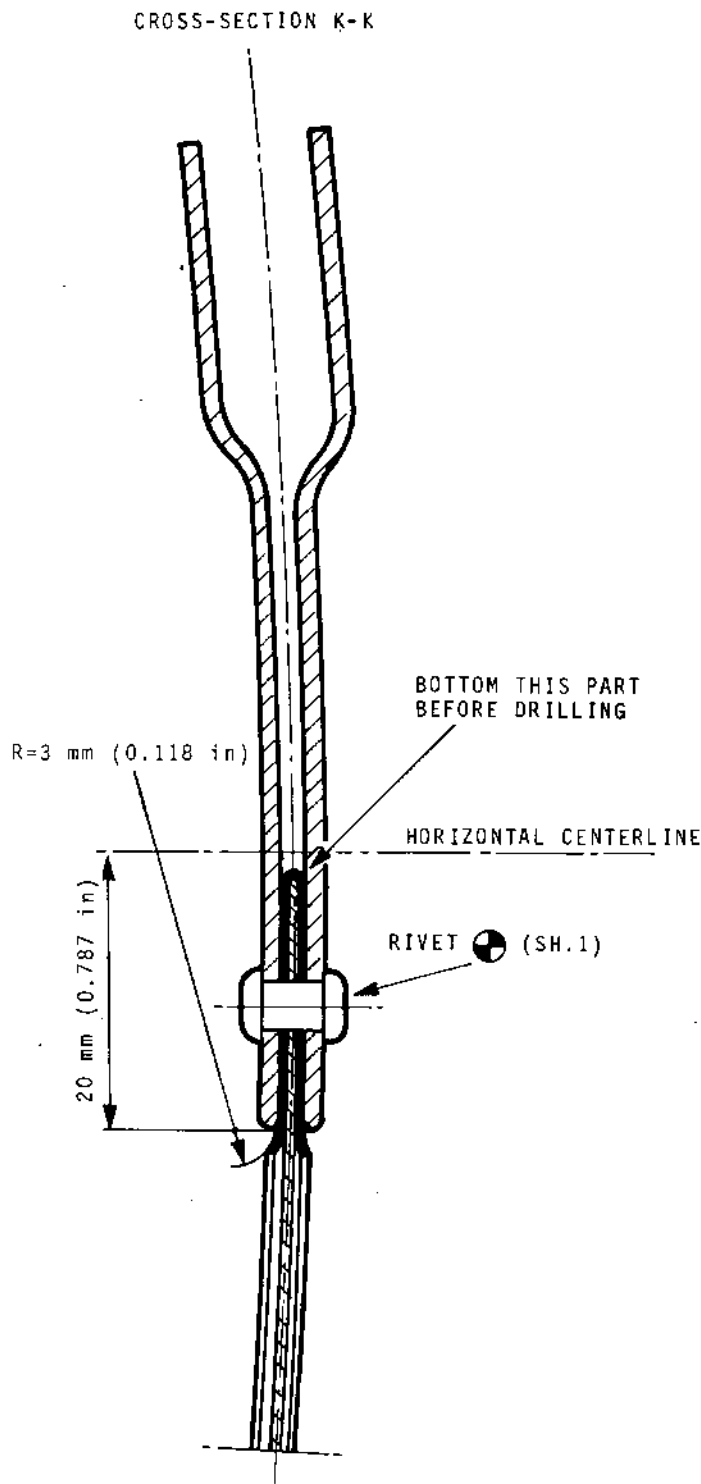
Page 407

Jan 31/81

PRINTED IN FRANCE



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



Patch Installation  
Figure 401 - (Sheet 6 of 9)

78-11-01

PRINTED IN FRANCE



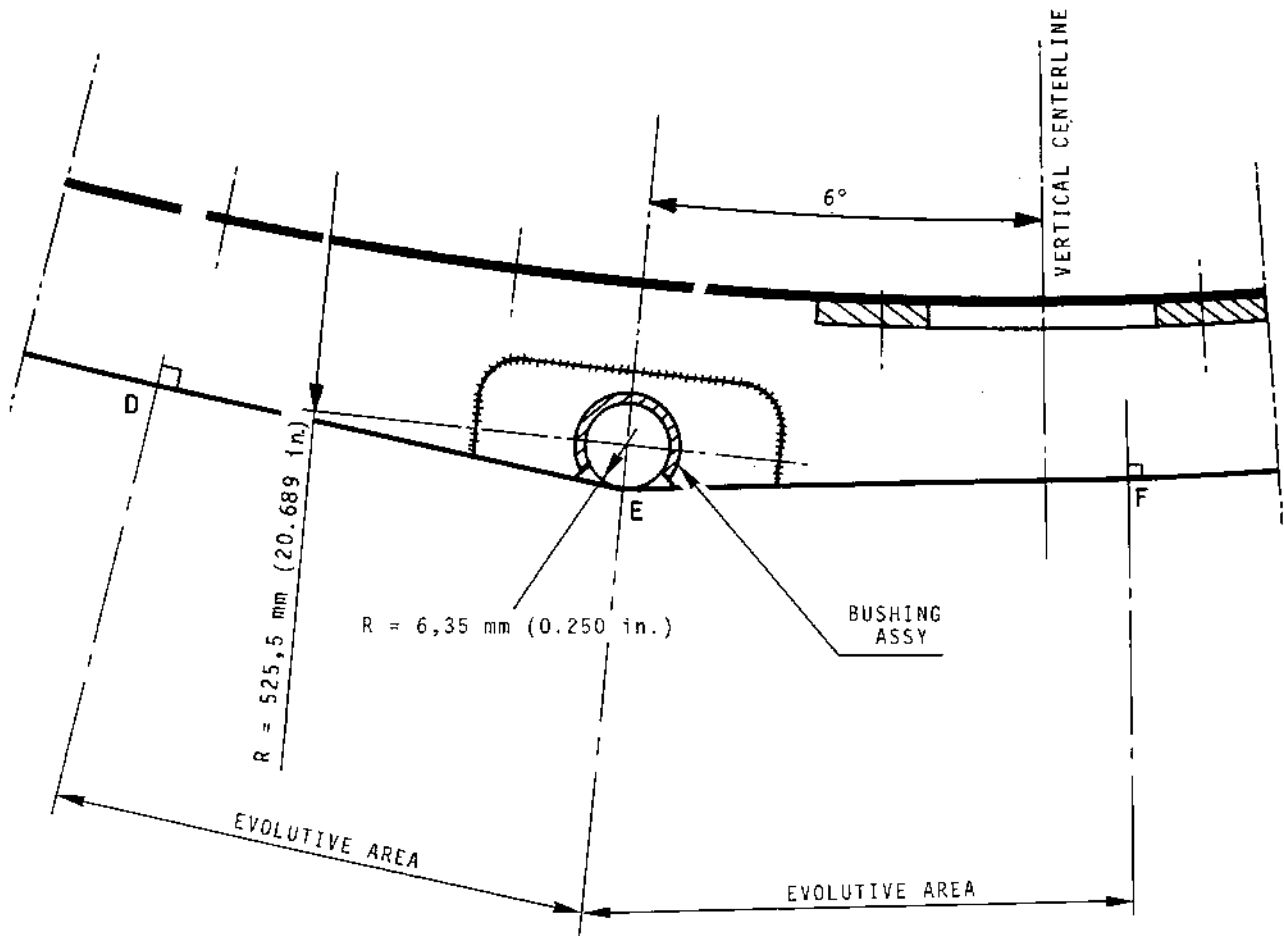
OLYMPUS 593

MK.610-14-28

OVERHAUL



L



Patch Installation  
Figure 401 - (Sheet 7 of 9)

78-11-01

REP 1-100-2

Page 409

Oct 31/81



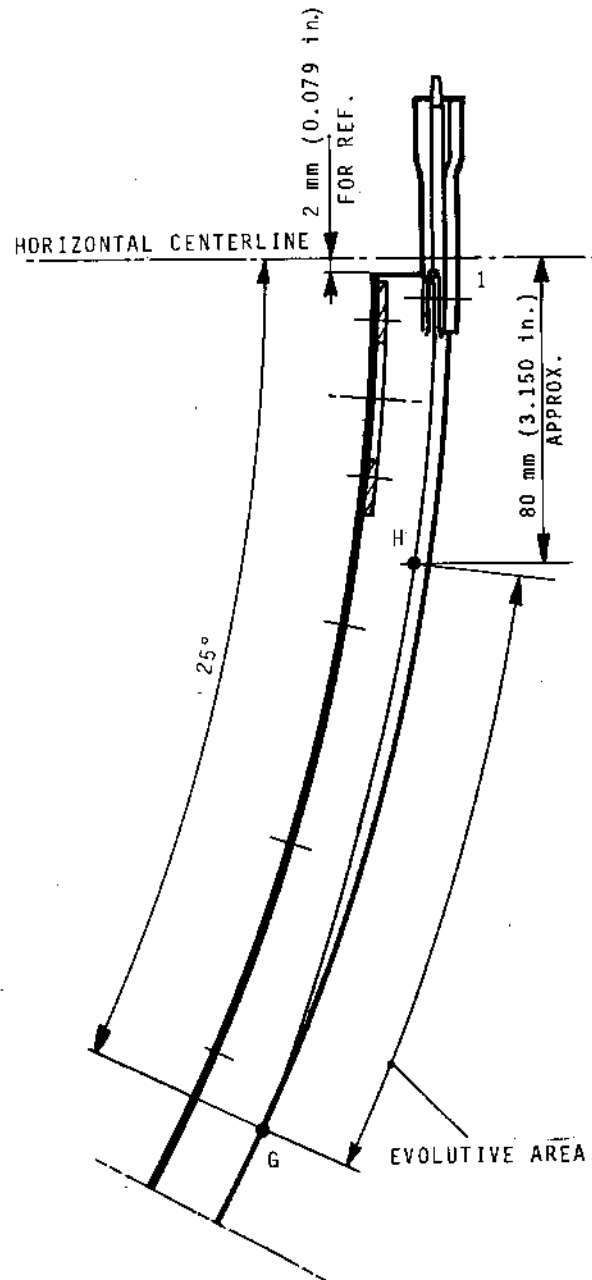
OLYMPUS 593

MK.610-14-28  
OVERHAUL



ZONES G-H-I REPRESENTED

ZONES A-B-C SYMMETRICAL



Patch Installation  
Figure 401 - (Sheet 8 of 9)

78-11-01

REP 1-100-2

Page 410

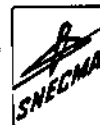
Oct. 31/81



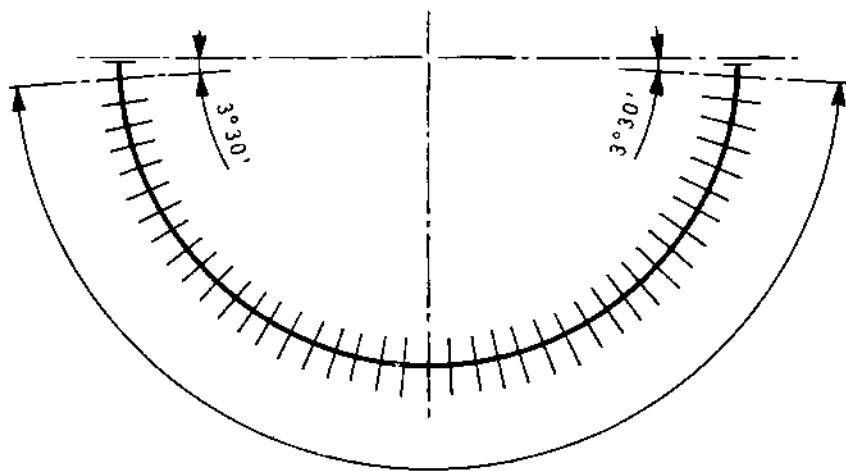
OLYMPUS 593

MK.610-14-28

OVERHAUL

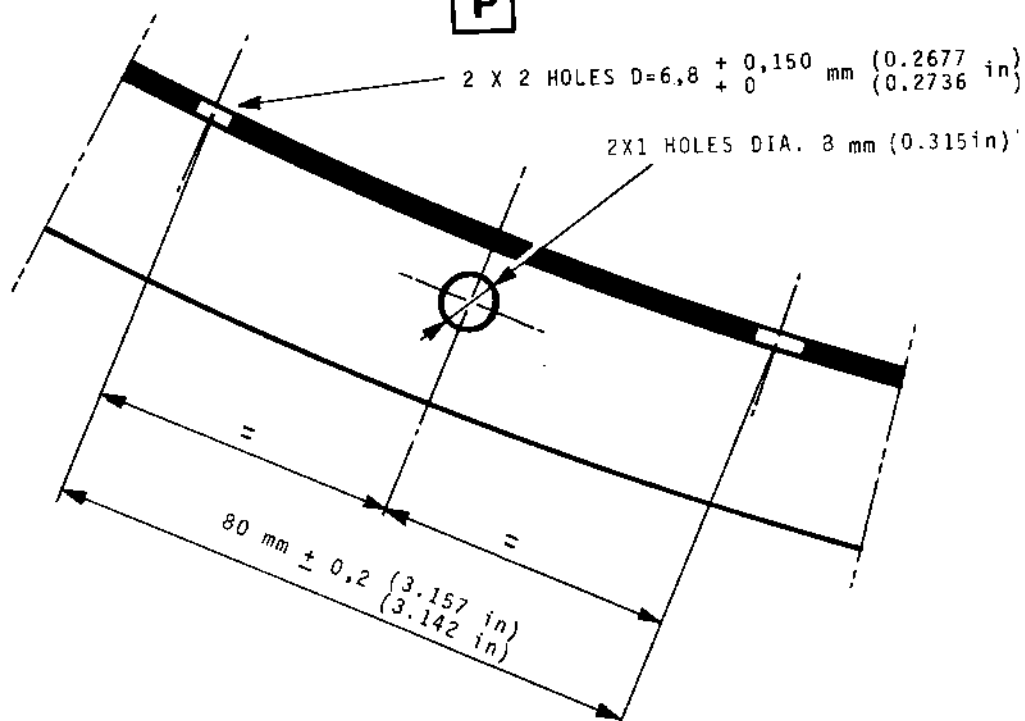


SCHEMATIC CROSS-SECTION 0 0



173°/40 DIVISIONS EQUALLY SPACED

P



Patch Installation  
Figure 401 - (Sheet 9 of 9)

78-11-01

REP 1-100-2  
Pages 411/412  
Dec 15/75

**OLYMPUS 593**

MK.610-14-28

OVERHAUL

REPAIRLOWER-HALF DEFLECTOR (1-100)3. Renewal of the Damaged Riveted Detail Parts

---

PARTS REQUIRED FOR REPAIR

---

Eyelet No. 525-203-033-0  
Front stiffener No. 525-600-115-0  
Rear stiffener No. 301-180-200-0  
Reinforcement stop No. 301-180-301-0  
Reinforcement stop No. 301-180-401-0  
Reinforcement spacer No. 525-600-118-0  
Retaining ring No. 301-180-600-0  
Rivet No. BNAE 21215 TB 2405 (650-012-041-0)  
or No. BNAE 21215 TB 3206 (650-012-072-0)  
Rivet No. BNAE 21215 TB 4010 (650-012-103-0)  
or No. BNAE 21215 TB 4811 (650-012-134-0)  
Rivet No. BNAE 21217 TB 2406 (650-022-042-0)  
or No. BNAE 21217 TB 3207 (650-022-073-0)  
Rivet No. BNAE 21217 TB 2409 (650-022-045-0)  
or No. BNAE 21217 TB 3210 (650-022-076-0)

A. Renewal of the riveted detail parts

- (1) Remove the detail parts by grinding off their attaching rivets.
- (2) Inspect rivet holes as instructed in chapter 70-50-10, "RIVETING", of the Standard Practices manual.
- (3) If necessary, counter drill both component to be riveted and half-deflector to provide for installation of an oversized rivet.

NOTE : Working lengthwise, radius edges of the sheet metal to 0,2 mm (0.008 in.).

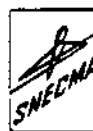
- (4) Re-install and rivet a new detail part as instructed in chapter 70-50-10, "RIVETING" of the Standard Practices manual and as indicated on figure 401, REP 1-100-2.

B. Inspect riveting

- (1) Check that rivets are correctly installed, as instructed in chapter 70-50-80, "RIVETING", of the Standard Practices manual.

**78-11-01**

REP 1-100-3  
Pages 401/402  
May 31/84

**OLYMPUS 593**MK.610-14-28  
OVERHAULREPAIRLOWER HALF DEFLECTOR (1-100)4. Replacement of the drain tube and repair of the surrounding area

---

PARTS REQUIRED FOR REPAIR

---

Union to be welded no. 649-473-028-0  
Union nut, serrated, ASA No. 649-478-008-0  
Steel sheet P3301 (Z10 CNT 18) 0,6 mm (0.024 in) in thickness  
Weld filler wire P3009 (Z10 CNT 18) or P 3002 (Z3 CN 18)  
Rivet No. BNAE 21215 TB 2405 (650-012-041-0)  
or No. BNAE 21215 TB 3206 (650-012-072-0)  
Rivet No. BNAE 21215 TB 3209 (650-012-075-0)  
or No. BNAE 21215 TB 4010 (650-012-103-0)  
Rivet No. BNAE 21217 TB 2406 (650-022-042-0)  
or No. BNAE 21217 TB 3207 (650-022-073-0)  
Rivet No. BNAE 21217 TB 2409 (650-022-045-0)  
or No. BNAE 21217 TB 3210 (650-022-076-0)

---

## A. General

This repair scheme calls for the front and rear stiffeners to be taken down and mounted back. Proceed as instructed in REP 1-100-2.

This repair scheme includes two types of repair :

- (1) Replacement of the sole fuel collector bushing assy as per paragraph B.
- (2) Repair of the bushing surrounding zone with replacement of the bushing as per paragraph C.

## B. Replacement of the bushing assy

- (1) Remove the damaged bushing by cutting out the deflector as shown in figure 401.
- (2) Using 0,6 mm (0.024 in) - thick sheet metal P 3301, make a connecting tube as shown in figure 401.

**78-11-01**

REP 1-100-4

Page 401

Apr 30/93





OLYMPUS 593

MK.610-14-28

OVERHAUL



- (3) Make a repair bushing as per figure 401 and following instructions :
- (a) Install the coupling nut.
  - (b) Adjust the connecting tube to the nozzle.
  - (c) Position the tube and argon are weld as per chapter 70-35-10.
    - 1 - Filler welding wire : P 3009 or P 3002
    - 2 - Class of weld : B2.
  - (d) Inspect B2 class welds as per chapter 70-35-80
    - 1 - Perform fluorescent penetrant inspection using water-washable product as per method M502B, chapter 70-20-10.
- (4) Install the bushing assy onto the half-deflector as per figure 401 and following instructions :
- (a) Position the bushing on the half deflector and draw the contour of the area to be cut out.
  - (b) Cut out the contour and adjust the bushing assy.
  - (c) Perform B2 class argon are weld as per chapter 70-35-10.
- (5) Carry out an inspection of class B2 welds as instructed in chapter 70-35-80 : "WELD INSPECTION".
- (a) A water washable fluorescent penetrant test by method M 502, chapter 70-20-10 "DYE PENETRANT INSPECTION".
  - (b) An X-ray inspection as described in chapter 70-20-30 "RADIOGRAPHIC INSPECTION".

C. Repair of the zone surrounding the bushing assy

- (1) Remove the damaged zone according to the procedure applied for patch segment installation and as instructed in chapter 70-35-10.
- (2) The patch segment must be cut out in 0,6 mm (0.024 in) thick sheet metal P 3301 to required dimensions and shaped as specified in REP 1-100-2.

78-11-01

REP 1-100-4

Page 402

Oct 31/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (3) Argon are weld the repair segment as per chapter 70-35-10.
- (a) Filler welding wire : P 3009 or P 3002
  - (b) Class of weld : B2.
- (4) Carry out an inspection of class B2 welds as instructed in chapter 70-35-80 : "WELD INSPECTION".
- (a) A water washable fluorescent penetrant test by method M502, chapter 70-20-10 "DYE PENETRANT INSPECTION".
  - (b) An X-ray inspection as described in chapter 70-20-30 "RADIOGRAPHIC INSPECTION".
- (5) Make and install a bushing assy as specified in paragraph B of this repair scheme.

D. Marking

- (1) Add "REP 4" next after the part number by method M 28 chapter 70-10-10 "MARKING".



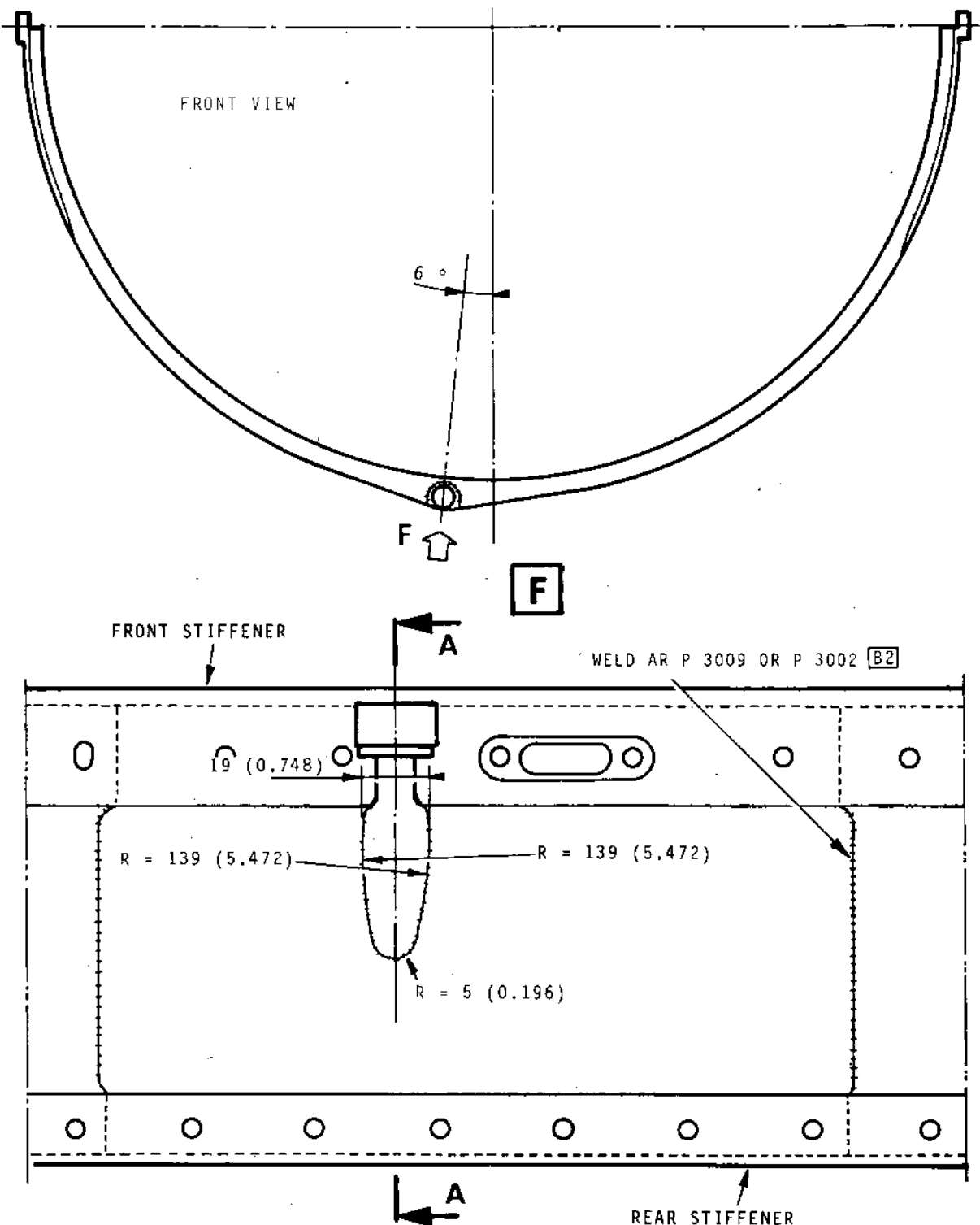
OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN FRANCE



DIMENSIONS ARE IN MILLIMETRES WITH INCH  
CONVERSIONS IN PARENTHESES.

Replacing the Draining Tube  
Figure 401 (Sheet 1 of 2)

78-11-01

REP 1-100-4

Page 404

Oct 31/81



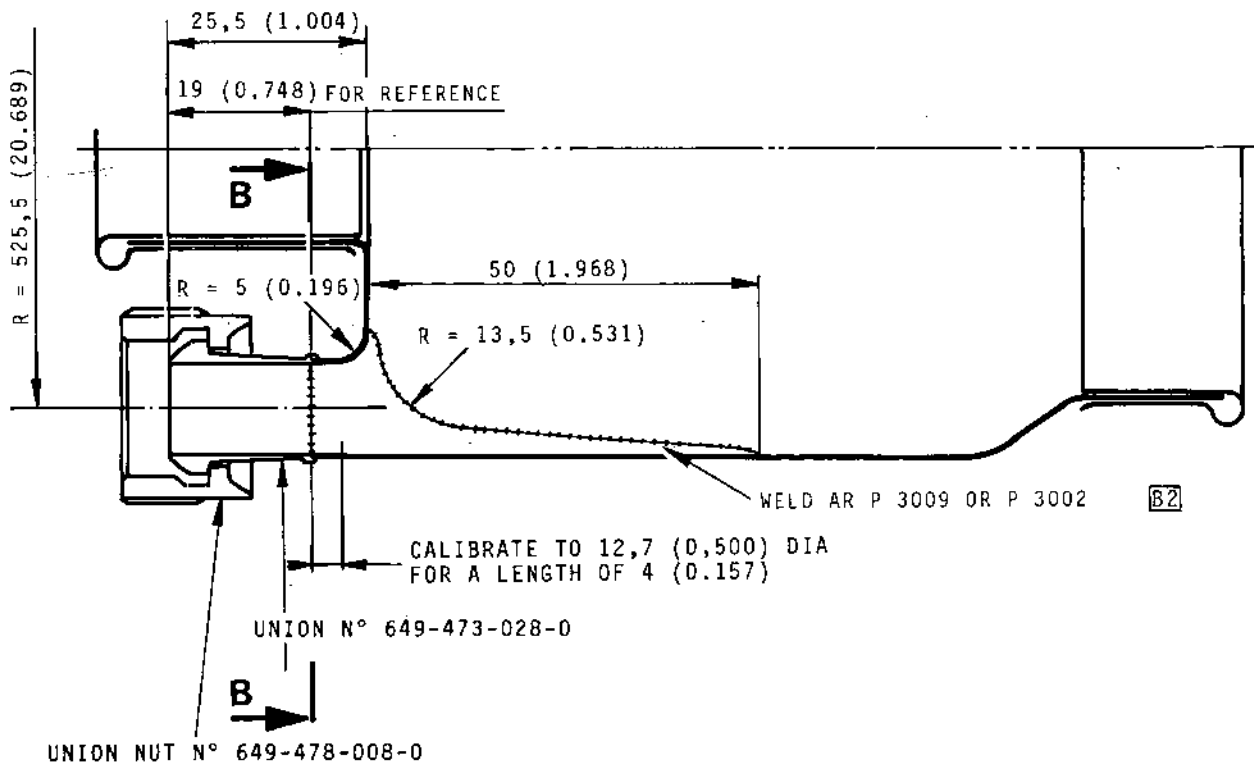
OLYMPUS 593

MK.610-14-28  
OVERHAUL

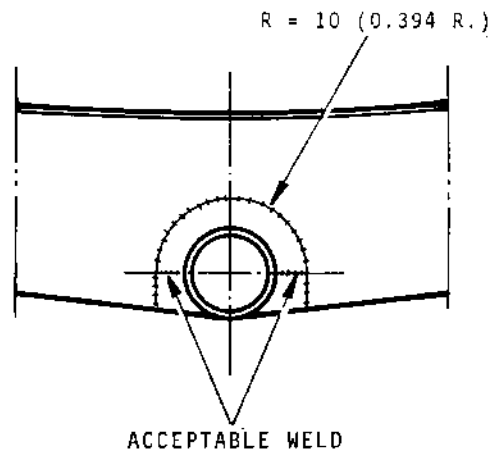


SECTION AA

PRINTED IN FRANCE



SECTION BB



DIMENSIONS ARE IN MILLIMETRES WITH INCH  
CONVERSIONS IN PARENTHESES.

Replacing the Draining Tube  
Figure 401 (Sheet 2 of 2)

78-11-01

REP 1-100-4  
Pages 405/406  
Oct 31/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

FLEXIBLE SPACER ASSEMBLY (3-90)

1. Reconditioning of the spacer hinge pin by weld build up.

---

PARTS REQUIRED FOR REPAIR

---

Filler welding wire: P3009 (Z10CNT18)  
or P3022 (NC15Fe)

---

A. Machining.

- (1) Remove the existing weld bead by grinding without damaging the spacer hinge pin (see figure 401).

B. Weld reconditioning.

- (1) Argon arc weld the hinge pin to the spacer as per chapter 70-35-10.

(a) Filler welding wire: P3009 (Z10CNT18)  
or P3022 (NC15Fe)

(b) Weld class : B1

C. Inspection.

- (1) Inspect weld bead, class 1, as per chapter 70-35-80.

(a) Locally inspect using water-washable dye penetrant as per method M501B in chapter 70-20-10.

78-11-01

REP 3-90-1

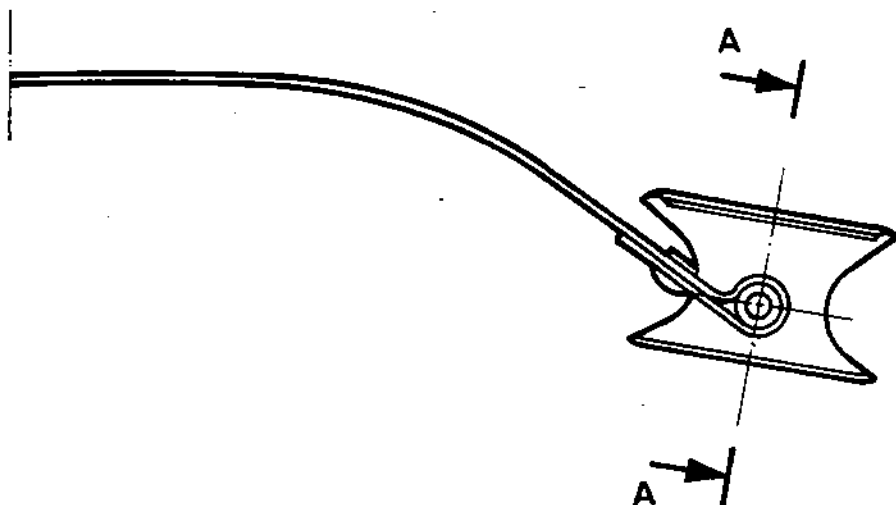
Page 401

Apr 30/93

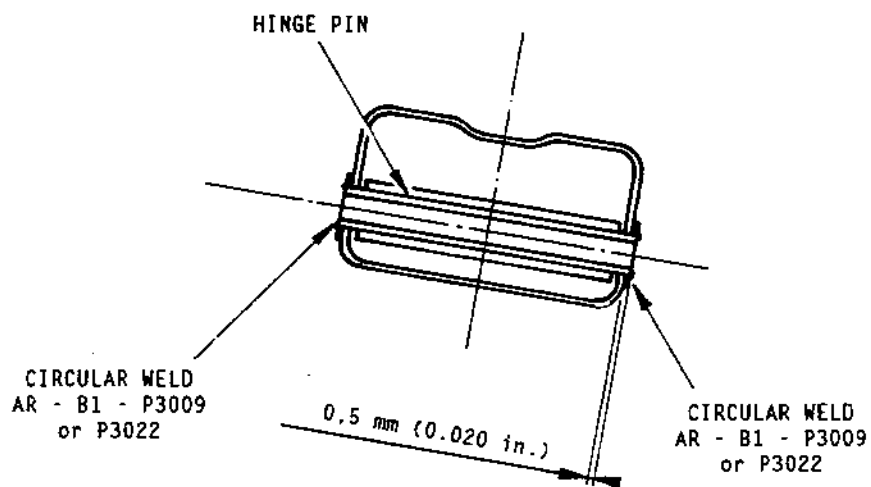


OLYMPUS 593

MK.610-14-28  
OVERHAUL



SECTION AA



Hinge Pin Weld Building up  
Figure 401

78-11-01

REP 3-90-1

Page 402

Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

VENTILATION SHROUD (3-130)

1. Filler welding cracks in the outer metal sheet

---

PARTS REQUIRED FOR REPAIR

---

Filler welding wire P3002 or P3009

---

A. Weld-filling the cracks

- (1) Filler-weld the cracks as instructed in Chapter 70-35-10 : "WELDING", and as indicated hereunder :

Filler welding wire : P3002 or P3009  
Class of weld : B1

CAUTION : WHEN GRINDING BE CAREFUL NOT TO DAMAGE THE QUARTZ WOOL INSIDE THE SHROUD.

REMOVAL OF THE CRACKS MUST NOT LEAVE ANY GRIND MARKS BEHIND WITHIN THE AREA MARKED OUT IN FIGURE 401 ; SHOULD IT OCCUR, APPLY A PATCH AS INDICATED IN REP 3-130-2.

B. Inspection for soundness

- (1) Test the B1 class welds for soundness as instructed in Chapter 70-35-80 : "WELDING", and as indicated below :

Checking is by the water-washable dye penetrant process using Method M501B described in Chapter 70-20-10: "PENETRANT INSPECTION".

CAUTION : THE PENETRANT IS TO BE REMOVED WITH A CLOTH SOAKED IN ISOPROPYL ALCOHOL (P442) OR METHYL ALCOHOL (P185).

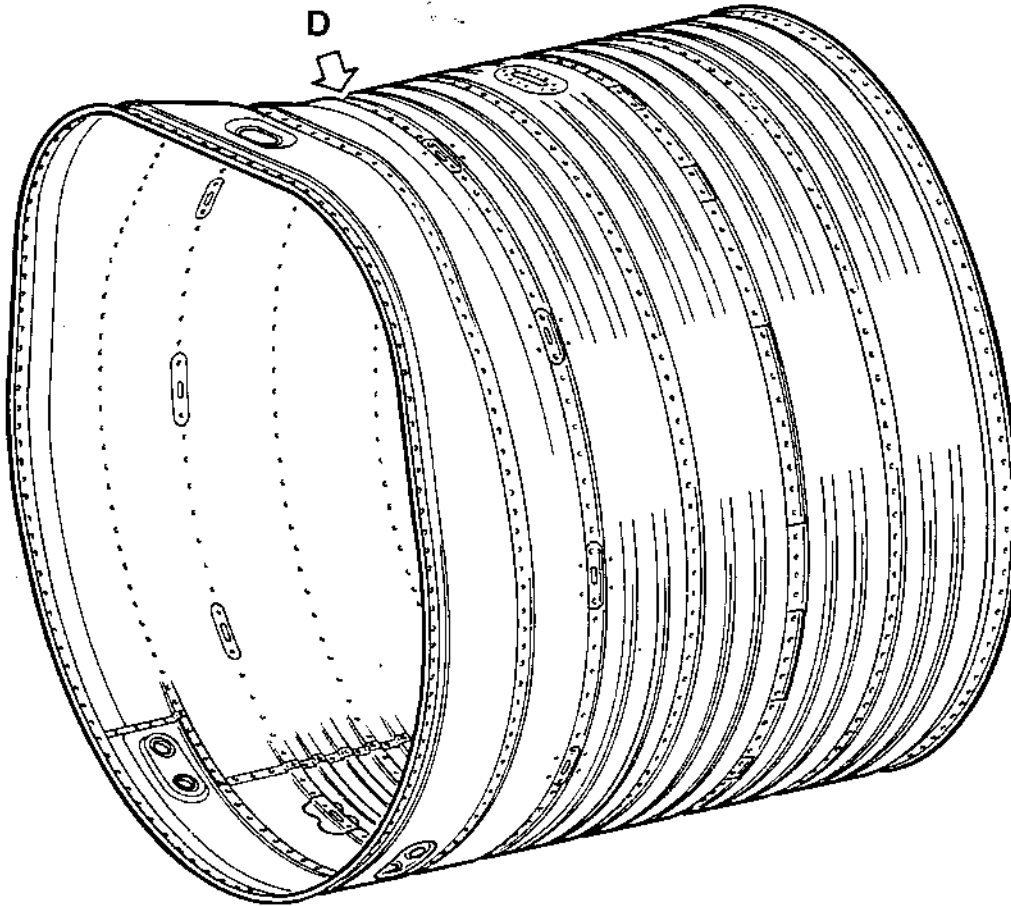
78-11-01

REP 3-130-1  
Page 401  
Jan 31/77



OLYMPUS 593

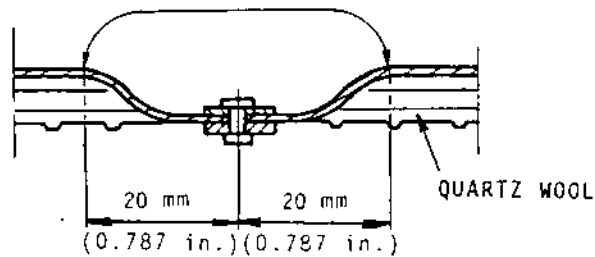
MK.610-14-28  
OVERHAUL



D

APPLICABLE TO ALL RIBS

NO WELD-FILLING MUST  
BE DONE IN THIS SEGMENT



Filler-Welding Cracks in the Outer Sheet  
Figure 401

78-11-01

REP 3-130-1

Page 402

Jan 31/77



**OLYMPUS 593**

MK. 610-14-28

OVERHAUL

REPAIRVENTILATION SHROUD (3-130)

2. Reconditioning the ventilation shroud by means of riveted patches or by renewing damaged parts.

---

PARTS REQUIRED FOR REPAIR

---

Front reinforcement plate	No. 525-600-147-0
Rear reinforcement plate	No. 525-203-055-0
	No. 525-203-042-0 and
	525-203-164-0
	No. 525-600-136-0 and
Reinforcement plate	525-600-137-0
	No. 525-600-138-0 and
	525-600-139-0
	No. 525-400-091-0
Riveting plate	No. 525-203-044-0 and
	525-203-045-0
Junction plate	No. 525-203-037-0
Plate	No. 525-400-062-0 and 525-400-064-0
	No. 525-400-066-0 and 525-600-146-0
Protective plate	No. 525-600-217-0 and
	525-600-218-0
Retaining member	No. 525-203-043-0
Pad support	No. 525-609-724-0
Inner ferrule	No. 301-183-600-0
Reinforcement ring	No. 525-203-057-0
Pin	No. 525-400-065-0
SIMMONDS nut	No. LA 579-4 K (649-303-009-0)
Inner edging	No. 525-600-128-0
Outer edging	No. 525-600-129-0
Edging	No. 301-178-800-0
Riveting washer	No. 525-203-026-0 and
	525-600-219-0
Riveting washer	No. 650-355-012-0
Rivet No. BNAE 21 215 TB 2405	(650-012-041-0)
or No. BNAE 21 215 TB 3206	(650-012-072-0)
Rivet No. BNAE 21 215 TB 2406	(650-012-042-0)
or No. BNAE 21 215 TB 3207	(650-012-073-0)
Rivet No. BNAE 21 215 TB 2408	(650-012-044-0)
or No. BNAE 21 215 TB 3209	(650-012-075-0)
Rivet No. BNAE 21 215 TB 3207	(650-012-073-0)
or No. BNAE 21 215 TB 4008	(650-012-101-0)
Rivet No. BNAE 21 217 TB 2406	(650-022-042-0)
or No. BNAE 21 217 TB 3207	(650-022-073-0)
Rivet No. BNAE 21 217 TB 2407	(650-022-043-0)
or No. BNAE 21 217 TB 3208	(650-022-074-0)

**78-11-01**

REP 3-130-2

Page 401

Apr 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



Rivet No. BNAE 21 217 TB 2408 (650-022-044-0)  
or No. BNAE 21 217 TB 3209 (650-022-075-0)  
Blind rivet HUCK No. MLSP-M4-1 (650-017-011-0)  
Metal sheet P3301, 0,1 and 0,4 mm (0.004-0.016 in.) in  
thickness  
Wafered metal sheet P3500, 0,1 mm (0.004 in.) in  
thickness  
Heat insulation material P3501

---

#### A. General

Cracks and burn marks are repaired by cutting out the damaged segment and applying riveted patches in its place. Patching may in some cases involve the removal of the riveted parts with a view to easier work or to meeting the particular requirements of patching.

#### B. Conditions of patching

- (1) If the damaged area lies within 15 mm (0.591 in.) of a riveted or crimped part, cut the patch out of the repair sheet in a shape that will hug the contours of that part.
- (2) In case of progressive deterioration underneath the front and rear reinforcement plates, unrivet them completely.
- (3) If the damage occurs in the heat-insulated area, take the requisite precautions to keep all undeteriorated quartz wool safe from impairment.

#### C. How to prepare patches

- (1) Patches can be cut from a sound portion of a discarded ventilation shroud or tailored from P3301 metal sheeting 0,4 mm (0.016 in.) in thickness in a shape matched to the contours of the surface segment to be reconditioned.
- (2) The patch size varies with the extent of the damage. Its shape must, however, meet the requirements laid down in Chapter "RIVETING", Section 70-50-10.

#### D. How to apply patches

- (1) If necessary, remove parts located in the damaged area for easier repair.
- (2) Rivet the patch on as instructed in Chapter "RIVETING" namely :

78-11-01

REP 3-130-2

Page 402

Jan 31/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



§ 70-50-10 for the non-heat-shielded portion, and  
§ 70-50-20 for the heat-insulated portion  
and as indicated in figure 401.

NOTE : If a patch is applied in the heat-insulated segment, every care must be taken not to damage the quartz wool when drilling the rivet holes.

- (3) Check the riveting as instructed in Sections 70-50-80 and 70-50-82 of Chapter "RIVETING".

E. Reinstalling the parts removed

NOTE : The following also applies to a renewal of damaged items.

(1) General

The instructions given hereunder cover all particulars required for the reassembly of parts removed with a view to repairs.

For every riveting job, two alternative schemes may be considered :

Scheme 1 : Riveting as laid down for new items.

Scheme 2 : Riveting by the use of rivets with a diameter 0,8 mm (0.031 in.) larger than the original dia.

NOTE : In the latter case, drill the washers or riveting plate as required by the particular rivet dia.

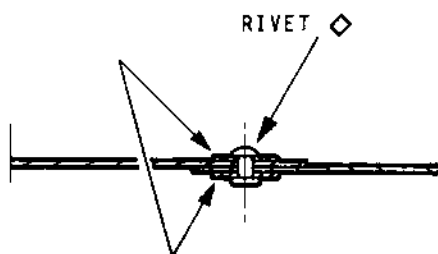
(2) Assembly of parts

- (a) Riveted parts are prepared and their riveting carried out and checked, as instructed in Chapter "RIVETING", Sections 70-50-10 and 70-50-80, and as indicated in figure 402.
- (b) For crimped parts, follow the indications in figure 402, and ascertain after crimping that the part is not cracked.



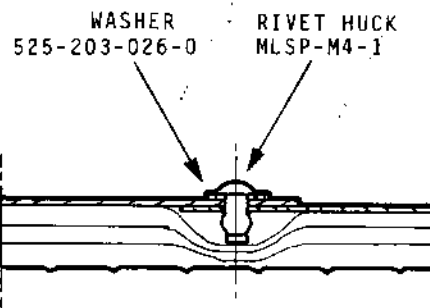
OLYMPUS 593

MK.610-14-28  
OVERHAUL



WASHERS No. 525-203-026-0

DETAIL OF RIVETING A  
PATCH IN THE NON-HEAT-  
INSULATED SEGMENT



DETAIL OF RIVETING A  
PATCH IN THE HEAT-  
INSULATED SEGMENT

BLIND RIVET				
No. HUCK	D = mm (in.)	L = mm (in.)	HEAD	MATERIAL
MLSP-M4-1	3,2 (0.126)	4,24 (0.167)	ROUND FLAT	NU 30

Patch Riveting  
Figure 401

78-11-01

REP 3-130-2  
Page 404  
Oct 31/81

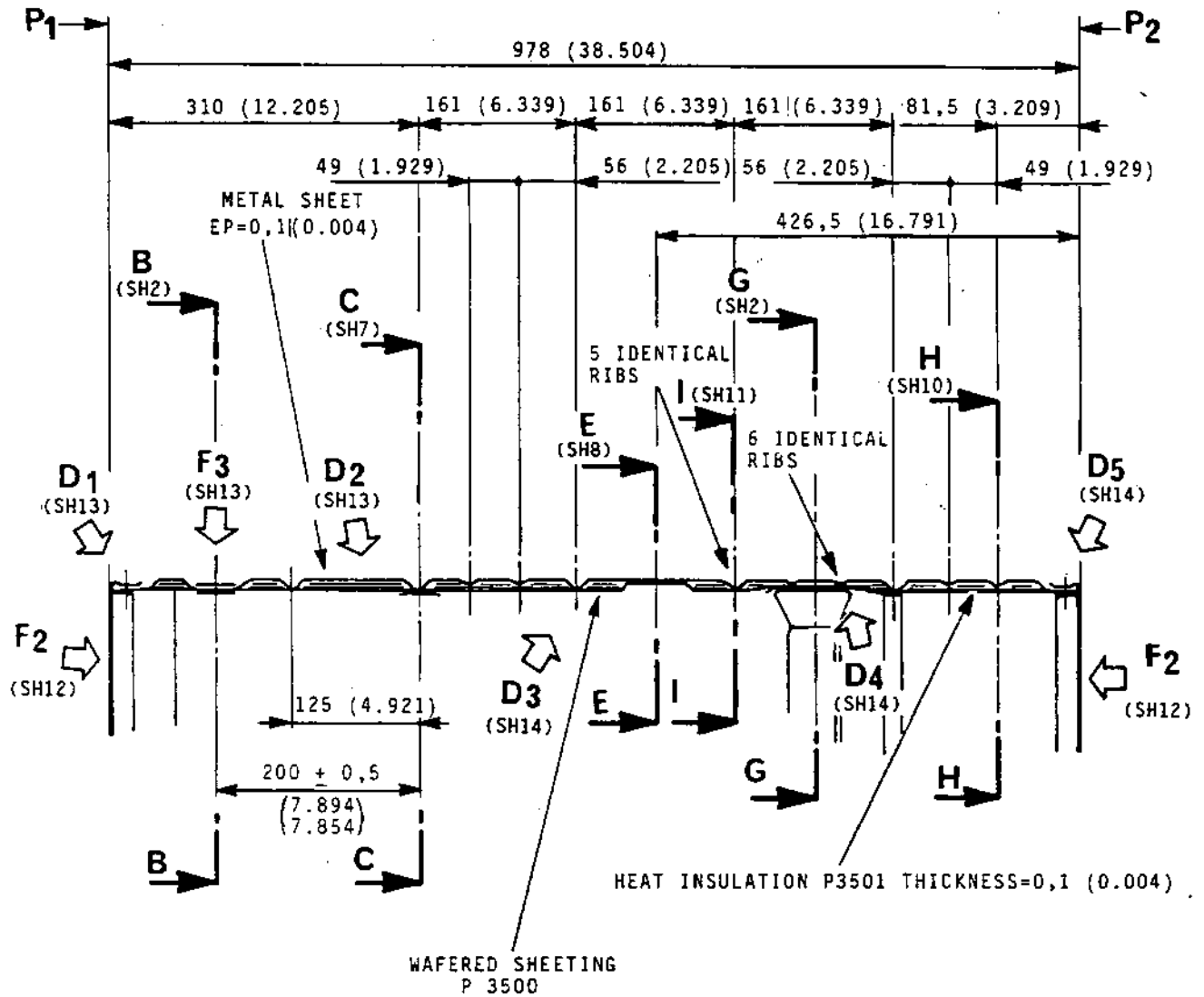


OLYMPUS 593

MK.610-14-28  
OVERHAUL



SECTION A-A



DIMENSIONS ARE GIVEN IN MM,  
WITH INCH EQUIVALENTS IN BRACKETS

Ventilation Shroud Details  
Figure 402 (Sheet 1 of 16)

78-11-01

REP 3-130-2

Page 405

Apr 30/93



# OLYMPUS 593

MK.610-14-28

OVERHAUL



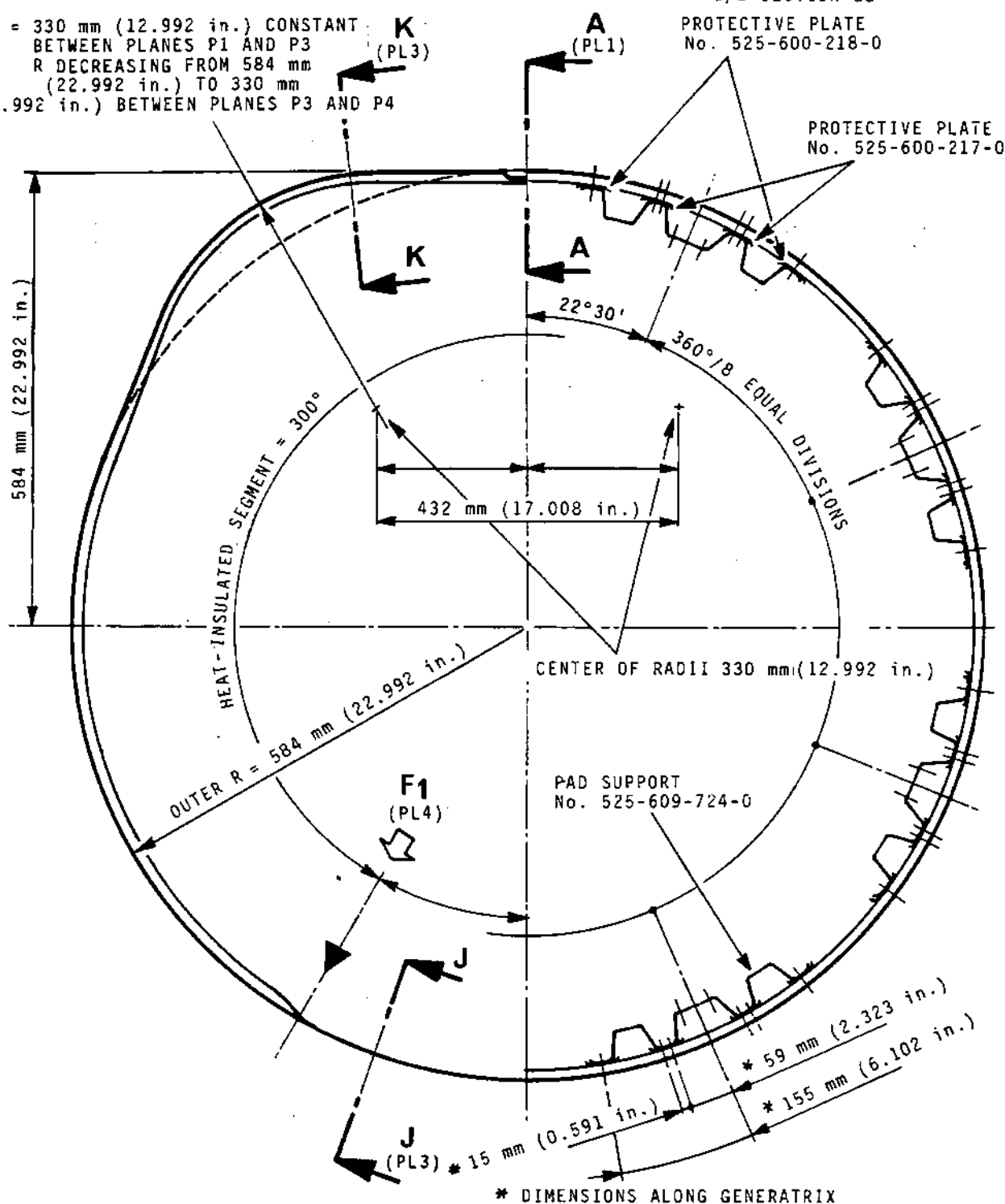
1/2 SECTION BB

1/2 SECTION GG

R = 330 mm (12.992 in.) CONSTANT  
BETWEEN PLANES P1 AND P3  
R DECREASING FROM 584 mm  
(22.992 in.) TO 330 mm  
(12.992 in.) BETWEEN PLANES P3 AND P4

PROTECTIVE PLATE  
No. 525-600-218-0

PROTECTIVE PLATE  
No. 525-600-217-0



Ventilation Shroud Details  
Figure 402 (Sheet 2 of 16)

78-11-01

REP 3-130-2

Page 406

Jan 31/77



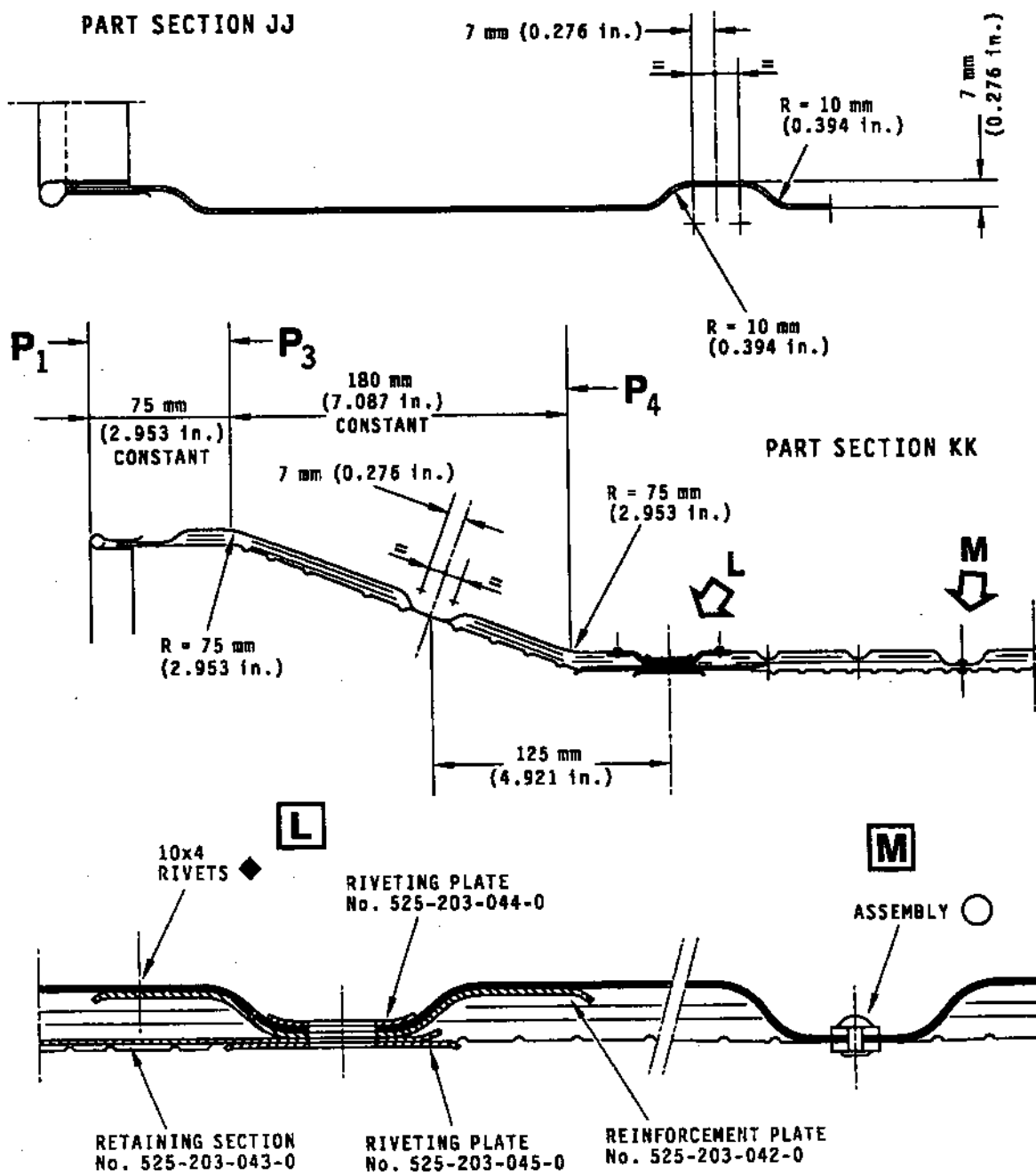
# OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema



S-OLY-SM-00049-00-B

Ventilation Shroud Details  
Figure 402 (Sheet 3 of 16)

## 78-11-01

REP 3-130-2

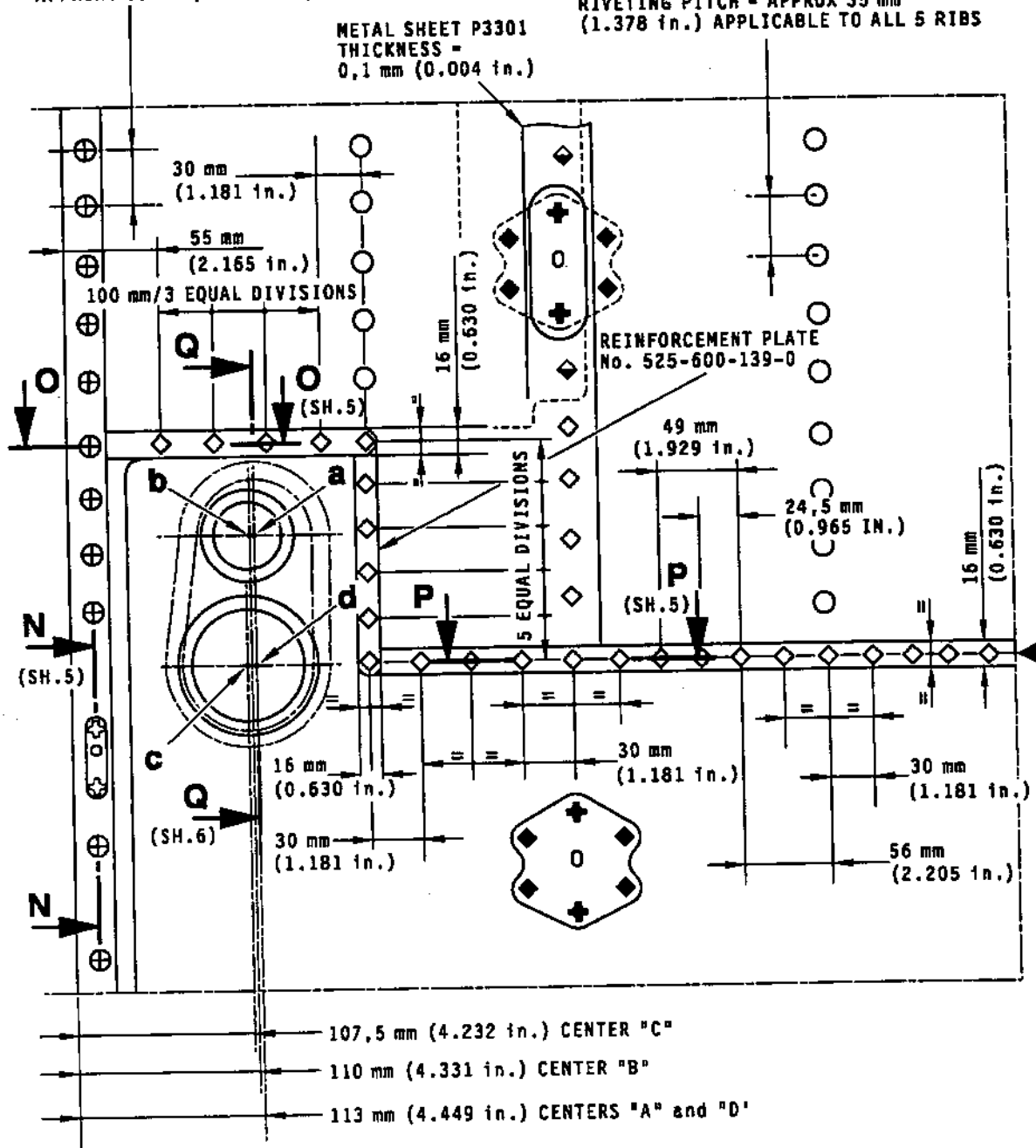
Page 407

Jun 30/97

**RIVETING PITCH =**  
**APPROX. 35 mm (1.378 in.)**

METAL SHEET P3301  
THICKNESS -  
0.1 mm (0.004 in.)

**RIVETING PITCH = APPROX 35 mm  
(1.378 in.) APPLICABLE TO ALL 5 RIBS**



**S-OLY-SM-00050-00-B**

Ventilation shroud Details  
Figure 402 (Sheet 4 of 16)

**78-11-01**

REP 3-130-2

Page 408

Jun 30/97





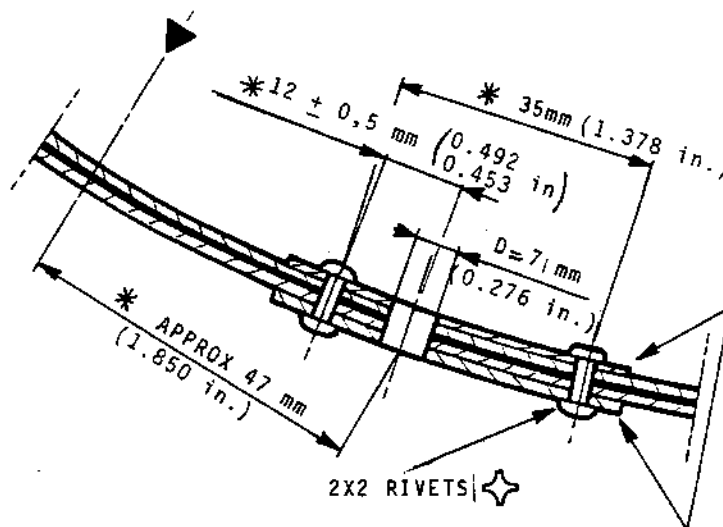
# OLYMPUS 593

MK.610-14-28

OVERHAUL



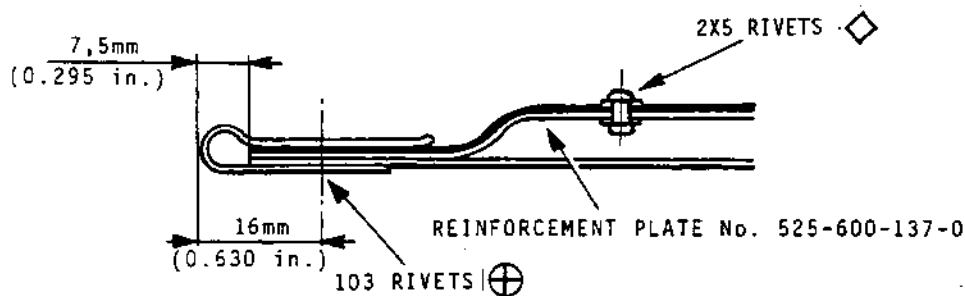
SECTION NN  
SYMMETRICAL WITH VERTICAL CENTERLINE  
ON EITHER SIDE



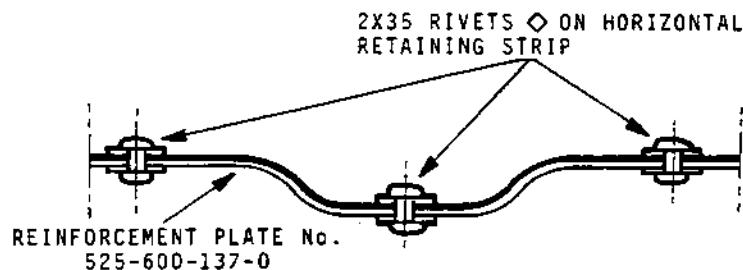
\* DIMENSIONS ALONG GENERATRIX

REINFORCEMENT PLATE No. 525-400-091-0

SECTION OO



SECTION PP



Ventilation Shroud Details  
Figure 402 (Sheet 5 of 16)

78-11-01

REP 3-130-2

Page 409

Apr 30/93



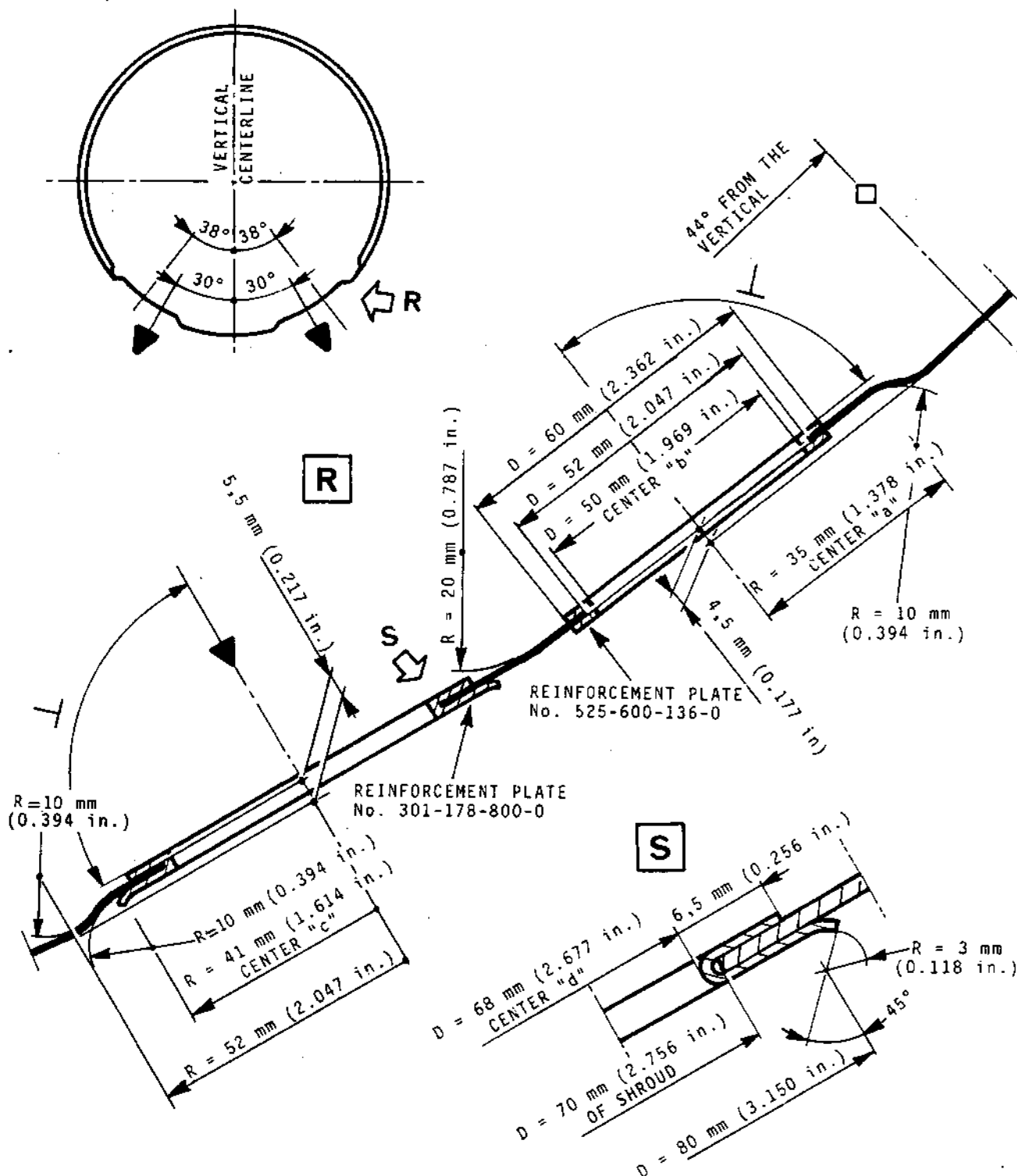
OLYMPUS 593

MK.610-14-28

OVERHAUL



SECTION QQ



Ventilation Shroud Details  
Figure 402 (Sheet 6 of 16)

78-11-01

REP 3-130-2

Page 410

Jan 31/77



# OLYMPUS 593

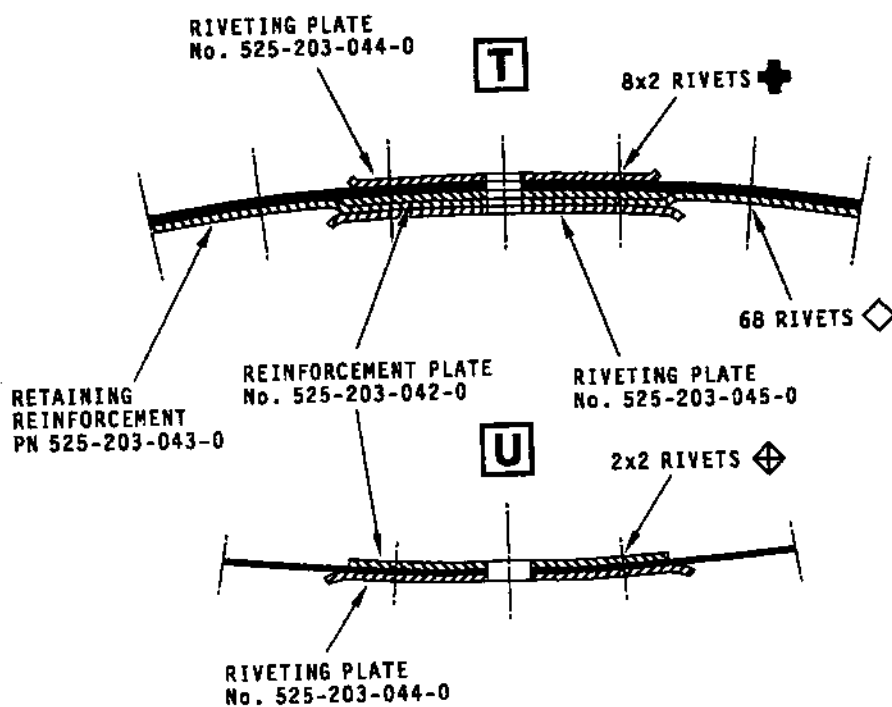
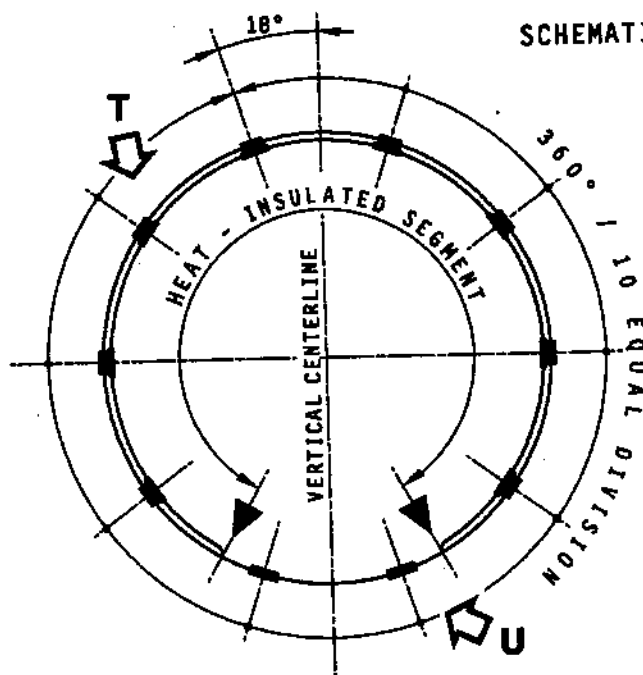
MK. 610-14-28

OVERHAUL



sneema

## SCHEMATIC SECTION CC



S-OLY-SM-00051-00-B

Ventilation Shroud Details  
Figure 402 (Sheet 7 of 16)

### 78-11-01

REP 3-130-2  
Page 411  
Jun 30/97



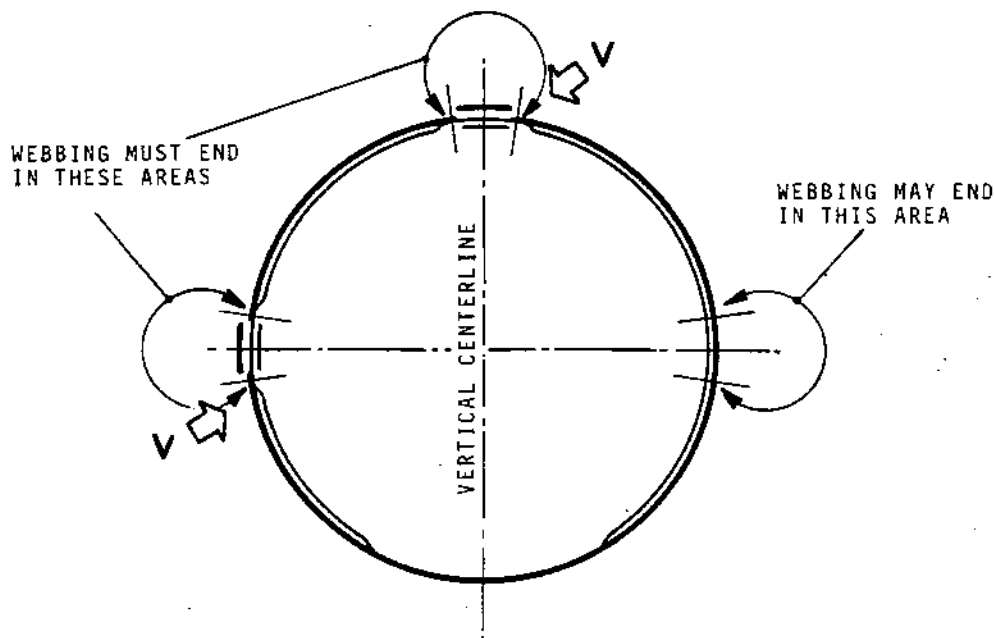
# OLYMPUS 593

MK.610-14-28

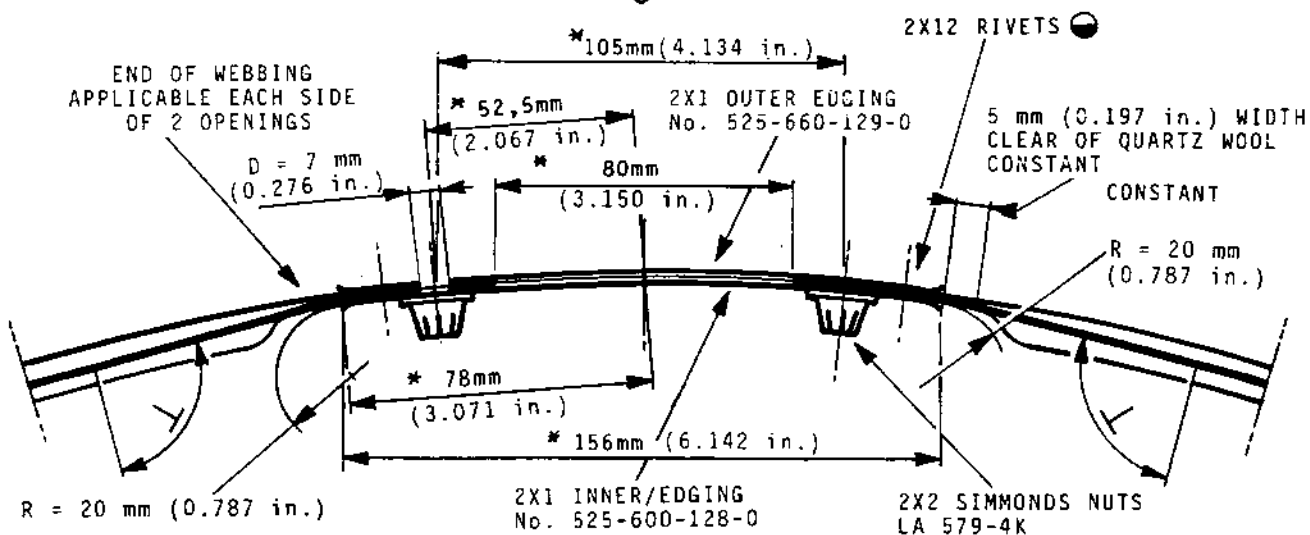
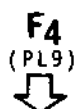
OVERHAUL



SCHEMATIC SECTION EE



PRINTED IN FRANCE



\* DIMENSIONS ALONG GENERATRIX

Ventilation Shroud Details  
Figure 402 (Sheet 8 of 16)

## 78-11-01

REP 3-130-2

Page 412

Jan 31/77



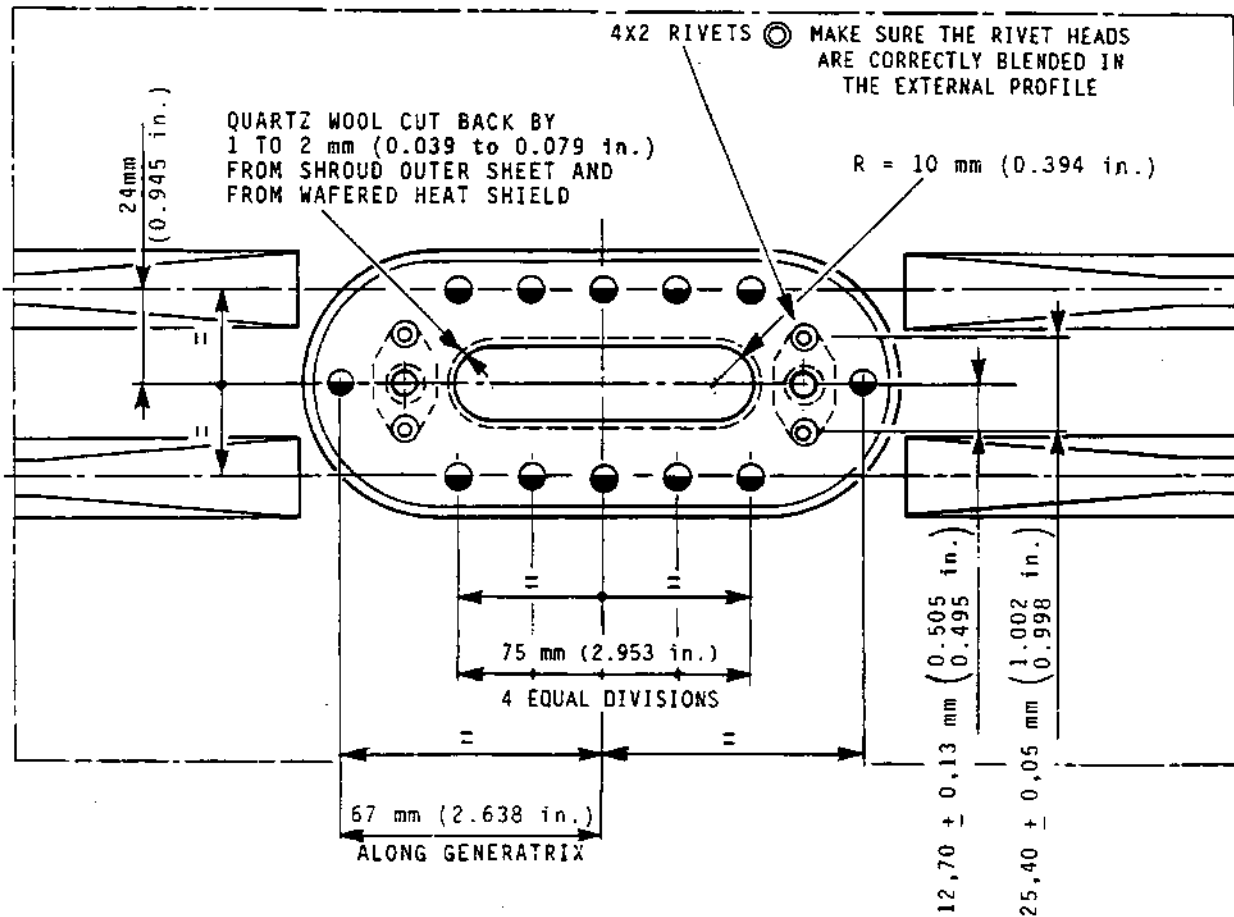
OLYMPUS 593

MK.610-14-28  
OVERHAUL



F<sub>4</sub>

PRINTED IN FRANCE



Ventilation Shroud Details  
Figure 402 (Sheet 9 of 16)

78-11-01

REP 3-130-2

Page 413

Apr 30/93

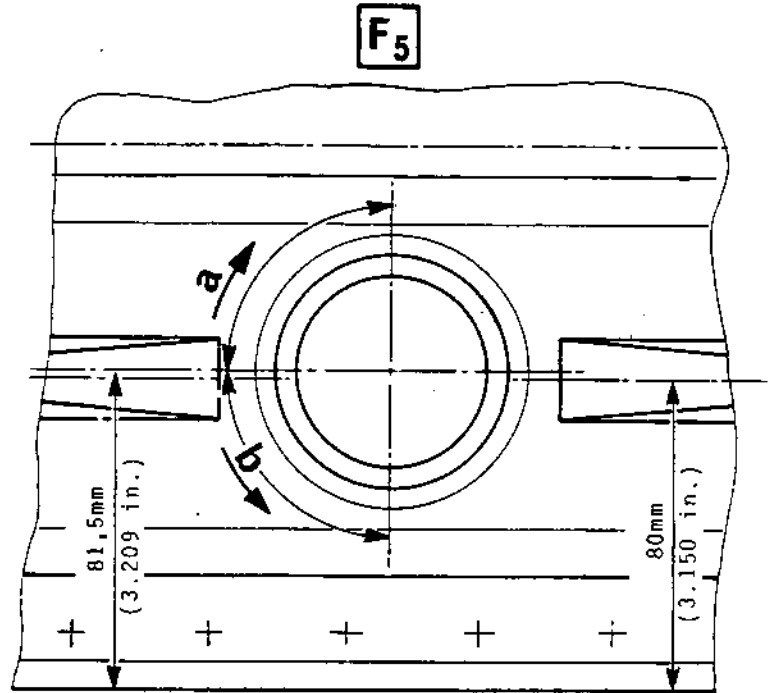
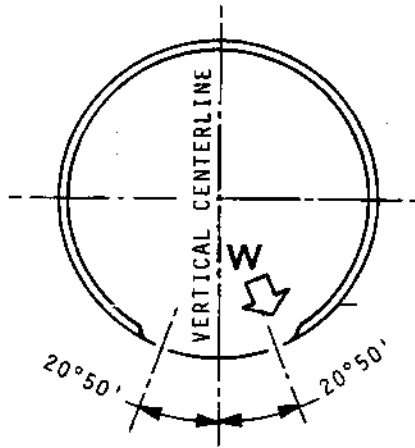


OLYMPUS 593

MK.610-14-28  
OVERHAUL



SCHEMATIC SECTION HH



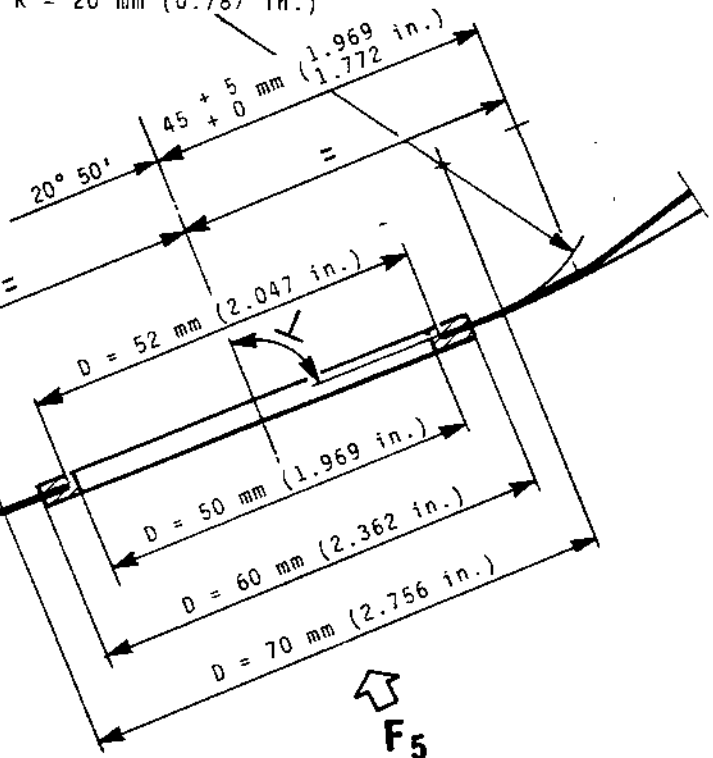
$R = 20 \text{ mm (0.787 in.)}$

**W**

$R = 20 \text{ mm (0.787 in.)}$

DECREASING IN  
SEGMENTS A & B

END OF WEBBING  
APPLICABLE EITHER  
SIDE OF OPENING



Ventilation Shroud Details  
Figure 402 (Sheet 10 of 16)

78-11-01

REP 3-130-2

Page 414

Jan 31/77



OLYMPUS 593

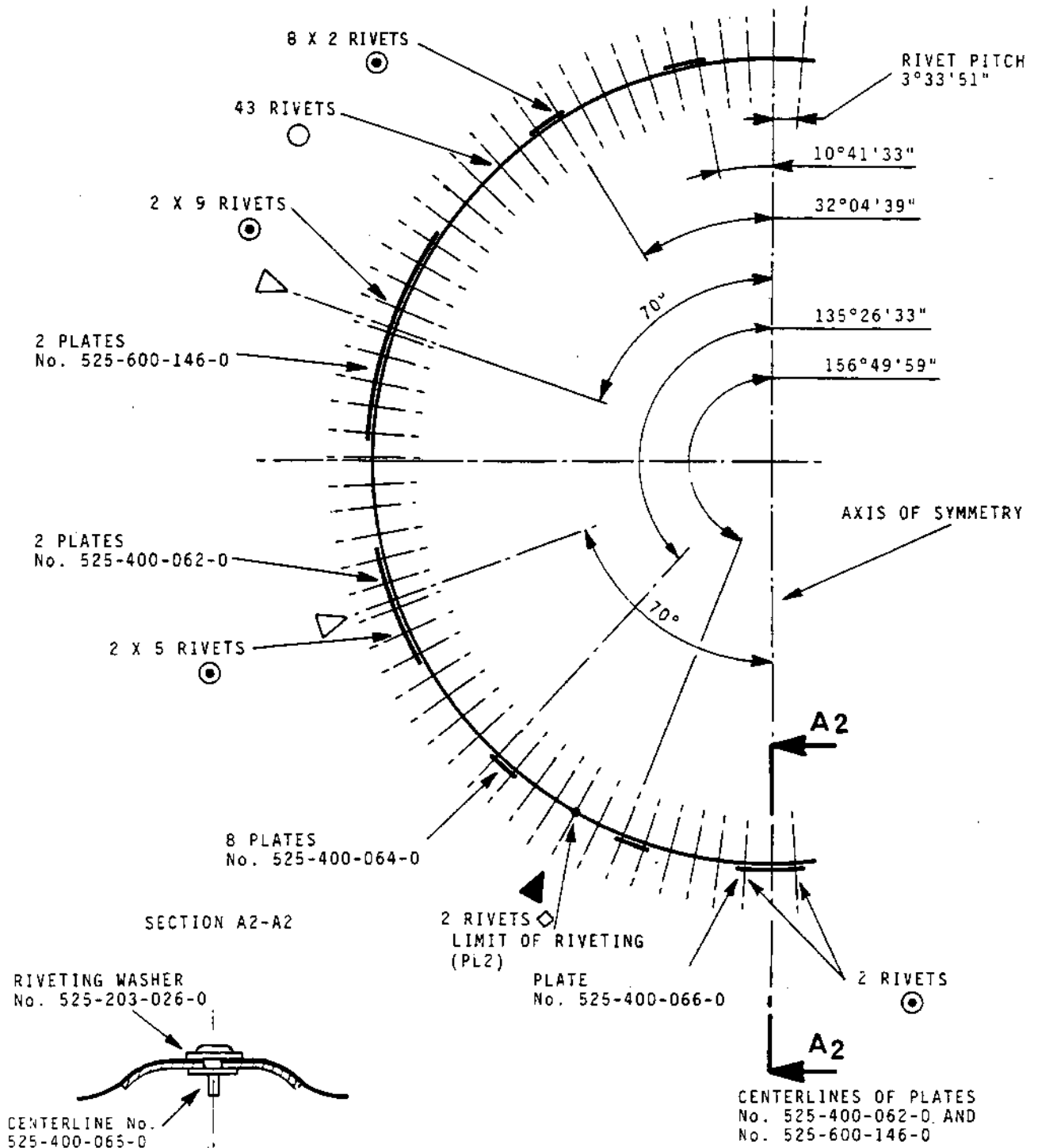
MK.610-14-28

OVERHAUL

1/2 SECTION II



PRINTED IN FRANCE



DIA OF DRILLING :  $2,45 + 0,10$  (0.096)  
 $+ 0$  (0.100)

Ventilation Shroud Details  
Figure 402 (Sheet 11 of 16)

78-11-01

REP 3-130-2

Page 415

Apr 30/93



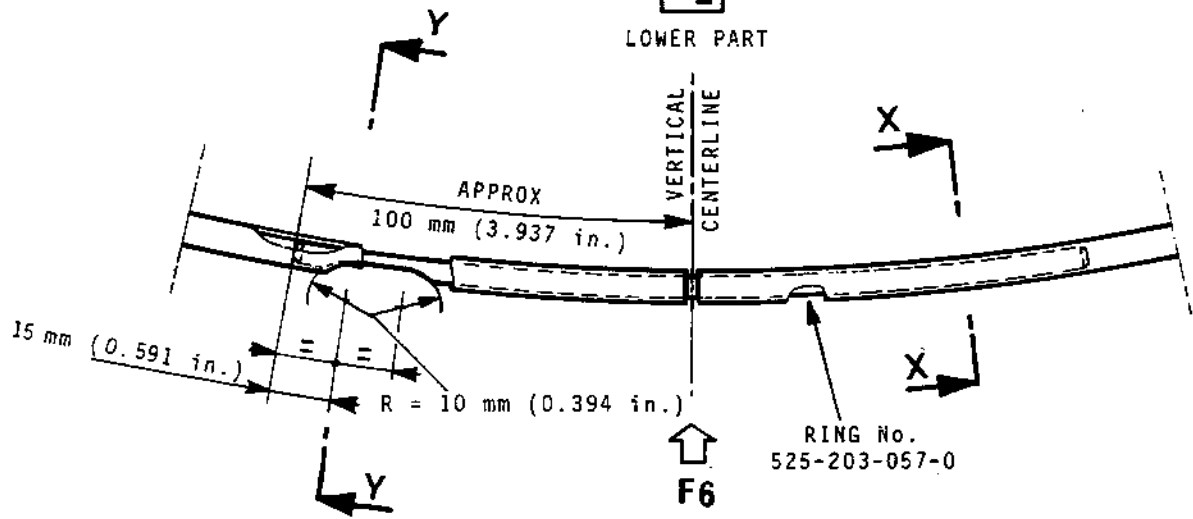
OLYMPUS 593

MK.610-14-28  
OVERHAUL

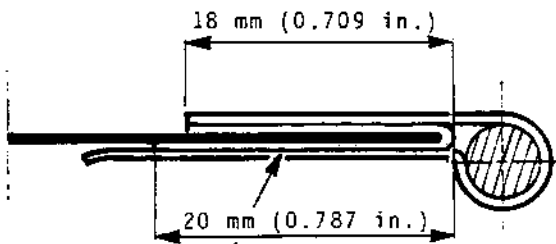


F<sub>2</sub>

LOWER PART

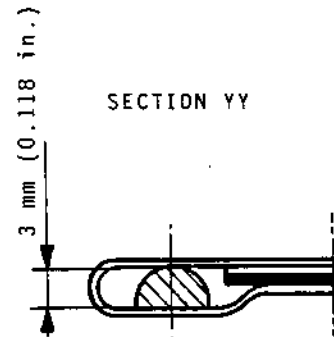


SECTION XX

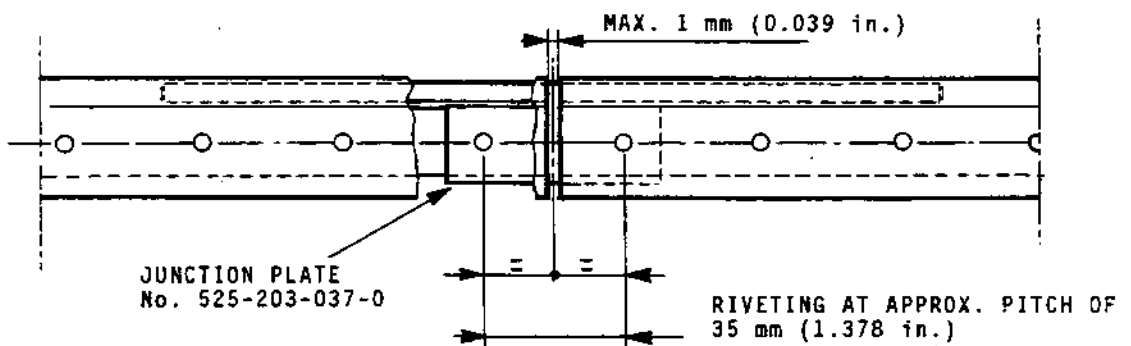


JUNCTION PLATE  
No. 525-203-037-0

SECTION YY



F<sub>6</sub>



Ventilation Shroud Details  
Figure 402 (Sheet 12 of 16)

78-11-01

REP 3-130-2

Page 416

Jan 31/77





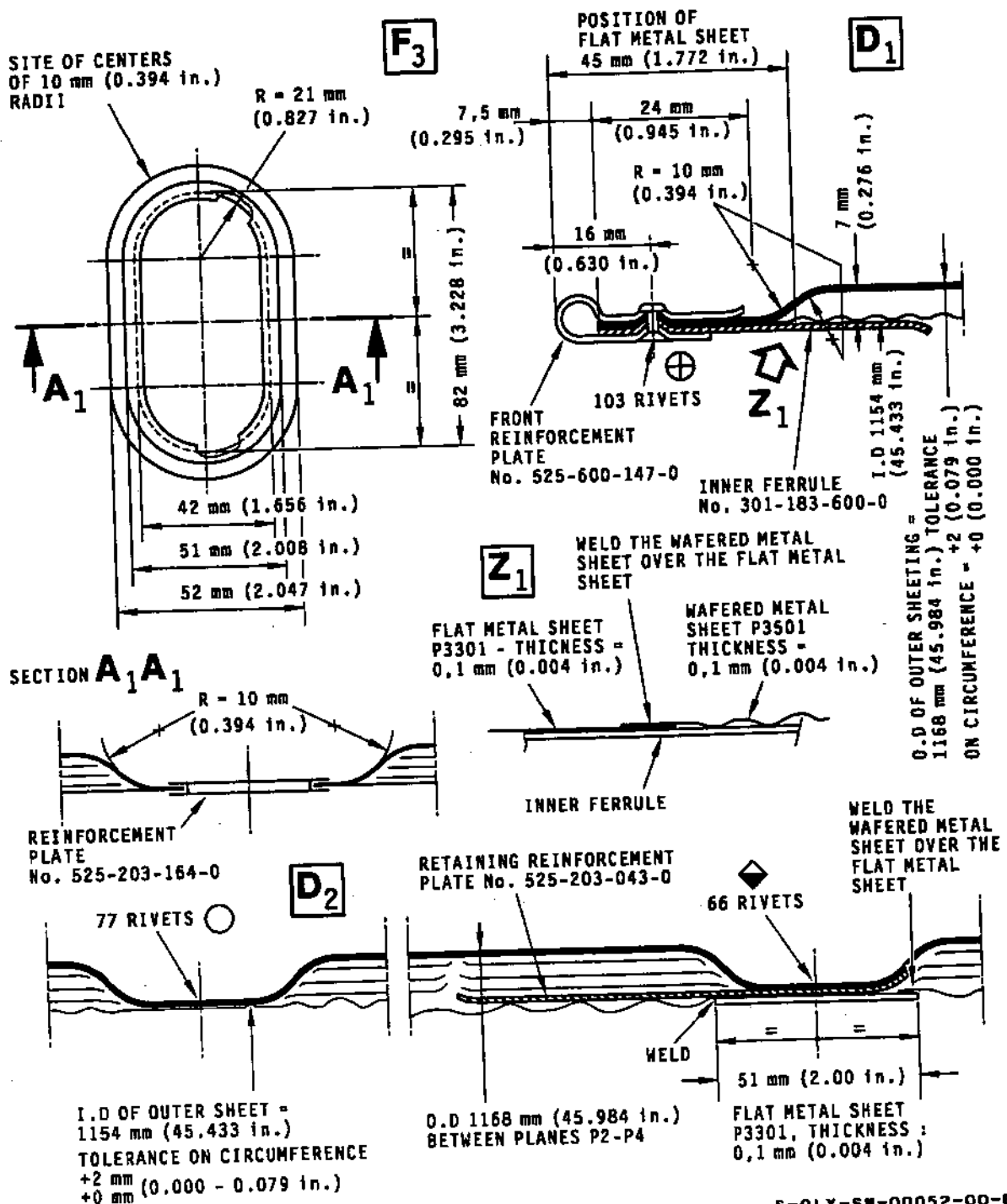
# OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema



Ventilation Shroud Details  
Figure 402 (Sheet 13 of 16)

78-11-01

REP 3-130-2

Page 417

Jun 30/97

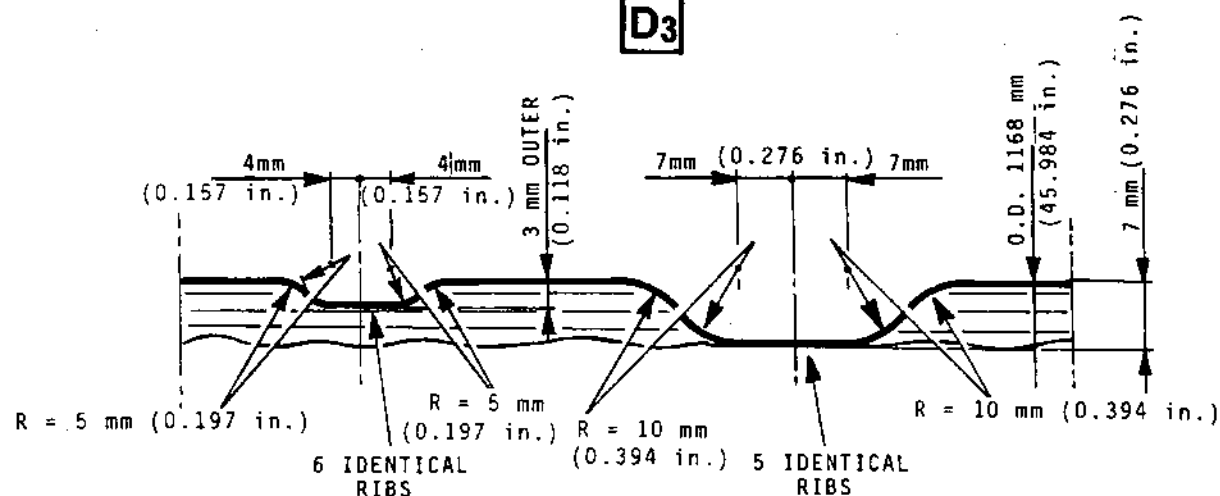


# OLYMPUS 593

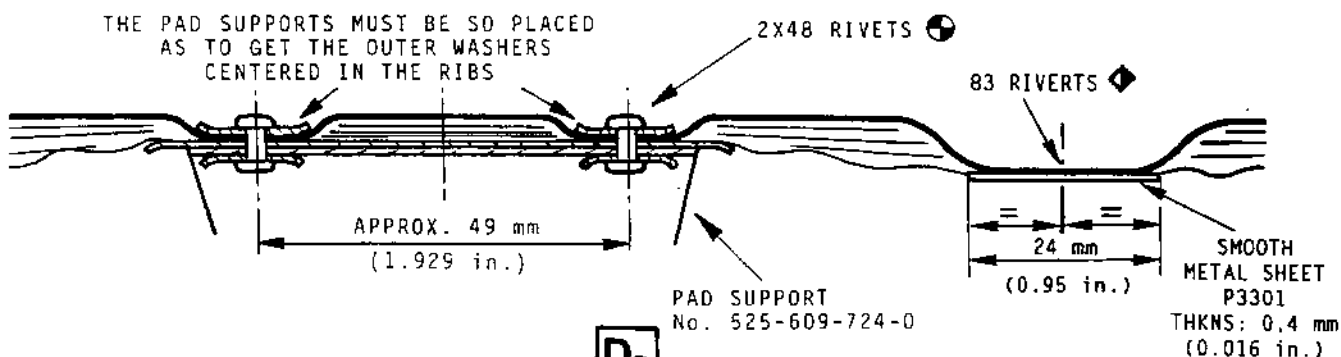
MK.610-14-28  
OVERHAUL



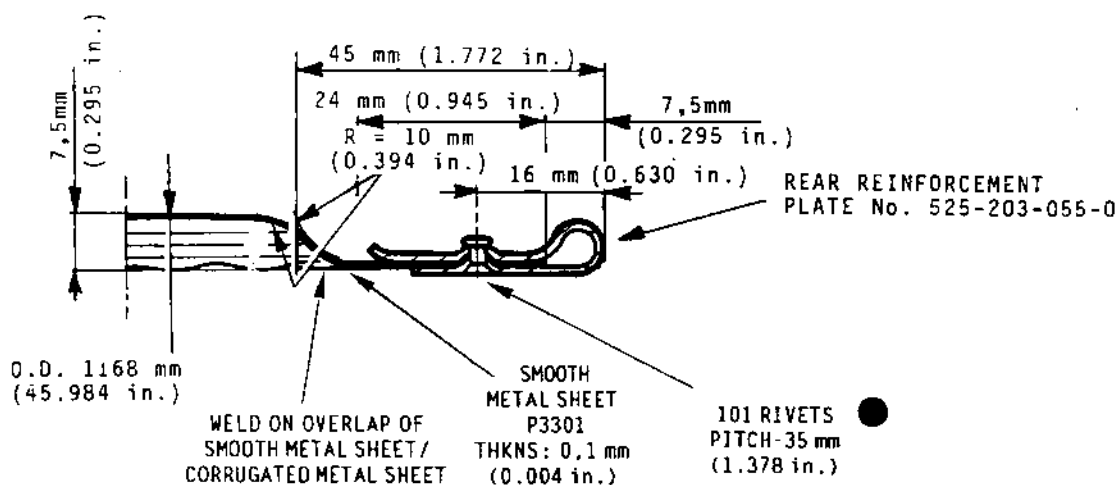
**D3**



**D4**



**D5**



Ventilation Shroud Details  
Figure 402 (Sheet 14 of 16)

**78-11-01**

REP 3-130-2

Page 418

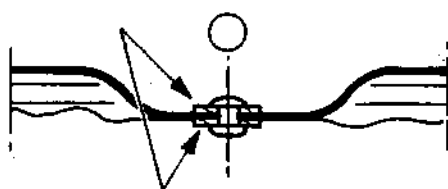
Apr 30/93



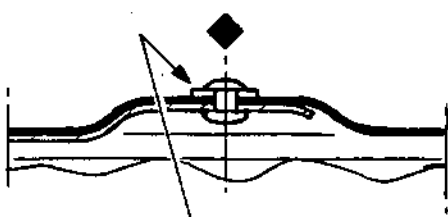
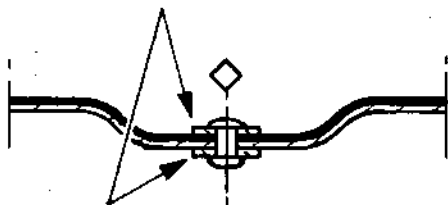
OLYMPUS 593

MK. 610-14-28

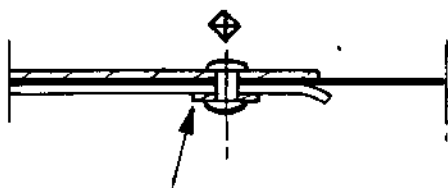
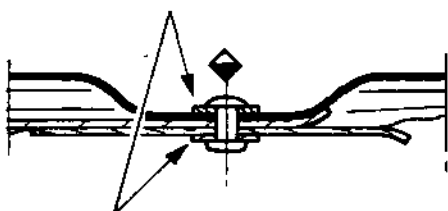
OVERHAUL



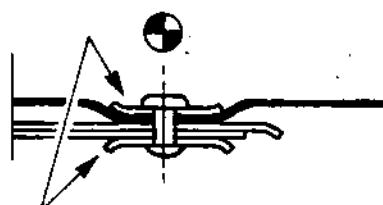
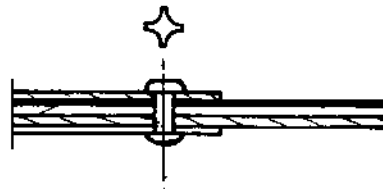
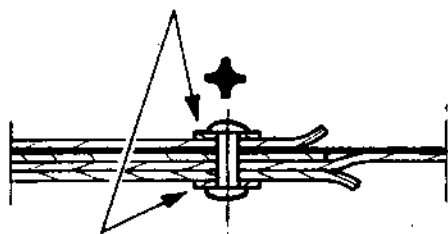
WASHERS  
No. 525-203-026-0



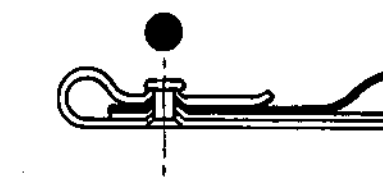
WASHERS No. 525-203-026-0



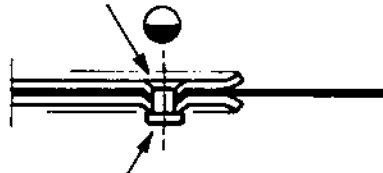
WASHERS No. 525-203-026-0



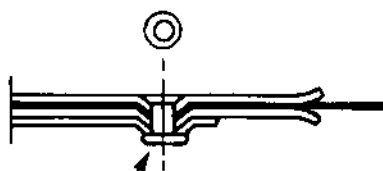
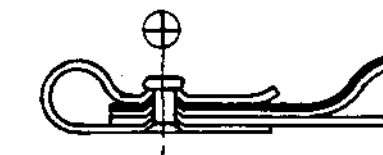
WASHERS No. 525-600-219-0



MACHINE-FLUSH



HEAD TO BE FORMED  
INSIDE SHROUD



HEAD TO BE FORMED  
INSIDE SHROUD

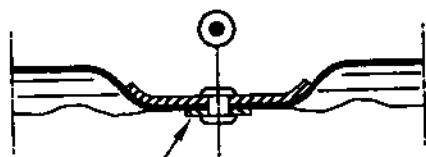
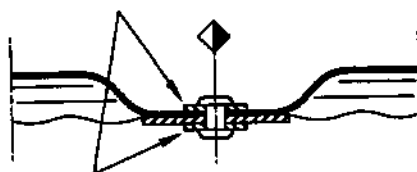
Ventilation Shroud Details  
Figure 402 (Sheet 15 of 16)

78-11-01

REP 3-130-2

Page 419

Jan 31/77

**OLYMPUS 593****MK. 610-14-28****OVERHAUL****sneema**RIVETING WASHER  
No. 525-203-026-0RIVETING WASHER  
No. 525-203-026-0

RIVETS					
BNAE No.	DIA mm (in.)	LENGHT mm (in.)	HEAD	MATERIAL	ASSEMBLY MARK
21215TB2405	2,4 (0.094)	5 (0.197)	ROUND FLAT	NU 30	
21215TB3206	3,2 (0.126)	6 (0.236)	ROUND FLAT	NU 30	
21215TB2406	2,4 (0.094)	6 (0.236)	ROUND FLAT	NU 30	
21215TB3207	3,2 (0.126)	7 (0.276)	ROUND FLAT	NU 30	
21215TB2408	2,4 (0.094)	8 (0.315)	ROUND FLAT	NU 30	
21215TB3209	3,2 (0.126)	9 (0.354)	ROUND FLAT	NU 30	
21215TB3207	3,2 (0.126)	7 (0.276)	ROUND FLAT	NU 30	
21215TB4008	4 (0.157)	8 (0.315)	ROUND FLAT	NU 30	
21217TB2406	2,4 (0.094)	5 (0.236)	F 100	NU 30	
21217TB3207	3,2 (0.126)	7 (0.276)	F 100	NU 30	
21217TB2407	2,4 (0.094)	7 (0.276)	F 100	NU 30	
21217TB3208	3,2 (0.126)	8 (0.315)	F 100	NU 30	
21217TB2408	2,4 (0.094)	8 (0.315)	F 100	NU 30	
21217TB3209	3,2 (0.126)	9 (0.354)	F 100	NU 30	

**RIVETING WASHER**

ORIGINAL	ON REPAIR
No. 525-203-026-0 (FOR RIVETS Ø 2,4 mm (0.094 in.))	No. 650-355-012-0 (FOR RIVETS Ø 3,2 mm (0.126 in.))
No. 525-600-219-0 (FOR RIVETS Ø 3,2 mm (0.126 in.))	COUNTERDRILL WITH CORRESP. PARTS FOR RIVETS Ø 4 mm (0.157 in.)

S-OLY-SM-00053-00-B

Ventilation Shroud Details  
Figure 402 (Sheet 16 of 16)**78-11-01**

REP 3-130-2

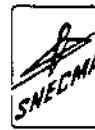
Page 420

Jun 30/97



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## REPAIR

### VENTILATION SHROUD (3-130)

3. Repairing the heat insulating metal sheet (heat shield) with resistance-welded patches

---

#### PARTS REQUIRED FOR REPAIR

---

Wafered metal sheeting	P3500, 0,1 mm (0.004 in.)
in thickness	
Smooth metal sheeting	P3301, 0,1 mm (0.004 in.)
in thickness	
Heat insulation	P3501

---

#### A. General

Burn marks on the heat shield are removed by cutting out the damaged portion and applying a resistance-welded patch in its place.

The ventilation shroud is so constructed as to require the patch to be welded on without removal of the heat insulation. The operation can be carried out by the use of a welding unit of the type : M10DZ0101

BRONZAVIA AERONAUTIQUE  
2, rue Jean Perrin  
92000 NANTERRE - FRANCE

#### B. Conditions of patching

- (1) These conditions are laid down in Chapter "WELDING", Section 70-35-20. Moreover, if the damaged area lies within 15 mm (0.591 in.) of a rivet the patch must be so shaped as to allow for the shape of the rivet.
- (2) In case of progressive deterioration underneath the different riveted parts unrivet them partially for repair.

NOTE : If such progressive damage occurs underneath the upstream and downstream reinforcing plates, they can be wholly unriveted.

#### C. How to cut out the part under repair

- (1) The part to be repaired is to be cut out as instructed in Chapter "WELDING", Section 70-35-20.

78-11-01

REP 3-130-3\

Page 401

Apr 30/93



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (2) Check the condition of the heat-insulating quartz wool. Should it be found impaired by burns, the damaged portion must be renewed.

D. How to prepare patches

- (1) Patches can be cut either from a sound portion of the heat insulating metal sheet of a discarded ventilation shroud or out of a wafered repair sheeting P3500.
- (2) The patch size varies with the extent of the damage. Its shape must meet the requirements laid down in Chapter "WELDING", Section 70-35-20.
- (3) Patches must be cut to allow for a min. 10 mm (0.394 in.) overlap, and in such a way that the corrugations on the patch exactly match those on the ventilation shroud.
- (4) If required, cut a piece of heat-insulating (P3501) quartz wool so that it fits snugly into its housing.

E. Welding patches

(1) Welding-kit parts and adjustment

- (a) The unit must feature an electrode of the same design as that shown in figure 401. This shape prevents the metal sheet from being perforated in welding.
- (b) Adjustments are made by reference to the operating instructions supplied with the unit, and verified on a test sample.

(2) Welding tryout on test sample

- (a) Before welding patches on, a test sample is to be welded to verify the adjustments made.
- (b) The welding sample is made up of two P3500 wafered sheet-metal strips 100 x 30 mm (3.937 x 1.181 in.) in size. The test sample must be cleaned and welded in the same way as the part under repair. It must carry at least 5 weld spots.
- (c) The test sample is checked by peeling off the weld spots.

78-11-01

REP 3-130-3  
Page 402  
Jan 31/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



The test sample is considered up to the mark if all weld spots peel off.

(3) Preparing the parts before welding

- (a) Fine-buff the area of overlap both on the patch and the shroud.

CAUTION : WHEN BUFFING, PROTECT THE ADJOINING AREAS TO KEEP THE QUARTZ WOOL SAFE FROM DAMAGE.

- (b) Clean the surfaces to be welded as instructed in Chapter "WELDING", Section 70-35-20.

(4) Welding on patches

- (a) If necessary, position the quartz wool.  
(b) Make perfect contact between the portions to be welded.

CAUTION : IMPERFECT CONTACT MAKES FOR EXCESSIVE WELDING PRESSURE, RESULTING IN THE PERFORATION OF THE METAL SHEETS.

- (c) Weld the patch on by stitch welding (see figure 401)

NOTE : Use a flat-tip electrode.

Connect the reverse current clip as close as possible to the area of welding.

F. Inspection

- (1) Check each part visually to make sure there is no burn mark or hole in the metal sheet.

78-11-01

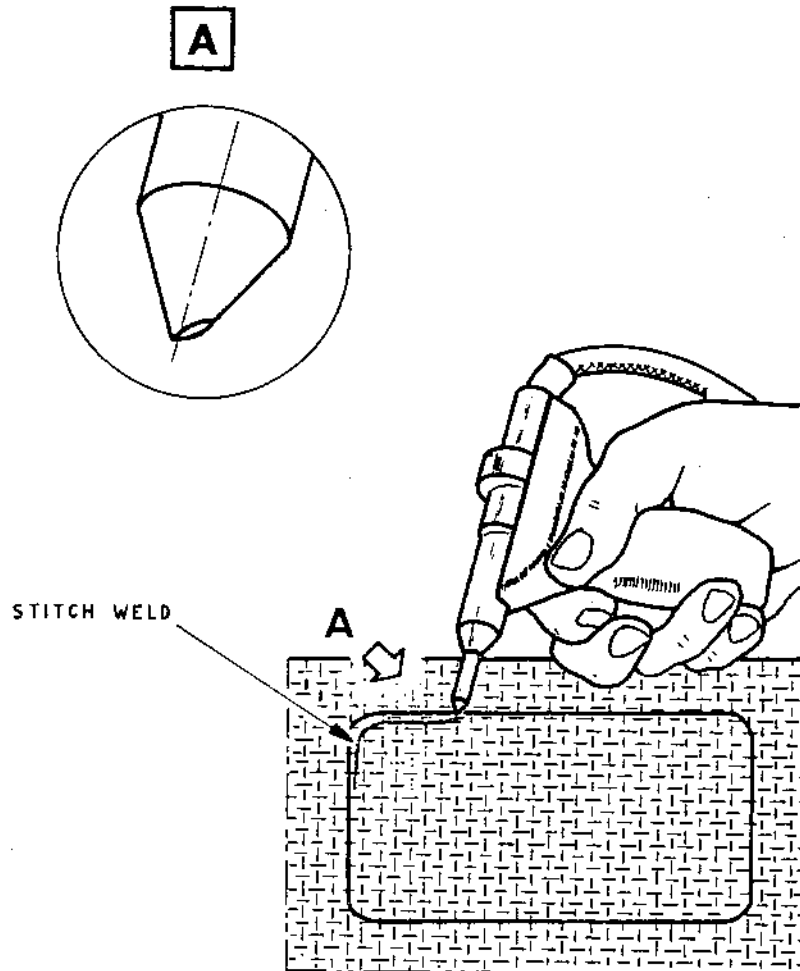
REP 3-130-3

Page 403

Jan 31/77



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



Welding the Heat Insulating Metal Sheet  
Figure 401

78-11-01

REP 3-130-3

Page 404

Jan 31/77





OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

SPHERICAL JOINT BOX (4-50,100)

1. Re-shaping of the attaching flange

---

PARTS REQUIRED FOR REPAIR

---

A. Re-shaping

- (1) Working at room ambient temperature, re-shape the spherical joint box attaching flange by means of a mallet.

B. Inspection for soundness

- (1) Inspect box assembly per fluorescent penetrant indirect post emulsified process M 504 B of chapter 70-20-10.

Scrap box if any crack is found.

C. Dimensional check

- (1) Check that the box flange does not show flatness defect exceeding 0,2 mm (0.008 in).

**78-11-01**

REP 4-50-1  
Pages 401/402  
Dec 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

ANGULAR POSITION STOP (4-60)

1. Re-shaping

---

PARTS REQUIRED FOR REPAIR

---

A. Re-shaping

- (1) Rest the part on hardwood blocks and, using a mallet, re-shape the stop at room ambient temperature.

B. Inspection for soundness

- (1) Inspect the stop assembly per post-emulsified fluorescent penetrant process M 504 B of chapter 70-20-10.  
Scrap the stop assembly if any crack is disclosed.

C. Dimensional check

- (1) Check that distance between planes P1 and P2 is within the values specified on figure 401.

PRINTED IN FRANCE

78-11-01

REP 4-60-1

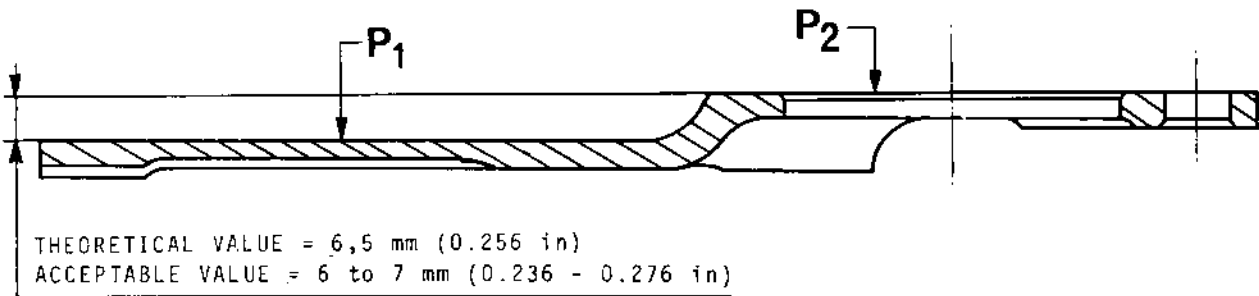
Page 401

Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Reshaping of the Angular Positioning Stop  
Figure 401

78-11-01

REP 4-60-1  
Page 402  
Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

ANGULAR POSITION STOP (4-60)

2. Fusion (weld) hard facing of the stop contact faces

---

PARTS REQUIRED FOR REPAIR

---

Filler welding wire P 3021

---

A. Filler welding (hard facing)

Filler weld the stop contact faces per instructions of chapter 70-35-10.

- Filler welding wire P 3021
- Weld class B1

B. Machining

Cyrlnd the contact faces to dimensions shown on figure 401.

C. Inspection for soundness

Inspect welds, class B1, per instructions of chapter 70-35-80.

- Inspect stop per the post-emulsified fluorescent penetrant process M 504 B of chapter 70-20-10.

D. Dimensional check

Check the stop dimensions as shown on figure 401.

**78-11-01**

REP 4-60-2

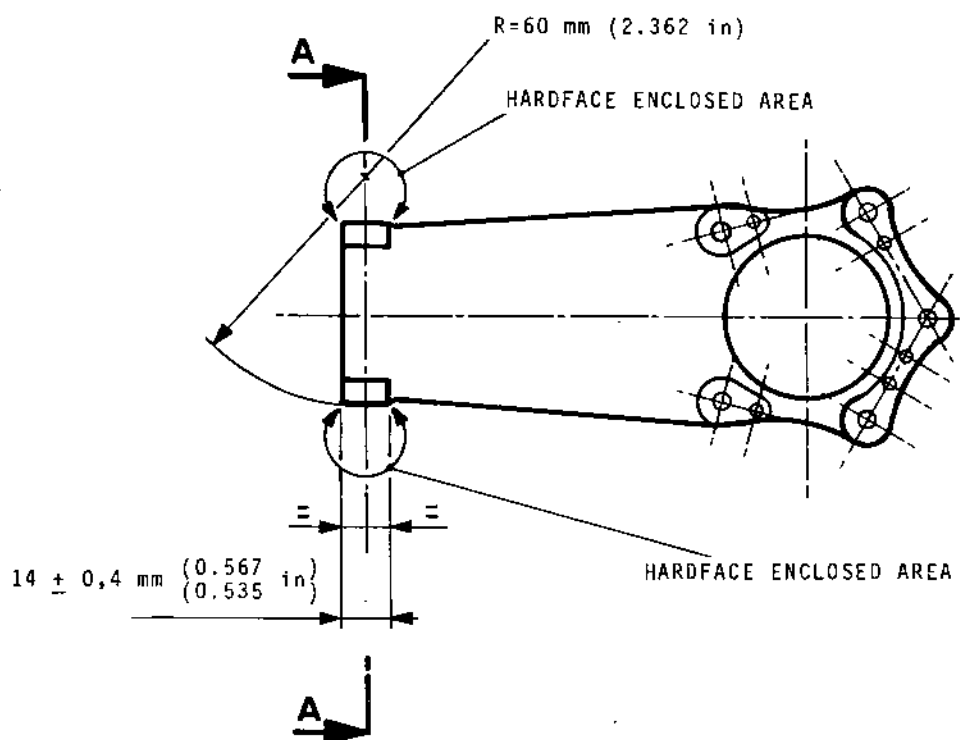
Page 401

Dec 30/74



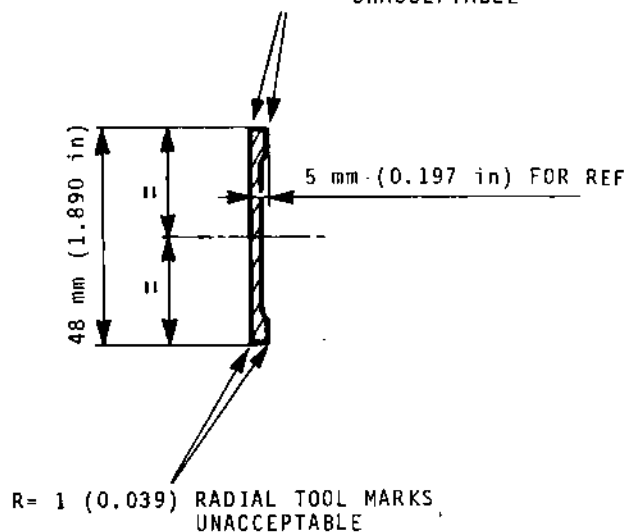
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CROSS-SECTION A-A

R= 1 (0.039) RADIAL TOOL MARKS  
UNACCEPTABLE



SURFACE FINISH = 3.2 mm (0.126 in)

Hard Facing of the Stop Contact Faces  
Figure 401

78-11-01

REP 4-60-2

Page 402

Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

ANTI-ROLL BOX (4-110)

1. Crack filler welding

---

PARTS REQUIRED FOR REPAIR

---

Filler welding wire P 3002 or P 3009

---

A. Crack filler welding

Filler weld cracks in accordance with instructions of chapter 70-35-10.

- Filler welding wire P 3002 or P 3009
- Weld class B1

B. Inspection for soundness

Inspect welds, class B1, per instructions of chapter 70-35-80.

- Inspect part per the water washable dye penetrant process M 501 B of chapter 70-20-10.

**78-11-01**

REP 4-110-1  
Pages 401/402  
Dec 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

CONNECTING LINK (4-120)

1. Re-shaping

---

PARTS REQUIRED FOR REPAIR

---

---

CAUTION - THIS RE-SHAPING IS TO BE PERFORMED ONLY ONCE DURING THE SERVICE LIFE OF THE SUBJECT PART.

A. Re-shaping procedure

Rest the ends of the connecting link on steel blocks positioned under a screw press and re-shape the link by exerting with the press a progressive load, applied exclusively in opposite direction of the link distortion, until sag falls within tolerance (refer to figure 401).

CAUTION - IF IT HAPPENED THAT LINK DISTORTION (BUCKLING) BECOMES REVERSED IN RELATION TO WHAT IT WAS ORIGINALLY, SCRAP THE LINK.

B. Inspection for soundness

Detect eventual cracks by performing X ray inspection in accordance with instructions of chapter 70-20-30.

Any crack entails scrapping the link.

C. Dimensional check

Ensure that buckling is less than 0,3 mm (0.012 in) (refer to figure 401).

D. Marking

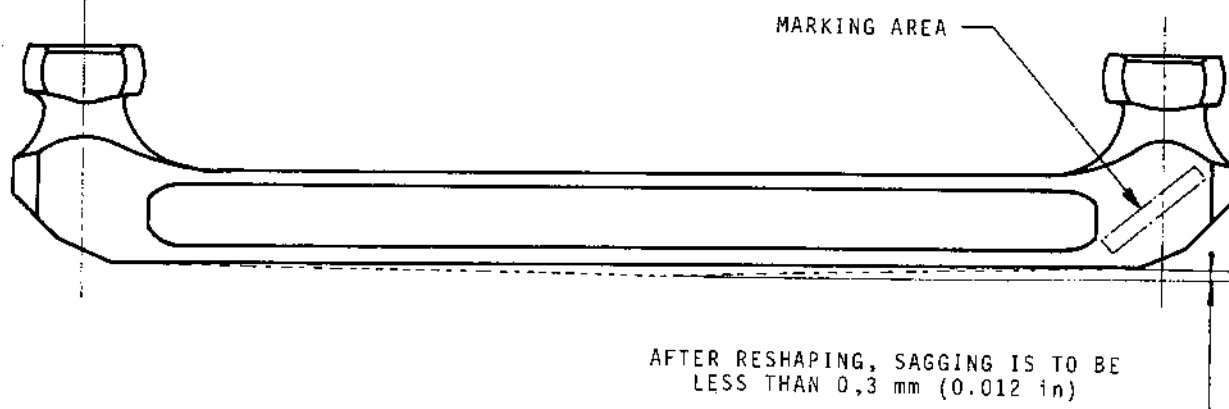
Under the part number, mark REP 4-120-1 as per method M 28 of chapter 70-10-00.

78-11-01

REP 4-120-1

Page 401

Dec 30/74



Link Reshaping  
Figure 401

**78-11-01**

REP 4-120-1

Page 402

Dec 30/74





OLYMPUS 593

MK. 610-14-28

OVERHAUL



SNECMA

CONNECTING LINK (4-120)

1. Re-application of anti-seize varnish C200

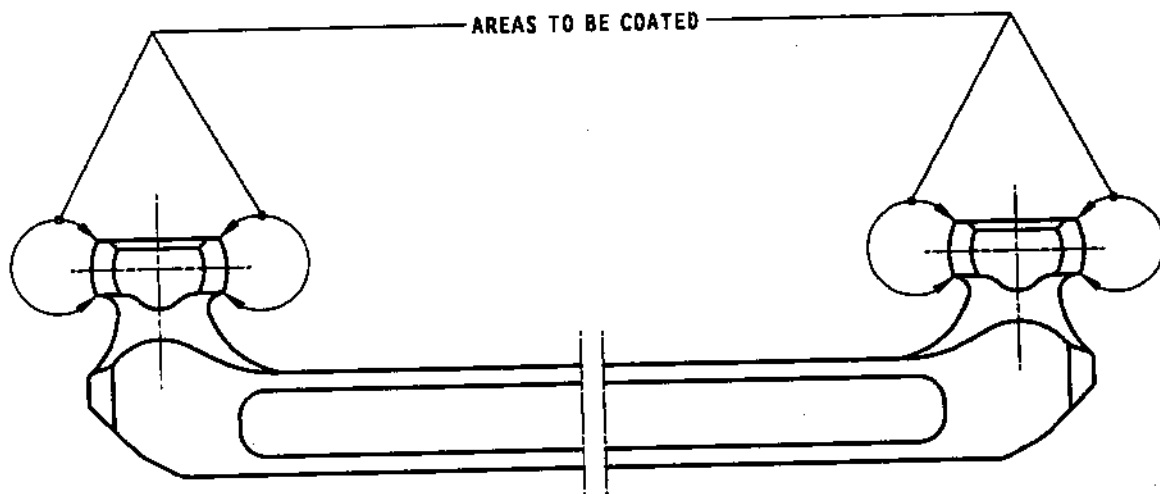
---

PARTS REQUIRED FOR REPAIR

---

- A. Coat areas shown on figure 401 with anti-seize varnish P 209 (C200) in accordance with method M322B of chapter 70-15-30.

NOTE: Vapor blasting is to be carried out only if surfaces to be coated offer a glazed aspect.



S-OLY-SM-00054-00-C

Reconditioning Anti-Seizing Treatment  
figure 401

**78-11-01**

REP 4-120-2  
Pages 401/402  
Jun 30/97



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

FUEL COLLECTOR TUBE (4-130)

1. Crack filler welding

---

PARTS REQUIRED FOR REPAIR

---

Filler welding wire P 3002 or P 3009

---

A. Filler welding cracks

Proceed as per instructions of chapter 70-35-10.

- Filler welding wire P 3002 or P 3009
- Weld class B2

B. Weld inspection

Inspect welds, class B2, in accordance with instructions of chapter 70-35-80.

- Perform water washable fluorescent penetrant inspection as per process M 502 B, chapter 70-20-10.
- X ray inspect as per chapter 70-20-30.

**78-11-01**

REP 4-130-1  
Pages 401/402  
Dec 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

FUEL COLLECTOR TUBE (4-130)

2. Renewal of a Segment of Tube

---

PARTS REQUIRED FOR REPAIR

---

Tube end assy. No. 525-600-223-0  
Union No. 649-474-008-0  
Bracket No. 525-203-108-0  
Pad No. 525-203-146-0  
Retaining sleeve No. 525-203-135-0  
Tube P3400, outer dia. 16 mm (0.630 in.),  
thickness 1 mm (0.039 in.)  
Filler welding wire P 3002 or P 3009  
Brazing wire P 3152 and flux P 3191 or P 3192

---

A. Requirement related to installation of tube segments

- (1) Minimum distance between two weld beads to be 10 mm (0.394 in).
- (2) Cutting through in an existing weld bead is permissible.

B. Preparation of a tube segment

- (1) The tube segment to be installed must be cut either from :
  - a scrapped fuel collector tube,
  - a piece of tube P 3400, dia. 16 mm (0.630 in) thickness 1 mm (0.039 in) for the straight portions of tube.

C. Installation of a tube segment

- (1) Fit the tube segment to dimensional requirements shown on figure 401.
- (2) Using argon arc welding method, tackweld and weld the tube segment as per instructions of chapter 70-35-10.
  - Filler welding wire P 3002 or P 3009
  - Weld class B2.

**78-11-01**

REP 4-130-2

Page 401

May 31/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



D. Inspection for soundness

(1) Inspect welds, class B2, in accordance with instructions of chapter 70-35-80.

- perform water washable fluorescent penetrant inspection as per process M 502 B, chapter 70-20-10.
- X ray inspect as per chapter 70-20-30.

E. Retaining sleeves brazing (if applicable)

(1) Braze the sleeves to the tube, in accordance with the instructions given in chapter 70-40, "BRAZING" and as indicated on figure 401.

Filler material : brazing wire P 3152

Flux : P 3191 or P 3192

Brazing class B1.\*

F. Dimensional check

Check dimensions of the fuel collector tube as per the requirements shown figure 401.

**78-11-01**

REP 4-130-2

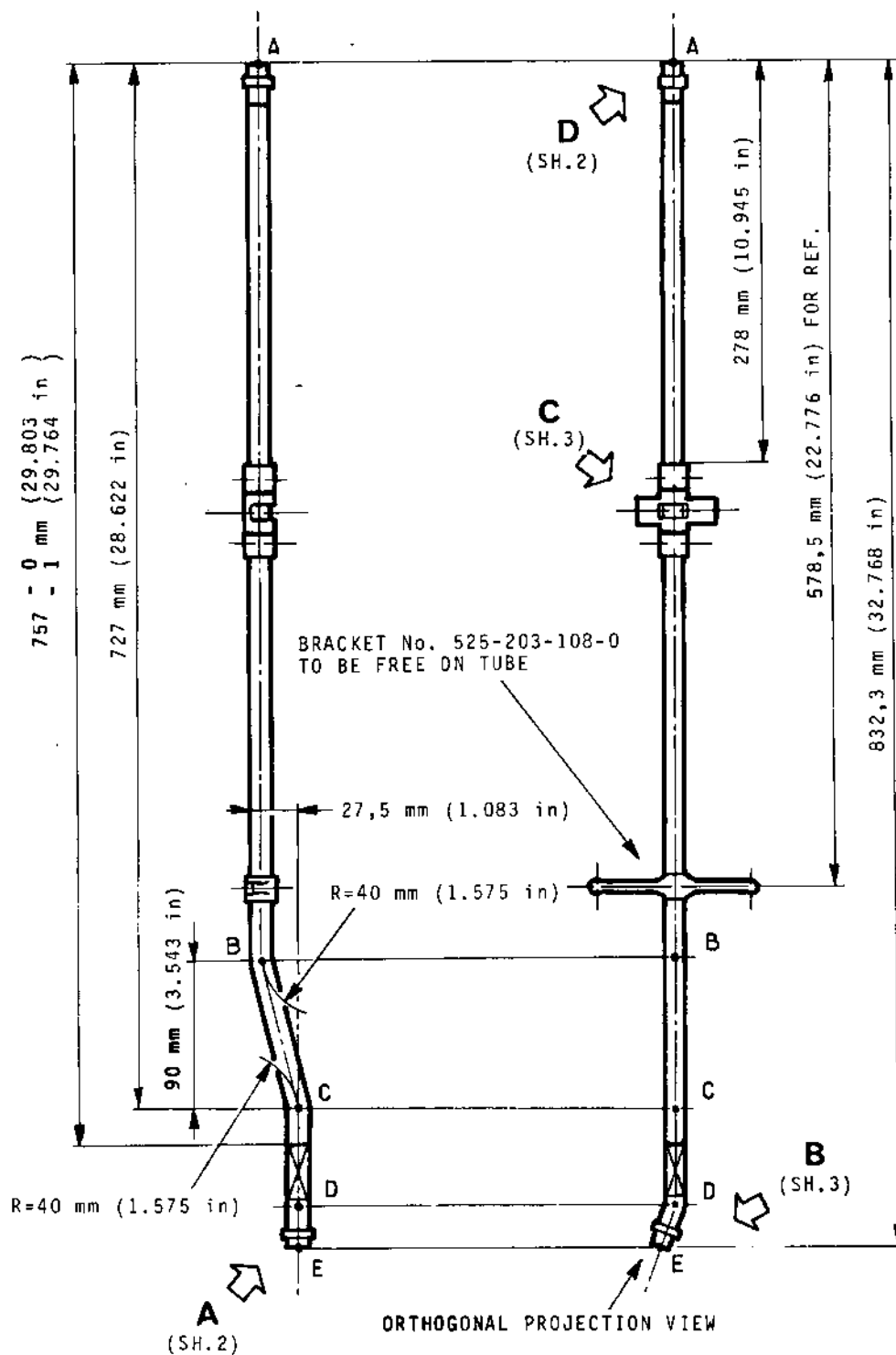
Page 402

Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Renewal of a Tube Segment  
Figure 401 - (Sheet 1 of 3)

78-11-01

REP 4-130-2

Page 403

Dec 15/75

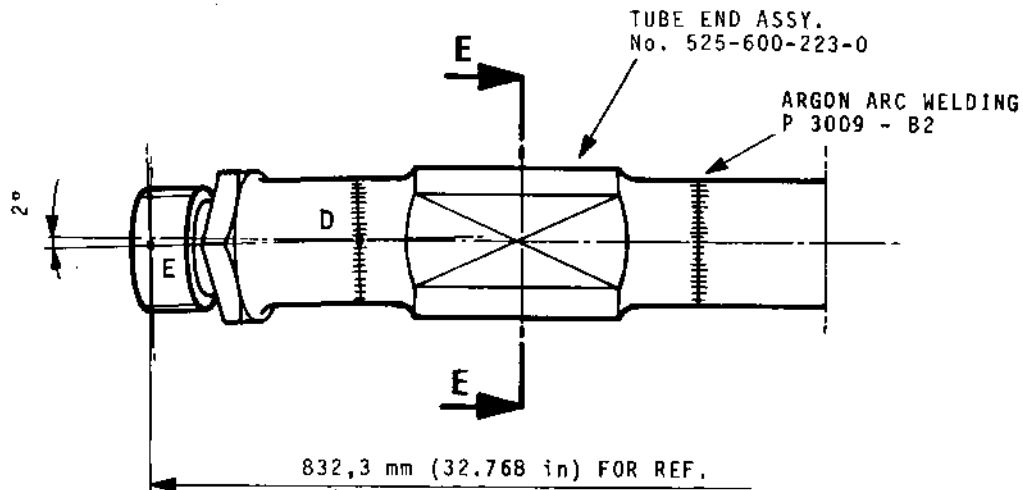


OLYMPUS 593

MK.610-14-28  
OVERHAUL

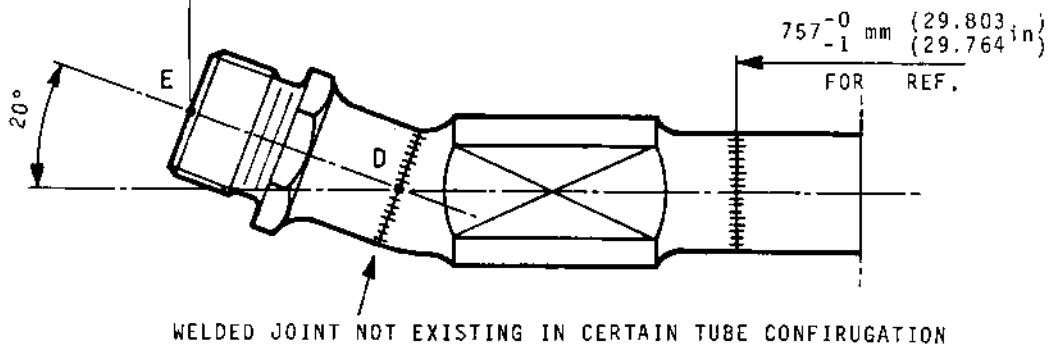


**A**

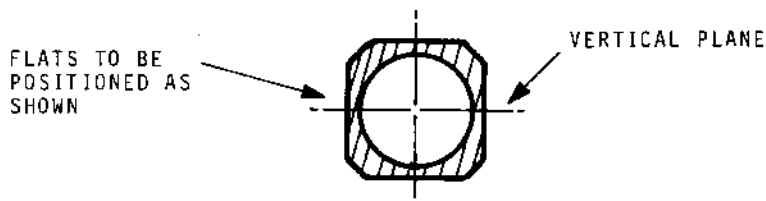


**B**

(FULL SIZE VIEW IN PLANE C. D. E)



CROSS-SECTION E-E



Renewal of a Tube Segment  
Figure 401 - (Sheet 2 of 3)

**78-11-01**

REP 4-130-2

Page 404

Dec 15/75

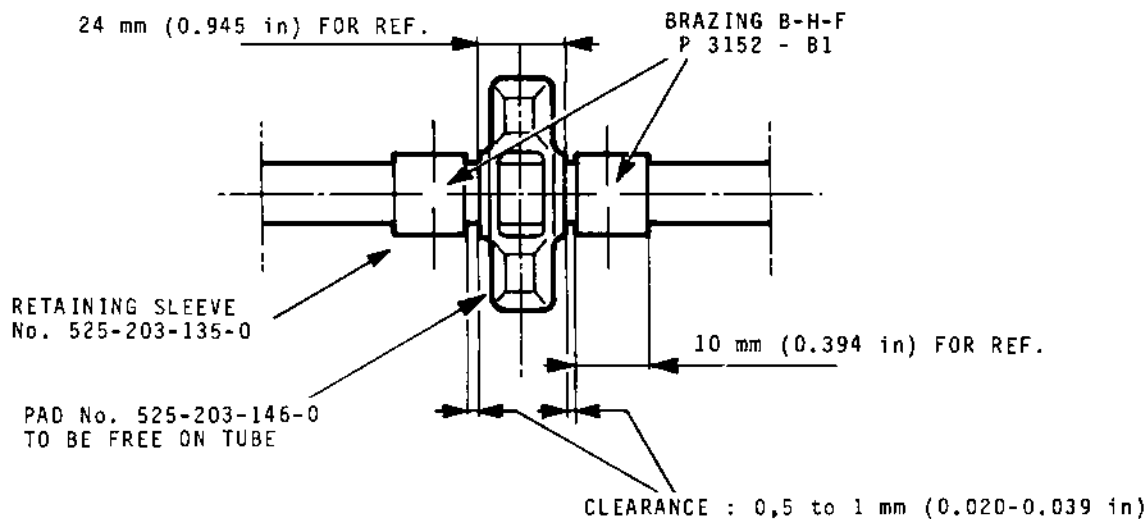


OLYMPUS 593

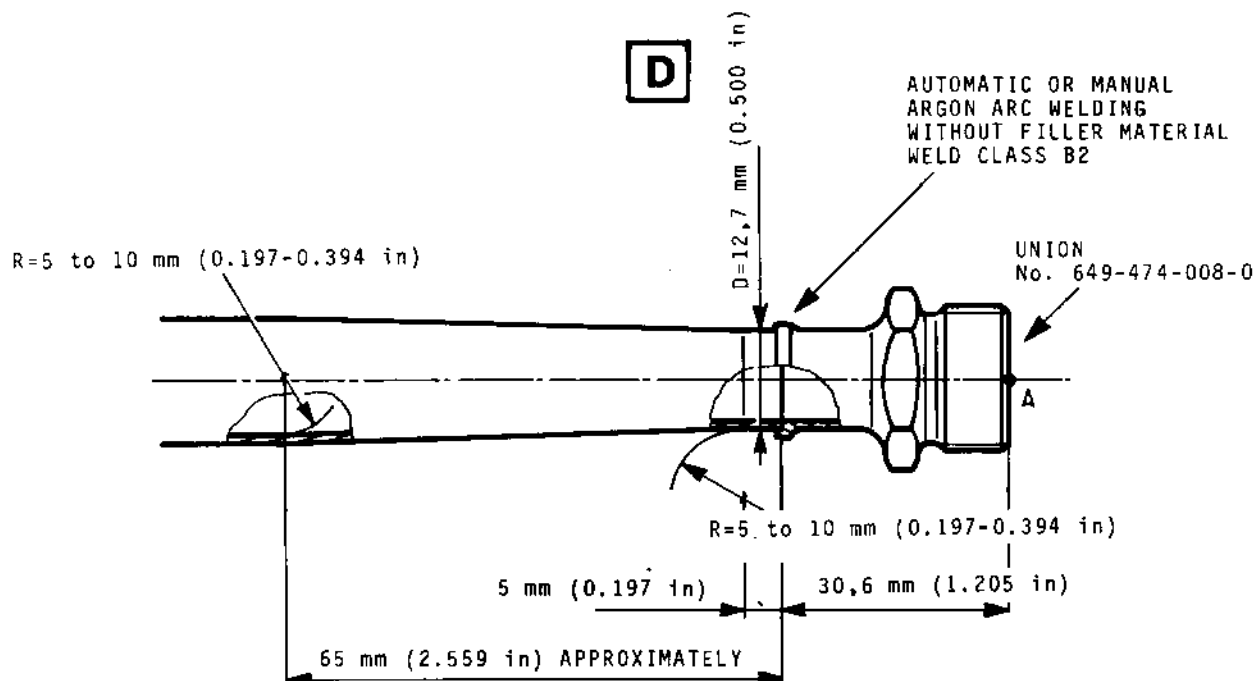
MK.610-14-28  
OVERHAUL



**C**



**D**



Renewal of a Tube Segment  
Figure 401 - (Sheet 3 of 3)

**78-11-01**

REP 4-130-2  
Pages 405/406  
Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

SUPPORT (4-200)

1. Re-shaping the attaching flange

---

PARTS REQUIRED FOR REPAIR

---

A. Re-shaping

Using a mallet, re-shape the attaching flange at room ambient temperature.

B. Inspection for soundness

Perform water washable fluorescent penetrant inspection, as per process M 502 B, chapter 70-20-10.

Any crack entails scrapping the part.

C. Dimensional check

Ensure that the flange flatness discrepancy is less than 0,2 mm (0.008 in).

**78-11-01**

REP 4-200-1  
Pages 401/402  
Dec 30/74





OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

ANTI-SCREECH LINER (5-10)

1. Crack removal using a grinding wheel

---

PARTS REQUIRED FOR REPAIR

---

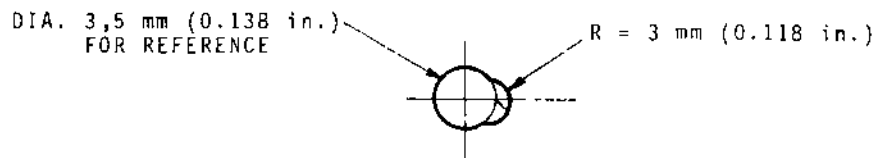
A. Crack removal

- (1) Grind the hole rim until complete resorbing of crack, as per requirements shown on figure 401.
- (2) Round off edges of the resulting elongation by smoothing edges lengthwise.  
Blend radius : 0,5 mm approx (0.019 in).  
Surfaces, so obtained by smoothing edges lengthwise, must be free from radial tool marks.

B. Inspection for soundness

Inspect part using water washable fluorescent penetrant process M 502 B, chapter 70-20-10.

If cracks are disclosed, refer to chapter Inspection of the Manual.



Grinding Off Cracks  
Figure 401

**78-11-01**

REP 5-10-1  
Pages 401/402  
Dec 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

ANTI-SCREECH LINER (5-10)

2. Renewal of spacers

---

PARTS REQUIRED FOR REPAIR

---

Spacer No. 525-600-101-0  
Rivet No. 650-772-020-0

---

A. Spacer removal

- (1) Drill out rivet securing spacer and remove spacer.

B. Inspection for soundness

- (1) At right angles to the spacer securing area, perform water washable fluorescent penetrant inspection, per process M 502 B, chapter 70-20-10.

If cracks are found, refer to chapter Inspection of Manual.

C. Spacer riveting

- (1) Locate and perform cold riveting of a new spacer as per requirements shown on figure 401.
- (2) Check riveting according to instructions of chapter 70-50-80 and figure 401.
- (3) After ensuring that clearance between rivet head and spacer is within specified limits, grind flush the rivet head.

78-11-01

REP 5-10-2

Page 401

Dec 15/75

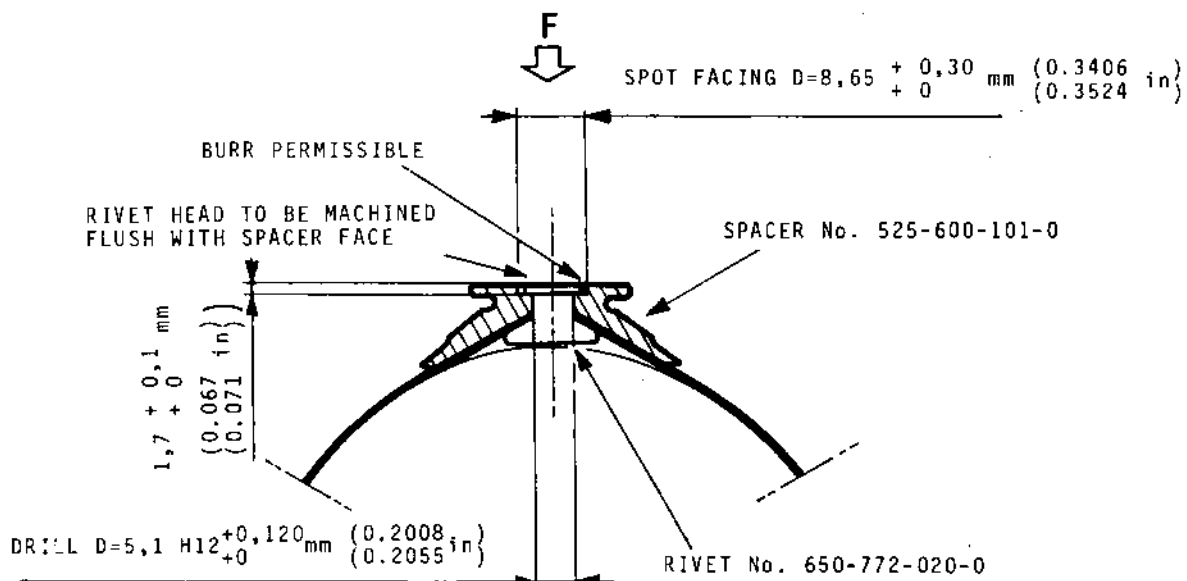


OLYMPUS 593

MK.610-14-28  
OVERHAUL

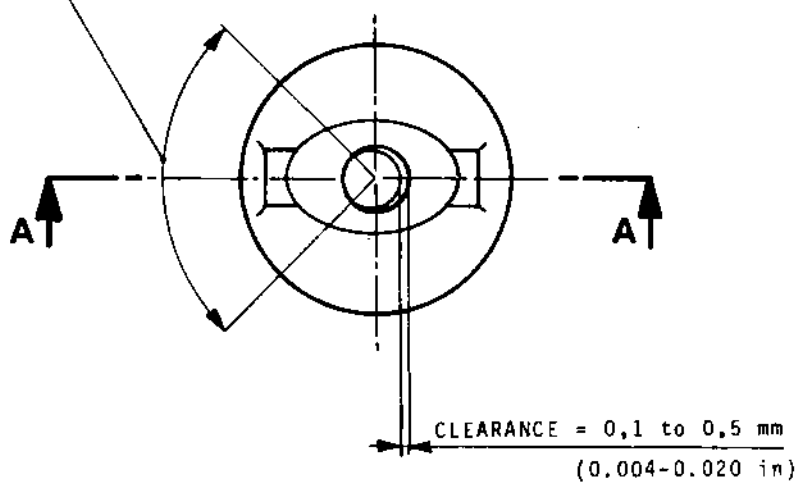


CROSS-SECTION A-A



MECHANICAL INTERFERENCE  
RIVET/SPACER ACCEPTABLE  
IF LIMITED TO ANGULAR  
SECTOR LOWER OR EQUAL TO 90°

F



Renewal of Spacers  
Figure 401

78-11-01

REP 5-10-2

Page 402

Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

ANTI-SCREECH LINER (5-10)

3. Liner patch weld repair

---

PARTS REQUIRED FOR REPAIR

---

Bare anti-screech liner No. 525-600-081-0 (4470 holes)  
or No. 525-600-033-0 (4700 holes)

Sheet metal P 3320, 1 mm (0.039 in) in thickness

Filler welding wire P 3020

Spacer No. 525-600-101-0

Rivet No. 525-203-162-0

---

CAUTION - TWO TYPES OF LINER ARE CURRENTLY AVAILABLE (4700 HOLES OR 4470 HOLES). AS A RESULT, MAKE SURE THAT SELECTED PATCHES ARE MATCHED WITH TYPE OF LINER CONCERNED.

A. Requirements concerning patch installation

These requirements are given in chapter 70-35-10.  
Furthermore, liner cutting must be done between two rows of holes.

NOTE - It is permissible to plug weld one (1) hole in each of the patch corner radius area.

B. Patch preparation

- (1) Patches must be cutted from sound metal portion of a scrapped liner or from a new liner or from a piece of sheet metal P 3320, 1 mm (0.039 in) thick, shaped to fit the contour of area to be patch repaired (refer to figure 401).
- (2) Shape of patches
  - (a) For minor deterioration close to an attaching hole, cut a circular patch, 35 mm (1.378 in) in diameter.
  - (b) For all other cases, shape to be given to patches must comply with requirements of chapter 70-35-10.

**78-11-01**

REP 5-10-3

Page 401

Dec 30/74



OLYMPUS 593

MK.610-14-28

OVERHAUL



C. Patch installation

- (1) Argon arc weld patches as per instructions of chapter 70-35-10.
  - Filler welding wire P 3020
  - Weld class B2
- (2) Inspect welds, class B2, according to the indications of chapter 70-35-80.
  - Water washable fluorescent penetrant inspect per process M 502 B, chapter 70-20-10.
  - Perform X-ray inspection per chapter 70-20-30.
- (3) Plane grind welds lightly.
- (4) Inspect welds for soundness using water washable fluorescent penetrant process M 502 B, chapter 70-20-10.
- (5) When patches made from sheet metal pieces are involved, the following operations may be required :
  - (a) At locations shown on figure 401, perform stamping, using tooling SC 139.
  - (b) Drill the air passage holes and attachment holes for spacers.
  - (c) Round off or blend edges of holes by smoothing edges lengthwise ; blend radius :  
0,5 mm (0.020 in).  
Finished surfaces obtained by smoothing hole edges lengthwise, must be free from radial tool marks.

D. Spacer installation (as applicable)

If required, locate and rivet one or several spacers in compliance with instructions given in repair scheme REP 5-10-2.

**78-11-01**

REP 5-10-3

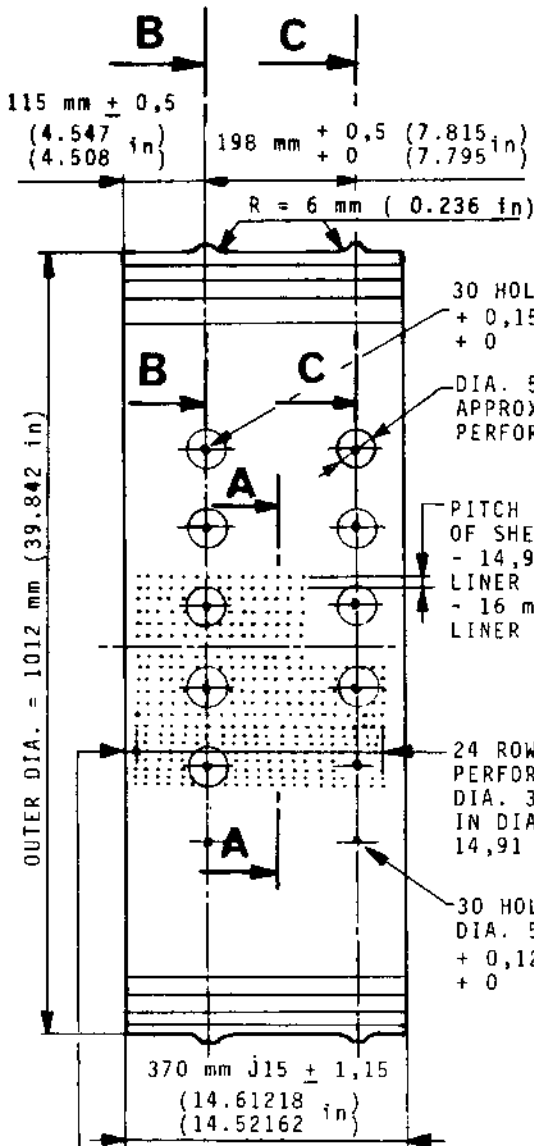
Page 402

Dec 30/74



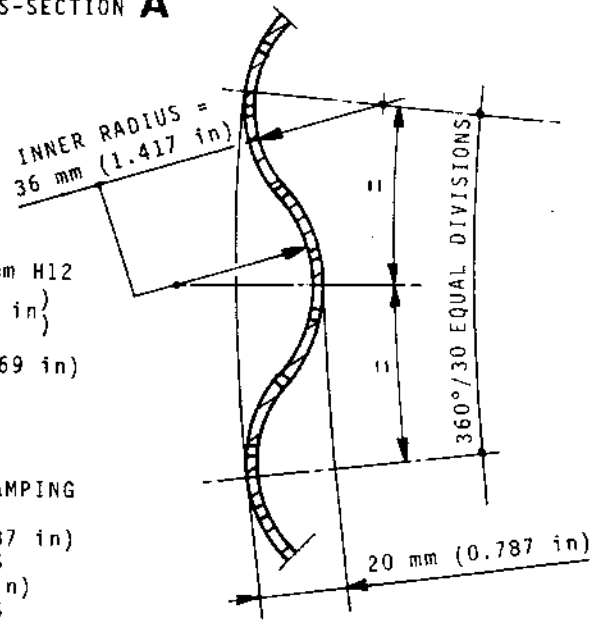
# OLYMPUS 593

MK.610-14-28  
OVERHAUL

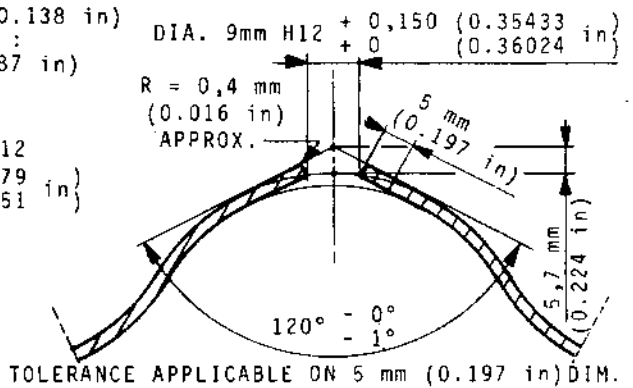


FIRST ROW OF PERFORATIONS AT 15 mm (0.591 in) FROM LINER FRONT EDGE

## CROSS-SECTION A

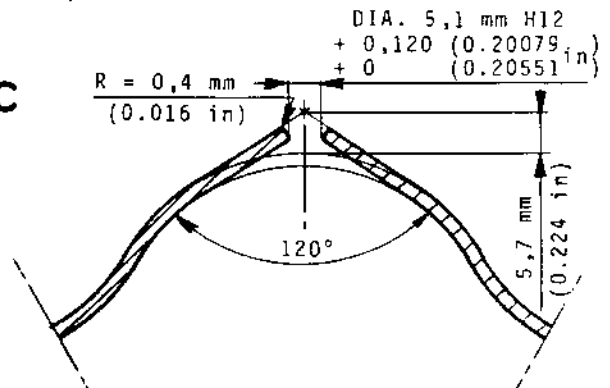


## CROSS-SECTION B



## CROSS-SECTION C

STAMPING



Anti screech liner patch repair  
Figure 401

78-11-01

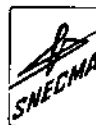
REP 5-10-3  
Pages 403/404  
Dec 30/74



OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

ANTI-SCREECH LINER (5-10)

4. Renewal of one or several liner corrugations

---

PARTS REQUIRED FOR REPAIR

---

Bare anti-screech liner No. 525-600-081-0 (4470 holes)  
or No. 525-600-033-0 (4700 holes)

Filler welding wire P 3020

Spacer No. 525-600-101-0

Rivet No. 525-203-162-0

---

CAUTION - TWO TYPES OF LINER ARE CURRENTLY AVAILABLE (ONE WITH 4700 HOLES, THE OTHER FEATURING 4470 HOLES). CONSEQUENTLY, MAKE SURE THAT CORRUGATIONS SEGMENTS USED FOR REPAIR ARE MATCHED WITH THE TYPE OF LINER CONCERNED.

A. Cutting of the liner deriorated corrugations.

Cut out of one or more corrugations, depending on how large is the deterioration, is to be made so as weld beads are equally spaced between to rows of holes.

B. Preparation of the patched corrugation segments.

The patched corrugations are cutted out from sound portion of a scrapped liner or from a new liner.

C. Installation of patched corrugations

(1) Argon arc weld corrugations in accordance with instructions of chapter 70-35-10.

- Filler welding wire P 3020
- Weld class B2

(2) Inspect welds, class B2, in accordance with instructions of chapter 70-35-80.

- water washable fluorescent penetrant inspection as per process M 502 B of chapter 70-20-10.
- x-ray inspection per chapter 70-20-30.

(3) Plane grind welds slightly

78-11-01

REP 5-10-4

Page 401

Dec 30/74



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (4) Inspect welds for soundness per water washable fluorescent penetrant process M 502 B, chapter 70-20-10.

D. Spacer installation

Locate and rivet one or more spacers, as specified in repair scheme REP 5-10-2:

**78-11-01**

REP 5-10-4

Page 402

Dec 30/74





OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

LUG (5-160)

1. Renewal of the floating anchor nut.

---

PARTS REQUIRED FOR REPAIR

---

Nut No. SIMONDS LA 579-4

Rivet No. BNAE 21215 TB 2408 (650-012-044-0)

or No. BNAE 21215 TB 3209 (650-012-075-0)

---

- A. Remove the nut retaining rivets by machining out head of rivets.
- B. Inspect rivet holes per instructions of chapter 70-50-10.
- C. As applicable, ream rivet holes to the next oversize diameter according to requirements indicated on figure 401 and in chapter 70-50-10.
- D. If necessary, install a new nut.  
Install the new rivets, selected from table I, in accordance with instructions of chapter 70-50-10 and figure 401.
- E. At completion of riveting, inspect rivets as per instructions of chapter 70-50-80.

**78-11-01**

REP 5-160-1

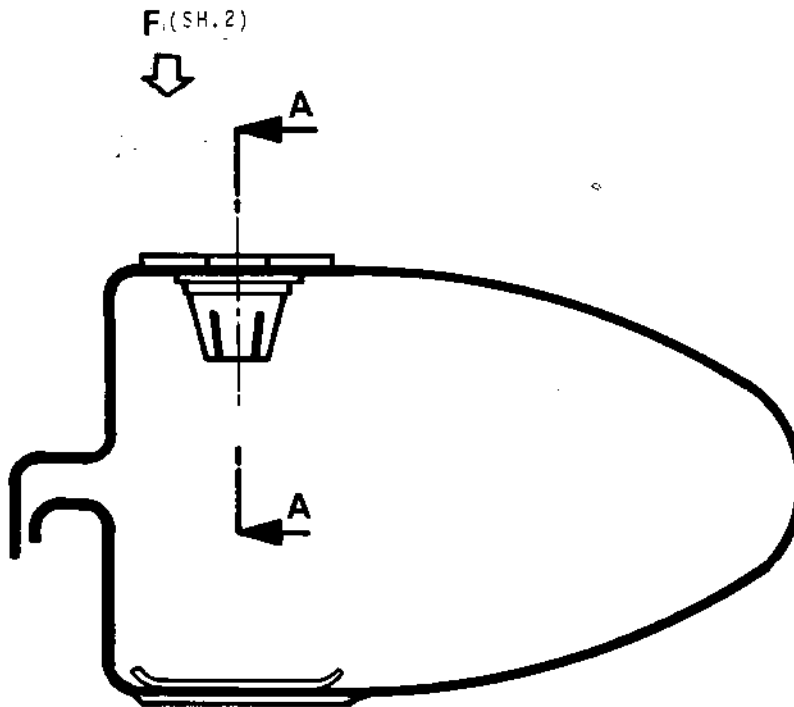
Page 401

Mar 31/78

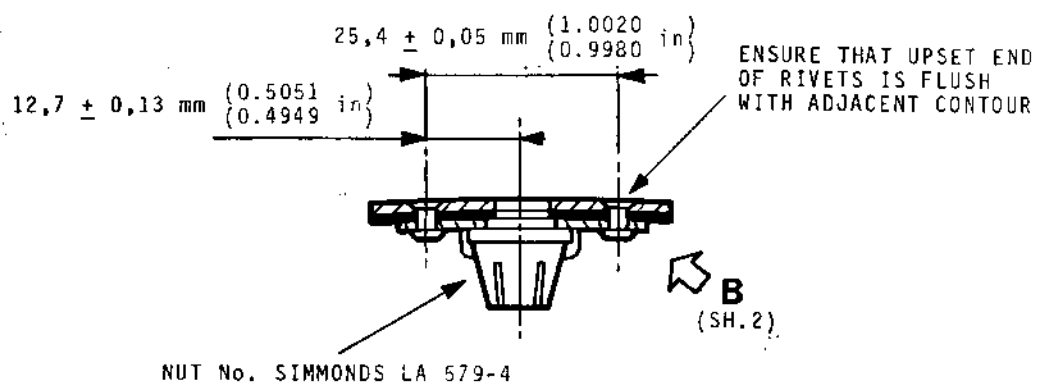


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CROSS-SECTION A-A



Renewal of Floating Anchor Nut  
Figure 401 - (Sheet 1 of 2)

78-11-01

REP 5-160-1

Page 402

Dec 15/75



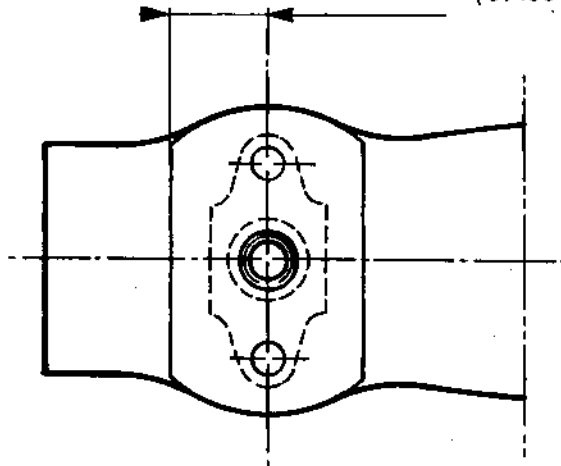
OLYMPUS 593

MK.610-14-28  
OVERHAUL



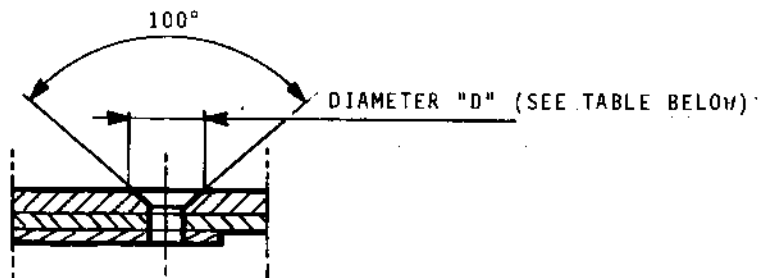
**F**

$13 \pm 0,6 \text{ mm}$   $\left( \begin{matrix} 0.535 \\ 0.488 \end{matrix} \text{ in} \right)$



**B**

(RIVET NOT SHOWN)



RIVET								LUG
Part No.	Diameter		Length		Material	Head		Diameter "D"
	mm	(in)	mm	(in)		Shape		
21215 TB 2408	2,4	(0.094)	8	(0.315)	NU 30	U		$4,8^{+0,4}_{+0} \text{ mm}$ $\left( \begin{matrix} 0.189 \\ 0.205 \end{matrix} \text{ in} \right)$
21215 TB 3209	3,2	(0.126)	9	(0.354)	NU 30	U		$5,6^{+0,4}_{+0} \text{ mm}$ $\left( \begin{matrix} 0.220 \\ 0.236 \end{matrix} \text{ in} \right)$

Renewal of Floating Anchor Nut  
Figure 401 - (Sheet 2 of 2)

**78-11-01**

REP 5-160-1  
Pages 403/404  
Mar 31/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

REHEAT DUCT (5-240)

1. Re-shaping of the duct central liner

---

PARTS REQUIRED FOR REPAIR

---

A. Re-shaping

Using a mallet, re-shape the duct central liner at room ambient temperature, blending it with adjacent contour.

B. Inspection for soundness

Perform water washable fluorescent penetrant inspection per process M 502 B, chapter 70-20-10.

If cracks are present, refer to chapter Inspection of Manual.

**78-11-01**

REP 5-240-1  
Pages 401/402  
Dec 30/74



OLYMPUS 593

MK.610-14-28

OVERHAUL

REPAIR



REHEAT DUCT (5-240)

2. Crack Filler Welding

---

PARTS REQUIRED FOR REPAIR

---

Filler welding wire P 3020 (KC 20 WNx)

---

CAUTION : COMPLIANCE WITH THE WELDING REQUIREMENTS GIVEN IN  
THIS REPAIR IS ESSENTIAL  
NO DEVIATION FROM THESE REQUIREMENTS IS ALLOWED.

A. Introduction.

This repair scheme applies when the following damage are present :

- Cracks affecting assembly weld seams (welded joints) of flanges, bosses and liners.
- Cracks emanating from a weld seam or from a hole edge and progressing through sheet metal of liners provided they do not feature ramifications and are not located within a burnt area.

B. Weld-Filling the Cracks.

- (1) Fill weld cracks as instructed in chapter 70-35-10.

NOTE : If crack originates from a hole, plug weld the hole in the same conditions as for the cracks, then drill hole again as specified on Figure 401 of repair scheme REP 5-240-3.

CAUTION : COMPLY WITH THE WELDING REQUIREMENTS BELOW :

1. FILL WELD CRACK AS PER CHAPTER 70-35-10 PARA. 5.A.(3).
2. ARGON ARC WELD, CLASS B2.
3. FILLER WELDING WIRE P 3020, DIA. 1, 2 MM (0.047 IN.)  $\pm$  30 %.

**78-11-01**

REP 5-240-2

Page 401

Jun 30/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



C. Inspection of Welds.

(1) Inspect welds, class B2, as per chapter 70-35-80.

- water washable fluorescent penetrant inspect per process M 502 B, chapter 70-20-10.
- X-ray inspect per chapter 70-20-30.

CAUTION : FOR WELD INSPECTION, COMPLY WITH THE FOLLOWING REQUIREMENTS :

1. ACCEPTANCE CRITERIA FOR VISUAL EXAMINATION AND DYE PENETRANT TEST AS PER CHAPTER 70-35-80.
2. ACCEPTANCE CRITERIA FOR X-RAY EXAMINATIONS AS PER 70-35-80.

3. X-RAY INSPECTION TECHNICAL DATA :

FILM : KODAK M

SOURCE TO FILM DISTANCE : 600 MM (23.622 IN.)

FILTER OR SCREEN : NONE

POSITIONING ANGLE : 10°

FILM DENSITY ON WELD : 2.1

SENSITIVITY : 2.6 %

I.Q.I. : GAUGE IN NC20 MATERIAL ;  
0,04 MM (0.0016 IN.) DIA WIRE

PRINTED IN FRANCE

78-11-01

REP 5-240-2

Page 402

Jun 30/78

**OLYMPUS 593****MK. 610-14-28****OVERHAUL****REPAIR****sneema****REHEAT DUCT (5-240)****3. Duct Patch Weld Repair.**

---

**PARTS REQUIRED FOR REPAIR**

---

Front reinforcement band N°. 301-174-200-0  
Liner N°. 525-600-194-0  
Identification plate N°. 301-178-100-0  
Identification plate N°. 525-400-084-0  
Rivet N°. BNAE 21217 TC 2407 (650-025-043-0)  
Rivet N°. BNAE 21217 TC 3207 (650-025-073-0)  
Sheet metal P 3320, thickness 1,5 mm (0.591 in.)  
Filler welding wire P 3020 (KC 20 WNx)

---

**CAUTION:** COMPLIANCE WITH THE WELDING REQUIREMENTS GIVEN IN THIS REPAIR IS ESSENTIAL. NO DEVIATION FROM THESE REQUIREMENTS IS ALLOWED.

**A. Requirements for Patch Installation.**

These requirements are given in chapter 70-35-10.

**NOTE:** If a patch is to be installed somewhere around strengthened areas adjacent to front and area duct flanges, and only in this circumstance, the welding of the subject patch may interfere with the existing flange/duct liner welded joint.

**B. Patch preparation.**

- (1) Patches prepared for repair of the duct strengthened areas (refer to Figure 401) must be cutted out from new liners or from sound portions of a scrapped reheat duct.
- (2) Patches to be used for repair of duct areas with constant thickness, must be cutted out from sheet metal P 3320, 1,5 mm (0.591 in.) in thickness, or from sound portion of a scrapped reheat duct.
- (3) Patch dimensions will be a function of damage to repair. However, their shape must comply with requirements of chapter 70-35-10.

**C. Patch Installation****78-11-01**

REP 5-240-3

Page 401

Jun 30/97



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (1) Argon arc weld patches as per instructions of chapters 70-35-10.

CAUTION : COMPLY WITH THE WELDING REQUIREMENTS BELOW :

1. TACK-WELD THE PATCH THROUGH ONE THIRD OF MATERIAL THICKNESS, WITHOUT USING FILLER METAL (PITCH : 10 MM APPROX.) (0.39 IN.).
  2. ARGON ARC WELD, CLASS B2.
  3. FILLER WELDING WIRE P3020, DIA 1,2 MM (0.047 IN.)  $\pm$  30 %.
- (2) Inspect welds, class B2, in accordance with chapter 70-35-80.

- Water washable fluorescent penetrant inspect per process M 502 B, chapter 70-20-10.
- X-ray inspect per chapter 70-20-30.

CAUTION : FOR WELD INSPECTION, COMPLY WITH THE FOLLOWING REQUIREMENTS :

1. ACCEPTANCE CRITERIA FOR VISUAL EXAMINATION AND DYE PENETRANT TEST AS PER CHAPTER 70-35-80.
  2. ACCEPTANCE CRITERIA FOR X-RAY EXAMINATION AS PER 70-35-80
  3. X-RAY INSPECTION TECHNICAL DATA :
    - FILM : KODAK M
    - SOURCE TO FILM DISTANCE : 600 MM (23.622 IN.)
    - FILTER OR SCREEN : NONE
    - POSITIONING ANGLE : 10°
    - FILM DENSITY ON WELD : 2.1
    - SENSITIVITY : 2.6 %
    - I.Q.I. : GAUGE IN NC 20 MATERIAL ;  
0,04 MM (0.0016 IN.) DIA. WIRE.
- (3) If required, machine the reheat duct to requirements shown on Figure 401 and according to the following instructions.
- (a) Transfer drill attachment holes for the anti-screch liner or the deflector halves.

78-11-01

REP 5-240-3

Page 402

Jun 30/78





OLYMPUS 593

MK.610-14-28

OVERHAUL



NOTE : Working lengthwise, radius edges of holes to 0,5 mm (0.020 in.).

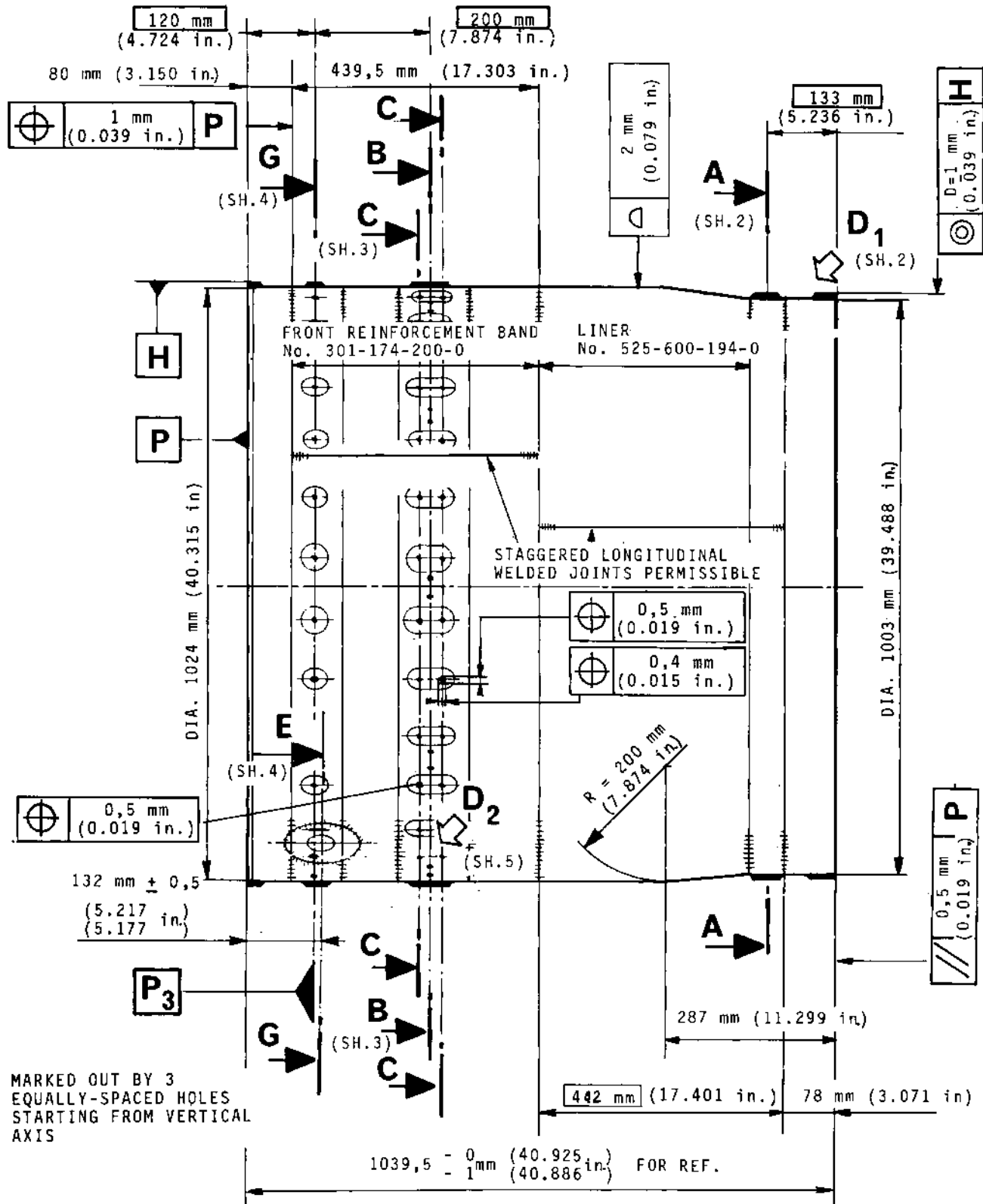
- (b) Using a fly press, flatten the anti-screech liner's attachment areas.
- (c) Rivet the identification plate in accordance with the instructions given in chapter 70-30-10 and requirements shown on Figure 401; then check the riveting as per chapter 70-50-80 and Figure 401.
- (4) Perform dimensional check of the reheat duct as indicated on Figure 401..



OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN FRANCE

78-11-01

REP 5-240-3

Page 404

Jun 30/78

## Jun 30/78



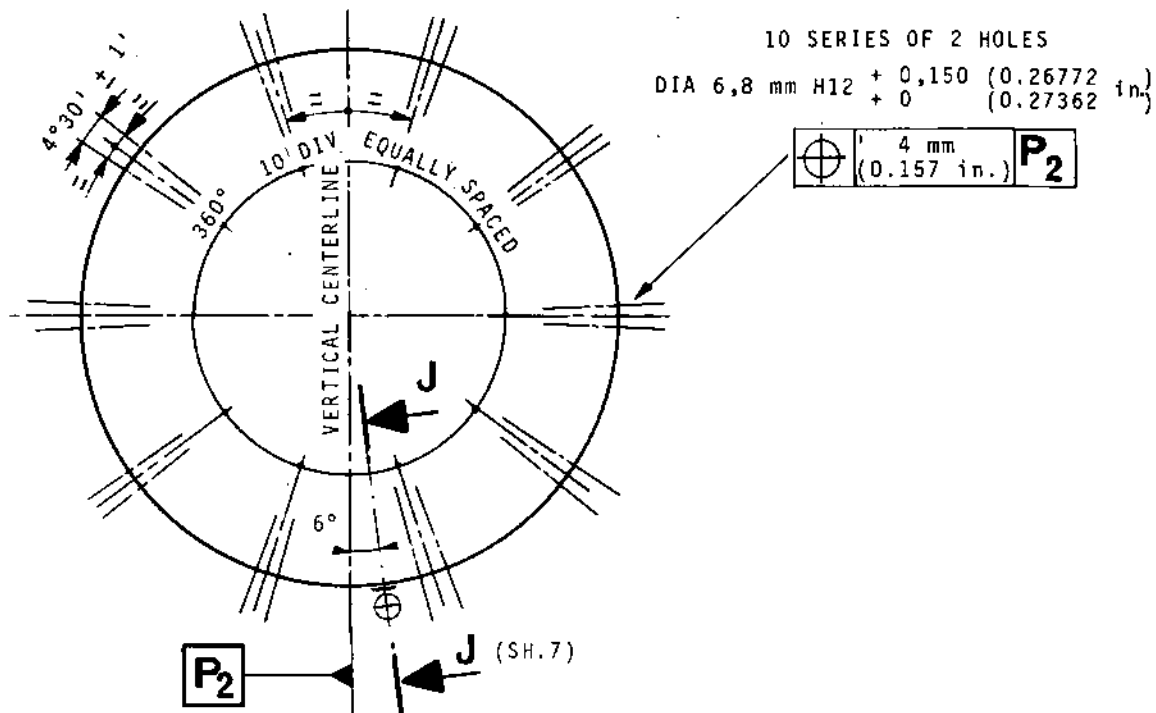
OLYMPUS 593

MK.610-14-28

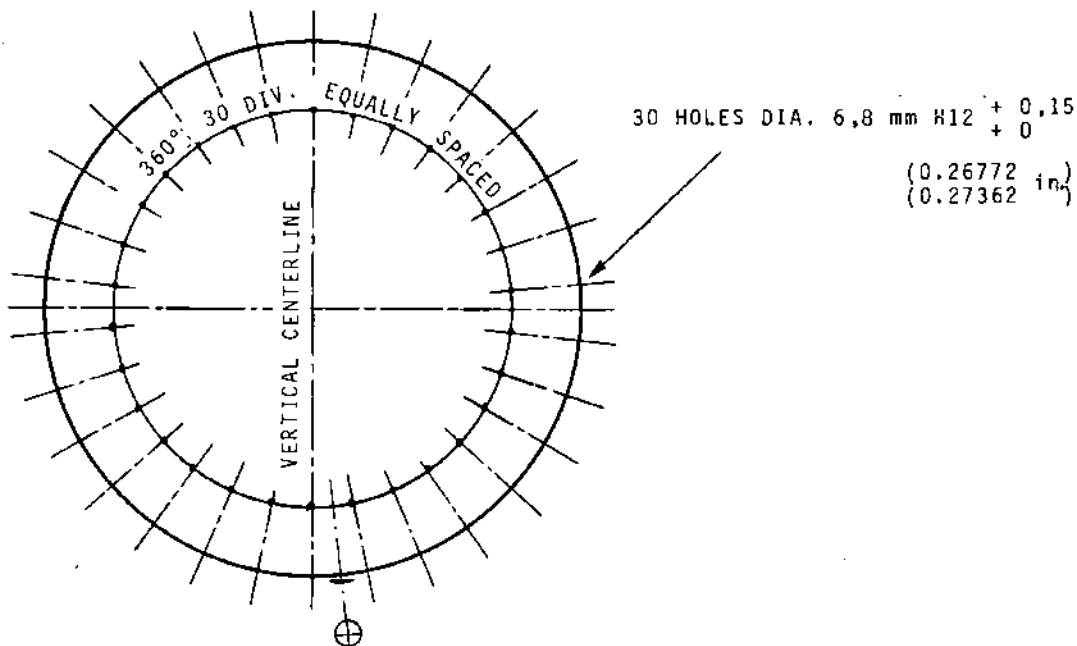
OVERHAUL



SCHEMATIC CROSS-SECTION B-B



SCHEMATIC CROSS-SECTION C-C



Patching

Figure 401 - (Sheet 3 of 8)

78-11-01

REP 5-240-3

Page 406

Jun 30/78

PRINTED IN FRANCE

PRINTED IN FRANCE

PRINTED IN FRANCE



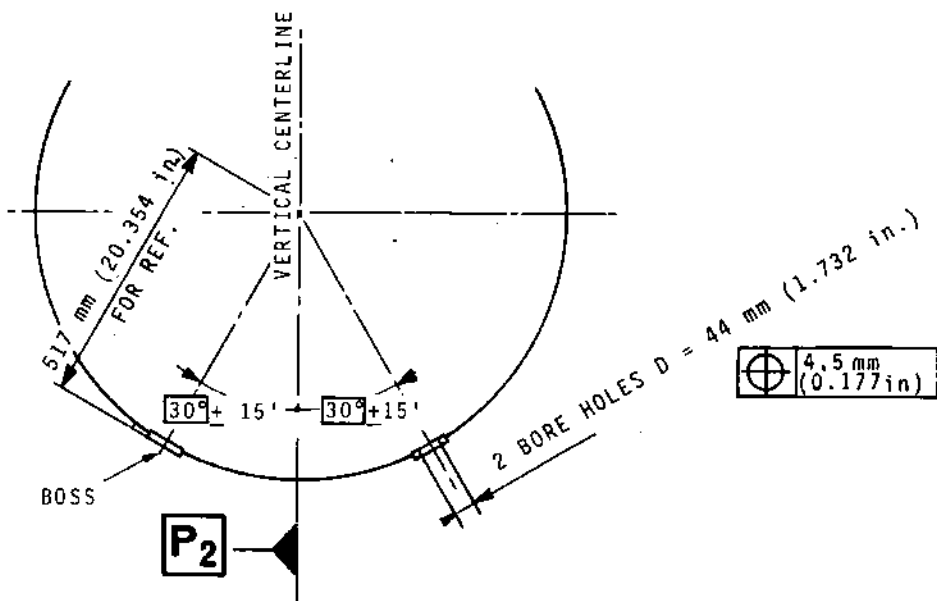
OLYMPUS 593

MK.610-14-28

OVERHAUL

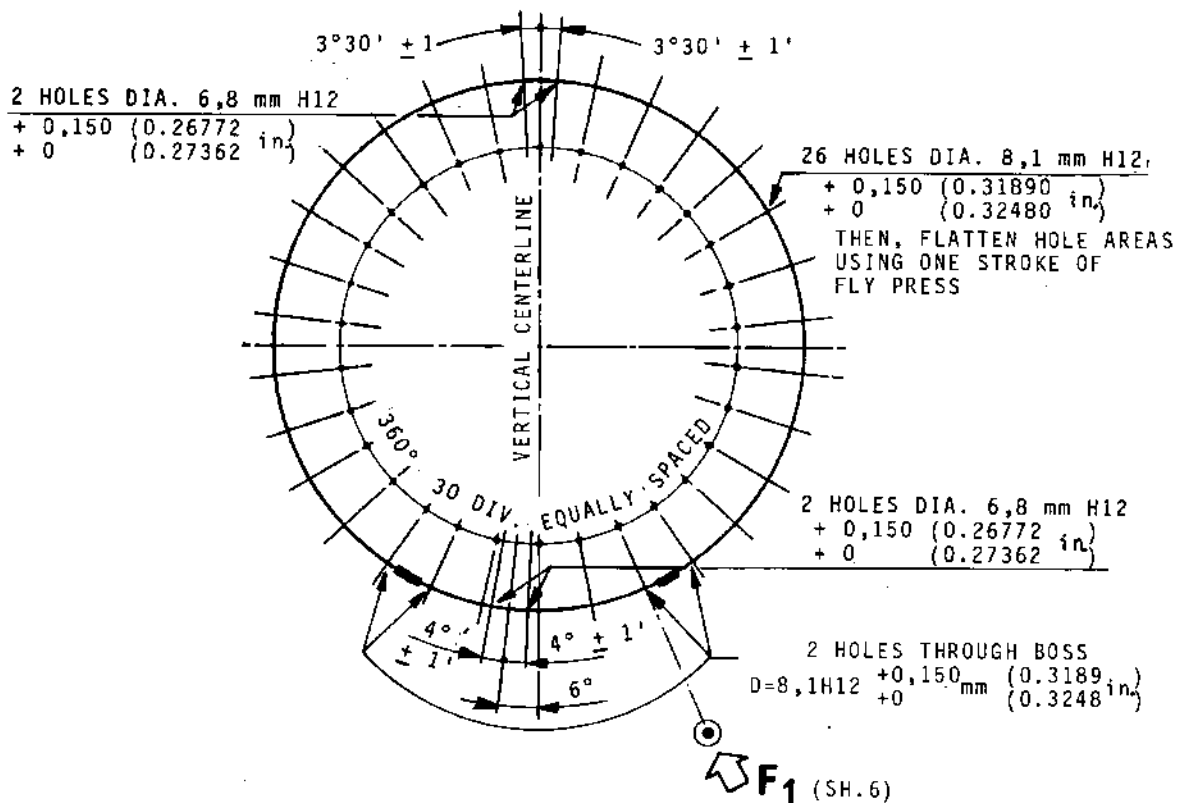


SCHEMATIC CROSS-SECTION E-E



PRINTED IN FRANCE

SCHEMATIC CROSS-SECTION G-G



Patching  
Figure 401 - (Sheet 4 of 8)

78-11-01

REP 5-240-3

Page 407

Jun 30/78



OLYMPUS 593

MK.610-14-28

OVERHAUL

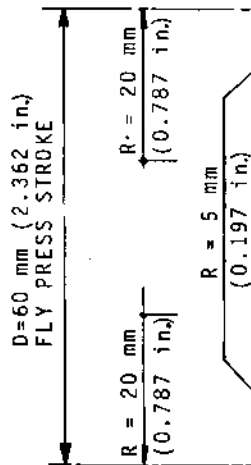


1,8 - 0  
- 0,2 mm (0.071 in.)  
(0.063 in.)

STRICT MINIMUM DIM.

D<sub>2</sub>

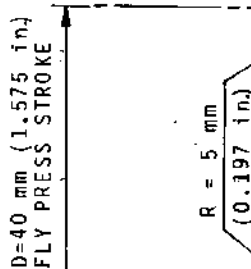
2,5 ± 0,15 mm (0.1043 in.)  
(0.0925 in.)



INTERNAL  
PROFILE

1,6 - 0  
- 0,2 mm (0.063 in.)  
(0.055 in.)

STRICT MINIMUM DIM.



1,8 - 0  
- 0,2 mm (0.071 in.)  
(0.063 in.)

35 mm  
(1.378 in.)

100 mm (3.937 in.)

K  
(SH.6)

182,5 mm (7.185 in.)

115 mm (4.528 in.)  
FOR REF.

75 mm (2.953 in.)

Patching

Figure 401 - (Sheet 5 of 8)

78-11-01

REP 5-240-3

Page 408

Jun 30/78

PRINTED IN FRANCE

PRINTED IN FRANCE

PRINTED IN FRANCE

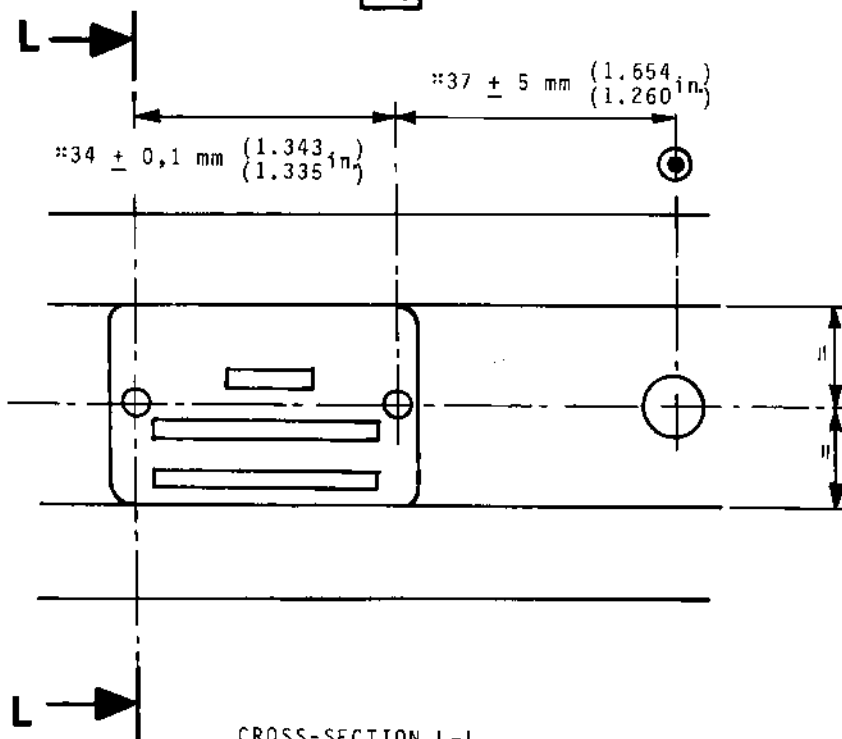


CROSS-SECTION K-K

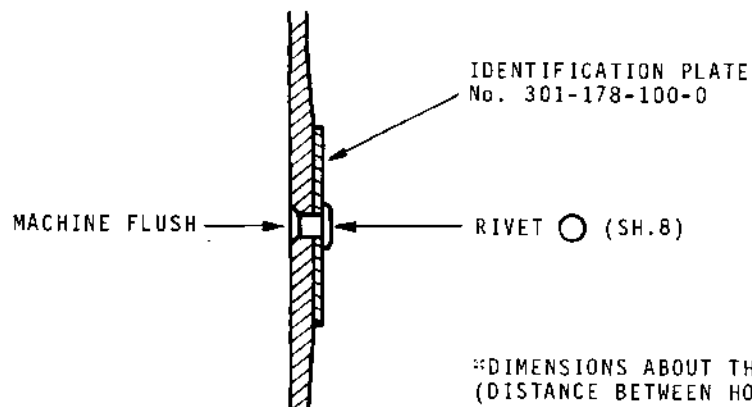
D=40 mm (1.575 in.)  
FLY PRESS STROKE

R=5 mm (0.197 in.)

F<sub>1</sub>



CROSS-SECTION L-L



\*DIMENSIONS ABOUT THE GENERATRIX  
(DISTANCE BETWEEN HOLE CENTERS)

Patching  
Figure 401 - (Sheet 6 of 8)

78-11-01

REP 5-240-3

Page 409

Jun 30/78

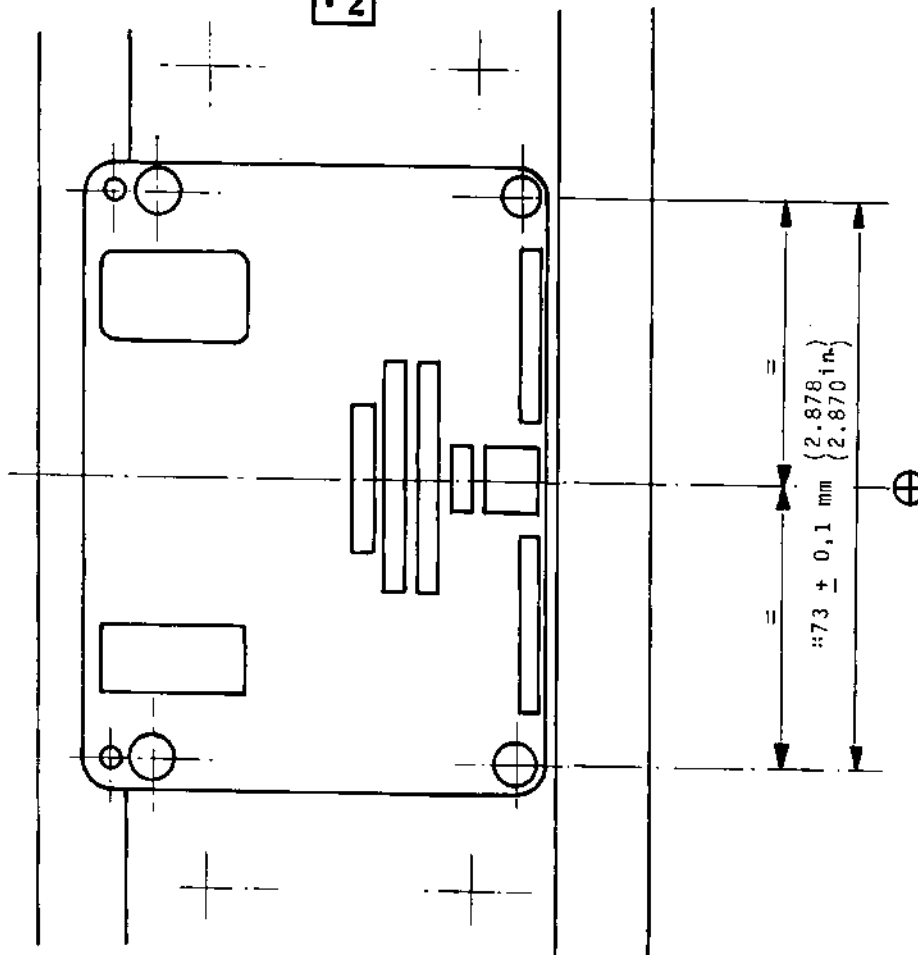


OLYMPUS 593

MK.610-14-28  
OVERHAUL

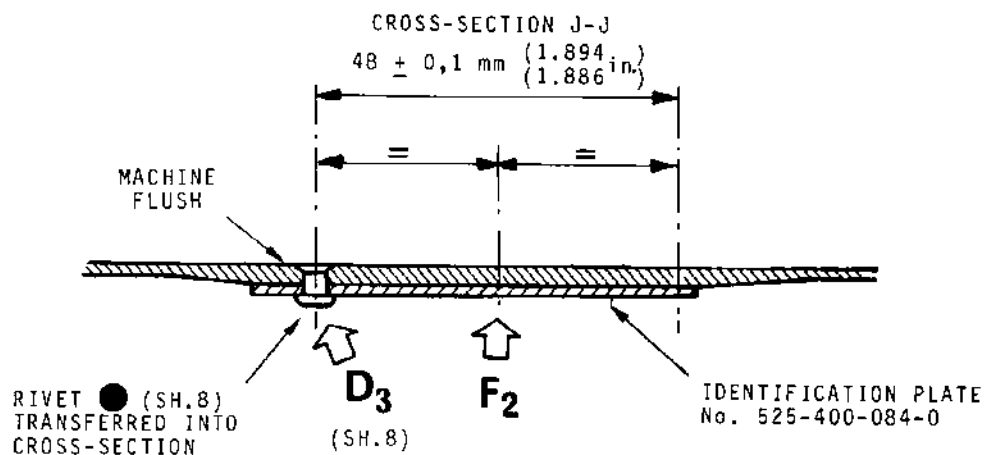


F<sub>2</sub>



PRINTED IN FRANCE

\*DIMENSION ABOUT THE GENERATRIX  
(DISTANCE BETWEEN HOLE CENTERS)



Patching  
Figure 401 - (Sheet 7 of 8)

78-11-01

REP 5-240-3

Page 410

Jun 30/78



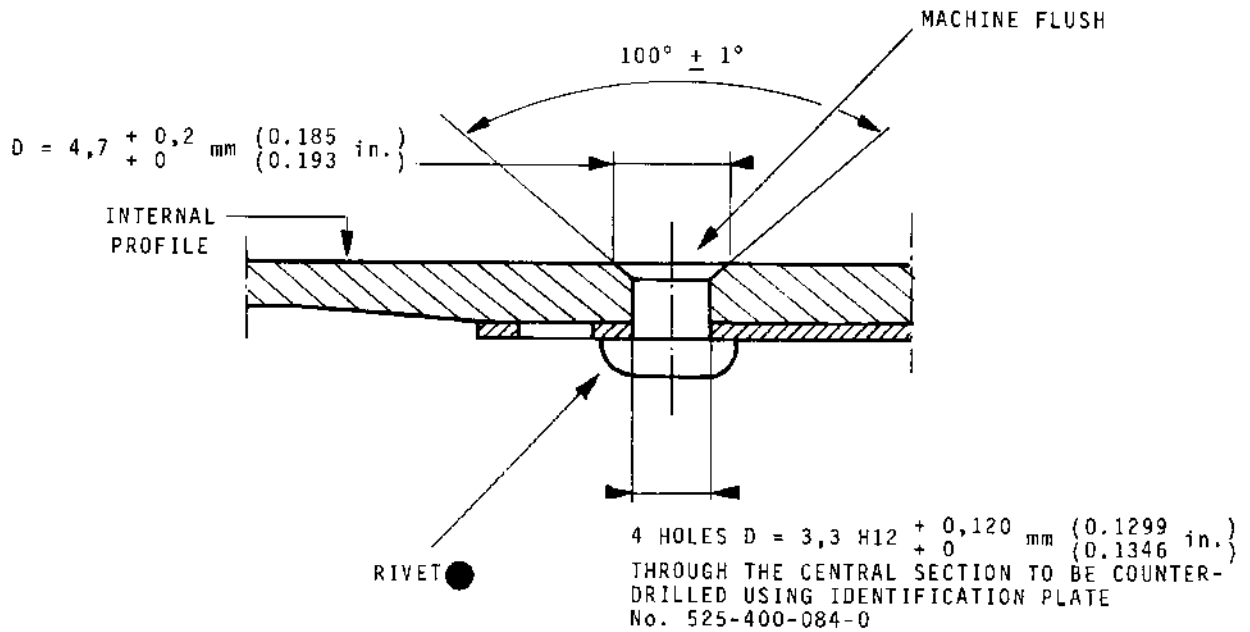


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE



PRINTED IN FRANCE

Rivet Data					
Description	Diameter mm (in)	Length mm (in)	Material	Head Shape	Assembly Symbol
21217 TC 2407	2,4 (0.094)	7 (0.276)	NC 25 Fe	F 100	○
21217 TC 3207	3,2 (0.126)	7 (0.276)	NC 25 Fe	F 100	●

Patching  
Figure 401 - (Sheet 8 of 8)

78-11-01

REP 5-240-3  
Pages 411/412  
Jun 30/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

REHEAT DUCT (5-240)

4. Reconditioning the Front and Rear Flanges Outer Contact Surfaces through Metal Spraying (Metallizing).

---

PARTS REQUIRED FOR REPAIR

---

Cobalt alloy powder (fine)	P 3205
Nickel/Aluminium powder	P 3203

---

A. General.

- (1) Depending on the extent of the defect, it may be necessary to apply an undercoat before spraying of the final coat.

The total thickness of the coating must not exceed 1,3 mm (0.052 in.).

- (2) If the part has already been reconditioned through metal spraying, remove metallization as instructed under para. B.

B. Removing the deteriorated metallization.

- (1) Remove the damaged metallization by abrasive blasting according to method M 103 A in Chapter 70-15-20 "CLEANING AND REMOVAL OF COATINGS".

NOTE : Omit the degreasing operation. Protect the surfaces surrounding the area to be abrasive blasted using metal shields.

C. Dimensionally inspect the area to be metal sprayed

NOTE : This operation is required only if the outer contact surface was previously metallized.

- (1) Measure and record the average diameter of the flange outer contact surface.  
This check allows to determine the thickness of metal spraying required.
- (2) Checking method (Ref. Fig. 401).

78-11-01

REP 5-240-4

Page 401

Sep 30/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



CAUTION : A 10°C TEMPERATURE VARIATION RESULTS A  
0,13 MM (0.00512 IN.) LINEAR CHANGE ON THE  
FLANGE DIAMETER.

The average diameter of the spherical contact surface of the flanges is found by working out the arithmetical mean of the 18 values recorded in the plane P1.

Perform these measurements as follows :

- (a) On the external surface of the flange, mark 18 generatrices equally distributed on the flange half-circumference.

CAUTION : IN ANY CASE, MARKING MUST NOT IMPAIR THE SURFACE CONDITION OF THE SPHERICAL CONTACT SURFACE.

- (b) Using the resizing tool SC 118, restore the roundness of the flange.
- (c) Calibrate the TESA UNIMASTER gage (TESA - S.A. 1020. RENENS - VD/Switzerland - Agent in France : SYNERGIE, 29 avenue Philippe Auguste - 75540 PARIS CEDEX 11 - Tel: 44-93-10-00

Fit the gage with :

- 1 the extension tubes required for obtaining the dimension to be checked
  - 2 the supports - correctly adjusted - to ascertain the measuring plane.
- (d) Rest the gage supports on to the flange edge and measure.
- (e) Repeat this operation in line with the 18 marks.

D. Metallizing the flange outer contact surface

- (1) Prepare the area to be metal sprayed as instructed in Chapter 70-65-20 "SPRAYING OF COATINGS USING A PLASMA TORCH".

NOTE : Perform dry abrasive blasting using corundum 160 (P 137) at a pressure of 3,5 bars (51 psi).

78-11-01

REP 5-240-4

Page 402

Apr 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Carry the metal spraying as instructed in Chapter 70-65-20 "SPRAYING OF COATINGS USING A PLASMA TORCH" in compliance with the requirements shown on Figure 402 and the following additional instructions :

- (a) Spraying of an undercoat, if applicable :  
Nickel/aluminium powder P 3203  
Maximum coat thickness 1 mm (0.039 in.)
- (b) Spraying of final coating :  
Cobalt alloy powder material P 3205  
Maximum coat thickness 0,3 mm (0.012 in.)

NOTE : Carefully blend out the metal coating at one end by thinning out the metallization as shown on Figure 402.

- (3) If required, smooth the surface discontinuities by sanding with an emery cloth.

#### E. Inspection

- (1) Inspect the metallization as specified in Chapter 70-65-80 "INSPECTION OF COATINGS".
- (2) Dimensionally inspect the flange outer contact surface as indicated in Figure 402.  
The inspection method is similar to that defined under para C. (2).

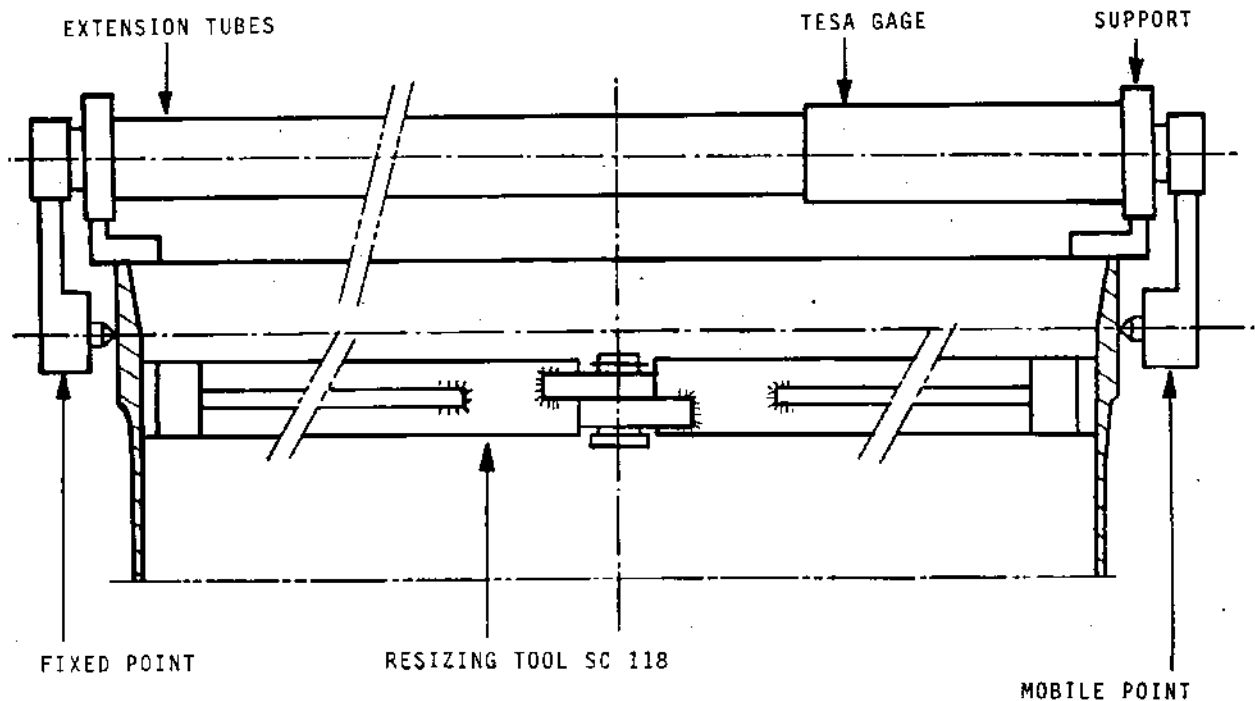
#### F. Marking

- (1) Following the part number, mark "REP 4" as per method M 28 of Chapter 70-10-10 "METHODS OF MARKING".



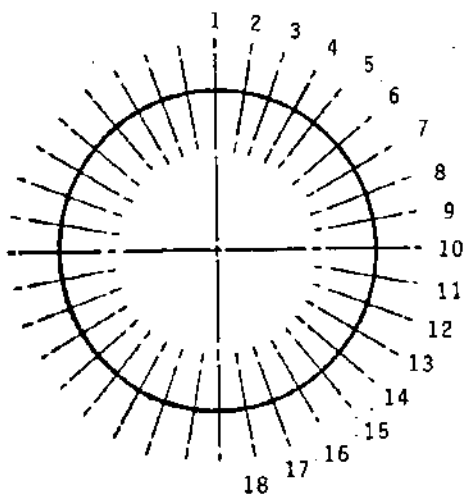
OLYMPUS 593

MK.610-14-28  
OVERHAUL



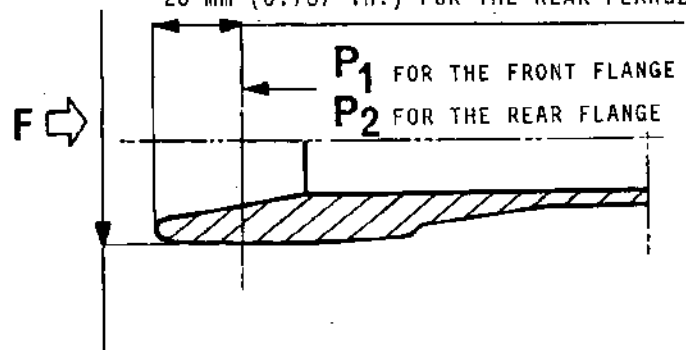
**F**

SCHEMATIC VIEW



17,5 mm (0.689 in.) FOR THE FRONT FLANGE

20 mm (0.787 in.) FOR THE REAR FLANGE



D = AVERAGE DIA. OF THE SPHERICAL CONTACT SURFACE

Checking the Front Flange Inner Average Diameter  
Figure 401

**78-11-01**

REP 5-240-4

Page 404

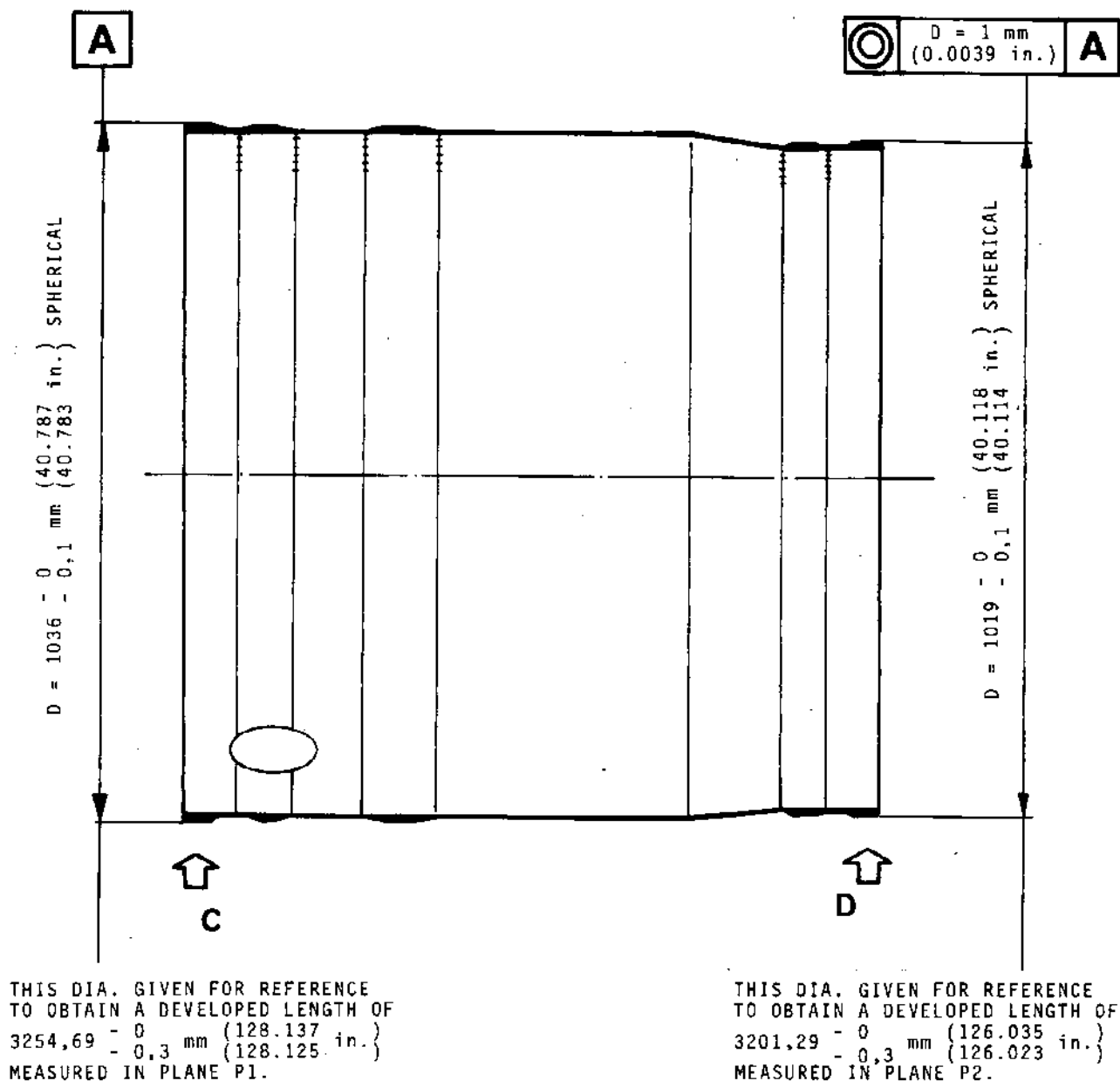
Sep 30/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



Metallizing the Front and Rear Flanges  
Outer Contact Surfaces.  
Figure 402 (Sheet 1 of 2)

78-11-01

REP 5-240-4

Page 405

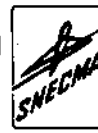
Sep 30/78



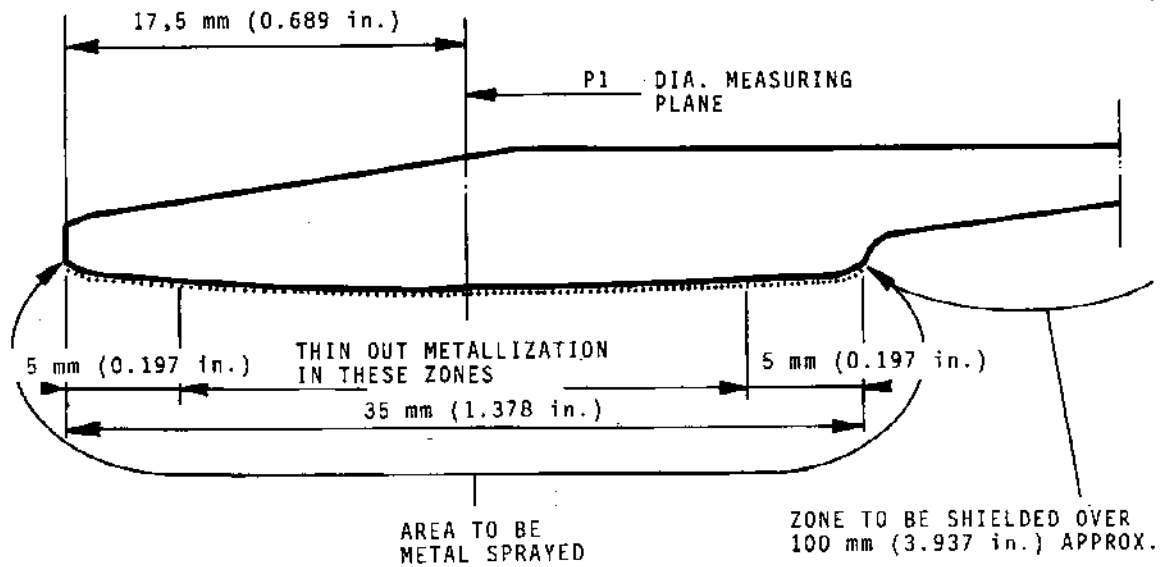
OLYMPUS 593

MK.610-14-28

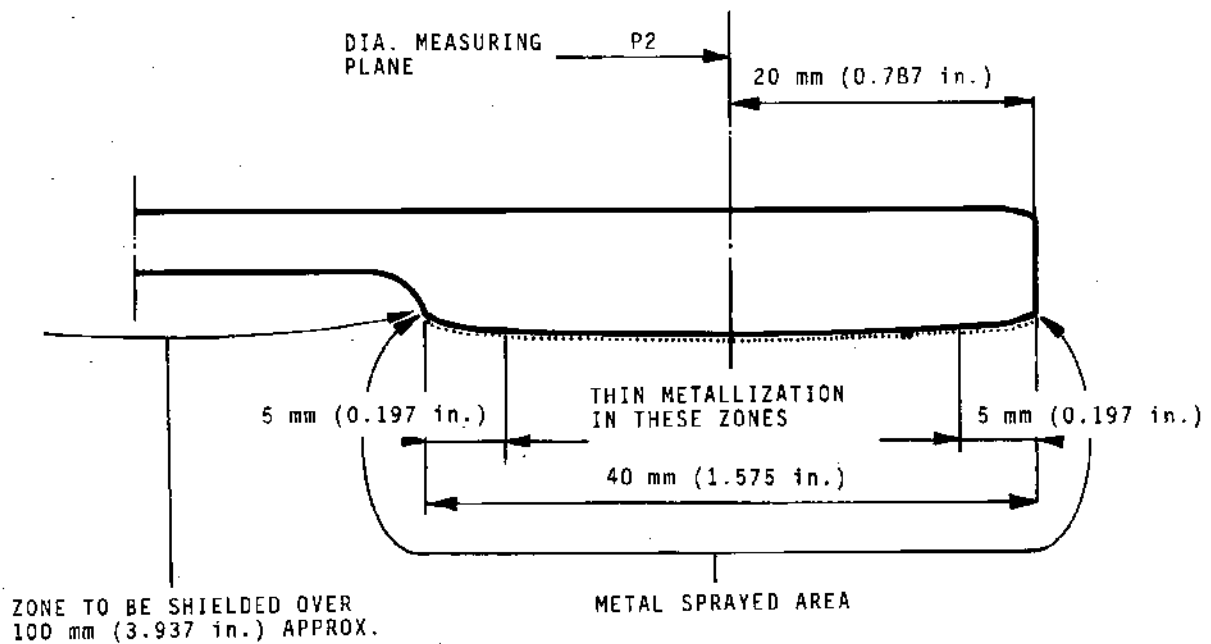
OVERHAUL



C



D



Metallizing the Front and Rear Flanges  
Outer Contact Surfaces.  
Figure 402 (Sheet 2 of 2)

78-11-01

REP 5-240-4

Page 406

Sep 30/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

REHEAT DUCT (5-240)

5. Reconditioning Tapped Holes in Bosses through Bush Installation

---

PARTS REQUIRED FOR REPAIR

---

Stock bar P 3623 (KC 20 WNx)  
Weld filler wire P 3020 (KC 20 WNx)

---

A. Machining

- (1) Drill, spot-face and tap the defective tappings as instructed in Figure 401.
- (2) Machine the required bushes from stock bar P 3020, as indicated in Figure 402.

B. Installing the bushes

- (1) Locate the bushes after having their external screw thread lightly coated with lanolin (P 194).
- (2) Using a drill, produce two diametrically opposed indentations as specified in Figure 401, sheet 2 of 2.
- (3) Argon-arc plug weld the above indentations as instructed in Chapter 70-35-10.
  - (a) Filler welding wire P 3020
  - (b) Weld class B1
- (4) Inspect the welds, class B1, as instructed in Chapter 70-35-80.
  - (a) Water washable fluorescent penetrant inspect as per method M 502 B in Chapter 70-20-10.
- (5) Grind the weld points and the bush faces flush with the boss surface (inner and outer).

PRINTED IN FRANCE





OLYMPUS 593

MK.610-14-28

OVERHAUL



(6) Bring the bush tapping to size if required.

C. Inspection

(1) Dimensionally inspect the reconditioned boss.

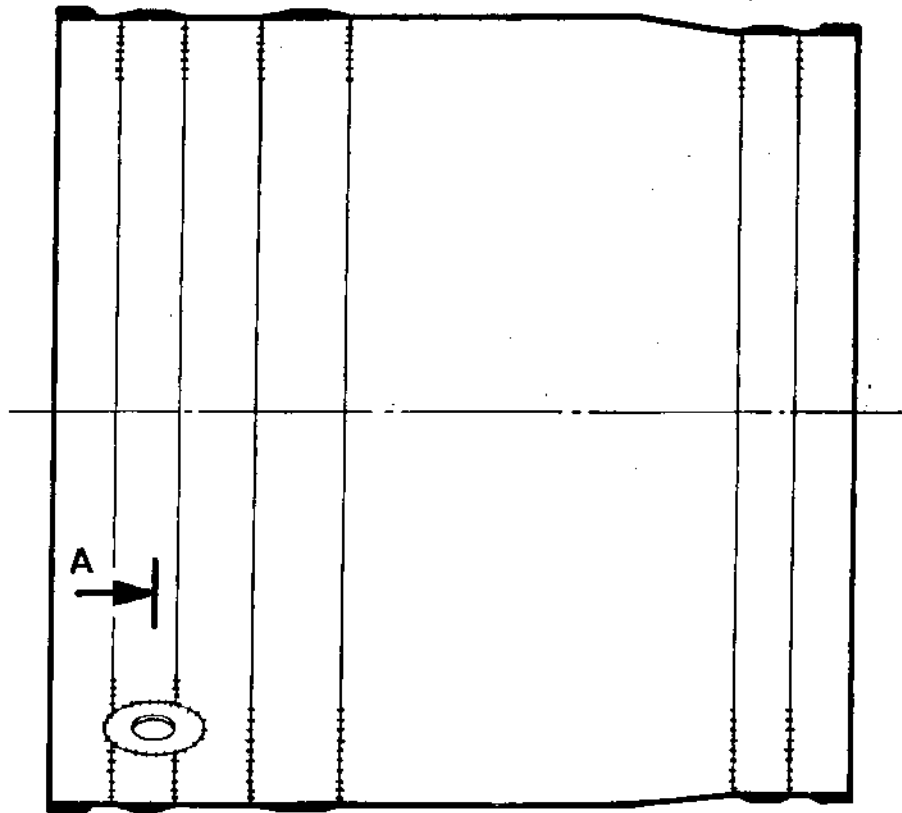
D. Marking

(1) Following the part item number, mark "REP 5" as instructed in Method M 28 of Chapter 70-10-10.

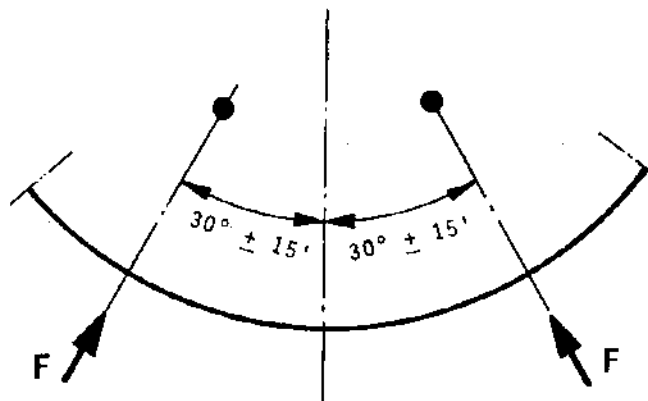


OLYMPUS 593

MK.610-14-28  
OVERHAUL



SECTION AA (SCHEMATIC)



Installing Bushes in Tapped Holes of Bosses  
Figure 401 (Sheet 1 of 2)

78-11-01

REP 5-240-5

Page 403

Sep 30/78



OLYMPUS 593

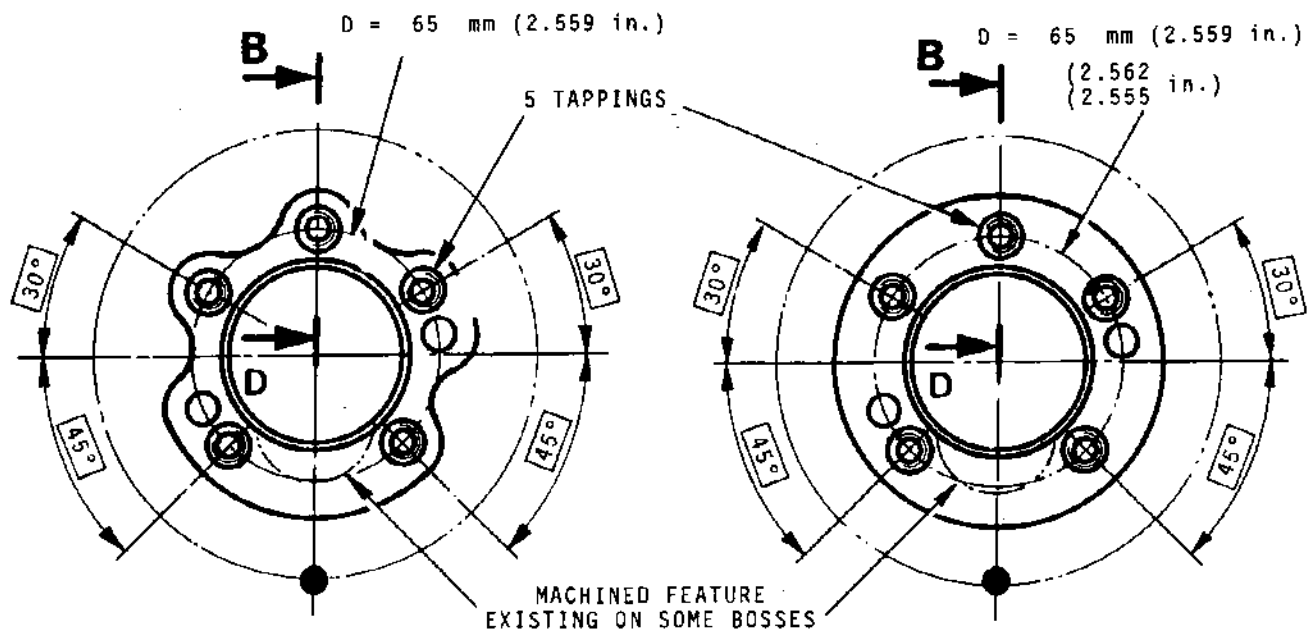
MK.610-14-28

OVERHAUL

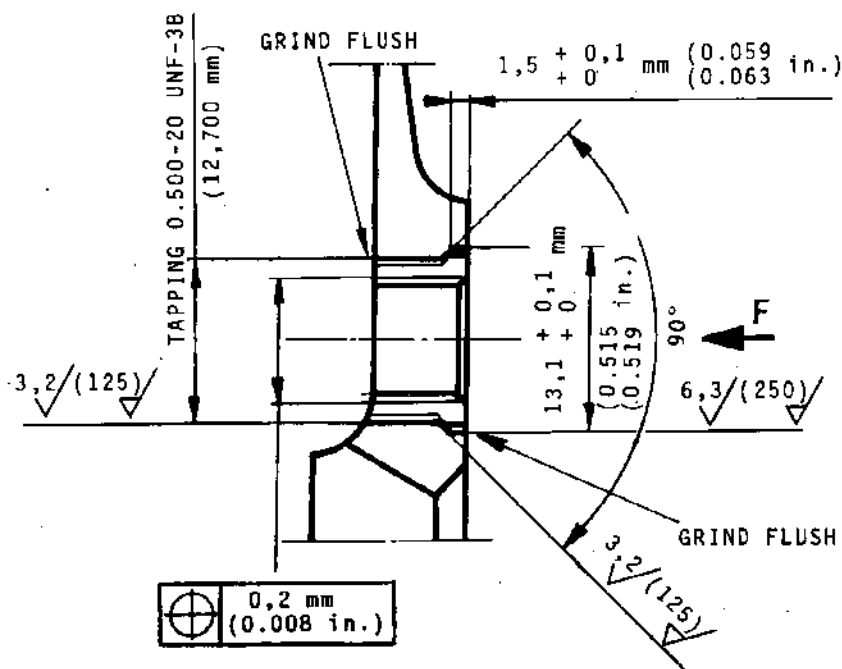


**F**

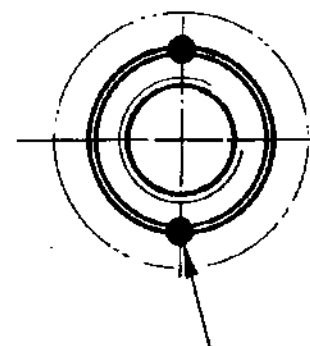
TWO SHAPES OF BOSS POSSIBLE



SECTION DD



**F<sub>1</sub>**



LOCK BUSH IN PLACE  
BY 2 PLUG WELDS  
DIAMETRICALLY OPPOSED  
AR B1 - P 3020

Installing Bushes in Tapped Holes of Bosses  
Figure 401 (Sheet 2 of 2)

78-11-01

REP 5-240-5

Page 404

Sep 30/78



OLYMPUS 593

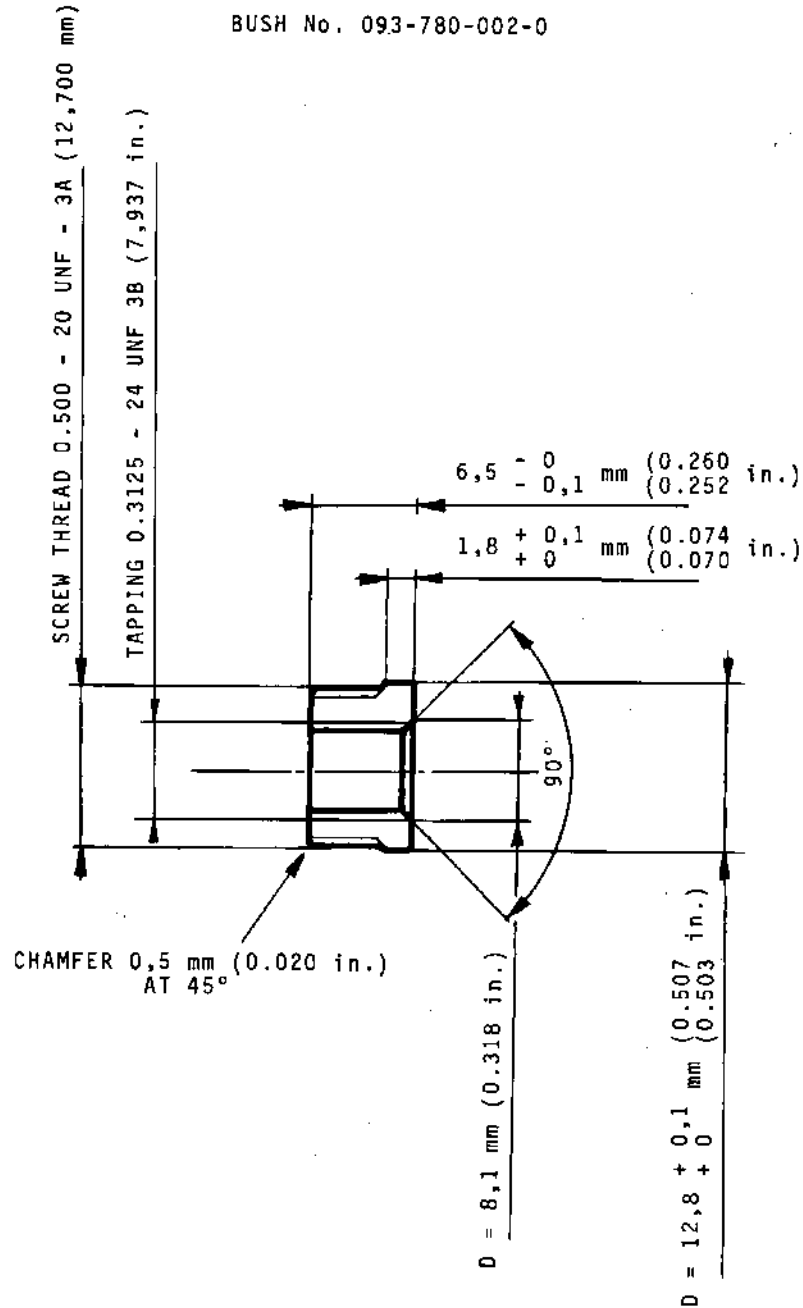
MK.610-14-28

OVERHAUL



PRINTED IN FRANCE

BUSH No. 093-780-002-0



Bush for Reconditioning the Boss Tappings  
Figure 402

78-11-01

REP 5-240-5  
Pages 405/406  
Sep 30/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

REHEAT DUCT (5-240)

9. Reshaping the front and rear flanges

---

PARTS REQUIRED FOR REPAIR

---

A. Inspection for soundness

- (1) Make sure that the distorted zone is free from any crack. Perform fluorescent penetrant inspection using water-washable product as per method M503 B in chapter 70-20-10.

B. Reshaping the front or rear flange

- (1) Smooth the sharp edges located in the distorted zone using crocus cloth.
- (2) Re-shape the flange concerned by peening. The treated zone must be first heated up to 600°C approximately.
- (3) Inspect the re-shaped zone for soundness by :
  - (a) Localized fluorescent penetrant inspection using water-washable product as per method M502 B in chapter 70-20-10.
  - (b) X-ray inspection of the welds as specified in chapter 70-20-30.
- (4) Check the reheat duct dimensions as specified in figure 401.
  - (a) Checking method of the flange average diameter.

78-11-01

REP 5-240-9

Page 401

Jan 31/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



CAUTION : A 10°C TEMPERATURE VARIATION RESULTS  
IN A LINEAR CHANGE OF THE FLANGE DIA-  
METER AMOUNTING TO 0,13 MM (0.00512 IN.)  
APPROXIMATELY.

The average diameter of the spherical contact  
surface of the front or rear flange is obtained  
by working out the arithmetical mean of the 18  
values recorded in the plane P1 or P2.

Perform these measurements as follows :

- 1 On the front external surface of the flange,  
mark 18 generatrices equally distributed on  
the flange half-circumference.

CAUTION : MARKING MUST NOT, IN ANY CASE,  
IMPAIR THE SURFACE CONDITION OF  
THE SPHERICAL CONTACT SURFACE

- 2 Using the resizing tool SC 118, restore the  
roundness of the front and rear flange of the  
reheat duct.
- 3 Calibrate the TESA UNIMASTER (TESA - S.A. 1020  
RENENS - VD/Switzerland - Agent in France :  
SYNERGIE, 29 Avenue Philippe Auguste,  
75540 PARIS CEDEX 11 - Tel: 44-93-10-00

Fit the gauge with :

- a the extension tubes required for obtaining  
the dimension to be checked.
- b the supports, correctly adjusted, to ascer-  
tain the measuring plane.
- 4 Rest the gauge supports onto the flange edge  
and measure.
- 5 Repeat this operation in line with the 18  
marks.

PRINTED IN FRANCE

78-11-01

REP 5-240-9

Page 402

Apr 30/93

C. Sandblasting.

(1) Sandblast the spherical contact surface of the flange as instructed below and as shown in figure 402.

- (a) Clean the part with trichlorethylene vapour as per method M101A in chapter 70-15-20.
- (b) Sandblast as per method M103A in chapter 70-15-20.

CAUTION : COMPLY WITH THE FOLLOWING REQUIREMENTS :

- QUARTZ 160 (S14)
- INTENSITY : F10 A2
- AUTOMATIC MACHINE

NOTE : The sandblasting parameters applied by SNECMA are the following :

- Rotational speed of the supporting plate :  $3 \text{ rpm} \pm 20 \%$
- Travelling speed of the gun :  $1,3 \text{ m/s} \pm 20 \%$

- (c) Inspect the condition of the flange spherical contact surface

CAUTION : REQUIRED CHECK :

CHECK SPHERICAL SURFACE FOR EVEN SANDBLASTING. NON-SANDBLASTED ZONES AND SWEEPING MARKS INDICATIVE OF UNSUITABLE NOZZLE INCIDENCE ANGLE, ARE NOT ACCEPTABLE.

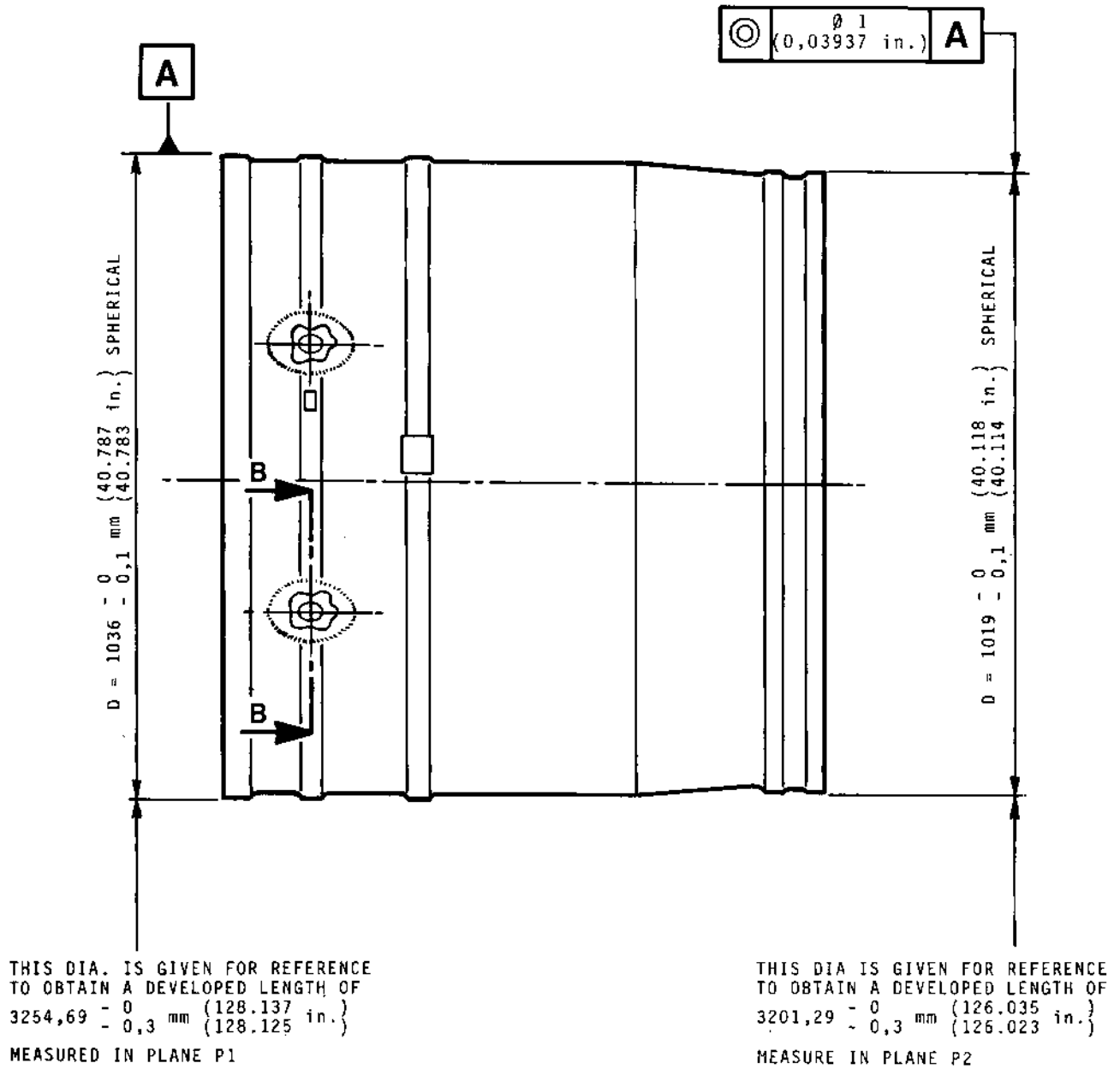
D. Dimensional check

Check the reheat duct dimensions as indicated in figure 401.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Dimensional Check of Reheat Duct  
Figure 401 - Plate 1/3

78-11-01

REP 5-240-9  
Page 404  
Jan 31/81





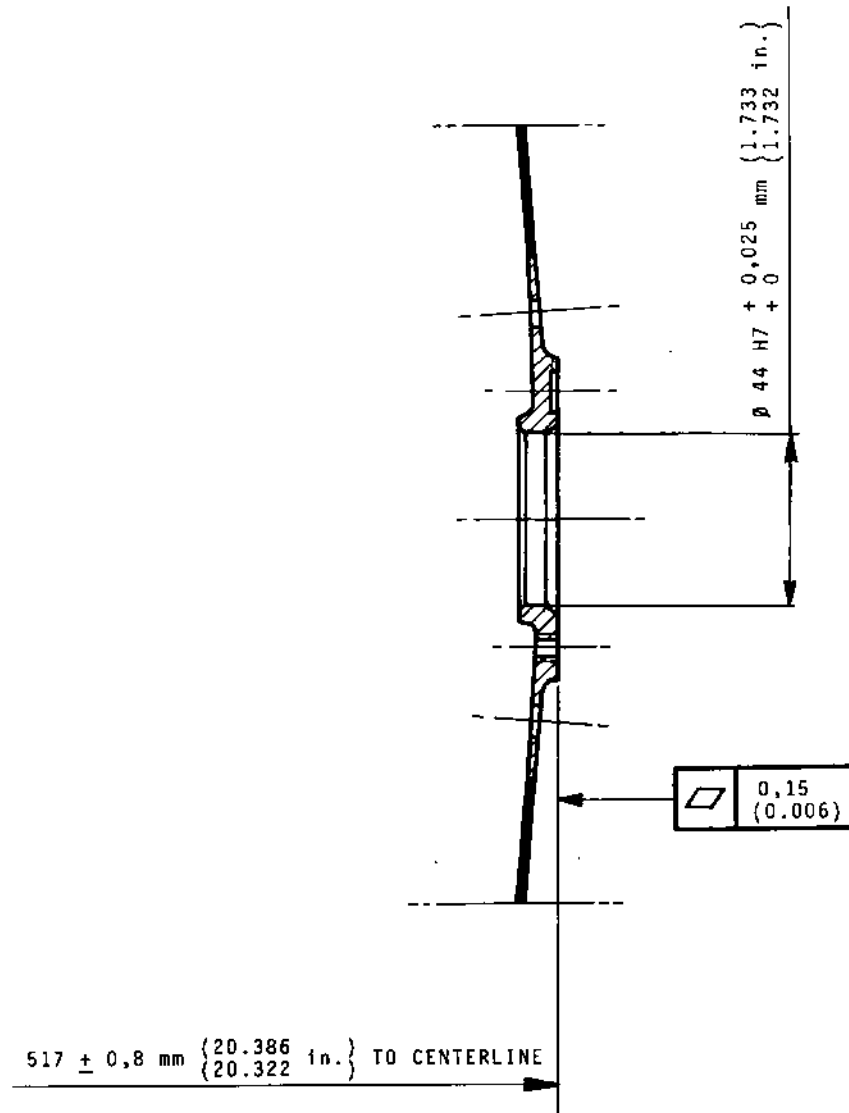
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE

SECTION BB



Dimensional Check of Reheat Duct  
Figure 401 - Plate 2/3

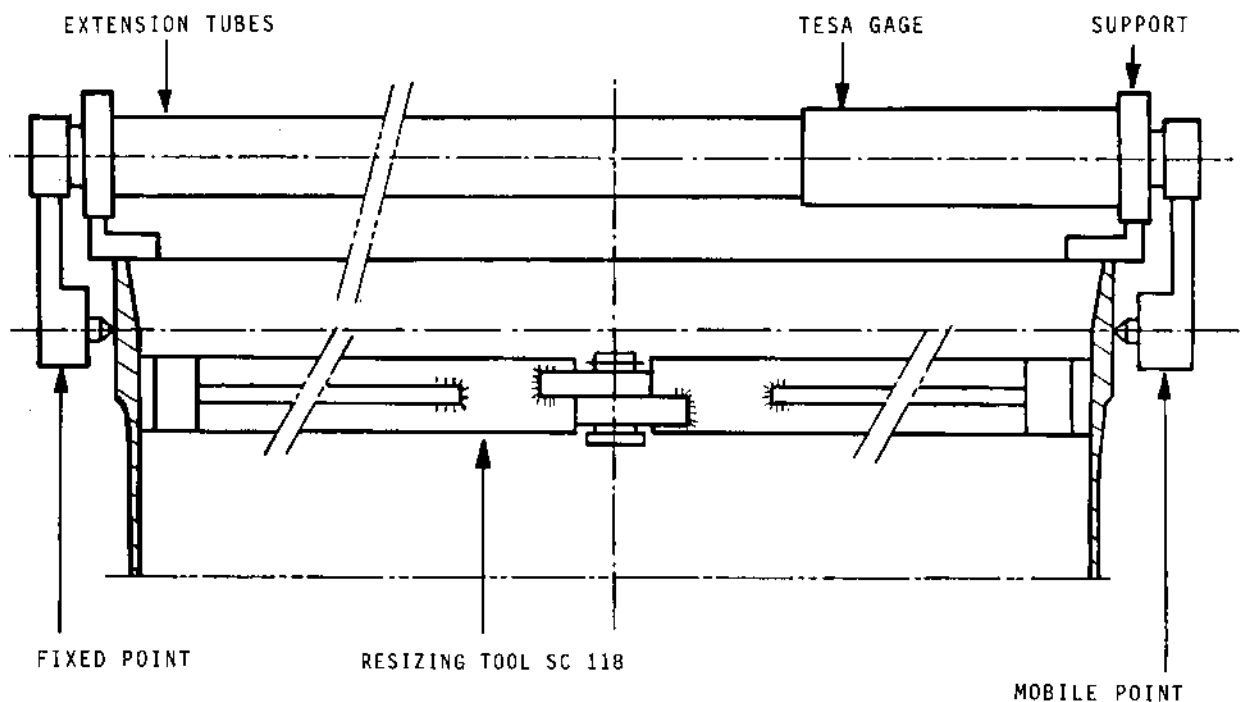


OLYMPUS 593

MK.610-14-28  
OVERHAUL

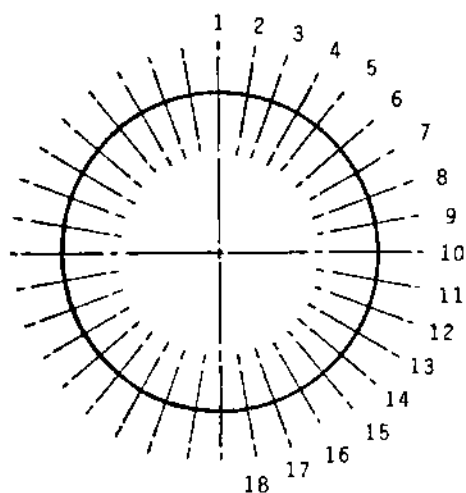


PRINTED IN FRANCE



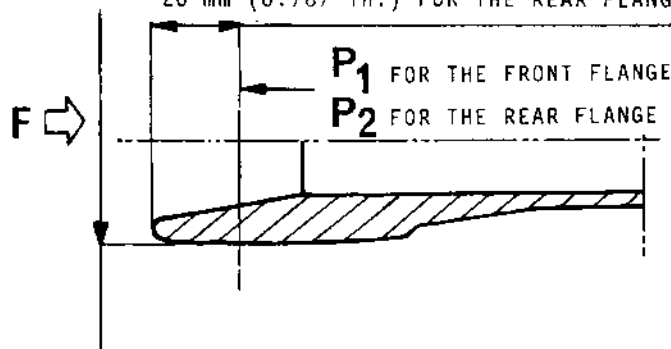
**F**

SCHEMATIC VIEW



17,5 mm (0.689 in.) FOR THE FRONT FLANGE

20 mm (0.787 in.) FOR THE REAR FLANGE



$D$  = AVERAGE DIA. OF THE SPHERICAL CONTACT SURFACE

Dimensional Check of Reheat Duct  
Figure 401 - Plate 3/3

78-11-01

REP 5-240-9

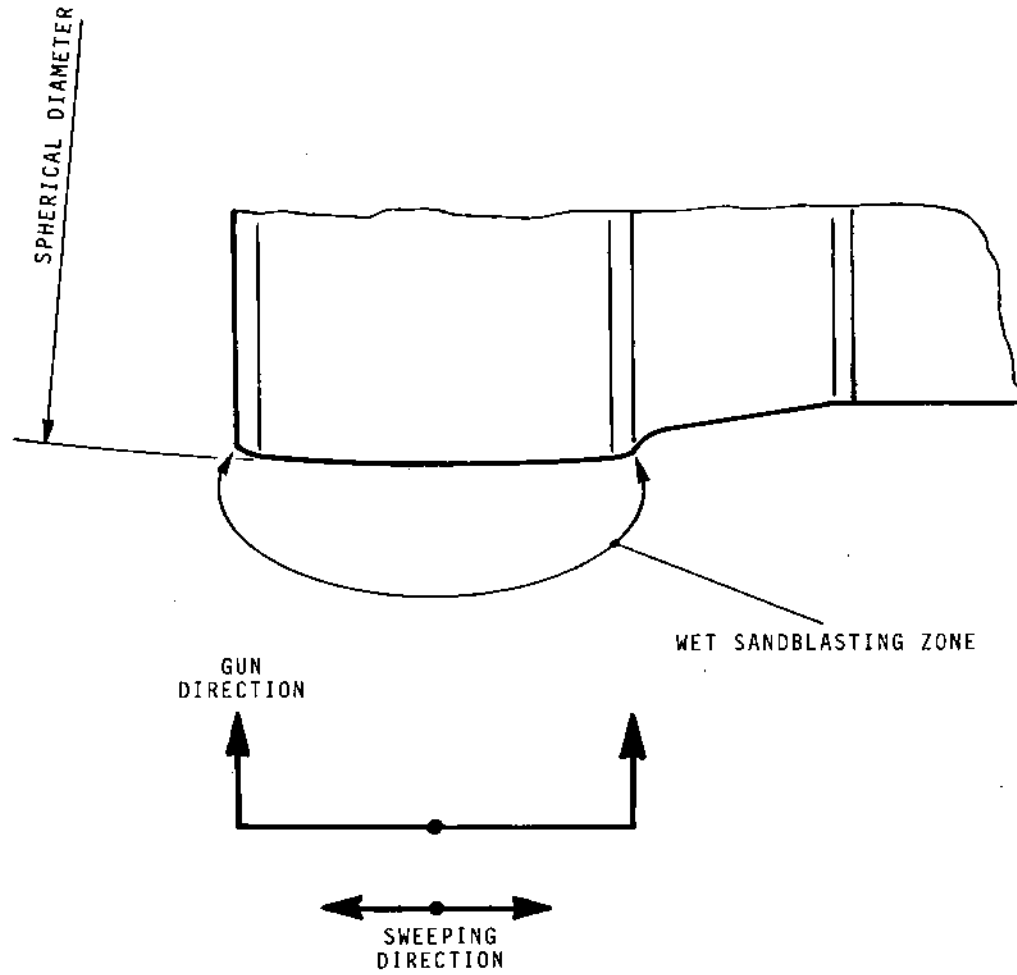
Page 406

Jan 31/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Spherical Diameter Sandblasting  
Figure 402



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## ASSEMBLY

### 1. General

- A. During assembly, follow the recommendations given in chapter 70-65-00 of the manual of Standard Practices and the working procedures of the Overhaul manual.
- B. Use only tools and other special equipment nominated in the assembly procedures, and identified by a number SC... The tools are shown in the Illustrated Tools and Equipment Manual (I.T.E.M).
- C. When assembling bolts and nuts, refer to pages 601-700 of the "Fits and Clearances" chapter for :
  - (1) The tightening torque for the bolt or nut.
  - (2) The lubrication to be applied to the nut or the bolt before fitting.
- D. The clearances to be checked during assembly are identified by a number. Refer to pages 601-700 of the "Fits and Clearances" chapter for the values which must be respected.
- E. In the working procedures section of the manual, parts are referenced to the I.P.C by two numbers in brackets, the first of which is the figure number in the I.P.C., the second being the item number within that figure.
- F. Torques should be applied with a torque spanner accurate to  $\pm 5\%$ .

### 2. Location

The reheat duct is assembled so as to be suitable for left-hand dressed engines i.e. 1 and 3 (see fig. 501).

It can be prepared for installation on a right-hand dressed engine by changing the position of the connecting link.

This is stated for information only, the details of the operations are given in the Maintenance manual.

### 3. Preparation for assembly

- A. Recommendations

78-11-01

Page 501  
Dec 30/74

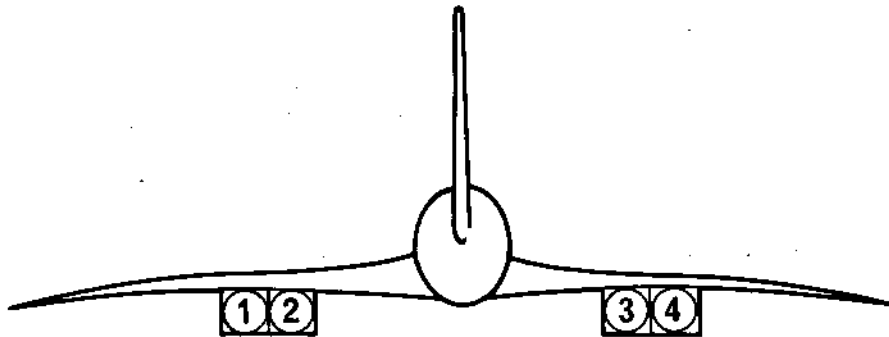


OLYMPUS 593

MK.610-14-28  
OVERHAUL



VIEW FROM REAR

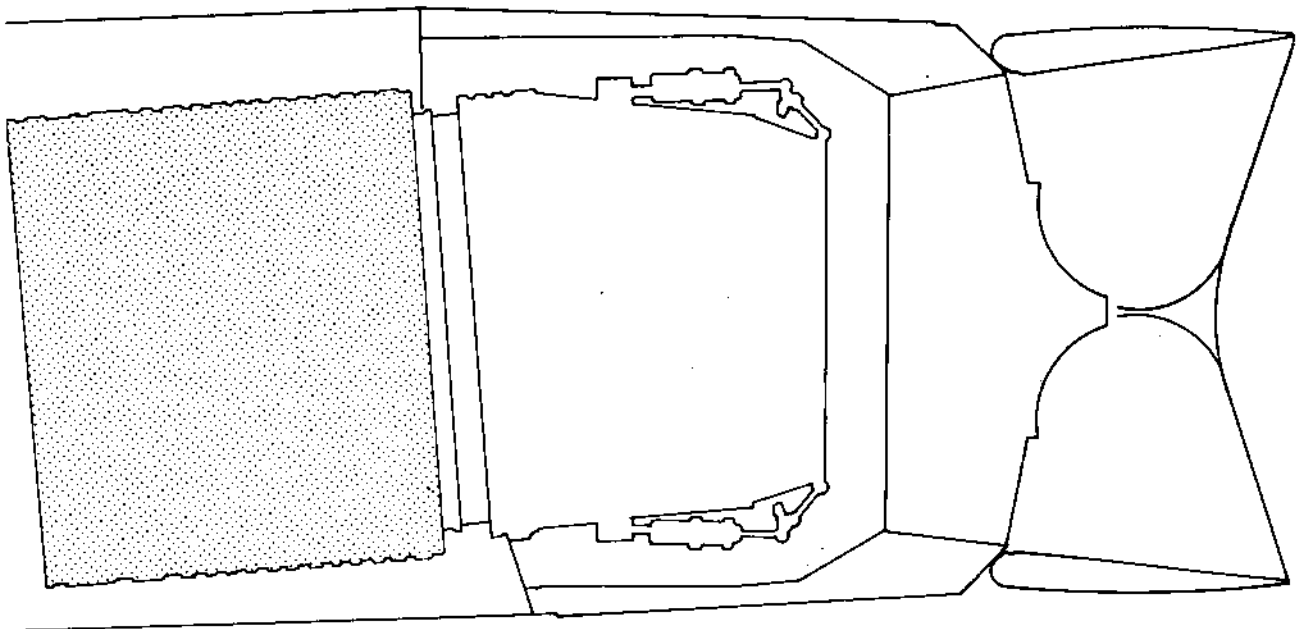


LEFT-HAND NACELLE

RIGHT-HAND NACELLE

LEFT-HAND DRESSED ENGINES 1 AND 3

RIGHT-HAND DRESSED ENGINES 2 AND 4



Position of the Reheat Jet-Pipe on the Aircraft  
Figure 501

78-11-01

Page 502  
Dec 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL



During assembly, coat the following parts with anti-seizing graphite grease (Pl89) :

- (1) Threads of bolts and nuts.
- (2) Sliding parts.
- (3) Any surfaces likely to suffer fretting (slides, spacers, ventilation shroud flexible mountings etc).

B. Preparation of ventilation shroud (3-130)

NOTE : The ventilation shroud is assumed to be in the vertical position on a stand.

- (1) Position the assembled flexible spacers (3-90).
- (2) Fit the internal plate (3-120).
- (3) Enter from the inside, the 12 point head bolts (3-110) and fit the self-locking nuts (3-100).
- (4) Torque tighten to the prescribed value.
- (5) Position the covers (3-70) on the outside of the shroud.
- (6) Fit hexagon head bolts (3-50) complete with flat washers (3-60).
- (7) Torque tighten to the prescribed value.
- (8) Fit washers (3-40) and hexagon head bolts (3-30), from the inside, to the ventilation shroud on either side of the vertical centre line.
- (9) Fit washers (3-20) on the outside and fix with self-locking nuts (3-10).
- (10) Torque tighten to the prescribed value.

C. Preparation of the reheat duct (5-240)

- (1) Place the reheat duct on the build stand - tool SC77 -
  - (a) Using bars - tool SC207 - and lifting beam - tool SC210 - lift and tilt the reheat duct.
  - (b) Lower the reheat duct in the horizontal position onto build stand - tool SC77 -
  - (c) Remove the handling tools - SC207 and SC210.

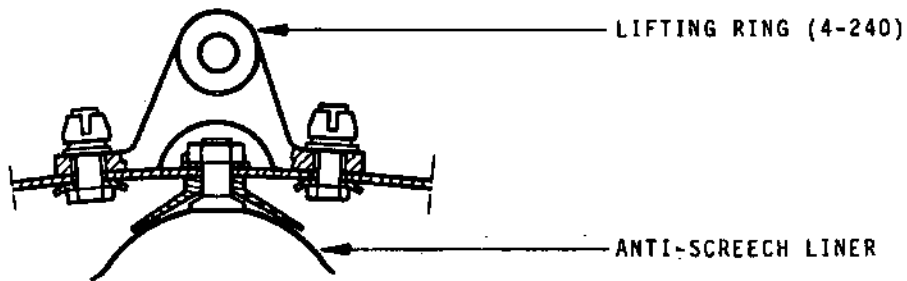
78-11-01

Page 503  
May 31/84

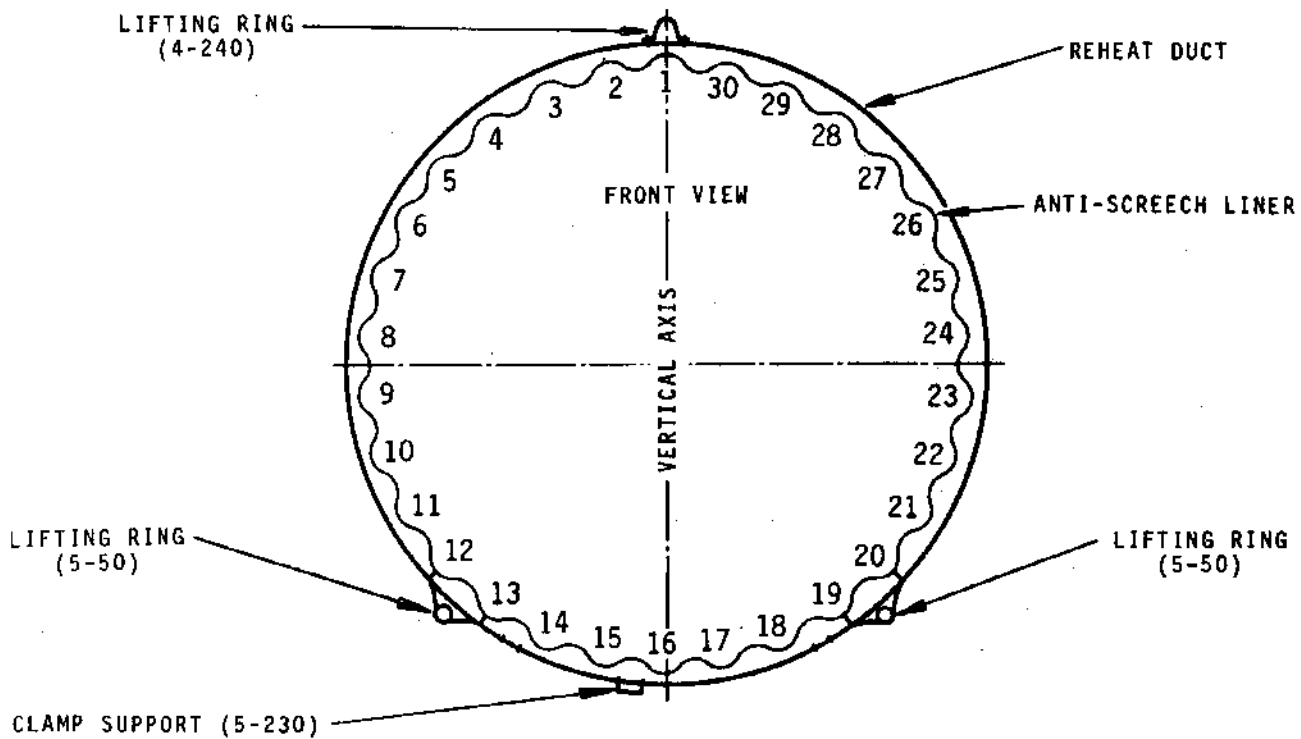


OLYMPUS 593

MK.610-14-28  
OVERHAUL



Fixation de l'Anneau de hissage



Position of Attachment Points  
Figure 502

78-11-01

Page 504  
Dec 30/74



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Fitting clamp support (5-230)
    - (a) Fit hexagon head bolts (5-210) and washers (5-220) from the inside of the reheat duct.
    - (b) Position the clamp support (5-230) and fit self-locking nuts (5-200).
    - (c) Torque tighten the bolts to the prescribed value.
  - (3) Fitting mounting lugs (5-160)
    - (a) Fit washers (5-190) and hexagon head bolts (5-180) from the inside of the reheat duct.
    - (b) Position the mounting lugs (5-160) and fit self-locking nuts (5-170).
- NOTE : Attention to the orientation of the mounting lugs, the open end should be towards the front of the duct.
- (c) Repeat operations (a) and (b) for each of the ten mounting lugs (5-160).
  - (d) Tighten the bolts to the prescribed torque.
- (4) Fitting of lifting ring (4-240)
  - (a) Fit washers (4-230) and hexagon head bolts (4-220) from inside the reheat duct.
  - (b) Position the lifting ring (4-240) and fit self-locking nuts (4-210).

NOTE : The tightening of these nuts is carried out in a later operation, to ease the fitting of one of the anti-screech liner fixing nuts (see fig. 501).

#### 4. Final assembly

##### A. Fitting the anti-screech liner

- (1) Assemble slides (5-150) to the anti-screech liner (5-10) and retain them with 30 location pins - tool SC78 -
- (2) Insert the anti-screech liner into the pre-assembled reheat duct.

78-11-01

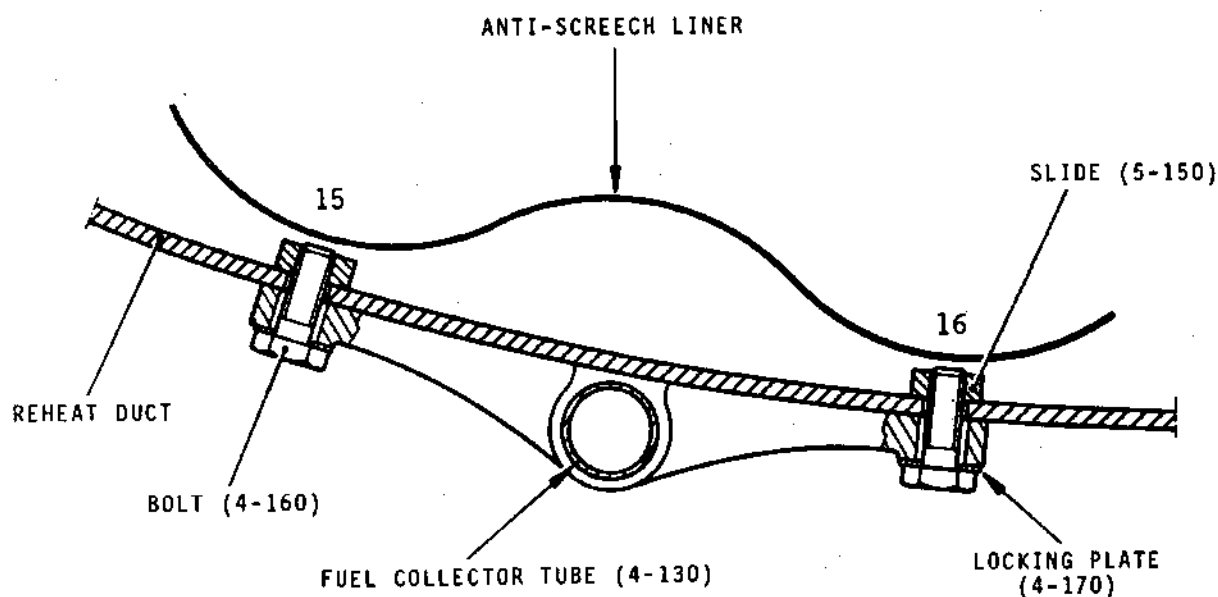
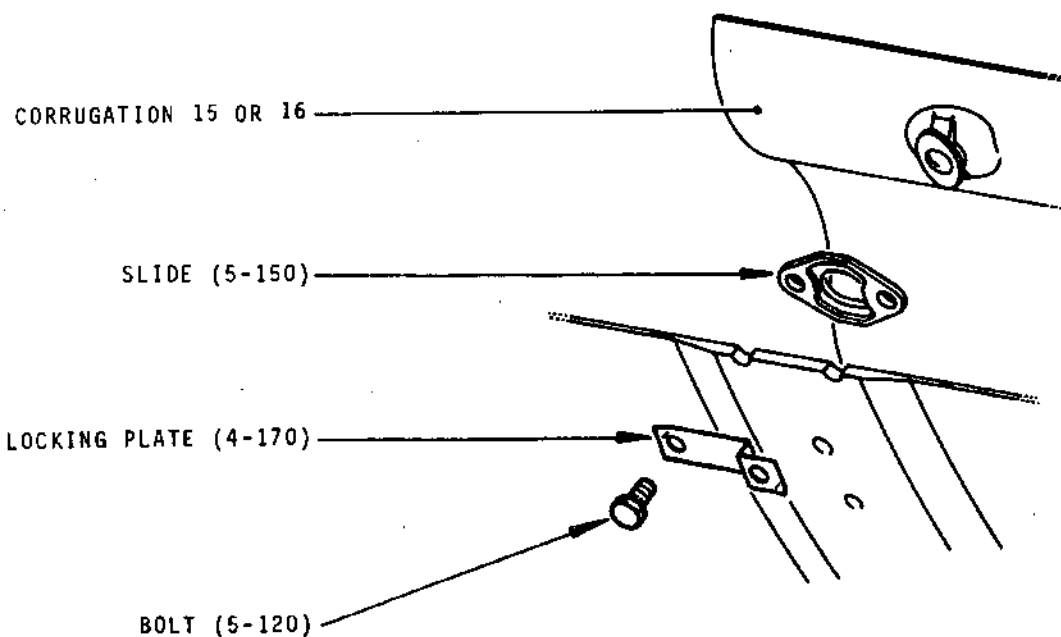
Page 505  
Dec 30/74





OLYMPUS 593

MK.610-14-28  
OVERHAUL



Attachment of Fuel Collector Tube  
Figure 503

78-11-01

Page 506  
May 31/84



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (3) Locate the reheat duct/anti-screach liner assembly by two conical pins - tool SC15 - at the forward mounting points.
- (4) Fitting spacers (5-140) and their attachment parts (see fig. 502).
  - (a) Using a lever - tool SC17 - and assembly clips - tool SC 79 - position spacers (5-140) between the anti-screach liner and the reheat duct.
  - (b) Using a bar - tool SC15 - check the alignment of the holes in the liner, spacer and reheat duct.
  - (c) Fit bolt (5-70 or 5-100) from the inside of the duct.
  - (d) On the outside fit the locking plate (5-80 or 5-110) and either blind nut (5-60) (on corrugations number 14 to 18) or hexagonal nut (5-90) (on corrugations 2 to 11 and 21 to 1).

NOTE : To ease the assembly, secure the liner at 4 equispaced points, then at the mid point of each sector, and so on until all 30 points are secured.

- (e) Fit the lifting rings (5-50) to corrugations 12-13 and 19-20 with bolts (5-30), locking plates (5-40) and blind nuts (5-20).

ATTENTION : CHECK THAT BLIND NUTS (5-20) AND (5-60) ARE FITTED ON CORRUGATIONS 12 TO 20 (see fig. 502).

- (5) Assembly of rear mounting points
  - (a) Fit a locking plate (5-130) and hexagon head bolt (5-120) to each slide (5-150).
  - (b) Withdraw the locating pin - tool SC78 - and fit the second hexagon head bolt (5-120).
  - (c) Repeat operations (a) and (b) for 28 fixing points on corrugations 2 to 14 and 17 to 1 (see fig. 502).

78-11-01

Page 507  
Dec 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (d) Fix the two slides on corrugations 15 and 16, each by a hexagon head bolt (5-120) and a locking plate (4-170) (see fig. 503). Remove locating pin - tool SC78 -

NOTE : Final assembly is carried out simultaneously with the assembly of the fuel collector tube.

- (6) Fit the fuel collector tube (4-130) and fix it with two hexagon head bolts (4-160) (see fig. 503).  
(7) Tighten all the anti-screach liner attachment points to 1,5 m daN (11.06 lbf. ft.).  
(8) Seat the parts together by tapping lightly on the head of each bolt with a mallet until the tightening to 1,5 m daN (11.06 lbf. ft.) is firm and consistent.  
(9) Un-screw all the attachment points and re-torque to the prescribed value.

NOTE : During tightening of the bolts, retain the locking plates in position with tool SC18.

- (10) Tighten the lifting ring (4-240) retaining bolts (4-220) to the prescribed torque value.  
(11) Lock all bolts.  
(12) Position the front collector tube clamp (4-150), fit the 12 point head bolts (4-140) and tighten to the prescribed torque.  
(13) Lock bolts (4-140) with 0,8 mm (0.031 in.) dia. lock wire (NC 15 Fe).  
(14) Fitting the connecting link (4-120) (see fig. 504).  
(a) Fit the spherical bearing housing (4-50) to the reheat duct vertically beneath corrugations 18-19 (see figure 502).  
(b) Position the angular position stop (4-60) on the spherical bearing housing (4-50).  
(c) Fit hexagon head bolts (4-10) and (4-30) complete with tab washers (4-20) and (4-40).

78-11-01

Page 508  
Dec 30/74



OLYMPUS 593

MK.610-14-28

OVERHAUL



NOTE : When fitting the tab washers, ensure that the tabs are entered in the appropriate holes.

- (d) Tighten the bolts to the prescribed torque and lock. (Refer FITS AND CLEARANCES page 603).
  - (e) Fit one end of the connecting link (4-120) with an anti-roll housing (4-110), spherical bearing housing (4-100), hexagon head bolts (4-80) complete with tab washers (4-90). Secure with slave nuts (4-70).
  - (f) Fit the connecting link by engaging the end in the spherical bearing housing (4-50), at right-angles to the axial centre line of the reheat duct. Then rotate it by 90°, thus placing it in the working position.
  - (g) Fit protector - tool SC19 -
- (15) Position the support (4-200) on the reheat duct vertically beneath the corrugations 13-14 (see fig. 502).
- (a) Fit hexagon head bolts (4-180) complete with tab washers (4-190).

NOTE : Ensure that the tabs of the washers are entered in the appropriate holes.

- (b) Tighten the bolts to the prescribed torque and lock.

B. Fitting the ventilation shroud (2-10)

- (1) Place the reheat duct, front flange downwards, on work table - tool SC211 - using bars - tool SC207 - and lifting beam - tool SC210.
- (2) Position the 10 spades - tool SC14 - on the reheat duct in order to guide the mounting lugs (5-160).
- (3) Compress the flexible spacers (3-90) on the shroud using 8 clamps - tool SC13 -
- (4) Fit clamps - tool SC11 - to the ventilation shroud (2-10).
- (5) Lift the ventilation shroud with a hoist and a 3 branch sling and fit it over the reheat duct. Lower the ventilation shroud and rest it on the brackets on the work table - tool SC211 -

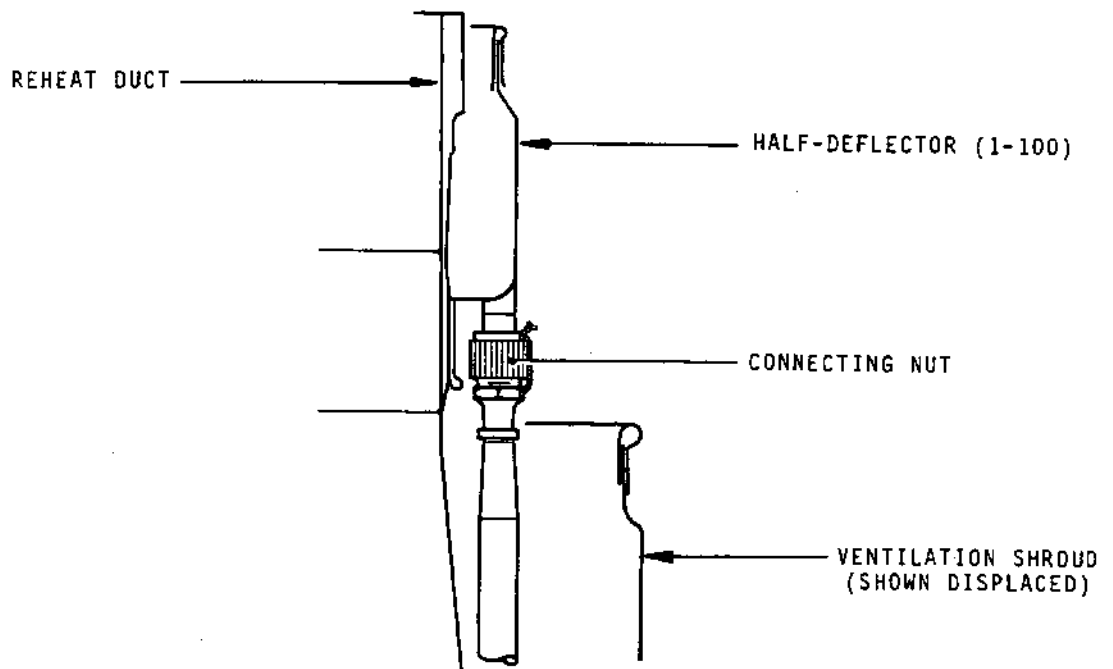
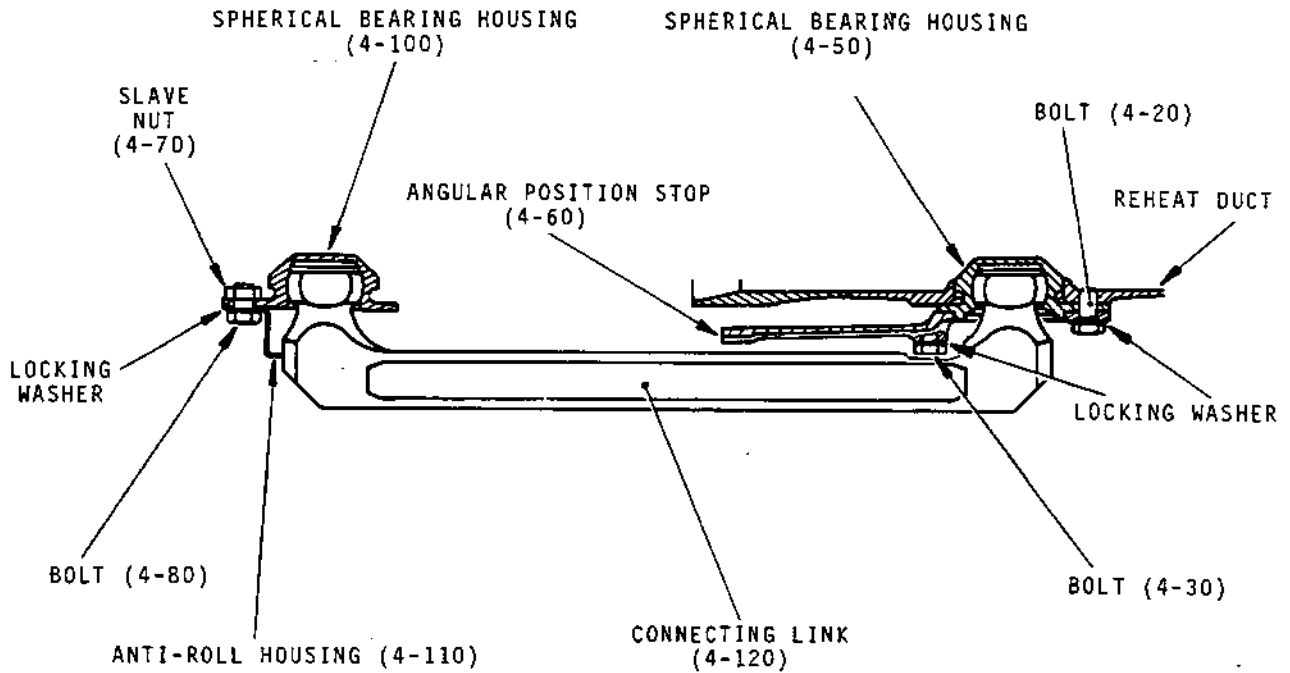
78-11-01

Page 509  
Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Connection of Fuel Collector Tube to Lower Half-Deflector  
Figure 504

78-11-01

Page 510  
Dec 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (6) Fitting the lower half-deflector (1-100).
  - (a) Fit the hexagon head bolts (1-160), complete with washers (1-170) from the inside of the reheat duct and position the half deflector (1-100).
  - (b) Fit bushes (1-180) and self-locking nuts (1-150).
  - (c) Couple the fuel collector tube (4-130) to the half deflector (1-100) with the connecting nut.
  - (d) Tighten the connecting nut to the prescribed torque using - tool SC20 - at the same time holding the union body with a flat spanner.  
Lock with 0,8 mm (0.0315 in) NC 15 Fe locking wire.
  - (e) Fit hexagon head bolts (1-120) complete with washers (1-130) from the inside of the reheat duct.
  - (f) Position the lifting rings (1-140) and fit self-locking nuts (1-110).
  - (g) Tighten the bolts to the prescribed torque.
- (7) Fitting the upper half-deflector (1-10).
  - (a) Fit hexagon head bolts (1-70) complete with washers (1-80) from inside the reheat duct and position the half-deflector (1-10).
  - (b) Position the bushes (1-90) and fit self-locking nuts (1-60).
  - (c) Fit hexagon head bolts (1-30) complete with washers (1-40).
  - (d) Position the lifting ring (1-50) and fit self-locking nuts (1-20).
  - (e) Tighten bolts to the prescribed torque.
- (8) Raise the ventilation shroud, align the mounting bracket and shroud holes, having removed the spades - tool SC14 -
- (9) Fit the 12 point head bolts (2-20) complete with washers (2-30).
- (10) Remove clamps - tool SC13
- (11) Tighten the bolts to the prescribed torque.

78-11-01

Pages 511/512

Jun 15/82

## FITS AND CLEARANCES

### 1. General

#### A. Layout

- (1) The table of clearances gives the machining tolerances of parts in new condition and acceptable wear limits. The values are expressed in millimeters.

ITEM FIG.	IPL FIGURE ITEM	NOMINAL DIMENSION	TYPE	CLEARANCES		MAX LIMIT	CAT.	REMARKS SELECTIONS
				MIN	MAX			
1	2	3	4	5	6	7	8	9

- (2) The item numbers in column (1) by reference to the corresponding figure provide a means of locating the clearance or dimension to be measured.
- (3) The item numbers in column (2) identify the parts in the "Illustrated Parts List". (FIGURE + ITEM).
- (4) Column (3) gives the manufacturing dimensions of parts together with the machining tolerances.
- In the case of two parts which form an assembly the first one is always the male part.
- (5) The code letters in column (4) indicate the type of clearance.
- A denotes an axial clearance
  - D denotes a diametral clearance
  - L denotes a side clearance
- (6) Columns (5) and (6) give the clearance (symbol J) or the interference (symbol S) which result from the manufacturing tolerances.

Column (9) is used to indicate that a smaller clearance than that resulting from the manufacturing tolerances is required. This reduced clearance is obtained by selective assembly of parts.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (7) The digits or letter in column (8) give the clearance category the definition of which is as follows :

- M - Check or adjustment to be carried out at each assembly
- 1 - Check to be systematically carried out
- 2 - Check to be carried out if the condition of parts makes it necessary.
- 3 - Dimensions intended for use by Design Offices (not applicable in this document).
- 4 - Check to be systematically carried out on the equipments intended for ageing studies (Sampling)

B. Max. after wear (column 7)

- (1) The MAX. LIMITS are the maximum wear limits within which a part can be accepted for a further period of use.
- (2) Parts worn beyond these limits will be either repaired in accordance with the instructions given in chapter "REPAIR" or replaced as applicable.
- (3) Therefore the values given in this column will change as experience is gained with the repaired equipment or the equipment intended for ageing studies.
- (4) This kind of information may be entered in this column

(a) Clearance

The maximum clearance or the minimum interference between two parts will be given only if they are matched parts. The distribution of this clearance on the male or female part is left to the discretion of the repairer.

(b) Dimension

In order to preserve interchangeability, the degree of permissible wear on male and female parts is given, thus ensuring a correct assembly at all times whatever the mating parts may be.



**OLYMPUS 593**

MK.610-14-28

OVERHAUL



## 2. Torque values

As torque is variable with respect to lubrication, we indicate in this paragraph both the torque and lubrication to comply with during assembly. Bolts, nuts... bear the I.P.L. references.

Bolts or nuts Fig. Item (I.P.L.)	Lubrication when assembly	Torque value
1-20, 60	Lubricate thread with anti-seizing graphite grease (P189)	0,6 daN.m (4.42 lbf.ft)
1-100	Lubricate thread of the union nut with anti-seizing graphite grease (P189)	1,9 daN.m (14 lbf.ft)
1-110, 150	Lubricate thread with anti-seizing graphite grease (P189)	0,6 daN.m (4.42 lbf.ft)
2-20	Lubricate thread with anti-seizing graphite grease (P189)	0,6 to 0,65 daN.m (4.42 to 4.79 lbf.ft)
3-10	Lubricate thread with anti-seizing graphite grease (P189)	0,6 daN.m (4.42 lbf.ft)
3-50	Lubricate thread with anti-seizing graphite grease (P189)	0,95 to 1,05 daN.m (7 to 7.74 lbf.ft)
3-100	Lubricate thread with anti-seizing graphite grease (P189)	0,26 to 0,28 daN.m (1.91 to 2.06 lbf.ft)
4-10, 30, 80	Lubricate thread with anti-seizing graphite grease (P189)	1 to 1,1 daN.m (7.37 to 8.11 lbf.ft)
4-140	Lubricate thread with anti-seizing graphite grease (P189)	0,23 to 0,25 daN.m (1.69 to 1.84 lbf.ft)
4-160	Lubricate thread with anti-seizing graphite grease (P189)	0,7 to 0,8 daN.m (5.16 to 5.90 lbf.ft)

**OLYMPUS 593**MK.610-14-28  
OVERHAULBolts or  
nuts  
Fig. Item  
(I.P.L.)Lubrication when  
assemblyTorque  
value

4-180	Lubricate thread with anti-seizing graphite grease (P189)	0,7 to 0,8 daN.m (5.16 to 5.90 lbf.ft)
4-210	Lubricate thread with anti-seizing graphite grease (P189)	0,6 daN.m (4.42 lbf.ft)
5-20	Lubricate thread with anti-seizing graphite grease (P189)	0,7 to 0,8 daN.m (5.16 to 5.90 lbf.ft)
5-60	Lubricate thread with anti-seizing graphite grease (P189)	0,7 to 0,8 daN.m (5.16 to 5.90 lbf.ft)
5-90	Lubricate thread with anti-seizing graphite grease (P189)	0,7 to 0,8 daN.m (5.16 to 5.90 lbf.ft)
5-120	Lubricate thread with anti-seizing graphite grease (P189)	0,8 daN.m (5.90 lbf.ft)
5-170	Lubricate thread with anti-seizing graphite grease (P189)	0,50 to 0,55 daN.m (3.68 to 4.05 lbf.ft)
5-200	Lubricate thread with anti-seizing graphite grease (P189)	0,45 to 0,50 daN.m (3.31 to 3.68 lbf.ft)

### 3. Table of fits and clearances

PRINTED IN FRANCE

**78-11-01**Page 604  
Oct 31/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



TABLE OF FITS AND CLEARANCES

IND. FIG.	IPL FIGURE INDEX	NOMINAL DIMENSION	TYPE	CLEARANCES		MAX. LIMIT	CAT.	REMARKS
				MIN.	MAX.			SELECTIONS
1 602	4-130	18 - 0 - 0,110 0.70866 0.70433	L	J 0,050 0.00197	J 0,510 0.02008		3	
	4-150	18,1 + 0,300 - 0,050 0.72441 0.71063						
2 601	4-100	45 - 0,009 - 0,034 1.77130 1.77031	D	J 0,009 0.00035	J 0,059 0.00232		2	
	6-60 *	45 + 0,025 + 0 1.77263 1.77165						* refer to IPL 72-54-01
3 601	4-120	32 - 0,025 - 0,050 1.25886 1.25787	D	J 0,025 0.00098	J 0,075 0.00295	J 0,325 (0.01280)	2	Min. value after wear 31.70 mm dia (1.24800 in. dia)
	4-100	32 + 0,025 + 0 1.26082 1.25984						
4 601	4-50	44 - 0,009 - 0,034 1.73193 1.73094	D	J 0,009 0.00035	J 0,059 0.00232		2	
	5-240	44 + 0,025 + 0 1.73326 1.73228						

PRINTED IN FRANCE

78-11-01

Page 605

Apr 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



TABLE OF FITS AND CLEARANCES

IND. FIG.	IPL FIGURE INDEX	NOMINAL DIMENSION	TYPE	CLEARANCES		MAX. LIMIT	CAT.	REMARKS
				MIN.	MAX.			SELECTIONS
5 601	4-120	32 - 0,025 - 0,050 1.25886 1.25787	D	J 0,025 0.00098	J 0,075 0.00295	J 0,325 (0.01280)	2	Min. value after wear 31.70 mm dia (1.24800 in. dia)
	4-50	32 + 0,025 + 0 1.26082 1.25984						
6 601	4-50	45 - 0 - 0,039 1.77165 1.77011	D	J 0,000	J 0,429 0.01689		2	
	4-60	45 + 0,390 + 0 1.78700 1.77165						
7 603	4-200	44 - 0,080 - 0,119 1.72913 1.72760	D	J 0,080 0.00315	J 0,144 0.00567		2	
	5-240	44 + 0,025 + 0 1.73326 1.73228						
8 602	4-130	16 - 0 - 0,180 0.62992 0.62283	D	J 0,100 0.00394	J 0,390 0.01535		2	
		16 + 0,110 + 0 0.63819 0.63386						

78-11-01



OLYMPUS 593

MK.610-14-28

OVERHAUL



TABLE OF FITS AND CLEARANCES

IND. — FIG.	IPL FIGURE INDEX	NOMINAL DIMENSION	TYPE	CLEARANCES		MAX. LIMIT	CAT.	REMARKS
				MIN.	MAX.			SELECTIONS
9 602	4-130	16 - 0 - 0,180 0.62992 0.62283	D	J 0	J 0,290 0.01142		3	
		16 + 0,110 + 0 0.63425 0.62992						
10 601	5-240	1036 - 0 - 0,100 40.78732 40.78338	D	J 0,900 0.03543	J 1,100 0.04331		1	
	6-60 *	10369 + 0,100 + 0 40.82669 40.82275						* refer to IPL 72-54-01
11 602	5-240	1019 - 0 - 0,100 40.11803 40.11409	D	J 0,900 0.03543	J 1,100 0.04331		1	
	4-110 *	10199 + 0,100 + 0 40.15740 40.15346						* refer to IPL 78-12-01

PRINTED IN FRANCE

78-11-01

Page 607

Dec 15/76

MTD 751026



OLYMPUS 593

MK.610-14-28  
OVERHAUL

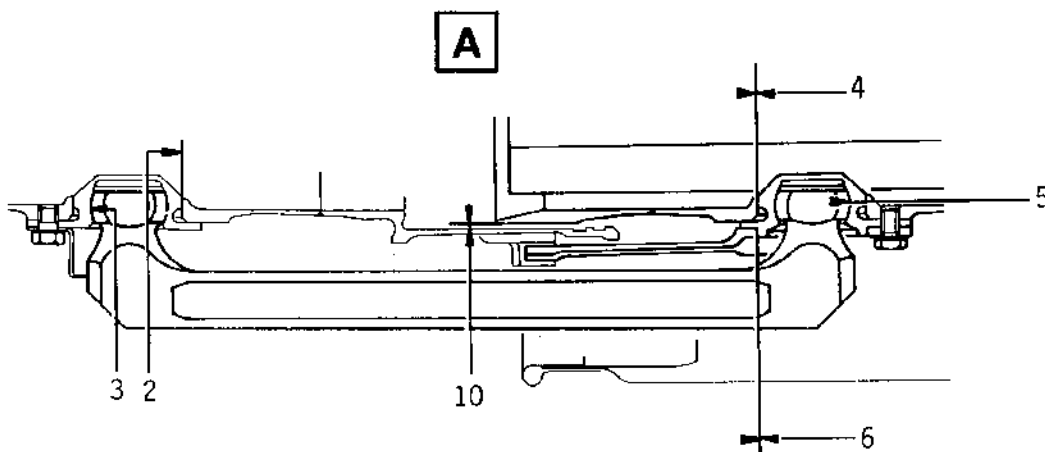
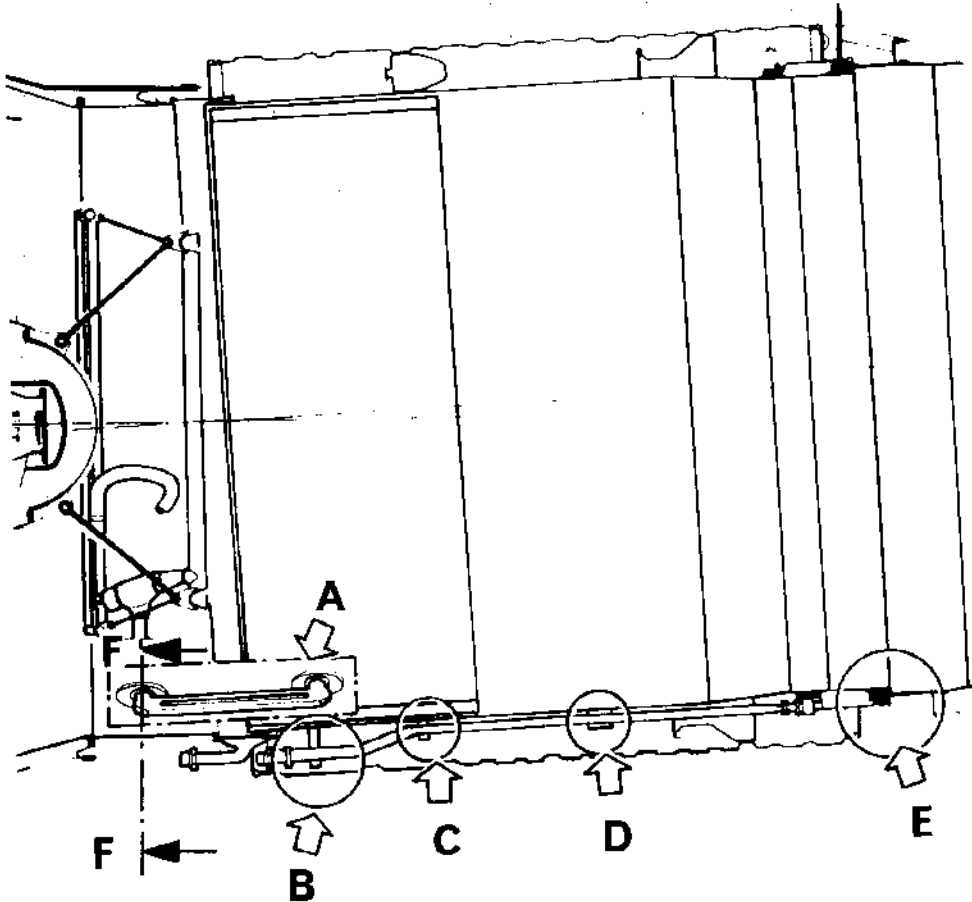


Table of Fits and Clearances  
Figure 601

78-11-01

Page 608  
Dec 15/76

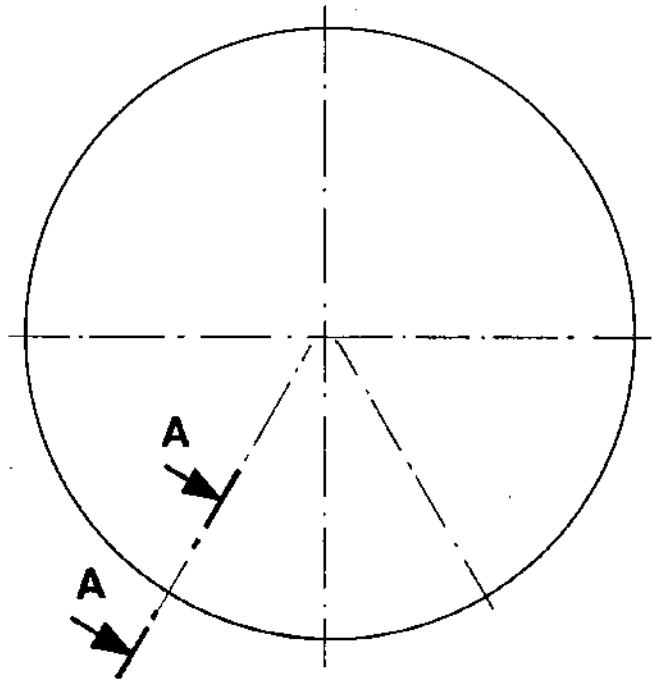


OLYMPUS 593

MK.610-14-28  
OVERHAUL



SECTION F-F



SECTION A-A

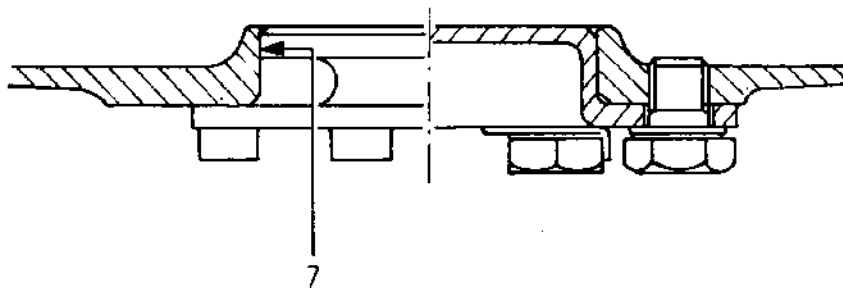


Table of Fits and Clearances  
Figure 603

PRINTED IN FRANCE

78-11-01

Page 610  
Dec 15/76



OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

## STORAGE

### 1. Storage

#### A. Storage in the container

Storage in the container shall be of long duration more than 3 months).

No special packaging conditions are required. The container should be protected from the sun and bad weather.

#### B. Storage out of the container

- (1) Take the reheat duct out of the container (see para 2) and install it on the storage stand - tool SC 97 -
- (2) Store in areas where the relative humidity remains less than 60%.
- (3) Protect the parts with a non-hermetically sealed, anti-dust bag made of vinyl chloride.
- (4) Attach the document wallet to the equipment.
- (5) If the relative humidity is less than 60%, check the condition of the parts every 3 months. If above 60% check every month.

### 2. Removal of the reheat jet-pipe from the container (see Fig. 901)

#### A. Positionning on the storage stand

- (1) Remove the container lead seals and lift off the cover.
- (2) Install clamps - tool SC 7 - to the jet-pipe.
- (3) Remove the two upper half-bearings, which are retained by 2 bolts.
- (4) Lift the reheat jet-pipe from the container using lifting beam - tool SC 8 -
- (5) Lower the re-heat jet-pipe onto the storage stand - tool SC 97 -
- (6) Slacken the bolts locking the braces on the support beam, and remove the latter from the rear (see figure 902).
- (7) Remove the braces, and collapse the armature assemblies as follows (see figure 903):
  - (a) Unlock the locking system.

**78-11-01**

Page 901  
Dec 31/01



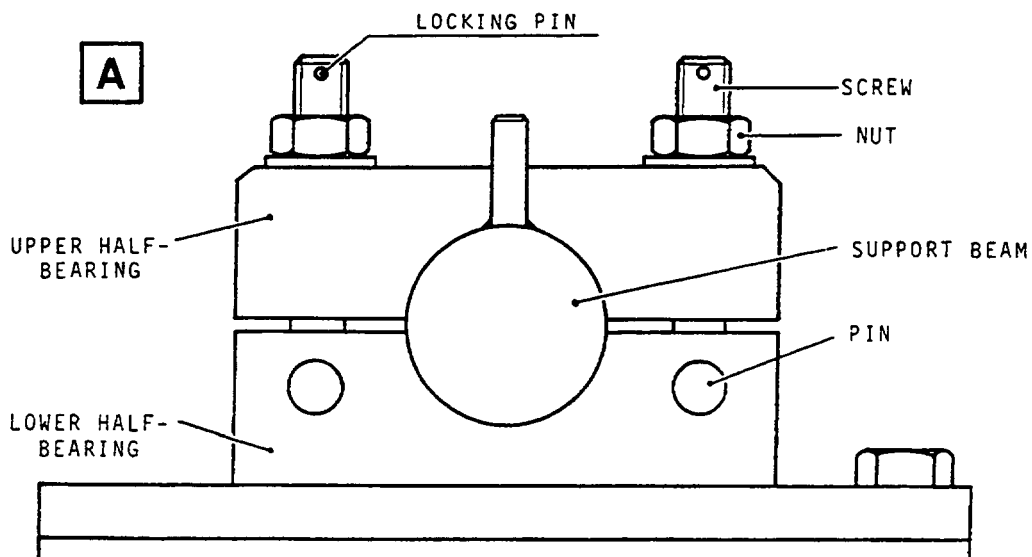
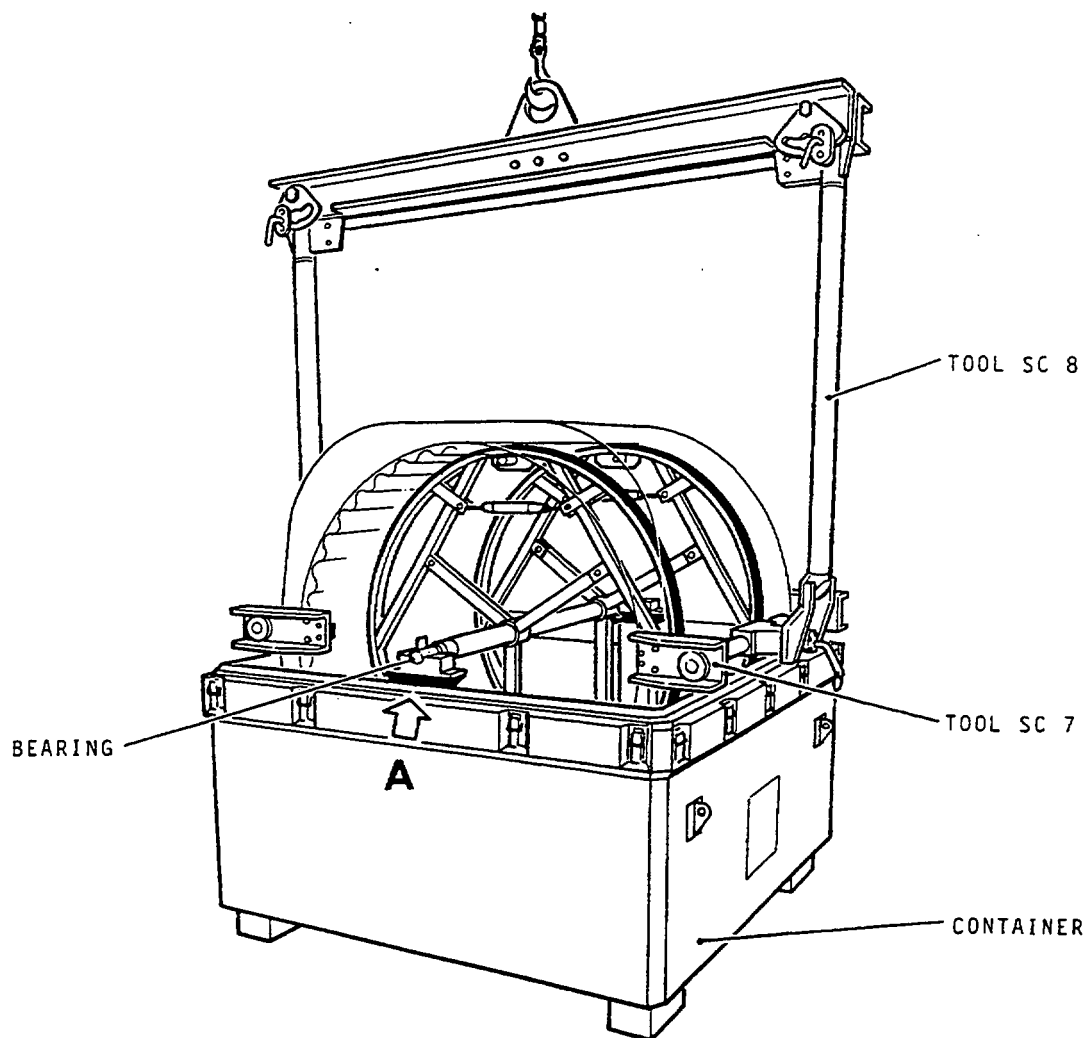


Figure 901



OLYMPUS 593

MK.610-14-28  
OVERHAUL

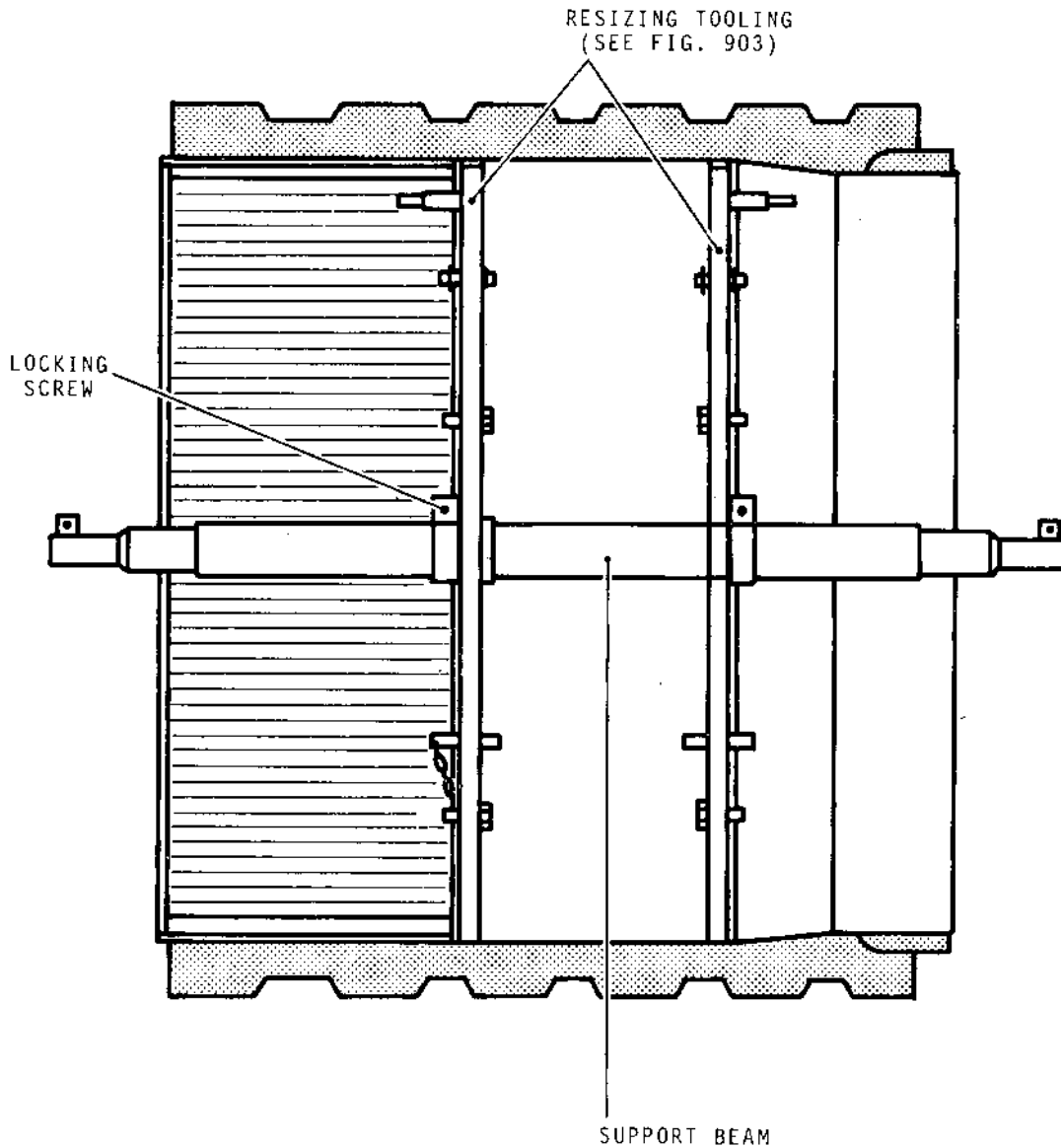


Figure 902

78-11-01

Page 903  
Dec 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL

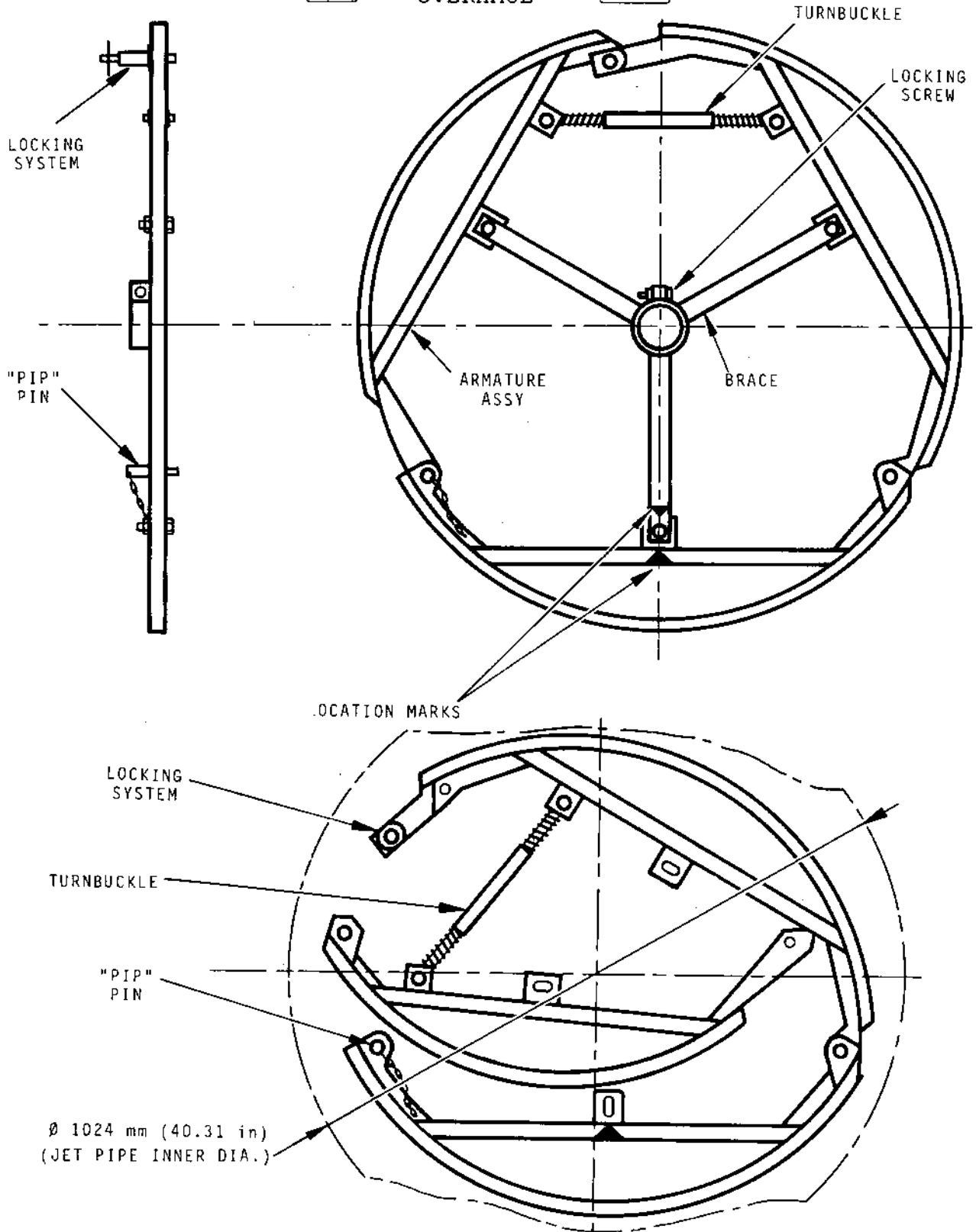
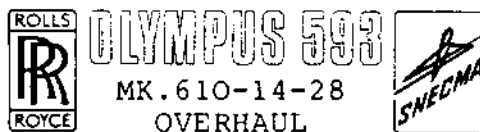


Figure 903

78-11-01

Page 904  
Dec 30/74



- (b) Free the segment retained by the "PIP" pin.
- (c) Collapse the assembly as shown in figure 903.

#### B. Returning empty containers

- (1) The container-to-contents connecting parts must be collected when the contents are removed from the container, and must be re-assembled in their respective locations in the container.
- (2) Re-assemble the support beam with the two brace and armature assemblies. Do not omit to fit the "PIP" pins and the locking system, which is essential in this case.
- (3) Mount this assembly in the container in the half bearings and retain it with the bolts.
- (4) Check, before closing container, that the coupling link has been removed from its box in the container. Also, check that the documents wallet has been removed from the external box.
- (5) Close and seal the container for return.
- (6) Obliterate the notices written on the black rectangle on the container.

### 3. Placing the equipment in the container

#### A. Preparation of the container

- (1) Place the container in the same area as the jet-pipe sufficiently in advance of the packaging operation for it to attain the same temperature as the re-heat jet-pipe, in order to avoid all risk of condensation.
- (2) Check the condition of the container (general cleanliness, lifting and handling rings, document box, closing devices, notices etc...).
- (3) Unlock the cover from the base and remove it with the appropriate tools.
- (4) Clean the joint faces and check the condition of the seal, flexible mountings, and internal fittings.
- (5) Disconnect the internal fittings from the container by removing the two upper half bearings.
- (6) Remove the fittings assembly from the container (paying attention to the pads on the armature assemblies).

78-11-01

Page 905  
Dec 30/74



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (7) Unlock the two armature assemblies from the support beam and braces.
- (8) Collapse the armature assemblies by slackening the locking systems and withdrawing "PIP" pins.
- (9) Wipe the internal walls of the container to remove all traces of humidity.

B. Preparation of the Reheat jet-pipe

- (1) Remove the coupling link (jet-pipe to spherical seal flange) and place it in the inner box of the container, wrapped up in quilted paper.
- (2) Ensure that the correct blank is fitted and locked to the inlet of the drain system (forward bowl).
- (3) Ensure the presence of the wallet containing the documents relevant to the parts packed.
- (4) Wipe the parts with clean, dry cloth.

C. Packing

- (1) With the reheat jet pipe placed horizontally on the storage stand SC 97 - place the first armature assembly inside the jet-pipe and against the anti-screech liner.
- (2) Bring the three segments of the armature assembly into contact with the inner wall of the jet-pipe and fix it with the "PIP" pin.
- (3) Operate the turn buckle to center the assembly. Apply a slight pre-load and lock the turn-buckle.
- (4) Do not lock the system (the locking system is only used for the return of the containers when empty).
- (5) Fit the second armature assembly, following the instructions above.

NOTE : Position it at 310 mm (12.2 in) from the rear flange of the reheat jet pipe.

- (6) Fix the first brace to the armature assembly placed against the anti-screech liner. Enter it via the front end of the reheat jet pipe.
- (7) Enter the support beam into the central boss of the first armature assembly, via the rear of the jet-pipe. Push the beam home until the stop fitted to the beam abuts against the central boss.

NOTE : The lifting lugs on the beam to be at the top.

78-11-01

Page 906  
Dec 30/74



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (8) Tighten the central boss with the bolt.
- (9) Enter the second brace assembly onto the beam via the rear of the jet-pipe, and fix it to the second armature assembly. Tighten the central boss onto the beam with the bolt.  
The internal fittings being thus in place in the re-heat jet-pipe.
- (10) Fit tool SC 7.
- (11) Lift the re-heat jet-pipe using - tool SC 8 - lifting beam.
- (12) Move the jet-pipe so assembled over the container.
- (13) Lower gently, so as not to bump the assembly, and rest it with the ends of the support beam on the two lower half-bearings.
- (14) Without removing the tooling, install the two upper half-bearings, locking washers and retaining bolts. Tighten the bolts.
- (15) Remove tooling SC 7 and SC 8.
- (16) Lock the bolts of each bearing together in pairs.
- (17) Lock the container :
  - (a) lower the cover onto the container base,
  - (b) secure the cover with clamps,
  - (c) lead-seal two opposite clamps.

78-11-01

Pages 907/908

Dec 30/74



OLYMPUS 593

MK.610-14-28

OVERHAUL



## SPECIAL TOOLS, FIXTURES AND EQUIPMENT (LIST)

TOOL N°	PART NUMBER	DESCRIPTION	UTILIZATION						PAGE
			DISASSEMBLY	CLEANING	CHECK	REPAIR	ASSEMBLY	TESTING	
SC 7	9970-521-044	SUPERSEDED BY SC 207							
SC 8	9970-521-048	SUPERSEDED BY SC 210							
SC 9	9970-521-050	SUPERSEDED BY SC 211							
SC 10	852-500-127-0	EXTRACTOR	X						1001
SC 11	9970-511-039	HOISTING BEAM	X				X		1002
SC 13	9970-511-034	RETRACTION CLAW	X				X		1003
SC 14	9970-511-035	RETRACTION SPADE	X				X		1004
SC 15	9970-515-104	CONICAL PIN					X		1005
SC 17	9970-515-103	LEVER					X		1006
SC 18	9970-511-024	WRENCH	X				X		1007
SC 19	9970-541-032	PROTECTOR							X 1008
SC 20	9970-515-056	31-TOOTH WRENCH	X				X		1009
SC 77	852-500-125-0	WORKSTAND					X		1010
SC 78	852-500-114-0	LOCATING DEVICE					X		1011
SC 79	852-500-115-0	CLAW					X		1012
SC 97	852-500-126-0	STORAGE FIXTURE							X 1013
SC 118	852-630-100-0	ANTI-DEFORMATION FIXTURE			X				1014
SC 139	852-630-065-0	FORMING TOOL				X			1015
SC 207	852-500-130-0	HOISTING AND TILTING BAR	X				X		1016
SC 210	852-500-129-0	LIFTING BAR	X				X		1017
SC 211	852-500-128-0	WORKSTAND	X				X		1018

PRINTED IN FRANN FRANCE

78-11-01

STEL Pages 1001/1002

Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



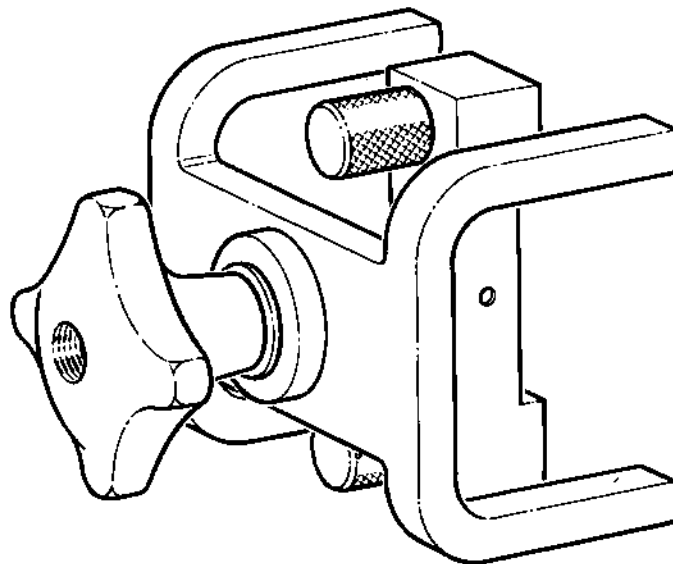
EXTRACTOR

SNECMA No. 852-500-127-0

Description ..... This tool is used to extract the spherical joint box of the link located on the reheat pipe front flange.

Weight ..... 1,2 kg (3 lb)

Dimensions ..... 110 x 100 x 90 mm (4 x 3.9 x 3.5 in.)



Tool  
SC 10

78-11-01

Page 1001  
Dec 15/75





OLYMPUS 593

MK.610-14-28

OVERHAUL



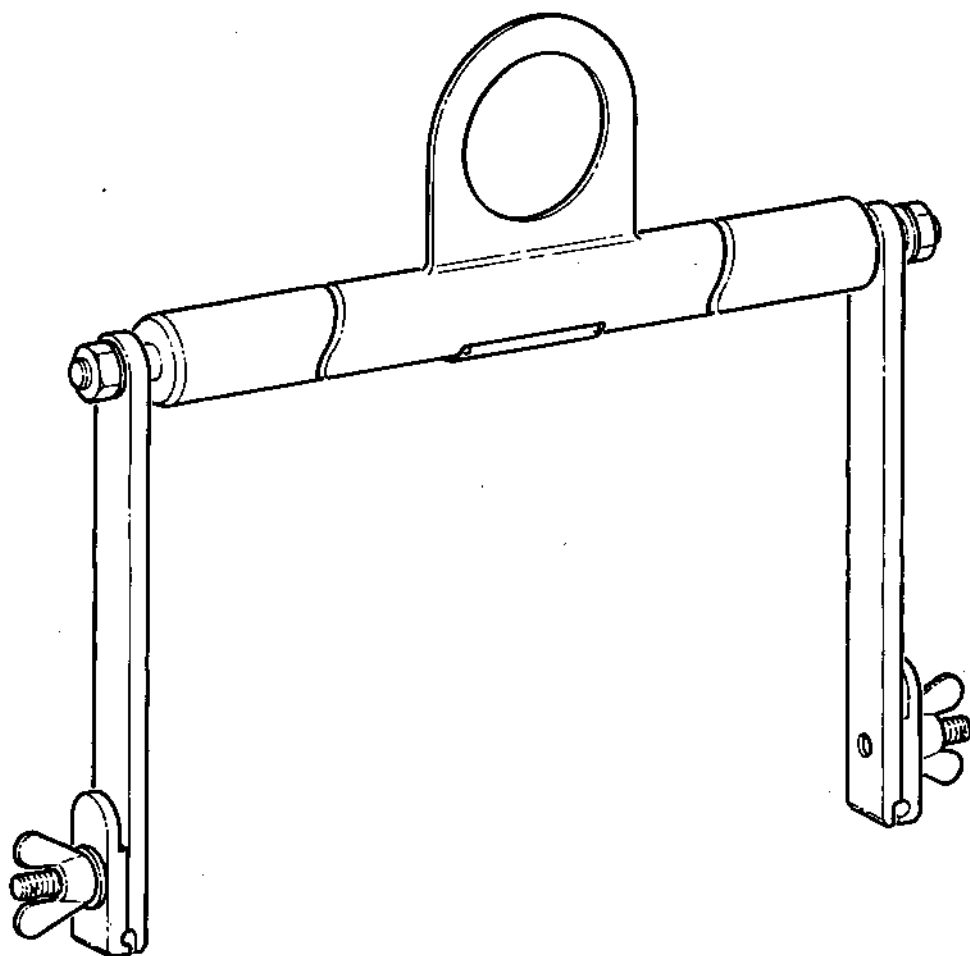
HOISTING BEAM

SNECMA No. 9970-511-039

Description ..... This hoisting beam is used to hoist the ventilation shroud.

Weight ..... 5 kg (11 lb)

Dimensions ..... 1200 x 360 x 40 mm (47.5 x 14 x 1.5 in.)



Tool  
SC 11

78-11-01

Page 1002  
Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



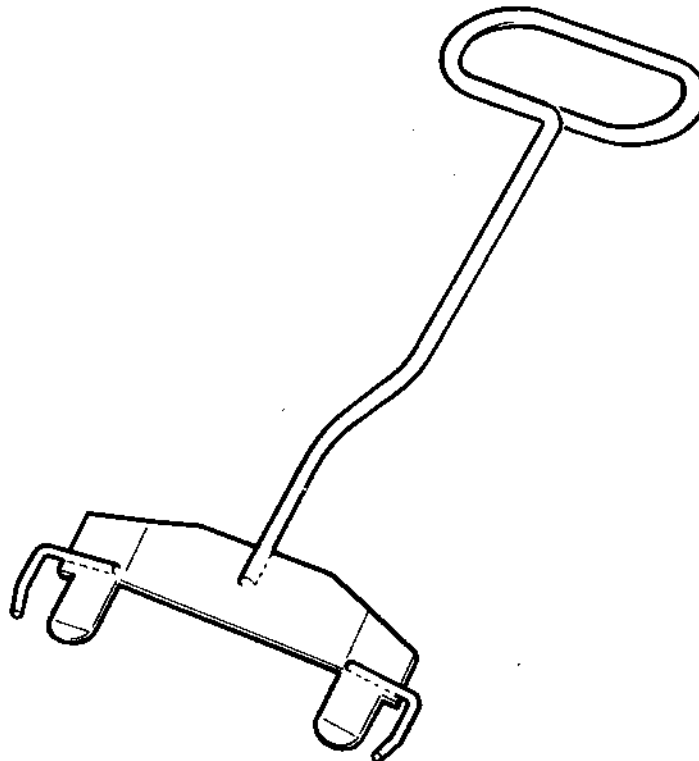
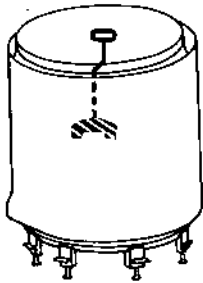
RETRACTION CLAW

SNECMA No. 9970-511-034

Description..... This retraction claw is used to retract the ventilation shroud flexible spacers when installing the shroud in the reheat duct. Tool SC 13 consists of 8 identical retraction claws.

Weight..... 1 Kg (2 lb) per claw

Dimensions..... 350 x 175 x 34 mm (13.8 x 6.9 x 1.3 in.)



Tool  
SC 13

78-11-01

Page 1003  
Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



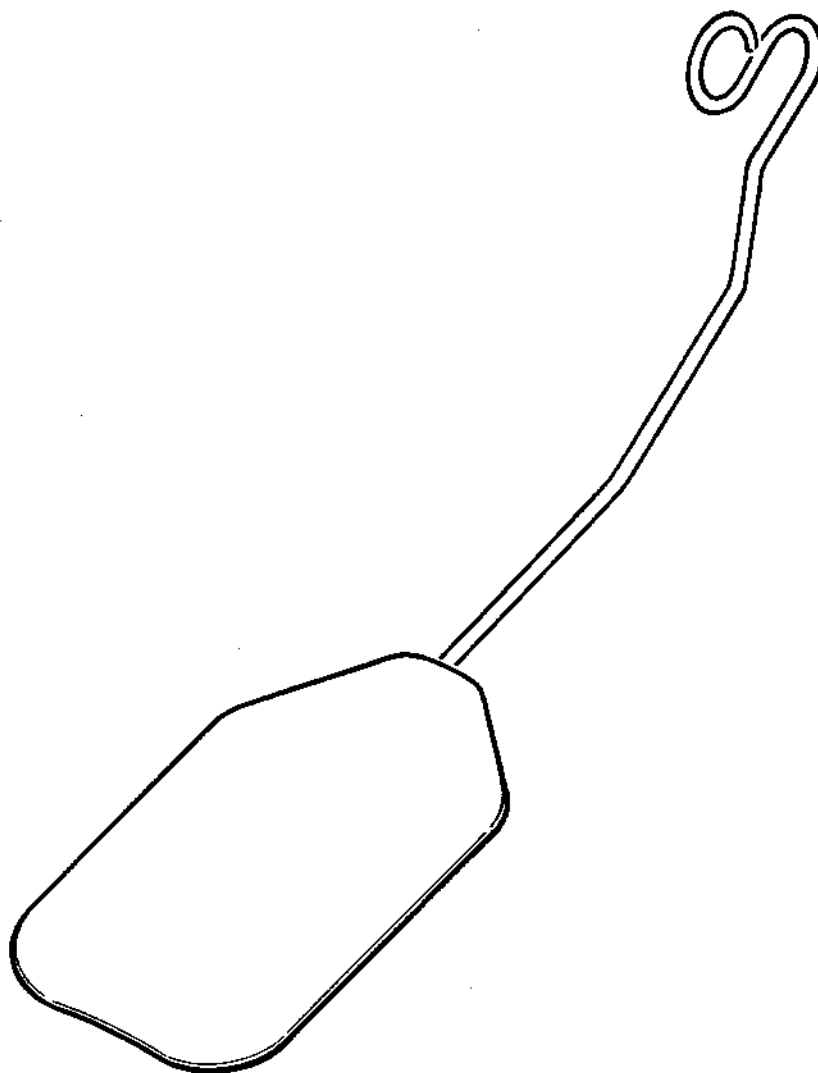
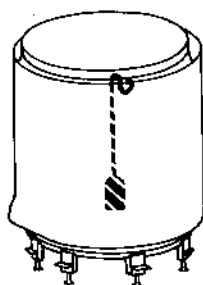
RETRACTION SPADE

SNECMA No. 9970-511-035

Description..... This spade is used to retract the reheat duct lugs when renewing the ventilation shroud.  
Tool SC 14 consists of 10 identical spades.

Weight..... 1 Kg (2 lb) per spade

Dimensions..... 700 x 150 x 16 mm (27.6 x 6 x 0.6 in.)



Tool  
SC 14

PRINTED IN FRANCE

78-11-01

Page 1004  
Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



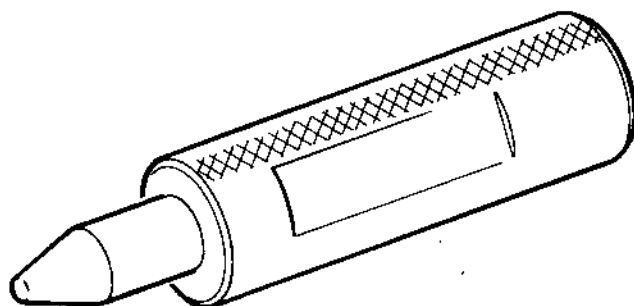
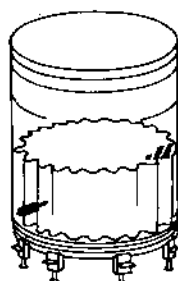
CONICAL PIN

SNECMA No. 9970-515-104

Description..... This pin is used to align the spacers with the reheat duct and the anti-screech liner holes.

Weight..... 0,200 Kg (0.44 lb)

Dimensions..... 135 x 15 x 15 mm (5.3 x 0.6 x 0.6 in.)



Tool  
SC 15

78-11-01

Page 1005  
Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



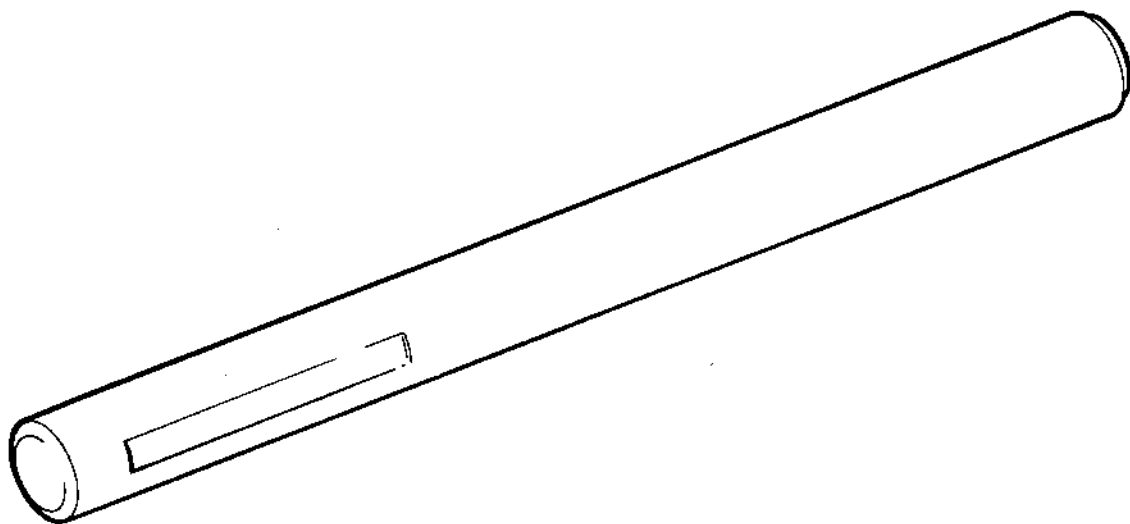
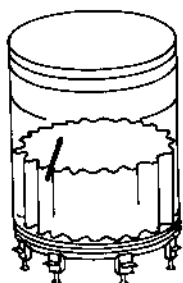
LEVER

SNECMA No. 9970-515-103

Description..... This lever is used for positioning the anti-screch liner spacers.

Weight..... 0,100 Kg (0.22 lb)

Dimensions..... 250 x 20 x 20 mm (9.8 x 0.8 x 0.8 in.)



Tool  
SC 17

78-11-01

Page 1006

Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



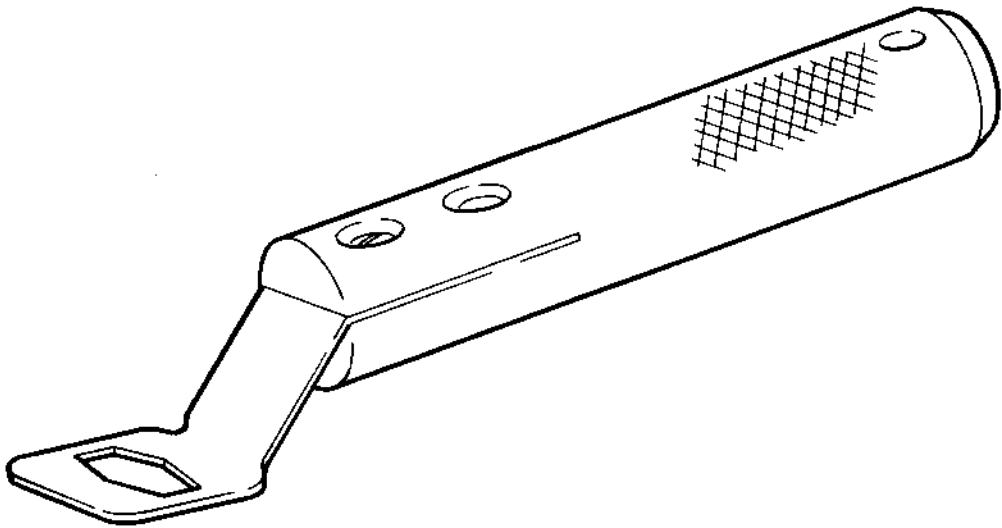
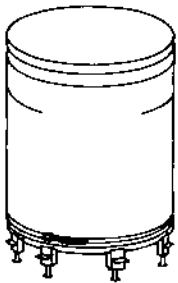
WRENCH

SNECMA No. 9970-511-024

Description..... This wrench is used for installing the anti-screch liner.

Weight..... 0,100 Kg (0.22 lb)

Dimensions..... 175 x 50 x 35 mm (6.9 x 2 x 1.4 in.)



Tool  
SC 18

78-11-01

Page 1007  
Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL

PROTECTOR

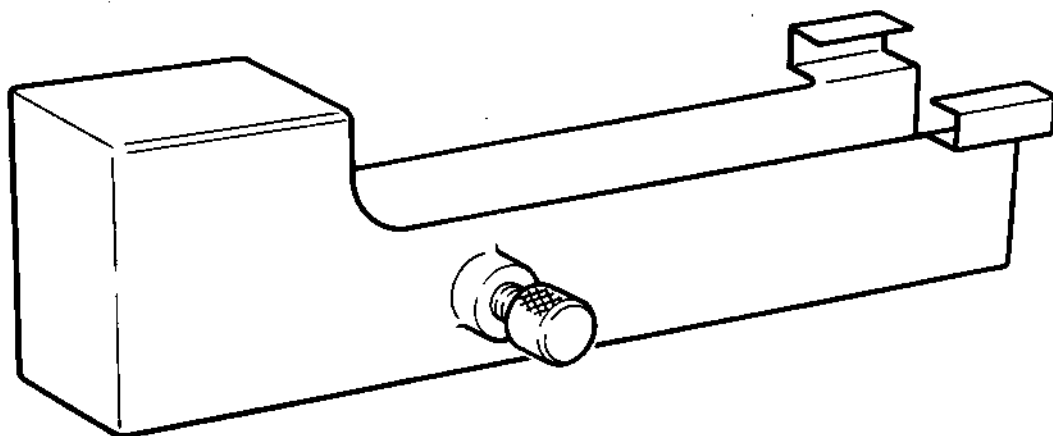
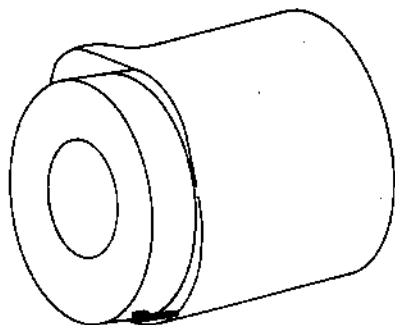


SNECMA No. 9970-541-032

Description..... This protector is used when removing the reheat jet pipe to protect the connecting link end pieces.

Weight..... 0,300 Kg (0.66 lb)

Dimensions..... 200 x 60 x 48 mm (7.9 x 2.4 x 1.9 in.)



Tool  
SC 19

78-11-01

Page 1008

Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



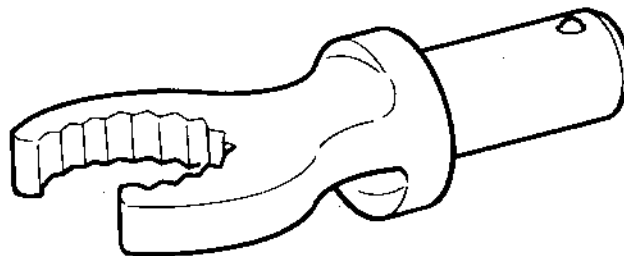
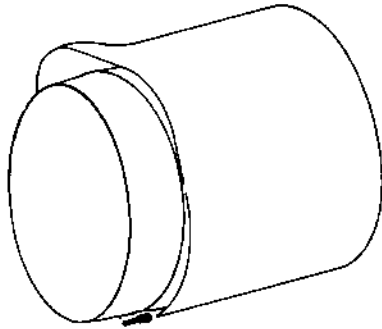
31 - TOOTH WRENCH

SNECMA No. 9970-515-056

Description..... This wrench is used to secure the fuel collector tube located at the reheat duct lower section.

Weight..... 0,150 Kg (0.33 lb)

Dimensions..... 87 x 44 x 24 mm (3.4 x 1.7 x 0.9 in.)



Tool  
SC 20

78-11-01

Page 1009  
Dec 15/75

PRINTED IN FRANCE





OLYMPUS 593

MK.610-14-28

OVERHAUL



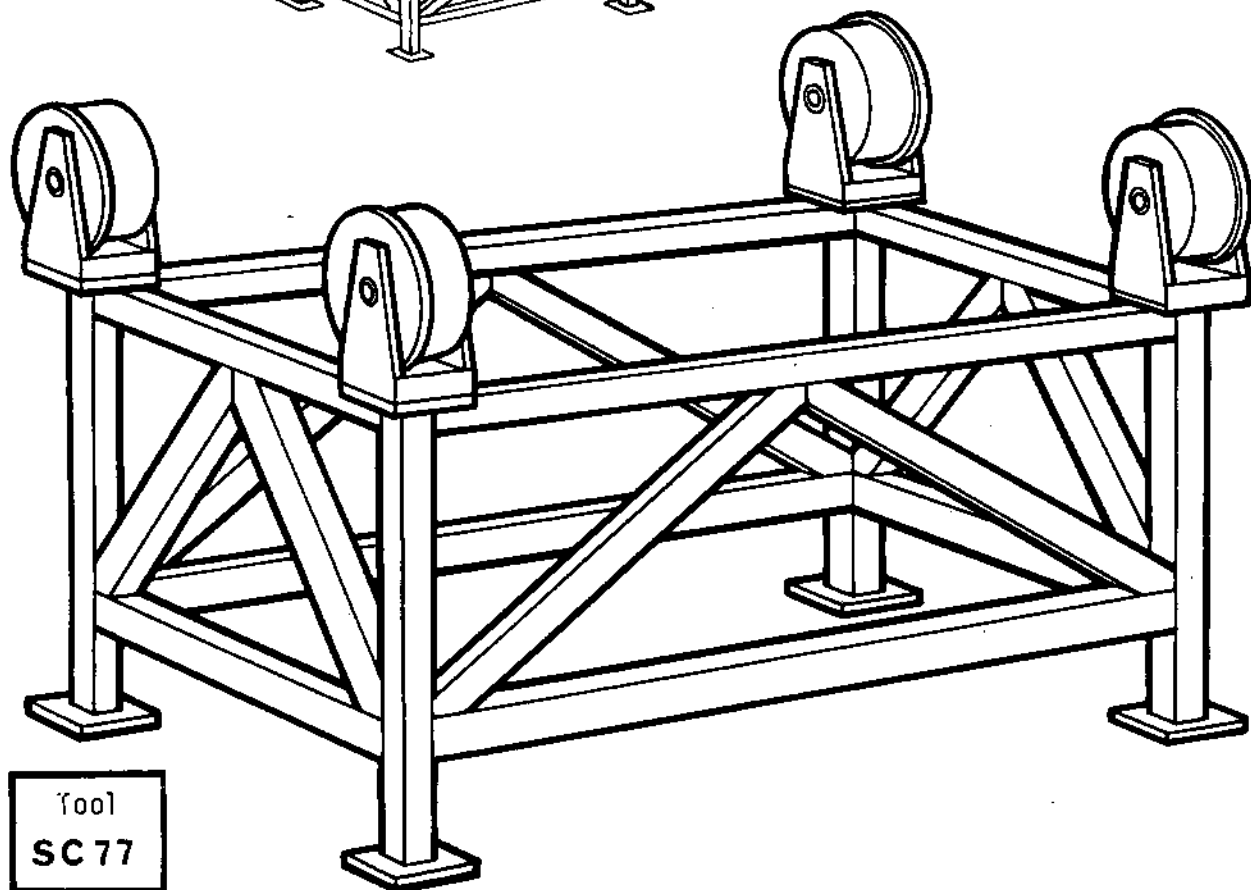
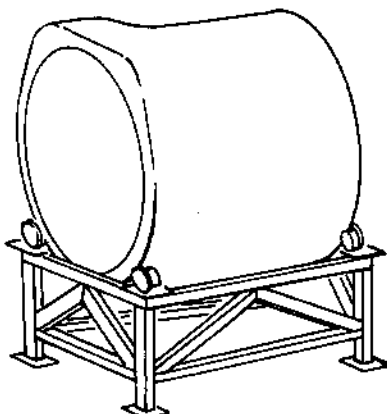
WORKSTAND

SNECMA No. 852-500-125-0

Description..... This stand is used during repair to assemble or disassemble the reheat jet pipe component parts.

Weight..... 45 Kg (99 lb)

Dimensions..... 1200 x 755 x 700 (47.2 x 29.7 x 27.6 in.)



**78-11-01**

Page 1010  
Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



LOCATING DEVICE

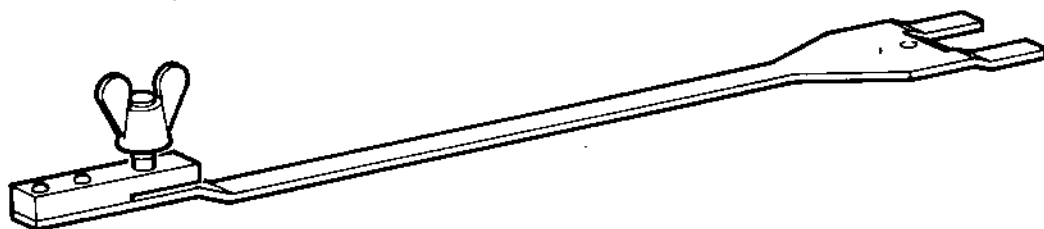
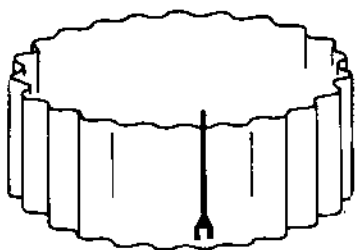
SNECMA No. 852-500-114-0

Description..... This device is used to maintain the slides in position when installing the anti-screech liner.

Tool SC 78 consists of 30 identical locating devices.

Weight..... 0,12 Kg (0.26 lb) per locating device

Dimensions..... 360 x 43 x 15 mm (14.2 x 1.7 x 0.6 in.)



Tool  
SC 78

78-11-01

Page 1011

Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



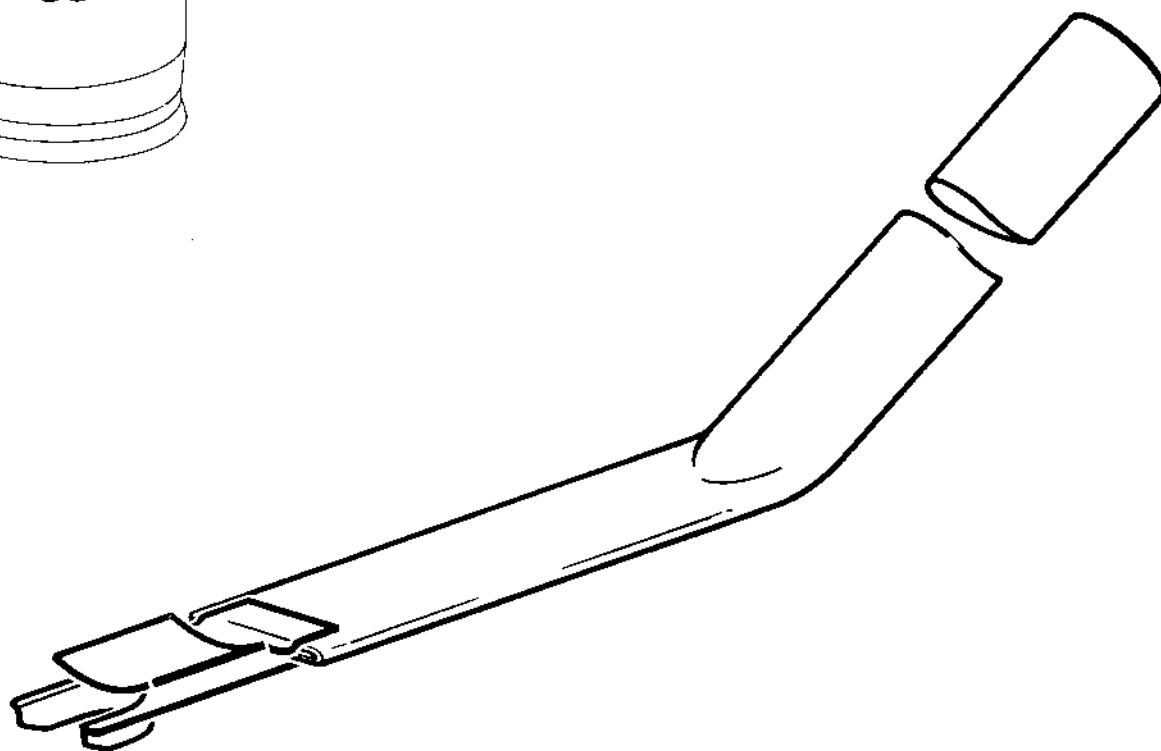
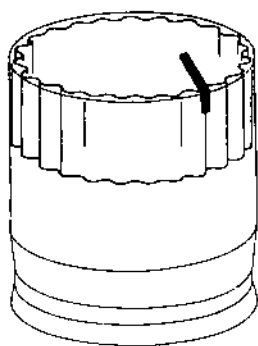
CLAW

SNECMA No. 852-500-115-0

Description..... This claw is used to insert in position the spacers between the anti-screach liner and the rehear duct.

Weight..... 0,25 Kg (0.55 lb)

Dimensions..... 420 x 170 x 35 mm (16.5 x 6.7 x 1.4 in.)



Tool  
SC 79

78-11-01

Page 1012  
Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



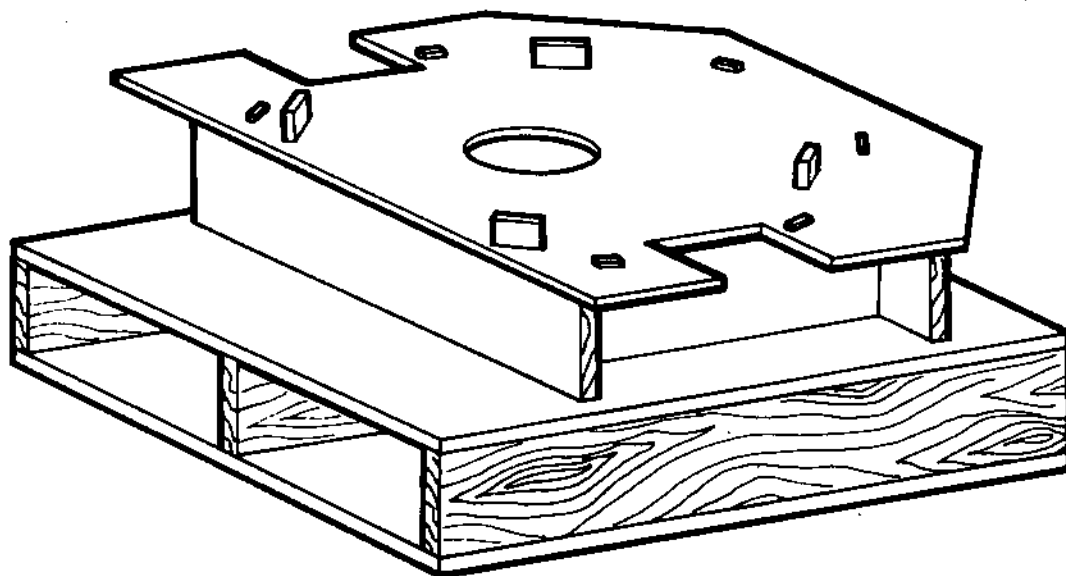
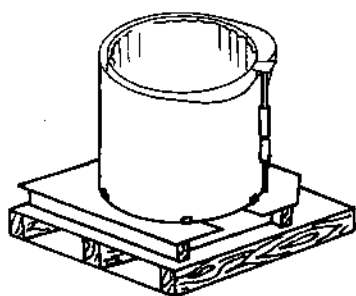
STORAGE FIXTURE

SNECMA No. 852-500-126-0

Description..... This fixture is used for temporary storage of the reheat jet pipe before overhauling it or placing it in a container.

Weight..... 29 Kg (64 lb)

Dimensions..... 1300 x 1200 x 425 mm (51.2 x 47.2 x 16.7 in.)



Tool  
SC 97

78-11-01

Page 1013  
Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



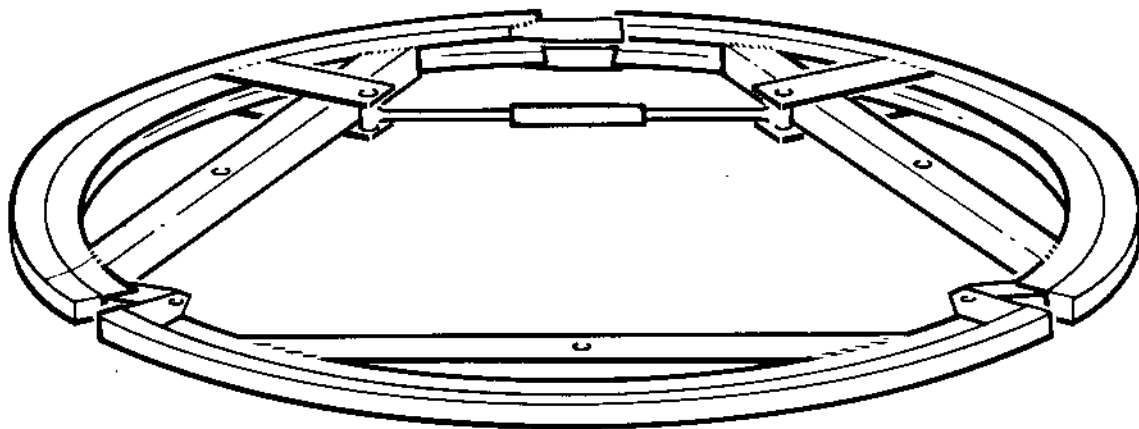
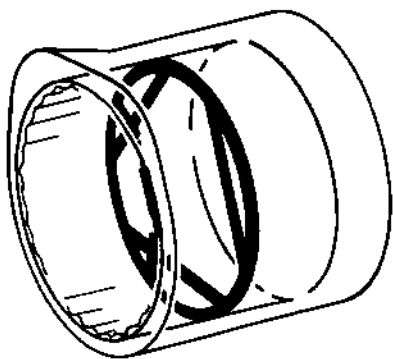
ANTI-DEFORMATION FIXTURE

SNECMA No. 852-630-100-0

Description..... This fixture is used to prevent deformation  
of the reheat jet pipe during tests.

Weight.....

Dimensions..... D = 1024 mm (40.31 in.)



Tool  
**SC 118**

**78-11-01**

Page 1014  
Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



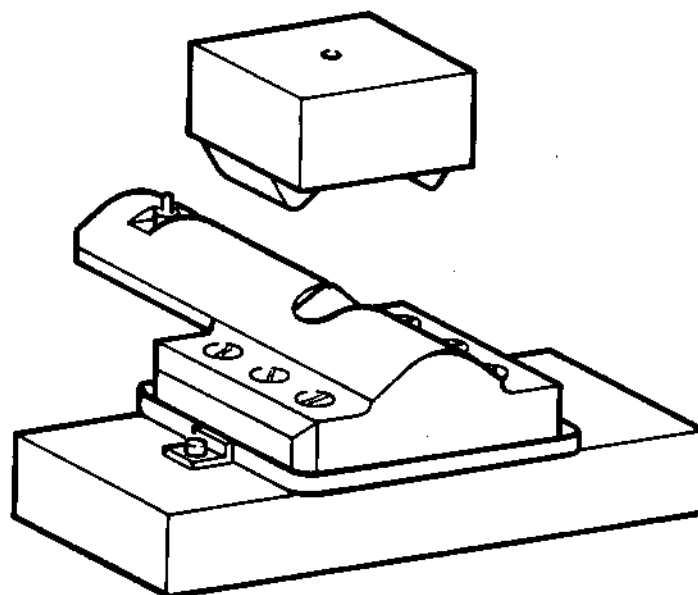
FORMING TOOL

SNECMA No. 852-630-065-0

Description..... This tool is used for patch forming before replacement of an anti-screech liner section.

Weight.....

Dimensions..... 330 x 300 x 160 mm (13 x 11.8 x 0.63 in.)



Tool  
SC 139

78-11-01

Page 1015

Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



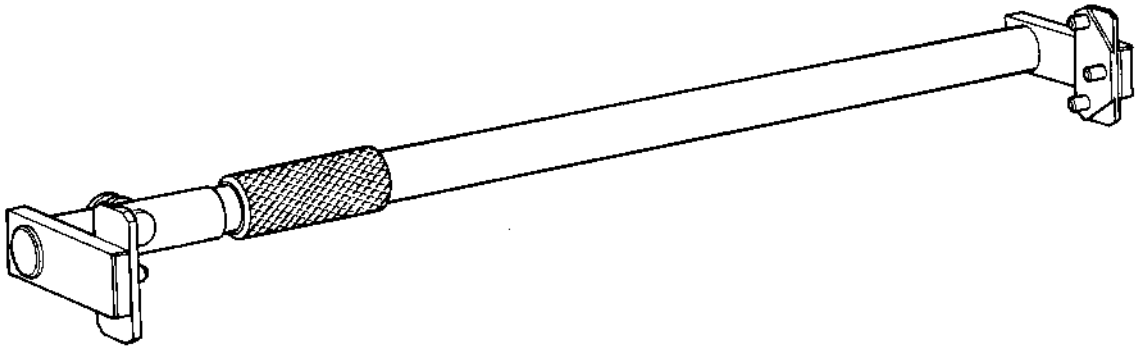
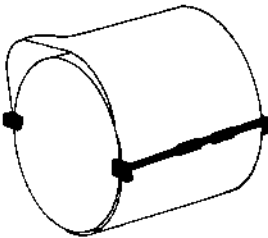
HOISTING AND TILTING BAR

SNECMA No. 852-500-130

Description..... This fixture is used for handling and tilting the reheat jet pipe.  
Tool SC 207 consists of 2 bars.

Weight..... 7 Kg (15.4 lb) for each bar detail

Dimensions..... 1200 x 220 x 140 mm (47.2 x 8.7 x 5.5 in.)



Tool  
**SC 207**

**78-11-01**

Page 1016  
Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



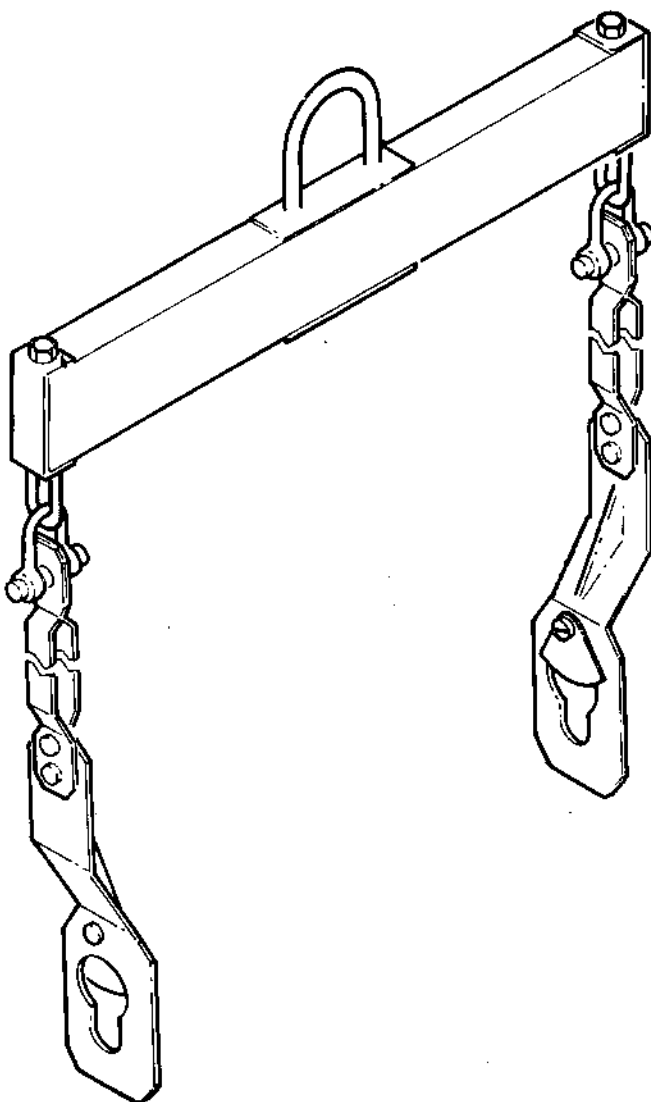
LIFTING BAR

SNECMA No. 852-500-129-0

Description..... This tool is used for handling of the reheat jet pipe and primary nozzle.

Weight..... 11,2 Kg (25 lb)

Dimensions..... 1480 x 975 x 40 mm (58.3 x 38.4 x 1.6 in.)



Tool  
**SC 210**

**78-11-01**

Page 1017

Dec. 15/75





OLYMPUS 593

MK.610-14-28  
OVERHAUL



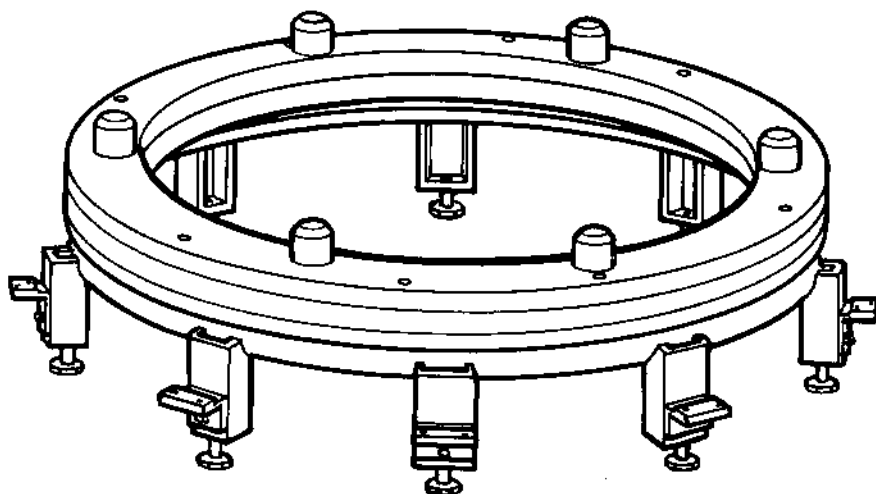
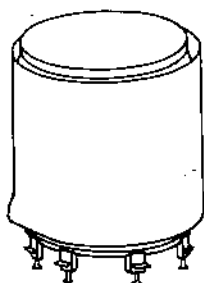
WORKSTAND

SNECMA No. 852-500-128-0

Description..... This stand is used to assemble/disassemble  
the reheat jet pipe.

Weight..... 47 Kg (103 lb)

Dimensions..... D = 1200 mm (47.2 in.), height = 280 mm  
(11 in.)



Tool  
SC 211

PRINTED IN FRANCE

78-11-01

Page 1018  
Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



# **ILLUSTRATED PARTS LIST**

**78-11-01**

TP 1101 PAGE 1  
DEC 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL



INTRODUCTION

1. Purpose

This illustrated parts list gives a complete list of the components required for the overhaul of an equipment.

2. Illustrated parts list

The illustrated parts list is divided into three parts :

- Introduction
- Numerical index
- Detailed parts list

A. Numerical index :

For the sake of clearness, this repertory is divided into two parts :

- (1) Index of manufacturers references beginning with a letter.
- (2) Index of manufacturers references beginning with a figure.

These indexes include all the manufacturers references for the parts described in the detailed nomenclature in alphabetical or numerical order. Opposite each reference is given the chapter-section-subject-figure-item number and the quantity.

B. Detailed parts list.

The detailed parts list gives, in disassembly order, the list and illustrations of the parts making up the assembly concerned from the origin as shown in the example paragraph B6 effectivity.

- (1) Items index numbers.

To allow simple and speedy identification, each item is given a numerical item in 10 to 10 sequence, this item will not vary during the whole life of the item.

- (2) Original item.

To cater for systematic evolution due to modifications a "letter" variant is added to the numerical item. The letter variant "A" is given in the original document to identify all the items in original definition.

78-11-01



It is given in the text part only.

(3) Modified item (Item variant).

After each modification concerning an item, the numerical item of this item is maintained but the "letter" variant progresses systematically to "B", then "C", "D" etc. (letters I, O and X are not used). This variant evolution is shown in the text and on the drawings only in the case of a change. The use of the "letter" variant added to the numerical item has been made necessary to make possible the rational use of the "effectivity Code" (usage code) such as it is presented paragraph 6 of this foreword.

(4) Indent

The detailed nomenclature is presented indented showing the relation between the various items, i.e :

1 2 3 4 5 6 7

Assembly

Assembly component parts

Sub-assembly

Sub-assembly attachment parts

\* \* \*

Sub-assembly component parts

Sub sub-assembly

Sub sub-assembly attachment parts

\* \* \*

Sub sub-assembly component parts

(5) Quantity per assembly

The quantity indicated in the "Quantity per assembly" column is that required by the next higher assembly.

(6) Effectivity

A coded method is used to indicate parts effectivity.

This alphanumerical code indicates the installation possibilities of sub-assemblies and primary parts in relation to the next higher sub-assembly or assembly. The validity column is left blank when installation is possible in all cases.

78-11-01



OLYMPUS 593

MK.610-14-28  
OVERHAUL

This code corresponds to the next higher assembly or sub-assembly item.

Figure Item	Manufacturers Reference	Description							Effectivity
		1	2	3	4	5	6	7	
1A	123450	Assembly							
1B	123451	Assembly (SB 1)							
1C	123452	Assembly (SB 2)							
1D	123453	Assembly (SB 3)							
10A	234560	. PRIMARY PART							1A
10B	234561	. PRIMARY PART (BS 1)							1BAC
10C	234562	. PRIMARY PART (BS 3)							1D
20A	345670	. SUB-ASSEMBLY							1A
20B	345671	. SUB-ASSEMBLY (BS 1)							1BAC
20C	345672	. SUB-ASSEMBLY (BS 2)							
20D	345673	. SUB-ASSEMBLY (BS 3)							
		. ATTACHING PARTS							
30A	456780	. PRIMARY PART							
		* * *							
40A	567890	. . PRIMARY PART							20A
40B	567891	. . PRIMARY PART (BS 1)							20BA
40C	567892	. . PRIMARY PART (BS-2)							20CAB
40D	567893	. . PRIMARY PART (BS 3)							20D

The above example shows that :

- The primary part index 10A can only be installed in assembly indexed 1A.
- The primary part index 10B can be installed in assemblies indexed 1A, 1B, and 1C.
- The primary part index 10C can only be installed in assembly indexed 1D.
- The sub-assembly index 20A can only be installed in assembly indexed 1A.
- The sub-assembly index 20B can be installed in assemblies indexed 1A, 1B and 1C.
- The sub-assemblies indexes 20C and 20D and their attaching parts indexed 30A can be installed in all assemblies indexed 1 and thus do not have an "effectivity" code.
- The primary part index 40A can only be installed in sub-assembly indexed 20A.
- The primary part index 40B can be installed in sub-assemblies indexed 20A and 20B.

78-11-01

- The primary part index 40C can be installed in sub-assemblies indexed 20A, 20B and 20C.
- The primary part index 40D can only be installed in the sub-assembly indexed 20D.

(7) Figure Variant

When it is not possible to illustrate the different variants of an assembly, resulting from modifications to the basic figure, one or several supplementary illustrations will describe these variants.

These supplementary illustrations will bear the same number as that of the basic figure, followed by a letter taken in the alphabetical order (except I and O).

Whatever the number of figure variants, they will be covered by only one nomenclature.

To ascertain quickly on which figure variant the item variant is to be found, the figure variant letter will be indicated in the nomenclature, in the "index reference figure item immediately in front of the item number.

3. Using the illustrated nomenclature

The identification of a component is possible taking the following elements in consideration :

A. Through the manufacturer's reference.

Search for the manufacturer's reference in the numerical index, note the chapter-section-subject-figure-item number and refer to the corresponding nomenclature.

B. At sight of the component, without knowing its references.

Look for the figure showing the component among the illustrations this will indicate the item permitting reference to the detailed nomenclature.



OLYMPUS 593

MK.610-14-28  
OVERHAUL

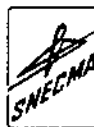


4. Manufacturer codes

<u>Code</u>	<u>Name and address</u>
F0224	SIMMONDS SA 5 RUE MICHELET 92152 SURESNES FRANCE
72962	ESNA DIV OF HARVARD INDUSTRIES INC. 2330 VAUXHALL ROAD UNION NEW JERSEY 07083 U.S.A.
13689	SPS TECHNOLOGIES INC. HALLOWELL DIV HATFIELD PENNSYLVANIA 19440 U.S.A.

PRINTED IN FRANCE

78-11-01

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

PART NUMBER	AIRLINE PART NUMBER	FIG	ITEM	TTL REQ
DHT5579-4		1	20A	2
		1	60A	8
		1	110A	4
		1	150A	7
		3	10A	2
		4	210A	2
		5	170A	5
		5	200A	2
DHT579-3		3	100A	32
MS9033-07		3	110A	32
MS9034-10		2	20A	10
SP108G		4	20A	3
		4	40A	2
		4	90A	5
		4	190A	5
Z1855-02				
OPT TO DHT579-3				
Z3874-048				
OPT TO DHT5579-4				

- ITEM NOT ILLUSTRATED

**78-11-01**NI ALPHA 1101 PAGE 1  
APR 30/93





OLYMPUS 593

MK.610-14-28

OVERHAUL



PART NUMBER	AIRLINE PART NUMBER	FIG	ITEM	TTL REQ
119FW1032				
OPT TO DHT579-3				
301-171-201-0		3	- 80A	1
301-171-202-0		3	- 80B	1
301-174-000-0		5	240A	1
301-178-400-0		5	160A	10
301-178-900-0		3	20A	2
301-179-000-0		3	40A	2
301-179-200-0		1	- 50B	1
301-179-201-0				
OPT TO 301-179-200-0				
301-179-300-0		1	-140B	2
301-179-301-0				
OPT TO 301-179-300-0				
301-179-500-0		4	120A	1
301-179-800-0		4	60A	1
301-180-000-0		1	100A	1
301-182-301-0		4	-130B	1
301-203-916-0		2	40A	1
SUPSD BY 301-203-918-0		4	- 1A	RF
SUPSD BY 301-203-918-0		5	- 1A	RF
SUPSD BY 301-203-918-0		2	- 40B	1
301-203-918-0				
SUPSDS 301-203-916-0		4	- 1B	RF
SUPSD BY 301-203-919-0		5	- 1B	RF
SUPSDS 301-203-916-0		2	- 40C	1
SUPSD BY 301-203-919-0		4	- 1C	RF
301-203-919-0		5	- 1C	RF
SUPSDS 301-203-918-0		2	10A	1
SUPSDS 301-203-918-0		3	- 1A	RF
SUPSDS 301-203-918-0		2	- 10B	1
SUPSDS 301-203-918-0		3	- 1B	RF
SUPSDS 301-203-918-0				
301-205-501-0				
SUPSDS BY 301-205-502-0				
SUPSD BY 301-205-502-0				
301-205-502-0				
SUPSDS 301-205-501-0				
SUPSDS 301-205-501-0				

- ITEM NOT ILLUSTRATED

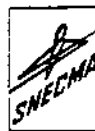
78-11-01

NI NUM 1101 - PAGE 1

DEC 15/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL

PART NUMBER	AIRLINE PART NUMBER	FIG	ITEM	TTL REQ
301-218-000-0		1	- 1A	RF
SUPSD BY 301-218-004-0		2	- 1A	RF
SUPSD BY 301-218-004-0		1	- 1C	RF
301-218-003-0		2	- 1C	RF
SUPSDS 301-218-004-0		1	- 1B	RF
SUPSD BY 301-218-005-0		2	- 1B	RF
SUPSDS 301-218-004-0		1	- 1D	RF
SUPSD BY 301-218-005-0		2	- 1D	RF
301-218-004-0		1	120A	8
SUPSDS 301-218-000-0		2	230A	1
SUPSD BY 301-218-003-0		3	150A	1
301-218-005-0		4	30A	10
SUPSDS 301-218-003-0		2	40A	4
SUPSDS 301-218-003-0		5	80A	5
525-203-047-0		5	110A	21
525-203-067-0		5	20A	4
525-203-068-0		5	60A	5
525-203-085-0		5	130A	28
525-203-100-0		4	170A	2
525-203-101-0		5	70A	5
525-203-102-0		5	100A	21
525-203-109-0		5	30A	4
525-203-124-0		4	-200B	1
525-203-125-0		4	100A	1
525-203-148-0		4	50A	1
525-203-172-0		5	140A	30
525-203-173-0		5	150A	30
525-203-242-0		3	90A	8
525-203-293-0		4	110A	1
525-203-614-0		3	70A	2
525-203-675-0		4	200A	1
525-400-094-0		1	40A	2
525-600-054-0		1	80A	8
525-600-055-0		1	130A	4
		1	170A	7
		4	230A	2

- ITEM NOT ILLUSTRATED

78-11-01

NI NUM 1101 - PAGE 2  
APR 30/93

BDC - 7824 - 12-78

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



PART NUMBER	AIRLINE PART NUMBER	FIG	ITEM	TTL REQ
525-600-055-0		5	190A	20
		5	220A	2
525-600-056-0		4	240A	1
525-600-086-0		5	50A	2
525-600-106-0		1	50A	1
525-600-166-0		1	90A	8
		1	180A	7
525-600-196-0		1	140A	2
525-609-725-0		4	130A	1
525-609-731-0				
OPT TO 525-600-196-0				
525-609-757-0				
OPT TO 525-600-106-0				
525-609-769-0		1	10A	1
525-609-773-0		5	10A	1
525-991-003-0		3	130A	1
525-991-004-0		3	-130B	1
649-091-073-0		3	50A	4
649-092-078-0		5	210A	2
649-092-372-0		3	30A	2
649-092-373-0		5	180A	20
649-092-377-0		1	30A	2
		1	70A	8
		1	120A	4
		1	160A	7
		4	220A	2
649-262-012-0		4	- 70A	5
		5	90A	21
649-341-011-0		3	60A	4
649-774-012-0		4	30A	2
649-774-014-0		4	180A	5
649-774-067-0		4	80A	5
649-774-068-0		4	10A	3
649-774-069-0		5	120A	58
649-774-086-0		4	160A	2
649-777-001-0		4	140A	2

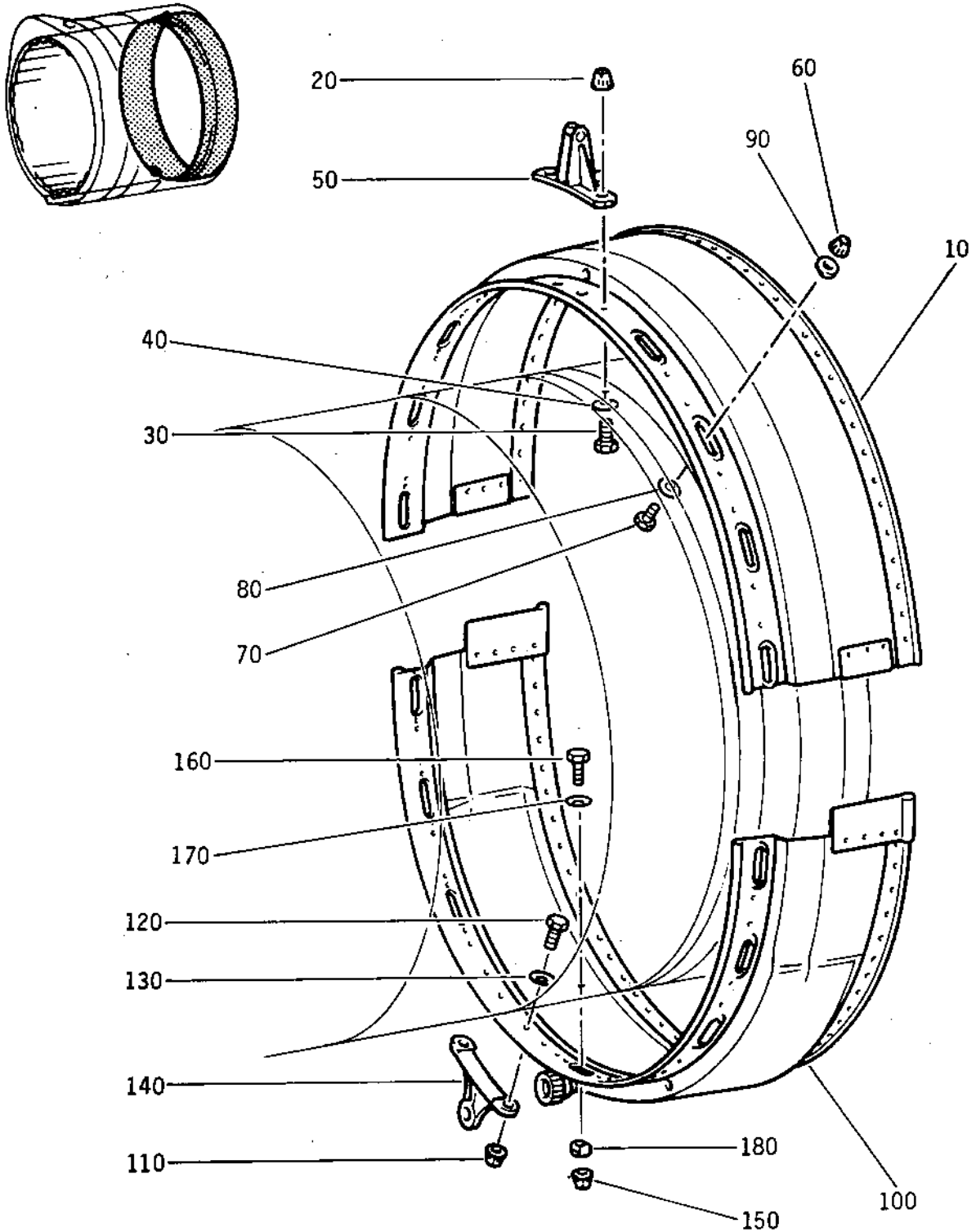
- ITEM NOT ILLUSTRATED

**78-11-01**NI NUM 1101 - PAGES 3/4  
DEC 15/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Jet Pipe Reheat  
Figure 1



OLYMPUS 593

MK.610-14-28

OVERHAUL



FIG-ITEM	PART NUMBER	NOMENCLATURE						USAGE CODE	UNITS PER ASSY
		1	2	3	4	5	6		
1 - 1A	301-218-000-0	JET-PIPE,REHEAT							RF
- 1B	301-218-004-0	JET-PIPE,REHEAT							RF
		POST SB OL-593-78-4							
- 1C	301-218-003-0	JET-PIPE,REHEAT							RF
		POST SB OL-593-78-5							
- 1D	301-218-005-0	JET-PIPE,REHEAT							RF R
		POST SB OL-593-77-9							
10A	525-609-769-0	.DEFLECTOR,HALF UPPER							1
		ATTACHING PARTS							
20A	DHT5579-4	.NUT,SELF-LOCKING							2
		OPT TO Z3874-048							
30A	649-092-377-0	.BOLT,HEXAGONAL HEAD							2
40A	525-600-055-0	.WASHER							2
50A	525-600-106-0	.RING,HOISTING						1AB	1 R
		OPT TO 525-609-757-0							
- 50B	301-179-200-0	.RING,HOISTING							1
		OPT TO 301-179-201-0							
		POST SB OL 593-78-5							
60A	DHT5579-4	.NUT,SELF-LOCKING							8
		OPT TO Z3874-048							
70A	649-092-377-0	.BOLT,HEXAGONAL HEAD							8
80A	525-600-055-0	.WASHER							8
90A	525-600-166-0	.BUSH							8
		***							
100A	301-180-000-0	.DEFLECTOR,HALF LOWER							1
		ATTACHING PARTS							
110A	DHT5579-4	.NUT,SELF-LOCKING							4
		OPT TO Z3874-048							
120A	649-092-377-0	.BOLT,HEXAGONAL HEAD							4
130A	525-600-055-0	.WASHER							4
140A	525-600-196-0	.RING,HOISTING						1AB	2 R
		OPT TO 525-609-731-0							
-140B	301-179-300-0	.RING,HOISTING							2
		OPT TO 301-179-301-0							
		POST SB OL-593-78-5							
150A	DHT5579-4	.NUT,SELF-LOCKING							7
		OPT TO Z3874-048							
160A	649-092-377-0	.BOLT,HEXAGONAL HEAD							7
170A	525-600-055-0	.WASHER							7
180A	525-600-166-0	.BUSH							7
		***							

- ITEM NOT ILLUSTRATED

78-11-01

PAGE 1101-1

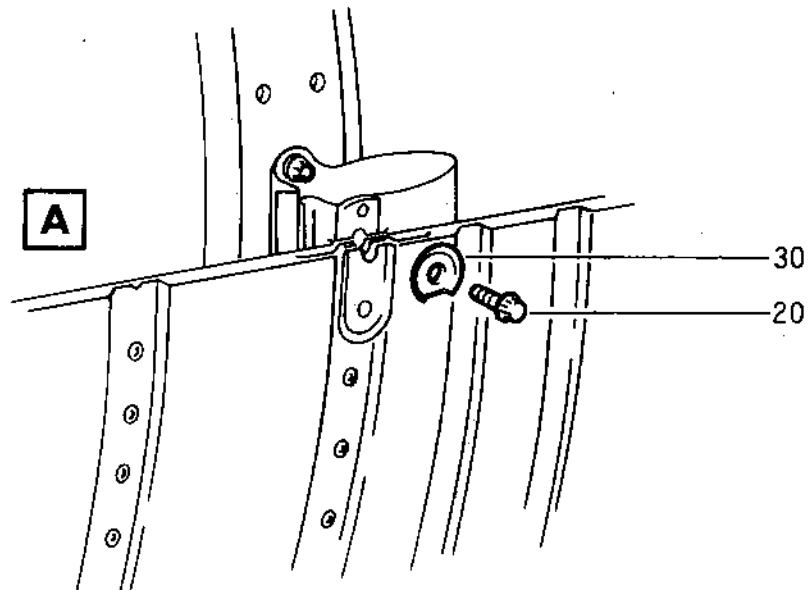
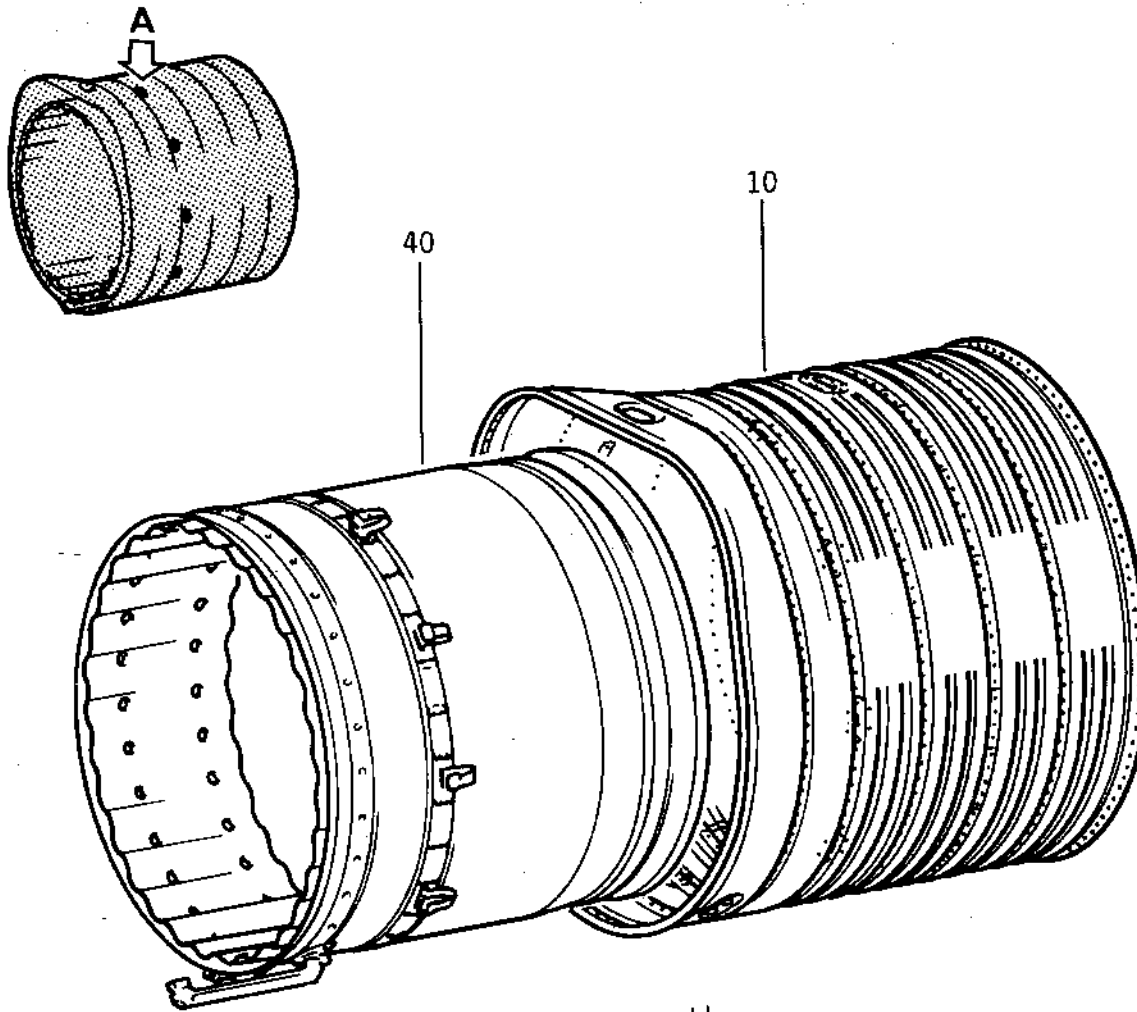
DEC 15/76

MTD AIA 07



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Jet Pipe Reheat  
Figure 2

78-11-01

PAGE 1102-0  
DEC 30/74



# OLYMPUS 593

MK.610-14-28

OVERHAUL



FIG-ITEM	PART NUMBER	NOMENCLATURE						USAGE CODE	UNITS PER ASSY
		1	2	3	4	5	6		
2 - 1A	301-218-000-0	JET-PIPE,REHEAT (CTD)							RF
- 1B	301-218-004-0	JET-PIPE,REHEAT (CTD)							RF
		POST SB OL-593-78-4							
- 1C	301-218-003-0	JET-PIPE,REHEAT (CTD)							RF
		POST SB OL-593-78-5							
- 1D	301-218-005-0	JET-PIPE,REHEAT (CTD)							RF R
		POST SB OL-593-77-9							
10A	301-205-501-0	.SHROUD,VENTILATION ASSY							1
		SEE 78-11-01-03 FOR DET							
- 10B	301-205-502-0	.SHROUD,VENTILATION ASSY							1 R
		SEE 78-11-01-03 FOR DET							
		POST SB OL-593-78-25							
20A	MS9034-10	.BOLT,12-POINT HEAD							10
30A	525-203-085-0	.WASHER							10
		****							
40A	301-203-916-0	.DUCT,REHEAT ASSY						1A	1
		SEE 78-11-01-04 FOR DET							
- 40B	301-203-918-0	.DUCT,REHEAT ASSY						1ABC	1 R
		SEE 78-11-01-04 FOR DET							
		POST SB OL-593-78-4							
- 40C	301-203-919-0	.DUCT,REHEAT ASSY							1 R
		SEE 78-11-01-04 FOR DET							
		POST SB OL-593-77-9							

- ITEM NOT ILLUSTRATED

## 78-11-01

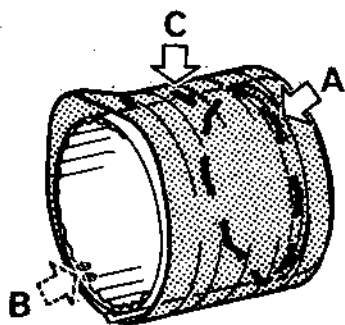
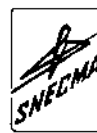
PAGE 1102-1

DEC 15/76

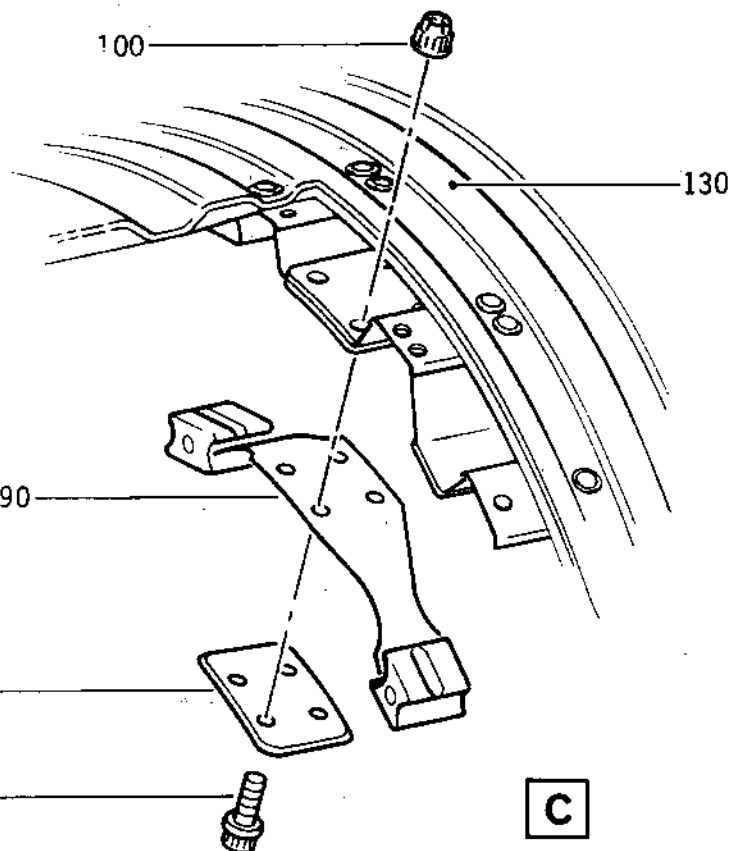


OLYMPUS 593

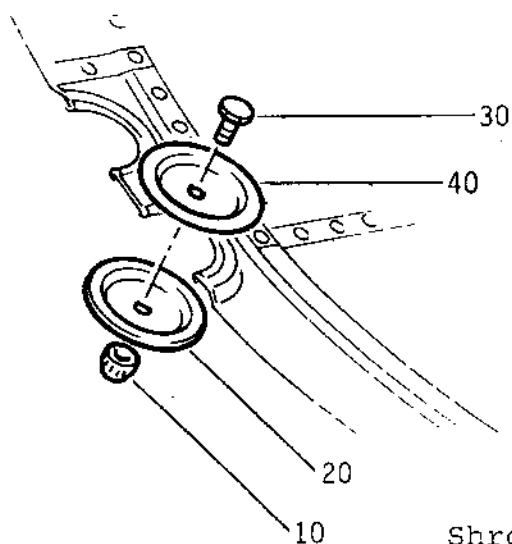
MK.610-14-28  
OVERHAUL



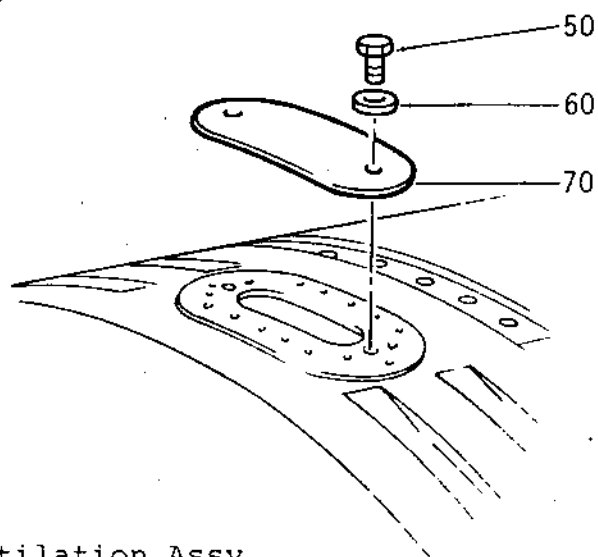
**A**



**B**



**C**



Shroud, Ventilation Assy  
Figure 3

**78-11-01**

PAGE 1103-0  
DEC 30/74





OLYMPUS 503

MK.610-14-28  
OVERHAUL

FIG-ITEM	PART NUMBER	NOMENCLATURE						USAGE CODE	UNITS PER ASSY
		1	2	3	4	5	6		
3 - 1A	301-205-501-0	SHROUD, VENTILATION ASSY SEE 78-11-01-02 FOR NHA							RF
- 1B	301-205-502-0	SHROUD, VENTILATION ASSY SEE 78-11-01-02 FOR NHA							RF
10A	DHT5579-4	.NUT, SELF-LOCKING VF0224 OPT TO Z3874-048 V72962							2
20A	301-178-900-0	.WASHER							2
30A	649-092-372-0	.BOLT, HEXAGONAL HEAD							2
40A	301-179-000-0	.WASHER							2
50A	649-091-073-0	.BOLT, HEXAGONAL HEAD							4
60A	649-341-011-0	.WASHER, FLAT							4
70A	525-400-094-0	.COVER							2
- 80A	301-171-201-0	.SHROUD, VENTILATION						1A	1
- 80B	301-171-202-0	.SHROUD, VENTILATION POST SB 0L-593-78-25							1
90A	525-203-614-0	..SPACER, FLEXIBLE ATTACHING PARTS							8
100A	DHT579-3	..NUT, SELF-LOCKING VF0224 OPT TO Z1855-02 V72962 OPT TO 119FW1032 V13689							32
110A	MS9033-07	..BOLT, 12 POINT HEAD							32
120A	525-203-047-0	..PLATE, INTERNAL ****							8
130A	525-991-003-0	..SHROUD, VENTILATION WITH FIXED PARTS						80A	1
-130B	525-991-004-0	..SHROUD, VENTILATION WITH FIXED PARTS POST SB 0L-593-78-25							1

- ITEM NOT ILLUSTRATED

78-11-01

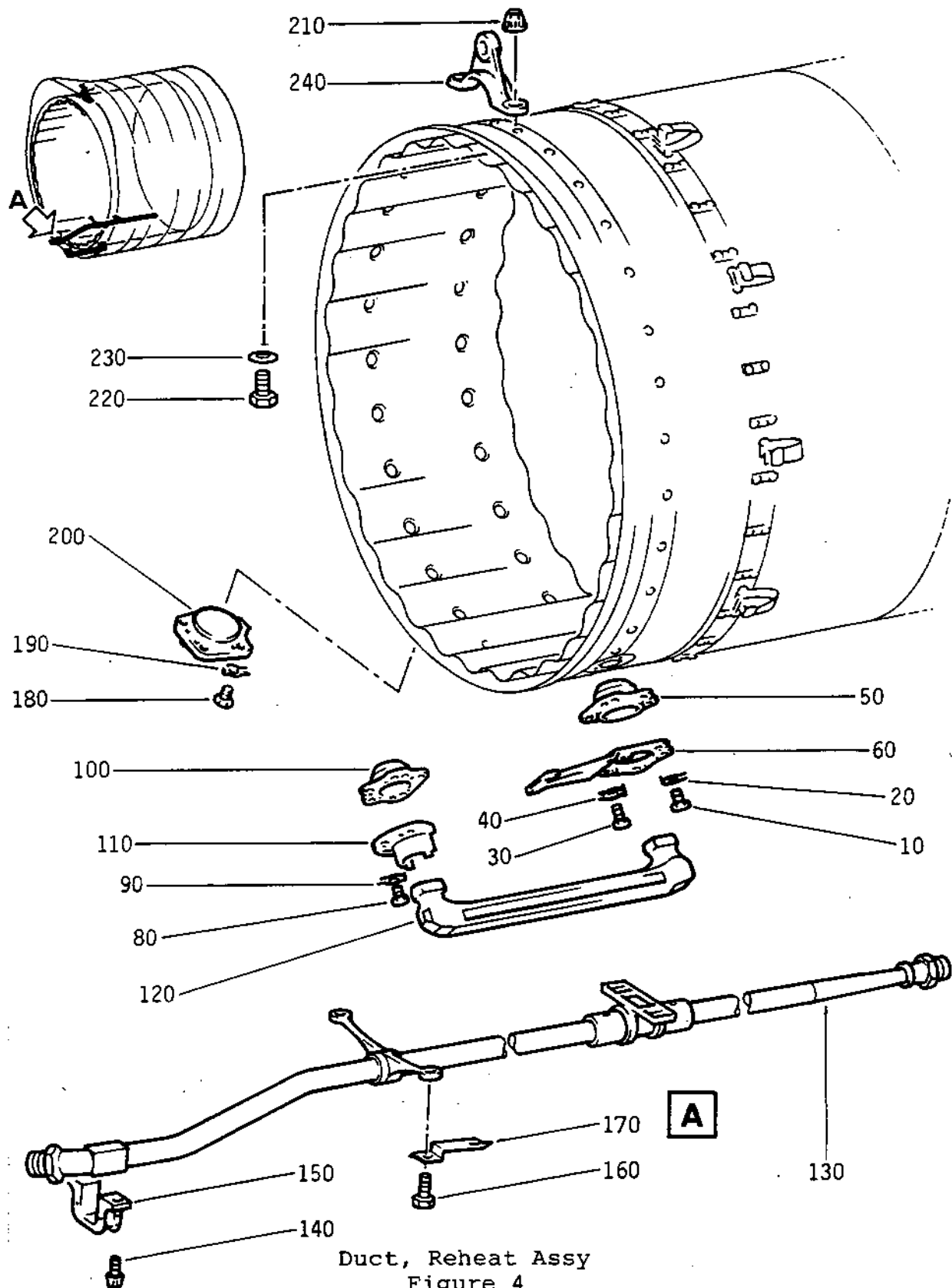
PAGE 1103-1  
APR 30/93



OLYMPUS 593

MK. 610-14-28

OVERHAUL



Duct, Reheat Assy  
Figure 4

78-11-01

PAGE 1104-0  
DEC 30/74

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



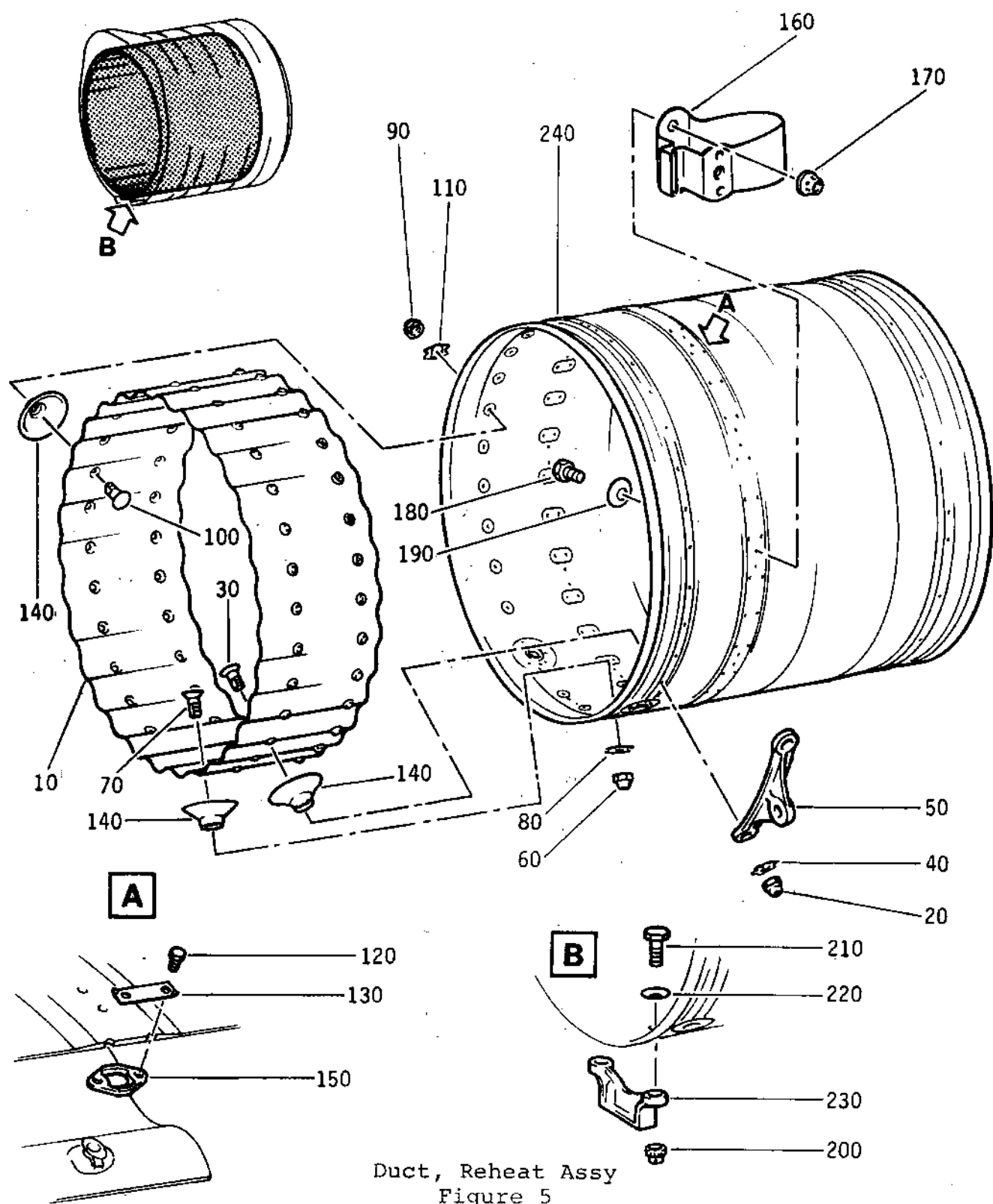
FIG-ITEM	PART NUMBER	NOMENCLATURE						USAGE CODE	UNITS PER ASSY
		1	2	3	4	5	6		
4 - 1A	301-203-916-0	DUCT,REHEAT ASSY							RF
		SEE 78-11-01-02 FOR NHA							
- 1B	301-203-918-0	DUCT,REHEAT ASSY							RF
		SEE 78-11-01-02 FOR NHA							
		POST SB OL-593-78-4							
- 1C	301-203-919-0	DUCT,REHEAT ASSY							RF R
		SEE 78-11-01-02 FOR NHA							
		POST SB OL-593-77-9							
10A	649-774-068-0	.BOLT,HEXAGONAL HEAD							3
20A	SP108G	.TABWASHER							3
30A	649-774-012-0	.BOLT,HEXAGONAL HEAD							2
40A	SP108G	.TABWASHER							2
50A	525-203-173-0	.HOUSING,SPHERICAL JOINT							1
60A	301-179-800-0	.STOP,ANGULAR POSITION							1
- 70A	649-262-012-0	.NUT,HEXAGONAL							5
		(TRANSPORTATION PARTS)							
80A	649-774-067-0	.BOLT,HEXAGONAL HEAD							5
90A	SP108G	.TABWASHER							5
100A	525-203-172-0	.HOUSING,SPHERICAL JOINT							1
110A	525-203-675-0	.HOUSING,ANTI-ROLL							1
120A	301-179-500-0	.LINK,CONNECTING							1
130A	525-609-725-0	.COLLECTOR,TUBE						1A	1
-130B	301-182-301-0	.COLLECTOR,TUBE							1
		POST SB OL-593-78-4							
		ATTACHING PARTS							
140A	649-777-001-0	.BOLT,12-POINT HEAD							2
150A	525-203-068-0	.CLAMP							1
160A	649-774-086-0	.BOLT,HEXAGONAL HEAD							2
170A	525-203-109-0	.LOCKPLATE							2
		XXXX							
180A	649-774-014-0	.BOLT,HEXAGONAL HEAD							5
190A	SP108G	.TABWASHER							5
200A	525-600-054-0	.SUPPORT						1AB	1
-200B	525-203-148-0	.COVER							1
		POST SB OL-593-77-9							
210A	DHT5579-4	.NUT,SELF-LOCKING							2
		OPT TO Z3874-048							
220A	649-092-377-0	.BOLT,HEXAGONAL HEAD							2
230A	525-600-055-0	.WASHER							2
240A	525-600-056-0	.RING,HOISTING							1

- ITEM NOT ILLUSTRATED

**78-11-01**

PAGE 1104-1

DEC 15/76



Duct, Reheat Assy  
Figure 5



OLYMPUS 593

MK.610-14-28

OVERHAUL



FIG-ITEM	PART NUMBER	NOMENCLATURE						USAGE CODE	UNITS PER ASSY
		1	2	3	4	5	6		
5 - 1A	301-203-916-0	DUCT,REHEAT ASSY (CTD)							RF
		SEE 78-11-01-02 FOR NHA							
- 1B	301-203-918-0	DUCT,REHEAT ASSY (CTD)							RF
		SEE 78-11-01-02 FOR NHA							
		POST SB OL-593-78-4							
- 1C	301-203-919-0	DUCT,REHEAT ASSY (CTD)							RF R
		SEE 78-11-01-02 FOR NHA							
		POST SB OL-593-77-9							
10A	525-609-773-0	.LINER,ANTI-SCREECH							1
		ATTACHING PARTS							
20A	525-203-101-0	.NUT,BLIND							4
30A	525-203-125-0	.BOLT							4
40A	525-203-100-0	.LOCKPLATE							4
50A	525-600-086-0	.RING,HOISTING							2
60A	525-203-101-0	.NUT,BLIND							5
70A	525-203-124-0	.BOLT							5
80A	525-203-100-0	.LOCKPLATE							5
90A	649-262-012-0	.NUT,HEXAGONAL							21
100A	525-203-124-0	.BOLT							21
110A	525-203-100-0	.LOCKPLATE							21
120A	649-774-069-0	.BOLT,HEXAGONAL HEAD							58
130A	525-203-102-0	.LOCKPLATE							28
140A	525-203-242-0	.SPACER							30
150A	525-203-293-0	.SLIDE							30
		****							
160A	301-178-400-0	.LUG							10
		ATTACHING PARTS							
170A	DHT5579-4	.NUT,SELF-LOCKING					VF0224		20
		OPT TO Z3874-048					V72962		
180A	649-092-373-0	.BOLT,HEXAGONAL HEAD							20
190A	525-600-055-0	.WASHER							20
		****							
200A	DHT5579-4	.NUT,SELF-LOCKING					VF0224		2
		OPT TO Z3874-048					V72962		
210A	649-092-078-0	.BOLT,HEXAGONAL HEAD							2
220A	525-600-055-0	.WASHER							2
230A	525-203-067-0	.SUPPORT,CLAMP							1
240A	301-174-000-0	.DUCT,REHEAT							1

- ITEM NOT ILLUSTRATED

78-11-01

PAGE 1105-1

DEC 15/76

MTD ATA 07



# **OLYMPUS 593 MK 610-14-28 OVERHAUL MANUAL**

## **EXHAUST SYSTEM**

## **PRIMARY NOZZLE 78-12-01**



1975

The information contained in this document is the property of Rolls-Royce limited and SNECMA and may not be copied or used for any purpose other than that for which it is supplied without the express written authority of Rolls-Royce limited and SNECMA. (This does not preclude use by engine and aircraft operators for normal instructional maintenance or overhaul purposes).

**ROLLS-ROYCE (1971) LIMITED**  
AERO DIVISION

TECHNICAL PUBLICATIONS DEPARTMENT  
P.O. BOX 3, FULTON, BRISTOL, BS12 7QE, ENGLAND

**SNECMA**  
APRES VENTE CIVILE  
SITE DE MELUN MONTEREAU  
AERODROME DE VILLAROCHE  
BP 1936 - 77019 MELUN CEDEX (FRANCE)



OLYMPUS 593

MK. 610-14-28  
OVERHAUL



LIST OF APPROVED REPAIR FACILITIES

TRADE NAME	ADDRESS

78-12-01

LARF Pages 1/2  
Dec 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL



LIST OF PRODUCTS AND COMPOUNDS

PRODUCT NAME	CODE	SUPPLIER	ADDRESS

78-12-01

LPC Pages 1/2  
Dec 30/74





OLYMPUS 593

MK.610-14-28  
OVERHAUL



## LIST OF CHAPTERS

FOREWORD	1
DESCRIPTION AND OPERATION	
1. Description	1
A. The convergent section	1
B. Support ring assembly	1
C. The petals	4
D. Pneumatic jacks	4
2. Operation	7
DISASSEMBLY	
1. General	101
2. Disassembly of the primary nozzle	101
A. Placing on the work table	101
B. Removal of the primary nozzle jacks	101
C. Removal of pressure tube	102
D. Disassembly of the nozzle area detection system	102
E. Disassembly of the actuation linkage and the petals	103
F. Removal of the convergent section/support ring	104
G. Disassembling the support ring assembly	105
CLEANING	
1. General	201
2. Specific recommendations	201
3. Cleaning processes	203
INSPECTION	
1. Introduction	301
A. Inspection - General	301

78-12-01

LC Page 1  
Dec 15/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



B. Prepare for "Estimate" Inspection .....	301
C. "Estimate" Inspection .....	301
D. Protection against corrosion following inspection .....	302
2. Visual inspection .....	302
3. Inspection for soundness .....	303
4. Dimensional inspection .....	305
5. Inspection of parts .....	306
A. Air supply .....	306
B. Tube .....	307
C. Blanking part assembly .....	307
D. Link .....	308
E. Support assembly .....	308
F. Connecting yoke .....	308
G. Yoke .....	308
H. Yoke .....	308
I. Stop .....	308
J. Follower petal .....	309
K. Link .....	310
L. Link .....	310
M. Spherical joint .....	310
N. Actuated petal .....	311
O. Lever .....	312
P. Lever .....	312
Q. Twin yoke .....	312
R. Convergent section .....	312
S. Jointing segment .....	315

78-12-01

LC Page 2  
Mar 31/78



# OLYMPUS 593

MK. 610-14-28  
OVERHAUL



T. Nozzle front fairing .....	315
U. Nozzle closing manifold .....	317
V. Spherical joint .....	317
W. Spherical joint box .....	318
X. Support ring assy .....	318
Y. Pins .....	319/320

## REPAIR

FOREWORD .....	401
REPAIR PARTS LIST .....	401

## AIR SUPPLY TUBE

REP 1-10-1                      Crack filler welding

## TUBE

REP 1-100-1                      Crack filler welding  
REP 1-100-2A                      Renewal of a segment of tube on part  
   No. 301-227-603-0  
REP 1-100-2B                      Renewal of a tube segment on part  
   No. 301-227-604-0

## BLANKING PART ASSY

REP 1-180-1                      Crack filler welding

## LINK

REP 2-60A-1                      Renewal of the link end-piece bushings

## SUPPORT ASSEMBLY

REP 2-120-1                      Renewal of the riveted nuts or of their  
   attaching rivets

## FOLLOWER PETAL

REP 3-30-1                      Reshaping the petal  
REP 3-30-2                      Elimination of cracks affecting the central  
   rib through reworking

## LINK

REP 3-100-1                      Reshaping

**78-12-01**

LC Page 3  
Mar 31/78



OLYMPUS 593  
MK. 610-14-28  
OVERHAUL



#### LINK

REP 3-170-1 Reshaping

#### ACTUATED PETAL

REP 3-220-1 Reshaping the lateral edges and the front guide lugs  
REP 3-220-2 Elimination of cracks affecting the petal ribs  
REP 3-220-3 Crack filler welding  
REP 3-220-4 Reconditioning the petal ugs recesses (accommodating the stops) by filler welding

#### LEVER

REP 3-230-1 Reshaping  
REP 3-320-1 Fitting bushings to restore the bores in the lever and yoke joint

#### TWIN YOKE

REP 4-50-1 Fitting bushings to restore the bores in the twin yoke

#### CONVERGENT SECTION

REP 4-110-1 Reshaping the convergent duct  
REP 4-110-2 Crack filler welding  
REP 4-110A-3 Patch welding repair  
REP 4-110B-3 Patch welding repair  
REP 4-110A-4 Renewal of the unions or of the rivets attaching the unions  
REP 4-110B-4 Renewal of the unions or of the rivets attaching the unions  
REP 4-110A\*5 Renewal of the dowel pin  
REP 4-110-6 Reconditioning the front flange inner contact surface through metal spraying (metallizing)

#### JOINTING SEGMENT

REP 4-120-1 Reshaping  
REP 4-120-2 Cracks filler welding

#### NOZZLE FRONT FAIRING

REP 5-10-1 Crack filler welding  
REP 5-10-2 Fairing repair through installation of riveted patch  
REP 5-10-3 Renewal of the rivets attaching the various components

#### NOZZLE CLOSING MANIFOLD

REP 5-90-1 Crack filler welding  
REP 5-90-2 Replacement of a manifold Segment

**78-12-01**

LC Page 4  
Dec 31/01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



#### SUPPORT ASSEMBLY

REP 5-150-1      Renewal of the anchor nuts or of their  
attaching rivets

#### SPHERICAL JOINT BOX

REP 6-110-1      Reshaping the mounting flange

#### SUPPORT RING ASSEMBLY

REP 6-190-1      Crack filler welding  
REP 6-190-2      Rivets or damaged riveted components renewal  
REP 6-190-3      Repair of the heatshield segments through  
installation of resistance welded patches  
REP 6-190C-4      Renewal of the dowel pin  
REP 6-190-5      Repair of the ring support assembly  
through installation of welded patches  
REP 6-190-6      Reconditioning the primary nozzle jack mounts  
by applying. Repair-size bushings

#### ASSEMBLY

1. General.....	501
2. Location.....	501
3. Assembly of the primary nozzle.....	503
A. Recommendations.....	503
B. Preparation of the support ring assembly.....	503
C. Preparation of the convergent section.....	507
D. Assembly of the support ring assembly to the con- vergent section.....	509
E. Assembly of petal actuating linkage.....	511
F. Assembly of the jacks.....	515
G. Assembly of the pressure tapping.....	517
H. Fitting blank.....	517
J. Assembly of the nozzle area indication system.....	520

78-12-01

LC Page 5  
Jan 31/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



## FITS AND CLEARANCES

1. General.....	601
A. Layout.....	601
B. Max. after wear.....	602
2. Torque values .....	603
3. Table of fits and clearances .....	607

## TESTING

1. General.....	701
2. Test equipment characteristics.....	701
3. Testing.....	701

TROUBLE SHOOTING.....Not applicable

## STORAGE

1. General.....	901
2. Storage requirements.....	901
A. Storage in container.....	901
B. Storage out of container.....	901
3. Removal of primary nozzle from container.....	901
A. Installation on wating stand.....	901
B. Returning empty containers.....	903
4. Placing the equipment in the container.....	903
A. Preparation of the container.....	903
B. Preparing the primary nozzle.....	903
C. Packing.....	905

SPECIAL TOOLS, FIXTURES AND EQUIPMENT..... 1001

ILLUSTRATED PARTS LIST..... 1101

**78-12-01**

LC Page 6  
Oct 31/81



# OLYMPUS 593

MK. 610-14-28

OVERHAUL



## FOREWORD

### 1. Effectivity

Some procedures described in this manual such as assembly, repair procedures, etc... specifically relate to given types of equipment. Hence, effectivity reference numbers are used which relate equipment to procedures.

These effectivity reference numbers can take the form of either a manufacturer's reference number or a serial number.

The table drawn up below will enable you to make the association between the two sets of numbers.

Manufacturer's ref No.	Serial No.
301-217-000-0-	6001 to 6024
301-217-003-0-	6025 to 6027
301-217-003-0-	6028 - 6029
301-217-005-0-	6030
301-217-004-0-	6031 to 6082 etc.

DESCRIPTION - OPERATION

1. Description

The primary nozzle, is isostatically mounted by three pins inside the twin secondary nozzle, at the rear of the reheat duct.

The primary nozzle front flange is sensibly in the same plane as the inlet face of the twin secondary nozzle structure, and locates the rear flange of the reheat duct. (See Fig. 1).

The outlet plane lies in convergent section of the twin secondary nozzle.

The primary nozzle, made of austenitic alloy, basically comprises :

- the convergent section.
- the support ring assembly.
- the petals.
- the pneumatic jacks.
- the manifold unit and supply tubes.

A. The convergent section

Comprises a truncated cone section with a welded flange at each end.

The front flange locates the rear flange of the reheat duct.

On the rear flange of the convergent section, a fool-proofing peg, at  $10^\circ$  from the vertical centre line, ensures the correct position of the convergent section relative to the support ring assembly. The flange has 90 holes to accommodate bolts which secure the convergent section to the support ring, and also retain the petal hinge point yokes and double-yokes.

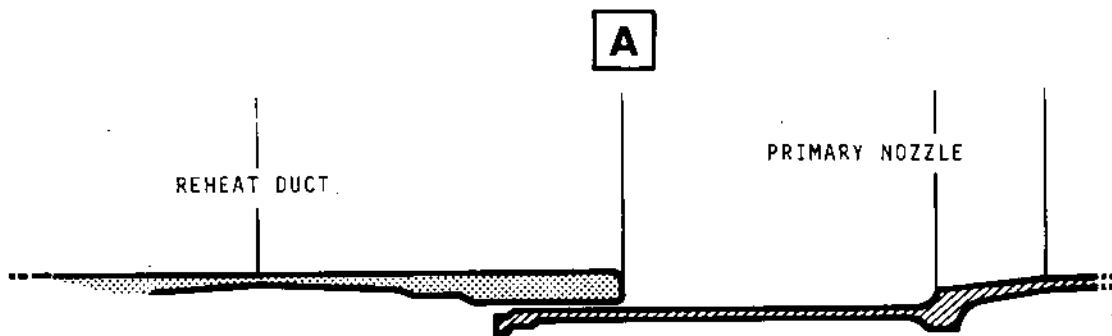
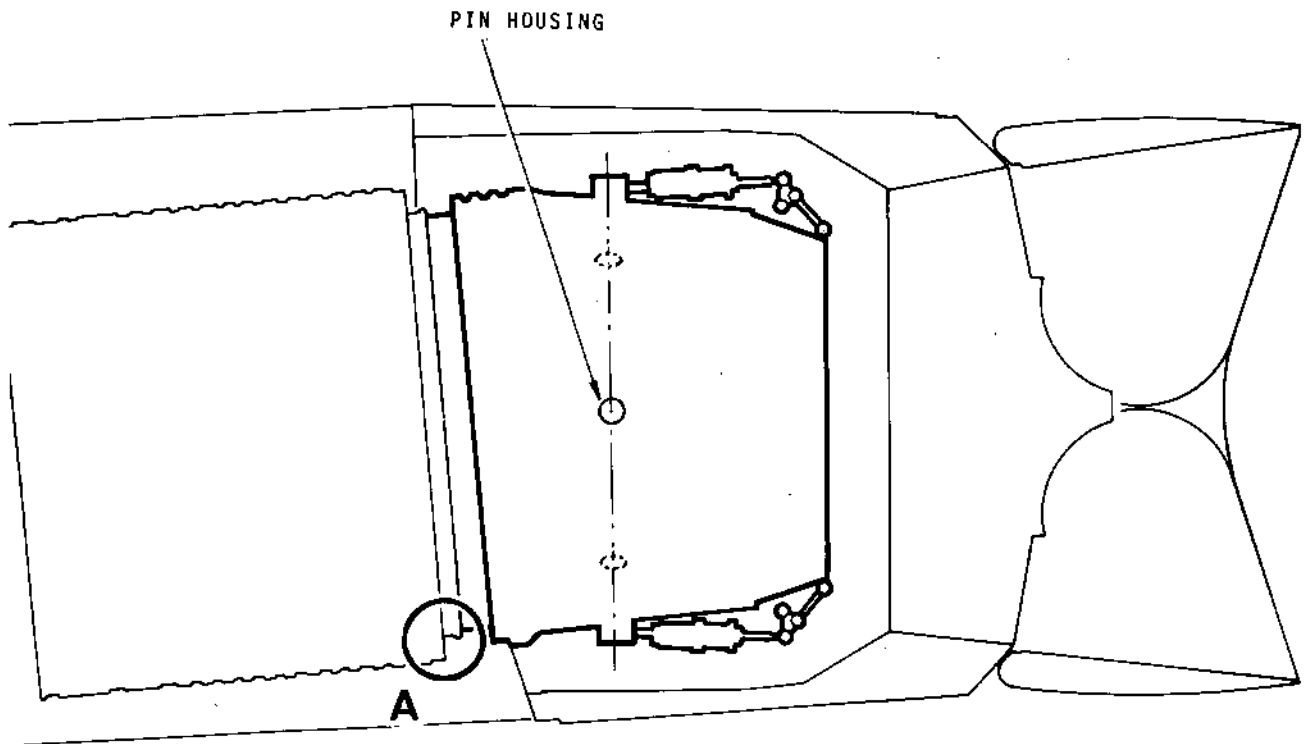
Two union bodies are rivetted to the convergent section, for fitting the pressure tapping tube (re-heat detection system).

The convergent guides the reheat duct gases to the petals.

B. Support ring assembly

This unit comprises a perforated drum, reinforced at the front end by a welded mounting ring section.



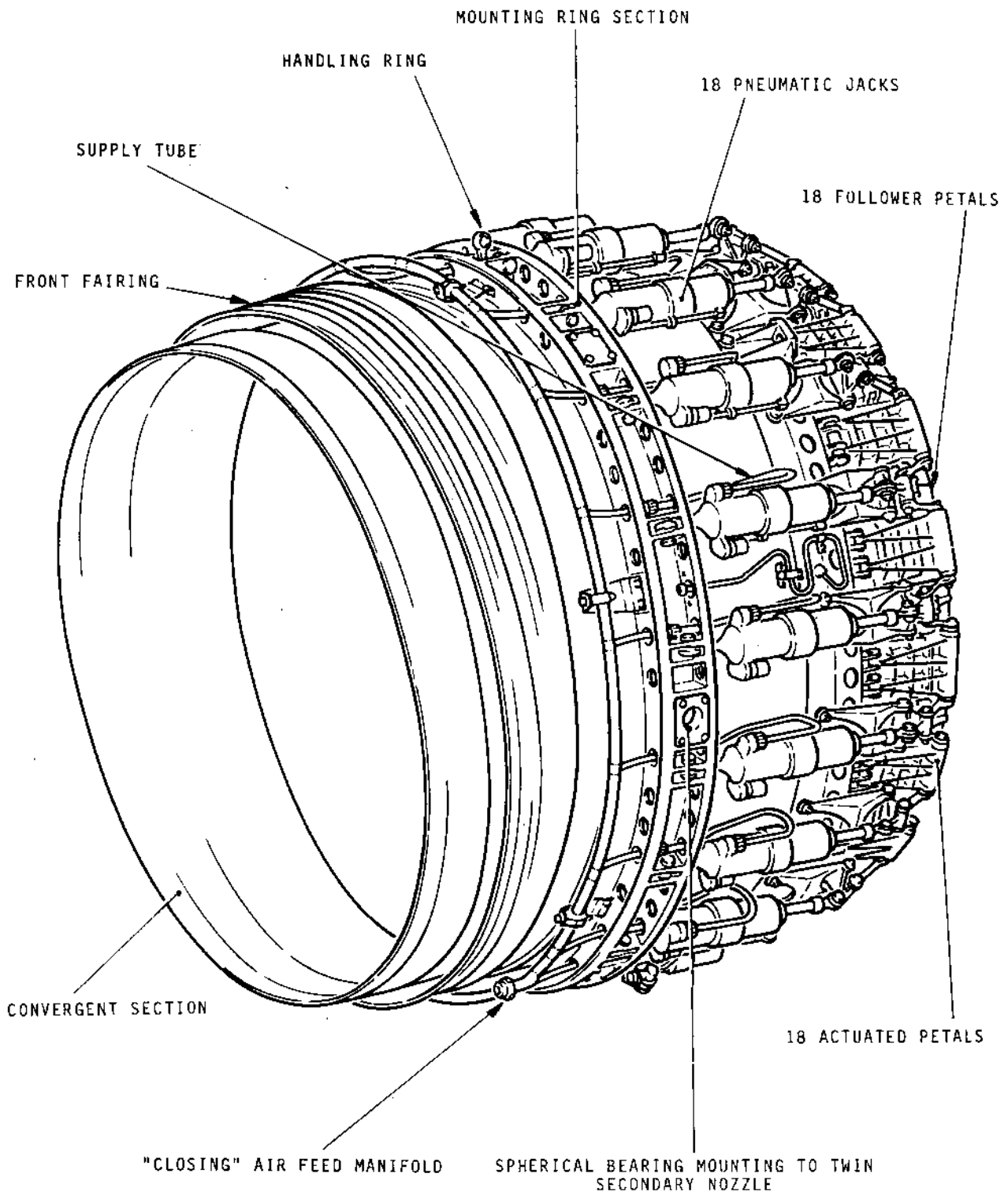


Relative Position of the Reheat Duct/Primary Nozzle/Secondary  
Nozzle Structure  
Figure 1



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Primary Nozzle  
Figure 2

78-12-01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



The mounting ring section is a one-piece, austenitic steel forging, ECM machined, which :

- takes the loads which the 3 primary nozzle-to-twin secondary nozzle mounting pins transmit to it.
- includes the mounting points for the 18 pneumatic jacks and the air feed manifold.
- takes the loads which the handling ring imposes on it during manoeuvring of the support ring assembly (See Fig.2).

The mounting ring is protected internally from radiated heat by a three part rivetted heat shield. Each part of the heat shield is composed of quartz glass fiber sandwiched between two sheets of wafered stainless steel.

The support ring assembly accommodates the primary nozzle area detection system. It is mounted on a support assembly which is fixed, at one end, to a yoke fitted to the mounting ring, and, at the other end, to a twin yoke.

The primary nozzle area detection system is the subject of a special chapter 78-12-50.

#### C. The petals

The petals-in cast austenitic alloy-comprise two types :

- the actuated petals-hinged to 18 twin yokes fitted to the rear flange of the support ring assembly.
- the follower petals, which are fitted and "float" between the actuated petals.

#### D. Pneumatic jacks.

The 18 pneumatic jacks are of the tandem mounted double piston type (See Fig. 4).

They are connected to the PNC (Pneumatic Nozzle Control Unit) by 18 supply tubes and the manifold.

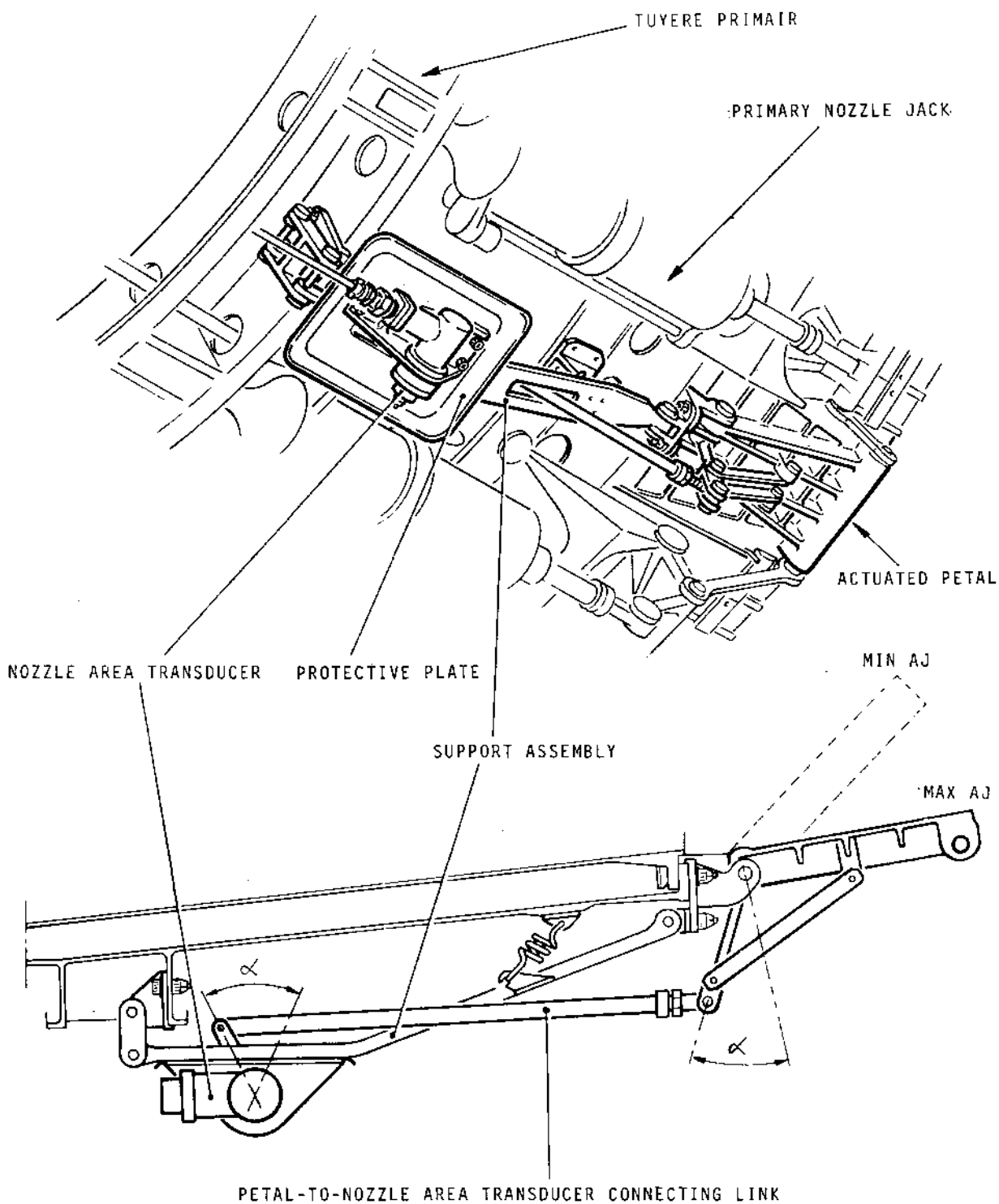
The body and the push rod of the jack are fitted with spherical bearing ends, which allow angular movement of the jack during operation. The jack body is thus fixed to the mounting ring by a pin, and the push-rod is attached to a lever by a threaded pin and nut.

78-12-01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Primary Nozzle Area Detection System  
Figure 3

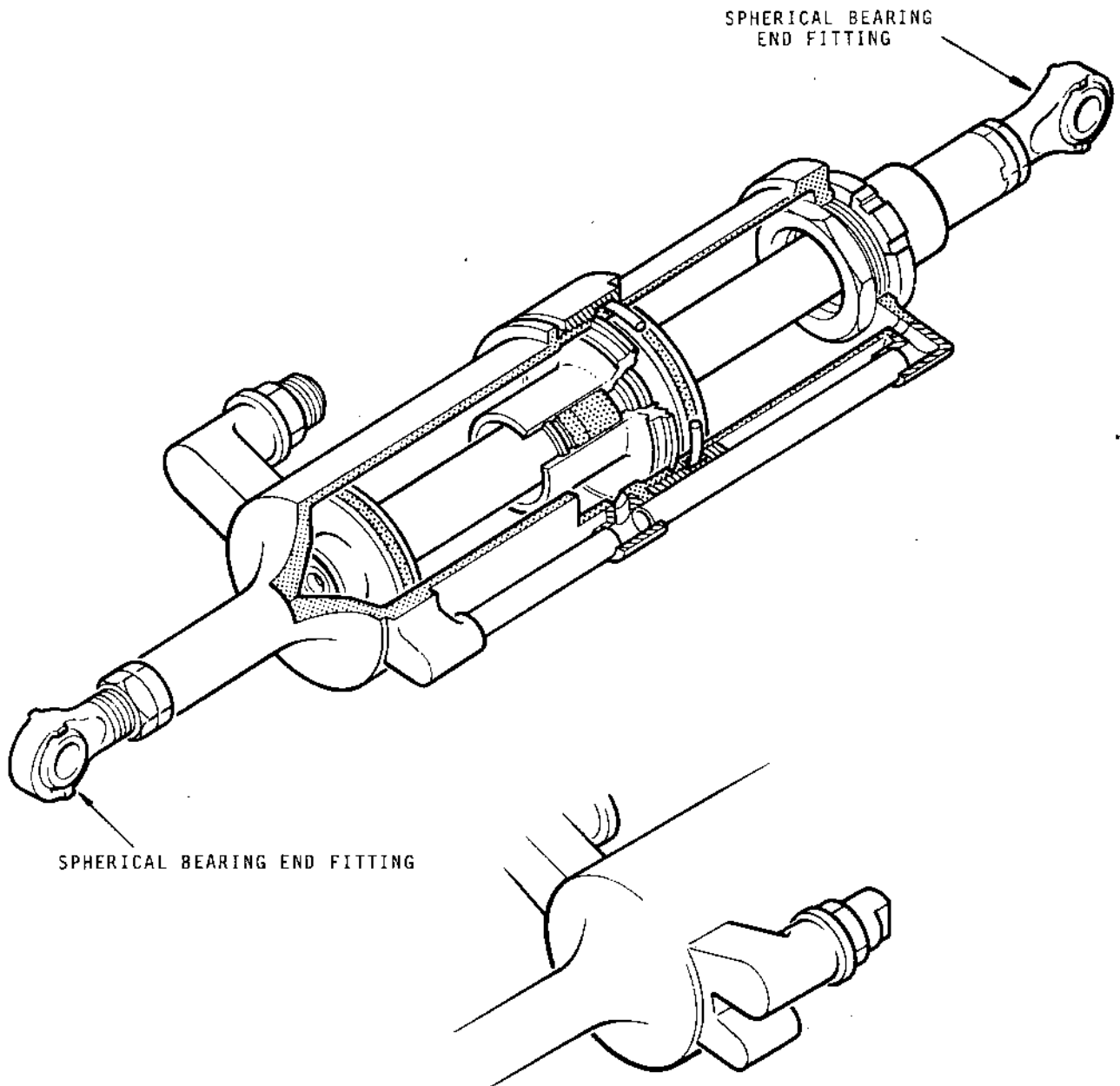
78-12-01

Page 5  
Dec 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Primary Nozzle Jack  
Figure 4

78-12-01

Page 6  
Dec 30/74



The pneumatic jacks are subject of a special chapter 78-12-40.

## 2. Operation

The outlet area of the primary nozzle is varied by the simultaneous action of the 36 petals (18 actuated, 18 followers) moved by the 18 pneumatic jacks. It is controlled by the P.N.C. (Pneumatic Nozzle Control Unit) fixed in the nacelle.

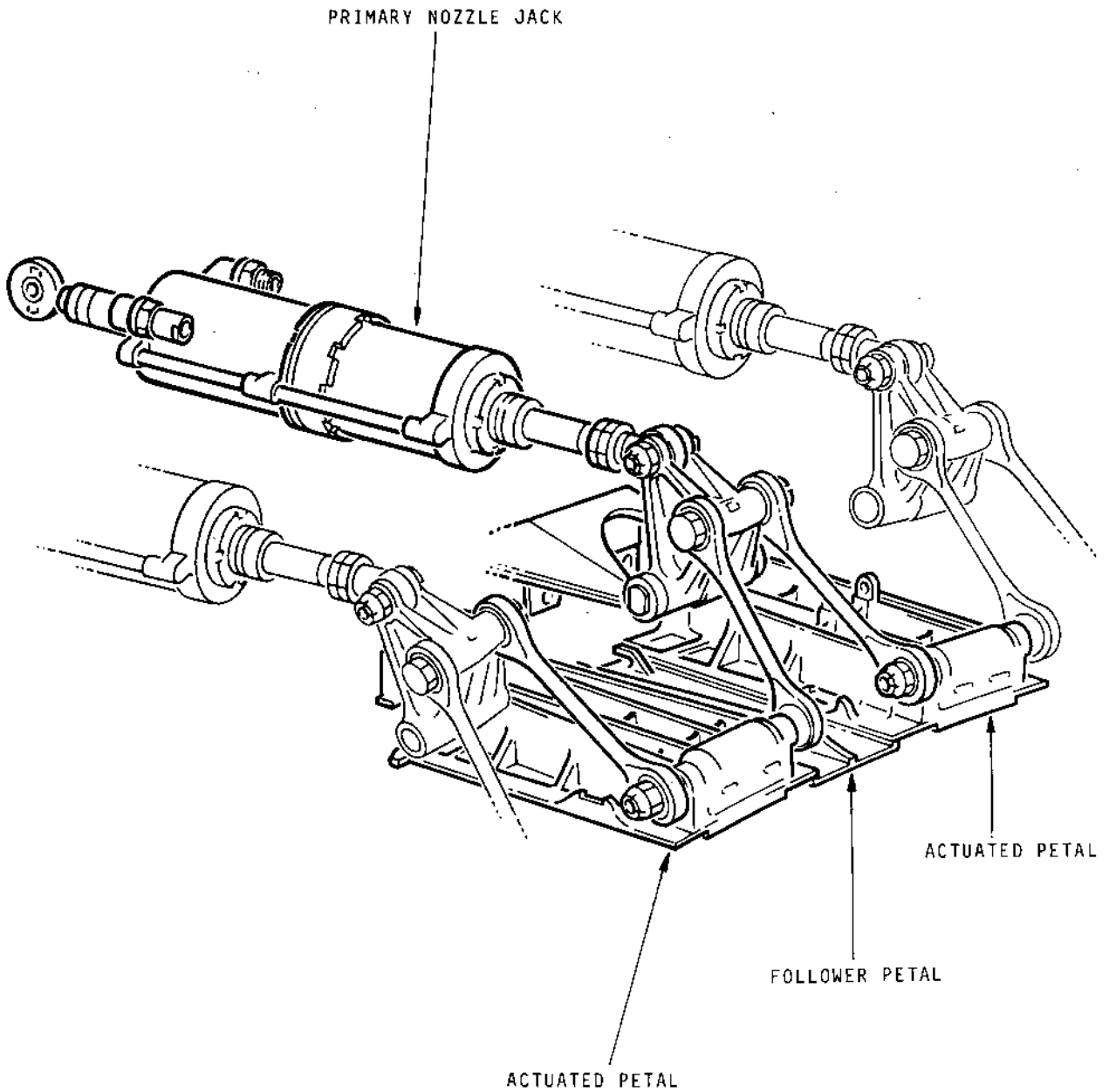
The jacks only act in the nozzle closing direction. The petals are driven open by the gas stream pressure.

Figure 5 shows the linkage system to the petals. It can be seen that the control linkage itself ensures synchronisation of the movement of all the petals, since each jack is connected to two actuated petals and the movement is thus transmitted from one to the other.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Primary Nozzle Petal Control Linkage  
Figure 5

78-12-01

Page 8  
Dec. 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL



DISASSEMBLY

1. General

- A. During dismantling, follow the recommendations given in chapter 70-05-00 of the manual of Standard Practices and in working procedures of the overhaul manual.
- B. Use only tools and other special equipment nominated in the dismantling procedures, and identified by a number SC... The tools are shown in the illustrated tools and equipment manual (I.T.E.M.).
- C. During dismantling, visually inspect all parts removed and report, to the inspection department, any defects found which could be obliterated by cleaning (scratches, burning etc.), and which may result from incorrect operation. Also report any broken parts or any locking devices not present.
- D. In the working procedures section of the manual, the parts are referenced to the IPC by two numbers in brackets, the first of which is the figure number in the IPC, the second being the item number within that figure

2. Disassembly of primary nozzle.

A. Placing on the work table - tool SC 59 -

- (1) Using the hoisting and swinging device - tool SC 24 - and the handling beam - tool SC 210 -, raise and remove the primary nozzle from the storage stand - tool SC 218 -.
- (2) Swing the primary nozzle and lower it on the work table - tool SC 59 - so as the convergent section front flange rests against the table.

B. Removal of the primary nozzle jacks (1-30)

- (1) Unlock and uncouple the supply tubes (1-10) from the jacks and the nozzle closing manifold - tool SC 35 -

ATTENTION : WHEN SLACKENING THE SUPPLY TUBE SERRATED NUTS, HOLD THE UNION BODIES ON THE JACKS AND THE MANIFOLD WITH A FLAT SPANNER.

- (2) Blank the supply tubes with storage plugs (1-20).
- (3) Remove the "U" shaped pin (1-40), washer (1-50) and pin (1-60).

78-12-01

Page 101  
Dec 15/75





OLYMPUS 593

MK.610-14-28

OVERHAUL



- (4) Remove the jack (1-30) and fit the blanking plug.
- (5) Repeat operations (1), (2), (3), (4) and (5) for all 18 jacks.

NOTE : Retain the jack spherical bearings with brass wire.

C. Removal of pressure tube (1-100).

- (1) Cut the locking wire and slacken the pressure tube connecting nut.
- (2) Remove the self-locking nuts (1-110) and the 12 point head bolts (1-120).
- (3) Cut the locking wire and slacken the 12 point head nut (1-130).
- (4) Cut the locking wire and remove the 12 point head bolt (1-140) and clamp (1-150).
- (5) Removal of pressure tapping blanking.
  - (a) Cut the locking wire and unscrew the blank assembly (1-180).
  - (b) Unscrew the 12 point head bolt (1-190) and remove locking plate (1-200).

D. Disassembly of the nozzle area detection system

- (1) Remove the detection system protection - tool SC 33 -
- (2) Withdraw the pin (2-10) and remove grooved washer (2-20).
- (3) Withdraw the pin (2-30) and remove grooved washer (2-40) and pin (2-50).
- (4) Remove the link (2-60).
- (5) Removing the threaded end piece (2-70).
  - (a) Cut the locking wire and slacken hexagonal nut (2-80).
  - (b) Remove the threaded end piece (2-70) and hexagonal nut (2-80).
- (6) Remove the 12 point head bolt (2-100), the nozzle transducer (2-90) and protective plate (2-110).
- (7) Removal of support assembly (2-120).
  - (a) Remove spring (2-130).

78-12-01

Page 102

Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Withdraw pin (2-140), remove grooved washer (2-150) and pin (2-160).
- (c) Withdraw pin (2-170), remove grooved washer (2-180) and pin (2-190).
- (8) Removal of connecting yoke (2-230).
  - (a) Withdraw pin (2-200), remove grooved washer (2-210) and pin (2-220).
- (9) Removal of the yoke (2-270).
  - (a) Unscrew the self-locking nuts, (2-240), remove flat washers (2-250) and 12 point head bolts (2-260).
- (10) Removal of the yoke (2-300)
  - (a) Unscrew the self-locking nuts (2-280) and remove hexagon head bolts (2-290).
- E. Dismantling of the actuating linkage and the petals.
  - (1) Removal of the follower petals (3-30)
    - (a) Cut the locking wire, unscrew the hexagon head bolts (3-10) and remove the stops (3-20).
    - (b) Repeat operation (a) for each of the 18 follower petals (3-30).
  - (2) Removal of detection system actuator links (3-100).
    - (a) Withdraw split pins (3-40), unscrew castellated nuts (3-50) and remove hexagon head bolts (3-60).
    - (b) Withdraw split pin (3-70), unscrew castellated nut (3-80) and remove hexagon head bolt (3-90).
    - \* (c) Repeat operations (a) and (b) for the other two links (3-100).
  - (3) Removal of petal actuating links (3-170)
    - (a) Withdraw split pins (3-110), unscrew castellated nuts (3-120) and remove pins (3-130) using extractor - tool SC 32 -
    - (b) Withdraw split pins (3-140), unscrew castellated nuts (3-150) and remove pins (3-160).



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (c) Dis-engage spherical bearings (3-180) and attach them to their respective links with brass wire.
- (4) Removal of actuated petals (3-220)
  - (a) Withdraw the "U" shaped pins (3-190), remove grooved washer (3-200) and pin (3-210).
  - (b) Remove lever (3-230).
  - \* (c) Repeat operations (a) and (b) for the second actuated petal (3-220).
- (5) Removal of actuated petals. (3-270)
  - (a) Withdraw the "U" shaped pins (3-240), remove grooved washers (3-250) and pins (3-260).
  - (b) Repeat operation (a) for each of the 17 petals (3-270).
- (6) Removal of levers (3-320)
  - (a) Withdraw split pin (3-280) unscrew castellated nut (3-290), remove flat washer (3-300) and pin (3-310).
  - (b) Repeat operation (a) for each of the 18 levers (3-320)
- F. Removal of the convergent section/support ring.
  - (1) Removal of the twin yokes (4-50).
    - (a) Unscrew self-locking nuts (4-10) and collect bolts (4-20)
    - (b) Unscrew self-locking nuts (4-30) and remove bolts (4-40)
    - (c) Repeat operations (a) and (b) for each of the 8 twin yokes (4-50).
  - (2) Removal of twin yokes (4-80)
    - (a) Unscrew self-locking nuts (4-60) and collect bolts (4-70).
    - (b) Repeat operation (a) for each of 10 twin yokes (4-80).
  - (3) Separating the support ring assembly, and convergent section
    - (a) Unscrew self-locking nuts (4-90) and collect bolts (4-100).
    - o (b) Set aside the stop (4-95)
  - (4) Separating the support ring from the convergent section

\* From primary nozzle No. 301-217-003-0

o From primary nozzle No. 301-217-004-0

78-12-01

Page 104  
Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (a) Fit the hoisting and swinging device - tool SC 24 - to the mounting ring section of the support ring assembly.
- (b) Using a hoist and lifting beam-tool SC 210 - lift the support ring assembly, invert it, and lower it, on the rear face of the mounting ring onto the build stand-tool SC 56 -
- (c) Remove handling equipment-tools SC 24 and SC 210 -
- (d) Remove the jointing segments (4-120) from the convergent section (4-110).
- (e) Use a hoist and lifting bar SC 66, place the convergent section on a pallet.

G. Disassembly of: support ring assembly (6-190)

- (1) Removal of the nozzle front fairing assembly (5-10)
  - (a) Unscrew 12 point head bolts (5-20) and remove bushes (5-30).
  - (b) Unscrew 12 point head bolts (5-40) and remove bush (5-50).
- (2) Removal of the nozzle closing manifold (5-90) and attachment parts.
  - (a) Unscrew the 12 point head bolts (5-60) and remove the manifold/supports assembly.
  - (b) Unlock and unscrew hexagon head bolts (5-70) and remove the support assemblies (5-80).
  - (c) Blank all 18 air outlets from the manifold with storage plugs (5-100).
  - (d) Unscrew connector plug (5-120) and remove blanking plug (5-130) - tool SC 31 -
  - (e) Blank the two air inlets to the manifold with storage plugs (5-110).
  - (f) Unscrew the 12 point head bolts (5-140) and remove the support assemblies (5-150).
- (3) Inversion of the support ring assembly.
  - (a) Fit the hoisting and swinging device - tool SC 24 - to the mounting ring section of the support ring assembly.
  - (b) With a hoist and lifting beam-tool SC 210 - lift the support ring assembly, turn it over,

78-12-01

Page 105

Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



and lower it - front face downwards - onto the build base - tool SC 56.

- (c) Remove the handling equipment - tools SC 24 and SC 210 -
- (4) Removal of the yokes (6-30)
  - (a) Unscrew self-locking nuts (6-10) and remove hexagon head bolts (6-20).
  - (b) Repeat operation (a) for each of the 18 yokes (6-30).
- (5) Removal of supports (6-60)
  - (a) Unscrew self-locking nuts (6-40) and remove hexagon head bolts (6-50).
  - (b) Repeat operation (a) for each of the 6 supports (6-60).
- (6) Removal of spherical bearing housings (6-110)
  - (a) Withdraw split pins (6-70) and unscrew castellated nuts (6-80).
  - (b) Remove the travel stop (6-90) and the spherical bearing/housing assembly.
  - (c) Dis-engage the spherical bearing (6-100) from its housing (6-110) by turning it through 90°.
  - NOTE : Attach the spherical bearing to its housing with brass wire.
  - (d) Remove bolts (6-130) and collect up "Truarc" rings (6-120).
  - (e) Repeat operations (a), (b), (c) and (d) for each of the 3 spherical bearing housings (6-110).
- (7) Removal of blanking covers (6-160).
  - (a) Withdraw split pins (6-140) and unscrew castellated nuts (6-150).
  - (b) Remove blanking cover (6-160).
  - (c) Remove bolts (6-180), and collect-up the "Truarc" rings (6-170)
  - (d) Repeat operations (a), (b) and (c) for each of the 3 blanking covers (6-160).

78-12-01

Page 106

Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL

CLEANING



## 1. General

- A. At completion of disassembly, clean all the parts of the primary nozzle in order to remove all the surface contamination such as oils, greases, carbon deposits, corrosion and oxidation marks.
- B. The purpose of cleaning is to :
  - (1) Allow exhaustive visual inspection of parts.
  - (2) Disclose cracks due to operation through use of fluorescent penetrant inspection methods.
  - (3) Prepare the surfaces in view of future repair work.

## 2. Specific recommendations

- A. Any cleaning method selected by an operator shall comply with the following requirements to avoid penalization on the service life of parts.
  - (1) Do not degrease titanium parts, either welded or not using halogen products such as chlorinated solvents, trichlorethylene etc...
  - (2) Do not clean in acid solutions parts having complex shapes or featuring blind holes, i.e parts on which rinsing or neutralization processes are difficult to carry out thoroughly.
  - (3) Do not use cleaning agents the action of which may induce generalized or intergranular corrosion of materials, specially on those materials showing aging resulting from operation on engine.
- B. Limitations related to electro-platings, chemical surface treatments, paints, varnishes and hardface metal coatings.
  - (1) The cleaning methods recommended in this chapter are normally not harmful to the protective surface treatments applied on the primary nozzle constitutive parts.

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

- (2) To avoid deterioration to surface treatments of parts or allow their future refurbishing, a list of the coated parts and their location identification (in regards of the Illustrated Parts List) is given hereunder.

(a) Silver coated parts nomenclature

Description	IPL Fig.item	Coated part base metal
Castellated nut	1 - 80	Austenitic steel
Self-locking nut	- 110	Austenitic alloy
Blanking part	- 180	Austenitic alloy
Threaded endpiece	2 - 70	Martensitic steel
Hexagonal nut	- 80	Austenitic steel
Self-locking nut	- 240 - 280	Austenitic alloy
Castellated nut	3 - 50,80 120,290	Austenitic steel
Self-locking nut	4 - 10,30, 60, 90	Austenitic alloy
Hexagonal head box	5 - 70	Austenitic steel
Connection nut	- 120	Martensitic steel
Self-locking nut	6 - 10,40	Austenitic alloy
Castellated nut	- 80,150	Austenitic steel
Ring support assy	- 190	Austenitic steel (nuts on part)

PRINTED IN FRANCE

**78-12-01**

Page 202

Nov 30/77

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



### 3. Cleaning processes

- A. The following table gives the cleaning processes specified in chapter 70-15-20 of the standard practices manual and applicable to parts described and itemized in relation to the IPL.

<u>Description</u>	<u>IPL Fig. item</u>	<u>Process</u>	<u>Remarks</u>
Supply tube	1 - 10	M100A	
Pin	- 60	M100A	
Pin	- 90	M100A	
Tube	- 100	M100A	
Clamp	- 150	M100A	
Blanking part	- 180	M100A	
Pin	2 - 50	M100A	
Link	- 60	M100A	
Threaded endpiece	- 70	M100A	
Protecting plate	- 110	M100A	
Support assy	- 120	M100A	
Pin	- 160 - 190 - 220	M110A	
Connecting yoke	- 230	M100A	
Yoke	- 270 - 300	M100A	
Stop	3 - 20	M100C or M100D	
Follower petal	- 30	M100C or M100D	
Link	- 100	M100C or M100D	
Pin	- 130, 160	M100A	
Link	- 170	M100A	
Spherical joint	- 180	M100A	



**OLYMPUS 593**MK.610-14-28  
OVERHAUL

<u>Description</u>	<u>IPL Fig.item</u>	<u>Process</u>	<u>Remarks</u>
Pin	3 - 210	M100A	
Actuated petal	- 220	M100C or M100D	
Lever	- 230	M100C or M100D	
Pin	- 260	M100A	
Actuated petal	- 270	M100C or M100D	
Pin	- 310	M100A	
Lever	- 320	M100C or M100D	
Twin yoke	4 - 50,80	M100C or M100D	
Stop	- 95	M100C or M100D	
Convergent section	- 110	M100C or M100D	
Jointing segment	- 120	M100C or M100D	
Nozzle front fairing	5 - 10	M100A	
Bushing	- 30,50	M100A	
Support assy	- 80	M100A	
Nozzle closing manifold	- 90	M100C	With alternate flowing under pressure of 3 bars (43.5 psi)
Connection nut	- 120	M101A	
Blanking plug for connection	- 130	M101A	
Support assy	- 150	M100A	
Yoke	6 - 30	M100C or M100D	
Support	- 60	M100C or M100D	
Travel stop	- 90	M100A	
Spherical joint	- 100	M100A	
Spherical joint box	- 110	M100A	
Blanking cover	- 160	M100A	

**78-12-01**Page 204  
Apr 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



<u>Description</u>	<u>IPL Fig.item</u>	<u>Process</u>	<u>Remarks</u>
Ring support assy	6 - 190	M100A	
Handling support	- 210	M100A	
Bushing	- 230	M100A	

NOTA : Cleaning of bolts, nuts, washers : 4100A

PRINTED IN FRANCE

78-12-01

Pages 205/206

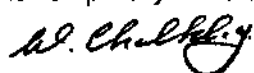
Nov 30/77

# ATP TEMPORARY REVISION

## BRITISH AIRWAYS

OLYMPUS 593 OVERHAUL MANUAL  
EXHAUST SYSTEM PRIMARY NOZZLE

This Temporary Revision complies with BCAR's Chapter A6-2 and TSS No. 0-2.



for Chief Engineer (Technical & Quality Services) CAA Design Approval No.  
DA1/8566/78

### TEMPORARY REVISION 78-524

Insert in 78-12-01 facing page 301

#### REASON FOR ISSUE

To introduce a Refurbishment Specification to the Primary Nozzle Overhaul (MCR.EPO.452/MD).

#### ACTION

#### Concorde Exhaust System Refurbishment

##### Introduction

The exhaust system consists of four main components:-

- (a) The Reheat Jet Pipe
- (b) The Primary Nozzle
- (c) The Twin Secondary Nozzle
- (d) The Thrust Reverser Bucket

Their Refurbishment Specifications are as follows:-

Reheat Jet Pipe	CON 78.11.01.100 Issue 1
Primary Nozzle	CON 78.12.01.100 Issue 1
Twin Secondary Nozzle	CON 78.13.01.100 Issue 1
Thrust Reverser Bucket	CON 78.31.01.100 Issue 1

These refurbishment schedules fulfil the life development requirements of the Approved Maintenance Schedule (A.M.S.).

The work listed in the Refurbishment Schedule is to allow the unit to be considered as a "Condition Monitored" (C.M.) unit.

This means that such units are currently considered to have no known hidden "wear out" features that require planned time interval specific inspections. However, such units may be required to be stripped and inspected purely to gain experience of their condition, i.e. life samples when it is considered that opportunity arisings of strip and inspection are inadequate. Such life sampling requirements will be indicated by an A.M.S. revision.

##### Notes

Where the term "visual inspection" is used, it implies a visual inspection of all parts exposed arising either as a result of the minimum work content of the Refurbishment Schedule or to a greater depth of strip dictated by other reasons, i.e. repair of damage embodiment of modifications, etc.

When in the course of visual inspection evidence exists, e.g. wear witness, distortion, etc. that requires further stripping, it must be referred to Propulsion Engineering for a review of acceptance standards and agreement to further strip.

# BRITISH AIRWAYS

## OLYMPUS 593 OVERHAUL MANUAL EXHAUST SYSTEM PRIMARY NOZZLE

TEMPORARY REVISION No. 78-524 (Cont'd.)

### Concorde Exhaust System Refurbishment Primary Nozzle

Specification No. CON 78.12.01.100 Issue 1

1. The Primary Nozzle is to be disassembled IAW OHM 78-12-01 P/B 100.
2. At the completion of disassembly send the pneumatic jacks for overhaul IAW OHM 78-12-40.
3. Clean thoroughly all parts of the primary nozzle in order to remove all surface contamination such as oils, greases, carbon deposits, corrosion and oxidisation marks IAW OHM 78-12-01 P/B 200.
4. Crack detect parts listed in OHM 78-12-01 Page 304/5 using method listed. All parts failing to meet the required standard must be held for possible repair development.
5. Visually inspect all parts IAW OHM 78-12-01 P/B 300 and repair as required. Any part that is damaged beyond the repair limits must be held for possible repair development. Any part that is damaged and has no cleared repair scheme must be held for possible repair development.
6. Embody Modifications IAW the BA Modification call up list.
7. Inform Propulsion Engineering of any defects found during refurbishment.
8. Re-assemble the Primary Nozzle IAW OHM 78-12-01 P/B 500.
9. The Primary Nozzle inspection and release documentation is to state the specification number to which the unit has been refurbished.



OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

## INSPECTION

### 1. Introduction

#### A. Inspection - General

(1) The "Estimate" inspection carried out on items removed from the accessory during overhaul aims at:

- eliminating worn-out or damaged items too expensive or impossible to be repaired.  
However, these items may be kept as the parts remaining sound may be used to repair an identical item,
- indicating the modifications to be applied to bring to a new standard,
- indicating the repairs to be carried out.  
If the case has not been foreseen, apply to the SNECMA repair office,
- eliminating parts having reached life limit.

#### B. Prepare for "Estimate" inspection

(1) Following disassembly clean each item according to the appropriate method defined in the "cleaning" section of the overhaul manual.

NOTE: Make sure that any assembly "awaiting inspection" be stored in "boxes" or containers provided for this purpose.

This inspection must be carried out on thoroughly clean parts.

Place all the parts making up the sub-assembly on the inspection tables covered with anti-shock material (Lino or similar material).

(2) Make a list of the modifications to be applied for each sub-assembly.

(3) Inspect the parts.

#### C. "Estimate" Inspection

CAUTION: DURING INSPECTION OPERATIONS THE PARTS MUST BE HANDLED WITH THE GREATEST CARE TO AVOID BLOWS, SCRATCHES, ETC...

**78-12-01**

Page 301  
Dec 30/74



- (1) Personnel carrying out this inspection must have a thorough knowledge of the instructions given in Inspection and Repair sections of this manual and in the corresponding chapter 70.  
It must be conscious of the importance of its decisions and of their consequences. A good technical and functional knowledge of the accessory will enable this personnel to carry out an efficient and intelligent inspection, particularly in vital zones.
- (2) The inspection methods to be used are the following:
  - Visual inspection.
  - Inspection for soundness.
  - Dimensional inspection.

NOTE: These inspections are best carried out in the order given so that faulty, not repairable parts detected during visual or soundness inspection may be discarded before the geometrical inspection is undertaken.

Should new defects be detected the repairer will request the study of a repair scheme from SNECMA.

- (3) During inspection each part will be labelled (see chapter 70-10-00) so as to indicate:
  - if it is fit for putting back in service,
  - if it requires repair,
  - if it must be replaced.

The labelling of parts can be used to record dimensions that may affect a play or a tolerance. This record will enable inspection to check the play or tolerance on final assembly.

#### D. Protection against corrosion following inspection

- (1) After inspection, when 3 months elapses before re-assembly, apply a temporary protection to carbon steel, alloy steel and martensitic alloy parts using a dehydrating oil such as Ensis Fluid 254 (P309) or ARDROX 396/1E8 (P373) or RUSTILO DW377 (P373).

## 2. Visual inspection

- A. Visual inspection is an operation which starts on reception of the accessory (inventory) and continues during disassembly, on table inspections, re-assembly, testing and dispatching.



OLYMPUS 598

MK.610-14-28

OVERHAUL



(1) Visual inspection generally concerns the following points :

- each part is examined to ascertain its general condition and make sure it is fit for service. Refer to chapter 70-21-00.
- parts featuring sheet metal elements must be devoid of nicks, metal rips, heavy distortion and/or, burning marks.
- threads and tapped holes must not be damaged.
- hinged parts (such as, pin/bush bores, link rod spherical joint inner/outer liners...) must be free from seizing or scratching indications ; if not, remove defects using fine emery cloth.
- parts featuring areas with hard-face protection must not show flaking.
- rivets securing various elements on riveted assemblies, must not be loosened, rotating, or missing, otherwise change rivets.
- self-locking nuts, must have a satisfactory locking torque. Refer to chapter 70-21-00 ; otherwise, renew nuts.
- crimped self-locking nuts must have satisfactory locking torque. Refer to chapter 70-21-00 ; otherwise, renew nuts.

(2) Steps to be taken, with regard to damages found on parts, are given in paragraph 5, "Inspection of parts".

### 3. Inspection for soundness

A. The main purpose of the inspection for soundness is to ascertain that the accessory parts are not cracked.  
The inspection methods used are the following :

- Visual inspection
- Dye penetrant inspection - refer to chapter 70-20-10
  - M 502 B - Water washable fluorescent penetrant inspection (except for titanium parts)
    - P - penetrant spraying
    - T - immersion in penetrant
  - M 504 B - Post-emulsified fluorescent penetrant inspection (except for titanium parts).

78-12-01

Page 303  
Dec 30/74

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



B. The following table gives the list of parts and the relevant inspection methods :

PARTS TO BE INSPECTED		INSPECTION METHOD	REMARKS and zones requiring careful examination
IPL	DESCRIPTION		
1-10	Air supply tube	M 502 B (P)	
1-100	Tube	M 502 B (P)	
1-180	Blanking part	Visual	
2-60	Link rod	M 502 B (T)	Scrap if cracked
2-110	Protecting plate	Visual	
2-120	Support assy	M 502 B (T)	
2-230	Connecting yoke	M 502 B (T)	Scrap if cracked
2-270	Yoke	M 502 B (T)	Scrap if cracked
2-300	Yoke	M 502 B (T)	Scrap if cracked
3-20	Stop plate	M 502 B (T)	Scrap if cracked
3-30	Follower petal	M 502 B (T)	
3-100	Link	M 502 B (T)	Scrap if cracked
3-170	Link	M 502 B (T)	Scrap if cracked
3-220, 270	Actuated petal	M 502 B (T)	
3-230	Lever	M 502 B (T)	Scrap if cracked
3-320	Lever	M 502 B (T)	Scrap if cracked
4-20, 70, 100	Bolt	M 502 B (T)	Scrap if cracked
4-50, 80	Twin yoke	M 502 B (T)	Scrap if cracked
4-95	Stop	M 502 B (T)	Scrap if cracked
4-110	Convergent section	M 502 B (P)	
4-120	Jointing segment	M 502 B (T)	
5-10	Nozzle front fairing	Visual	
5-80	Support assy	M 502 B (T)	Scrap if cracked
5-90	Nozzle closing manifold	M 502 B (P)	
5-150	Support assy	M 502 B (T)	Scrap if cracked

**78-12-01**Page 304  
Apr 30/93



**OLYMPUS 593**MK.610-14-28  
OVERHAUL

PARTS TO BE INSPECTED		INSPECTION	REMARKS
IPL	DESCRIPTION	METHOD	and zones requiring careful examination
6-30	Yoke	M 502 B (T)	Scrap if cracked
6-60	Support	M 502 B (T)	Scrap if cracked
6-90	Travel stop	M 504 B	Scrap if cracked
6-100	Spherical joint	M 504 B	Scrap if cracked
6-110	Spherical joint box	M 504 B	Scrap if cracked
6-130	Bolt	M 504 B	Scrap if cracked
6-160	Blanking cover	Visual	Scrap if cracked
6-190	Support ring assy	M 502 B (P)	
<u>Miscellaneous parts</u>			
	Pins	M 502 B (T)	} Scrap if cracked
	Spherical joints	M 502 B (T)	
	Grooved washers	Visual	
	Bushes	M 502 B (T)	

#### 4. Dimensional inspection

##### A. General

##### (1) Measuring instruments

The selection of any measuring instrument is to be made in relation to the precision desired.

##### (a) Instrument classification

Two kinds of measuring instruments are to be distinguished :

- standard and universal measuring instruments such as : slide gages, micrometers, depth gages, dial indicators of various types, miscellaneous gages, etc...

This equipment is part of the provisioning items that are procurable in the trade and require no particular comment provided that they are available in the required quantity and precision, and satisfy to the requirements for the work to be undertaken.

**78-12-01**

Page 305

Dec 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- special inspection equipment such as :  
bases, supports, rigs, jigs, etc...

These tools are identified by a type number in the manual text at the exact place where they are used.

(b) Calibration

Measuring instruments used in overhaul are to be checked periodically according to a procedure defined in relation to master instruments (SNECMA to be informed of procedure), themselves checked in relation to the official master instruments of the country concerned.

The Official Control Authorities of the countries where repairs are carried out will have to take steps to ensure that the repairer has set up suitable facilities and equipment.

In the absence of a procedure in the countries concerned the repairer will request from SNECMA the procedure applied in their own workshop.

B. Dimensional inspection of parts

Details concerning the dimensional inspection and the acceptance criteria are given in paragraph 5 "Parts Inspection".

5. Inspection of parts

A. Air supply tube (1-10)

(1) Visual inspection

- (a) Damage affecting thread or desilvering of one or both the tube end nuts is cause for repair in accordance with BOR 35 re-silver plating end nuts.
- (b) The spherical contact surface of the tube nozzle must be free from scratches or flat defects ; if not, scrap the tube.
- (c) The tube external surface must be devoid of chafing indications and/or, scratches.

Otherwise :

- . using fine emery cloth, remove defects if depth is less than 0,10 mm (0.004 in).

78-12-01

Page 306



OLYMPUS 593

MK.610-14-28

OVERHAUL



. scrap the tube if defects are deeper than  
0,10 mm (0.004 in).

(2) Inspection for soundness

Cracks affecting weld beads, are to be removed by filler welding, as per REP 1-10-1.

B. Tube (1-100)

(1) Visual inspection

(a) Thread deterioration or desilvering affecting the tube nipple or the union nut is cause for renewal of the damaged element, as per REP 1-100-2.

(b) The spherical contact surface of the tube nozzle must not show scratches or flat defects ; if not, renew nozzle, as per REP 1-100-2.

(c) The tube external surface must not show chafing or scratch indications ; if that's not the case :

using fine emery cloth, remove defects if they are less than 0,10 mm (0.004 in) in depth.

renew segment of tube affected, if defects are deeper than 0,10 mm (0.004 in) as per REP 1-100-2.

(2) Inspection for soundness

Cracks affecting the weld beads must be removed by filler welding, as per REP 1-100-1.

C. Blanking part assembly (1-180)

(1) Visual inspection

(a) Thread deterioration or desilvering affecting nut of union, is cause for scrapping of the blanking part.

(b) The spherical contact surface of the nozzle must not show scratches or flat defects, otherwise, scrap the blanking part.

(2) Inspection for soundness

Cracks located in the sleeve/nozzle welded joint must be repaired by filler welding, as per REP 1-180-1.

78-12-01

Page 307  
Dec 15/75



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



D. Link (2-60)

(1) Dimensional inspection

- (a) Inner diameter wear of bushes located in the threaded end-pieces of link is acceptable if diameter size is less than or equal to 6,05 mm (0.2382 in).

Beyond this limit, renew the threaded end-piece bushes, as per REP 2-60-1.

E. Support assembly (2-120)

(1) Dimensional inspection

- (a) Wear condition of the eyelet bores is acceptable if bore size is less than or equal to 6,05 mm (0.2382 in).

Beyond this value, resize by inserting a bush.

F. Connecting yoke (2-230)

(1) Dimensional inspection

Wear of holes is acceptable if their respective diameter is less than or equal to 6,05 mm (0.2382 in).

Beyond this limit, scrap the connecting yoke.

G. Yoke (2-270)

(1) Dimensional inspection

Wear of holes accommodating the hinge pin is acceptable if their diameter is less than or equal to 6,05 mm (0.2382 in).

Beyond this limit scrap yoke.

H. Yoke (2-300)

(1) Dimensional inspection

Wear of holes accommodating the hinge pin is acceptable if their diameter is less than or equal to 6,05 mm (0.2382 in).

Beyond this limit scrap yoke.

I. Stop (3-20)

(1) Visual inspection

78-12-01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (a) Thread deterioration of tapped hole is cause for scrapping of the part.
- (b) Peening marks on the stop lateral faces are acceptable if their depth is less than 0,3 mm (0.012 in).

Repair scheme awaiting release.

J. Follower petal (3-30)

(1) Visual inspection

- (a) Broken condition of one or both positioning lugs is cause for scrapping of the petal.

(2) Inspection for soundness

(a) Cracks affecting the center rib :

- . which are less than or equal to 2 mm (0.079 in) in length and which do not reach the petal base plate are to be removed using a grinding wheel as per REP 3-30-2.
- . which are longer than 2 mm (0.079 in) or progressing in the petal base plate, are cause for scrapping of the part.

- (b) Cracks affecting the front positioning lugs must be removed through filler welding.

- (c) Minute cracks emanating from lateral edges are acceptable.

(3) Dimensional inspection

- (a) Twisted condition of the petal, measured at lateral faces is acceptable if less than or equal to 1 mm (0.039 in).

Beyond this limit, re-shape petal as per REP 3-30-1

- (b) Bending of the lateral edges is acceptable if resulting sag does not exceed 1 mm (0.039 in).

Beyond this limit, re-shape petal as per REP 3-30-1

- (c) Twisting of the stop mounting pad is acceptable if it does not exceed 4° in relation to theoretical position of the mounting pad.

Beyond this limit, un-twist the mounting pad as per REP 3-30-1.

78-12-01



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (d) Defect in flatness of the mounting pad top surface is acceptable provided that the flatness error is less than 0,7 mm (0.028 in).

Beyond this limit, re-shape the petal as per REP 3-30-1

- (e) A defect in orientation of the front positioning lugs is acceptable if less than 1 mm (0.039 in) from nominal position.

Beyond this limit, re-shape the petal as per REP 3-30-1

K. Link (3-100)

(1) Dimensional inspection

- (a) Buckling of the link is acceptable if sag is less than 2 mm (0.079 in).

Beyond this limit, re-shape link as per REP 3-100-1.

- (b) Wear of holes is acceptable provided that hole dia. is less than or equal to 5,1 mm (0.201 in).

Beyond this limit, scrap the link.

L. Link (3-170)

(1) Dimensional inspection

- (a) Buckling of the link body is acceptable provided that sag is less than 0,3 mm (0.012 in).

Beyond this tolerance, re-shape the link as per REP 3-170-1.

- (b) Wear condition of the spherical bores is admissible if bore diameter is less than or equal to 18,2 mm (0.716 in).

Beyond this tolerance, scrap the link.

M. Spherical joint (3-180)

(1) Dimensional inspection

Wear condition of the spherical outer dia. is admissible if dia. is higher than or equal to 17,9 mm (0.705 in).

Under this value, scrap the spherical joint.

78-12-01



OLYMPUS 593

MK.610-14-28

OVERHAUL



N. Actuated petal (3-220,270)

(1) Visual inspection

- (a) Failure of the lateral "ears" accommodating the stops (3-20), entails repairing the petal by filler welding as per REP 3-220-4.
- (b) Heavy distortion of the petal front guide tabs is unacceptable :
  - if tabs are distorted but not cracked, perform re-shaping as per REP 3-220-1.
  - if tabs are cracked or broken, scrap the petal.

(2) Inspection for soundness

- (a) Cracks affecting the petal ribs :
  - . are to be removed by grinding if less than 2 mm (0.079 in) as per REP 3-220-2.
  - . entail scrapping the petal if longer than 2 mm (0.079 in).
- (b) Cracks located in recesses of the lateral "ears" accommodating stops (3-20) shall be repaired by filler welding as per REP 3-220-3.
- (c) Cracks originating from the petal lateral edges :
  - . which do not progress through the petal base plate shall be filler welded as per REP 3-220-3
  - . which progress in the petal base plate are cause for scrapping of the part.

(3) Dimensional inspection

- (a) Bending of the petal lateral edges is acceptable if less than or equal to 1 mm (0.039 in), measured throughout the petal length.  
A local distortion is acceptable if less than or equal to 0,3 mm (0.012 in).  
Beyond this tolerance, perform re-shaping of petal as per REP 3-220-1.
- (b) Chafing wear affecting recesses of lateral "ears" accommodating the stops (3-20) is acceptable if recess width is less than or equal to 15 mm (0.591 in).

78-12-01

Page 311  
Dec 15/75

**ATP  
TEMPORARY  
REVISION**

**BRITISH AIRWAYS**

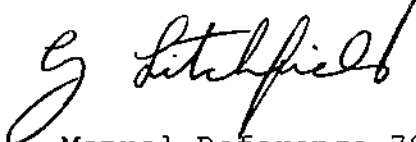
OLYMPUS 593

OVERHAUL MANUAL

ATP: E6868

TEMPORARY REVISION No. 78-534

THIS TEMPORARY REVISION IS ISSUED BY BRITISH AIRWAYS ENGINEERING (TECHNICAL INFORMATION SERVICES, G2, TBA, S401, P. O. BOX 10, HEATHROW AIRPORT, HOUNSLOW, MIDDLESEX TW6 2JA) AND COMPLIES WITH BCAR'S CHAPTER A5-3, B5-3 AND/OR TSS No. 0-2 AS REQUIRED. CAA DESIGN APPROVAL No. DAI/8566/78.



For CHIEF ENGINEER QUALITY AND TRAINING

Manual Reference 78-12-01 Page 312

**REASON FOR REVISION**

British Airways information (BA Page 312) re-issued to align with manufacturers Revision No. 23.

**ACTION**

Paragraph 5. Inspection of parts

Add new Sub-Paragraph QA as follows:

QA. Stop plate (4-95A)

Repair small cracks in accordance with BOR 4, use welding fixture to ensure hole pitch is maintained during welding.

Originator: TIS  
Reference: -  
Workbook: GE 78-51

78-12-01  
Page 312





**OLYMPUS 593**  
**MK. 610-14-28**  
**OVERHAUL**



Beyond this limit, repair petal by filler welding as per REP 3-220-4.

**O. Lever (3-230)**

**(1) Dimensional inspection**

- (a) Buckling of the lever body is acceptable if sag is less than 1 mm (0.039 in).

Beyond this tolerance, perform lever re-shaping as per REP 3-230-1.

- (b) Wear of bores is acceptable if bore size is less than or equal to:

- 10,2 mm (0.402 in) for the "lever hinge" bore
- 5,1 mm (0,201 in) for the "link 3-100" bore
- 6,2 mm (0.244 in) for the "link 2-60" bore

Beyond these limits, scrap the lever.

**P. Lever (3-320)**

**(1) Dimensional inspection**

Wear of bores accomodating the lever/yoke 6-30 hinge pin, is acceptable if bore sizes are less than or equal to 12,1 mm (0.476 in). Beyond this limit, rework lever by bush insertion in accordance with REP 3-320-1.

**Q. Twin yoke (4-50, 80)**

**(1) Dimensional inspection**

Wear of bores is admissible if bore size is less than or equal to 10,05 mm (0.39567 in).

Beyond this limit, repair as per REP 4-50-1.

**R. Convergent section (4-110)**

- (a) Acceptance criteria for damage affecting the shape of the convergent central section are the following :

**78-12-01**



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- 1 Wrinkles in the central section metal unacceptable.
- 2 Collapsed sheet metal just in front of the rear flange is acceptable provided that measured sag is less than 2 mm (0.08 in).

In case of unacceptable damage, repair the central section by patch welding per REP 4-110-3.

- (b) Deterioration of union threads of pressure tappings implies renewal of the unions as per REP 4-110-4.
- (c) A loosening of the dowel pin on the convergent sections variant "A" is unacceptable.

Renew it in accordance with REP 4-110A-5.

- (d) Wear marks on front flange are acceptable after smoothening the surface, providing that the geometrical conditions hereafter defined are complied with.
- (e) Impact marks on the central section are admissible so long as they are localized dents without cracks or sharps edged bottoms. If they fail to meet these requirements, the central section is to be repaired by welding a patch on in accordance with REP 4-110-3.

(2) Inspection for soundness

- (a) Cracks spreading in welded seams of flanges, liners, pads, shall be removed by filler welding as per REP 4-110-2.
- (b) Cracks emanating from a weld bead and progressing in the sheet metal must be filler welded as per REP 4-110-2 or if they feature ramifications or affect a burned area, they are to be removed through patch installation as per REP 4-110-3.
- (c) Cracks arising near the retaining bolt holes on rear flange are not acceptable.

If cracked, the flange is to be replaced.

78-12-01

Page 313  
Mar 31/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(3) Dimensional inspection

- (a) An increase in the front flange average inner diameter, as measured in planes P1, P2, P3, at 20°C room temperature is :

- 1 acceptable if average dia. is less than or equal to 1020,1 mm (40.161 in)
- 2 unacceptable if average dia. is larger than 1020,1 mm (40.161 in), and requires resizing of flange by metallization in accordance with REP 4-110-6.

CAUTION - A 10°C VARIATION IN ROOM TEMPERATURE RESULTS IN A 0,13 mm (0.00512 in) LINEAR CHANGE OF THE FLANGE INNER DIA

Inspection method (refer to figure 301)

The front flange inner average diameter, measured in plane P1, then in plane P2, and then in plane P3, is determined by computing the arithmetical mean of 18 measurements taken in the appropriate plane.

To perform these measurements, proceed as follows :

- 1 On the flange inner wall (I.D) index mark 18 generatrices equally spaced on the front flange half-circumference.

CAUTION : UNDER NO CIRCUMSTANCES SHALL THE TRACING OF THE INDEX MARKS BE DETRIMENTAL TO SURFACE CONDITION OF THE FLANGE INNER WALL ( OR INNER DIA.).

- 2 Using the stiffening tool SC 118, remove the front flange out-of-round.
- 3 Calibrate the gauge TESA UNIMASTER - TESA S.A. 1020 RENENS - V/D/Switzerland - Agent for France : SYNERGIE, 27, Av Philippe Auguste - PARIS 11ème - Tel. 357.21.00.
- 4 Fit the measuring gauge with :
  - a the necessary tube extensions to obtain the dimension to be checked,

PRINTED IN FRANCE

78-12-01

Page 314  
Mar 31/78

**ATP  
TEMPORARY  
REVISION**

**BRITISH AIRWAYS**

CONCORDE OLYMPUS 593  
OVERHAUL MANUAL

TR Page 1 of 1  
21 September 1993

THIS TEMPORARY REVISION IS ISSUED BY BRITISH AIRWAYS TECHNICAL SERVICES AND COMPLIES WITH BCAR'S CHAPTER A5-3, B5-3 AND/OR TSS No. 0-2 AS REQUIRED. CAA DESIGN APPROVAL No. DAI/8566/78.



FOR CHIEF ENGINEER TECHNICAL SERVICES

TEMPORARY REVISION NO. 78-530

Manual Reference 78-12-01 Page 315

**REASON FOR REVISION**

British Airways information (BA Page 315) re-issued to align with manufacturers Revision No.22.

**ACTION**

Reference Para 5.S. Jointing segment (4-120)

Add to Sub Para (1) (b) the following:

Small cracks may be welded in accordance with BOR 34.



OLYMPUS 593

MK.610-14-28

OVERHAUL



b the supports, properly adjusted, to establish measuring plane (P1,P2,P3).

5 Rest the gauge supports on the front flange rim and measure.

6 Repeat the same operation in line with the 18 index marks.

S. Jointing segment (4-120)

(1) Visual inspection

(a) Local distortions of the flanged edge shall be removed through segment re-shaping, as per REP 4-120-1.

(b) Flanged edge wear is acceptable if not associated with puncturing.

Otherwise, scrap the segment.

(2) Soundness inspection

(a) Cracks starting from the edge of the part, evolving in the sheet metal, shall be built-up in accordance with REP 4-120-2 if there is a minimum space of 3 mm (0.12 in.) between each crack and if they are not located in a burnt area.

T. Nozzle front fairing (5-10)

(1) Visual inspection

(a) A local distortion of the sheet metal is acceptable if not associated with cracking or burning ; otherwise, repair the fairing by fitting a riveted patch, in accordance with REP 5-10-2.

(b) Tears in the sheet metal are unacceptable and shall be repaired by riveted patches, in accordance with REP 5-10-2.

(c) Worn condition of the fairing eyelets if less than 0,3 mm (0.012 in) in depth, is acceptable after smoothing out wear marks.

Beyond this limit, renew the eyelets as per REP 5-10-2.

78-12-01

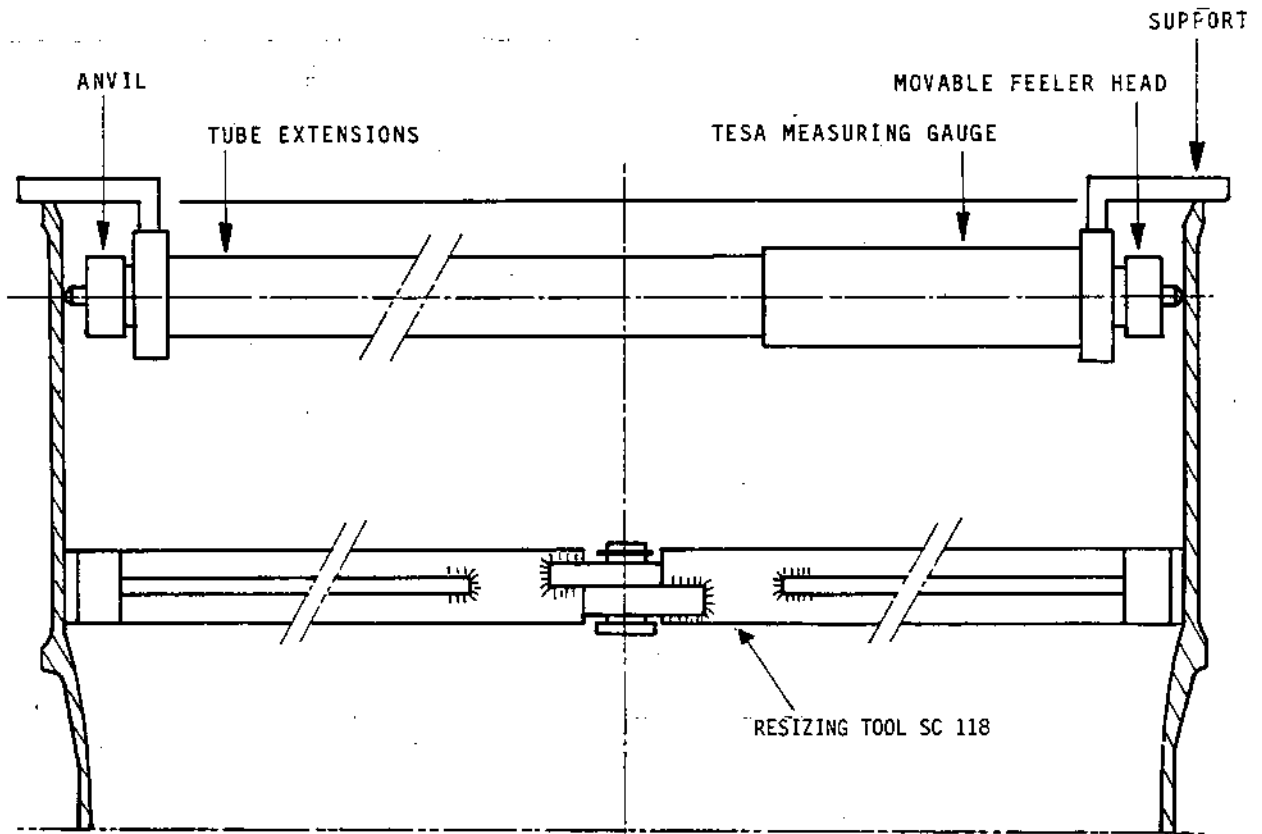
Page 315

Apr 30/93



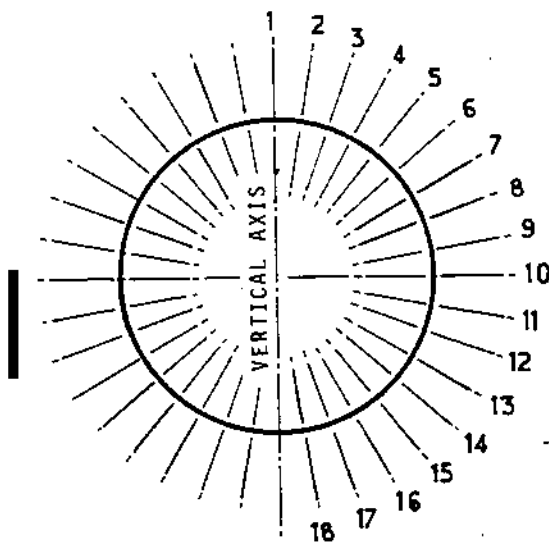
OLYMPUS 593

MK.610-14-28  
OVERHAUL

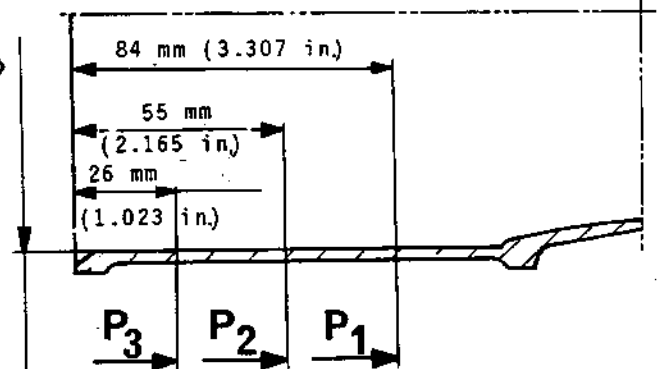


SCHEMATIC VIEW IN DIRECTION

**F**



**F** →



AVERAGE INNER DIA

= 1019,9 mm (40.154 in) NOMINAL  
≤ 1020,1 mm (40.161 in) ACCEPTABLE  
> 1020,1 mm (40.161 in) UNACCEPTABLE

Checking the Convergent Section Front Flange Average Inner Dia.  
Figure 301

78-12-01

Page 316  
Dec 15/75



OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

- (d) Signs of wear on the upstream and downstream stiffeners are acceptable unless compounded by cracks and or punctures. If so, replace the damage items in accordance with REP 5-10-3.

(2) Soundness inspection

- (a) Cracks occurring in the fairing metalsheet are to be repaired as follow :
  - 1) By weld filling in accordance with REP 5-10-1 if isolated and lying in an unoxidized area.
  - 2) By patching in accordance with REP 5-10-2, if ramified or lying in an oxidized area.
- (b) Cracks arisen in the different weld parts stiffeners, grommets, etc... require the item affected to be replaced in accordance with REP 5-10-3.

U. Nozzle closing manifold (5-90)

(1) Visual inspection

- (a) Surface deterioration affecting the manifold (chafing indications, scratches), are to be removed using fine emery cloth if damage depth less than 0,15 mm (0.006 in.);

Beyond this limit, renew the damaged manifold segment in accordance with REP 5-90-2.

- (b) Thread deterioration affecting the manifold unions, or the tapped holes of the manifold clamps, results in renewal of the damaged manifold component.

- (c) Dent on air manifold tube is acceptable if there is no cracks or sharp edges..

If not, renew the damaged manifold segment in accordance with REP 5-90-2.

V. Spherical joint (6-100)

(1) Dimensional inspection.

78-12-01



OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

- (a) Worn condition of the spherical diameter is acceptable if dia. is less than or equal to 49,90 mm (1.96456 in.).

under this value, scrap the spherical joint.

(2) Inspection for soundness:

- (a) Cracks localised in welded beads jointing each other the various elements are to be removed by filler welding in accordance with REP 5-90-1.
- (b) Worn condition of the joint bore is acceptable provided that bore size is less than or equal to 32,05 mm (1.26180 in.).

Above this limit, scrap the spherical joint.

W. Spherical joint box (6-110)

(1) Dimensional inspection

- (a) Worn condition of the spherical inner diameter is acceptable if dia. is less than or equal to 50,50 mm (1.97046 in.).

Above this value, scrap box.

- (b) A defect in flatness of the spherical joint box mounting flange is acceptable if less than 0,5 mm (0.020 in.).

Above this tolerance, perform flange re-shaping in accordance with 6-110-1.

X. Support ring assy (6-190)

(1) Visual inspection

- (a) In the wafered sheet of the thermal insulation liner, damages resulting from an overtemperature or tears are unacceptable.

Depending on how heavy is the deterioration, repair of the wafered heet is accomplished by patch installation or renewal of the damaged sheet segment as per REP 6-190-3 or 6-190-2.

- (b) Desilvering condition or thread deterioration of pads

78-12-01





OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

and riveted nuts entail the renewal of the damaged part, in accordance with REP 6-190-2.

- (c) A dislodged locating pin on the support ring assy model C, is unacceptable. Replace the pin in accordance with REP 6-190C-4.
- (d) Signs of wear on the rear flange, due to knocking by the petal seal segments, are admissible after smoothing over the surface, if they are not deeper than 0,8 mm (0.031 in.). Above this limit, lay the part by pending an appropriate repair scheme.
- (e) Signs of wear on the front flange, due to interference with the front nozzle fairing, are admissible after smoothing over the surface, if they are not deeper than 0,5 mm (0.020 in.). Above this limit, lay the part by pending an appropriate repair scheme.

## (2) Soundness inspection

- (a) Cracks in weld beads are to be removed by weld filling as per REP 6-190-1.
- (b) Cracks in the wafered sheet of the terminal insulation liner are to be repaired by patching as per REP 6-190-3.
- (c) Cracks in the ring sheet metal are to be repaired as follows:
  - 1) By weld filling, as per REP 6-190-1, if isolated and lying in an unoxidized area.
  - 2) By patching in accordance with REP 6-190-5, if ramified or lying in an oxidized area.

## (3) Dimensional inspection

- (a) Worn condition of the (support ring) bush bores accomodating the primary nozzle jacks attachment pins, is acceptable if the bore size does not exceed 10,1 mm (0.398 in.).

Above this dimension, recondition the support ring by installing oversized bushes, in accordance with REP 6-190-6.

78-12-01

**OLYMPUS 593****MK. 610-14-28****OVERHAUL****sneema**

- (b) Worn condition on the FWD face of rear flange is acceptable if the remaining thickness is more than 5,4 mm (0.216 in.).

under this value, lay the part by pending an appropriate repair scheme.

Y. Pins.

(1) Dimensional inspection.

- (a) Diametrical wear affecting these pins is acceptable if their respective outer dia. is larger or equal to minimum dimensions specified in the following table.

Scrap any pin under minimum dia. specified.

Pins	Minimum acceptable diameter
1-60	9,90 mm (0.38976 in.)
1-90	9,90 mm (0.38976 in.)
2-50	5,90 mm (0.23228 in.)
2-190	5,90 mm (0.23228 in.)
2-220	5,90 mm (0.23228 in.)
2-250	5,90 mm (0.23228 in.)
3-60	4,70 mm (0.18504 in.)
3-90	4,70 mm (0.18504 in.)
3-130	9,90 mm (0.38976 in.)
3-160	9,90 mm (0.38976 in.)
3-210	9,95 mm (0.39173 in.)
3-260	9,95 mm (0.39173 in.)
3-310	11,90 mm (0.46850 in.)

**78-12-01**



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## REPAIR

### 1. Format of the repair schemes

Each repair scheme (REP) describes only one operation to be carried out on a single part.

#### A. Repair scheme identification and classification

Any one part is identified by :

- its nomenclature
- its classification in the Illustrated Parts List (Figure-Item)

A repair scheme is identified by :

- the part to which it relates
- the purpose of this repair

These various criteria have been used for identification and classification purposes.

##### (1) Identification

The identification of a repair scheme is given by :

- the nomenclature of the part with its IPL reference No. (Figure-Item)
- the purpose of the repair preceded by its numerical order

##### (2) Classification

The classification of a repair scheme is given by :

- the A.T.A. breakdown system
- the number of the repair scheme which is given by :
  - (a) The part IPL classification (Figure-Item) and the repair numerical order.
- the page number, proper to any repair scheme (re-starts from page 401 for each repair scheme)
- the date

##### (3) Sample of identification and classification

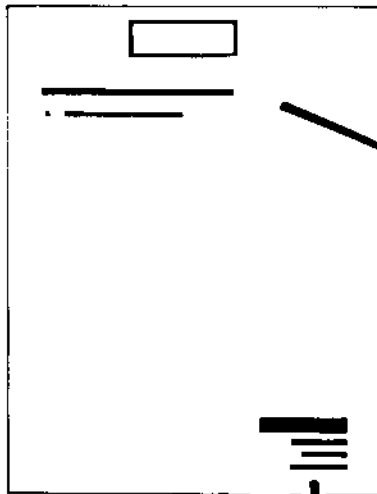
78-12-01

FOREWORD  
Page 401  
Dec 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL



NOMENCLATURE OF THE PART

IPL PART CLASSIFICATION

- 11 : FIGURE No.
- 320 : ITEM

MOBILE ASSEMBLY (11-320).

1. Renewal of the crimped nuts

PURPOSE OF THE REPAIR

REPAIR SCHEME No.

REP No. :

- REP = IPL FIGURE No. WHERE  
THE PART IS SHOWN
- 320 = PART ITEM No. ON FIGURE
- 1 = REPAIR SCHEME No.

ATA BREAKDOWN SYSTEM

**78-10-01**

REP 11-320-1

Page 401

May 30/73

PAGE NUMBERING

DATE

**78-12-01**

FOREWORD

Page 402

Dec 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL



NOTE : The REP numbering system uses the repair scheme identification criteria in order to establish the direct identification/classification relationship.

(4) Particular case

(a) Identical parts

When n identical parts are installed on a same assembly, the numbering of the REP will be made by using the IPL classification of the first part.

Example :

Identification of the  
thrust reverser cascades : CASCADE (2-10, 11, 30, 31,  
50, 51, 70, 90, 110, 111,  
130, 150, 170, 190)

REP No. : REP. 2-10-1

(b) Optional parts

In the case of the I.P.L. making mention of optional parts (OPT TO ...) and should these parts require a special repair scheme, the said scheme shall be identified as follows :

- the nomenclature of the part with its IPL reference No. (Figure - Item) of the basic part (and, if required, the manufacturer's part number),
- the purpose of the repair preceded by its numerical order number,  
and classified as follows :
- A.T.A. breakdown system,
- the number of the repair scheme which is given by the IPL classification of the basic part (Figure - Item) and the repair scheme numerical order number followed by an alphabetical variant,
- page numbered 401 and onward,
- the date.

78-12-01

FOREWORD  
Page 403  
Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



## 2. Updating

A. The revisions, entailed by the technical evolution of the repair scheme, will affect its classification only as far as the date is concerned.

B. Modification of the alternate part

An alpha variant is introduced in the IPL and modifies the figure-item No.

- (1) This modification has no effect on the repair scheme :  
- the REP remains unchanged
- (2) This modification introduces a new REP :

Elaboration of a new repair scheme in which appears the alpha variant issue letter introducing this new REP.

Example : The modification introduces a REP with issue letter C, the previous REP is valid for the parts A and B.

REP 4-20-3 : valid for alpha variant A and B

REP 4-20C-3: valid from alpha variant C.

78-12-01

FOREWORD

Page 404

Dec 15/75

PRINTED IN FRANCE

PRINTED IN FRANCE

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

PART NUMBER	DESCRIPTION	REPAIR NUMBER
AJ579-3	ANCHOR NUT	REP 5-150 -1
AJ579-4	ANCHOR NUT	REP 2-120 -1
BL579-3	ANCHOR NUT	REP 5-150 -1
G579-4	ANCHOR NUT	REP 6-190 -2
002-003-327-6	BUSHING	REP 3-320 -1
21215CA3207	RIVET	REP 6-190 -2
21215CA3207	RIVET	REP 6-190 -5
21215CA4008	RIVET	REP 6-190 -2
21215CM2407	RIVET	REP 6-190 -2
21215CM2408	RIVET	REP 6-190 -2
21215CM3208	RIVET	REP 6-190 -2
21215CM3208	RIVET	REP 6-190 -5
21215CM3209	RIVET	REP 6-190 -2
21215CM3212	RIVET	REP 6-190 -2
21215CM4009	RIVET	REP 6-190 -2
21215CM4013	RIVET	REP 6-190 -2
21215TB2405	RIVET	REP 5- 10 -2
21215TB2405	RIVET	REP 5- 10 -3
21215TB2406	RIVET	REP 5- 10 -2
21215TB2406	RIVET	REP 5- 10 -3
21215TB3206	RIVET	REP 5- 10 -2
21215TB3206	RIVET	REP 5- 10 -3
21215TB3207	RIVET	REP 5- 10 -2
21215TB3207	RIVET	REP 5- 10 -3
21217CA2406	RIVET	REP 6-190 -2
21217CA2407	RIVET	REP 6-190 -2
21217CA2408	RIVET	REP 6-190 -2
21217CA3207	RIVET	REP 6-190 -2
21217CA3208	RIVET	REP 6-190 -2
21217CA3209	RIVET	REP 6-190 -2
21217CM3208	RIVET	REP 2-120 -1
21217CM4018	RIVET	REP 6-190 -2
21217CM4819	RIVET	REP 6-190 -2
21217TB2406	RIVET	REP 5- 10 -2
21217TB2406	RIVET	REP 5- 10 -3
21217TB2407	RIVET	REP 5- 10 -2
21217TB2407	RIVET	REP 5- 10 -3
21217TB2407	RIVET	REP 5-150 -1
21217TB2408	RIVET	REP 5- 10 -2
21217TB2408	RIVET	REP 5- 10 -3
21217TB3207	RIVET	REP 5- 10 -2
21217TB3207	RIVET	REP 5- 10 -3
21217TB3208	RIVET	REP 5- 10 -2

**78-12-01**

REPAIR PARTS LIST

Page 401

Apr 30/93

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

PART NUMBER	DESCRIPTION	REPAIR NUMBER
21217TB3208	RIVET	REP 5- 10 -3
21217TB3208	RIVET	REP 5-150 -1
21217TB3209	RIVET	REP 5- 10 -2
21217TB3209	RIVET	REP 5- 10 -3
21217TC4010	RIVET	REP 4-110A-3
21217TC4010	RIVET	REP 4-110A-4
21217TC4011	RIVET	REP 4-110B-4
21217TC4811	RIVET	REP 4-110A-4
21217TC4812	RIVET	REP 4-100B-4
212317CM2407	RIVET	REP 2-120 -1
301-176-100-0	RING	REP 5- 10 -2
301-176-100-0	RING	REP 5- 10 -2
301-176-600-0	DOWEL PIN	REP 4-110A-5
301-176-600-1	DOWEL PIN	REP 4-110A-5
301-176-600-2	DOWEL PIN	REP 4-110A-5
301-177-501-0	BUSHING	REP 2- 60 -1
301-177-501-1	BUSHING	REP 2- 60 -1
301-177-501-2	BUSHING	REP 2- 60 -1
301-177-501-3	BUSHING	REP 2- 60 -1
301-178-000-0	IDENTIFICATION PLATE	REP 6-190 -2
301-178-201-0	BUSHING	REP 2- 60 -1
301-178-201-1	BUSHING	REP 2- 60 -1
301-178-201-2	BUSHING	REP 2- 60 -1
301-178-201-3	BUSHING	REP 2- 60 -1
301-181-500-0	DOWEL PIN	REP 6-190C-4
301-181-500-1	DOWEL PIN	REP 6-190C-4
301-181-500-2	DOWEL PIN	REP 6-190C-4
301-225-200-0	GUIDE	REP 6-190 -2
301-226-300-0	LINER	REP 1-100A-2
301-226-301-0	LINER	REP 1-100B-2
301-226-700-0	ELBOW	REP 1-100A-2
301-226-801-0	UNION	REP 1-100A-2
301-226-801-0	UNION	REP 1-100B-2
301-227-000-0	CLAMP	REP 1-100A-2
301-227-000-0	CLAMP	REP 1-100B-2
301-227-100-0	TUBE	REP 1-100A-2
301-227-101-0	TUBE	REP 1-100B-2
301-227-203-0	PRE-SHAPED TUBE	REP 1-100A-2
301-227-700-0	NUT	REP 6-190 -2
301-227-700-0	NUT	REP 6-190 -2
301-227-700-0	NUT	REP 6-190 -2
301-227-700-0	NUT	REP 6-190 -2
301-227-700-0	NUT	REP 6-190 -2
301-227-800-0	BOSS	REP 6-190 -2

**78-12-01**

REPAIR PARTS LIST

Page 402

Apr 30/93



**OLYMPUS 593**MK.610-14-28  
OVERHAUL

PART NUMBER	DESCRIPTION	REPAIR NUMBER
301-227-901-0	UNION	REP 4-110A-3
301-227-901-0	UNION	REP 4-110A-4
301-227-902-0	UNION	REP 4-110B-4
301-228-001-0	BOSS	REP 4-110A-3
525-203-026-0	LOAD SPREADING WASHER	REP 5- 10 -2
525-203-026-0	LOAD SPREADING WASHER	REP 5- 10 -3
525-203-033-0	EYELET	REP 5- 10 -2
525-203-154-0	REINFORCEMENT RING	REP 5- 10 -2
525-217-154-0	LOOP CLAMP	REP 5- 90 -2
525-217-155-0	LOOP CLAMP	REP 5- 90 -2
525-600-077-1	BUSHING	REP 6-190 -6
525-600-077-2	BUSHING	REP 6-190 -6
525-600-077-3	BUSHING	REP 6-190 -6
525-600-077-4	BUSHING	REP 6-190 -6
525-600-077-5	BUSHING	REP 6-190 -6
525-600-088-0	REAR REINFORCING PLATE	REP 5- 10 -2
525-600-169-0	REINFORCEMENT RING	REP 5- 10 -2
525-600-171-0	FRONT REINFORCING PLATE	REP 5- 10 -2
525-600-184-0	REAR REINFORCING PLATE	REP 5- 10 -2
525-600-185-0	FRONT REINFORCING PLATE	REP 5- 10 -2
525-609-752-0	CONNECTING TUBE ASSY	REP 5- 90 -2
525-609-753-0	CONNECTING TUBE ASSY	REP 5- 90 -2
525-990-701-0	CONNECTING TUBE ASSY	REP 5- 90 -2
649-794-100-0	UNION NUT	REP 1-100A-2
649-794-100-0	UNION NUT	REP 1-100B-2
649-794-112-0	NOZZLE	REP 1-100A-2
649-794-119-0	NOZZLE	REP 1-100B-2
650-355-011-0	LOAD SPREADING WASHER	REP 6-190 -2

**78-12-01**

REPAIR PARTS LIST

Pages 403/404

Apr 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL

REPAIR



AIR SUPPLY TUBE (1-10).

1. Crack filler welding.

---

PARTS REQUIRED FOR REPAIR

---

Filler welding wire P 3009

---

A. Filler welding of cracks.

Filler weld cracks according to instructions given in chapter 70-35-10.

- Filler welding wire P 3009
- Weld class B 3.

B. Weld inspection.

- (1) Inspect welds, class B3, according to instructions given in chapter 70-35-80.
  - Water washable fluorescent penetrant inspect as per process M 502 B, chapter 70-20-10.
  - X-ray inspect as per chapter 70-20-30.

- (2) Perform a pressure test with fluid (P 163).

Test pressure : 50 bar (725 psi).  
Pressure holding time : 5 minutes.

C. Cleaning.

- (1) Degrease the supply tube in trichlorethylene vapours as per process M 101 A, chapter 70-15-20.
- (2) Run clean trichlorethylene (P 76) through the supply tube, at room ambient temperature, for 5 minutes.
- (3) Rinse the tube with running hot water (85 to 90°C).
- (4) Dry tube by insufflating dehydrated air.

**78-12-01**

REP 1-10-1  
Pages 401/402  
Dec 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

TUBE (1-100)

1. Crack filler welding.

---

PARTS REQUIRED FOR REPAIR

---

Filler welding wire P 3028.

---

A. Filler welding of cracks.

Filler weld cracks according to the instructions detailed in chapter 70-35-10.

- filler welding wire P 3028
- weld class B3.

B. Weld inspection.

(1) Inspect welds, class B3, according to the instructions given in chapter 70-35-80.

- water washable fluorescent penetrant inspect as per process M 502 B, chapter 70-20-10.
- X-ray inspect as per chapter 70-20-30.

C. Heat treatment.

(1) Carry out a tube annealing heat treatment as per instructions detailed in chapter 70-45-00.

- heat treat at : 800°C
- maintain at this temperature level for : 8 hrs.

D. Pressure test.

Perform a pressure test using fluid (P 163).

- test pressure : 50 bar (725 psi).
- pressure holding time : 5 minutes.

78-12-01

REP 1-100-1

Page 401

Dec 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL



#### E. Cleaning

- (1) Degrease tube in trichlorethylene vapours as per process M 101 A, chapter 70-15-20.
- (2) Run clean trichlorethylene (P 76) through the tube, at room ambient temperature, for 5 minutes.
- (3) Rinse the tube, with running hot water (85 to 90°C).
- (4) Dry tube by insufflating dehydrated air.

**78-12-01**

REP 1-100-1  
Page 402  
Dec 30/74

**OLYMPUS 593**

MK.610-14-28

OVERHAUL

REPAIRTUBE (1-100)2. Renewal of a segment of tube

---

**PARTS REQUIRED FOR REPAIR**

---

Elbow	No. 301-226-700-0
Union	No. 301-226-801-0
Union nut	No. 649-794-100-0
Nozzle	No. 649-794-112-0
Liner	No. 301-226-300-0
Tube	No. 301-227-100-0
Pre-shaped tube	No. 301-227-203-0
Tube P 3420, outer dia 6,35 (0.250 in), wall thickness 0.8 mm (0.031 in).	
Welding filler wire P 3028	
Brazing filler metal P 3152	

---

## A. Requirement related to the installation of a tube segment.

- (1) The cut-out of a deteriorated segment of tube is to be accomplished so that minimum distance separating two weld beads is 10 mm (0.394 in).

## B. Preparation of a tube segment.

- (1) Tube segment to be installed should be machined out from :
- a scrapped tube
  - a new pre-shaped tube
  - a tube P 3420, dia 6,35 (0.250 in), wall thickness 0,8 mm (0.031 in), for straight tube sections.

## C. Installation of tube segment.

- (1) Machine (fit) the segment of tube to be welded on tube (1-100) in compliance with dimensional requirements shown on figure 401.

NOTE 1 - When fitting the segment, allow for the important metal shrinkage (0,5 mm-0.020 in approx.) which will occur during welding operation.

**78-12-01**

REP 1-100-2

Page 401

Nov 30/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



NOTE 2 : If tube segments used for repair feature details to be brazed, those details must be fitted on tube segment so as to obtain a play within 0,04 and 0,12 mm (0.0016 - 0.0047 in).

- (2) Tack weld and argon arc weld the tube segment in accordance with instructions detailed in chapter 70-35-10.

- in filler welding wire P 3028
- weld class B3.

NOTE : If tube segment used for repair features details to be brazed, those details shall be installed on tube segment, before welding the latter.

- (3) Inspect welds, class B3, as per instructions detailed in chapter 70-35-80.

- water washable fluorescent penetrant inspect per process M 502 B, chapter 70-20-10.
- X-ray inspect per chapter 70-20-30.

D. Brazing of the various elements (if applicable).

- (1) Locate in place the tube, and/or, the liner and induction braze them using an high-frequency generator, as per instructions detailed in chapter 70-40-10.

- brazing filler metal P 3152.
- brazing class B1.

- (2) Inspect brazed joints, class B1, as per instructions detailed in chapter 70-40-80.

E. Heat treatment.

- (1) Carry out annealing heat treatment of tube as detailed in chapter 70-45-00.

- Heat treatment temp. : 800°C.
- Maintain at this temp. level for : 8 hrs.

**78-12-01**

REP 1-100-2  
Page 402  
Dec 30/74



OLYMPUS 593

MK.610-14-28

OVERHAUL



F. Dimensional inspection.

Check tube dimensional characteristics as per requirements shown on figure 401.

G. Pressure test.

Perform a pressure test using fluid (P 163)

- proving pressure : 50 bar (725 psi)
- pressure application time : 5 minutes.

H. Cleaning.

- (1) Degrease tube in trichlorethylene vapours as detailed in process M 101 A, chapter 70-15-20.
- (2) Run clean trichlorethylene (P 76) through the tube, at room ambient temperature, for 5 minutes.
- (3) Rinse the tube using running hot water (85 to 90°C).
- (4) Dry tube by insufflating dehydrated air.

78-12-01

REP 1-100-2

Page 403

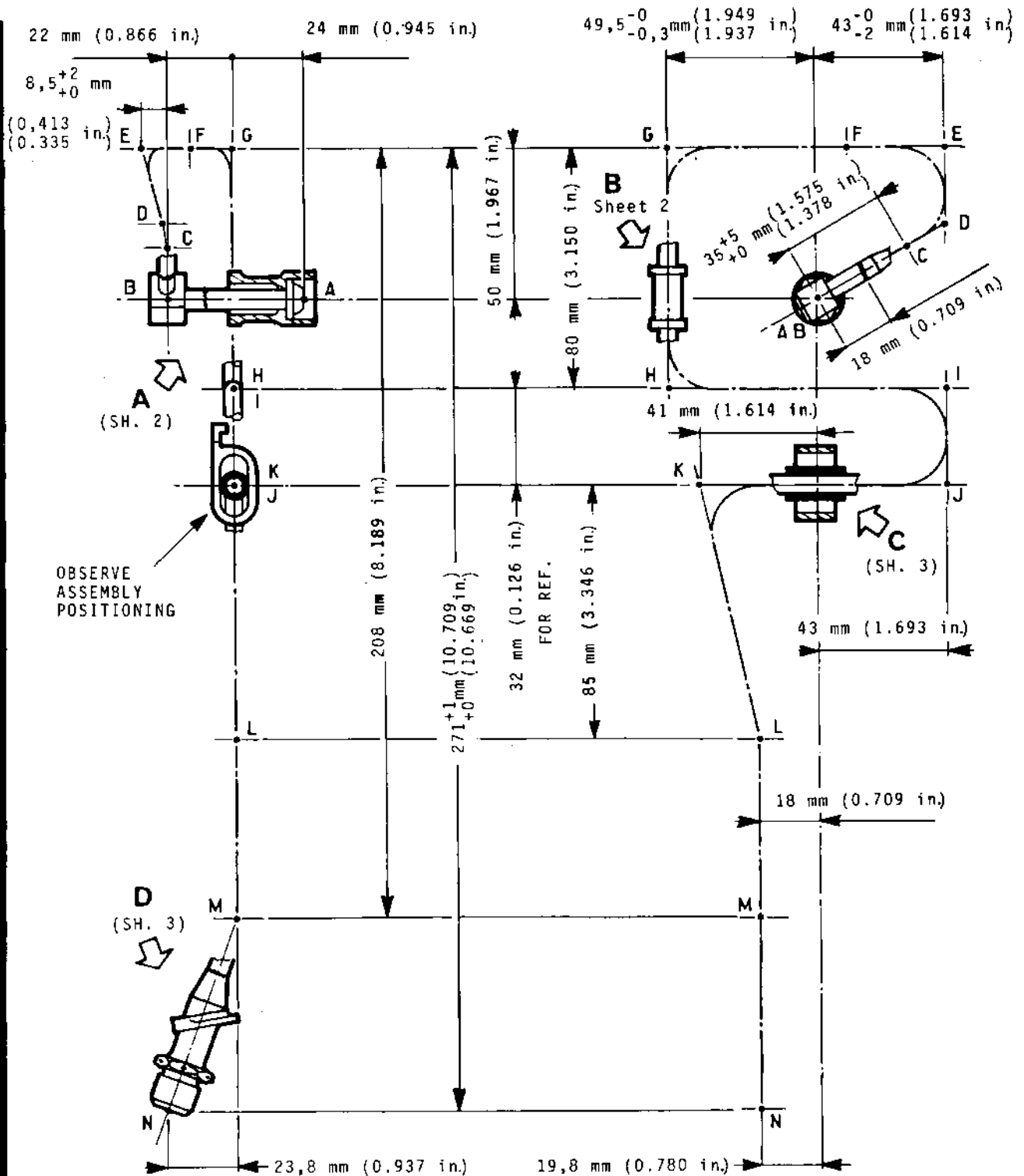
Dec 30/74



# OLYMPUS 593

MK.610-14-28

OVERHAUL



BENDING RADIUS = 16 mm (0.630 in.)

Air Supply Tube Segment Renewal  
Figure 401 - Sheet 1 of 3

78-12-01

REP 1-100-2

Page 404

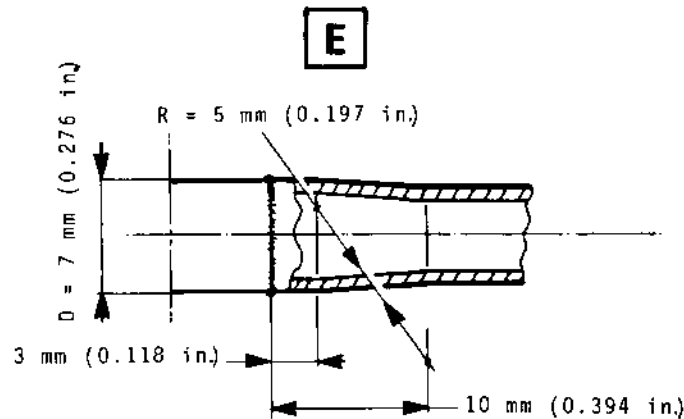
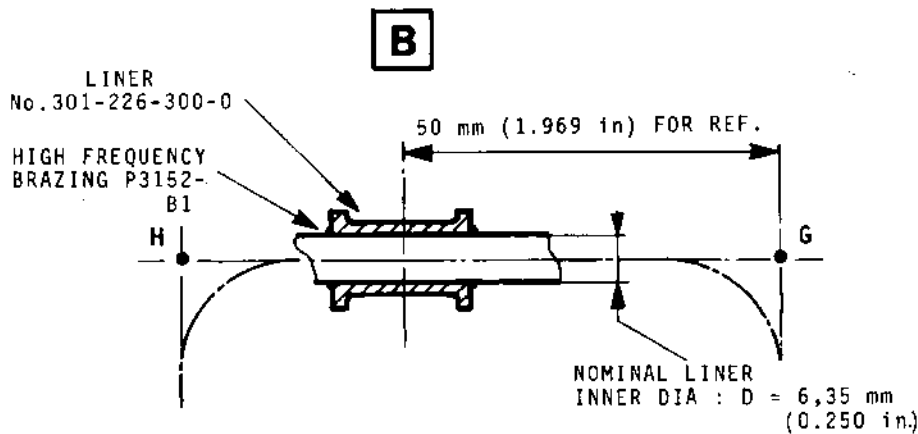
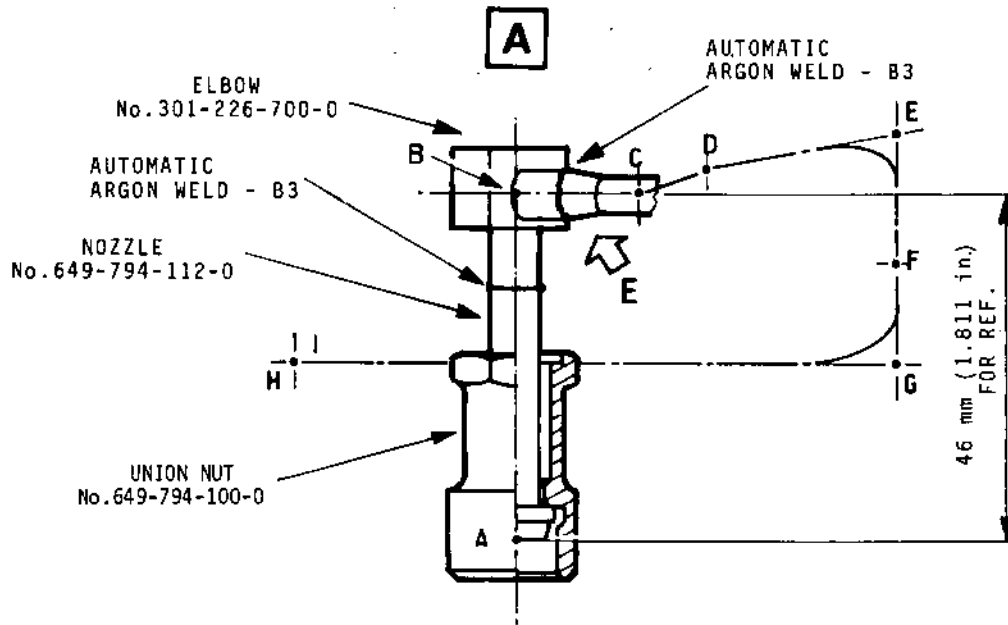
Dec 15/75





# OLYMPUS 593

MK.610-14-28  
OVERHAUL



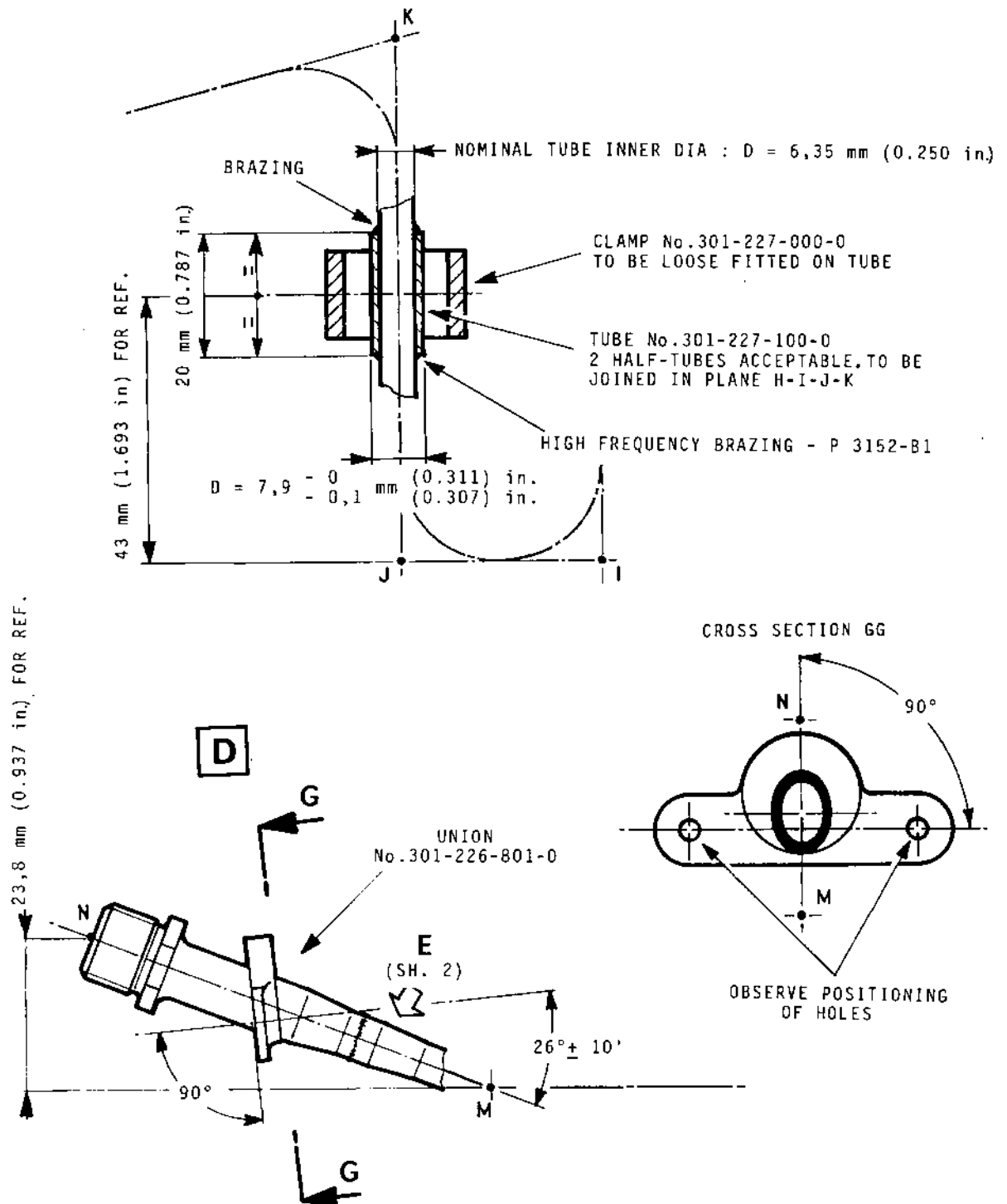
Air Supply Tube Segment Renewal  
Figure 401 - Sheet 2 of 3

## 78-12-01

REP 1-100-2

Page 405

Dec 15/75



Air Supply Tube Segment Renewal  
Figure 401 - Sheet 3 of 3

78-12-01

REP 1-100-2

Page 406

Dec 15/75

**OLYMPUS 593**MK.610-14-28  
OVERHAULREPAIRTUBE (1-100)2A. Renewal of a segment of tube on part No. 301-227-603-0.

---

PARTS REQUIRED FOR REPAIR

---

Clamp	No. 301-227-000-0
Elbow	No. 301-226-700-0
Union	No. 301-226-801-0
Union nut	No. 649-794-100-0
Nozzle	No. 649-794-112-0
Liner	No. 301-226-300-0
Tube	No. 301-227-100-0
Pre-shaped tube	No. 301-227-203-0
Tube P 3420 Outer dia. 6,35 mm (0.25 in.)	
Wall thickness 0,8 mm (0.031 in.)	
Filler welding wire P 3028	
Brazing filler metal P 3152	

---

## A. Requirement related to the installation of a tube segment.

- (1) The cut-out of a deteriorated segment of tube is to be accomplished so that minimum distance separating two weld beads is 10 mm (0.394 in).

## B. Preparation of a tube segment.

- (1) Tube segment to be installed should be machined out from :
  - a scrapped tube
  - a new pre-shaped tube
  - a tube P 3420, dia 6,35 (0.25 in), wall thickness 0,8 mm (0.031 in), for straight tube sections.

## C. Installation of tube segment.

- (1) Machine (fit) the segment of tube to be welded on tube (1-100) in compliance with dimensional requirements shown on figure 401.

NOTE 1 - When fitting the segment, allow for the important metal shrinkage (0,5 mm-0.020 in approx.) which will occur during welding operation.

**78-12-01**

REP 1-100-2A

Page 401

Apr 30/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



NOTE 2 : If tube segments used for repair feature details to be brazed, those details must be fitted on tube segment so as to obtain a play within 0,04 and 0,12 mm (0.0016 - 0.0047 in).

- (2) Tack weld and argon arc weld the tube segment in accordance with instructions detailed in chapter 70-35-10.

- Filler welding wire P 3028
- weld class B3.

NOTE : If tube segment used for repair features details to be brazed, those details shall be installed on tube segment, before welding the latter.

- (3) Inspect welds, class B3, as per instructions detailed in chapter 70-35-80.

- water washable fluorescent penetrant inspect per process M 502 B, chapter 70-20-10.
- X-ray inspect per chapter 70-20-30.

D. Brazing of the various elements (if applicable).

- (1) Locate in place the tube, and/or, the liner and induction braze them using an high-frequency generator, as per instructions detailed in chapter 70-40-10.

- brazing filler metal P 3152.
- brazing class B1.

- (2) Inspect brazed joints, class B1, as per instructions detailed in chapter 70-40-80.

E. Heat treatment.

- (1) Carry out annealing heat treatment of tube as detailed in chapter 70-45-00.

- Heat treatment temp. : 800°C.
- Maintain at this temp. level for : 8 hrs.

PRINTED IN FRANCE

78-12-01

REP 1-100-2A

Page 402

Apr 30/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



F. Dimensional inspection.

Check tube dimensional characteristics as per requirements shown on figure 401.

G. Pressure test.

Perform a pressure test using fluid (P 163)

- proving pressure : 50 bar (725 psi)
- pressure application time : 5 minutes.

H. Cleaning.

- (1) Degrease tube in trichlorethylene vapours as detailed in process M 101 A, chapter 70-15-20.
- (2) Run clean trichlorethylene (P 76) through the tube, at room ambient temperature, for 5 minutes.
- (3) Rinse the tube using running hot water (85 to 90°C).
- (4) Dry tube by insufflating dehydrated air.

PRINTED IN FRANCE

**78-12-01**

REP 1-100-2A

Page 403

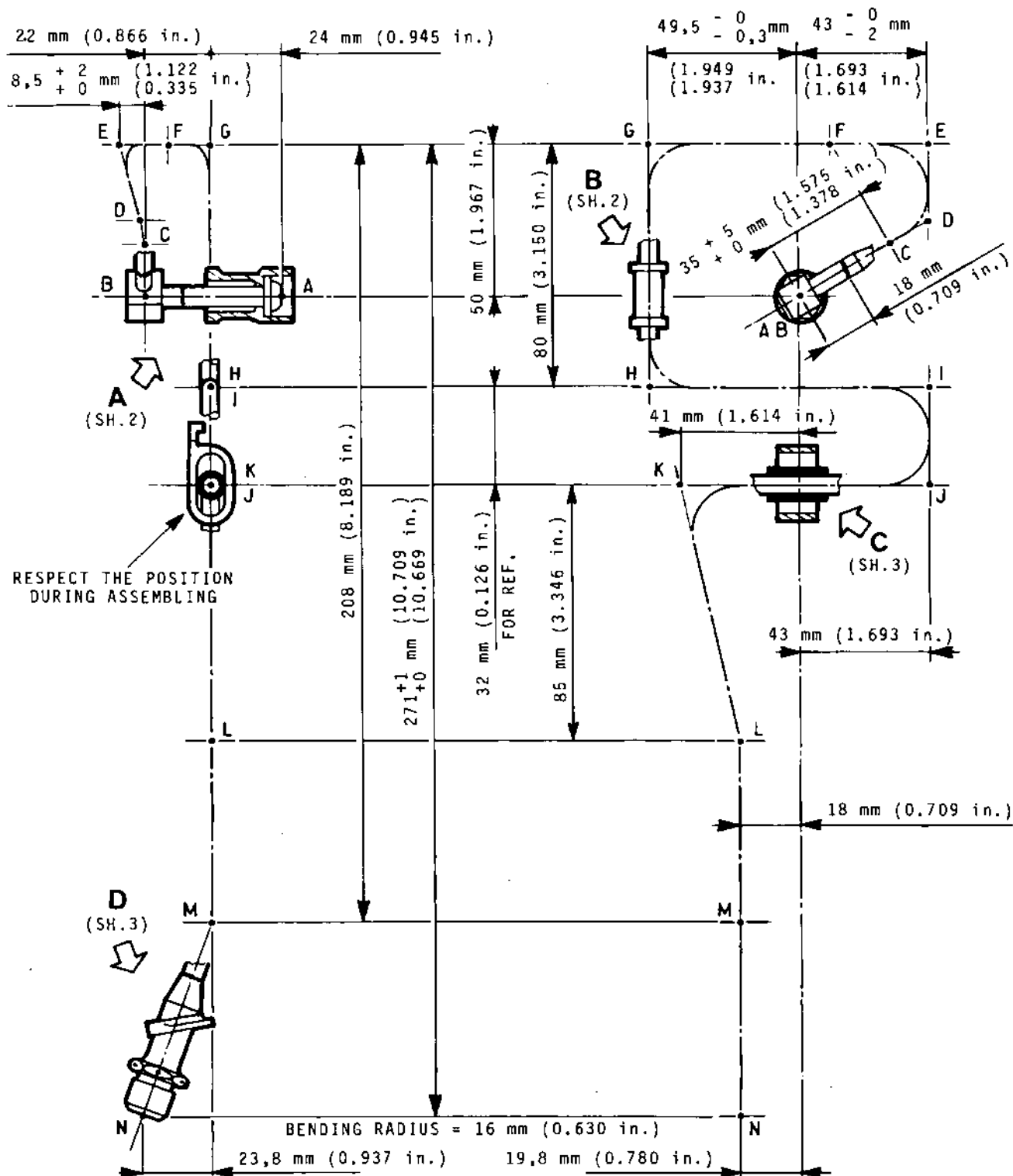
Apr 30/76



# OLYMPUS 593

MK.610-14-28

OVERHAUL



Renewal of a Pressure Tube Segment  
Figure 401 - Sheet 1 of 3

78-12-01

REP 1-100-2A

Page 404

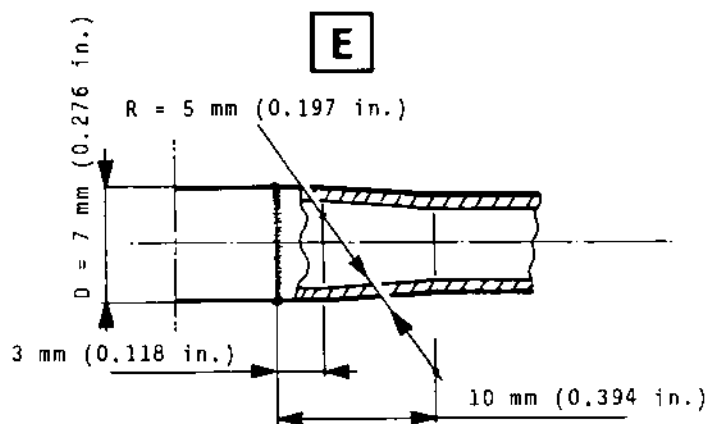
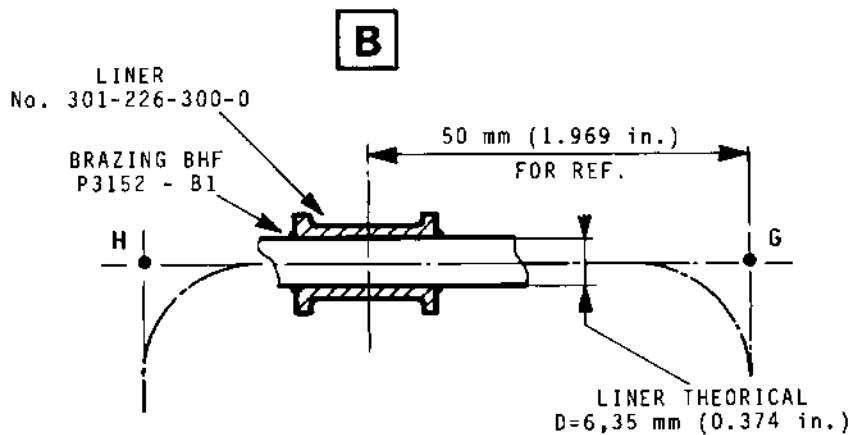
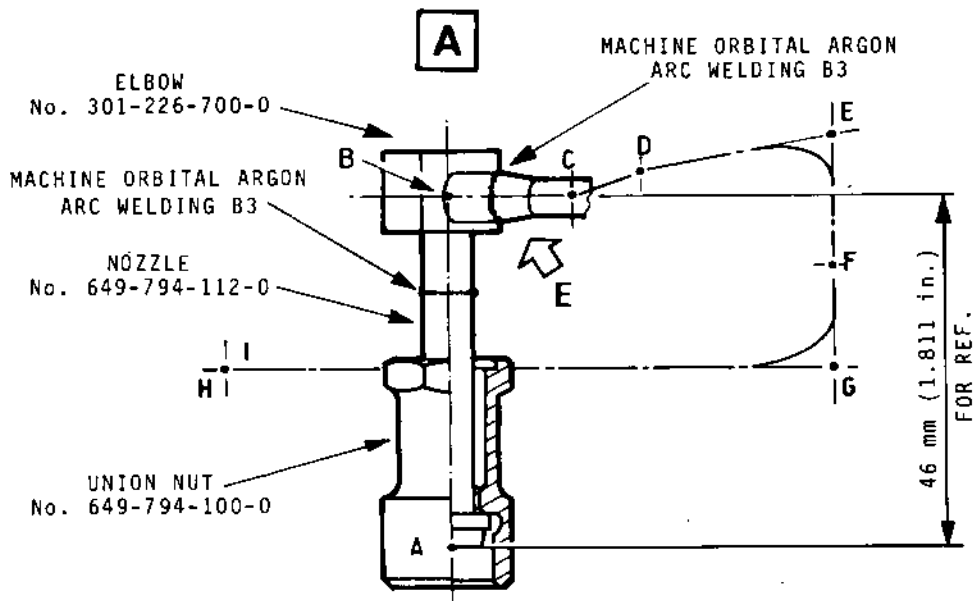
Apr 30/76

PRINTED IN FRANCE



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Renewal of a Pressure Tube Segment  
Figure 401 - Sheet 2 of 3

78-12-01

REP 1-100-2A

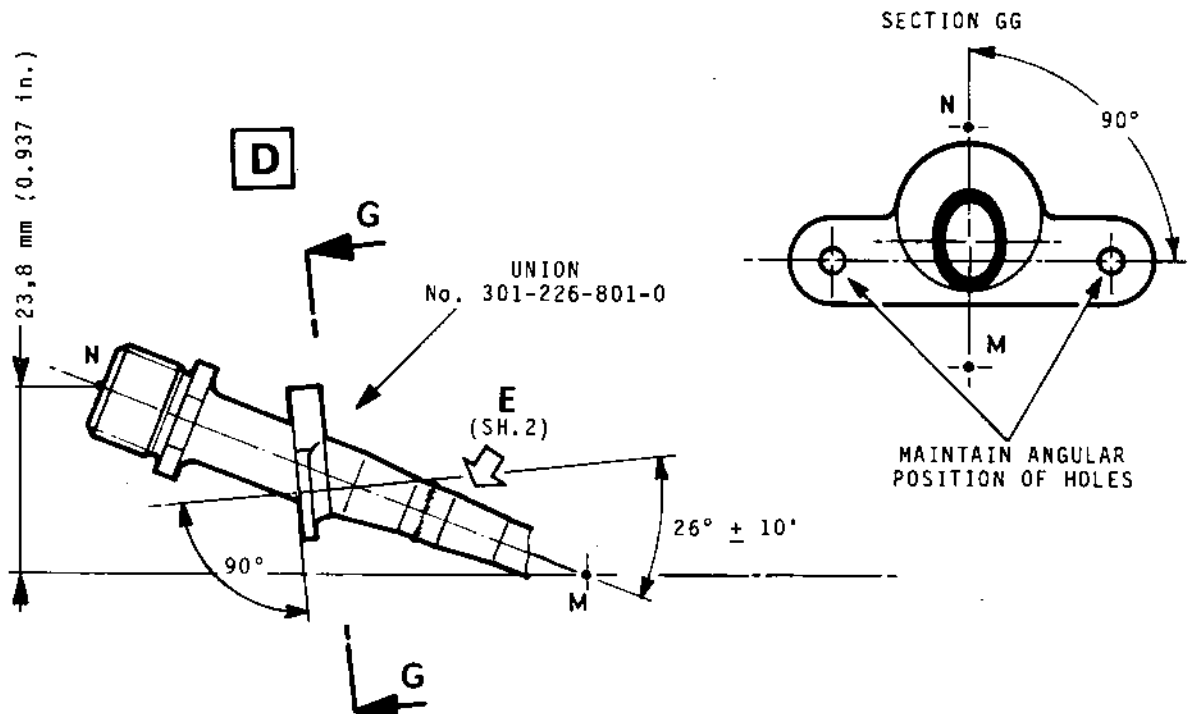
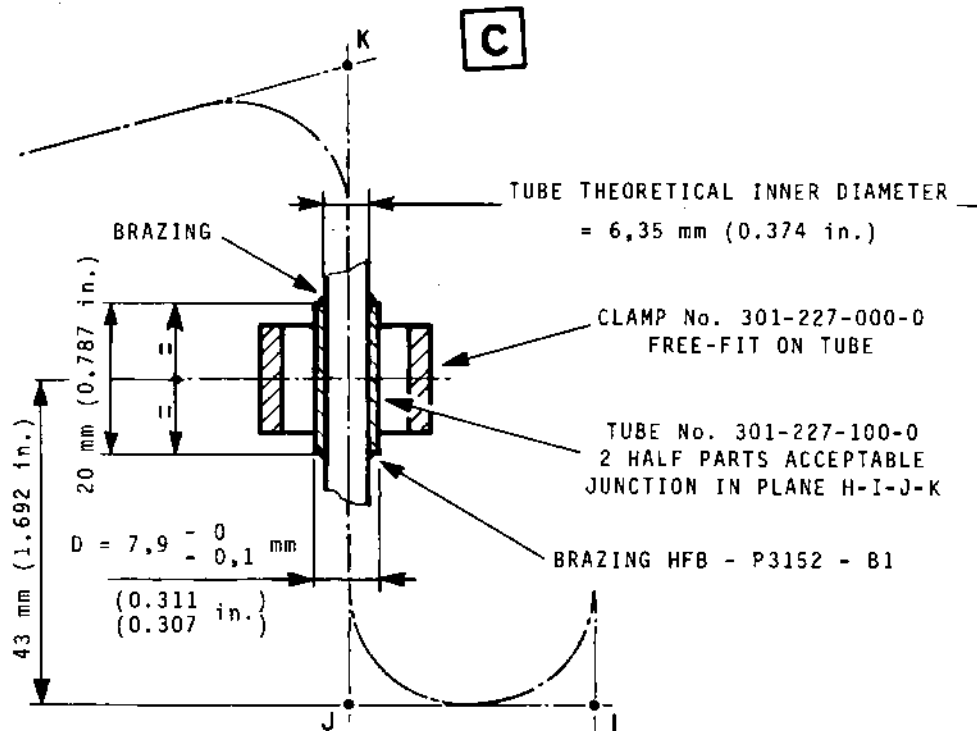
Page 405

Apr 30/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Renewal of a Pressure Tube Segment  
Figure 401 - Sheet 3 of 3

78-12-01

REP 1-100-2A

Page 406

Apr 30/76

PRINTED IN FRANCE

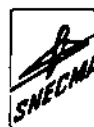




OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

TUBE (1-100)

2B. Renewal of a Tube Segment on Part No. 301-227-604-0

---

PARTS REQUIRED FOR REPAIR

---

Clamp	No. 301-227-000-0
Union	No. 301-226-801-0
Union nut	No. 649-794-100-0
Nozzle	No. 649-794-119-0
Liner	No. 301-226-301-0
Tube	No. 301-227-101-0

Tube P 3420 outer diameter 6 mm (0.236 in.)

Wall thickness 0,8 mm (0.031 in.)

Filler welding wire P 3028

Brazing metal filler P 3152

---

A. Requirement related to installation of a tube segment

- (1) The cut-out of a deteriorated segment of tube is to be accomplished so that minimum distance separating two weld beads is 10 mm (0.394 in.)

B. Preparation of a tube segment

- (1) Tube segment to be installed should be machined out from :
- a scrapped tube
  - a tube P 3420 diameter 6 mm (0.236 in.),  
wall thickness 0,8 mm (0.031 in.)

C. Installation of tube segment

- (1) Fit the tube segment to be installed in compliance with the dimensional requirements shown on figure 401.

NOTE 1 - When fitting the segment, allow for the important metal shrinkage (0.5 mm (0.020 in) approx.) which will occur during welding operation.

**78-12-01**

REP 1-100-2B

Page 401

May 31/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



NOTE 2 : If tube segments used for repair feature details to be brazed, those details must be fitted on tube segment so as to obtain a play within 0,04 and 0,12 mm (0.0016 - 0.0047 in).

- (2) Tack weld and argon arc weld the tube segment in accordance with instructions detailed in chapter 70-35-10.

- in filler welding wire P 3028
- weld class B3.

NOTE : If tube segment used for repair features details to be brazed, those details shall be installed on tube segment, before welding the latter.

- (3) Inspect welds, class B3, as per instructions detailed in chapter 70-35-80.

- water washable fluorescent penetrant inspect per process M 502 B, chapter 70-20-10.
- X-ray inspect per chapter 70-20-30.

#### D. Brazing of the various elements (if applicable).

- (1) Locate in place the tube, and/or, the liner and induction braze them using an high-frequency generator, as per instructions detailed in chapter 70-40-10.

- brazing filler metal P 3152.
- brazing class B1.

- (2) Inspect brazed joints, class B1, as per instructions detailed in chapter 70-40-80.

#### E. Heat treatment.

- (1) Carry out annealing heat treatment of tube as detailed in chapter 70-45-00.

- Heat treatment temp. : 800°C.
- Maintain at this temp. level for : 8 hrs.

PRINTED IN FRANCE

**78-12-01**

REP 1-100-2B

Page 402

Dec 15/75

PRINTED IN FRANCE



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE

PRINTED IN FRANCE

F. Dimensional inspection.

Check tube dimensional characteristics as per requirements shown on figure 401.

G. Pressure test.

Perform a pressure test using fluid (P 163)

- proving pressure : 50 bar (725 psi)
- pressure application time : 5 minutes.

H. Cleaning.

- (1) Degreas tube in trichlorethylene vapours as detailed in process M 101 A, chapter 70-15-20.
- (2) Run clean trichlorethylene (P 76) through the tube, at room ambient temperature, for 5 minutes.
- (3) Rinse the tube using running hot water (85 to 90°C).
- (4) Dry tube by insufflating dehydrated air.

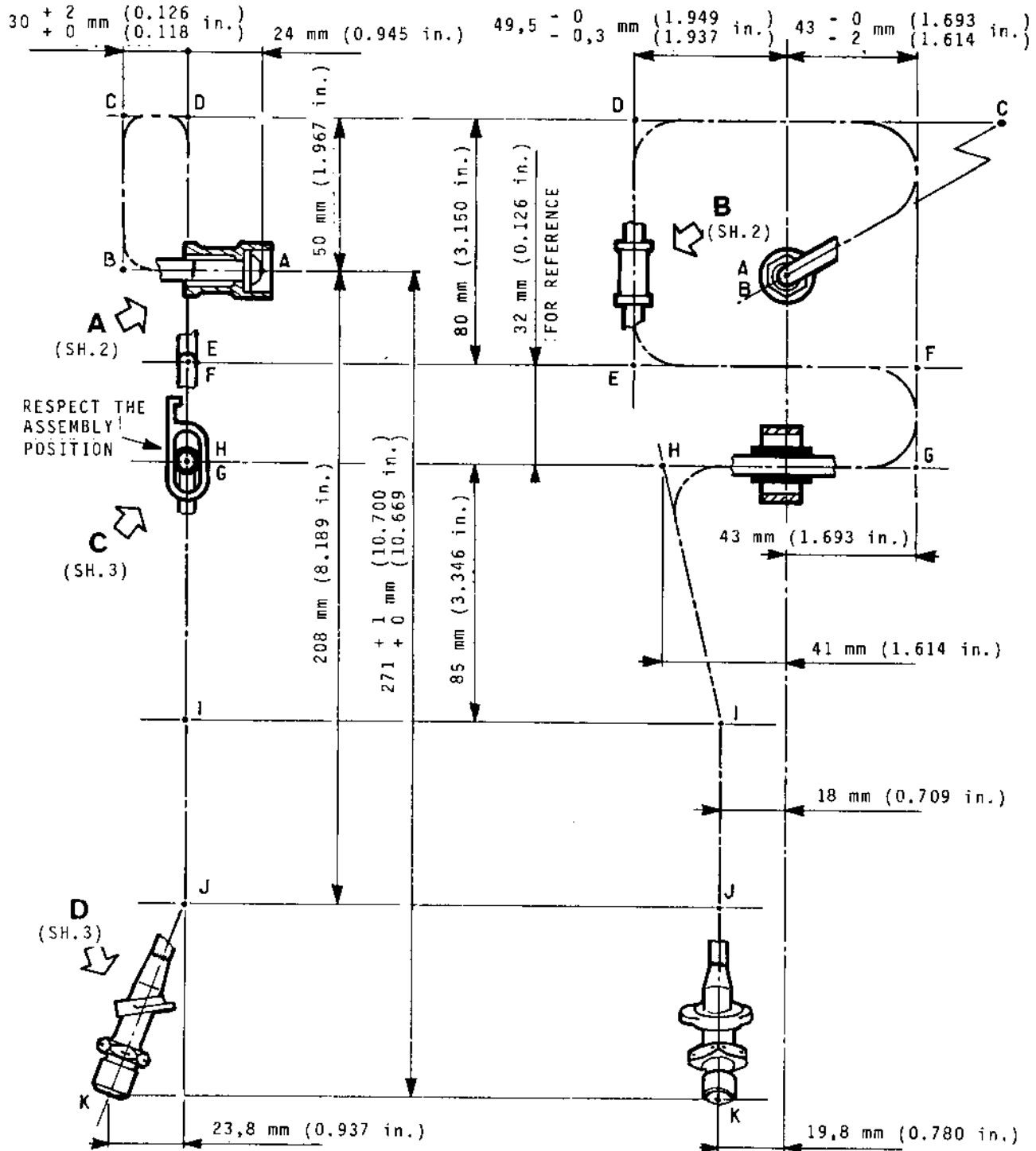
78-12-01

REP 1-100-2B  
Page 403  
Dec 15/75



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



Renewal of a Pressure Tube Segment  
Figure 401 - Sheet 1 of 3

## 78-12-01

REP 1-100-2B  
Page 404  
Dec 15/75

PRINTED IN FRANCE

PRINTED IN FRANCE



OLYMPUS 593

MK.610-14-28

OVERHAUL

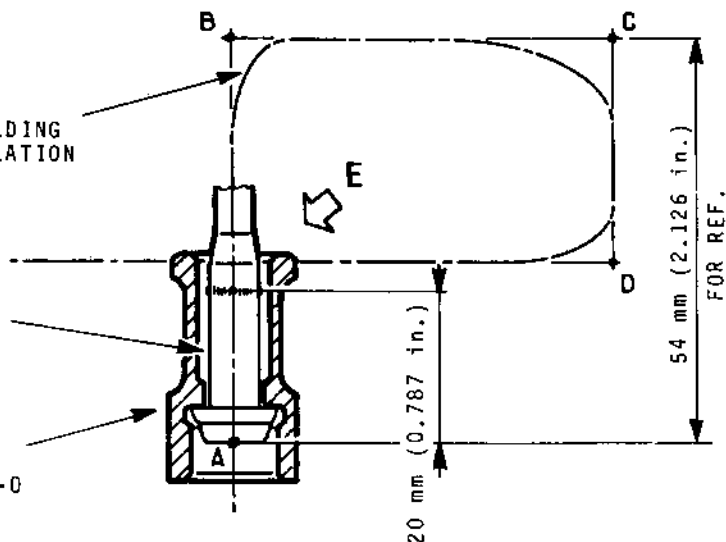


A

BENDING TO BE  
CARRIED OUT AFTER WELDING  
OF NOZZLE AND INSTALLATION  
OF THE UNION NUT

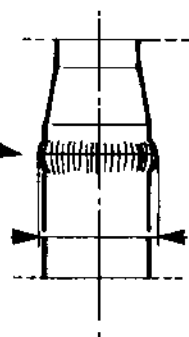
NOZZLE  
No. 649-794-119-0

UNION NUT  
No. 649-794-100-0



E

MACHINE ORBITAL ARGON  
ARC WELDING B3

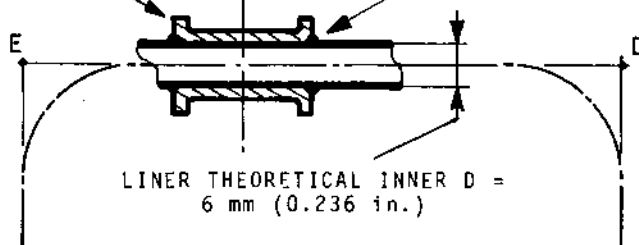


D = 7,9 mm (0.311 in.) MAX.  
FOR NOZZLE ONLY

B

LINER  
No. 301-226-301-0

BRAZING BHF :  
P 3152 - B1



Renewal of a Pressure Tube Segment  
Figure 401 - Sheet 2 of 3

78-12-01

REP 1-100-2B

Page 405

Dec 15/75

PRINTED IN FRANCE

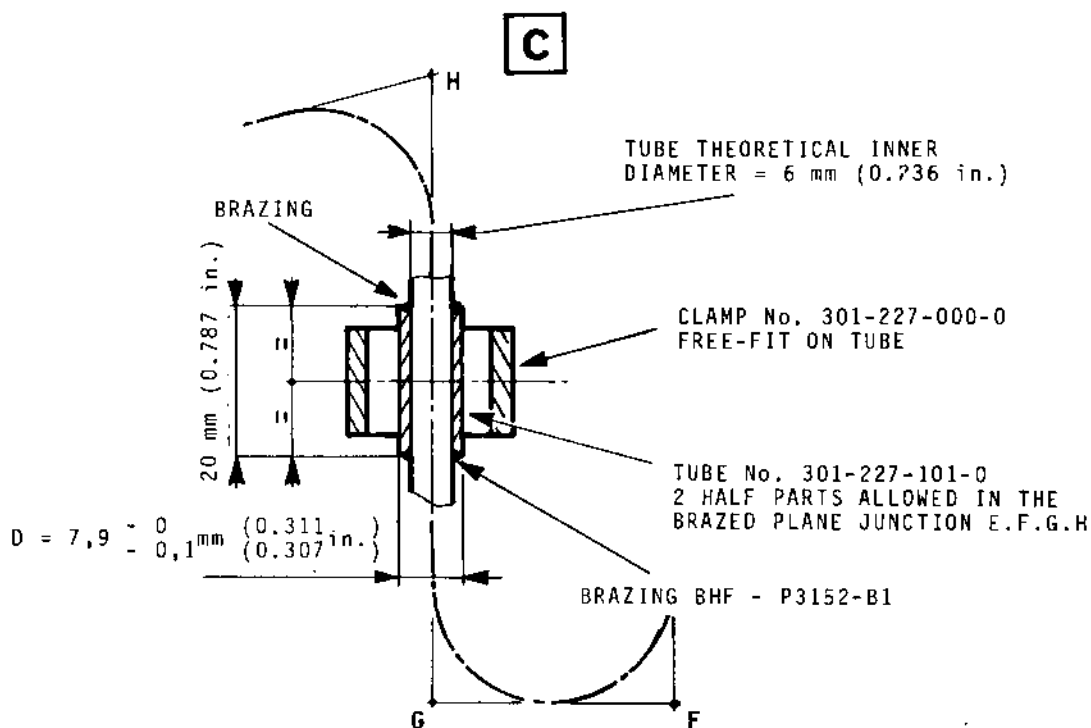
PRINTED IN FRANCE



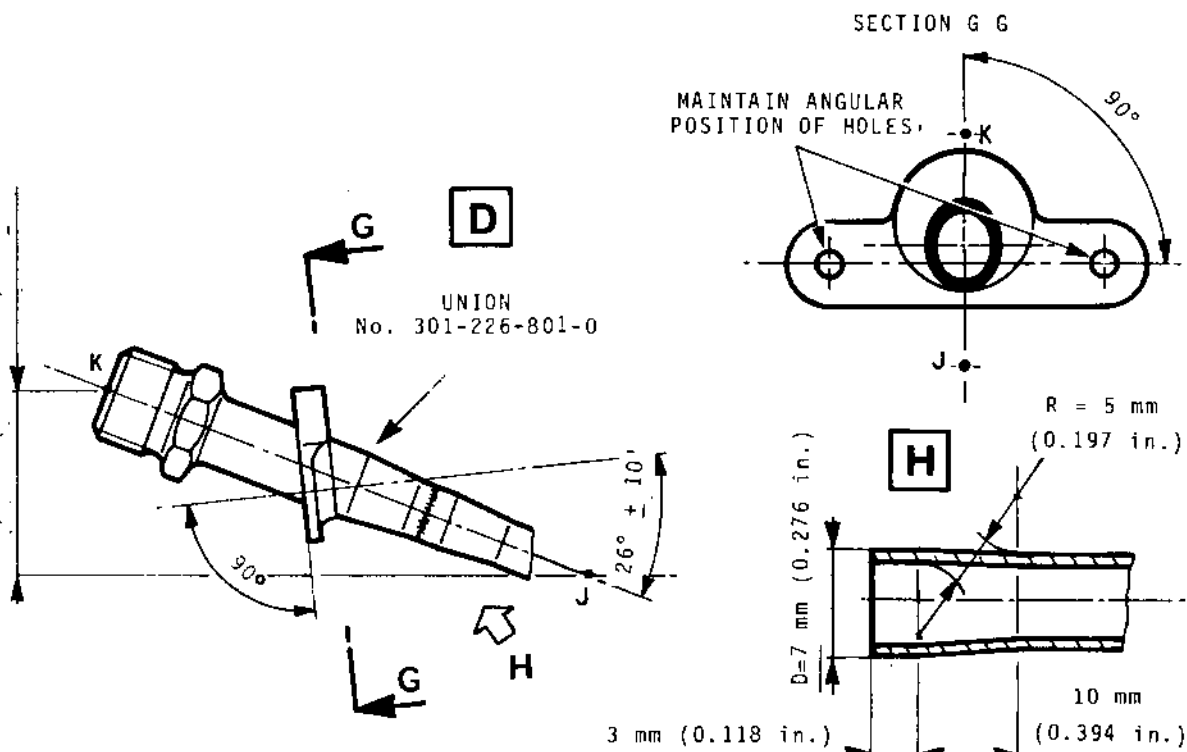
OLYMPUS 593

MK.610-14-28

OVERHAUL



23.8 mm (0.937 in.) FOR REFERENCE



Renewal of a Pressure Tube Segment  
Figure 401 - Sheet 3 of 3

78-12-01

REP 1-100-2B

Page 406

Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL

REPAIR



BLANKING PART ASSY. (1-180)

1. Crack filler welding

---

PARTS REQUIRED FOR REPAIR

---

Filler welding wire P 3030

---

A. Filler welding of cracks

Filler weld cracks as per instructions detailed in chapter 70-35-10.

- Filler welding wire P 3030
- Weld class B1

B. Weld inspection

Inspect weld, class B1, as per instructions detailed in chapter 70-35-80.

**78-12-01**

REP 1-180-1  
Pages 401/402  
Dec 30/74



OLYMPUS 593

MK.610-14-28

OVERHAUL

REPAIR



LINK (2-60)

1. Renewal of the link end-piece bushings.

---

PARTS REQUIRED FOR REPAIR

---

Bushing No. 301-177-501-0 or No. 301-177-501-1  
301-177-501-2  
301-177-501-3

Bushing No. 301-178-201-0 or No. 301-178-201-1  
301-178-201-2  
301-178-201-3

---

A. Removal of the existing bushings.

(1) Machine out bushing or bushings not within limits.

B. Checking the bores which accommodate the bushings.

(1) Check that bore diameters are within limits prescribed in Table I.

1st case - the diameter is within limits : select bushing to be installed.

2nd case - the diameter is not within limits : bore resizing is necessary.

C. Eventual rework of bores accommodating the bushings.

(1) When bore diameter is out of limits, rework it so as to obtain the nearest oversize dimension prescribed in Table I.

D. Bushing installation

(1) Select (match) the bushings to be installed, according to the accommodating bore diameters, and in compliance with dimensional requirements of Table I.

(2) Fit the bushings after having them shrunk in liquid nitrogen (P 441).

E. Dimensional inspection

(1) Check the link bores center-to-center dimension as shown on figure 401.

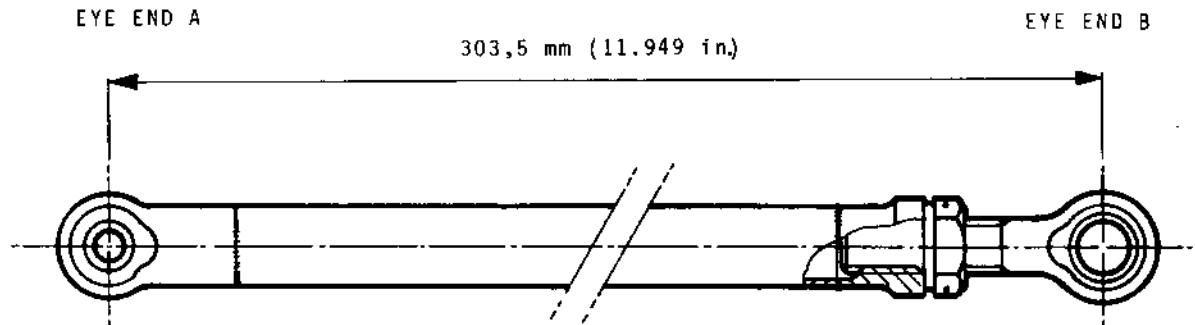
78-12-01

REP 2-60-1

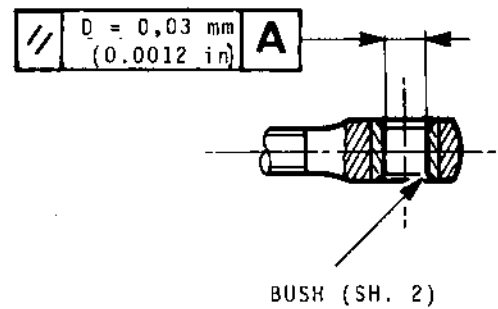
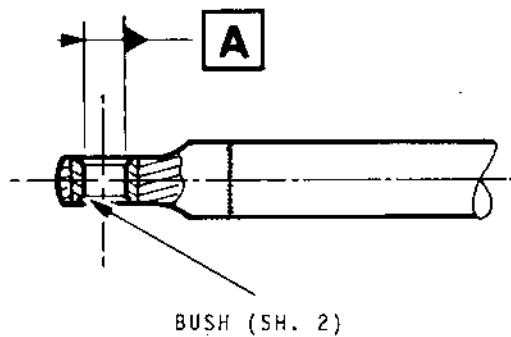
Page 401

Dec 15/75





THIS MAX. TOLERANCE IS TO BE  
IMPERATIVELY CHECKED FOLLOWING  
ADJUSTMENT OF LINK LENGTH ON THE  
PRIMARY NOZZLE.



Link Eye End Bushings Renewal  
Figure 401 - Sheet 1 of 2

78-12-01

REP 2-60-1  
Page 402  
Dec 15/75

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

TABLE I

## EYE END A

Bush No.	Bush outer diameter		Accommodating bore diameter	
	mm	in.	mm	in.
301-177-501-0	9 p6	+0,024 - 0.35528	9 H7	+0,015 0.35433
		+0,015 0.35492		+0 0.35492
301-177-501-1	9,1p6	+0,024 0.35921	9,1H7	+0,015 0.35827
		+0,015 0.35886		+0 0.35886
301-177-501-2	9,2p6	+0,024 0.36315	9,2H7	+0,015 0.36220
		+0,015 0.36280		+0 0.36280
301-177-501-3	9,3p6	+0,024 0.36709	9,3H7	+0,015 0.36614
		+0,015 0.36673		+0 0.36673

## EYE END B

		Bush outer diameter		Accommodating bore diameter	
		mm	in.	mm	in.
301-178-201-0	9 p6	+0,024 0.35528	9 H7	+0,015 0.35433	0.35492
		+0,015 0.35492		+0 0.35492	
301-178-201-1	9,1p6	+0,024 0.35921	9,1H7	+0,015 0.35827	0.35886
		+0,015 0.35886		+0 0.35886	
301-178-201-2	9,2p6	+0,024 0.36315	9,2H7	+0,015 0.36220	0.36280
		+0,015 0.36280		+0 0.36280	
301-178-201-3	9,3p6	+0,024 0.36709	9,3H7	+0,015 0.36614	0.36673
		+0,015 0.36673		+0 0.36673	

Link Eye End Bushings Renewal  
Figure 401 - Sheet 2 of 2**78-12-01**REP 2-60-1  
Pages 403/404  
Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## REPAIR

### LINK (2-60 VARIANT "A")

#### 1. Renewal of the link end-piece bushing.

---

##### PARTS REQUIRED FOR REPAIR

---

Bushing No. 301-177-501-0 or No. 301-177-501-1  
301-177-501-2  
301-177-501-3

Bushing No. 301-178-201-0 or No. 301-178-201-1  
301-178-201-2  
301-178-201-3

---

- A. Removal of the existing bushings
- (1) Machine out bushing or bushings not within limits.
- B. Checking the bores which accommodate the bushings.
- (1) Check that bore diameters are within limits prescribed in Table 1.
- 1st case - the diameter is within limits : select bushing to be installed.
- 2nd case - the diameter is not within limits : bore resizing is necessary.
- C. Rework of bores accommodating the bushings, if required
- (1) When bore diameter is out of limits, rework it so as to obtain the nearest oversize dimension prescribed in Table I.
- D. Bushing installation
- (1) Select (match) the bushings to be installed, according to the accommodating bore diameters, and in compliance with dimensional requirements of Table I.
- (2) Fit the bushings after having them shrunk in liquid nitrogen (P 441).
- E. Dimensional inspection
- (1) Check the link bore center-to-center dimension as shown on figure 401.

78-12-01

REP 2-60A-1

Page 401

Jan 31/77



OLYMPUS 593

MK.610-14-28

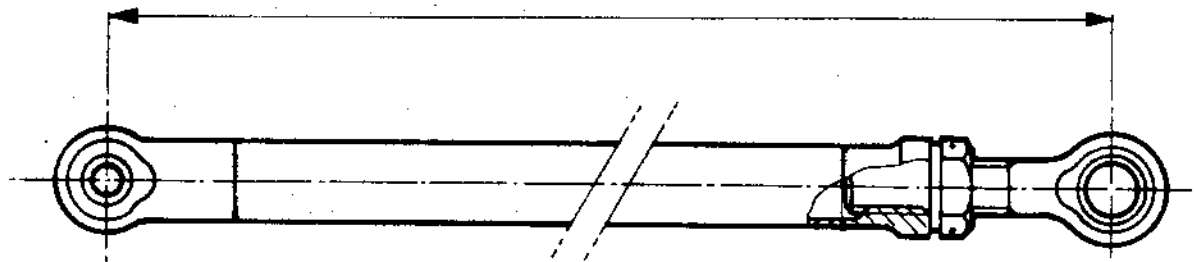
OVERHAUL



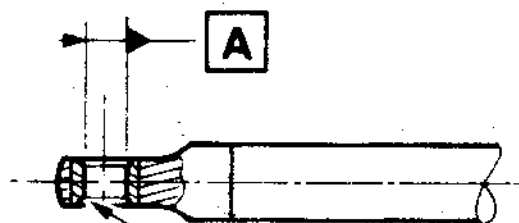
EYE END A

303,5 mm (11.949 in)

EYE END B

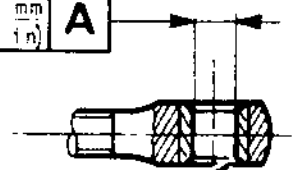


THIS MAX. TOLERANCE IS TO BE  
IMPERATIVELY CHECKED FOLLOWING  
ADJUSTMENT OF LINK LENGTH ON THE  
PRIMARY NOZZLE.



BUSH (SH. 2)

$\parallel$   $\Delta = 0,03 \text{ mm}$   
(0.0012 in) A



BUSH (SH. 2)

Link Eye End Bushings Renewal  
Figure 401 - Sheet 1 of 2

78-12-01

REP 2-60A-1

Page 402

Jan 31/77

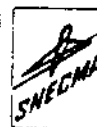
**OLYMPUS 593**MK. 610-14-28  
OVERHAUL

TABLE I

## EYE END A

Bush No.	Bush outer diameter		Accommodating bore diameter	
	mm	in.	mm	in.
301-177-501-0	9 p6	+0,024	9 H7	+0,015
		+0,015		+0
301-177-501-1	9,1p6	+0,024	9,1H7	+0,015
		+0,015		+0
301-177-501-2	9,2p6	+0,024	9,2H7	+0,015
		+0,015		+0
301-177-501-3	9,3p6	+0,024	9,3H7	+0,015
		+0,015		+0

## EYE END B

	mm		in.	
	mm	in.	mm	in.
301-178-201-0	9 p6	+0,024	9 H7	+0,015
		+0,015		+0
301-178-201-1	9,1p6	+0,024	9,1H7	+0,015
		+0,015		+0
301-178-201-2	9,2p6	+0,024	9,2H7	+0,015
		+0,015		+0
301-178-201-3	9,3p6	+0,024	9,3H7	+0,015
		+0,015		+0

Link Eye End Bushings Renewal  
Figure 401 - Sheet 2 of 2**78-12-01**REP 2-60A-1  
Page 403/404  
Jan 31/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

SUPPORT ASSEMBLY (2-120)

1. Renewal of the riveted nuts or of their attaching rivets

---

PARTS REQUIRED FOR REPAIR

---

Anchor nut No. SIMMONDS AJ 579-4  
Rivet No. BNAE 21217 CM 2407 (650-024-043-0)  
or No. BNAE 21217 CM 3208 (650-024-074-0)

---

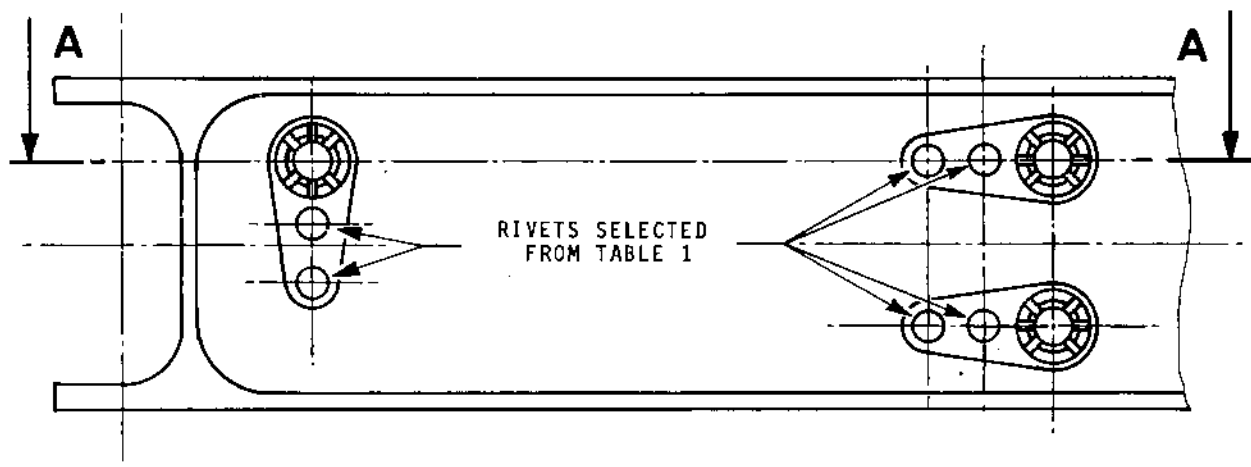
- A. Remove the attaching rivets by grinding rivet heads.
- B. Check rivet holes according to instructions detailed in chapter 70-50-10.
- C. If required, rebore rivet holes to the next oversize diameter as indicated on figure 401 and in chapter 70-50-10.
- D. If required, install a new anchor nut. Install the new rivets, selected from table I, according to instructions detailed, in chapter 70-50-10 and per figure 401.
- E. Check riveting as per chapter 70-50-80.

78-12-01

REP 2-120-1

Page 401

Dec 15/75



CROSS-SECTION **A**

RIVETS HEADS MUST BE MACHINED FLUSH

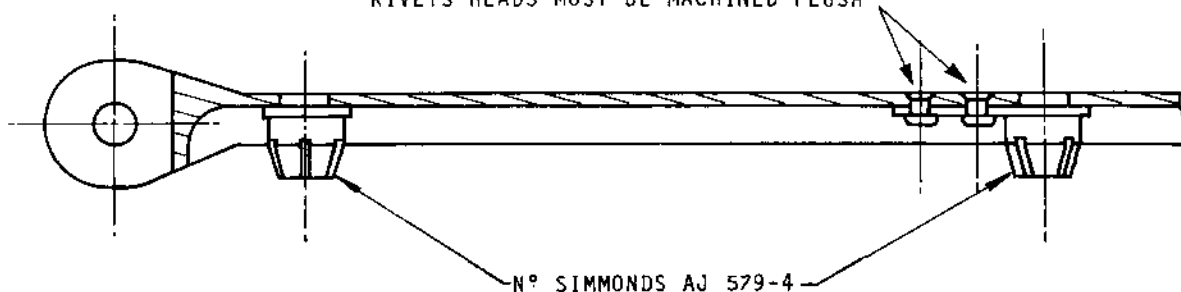


Table I - Riveting Data

Nominal rivet	Dia.	Length	Material	Rivet head
Oversize rivet	mm	(in) mm (in)		shape
21217 CM 2407	2,4 (0.094)	7 (0.276)	Z6 NCT 25	F 100
21217 CM 3208	3,2 (0.126)	8 (0.315)	Z6 NCT 25	F 100

Renewal of the Support Assy. Riveted Nuts or of  
their Attaching Rivets  
Figure 401

78-12-01

REP 2-120-1

Page 402

Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL  
REPAIR



FOLLOWER PETAL (3-30)

1. Re-shaping the petal.

---

PARTS REQUIRED FOR REPAIR

---

A. Re-shaping.

Re-shape the petal, at room ambient temperature, using a mallet, with the petal resting on hard-wooden blocks.

B. Inspection for soundness.

Water washable fluorescent penetrant inspect part, as per process M 502 B; chapter 70-20-10. If cracks are present, refer to chapter "Inspection" of the Manual.

C. Dimensional inspection.

The following permanent distortions are acceptable provided that :

- . twisting, as measured on petal lateral edges, is less than 0,3 mm (0.012 in).
- . bending of the lateral edges is less than 0,4 mm (0.015in)
- . twisting of the stop attachment pad is less than 1°.
- . flatness error of the stop attachment pad is less than 0,3 mm (0.012 in).
- . defect in orientation of the petal front positioning lugs is less than 0,3 mm (0.012 in).

**78-12-01**

REP 3-30-1

Pages 401/402

Dec 30/74



## FOLLOWER PETAL (3-30)

### 2. Elimination of cracks affecting the central rib through reworking.

#### PARTS REQUIRED FOR REPAIR

##### A. Removal of cracks

- (1) Remove cracks using a grinding wheel or a dental type end-milling cutter as per indications shown on figure 401.

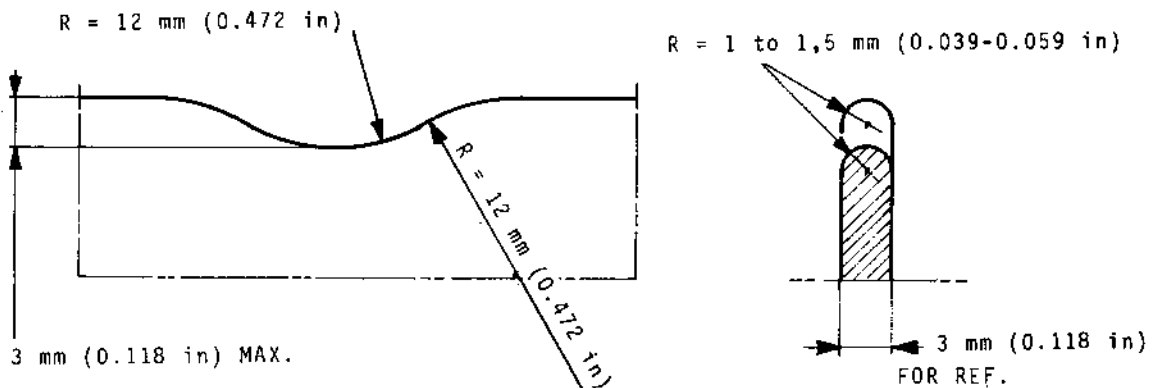
NOTE : Keep removal of parent metal at a strict minimum, while making sure that crack has been completely removed out.

- (2) Finish rework by blending lengthwise to remove all radial tool marks.

##### B. Inspection for soundness.

Water washable fluorescent penetrant inspect part, as per process M 502 B, chapter 70-20-10.

If any crack is found, scrap the petal.



Removal of Cracks Affecting the Petal Central Rib  
Figure 401

**78-12-01**



OLYMPUS 593

MK.610-14-28

OVERHAUL  
REPAIR



LINK (3-100)

1. Re-shaping

---

PARTS REQUIRED FOR REPAIR

---

A. Re-shaping.

Straighten the link, at room ambient temperature, using a fly press, the link resting on hard wooden blocks.

B. Inspection for soundness

Inspect part using water washable fluorescent penetrant process M 502 B of chapter 70-20-10.  
Scrap the link if any crack is found.

D. Dimensional inspection.

Check that residual bending is less than 0,5 mm (0.020 in).

**78-12-01**

REP 3-100-1  
Pages 401/402  
Dec 30/74



OLYMPUS 593

MK.610-14-28

OVERHAUL  
REPAIR



LINK (3-170)

1. Re-shaping

---

PARTS REQUIRED FOR REPAIR

---

A. Re-shaping

Straighten the link, at room ambient temperature, using a fly press, the link resting on hard wooden blocks.

B. Inspection for soundness.

Inspect part using water washable fluorescent penetrant process M 502 B of chapter 70-20-10.  
Scrap the link if any crack is found.

C. Dimensional inspection

Check that residual bending is less than 0,1 mm (0.004 in).

**78-12-01**

REP 3-170-1  
Pages 401/402  
Dec 30/74



OLYMPUS 593

MK.610-14-28

OVERHAUL  
REPAIR



ACTUATED PETAL (3-220, 270)

1. Re-shaping the lateral edges and the front guide lugs.

---

PARTS REQUIRED FOR REPAIR

---

A. Re-shaping.

Re-shape the petal, at room ambient temperature, using a mallet, the petal resting on hard-wooden blocks.

B. Inspection for soundness.

Inspect the part using water washable fluorescent penetrant process M 502 B of chapter 70-20-10.

If any crack is found, refer to chapter "Inspection" of Manual

C. Dimensional inspection.

Check that distortion due to bending of the lateral edges is less 0,3 mm (0.012 in).

**78-12-01**

REP 3-220-1  
Pages 401/402  
Dec 30/74



OLYMPUS 593

MK.610-14-28

OVERHAUL  
REPAIR



ACTUATED PETAL (3-220, 270)

2. Elimination of cracks affecting the petal ribs

---

PARTS REQUIRED FOR REPAIR

---

A. Removal of cracks.

- (1) Remove crack using a grinding wheel or a dental type end-milling cutter as shown on figure 401.

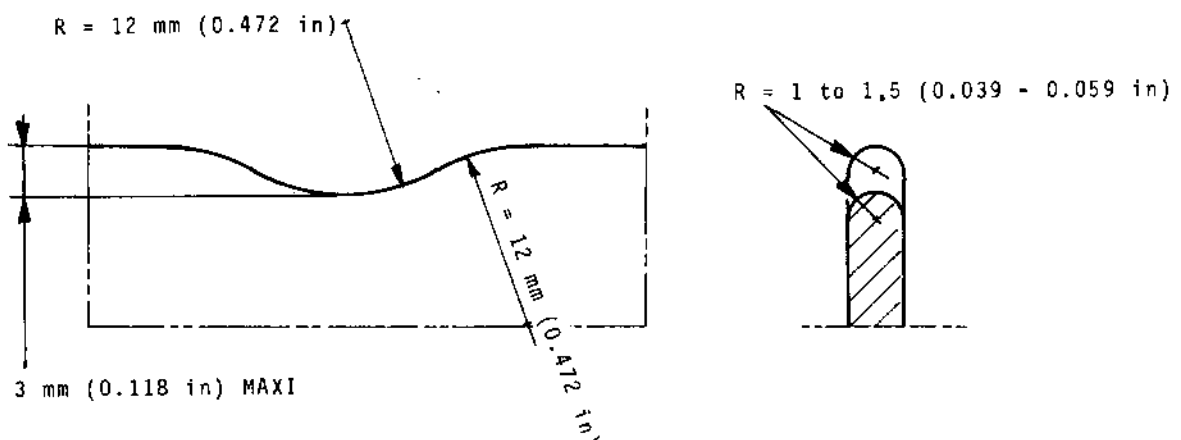
NOTE : Keep removal of the petal parent metal at a strict minimum, while making sure that crack has been totally removed out.

- (2) Finish rework by blending lengthwise to remove all radial tool marks.

B. Inspection for soundness.

Water washable fluorescent penetrant inspect the part as per process M 502 B, chapter 70-20-10.

If any crack is found, scrap the petal.



Removal of the Cracks Affecting the Petal Ribs  
Figure 401

78-12-01

REP 3-220-2  
Pages 401/402  
Dec 30/74



OLYMPUS 593

MK.610-14-28

OVERHAUL  
REPAIR



ACTUATED PETAL (3-220, 270)

3. Crack filler welding

---

PARTS REQUIRED FOR REPAIR

---

Filler welding wire P 3020

---

A. Filler welding of cracks.

Argon arc fill weld the cracks according to the instructions detailed in chapter 70-35-10.

- Filler welding wire P 3020
- Weld class B2

B. Inspection for soundness

Inspect welds class B2, as per instructions detailed in chapter 70-35-80.

- Water washable fluorescent penetrant inspect welds as per process M 502 B, chapter 70-20-10.
- X-ray inspect welds as per chapter 70-20-30.

**78-12-01**

REP 3-220-3  
Pages 401/402  
Dec 30/74



OLYMPUS 593

MK.610-14-28

OVERHAUL  
REPAIR



ACTUATED PETAL (3-220, 270)

4. Reconditioning the petal lug recesses (accommodating the stops -20-) by filler welding.

---

PARTS REQUIRED FOR REPAIR

---

Filler welding wire P 3020

---

A. Filler welding.

- (1) Grind out the broken area of lug so as to weld on a sound zone of parent metal.
- (2) Argon arc filler weld the lug recess as per the instructions detailed in chapter 70-35-10.

- Filler welding wire P 3020
- Weld class B2

NOTE : Using an oxy-acetylene torch preheat zone to be filler welded at about 300°C.

B. Weld inspection.

Inspect weld class B2 as per instructions detailed in chapter 70-35-80.

- Water washable fluorescent penetrant inspect per process M 502 B, chapter 70-20-10.
- X-ray inspect welds per chapter 70-20-30.

C. Machining.

Machine the lug recess in accordance with the dimensional requirements shown on figure 401.

D. Dimensional inspection.

Check that the petal dimensions are in conformity with the requirements of figure 401.

**78-12-01**

REP 3-220-4

Page 401

Dec 30/74



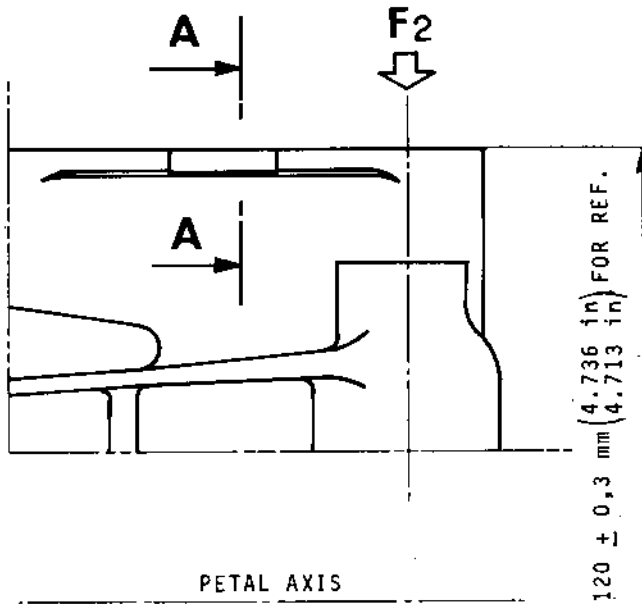
OLYMPUS 593

MK.610-14-28  
OVERHAUL

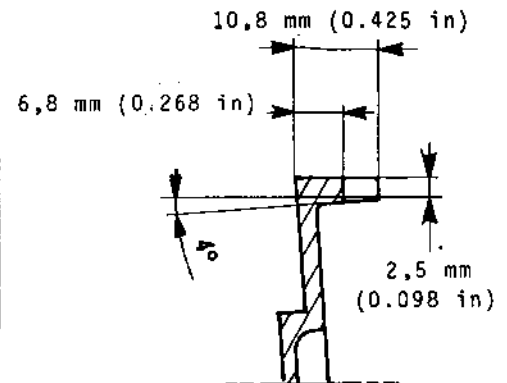


VIEW IN DIRECTION

**F<sub>1</sub>**



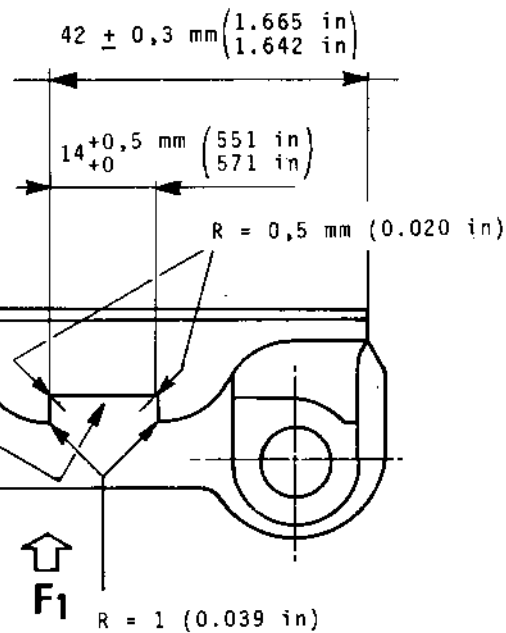
CROSS-SECTION **A**



VIEW IN DIRECTION

**F<sub>2</sub>**

ARGON ARC  
FILLER WELDING  
R-P 3020-B2



Reconditioning the Petal Lug Recesses  
Figure 401

**78-12-01**

REP 3-220-4

Page 402

Dec 30/74





OLYMPUS 593

MK.610-14-28

OVERHAUL  
REPAIR



LEVER (3-230)

1. Re-shaping

---

PARTS REQUIRED FOR REPAIR

---

A. Re-shaping.

Re-shape the lever using a fly-press, the lever resting on hard-wooden blocks, at room ambient temperature.

B. Inspection for soundness.

Water washable fluorescent penetrant inspect the lever, per process M 502 B of chapter 70-20-10.  
If any crack is disclosed, scrap the lever.

C. Dimensional inspection.

Check that residual bending (buckling) is less than 0,3 mm (0.012 in).

**78-12-01**

REP 3-230-1  
Pages 401/402  
Dec 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

LEVER (3-320)

1. Fitting Bushings to Restore the Bores in the Lever-and-Yoke

Joint

---

PARTS REQUIRED FOR REPAIR

---

Bushing No. 002-003-327-6

---

A. Machining the Lever

- (1) Mill the bores to remove flaws as shown in Fig. 403.

NOTE : Any bushings already in the bores are to be ground out, and their recesses slightly reworked as necessary.

- (2) Machine the side faces of the lever to the dimension specified in Fig. 401.

NOTE : In case of bores with bushings in, this operation is dispensed with.

B. Machining the Bushing

- (1) Depending on the diameter given the lever, readjust two repair bushings in such a way as to produce an interference fit of 0 to 0,029 mm (0 to 0.011 in).

C. Fitting the Bushings

- (1) Insert the bushings, previously shrunk in liquid nitrogen (P441) into the corresponding recesses.

NOTE : Make sure that the bushing rims bear firmly against the lever face.

D. Reworking

- (1) Rework the bushing bores and faces into conformity with the values and dimensional requirements specified in Fig. 401.

**78-12-01**

REP 3-320-1

Page 401

Mar 31/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



E. Dimensional inspection

- (1) Perform a dimensional check of the lever as shown in Fig. 401.

F. Marking

- (1) Add "REP 1" next after the part No. as described under method M 21 in chapter 70-10-10 "MARKING".

PRINTED IN FRANCE

**78-12-01**

REP 3-320-1

Page 402

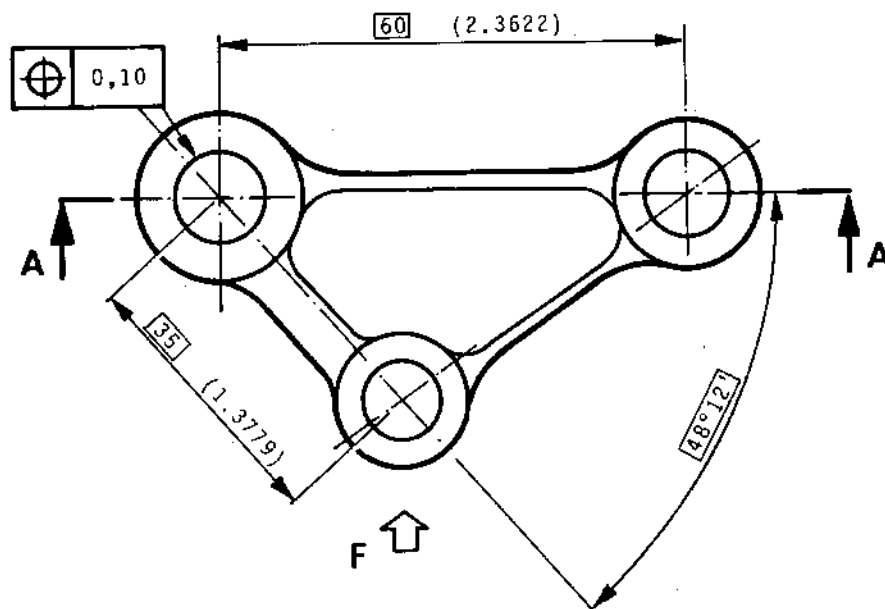
Mar 31/78



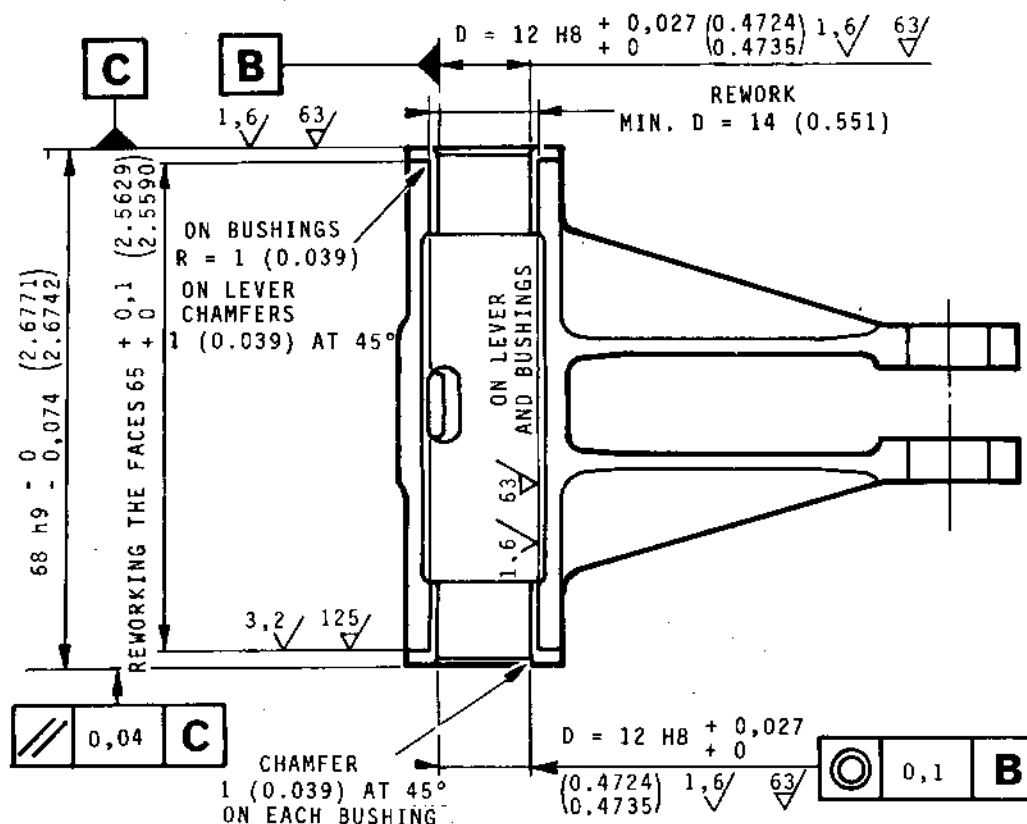
OLYMPUS 593

MK.610-14-28

OVERHAUL



SECTION AA



DIMENSIONS ARE IN MILLIMETRES WITH INCH CONVERSIONS IN PARENTHESES.

Fitting Bushings to Restore Bores on Lever/Yoke Joint  
Figure 401 (Sheet 1 of 2)

78-12-01

REP 3-320-1

Page 403

Mar 31/78

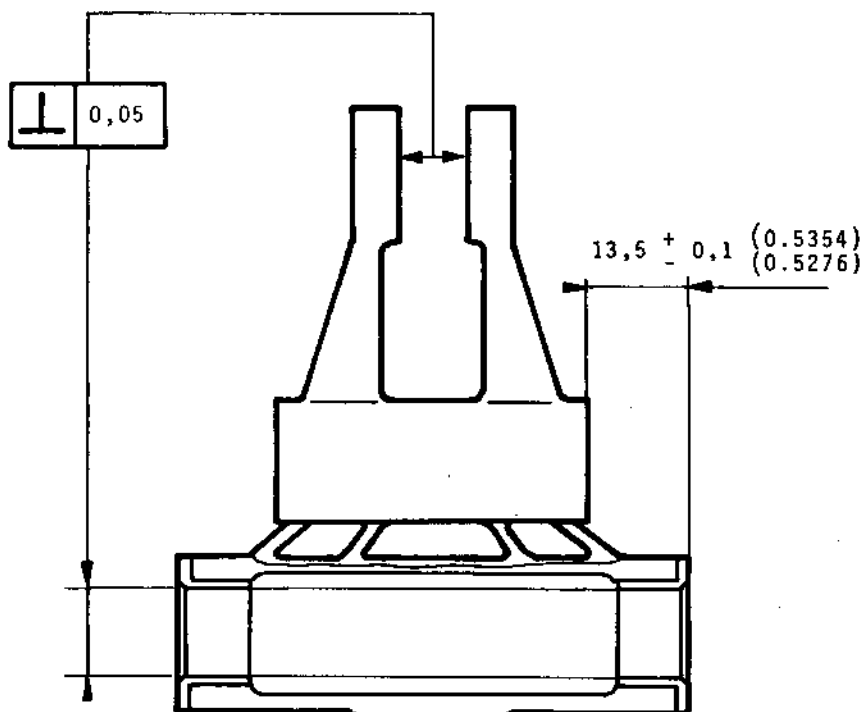


OLYMPUS 593

MK.610-14-28  
OVERHAUL



F



PRINTED IN FRANCE

DIMENSIONS ARE IN MILLIMETRES WITH INCH  
CONVERSIONS IN PARENTHESES.

Fitting Bushings to Restore Bores on Lever/Yoke Joint  
Figure 401 (Sheet 2 of 2)

78-12-01

REP 3-320-1

Page 404

Mar 31/78



# OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

## REPAIR

### TWIN YOKE (4-50/80)

#### 1. Fitting Bushings to Restore the Bores in the Twin Yoke.

---

#### PARTS REQUIRED FOR REPAIR

---

Bar P3623 (KC 20 WNX); 12,7 mm (0.50 in.) Dia Mini  
Brazing Powder Ni.Cr.B 1055  
Cement P3196 (Microbraz 400)

---

#### A. Machining the Bores of the Twin Yokes. See figure 401.

- (1) Position and center tool No. 025-4598-78 on the machine tool table.
- (2) Position the part on the tool and secure.
- (3) Rework the bores per chapter 70-55-00 and the following indications:
  - (a) Twin yoke material: KC 25 NW (HS 31).
  - (b) Rough machining to 11,8 mm (0.465 in.) Dia using a 8 mm (0.315 in.) Dia boring cutter bar fitted with a K10 cutting tip.
  - (c) Final machining to 12,02-12,07 mm (0.4732-0.4752 in.) Dia using a 10 mm (0.394 in.) Dia boring cutter bar fitted with a K10 cutting tip.
  - (d) Remove the part from tool.

#### B. Machining of the Bushings. See figure 402.

- (1) Machine the necessary bushings in the 12,7 mm (0.50 in.) minimum diameter P3623 bar.
  - (a) For twin yoke (4-50): 2 bushings 3,5 mm (0.138 in.) wide and 2 bushings 4 mm (0.157 in.) wide.
  - (b) For twin yoke (4-80): 4 bushings 3,5 mm (0.138 in.) wide.

# 78-12-01

REP 4-50-1

Page 401

Jun 30/97



OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

C. Ultrason Cleaning of the Parts to be Brazed.

- (1) Degrease by immersion in an alkaline solution. Bath with ultrasonic steering if possible.
  - (a) ARDROX PST39.
  - (b) Concentration: 30 g/l.
  - (c) Duration: 13 min  $\pm$  15 seconds.
- (2) Rinse by immersion in fresh water, with ultrasonic steering, if possible.
  - (a) Duration: 13 min  $\pm$  15 seconds.
- (3) Rinse by immersion in hot demineralized water.
  - (a) Immersion duration 12 min + 15 seconds.
  - (b) Dripping duration: 1 min  $\pm$  15 seconds.
- (4) Clean in a P456 (Flugene 113) bath with ultrasonic steering.
  - (a) Immersion duration: 5 min.
  - (b) Dripping duration: 45 seconds.
- (5) Rinse by immersion in a P456 bath.
  - (a) Immersion duration: 2 min.
  - (b) Dripping duration: 45 seconds.
- (6) Dry with P456 vapour.
  - (a) Immersion duration: 1 min.
  - (b) Dripping duration at the coil level: 1 min.
  - (c) Dripping duration over the tank: 1 min.

D. Brazing of the Bushings. See figure 403.

- (1) Stir Ni.CR.B 1055 brazing powder with P3196 (Microbraz 400) cement to obtain an homogeneous paste to be applied using a pneumatic syringe fitted with a 0,4 mm (0.016 in.) inner diameter needle.
- (2) Position the bushings in their recess.

78-12-01

REP 4-50-1  
Page 402  
Jun 30/97



# OLYMPUS 593

MK. 610-14-28

OVERHAUL



SNECMA

- (a) Fit a 15,05 mm (0.5925 in.) calibrated shim between the 4 mm (0.16 in.) wide ribs.
- (b) Apply a brazing past bead on the bushings fitting side.
- (3) Position the twin yoke on stumatite shims in a vacuum furnace.
  - (a) Residual pressure of less than 0.001 Pa.
- (4) Perform the following brazing cycle.

NOTE: - Temperature are given with a + or - 10°C (-18°F) tolerance.  
- Temperature holding times are given with a 0-20% tolerance.

- (a) Heating from 20°C (68°F) to within 400-500°C (752-932°F) in more than 30 min.
- (b) Degazing holdover for 15 min minimum then return to the original pressure.
- (c) Heating to 950°C (1742°F) in more than 30 min.
- (d) Homogenizing holdover for 15 min at 950°C (1742°F).
- (e) Heating from 950°C (1742°F) to 1200°C (2192°F) in less than 45 min.
- (f) 10 to 20 min holdover at 1200°C (2192°F).
- (g) Vacuum or argon cool to 1000°C (1832°F).

#### E. Brazing Check.

NOTE: X-ray inspection on the brazed joint is not possible. Only the visual examination is to be carried out.

- (1) Perform a brazing check, class B2 as per instructions detailed in chapter 70-40-80.
  - (a) Negative fillet at the exposed edge joint is acceptable if joining line is gradual, and if the braze material is visible.  
In doubt, inspect as per process M503A; chapter 70-20-10. No indication allowed.

## 78-12-01

REP 4-50-1  
Page 403  
Jun 30/97





**OLYMPUS 593**

**MK. 610-14-28**

**OVERHAUL**



**sneema**

F. Machining the Bores of the Bushings. See figure 404.

- (1) Position and center tool No. 025-4598-78 on the machine tool table.
- (2) Position the part on the tool and secure.
- (3) Rework the bore of the bushing to 10,000-10,022 mm (0,39370-0.39457 in.) Dia using a 8 mm (0.315 in.) Dia boring cutter bar fitted with a K10 cutting tip. Perform finition using a hard reamer, if necessary.
- (4) Chamfer according to figure 404.
- (5) Remove the part from tool.

G. Inspection.

- (1) Perform a dimensional inspection of the bores in the bushings according to figure 404.

H. Marking.

- (1) Mark "REP 1" per method M21 of CHAPTER 70-10-10 and indications given in figure 404.

**78-12-01**

REP 4-50-1

Page 404

Jun 30/97



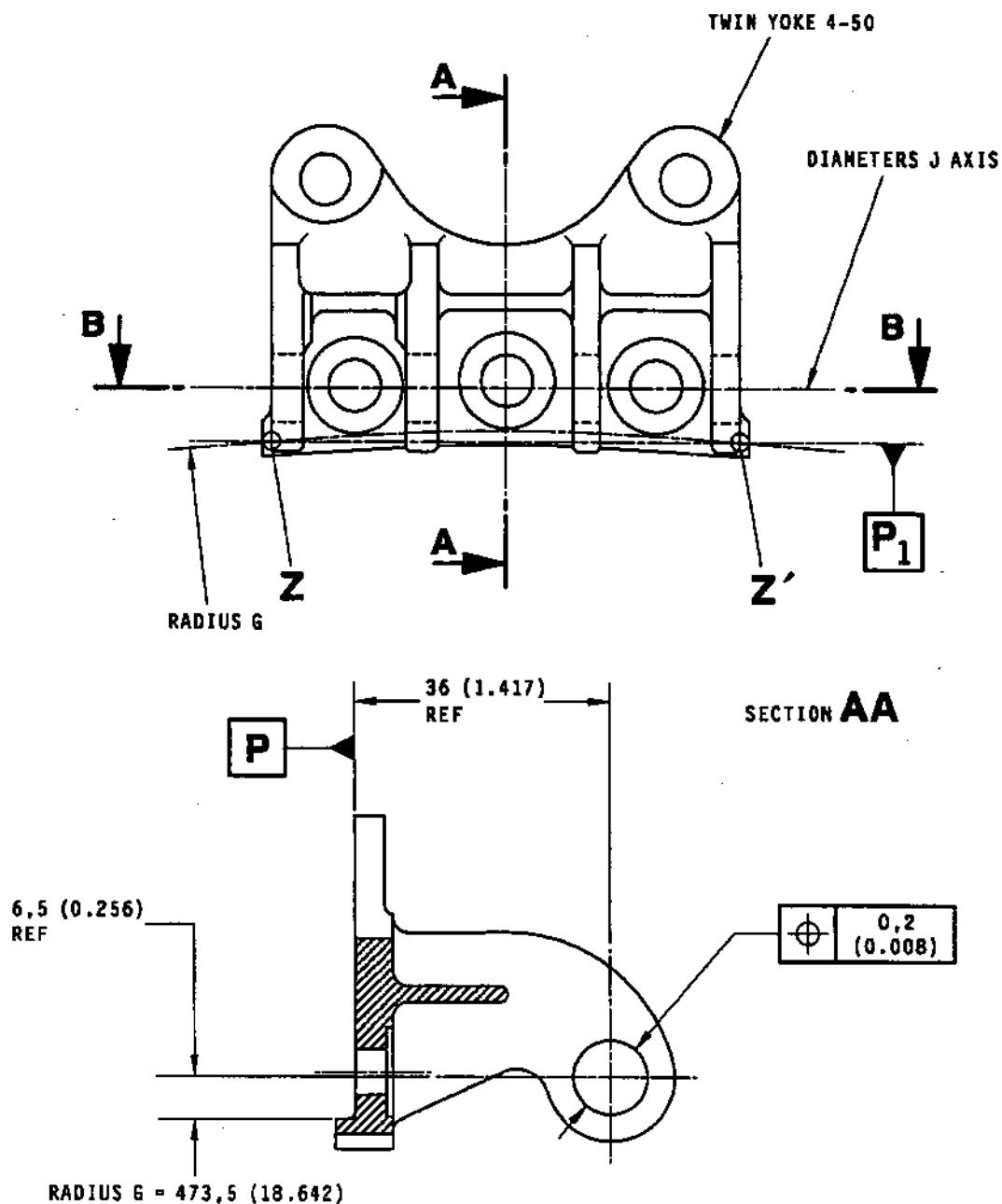
OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema



DIMENSIONS ARE IN MILLIMETRES WITH  
INCH CONVERSIONS IN PARENTHESES.

S-OLY-SM-00022-00-B

Rework of the Articulation Bores  
Figure 401 (Sheet 1 of 3)

78-12-01

REP 4-50-1  
Page 405  
Jun 30/97



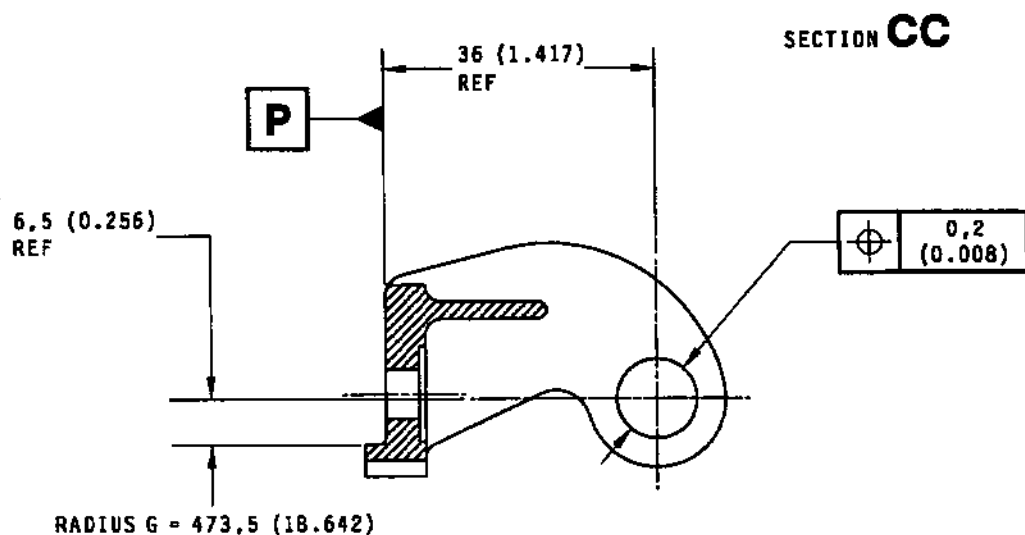
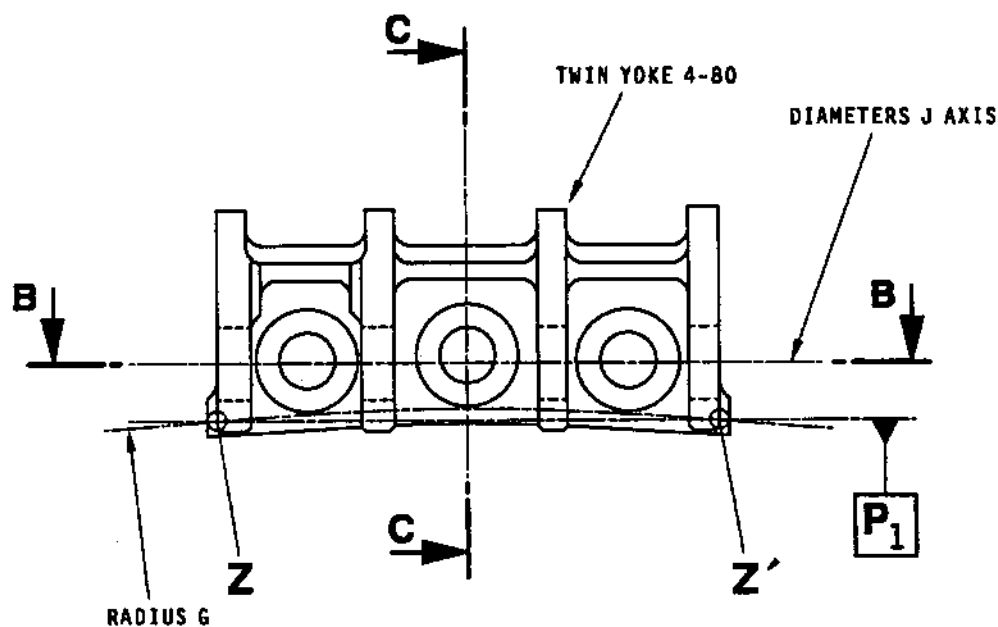
# OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema



DIMENSIONS ARE IN MILLIMETRES WITH  
INCH CONVERSIONS IN PARENTHESES.

S-OLY-SM-00023-00-B

Rework of the Articulation Bores  
Figure 401 (Sheet 2 of 3)

## 78-12-01

REP 4-50-1

Page 406

Jun 30/97

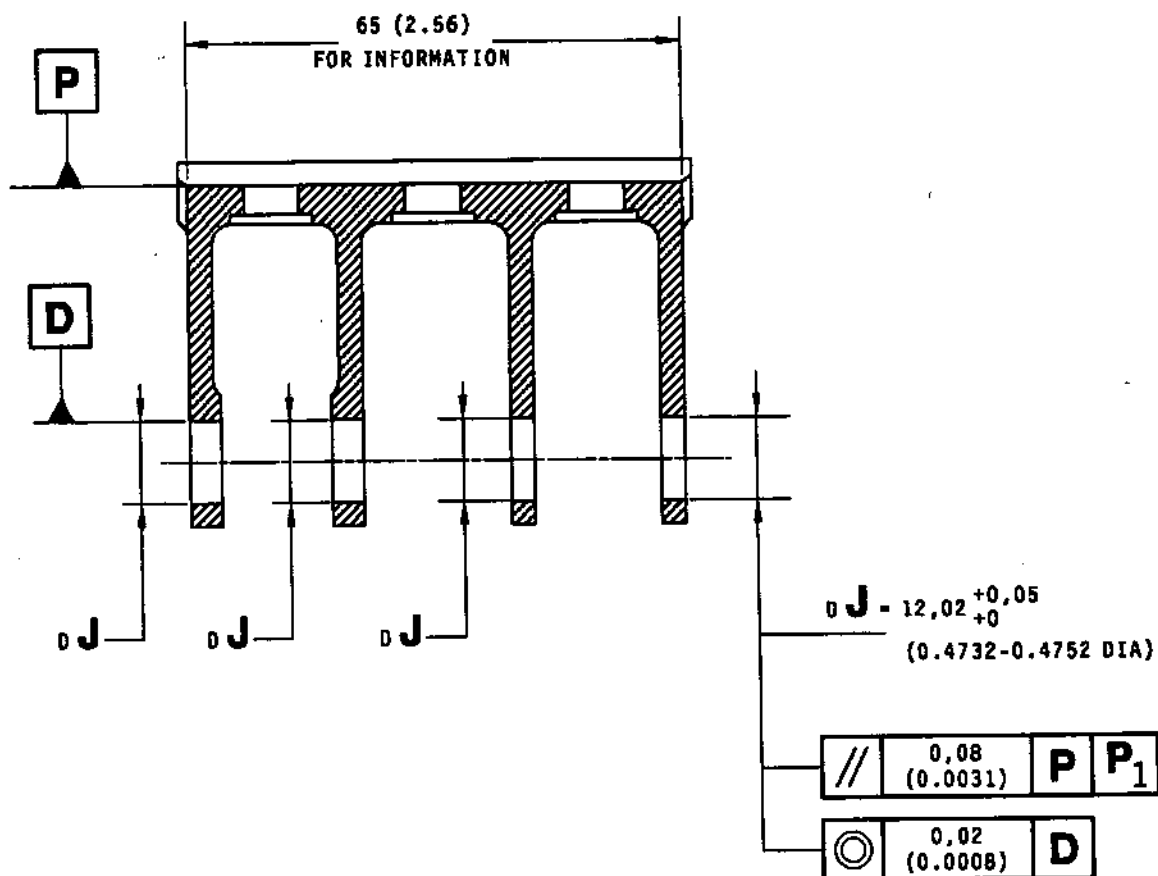
**OLYMPUS 593**

MK. 610-14-28

OVERHAUL



SNECMA

**SECTION BB****NOTE :**

MATERIAL : KC25NW (HS31)

ROUGHNESS OF  
MACHINED SURFACES : 3,2/ [125/]DIMENSIONS ARE IN MILLIMETRES WITH  
INCH CONVERSIONS IN PARENTHESES.

S-OLY-SM-00024-00-B

Rework of the Articulation Bores  
Figure 401 (Sheet 3 of 3)**78-12-01**

REP 4-50-1

Page 407

Jun 30/97



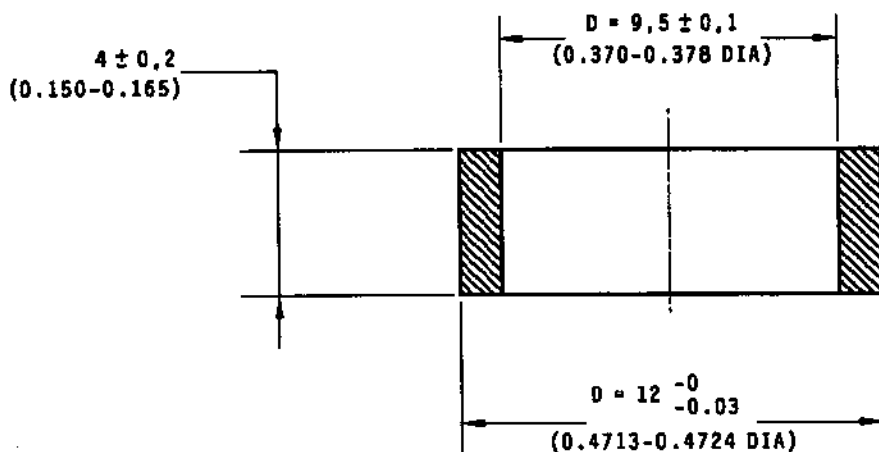
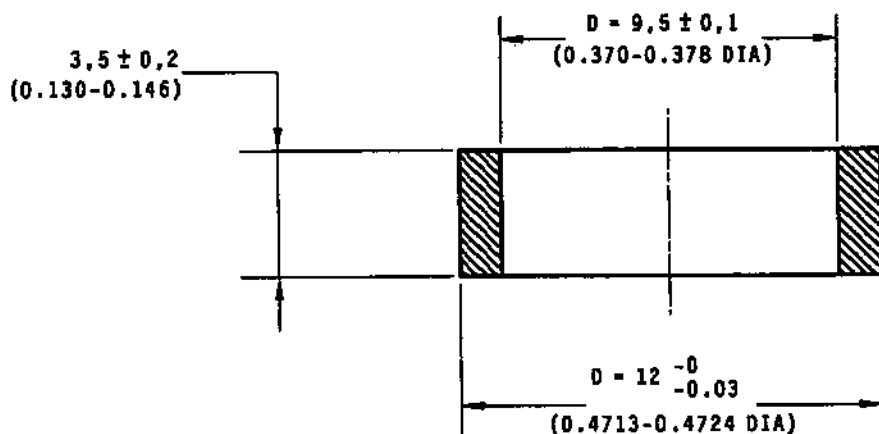
# OLYMPUS 593

MK. 610-14-28

OVERHAUL



SNECMA



**NOTE :**

**MATERIAL :** P3623 (KC20WNx or HS25)

**ROUGHNESS :**  $3,2 \sqrt{[126 \sqrt{}]}$

**DIMENSIONS ARE IN MILLIMETRES WITH  
INCH CONVERSIONS IN PARENTHESES.**

S-OLY-SM-00025-00-B

Machining of Bushings  
Figure 402

## 78-12-01

REP 4-50-1

Page 408

Jun 30/97



# OLYMPUS 593

MK. 610-14-28

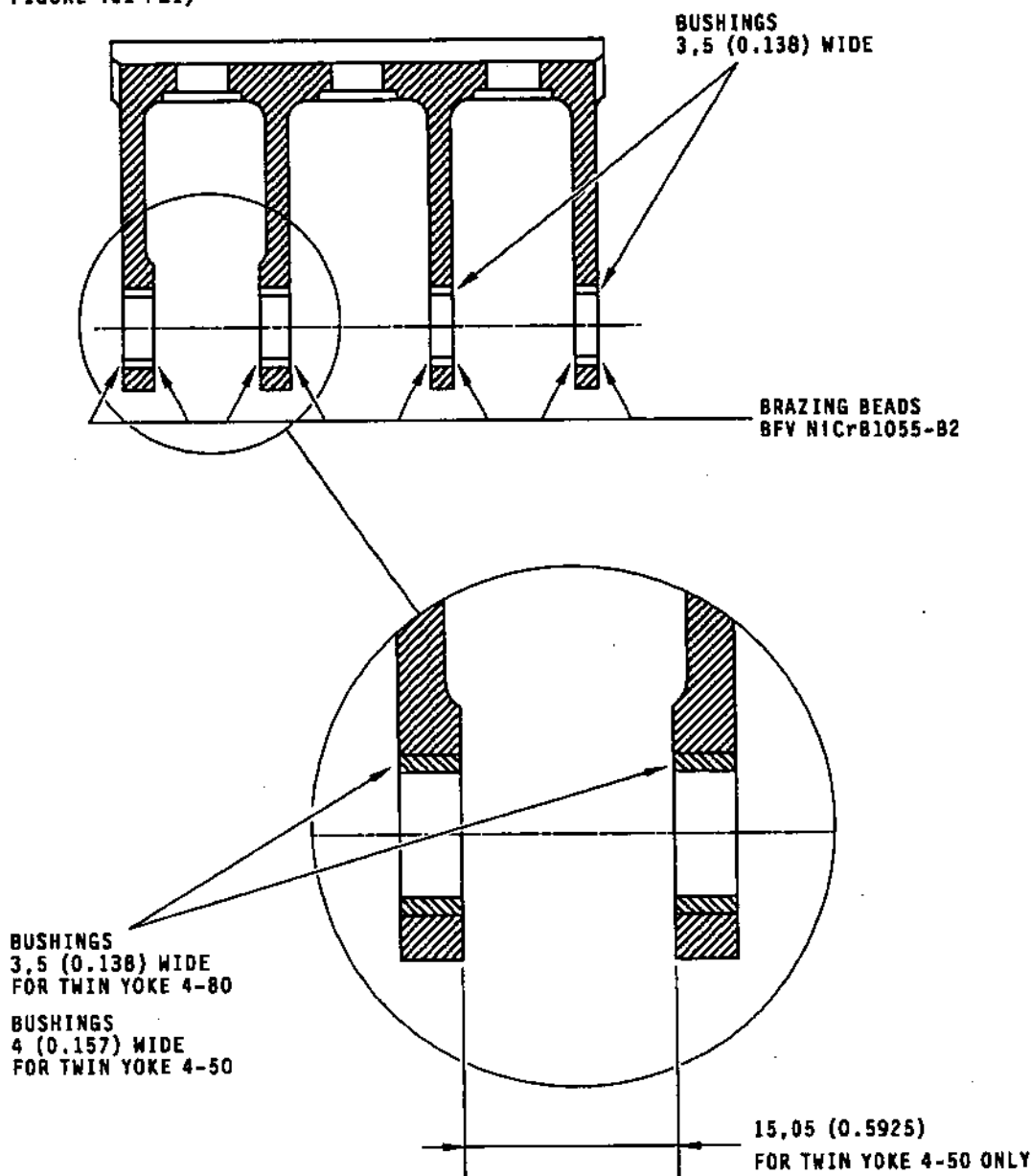
OVERHAUL



sneema

## SECTION BB

(SEE FIGURE 401 PL1)



DIMENSIONS ARE IN MILLIMETRES WITH  
INCH CONVERSIONS IN PARENTHESES.

S-OLY-SM-00026-00-B

Brazing of Bushings  
Figure 403

# 78-12-01

REP 4-50-1

Page 409

Jun 30/97



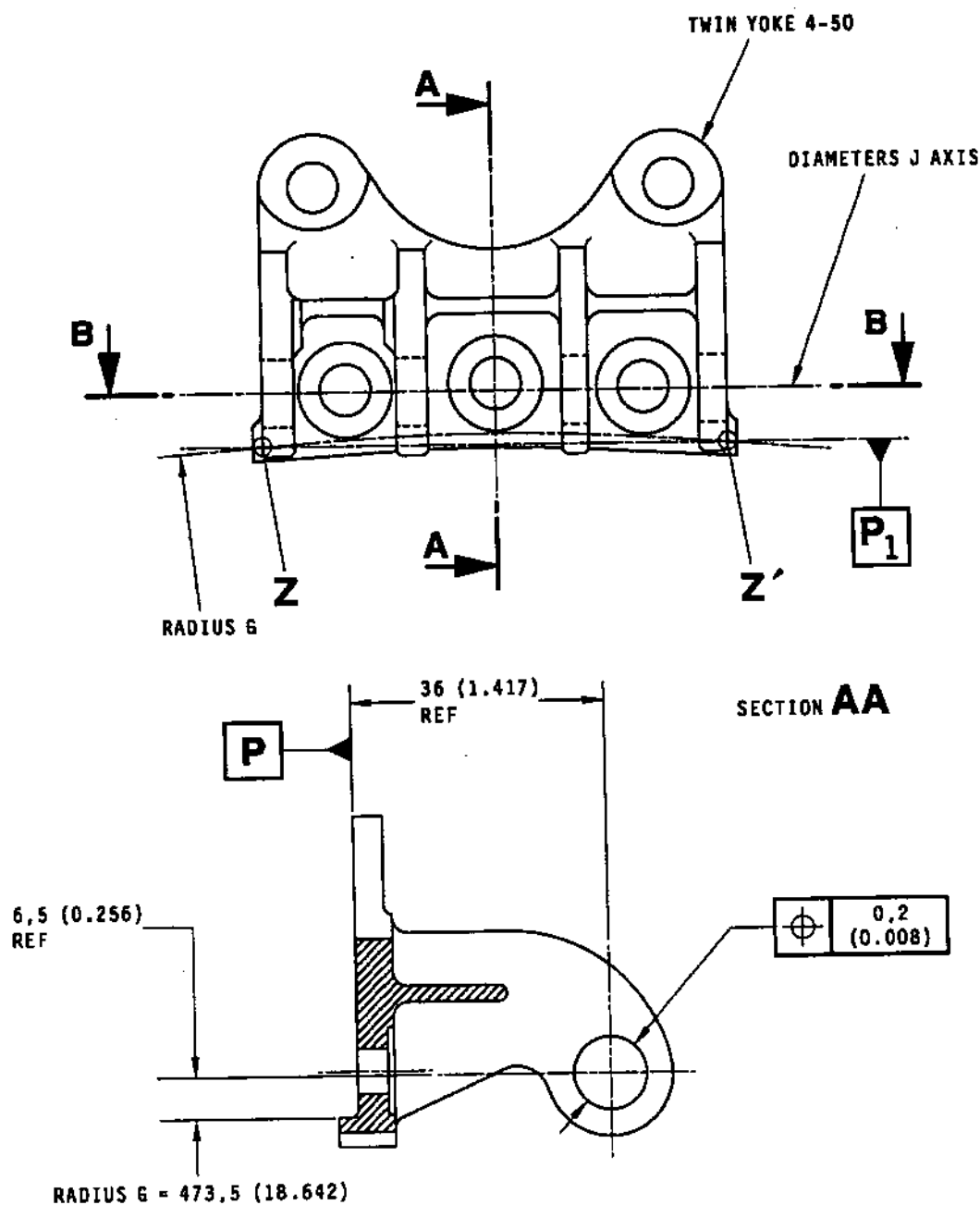
# OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema



DIMENSIONS ARE IN MILLIMETRES WITH  
INCH CONVERSIONS IN PARENTHESES.

S-OLY-SM-00022-00-B

Machining of the Bores of the Bushings  
Figure 404 (Sheet 1 of 3)

## 78-12-01

REP 4-50-1

Page 410

Jun 30/97



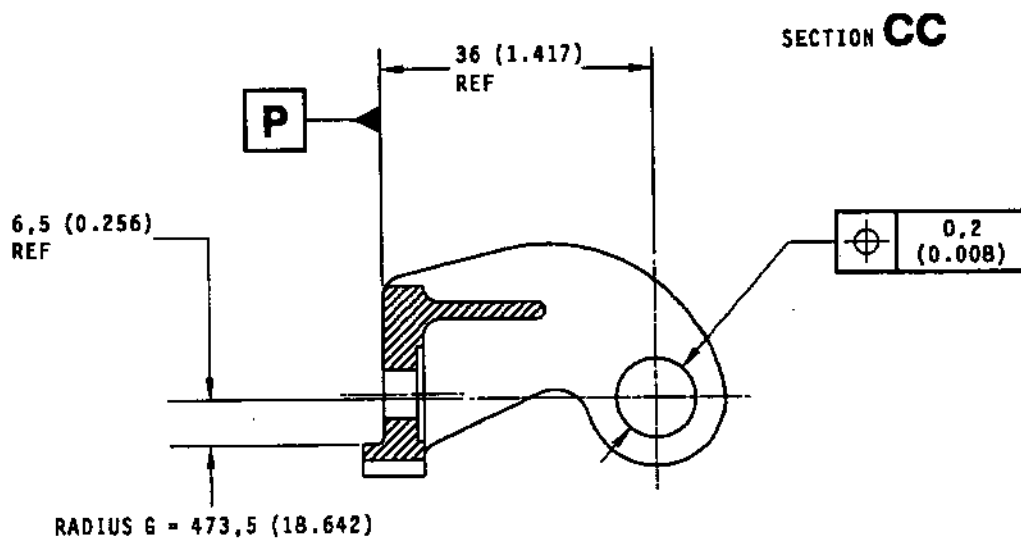
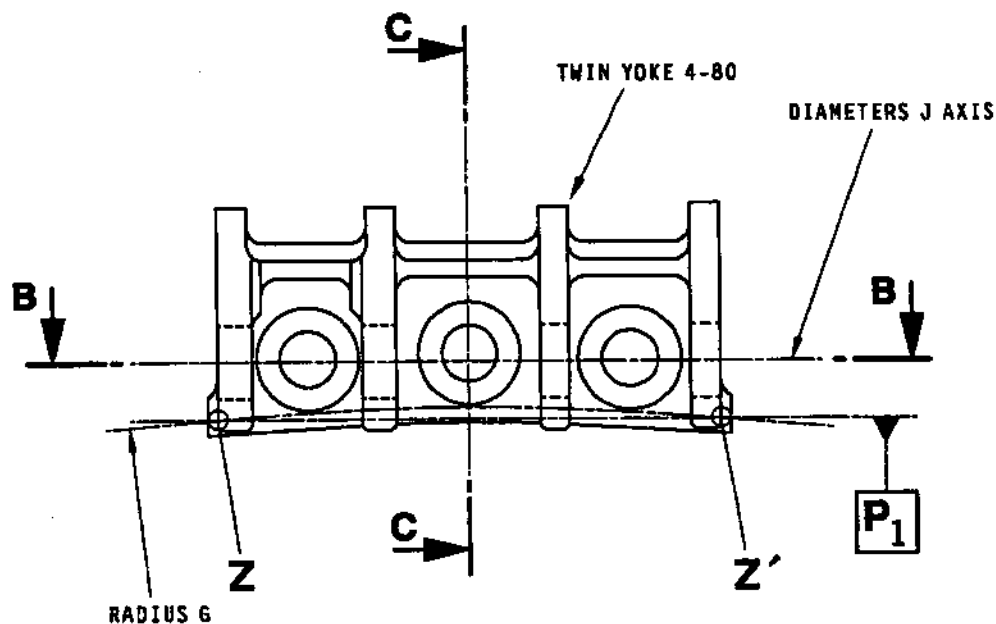
# OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema



DIMENSIONS ARE IN MILLIMETRES WITH  
INCH CONVERSIONS IN PARENTHESES.

S-OLY-SM-00023-00-B

Machining of the Bores of the Bushings  
Figure 404 (Sheet 2 of 3)

## 78-12-01

REP 4-50-1

Page 411

Jun 30/97





# OLYMPUS 593

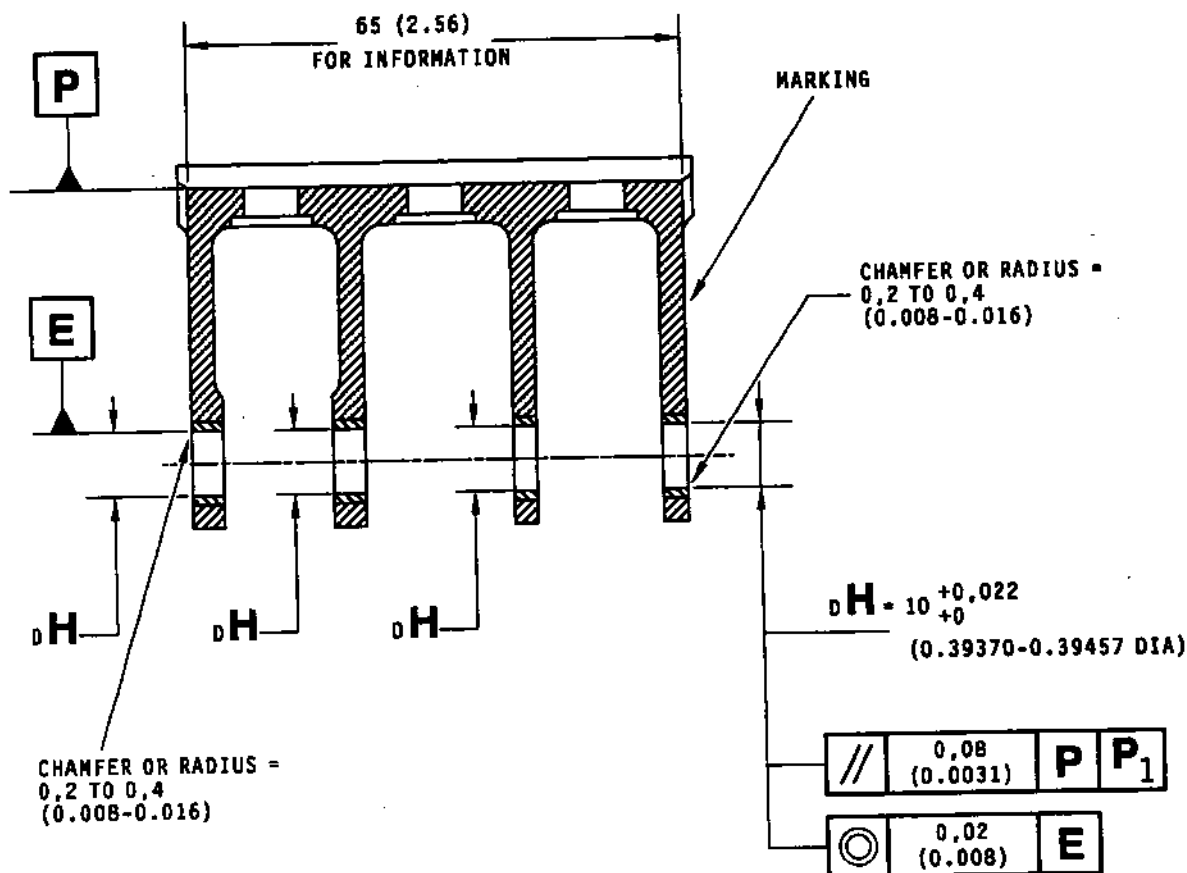
MK. 610-14-28

OVERHAUL



SNECMA

## SECTION BB



S-OLY-SM-00027-00-B

Machining of the Bores of the Bushings  
Figure 404 (Sheet 3 of 3)

# 78-12-01

REP 4-50-1

Page 412

Jun 30/97



OLYMPUS 593

MK.610-14-28

OVERHAUL  
REPAIR



CONVERGENT SECTION (4-110)

1. Re-shaping the convergent duct.

---

PARTS REQUIRED FOR REPAIR

---

A. Re-shaping.

Re-shape the duct, at room ambient temperature, using a mallet and blending it with adjacent contour.

B. Inspection for soundness.

Perform a water washable fluorescent penetrant inspection as per process M 502 B, chapter 70-20-10.  
If cracks are found, refer to chapter "Inspection" of the Manual.

**78-12-01**

REP 4-110-1  
Pages 401/402  
Dec 30/74



OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

CONVERGENT SECTION (4-110)

2. Crack. Filler Welding.

---

PARTS REQUIRED FOR REPAIR

---

Filler welding wire P 3020 (KC 20 WNX)

---

CAUTION : COMPLIANCE WITH THE WELDING REQUIREMENTS GIVEN IN  
THIS REPAIR IS ESSENTIAL.  
NO DEVIATION FROM THESE REQUIREMENTS IS ALLOWED.

A. Introduction.

This repair scheme applies when the following damage are present :

- Cracks affecting assembly weld seams (welded joints) of flanges, bosses and liners.
- Cracks emanating from a weld seam or from a hole edge and progressing through sheet metal of liners provided they do not feature ramifications and are not located within a burnt area.

B. Weld-Filling the Cracks.

- (1) Fill weld cracks as instructed in chapter 70-35-10.

NOTE : If crack originates from a hole, plug weld the hole in the same conditions as for the cracks, then drill hole again as specified on Figure 401 of repair scheme REP 4-110-3.

CAUTION : COMPLY WITH THE WELDING REQUIREMENTS BELOW :

1. FILL WELD CRACK AS PER CHAPTER 70-35-10 PARA. 5.A.(3).
2. ARGON ARC WELD, CLASS B2.
3. FILLER WELDING WIRE P 3020, DIA. 1,2 MM (0.047 IN.)  $\pm$  30 %.

**78-12-01**

REP 4-110-2

Page 401

Jun 30/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



C. Inspection of Welds.

(1) Inspect welds, class B2, as per chapter 70-35-80.

- water washable fluorescent penetrant inspect per process M 502 B, chapter 70-20-10.

- X-ray inspect per chapter 70-20-30.

CAUTION : FOR WELD INSPECTION, COMPLY WITH THE FOLLOWING REQUIREMENTS :

1. ACCEPTANCE CRITERIA FOR VISUAL EXAMINATION AND DYE PENETRANT TEST AS PER CHAPTER 70-35-80.

2. ACCEPTANCE CRITERIA FOR X-RAY EXAMINATIONS AS PER 70-35-80.

3. X-RAY INSPECTION TECHNICAL DATA :

FILM

SOURCE TO FILM DISTANCE : 600 MM(23.622 IN.).

FILTER OR SCREEN : NONE

POSITIONING ANGLE : 10°

FILM DENSITY ON WELD : 2.1

SENSITIVITY : 2.6 %

I.Q.I. : GAUGE IN NC20 MATERIAL ;  
0,04 MM (0.0016 IN.) DIA WIRE.

PRINTED IN FRANCE

78-12-01

REP 4-110-2

Page 402

Jun 30/78



OLYMPUS 593

MK.610-14-28

OVERHAUL

REPAIR



CONVERGENT SECTION (4-110-Variant "A")

3. Patch Welding Repair.

---

PARTS REQUIRED FOR REPAIR

---

Sheet metal P 3320 ; thickness 1,5 mm (0.591 in.)  
(KC 20 WNx)

Filler welding wire P 3020 (KC 20 WNx)

Boss No. 301-228-001-0

Union No. 301-227-901-0

Rivet No. 21217 TC. 4010 (650-025-103-0)

---

CAUTION : COMPLIANCE WITH THE WELDING REQUIREMENTS GIVEN IN THIS REPAIR IS ESSENTIAL. NO DEVIATION FROM THESE REQUIREMENTS IS ALLOWED.

A. Requirements Related to the Installation of Patches.

- (1) The requirements pertaining to the patch installation are given in chapter 70-35-10.

NOTE : If applicable, allow for installation of bosses provided for the pressure-tapping unions.

B. Patch Preparation.

- (1) The patches shall be cut out from :
- Sheet metal P 3320, 1,5 mm (0.591 in.) thick, or from a sound area of a scrapped convergent section.
- (2) The patch dimensions will depend on how large are the damages found. However, their shape must comply with the requirements of chapter 70-35-10.

C. Patch Installation.

- (1) Argon arc weld the patches as per the instructions detailed in chapter 70-35-10.

CAUTION : COMPLY WITH THE WELDING REQUIREMENTS BELOW :

1. TACK-WELD THE PATCH THROUGH ONE THIRD OF MATERIAL THICKNESS, WITHOUT USING FILLER METAL (PITCH : 10 MM APPROX.) (0.39 IN.).

**78-12-01**

REP 4-110A-3

Page 401

Jun 30/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



2. ARGON ARC WELD, CLASS B2.

3. FILLER WELDING WIRE P 3020, DIA. 1,2 MM  
(0.047 IN.)  $\pm$  30 %.

(2) Inspect welds, class B2, as per chapter 70-35-80.

- water washable fluorescent penetrant inspect as per  
process M 502 B, chapter 70-20-10.

- X-ray inspect as per chapter 70-20-30.

CAUTION : FOR WELD INSPECTION, COMPLY WITH THE FOLLO-  
WING REQUIREMENTS :

1. ACCEPTANCE CRITERIA FOR VISUAL EXAMINA-  
TION AND DYE PENETRANT TEST AS PER CHAP-  
TER 70-35-80.

2. ACCEPTANCE CRITERIA FOR X-RAY EXAMINA-  
TION AS PER 70-35-80.

3. X-RAY INSPECTION TECHNICAL DATA :

FILM : KODAK M

SOURCE TO FILM DISTANCE : 800 MM (31.496 IN.)

FILTER OR SCREEN : NONE

POSITIONNING ANGLE : 10°

FILM DENSITY ON WELD : 2.1

SENSITIVITY : 2.6 %

I.Q.I. : GAUGE IN NC20 MATERIAL ;  
0,04 MM (0.0016 IN.) DIA. WIRE.

D. Installation of the Bosses and Unions (If applicable)

(1) Prior to installation of the bosses, machine the con-  
vergent section according to the requirements shown  
on Figure 401.

PRINTED IN FRANCE

78-12-01

REP 4-110A-3

Page 402

Jun 30/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Argon arc weld the bosses as per instructions detailed in chapter 70-35-10.

- filler welding wire P 3020.

- weld class B2.

NOTE : Prior to welding, locate the boss as shown on figure 401.

CAUTION : FOR WELDING REQUIREMENTS, REFER TO PARA. C.(1). ABOVE.

- (3) Inspect weld, class B2, as per chapter 70-35-80.

- water washable fluorescent penetrant inspect as per process M 502 B, chapter 70-20-10.

- X-ray inspect as per chapter 70-20-30.

CAUTION : FOR WELD INSPECTION REQUIREMENTS, REFER TO PARA. C.(2) ABOVE.

- (4) Locate the union and transfer drill the rivet holes as shown on Figure 401 and according to the instructions detailed in chapter 70-50-10.

- (5) Rivet the union to the boss as shown on Figure 401 and according to the instructions detailed in chapter 70-50-10.

- (6) Inspect riveting as per instructions detailed in chapter 70-50-80.

- (7) On the gaspath side of the convergent section, grind rivet heads and union flush with the boss.

#### E. Dimensional Inspection.

Check that dimensions of the convergent section are in accordance with the requirements shown on Figure 401.

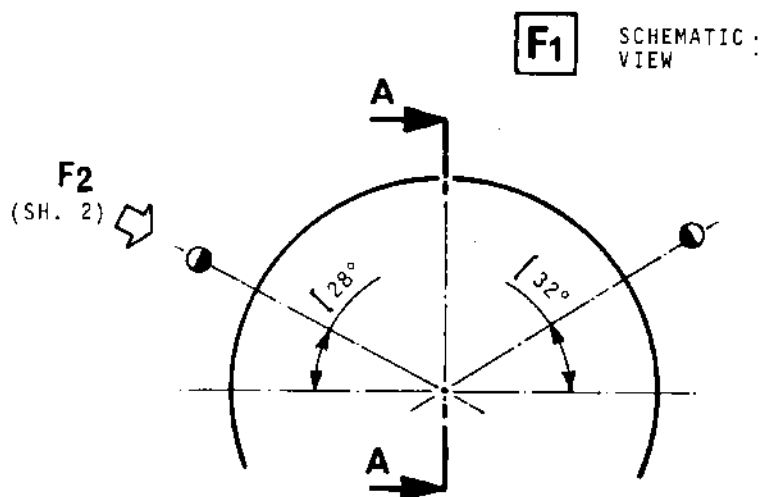
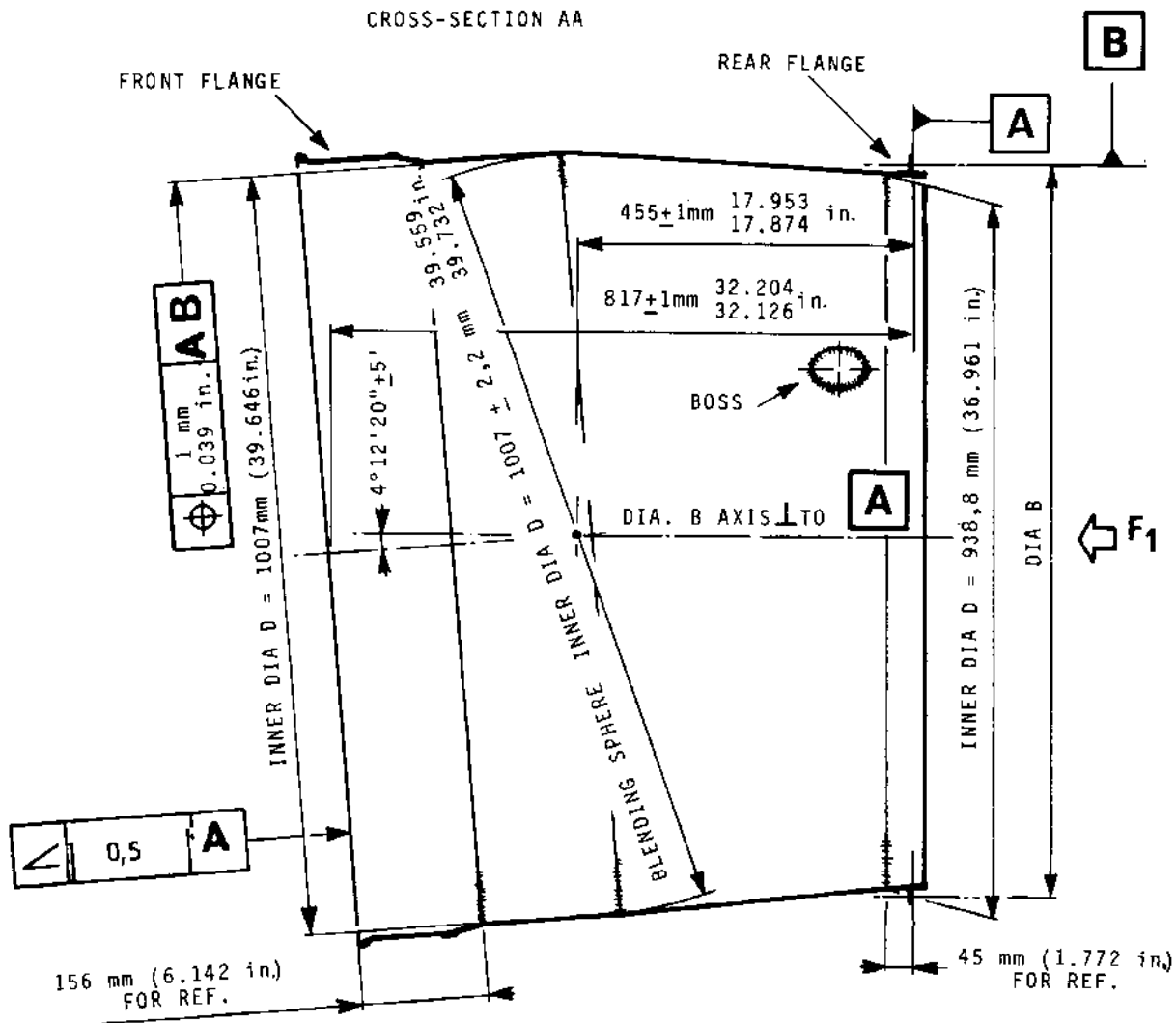


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CROSS-SECTION AA



Convergent Section Repair  
Figure 401 - Sheet 1 of 2

78-12-01

REP 4-110A-3

Page 404

Dec 15/75

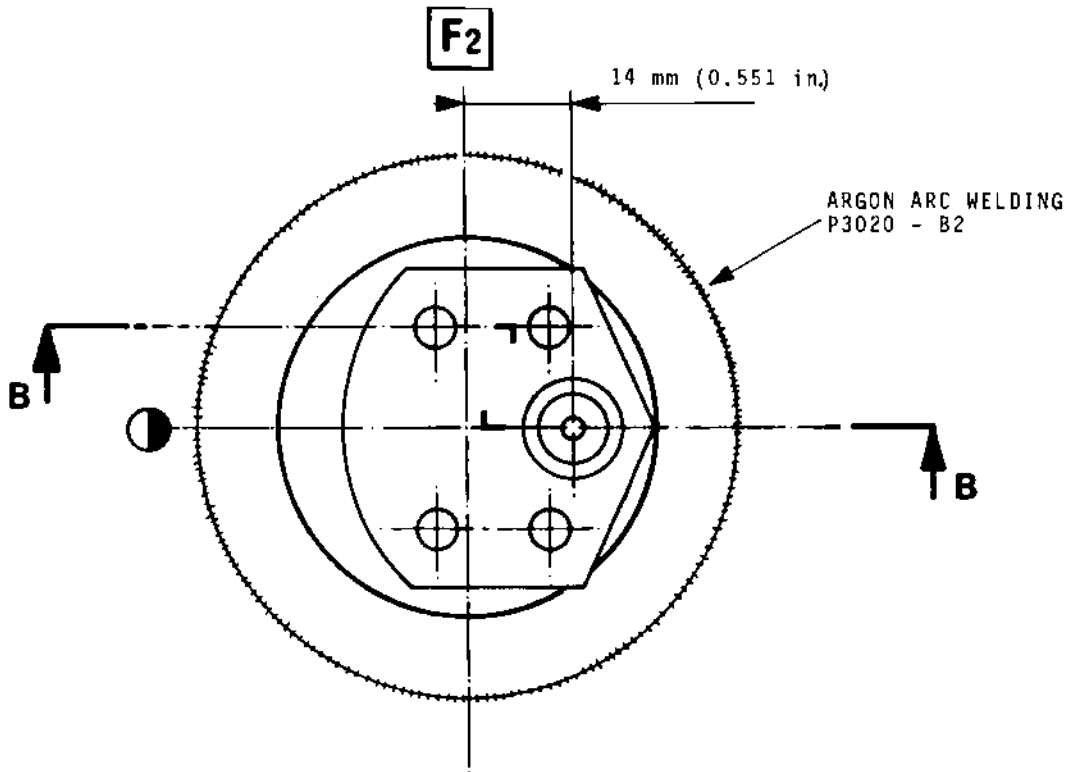




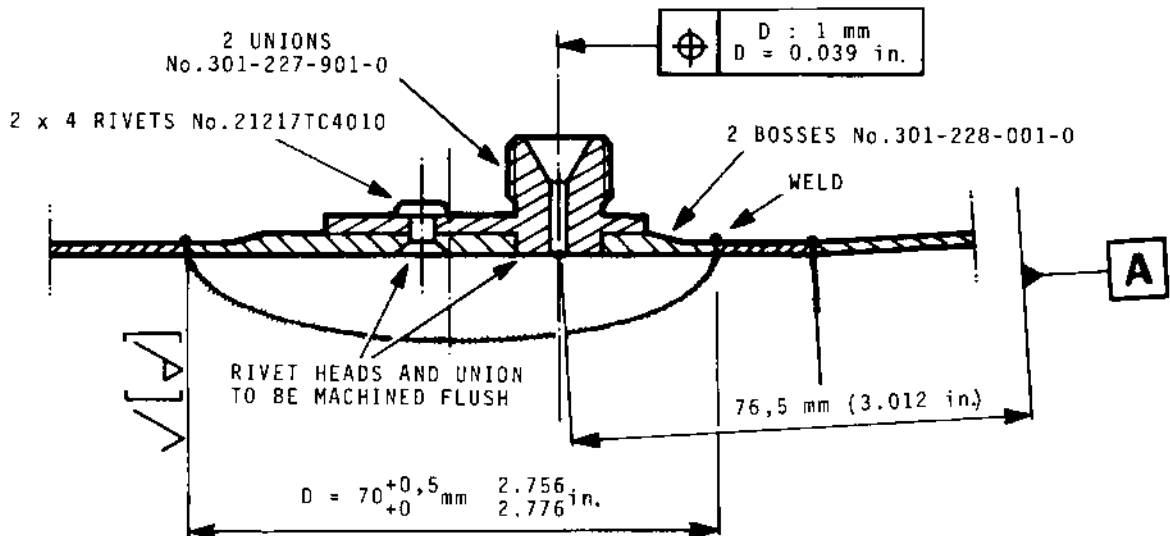
OLYMPUS 593

MK.610-14-28

OVERHAUL



CROSS-SECTION BB



Convergent Section Repair  
Figure 401 - Sheet 2 of 2

78-12-01

REP 4-110A-3  
Pages 405/406

Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL

REPAIR



CONVERGENT SECTION (4-110 Variant "B")

3. Patch Welding Repair.

---

PARTS REQUIRED FOR REPAIR

---

Sheet metal P3320 thickness 1,5 mm (0.591 in.)  
(KC 20 WNx)  
Filler welding wire P3020 (KC 20 WNx)

---

CAUTION : COMPLIANCE WITH THE WELDING REQUIREMENTS GIVEN IN  
THIS REPAIR IS ESSENTIAL.  
NO DEVIATION FROM THESE REQUIREMENTS IS ALLOWED.

A. Requirements for Patch Installation.

- (1) The requirements for patch installation are given in  
chapter 70-35-10.

B. Patch Preparation.

- (1) The patches shall be cut out from :

Sheet metal P3320, thickness 1,5 mm (0.591 in.) or  
from a sound area of a scrapped convergent section.

- (2) The patch dimensions depend on the extent of damage  
found. However, their shape must comply with the re-  
quirements of chapter 70-35-10.

C. Patch Installation.

- (1) Argon arc-weld the patches in accordance with the  
instructions of chapter 70-35-10.

CAUTION : COMPLY WITH THE WELDING REQUIREMENTS BELOW :

1. TACK-WELD THE PATCH THROUGH ONE THIRD OF  
MATERIAL THICKNESS, WITHOUT USING FILLER  
METAL (PITCH : 10 MM APPROX.) (0.39 IN.).
2. ARGON ARC WELD, CLASS B2.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



3. FILLER WELDING WIRE P3020, DIA. 1,2 MM  
(0.047 IN.)  $\pm$  30%.

(2) Check the welds, class B2, in accordance with chapter 70-35-80.

- water washable fluorescent penetrant inspect in accordance with instructions M 502 B of chapter 70-20-10.

- X-ray inspection in accordance with chapter 70-20-30.

CAUTION : FOR WELD INSPECTION, COMPLY WITH THE FOLLOWING REQUIREMENTS :

1. ACCEPTANCE CRITERIA FOR VISUAL EXAMINATION AND DYE PENETRANT TEST AS PER CHAPTER 70-35-80.

2. ACCEPTANCE CRITERIA FOR X-RAY EXAMINATIONS AS PER 70-35-80.

3. X-RAY INSPECTION TECHNICAL DATA :

FILM : KODAK M

SOURCE TO FILM DISTANCE : 800 MM (31.496 IN.)

FILTER OR SCREEN : NONE

POSITIONING ANGLE : 10°

FILM DENSITY ON WELD : 2.1

SENSITIVITY : 2.6

I.Q.I. : GAUGE IN NC 20 MATERIAL ;  
0,04 MM (0.0016 IN.) DIA. WIRE.

#### D. Dimensional Inspection

Check the dimensions of the convergent section in accordance with the requirements shown on Figure 401.

PRINTED IN FRANCE

78-12-01

REP 4-110B-3

Page 402

Jun 30/78



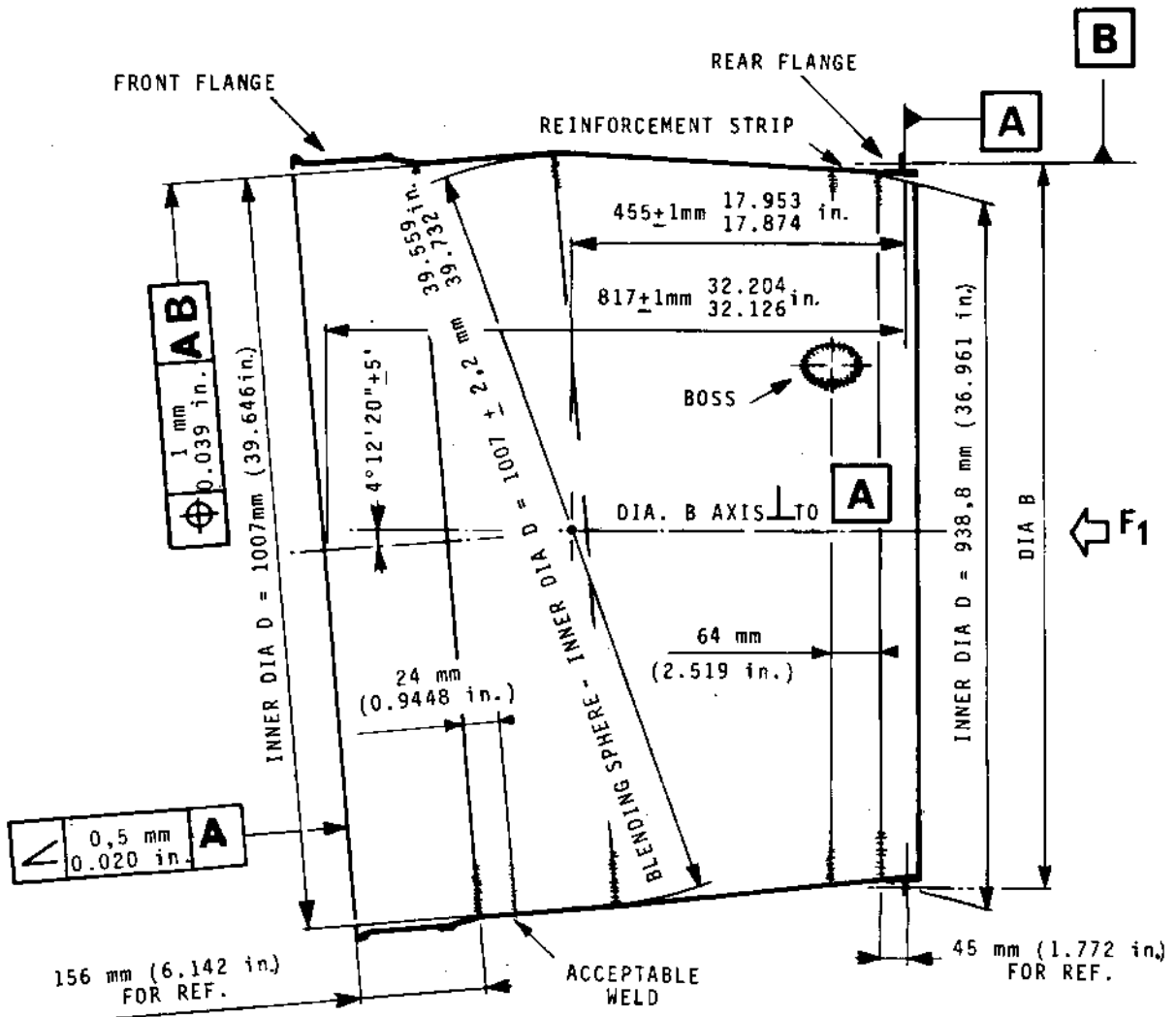
OLYMPUS 593

MK.610-14-28

OVERHAUL



CROSS-SECTION ALONG VERTICAL CENTERLINE



Convergent Section Repair  
Figure 401

78-12-01

REP 4-110B-3  
Pages 403/404  
Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



CONVERGENT SECTION (4-110 Variant "A")

4. Renewal of the unions or of the rivets attaching the unions

---

PARTS REQUIRED FOR REPAIR

---

Union No. 301-227-901-0

Rivet No. BNAE 21217 TC 4010 (650-025-103-0)

or No. BNAE 21217 TC 4811 (650-025-134-0)

---

- A. Remove the attachment rivets of the union by grinding the heads.
- B. Check the rivet holes in accordance with the instructions of chapter 70-50-10 of the Standard Practices Manual.
- C. If necessary, rebores the rivet holes to the oversize diameter as shown on figure 401 and as per chapter 70-50-10.
- D. If required, install a new union.

Install the new rivets selected in conformity with Table I and the instructions of chapter 70-50-10 of the Standard Practices Manual and as shown on figure 401 of repair scheme REP 4-110-3.

- E. Check the riveting in accordance with the instructions of chapter 70-50-80.
- F. On the gaspath side of the convergent section, grind rivet heads and union flush with the boss.

PRINTED IN FRANCE

PRINTED IN FRANCE

78-12-01

REP 4-110A-4

Page 401

Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



TABLE I - Riveting Data

Nominal rivet	Diameter		Length		Material	Head
Oversize rivet	mm	(in)	mm	(in)		shape
21217 TC 4010	4	(0.157)	10	(0.394)	NC 15 Fe	F 100
21217 TC 4811	4,8	(0.189)	11	(0.433)	NC 15 Fe	F 100

Renewal of the Unions or of the Rivets Attaching the Unions  
Figure 401

78-12-01

REP 4-110A-4

Page 402

Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



CONVERGENT SECTION (4-110 Variant "B")

4. Renewal of the unions or of the rivets attaching the unions

---

PARTS REQUIRED FOR REPAIR

---

Union No. 301-227-902-0

Rivet No. BNAE 21217 TC 4011 (650-025-104-0)

or No. BNAE 21217 TC 4812 (650-025-135-0)

---

- A. Remove the rivets attaching the unions by grinding out the heads.
- B. Check the rivet holes in accordance with the instructions of chapter 70-50-10 "RIVETING".
- C. If necessary, rebore the rivet holes to the oversize diameter as shown on figure 401 and as per chapter 70-50-10 "RIVETING".
- D. If required, install a new union.

Install the new rivets selected in accordance with indications given in figure 401 and the instructions of chapter 70-50-10 "RIVETING".

- E. Check the riveting as per the instructions of chapter 70-50-80 "RIVETING".
- F. On the gaspath side of the convergent section, grind rivet heads and union flush with the boss.

78-12-01

REP 4-110B-4

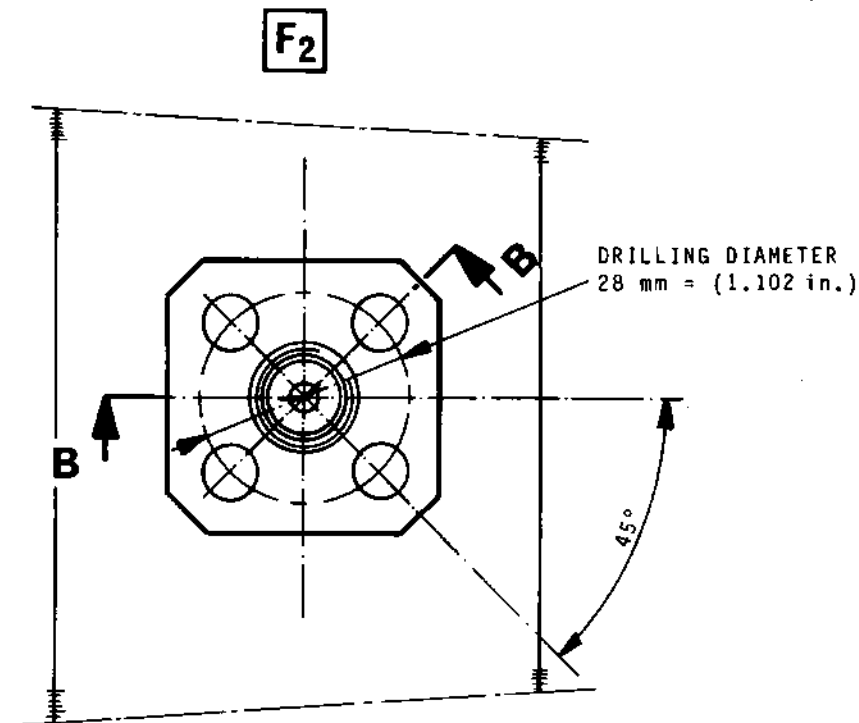
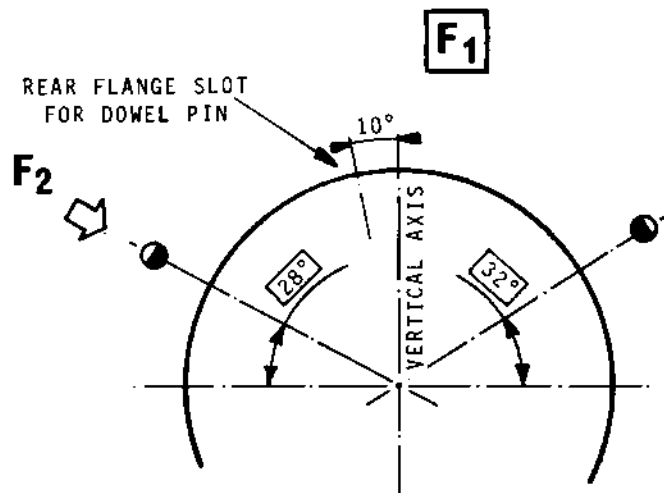
Page 401

Apr 30/76



OLYMPUS 593

MK. 610-14-28  
OVERHAUL



Renewal of the Unions or of the Rivets attaching the Unions  
Figure 401

78-12-01

REP 4-110B-4

Page 402

Apr 30/76

PRINTED IN FRANCE





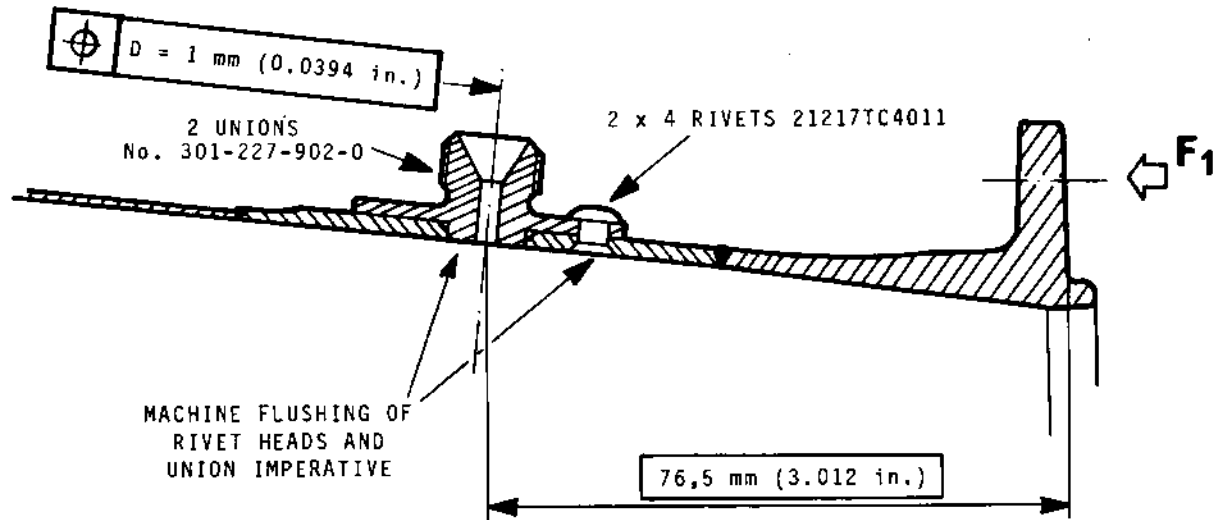
OLYMPUS 593

MK.610-14-28

OVERHAUL



CROSS-SECTION BB



Riveting Data

Standard rivet	Diameter	Length	Material	Head
Oversize rivet	mm (in)	mm (in)		Shape
21217 TC 4010	4 (0.157)	11 (0.433)	NC 15 Fe	F 100
21217 TC 4811	4,8 (0.189)	12 (0.472)	NC 15 Fe	F 100

Renewal of the Unions or of the Rivets attaching the Unions  
Figure 401

78-12-01

REP 4-110B-4

Pages 403/404

Apr 30/76



OLYMPUS 593

MK.610-14-28

OVERHAUL

REPAIR



CONVERGENT SECTION (4-110).

5. Renewal of the dowel pin.

---

PARTS REQUIRED FOR REPAIR

---

Dowel pin 301-176-600-0 or 301-176-600-1  
301-176-600-2

---

A. Removal of the dowel pin.

Machine out the dowel pin or remove it using a pin drift.

B. Installation of a new dowel pin.

(1) Check the hole condition and its diameter.

(a) If hole not damaged, re-install a dowel pin matching the hole diameter (Table I).

(b) If hole damaged (out of round, scratched) rebore as much as required to remove damage according to Table I and install the corresponding oversize dowel pin.

(2) Install the dowel pin after having it shrunk in liquid nitrogen (P 441).

(3) Flare the end of the dowel pin as per the requirements shown on figure 401.

78-12-01

REP 4-110-5

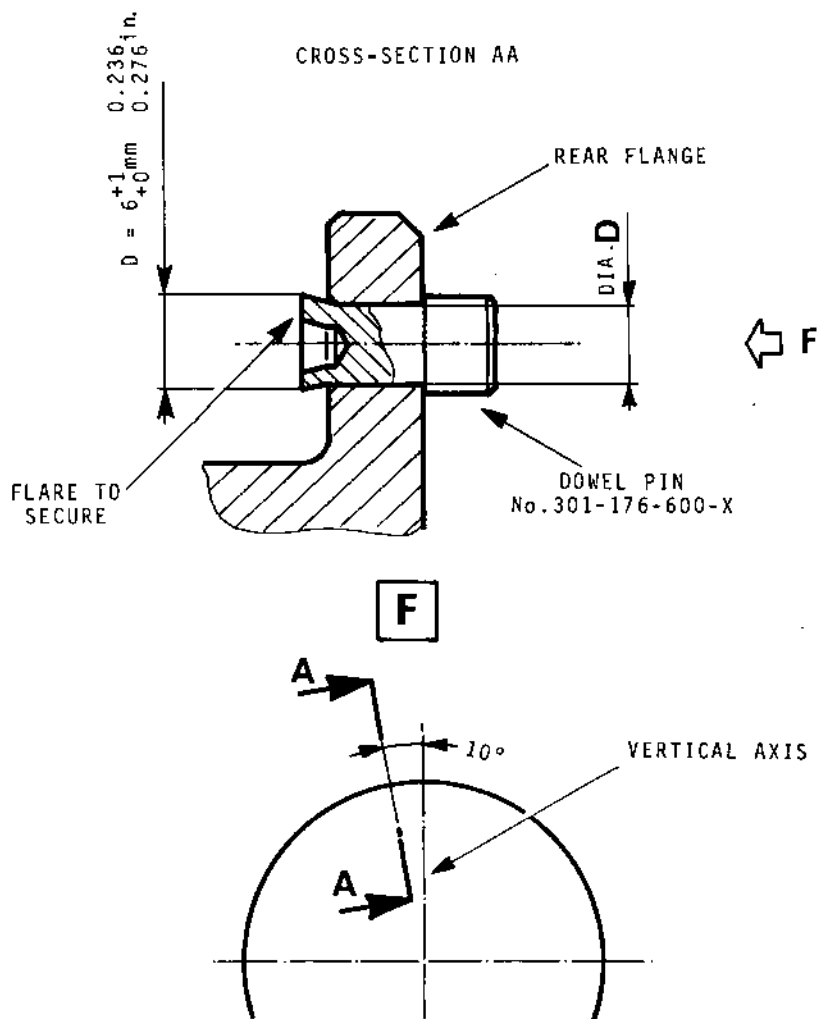
Page 401

Dec 30/74



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



Dowel pin No.	Hole bore dia. mm (in.)	Dowel pin matching dia. mm (in.)
301-176-600-0	$D = 5H7 \begin{matrix} + 0,012 \\ + 0 \end{matrix} \begin{matrix} (0.19685) \\ (0.19732) \end{matrix}$	$D = 5s6 \begin{matrix} + 0,027 \\ + 0,019 \end{matrix} \begin{matrix} (0.19791) \\ (0.19760) \end{matrix}$
301-176-600-1	$D = 5,1H7 \begin{matrix} + 0.012 \\ + 0 \end{matrix} \begin{matrix} (0.20079) \\ (0.20126) \end{matrix}$	$D = 5,1s6 \begin{matrix} + 0,027 \\ + 0,019 \end{matrix} \begin{matrix} (0.20185) \\ (0.2015) \end{matrix}$
301-176-600-2	$D = 5,2H7 \begin{matrix} + 0.012 \\ + 0 \end{matrix} \begin{matrix} (0.20472) \\ (0.20520) \end{matrix}$	$D = 5,2s6 \begin{matrix} + 0,027 \\ + 0,019 \end{matrix} \begin{matrix} (0.20579) \\ (0.20547) \end{matrix}$

Convergent Section Dowel Pin Renewal  
Figure 401

## 78-12-01

REP 4-110-5  
Page 402  
Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

CONVERGENT SECTION (4-110 Variant "A").

5. Renewal of the dowel pin.

---

PARTS REQUIRED FOR REPAIR

---

Dowel pin 301-176-600-0 or 301-176-600-1  
301-176-600-2

---

A. Removal of the dowel pin.

Machine out the dowel pin or remove it using a pin drift.

B. Installation of a new dowel pin.

(1) Check the hole condition and its diameter.

- (a) If hole not damaged, re-install a dowel pin matching the hole diameter (Table I).
- (b) If hole damaged (out of round, scratched) rebore as much as required to remove damage according to Table I and install the corresponding oversize dowel pin.

(2) Install the dowel pin after having it shrunk in liquid nitrogen (P 441).

(3) Flare the end of the dowel pin as per the requirements shown on figure 401.

PRINTED IN FRANCE

**78-12-01**

REP 4-110A-5

Page 401

Apr 30/76

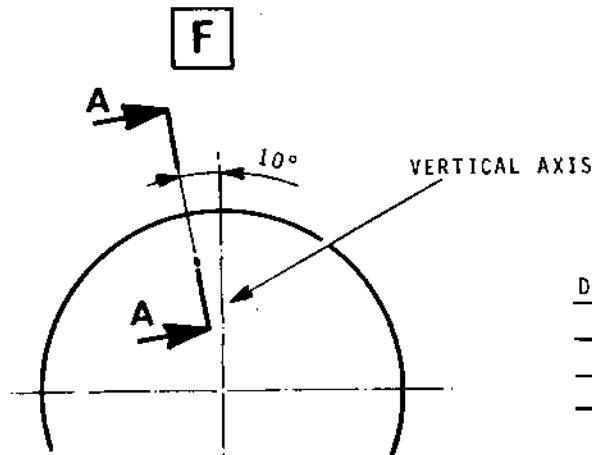
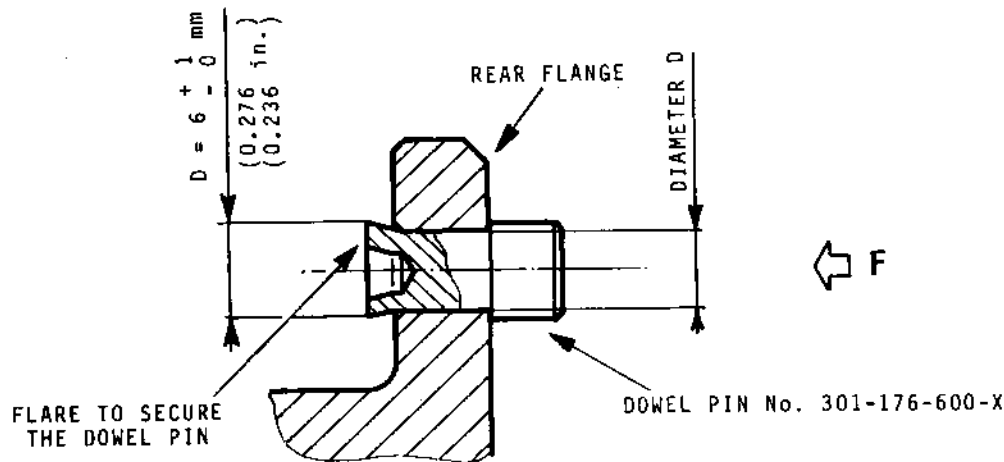


# OLYMPUS 593

MK.610-14-28  
OVERHAUL



## CROSS-SECTION AA



### DOWEL PIN HEAD MARKING

○	301-176-600-0
①	301-176-600-1
⊕	301-176-600-2

Dowel pin No.	Hole bore dia. mm	(in)	Dowel pin matching diameter mm	(in)
301-176-600-0 D=5,0mmH7	+ 0,012	(0.196850in)	+ 0,027	(0.197913in)
	+ 0,000	(0.197322in)	+ 0,019	(0.197598in)
301-176-600-1 D=5,1mmH7	+ 0,012	(0.200787in)	+ 0,027	(0.201850in)
	+ 0,000	(0.201259in)	+ 0,019	(0.201535in)
301-176-600-2 D=5,2mmH7	+ 0,012	(0.204724in)	+ 0,027	(0.205787in)
	+ 0,000	(0.205196in)	+ 0,019	(0.205472in)

Renewal of the Dowel Pin  
Figure 401

# 78-12-01

REP 4-110A-5

Page 402

Mar 31/76

PRINTED IN FRANCE



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

CONVERGENT SECTION (4-110)

6. Reconditioning the Front Flange Inner Contact Surface through Metal Spraying (Metallizing)

---

PARTS REQUIRED FOR REPAIR

---

Cobalt alloy powder (fine) P 3205  
Nickel/aluminium powder P 3203

---

A. General.

- (1) Depending on the extent of the defect, it may be necessary to apply an undercoat before spraying of the final coat.  
The total thickness of the coating must not exceed 1,3 mm (0.052 in.).
- (2) If the part has already been reconditioned through metal spraying, remove metallization as instructed under para. B.

B. Removing the deteriorated metallization

- (1) Remove the damaged metallization by abrasive blasting according to method M 103 A in Chapter 70-15-20 "CLEANING AND REMOVAL OF COATINGS".

NOTE : Omit the degreasing operation. Protect the surfaces surrounding the area to be abrasive blasted using metal shields.

C. Dimensionally inspect the area to metal sprayed

NOTE : This operation is required only if the inner contact surface was previously metallized.

- (1) Measure and record the average diameter of the front flange inner contact surface in planes P1 and P2.

This check allows to determine the thickness of metal spraying required in the various planes of the inner contact surface.



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Checking method (Ref. Fig. 401)

CAUTION : A 10°C TEMPERATURE VARIATION RESULTS A  
0,13 MM (0.00512 IN.) LINEAR CHANGE ON THE  
FLANGE DIAMETER.

The average inner diameter of the front flange in plane P1, then in plane P2, is found by working out the arithmetical mean of the 18 values recorded in the plane concerned.

- (a) On the inner diameter, mark 18 generatrices equally distributed on the front flange half-circumference.

CAUTION : IN ANY CASE, MARKING MUST NOT DETERIORATE THE SURFACE CONDITION OF THE FLANGE INNER DIAMETER.

- (b) Using the resizing tool SC 118, restore the roundness of the front flange.

- (c) Calibrate the TESA UNIMASTER gage  
- TESA S.A. 1020 - RENENS - VD/SWITZERLAND  
Agent in France : SYNERGIE, 27 avenue Philippe  
Auguste - 75011 PARIS - Tel. 357.21.00).

Fit the gage with :

- 1 The extension tubes required for obtaining the dimension to be checked.

- 2 The supports - correctly adjusted - to ascertain the measuring plane (P1 then P2).

- (d) Bear the gage supports on to the flange edge and measure.

- (e) Repeat this operation in line with the 18 marks.

D. Metallizing the front flange inner contact surface

- (1) Prepare the area to be metal sprayed as instructed in Chapter 70-65-20 "SPRAYING OF COATINGS USING A PLASMA TORCH".

78-12-01

REP 4-110-6

Page 402

Sep 30/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



NOTE : Perform dry abrasive blasting using corundum 160 (P137) at a pressure of 3,5 bars (51psi).

- (2) Carry the metal spraying as instructed in Chapter 70-65-20 "SPRAYING OF COATINGS USING A PLASMA TORCH" in compliance with the requirements shown on Figure 402 and the following additional instructions :

- (a) Spraying of an undercoat, if applicable :  
Nickel/aluminium powder P 3203  
Maximum coat thickness 1 mm (0.039 in.)
- (b) Spraying of final coating :  
Cobalt alloy powder material P 3205  
Maximum coat thickness material P 3205

NOTE : Carefully blend out the metal coating at one end by thinning out the metallization as shown on Figure 402.

- (3) If required, smooth the surface discontinuities by sanding with an emery cloth.

#### E. Inspection

- (1) Inspect the metallization as specified in Chapter 70-65-80 "INSPECTION OF COATINGS".
- (2) Dimensionally inspect the front flange inner contact surface as indicated in Figure 402.  
The inspection method is similar to that defined under para. C. (2).

#### F. Marking

- (1) Following the part number, mark "REP6" as per Method M 28 of Chapter 70-10-10 "METHODS OF MARKING".

78-12-01

REP 4-110-6

Page 403

Sep 30/78

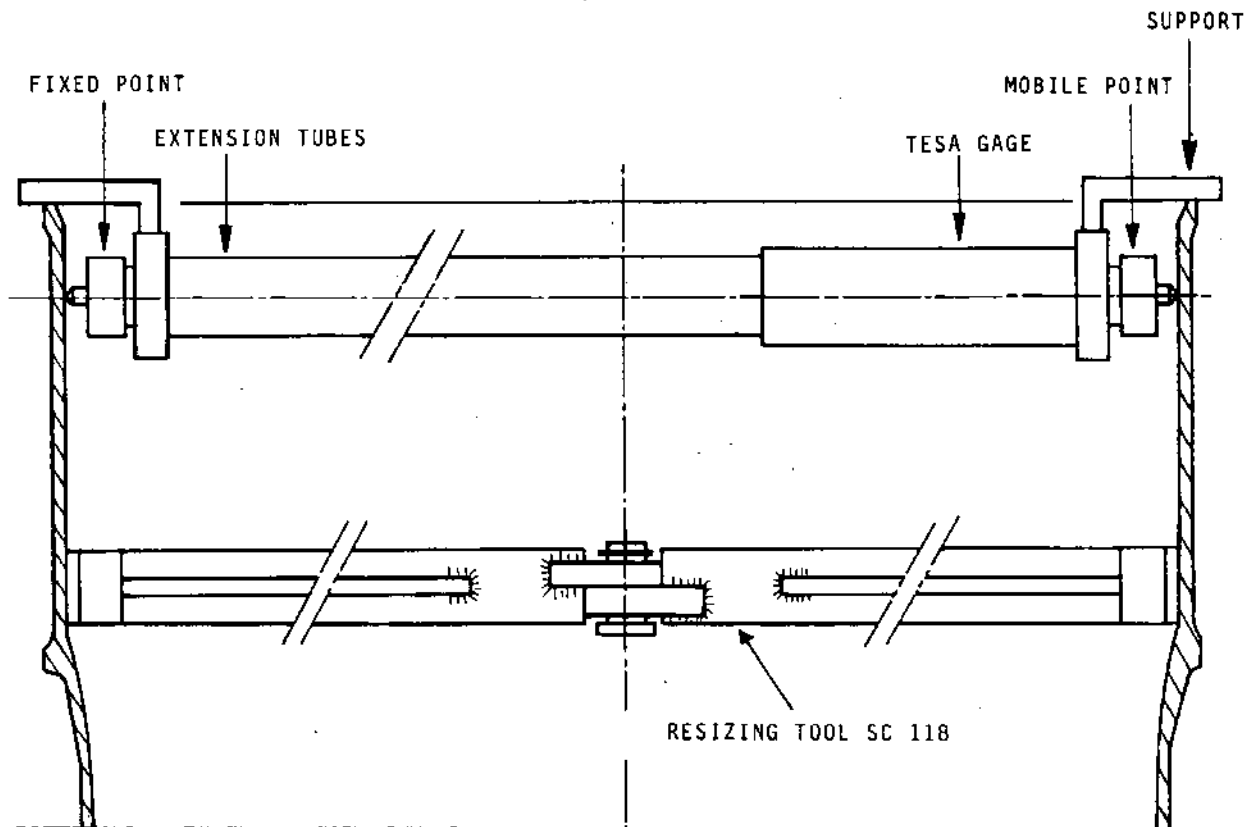




OLYMPUS 593

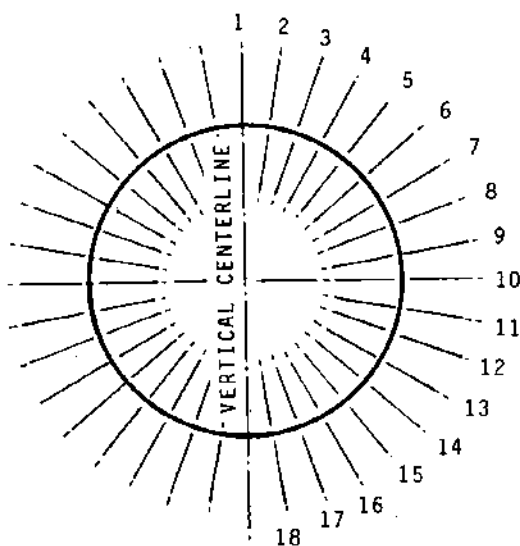
MK.610-14-28

OVERHAUL

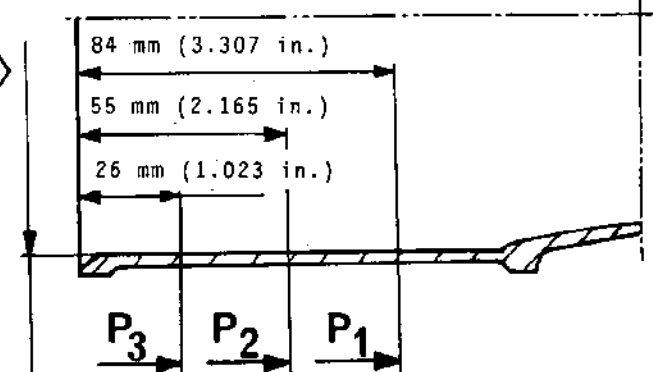


**F**

SCHEMATIC VIEW



**F** →



D = INNER AVERAGE DIAMETER

Checking the Front Flange Inner Average Diameter  
Figure 401

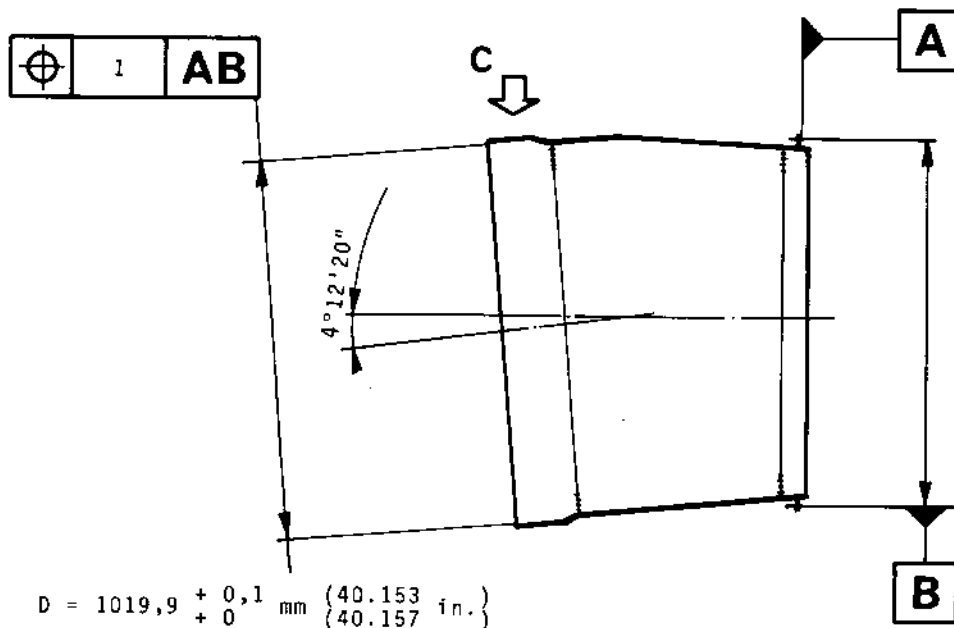
**78-12-01**

REP 4-110-6

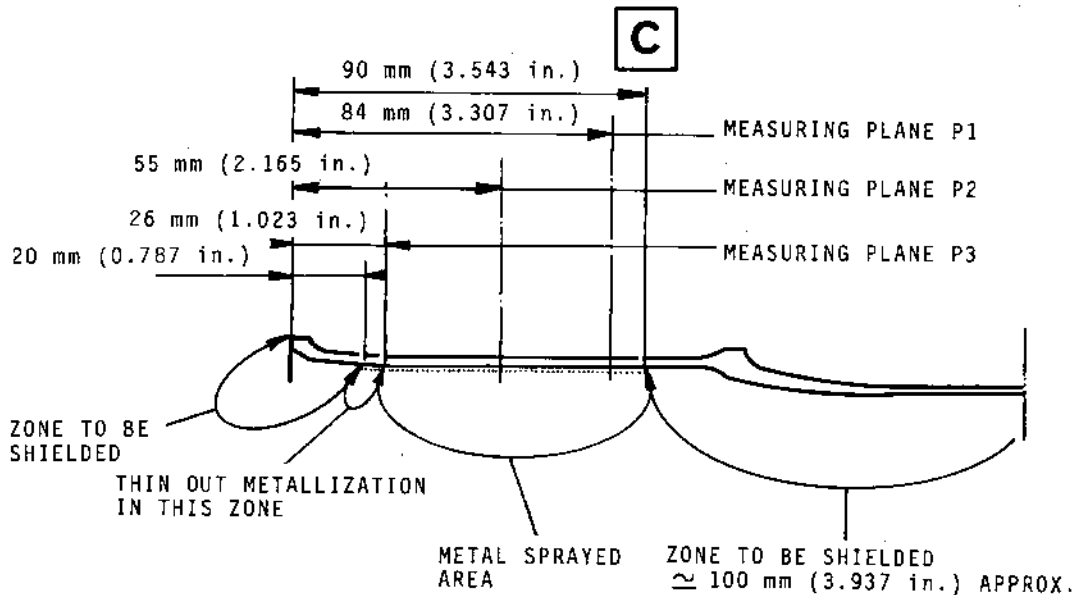
Page 404

Sep 30/78

**PRINTED IN FRANCE**



THIS DIA. GIVEN FOR  
REFERENCE TO OBTAIN  
A DEVELOPED LENGTH OF

$$3204,11 + 0,31 \text{ mm} \left\{ \begin{array}{l} 126.146 \\ 126.158 \end{array} \text{ in.} \right\}$$


Metallizing the Front Flange Inner Contact Surface  
Figure 402

78-12-01

REP 4-110-6  
Pages 405/406  
Sep 30/78



OLYMPUS 593

MK.610-14-28

OVERHAUL  
REPAIR



JOINTING SEGMENT (4-120)

1. Re-shaping

---

PARTS REQUIRED FOR REPAIR

---

A. Re-shaping.

Using a mallet and working at room ambient temperature, re-shape the segment by blending it with adjacent contour.

B. Inspection for soundness.

Carry out a water washable fluorescent penetrant inspection as per process M 502 B, chapter 70-20-10.

In case of cracks, carry out a weld built-up in accordance with REP 4-120-2.

**78-12-01**

REP 4-120-1  
Pages 401/402  
Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



JOINTING SEGMENT (4-120)

1. Cracks filler welding

---

PARTS REQUIRED FOR REPAIR

---

Filler welding WIRE P3020 (KC 20 WNX)  
Solvent P325 (ACETONE)  
or P422 (METHYL ETHYL KETONE)  
or P616 (GENKLENE LV)

---

A. General

This repair is applicable:

- If distance between different cracks is at least 0.12 in. (3 mm).
- If cracks are not within a burned area.

B. PREPARATION

- (1) Make a cutout along the cracks with a 0.06 in. (1,5 mm) thick grinding disk fitted on a portable grinding tool.
- (2) Clean areas to be welded with a cloth moisted with solvent P325 or P422 or P616.

C. Cracks filler welding

- (1) Fill the cracks as specified in chapter 70-35-10.
  - filler welding wire: P3020,
  - weld class: B1.

D. Inspection

- (1) Inspect the welding as specified in chapter 70-35-80, class B1.
  - Carry out a water washable fluorescent penetrant check, as per process M502B, chapter 70-20-10.

- E. Dress the weldings to the thickness of the segment 0.03 in. (0,8 mm).

**78-12-01**

REP 4-120-2  
Pages 401/402  
Apr 30/93

**OLYMPUS 593**

MK.610-14-28

OVERHAUL

REPAIRNOZZLE FRONT FAIRING (5-10)2. Repair through installation of riveted patch

---

PARTS REQUIRED FOR REPAIR

---

Ring	No. 301-176-100-0 or 301-176-101-0
Front reinforcement plate	No. 525-600-171-0 or 525-600-185-0
Rear reinforcement plate	No. 525-600-088-0 or 525-600-184-0
Reinforcement ring	No. 525-203-154-0 or 525-600-169-0
Rivet No. 650-012-041-0	
or No. BNAE 21 215 TB 3206	(650-012-072-0)
Rivet No. BNAE 21 215 TB 2406	(650-012-042-0)
or No. BNAE 21 215 TB 3207	(650-012-073-0)
Rivet No. BNAE 21 217 TB 2406	(650-022-042-0)
or No. BNAE 21 217 TB 3207	(650-022-073-0)
Rivet No. BNAE 21 217 TB 2407	(650-022-043-0)
or No. BNAE 21 217 TB 3208	(650-022-074-0)
Rivet No. BNAE 21 217 TB 2408	(650-022-044-0)
or No. BNAE 21 217 TB 3209	(650-022-075-0)

Eyelet No. 525-203-033-0

Load spreading washer No. 525-203-026-0

Sheet metal P 3301 ou P 3302 thickness 0,4 mm (0.016 in)

---

**A. General**

In some cases, the installation of a riveted patch may necessitate the removal of riveted parts in order to facilitate the repair-work or to comply with the requirements related to installation of patches.

**B. Requirements related to installation of patches**

- (1) If damages are found at a distance less than 15 mm (0.591 in) from a riveted part, cut out the sheet metal so that shape of patch mates with the riveted part..
- (2) If damages progress beneath the front or rear plates, un-rivet the plates entirely to carry out the repair.

**C. Patch preparation****78-12-01**

REP 5-10-2

Page 401

Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

NOZZLE FRONT FAIRING (5-10)

1. Crack filler welding

---

PARTS REQUIRED FOR REPAIR

---

Filler welding wire P 3002

---

A. Filler welding of cracks

Fill up weld the cracks as specified in chapter 70-35-10.

- Filler welding wire P 3002
- Weld class B1

B. Weld inspection

Inspect welds, class B1, as specified in chapter 70-35-80.

- Water washable dye penetrant inspect as per process  
M 501 B, chapter 70-20-10.

**78-12-01**

REP 5-10-1  
Pages 401/402  
Dec 30/74



OLYMPUS 593

MK.610-14-28

OVERHAUL



(1) The patches may be cut out from :

- a sound area of scrapped fairing,
- a new ring,
- a piece of sheet metal P 3301 or P 3302, thickness 0,4 mm (0.016 in) shaped to contour of the area to be repaired in compliance with the requirements shown on figure 401.

(2) The patch dimensions will be scaled in relation to the damages found. However, their shape must comply with the requirements of chapter 70-50-10 "RIVETING".

D. Patch installation

- (1) Unrivet adjacent parts if required, in order to facilitate accomplishment of repair.
- (2) Riveting of the patch is to be accomplished in accordance with the instructions detailed in chapter 70-50-10 "RIVETING" and requirements shown on figure 401.
- (3) Inspect the riveting in accordance with the instructions in chapter 70-50-80 "RIVETING".

E. Re-installation of the un-riveted parts

The following instructions give all data required for the re-installation of un-riveted parts.

NOTE : IF THE UNRIVETED PARTS ARE DAMAGED, INSTALL NEW PARTS

(1) For each case, two methods are provided :

1st method : Riveting as specified for new parts

2nd method : Riveting with a rivet that has a diameter 0,8 mm (0.031 in) above standard diameter.

(2) Preparation of parts and riveting must be carried-out in compliance with instructions specified in chapter 70-50-10 "RIVETING" and instructions shown figure 401.

Rivet data are given figure 401 sheet 8.

(3) Inspect riveting as per instructions chapter 70-50-80 "RIVETING".

78-12-01

REP 5-10-2

Page 402

Dec 15/75

PRINTED IN FRANCE

PRINTED IN FRANCE

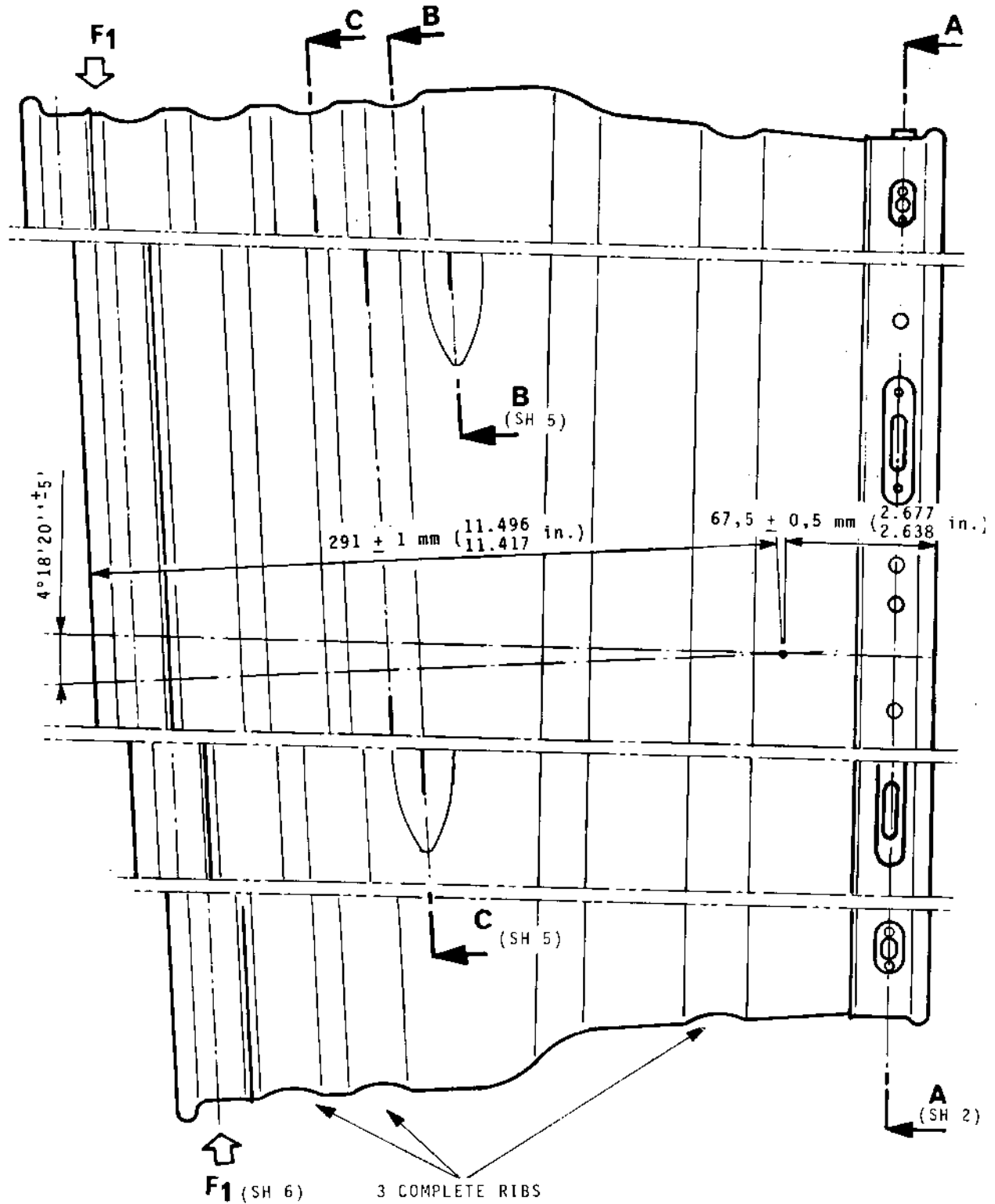


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE



Repairs through Installation of Riveted Patches  
Figure 401 - Sheet 1 of 8

78-12-01

RFP 5-10-2

Page 403

Dec 15/75





OLYMPUS 593

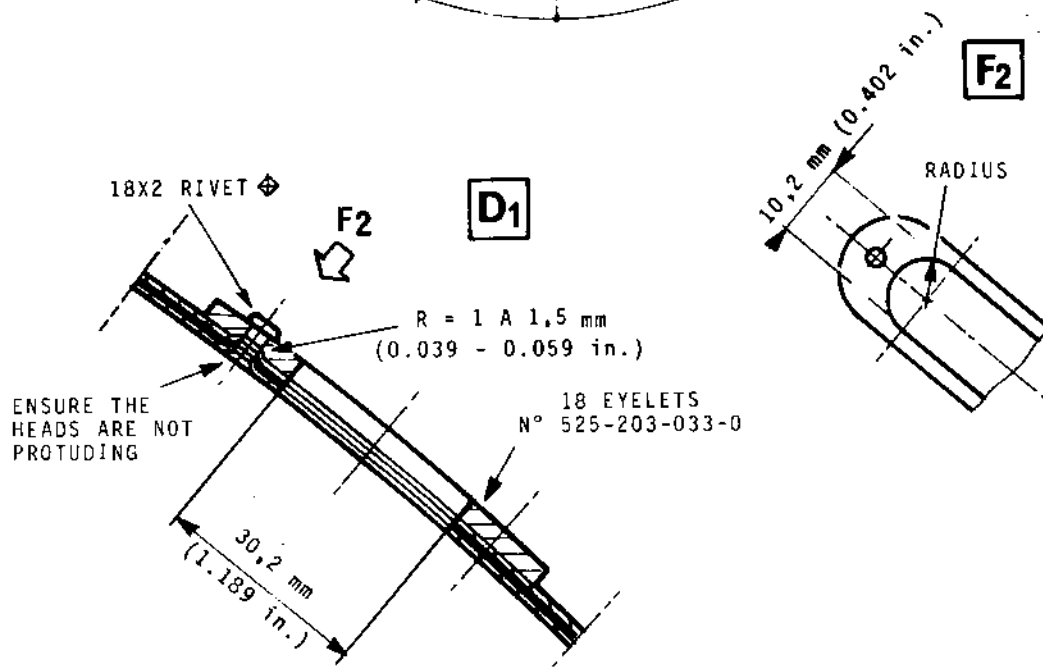
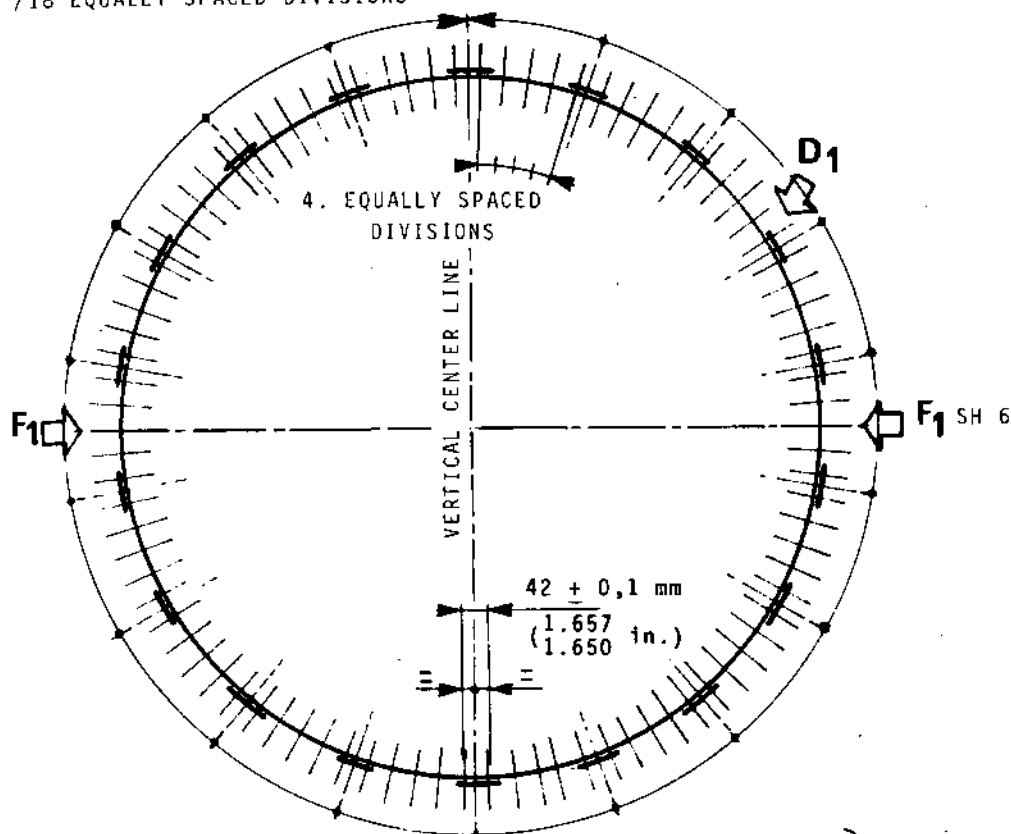
MK.610-14-28

OVERHAUL



SCHEMATIC AA CROSS SECTION

360°/18 EQUALLY SPACED DIVISIONS



Repair through Installation of Riveted Patches  
Figure 401 - Sheet 2 of 8

78-12-01

REP 5-10-2

Page 404

Dec 15/75

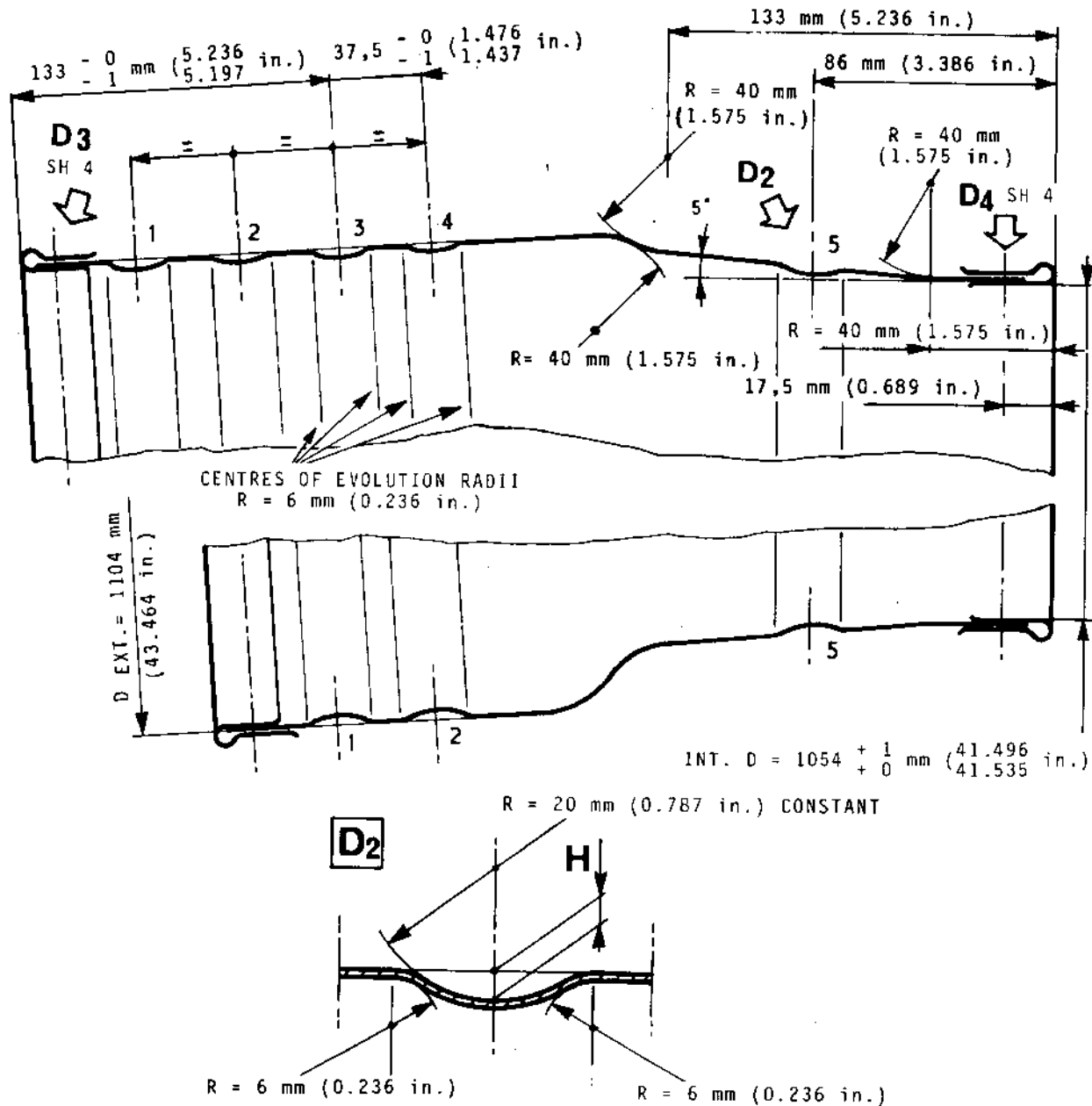


# OLYMPUS 593

MK.610-14-28  
OVERHAUL



DEFINITION AS PER VERTICAL CENTERLINE



GROOVE No.	1		2		3		4		5	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
H	$4 + 1$ $- 0,6$	$(0.134)$ $(0.197)$	$4 + 0,6$ $(0.134)$ $(0.181)$		$4 + 0,6$ $- 1,5$	$(0.098)$ $(0.131)$	$4 + 0,6$ $- 1,5$	$(0.098)$ $(0.181)$	$4 + 0,6$ $- 1,5$	$(0.098)$ $(0.181)$

Repair through Installation of Riveted Patches  
Figure 401 - Sheet 3 of 8

## 78-12-01

REP 5-10-2

Page 405

Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN FRANCE

D3

FRONT REINFORCEMENT PLATE

No. 525-600-171-0

OR

No. 525-600-185-0

96 RIVETS  
PITCH 35 mm  
(1.378 in.)

6 + 1 mm (0.276 in.)  
+ 0 mm (0.236 in.)

17 mm (0.669 in.)

D4

50 RIVETS  
PITCH 35 mm  
(1.378 in.)

REAR REINFORCEMENT PLATE

No. 525-600-088-0

OR

No. 525-600-184-0

5,5 + 1 mm (0.256 in.)  
+ 0 mm (0.217 in.)

17,5 mm (0.689 in.)

Repair through Installation of Riveted Patches

Figure 401 - Sheet 4 of 8

78-12-01

REP 5-10-2

Page 406

Dec 15/75



OLYMPUS 593

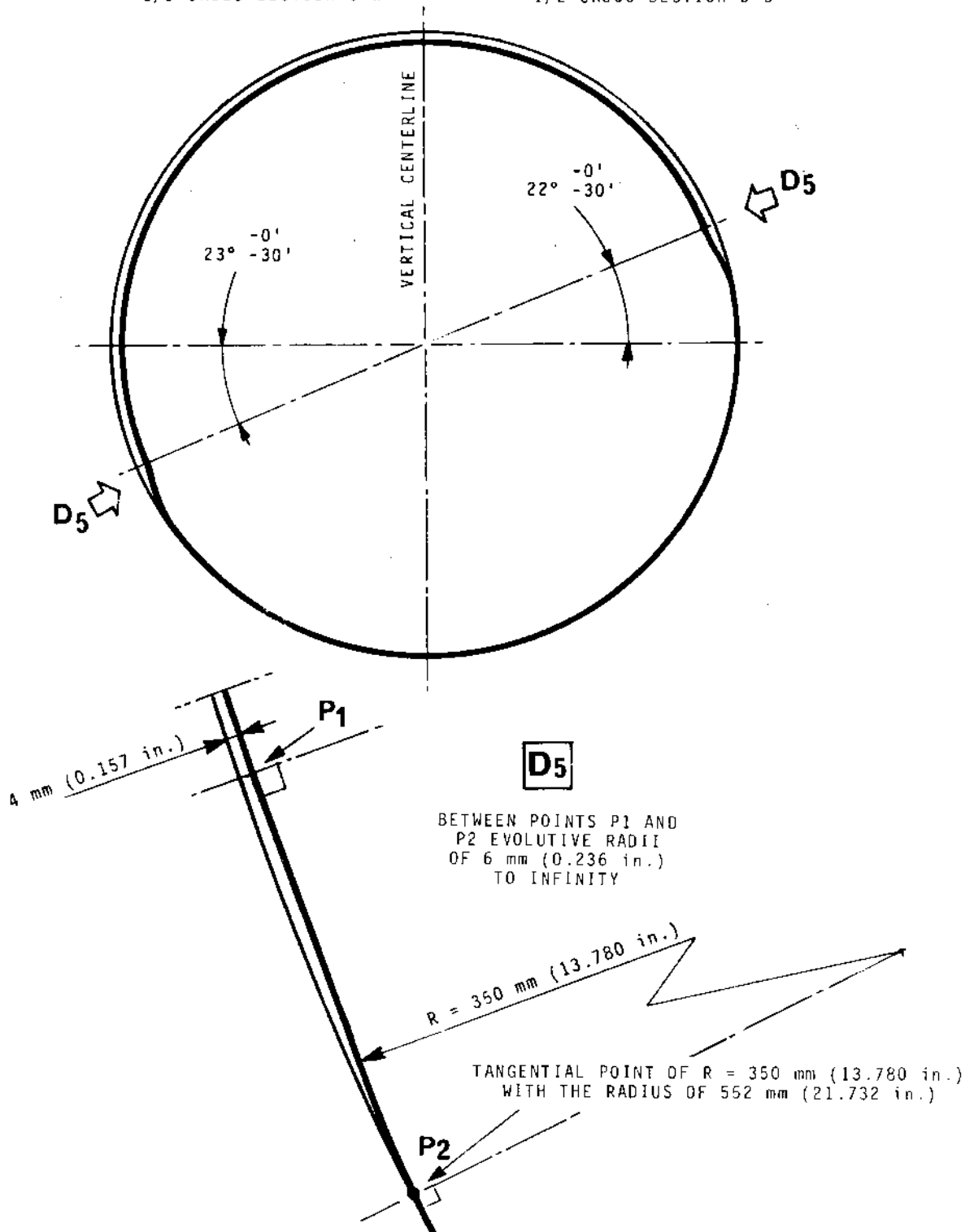
MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE

1/2 CROSS SECTION C C

1/2 CROSS SECTION B B



Repair through Installation of Riveted Patches  
Figure 401 - Sheet 5 of 8

78-12-01

REP 5-10-2

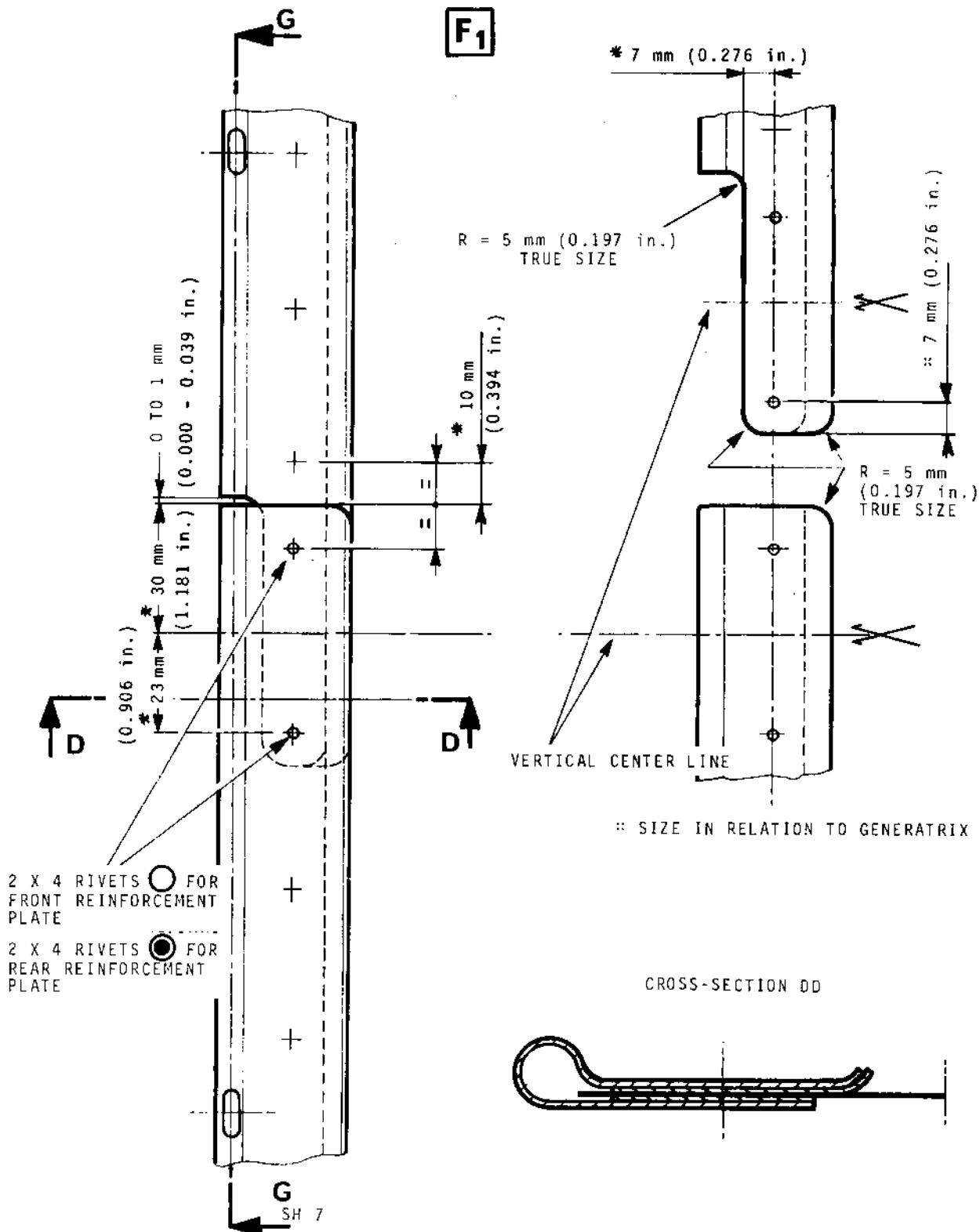
Page 407

Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Repair through Installation of Riveted Patches  
Figure 401 - Sheet 6 of 8

78-12-01



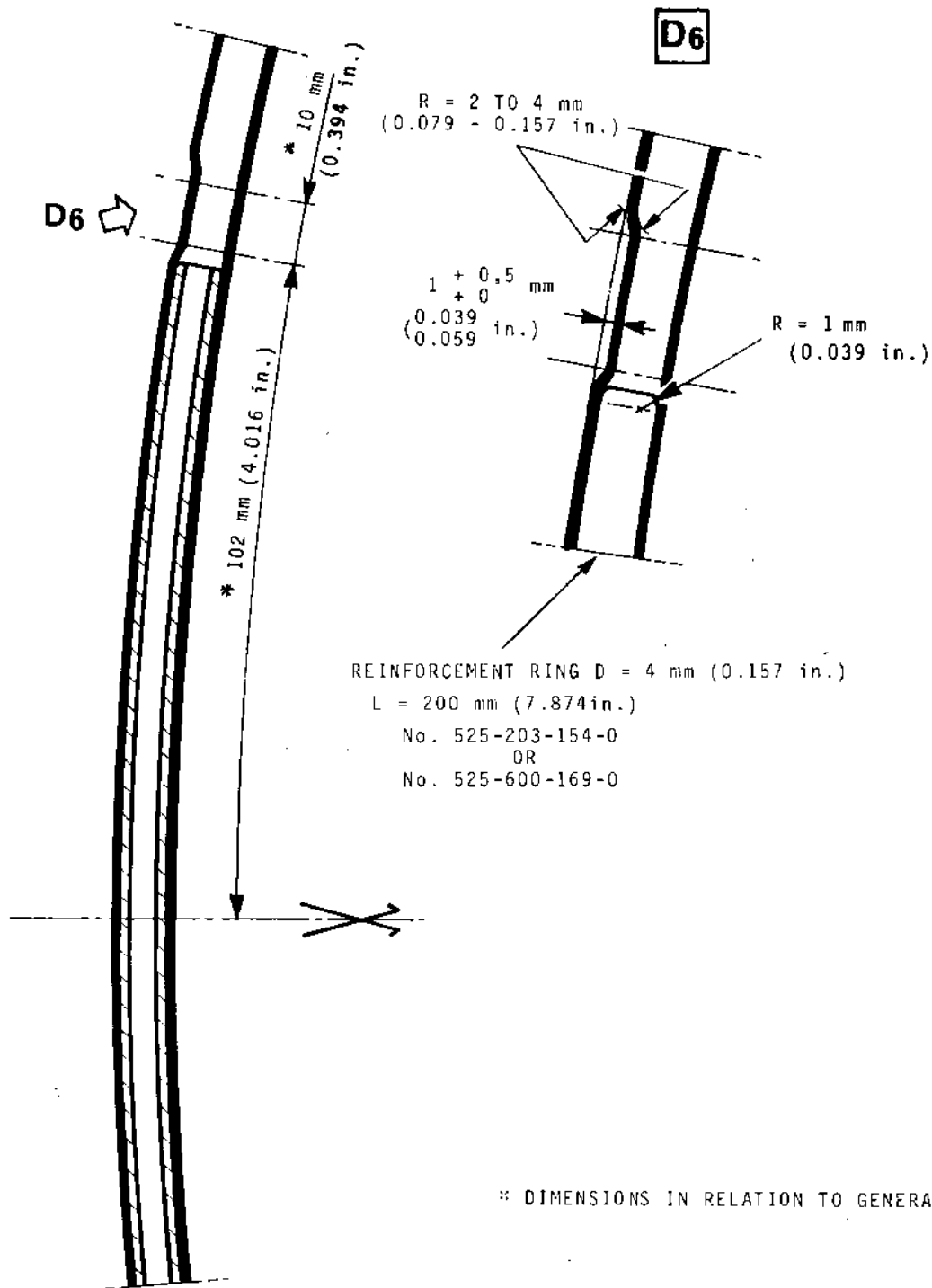
OLYMPUS 593

MK.610-14-28

OVERHAUL



G G CROSS SECTION



≡ DIMENSIONS IN RELATION TO GENERATRIX

Repair through Installation of Riveted Patches  
 Figure 401 - Sheet 7 of 8

78-12-01

REP 5-10-2

Page 409

Dec 15/75

**OLYMPUS 593**MK. 610-14-28  
OVERHAUL

DETAILS OF RIVETS					
REFERENCE BNAE	D = mm (in.)	LENGTH = mm (in.)	MATERIAL	HEAD SHAPE	ASSEMBLY SYMBOL
21215TB2405	2,4 (0.094)	5 (0.197)	NU 30	ROUND FLATTE- NED	
21215TB3206	3,2 (0.126)	6 (0.236)	NU 30	ROUND FLATTE- NED	
21215TB2406	2,4 (0.094)	6 (0.236)	NU 30	ROUND FLATTE- NED	
21215TB3207	3,2 (0.126)	7 (0.276)	NU 30	ROUND FLATTE- NED	
21217TB2406	2,4 (0.094)	6 (0.236)	NU 30	F 100	
21217TB3207	3,2 (0.126)	7 (0.276)	NU 30	F 100	
21217TB2407	2,4 (0.094)	7 (0.276)	NU 30	F 100	
21217TB3208	3,2 (0.126)	8 (0.315)	NU 30	F 100	
21217TB2408	2,4 (0.094)	8 (0.315)	NU 30	F 100	
21217TB3209	3,2 (0.126)	9 (0.354)	NU 30	F 100	

Repair through Installation of Riveted Patches  
Figure 401 - Sheet 8 of 8**78-12-01**

REP 5-10-2

Page 410

Oct 31/81



OLYMPUS 593

MK.610-14-28

OVERHAUL

REPAIR



NOZZLE FRONT FAIRING (5-10)

3. Renewal of the rivets attaching the various components

---

PARTS REQUIRED FOR REPAIR

---

Rivet No. 650-012-041-0	or	No. 650-012-072-0
Rivet No. 650-012-042-0	or	No. 650-012-073-0
Rivet No. 650-022-042-0	or	No. 650-022-073-0
Rivet No. 650-022-043-0	or	No. 650-022-074-0
Rivet No. 650-022-044-0	or	No. 650-022-075-0

Load spreading washer No. 525-203-026-0

---

A. Rivet renewal

Renew damaged rivets as specified in chapter 70-50-10 and according to requirements shown on figure 401 of repair scheme REP 5-10-2.

B. Riveting inspection

Check for proper riveting as per instructions of chapter 70-50-80.

**78-12-01**

REP 5-10-3  
Pages 401/402  
Dec 30/74





OLYMPUS 593

MK.610-14-28

OVERHAUL

REPAIR



NOZZLE CLOSING MANIFOLD (5-90)

1. Crack filler welding

---

PARTS REQUIRED FOR REPAIR

---

Filler welding wire P 3009

---

A. Crack filler welding

- (1) Fill up weld cracks as specified in chapter 70-35-10.
  - Filler welding wire P 3009
  - Weld class B3.

B. Weld inspection

- (1) Inspect welds, class B3, as specified in 70-35-80.
  - Water washable fluorescent penetrant inspect as per process M 502 B, chapter 70-20-10.
  - X-ray inspect as per chapter 70-20-30.
- (2) Carry out pressurizing test of the manifold with test fluid (P 163)  
Pressure : 50 bars (725 psi)  
Pressure holding time : 5 minutes

C. Cleaning

- (1) Degrease the manifold in trichlorethylene vapours as per process M 101 A, chapter 70-15-20.
- (2) Run clean trichlorethylene (P 76) through the manifold, at room ambient temperature, for 5 minutes.
- (3) Rinse the manifold with running hot water (85 to 90°C).
- (4) Dry the tube by insufflating dehydrated air.

78-12-01

REP 5-90-1

Pages 401/402

Dec 30/74



OLYMPUS 593

MK.610-14-28

OVERHAUL



## REPAIR

### NOZZLE CLOSING MANIFOLD (5-90)

#### 2. Replacement of a manifold segment

---

#### PARTS REQUIRED FOR REPAIR

---

Connecting tube assy	No. 525-990-701-0
Connecting tube assy	No. 525-609-752-0
Connecting tube assy	No. 525-609-753-0
Loop clamp	No. 525-217-154-0
Loop clamp	No. 525-217-155-0
Tube P 3400 (Z10 CNT 18)	Dia. 15,875 mm X 0,914 mm (0.625 in X 0.036 in)
Weld filler wire P 3009	(Z10 CNT 18)
Brazing metal P 3150	(Ag-Cu-Zn Cd 630)

---

#### A. General

This repair scheme contains the information needed to replace any manifold segment whatever. There is no limit set to the length of the segment replaced.

#### B. Cutting out the segment to be replaced

(1) Cut out the damaged portion, mindful of the following requirements :

- (a) The weld beads required for fitting a new segment must be made either within or 10 mm (0.39 in) from an existing bead and, mandatorily, min. 40 mm (1.57 in) from a brazed loop clamp.
- (b) When cutting out, allow for an additional length of 5 mm (0.20 in) on the manifold as a margin for subsequent adjustments.

#### C. Making a new segment

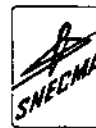
NOTE : If the new segment features a number of elements, they are to be adjusted and welded in pairs to prevent a massing of weld shrinkages, which interfere with the use of the SC 285 fixture provided.



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (1) Form a tube to the manifold radius and to a length suited to the extent of damage, as indicated in Fig. 401.

Tube material : P 3400

Tube dimensions : outer diameter : 15,875 (0.625 in)  
thickness : 0,914 mm (0.036 in)

- (2) Using adjusting and tack welding fixture SC 285, adjust the different elements making up the segment, as detailed in Fig. 401.
- (3) Argon arc tack-weld the constituent elements on the SC 285 fixture, as instructed in chapter 70-35-10 "FUSION WELDING".

Filler metal P 3009

Weld class B3

NOTE : Prior to tack welding, be sure to mount the requisite loop clamps as required for the particular segments (see Fig. 401), careful of the way each is to be positioned.

- (4) Remove the segment from the fixture and argon arc weld the elements following the instructions in chapter 70-35-10 "Fusion Welding"

Filler metal P 3009

Weld class B3

- (5) Perform a class B3 weld inspection as instructed in chapter 70-35-80 "Weld Inspection", covering :  
Water washable fluorescent penetrant test by method M 502 B, chapter 70-20-10 " Dye Penetrant Inspection"  
An X-ray examination as instructed in chapter 70-20-30. "Radiographic Inspection".

D. Assembling the segment to the manifold

- (1) Adjust the segment to the manifold on the SC 285 fixture.

NOTE : If necessary, previously adjust the manifold or the new segment for proper accommodation on the fixture.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Argon arc tack weld the segment as instructed in chapter 70-35-10 "Fusion Welding".

Filler metal P 3009  
Weld class B3

- (3) Remove the manifold from the fixture and argon arc weld the segment as instructed in chapter 70-35-10 "Fusion Welding"

Filler metal P 3009  
Weld class B3

- (4) Carry out a class B3 weld inspection, following the instruction in chapter 70-35-80 "Weld Inspection", covering :  
Water washable fluorescent penetrant test by method M 502 B, chapter 70-20-10 "Dye Penetrant Inspection".  
X-ray examination, as instructed in chapter 70-20-30 "Radiographic Inspection".

#### E. Brazing the clamps

- (1) Secure the manifold on to the SC 285 tack-welding fixture, and put the loop clamps in position.

NOTE : Use a fine emery cloth to rub those manifold surfaces that are to accommodate the clamps, then cleanse them with isopropyl alcohol (P 442).

- (2) Crimp the loop clamps with crimping tool SC 138.

- (3) Induction braze the clamps as instructed in chapter 70-40-10 "Brazing" and in Fig. 401.

Brazing metal P 3150  
Brazing class B1

NOTE : Prior to brazing, put some "DURMAX" alumina in the bottoms of the tapped clamps holes to prevent the brazing solder from seeping through.

- (4) Remove any excess solder with a fine emery cloth and work a tap round inside the clamp threads.
- (5) Perform a class B1 brazing inspection as instructed in chapter 70-40-80 "Brazed Joint Inspection".

78-12-01

REP 5-90-2

Page 403

Jan 31/81



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (6) Position the manifold on the SC 285 fixture ; if necessary, adjust it for correct shape and dimensions.

#### F. Leak test

- (1) Apply blanking plugs :
  - (a) to the connecting tube assemblies serving for the supply of the pneumatic jacks (tightening torque 0,4 m.daN)
  - (b) to a supply connecting tube (tightening torque 2,5 m.daN)
- (2) Perform a leak test with petroleum (P 163)  
at a pressure of 50 bars (725 spi)  
for a period of 5 min.

#### G. Cleaning

- (1) Degrease the manifold in trichlorethylene vapour by method M 101 A, chapter 70-15-20 "Cleaning".
- (2) Circulate clean trichlorethylene (P 76 A) inside the manifold for 2 minutes, at ambient temperature.
- (3) Flush out the manifold interior by hot water (85° to 90°) circulation.
- (4) Dry the manifold in dehydrated compressed air.

#### H. Dimensional inspection

- (1) Check and, if necessary, adjust the manifold so as to ensure its proper accommodation on the SC 285 fixture, with due regard for the dimensional requirements specified in Fig. 401.

#### I. Marking

- (1) Inscribe "REP 2" next beyond the part number, using method M28 described in chapter 70-10-20 "Marking Of Parts".

NOTE : Any markings on the cut out segment should be carried over to the new one.

78-12-01

REP 5-90-2

Page 404

Jan 31/81

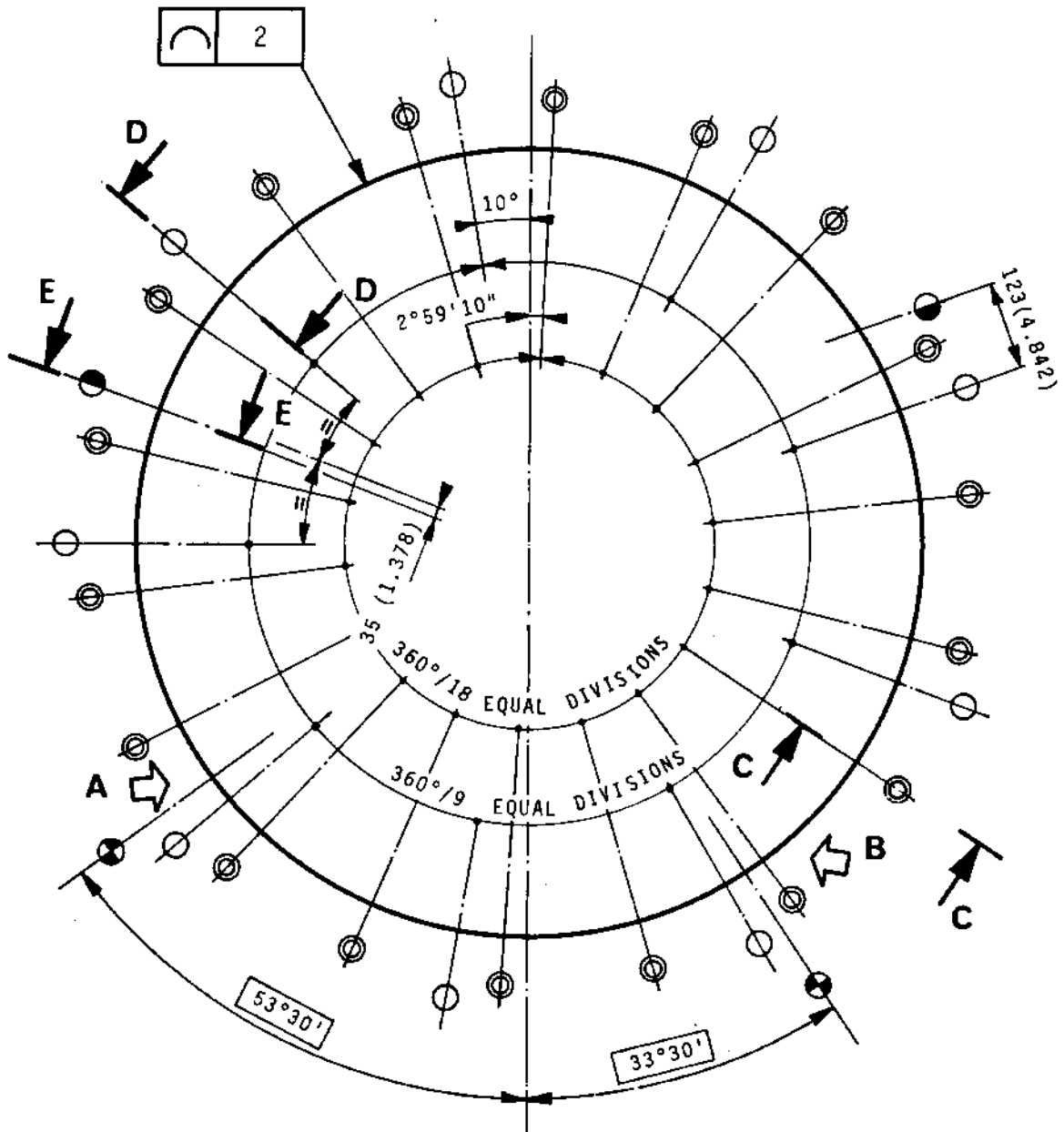


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE



DIMENSIONS ARE IN MILLIMETRES WITH INCH  
CONVERSIONS IN PARENTHESES.

Dimensional Details of Manifold  
Figure 401 (Sheet 1 of 3)

78-12-01

REP 5-90-2

Page 405

Jan 31/81

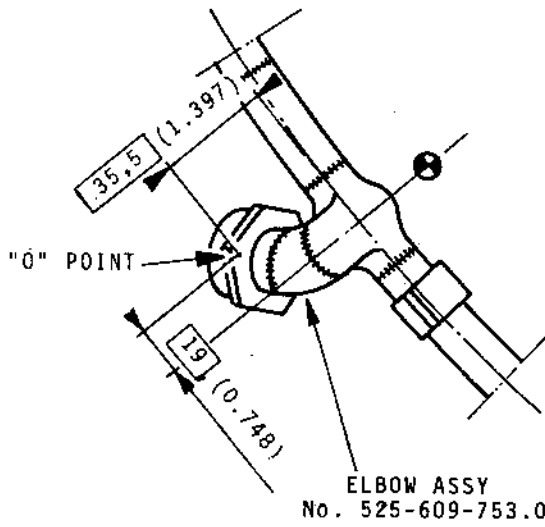


OLYMPUS 593

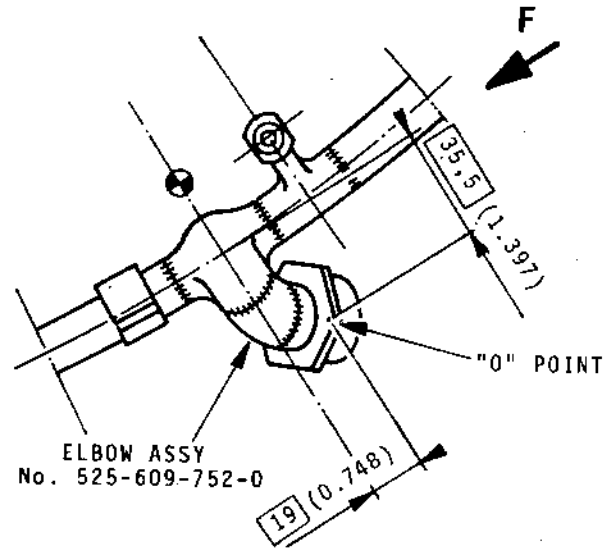
MK.610-14-28  
OVERHAUL



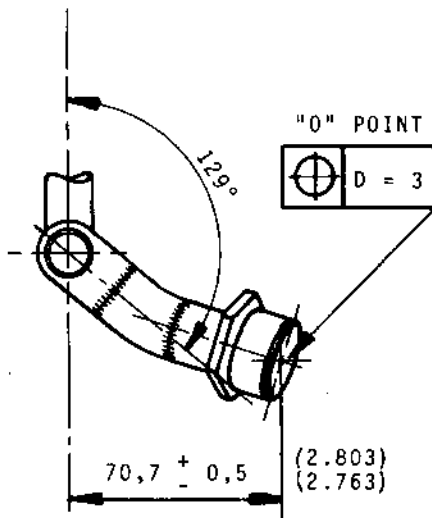
**A**



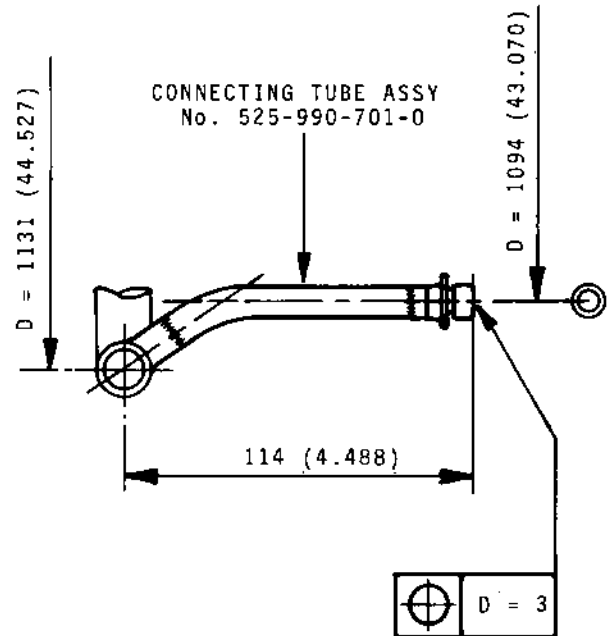
**B**



**F**



SECTION CC



DIMENSIONS ARE IN MILLIMETRES WITH INCH  
CONVERSIONS IN PARENTHESES.

Dimensional Details of Manifold  
Figure 401 (Sheet 2 of 3)

**78-12-01**

REP 5-90-2

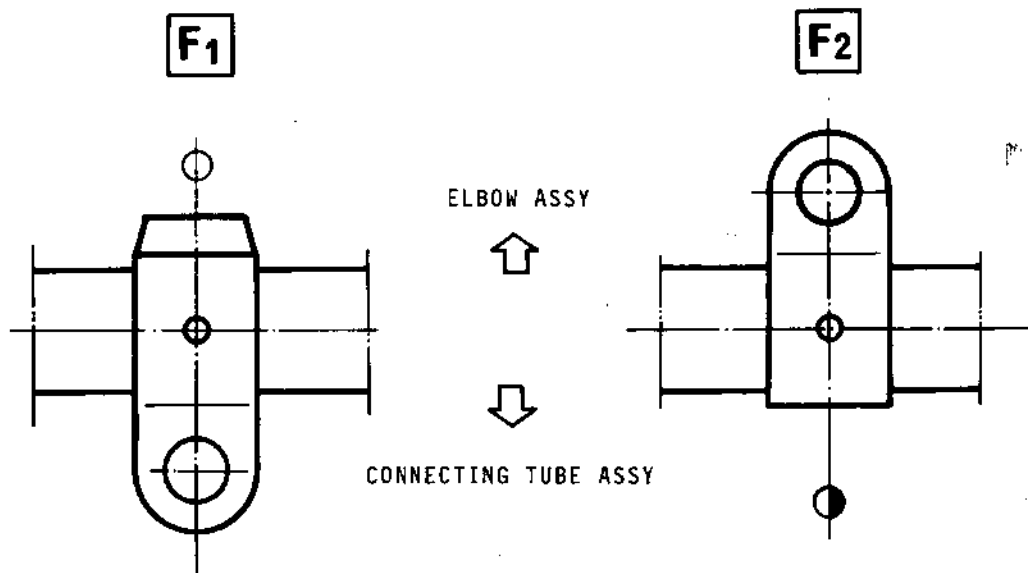
Page 406

Jan 31/81



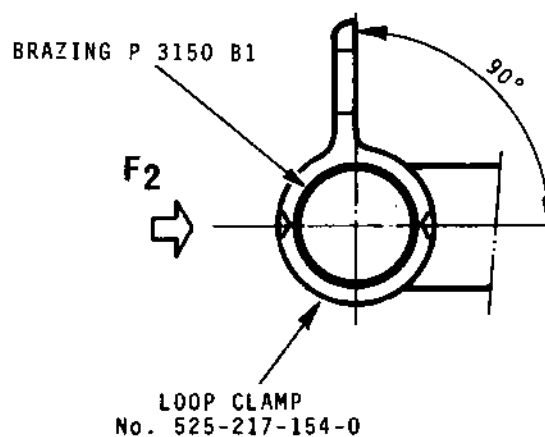
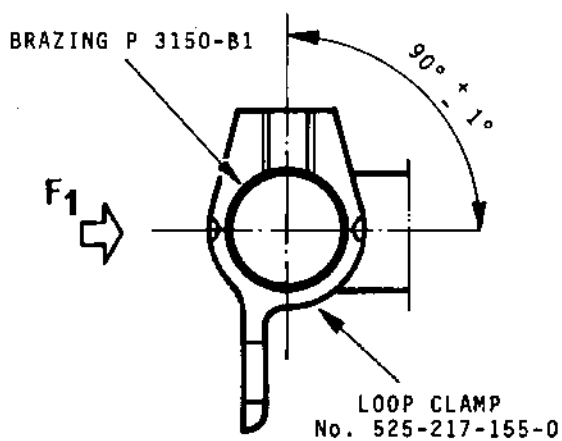
OLYMPUS 593

MK.610-14-28  
OVERHAUL



SECTION DD

SECTION EE



Dimensional Details of Manifold  
Figure 401 (Sheet 3 of 3)

78-12-01

REP 5-90-2

Page 407

Jan 31/81





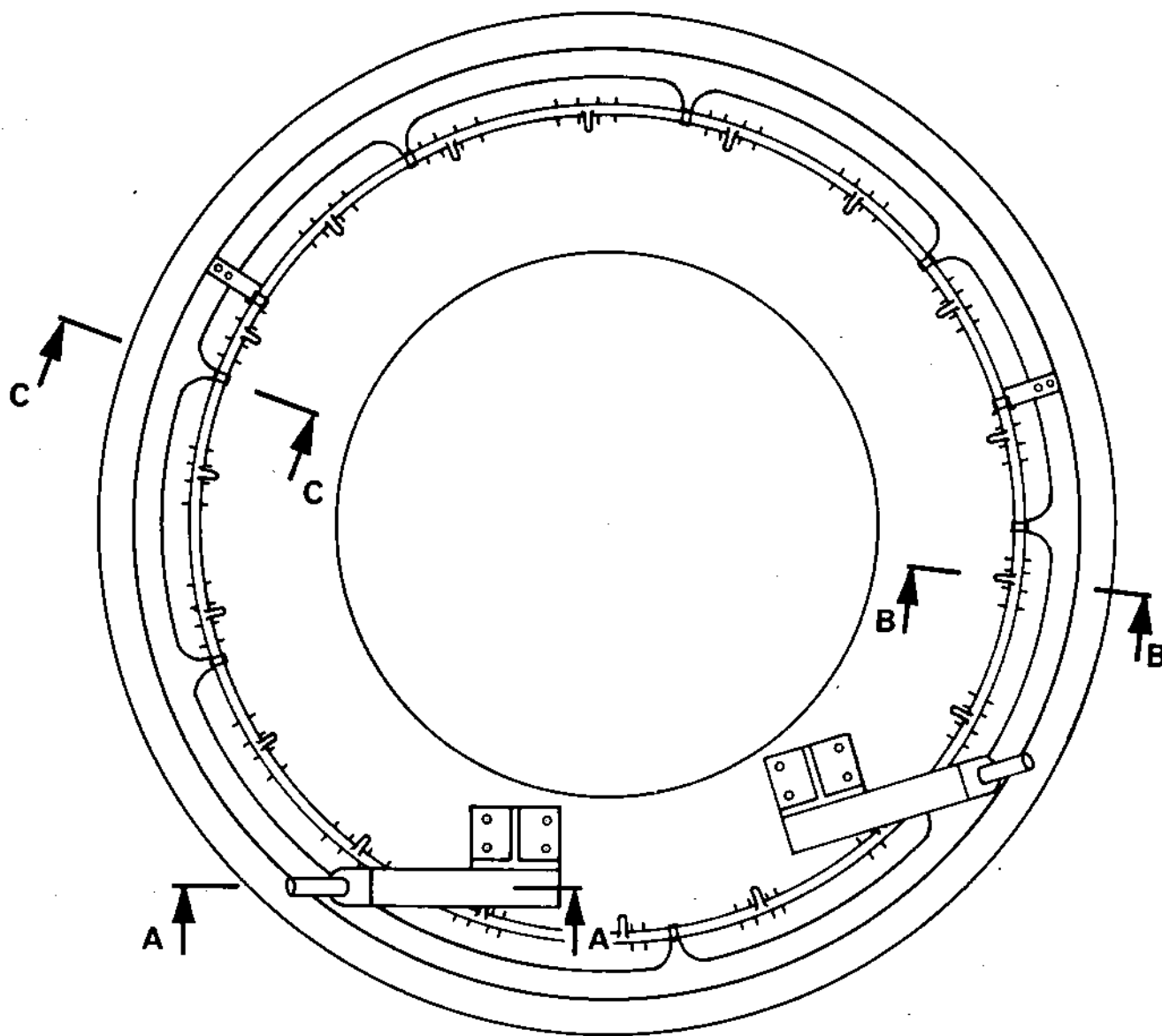
OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN FRANCE



Adjusting and Tack-Welding Fixture SC 285  
Figure 402 (Sheet 1 of 2)

78-12-01

REP 5-90-2

Page 408

Jan 31/81

N

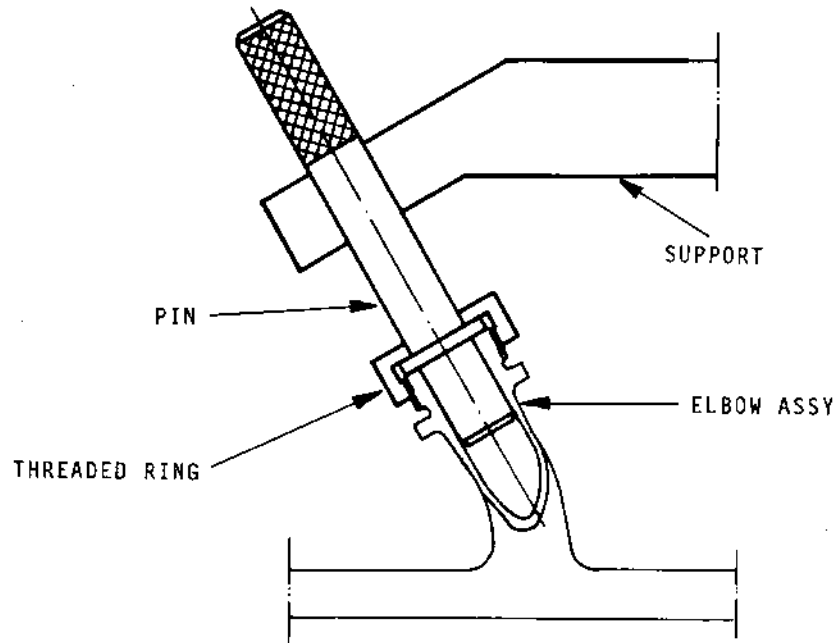


OLYMPUS 593

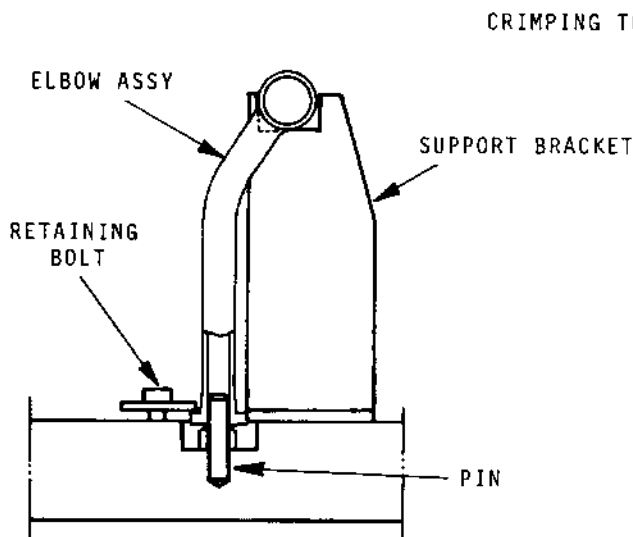
MK.610-14-28  
OVERHAUL



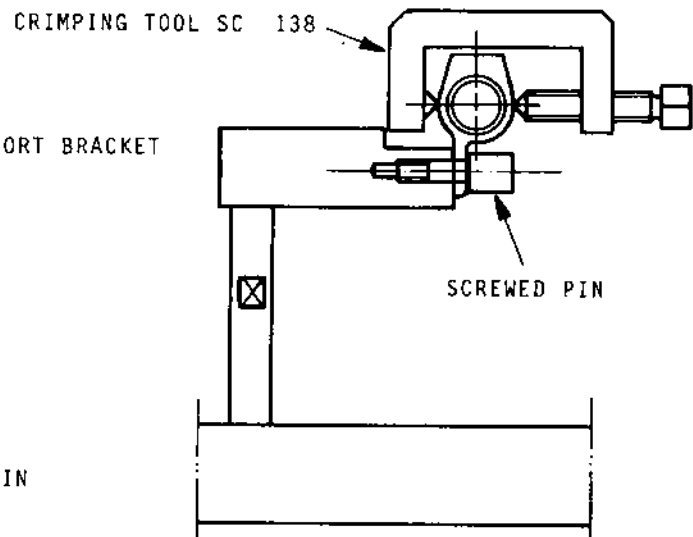
SECTION AA



SECTION BB



SECTION CC



Adjusting and Tack Welding Fixture SC 285  
Figure 402 (Sheet 2 of 2)

**78-12-01**

REP 5-90-2

Pages 409/410

Jan 31/81



OLYMPUS 593

MK.610-14-28

OVERHAUL

REPAIR



SUPPORT ASSEMBLY (5-150)

1. Renewal of the anchor nuts or of their attaching rivets

---

PARTS REQUIRED FOR REPAIR

---

Anchor nut No. SIMMONDS AJ 579-3  
Anchor nut No. SIMMONDS BL 579-3  
Rivet No. BNAE 21217 TB 2407 (650-022-043-0)  
or No. BNAE 21217 TB 3208 (650-022-074-0)

---

- A. Using an abrasive wheel, machine out heads of the anchor nut attaching rivets.
- B. Inspect rivets holes as per instructions of chapter 70-50-10.
- C. If required, rebore rivet holes to the oversize diameter in accordance with requirements shown on figure 401 and chapter 70-50-10.
- D. If applicable, install a new anchor nut.  
Fit the new rivets, selected from Table I, as specified in chapter 70-50-10 and as shown on figure 401.
- E. Inspect riveting as specified in chapter 70-50-80.

78-12-01

REP 5-150-1

Page 401

Dec 15/75

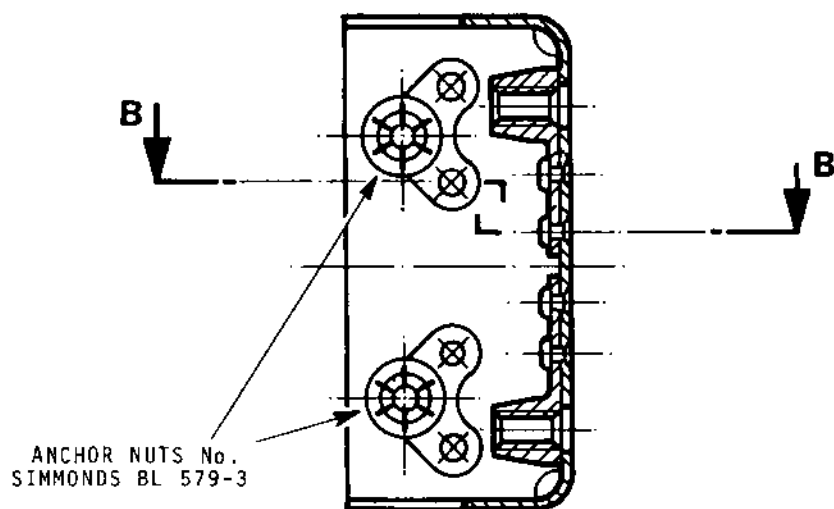
**OLYMPUS 593**

MK.610-14-28

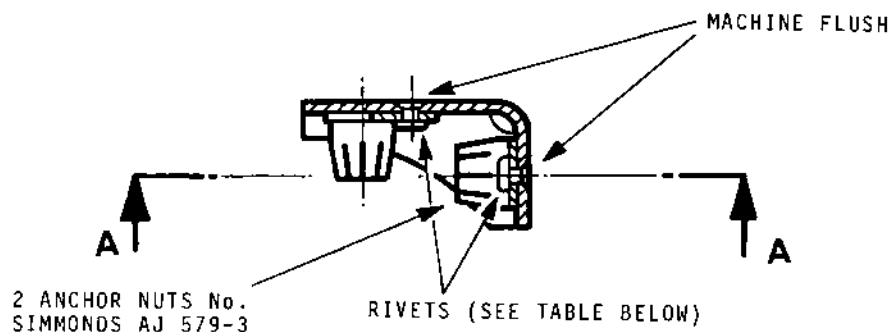
OVERHAUL



## CROSS-SECTION AA



## CROSS-SECTION BB



Rivet BNAE No.	Diameter mm (in.)	Length mm (in.)	Material	Head shape
21217 TB 2407	2,4 mm	7 (0.276)	NU 30	F 100
21217 TB 3208	3,2 mm	8 (0.315)	NU 30	F 100

Renewal of the Support Assy Anchor Nuts or of their  
Attachint Rivets  
Figure 401

**78-12-01**

REP 5-150-1

Page 402

Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL

REPAIR



SPHERICAL JOINT BOX (6-110)

1. Re-shaping the mounting flange

---

PARTS REQUIRED FOR REPAIR

---

A. Re-shaping

- (1) Re-shape the spherical joint box mounting flange at room ambient temperature, using a mallet.

B. Inspection for soundness

- (1) Inspect part using post-emulsified fluorescent penetrant process M 504 B, chapter 70-20-10.

Scrap the box if any crack is disclosed.

C. Dimensional inspection

- (1) Check that the box flange does not show flatness defect greater than 0,2 mm (0,008 in).

**78-12-01**

REP 6-110-1  
Pages 401/402  
Dec 30/74



OLYMPUS 593

MK.610-14-28

OVERHAUL

REPAIR



SUPPORT RING ASSEMBLY (6-190)

1. Crack filler welding

---

PARTS REQUIRED FOR REPAIR

---

Filler welding wire P 3004

---

A. Crack filler welding

Argon arc fill up weld cracks as specified in chapter 70-35-10.

- Filler welding wire P 3004
- Weld class B2

B. Weld inspection

Inspect welds class B2 as specified in chapter 70-35-80

- Water washable fluorescent penetrant inspect as per process M 502 B, chapter 70-20-10.
- X-ray inspect.

**78-12-01**

REP 6-190-1  
Pages 401/402  
Dec 30/74

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

## REPAIR

SUPPORT RING ASSEMBLY (6-190)2. Renewal of rivets or damaged riveted components

## PARTS REQUIRED FOR REPAIR

Guide	No.	301-225-200-0	
Boss	No.	301-227-800-0	
Nut	No.	301-227-700-0	
Bracket	No.	301-174-601-0	
Heat-shield segment	No.	301-225-901-0	
Guide	No.	301-226-400-0	
Identification plate	No.	525-410-021-0	
Identification plate	No.	301-178-000-0	
Anchor nut	No.	SIMMONDS G 579-4	
Rivet	No. BNAE	21215 CA 3207	(650-013-073-0)
	or No.	21215 CA 4008	(650-013-101-0)
Rivet	No. BNAE	21215 CM 2407	(650-014-043-0)
	or No.	21215 CM 3208	(650-014-074-0)
Rivet	No. BNAE	21215 CM 2408	(650-014-044-0)
	or No.	21215 CM 3209	(650-014-075-0)
Rivet	No. BNAE	21215 CM 3208	(650-014-074-0)
	or No.	21215 CM 4009	(650-014-102-0)
Rivet	No. BNAE	21215 CM 3212	(650-014-078-0)
	or No.	21215 CM 4013	(650-014-106-0)
Rivet	No. BNAE	21217 CA 2406	(650-023-042-0)
	or No.	21217 CA 3207	(650-023-073-0)
Rivet	No. BNAE	21217 CA 2407	(650-023-043-0)
	or No.	21217 CA 3208	(650-023-074-0)
Rivet	No. BNAE	21217 CA 2408	(650-023-044-0)
	or No.	21217 CA 3209	(650-023-075-0)
Rivet	No. BNAE	21217 CM 4018	(650-024-111-0)
	or No.	21217 CM 4819	(650-024-143-0)
Load spreading washer	No.	650-355-011-0	

- A. Grind out the head of damaged rivets or rivets of the defective detail parts.
- B. Check the rivet holes as per chapter 70-50-10, "RIVETING".
- C. If applicable, counter-drill the rivet holes or the load-spreading washers to the next higher diameter as instructed on figure 401 and in chapter 70-50-10, "RIVETING".

**78-12-01**

REP 6-190-2

Page 401

Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

- D. Install the new detail parts and rivet them as instructed on figure 401 and in chapter 70-50-10, "RIVETING".
- E. Inspect the riveting as indicated in chapter 70-50-80, "RIVETING".

**78-12-01**

REP 6-190-2

Page 402

Dec 15/75





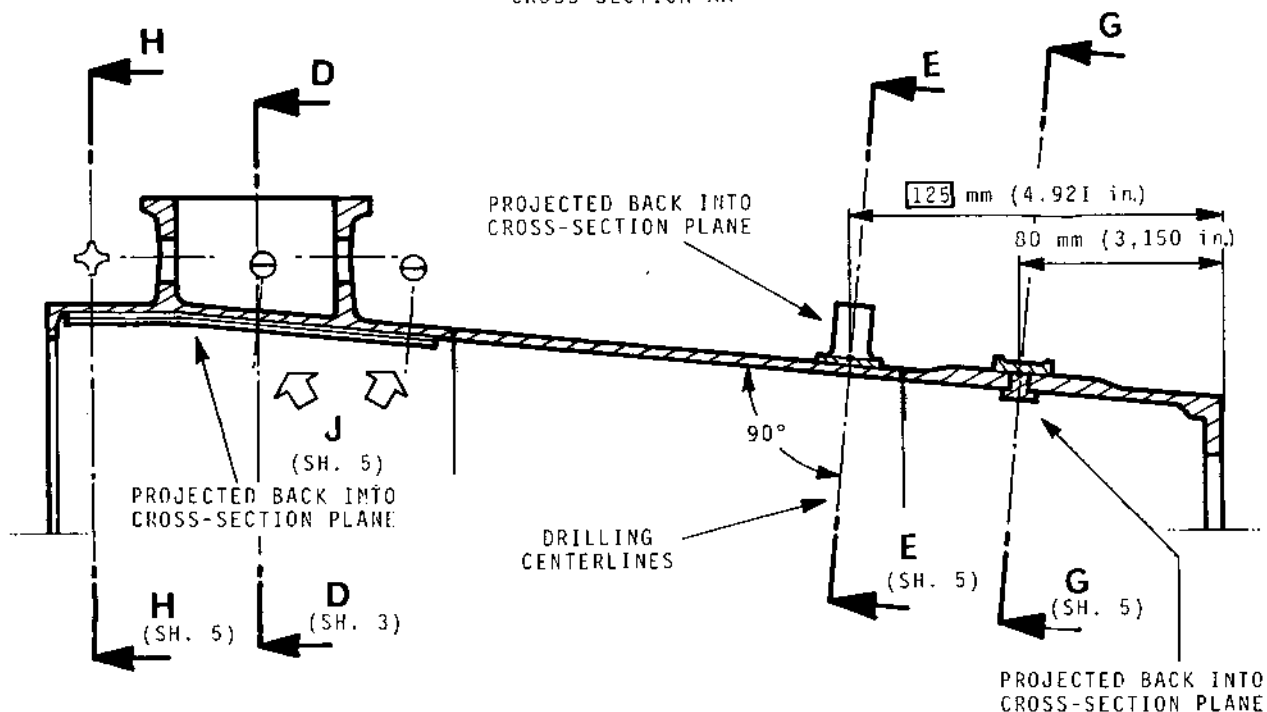
OLYMPUS 593

MK.610-14-28

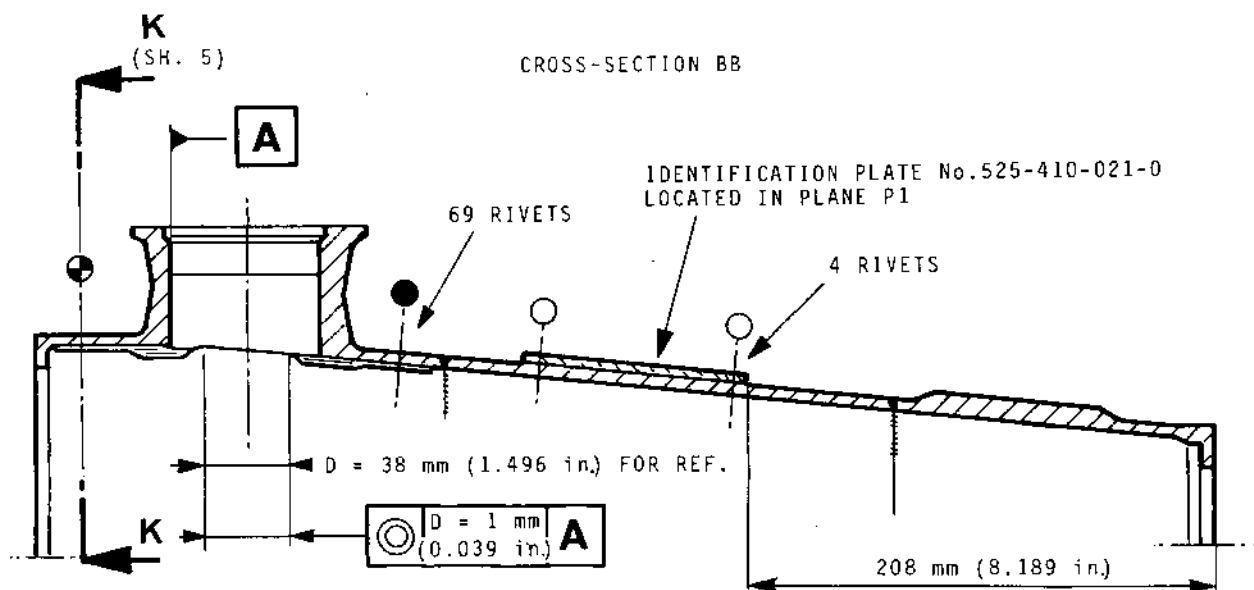
OVERHAUL



CROSS-SECTION AA



CROSS-SECTION BB



Renewal of the Support Ring Rivets or Riveted Detail Parts  
Figure 401 - Sheet 1 of 6

78-12-01

REP 6-190-2

Page 403

Dec 15/75



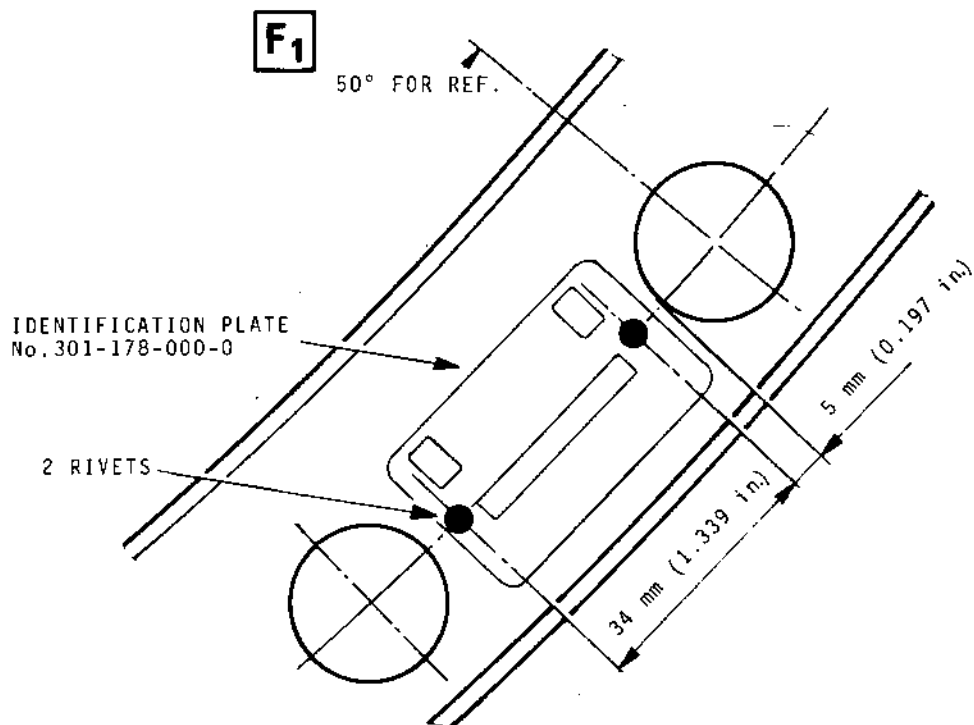
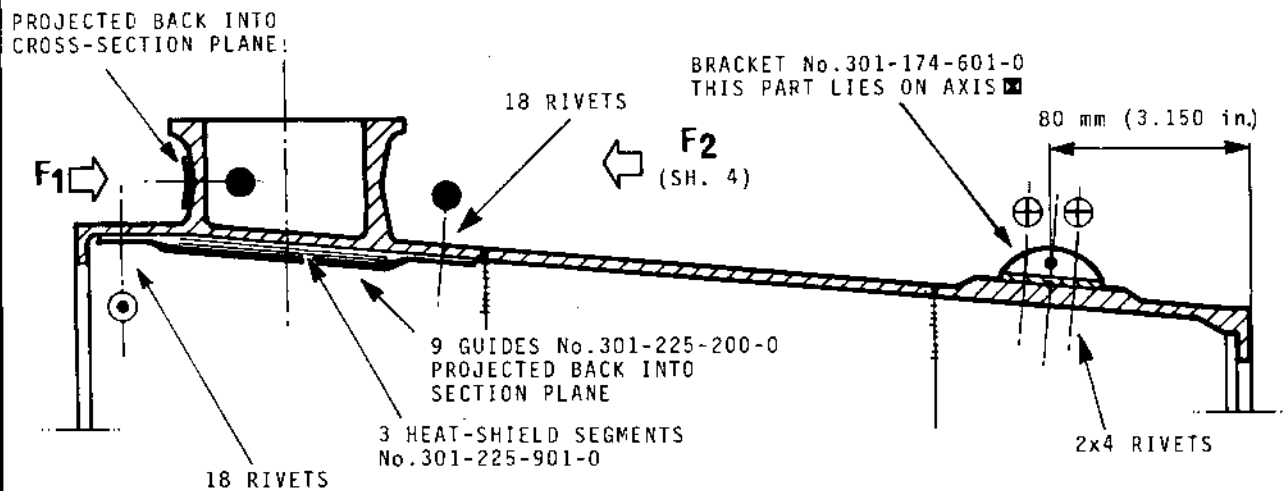
OLYMPUS 593

MK.610-14-28

OVERHAUL



CROSS-SECTION CC



Renewal of the Support Ring Rivets or Riveted Detail Parts  
Figure 401 - Sheet 2 of 6

78-12-01

REP 6-190-2

Page 404

Dec 15/75

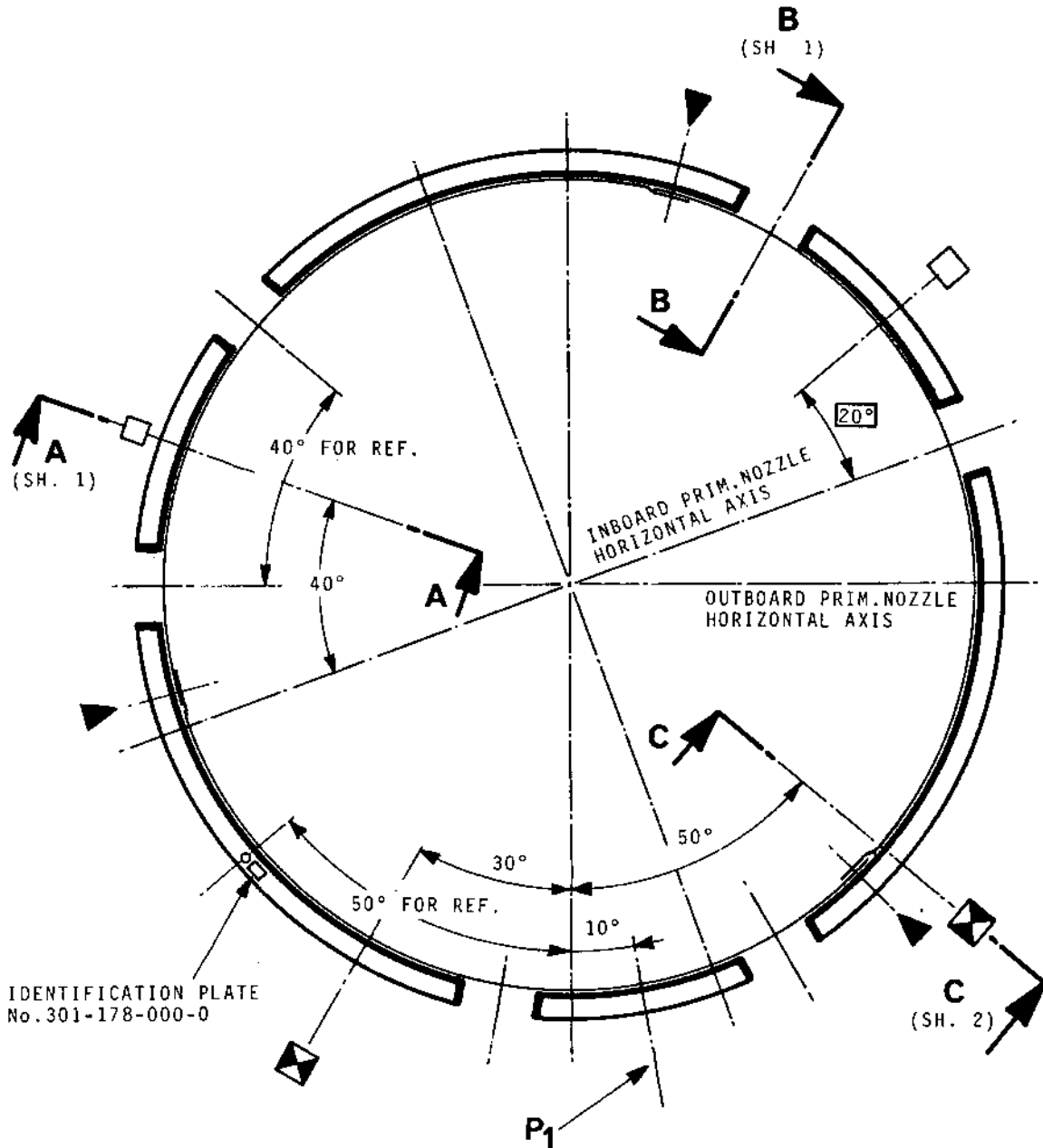


OLYMPUS 593

MK.610-14-28  
OVERHAUL



SCHEMATIC CROSS-SECTION DD



Renewal of the Support Ring Rivets or Riveted Detail Parts  
Figure 401 - Sheet 3 of 6

78-12-01

REP 6-190-2

Page 405

Dec 15/75



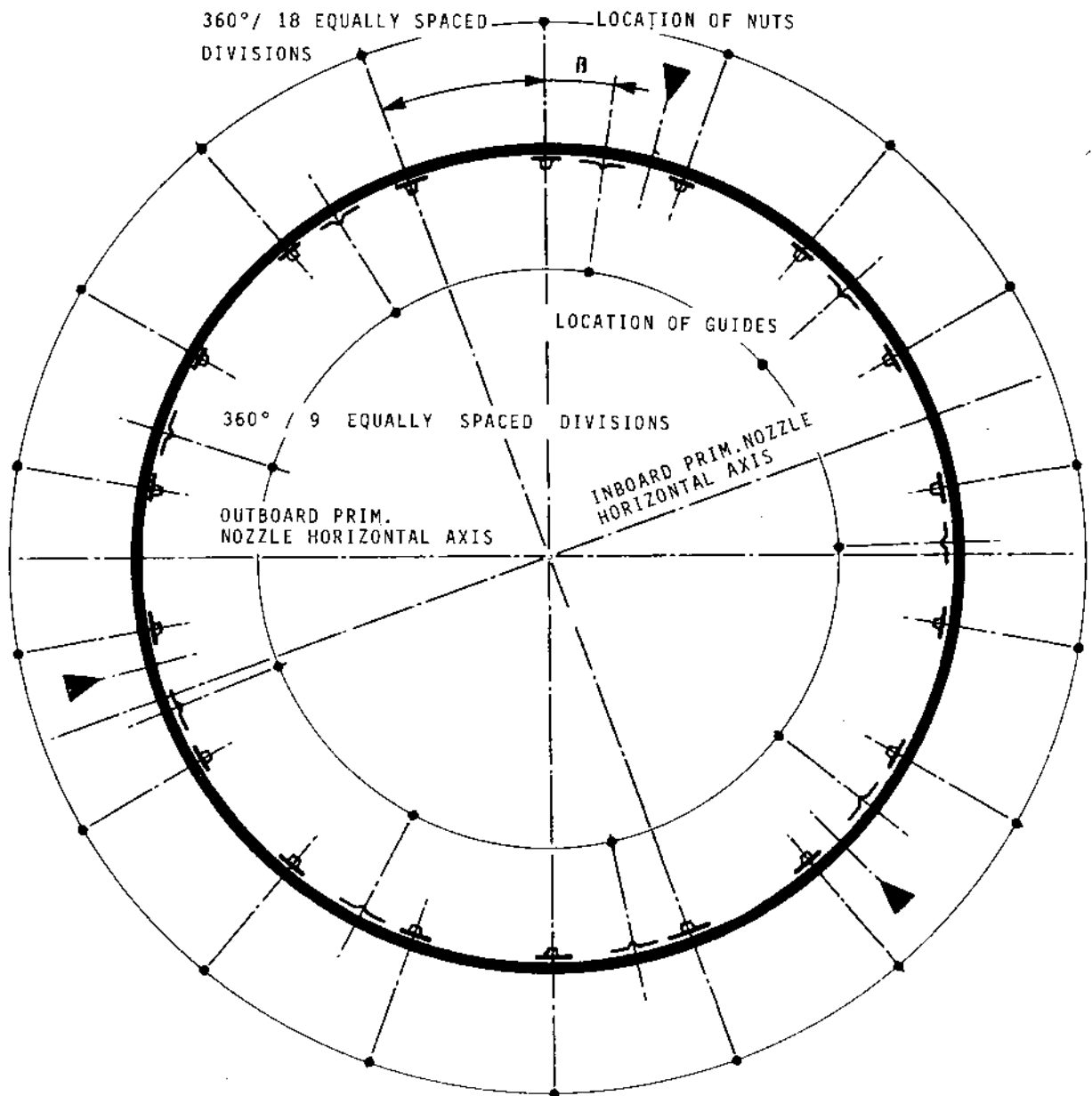
OLYMPUS 593

MK.610-14-28  
OVERHAUL



F<sub>2</sub>

SCHEMATIC VIEW



JUNCTIONS OF HEAT-SHIELD SEGMENTS TO LIE WITHIN AXIS MARKED ▼  
SEE CROSS-SECTION A (SH.1), SECTION H (SH.5) AND DETAIL J (SH.5)

Renewal of the Support Ring Rivets or Riveted Detail Parts  
Figure 401 - Sheet 4 of 6

78-12-01

REP 6-190-2

Page 406

Dec 15/75



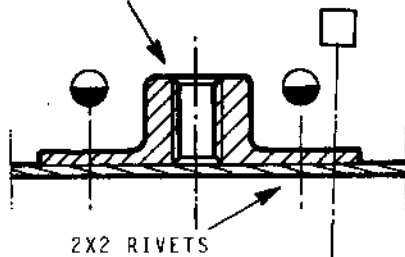
# OLYMPUS 593

MK.610-14-28  
OVERHAUL

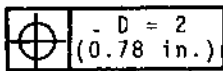


## SECTION E E

2 BOSSES  
No. 301-227-800-0

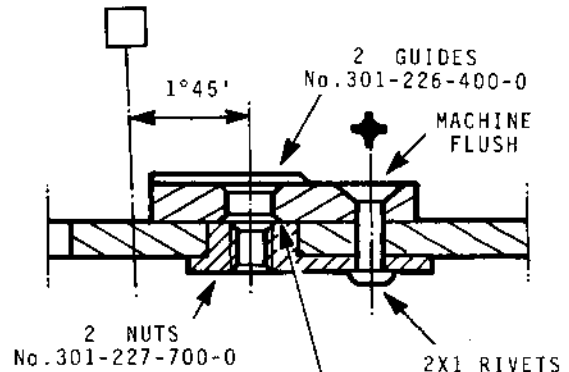


2X2 RIVETS



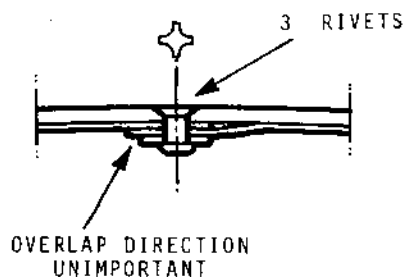
2°

## SECTION G G

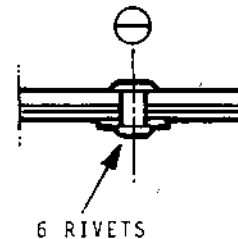


MACHINE FLUSH IF NUT UPPER FACE  
NOT RECESSED WITH RESPECT TO  
THE RING OUTER CONTOUR

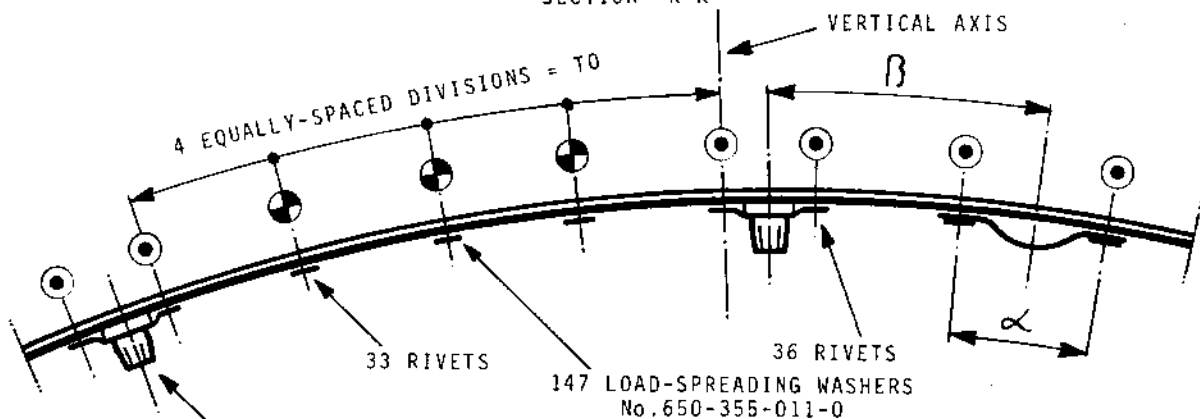
## SECTION H H



J



## SECTION K K



18 SIMMONDS NUTS  
G 579-4



FOR RIVETS, NUTS AND  
IDENTIFICATION PLATE EXCEPTED

$\alpha$  NOMINAL = 4°18'06"  
 $\beta$  NOMINAL = 7°50'22"

Renewal of the Support Ring Rivets or Riveted Detail Parts  
Figure 401 - Sheet 5 of 6

# 78-12-01

REP 6-190-2

Page 407

Mar 31/78

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



## RIVETS

Rivet BNAE No.	Diameter mm (in)	Length mm (in)	Material	Head shape	Symbol
21215 CA 3207	3,2 (0.126)	7 (0.276)	Z3CN18-10	U	
21215 CA 4008	4 (0.157)	8 (0.315)	Z3CN18-10	U	
21215 CM 2407	2,4 (0.094)	7 (0.276)	Z6NCT25s.v	U	
21215 CM 3208	3,2 (0.126)	8 (0.315)	Z6NCT25s.v	U	
21215 CM 2408	2,4 (0.094)	8 (0.315)	Z6NCT25s.v	U	
21215 CM 3209	3,2 (0.126)	9 (0.354)	Z6NCT25s.v	U	
21215 CM 3208	3,2 (0.126)	8 (0.315)	Z6NCT25s.v	U	
21215 CM 4009	4 (0.157)	9 (0.354)	Z6NCT25s.v	U	
21215 CM 3212	3,2 (0.126)	12 (0.472)	Z6NCT25s.v	U	
21215 CM 4013	4 (0.157)	13 (0.512)	Z6NCT25s.v	U	
21217 CA 2406	2,4 (0.094)	6 (0.236)	Z3CN18-10	F 100	
21217 CA 3207	3,2 (0.126)	7 (0.276)	Z3CN18-10	F 100	
21217 CA 2407	2,4 (0.094)	7 (0.276)	Z3CN18-10	F 100	
21217 CA 3208	3,2 (0.126)	8 (0.315)	Z3CN18-10	F 100	
21217 CA 2408	2,4 (0.094)	8 (0.315)	Z3CN18-10	F 100	
21217 CA 3209	3,2 (0.126)	9 (0.354)	Z3CN18-10	F 100	
21217 CM 4018	4 (0.157)	18 (0.709)	Z6NCT25s.v	F 100	
21217 CM 4819	4,8 (0.189)	20 (0.787)	Z6NCT25s.v	F 100	

Renewal of the Support Ring Rivets or Riveted Detail Parts  
Figure 401 - Sheet 6 of 6

**78-12-01**

REP 6-190-2

Page 408

Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL

REPAIR



RING SUPPORT ASSEMBLY (6-190)

3. Repair of the heatshield segments through installation of resistance welded patches.

---

PARTS REQUIRED FOR REPAIR

---

Wafered sheet metal P 3502 ; thickness 0,3mm (0.012 in)  
Heatshield material P 3501.

---

A. General

The repair of burnt areas or local tears affecting the heatshield sheet metal is carried out by cutting out the deteriorated area and installation of a resistance welded patch.

This repair procedure is performed without any removal of the heatshield, using a welding pistol type :

BRONZAVIA AERONAUTIQUE  
2, rue Jean Perrin  
92000 NANTERRE - FRANCE

B. Requirement related to installation of patches

- (1) Requirements concerning the installation of patches are detailed in chapter 70-35-20.  
If deteriorations are located within blending radii or at less than 15 mm (0.59 in) from the eyelets renew entirely the heatshield segment.

C. Cutting out the damaged area

- (1) The cutting out of segment to be repaired must be carried out according to the instructions of chapter 70-35-20.
- (2) Check condition of the quartz glass fiber. If it shows deteriorations due to burning, the damaged area must be renewed.

78-12-01

REP 6-190-3

Page 401

Apr 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



#### D. Patch preparation

- (1) The patches to be installed may be cut out from :
  - a sound area of a scrapped heatshield segment
  - wafered sheet metal P 3502 ; thickness 0,3 mm (0.012in)
- (2) Patch dimensions will depend on how large are the deteriorations ; their shape must comply with the requirements of chapter 70-35-20.
- (3) The patches are to be cut-out so as to provide a 10 mm (0.394 in) minimum overlap and perfect mating of the patch wafered sheet metal with the corresponding heatshield wafered sheet metal.
- (4) If required, cut out a piece of quartz glass fiber from heatshield material P 3501 so that to fit it without play in its recess.

#### E. Patch welding

- (1) Welding pistol equipment and adjustment.
  - (a) The welding pistol must be fitted with an electrode having the tip profile shown on figure 401. This configuration prevents puncture of sheet metal during welding.
  - (b) Adjustments of the welding pistol must be checked on test specimen.
- (2) Welding tests on specimen
  - (a) The welding test specimen is composed of two 100 x 30 mm (3.937 x 1.181 in) strips of metal. Both cleaning and welding of the test specimen must be carried out using the same procedure as for the part to be repaired. The test specimen must be subjected to a series of five spot welds at least.
  - (b) Inspection of the test specimen is accomplished by peeling off the spot welds. The specimen is deemed satisfactory when all the spot welds are peeled-off.

78-12-01

REP 6-190-3

Page 402

Dec 30/74





OLYMPUS 593

MK.610-14-28  
OVERHAUL



(3) Preparation of parts prior to welding

- (a) Carry out fine buffing of the heatshield area to be overlapped by the patch.

CAUTION : TAKE CARE TO FIT PROTECTIVE MASKING TO  
AVOID DETERIORATION OF THE QUARTZ  
GLASS FIBER DURING BUFFING OPERATION

- (b) Clean the areas to be welded as specified in chapter 70-35-20.

(4) Patch welding procedure

- (a) If required, locate the quartz glass fiber.

- (b) Obtain a perfect contact between parts to be welded.

NOTE : A poor contact entails an excessive welding pressure resulting in puncturing of the metal sheets.

- (c) Perform stitch welding (refer to Fig. 401)

NOTE :-Work with the flat machined at tip of electrode.  
-Connect the earthing clamp as close as possible from the welding area.

F. Weld spots inspection

- (1) Visually inspect to ensure that there is no evidence of burning or puncturing of the sheet metal.

78-12-01

REP 6-190-3

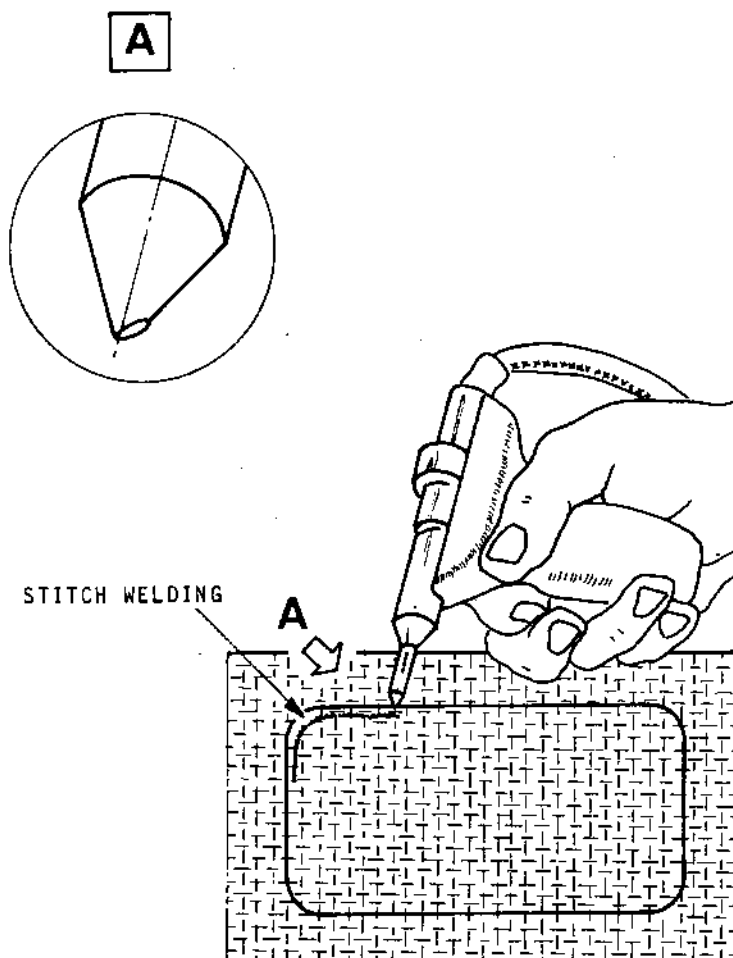
Page 403

Dec 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Patch Welding  
Figure 401

78-12-01

REP 6-190-3

Page 404

Dec 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

SUPPORT RING ASSY (6-190 Variant "C")

4. Renewal of the dowel pin

---

PARTS REQUIRED FOR REPAIR

---

Dowel pin No. 301-181-500-0 or 301-181-500-1  
or 301-181-500-2

---

A. Removal of the dowel pin

Grind out the dowel pin or remove it using a pin drift.

B. Installation of a new dowel pin

- (1) Check hole condition and corresponding diameter.
  - (a) If no hole deterioration is observed, install a dowel pin adapted to the hole diameter (Table I)
  - (b) If hole deterioration is observed (out of round, scratched), re-bore it in relation to deterioration dimension as per Table I and install the appropriate dowel.
- (2) Install the dowel pin after shrinking it in liquid nitrogen (P 441)
- (3) Flare the dowel pin end as per indications in figure 401.
- (4) If required, machine the pin flush with flange face.

78-12-01

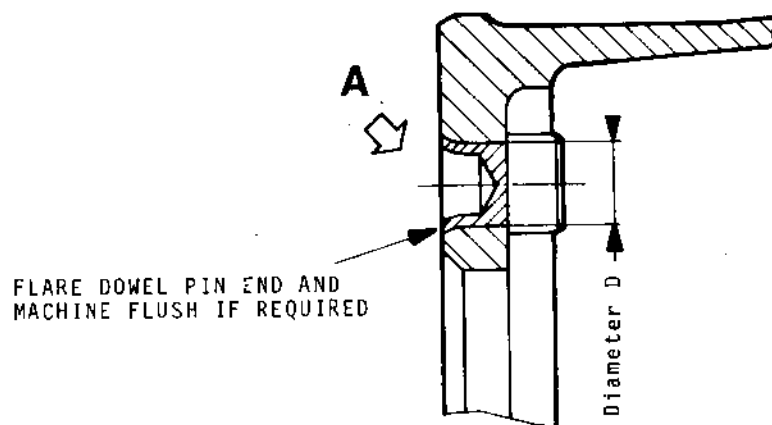
REP 6-190C-4

Page 401

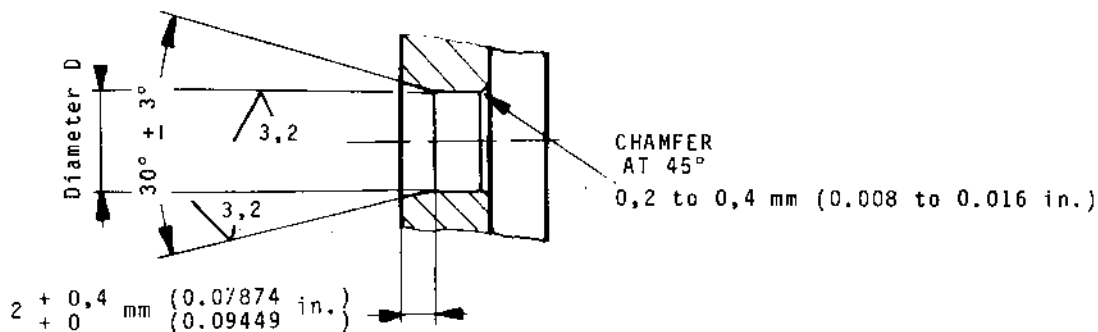
Dec 15/75

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

CROSS-SECTION ALONG VERTICAL CENTERLINE



WITHOUT DOWEL PIN



DOWEL PIN No.	BORE DIAMETER ON THE FLANGE		DOWEL PIN MATCHING DIAMETER	
	mm (in.)		mm (in.)	
301.181.500.0	D=7,5H7	$+0,015$ $+0$ (0.29528) (0.29587)	D=7,5S6	$+0,032$ $+0,023$ (0.29653) (0.29618)
301.181.500.1	D=7,6H7	$+0,015$ $+0$ (0.29921) (0.29980)	D=7,6S6	$+0,032$ $+0,023$ (0.30047) (0.30012)
301.181.500.2	D=7,7H7	$+0,015$ $+0$ (0.30315) (0.30374)	D=7,7S6	$+0,032$ $+0,023$ (0.30441) (0.30405)

Renewal of Dowel Pin  
Figure 401**78-12-01**REP 6-190C-4  
Page 402  
Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

RING SUPPORT ASSEMBLY (6-190)

5. Repair of the ring support assembly through installation of welded patches.

---

PARTS REQUIRED FOR REPAIR

---

Sheet metal P3300 (Z3 NCT25), thickness : 1,2 mm  
(0.047 in.)

Weld filler wire P3030 (ND 24 FeC)

Rivet No. 650-013-073-0

Rivet No. 650-014-074-0

---

A. Conditions required for patch installation

- (1) The conditions required for patch installation are described in chapter "WELDING BY FUSION", 70-35-10.

NOTE : Bosses must be taken into account, when required.

B. Preparation of the patch

- (1) The patches shall be cut out of sheet metal P3300, 1,2 mm (0.047 in.)-thick.
- (2) Temper the patch as per method M817 in chapter "HEAT TREATMENTS", 70-45-10.
- (3) Patch dimensions depend on the extend of the damaged section. However, the patch shape shall meet the requirements defined in chapter "WELDING BY FUSION" 70-35-10.

NOTE : On adjusting, take into account an approximate 0,8 mm (0.031 in.) structural shrinkage due to tempering cumulated with the shrinkage caused by welding.

C. Patch installation

- (1) Argon-arc-weld the patch as per chapter "WELDING BY FUSION", 70-35-10.

- Weld filler wire P3030
- Class of weld : B2

**78-12-01**

REP 6-190-5

Page 401

Jan 31/81

- (2) Inspect Class B2 welds as prescribed in chapter "INSPECTION OF WELDS", 70-35-80.
- Inspection using the post-emulsified fluorescent penetrant process as per method M504 B in chapter 70-20-10.
  - X-ray radiographic inspection as per chapter 70-20-30.
- (3) Locally heat-treat the welded zone at 725°C for 8 hours in air.

NOTE : This kind of treatment was carried out by SNECMA as follows :

- One thermocouple was installed at each of the four corners of the patch and two at the center
  - Install six quartz lamps of 1200 W each at 80-100 mm (3.149-3.937 in.) away from the surface to be treated.
  - Thermally insulate this system in order to minimize heat losses.
  - Raise and maintain the temperature as long as necessary, then leave to cool in ambient air.
- (4) Sound inspect the welds using the post-emulsified fluorescent penetrant process as per method M504B in chapter "PENETRANT INSPECTION", 70-20-10.

D. Dimensional inspection

- (1) Dimensionally inspect as per figure 401.

E. Marking

- (1) Following the part number, mark REP 5 as per method M21 in chapter 70-10-20.

78-12-01

REP 6-190-5

Page 402

Jan 31/81

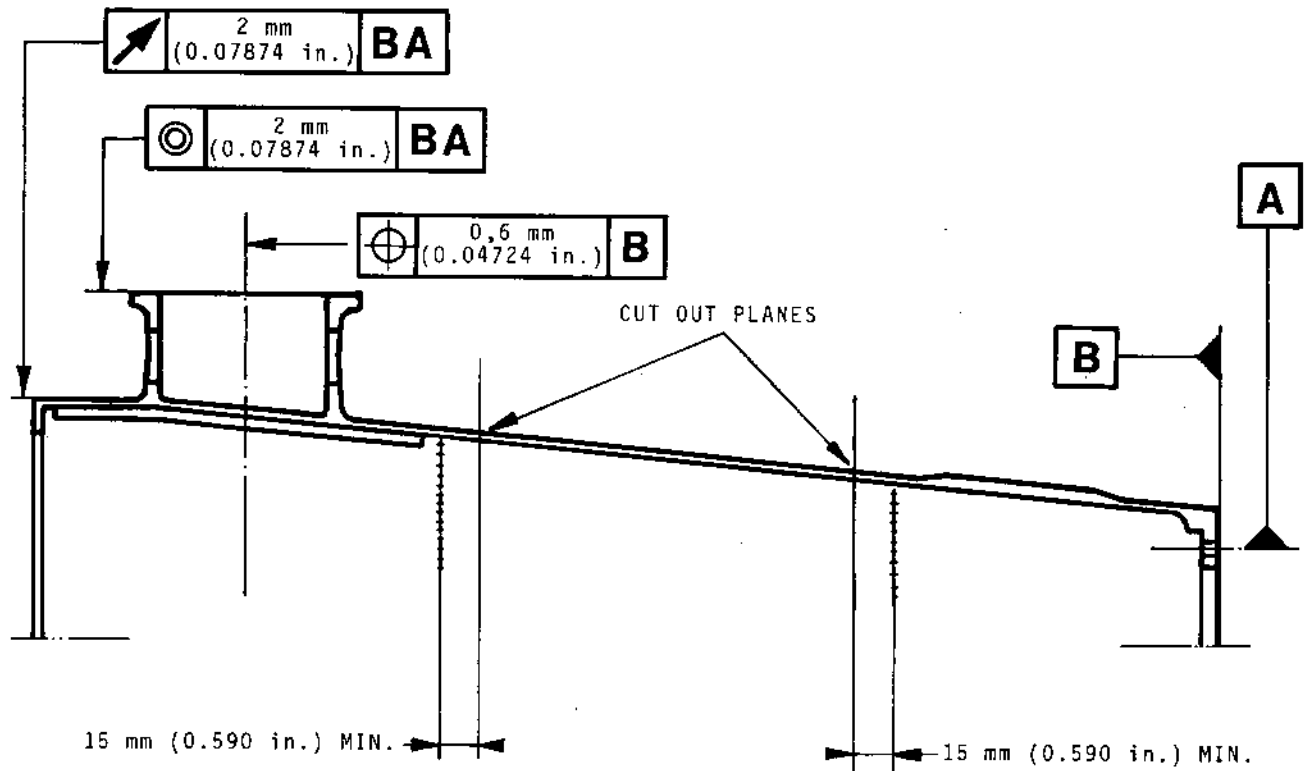


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE



Dimensional Inspection of Ring Support Assembly  
Figure 401

78-12-01

REP 6-190-5  
Pages 403/404  
Jan 31/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

SUPPORT RING (6-190)

6. Reconditioning the primary nozzle jack mounts by applying repair-size bushings

---

PARTS REQUIRED FOR REPAIR

---

Bushing 525-600-077-1 through 5

---

CAUTION : THE TWO BUSHINGS OF A PRIMARY NOZZLE JACK MOUNT MUST ABSOLUTELY BE RENEWED.

A. Removing the bushings

- (1) Remove the damaged bushings by machining.  
Rework the bushing recesses as specified in figure 401, when required.

B. Fitting bushings

- (1) If necessary readjust the thickness of the bushing flanges so as to ensure that the after-assembly dimension between the bushings is as indicated in figure 401.

C. Mounting the bushings

- (1) Mount the bushings, previously shrunk in liquid nitrogen (P441), into their recesses.

NOTE : Make sure that the bushing flanges are firmly seated on the mounting ring.

D. Inspection

- (1) Make a dimensional check the bushings conformably to the indications in figure 401.

**78-12-01**

REP 6-190-6

Page 401

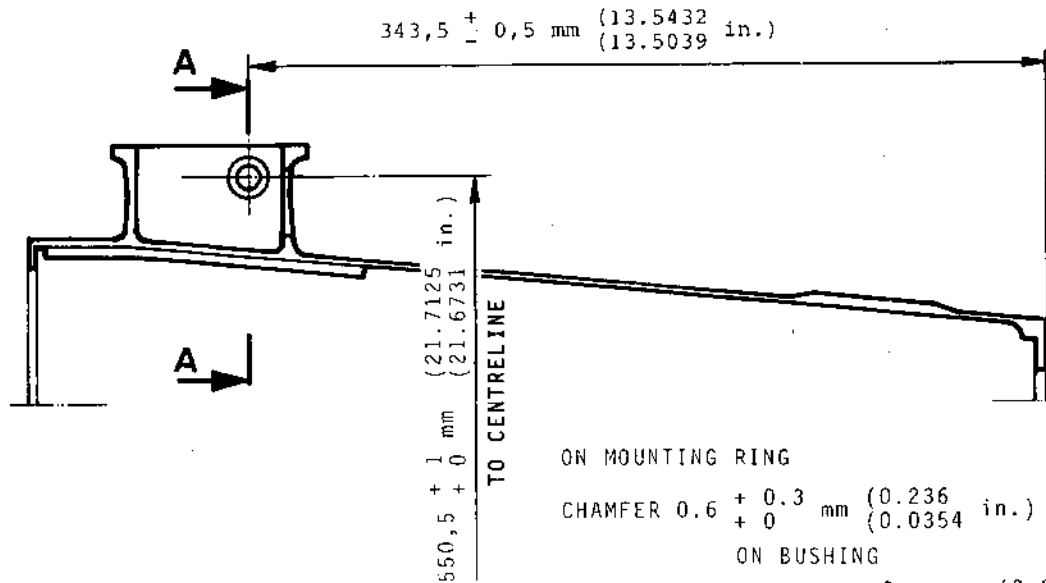
Oct 31/81



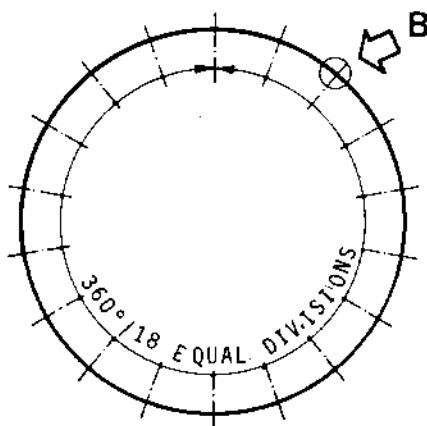


# OLYMPUS 593

MK.610-14-28  
OVERHAUL

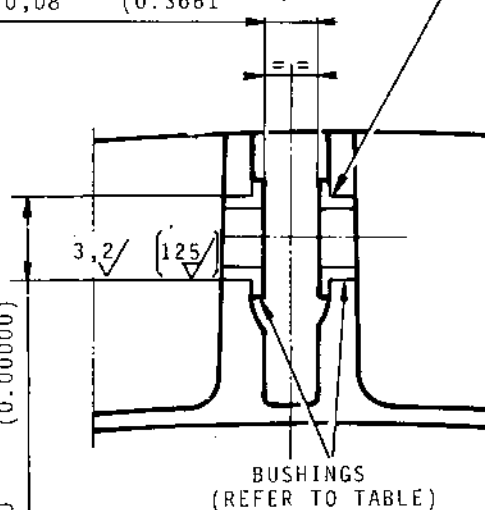


SECTION AA



9,1 + 0,2 mm (0.3551 in.)  
- 0,08 mm (0.3661 in.)

DIA "D" H7 + 0,018 (0.00071)  
+ 0 (0.00000)



DIA. "D"	BUSHING No.
15,1	525-600-077-1
15,2	525-600-077-2
15,3	525-600-077-3
15,4	525-600-077-4
15,5	525-600-077-5

Reconditioning the Primary Nozzle Jack  
Mounts by Applying Repair-size Bushings  
Figure 401

## 78-12-01

REP 6-190-6

Page 402

Oct 31/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



## ASSEMBLY

### 1. General

- A. During assembly, follow the recommendations given in chapter 70-65-00 of the manual of Standard Practices, and in the working procedures section of the Overhaul Manual.
- B. Use only tools and other special equipment nominated in the assembly procedures, and identified by a number SC... The tools are shown in the Illustrated Tools and Equipment Manual (I.T.E.M.).
- C. During assembly of bolts and nuts refer to pages 601-700 of the "Fits and Clearances" chapter for :
  - (1) The tightening torque for the nut or bolt.
  - (2) The lubrication to be applied to the nut or bolt before assembly.
- D. The clearances to be checked during assembly are identified by a number. Refer to pages 601-700 of the "Fits and Clearances", chapter for the values which must be respected.
- E. In the working procedures section of the manual, parts are referenced to the I.P.C by two numbers in brackets, the first of which is the figure number in the I.P.C, the second being the item number within that figure.

### 2. Location

The primary nozzle is assembled so as to be suitable for left-hand dressed engines i.e. 1 and 3 (see fig. 501).

It can be prepared for installation on a right-hand dressed engine by rotating it 20° clockwise from the rear and by changing the position of the following parts :

- Actuated petal for nozzle area indication.
- \* Primary nozzle area transducer
- Twin secondary nozzle mounting spherical bearings and cover plates.
- Pressure tapping tube and blank.
- Blanking of the manifold.
- Front fairing.

\*Up to primary nozzle No. 301-217-003-0 excluded.

**78-12-01**

Page 501  
Dec 15/75

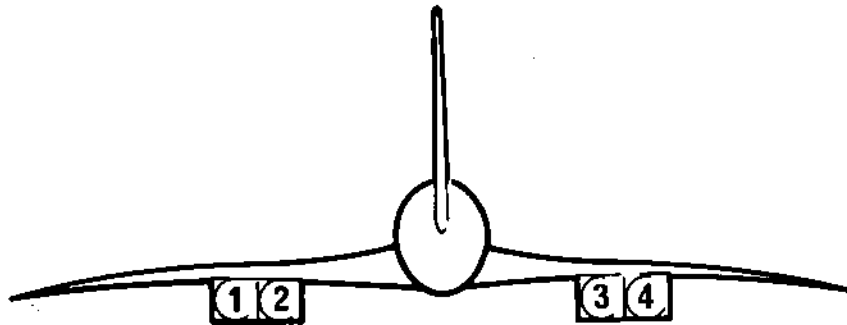


OLYMPUS 593

MK.610-14-28  
OVERHAUL



VIEW FROM REAR

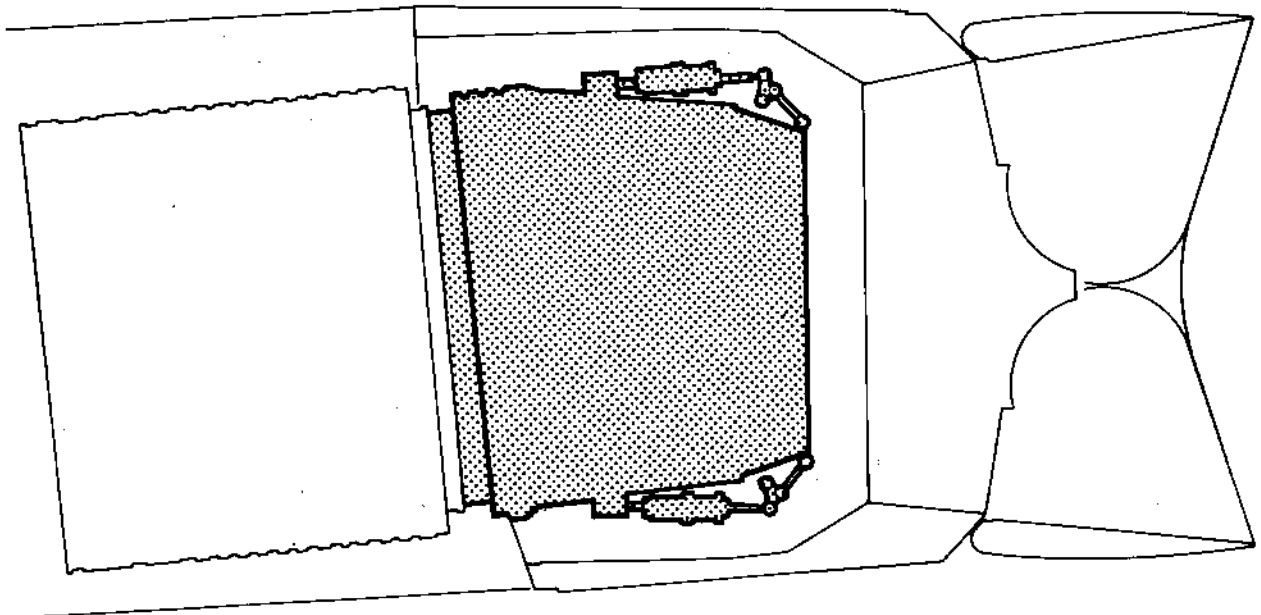


LEFT HAND NACELLE

RIGHT HAND NACELLE

LEFT HAND DRESSED ENGINES 1 and 3

RIGHT HAND DRESSED ENGINES 2 and 4



Position of the Primary Nozzle on the Aircraft  
Figure 501

78-12-01

Page 502  
Dec 30/74



OLYMPUS 593

MK.610-14-28

OVERHAUL



This is given for information only, details of the operations are given in the Heavy Maintenance manual.

### 3. Assembly of the primary nozzle

#### A. Recommendations

During the various assembly operations, coat the following with anti-seizing graphite grease (P189) :

- (1) The threads of nuts and bolts.
- (2) The front flange of the convergent section (4-110).
- (3) The jointing segments (4-120).
- (4) Rubbing surfaces of the petals (3-30), (3-260) and (3-270).
- (5) The connections

NOTE : Pins (2-50) (2-220) and (2-250) should be coated with lubricating varnish X321 (P 329).

#### B. Preparation of the support ring assembly

- (1) Using the hoisting bar - tool SC 66 - place the support ring assy. on build stand - tool SC 56 - so as it rests on the front face of the mounting ring.
- (2) Fitting supports (6-60)  
(Positions 2-16-18-20-34-36 in figure 502)  
and 2-4-18-20-22-36 in figure 502A).
  - (a) Position supports (6-60).
  - (b) Fit hexagon head bolts (6-50) from inside the ring and fit self-locking nuts (6-40) without tightening.
  - (c) Fix a retaining plate - tool SC 58 - to the flange of the support ring assembly and to each support with slave bolts.
  - (d) Tighten self-locking nuts (6-40) to the prescribed torque.
  - (e) Remove the slave bolts and the retaining plate - tool SC 58 -
- (3) Fitting the yokes (6-30)  
(Positions 1-3-5-7-9-11-13-15-17-19-21-23-25-27-29-31-33-35 in figure 502).
  - (a) Position yokes (6-30).

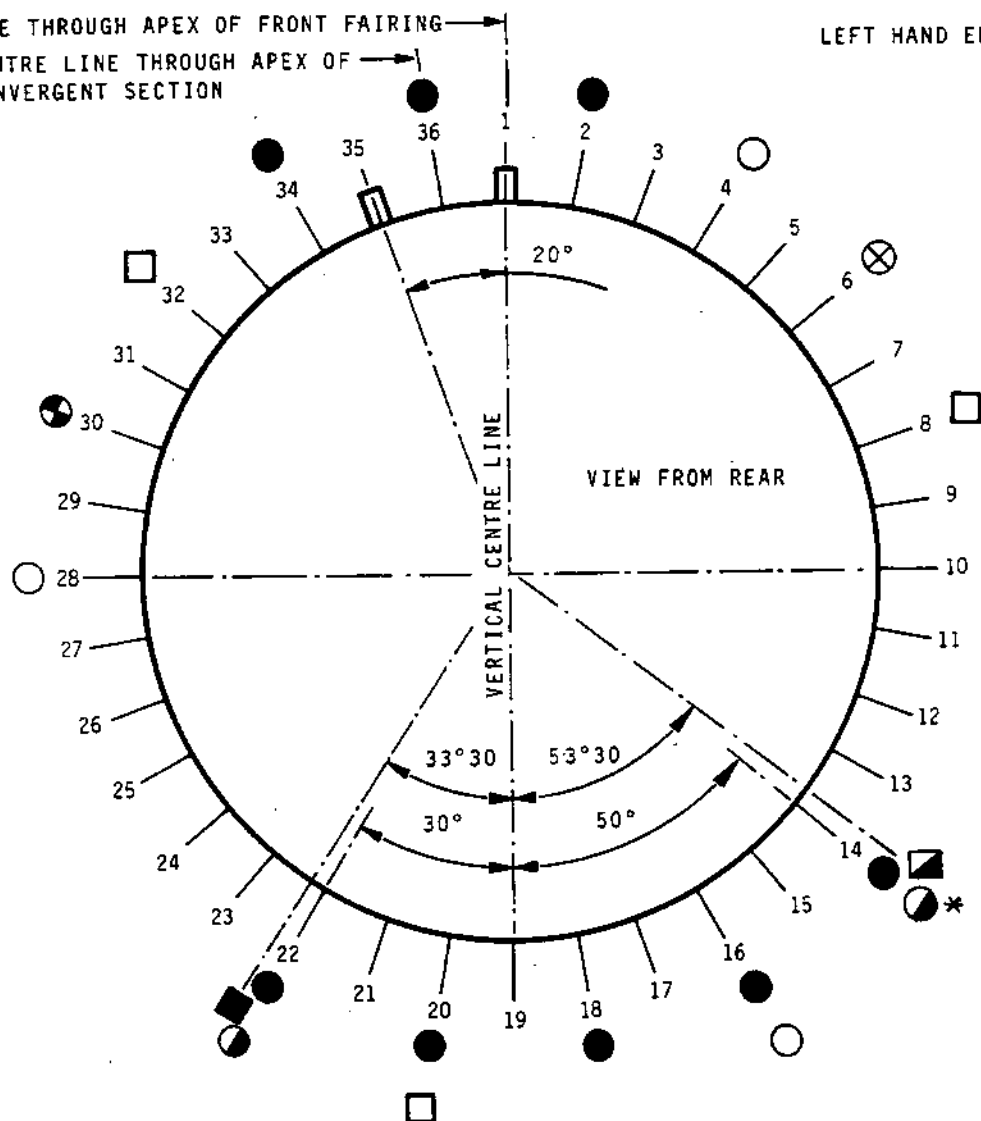
78-12-01

Page 503

Apr 30/93

CENTRE LINE THROUGH APEX OF FRONT FAIRING  
CENTRE LINE THROUGH APEX OF  
CONVERGENT SECTION

LEFT HAND ENGINE (1-3)



- |   |                    |         |
|---|--------------------|---------|
| ⊗ | PRESSURE TUBE      | (1-100) |
| ⊗ | BLANK              | (1-180) |
| ⊗ | ACTUATED PETAL     | (3-220) |
| ● | TWIN YOKES         | (4-50)  |
| ■ | MANIFOLD BLANKING  | (5-130) |
| ◼ | MANIFOLD SUPPLY    |         |
| ○ | SPHERICAL BEARINGS | (6-100) |
| □ | COVER PLATES       | (6-160) |

Position of Primary Nozzle Components  
Figure 502

\* Effectivity: from primary nozzle No. 301-217-003-0

78-12-01

Page 504  
Apr 30/93



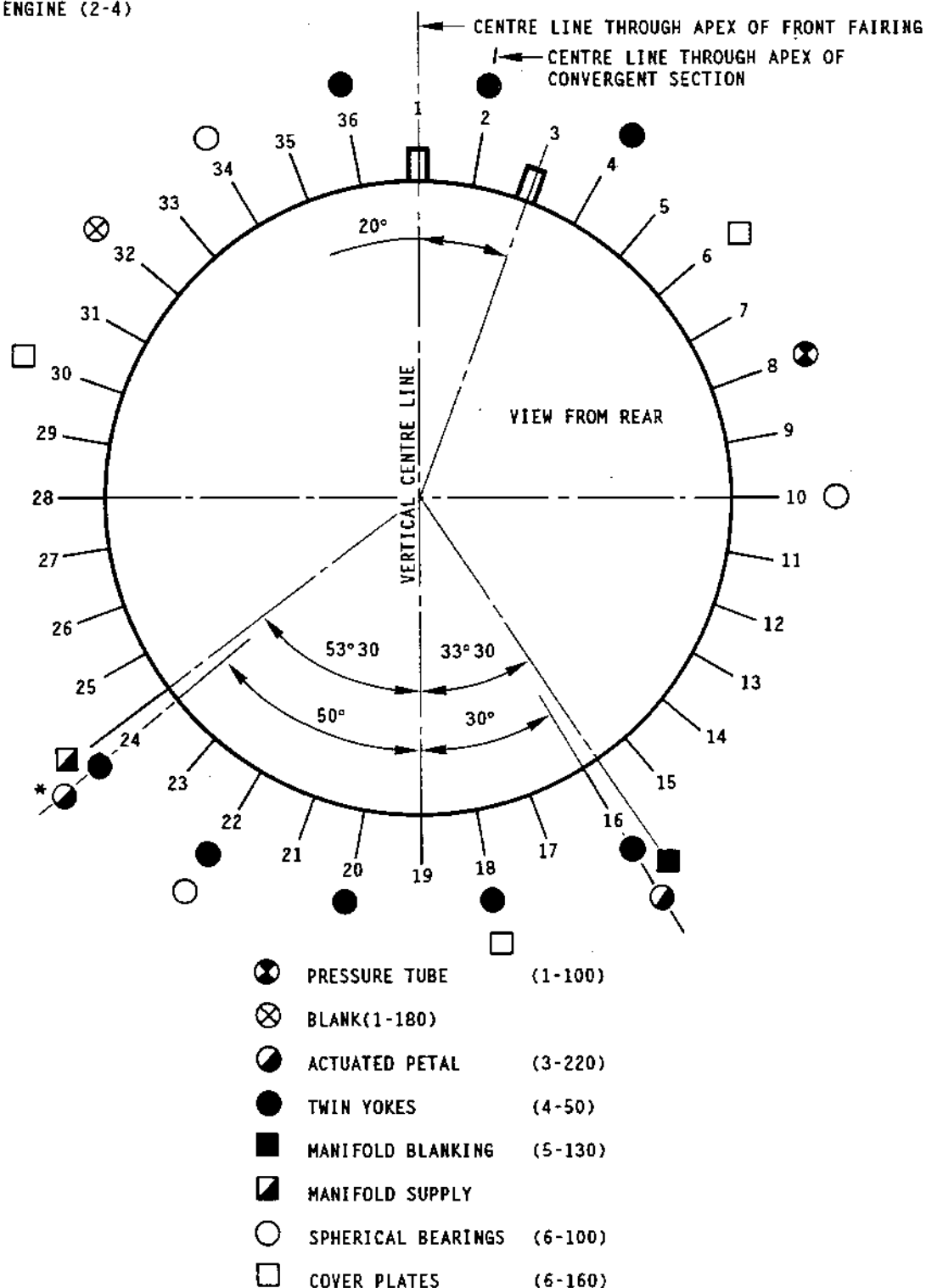
# OLYMPUS 593

MK.610-14-28

OVERHAUL



RIGHT HAND ENGINE (2-4)



Position of Primary Nozzle Components  
Figure 502A

\* Effectivity: from primary nozzle No. 301-217-003-0.

78-12-01

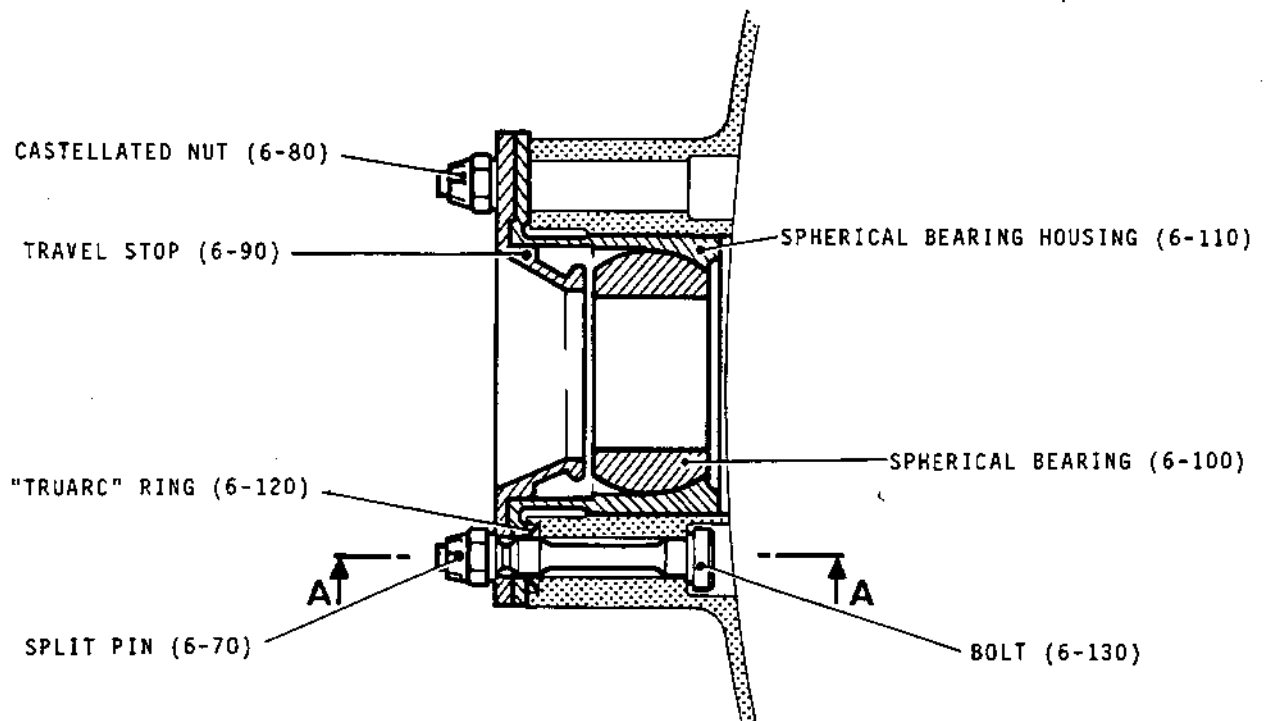
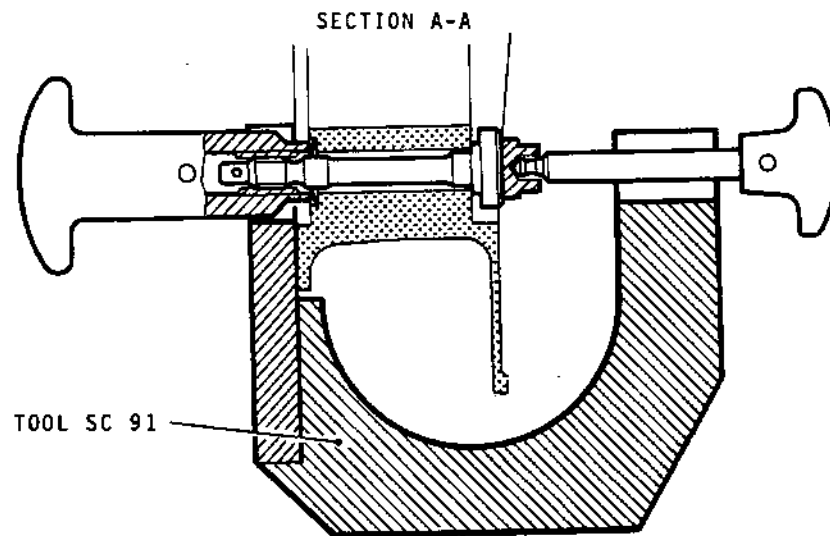
- (b) Fit hexagon head bolts (6-20) from inside the support ring assembly and fit self locking nuts (6-10) without tightening.
  - (c) Fix each yoke (6-30) to the rear flange of the support ring assembly with slave bolts.
  - (d) Tighten the self locking nuts (6-10) to the prescribed torque.
  - (e) Remove the slave bolts.
- (4) Assembly of spherical bearings (6-100) (see figure 503).  
(Positions 4-16-28 in figure 502, and 10-22-34 in figure 502A).
- (a) Fit bolts (6-130) from inside the support ring assembly.
  - (b) Fit a "truarc" ring (6-120) to each bolt tool SC 91 (see figure 503).
- NOTE : Take care that the "truarc" ring is fitted the right way round.
- (c) Position the spherical bearing housings (6-110) completed with their bearings (6-100).
- ATTENTION : EACH BEARING HOUSING IS MATCHED TO A SPHERICAL BEARING. DO NOT MIX THEM.
- (d) Position the travel stops (6-90) and fit castellated nuts (6-80).
  - (e) Tighten the nuts to the prescribed torque and fit split pins (6-70) as per "Standard Practices" 70-70-50.
- (5) Inversion of the support ring assembly.
- (a) Fit the hoisting/swinging device - tool SC 24 - to the mounting ring section of the support ring assy.
  - (b) Using a hoist and lifting beam - tool SC 210 - lift the support ring assembly, invert it and lower it on the rear face of the mounting ring section on the build stand-tool SC 56.
  - (c) Remove the lifting equipment - tools SC 24 and SC 210.
- (6) Fitting the front nozzle fairing (5-10).
- (a) Offer up the front fairing (5-10) to the front flange of the support ring assembly.



OLYMPUS 593

MK.610-14-28

OVERHAUL



Spherical Bearing Assembly  
Figure 503

78-12-01

Page 506  
Dec 30/74





OLYMPUS 593

MK.610-14-28

OVERHAUL

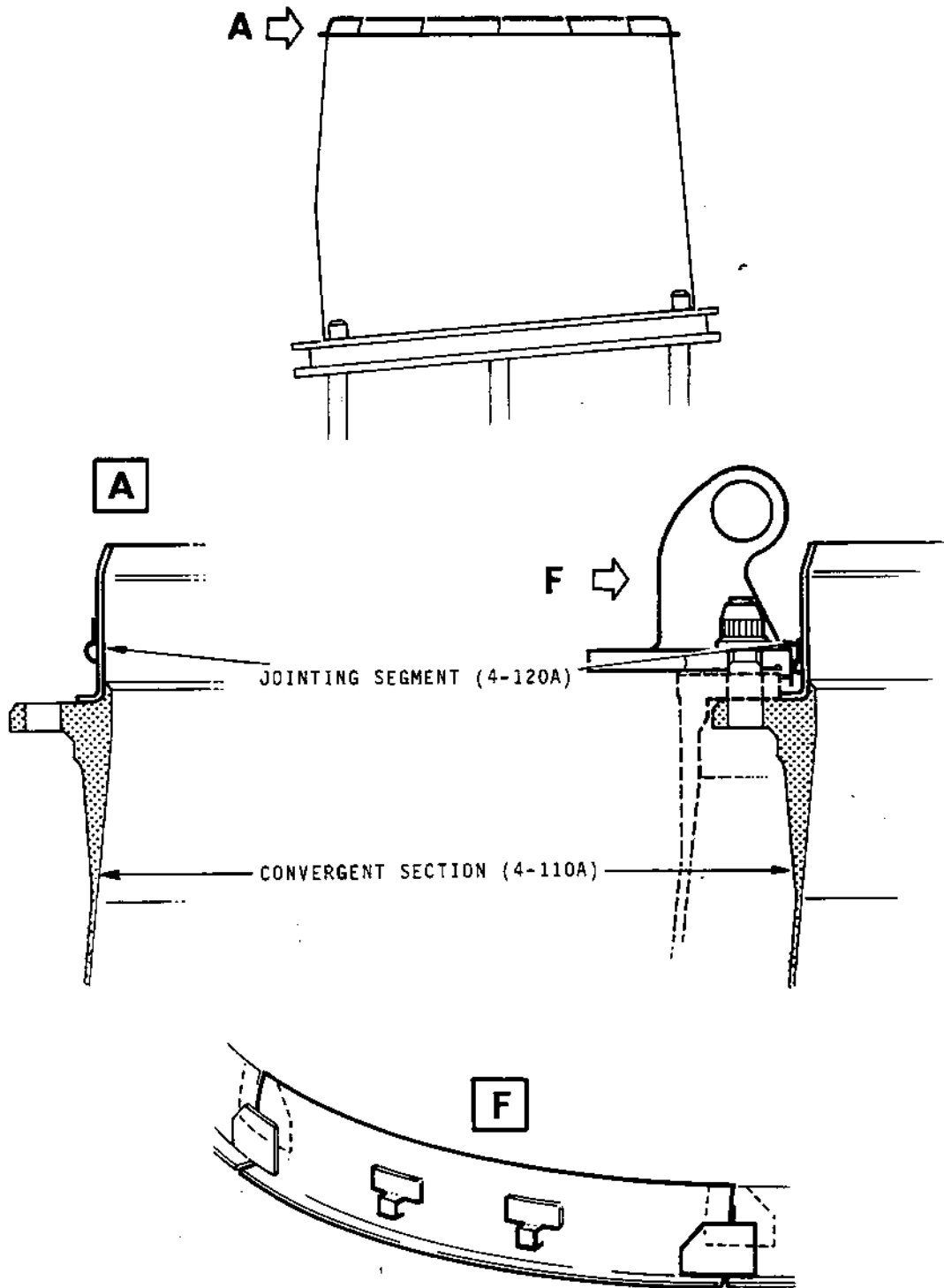


- (b) Fit bush (5-50) in position 1 of figure 502.  
NOTE : The bush (5-50) is placed on the widest part of the front fairing (Identity mark H is engraved on the eyelet).
- (c) Secure the dowel with 12 point head bolts (5-40).
- (d) Fit dowels (5-30) and secure with 12 point head bolts (5-20).
- (e) Tighten the bolts to the prescribed torque.
- (7) Fitting support assemblies (5-150).
  - (a) Fit support assemblies (5-150) on the front face of the mounting section.
  - (b) Fit 12 point head bolts (5-140) from inside the mounting ring.  
NOTE : The tightening of bolts (5-140) shall be carried out on a later operation.
- (8) Fitting the nozzle closing manifold (5-90).
  - (a) Fit the support assemblies (5-80) to the manifold with hexagon head bolts (5-70).
  - (b) Position the manifold, thus assembled, to the support ring assembly.  
NOTE : Ensure that the inlets to the manifold are positioned as shown on figure 502.
  - (c) Fit support brackets (5-80) to support assemblies (5-150) with 12 point head bolts (5-60).
  - (d) Tighten bolts (5-60), then (5-70) to the prescribed torque values.
  - (e) Lock bolts (5-70) with 0,8 mm (0.031 in.) diameter locking wire (NC 15Fe).
  - (f) Fit blank (5-130) and connecting nut (5-120) to the manifold (on the left hand side, view from rear).
  - (g) Tighten the connecting nut to the prescribed torque - tool SC 31.
- C. Preparation of the convergent section (4-110).
  - (1) Lubricate the front flange of the convergent section (4-110) and the outer surface of jointing segments (4-120) with anti-seizing graphite grease (P189).

78-12-01

Page 507

Apr 30/93



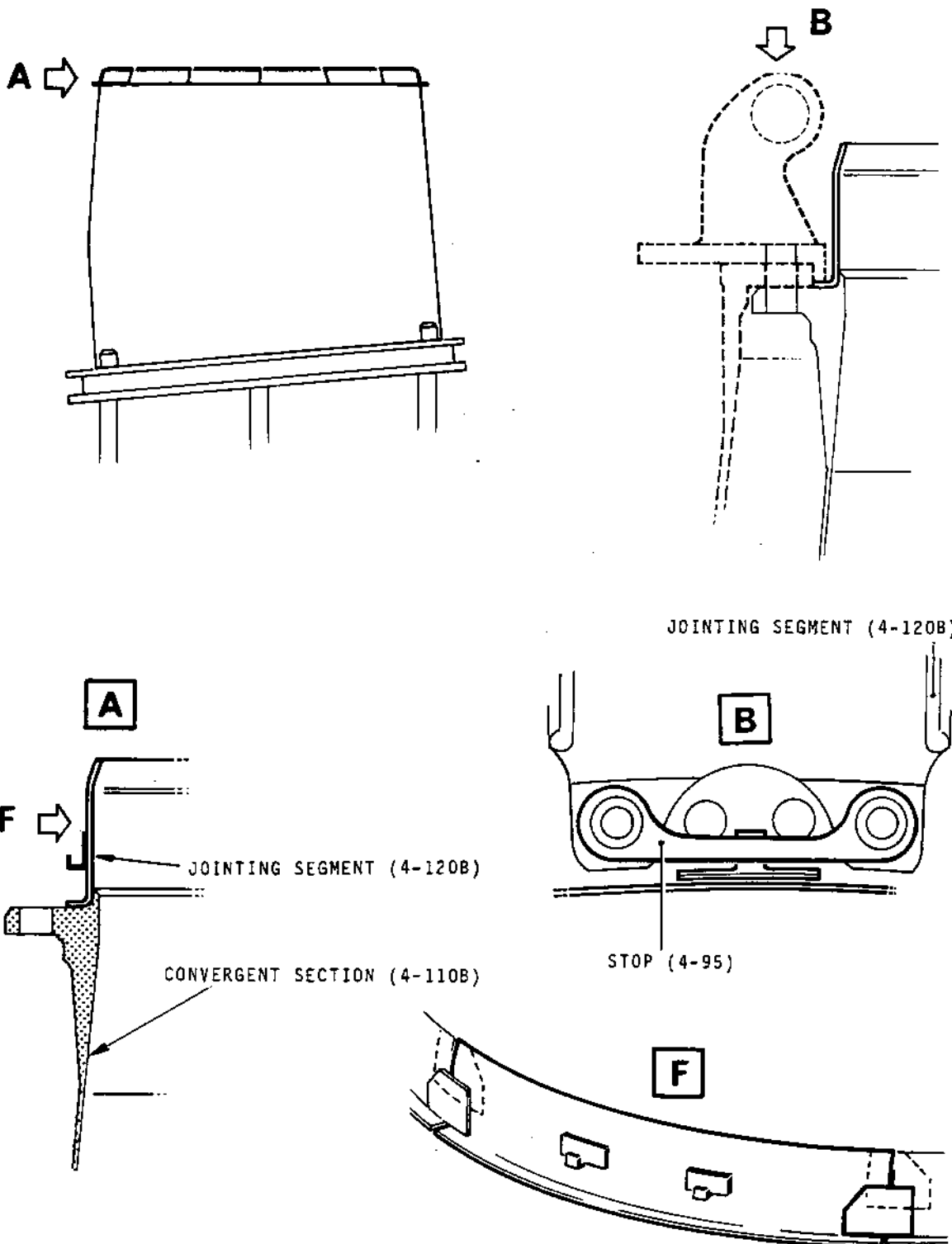
Position of Jointing Segments on the Convergent Section  
Figure 504



OLYMPUS 593

MK.610-14-28

OVERHAUL



Position of Jointing Segments on the Convergent Section  
Figure 504A



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Place the convergent section on its front flange on the build base - tool SC 59 - and clamp it.  
Use lifting bar - tool SC 66 -
- (3) Fit joint segments (4-120) to the rear flange of the convergent section (see figure 504).

D. Assembly of the support ring assembly to the convergent section.

CAUTION : HOLD HEAD OF BOLTS (4-20, 70, 100) WHILST TIGHTENING THE ASSEMBLY SO AS TO AVOID ANY ROTATION WHICH WOULD BE DETRIMENTAL TO THE CONVERGENT SECTION.

- (1) Fit the hoisting and swinging device - tool SC 24 - to the mounting ring section of the support ring assembly.
- (2) Using the hoist and lifting beam - tool SC 210 - lift the support ring assembly, invert it, and position it on the convergent section.
- (3) Align the fool-proofing hole of the support ring assembly with the fool-proofing peg on the convergent, and enter the one in the other (position 35 in figure 502 and position 1 in figure 502A).
- (4) Check the position of the jointing segments (4-120).
- (5) Remove tools - SC 24 and SC 210 - .
- (6) Secure the support ring assembly to the convergent section.
  - (a) With special pliers - tool SC 60 - enter bolts (4-100) via the holes in the support ring assembly at the yoke (6-30) positions.
  - (b) Fit self locking nuts (4-90).
- (7) Fitting twin yokes (4-50).  
(Positions 2-14-16-18-20-22-34-36 in figure 502 and 2-4-16-18-20-22-24-36 in figure 502A).
  - (a) With special pliers - tool SC 60 - enter bolts (4-20) via the holes in the support ring assembly.
  - (b) Position the twin yokes (4-50) and fit self - locking nuts (4-10).



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Place the convergent section on its front flange on the build base - tool SC 59 - and clamp it.  
Use lifting bar - tool SC 66 -
- (3) Fit joint segments (4-120) to the rear flange of the convergent section (see figure 504).

D. Assembly of the support ring assembly to the convergent section

CAUTION : MAINTAIN BOLT (4-20, 70, 100) HEADS IN POSITION DURING TIGHTENING TO AVOID ANY ROTATION THAT COULD DAMAGE THE CONVERGENT SECTION.

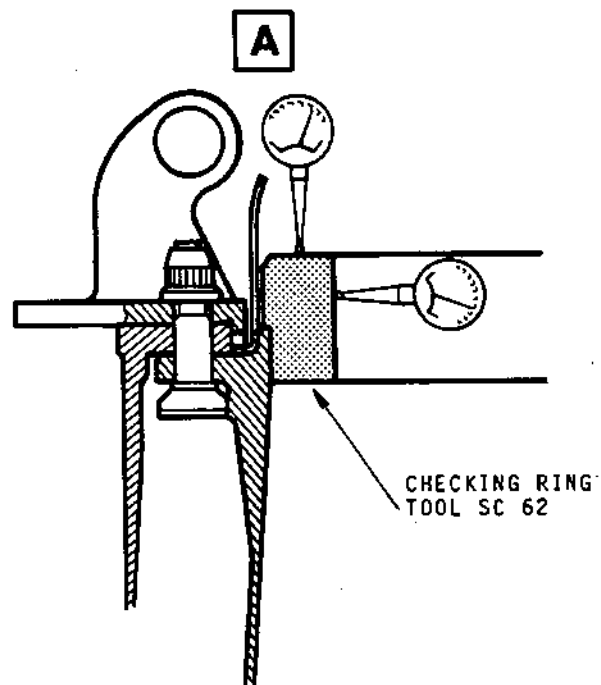
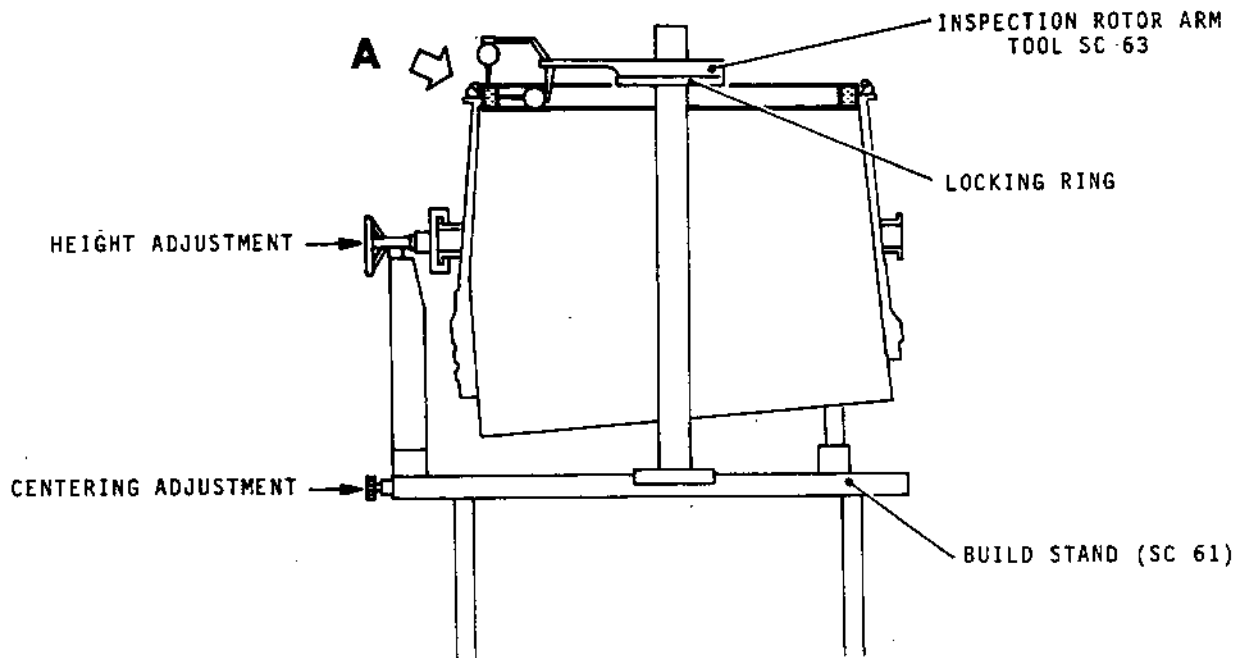
- (1) Fit the hoisting and swinging device - tool SC 24 - to the mounting ring section of the support ring assembly.
- (2) Using a hoist and lifting beam - tool SC 210 - lift the support ring assembly, invert it and position it on the convergent section.
- (3) Align the fool-proofing hole of the convergent assembly with the fool-proofing peg on the support ring and enter the one in the other (position 35 in figure 502 and position 1 in figure 502A).
- (4) Check the position of the jointing segments (4-120B)
- (5) Remove tools - SC 24 and SC 210 -
- (6) Secure the support ring assembly to the convergent section.
  - (a) With positioning tool - SC 60A - enter bolts (4-100B) via the holes in the support ring assembly at the yoke (6-30B) positions.
  - (b) Position the jointing segments (4-120B) and hold them in position using stops (4-95) (see figure 504A).
  - (c) Install self-locking nuts (4-90).
- (7) Fitting twin yokes (4-50).  
(Positions 2-14-16-18-20-22-34-36 in figure 502 and 2-4-16-18-20-22-24-36 in figure 502A).
  - (a) With special pliers - tool SC 60 - enter bolts (4-20) via the holes in the support ring assembly.
  - (b) Position the twin yokes (4-50) and fit self-locking nuts (4-10).



OLYMPUS 593

MK.610-14-28

OVERHAUL



Positioning - Adjustment on the Build Stand  
Figure 505

78-12-01

Page 510  
Dec 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (c) Fit hexagonal head bolts (4-40) and self-locking nuts (4-30), securing twin yokes (4-50) to supports (6-60) (Positions 2-16-18-20-34-36 in figure 502 and 2-4-18-20-22-36 in figure 502A).
- (8) Fitting twin yokes (4-80).  
(Positions 4-6-8-10-12-24-26-28-30-32 in figure 502 and 6-8-10-12-14-26-28-30-32-34 in figure 502A).
  - (a) Using clamp - tool SC 60 - enter bolts (4-70) via the holes in the support ring assembly.
  - (b) Position twin yokes (4-80) and fit self-locking nuts (4-60).
- (9) Tighten self locking-nuts (4-10) (4-30) (4-60) and (4-90) to the prescribed torques.

E. Assembly of petal actuating linkage.

ATTENTION : THE HEADS OF PINS AND BOLTS MUST BE TOWARDS THE TOP OF THE NOZZLE EXCEPT :  
- THE PETAL REAR PINS (3-130),  
- THE TWIN YOKES TO FLAPS CONNECTING PINS (3-210) AND (3-260),  
- THE JACK TO SUPPORT RING ASSEMBLY CONNECTING PINS (1-60).

NOTE : During build, do not omit to coat the rubbing surfaces of petals (3-30), (3-220) and (3-270) with anti-seizing graphite grease (P189).

- (1) Installing the support ring/convergent section on the build stand - tool SC 61 - (see figure 505).
  - (a) Fit the hoisting/swinging device - tool SC 24 - to the mounting ring section of the support ring assembly.
  - (b) Using a hoist and lifting beam - tool SC 210 - remove the assembly from the build stand - tool SC 59 - after having unclamped the convergent section.
  - (c) Lower the assembly onto build stand - tool SC 61 - and secure it by the three adjustable mountings at the spherical bearing cover plate positions (Positions 8, 20 and 32 in figure 502 and 6-18-30 in figure 502A).
  - (d) Remove the lifting equipment - tools SC 24 and SC 210 - .

78-12-01



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (e) Position the inspection ring - tool SC 62 - in contact with the rear flange of the convergent section (see figure 505).
  - (f) Using inspection rotor arm - tool SC 63 - check and adjust the concentricity and flatness of the rear flange of the convergent section.
  - (g) Remove the inspection rotor arm - tool SC 63 - and checking ring - tool SC 62 -
  - (h) Fit the adjusting equipment - tool SC 64 - to the build stand - SC 61 - shaft using lifting beam - tool SC 65 -
- (2) Fitting actuated petal (3-220)  
(Position 22 in figure 502 and 16 in figure 502A).
- (a) Position the actuated petal (3-220) on the twin yoke (4-50).
  - (b) Enter pin (3-210) from inside the twin yoke (4-50) and fit lever (3-230). The head of the pin is to be toward the top of the nozzle.
  - (c) Fit the grooved washer (3-200) and the U shaped pin (3-190).
  - (d) Lock by bending the two ends of the pin rearwards.
- (3) Fitting the actuated petals (3-270)  
(Positions 2-4-6-8-10-12-14-16-18-20-24-26-28-30-32-34-36 in figure 502 and 2-4-6-8-10-12-14-18-20-22-24-26-28-30-32-34-36 in figure 502A).
- (a) Position the actuated petal (3-270) on the twin yoke.
  - (b) Enter pins (3-260) on either side of the twin yoke.
  - (c) Fit the grooved washers (3-250) and U shaped pins (3-240).
  - (d) Lock by bending the two ends of the pin (3-240) rearwards.
  - (e) Repeat operations (a), (b), (c) and (d) for each of the actuated petals (3-270).





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (e) Position the inspection ring - tool SC 62 - in contact with the rear flange of the convergent section (see figure 505).
- (f) Using inspection rotor arm - tool SC 63 - check and adjust the concentricity and flatness of the rear flange of the convergent section.
- (g) Remove the inspection rotor arm - tool SC 63 - and checking ring - tool SC 62 -
- (h) Fit the adjusting equipment - tool SC 64 - to the build stand - SC 61 - shaft using lifting beam - tool SC 65 -
- (2) Fitting actuated petals (3-220B)  
(Positions 14-22 in figure 502, and 16-24 in figure 502A).
  - (a) Position the actuated petal (3-220B) on the twin yoke (4-50).
  - (b) Enter pin (3-210B) from inside the twin yoke (4-50) and fit lever (3-230B). The head of the pin is to be toward the top of the nozzle.
  - (c) Fit the grooved washer (3-200B) and the U shaped pin (3-190B).
  - (d) Lock by bending the two ends of the pin rearwards.
- (3) Fitting the actuated petals (3-270B)  
(Positions 2-4-6-8-10-12-16-18-20-24-26-28-30-32-34-36 in figure 502 and 2-4-6-8-10-12-14-18-20-22-26-28-30-32-34-36 in figure 502A).
  - (a) Position the actuated petal (3-270) on the twin yoke.
  - (b) Enter pins (3-260) on either side of the twin yoke.
  - (c) Fit the grooved washers (3-250) and U shaped pins (3-240).
  - (d) Lock by bending the two ends of the pin (3-240) rearwards.
  - (e) Repeat operations (a), (b), (c) and (d) for each of the actuated petals (3-270).

Effectivity : From primary nozzle

No. 301-217-003-0

78-12-01

Pages 512A/512B

Apr 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL

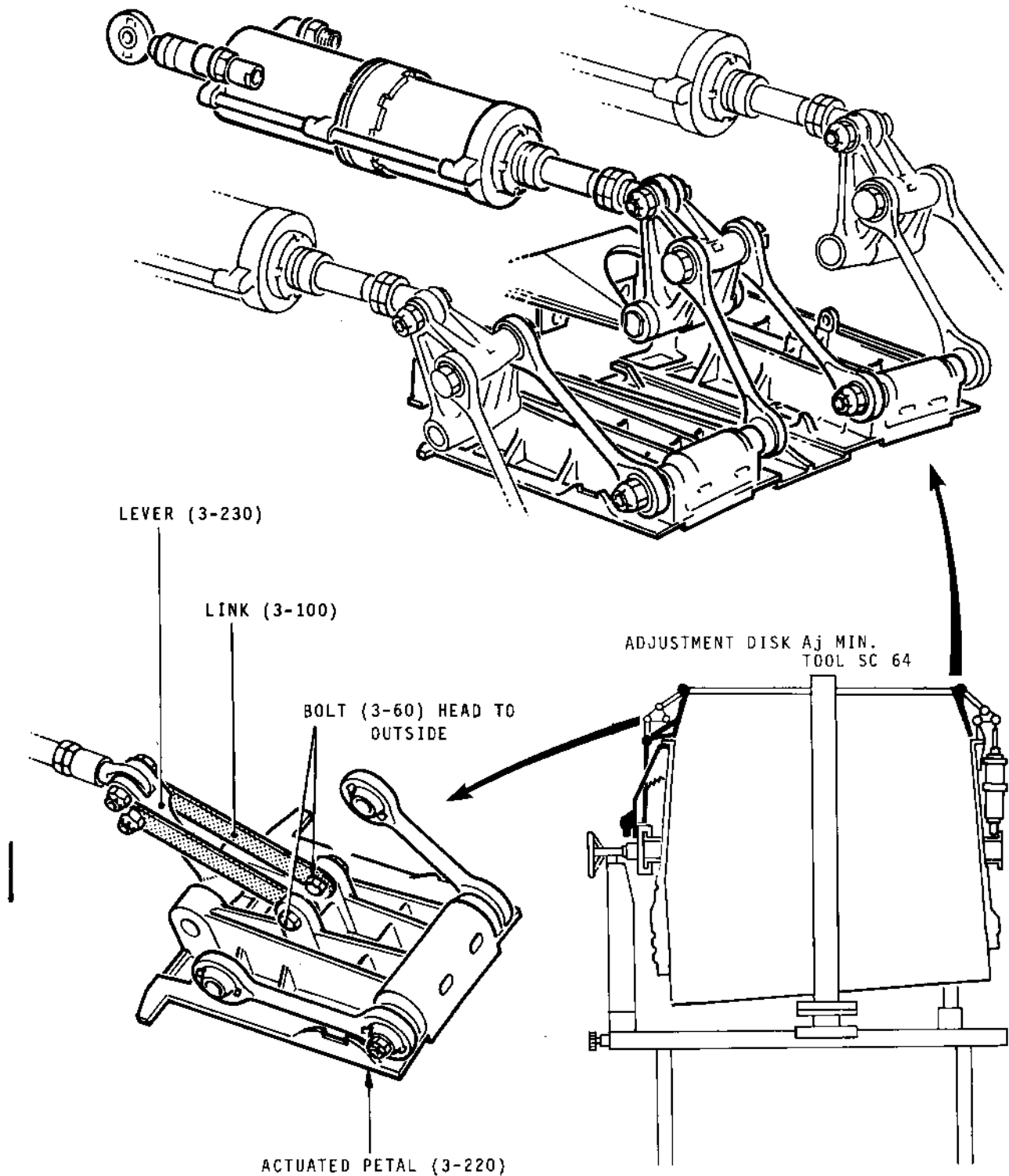


- (4) Fitting the follower petals (3-30)
  - (a) Position a follower petal (3-30) between each actuated petal.
  - (b) Secure each follower petal (3-30) to the adjacent actuated petals by two stops (3-20), retained by hexagon head bolts (3-10).
  - (c) Tighten the bolts (3-10) to the prescribed torque and lock with 0,8 mm (0.315 in.) dia. locking wire (NC15Fe).
  - (d) Check clearance "X" between the follower petals (3-30) and the joint segments (4-120).
- (5) Fitting levers (3-320)
  - (a) To each yoke (6-30), fit a lever (3-320).
  - (b) Secure each lever (3-320) with a pin (3-310) (head toward the top of the nozzle). Fit a flat washer (3-300) and a castellated nut (3-290).
  - (c) Tighten each nut (3-290) to the minimum prescribed torque and fit a split pin (3-280) as per Standard Practices 70-70-50.
- (6) Fitting parts associated with the actuated petals (3-220), see figure 506.
  - (a) Position the links (3-100) on the actuated petal (3-220).
  - (b) Secure each link (3-100) with a hexagon head bolt (3-60) and a castellated nut (3-50).
  - (c) Tighten each nut (3-50) to the minimum prescribed torque and lock with a split pin (3-40) as per Standard Practices 70-70-50.
  - (d) Secure the links (3-100) to lever (3-230) with a hexagon head bolt (3-90) (head toward the top of the nozzle) and a castellated nut (3-80).
  - (e) Tighten the nut to the minimum prescribed torque and lock with a split pin (3-70) as per Standard Practices 70-70-50.
- (7) Assembly of links (3-170)
  - (a) Fit links (3-170) with the spherical bearings (3-180).



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Assembly Nozzle Area Detection Petal  
Figure 506

78-12-01

Page 514  
May 31/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



ATTENTION : THE LINKS AND SPHERICAL BEARINGS ARE  
MATCHED. DO NOT MIX THEM.

- (b) Fit two assembled links (3-170) by their smaller ends, to each of the levers (3-320). Retain with a pin (3-160) (head toward the top of the nozzle) and a castellated nut (3-150).
- (c) Tighten each nut (3-150) to the minimum prescribed torque and lock with a split pin (3-140) using Standard Practices 70-70-50.
- (d) Connect the other end of the links (3-170) to the actuated petals by a pin (3-130), entered from the left in the build position (ie. the head to the right, viewed from rear).
- (e) Secure each pin (3-130) by a castellated nut (3-120).
- (f) Tighten to the minimum prescribed torque and lock with a split pin (3-110) as per Standard Practices 70-70-50.
- (g) Check that all the petals are in contact with the setting disk - tool SC 64 -

F. Assembly of the jacks (1-30)

NOTE : Lubricate the supply tubes (1-10) connections with anti-seizing graphite grease (P189).

CAUTION : CARRY OUT NO LUBRICATION OF THE JACKS.

- (1) For each jack, position the front end fitting, with its spherical bearing, in the mounting ring of the support ring assembly.
- (2) Enter pin (1-60) from the left in the build position (i.e. the head on the right, viewed from the rear), fit grooved washer (1-50) and lock with U shaped pin (1-40).
- (3) Position the supply tubes (1-10). The connecting nuts are to be fitted and tightened to the torque prescribed in Standard Practices 70-70-30 - tool SC 30 -
- (4) Tighten the 12 point head bolts (5-140) to the prescribed torque.

NOTE : For reference only, these bolts retain the manifold supports (5-150) to the mounting ring (see NOTE B. (8) (b) page 507)

- (5) For each jack, position the rear end fitting, with its spherical bearing (with the rod in the deployed position on lever yoke (3-320)).

78-12-01

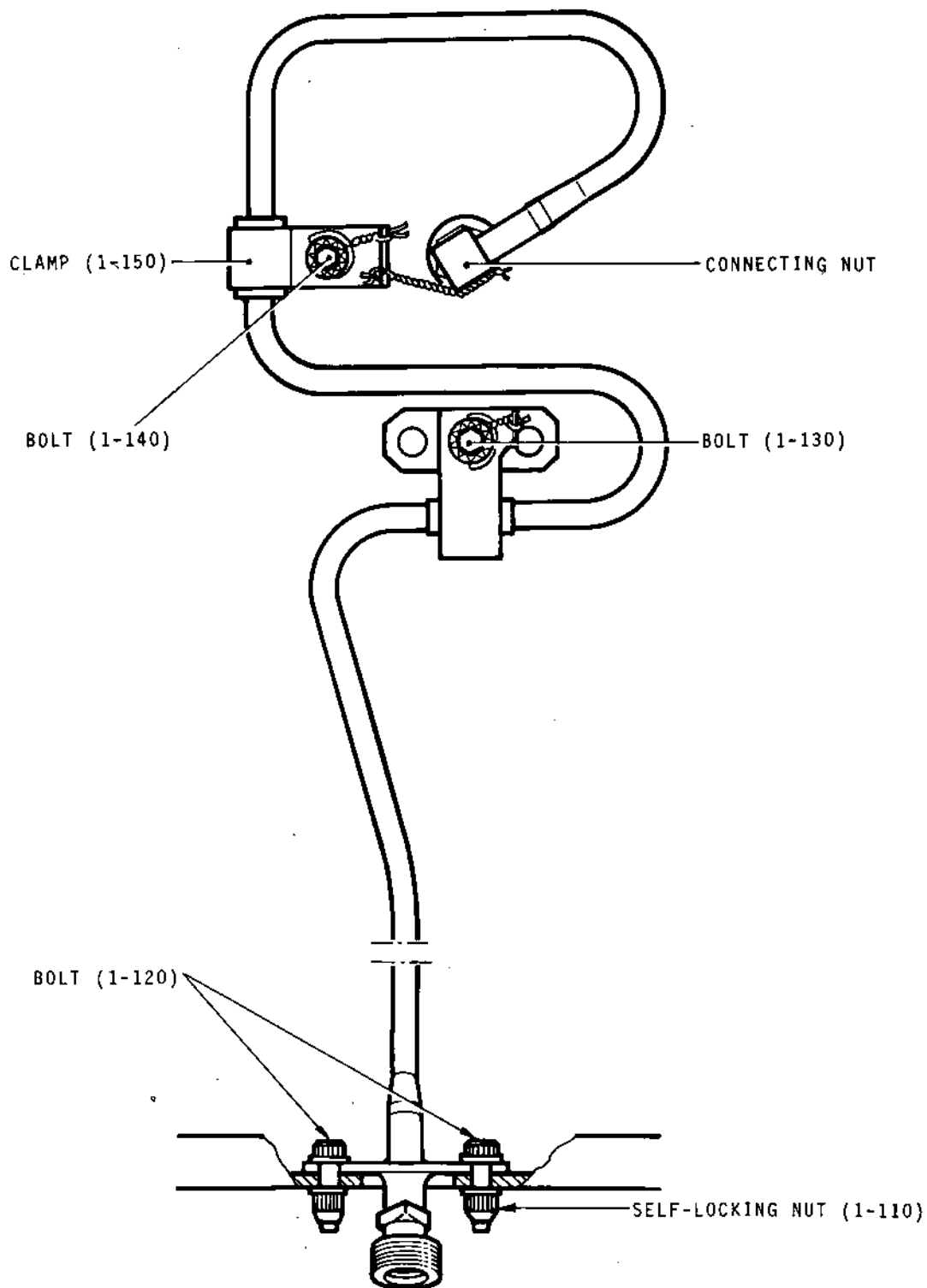
Page 515  
Oct 31/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



Assembly of Pressure Tapping Tube  
Figure 507

78-12-01

Page 516  
Dec 30/74



OLYMPUS 593

MK.610-14-28

OVERHAUL



position) to the yoke of lever (3-320).

Tighten or slacken the end fitting by 1/2 turn to align the end fitting and lever bores (a finer adjustment may be obtained by the jack rod).

NOTE : During adjustment, ensure that the petals are always in contact with the setting disk  
- tool SC 64 -

- (6) Fit pin (1-90) (head to the top of the nozzle) and castellated nut (1-80).
- (7) Tighten to the minimum prescribed torque and lock with a split pin (1-70) as per Standard Practices 70-70-50.
- (8) Tighten the jack rear end fitting lock nut to the prescribed torque.

G. Assembly of the pressure tapping (see fig. 507)  
(Position 30 in figure 502 and position 8 in figure 502A).

- (1) Position pressure tapping tube (1-100) and screw the connection nut onto the convergent section.
- (2) Secure the other end of the tube to the mounting ring on the support ring by 12 point head bolts (1-120) and self-locking nuts (1-110).
- (3) Fitting the tube (1-100) clipping points.

(a) 12 point head bolts (1-130).

(b) Clamp (1-150) retained by a 12 point head bolt (1-140).

- (4) Tighten bolts (1-120), (1-130) and (1-140) and the connecting nut to the prescribed torques.

NOTE : Check that the tightening of these bolts does not strain the tube.

- (5) Lock bolts (1-130), (1-140) and the connecting nut with 0,8 mm (0.031 in.) dia. locking wire (NC15Fe).
- (6) Fit the storage blanking plug to the tube.

H. Fitting blank (1-180) (see fig. 508)  
(Position 6 in figure 502 and position 32 in figure 502A).

- (1) Screw the blank (1-180) onto the convergent section and tighten to prescribed torque.
- (2) Fix the locking plate (1-200) with the 12 point head bolts (1-190) and tighten to the prescribed torque.

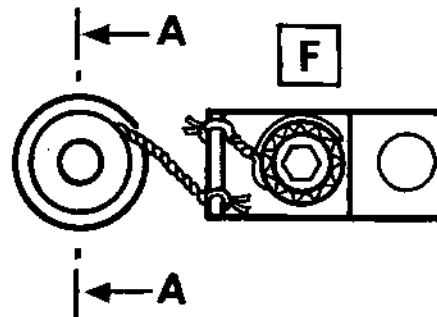
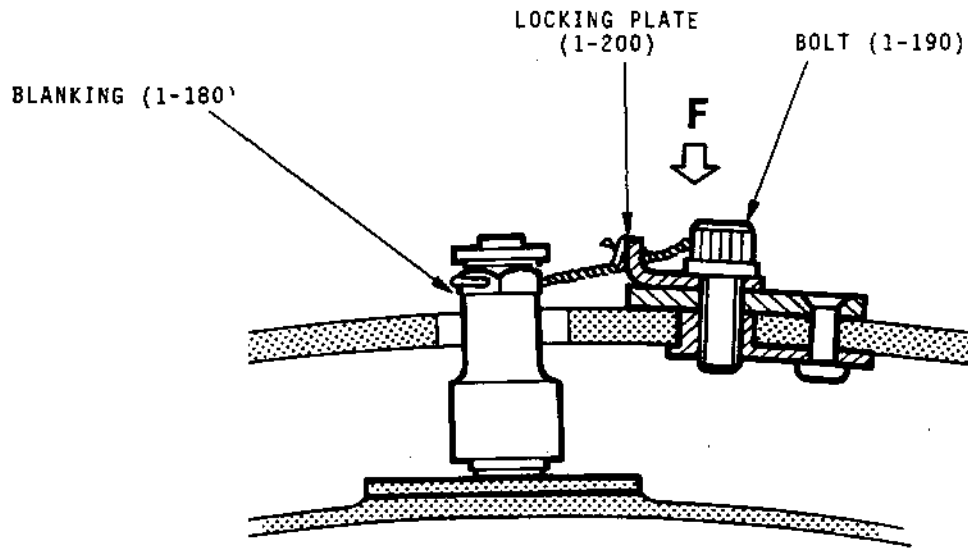
78-12-01

Page 517  
Apr 30/93

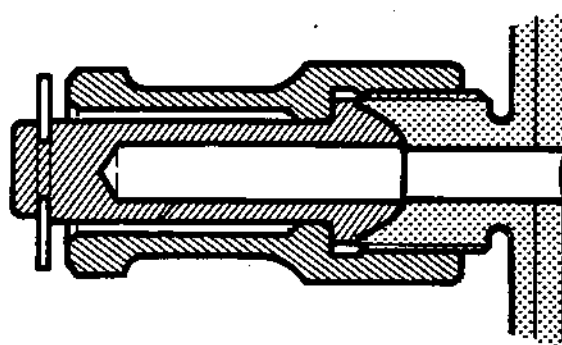


OLYMPUS 593

MK.610-14-28  
OVERHAUL



SECTION A-A



Assembly of Blanking Parts  
Figure 508

78-12-01

Page 518  
Dec 30/74

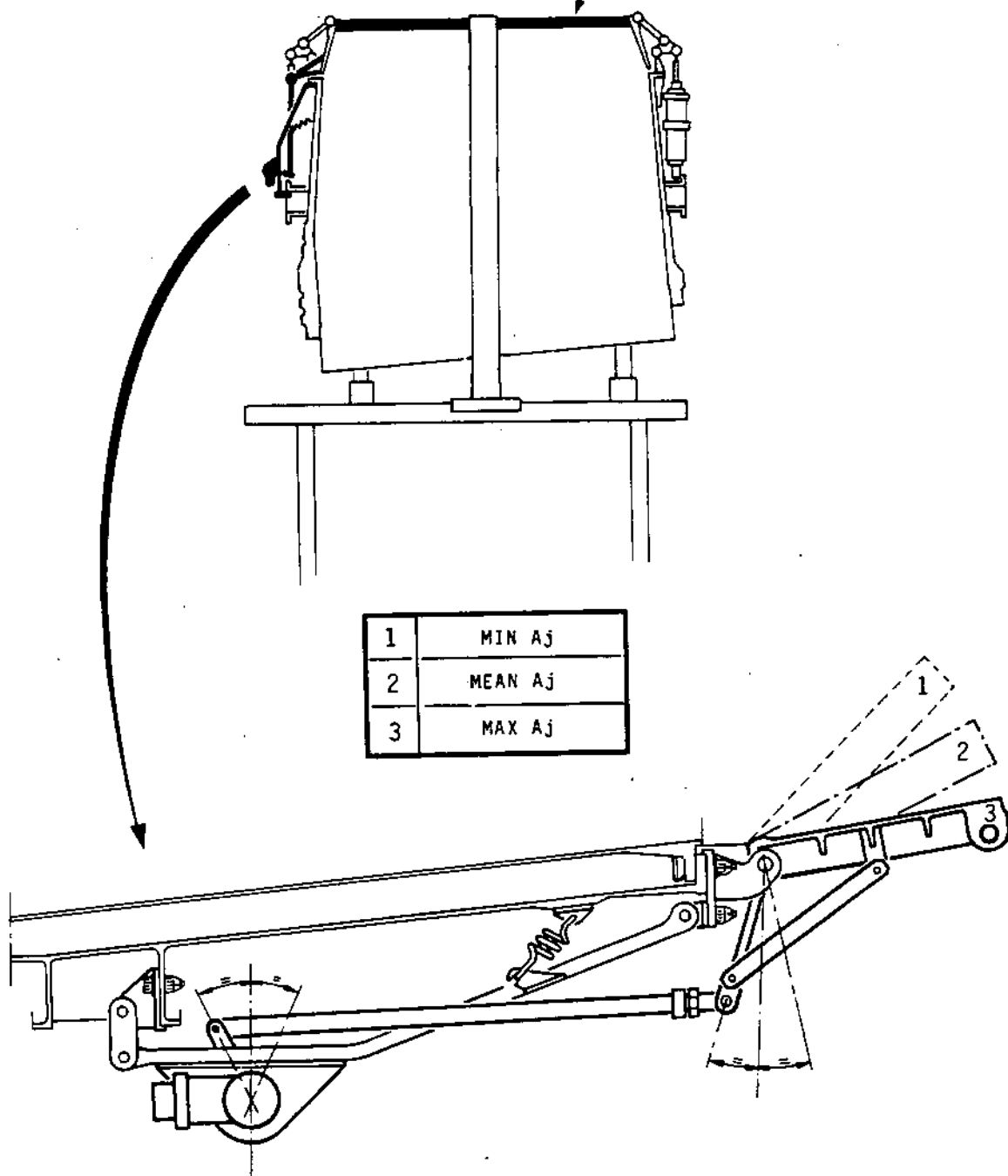


OLYMPUS 593

MK.610-14-28  
OVERHAUL



MEAN AJ SETTING DISC  
TOOL SC 95



Assembly of Nozzle Area Transducer  
Figure 509

78-12-01

Page 519  
Dec 30/74





OLYMPUS 593

MK.610-14-28

OVERHAUL



- (3) Lock bolt (1-190) and the blank (1-180) with 0,8 mm (0.031 in.) dia. locking wire (NC15Fe).
- (4) Fitting blanking covers (6-160).  
(Positions 8-20-32 in figure 502 and 6-18-30 in figure 502A).

- (a) Enter bolts (6-180) from inside the support ring assembly.
- (b) Fit a "Truarc" ring (6-170) to each bolt - tool SC 91 -

NOTE : Take care to fit the "Truarc" ring the right way round.

- (c) Position the blanking covers (6-160) and fit castellated nuts (6-150).
- (d) Tighten the nuts to the minimum prescribed torque and fit split pins (6-140) as per Standard Practices 70-70-50.

J. Assembly of the nozzle area indication system (fig. 509)  
(Position 22 in figure 502, and position 16 in figure 502A).

NOTE : Fit the pins with their head toward the top of the nozzle (i.e. enter them from the left during assembly).

- (1) Fitting the yoke (2-300).
  - (a) Secure the yoke (2-300) to the twin yoke (4-50) using hexagon head bolts (2-290) and self-locking nuts (2-280).
  - (b) Tighten the nuts to the prescribed torque.
- (2) Fitting the yoke (2-270)
  - (a) Fit the yoke (2-270) to the inside of the mounting ring of the support ring assembly, with hexagon head bolts (2-260), flat washers (2-250) and self locking nuts (2-240).
  - (b) Tighten the nuts to the prescribed torque.
- (3) Fitting connecting yoke (2-230)
  - (a) Secure the connecting yoke (2-230) to the yoke (2-270) by a pin (2-220).
  - (b) Fit the grooved washer (2-210) and lock with U shaped pin (2-200).

78-12-01

Page 520  
Apr 30/93



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



- (4) Fitting the support assembly (2-120)
  - (a) Position the yoke of the support assembly (2-120) on the connecting yoke (2-230).
  - (b) Secure with pin (2-160) and grooved washer (2-150) locked by the U shaped pin (2-140).
  - (c) Secure the lower part of the support assembly (2-120) to the yoke (2-300) by a pin (2-190) and a grooved washer (2-180) locked by a U shaped pin (2-170).
  - (d) Fit the spring (2-130) which connects the support assembly (2-120) to the support ring assembly using the spring tensioning device - tool SC 191 -
- (5) Fitting the nozzle transducer (2-90)
  - (a) Secure the nozzle transducer (2-90) to the support assembly (2-120), along with the protective plate (2-110) by 12 point head bolts (2-100).
  - (b) Tighten the bolts to the prescribed torque.
- (6) Fitting the detection system actuating lever (2-60)
  - (a) Fit the threaded end fitting (2-70) and hexagonal nut (2-80) to the link (2-60).

NOTE : Nut (2-80) is to be tightened only after the adjustment of the detection system.
  - (b) Slide the link (2-60) onto the transducer spindle, fit the grooved washer (2-20) and lock temporarily with U-shaped pin (2-10).
  - (c) Set the transducer to the "electrical-zero position" using dowel - tool SC 96 - .
  - (d) Set the nozzle area to "Mean Aj" using the adjustment disk - tool SC 95 - .
  - (e) With link (2-60) secured to the transducer, offer the other end up to the yoke on the lever (3-230) .
  - (f) Adjust the threaded endpiece (2-70) until the pin (2-50) can be freely engaged.
  - (g) Remove dowel - tool SC 96 - .
  - (h) Remove the link and locate it in position on rigging template - tool SC 248 - .
  - (j) Torque hex. nut (2-80) to the prescribed torque value and wire lock.

78-12-01



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (k) Remove the link from the rigging template and locate it in position on the transducer.
- (l) Fit the grooved washer (2-20) and lock using U-shaped pin (2-10).
- (m) Fit the pin (2-50), the grooved washer (2-40) and lock with pin (2-30).
- (n) Perform tests specified as from page 701.
- (p) Remove the primary nozzle from the assembly support stand - tool SC 61 - using the hoisting and swinging device - tool SC 24 - and lifting beam - tool SC 210 - and lower it on the storage stand - tool SC 218.

78-12-01

Page 522  
Dec 15/75

**OLYMPUS 593**MK.610-14-28  
OVERHAUL**FITS AND CLEARANCES****1. General****A. Layout**

- (1) The table of clearances gives the machining tolerances of parts in new condition and acceptable wear limits. The values are expressed in millimeters.

ITEM FIG.	IPL FIGURE ITEM	NOMINAL DIMENSION	TYPE	CLEARANCES		MAX LIMIT	CAT.	REMARKS SELECTIONS
				MIN	MAX			
1	2	3	4	5	6	7	8	9

- (2) The item numbers in column (1) by reference to the corresponding figure provide a means of locating the clearance or dimension to be measured.
- (3) The item numbers in column (2) identify the parts in the "Illustrated Parts List". (FIGURE + ITEM).
- (4) Column (3) gives the manufacturing dimensions of parts together with the machining tolerances.  
In the case of two parts which form an assembly the first one is always the male part.
- (5) The code letters in column (4) indicate the type of clearance.
- A denotes an axial clearance
  - D denotes a diametral clearance
  - L denotes a side clearance
- (6) Columns (5) and (6) give the clearance (symbol J) or the interference (symbol S) which result from the manufacturing tolerances.
- Column (9) is used to indicate that a smaller clearance than that resulting from the manufacturing tolerances is required. This reduced clearance is obtained by selective assembly of parts.

**78-12-01**Page 601  
Dec 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (7) The digits or letter in column (8) give the clearance category the definition of which is as follows :

- M - Check or adjustment to be carried out at each assembly
- 1 - Check to be systematically carried out.
- 2 - Check to be carried out if the condition of parts makes it necessary.
- 3 - Dimensions intended for use by Design Offices (not applicable in this document).
- 4 - Check to be systematically carried out on the equipments intended for ageing studies (Sampling)

B. Max. after wear (column 7)

- (1) The MAX. LIMITS are the maximum wear limits within which a part can be accepted for a further period of use.
- (2) Parts worn beyond these limits will be either repaired in accordance with the instructions given in chapter "REPAIR" or replaced as applicable.
- (3) Therefore the values given in this column will change as experience is gained with the repaired equipment or the equipment intended for ageing studies.
- (4) This kind of information may be entered in this column.

(a) Clearance

The maximum clearance or the minimum interference between two parts will be given only if they are matched parts. The distribution of this clearance on the male or female part is left to the discretion of the repairer.

(b) Dimension

In order to preserve interchangeability, the degree of permissible wear on male and female parts is given, thus ensuring a correct assembly at all times whatever the mating parts may be.

78-12-01

Page 602  
Dec 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## 2. Torque values

As torque is variable with respect to lubrication, we indicate in this paragraph both the torque and lubrication to comply with during assembly. Bolts, nuts... bear the I.P.L. references.

Bolts or nuts Fig. Item (I.P.L.)	Lubrication when assembly	Torque value
1-10	Lubricate thread of the two union nuts with anti-seizing graphite grease (P189)	0,7 daN.m (5.16 lbf.ft)
1-80	Lubricate thread with anti- seizing graphite grease (P189)	0,7 to 0,8 daN.m (5.16 to 5.90 lbf.ft)
1-100	Lubricate thread of union nut with anti-seizing graphite grease (P189)	1,8 to 2 daN.m (13.2 to 14.75 lbf.ft)
1-110	Lubricate thread with anti- seizing graphite grease (P189)	0,4 to 0,5 daN.m (2.95 to 3.68 lbf.ft)
1-130	Lubricate thread with anti- seizing graphite grease (P189)	0,95 to 1,05 daN.m (7 to 7.74 lbf.ft)
1-140	Lubricate thread with anti- seizing graphite grease (P189)	0,95 to 1,05 daN.m (7 to 7.74 lbf.ft)
1-180	Lubricate thread with anti- seizing graphite grease (P189)	1,8 to 2 daN.m (13.26 to 14.75 lbf.ft)
1-190	Lubricate thread with anti- seizing graphite grease (P189)	0,95 to 1,05 daN.m (7 to 7.74 lbf.ft)
2-80	Lubricate thread with anti- seizing graphite grease (P189)	0,6 to 0,8 daN.m (4.41 to 5.90 lbf.ft)
2-100	Lubricate thread with anti- seizing graphite grease (P189)	0,95 to 1,05 daN.m (7 to 7.74 lbf.ft)

PRINTED IN FRANCE

78-12-01

Page 603  
Oct 31/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



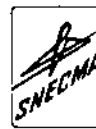
Bolts or nuts Fig. Item (I.P.L.)	Lubrication when assembly	Torque value
2-240	Lubricate thread with anti-seizing graphite grease (P189)	0,4 to 0,5 daN.m (2.95 to 3.68 lbf.ft)
2-280	Lubricate thread with anti-seizing graphite grease (P189)	0,4 to 0,5 daN.m (2.95 to 3.68 lbf.ft)
3-10	Lubricate thread with anti-seizing graphite grease (P189)	0,3 to 0,4 daN.m (2.21 to 2.95 lbf.ft)
3-50	Lubricate thread with anti-seizing graphite grease (P189)	0,09 to 0,11 daN.m (0.66 to 0.81 lbf.ft)
3-80	Lubricate thread with anti-seizing graphite grease (P189)	0,09 to 0,11 daN.m (0.66 to 0.81 lbf.ft)
3-120	Lubricate thread with anti-seizing graphite grease (P189)	0,3 to 0,7 daN.m (2.21 to 5.16 lbf.ft)
3-150	Lubricate thread with anti-seizing graphite grease (P189)	0,3 to 0,7 daN.m (2.21 to 5.16 lbf.ft)
3-290	Lubricate thread with anti-seizing graphite grease (P189)	0,09 to 0,11 daN.m (0.66 to 0.81 lbf.ft)
4-10	Lubricate thread with anti-seizing graphite grease (P189)	0,95 to 1,05 daN.m (7 to 7.74 lbf.ft)
4-30	Lubricate thread with anti-seizing graphite grease (P189)	0,4 to 0,5 daN.m (2.95 to 3.68 lbf.ft)
4-90	Lubricate thread with anti-seizing graphite grease (P189)	0,95 to 1,05 daN.m (7 to 7.74 lbf.ft)

PRINTED IN FRANCE

78-12-01

Page 604

Oct 31/81

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

PRINTED IN FRANCE

Bolts or nuts Fig. Item (I.P.L.)	Lubrication when assembly	Torque value
5-20	Lubricate thread with anti-seizing graphite grease (P189)	0,4 to 0,5 daN.m (2.95 to 3.68 lbf.ft)
5-40	Lubricate thread with anti-seizing graphite grease (P189)	0,4 to 0,5 daN.m (2.95 to 3.68 lbf.ft)
5-60	Lubricate thread with anti-seizing graphite grease (P189)	0,4 to 0,5 daN.m (2.95 to 3.68 lbf.ft)
5-70	Lubricate thread with anti-seizing graphite grease (P189)	0,75 to 0,85 daN.m (5.52 to 6.26 lbf.ft)
5-120	Lubricate thread with anti-seizing graphite grease (P189)	4,5 to 5,5 daN.m (2.95 to 3.68 lbf.ft)
6-40	Lubricate thread with anti-seizing graphite grease (P189)	0,4 to 0,5 daN.m (2.95 to 3.68 lbf.ft)
6-80	Lubricate thread with anti-seizing graphite grease (P189)	0,75 to 0,85 daN.m (5.52 to 6.26 lbf.ft)
6-150	Lubricate thread with anti-seizing graphite grease (P189)	0,75 to 0,85 daN.m (5.52 to 6.26 lbf.ft)

### 3. Table of fits and clearances

**78-12-01**

Pages 605/606

Oct 31/81





OLYMPUS 593

MK.610-14-28

OVERHAUL



TABLE OF FITS AND CLEARANCES

IND. — FIG.	IPL FIGURE INDEX	NOMINAL DIMENSION	TYPE	CLEARANCES		MAX. LIMIT	CAT.	REMARKS
				MIN.	MAX.			SELECTIONS
1	6-230	15 + 0,034 + 0,023 0.59188 0.59145	D	S 0,005 0.00019	S 0,034 0.00133		3	
	602 6-190	15 + 0,018 + 0 0.59125 0.59055						
2	1-60	10 - 0,040 - 0,062 0.39212 0.39125	D	J 0,040 0.00157	J 0,098 0.00385		2	
	602 6-230	10 + 0,036 + 0 0.39511 0.39370						
3	1-60	10 - 0,040 - 0,062 0.39212 0.39125	D	J 0,039 0.00153	J 0,082 0.00322		2	
	602 1-30	10,020 9,999 0.39448 0.39366						
4	1-60	10 - 0,040 - 0,062 0.39212 0.39125	D	J 0,080 0.00314	J 0,138 0.00054		2	
	602 1-50	10 + 0,076 + 0,040 0.39669 0.39527						

PRINTED IN FRANCE

78-12-01

Page 607  
Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL

TABLE OF FITS AND CLEARANCES

IND. FIG.	IPL FIGURE INDEX	NOMINAL DIMENSION	TYPE	CLEARANCES		MAX. LIMIT	CAT.	REMARKS SELECTIONS
				MIN.	MAX.			
5  602	Between 6-230 and	9,1 + 0,200 - 0,080  0.36614 0.35511	L	J 0,029 0.00114	J 0,334 0.01314		3	
	1-30	8,991 8,966  0.35397 0.35299						
6  602	1-90	10 - 0,013 - 0,035  0.39318 0.39232	D	J 0,013 0.00051	J 0,071 0.00279		2	
	3-320	10 + 0,036 + 0  0.39511 0.39370						
7  602	1-90	10 - 0,013 - 0,035  0.39318 0.39232	D	J 0,012 0.00047	J 0,055 0.00216		2	
	1-30	10,020 9,999  0.39448 0.39366						
8  602	Between 1-30 and	8,991 8,966  0.35397 0.35299	L	J 0,009 0.00035	J 0,070 0.00275		2	
	3-220	9 + 0,036 + 0  0.35574 0.35433						

78-12-01

Page 608  
Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



TABLE OF FITS AND CLEARANCES

IND. FIG.	IPL FIGURE INDEX	NOMINAL DIMENSION	TYPE	CLEARANCES		MAX. LIMIT	CAT.	REMARKS SELECTIONS
				MIN.	MAX.			
9  602	3-160	10 - 0,025 - 0,061 0.39271 0.39129	D	J 0,025 0.00098	J 0,097 0.00381		2	
	3-180	10 + 0,36 + 0 0.39511 0.39370						
10  602	3-180	18 - 0,016 - 0,034 0.70803 0.70732	D	J 0,016 0.00062	J 0,055 0.00216		2	
	3-170	18 + 0,021 + 0 0.70948 0.70866						
11  602	3-160	10 - 0,025 - 0,061 0.39271 0.39129	D	J 0,038 0.00149	J 0,096 0.00377		2	
	3-320	10 + 0,035 + 0,013 0.39507 0.39421						
12  602	3-310	12 - 0,006 - 0,024 0.47220 0.47149	D	J 0,006 0.00023	J 0,051 0.00200		2	
	6-30	12 + 0,027 + 0 0.47350 0.47244						

PRINTED IN FRANCE

78-12-01

Page 609

Dec 15/75

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

TABLE OF FITS AND CLEARANCES

IND. FIG.	IPL FIGURE INDEX	NOMINAL DIMENSION	TYPE	CLEARANCES		MAX. LIMIT	CAT.	REMARKS SELECTIONS
				MIN.	MAX.			
13	3-310	12 - 0,006 - 0,024 0.47220 0.47149	D	J 0,006 0.00023	J 0,051 0.00200		2	
602	3-320	12 + 0,027 + 0 0.47350 0.47244						
14	Between 3-320 and	68 - 0 - 0,074 2.67716 2.67424	L	J 0,060 0.00236	J 0,208 0.00818		3	
602	6-30	68 + 0,134 + 0,060 2.68243 2.67952						
15	3-260	9,98 ± 0,003 0.39280 0.39303	D	J 0,017 0.00067	J 0,045 0.00177		2	
603	4-80	10 + 0,022 + 0 0.39456 0.39370						
16	3-260	9,98 ± 0,003 0.39280 0.39303	D	J 0,030 0.00118	J 0,058 0.00228		2	
603	3-270	10 + 0,035 + 0,013 0.39507 0.39421						

**78-12-01**Page 610  
Oct 31/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL

TABLE OF FITS AND CLEARANCES

IND. — FIG.	IPL FIGURE INDEX	NOMINAL DIMENSION	TYPE	CLEARANCES		MAX. LIMIT	CAT.	REMARKS
				MIN.	MAX.			SELECTIONS
17	3-260	9,98 ± 0,003 0.39280 0.39303	D	J 0,057 0.00224	J 0,099 0.00390		2	
	603 3-240	10 + 0,076 + 0,040 0.39669 0.39527						
18	Between 3-270 and	15 - 0,050 - 0,160 0.58858 0.58425	L	J 0,050 0.00196	J 0,270 0.01062		3	
	603 4-80	15 + 0,110 + 0 0.59488 0.59055						
19	3-130	10 - 0,025 - 0,061 0.39271 0.39129	D	J 0,025 0.00098	J 0,097 0.00381		2	
	603 3-180	10 + 0,036 + 0 0.39511 0.39370						
20	3-130	10 - 0,025 - 0,061 0.39271 0.39129	D	J 0,025 0.00098	J 0,097 0.00381		2	
	603 3-270	10 + 0,036 + 0 0.39511 0.39370						

PRINTED IN FRANCE

78-12-01

Page 611  
Oct 31/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



TABLE OF FITS AND CLEARANCES

IND. FIG.	IPL FIGURE INDEX	NOMINAL DIMENSION	TYPE	CLEARANCES		MAX. LIMIT	CAT.	REMARKS
				MIN.	MAX.			SELECTIONS
21	3-130	10 - 0,025 - 0,061 0.39271 0.39129	D	J 0,025 0.00098	J 0,097 0.00381		2	
603	3-220	10 + 0,036 + 0 0.39511 039370						
22	2-160	6 - 0,004 - 0,012 0.23606 0.23574	D	J 0,004 0.00015	J 0,024 0.00094		2	
604	2-120	6 + 0,012 + 0 0.23669 0.23622						
23	Between 2-230 and	44 + 0,039 + 0 1.73381 1.73228	L	J 0,025 0.00098	J 0,089 0.00350		3	
604	2-120	44 - 0,025 - 0,012 1.73129 1.73031						
24	2-220	6 - 0,004 - 0,012 0.23606 0.23574	D	J 0,004 0,00015	J 0,024 0.00094		2	
604	2-230	6 + 0,012 + 0 0.23669 0.23622						

78-12-01

Page 612  
Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL

TABLE OF FITS AND CLEARANCES

IND. — FIG.	IPL FIGURE INDEX	NOMINAL DIMENSION	TYPE	CLEARANCES		MAX. LIMIT	CAT.	REMARKS
				MIN.	MAX.			SELECTIONS
25	2-220	6 - 0,004 - 0,012 0.23606 0.23574	D	J 0,004	J 0,030		2	
	604 2-270	6 + 0,018 + 0 0.23692 0.23622		0.00015	0.00118			
26	2-220	6 - 0,004 - 0,012 0.23606 0.23574	D	J 0,034	J 0,072		2	
	604 2-210	6 + 0,060 + 0,030 0.23858 0.23740		0.00133	0.00283			
27	Between 2-270 and	44 + 0 - 0,1 1.73228 1.72834	L	J 0 0	J 0,139 0.00547		2	
	604 2-230	44 + 0,039 + 0 1.73381 1.73228						
28	Bush in	9 + 0,024 + 0,015 0.35527 0.35492	D	J 0 0	J 0,024 0.00094		3	
	604 2-60	9 + 0,015 + 0 0.35492 0.35433						

PRINTED IN FRANCE

78-12-01

Page 613  
Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL

TABLE OF FITS AND CLEARANCES

IND. — FIG.	IPL FIGURE INDEX	NOMINAL DIMENSION	TYPE	CLEARANCES		MAX. LIMIT	CAT.	REMARKS
				MIN.	MAX.			SELECTIONS
29	2-50	6 - 0,004 - 0,012 0.23606 0.23574	D	J 0,004 0.00015	J 0,030 0.00118		2	
	604 3-230	6 + 0,018 + 0 0.23692 0.23622						
30	2-50	6 - 0,004 - 0,012 0.23606 0.23574	D	J 0,034 0.00133	J 0,057 0.00224		2	
	604 2-70	6,03 + 0,015 + 0 0.23799 0.23740						
31	Bush in	9 + 0,024 + 0,015 0.35527 0.35497	D	S 0 0	S 0,024 0.00094		3	
	604 2-70	9 + 0,015 + 0 0.35492 0.35433						
32	2-50	6 - 0,004 - 0,012 0.23606 0.23574	D	J 0,034 0.00133	J 0,072 0.00283		2	
	604 2-40	6 + 0,060 + 0,030 0.23858 0.23740						

78-12-01

Page 614  
Dec 15/75





OLYMPUS 593

MK.610-14-28

OVERHAUL



TABLE OF FITS AND CLEARANCES

IND. — FIG.	IPL FIGURE INDEX	NOMINAL DIMENSION	TYPE	CLEARANCES		MAX. LIMIT	CAT.	REMARKS SELECTIONS
				MIN.	MAX.			
33	Between 3-230 and	8 + 0,022 + 0 0.31582 0.31496	L	J 0,010	J 0,082		3	
604	2-70	8 - 0,010 - 0,060		0.00039	0.00322			
34	3-90	4,81 4,75 0.18936 0.18700	D	J 0,090	J 0,198		2	
604	3-100	4,9 + 0,048 + 0 0.19480 0.19291		0.00354	0.00779			
35	3-90	4,81 4,75 0.18936 0.18700	D	J 0,090	J 0,198		2	
604	3-230	4,9 + 0,048 + 0 0.19480 0.19291		0.00354	0.00779			
36	2-190	6 - 0,004 - 0,012 0.23606 0.23574	D	J 0,004	J 0,024		2	
605	2-300	6 + 0,012 + 0 0.23669 0.23622		0.00015	0.00094			

PRINTED IN FRANCE

78-12-01

Page 615  
Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL

TABLE OF FITS AND CLEARANCES

IND. — FIG.	IPL FIGURE INDEX	NOMINAL DIMENSION	TYPE	CLEARANCES		MAX. LIMIT	CAT.	REMARKS SELECTIONS
				MIN.	MAX.			
37  605	2-190	6 - 0,004 - 0,012 0.23606 0.23574	D	J 0,004 0.00015	J 0,024 0.00094		2	
	2-120	6 + 0,012 + 0 0.23669 0.23622						
38  605	Between 2-300 and	10 + 0,022 + 0 0.39456 0.39370	L	J 0 0	J 0,122 0.00480		3	
	2-120	10 - 0 - 0,100 0.39370 0.38976						
39  605	2-190	6 - 0,004 - 0,012 0.23606 0.23574	D	J 0,034 0.00133	J 0,072 0.00283		2	
	2-180	6 + 0,060 + 0,030 0.23858 0.23740						
40  605	3-210	9,98 ± 0,003 0.39280 0.39303	D	J 0,017 0.00067	J 0,045 0.00177		2	
	4-50	10 + 0,022 + 0 0.39456 0.39370						

78-12-01

Page 616  
Oct 31/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



TABLE OF FITS AND CLEARANCES

IND. — FIG.	IPL FIGURE INDEX	NOMINAL DIMENSION	TYPE	CLEARANCES		MAX. LIMIT	CAT.	REMARKS
				MIN.	MAX.			SELECTIONS
41  605	3-210	10 - 0,005 - 0,020 0.39350 0.39291	D	J 0,018 0.00070	J 0,055 0.00216		2	
	3-220	10 + 0,035 + 0,013 0.39507 0.39421						
42  605	3-210	10 - 0,005 - 0,020 0.39350 0.39291	D	J 0,005 0.00019	J 0,056 0.00220		2	
	3-230	10 + 0,036 + 0 0.39511 0.39370						
43  605	Between 4-50 and	15 + 0,110 + 0 0.59488 0.59055	L	J 0,050 0.00196	J 0,270 0.01062		3	
	4-220	15 - 0,050 - 0,160 0.58858 0.58425						
44  605	3-210	10 - 0,005 - 0,020 0.39350 0.39291	D	J 0,045 0.00177	J 0,096 0.00377		2	
	3-200	10 + 0,076 + 0,040 0.39669 0.39527						

PRINTED IN FRANCE

78-12-01

Page 617

Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL

TABLE OF FITS AND CLEARANCES

IND. — FIG.	IPL FIGURE INDEX	NOMINAL DIMENSION	TYPE	CLEARANCES		MAX. LIMIT	CAT.	REMARKS SELECTIONS
				MIN.	MAX.			
45	3-60	4,81 4,75 0.18936 0.18700	D	J 0,090 0.00354	J 0,198 0.00778		2	
	3-220	4,9 + 0,048 + 0 0.19480 0.19275						
46	6-100	50 - 0,025 - 0,041 1.96586 1.92983	D	J 0,025 0.00098	J 0,057 0.00224		1	
	6-110	50 + 0,016 + 0 1.96747 1.96685						
47	6-110	58 - 0,030 - 0,049 2.28036 2.27961	D	J 0,030 0.00118	J 0,095 0.00373		2	
	6-190	58 + 0,046 + 0 2.28335 2.28154						
48	6-90	52 - 0,100 - 0,220 2.04159 2.03686	D	J 0,100 0.00393	J 0,340 0.01337		2	
	6-110	52 + 0,120 + 0 2.05024 2.04552						

78-12-01

Page 618  
Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



TABLE OF FITS AND CLEARANCES

IND. FIG.	IPL FIGURE INDEX	NOMINAL DIMENSION	TYPE	CLEARANCES		MAX. LIMIT	CAT.	REMARKS
				MIN.	MAX.			SELECTIONS
49	5-30	10 - 0,040 - 0,130 0.39179 0.38825	L	J 0,040	J 0,220		2	
601	5-10	10 + 0,090 + 0 0.39691 0.39337		0.00157	0.00865			
50	5-50	10 - 0,040 - 0,130 0.39179 0.38825	L	J 0,040	J 0,220		2	
601	5-10	10 + 0,090 + 0 0.39691 0.39337		0.00157	0.00865			
51	Between 4-120  and		L	J 5,0			M	
601	3-30			0.19668				
52	Between 3-30  and		L	J 1,60			M	Nozzle pe- tals in
606	3-220 or 3-270			0.06293				full open position

78-12-01

Page 619  
Dec 15/75

PRINTED IN FRANCE

MTD 751026



OLYMPUS 593  
MK.610-14-28  
OVERHAUL

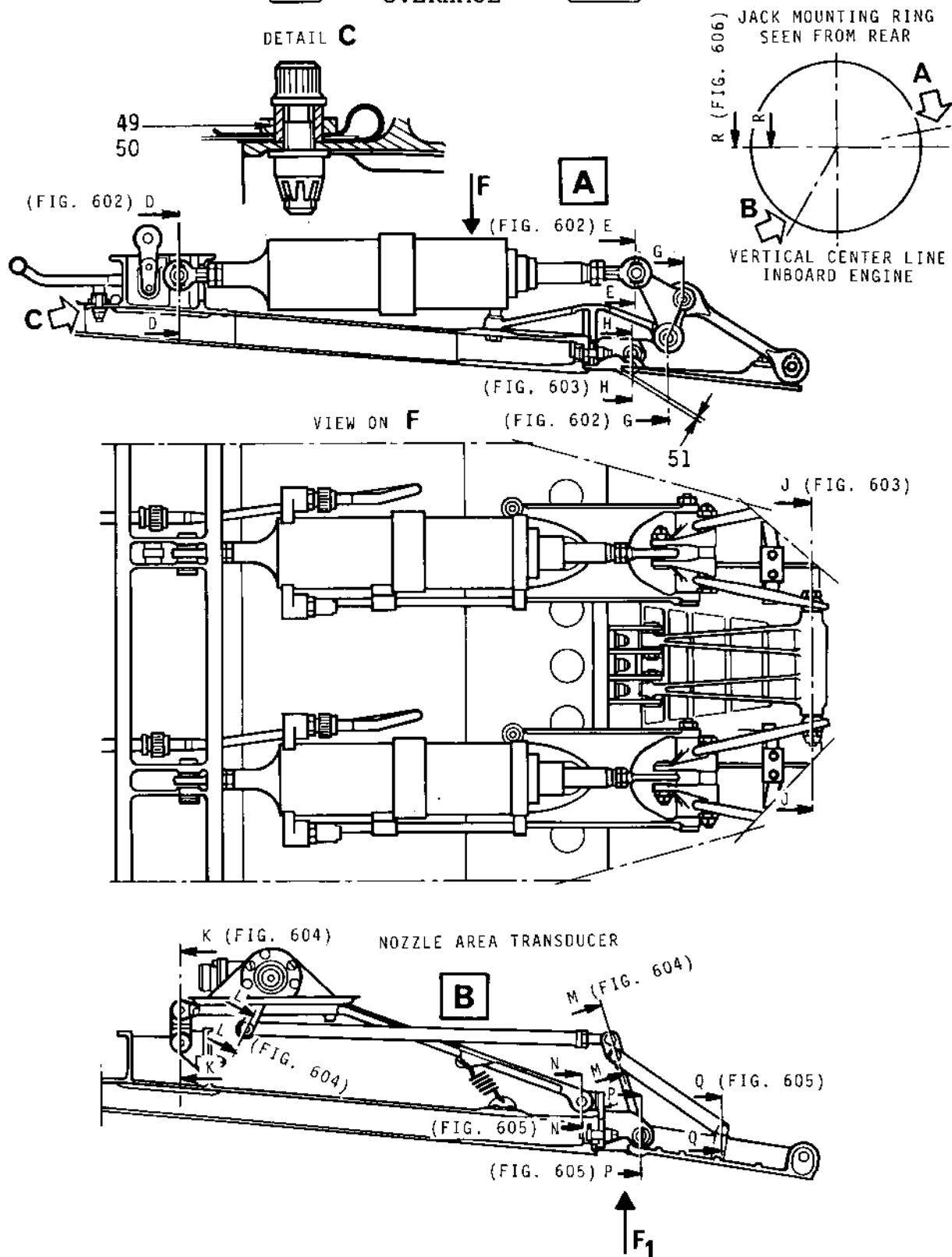


Figure 601

78-12-01

Page 620  
Dec 15/75

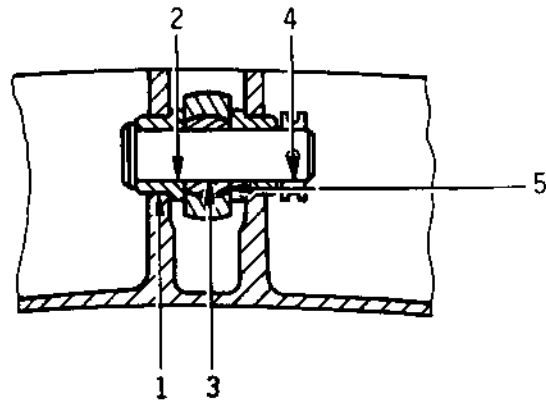


OLYMPUS 593

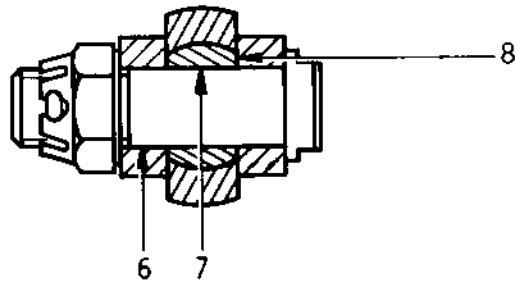
MK. 610-14-28  
OVERHAUL



SECTION DD



SECTION EE



SECTION GG

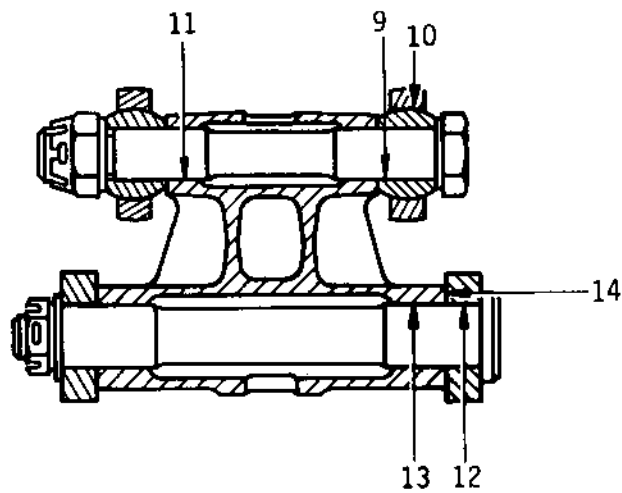


Figure 602

78-12-01

Page 621  
Dec 15/75

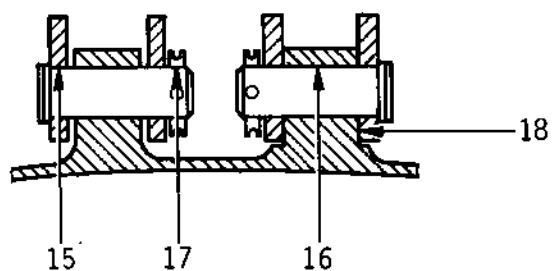


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



SECTION HH



SECTION JJ

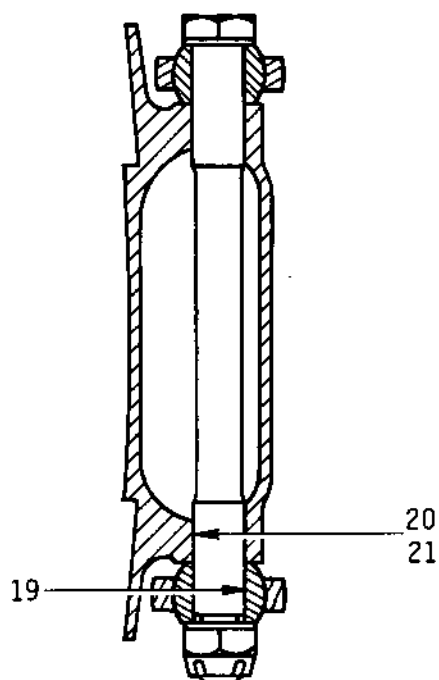


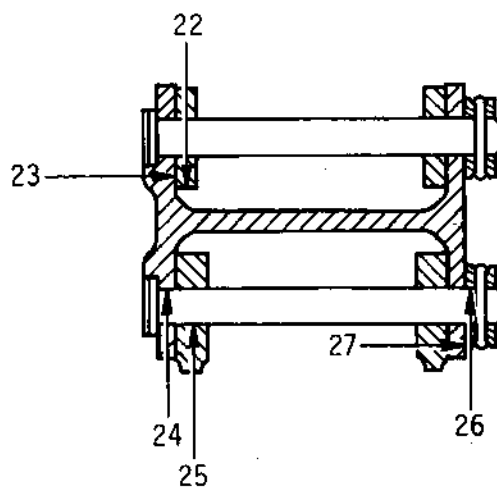
Figure 603

78-12-01

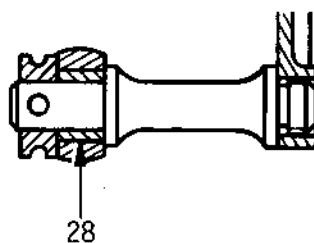
Page 622  
Dec 15/75



SECTION **KK**



SECTION **LL**



SECTION **MM**

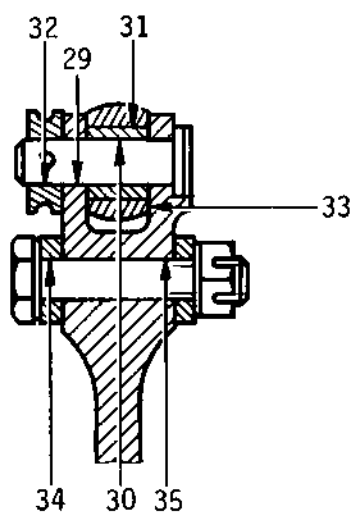


Figure 604



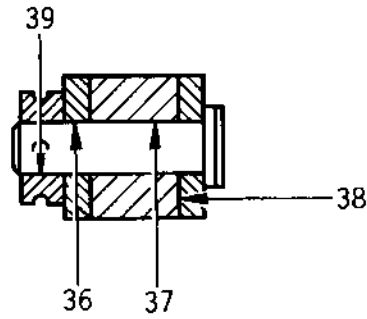
OLYMPUS 593

MK.610-14-28

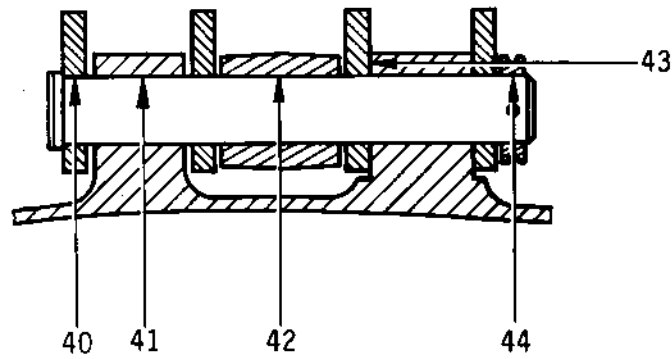
OVERHAUL



SECTION **NN**



SECTION **PP**



SECTION **QQ**

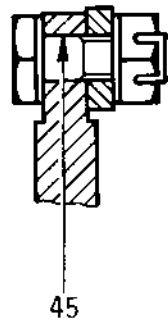


Figure 605

78-12-01

Page 624

Dec 15/75



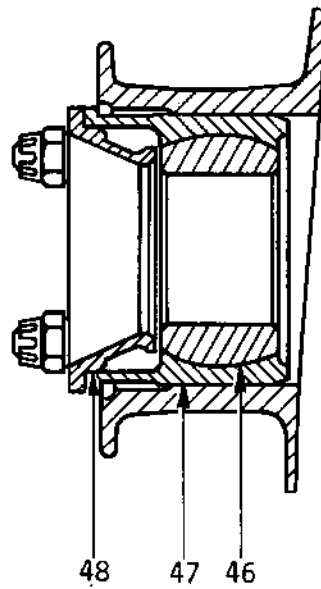
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE

SECTION RR



VIEW ON F<sub>1</sub>

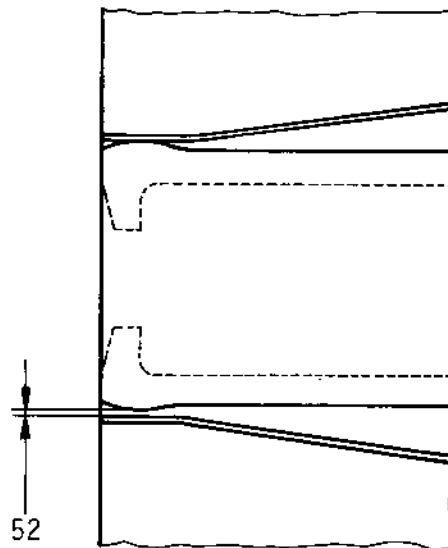


Figure 606

78-12-01

Pages 625/626  
Dec 15/75

**OLYMPUS 593**MK.610-14-28  
OVERHAUL**TESTING****1. General**

The tests to be carried out after overhaul of the primary nozzle comprise a leak test and an operational test.

**2. Test equipment characteristics****A. Nozzle supply**

- (1) Test fluid            dehydrated, de-oiled compressed air
- (2) Supply pressure       0,2 - 3,5 bar (2.9 - 50.8 psi)
- (3) Supply flow           40 m<sup>3</sup>/h (1413 cu ft/h)
- (4) Fluid temperature    ambient
- (5) Filter mesh           5 $\mu$  (5 microns)

**B. Control, instrumentation and inspection**

	SCALE	ACCURACY	REMARKS
Supply pressure	0-1 bar		
	(0 - 14.51 psi)	1%	
	0-6 bar		
	(0 - 87.0 psi)	1%	
Air flow measurement	4 m <sup>3</sup> /h - 40 m <sup>3</sup> /h	2%	Rotameter
	(141 - 1413 cu ft/h)		

**3. Testing****A. Connections**

- (1) Connect the compressed air supply to the jack closing circuit using the adaptor - tool SC 238 - Tighten the nut using the 37-tooth wrench - tool SC 31, and the handle for torque wrench - tool SC 45.

NOTE : Check that connector (5-120) is tightened, blanked and locked.

**B. Leak test**

- (1) Progressively increase the supply pressure to 3,5 bar gauge (50.8 psig), then reduce it to 2,5 bar gauge (36.3 psig).

**78-12-01**Page 701  
Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



The leak flow must be less than or equal to 15 m<sup>3</sup>/h  
(529 cu ft/h).

C. Operational test

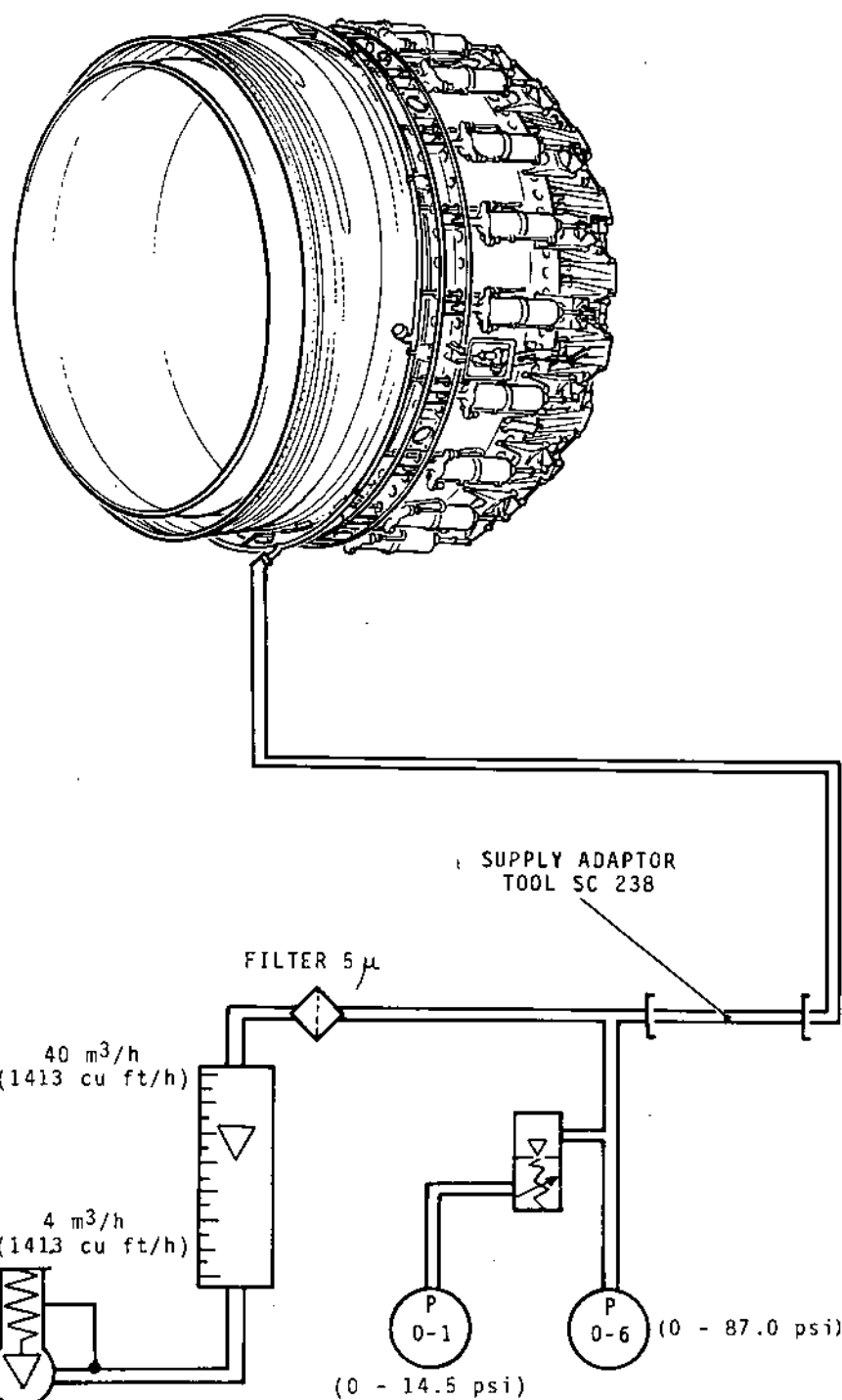
- (1) Check that the primary nozzle petals close at a supply pressure equal to or less than 0,300 bar (4.35 psi) ; the return to the "open" position is carried out manually.

NOTE : If pressure is greater than or equal to 0,2 bar (2.90 psi), check position of pins and links.

CAUTION : ENSURE THAT IN ANY OPEN OR CLOSED POSITION, THE TRANSDUCER CONTROL LEVER NEVER MECHANICALLY INTERFERES WITH THE TRANSDUCER SUPPORT.

78-12-01

Page 702  
Oct 31/81



Arrangement of the Test Rig  
Figure 701



## STORAGE

### 1. General

This chapter gives all information on primary nozzle storage which can be carried out by repair organization prior to and following overhaul.

### 2. Storage requirements

#### A. Storage in container

It shall be of long duration (more than 3 months).

No special conditions. The container shall be sheltered from sun and bad weather.

#### B. Storage out-of-container

- (1) Take the primary nozzle out of the container (see paragraph 3). and install it on the rest stand - tool SC 218 -
- (2) Store in premises where the relative humidity remains below 60%.
- (3) Protect the equipment with a non-hermetic, anti-dust cover made of vinyl chloride.
- (4) Stick the document wallet on the equipment.
- (5) Check condition of the equipment every three months when relative humidity is less than 60%. If above 60%, check every month.

### 3. Removal of primary nozzle from container (Fig. 901)

#### A. Installation on waiting stand

- (1) Remove the container seals.
- (2) Remove the cover using a hoist and slings.
- (3) Position the hoisting bar - tool SC 57 - and take the weight of the nozzle with a hoist.
- (4) Remove the upper retaining blocks.
- (5) Lift the primary nozzle, position it on the rest stand - tool SC 218 - and secure it.
- (6) Remove the hoisting bar - tool SC 57 -

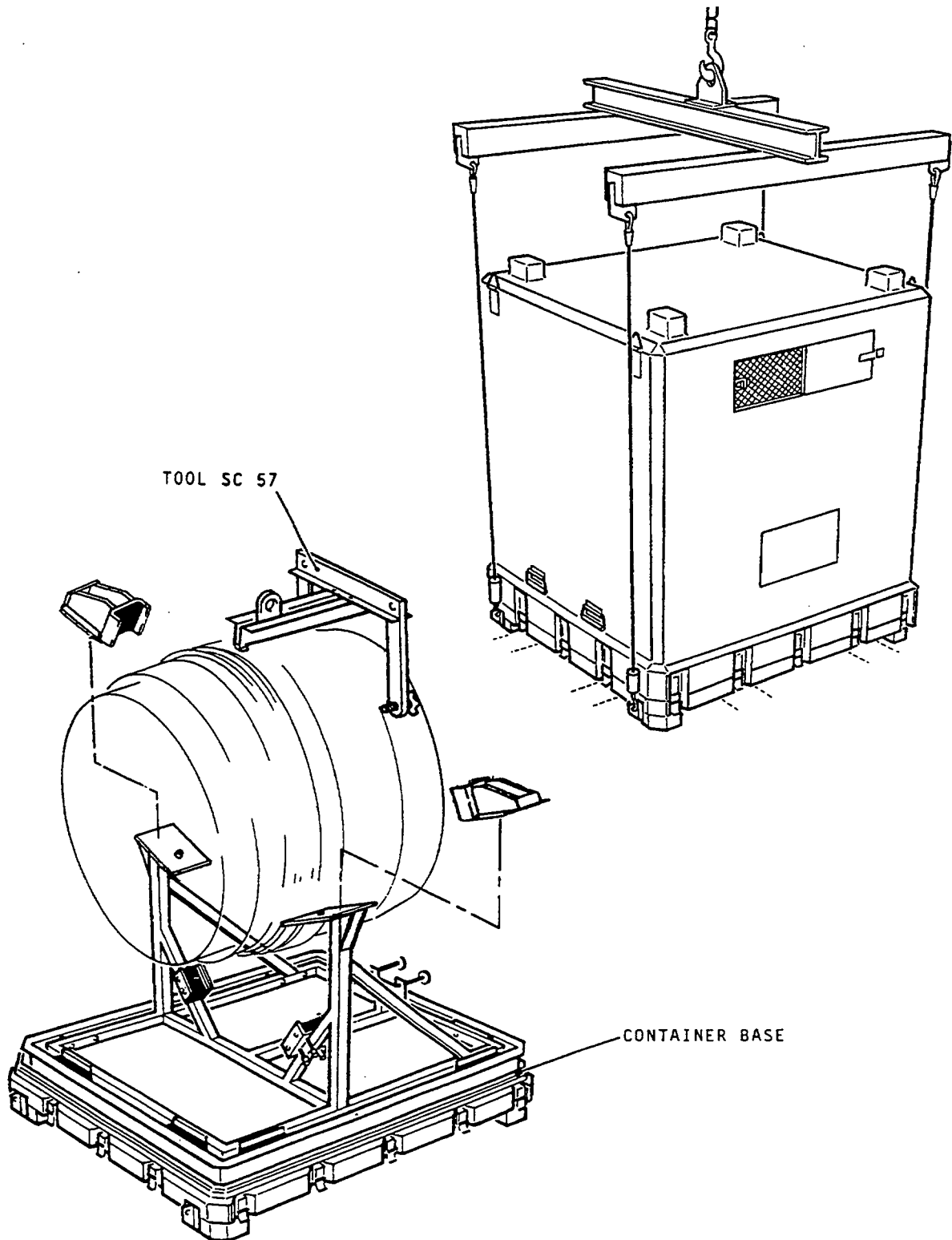


Figure 901





OLYMPUS 593  
MK.610-14-28  
OVERHAUL



#### B. Returning empty containers

The container-to-contents connecting parts must be collected when contents are removed from the container, and must be re-assembled in their respective locations in the container.

- (1) Fix the upper retaining blocks in the respective locations.
- (2) Close and lead-seal the container for the return.
- (3) Obliterate the notices written on the black rectangle on the container.

#### 4. Placing the equipment in the container (fig. 902)

##### A. Preparation of the container

- (1) Place the container in the same area as the jet-pipe sufficiently in advance of the packaging operation for it to attain the same temperature as the jet-pipe, in order to avoid all risk of condensation.
- (2) Check the condition of the container (general cleanliness, lifting and handling rings, document box, closing devices, notices etc...).
- (3) Unlock the cover from the base and open the container using a hoist and a four branch sling.
- (4) Clean the joint faces and check the condition of the seal, flexible mountings and internal fittings.
- (5) Remove the upper retaining blocks from the support mount.
- (6) Wipe the inside walls of the container to remove any traces of humidity.

##### B. Preparing the primary nozzle

- (1) Check for the presence of the appropriate blanks for delivery, and that they are locked. Also check that the petals are locked in the closed position (and retained by lock-wire).
- (2) Check the presence of the wallet containing the nozzle documents.
- (3) Wipe the primary nozzle with clean, dry cloth.

78-12-01

Page 903  
Dec 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL

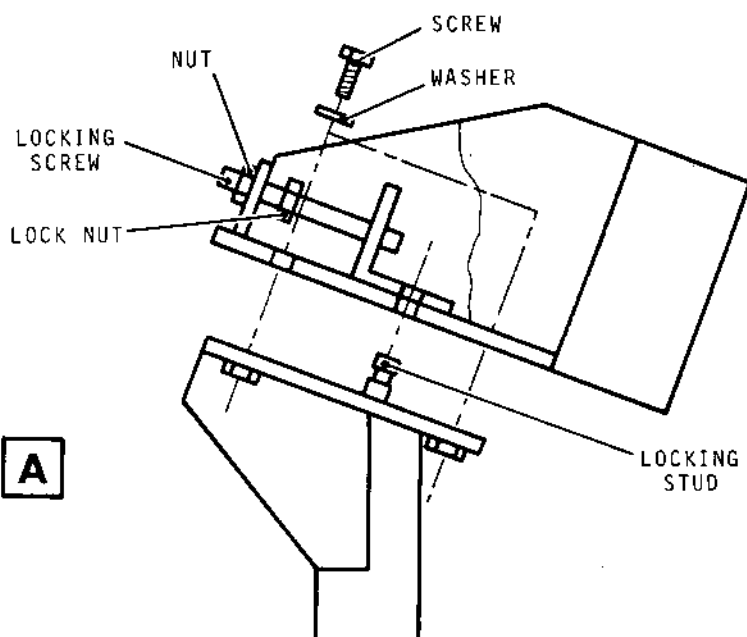
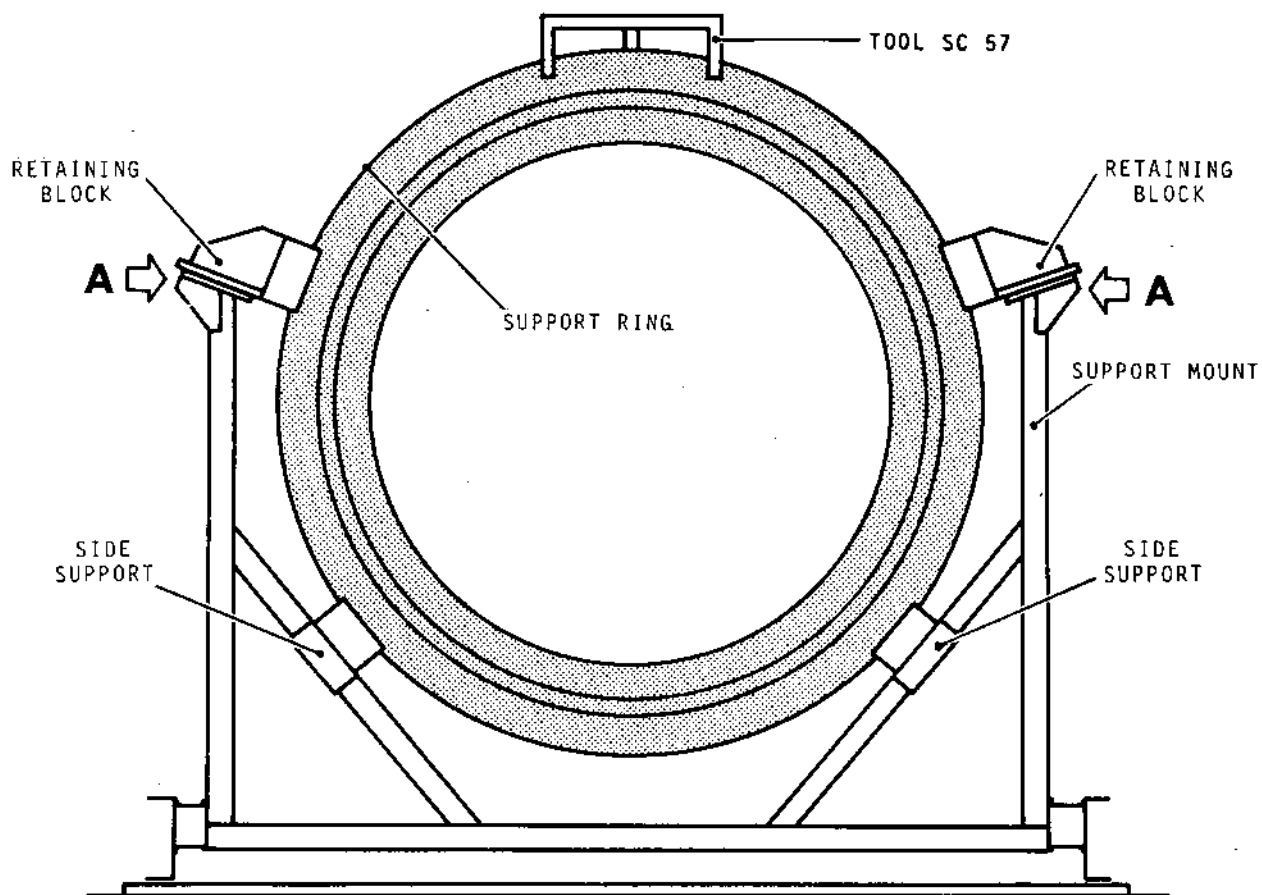


Figure 902

78-12-01

Page 904  
Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



### C. Packing

- (1) Remove the jet-pipe from the rest stand - tool SC 218 - using hoisting bar - tool SC 57 -
- (2) Offer up the jet-pipe to the container, lower gently and engage the support ring in the two lower side supports.
- (3) Place the two upper support blocks onto their locations on the support mount.
  - (a) Centre the retaining block onto the locking studs having slackened the nut and locking nut on the locking screw.
  - (b) Fit both supports with the bolts and washers not tightened.
- (4) Centre and bring the two retaining blocks into contact with the support ring by tightening the locking screws
- (5) Tighten the retaining block fixing bolts and lock them in pairs with locking wire.
- (6) Tighten the nut and the lock-nut on the locking screw, and lock them together.
- (7) Remove the hoisting bar - tool SC 57 -
- (8) Close the container
  - (a) Place the cover on the base.
  - (b) Lock by means of the clamps.
  - (c) Lead-seal two opposite clamps.
- (9) Place in the documents box the wallet containing :
  - module log sheet
  - release note
  - storage instructions
- (10) Lead seal the documents box
- (11) Mark on the container, using stencils :
  - the serial number of the primary nozzle
  - the date of packing
  - the duration of storage.

78-12-01

Pages 905/906

Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



## SPECIAL TOOLS, FIXTURES AND EQUIPMENT (LIST)

TOOL N°	PART NUMBER	DESCRIPTION	UTILIZATION						PAGE
			DISASSEMBLY	CLEANING	CHECK	REPAIR	ASSEMBLY	TESTING	
SC 8	9970-521-048	SUPERSEDED BY SC 210							
SC 22	9970-521-066	SUPERSEDED BY SC 57							
SC 23	9970-521-073	SUPERSEDED BY SC 218							
SC 24	9970-521-043	HOISTING AND SWINGING DEVICE	x				x		1001
SC 30	9970-515-272	22-TOOTH WRENCH	x				x		1002
SC 31	9970-515-062	37-TOOTH WRENCH	x				x		1003
SC 32	9970-511-038	EXTRACTOR	x						1004
SC 33	9970-521-063	PROTECTOR						x	1005
SC 35	9970-515-063	22-TOOTH WRENCH	x				x		1006
SC 45	9970-515-269	HANDLE FOR TORQUE WRENCH	x				x		1007
SC 55	852-500-102-0	CANCELLED							
SC 56	852-500-103-0	ASSEMBLY STAND	x				x		1008
SC 57	852-500-104-0	HOISTING BAR	x				x	x	1009
SC 58	852-500-105-0	LEVELLING BLOCK					x		1010
SC 59	852-500-106-0	WORK STAND	x				x		1011
SC 60	852-500-107-0	POSITIONING TOOL					x		1012
SC 60A	852-500-154-0	POSITIONING TOOL					x		1013
SC 61	852-500-108-0	ASSEMBLY SUPPORT STAND					x		1014
SC 62	852-500-109-0	CHECKING RING					x		1015
SC 63	852-500-110-0	CHECKING ARM					x		1016
SC 64	852-500-155-0	ADJUSTMENT DISC					x		1017
SC 65	852-500-112-0	HOISTING DEVICE					x		1018
SC 66	852-500-113-0	HOISTING BAR	x				x		1019
SC 91	852-500-116-0	HOLDING DEVICE FOR INSTALLATION OF TRUARC RING					x		1020
SC 95	852-500-120-0	ADJUSTMENT DISC					x		1021
SC 96	852-500-121-0	SPINDLE					x		1022
SC 114	852-500-123-0	CANCELLED							
SC 118	852-630-100-0	ANTI-DEFORMATION FIXTURE			x				1023
SC 191	852-500-131-0	SPRING LOCATING DEVICE					x		1024
SC 210	852-500-129-0	LIFTING BAR	x				x		1025
SC 218	852-500-147-0	REST STAND	x				x	x	1026
SC 238	852-500-077-0	ADAPTOR						x	1027
SC 248	852-500-150-0	LOCATING DOWEL					x		1028
SC 138	852-630-052-0	CRIMPING TOOL				x			1029
SC 285	852-630-166-0	ADJUSTING AND TACK-WELD ING. FIXTURE				x			1030

PRINTED IN FRANCE

PRINTED IN FRANCE

78-12-01

STE - Pages 1001/1002

May 31/84



OLYMPUS 593

MK.610-14-28  
OVERHAUL



HOISTING AND SWINGING DEVICE - PRIMARY NOZZLE

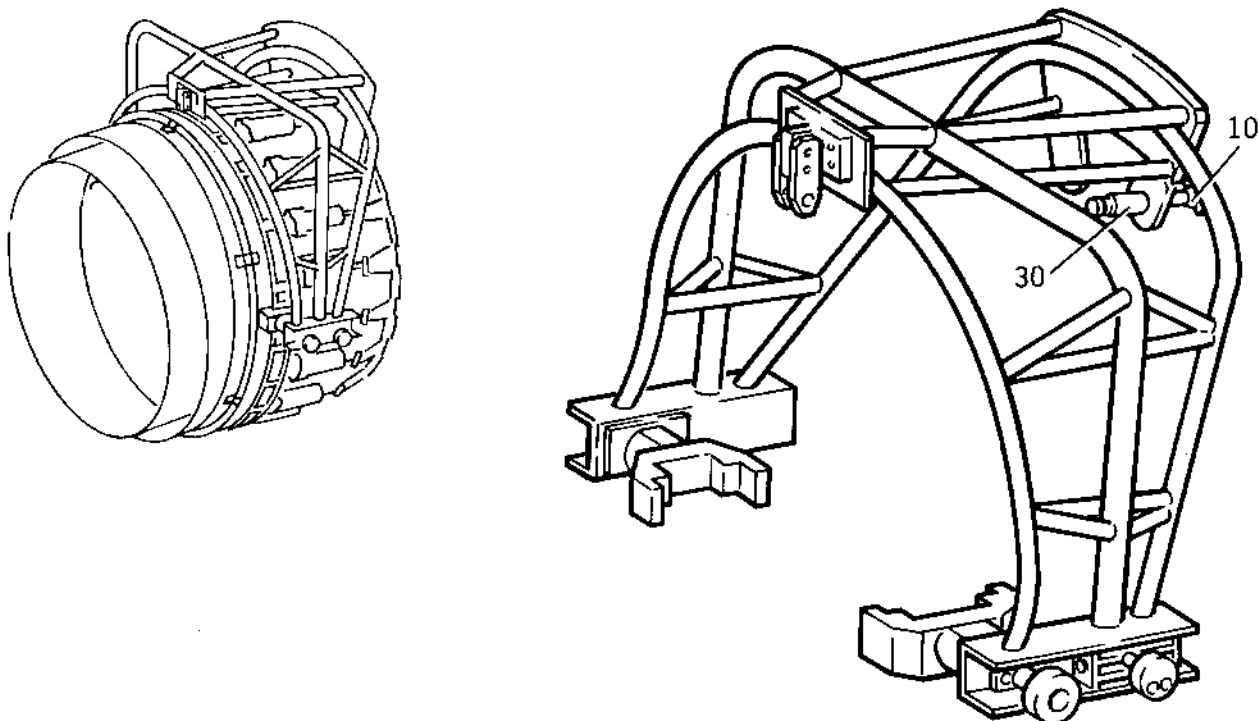
SNECMA No. 9970-521-043

Description..... This device is used in the workshop for  
hoisting and swinging the primary nozzle.

Weight..... 37 Kg (81.4 lb)

Dimensions..... 1400 x 710 x 600 mm (55 x 28 x 24 in.)

PRINTED IN FRANCE



Tool  
SC 24

Figure 3

FIG-ITEM	PART NUMBER	NOMENCLATURE							USAGE CODE	UNITS PER ASSY
		1	2	3	4	5	6	7		
3 - 1A	9970-521-043	HOISTING AND SWINGING DE VICE, PRIMARY NOZZLE								RF
10A		.HANDLE								2
- 20A		.PIN								2
30A		.PIN THREADED								2
- 40A		.PROTECTOR								2

- ITEM NOT ILLUSTRATED

78-12-01

Page 1001  
Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



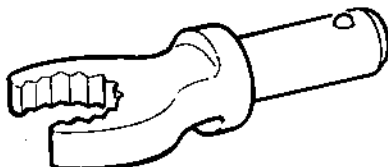
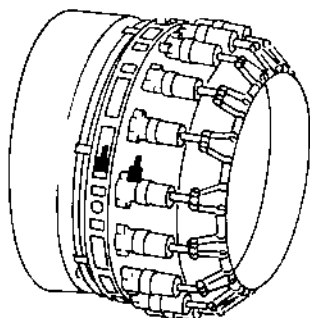
22 TOOTH WRENCH - PRIMARY NOZZLE

SNECMA No. 9970-515-272

Description..... This wrench is used for connecting the air supply pipes on the primary nozzle jacks.

Weight..... 0,100 Kg (0.22 lb)

Dimensions..... 52 x 28 x 14 mm (2 x 1.1 x 0.5 in.)



Tool  
SC 30

78-12-01

Page 1002  
Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



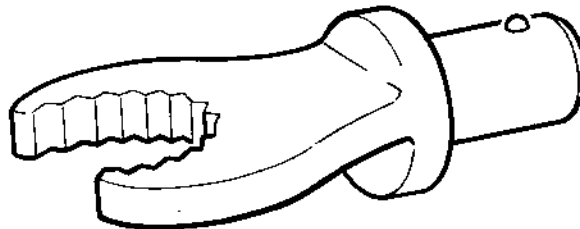
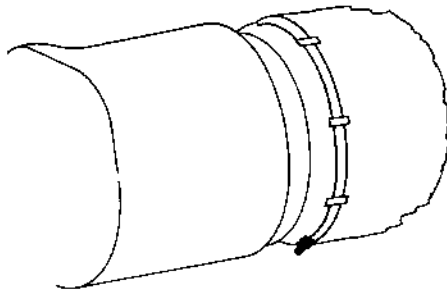
37 TOOTH WRENCH - PRIMARY NOZZLE

SNECMA No. 9970-515-062

Description..... This wrench is used for the connection of the  
PNC pipe to the primary nozzle closing pipe.

Weight..... 0,150 Kg (0.360 lb)

Dimensions..... 95 x 55 x 22 mm (3.7 x 2 x 0.8 in.)



Tool  
SC 31

78-12-01

Page 1003  
Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



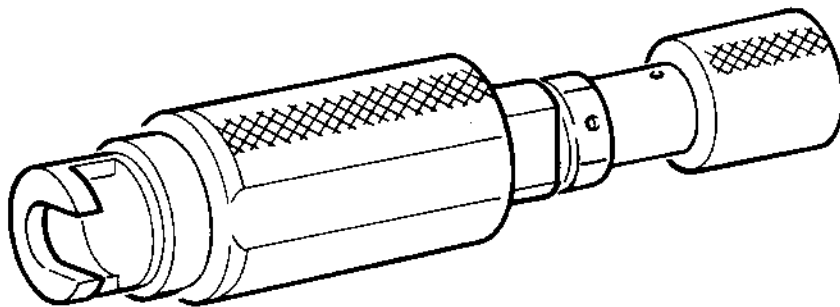
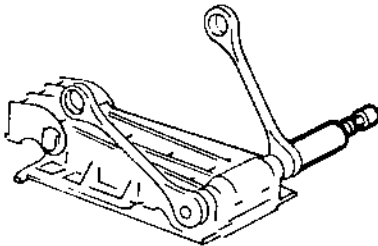
EXTRACTOR - PRIMARY NOZZLE

SNECMA No. 9970-511-038

Description..... This tooling is used for the removal of the primary nozzle petal hinge pin.

Weight..... 0,350 Kg (0.77 lb)

Dimensions..... 130 x 30 x 30 mm (5 x 1.2 x 1.2 in.)



Tool  
SC 32

78-12-01

Page 1004  
Dec 15/75





OLYMPUS 593

MK.610-14-28  
OVERHAUL



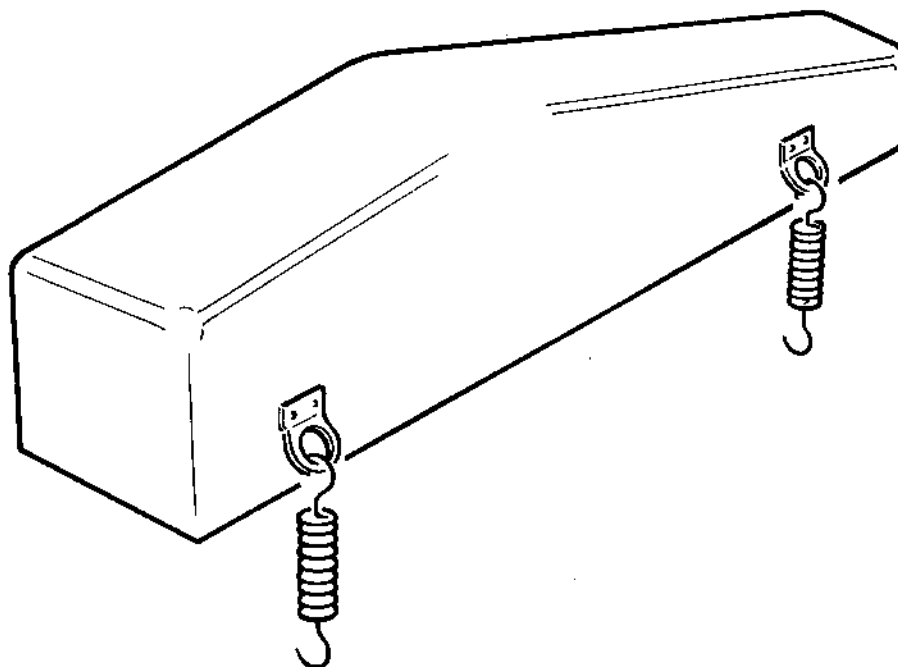
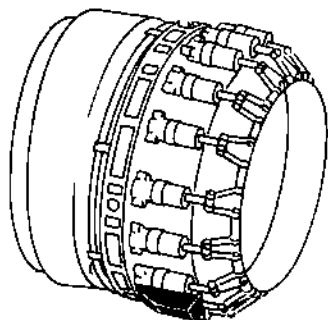
PROTECTOR - NOZZLE AREA DETECTION SYSTEM

SNECMA No. 9970-521-063

Description..... This protector is placed on the primary nozzle when it is not installed on the plane.

Weight..... 0,250 Kg (5.5 lb)

Dimensions..... 320 x 120 x 100 mm (12.6 x 4.7 x 4 in.)



Tool  
SC 33

**78-12-01**

Page 1005  
Dec 15/75

PRINTED IN FRANCE



OLYMPUS 593

MK.610-14-28

OVERHAUL



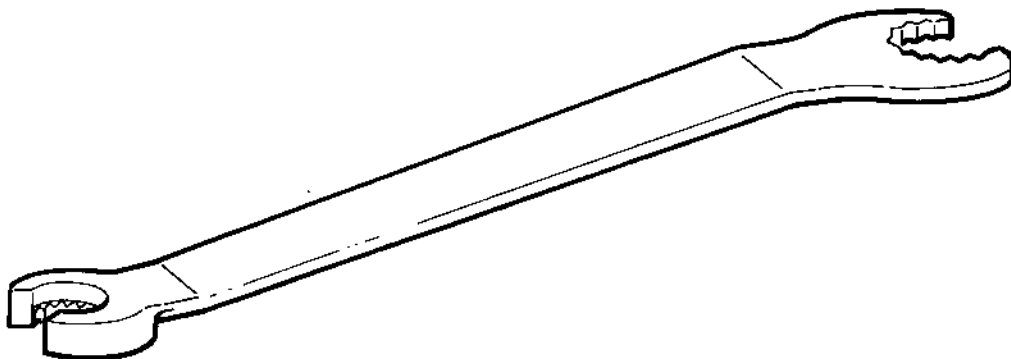
22 TOOTH WRENCH - PRIMARY NOZZLE

SNECMA No. 9970-515-063

Description..... This wrench is used for the removal of  
serrated nuts.

Weight..... 0,500 Kg (1.1 lb)

Dimensions..... 270 x 30 x 10 mm (10.6 x 1.2 x 0.4 in.)



Tool

SC 35

**78-12-01**

Page 1006

Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



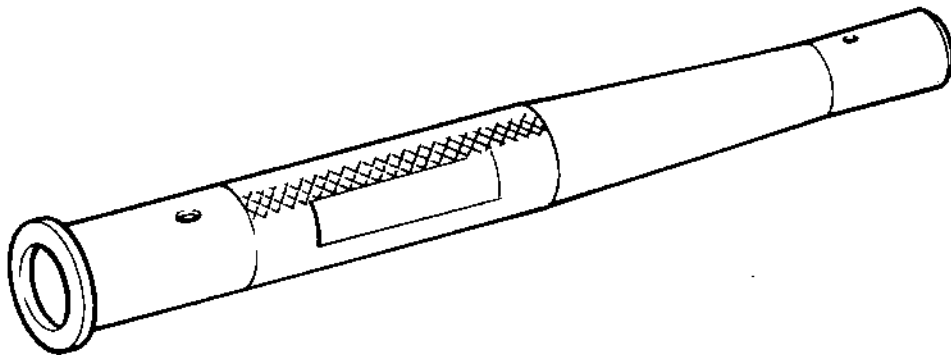
HANDLE FOR TORQUE WRENCH

SNECMA No. 9970-515-269

Description..... This handle is fitted to torque wrenches  
when torque measurement is not required  
(i.e unscrewing).

Weight..... 0,150 Kg (0.36 lb)

Dimensions..... 22 x 22 x 200 mm (0.9 x 0.9 x 8 in.)



Tool  
SC 45

**78-12-01**

Page 1007  
Dec 15/75

PRINTED IN FRANCE



OLYMPUS 593

MK.610-14-28  
OVERHAUL



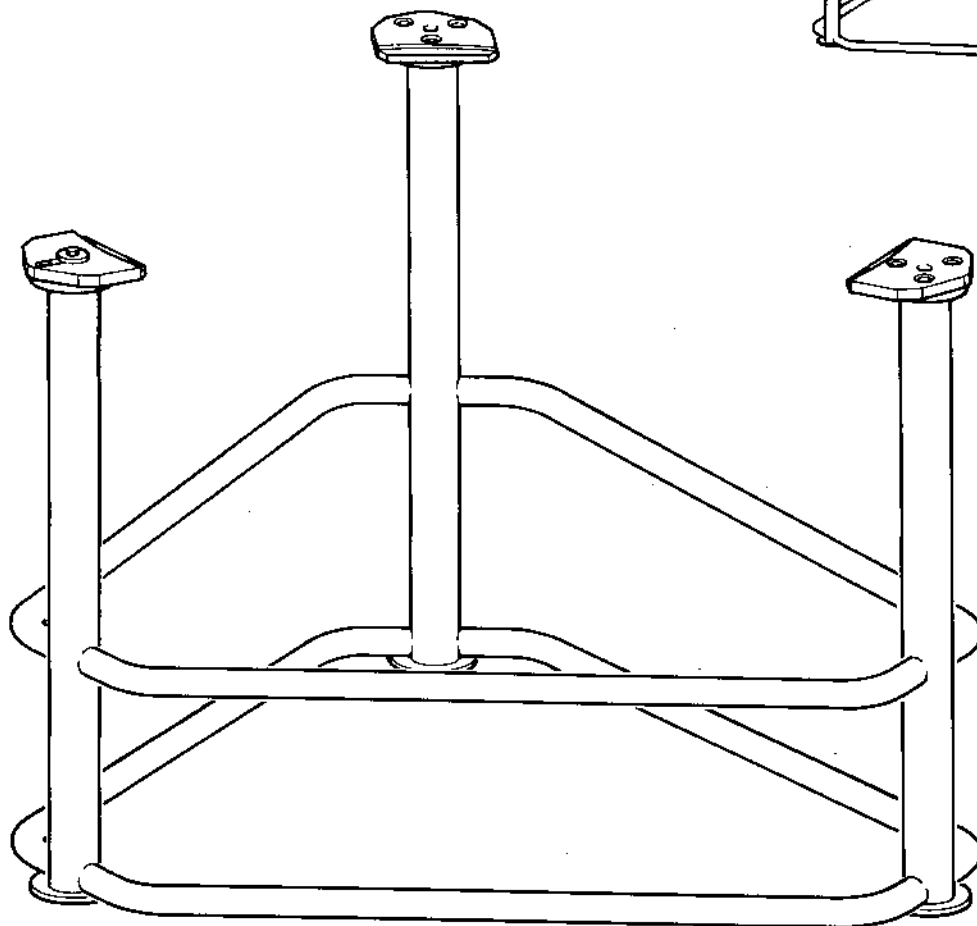
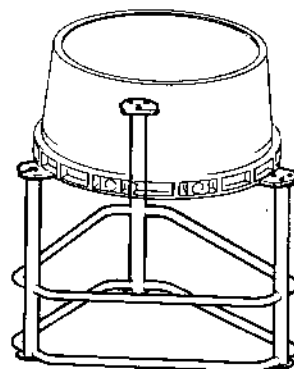
ASSEMBLY STAND - PRIMARY NOZZLE

SNECMA No. 852-500-103-0

Description..... This stand is used for the fitting out of the support ring.

Weight.....

Dimensions..... 700 x 900 mm (28 x 36 in)



Tool  
SC 56

78-12-01

Page 1008  
Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



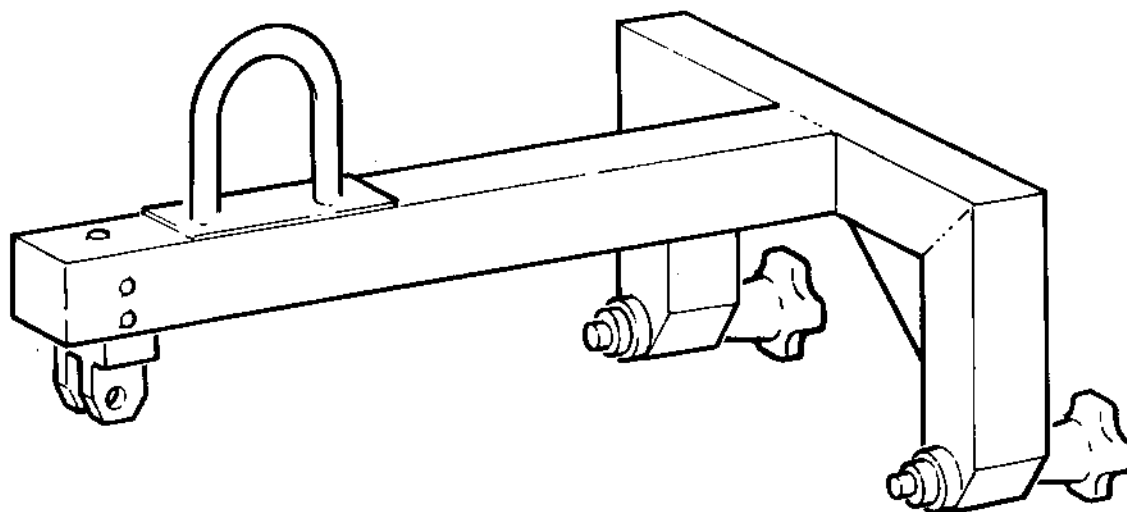
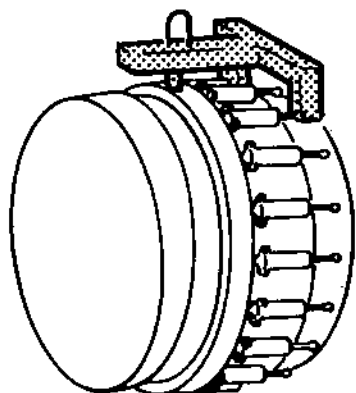
HOISTING BAR

SNECMA N° 852-500-104-0

Description..... This lifting bar is used to handle the primary nozzle out of/into its container.

Weight..... 7 kg (15 lb)

Dimensions..... 460 x 317 x 230 mm (18.1 x 12.5 x 9.1 in).



Tool  
SC 57

**78-12-01**

Page 1009

Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



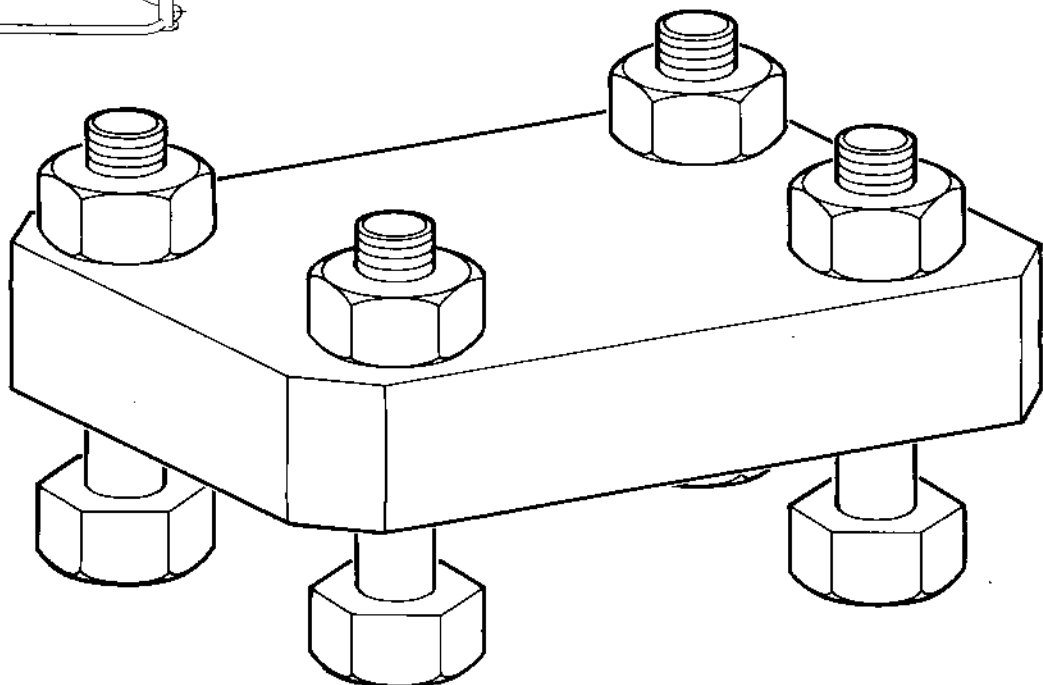
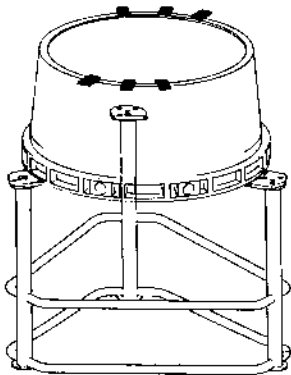
LEVELLING BLOCK - PRIMARY NOZZLE

SNECMA No. 852-500-105-0

Description..... This block is used to maintain the supports alignment in relation to the support ring rear flange when tightening.

Weight.....

Dimensions..... 66 x 44 x 10 mm (2.6 x 1.8 x .40 in)



Tool  
SC 58

78-12-01

Page 1010

Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



WORK STAND

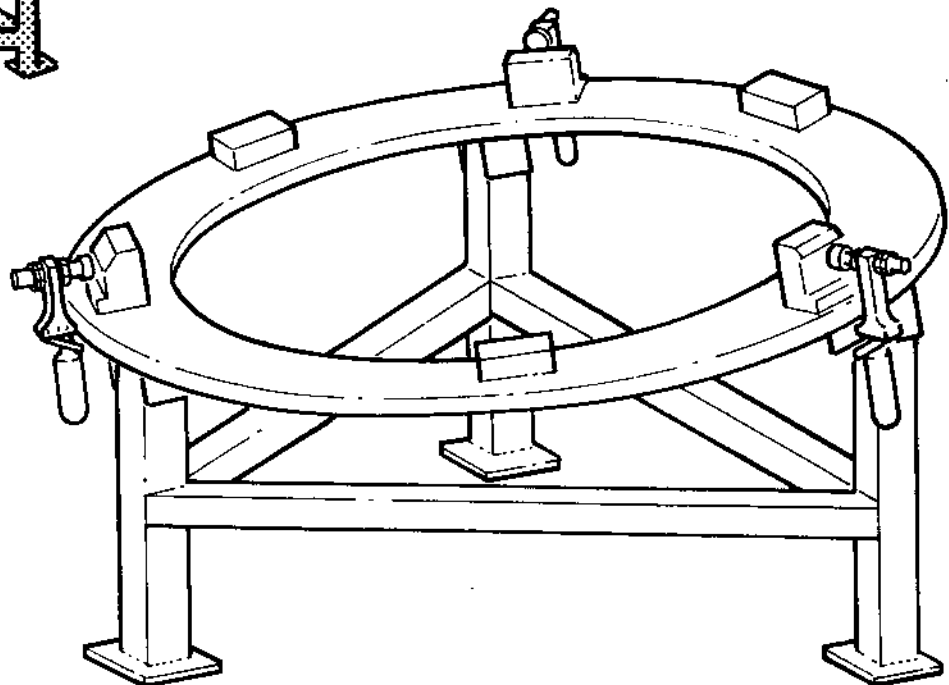
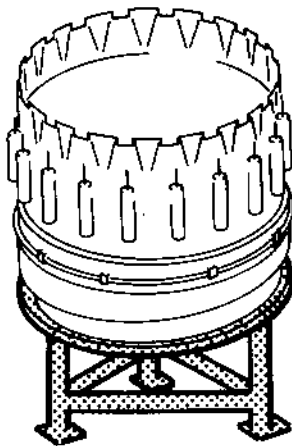
SNECMA N° 852-500-106-0

Description..... This stand is used for assembling the convergent section/support ring.

Weight..... 35 kg (77 lb)

Dimensions..... 1080 x 500 mm (42.5 x 19.7 in.)

PRINTED IN FRANCE



Tool  
**SC 59**

**78-12-01**

Page 1011  
Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



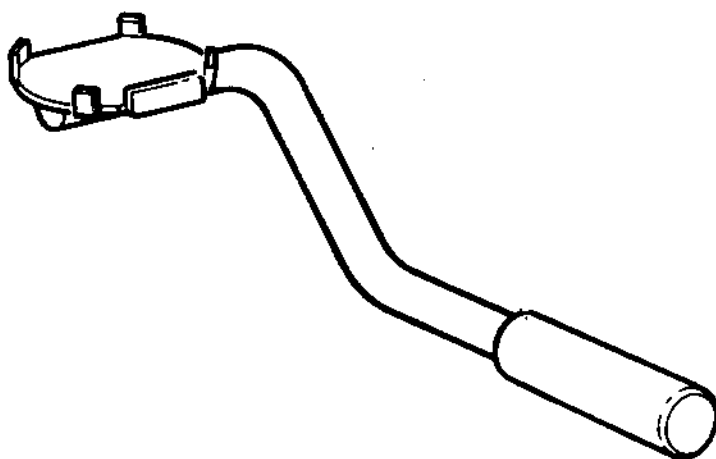
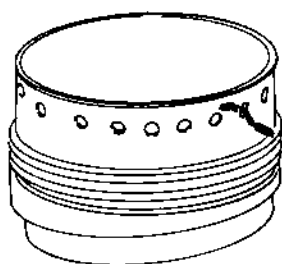
POSITIONING TOOL

SNECMA N° 852-500-107-0

Description..... This positioning tool is used to position the convergent section attachment screws/support ring.

Weight.....

Dimensions..... 80 x 30 x 15 mm (3.2 x 1.2 x 0.6 in).



Tool

SC 60

**78-12-01**

Page 1012  
Dec 15/75





OLYMPUS 593

MK.610-14-28  
OVERHAUL



POSITIONING TOOL

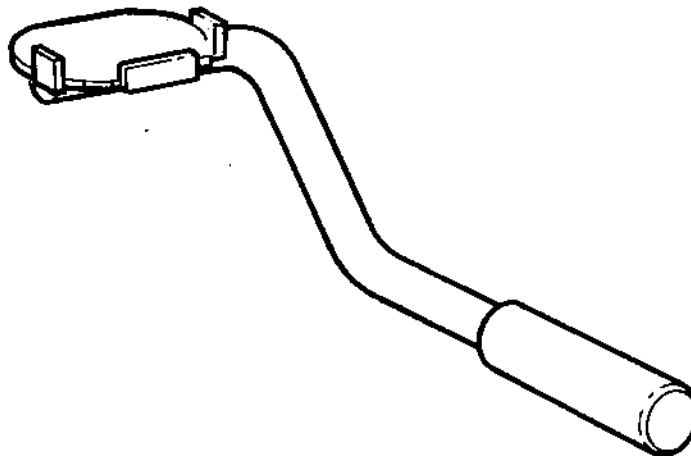
SNECMA No. 852-500-154-0

Description..... This positioning tool is used to position the convergent section attachment screws/support ring.

Weight.....

Dimensions..... 80 x 30 x 15 mm (3.2 x 1.2 x 0.6 in.)

PRINTED IN FRANCE



Tool  
**SC 60A**

**78-12-01**

Page 1013  
Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



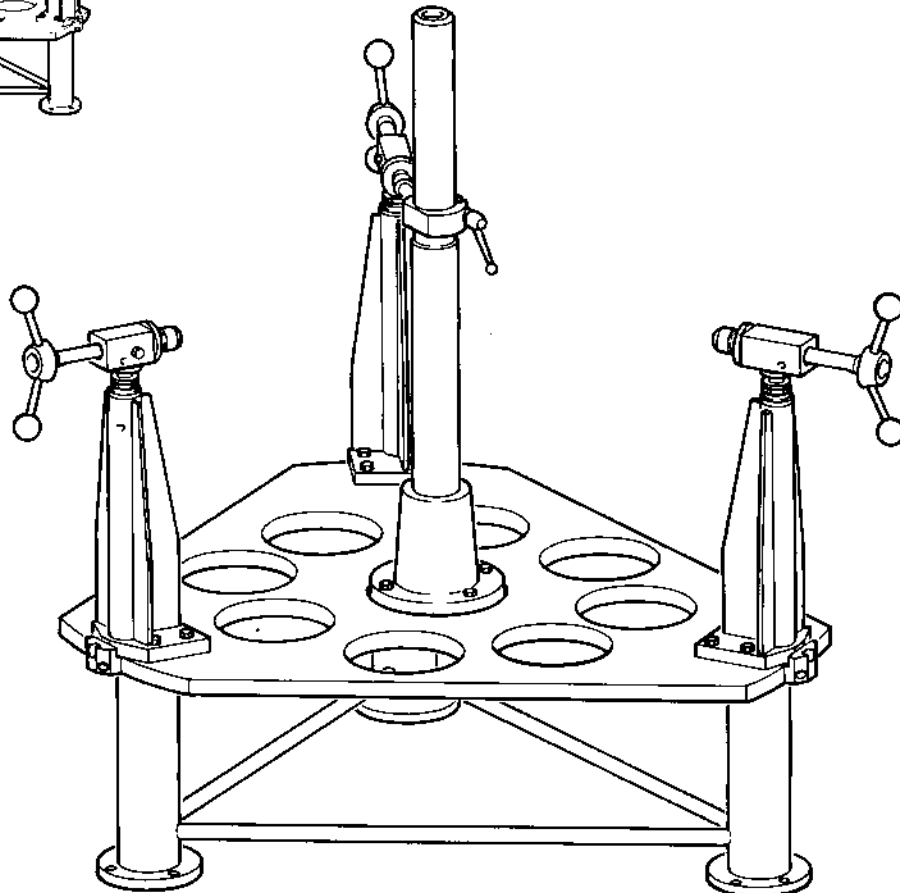
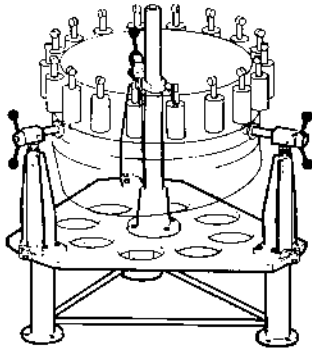
ASSEMBLY SUPPORT STAND - PRIMARY NOZZLE

SNECMA No. 852-500-108-0

Description..... This support stand is used for the positioning and adjustment of the primary nozzle flaps.

Weight.....

Dimensions..... 1600 x 1300 mm (63 x 51 in)



Tool  
SC 61

78-12-01

Page 1014

Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



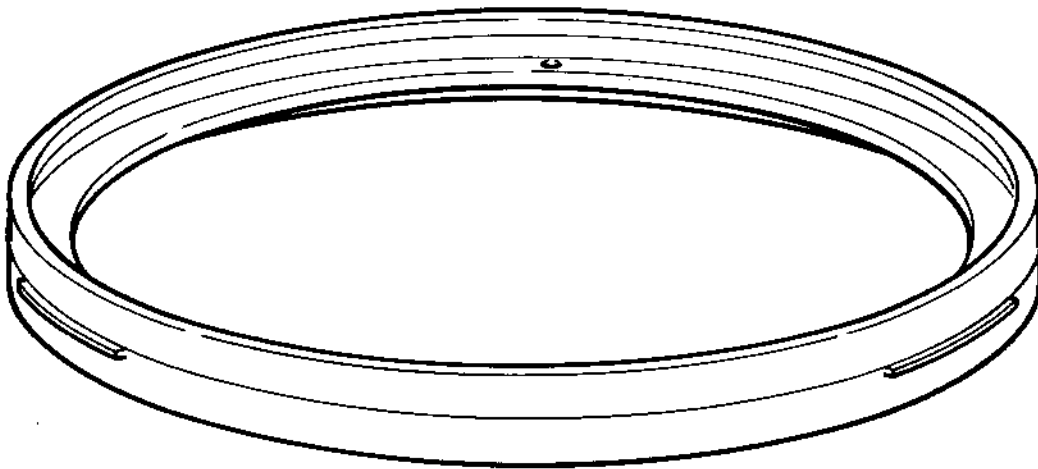
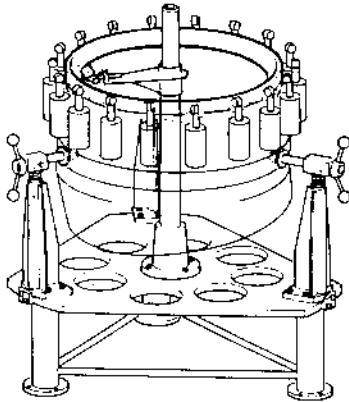
CHECKING RING - PRIMARY NOZZLE

SNECMA No. 852-500-109-0

Description..... This ring is used with checking arm SC 63.

Weight.....

Dimensions..... 980 x 85 mm (39 x 3.4 in)



Tool  
SC 62

**78-12-01**

Page 1015

Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



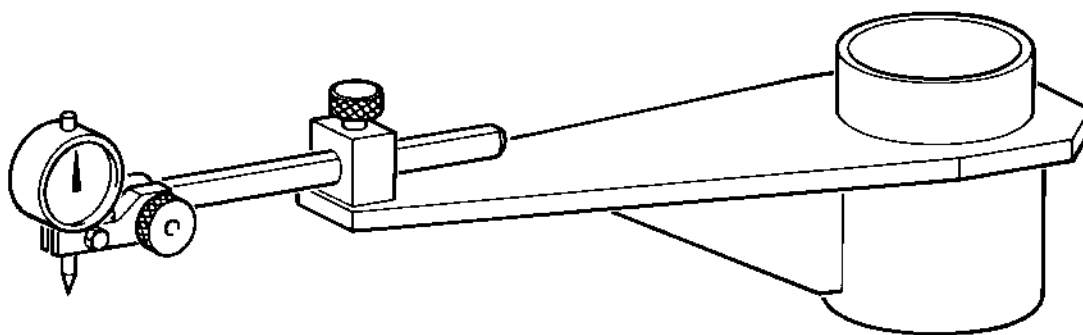
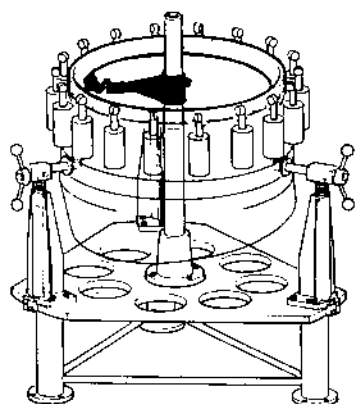
CHECKING ARM - PRIMARY NOZZLE

SNECMA No. 852-500-110-0

Description..... This tool is used to adjust the convergent flange concentricity and surface flatness.

Weight.....

Dimensions..... 450 x 120 x 100 mm (18 x 4.8 x 4 in)



Tool  
SC 63

78-12-01

Page 1016

Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



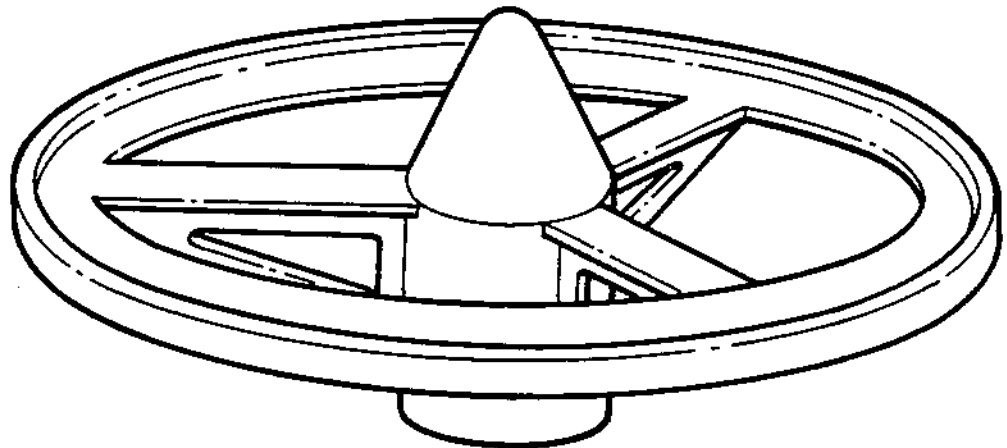
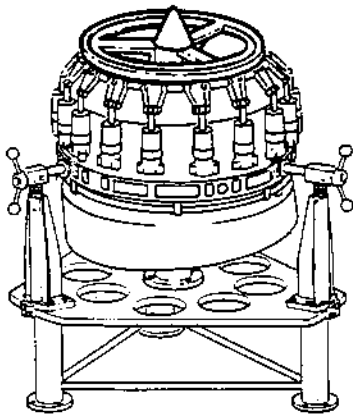
ADJUSTMENT DISC - PRIMARY NOZZLE

SNECMA No. 852-500-155-0

Description..... This disc is used with the assembly support stand (tool SC 61) for the adjustment of the primary nozzle maximum closing area (Mini Aj).

Weight.....

Dimensions..... 757 x 295 mm (30 x 12 in.)



Tool  
SC 64

78-12-01

Page 1017

Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



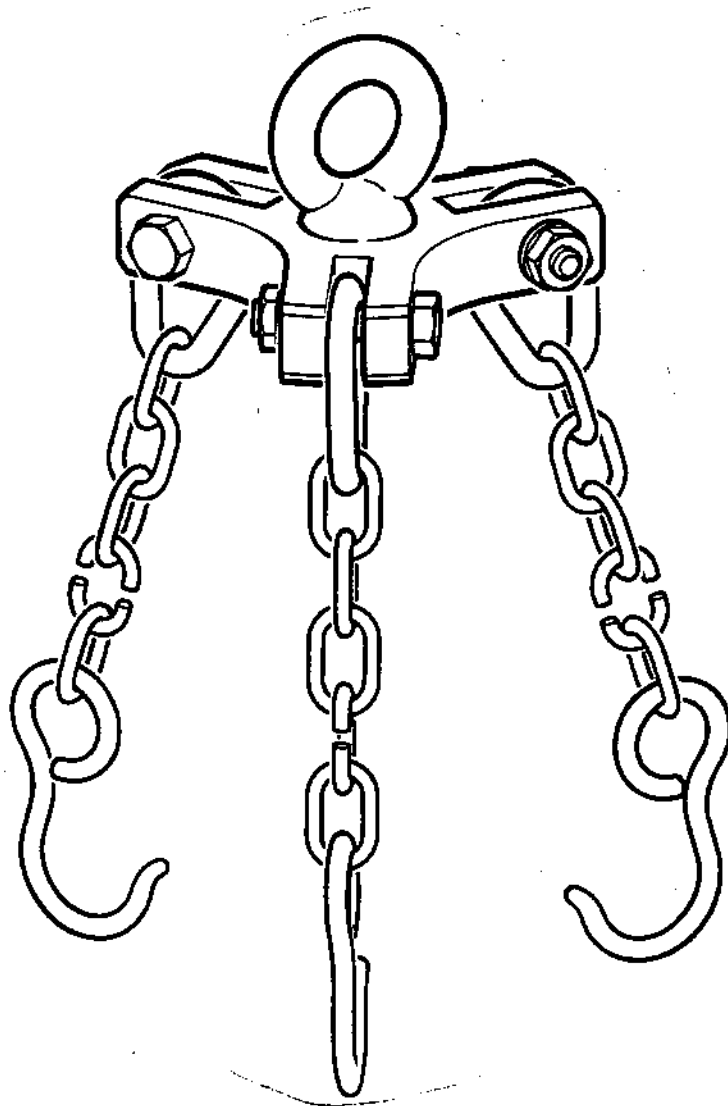
HOISTING DEVICE - PRIMARY NOZZLE

SNECMA No. 852-500-112-0

Description..... This device is used for handling the adjusting discs SC 64 and SC 95.

Weight.....

Dimensions..... 150 x 700 mm (6 x 28 in)



Tool  
SC 65

78-12-01

Page 1018

Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



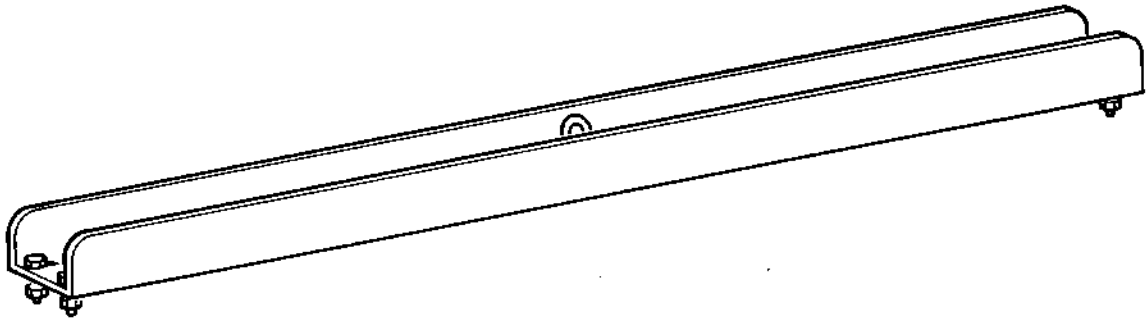
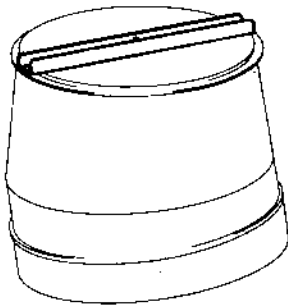
HOISTING BAR - PRIMARY NOZZLE

SNECMA No. 852-500-113-0

Description..... This bar is used for convergent handling.

Weight.....

Dimensions..... 990 x 80 x 40 mm (39 x 3.5 x 1.6 in)



Tool  
SC 66

78-12-01

Page 1019  
Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



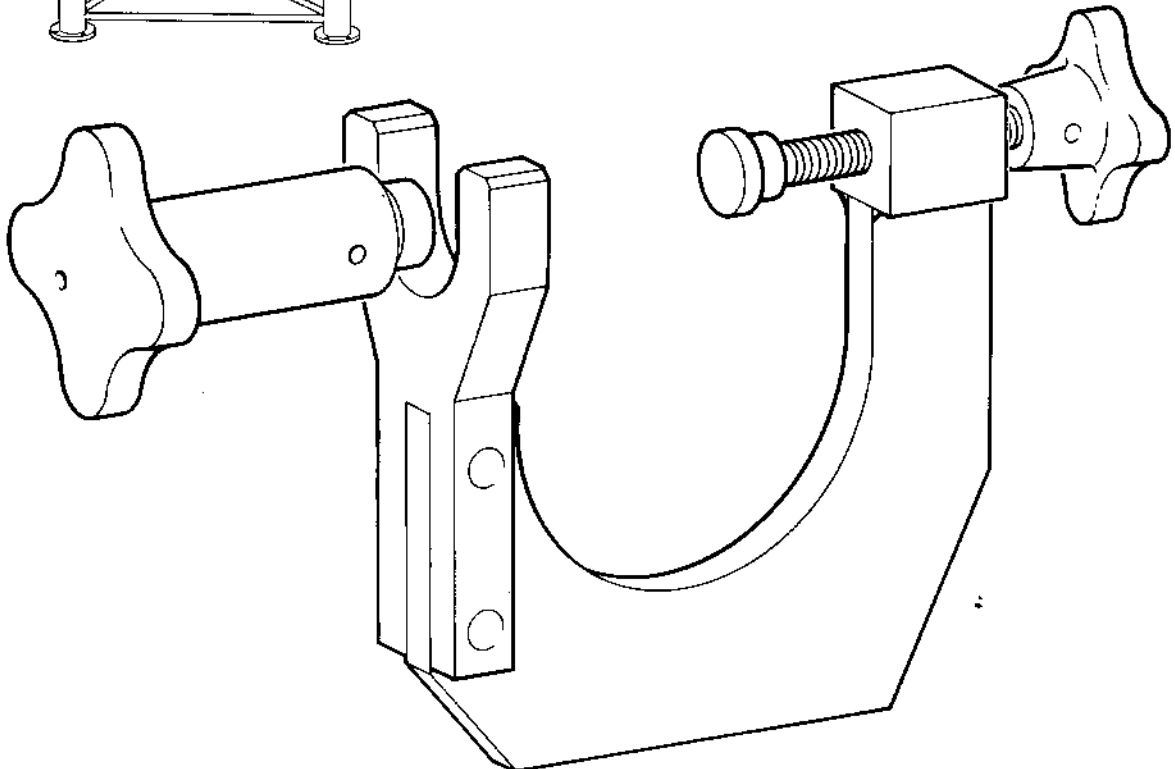
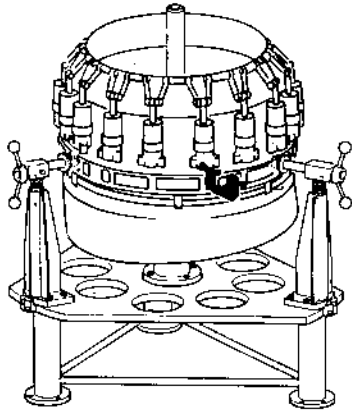
HOLDING DEVICE - PRIMARY NOZZLE

SNECMA No. 852-500-116-0

Description..... This device is used for the installation of  
Truarc rings.

Weight.....

Dimensions..... 170 x 90 x 40 mm (6.70 x 3.6 x 1.6 in)



Tool  
SC 91





OLYMPUS 593

MK.610-14-28  
OVERHAUL



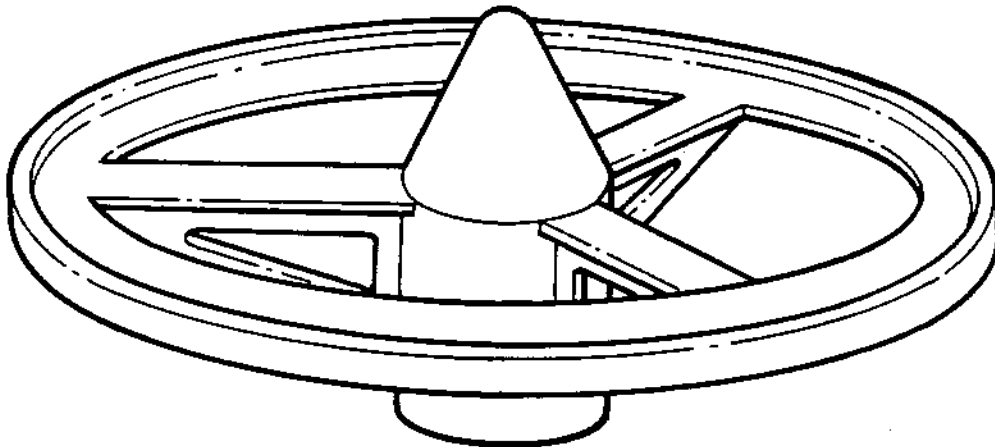
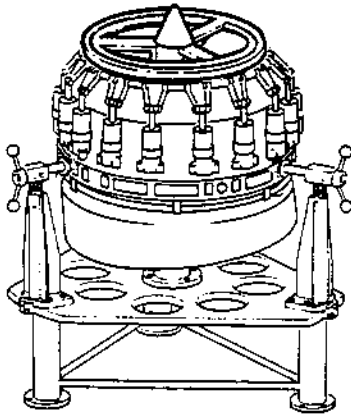
ADJUSTMENT DISC - PRIMARY NOZZLE

SNECMA No. 852-500-120-0

Description..... This disc is used on the assembly support stand  
(tool SC 61) for the nozzle area detector adjustment (Mean Aj).

Weight.....

Dimensions..... 823 x 295 mm (32 x 12 in.)



Tool  
SC 95

78-12-01

Page 1021

Apr 30/93



OLYMPUS 593

MK.610-14-28

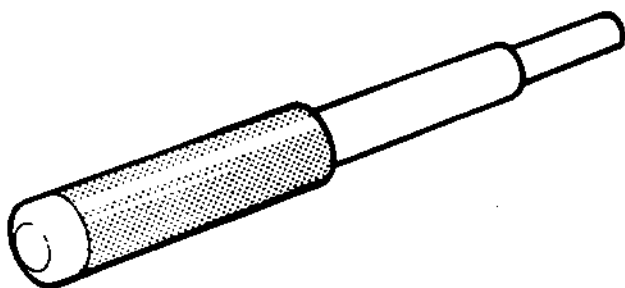
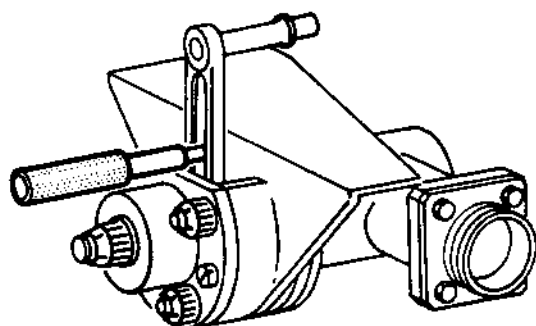
OVERHAUL

SPINDLESNECMA No.852-500-121-0

Description..... This is used to position the control lever for assembling the support with the angular pickoff.

Weight ..... 200 g (7 oz)

Dimensions ..... 4,5 x 6 x 70 mm (0.177 x 0.236 x 2.755 in)



Tool

SC 96

78-12-01

Page 1022

Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



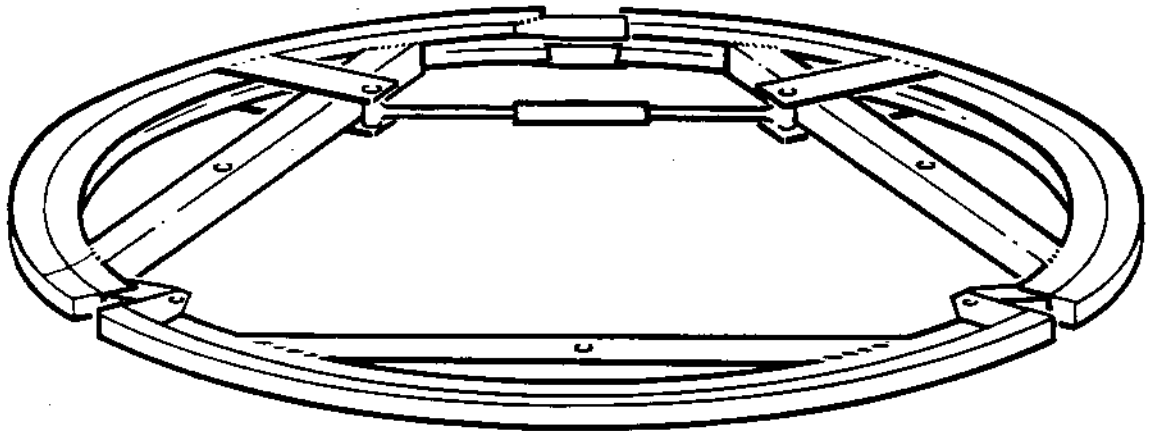
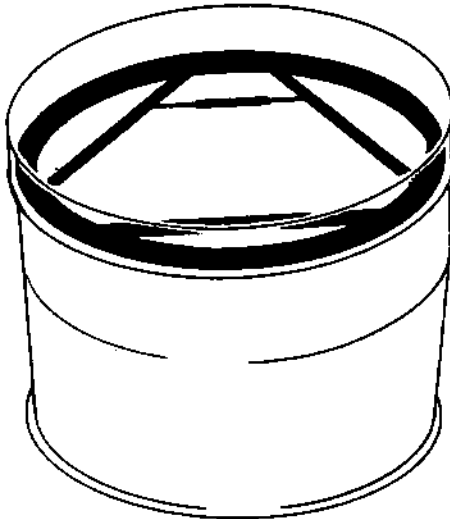
ANTI-DEFORMATION FIXTURE

SNECMA No. 852-630-100-0

Description..... This fixture is used to prevent deformation  
of the convergent section during inspection.

Weight.....

Dimensions..... D = 1019,9 mm (40.154 in.)



Tool  
SC 118

78-12-01

Page 1023  
Apr 30/93

PRINTED IN FRANCE



OLYMPUS 593

MK.610-14-28

OVERHAUL



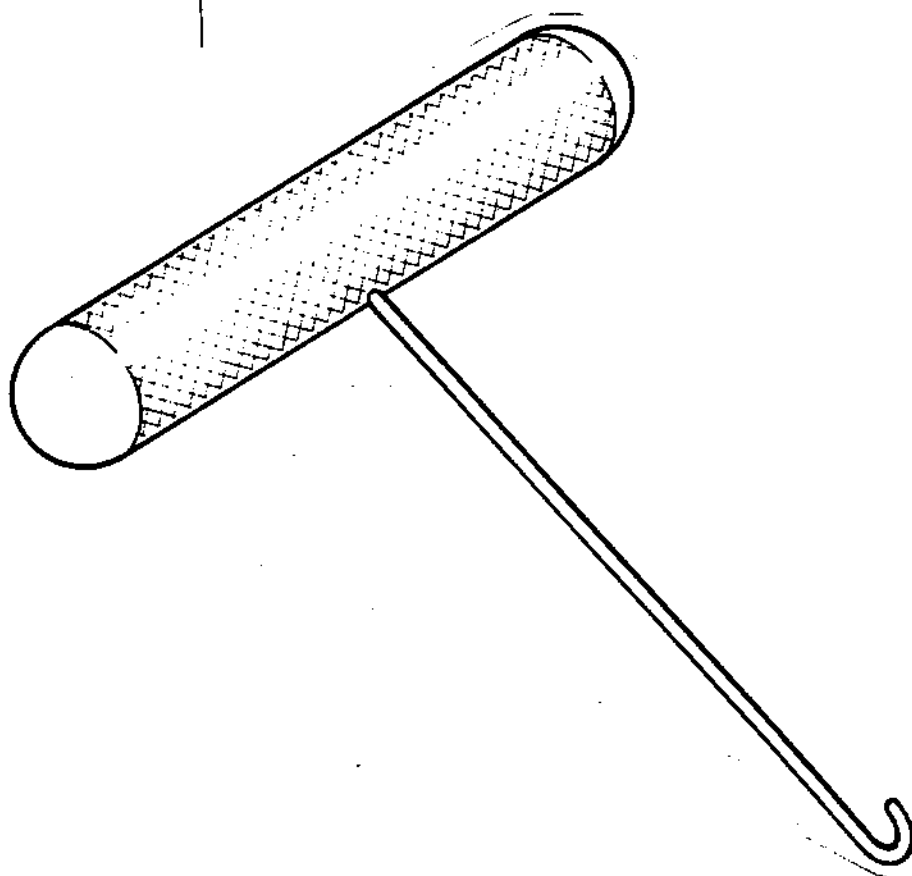
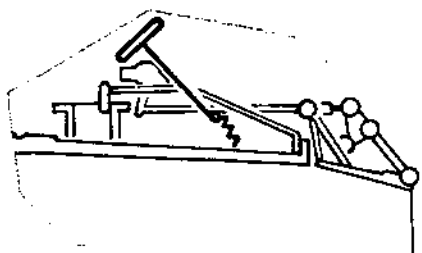
SPRING LOCATING DEVICE

SNECMA No. 852-500-131-0

Description..... This tool is used for locating the primary nozzle area transducer support anti-vibratory spring.

Weight.....

Dimensions.....



Outil  
SC 191

78-12-01

Page 1024

Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



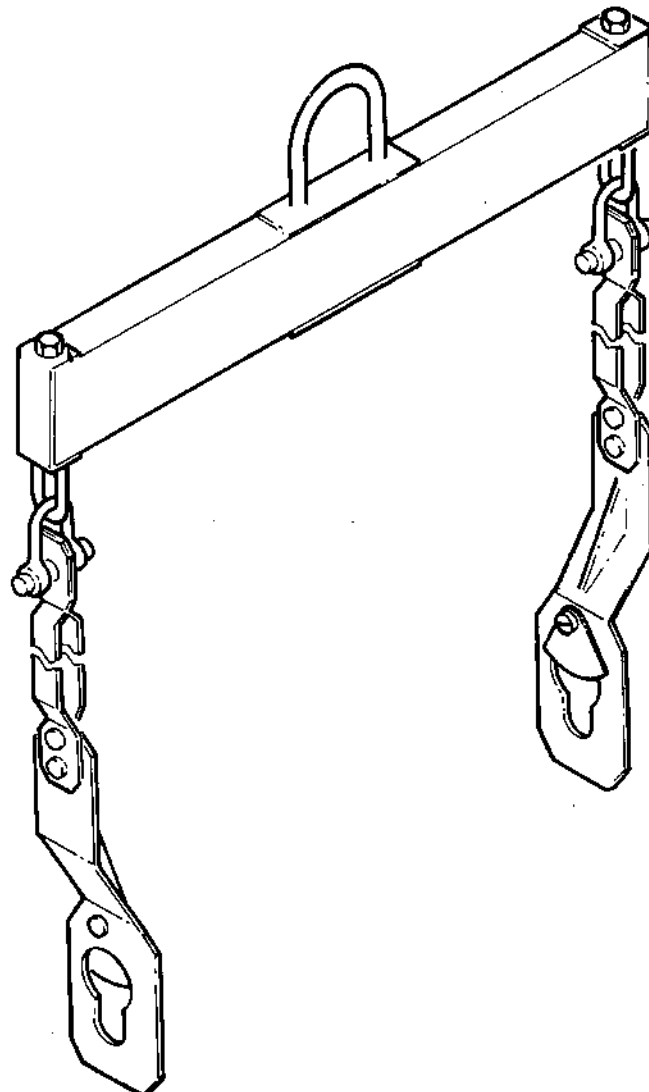
LIFTING BAR

SNECMA No. 852-500-129-0

Description..... This tool is used for handling of the reheat jet pipe and primary nozzle.

Weight..... 11,2 Kg (25 lb)

Dimensions..... 1480 x 975 x 40 mm (58.3 x 38.4 x 1.6 in.)



Tool  
SC 210

78-12-01

Page 1025  
Dec 15/75

PRINTED IN FRANCE



# OLYMPUS 593

MK.610-14-28

OVERHAUL



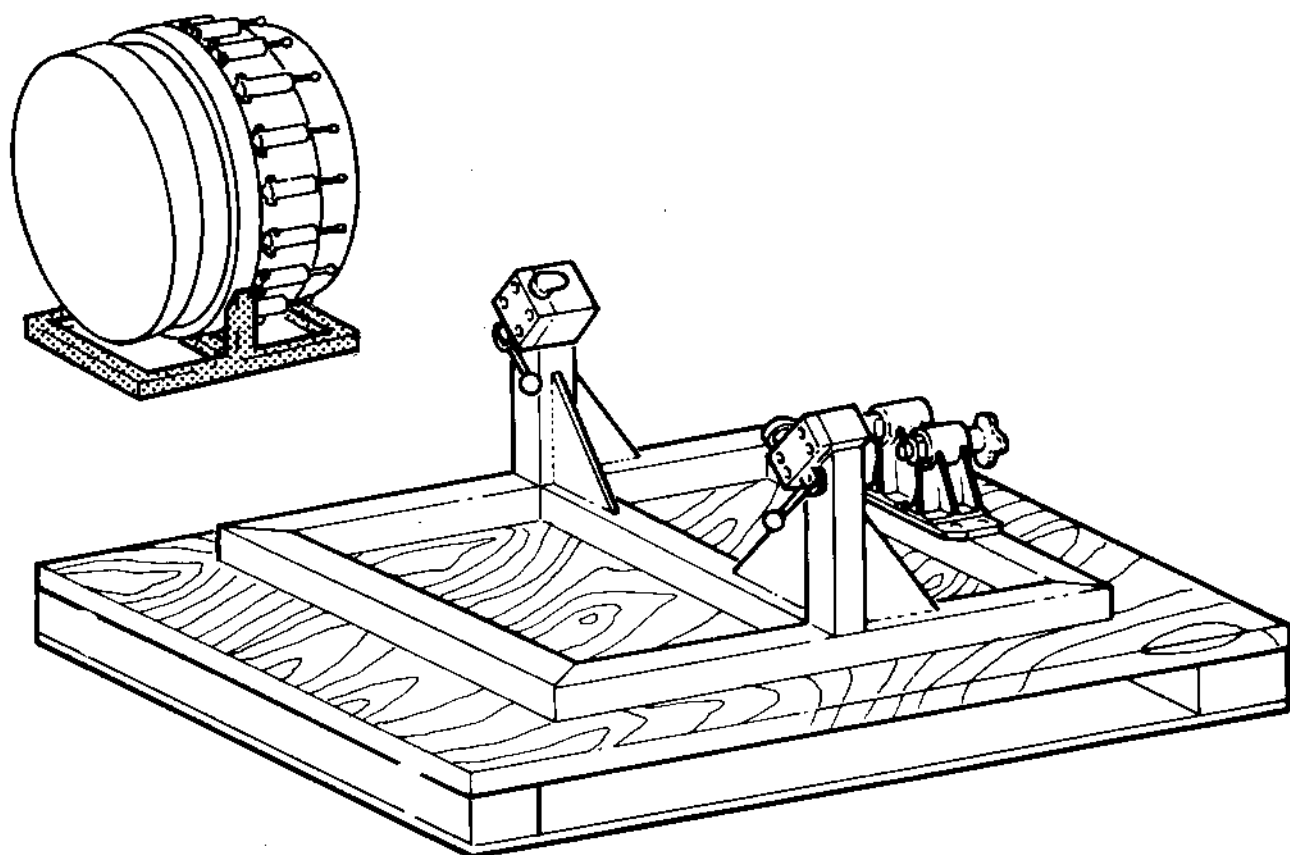
REST STAND

SNECMA N° 852-500-147-0

Description..... This stand accomodates the primary nozzle in horizontal position for overhaul shop storage

Weight.....

Dimensions.....



Tool

**SC 218**

**78-12-01**

Page 1026

Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



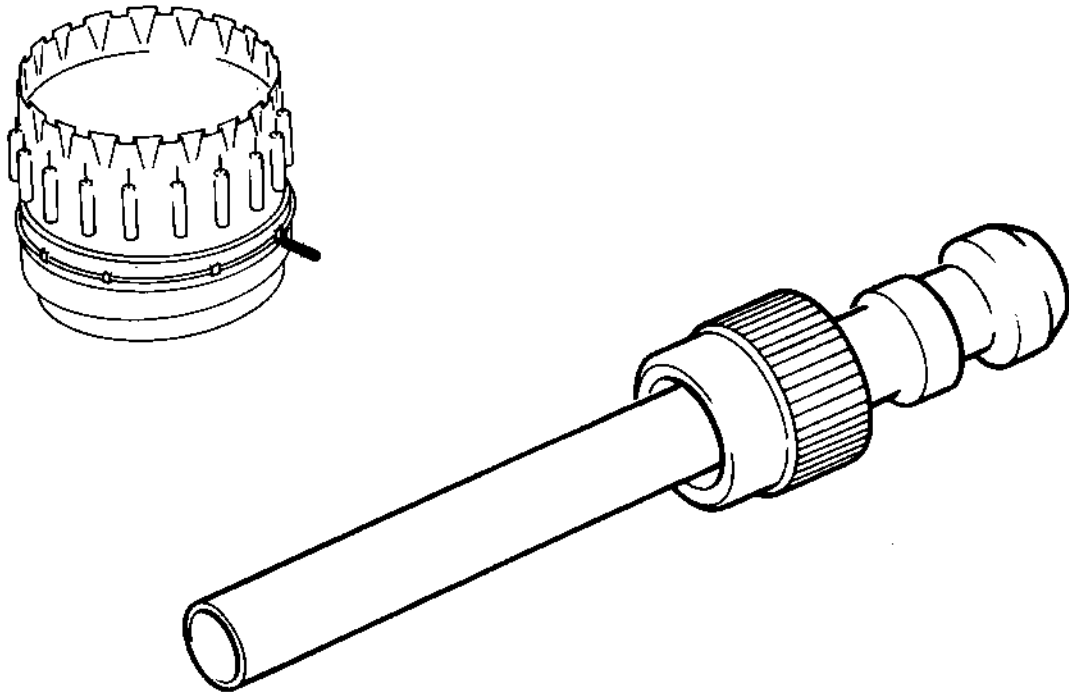
ADAPTOR

SNECMA N° 852-500-077-0

Description..... This adaptor is used to provide for the  
nozzle/air source connection during operation tests.

Weight.....

Dimensions..... 110 x 40 mm (4.3 x 1.6 in).



Tool  
**SC 238**

**78-12-01**

Page 1027

Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



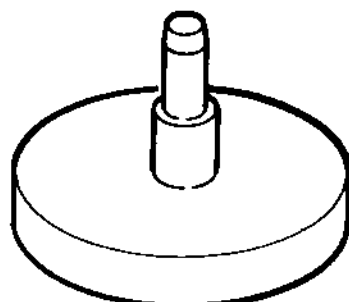
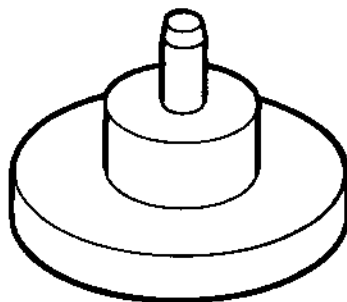
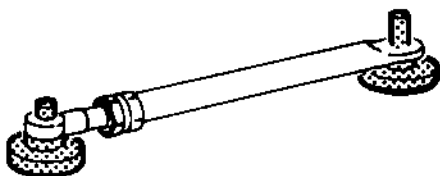
LOCATING DOWEL

SNECMA N° 852-500-150-0

Description.....This tool is used to align the link center-  
lines (primary nozzle area transducer)

Weight..... 0,10 kg (0.22 lb)

Dimensions..... 50 x 25 mm (1.9 x 0.9 in).



Tool

SC 248

**78-12-01**

Page 1028  
Dec 15/75





OLYMPUS 593

MK.610-14-28

OVERHAUL



CRIMPING TOOL

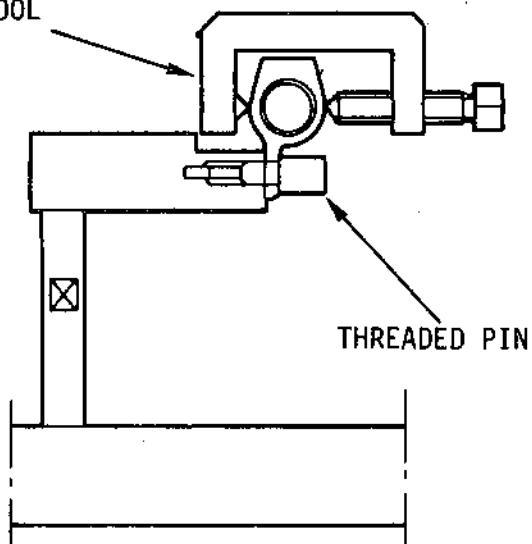
SNECMA No. 852-630-052-0

Description ..... This tool is used for crimping the loop  
clamps on manifold

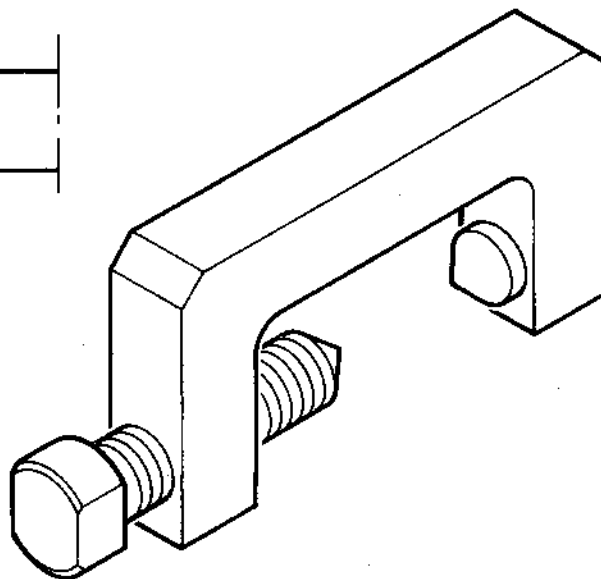
Weight .....

Dimensions ..... 57 x 32 mm (2.2 x 1.25 in.)

CRIMPING TOOL  
SC 138



THREADED PIN



Tool  
**SC 138**

**78-12-01**



OLYMPUS 593

MK.610-14-28  
OVERHAUL



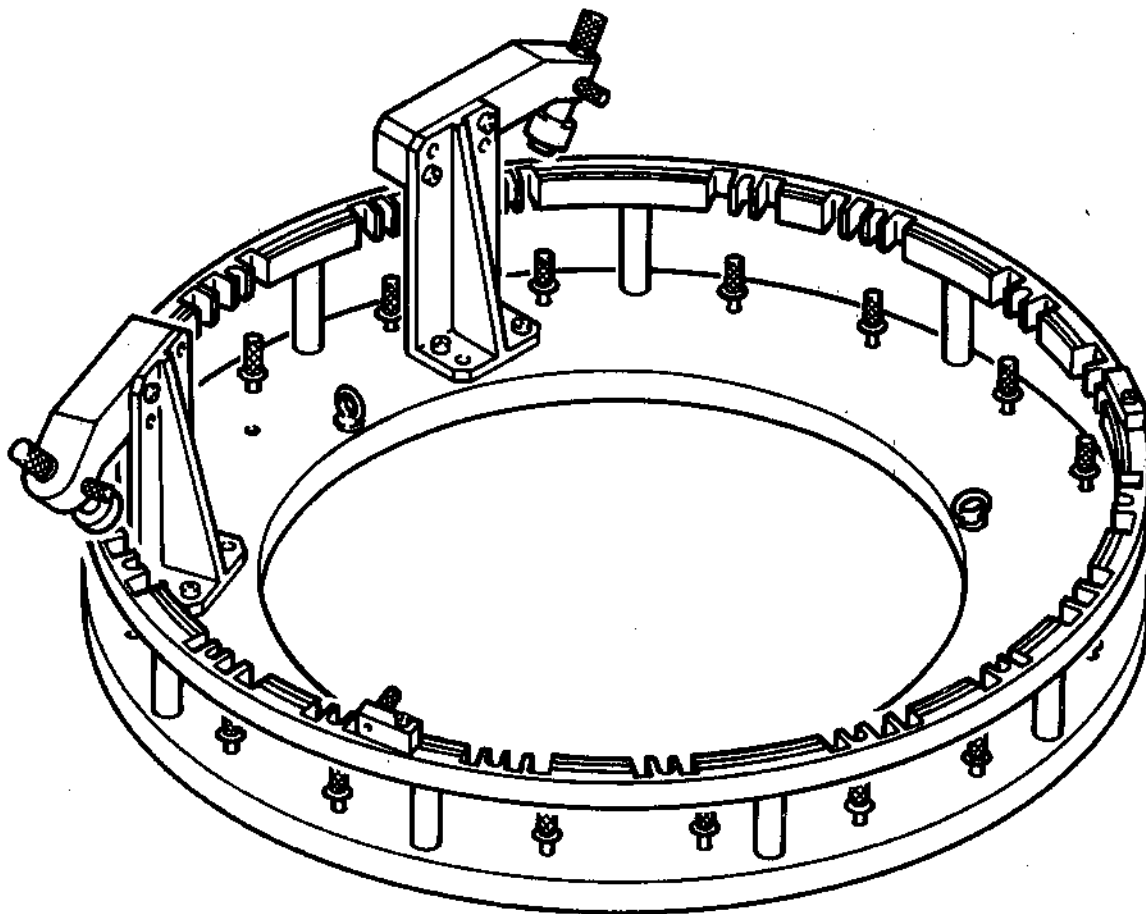
ADJUSTING AND TACK-WELDING FIXTURE

SNECMA No. 852-630-166-0

Description ..... This tool is used for replacing manifold segments.

Weight .....

Dimensions .....



PRINTED IN FRANCE

Tool

SC 285

78-12-01

Page 1030  
May 31/84



OLYMPUS 593

MK.610-14-28  
OVERHAUL



# **ILLUSTRATED PARTS LIST**

**78-12-01**

TP 1101 PAGE 1  
DEC 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## INTRODUCTION

### 1. Purpose

This illustrated parts list gives a complete list of the components required for the overhaul of an equipment.

### 2. Illustrated parts list

The illustrated parts list is divided into three parts :

- Introduction
- Numerical index
- Detailed parts list

#### A. Numerical index :

For the sake of clearness, this repertory is divided into two parts :

- (1) Index of manufacturers references beginning with a letter.
- (2) Index of manufacturers references beginning with a figure.

These indexes include all the manufacturers references for the parts described in the detailed nomenclature in alphabetical or numerical order. Opposite each reference is given the chapter-section-subject-figure-item number and the quantity.

#### B. Detailed parts list.

The detailed parts list gives, in disassembly order, the list and illustrations of the parts making up the assembly concerned from the origin as shown in the example paragraph B6 effectivity.

- (1) Items index numbers.

To allow simple and speedy identification, each item is given a numerical item in 10 to 10 sequence, this item will not vary during the whole life of the item.

- (2) Original item.

To cater for systematic evolution due to modifications a "letter" variant is added to the numerical item. The letter variant "A" is given in the original document to identify all the items in original definition.

78-12-01



OLYMPUS 593

MK.610-14-28

OVERHAUL



It is given in the text part only.

(3) Modified item (Item variant).

After each modification concerning an item, the numerical item of this item is maintained but the "letter" variant progresses systematically to "B", then "C", "D" etc. (letters I, O and X are not used). This variant evolution is shown in the text and on the drawings only in the case of a change. The use of the "letter" variant added to the numerical item has been made necessary to make possible the rational use of the "effectivity Code" (usage code) such as it is presented paragraph 6 of this foreword.

(4) Indent

The detailed nomenclature is presented indented showing the relation between the various items, i.e :

1	2	3	4	5	6	7
Assembly						
	Assembly component parts					
	Sub-assembly					
	Sub-assembly attachment parts					
	*	*	*			
	Sub-assembly component parts					
	Sub sub-assembly					
	Sub sub-assembly attachment parts					
	*	*	*			
	Sub sub-assembly component parts					

(5) Quantity per assembly

The quantity indicated in the "Quantity per assembly" column is that required by the next higher assembly.

(6) Effectivity

A coded method is used to indicate parts effectivity.

This alphanumerical code indicates the installation possibilities of sub-assemblies and primary parts in relation to the next higher sub-assembly or assembly. The validity column is left blank when installation is possible in all cases.

78-12-01



OLYMPUS 593

MK.610-14-28

OVERHAUL



This code corresponds to the next higher assembly or sub-assembly item.

Figure Item	Manufacturers Reference	Description							Effectivity
		1	2	3	4	5	6	7	
1A	123450	Assembly							
1B	123451	Assembly (SB 1)							
1C	123452	Assembly (SB 2)							
1D	123453	Assembly (SB 3)							
10A	234560	. PRIMARY PART							1A
10B	234561	. PRIMARY PART (BS 1)							1BAC
10C	234562	. PRIMARY PART (BS 3)							1D
20A	345670	. SUB-ASSEMBLY							1A
20B	345671	. SUB-ASSEMBLY (BS 1)							1BAC
20C	345672	. SUB-ASSEMBLY (BS 2)							
20D	345673	. SUB-ASSEMBLY (BS 3)							
		. ATTACHING PARTS							
30A	456780	. PRIMARY PART							
		* * *							
40A	567890	. . PRIMARY PART							20A
40B	567891	. . PRIMARY PART (BS 1)							20BA
40C	567892	. . PRIMARY PART (BS-2)							20CAB
40D	567893	. . PRIMARY PART (BS 3)							20D

The above example shows that :

- The primary part index 10A can only be installed in assembly indexed 1A.
- The primary part index 10B can be installed in assemblies indexed 1A, 1B, and 1C.
- The primary part index 10C can only be installed in assembly indexed 1D.
- The sub-assembly index 20A can only be installed in assembly indexed 1A.
- The sub-assembly index 20B can be installed in assemblies indexed 1A, 1B and 1C.
- The sub-assemblies indexes 20C and 20D and their attaching parts indexed 30A can be installed in all assemblies indexed 1 and thus do not have an "effectivity" code.
- The primary part index 40A can only be installed in sub-assembly indexed 20A.
- The primary part index 40B can be installed in sub-assemblies indexed 20A and 20B.

78-12-01

INTRO 1101 - PAGE 3

DEC 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- The primary part index 40C can be installed in sub-assemblies indexed 20A, 20B and 20C.
- The primary part index 40D can only be installed in the sub-assembly indexed 20D.

(7) Figure Variant

When it is not possible to illustrate the different variants of an assembly, resulting from modifications to the basic figure, one or several supplementary illustrations will describe these variants.

These supplementary illustrations will bear the same number as that of the basic figure, followed by a letter taken in the alphabetical order (except I and O).

Whatever the number of figure variants, they will be covered by only one nomenclature.

To ascertain quickly on which figure variant the item variant is to be found, the figure variant letter will be indicated in the nomenclature, in the "index reference figure item immediately in front of the item number.

3. Using the illustrated nomenclature

The identification of a component is possible taking the following elements in consideration :

A. Through the manufacturer's reference.

Search for the manufacturer's reference in the numerical index, note the chapter-section-subject-figure-item number and refer to the corresponding nomenclature.

B. At sight of the component, without knowing its references.

Look for the figure showing the component among the illustrations this will indicate the item permitting reference to the detailed nomenclature.

78-12-01



OLYMPUS 598

MK.610-14-28  
OVERHAUL



4. Manufacturer codes

Code

Name and address

F0224

SIMMONDS S.A  
5 RUE MICHELET  
92152 SURESNES  
FRANCE

K1037

DUNLOP LTD-AVIATION DIV  
FOLESHILL  
COVENTRY CV6 4AA  
ENGLAND

72962

ESNA  
DIV OF HARVARD INDUSTRIES INC.  
2330 VAUXHALL ROAD  
UNION  
NEW JERSEY 07083  
U.S.A.

PRINTED IN FRANCE

78-12-01

INTRO 1101 - PAGES 5/6  
APR 30/93



**OLYMPUS 593**MK.610-14-28  
OVERHAUL

PART NUMBER	AIRLINE PART NUMBER	FIG	ITEM	TTL REQ
AC64174		1	30A	18
DHT5579-3		1	110A	2
DHT5579-4		2	240A	2
		2	280A	2
		4	10A	24
		4	30A	30
		4	60A	30
		4	90A	36
		6	10A	36
		6	40A	12
MS9033-08		5	60A	18
		5	140A	18
MS9034-10		2	100A	3
		2	260A	2
MS9034-12		5	20A	17
		5	40A	1
SP90B4		3	40A	2
		3	40B	4
		3	70A	1
		3	70B	2
SP90C4		1	70A	18
		3	110A	18
		3	140A	18
		3	280A	18
		6	70A	12
		6	140A	12
Z3874-02				
OPT TO DHT5579-3				
Z3874-048				
OPT TO DHT5579-4				

- ITEM NOT ILLUSTRATED

**78-12-01**NI ALPHA 1101 PAGE 1  
APR 30/93

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



PART NUMBER	AIRLINE PART NUMBER	FIG	ITEM	TTL REQ
21215CA3207		6	240A	4
301-160-002-0		2	90A	1
301-170-001-0		3	270A	17
		3	-270B	16
301-170-002-0				
OPT TO 301-170-001-0				
301-171-803-0		2	- 60B	1
301-171-804-0		2	60A	1
301-172-002-0		2	- 70B	1
301-172-100-0		2	300A	1
301-172-101-0				
OPT TO 301-172-100-0				
301-172-401-0		2	230A	1
301-172-602-0				
OPT TO 425-611-849-0				
301-172-901-0		2	190A	1
301-173-000-0		2	- 50B	1
SUPSDS 301-173-001-0				
301-173-001-0		2	50A	1
SUPSD BY 301-173-000-0				
301-173-001-0		2	50A	1
301-173-101-0		2	160A	1
		2	220A	1
301-173-200-0		2	130A	1
301-173-300-0		3	230A	1
		3	-230B	2
301-174-702-0		2	270A	1
301-175-100-0		2	20A	1
		2	40A	1
		2	150A	1
		2	180A	1
		2	210A	1
301-176-000-0		5	10A	1
301-176-900-0		3	310A	18
301-176-901-0		3	-310B	18
301-176-902-0		3	-310D	18
301-176-903-0		3	-310C	18
301-177-000-0		6	-160B	3
301-177-601-0		2	110A	1
301-178-301-0		2	70A	1
301-179-101-0		6	- 30B	18
301-180-900-0		4	-120B	9
301-181-400-0		4	95A	18
301-217-000-0		1	- 1A	RF
SUPSD BY 301-217-003-0				
		2	- 1A	RF
SUSPS BY 301-217-003-0				

- ITEM NOT ILLUSTRATED

BDC - 7824 - 12-79

**78-12-01**NI NUM 1101 PAGE 1  
APR 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



PART NUMBER	AIRLINE PART NUMBER	FIG	ITEM	TTL REQ
301-217-000-0		3	- 1A	RF
SUPSD BY 301-217-003-0		4	- 1A	RF
SUPSD BY 301-217-003-0		5	- 1A	RF
SUPSD BY 301-217-003-0		6	- 1A	RF
SUPSD BY 301-217-003-0		1	- 1B	RF
301-217-003-0				
SUPSDS 301-217-000-0				
SUPSD BY 301-217-004-0				
SUPSD BY 301-217-005-0		2	- 1B	RF
SUPSDS 301-217-000-0				
SUPSD BY 301-217-004-0				
SUPSD BY 301-217-005-0		3	- 1B	RF
SUPSDS 301-217-000-0				
SUPSD BY 301-217-004-0				
SUPSD BY 301-217-005-0		4	- 1B	RF
SUPSDS 301-217-000-0				
SUPSD BY 301-217-004-0				
SUPSD BY 301-217-005-0		5	- 1B	RF
SUPSDS 301-217-000-0				
SUPSD BY 301-217-004-0				
SUPSD BY 301-217-005-0		6	- 1B	RF
SUPSDS 301-217-000-0				
SUPSD BY 301-217-004-0				
SUPSD BY 301-217-005-0		1	- 1C	RF
301-217-004-0		2	- 1C	RF
SUPSDS 301-217-003-0		3	- 1C	RF
SUPSDS 301-217-003-0		4	- 1C	RF
SUPSDS 301-217-003-0		5	- 1C	RF
SUPSDS 301-217-003-0		6	- 1C	RF
SUPSDS 301-217-003-0		1	- 1D	RF
301-217-005-0				
SUPSDS 301-217-003-0				
SUPSD BY 301-217-004-0				

- ITEM NOT ILLUSTRATED

78-12-01

NI NUM 1101 PAGE 2  
AUG.31/77

DOC. 7824 - 12-78



OLYMPUS 593

MK.610-14-28

OVERHAUL



PART NUMBER	AIRLINE PART NUMBER	FIG	ITEM	TTL REQ
301-217-005-0		2	- 1D	RF
SUPSDS 301-217-003-0				
SUPSD BY 301-217-004-0				
		3	- 1D	RF
SUPSDS 301-217-003-0				
SUPSD BY 301-217-004-0				
		4	- 1D	RF
SUPSDS 301-217-003-0				
SUPSD BY 301-217-004-0				
		5	- 1D	RF
SUPSDS 301-217-003-0				
SUPSD BY 301-217-004-0				
		6	- 1D	RF
SUPSDS 301-217-003-0				
SUPSD BY 301-217-004-0				
		1	- 1D	RF
SUPSDS 301-217-003-0				
SUPSD BY 301-217-004-0				
301-225-001-0		3	220A	1
		3	- 220B	2
301-225-002-0				
OPT TO 301-225-001-0				
301-225-100-0		3	30A	18
301-225-101-0				
OPT TO 301-225-100-0				
301-225-600-0				
OPT TO 301-225-601-0				
301-225-601-0		6	60A	6
301-226-900-0		1	150A	1
301-227-300-0		1	200A	1
301-227-500-0		1	180A	1
301-227-603-0				
OPT TO 301-227-604-0				
301-227-604-0		1	100A	1
301-228-110-0		6	- 190B	1
301-228-112-0		6	190A	1
301-228-113-0		6	- 190C	1
301-228-300-0		4	20A	24
		4	70A	30
		4	100A	36
301-228-301-0		4	- 20B	24
		4	- 70B	30
		4	- 100B	36
301-228-507-0		4	110A	1
301-228-510-0		4	- 110B	1
425-611-849-0		2	120A	1
525-217-008-0		3	20A	36
525-217-035-0		4	- 50A	8

- ITEM NOT ILLUSTRATED

78-12-01

NI NUM 1101 PAGE 3  
APR 30/93



OLYMPUS 593

MK. 610-14-28

OVERHAUL



PART NUMBER	AIRLINE PART NUMBER	FIG	ITEM	TTL REQ
525-217-059-0		3	130A	18
525-217-091-0		3	100A	2
		3	-100B	4
525-217-118-0		4	80A	10
525-217-139-0		3	210A	1
		3	-210B	2
525-217-195-0		1	80A	18
		3	120A	18
		3	150A	18
525-217-643-0		4	120A	9
525-410-009-0		6	30A	18
525-410-011-0		3	180A	72
525-410-014-0		3	200A	1
		3	-200B	2
		3	250A	34
		3	-250B	32
525-410-017-0		3	260A	34
		3	-260B	32
525-410-019-0		1	90A	18
525-410-021-0		6	250A	1
525-600-007-0		6	220A	AR
525-600-014-0		3	320A	18
525-600-037-0		5	50A	1
525-600-038-0		5	30A	17
525-600-040-0		6	110A	3
525-600-041-0		6	90A	3
525-600-042-0		6	100A	3
525-600-045-0		3	170A	36
525-600-077-0		6	230A	36
525-600-077-1		6	-232A	AR
OVERSIZE				
		6	-234A	AR
OVERSIZE				
		6	-235A	AR
OVERSIZE				
		6	-236A	AR
OVERSIZE				
		6	-238A	AR
525-600-078-0		6	210A	2
525-600-079-0		6	200A	4
525-600-084-0				
OPT TO 525-600-040-0				
525-600-085-0				
OPT TO 525-600-041-0				
525-600-165-0		6	130A	12
		6	180A	12

-- ITEM NOT ILLUSTRATED

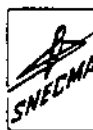
78-12-01

NI NUM 1101 PAGE 4  
APR 30/93

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



PART NUMBER	AIRLINE PART NUMBER	FIG	ITEM	TTL REQ
525-609-721-0		5	90A	1
525-609-764-0		5	80A	9
525-609-783-0		5	150A	9
525-609-788-0		1	10A	18
525-609-791-0		6	160A	3
649-091-375-0		2	290A	2
649-092-075-0		4	40A	12
649-092-080-0		6	20A	36
		6	50A	12
649-143-063-0		1	130A	1
649-143-064-0		1	140A	1
		1	190A	1
649-143-333-0		1	120A	2
649-261-011-0		2	80A	1
649-341-011-0		2	250A	2
649-343-012-0		3	300A	18
649-477-014-0		5	130A	1
649-478-014-0		5	120A	1
649-771-004-0		1	60A	18
649-774-013-0		3	90A	1
		3	- 90B	2
649-774-021-0		3	60A	2
		3	- 60B	4
649-774-064-0		5	70A	9
649-774-065-0		3	10A	36
649-774-066-0		3	160A	18
649-783-005-0		3	50A	2
		3	- 50B	4
		3	80A	1
		3	- 80B	2
649-783-007-0				
OPT TO 525-217-195-0				
649-783-021-0		6	80A	12
		6	150A	12
649-783-026-0		3	290A	18
649-786-057-0		1	50A	18
649-786-060-0		6	120A	12
		6	170A	12
649-971-004-0		1	- 20A	2
		1	- 160A	1
649-971-034-0				
OPT TO 649-971-004-0				
649-972-004-0		1	- 170A	1
		5	- 100A	18
649-972-014-0		5	- 110A	2

- ITEM NOT ILLUSTRATED

**78-12-01**NI NUM 1101 PAGE 5  
APR 30/93

**OLYMPUS 593**

MK. 610-14-28

OVERHAUL



PART NUMBER	AIRLINE PART NUMBER	FIG	ITEM	TTL REQ
650-362-607-6		1	40A	18
		3	190A	1
		3	- 190B	2
		3	240A	34
		3	- 240B	32
650-362-620-6		2	10A	1
		2	30A	1
		2	140A	1
		2	170A	1
		2	200A	1
650-771-011-0				
OPT TO 650-362-607-6				
650-771-012-0				
OPT TO 650-362-620-6				

- ITEM NOT ILLUSTRATED

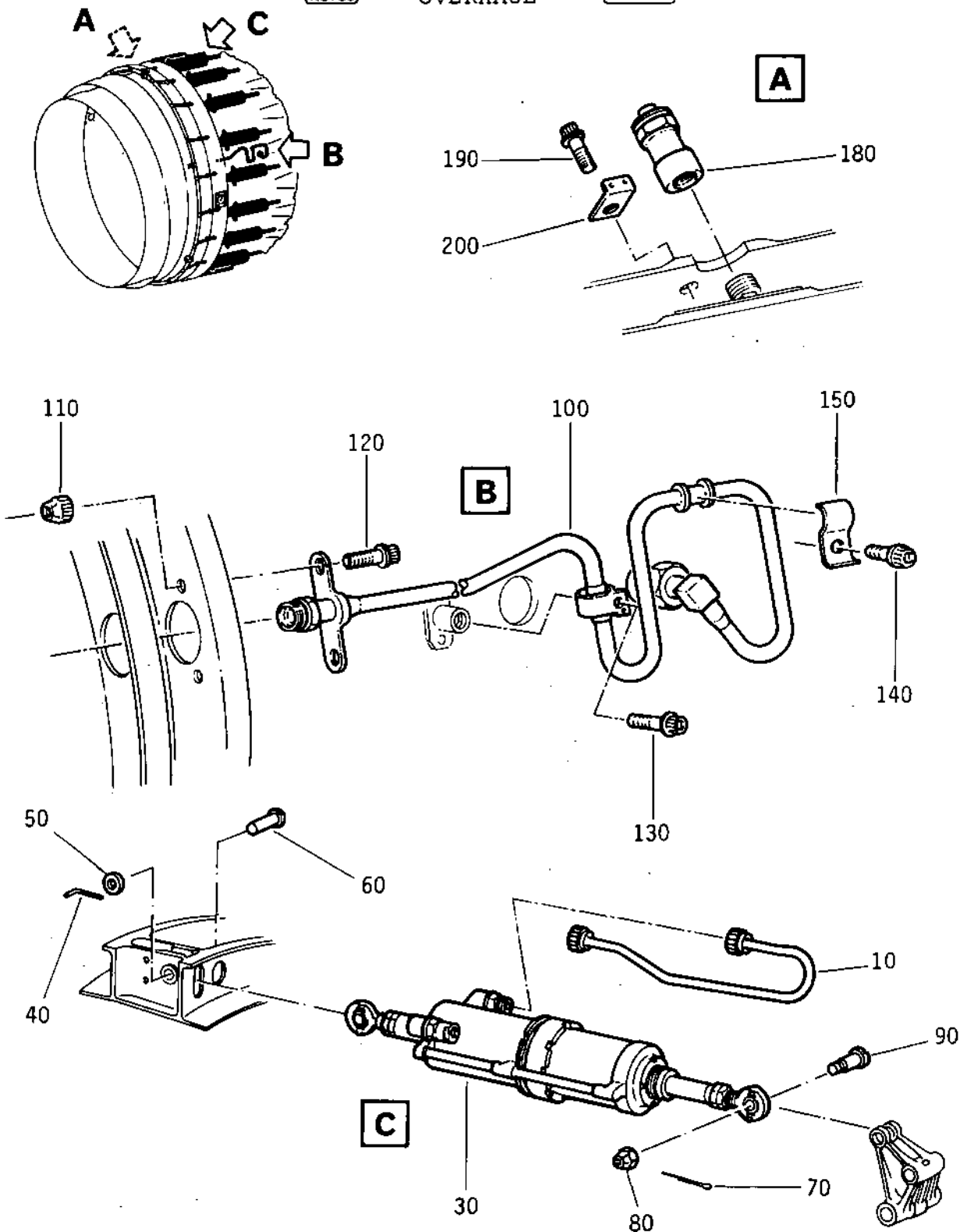
**78-12-01**NI NUM 1101 PAGE 6  
APR 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



Nozzle, Primary  
Figure 1

78-12-01

PAGE 1101-0  
DEC 30/74



**OLYMPUS 593**

MK. 610-14-28

OVERHAUL

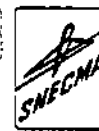


FIG-ITEM	PART NUMBER	NOMENCLATURE					USAGE CODE	UNITS PER ASSY
		1	2	3	4	5		
1 - 1A	301-217-000-0	NOZZLE, PRIMARY						RF
- 1B	301-217-003-0	NOZZLE, PRIMARY						RF
		POST SB 0L-593-78-7						
- 1C	301-217-004-0	NOZZLE, PRIMARY						RF
		POST SB 0L-593-78-2						
		POST SB 0L-593-78-1						
		POST SB 0L-593-78-8						
- 1D	301-217-005-0	NOZZLE PRIMARY						RF
		POST SB 0L-593-78-8						
10A	525-609-788-0	.TUBE, SUPPLY						18
- 20A	649-971-004-0	..PLUG, STORAGE						2
		OPT TO 649-971-034-0						
30A	AC64174	.JACK, PRIMARY NOZZLE				VK1037		18
		SEE 78-12-40 FOR DET						
		ATTACHING PARTS						
40A	650-771-011-0	.PIN						18
		OPT TO 650-362-607-6						
50A	649-786-057-0	.WASHER						18
60A	649-771-004-0	.PIN						18
70A	SP90C4	.PIN, SPLIT						18
80A	525-217-195-0	.NUT, CASTELLATED						18
		OPT TO 649-783-007-0						
90A	525-410-019-0	.PIN						18
		***						
100A	301-227-603-0	.TUBE						1
		OPT TO 301-227-604-0						
		ATTACHING PARTS						
110A	DHT5579-3	.NUT, SELF-LOCKING				VF0224		2
		OPT TO Z3874-02				V72962		
120A	649-143-333-0	.BOLT, 12 POINT HEAD						2
130A	649-143-063-0	.BOLT, 12 POINT HEAD						1
140A	649-143-064-0	.BOLT, 12 POINT HEAD						1
150A	301-226-900-0	.CLAMP						1
		***						
-160A	649-971-004-0	..PLUG, STORAGE						1
		OPT TO 649-971-034-0						
-170A	649-972-004-0	..PLUG, STORAGE						1
180A	301-227-500-0	.BLANKING, PART						1
190A	649-143-064-0	.BOLT, 12 POINT HEAD						1
200A	301-227-300-0	.PLATE, LOCKING						1

- ITEM NOT ILLUSTRATED

**78-12-01**

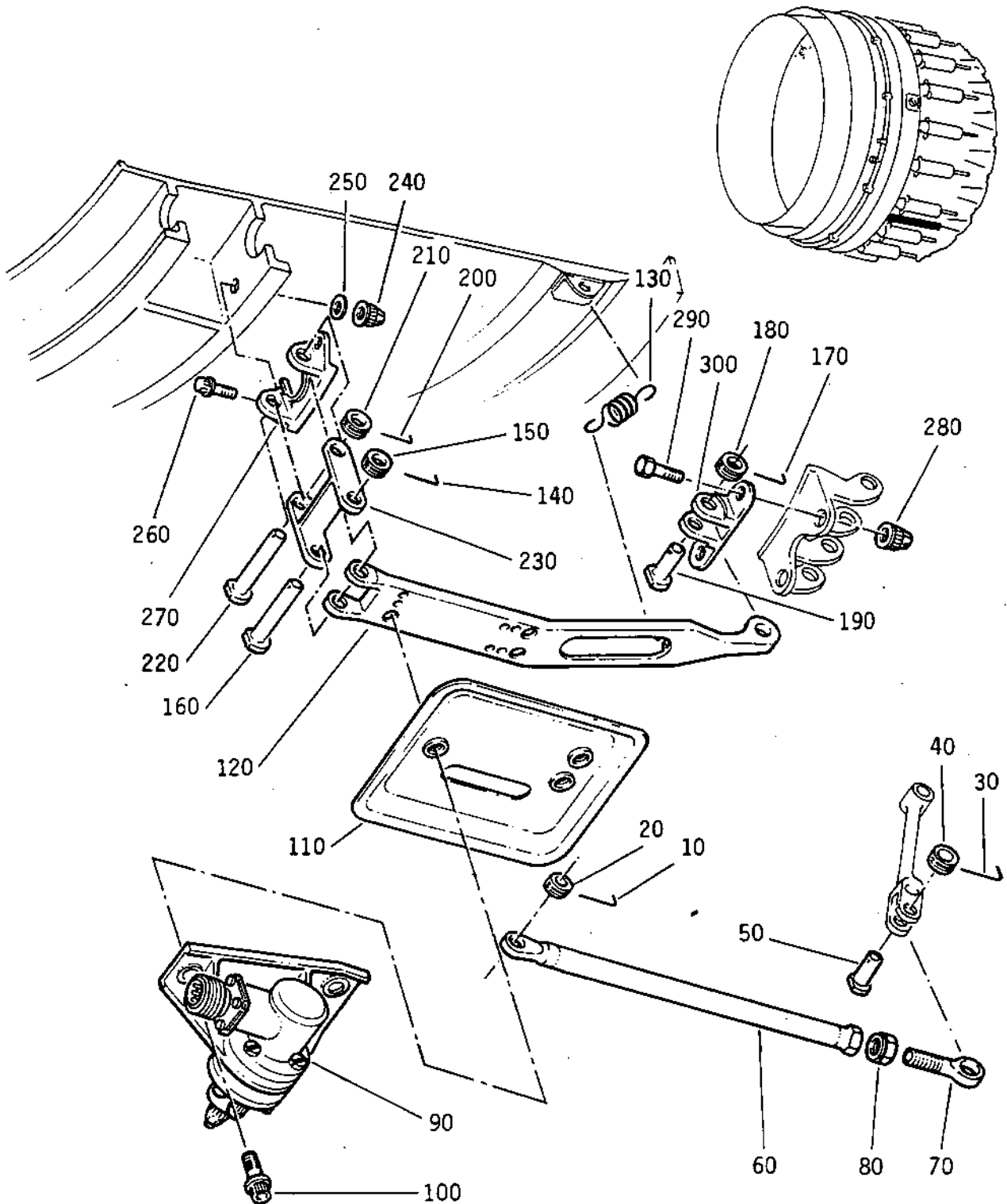
PAGE 1101-1

APR 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Nozzle, Primary  
Figure 2

78-12-01

PAGE 1102-0  
DEC 30/74

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

FIG-ITEM	PART NUMBER	NOMENCLATURE						USAGE CODE	UNITS PER ASSY
		1	2	3	4	5	6		
2 - 1A	301-217-000-0	NOZZLE, PRIMARY (CTD)							RF
- 1B	301-217-003-0	NOZZLE, PRIMARY (CTD)							RF
		POST SB 0L-593-78-7							
- 1C	301-217-004-0	NOZZLE, PRIMARY (CTD)							RF
		POST SB 0L-593-78-2							
		POST SB 0L-593-78-1							
		POST SB 0L-593-78-8							
- 1D	301-217-005-0	NOZZLE, PRIMARY (CTD)							RF
		POST SB 0L-593-78-8							
10A	650-771-012-0	.PIN							1
		OPT TO 650-362-620-6							
20A	301-175-100-0	.WASHER, GROOVED							1
30A	650-771-012-0	.PIN							1
		OPT TO 650-362-620-6							
40A	301-175-100-0	.WASHER, GROOVED							1
50A	301-173-001-0	.PIN							1
- 50B	301-173-000-0	.PIN							1
		POST SB 0L-593-78-15							
60A	301-171-804-0	.LINK							1
- 60B	301-171-803-0	.LINK							1
70A	301-178-301-0	..ENDPIECE, THREADED						60A	1
- 70B	301-172-002-0	..ENDPIECE, THREADED						60B	1
80A	649-261-011-0	..NUT, HEXAGONAL							1
90A	301-160-002-0	.TRANSDUCER, PRIMARY NOZZLE							1
		SEE 78-12-50 FOR DET							
		ATTACHING PARTS							
100A	MS9034-10	.BOLT, 12 POINT HEAD							3
		***							
110A	301-177-601-0	.PLATE, PROTECTING							1
120A	301-172-602-0	.SUPPORT ASSEMBLY							1
		OPT TO 425-611-849-0							
		ATTACHING PARTS							
130A	301-173-200-0	.SPRING							1
140A	650-771-012-0	.PIN							1
		OPT TO 650-362-620-6							
150A	301-175-100-0	.WASHER, GROOVED							1
160A	301-173-101-0	.PIN							1
170A	650-771-012-0	.PIN							1
		OPT TO 650-362-620-6							
180A	301-175-100-0	.WASHER, GROOVED							1
190A	301-172-901-0	.PIN							1
		***							
200A	650-771-012-0	.PIN							1
		OPT TO 650-362-620-6							
210A	301-175-100-0	.WASHER, GROOVED							1
220A	301-173-101-0	.PIN							1
230A	301-172-401-0	.YOKE, CONNECTING							1

- ITEM NOT ILLUSTRATED

**78-12-01**PAGE 1102-1  
APR 30/93

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



FIG-ITEM	PART NUMBER	NOMENCLATURE						USAGE CODE	UNITS PER ASSY
		1	2	3	4	5	6		
240A	DHT5579-4	.	NUT,SELF-LOCKING				VF0224		2
			OPT TO Z3874-048				V72962		
250A	649-341-011-0	.	WASHER,FLAT						2
260A	MS9034-10	.	BOLT,12 POINT HEAD						2
270A	301-174-702-0	.	YOKE						1
280A	DHT5579-4	.	NUT SELF-LOCKING				VF0224		2
			OPT TO Z3874-048				V72962		
290A	649-091-375-0	.	BOLT,HEXAGONAL HEAD						2
300A	301-172-101-0	.	YOKE						1
			OPT TO 301-172-100-0						

- ITEM NOT ILLUSTRATED

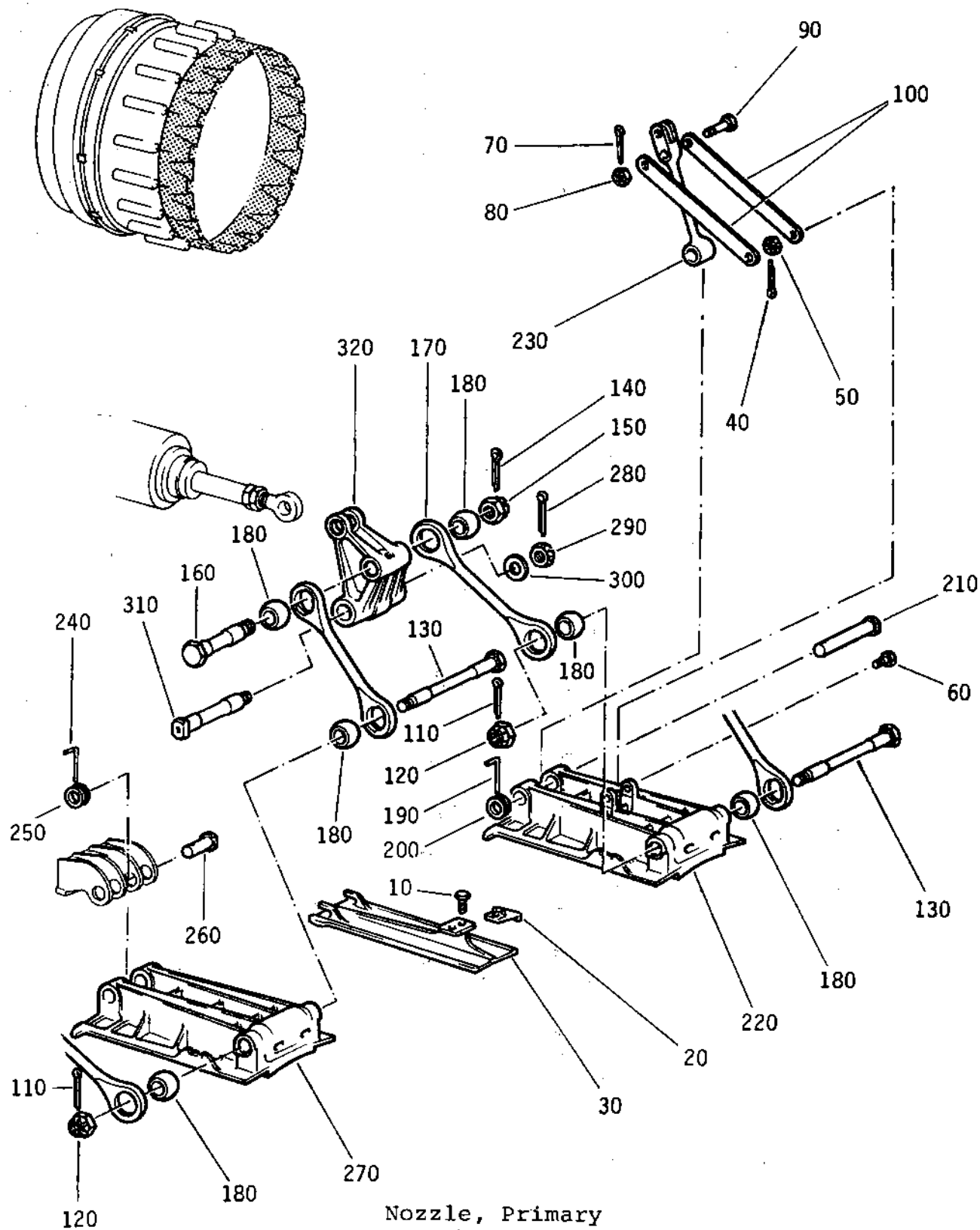
**78-12-01**PAGE 1102-2  
APR 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



Nozzle, Primary  
Figure 3

78-12-01

PAGE 1103-0

DEC 30/74

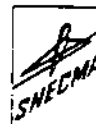
**OLYMPUS 593**MK.610-14-28  
OVERHAUL

FIG-ITEM	PART NUMBER	NOMENCLATURE						USAGE CODE	UNITS PER ASSY
		1	2	3	4	5	6		
3 - 1A	301-217-000-0	NOZZLE, PRIMARY (CTD)							RF
- 1B	301-217-003-0	NOZZLE, PRIMARY (CTD)							RF
		POST SB OL-593-78-7							
- 1C	301-217-004-0	NOZZLE, PRIMARY (CTD)							RF
		POST SB OL-593-78-2							
		POST SB OL-593-78-1							
		POST SB OL-593-78-8							
- 1D	301-217-005-0	NOZZLE, PRIMARY							RF
		POST SB OL-593-78-8							
10A	649-774-065-0	.BOLT, HEXAGONAL HEAD							36
20A	525-217-008-0	.STOP							36
30A	301-225-100-0	.PETAL, FOLLOWER							18
		OPT TO 301-225-101-0							
40A	SP90B4	.PIN, SPLIT						1A	2
- 40B	SP09B4	.PIN, SPLIT						1BCD	4
		POST SB OL-593-78-7							
50A	649-783-005-0	.NUT, HEXAGONAL THIN CASTELLATED						1A	2
- 50B	649-783-005-0	.NUT, HEXAGONAL THIN CASTELLATED						1BCD	4
		POST SB OL-593-78-7							
60A	649-774-021-0	.BOLT, HEXAGONAL HEAD						1A	2
- 60B	649-774-021-0	.BOLT, HEXAGONAL HEAD						1BCD	4
		POST SB OL-593-78-7							
70A	SP90B4	.PIN, SPLIT						1A	1
- 70B	SP90B4	.PIN, SPLIT						1BCD	2
		POST SB OL-593-78-7							
80A	649-783-005-0	.NUT, HEXAGONAL THIN CASTELLATED						1A	1
- 80B	649-783-005-0	.NUT, HEXAGONAL THIN CASTELLATED						1BCD	2
		POST SB OL-593-78-7							
90A	649-774-013-0	.BOLT, HEXAGONAL HEAD						1A	1
- 90B	649-774-013-0	.BOLT, HEXAGONAL HEAD						1BCD	2
		POST SB OL-593-78-7							
100A	525-217-091-0	.LINK						1A	2
-100B	525-217-091-0	.LINK						1BCD	4
		POST SB OL-593-78-7							
110A	SP90C4	.PIN, SPLIT							18
120A	525-217-195-0	.NUT, CASTELLATED							18
		OPT TO 649-783-007-0							
130A	525-217-059-0	.PIN							18
140A	SP90C4	.PIN, SPLIT							18
150A	525-217-195-0	.NUT, CASTELLATED							18
		OPT TO 649-783-007-0							
160A	649-774-066-0	.PIN							18
170A	525-600-045-0	.LINK							36
180A	525-410-011-0	.JOINT, SPHERICAL							72
190A	650-771-011-0	.PIN						1A	1
		OPT TO 650-362-607-6							
-190B	650-771-011-0	.PIN						1BCD	2
		POST SB OL-593-78-7							
		OPT TO 650-362-607-6							

- ITEM NOT ILLUSTRATED

**78-12-01**PAGE 1103-1  
APR 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



FIG-ITEM	PART NUMBER	NOMENCLATURE						USAGE CODE	UNITS PER ASSY
		1	2	3	4	5	6		
3 200A	525-410-014-0	.	W	A	S	H	E	1A	1
-200B	525-410-014-0	.	W	A	S	H	E	1BCD	2
							POST SB OL-593-78-7		
210A	525-217-139-0	.	P	I	N			1A	1
-210B	525-217-139-0	.	P	I	N			1BCD	2
							POST SB OL-593-78-7		
220A	301-225-002-0	.	P	E	T	A	L,ACTUATED	1A	1
							OPT TO 301-225-001-0		
-220B	301-225-002-0	.	P	E	T	A	L,ACTUATED	1BCD	2
							OPT TO 301-225-001-0		
							POST SB OL-593-78-7		
230A	301-173-300-0	.	L	E	V	E	R	1A	1
-230B	301-173-300-0	.	L	E	V	E	R	1BCD	2
							POST SB OL-503-78-7		
240A	650-771-011-0	.	P	I	N			1A	34
							OPT TO 650-362-607-6		
-240B	650-771-011-0	.	P	I	N			1BCD	32
							POST SB OL-593-78-7		
							OPT TO 650-362-607-6		
250A	525-410-014-0	.	W	A	S	H	E	1A	34
-250B	525-410-014-0	.	W	A	S	H	E	1BCD	32
							POST SB OL-593-78-7		
260A	525-410-017-0	.	P	I	N			1A	34
-260B	525-410-017-0	.	P	I	N			1BCD	32
							POST SB OL-593-78-7		
270A	301-170-002-0	.	P	E	T	A	L,ACTUATED	1A	17
							OPT TO 301-170-001-0		
-270B	301-170-002-0	.	P	E	T	A	L,ACTUATED	1BCD	16
							OPT TO 301-170-001-0		
							POST SB OL-593-78-7		
280A	SP90C4	.	P	I	N	,	SPLIT		18
290A	649-783-026-0	.	N	U	T	,	HEXAGONAL THIN CASTELLATED		18
300A	649-343-012-0	.	W	A	S	H	E		18
310A	301-176-900-0	.	P	I	N			1ABD	18
-310B	301-176-901-0	.	P	I	N			1C	18
							POST SB OL-593-78-1		
-310C	301-176-903-0	.	P	I	N			1ABD	18
-310D	301-176-902-0	.	P	I	N			1C	18
320A	525-600-014-0	.	L	E	V	E	R		18

- ITEM NOT ILLUSTRATED

78-12-01

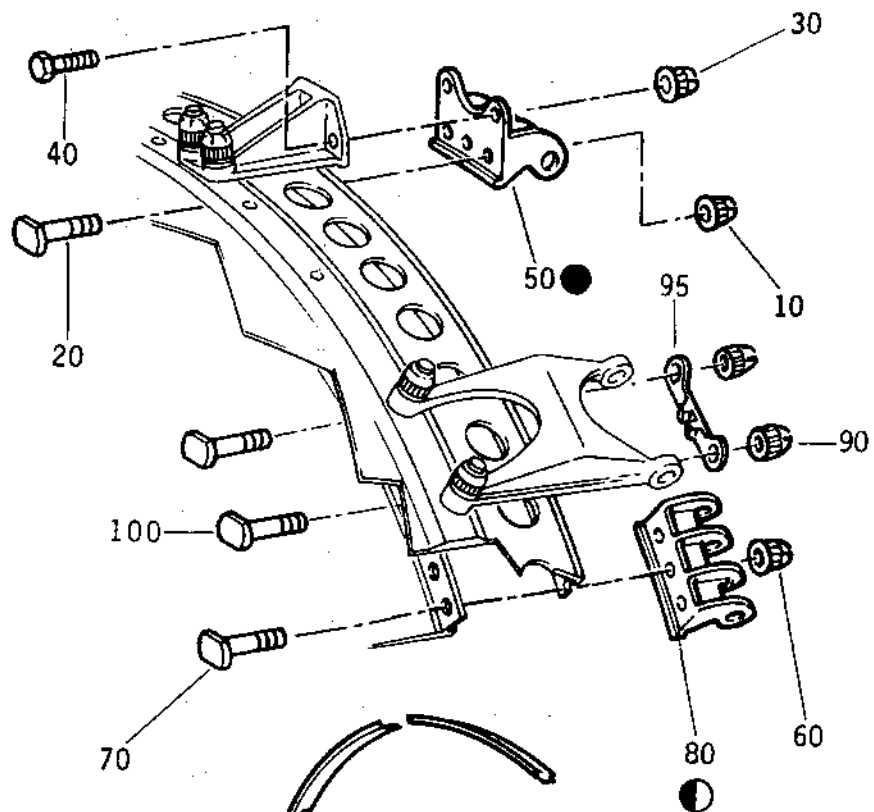
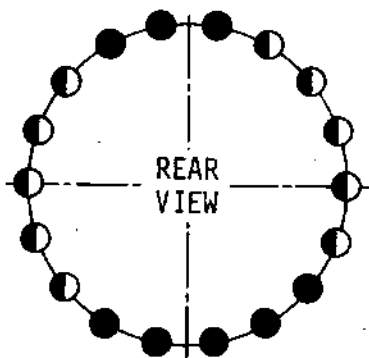
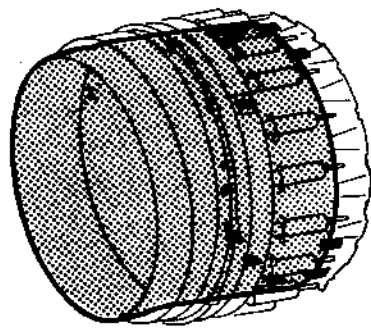
PAGE 1103-2

APR 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



110

Nozzle, Primary  
Figure 4

78-12-01

PAGE 1104-0  
DEC 15/76





# OLYMPUS 593

MK.610-14-28

OVERHAUL



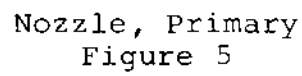
FIG-ITEM	PART NUMBER	NOMENCLATURE	USAGE CODE	UNITS PER ASSY
		1 2 3 4 5 6 7		
4 - 1A	301-217-000-0	NOZZLE,PRIMARY (CTD)		RF
- 1B	301-217-003-0	NOZZLE,PRIMARY (CTD)		RF
		POST SB OL-593-78-7		
- 1C	301-217-004-0	NOZZLE,PRIMARY (CTD)		RF
		POST SB OL-593-78-2		
		POST SB OL-593-78-1		
		POST SB OL-593-78-8		
- 1D	301-217-005-0	NOZZLE,PRIMARY (CTD)		RF
		POST SB OL-593-78-8		
10A	DHT5579-4	.NUT,SELF-LOCKING	VF0224	24 R
		OPT TO Z3874-048	V72962	
20A	301-228-300-0	.BOLT	1AB	24
- 20B	301-228-301-0	.BOLT	1CD	24
		POST SB OL-593-78-8		
30A	DHT5579-4	.NUT,SELF LOCKING	VF0224	30 R
		OPT TO Z3874-048	V72962	
40A	649-092-075-0	.BOLT,HEXAGONAL HEAD		12
50A	525-217-035-0	.YOKE,TWIN		8
60A	DHT5579-4	.NUT,SELF LOCKING	VF0224	30 R
		OPT TO Z3874-048	V72962	
70A	301-228-300-0	.BOLT	1AB	30
- 70B	301-228-301-0	.BOLT	1CD	30
		POST SB OL-593-78-8		
80A	525-217-118-0	.YOKE,TWIN		10
90A	DHT5579-4	.NUT,SELF LOCKING	VF0224	36 R
		OPT TO Z3874-048	V72962	
95A	301-181-400-0	.STOP	1CD	18
		POST SB OL-593-78-8		
100A	301-228-300-0	.BOLT	1AB	36
-100B	301-228-301-0	.BOLT	1CD	36
		POST SB OL-593-78-8		
110A	301-228-507-0	.CONVERGENT SECTION	1AB	1
-110B	301-228-510-0	.CONVERGENT SECTION	1CD	1
		POST SB OL-593-78-8		
120A	525-217-643-0	.SEGMENT,JOINTING	1AB	9
-120B	301-180-900-0	.SEGMENT,JOINTING	1CD	9
		POST SB OL-593-78-8		

ITEM NOT ILLUSTRATED

## 78-12-01

PAGE 1104-1

AUG 31/77



DEC 30/74



# OLYMPUS 593

MK.610-14-28

OVERHAUL



FIG-ITEM	PART NUMBER	NOMENCLATURE						USAGE CODE	UNITS PER ASSY
		1	2	3	4	5	6 7		
5 - 1A	301-217-000-0								RF
- 1B	301-217-003-0								RF
							POST SB 0L-593-78-7		
- 1C	301-217-004-0								RF
							NOZZLE,PRIMARY (CTD)		
							POST SB 0L-593-78-2		
							POST SB 0L-593-78-1		
							POST SB 0L-593-78-8		
- 1D	301-217-005-0								RF R
							NOZZLE,PRIMARY (CTD)		
							POST SB 0L-593-78-8		
10A	301-176-000-0								1
							.FAIRING,FRONT NOZZLE		
							ATTACHING PARTS		
20A	MS9034-12								17
30A	525-600-038-0						.BOLT,12 POINT HEAD		17
40A	MS9034-12						.BUSH		1
50A	525-600-037-0						.BOLT,12 POINT HEAD		1
							.BUSH		1
							***		
60A	MS9033-08								18
70A	649-774-064-0						.BOLT,12 POINT HEAD		9
80A	525-609-764-0						.BOLT,HEXAGONAL HEAD		9
90A	525-609-721-0						.SUPPORT,ASSY		1
-100A	649-972-004-0						.MANIFOLD,NOZZLE CLOSING		18
-110A	649-972-014-0						..PLUG,STORAGE		2
120A	649-478-014-0						..PLUG,STORAGE		1
130A	649-477-014-0						.NUT,CONNECTOR		1
140A	649-477-014-0						.PLUG,BLANKING FOR CONNECTOR		18
150A	MS9033-08						.BOLT,12 POINT HEAD		9
	525-609-783-0						.SUPPORT,ASSY		

- ITEM NOT ILLUSTRATED

## 78-12-01

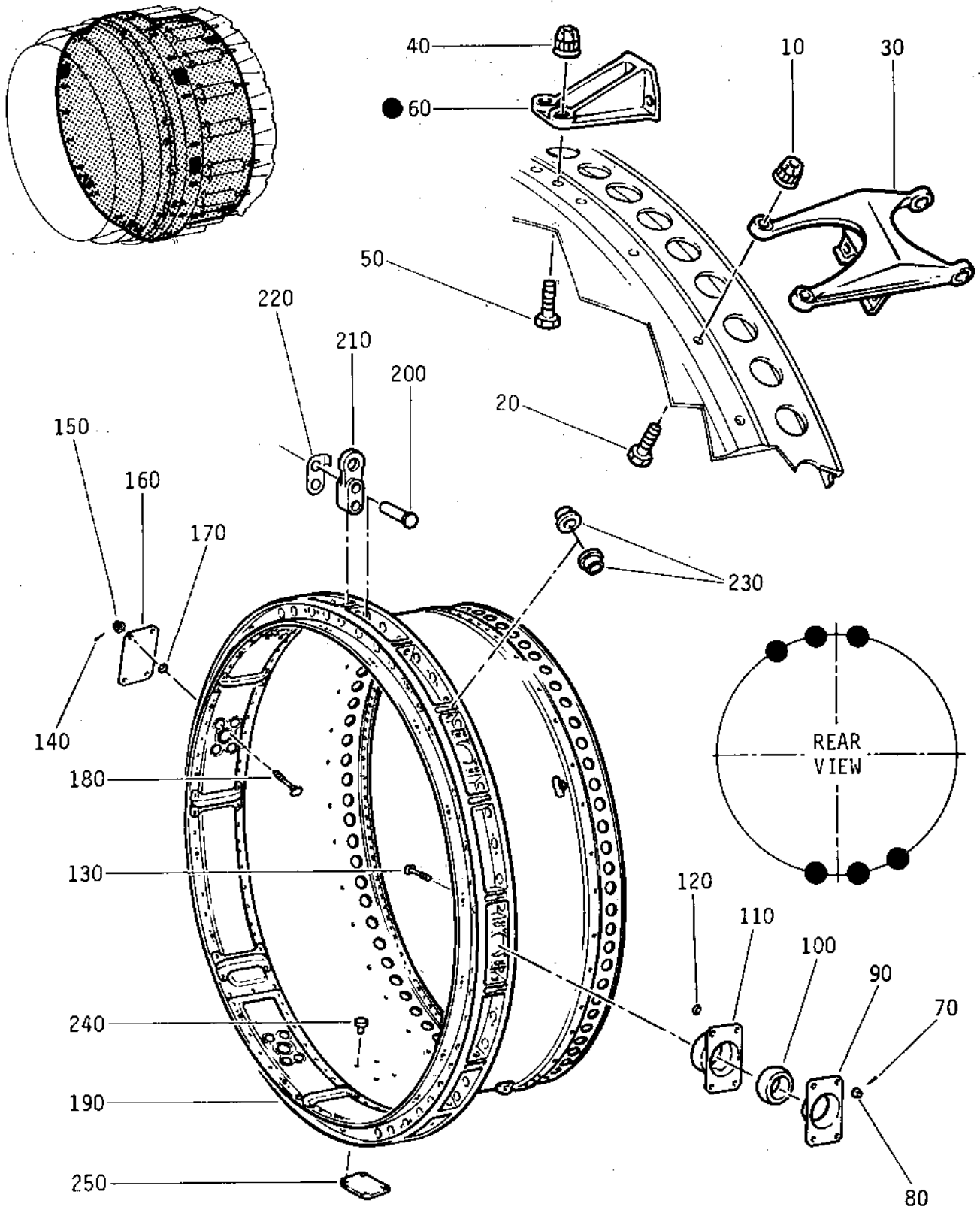
PAGE 1105-1

DEC 15/76



OLYMPUS 593

MK. 610-14-28  
OVERHAUL



Nozzle, Primary  
Figure 6

78-12-01

PAGE 1106-0  
DEC 30/74



OLYMPUS 593

MK.610-14-28  
OVERHAUL

FIG-ITEM	PART NUMBER	NOMENCLATURE						USAGE CODE	UNITS PER ASSY
		1	2	3	4	5	6		
6 - 1A	301-217-000-0	NOZZLE,PRIMARY (CTD)							RF
- 1B	301-217-003-0	NOZZLE,PRIMARY (CTD)							RF
		POST SB 0L-593-78-7							
- 1C	301-217-004-0	NOZZLE,PRIMARY (CTD)							RF
		POST SB 0L-593-78-2							
		POST SB 0L-593-78-1							
		POST SB 0L-593-78-8							
- 1D	301-217-005-0	NOZZLE,PRIMARY (CTD)							RF
		POST SB 0L-593-78-8							
10A	DHT5579-4	.NUT,SELF-LOCKING						VF0224	36
		OPT TO Z3874-048						V72962	
20A	649-092-080-0	.BOLT,HEXAGONAL HEAD							36
30A	525-410-009-0	.YOKE						1AB	18
- 30B	301-179-101-0	.YOKE						1CD	18
		POST SB 0L-593-78-1							
		POST SB 0L-593-78-8							
40A	DHT5579-4	.NUT,SELF LOCKING						VF0224	12
		OPT TO Z3874-048						V72962	
50A	649-092-080-0	.BOLT,HEXAGONAL HEAD							12
60A	301-225-601-0	.SUPPORT							6
		OPT TO 301-225-600-0							
70A	SP90C4	.PIN,SPLIT							12
80A	649-783-021-0	.NUT,HEXAGONAL THICK CASTELLATED							12
90A	525-600-041-0	.TRAVEL STOP							3
		OPT TO 525-600-085-0							
100A	525-600-042-0	.JOINT,SPHERICAL							3
110A	525-600-040-0	.BOX,SPHERICAL JOINT							3
		OPT TO 525-600-084-0							
120A	649-786-060-0	.RING,TRUARC							12
130A	525-600-165-0	.BOLT							12
140A	SP90C4	.PIN,SPLIT							12
150A	649-783-021-0	.NUT,HEXAGONAL THICK CASTELLATED							12
160A	525-609-791-0	.COVER,BLANKING						1ABD	3
-160B	301-177-000-0	.COVER,BLANKING						1C	3
		POST SB 0L-593-78-2							
170A	649-786-060-0	.RING,TRUARC							12
180A	525-600-165-0	.BOLT							12
190A	301-228-112-0	.RING,SUPPORT ASSY						1AB	1
-190B	301-228-110-0	.RING,SUPPORT ASSY						1AB	1
-190C	301-228-113-0	.RING,SUPPORT ASSY						1CD	1
		POST SB 0L-593-78-8							
200A	525-600-079-0	..PIN							4
210A	525-600-078-0	..SUPPORT,HANDLING							2
220A	525-600-007-0	..SPACER							AR
230A	525-600-077-0	..BUSH DIA 15 MM (0.590 IN)							36 R

- ITEM NOT ILLUSTRATED

78-12-01

PAGE 1106-1  
SEP 30/78



# OLYMPUS 593

MK.610-14-28

OVERHAUL



FIG-ITEM	PART NUMBER	NOMENCLATURE							USAGE CODE	UNITS PER ASSY
		1	2	3	4	5	6	7		
6 -232A	525-600-077-1	..	BUSH	DIA	15,1	MM	(0.594	IN)		AR R
			OVERSIZE							
-234A	525-600-077-2	..	BUSH	DIA	15,2	MM	(0.598	IN)		AR R
			OVERSIZE							
-235A	525-600-077-3	..	BUSH	DIA	15,3	MM	(0.602	IN)		AR R
			OVERSIZE							
-236A	525-600-077-4	..	BUSH	DIA	15,4	MM	(0.606	IN)		AR R
			OVERSIZE							
-238A	525-600-077-5	..	BUSH	DIA	15,5	MM	(0.610	IN)		AR R
			OVERSIZE							
240A	21215CA3207	..	RIVET,FLAT	ROUND	HEAD					4
250A	525-410-021-0	..	PLATE	IDENTIFICATION						1

- ITEM NOT ILLUSTRATED

## 78-12-01

PAGE 1106-2

SEP 30/78



# **OLYMPUS 593 MK 610-14-28 OVERHAUL MANUAL**

## **EXHAUST SYSTEM**

### **VOLUME 2**

## **TWIN SECONDARY NOZZLE 78-13-01**



1975

The information contained in this document is the property of Rolls-Royce Limited and SNECMA and may not be copied or used for any purpose other than that for which it is supplied without the express written authority of Rolls-Royce Limited and SNECMA. (This does not preclude use by engine and aircraft operators for normal instructional maintenance or overhaul purposes).

**ROLLS-ROYCE (1971) LIMITED**  
AERO DIVISION

TECHNICAL PUBLICATIONS DEPARTMENT  
P.O. BOX 3, FULTON, BRISTOL, BS12 7QE, ENGLAND

**SNECMA**  
APRES VENTE CIVILE  
SITE DE MELUN MONTEREAU  
AERODROME DE VILLAROCHE  
BP 1936 - 77019 MELUN CEDEX (FRANCE)



LIST OF CHAPTERS		Pages
FOREWORD		1
DESCRIPTION/OPERATION		
1. General.....		1
2. Description of the twin secondary nozzle.....		1
3. Description of the bucket actuator system.....		18
4. Operation of the twin secondary nozzle assembly..		18
DISASSEMBLY		
1. General.....		101
2. Removal of seal Plates and anti-fret strips from the front framework.....		101
3. Preparation for disassembly.....		104
4. Removal of access doors (left hand twin secondary nozzle).....		105
5. Removal of access doors (right hand twin secondary nozzle).....		107
6. Removal of deflechor assembly.....		109
7. Removal of rerverser bucket assemblies.....		111
8. Removal of bucket drive pneumatic actuators.....		116
9. Removal of bucket position transmitters (indicators).....		120
10. Removal of flexibles shafts.....		121
11. Removal of ballscrew gearboxes.....		126
12. Removal of the cross-feed isolation valve.....		126
13. Removal of the P3 air feed tubes.....		128
14. Removal of electrical harnesses.....		129
15. Removal of the P3 air feed pipe supports.....		132
16. Removal of ballscrew gear box supports.....		133





OLYMPUS 593

MK.610-14-28

OVERHAUL



	Pages
17. Removal of the link assembly (24.10) .....	135
18. Removal of the welded housing assemblies (22-30) .....	136
19. Removal of the mounting pin assemblies .....	136
20. Removal of ballscrew gear box recess covers .....	138
21. Removal of support assemblies from the rear framework .	144
22. Removal of the support assemblies from the rear framework .....	147
23. Removal of heat shield assemblies .....	148
24. Removal of the nozzle side fairing assemblies .....	150
25. Removal of the convergent section panels .....	152
26. Removal of the divergent section panels .....	152
27. Removal of the fire detection support bracket assembly .....	154
28. Removal of the cover assemblies .....	156
29. Fitting the twin secondary nozzle assembly to the transport trolley .....	156
30. Removal of the spherical bearing housing from the front framework .....	157

#### CLEANING

1. General .....	201
2. Specific recommendations .....	201

#### INSPECTION - GENERAL

1. Breakdown of the inspection section .....	301
2. General .....	301

#### TWIN SECONDARY NOZZLE ASSEMBLY - REMOVABLE PARTS

1. Introduction .....	301
2. Visual inspection .....	301

78-13-01

LC Page 2  
Aug 31/79



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE

Pages

3. Inspection for soundness.....	302
4. Dimensional inspection of parts.....	309
5. Parts inspection.....	309

#### BASIC TWIN SECONDARY NOZZLE

1. Introduction.....	301
2. Identification.....	301
3. Restriction areas.....	301
4. Inspection methods.....	301
5. Permissible damages.....	301

#### REPAIR

FORWORD.....	401
REPAIR PARTS LIST.....	401

#### DEFLECTOR ASSEMBLY

- REP 1-10-1 Replacement of the cover
- REP 1-10-2 Repair of leading edge of blade  
by welded replacement part

#### ACCESS DOORS

- REP 3-10-1 Reconditioning the plasma coating
- REP 3-10-2 Renewing the stiffener
- REP 3-10-3 Renewing the inserts
- REP 3-10-4 Reconditioning the access doors  
consecutively to various damages

#### SEAL ASSEMBLIES

- REP 5-130-1 Renewing seal elements

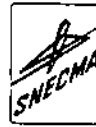
78-13-01

LC Page 3  
Jun 15/82



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## UPPER AND LOWER HEAT SHIELDS

- REP 5-260-1 Replacement of riveted elements
- REP 5-260-2 Crack filler welding
- REP 5-260-3 Reconditioning of worn areas by metal spraying

## SUPPORT ASSEMBLY

- REP 7-10-1 Replacement of the floating anchor nut

## MOUNTING PIN

- REP 8-10-1 Replacement of the sleeve

## SPACER

- REP 8-50-1 Renewing the anchor nuts

## SPHERICAL STOP

- REP 8-90-1 Reconditioning the silver plating

## CUP WASHER ASSY

- REP 8-100-1 Renewing the crimped nut

## REAR SIDE FAIRING

- REP 9-10-1 Replacement of reinforcement plates or their fasteners
- REP 9-10-2 Reconditioning the fairings consecutively to various damages

## HEAT SHIELD

- REP 9-530-1 Replacing the floating nuts

## CONVERGENT PANEL ASSY

- REP 11-10-1 Renewing the inserts
- REP 11-10-2 Reconditioning the plasma coating

**78-13-01**

LC Page 4  
Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REP 11-10-3 Panel repairs for miscellaneous types of damages

#### JOINT PLATE

REP 11-130-1 Renewing the floating nuts

#### DIVERGENT PANELS

REP 12-10B-1 Renewing crimped washers

#### SUPPORT ASSY

REP 16-220-1 Renewing the self-locking nuts

#### ELBOW ASSY

REP 17-110-1 Reconditioning the chrome-plating of the conical flange seating

REP 17-110-2 Weld filling cracks

REP 17-150-1 Weld filling cracks

#### ELBOW ASSY

REP 18-110-1 Reconditioning the silver plating of the conical flange seating

REP 18-110-2 Weld filling cracks

REP 18-110-3 Replacement of the spherical bearing with or without the sleeve

REP 18-110-4 Reconditioning of the heat resistant varnish on the conical flange seating

#### ISOLATION VALVE SUPPORT BRACKET ASSY

REP 18-270-1 Reconditioning the anti-seizing varnish on the ball joint

#### AIR INLET P3 TUBE ASSY

REP 18-340-1 Reconditioning the silver plating of the conical flange bores

REP 18-340-2 Reconditioning the chrome-plating of the ball ends

**78-13-01**

LC Page 5  
Apr 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



REP 18-340-3 Weld filling cracks

REP 18-340-4 Reconditioning of the heat resistant  
varnish on the conical flange bores

#### HEXAGONAL NUT

REP 19-40-1 Reconditioning the silver plating

#### AIR PIPE P3

REP 19-100-1 Reconditioning the anti-seizing varnish  
on the ball joint

REP 19-100-2 Reconditioning the silver plating of  
the conical flange bores

REP 19-100-3 Weld filling cracks

REP 19-100-4 Reconditioning of the heat resistant  
varnish on the conical flange bores

REP 19-200-1 Deleted

REP 19-200-2 Deleted

REP 19-200-3 Deleted

#### SUPPORT

REP 20-150-1 Repairing the internal bore by hand  
chromium plating

#### TRUNION

REP 20-170-1 Reconditioning the hard chrome-plating

#### SLOTTED PLATE ASSY

REP 22-20-1 Weld filling cracks

#### WELDED HOUSING ASSY

REP 22-30-1 Renewing the riveted nuts

78-13-01

LC Page 6  
Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



#### BLANKING PART FOR ACTUATOR CAVITY

- REP 22-85-1 Crack fill-weld
- REP 22-85-2 Repair of attachment zone of blanking part at junction between vertical panel of actuator cavity and attachment fitting on rear frame

#### SUPPORT BRACKET ASSY

- REP 23-10-1 Renewing the riveted floating nuts

#### BALLSCREW GEARBOX SUPPORT

- REP 25-10-1 Renewing the ball joint

#### TWIN SECONDARY NOZZLE

- REP 29-190-1 Renewing floating nuts securing convergent panels throat and angle section
- REP 29-190-2 Replacing the attachment items of divergent panels next to front frame and throat section
- REP 29-190-3 Renewing attachment items of access doors
- REP 29-190-4 Renewing attachment items for heat shields on rear frame
- REP 29-190-5 Reconditioning the airfoil by use an elastomer
- REP 29-190-6 Replacement of BAC seal fasteners
- REP 29-190-7 Renewing riveted nuts securing heat insulation on side walls
- REP 29-190-8 Repair of panel suspension links
- REP 29-190-9 Replacement of defective fasteners on inner and outer skin panels
- REP 29-190-10 Replacement of bushings at the bucket pneumatic drive actuator mounting points
- REP 29-190-11 Repair of cracks on inner and outer skin panels

**78-13-01**

LC Page 7  
Apr 30/93



OLYMPUS 593

MK. 610-14-28

OVERHAUL



SNECMA

- REP 29-190-12    Repair of delamination affecting the inner and outer skin panels
- REP 29-190-13    Repair of the zone surrounding the access doors to the bucket ballscrew gearbox attachment bolts
- REP 29-190-14    Repair of the drain tube
- REP 29-190-16    Applying doublers to tops elevon panels
- REP 29-190-17    Repair of delamination lying in the barrel suspension link attachment zones
- REP 29-190-18    Repair of wrinkling or core-to-face sheet separations on rear side-panels
- REP 29-190-19    Repair of delaminations (core -to-face sheet separations) affecting the aft zone of the upper and lower panels
- REP 29-190-20    Repair of delaminations situated in panels of central wall, in the area of centering supports of primary nozzle
- REP 29-190-21    Repair of delamination in pressure area away from barrel suspension link attachment
- REP 29-190-23    Replacement of inner and outer skin panels
- REP 29-190-24    Reconditionning of the blanking plates attachment points of the ballscrew yack recesses
- REP 29-190-25    Replacement of the bushes in the fitting at the attachment point "R"
- REP 29-190-26    Replacement of the ballscrew gearbox access doors

**78-13-01**

LC Page 8  
Jun 30/97



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE

## ASSEMBLY

Pages

1. General.....	501
2. Location.....	501
3. Fitting of front framework attachment links.....	503
4. Installation of the twin secondary nozzle on the assembly/disassembly workstand.....	503
5. Installation of the electrical wiring harnesses..	504
6. Installation of link assembly (24-10).....	512
7. Installation of ballscrew gearbox support fitting.....	514
8. Installation of welded housing assemblies.....	516
9. Installation of the P3 air supply tube supports to the bucket drive pneumatic actuator.....	516
10. Installation of the convergent section panels....	518
11. Installation of the divergent section panels.....	520
12. Installation of the fire detection support bracket assemblies.....	524
13. Installation of the side fairing assemblies.....	525
14. Installation of the support assemblies to the rear framework.....	529-3
15. Installation of heat shield assemblies to the rear frame.....	531
16. Installation of ballscrew gear box recess covers.	540
17. Installation of position transmitters (indicators).....	547
18. Installation of ballscrew gearboxes.....	551
19. Installation of flexible shafts.....	552
20. Installation of P3 air feeds.....	558

78-13-01

LC Page 9  
Apr 30/93





OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE

	Pages
21. Installation of the crossfeed insulation valve...	561
22. Installation of bucket drive pneumatic actuators.....	568
22A. Installation of mounting pin assembly.....	582
23. Installation of reverser bucket assemblies to the structure.....	587
24. Installation of deflector assemblies.....	597
25. Fitting out of the front framework.....	598
26. Barry out bucket position indicator recess door sealing.....	598.4
27. Installation of access doors (LH twin secondary nozzle assembly).....	598.8
28. Installation of access doors (RH twin secondary nozzle assembly).....	598.12
29. Installation of bucket position indicator access doors (LH and RH twin secondary nozzle assembly).	598.14
30. Installation of covers assemblies.....	598.20
31. Installation of the twin secondary nozzle assembly to the transport trolley.....	598-20
FITS AND CLEARANCES	
1. General.....	601
2. Test equipment requirements.....	603
3. Table of fits and clearances	To be issued later
TESTING	
1. General.....	701
2. Test equipment requirements.....	701

78-13-01

LC Page 10  
Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE

	Pages
3. Manual fonction test.....	704
4. Function test with time measurement of bucket transit times.....	707
5. Functional test via actuation of the crossfeed isolation valve.....	709
6. Electrical continuity of the primary nozzle area transducer electrical harness.....	710
STORAGE	
1. General.....	901
2. Removing the twin secondary nozzle from its container.....	901
3. Installing the twin secondary nozzle into the container.....	903
4. Storage duration.....	907
5. Return of the empty containers.....	907
SPECIAL TOOLS AND EQUIPMENT.....	1001
ILLUSTRATED PARTS LIST.....	1101

**78-13-01**

LC Pages 11/12  
Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



LIST OF PRODUCTS AND COMPOUNDS

PRODUCT NAME	CODE	SUPPLIER	ADDRESS

78-13-01

LPC Pages 1/2  
Dec 30/74

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



## FOREWORD

1. Effectivity

Some procedures described in this manual such as assembly, repair procedures, etc... specifically relate to given types of equipment. Hence, effectivity reference numbers are used which relate equipment to procedures.

These effectivity reference numbers can take the form of either a manufacturer's reference number or a serial number.

The table drawn up below will enable you to make the association between the two sets of numbers.

R.H. Twin Secondary Nozzle		L.H. Twin Secondary Nozzle	
Manufacturer's ref No.	Serial No.	Manufacturer's ref No.	Serial No.
301-203-601-0	310	301-203-501-0	309
301-203-602-0	312 - 314	301-203-502-0	311
301-203-603-0	316	301-203-503-0	314
301-203-604-0	318	301-203-504-0	315
301-203-605-0	324	301-203-505-0	321
301-203-606-0	322	301-203-506-0	319
301-203-607-0	328	301-203-507-0	323
301-203-608-0	320	301-203-508-0	317
301-203-609-0	326	301-203-509-0	327

**78-13-01**

FOREWORD Pages 1/2

Dec 15/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



## DESCRIPTION - OPERATION.

### 1. General

#### A. Introduction

The twin secondary nozzle assembly (figure 1) developed by SNECMA to equip the power units of CONCORDE ; fulfils two main functions :

- (1) a convergent-divergent secondary nozzle function,
  - (2) a thrust reverser function for deceleration in flight and during landing.
- In addition, the thrust-reverser system contributes to the achievement of optimum performance in all flight configurations.

#### B. General characteristics

The twin secondary system assembly weighs approximately 1150 kg (2 535 lb). Its dimensions are :

- length..... 2100 mm ( 82.7 in)
- width..... 2800 mm (110.0 in)
- height..... 1550 mm ( 61.0 in)

#### C. Composition of the twin secondary nozzle

The twin secondary nozzle assembly comprises :

- (1) the twin secondary nozzle which carries the thrust reverser system,
- (2) the buckets and actuator system which perform the thrust reverser function.

### 2. Description of the twin secondary nozzle

#### A. General

The twin secondary nozzle is a monobloc assembly which constitutes the final section of the engine nacelles. The two twin secondary nozzles fitted to the aircraft are not identical due to the geometry of the nacelles, between two adjacent engines and the aircraft axis of symmetry.

#### B. Functions

The twin secondary nozzle assembly has the following functions :

- (1) to support the primary nozzles,
- (2) to support the buckets and their actuator system,

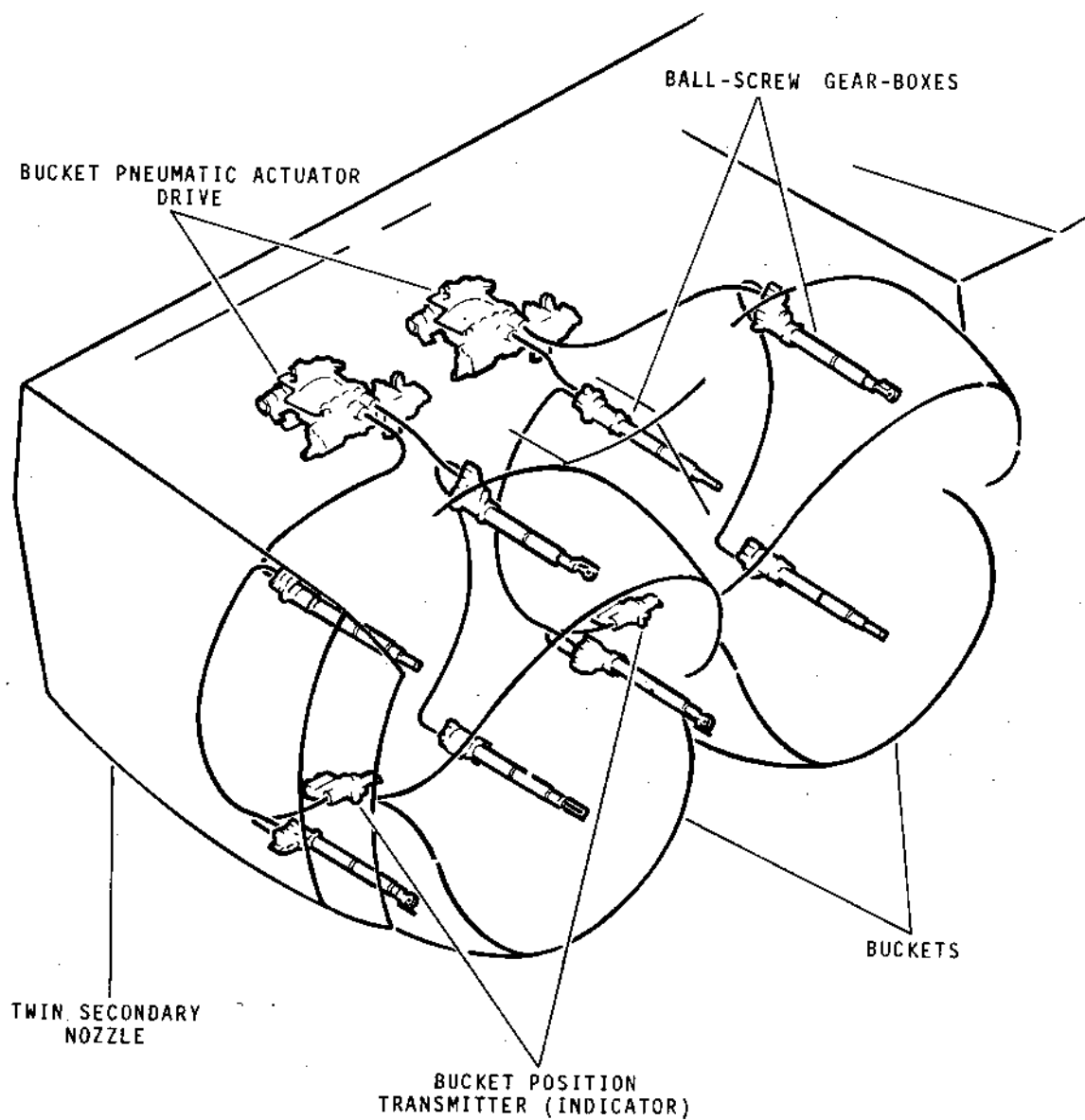
78-13-01



OLYMPUS 593

MK.610-14-28

OVERHAUL



Twin Secondary Nozzle Assembly  
Figure 1

78-13-01

Page 2  
Dec 30/74



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (3) to ensure continuity of the lines of the nacelle,
- (4) to channel the secondary air during straight-jet operation and to control the expansion of gas issuing from the primary nozzles,
- (5) to transmit loads imposed on the primary and secondary exhaust systems to the air frame.

#### C. Attachment of the twin secondary nozzle assembly

The connection of the twin secondary nozzle to the nacelle is isostatic, and comprises 4 attachment points (see figure 2) :

- (1) two clevis attachments on the outer walls, carrying loads in directions X and Z,
- (2) a clevis attachment fitted to the upper section of the central wall, carrying loads in direction Y. This attachment can also take loads in direction X, in the event of failure of one of the outer wall attachments, or the lower attachments.
- (3) a clevis attachment on the lower part of the central wall, carrying load in direction X and also capable of taking load in direction Z in the event of failure of one of the outer fixation points.

#### D. Composition

The twin secondary nozzle has the form of a rectangular prism with two cylindrical bays in the lengthwise direction. It comprises basically :

- three walls forming a cell (a central wall and two outer walls) parallel to each other and inter connected by upper and lower frames,
- internal and external skin panels rigidly fixed to the framework of the twin secondary nozzle,
- removable panels which form, in effect, the hot sections of the twin secondary nozzle,
- access doors for the various actuator system elements, and for endoscope inspection of the structure,
- parts for the attachment of the primary nozzles and the buckets,
- two harnesses for indication of primary nozzle area,
- parts for the attachment of the accessories mounted on the twin secondary nozzle.

##### (1) Description of the frame-work (see figure 3)

- (a) The outer walls

78-13-01

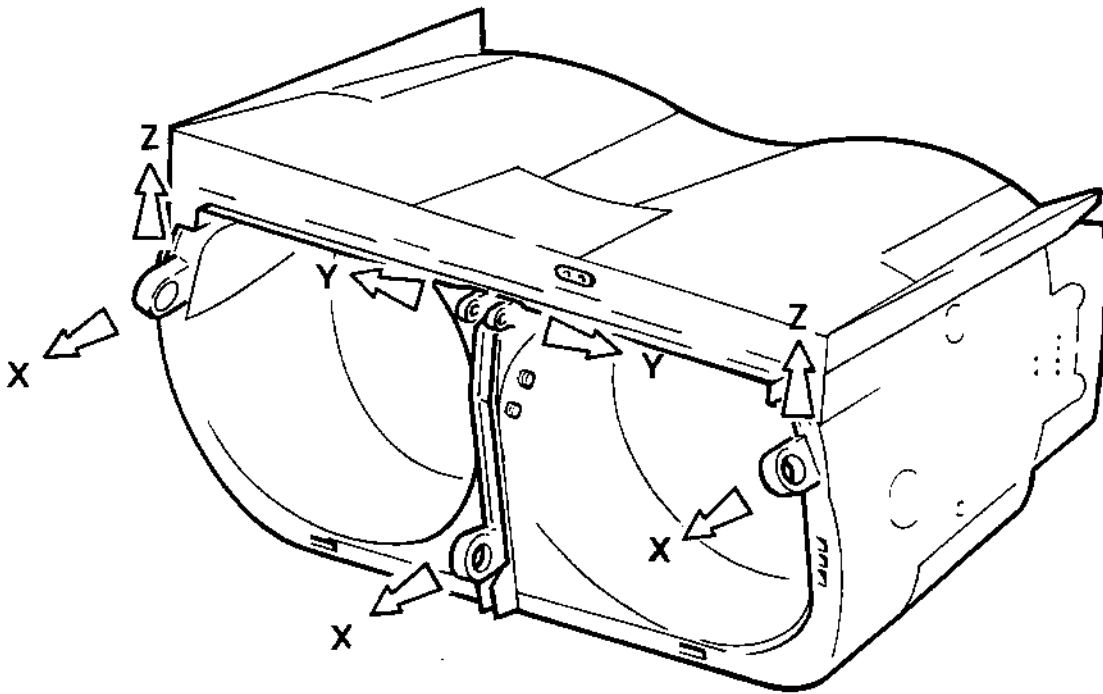
Page 3

Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Twin Secondary Nozzle  
Figure 2

78-13-01

Page 4  
Dec 30/74

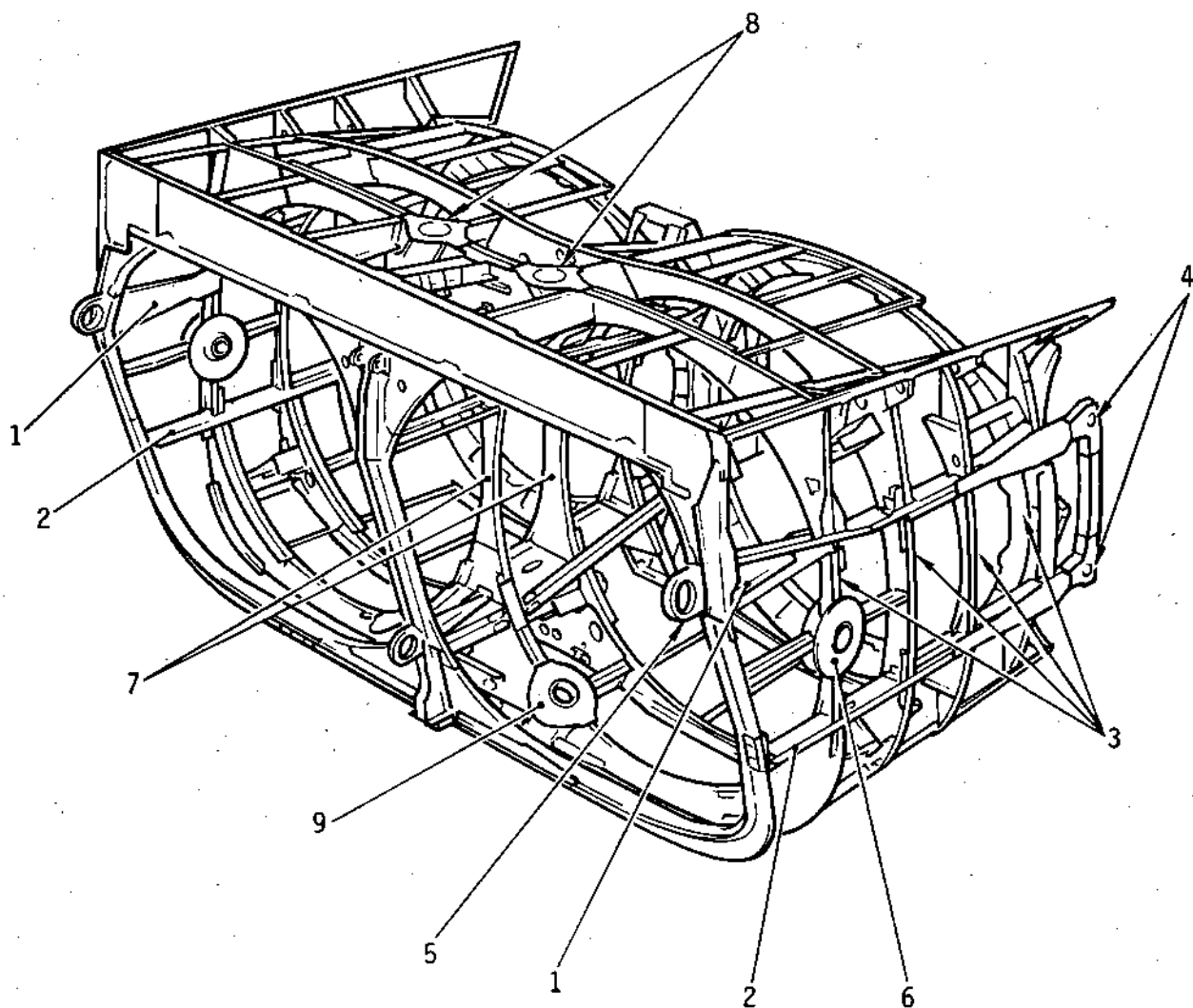




OLYMPUS 593

MK.610-14-28

OVERHAUL



Twin Secondary Nozzle Basic Structure  
Figure 3

78-13-01

Page 5  
Dec 30/74



OLYMPUS 593

MK.610-14-28

OVERHAUL



They comprise two horizontal beams (1 and 2) inter-connected by stringers (3) rivetted to the beams.

The beams which transmit loads to the airframe comprise machined from-solid-sections welded together.

At the rear of these beams are situated the bucket hinge points (4).

The yokes (5) for fixing the nozzle to the nacelle are situated towards the top at the extreme front of the structure.

Towards the front, and near the horizontal centre line of the outer walls is situated a housing (6) for the primary nozzle mounting pin.

(b) The central wall

The technology of the central wall is similar to that of the outer walls. The beams carry the bucket hinge points at the rear, and the nozzle-to-nacelle fixation points at the front.

The stringers connecting the beams are fabricated from various materials : "machined-from-solid-sections-brackets-honeycomb sections".

(c) Upper and lower frame-works

These form the connection between the wall frames. They comprise machined-from-solid sections rivetted together.

In addition, the frames carry the upper (8) and lower (9) housings for the primary nozzle fixing pins.

(2) Description of skin panels

The inner and outer skins are of stainless steel honeycomb sheet. Most of the panels are rivetted to the frame-work, imparting a high degree of rigidity to the assembly, others are removable , such as :

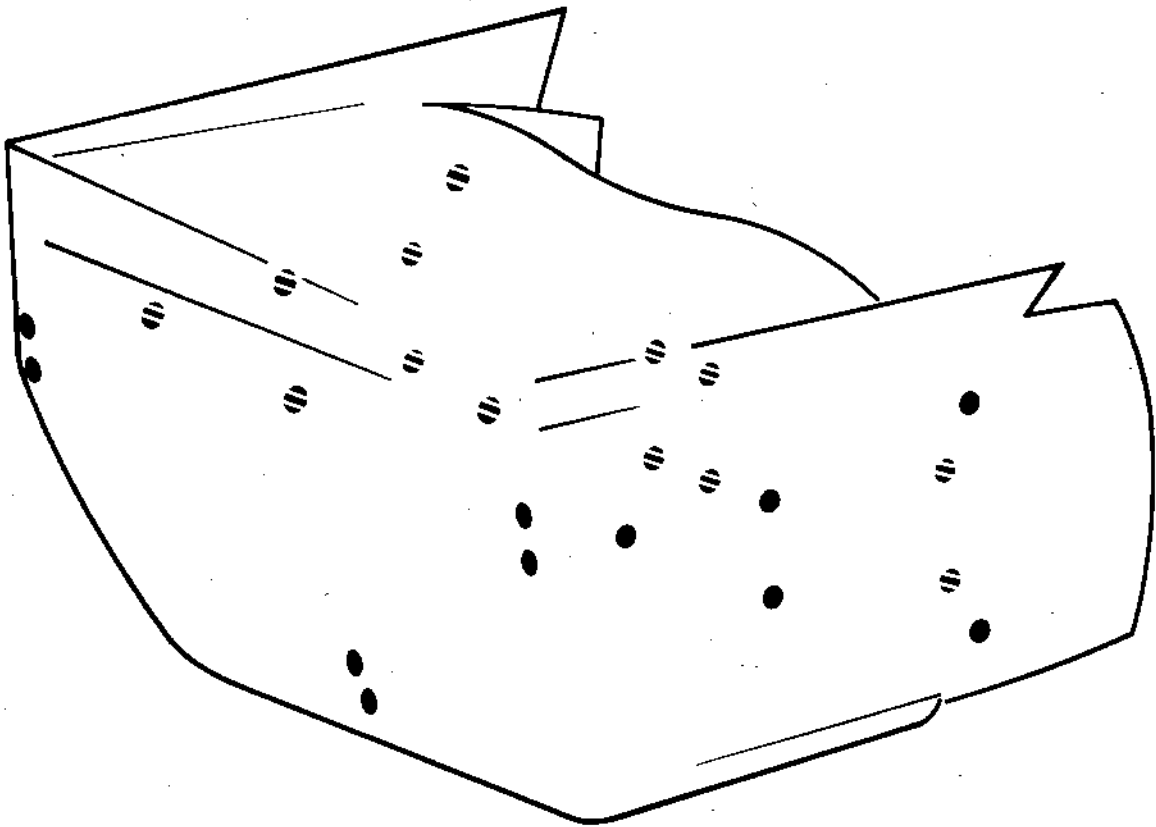
- (a) the convergent panels in austenitic alloy, which form the convergent section of the secondary nozzle,
- (b) the divergent panels in austenitic alloy, which form the divergent section of the secondary nozzle.

78-13-01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Position of Blanking Plugs.  
Figure 4

78-13-01

Page 7  
Dec 30/74



OLYMPUS 593

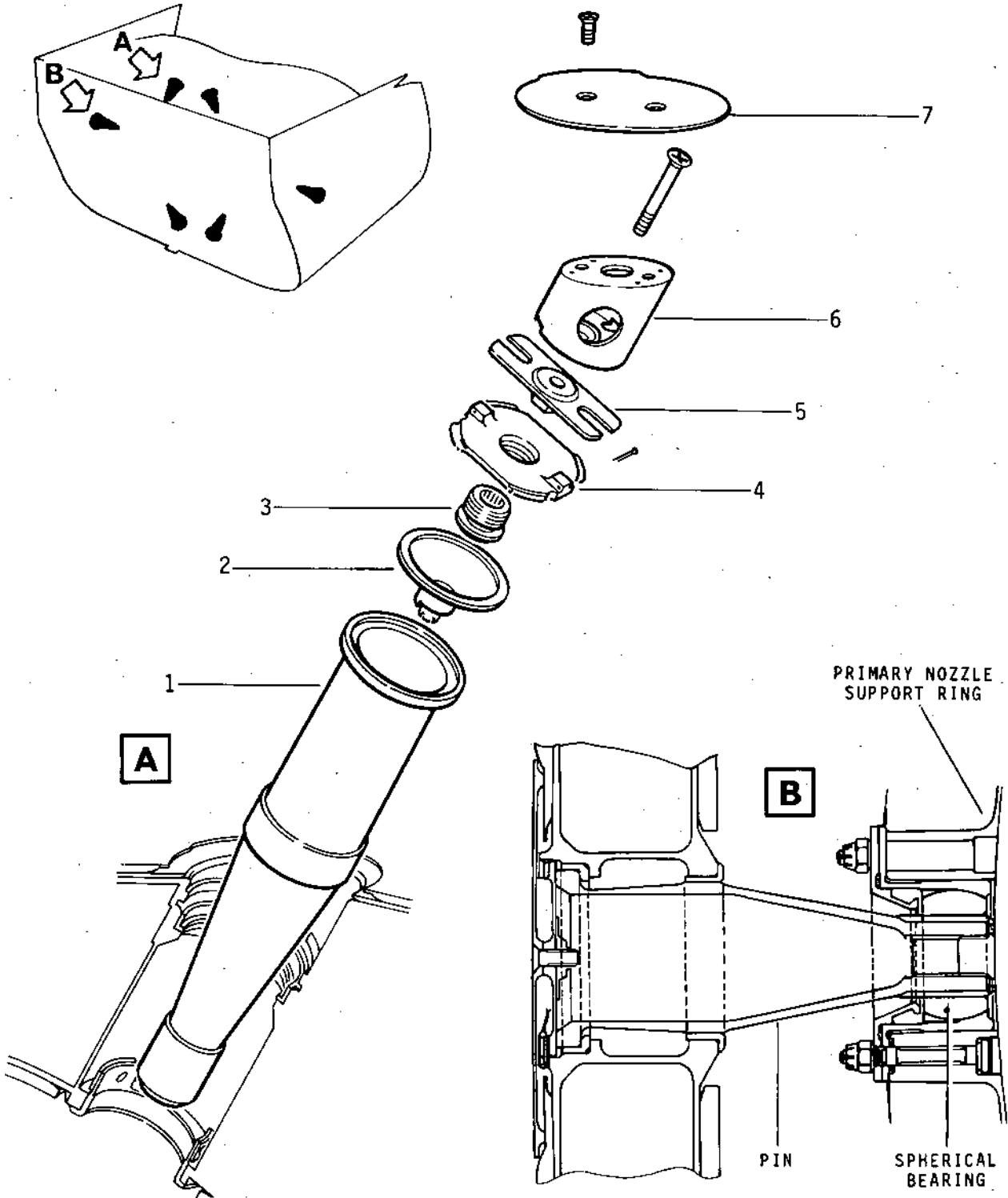
MK.610-14-28

OVERHAUL

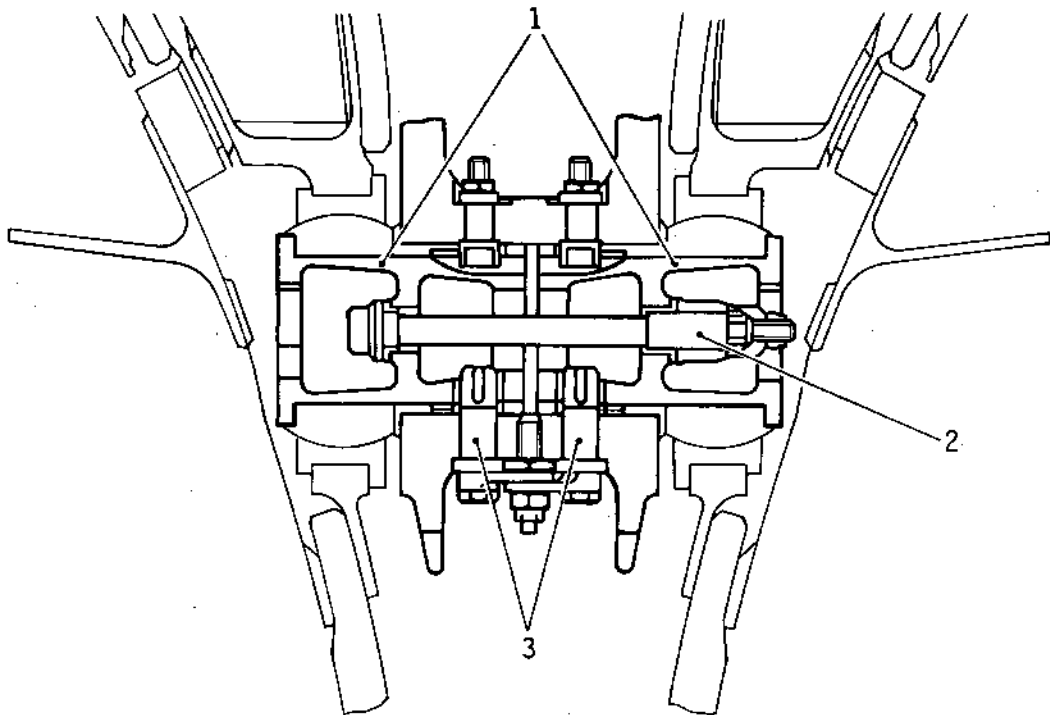
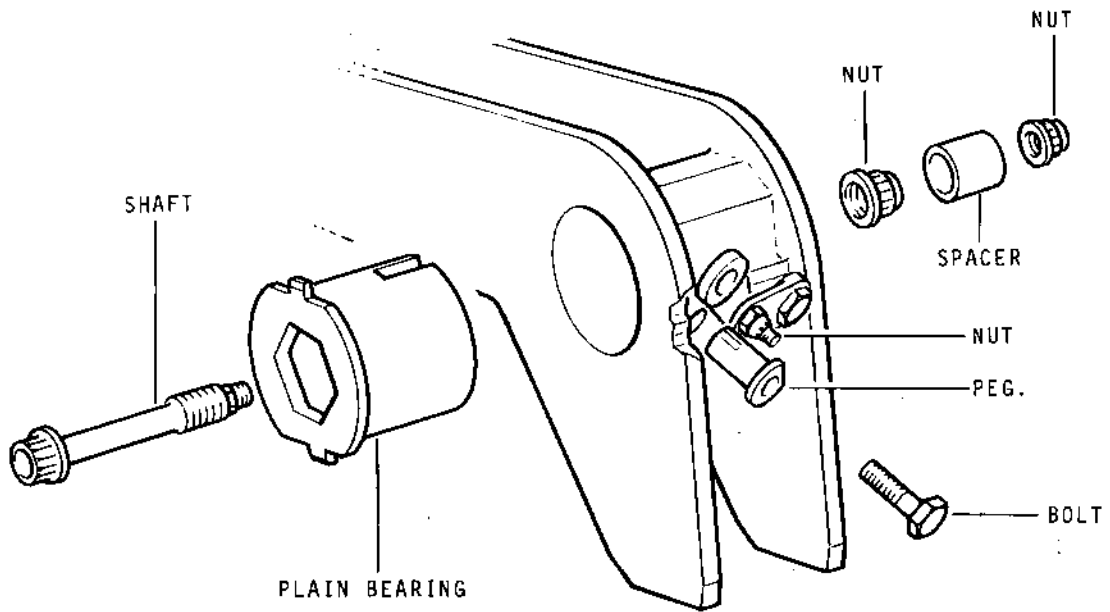


- (c) the shields, in stainless-steel honeycomb sheet, which provide thermal protection for the rear-end frame-work of the secondary nozzle when in "reverse thrust" configuration ;
  - (d) the fairings, in stainless-steel honeycomb sheet, which form the extension of the side-walls,
  - (e) the access doors to the various elements of the bucket actuator system, which are located as follows :
    - 1) at the top,
      - at the front, two central doors giving access to the pneumatic motors,
      - at the rear, one central door giving access to the bucket central screw gear-boxes and to the bucket crossfeed isolation valve,
      - at the rear, two side doors giving access to the bucket side screw gear-boxes.
    - 2) at the bottom,
      - at the front, two central doors giving access to position indicators,
      - at the rear, one central door giving access to the bucket central screw gear-boxes,
      - at the rear, two side doors giving access to the bucket side screw gear-boxes.
  - (f) The covers blanking the twin secondary nozzle endoscope inspection holes. The position of these inspection holes is given in figure 4.
- (3) Description of items for fixing the primary nozzles and the buckets
- (a) Attachment of primary nozzles
- Each of the two primary nozzles is fixed to the twin secondary nozzle by 3 pins (see figure 5). These pins (1), in high-temperature alloy, fit, at one end, into housings integral with the secondary nozzle frame-work. The other end, covered with a sleeve, fits into the inner ring of a spherical bearing, fixed to the primary nozzle support ring. The pins are retained in the axial direction by the components:

78-13-01



Attachment of Primary Nozzles  
Figure 5



Bucket Attachment  
Figure 6



OLYMPUS 593

MK.610-14-28

OVERHAUL



cup-washer (2) spherical end stop (3) dogged washer (4) retained by keep plate (5). A cover (7) blanks the recesses containing the pins and locking system. On the upper and lower pins, the cover (7) is fitted with a spacer (6).

(b) Bucket attachment (see figure 6)

Each twin secondary nozzle is fitted with four buckets, each of which has two hinge points with the secondary system. These hinge points are situated at the rear of the central and side wall members of the twin secondary nozzle assembly. The mounting is effected by a plain bearing fitted into the inner ring of the spherical bearing in the bucket. The plain bearing includes pegs which prevent the inner ring from rotating. The risk of the plain bearing (1) becoming dislodged from their housings in the case of a failure of the shaft (2) lead to the introduction of a retaining device. This consists, basically, of a peg (3) for each plain bearing. The pegs (3) are fixed to the hinge bracket into which the plain bearings (1) are fitted, thus limiting their movement in the case of a failure of the shaft (2).

Austenitic alloy deflectors are fitted to the inside of the buckets. During reverse thrust, these deflectors resist the ingestion of hot gas into the interior of the secondary nozzle. In addition they protect the bucket hinge points on the twin secondary nozzle.

(4) Description of the operation of the primary nozzle area transducer harness.

(a) Description

Two harnesses (see figure 7) are fitted to the secondary nozzle, and are located symetrically about the assembly centre line. They are located in the lower forward part of the interior of the structure. One end of the cable exits in the forward part of the central wall, and is fixed by two bolts with a plate (1) and a bar. This end constitutes the harness frontier with the nacelle. The other end is attached to the nozzle area transducer fitted to the primary nozzle. The free section of the harness is supported by two half clamps (2) fixed to the bay wall.

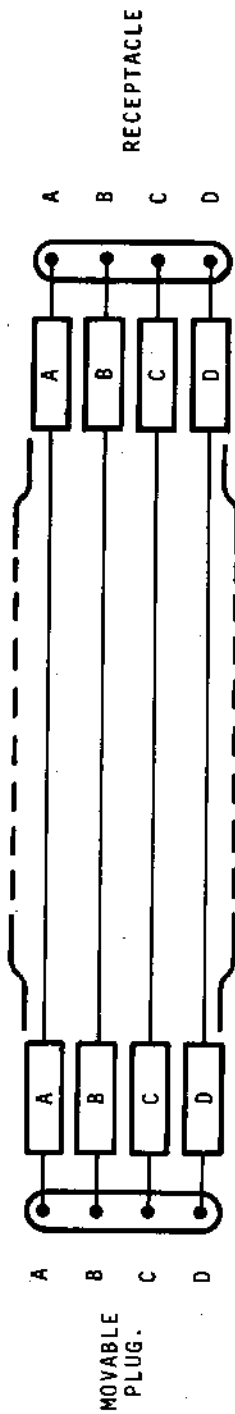
78-13-01



OLYMPUS 593

MK.610-14-28

OVERHAUL



HARNESS LAY-OUT

KEY



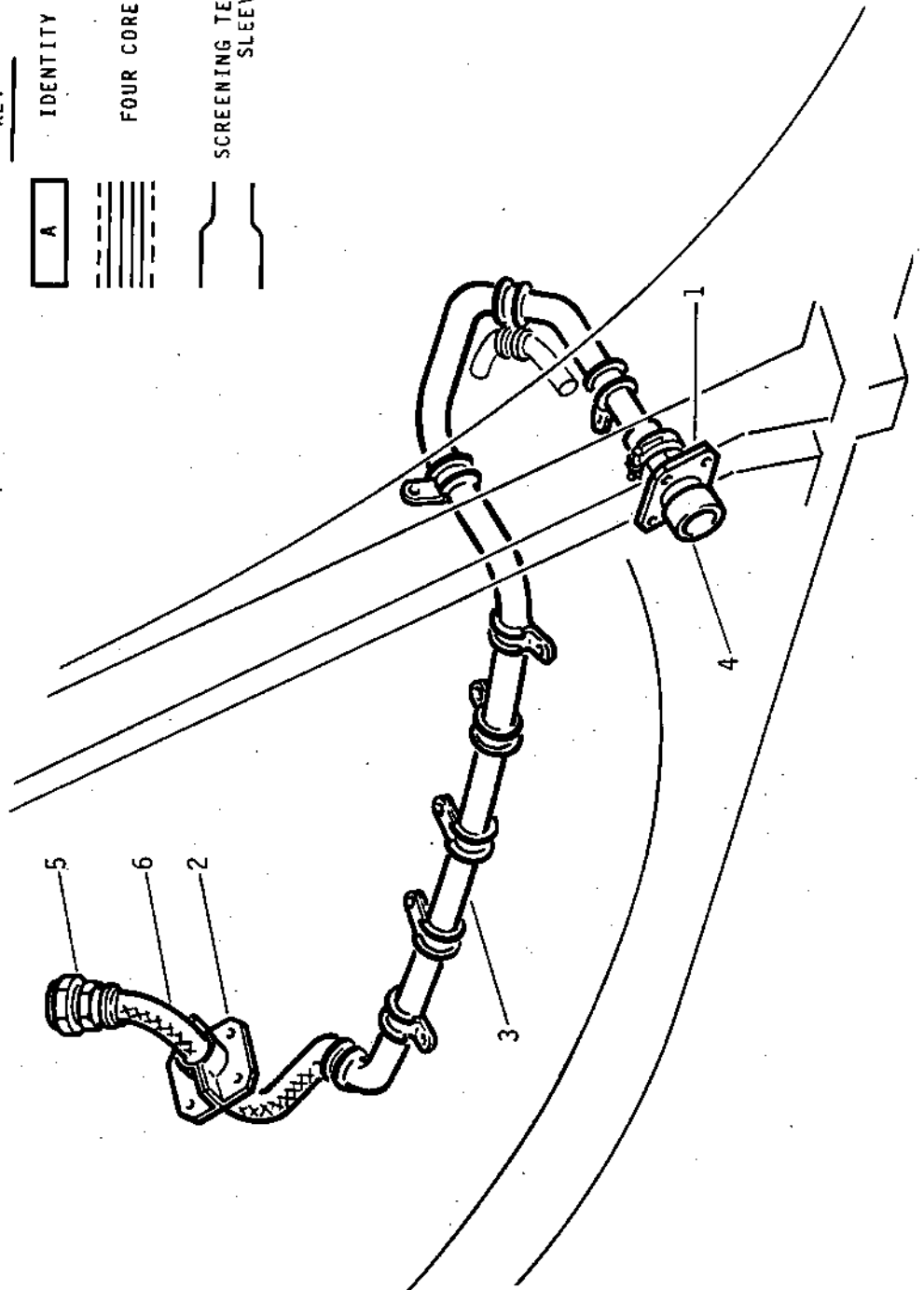
IDENTITY SLEEVE



FOUR CORED CABLE



SCREENING TERMINATION SLEEVE



Primary Nozzle Transducer Harness  
Figure 7

78-13-01

Page 12  
Dec 30/74





OLYMPUS 593

MK.610-14-28

OVERHAUL



The nozzle area transducer harness is itself composed of :

- 1) a screened four-cored cable (3) with thermal-setting sleeves placed close to the connector at the ends of the screening,
- 2) a receptacle (4) with four pins,
- 3) a movable four pin socket connector (5),
- 4) a protective sheath comprising a flexible sleeve (6) in stainless steel brazed to the movable connector,
- 5) identify sleeves for each wire, yellow in colour and marked A, B, C, D respectively.

(b) Operation

See layout on figure 7

(5) Description of accessory attachment parts

(a) Attachment of bucket pneumatic drive motors (figure 8)

The bucket actuator drive motors (1) are located in the upper forward part of the twin secondary nozzle ; access is via the central doors. The motors are fixed to the structures at three points :

- two rigid motor-to-structure mounting points (2),
- one adjustable motor-structure mounting by means of tie-rod (3).

The P3 air feed for each bucket motor is effected by a tube which crosses the forward bulk head of the central wall, to which it is secured by a nut (5). The other end of the tube is fixed to a bracket (6) inside the bucket actuator motor housing. Two covers (7) blank the tube (4) passage in the base of the housing. The connection between tube (4) and tube (8) mounted on the motor, is effected by a telescopic tube (9), thus ensuring continuity of flow without imposing mechanical loads on the connection points. An exhaust duct (10) fixed to each motor, passes through the access door and allows exhaust air to escape to the outside of the structure.

(b) Attachment of the nozzle ball-screw gear-boxes, and bucket position transmitters (indicators) (see figure 9).

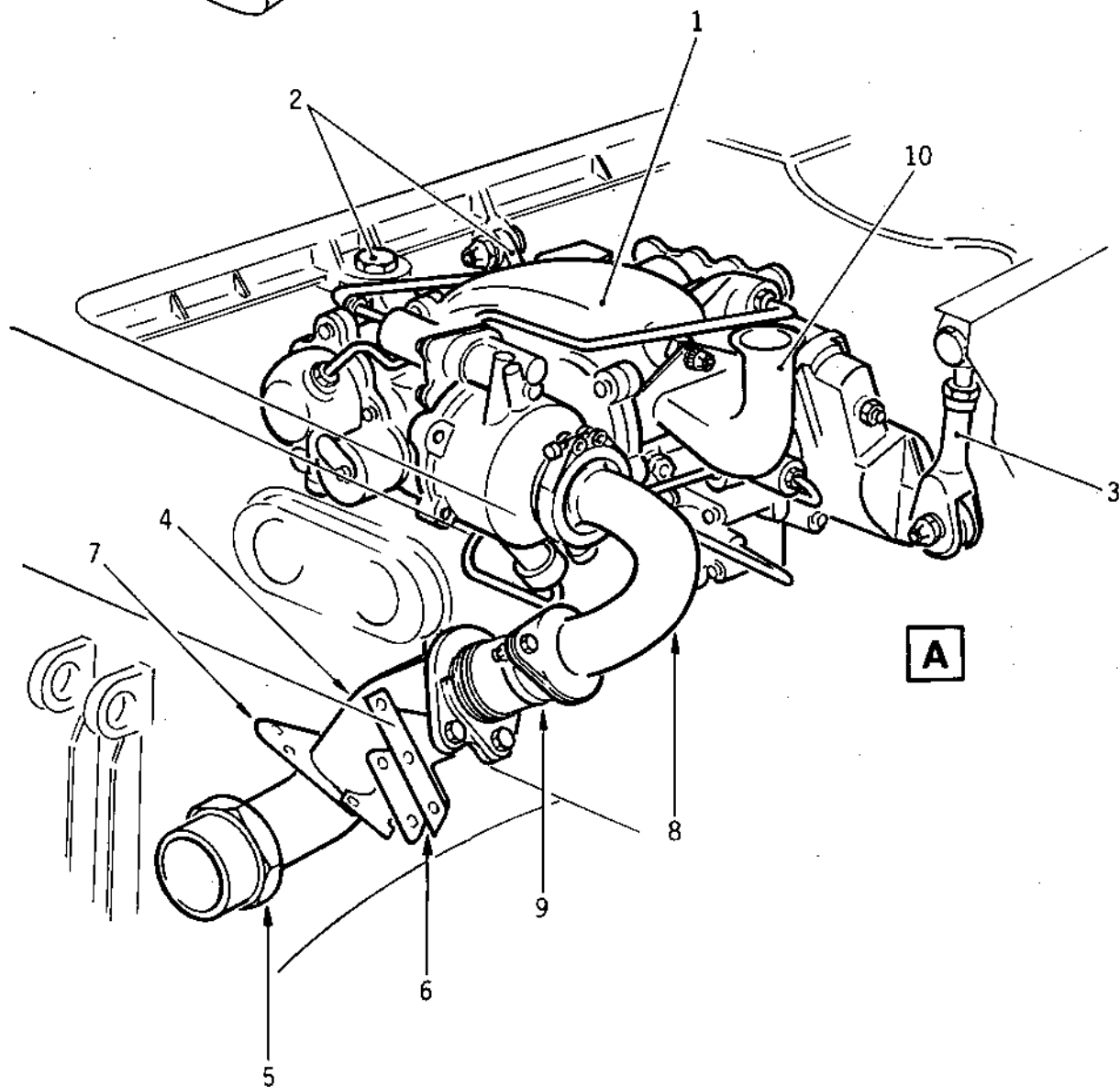
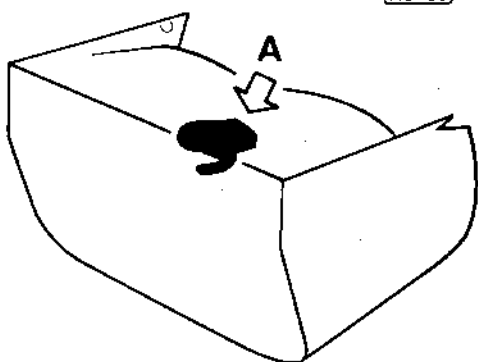
78-13-01



OLYMPUS 593

MK.610-14-28

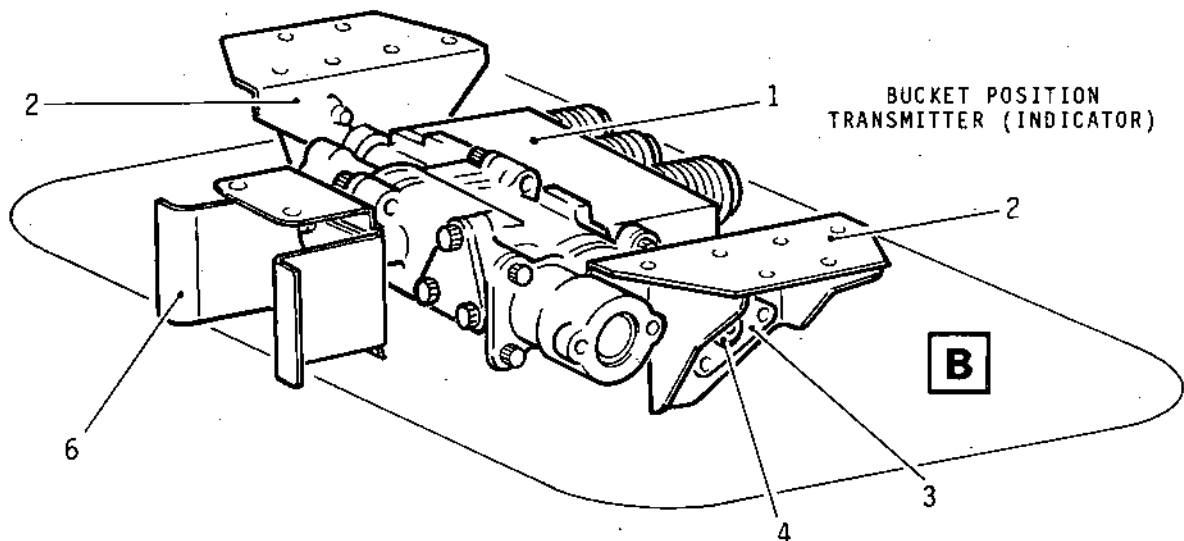
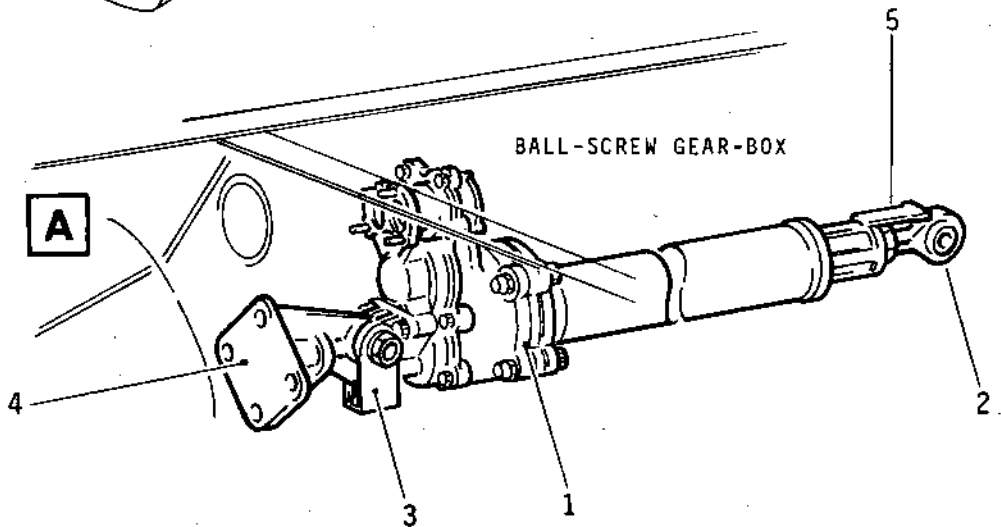
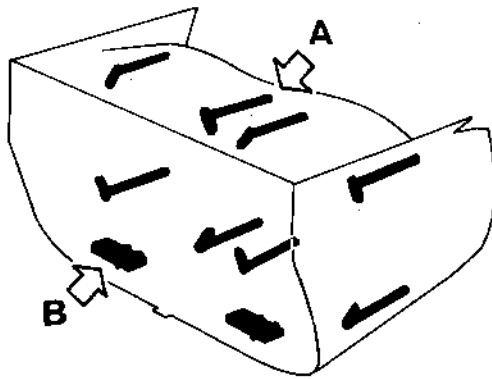
OVERHAUL



Attachment of Bucket Pneumatic  
Actuator Drive  
Figure 8

78-13-01

Page 14  
Dec 30/74



Attachment of Ball-Screw Gear-Boxes and Bucket Position  
Transmitter (Indicator)  
Figure 9



OLYMPUS 593

MK.610-14-28

OVERHAUL



1) Attachment of bucket ball-screw gear-boxes

There are eight ball-screw gear-boxes (1) per twin secondary nozzle ; i.e two gear-boxes to move each bucket. The end fitting (2) of the gear-box fits into a yoke on the bucket. The other end (i.e reduction gear-box end) carries a yoke (3) which is fixed by a shaft, to a bracket (4) which is rigidly mounted on the secondary nozzle. The bracket (4) carries a peg which fits into the gear-box yoke (3) and which, with anti-rotation bracket (5), engaged into the bucket yoke, resists any reaction torque resulting from the operation of the nut/screw system.

The hinge between the bracket (4) and the yoke (3) includes a spherical bearing crimped into the bracket.

2) Attachment of the bucket position transmitter (indicator).

Two bucket position transmitters (indicators) per twin secondary nozzle are fitted. They are located in the lower, forward part of the structure.

The position transmitters (indicators) (1) are three-point mounted by two removable supports (2) and a fixed support (6). The transmitter (indicator) trunnions (4) fit into spherical bearings (3), attached to these supports.

(c) Attachment of bucket crossfeed isolation valve (figure 10).

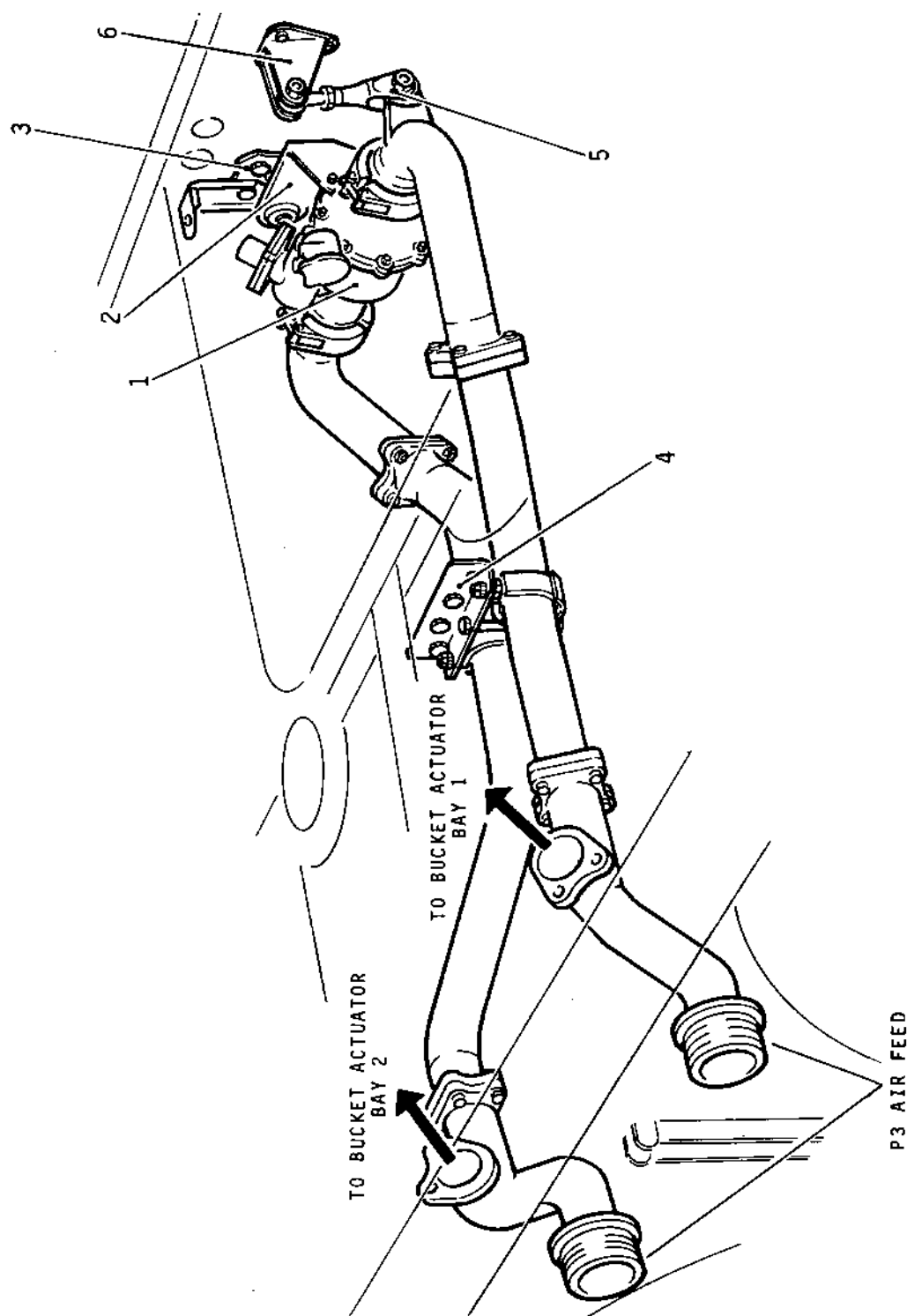
The isolation valve (1) is located in the upper central part of the secondary nozzle. It is mounted on a bracket which pivots on a flanged shaft (3) rigidly mounted on the secondary nozzle structure. The isolation valve is fitted into the tube connecting the two P3 air feeds to the bucket motors. This tube is supported :

- by a double clamp (4) fixed to the bulkhead of the bucket motor housing,
- by a tie-rod (5) hinged to a yoke fitted to the structure,

(d) Attachment of electrical harness

On each secondary nozzle are fitted two electrical harnesses which connect the various accessories fitted to the nozzle. These harnesses comprise :

78-13-01



Attachment of the Bucket  
Cross-feed Isolation Valve  
Figure 10



OLYMPUS 593

MK.610-14-28

OVERHAUL



junction box fixed inside the bucket motor housings. From this junction box, two looms go :

- one to the bucket motor,
- the other to the bucket position transmitter (indicator). The looms are supported by clips and are lead through the structure inside a metal tube fixed to the structure. The outlet connectors from the junction boxes form the harness frontier between the secondary nozzle and the nacelle.

NOTE : The electrical harnesses for bays 2 and 4 include a third loom for the isolation valve.

### 3. Description of the bucket actuator system

Refer to the following chapters :

- 78-13-10 for electrical harnesses,
- 78-31-01 for the buckets,
- 78-31-12 for the telescopic tube,
- 78-32-19 for the bucket ball-screw gear-boxes,
- 78-33-06 for the bucket motors,
- 78-34-01 for the bucket flexible shafts,
- 78-35-01 for the bucket position transmitter (indicator),
- 78-37-01 for the isolation valve.

### 4. Operation of the twin secondary nozzle assembly

As stated in the previous pages, the twin secondary nozzle assembly embodies the basic twin secondary nozzle, the reverse buckets and part of the whole reverse bucket control system. In order to facilitate comprehension of operation we suggest, although the following is beyond the scope of this manual, to offer the reader a short description of the whole control system.

#### A. Composition of the reverse bucket control system.

This system embodies electro-pneumatic pieces of equipment the logic diagram of which is shown on Figure 11.

**78-13-01**

Page 18  
Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



These equipment are the following :

(1) The reverse command system

This system is remotely installed and is thereby not part of the twin secondary nozzle assembly. It is composed of :

- (a) The A.D.C. (Air Data Computer) which delivers an electrical signal proportional to the aircraft Mach number.
- (b) The N.A.S.U. (Nozzle Angle Scheduling Unit) which generates a signal  $S_1 = f(\text{Mach})$  versus the pre-selected modulation law (Ref. to Fig. 12).
- (c) The N.T.R.C. (Nozzle and Thrust Reverser Controller) which compares the feedback signal proportional to the position of the buckets, with the thrust reverse command signal  $S_1$ . It amplifies the error signal to command the bucket pneumatic drive actuator operation.

(2) The reverse actuating system

This system is part of the twin secondary nozzle assembly. It is composed of :

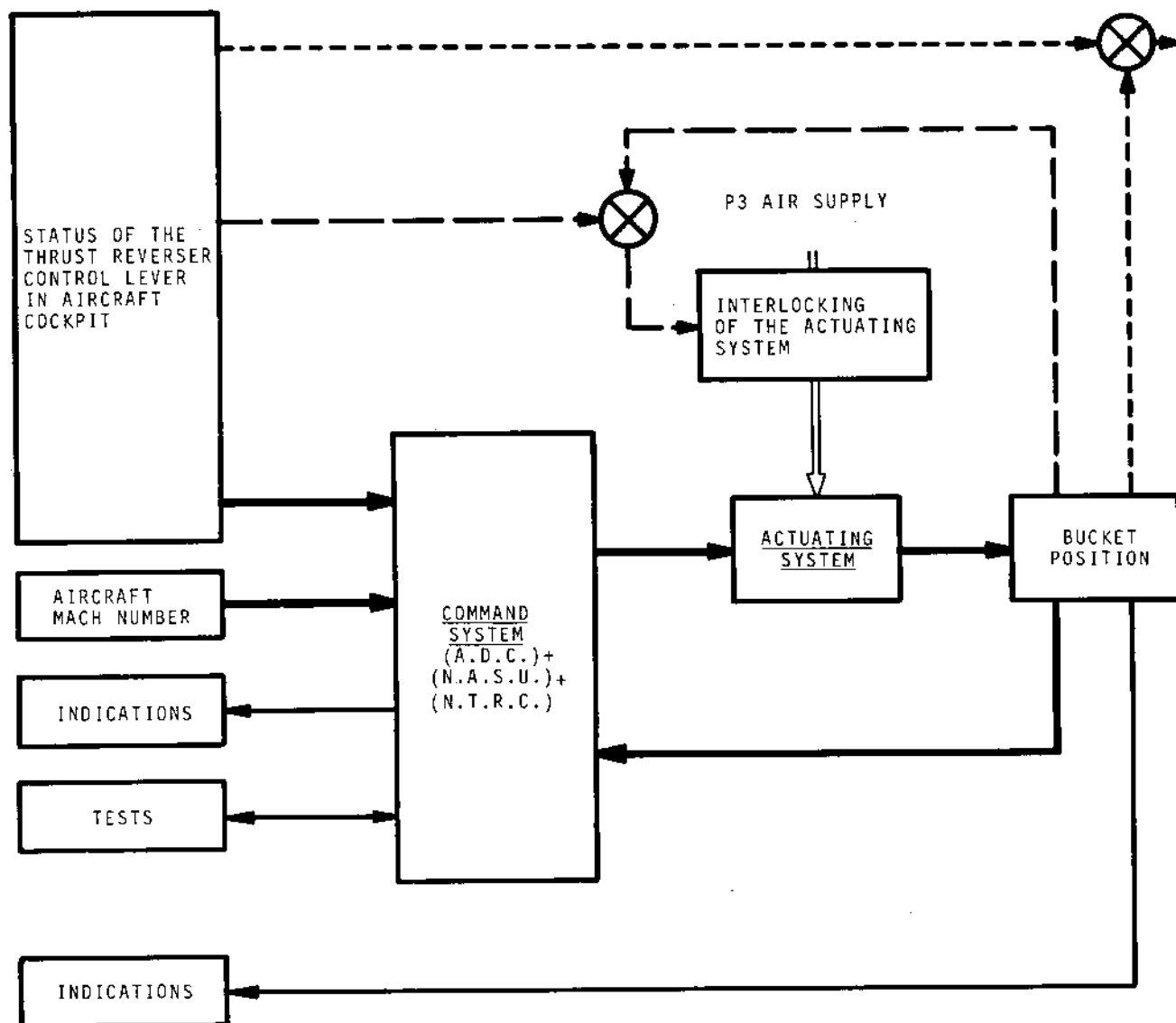
- (a) The bucket pneumatic drive actuator which itself, incorporates :
  - an air motor
  - an electro-magnetic control valve which supplies a pneumatic signal as a function of the error signal.
  - an L.V.D.T. (Linear Variable Differential Transformer) which, from a duplication of the pneumatic drive actuator position, provides a feedback electrical signal to the N.T.R.C.
  - various pneumatic servo-control systems.
- (b) The flexible shafts which transfer the air motor power output to the bucket ballscrew gear-boxes.
- (c) The ballscrew gear-boxes which actuate the buckets.

78-13-01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- MODULATION AND THRUST REVERSE FUNCTIONS.
- SAFETY FUNCTION : ENGINE "WIND-DOWN" (IDLING)  
UPON ACCIDENTAL BUCKET MOVEMENT.
- . - . - SAFETY FUNCTION : LOCKING OF BUCKETS, AT SLIGHTLY  
PAST 27 DEG., UPON ACCIDENTAL CLOSING OF BUCKETS.
- ===== INDICATION AND TESTS/CHECKS FUNCTIONS.

Logic Diagram of the Reverse Bucket Control System  
Figure 11

78-13-01

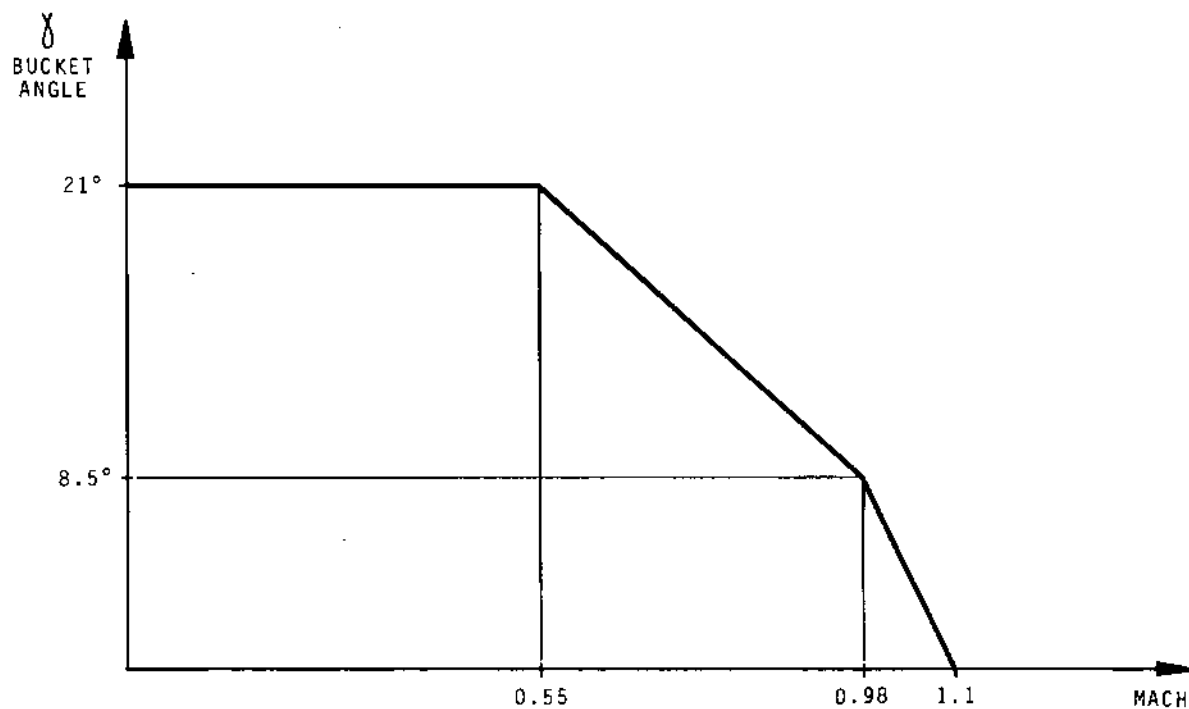




OLYMPUS 593

MK.610-14-28

OVERHAUL



Modulation Law  
Figure 12

78-13-01

Page 21  
Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (d) The bucket position transmitter (indicator), integrated in the transmission train, which sends signals about the bucket positions to provide for the indication and safety functions.
- (e) The bucket crossfeed isolation valve which allows in-flight thrust reverse on the two inboard engines.

## B. Operation

The twin secondary nozzle assembly and the bucket control system provide for :

- Specific, major functions :
    - Modulation of the twin nozzle exhaust area
    - Thrust reverse operation
  - Secondary safety functions :
    - Automatic return of engine to idle power setting (wind-down)
    - Limitation of the bucket travel
  - Indication functions for the flight crew information
- (1) Modulation of the twin nozzle exhaust gas area.

To optimize the powerplant performance, the twin nozzle exhaust area is modulated versus the aircraft Mach number. The pre-selected law, evolving from in-flight tests data, is shown on Figure 12.

The buckets, which govern the exhaust gas area, are servo-controlled in position by a regulation loop comprising the N.T.R.C. and the bucket pneumatic drive actuator.

At any time, the N.T.R.C. compares the actual bucket position with the command signal delivered by the N.A.S.U. The resulting error signal, if any, commands the pneumatic drive actuator to operate, thus causing the buckets to move towards the required direction (Figure 13) by means of the flexible shafts and of the bucket ballscrew gear-boxes.

### (2) Thrust reverse

Engine thrust reverse is applied on ground during the

**78-13-01**

Page 22  
Dec 15/75



OLYMPUS 593

MK.610-14-28  
OVERHAUL



aircraft landing roll or in case of aborted take-off in order to assist the aircraft braking; it is also used in flight to ensure a sufficient aircraft descent rate during the subsonic deceleration phase. In the two cases, the buckets are positioned at 73 deg. thus blocking the free passage for the exhaust jet while enabling the obtention of a negative thrust (Refer to Fig. 13).

(a) On-ground thrust reverse mode

During the phase where the thrust reverse is operating, the bucket pneumatic drive actuator is controlled in open loop configuration. The reverse command signal, emanating from the relevant reverse lever, opens the regulation loop. The pneumatic drive actuator electro-magnetic control valve is then electrically supplied with a constant control current which is cause for the bucket actuation towards the 73 deg. angular position.

(b) In-flight thrust reverse mode : pneumatic cross-feed system.

In-flight thrust reverse, used to increase the aircraft descent rate, is applied on the two aircraft inboard engines only. At high altitude and with the engines at idle power, the air bleed pressure available from the HP compressor of the engines, taken individually, is marginal to ensure a suitable deployment of the buckets in the exhaust stream. Consequently, in order to obtain a higher pneumatic pressure, the actuating systems of the inboard bay's buckets are - during the buckets transit period - supplied via the crossfeed isolation valve by HP bleed air from the adjacent engine, the idle power of which is set at a higher level for the whole duration of the reverse sequence. The pneumatic crossfeed system is illustrated by the diagram of Figure 14.

(3) Automatic return to idle power (wind-down)

The engine power rating is automatically re-set to idle in the two following occurrences :

- Movement of the buckets beyond 45 deg. without having the thrust reverse selected beforehand.

78-13-01

Page 23  
Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



- Movement of the buckets within 71 deg. when the reversed jet position is selected.

This function is achieved by means of micro-switches the operating state of which is slaved to the bucket position (bucket position transmitter (indicator)) and to the pilot's throttle lever configuration.

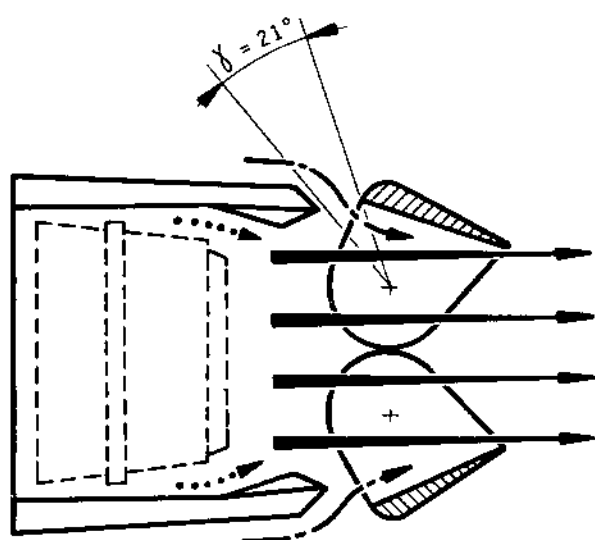
The resulting signal is then sent to the basic engine control amplifiers which in turn, govern the engine rotational speed.

(4) Interlocking of the bucket actuating system

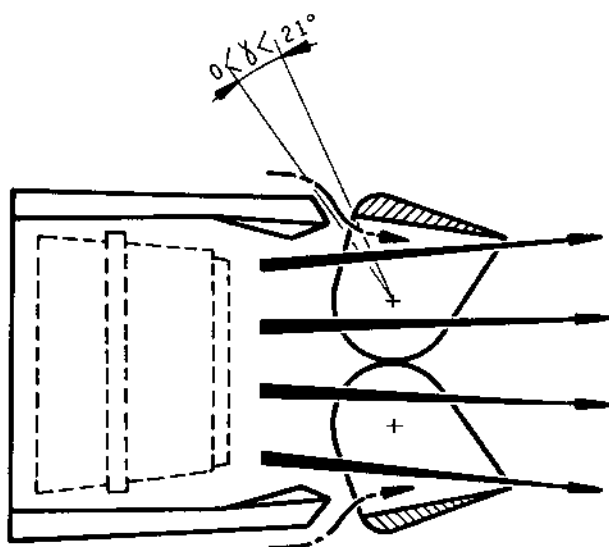
A shut-off valve located on the bucket pneumatic drive actuator air inlet system cuts the air feed should an unwanted transit of the buckets beyond 27 deg. occurs notwithstanding the non-selection of the thrust reverse; the buckets are then interlocked in a position slightly higher than 27 deg.

(5) Indications

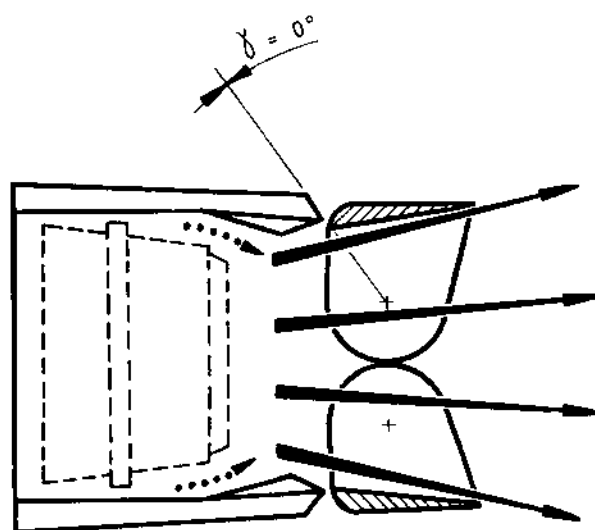
Some of the analogic and/or logic indications are conveyed back to the aircraft cockpit or to the 3rd crew member station and allow to visually check for nominal operation of the whole system.



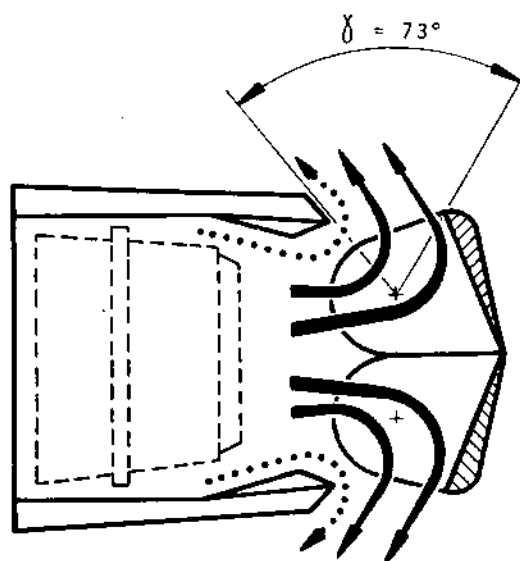
TAKE-OFF MODE



TRANSONIC MODE



SUPERSONIC MODE



GROUND REVERSE MODE

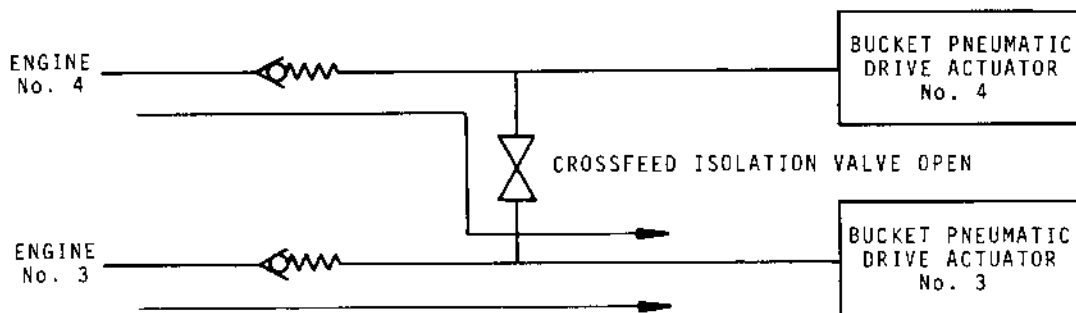
- PRIMARY AIRSTREAM
- - - TERTIARY AIRSTREAM
- ..... SECONDARY AIRSTREAM

Modulation of the Twin Secondary Nozzle Exhaust Area  
Figure 13

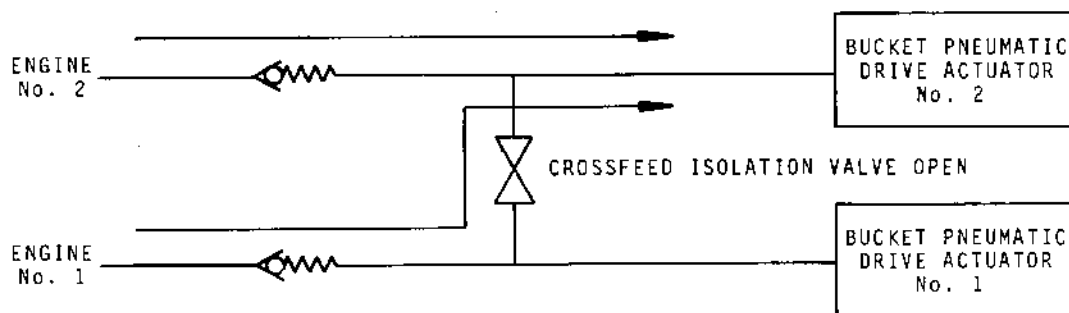


OLYMPUS 593

MK.610-14-28  
OVERHAUL



----- AIRCRAFT AXIS OF SYMMETRY -----



Reverse Bucket Pneumatic Crossfeed Diagram  
Figure 14

78-13-01

Page 26  
Dec 15/75



OLYMPUS 593

MK.610-14-28

OVERHAUL



## DISASSEMBLY

### 1. General

- A. During disassembly, follow the general recommendations given in chapter 70-05-00 of the Standard Practices manual, and the working procedures section of the Overhaul Manual.
- B. Use only tools and special equipment nominated in the disassembly procedures, and identified by a number SC.. of which an illustration is shown in the Special Tools and Equipment chapter.
- C. During disassembly, visually inspect all parts removed and report, to the Inspection Department, any defects found which could be obliterated by cleaning (scratches, burning) and which may result from incorrect operation. Also report any broken parts or missing locking devices.
- D. In the working procedures section of the manual, parts are referenced to the I.P.L. by two numbers in brackets, the first of which is the figure number in the I.P.L. on which the part is shown, and the second number is the item number within that figure.

### 2. Removal of Seal Plates and Anti-Fret Strips from the Front Framework

NOTE : These disassembly operations must be carried out when the secondary nozzle is on the transport trolley - tool SC 36 - in order to avoid damaging the seals during positioning on the rotating stand.

- A. Removal of the seals around the front framework of bay 1 or bay 3.
  - (1) Removal of LH seal plate (10-20)
    - (a) Unscrew nuts (10-12)  
Remove washers (10-15) and screws (10-17).
    - (b) Unscrew nuts (10-5). Remove countersunk head screws (10-10) and remove seal plate (10-20) for bay 1 or (10-21) in the case of bay 3.
  - (2) Unscrew nuts (10-25), withdraw countersunk head screws (10-30) and remove LH seal plate assembly (10-40) for bay 1 or (10-41) for bay 3.

78-13-01

Page 101  
May 31/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (3) Unscrew nuts (10-45), withdraw countersunk head screws (10-50) and remove LH seal plate assembly (10-60) for bay 1 or (10-61) for bay 3.
- (4) Unscrew nuts (10-65), withdraw countersunk head screws (10-70) and remove LH seal plate assembly (10-80) for bay 1 or (10-81) for bay 3.
- (5) Unscrew nuts (10-85), withdraw countersunk head screws (10-90) and remove LH seal plate assembly (10-100) for bay 1 or (10-101) for bay 3.
- (6) Unscrew nuts (10-105), withdraw countersunk head screws (10-110) and remove LH seal plate assembly (10-120) for bay 1 or (10-121) for bay 3.
- (7) Unscrew nuts (10-125), withdraw countersunk head screws (10-130) and remove LH seal plate assembly (10-140) for bay 1 or (10-141) for bay 3.
- (8) Unscrew nuts (10-145), withdraw countersunk head screws (10-150) and remove LH seal plate assembly (10-160) for bay 1 or (10-161) for bay 3.
- (9) Unscrew nuts (10-165), withdraw countersunk head screws (10-170) and remove LH seal plate assembly (10-180) for bay 1 or (10-181) for bay 3.
- (10) Unscrew nuts (10-185), withdraw countersunk head screws (10-190) and remove LH seal plate assembly (10-200) for bay 1 or (10-201) for bay 3.
- (11) Unscrew nuts (10-205), withdraw countersunk head screws (10-210) and remove LH seal plate assembly (10-220) for bay 1 or (10-221) for bay 3.
- (12) Unscrew nuts (10-225), withdraw countersunk head screws (10-230) and remove seal plate (10-240).

B. Removal of Seal Plate Assemblies around the Front Framework of Bay 2 or Bay 4.

- (1) Removal of seal plate assembly (10-260)
  - (a) Unscrew nuts (10-252), withdraw washers (10-255) and screws (10-257)
  - (b) Unscrew nuts (10-245), withdraw countersunk head screws (10-250) and remove the LH seal plate assembly (10-260) for bay 2 or RH seal plate assembly (10-261) for bay 4.

PRINTED IN FRANCE

78-13-01

Page 102

May 31/76





OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN FRANCE

- (2) Unscrew nuts (10-265), withdraw countersunk head screws (10-270) and remove the LH seal plate assembly (10-280) for bay 2 or (10-281) for bay 4.
- (3) Unscrew nuts (10-285), withdraw countersunk head screws (10-290) and remove the LH seal plate assembly (10-300) for bay 2 or (10-301) for bay 4.
- (4) Unscrew nuts (10-305), withdraw countersunk head screws (10-310) and remove the LH seal plate assembly (10-320) for bay 2 or (10-321) for bay 4.
- (5) Unscrew nuts (10-325), withdraw countersunk head screws (10-330) and remove the LH seal plate assembly (10-340) for bay 2 or (10-341) for bay 4.
- (6) Unscrew nuts (10-345), withdraw countersunk head screws (10-350) and remove the LH seal plate assembly (10-360) for bay 2 or (10-361) for bay 4.
- (7) Unscrew nuts (10-365), withdraw countersunk head screws (10-370) and remove the LH seal plate assembly (10-380) for bay 2 or (10-381) for bay 4.
- (8) Unscrew nuts (10-385), withdraw countersunk head screws (10-390) and remove the LH seal plate assembly (10-400) for bay 2 or (10-401) for bay 4.
- (9) Unscrew nuts (10-405), withdraw countersunk head screws (10-410) and remove the LH seal plate assembly (10-420) for bay 2 or (10-421) for bay 4.
- (10) Unscrew nuts (10-425), withdraw countersunk head screws (10-430) and remove the LH seal plate assembly (10-440) for bay 2 or (10-441) for bay 4.
- (11) Unscrew nuts (10-445), withdraw countersunk head screws (10-450) and remove the LH seal plate assembly (10-460) for bay 2 or (10-461) for bay 4.
- (12) Unscrew nuts (10-465), withdraw countersunk head screws (10-470) and remove the LH seal plate assembly (10-480).

C. Removal of Anti-fret Strips from the Central Wall

- (1) Unscrew blind bolts (10-500), withdraw throat washer (10-510) and remove anti-fret strips (10-520) and (10-530).

78-13-01

Page 103

May 31/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Unscrew blind bolts (10-540), withdraw throat washer (10-550) and remove anti-fret strips (10-560) and (10-570).
- (3) Unscrew blind bolts (10-580), withdraw throat washer (10-590) and remove anti-fret strips (10-600) and (10-610).
- (4) Unscrew blind bolts (10-620), withdraw throat washer (10-630) and remove anti-fret strips (10-640) and (10-650).
- (5) Unscrew self-locking nuts (10-660) and remove washers (10-670).
- (6) Withdraw bolts (10-680) and remove anti-fret strips (10-690) and (10-700).

D. Removal of Threaded Pins (10-490)

- (1) Unlock pins (10-490).
- (2) Unscrew and remove the pins.

E. Removal of Trunnions

Carry out the following operations for each trunnion.

- (1) Unscrew self-locking nut (20-70), remove plain washer (20-80) and screw (20-90)
- (2) Unscrew self-locking nut (20-100), remove plain washer (20-110) and bolt (20-120) complete with washer (20-130).
- (3) Collect laminated shim (20-140) and remove the support (20-150) complete with the trunnion (20-155).
- (4) Remove the trunnion assembly (20-155) from the support and separate the spring pins (20-160) from the trunnion (20-170).

3. Preparation for Disassembly

A. Fitting the Twin Secondary Nozzle to the Rotating Stand - tool SC 117.

- (1) Using a hoist, fit the hoisting "T" beam - tool SC 195 - to the nozzle, which is on the trolley - tool SC 36.

PRINTED IN FRANCE

78-13-01

Page 104  
May 31/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Attach the three slings of the hoisting "T" beam to the lifting point located on the upper forward section and on the side walls.
- (3) Unlock the secondary nozzle from the trolley - tool SC 36.
- (4) Operate the hoist to remove the nozzle from the trolley, and position the latter on the rotating stand - tool SC 117.
- (5) Fit the tooling ring at the attachment and mounting pin points.
- (6) Remove the lifting beam - tool SC 195.

#### 4. Removal of Access Doors (Left Hand Twin Secondary Nozzle)

NOTE : Remove doors (3-10) and (3-170) while the nozzle is still in its container, so as to allow fitting of the upper handling support - tool SC 194.

##### A. Removal of Access Door (3-10)

- (1) Remove countersunk head screws (3-20) and (3-25).
- (2) Remove LH access door assembly (3-10) which gives access to the bay 1 bucket pneumatic drive actuator housing.
- (3) Disassembly of left hand access door assembly (3-10).
  - (a) Unscrew self-locking nuts (3-30) and remove washers (3-40).
  - (b) Remove countersunk head screws (3-50), the LH sleeve support plate (3-60), the LH sleeve assembly (3-70) and the LH sleeve support (3-80).
  - (c) Unscrew self-locking nuts (3-90) and remove plain washers (3-100).
  - (d) Remove countersunk head screws (3-110), the LH sleeve support plate (3-120), the LH sleeve assembly (3-130) and the LH sleeve support (3-140).

##### B. Removal of the LH Access Door (3-170)

- (1) Remove countersunk head screws (3-180) and (3-185).
- (2) Remove LH access door (3-170) which gives access to the bay 2 bucket drive pneumatic actuator housing.

**78-13-01**



OLYMPUS 593

MK.610-14-28  
OVERHAUL



C. Removal of LH Access Door (3-330)

- (1) Remove countersunk head screws (3-340).
- (2) Remove the LH access door (3-330) which gives access to the crossfeed isolation valve and the upper central ballscrew gearboxes.

D. Removal of LH Access Door (3-350)

- (1) Remove countersunk head screws (3-360).
- (2) Remove LH access door (3-350) which gives access to the upper LH ballscrew gearbox for bay 1.

E. Removal of LH Access Door (3-370)

- (1) Remove countersunk head screws (3-380)
- (2) Remove LH access door (3-370) which gives access to the bay 2 upper RH ballscrew gearbox housing.

F. Removal of RH Access Doors (3-390)

For each access door, carry out the following operations :

- (1) Remove countersunk head screws (3-410).
- (2) Remove the RH access door assembly (3-390).
- (3) Dissassembly of RH access door (3-390)
  - (a) Remove split pin (3-400).
  - (b) Remove countersunk head screws (3-410) and withdraw nut plate assembly (3-420).

G. Removal of RH Cover Plates (3-440)

For each cover plate, carry out the following operations :

- (1) Unscrew countersunk head screws (3-460).
- (2) Remove the RH cover plate assembly (3-440).
- (3) Disassemble the cover plate (3-440).
  - (a) Withdraw split pin (3-450).
  - (b) Remove countersunk head screws (3-460) and withdraw the nut plate assembly (3-470).

PRINTED IN FRANCE

78-13-01

Page 106  
May 31/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN FRANCE

H. Removal of Access Door (4-10)

- (1) Remove countersunk head screws (4-20).
- (2) Remove the access door (4-10) which gives access to the lower central ballscrew gearboxes.

J. Removal of LH Access Door (4-30)

- (1) Remove countersunk head screws (4-40).
- (2) Remove LH access door (4-30) which gives access to the bay 3 lower LH ballscrew gearbox.

K. Removal of LH Access Door (4-50)

- (1) Remove countersunk head screws (4-60).
- (2) Remove LH access door (4-50) which gives access to the bay 4 lower RH ballscrew gearbox.

L. Removal of LH Access Door (4-70)

- (1) Remove countersunk head screws (4-80)
- (2) Remove LH access door (4-70) which gives access to the bay 4 bucket position indicator.
- (3) Remove the threaded plug (4-90).

M. Removal of LH Access Door (4-100)

- (1) Remove countersunk head screws (4-110).
- (2) Remove the LH access door (4-100) which gives access to the bay 1 bucket position indicator.
- (3) Remove threaded plug (4-120).

5. Removal of Access Doors (RH Twin Secondary Nozzle Assembly)

NOTE : Remove RH access doors (3-150) and (3-190) while the nozzle is still in its container, so as to allow fitting of the upper handling support - tool SC 194.

A. Removal of RH Access Door (3-150)

- (1) Unscrew countersunk head screws (3-160).
- (2) Remove the RH access door (3-150) which gives access to the bay 4 bucket pneumatic drive actuator housing.

78-13-01

Page 107  
May 31/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



B. Removal of RH Access Door (3-190)

- (1) Remove countersunk head screws (3-200).
- (2) Remove RH access door assembly (3-190), which gives access to the bay 3 bucket pneumatic drive actuator.
- (3) Disassembly of access door (3-190).
  - (a) Unscrew self-locking nuts (3-210) and plain washers (3-220).
  - (b) Remove countersunk head screws (3-230), the RH sleeve support (3-240), the RH sleeve assembly (3-250) and the RH sleeve support (3-260).
  - (c) Unscrew self-locking nuts (3-270) and remove plain washers (3-280).
  - (d) Remove countersunk head screws (3-290), the RH sleeve support (3-300), the RH sleeve assembly (3-310) and the RH sleeve support (3-320).

C. Removal of RH Access Door (3-331)

- (1) Unscrew countersunk head screws (3-340)
- (2) Remove access door (3-331) which gives access to the crossfeed isolating valve and the upper central ball-screw gearboxes.

D. Removal of RH Access Door (3-351)

- (1) Remove countersunk head screws (3-360).
- (2) Remove access door (3-351) which gives access to the bay 4 upper RH ballscrew gearbox housing.

E. Removal of RH Access Door (3-371)

- (1) Unscrew countersunk head screws (3-380).
- (2) Remove access door (3-371) which gives access to the bay 3 upper LH ballscrew gearbox housing.

F. Removal of RH Access Door Assemblies (3-390)

- (1) Repeat the operations given in paragraph 4.F.

PRINTED IN FRANCE

78-13-01

Page 108  
May 31/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN FRANCE

G. Removal of RH Cover Plate Assemblies (3-440)

- (1) Repeat the operations given in paragraph 4.G.

H. Removal of Access Door (4-10)

- (1) Repeat the operations given in paragraph 4.H.

J. Removal of RH Access Door (4-31)

- (1) Remove countersunk head screws (4-40).
- (2) Remove access door (4-31) which gives access to the bay 4 lower RH ballscrew gearbox.

K. Removal of RH Access Door (4-51)

- (1) Remove countersunk head screws (4-60).
- (2) Remove access door (4-51) which gives access to the bay 3 lower LH ballscrew gearbox.

L. Removal of LH Access Door (4-71)

- (1) Remove countersunk head screws (4-80).
- (2) Remove access door (4-71) which gives access to the bay 3 bucket position indicator.
- (3) Remove threaded plug (4-90).

M. Removal of RH Access Door (4-101)

- (1) Remove countersunk head screws (4-110)
- (2) Remove access door (4-101) which gives access to the bay 4 bucket position indicator.
- (3) Remove threaded plug (4-120).

6. Removal of the Deflector Assembly

NOTE : Do not mix the attachment parts. As disassembly progresses, arrange them on the templates - tool SC 200.

78-13-01

Page 109  
May 31/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



A. Removal of Deflector Assemblies (1-10)

For each deflector assembly, carry out the following operations :

- (1) Remove hex. head bolts (1-110), (1-120), (1-130).
- (2) Remove hex. head bolts (1-180) and collect plain washers (1-190).
- (3) Remove hex. head bolts (1-140) and collect plain washers (1-150).
- (4) Remove hex. head bolt (1-160) and collect plain washers (1-170).
- (5) Unscrew self-locking nut (1-40), withdraw hex. head bolt (1-20) and collect plain washers (1-50) and (1-30).
- (6) Remove hex. head bolt (1-60) and collect plain washer (1-70).
- (7) Remove hex. head bolt (1-80) and collect plain washer (1-90).
- (8) Remove cover strip (1-100) and deflector assembly (1-10).

B. Removal of Deflector Assemblies (1-200)

For each deflector assembly, carry out the following operations :

- (1) Remove hex. head bolts (1-300), (1-310), (1-320).
- (2) Remove hex. head bolts (1-370) and collect plain washers (1-380).
- (3) Remove hex. head bolts (1-330) and collect plain washers (1-340).
- (4) Unscrew hex. head bolt (1-350) and collect the plain washer (1-360).
- (5) Unscrew self-locking nut (1-230), withdraw hex. head bolt (1-210) and collect plain washers (1-240) and (1-220).
- (6) Remove hex. head bolt (1-250) and collect the plain washer (1-260).

PRINTED IN FRANCE

78-13-01

Page 110

May 31/76





OLYMPUS 593

MK.610-14-28

OVERHAUL



- (7) Remove hex. head bolt (1-270) and collect the plain washer (1-280).
- (8) Remove the cover strip (1-290) and the deflector assembly (1-200).

## 7. Removal of Reverser Bucket Assemblies

### A. Removal of the Locking Pads for the Safety Pins.

- (1) Withdraw the locking wire from hex. head bolts (2-110).
- (2) Unscrew bolts (2-110).
- (3) Withdraw split pin (2-80).
- (4) Unscrew the castellated nut (2-90) and collect the plain washer (2-100).
- (5) Remove the locking pads (2-120).

### B. Removal of the Bay 1 Upper Reverser Bucket.

- (1) Using a hoist, position the hoisting beam - tool SC 205 - and fix it to the bucket.
- (2) Operate the hoist so that it just takes the weight of the bucket.
- (3) Separate the bucket from the ballscrew gearboxes by carrying out the following operations at each attachment point :
  - (a) Withdraw split pin (2-390) and unscrew the castellated nut (2-400).
  - (b) Withdraw the ballscrew gearbox attachment bolt (2-420) and collect plain washers (2-410) and (2-430).
- (4) Removal of the trunnion bearing attachment bolt (2-250) on the side wall.
  - (a) Using special spanner - tool SC 254 - unscrew the locknut (2-210) and withdraw the anti-rotation sleeve (2-220).
  - (b) Using special spanner - tool SC 254 - unscrew self-locking nut (2-230) and withdraw the trunnion attachment bolt washer (2-240)

78-13-01



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (c) Withdraw the trunnion bearing attachment bolt (2-250).
  - (5) Removal of the trunnion attachment bolt (2-60) from the central wall.
    - (a) Using special spanner - tool SC 254 - unscrew the locknut (2-20) and withdraw the anti-rotation sleeve (2-30).
    - (b) Using special spanner - tool SC 254 - unscrew self-locking nut (2-40) and withdraw the trunnion attachment bolt washer (2-50).
    - (c) Withdraw the trunnion attachment bolt (2-60) and collect the trunnion attachment bolt washer (2-70)
  - (6) Withdraw the safety pin (2-130) which retains the bucket trunnion bearing (2-170).
  - (7) Remove the trunnion bucket bearings (2-260) and (2-170) using the extractor - tool SC 209 -
  - (8) Operate the hoist to remove the complete reverser bucket assembly (2-10) from the structure. Position it on the workstand - tool SC 37 -
  - (9) Secure the reverser bucket to the workstand and remove the hoisting beam.
- C. Removal of the Bay 1 Reverser Bucket Assembly
- (1) Using a hoist, position the hoisting beam - tool SC 205- and attach it to the bucket.
  - (2) Operate the hoist so that it just takes the weight of the bucket.
  - (3) Separate the reverser bucket from the ballscrew gearboxes by carrying out the following operations at each attachment point :
    - (a) Withdraw split pin (2-390) and unscrew castellated nut (2-400).
    - (b) Withdraw the ballscrew gearbox attachment bolt (2-420) and collect plain washers (2-410) and (2-430).
  - (4) Removal of the trunnion bearing attachment bolt (2-340) from the side wall.

PRINTED IN FRANCE

78-13-01

Page 112

May 31/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN FRANCE

- (a) Using the special spanner - tool SC 254 - unscrew the locknut (2-300) and withdraw the anti-rotation sleeve (2-310).
  - (b) Using the special spanner - tool SC 254 - unscrew the self-locking nut (2-320) and withdraw the trunnion attachment bolt washer (2-330).
  - (c) Withdraw the trunnion bearing attachment bolt (2-340).
- (5) Removal of the trunnion attachment bolt (2-60) from the central wall.
- (a) Using the special spanner - tool SC 254 - unscrew the locknut (2-20) and withdraw the anti-rotation sleeve (2-30).
  - (b) Using the special spanner - tool SC 254 - unscrew the self-locking nut (2-40) and withdraw the trunnion attachment bolt washer (2-50).
  - (c) Withdraw the trunnion attachment bolt (2-60) and collect the trunnion attachment bolt washer (2-70).
- (6) Withdraw the safety pin (2-130) which retains the bucket trunnion bearing (2-160).
- (7) Remove the trunnion bucket bearings (2-160) and (2-350) using the extractor - tool SC 209 -
- (8) Operate the hoist to remove the complete reverser bucket assembly (2-10) from the structure, and position it on workstand - tool SC 37 -
- (9) Secure the reverser bucket assembly to the workstand and remove the hoisting beam.
- D. Removal of the Bay 2 Upper Reverser Bucket Assembly
- (1) Using a hoist, position the hoisting beam- tool SC 205 and fix it to the bucket.
  - (2) Operate the hoist so as to just take the weight of the bucket.
  - (3) Separate the bucket from the ballscrew gearboxes by carrying out the following operations at each attachment point :
    - (a) Withdraw split pin (2-390) and unscrew castellated nut (2-400).

78-13-01

Page 113

May 31/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Withdraw the ballscrew gearbox attachment bolt (2-420) and collect plain washers (2-410) and (2-430).
- (4) Removal of the trunnion attachment bolt bearing (2-340) on the side wall central beam.
  - (a) Using the special spanner - tool SC 254 - unscrew the locknut (2-300) and withdraw the anti-rotation sleeve (2-310).
  - (b) Using the special spanner - tool SC 254 - unscrew the self-locking nut (2-320) and withdraw the trunnion attachment bolt washer (2-330).
  - (c) Withdraw the trunnion attachment bolt washer (2-340).
- (5) Withdraw the safety pin (2-130) which retains the trunnion bucket bearing (2-160), the double ended bolt (2-140) and the adjusting shim (2-150).
- (6) Remove the trunnion bucket bearings (2-160) and (2-350), using the extractor - tool SC 209 -
- (7) Operate the hoist to remove the complete reverser bucket assembly (2-10) from the structure and position it on the workstand - tool SC 37 -
- (8) Secure the bucket assembly to the waiting stand and remove the lifting beam.

E. Removal of the Bay 2 Lower Reverser Bucket Assembly

- (1) Using a hoist, position the hoisting beam - tool SC 205 - and fix it to the bucket.
- (2) Operate the hoist to just take the weight of the bucket.
- (3) Separate the reverser bucket from the ballscrew gearboxes by carrying out the following operations at each attachment point.
  - (a) Withdraw the split pin (2-390) and unscrew the castellated nut (2-400).
  - (b) Withdraw the ballscrew gearbox attachment bolt (2-420) and collect the plain washers (2-410) and (2-430).
- (4) Removal of trunnion bearing attachment bolt (2-250) on the side wall :

PRINTED IN FRANCE

78-13-01

Page 114  
May 31/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE

- (a) Using the special spanner - tool SC 254 - unscrew locknut (2-210) and withdraw the anti-rotation sleeve (2-220).
  - (b) Using the special spanner - tool SC 254 - unscrew the self-locking nut (2-230) and withdraw the trunnion attachment bolt washer (2-240).
  - (c) Withdraw the trunnion bearing attachment bolt (2-250).
- (5) Withdraw the safety pin (2-130) which retains the bucket trunnion bearing (2-170), the double-ended bolt (2-140) and the adjusting shim (2-150).
  - (6) Remove the bucket trunnion bearings (2-260) and (2-170) using extractor - tool SC 209 -
  - (7) Operate the hoist to remove the complete reverser bucket assembly (2-10) from the structure and position it on the workstand - tool SC 37 -
  - (8) Fix the bucket assembly to the rotating stand and remove the hoisting beam.

#### F. Removal of the Trunnion Locking Pins

- (1) Carry out the following operations to remove the trunnion locking pins at the upper side attachment points.
  - (a) Withdraw the lockwire from trunnion locking pins (2-380).
  - (b) Unscrew hex. nuts (2-360) and collect plain washers (2-370).
  - (c) Withdraw the trunnion locking pins (2-380).
- (2) Carry out the following operations to remove the trunnion locking pins from the lower side attachment points.
  - (a) Withdraw the lockwire from trunnion locking pins (2-290).
  - (b) Unscrew hex. nuts (2-270) and collect plain washers (2-280).
  - (c) Withdraw the trunnion locking pins (2-290).

78-13-01

Page 115  
May 31/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Carry out the following operations to remove the trunnion locking pins from the central attachment points :

- (a) Withdraw the lockwire from the trunnion locking pins (2-200).
- (b) Unscrew hex. nuts (2-180) and collect plain washers (2-190).
- (c) Withdraw the trunnion locking pins (2-200).

8. Removal of the Bucket Drive Pneumatic Actuators

- A. Operate the Rotating Stand - tool SC 117 - to Position the Twin Secondary Nozzle Assembly Central Line Vertically.
- B. Uncoupling the Flexible Shafts from the Pneumatic Drive Actuators.

- (1) Uncoupling the flexible shafts from the bay 1 bucket pneumatic drive actuators.

- (a) Unscrew bolts (15-12) or (15-13) or (15-14) which retain the open flange of flexible shaft (15-10) to the pneumatic actuator, and remove the open flange.
- (b) Disengage the hexagon of flexible shaft (15-10) from its housing and, if applicable, collect shim (15-15) or (15-16).
- (c) Position the support - tool SC 187 - to the end of the flexible shaft.
- (d) Remove bolts (15-22) or (15-23) or (15-24) which secure the flexible shaft (15-20) flange to the pneumatic actuator.
- (e) Disengage the hexagon of flexible shaft (15-20) from its housing and, if applicable, collect shim (15-25) or (15-26).
- (f) Position the support - tool SC 187 - to the end of the flexible shaft.

- (2) Uncoupling the Flexible Shaft from the Bay 2 Bucket Drive Pneumatic Actuators.

- (a) Remove bolts (15-162) or (15-163) or (15-164) which retain the open flange of flexible shaft (15-160) to the pneumatic actuator, and remove the open flange.

PRINTED IN FRANCE

78-13-01

Page 116

May 31/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Disengage the hexagon of flexible shaft (15-160) from its housing and, if applicable, recover shim (15-165) or (15-166).
  - (c) Position the support-tool SC 187 - to the end of the flexible shaft.
  - (d) Remove bolts (15-152) or (15-153) or (15-154) which retain the flexible shaft (15-150) flange to the pneumatic actuator.
  - (e) Disengage the hexagon of flexible shaft (15-150) from its housing and, if applicable, recover shim (15-155) or 15-156).
  - (f) Position the support-tool SC 187 - to the end of the flexible shaft.
- C. Removal of the Bay 1 Telescopic Tube (17-10)
- (1) Remove self-locking nut (17-20), withdraw hex. head bolt (17-30) and recover plain washer (17-40).
  - (2) Remove the retaining plate (17-50).
- D. Removal of Elbow Assembly (17-110)
- (1) Slacken and remove collar clamp (17-100) ; withdraw the elbow assembly (17-110) complete with the telescopic keep ring (17-90).
  - (2) Recover the sealing ring (17-120).
  - (3) Save the telescopic tube (17-10).
  - (4) Unscrew self-locking nut (17-60), withdraw the hex. head bolt (17-70) and recover the plain washer (17-80).
  - (5) Remove the telescopic keep ring (17-90) from the elbow assembly (17-110).
- E. Disconnect the Electrical Connectors
- (1) Remove the lockwire from each connector.
  - (2) Withdraw the electrical connectors from the pneumatic actuator receptacles.
- F. Removal of Bay 1 Bucket Pneumatic Drive Actuator.
- (1) Withdraw split pin (17-280), unscrew castellated nut (17-290) and recover the plain washer (17-300).



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Withdraw the hex. head bolt (17-310) and the bushing (17-320).
- (3) Withdraw the split pin (17-330); unscrew the castella-  
ted nut (17-340).
- (4) Withdraw hex. head bolt (17-350) and collect plain  
washer (17-360).
- (5) Withdraw the split pin (19-220); unscrew castellated  
nut (19-230) and collect the plain washer (19-240).
- (6) Withdraw the hex. head bolt (19-250); withdraw the end  
of the rod assembly from the yoke on the structure and  
collect flanged bushings (19-390) and (19-400).
- (7) Disengage the pneumatic actuator from its mounting  
yokes and remove it from its housing.
- (8) Collect the flanged bushings (17-370) and (17-380).
- (9) Removal of the rod assembly :
- (a) Withdraw the split pin (17-240).
  - (b) Unscrew castellated nut (17-250) and collect  
plain washer (17-260).
  - (c) Withdraw hex. head bolts (17-270) and remove the  
rod assembly.
  - (d) Collect the flanged bushings (19-370) and  
(19-380).
- (10) Removal of the exhaust elbow assembly :
- (a) Slacken self-locking nuts (17-130).
  - (b) Unscrew self-locking nuts (17-130) and collect  
washers (17-140)
  - (c) Remove the exhaust elbow assembly (17-150) from  
the pneumatic actuator.
- (11) Remove the studs (17-220).
- (12) Fit blanks to the electrical connectors and the air  
inlet.
- G. Removal of the Bay 2 Pneumatic Actuator Exhaust Elbow  
Assembly (17-210)
- (1) Slacken the nuts (17-190)

PRINTED IN FRANCE

78-13-01

Page 118  
May 31/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Remove nuts (17-190) and collect flat washers (17-200).
- (3) Remove the exhaust elbow assembly (17-210) from the actuator.
- H. Removal of the Bay 2 Telescopic Tube (17-10).
- (1) Unscrew self-locking nut (17-20); remove hex. head bolt (17-30) and plain washer (17-40).
- (2) Remove the retaining plate (17-50).
- J. Removal of Elbow Assembly (17-170).
- (1) Slacken and remove the collar clamp (17-160); withdraw the elbow assembly (17-170) complete with the telescopic keep ring (17-90).
- (2) Remove the sealing ring (17-180).
- (3) Save the telescopic tube (17-10)
- (4) Unscrew self-locking nut (17-60) ; remove hex. head bolt (17-70) and the plain washer (17-80).
- (5) Remove the telescopic keep ring (17-90) from the elbow assembly (17-170).
- K. Disconnect the Electrical Connectors.
- (1) Withdraw the lockwire from each connector.
- (2) Withdraw the electrical connectors from the receptacles on the pneumatic actuator.
- L. Removal of the Bay 2 Bucket Drive Pneumatic Actuator.
- (1) Withdraw the split pin (17-280); unscrew castellated nut (17-290) and remove washer (17-300).
- (2) Withdraw the hex. head bolt (17-310) and the bushing (17-320).
- (3) Withdraw the split pin (17-330); unscrew the castellated nut (17-340).
- (4) Withdraw the hex. head bolt (17-350) and remove plain washer (17-360).

78-13-01

Page 119

Aug 31/79



OLYMPUS 500

MK.610-14-28  
OVERHAUL



- (5) Withdraw the split-pin (19-420); unscrew castellated nut (19-430) and remove plain washer (19-440).
  - (6) Remove the hex. head bolt (19-450); withdraw the end of the rod assembly from the yoke on the structure and collect the flanged bushings (19-510) and (19-520).
  - (7) Disengage the pneumatic actuator from the mounting yokes and remove it from its housing.
  - (8) Collect the flanged bushings (17-390) and (17-400).
  - (9) Removal of the rod assembly :
    - (a) Withdraw the split pin (17-240).
    - (b) Unscrew the castellated nut (17-250) and remove plain washer (17-260).
    - (c) Withdraw hex. head bolt (17-270) and remove the rod assembly.
    - (d) Collect the flanged bushings (19-490) and (19-500)
  - (10) Remove the studs (17-220).
  - (11) Fit blanks to the electrical connectors and the air inlet.
- M. Disassembly of Rod Assemblies (19-210) and (19-410).
- (1) Slacken the lock nut (19-270) and unscrew it; unscrew the rod end (19-260) from the fork end (19-280) and remove the lock nut.
  - (2) Slacken the lock nut (19-470) and unscrew it; unscrew the rod end (19-460) from the fork end (19-480) and remove the locknut (19-470).

9. Removal of Bucket Position Transmitters (Indicators)

A. Carry out the following operations for each transmitter :

- (1) Withdraw the lockwire from the electric cable connectors.
- (2) Disconnect the electrical connectors.
- (3) Remove the bolts (15-52) or (15-53) which retain the flexible shaft (15-50) flange to the position transmitter.

78-13-01



OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN FRANCE

- (4) Disengage the hexagon of the flexible shaft (15-50) from its housing and, if applicable, collect the spacer (15-54) or (15-55).
- (5) Position the support - tool SC 187 - to the end of the flexible shaft (15-50).
- (6) Remove hex. head bolts (16-80) and plain washers (16-90).
- (7) Remove the spherical bearing assemblies (16-110) and collect the mounts (16-100).
- (8) Disengage the position transmitter (indicator) (16-70) upwards and remove it from its housing.
- (9) Remove the hex. head bolts (16-140) and the plain washers (16-150).

NOTE : These assembly elements also retain the gutter weldment (28-278) which support the primary nozzle area transfuser harness. Care should be taken to leave the gutter attached to the harness.

- (10) Remove the spherical bearing assembly (16-160) and the shim (16-190).
- (11) Withdraw spherical bearings (16-120) and (16-170) from housings (16-130) and (16-180).
- (12) Fit blanks to the transmitter connectors.
- (13) Unscrew self-locking nuts (16-210).
- (14) Withdraw screws (16-200) and remove the welded bracket assembly (16-220).
- (15) Remove nuts (16-240).
- (16) Withdraw countersunk head screws (16-230) and remove the welded bracket assembly (16-250).

#### 10. Removal of Flexible Shafts

CAUTION : DURING REMOVAL, TAKE CARE NOT TO BEND THE FLEXIBLE SHAFTS.

78-13-01

Page 121

May 31/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



A. Removal of Bay 1 Flexible Shaft (15-10)

- (1) Unscrew the nuts (15-17) which retain the flexible shaft flange to the bay 1 upper LH ballscrew gearbox.
- (2) Disengage the hexagon of the flexible shaft (15-10) from its housing and remove, if applicable, spacer (15-18) or (15-19).
- (3) Position the support - tool SC 187 - to the end of flexible shaft (15-10).

NOTE : The method of uncoupling the other end of the flexible shaft is described in paragraph 8.B.1.

- (4) Remove the flexible shaft (15-10).

B. Removal of Bay 1 Flexible Shaft (15-30)

- (1) Unscrew nuts (15-32) which retain the open flange of the flexible shaft (15-30) to the bay 1 upper LH ballscrew gearbox. Remove the open flange.
- (2) Disengage the hexagon of flexible shaft (15-30) from its housing and, if applicable, remove spacer (15-33) or (15-34).
- (3) Position the support - tool SC 187 - to the end of the flexible shaft (15-30).
- (4) Unscrew the nuts (15-35) which retain the flexible shaft (15-30) flange to the bay 1 lower LH ballscrew gearbox.
- (5) Disengage the hexagon of the flexible shaft (15-30) from its housing and, if applicable, remove the spacer (15-36) or (15-37).
- (6) Position the support - tool SC 187 - to the end of the flexible shaft (15-30).
- (7) Remove the flexible shaft (15-30).

C. Removal of the Bay 1 Flexible Shaft (15-50)

- (1) Unscrew nuts (15-56) which retain the open flange of the flexible shaft (15-50) to the lower bay 1 LH ballscrew gearbox, and remove the open flange.

PRINTED IN FRANCE

78-13-01

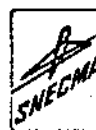
Page 122  
May 31/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Disengage the hexagon of flexible shaft (15-50) from its housing and, if applicable, remove spacer (15-57) or (15-58).

- (3) Position the cable support - tool SC 187 - to the end of the flexible shaft (15-50).

NOTE : The method of uncoupling the other end of the flexible shaft is described in paragraph 9.A.

- (4) Remove the flexible shaft (15-50).

D. Removal of Bay 1 Flexible Shaft (15-20)

- (1) Unscrew the nuts (15-27) which retain the flexible shaft(15-20)open flange to the bay 1 upper RH ball-screw gearbox , and remove the open flange.

- (2) Disengage the hexagon of flexible shaft (15-20) from its housing and remove, if applicable, spacer (15-28) or (15-29).

- (3) Position the cable support - tool SC 187 - to the end of flexible shaft (15-20).

NOTE : The method for uncoupling the other end of the flexible shaft is described in paragraph 8.B.1.

- (4) Remove the flexible shaft (15-20).

E. Removal of Bay 1 Flexible Shaft (15-40)

- (1) Unscrew the nuts (15-42) which retain the flange of the flexible shaft (15-40) to the bay 1 upper RH ball-screw gearbox.

- (2) Disengage the hexagon of flexible shaft (15-40) from its housing and, if applicable, remove spacer (15-43) or (15-44).

- (3) Position the cable support - tool SC 187 - to the end of flexible shaft (15-40).

- (4) Unscrew the nuts (15-45) which retain the open flange of flexible shaft (15-40) to the bay 1 lower RH ball-screw gearbox , and remove the open flange.

- (5) Disengage the hexagon of flexible shaft (15-40) from its housing and, if applicable, remove spacer (15-46) or (15-47).



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(6) Position the cable support - tool SC 187 - to the end of the flexible shaft (15-40).

(7) Remove the flexible shaft (15-40).

F. Removal of Bay 2 Flexible Shaft (15-160)

(1) Unscrew the nuts (15-167) which retain the flange of flexible shaft (15-160) to the bay 2 upper LH ball-screw gearbox.

(2) Disengage the hexagon of flexible shaft (15-160) from its housing and, if applicable, remove the spacer (15-168) or (15-169).

(3) Position the cable support - tool SC 187 - to the end of the flexible shaft (15-160).

NOTE : The method of uncoupling the other end of the flexible shaft is described in paragraph 8.B.2.

(4) Remove the flexible shaft (15-160).

C. Removal of Bay 2 Flexible Shaft (15-170)

(1) Unscrew the nuts (15-172) which retain the open flange of the flexible shaft to the bay 2 upper LH ballscrew gearbox , and remove the open flange.

(2) Disengage the hexagon of flexible shaft (15-170) from its housing and, if applicable, remove spacer (15-173) or (15-174).

(3) Position the cable support - tool SC 187 - to the end of flexible shaft (15-170).

(4) Unscrew the nuts (15-175) which retain the flange of flexible shaft (15-170) to the bay 2 lower LH gearbox.

(5) Disengage the hexagon of flexible shaft (15-170) from its housing and, if applicable, remove spacer (15-176) or (15-177).

(6) Position the cable support - tool SC 187 - to the end of the flexible shaft (15-170).

(7) Remove the flexible shaft (15-170).

PRINTED IN FRANCE

/8-13-01

Page 124  
May 31/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



H. Removal of Bay 2 Flexible Shaft (15-50)

Carry out the same operations as in paragraph 10.C.

J. Removal of Bay 2 Flexible Shaft (15-150)

- (1) Unscrew the nuts (15-157) which retain the open flange of flexible shaft (15-150) to the bay 2 upper RH ballscrew gearbox, and remove the open flange.
- (2) Disengage the hexagon of flexible shaft (15-150) from its housing and, if applicable, remove the spacer (15-157) or (15-158)
- (3) Position cable support - tool SC 187 - to the end of the flexible shaft (15-150).

NOTE : The method of uncoupling the other end of the flexible shaft is described in paragraph 8.B.2.

- (4) Remove the flexible shaft (15-150).

K. Removal of Bay 2 Flexible Shaft (15-30)

- (1) Unscrew the nuts (15-32) which retain the flange of the flexible shaft (15-30) to the bay 2 upper RH ballscrew gearbox.
- (2) Disengage the hexagon of flexible shaft (15-30) from its housing and, if applicable, remove the spacer (15-33) or (15-34).
- (3) Position the cable support - tool SC 187 - to the end of flexible shaft (15-30).
- (4) Unscrew the nuts (15-35) which retain the open flange of flexible shaft (15-30) to the bay 2 lower RH ballscrew gearbox, and remove the open flange.
- (5) Disengage the hexagon of flexible shaft (15-30) from its housing and, if applicable, remove spacer (15-36) or (15-37).
- (6) Position the cable support - tool SC 187 - to the end of the flexible shaft (15-30).
- (7) Remove the flexible shaft (15-30).

78-13-01



OLYMPUS 593

MK.610-14-28

OVERHAUL



## 11. Removal of Ballscrew Gearboxes

### A. Carry out the following operations for each ballscrew gearbox :

- (1) Withdraw split-pin (16-20); unscrew castellated nut (16-30) and remove plain washer (16-40).
- (2) Remove the ballscrew gearbox attachment bolt (16-50) and the plain washer (16-60).
- (3) Remove the ballscrew gearbox (16-10).
- (4) On the lower RH ballscrew gearboxes, unscrew the nuts and remove the blank (16-5).

## 12. Removal of the Cross-Feed Isolation Valve

### A. Removal of the Elbow Assemblies

- (1) Slacken and remove collar clamps (18-160) and (18-240)
- (2) Withdraw split-pin (18-20); unscrew castellated nut (18-30) and remove plain washer (18-40).
- (3) Withdraw the hex. head bolt (18-50) and remove washer (18-55).
- (4) Withdraw the lockwire from hex. nuts (18-120) and (18-200).
- (5) Unscrew hex. nuts (18-120) and (18-200).
- (6) Remove the spherical washers (18-130), (18-140), (18-210) and (18-220).
- (7) Remove dee head bolts (18-150) and (18-230).
- (8) Remove the elbow assemblies (18-190) and (18-110).
- (9) Remove sealing rings (18-170) and (18-250).
- (10) Remove the spherical bearing (18-180) from the elbow assembly (18-110).

### B. Removal of the Tube Assemblies

- (1) Unscrew hex. head bolt (18-320) and remove the half clamp assembly (18-330).

PRINTED IN FRANCE

78-13-01

Page 126  
May 31/76





OLYMPUS 598

MK.610-14-28  
OVERHAUL



- (2) Unscrew self-locking nuts (18-480) and (18-390); remove plain washers (18-490) and (18-400).
- (3) Remove the hex. head bolts (18-410) and (18-500) and the washers (18-400) and (18-490).
- (4) Remove the P clips (18-420) and (18-510).
- (5) Unscrew self-locking nuts (18-520); remove plain washers (18-530).
- (6) Withdraw hex. head bolts (18-540) and remove the angle bracket (18-550).
- (7) Removal of the tube assembly (18-340). Carry out the following operations :
  - (a) Unlock and remove hex. nuts (18-350).
  - (b) Remove the spherical washers (18-360) and (18-370)
  - (c) Withdraw the dee head bolts (18-380) and remove the tube assembly (18-340).
- (8) Removal of tube assembly (18-430). Carry out the following operations :
  - (a) Unlock and remove hex. nuts (18-440).
  - (b) Remove the spherical washers (18-450) and (18-460)
  - (c) Withdraw the dee head bolts (18-470).
  - (d) Unscrew nut (18-472) and remove washer (18-474).
  - (e) Remove bolt (18-476) and the spherical washers (18-477) and (18-478).
  - (f) Remove the tube assembly (18-430).

#### C. Removal of the Cross-Feed Isolation Valve

- (1) Unlock and unscrew the electrical connectors.
- (2) Remove the cross-feed isolation valve (18-310) by disengaging it from its mounting pivot.
- (3) Unscrew bolts (18-260) and remove the valve support bracket (18-270).
- (4) Remove the spherical bearing (18-280) from the support bracket (18-270)
- (5) Fit blanks to the cross-feed isolation valve at the electrical plug and air inlet positions.

**78-13-01**

Page 127  
May 31/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



D. Removal of the Link Assembly and Mounting Yoke

- (1) Remove self-locking nuts (18-570) and plain washers (18-580).
- (2) Withdraw the hex. head bolts (18-590).
- (3) Withdraw bolt (18-593) and remove the mounting yoke complete with the link assembly. Collect the flanged bushings (18-600) and (18-610), along with the clip P (18-597).
- (4) Removal of the mounting link assembly :
  - (a) Withdraw the split-pin (18-20). Unscrew the castellated nut (18-30) and remove the plain washer (18-40).
  - (b) Withdraw the hex. head bolt (18-50), remove the link assembly and collect the flanged bushings (18-60) and (18-70).
- (5) Disassembly of the link assembly :
  - (a) Unlock the lock nut (18-90) and unscrew the rod end (18-80) from the rod end clevis (18-100).
  - (b) Remove the lock nut (18-90) from the rod end (18-80).

E. Removal of the Locating Pivot

- (1) Unscrew nut (26-220) and withdraw the bolt (26-230) which retains the electrical harness clip (18-655) to the bracket (18-670). Remove clip (18-655).
- (2) Unscrew self-locking nuts (18-630); remove plain washers (18-640).
- (3) Withdraw hex. head bolts (18-650); remove bracket (18-670) and the pivot (18-660).

13. Removal of the P3 Air Feed Tubes

A. Removal of Pipe Assembly (19-100)

- (1) Unscrew hex. head bolts (19-10); remove cover plates (19-20) and (19-30).
- (2) Unscrew pipe-end nut (19-40).

PRINTED IN FRANCE

**78-13-01**

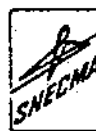
Page 128  
Oct 31/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN FRANCE

- (3) Unscrew hex. nut (19-50); remove the spacer washer (19-60).
- (4) Remove the hex.head bolt (19-70) and washer (19-80). Remove the pipe assembly (19-100).
- (5) Remove the blank (19-5).

B. Removal of Pipe Assembly (19-200)

- (1) Unscrew hex. head bolts (19-110); remove cover plates (19-120) and (19-130).
- (2) Unscrew pipe-end nut (19-140).
- (3) Unscrew hex. nut (19-150); remove the spacer washer (19-160).
- (4) Remove the hex. head bolt (19-170, and washer (19-180). Remove the pipe assembly (19-200).
- (5) Remove the blank (19-5).

14. Removal of Electrical Harnesses

NOTE : During disassembly, place the clips in a bag. These clips will accompany the harness during its overhaul cycle.

A. Removal of the Primary Nozzle Area Transducer Harness from Bay 1

- (1) Unscrew hex. head bolts (28-70) and remove plain washers (28-80).
- (2) Unscrew hex. nuts (28-50) and remove plain washers (28-60); withdraw bolts (28-40).
- (3) Remove the half-clamps (28-90).
- (4) Unscrew self-locking nut (28-110) and remove plain washer (18-120).
- (5) Remove either :
  - (a) Hex. head bolt (28-100) and clip C.
  - (b) Bolt (28-105), clip C and washer (28-115).
- (6) Unscrew self-locking nuts (28-140) and remove plain washers (28-150).

78-13-01

Page 129  
May 31/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (7) Remove hex. head bolts (28-130) and clips D and K.
- (8) Unscrew self-locking nuts (28-170) and remove washers (28-180).
- (9) Remove round-head bolts (28-160) and clips E and F.
- (10) Unscrew self-locking nuts (28-200) and remove washers (28-210).
- (11) Remove hex. head bolts (28-190) and clips G and H.
- (12) Unscrew self-locking nut (28-230) and remove washer (28-240).
- (13) Withdraw bolt (28-220) and clip J.
- (14) Unscrew self-locking nut (28-260) and remove washer (28-270).
- (15) Withdraw hex. head bolt (28-250) and clip L.
- (16) Unscrew hex. head bolts (28-280) and remove washers (28-290).
- (17) Unlock and unscrew cylindrical head bolts (28-20); remove square spacers (28-30) and square plates (28-300).
- (18) Unscrew nut (28-273); remove washer (28-275) and bolt (28-272).
- (19) Remove the gutter unit (28-278) from the harness and remove the sheath (28-277).
- (20) Withdraw the primary nozzle area transducer harness from the structure.
- (21) Fit the blanking caps (30-30) and (30-140) to the harness connectors.

B. Removal of the Primary Nozzle Area Transducer Harness from Bay 2

- (1) Carry out the same operations as for the bay 1 harness.

C. Removal of the Electrical Wiring from Bay 1

- (1) Unscrew self-locking nuts (27-70); remove the hex. head bolts (27-80) and the clips A and B, which hold the wiring harness to the gutter unit.

PRINTED IN FRANCE

78-13-01

Page 130

May 31/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Unscrew hex. head bolt (27-90); remove clip C and locking plate.
- (3) Unscrew nuts (27-100); remove hex. head bolts (27-110) and clips D and E.
- (4) Unscrew self-locking nuts (27-120); remove hex. head bolt (27-130) and clips F, G and H.
- (5) Unscrew bolt (27-170), remove clip (27-180) and the teflon spiral (27-220).
- (6) Unscrew self-locking nut (27-140) and remove the hex. head bolts (27-150) which retain the distribution box.
- (7) On the bucket position transmitter (indicator) side of the harness, arrange the connectors so that they may be easily withdrawn through the harness guide tube. Retain them with a plastic sheath (P-457).
- (8) Unscrew the hex. head bolts (27-160) which retain the box.
- (9) Carefully withdraw the harness from the guide tube, and remove the wiring harness (27-60) from the structure.
- (10) Fit blanks to the wiring harness connectors.
- (11) Unscrew nut (27-190); remove bolt (27-200) and the support assembly (27-210).

D. Removal of the Electrical Wiring Harness from Bay 2

- (1) Unscrew self-locking nuts (28-180), remove hex. head bolts (26-190) and disengage the connectors from the support.
- (2) Unscrew self-locking nuts (26-90) and (26-110); remove bolts (26-100) and (26-120) along with clips G and H.
- (3) Unscrew self-locking nuts (26-60), remove bolts (26-70) and clips C, E, F and the locking plates.
- (4) Unscrew hex. head bolt (26-80); remove clip D and the locking plate.
- (5) Unscrew nut (26-40), remove bolt (26-50) and clip B.
- (6) Unscrew nut (26-20), remove bolt (26-30) and clip A and the locking plate.

78-13-01

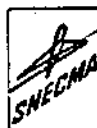
Page 131  
May 31/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (7) Unscrew hex. head bolt (26-130); remove clip J.
- (8) Unscrew self-locking nut (26-160); remove hex. head bolts(26-170) and clips M, N and P.
- (9) Unscrew self-locking nut (26-140); remove hex. head bolts(26-150) and clips L and K.
- (10) Remove the clip (26-240) and remove the teflon spiral (26-250).
- (11) On the bucket position transmitter (indicator) and of the harness, arrange the connectors so that they may be withdrawn through the harness guide-tube. Retain them with a plastic sheath (P457).
- (12) Unscrew hex. head bolts (26-200) and (26-210).
- (13) Carefully withdraw the electrical harness from the guide-tube and remove the electrical wiring harness (26-10) from the structure.
- (14) Fit blanks to the electrical wiring harness connectors.

15. Removal of the P3 Air Feed Pipe Supports

A. Removal of the Support Bracket (21-10) from Bay 1

- (1) Unscrew self-locking nuts (21-20) and remove plain washers (21-30).
- (2) Remove hi-lock screws (21-40) and remove the laminated shims (21-50).
- (3) Unscrew the self-locking nut (21-60) and remove the plain washer (21-70).
- (4) Remove the hi-lock bolt (21-80); remove the spacer washers (21-110) and (21-90), along with the laminated shim (21-100).
- (5) Unscrew the self-locking nut (21-120) and remove the plain washer (21-130).
- (6) Remove the hi-lock bolt (21-140); remove the plain washers (21-150) and the spacer washers (21-160).
- (7) Remove the support bracket (21-10) from the structure.

PRINTED IN FRANCE

78-13-01

Page 132

May 31/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN FRANCE

B. Removal of Support Bracket (21-170) from Bay 2

- (1) Unscrew self-locking nut (21-180) and remove plain washer (21-190).
- (2) Remove hi-lock screw (21-200) and the laminated shim (21-210).
- (3) Unscrew self-locking nut (21-220) and remove plain washer (21-230).
- (4) Remove hi-lock bolt (21-240); remove plain washers (21-250) and laminated shims (21-260).
- (5) Unscrew self-locking nut (21-270) and remove plain washers (21-280).
- (6) Remove hi-lock bolt (21-290); remove plain washers (21-300), spacer washers (21-310) and laminated shims (21-320).
- (7) Unscrew self-locking nut (21-390) and remove laminated shim (21-400).
- (8) Remove hi-lock bolt (21-370) and the plain washer (21-380).
- (9) Unscrew self-locking nut (21-350) and remove laminated shim (21-360).
- (10) Remove hi-lock bolt (21-330) and spacer washer (21-340).
- (11) Remove the support bracket (21-170) from the structure.

16. Removal of Ball-Screw Gear Box Supports

A. Removal of the Ballscrew Gearbox Support Fitting (25-10)

- \* (1) Unscrew bolt (25-20); remove plain washers (25-30) and the nut plate assembly (25-40A).

NOTE : Discard the nut plate assembly (25-40A). Installation of the support fitting (25-10) will be carried out using nuts (25-40B).

- \*\*\* (1) Unscrew nuts (25-40B) ; remove washers (25-45), bolts (25-20) and washers (25-30).
- (2) Unscrew self-locking nuts (25-70) and remove plain washers (25-80).

- \* 301-203-501-0 and 301-203-601-0
- \*\* 301-203-502-0 and subsequent
- 301-203-602-0 and subsequent

78-13-01

Page 133  
May 31/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Remove bolts (25-50) and plain washers (25-60).
- (4) Remove the ballscrew gearbox support fitting (25-10) from the structure.
- B. Removal of the ballscrew gearbox support fitting (25-90)
- \* (1) Unscrew bolts (25-100); remove plain washers (25-110) and the nut plate assembly (25-120A).
  - \*\* (1) Unscrew nuts (25-120B); remove washers (25-125), bolts (25-100) and washers (25-110).
  - (2) Unscrew self-locking nuts (25-150) and remove plain washers (25-160).
  - (3) Remove bolts (25-130) and plain washers (25-140).
  - (4) Remove the ballscrew gearbox support fitting (25-90) from the structure.
- C. Removal of the ballscrew gearbox support fitting (25-170)
- \* (1) Unscrew bolts (25-180); remove plain washers (25-190) and the nut plate assembly (25-200A).
  - \*\* (1) Unscrew nuts (25-200B) and remove washers (25-205), bolts (25-180) and washers (25-190).
  - (2) Unscrew self-locking nuts (25-230) and remove plain washers (25-240).
  - (3) Remove bolts (25-210) and plain washers (25-220).
  - (4) Remove the ballscrew gearbox support fitting (25-170) from the structure.
- D. Removal of the ballscrew gearbox support fitting (25-250)
- \* (1) Unscrew bolts (25-260); remove plain washers (25-270) and the nut plate assembly (25-280A).
  - \*\* (1) Unscrew nuts (25-280B); remove washers (25-285), bolts (25-260) and washers (25-270).
  - (2) Unscrew self-locking nuts (25-310) and remove plain washers (25-320).

- \* 301-203-501-0 and 301-203-601-0
- \*\* 301-203-502-0 and subsequent
- 301-203-602-0 and subsequent

78-13-01

Page 134  
May 31/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE

- (3) Remove bolts (25-290) and plain washers (25-300).
- (4) Remove the ballscrew gearbox support fitting (25-250) from the structure.

E. Removal of Ballscrew Gearbox Support Fitting (25-330)

Carry out the following operations for each support :

- (1) Unscrew self-locking nuts (25-360) and remove plain washers (25-370).
- (2) Remove bolts (25-340) and plain washers (25-350).
- (3) Remove the ballscrew gearbox support fitting (25-330) and the cruciform spacer (25-380) from the structure.

F. Removal of Ballscrew Gearbox Support Fitting (25-390)

Carry out the following operations for each support :

- (1) Unscrew self-locking nuts (25-420) and remove plain washers (25-430).
- (2) Remove bolts (25-400) and plain washers (25-410).
- (3) Remove the ballscrew gearbox support fitting (25-390) and the cruciform spacer (25-440) from the structure.

17. Removal of the Link Assembly (24-10)

A. Removal of the Link Assembly from the Structure

- (1) Withdraw split-pin (24-20); unscrew hex. nut (24-30) and remove plain washer (24-40).
- (2) Remove shouldered bolt (24-50) and plain washer (24-60)
- (3) Withdraw split-pin (24-70); unscrew hex. nut (28-80) and remove plain washer (24-90).
- (4) Remove shouldered hex. head bolt (24-100) and plain washer (24-110).
- (5) Disengage the link assembly and collect the flanged bushings (24-170) and (24-180).

B. Disassembly of the Link Assembly

- (1) Unlock and unscrew locknut (24-130).

78-13-01

Page 135  
May 31/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Unscrew the end fitting assembly (24-120) and remove the locking nut (24-130).
- (3) Remove flanged bushing (24-150) and (24-160) from the fork end (24-140).

18. Removal of the Welded Housing Assemblies (22-30)

A. Carry out the following operations for each housing assy :

- (1) Unscrew hex.head bolts (22-40) and remove plain washers (24-50).
- (2) Remove the housing assembly from the structure.
- (3) Remove the hex.head bolts (24-10) and the slotted plate assembly (22-20).

19. Removal of the Mounting Pin Assemblies

A. Removal of Mounting Pin Assembly (8-10)

- (1) Remove countersunk head screws (8-20) and covers (8-30).
- (2) Remove countersunk head screws (8-40) and spacers (8-50).
- (3) Withdraw the split pin (8-60) and the lock plate (8-70).
- (4) Unlock the spherical stop (8-90); withdraw the dogged washer (8-80) complete with the stop, and remove the spherical stop.
- (5) Remove the cup washer (8-100) and the mounting pin (8-10).

B. Removal of Mounting Pin Assembly (8-140)

- (1) Remove countersunk head screws (8-150) and covers (8-160).
- (2) Remove countersunk head screws (8-170) and spacers (8-180).

PRINTED IN FRANCE

78-13-01

Page 136

Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRNCE

- (3) Withdraw the split pin (8-190) and the lock plate (8-200).
- (4) Unlock the spherical stop (8-220); withdraw the dogged washer (8-210) complete with the stop, and remove the spherical stop.
- (5) Remove the cup washer (8-230) and the mounting pin (8-140).

C. Removal of Mounting Pin Assembly (8-270)

- (1) Remove countersunk head screws (8-280) and covers (8-290).
- (2) Remove countersunk head screws (8-300) and spacers (8-310).
- (3) Withdraw the split pin (8-320) and the lock plate (8-330).
- (4) Unlock the spherical stop (8-350); withdraw the dogged washer (8-340) complete with the stop, and remove the spherical stop.
- (5) Remove the cup washer (8-360) and the mounting pin (8-270).

D. Removal of Mounting Pin Assembly (8-400)

- (1) Remove countersunk head screws (8-410) and covers (8-420).
- (2) Remove countersunk head screws (8-430) and spacers (8-440).
- (3) Withdraw the split pin (8-450) and the lock plate (8-460).
- (4) Unlock the spherical stop (8-480), withdraw the dogged washer (8-470) complete with the stop, and remove the spherical stop.
- (5) Remove the cup washer (8-490) and the mounting pin (8-400).

78-13-01

Page 137  
Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



E. Removal of Mounting Pin Assemblies (8-530).

Carry out the following operations to remove each mounting pin assembly :

- (1) Remove countersunk head screw (8-540) and the cover plate.
- (2) Withdraw the split pin (8-560) and the lock plate (8-570).
- (3) Unlock the spherical stop (8-590), withdraw the dogged washer (8-580), complete with the stop, and remove the spherical stop.
- (4) Remove cup washer (8-600) and the mounting pin (8-530).

20. Removal of Blanking Plates from Ballscrew Gearbox Recesses.

Operate the rotating stand - tool SC 117 - to place the twin secondary nozzle assembly centre line in the horizontal.

A. Removal of Upper Blanking Plate, Bay 1 (22A-85).

- (1) Unscrew hex. head bolts (5-10), and remove plain washers (5-20).
- (2) Remove stiffener (5-30).
- (3) Unscrew bolt (22A-90), and remove plain washer (22A-95)
- (4) Unscrew bolt (22A-100), and remove plain washer (22A-105).
- (5) Unscrew bolt (22A-110) and remove plain washer (22A-115).
- (6) Unscrew bolt (22A-120) and remove plain washer (22A-125).
- (7) Remove shim(s) (22A-130).

NOTE : Reference-mark the adjusting shims.

78-13-01

Page 138  
Apr 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (8) Unscrew bolt (5-360B), and remove washer (5-370B).
- (9) Remove nut (5-270) and washer (5-280).
- (10) Take out bolt (5-290), and remove washer (5-300).
- (11) Remove upper blanking plate (22A-85).
- (12) Recover washers (5-305) and (5-375).

B. Removal of Bay 1 Upper Blanking Plate (22C-360)

- (1) Unscrew bolt (22C-365) and remove plain washer (22C-370).
- (2) Unscrew hex. head bolts (5-40) and take off plain washers (5-50).
- (3) Remove stiffener (5-60).
- (4) Unscrew bolts (22C-380) and remove plain washers (22C-385).
- (5) Unscrew bolt (5-360B) and take out washer (5-370B).
- (6) Unscrew nut (5-270) and take out washer (5-280).
- (7) Take out bolt (5-290) and remove washer (5-300).
- (8) Remove upper blanking plate (22C-360).
- (9) Recover spacer (22C-375) and washers (5-305) and (5-375).

78-13-01

Page 139

Apr 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN FRANCE

C. Removal of Bay 2 Upper Blanking Plate (22D-500).

- (1) Unscrew bolt (22D-505) and remove washer (22D-510).
- (2) Unscrew hex. head bolts (5-380) and remove plain washers (5-390).
- (3) Take down stiffener (5-400).
- (4) Unscrew bolts (22D-520), and remove washers (22D-525).
- (5) Unscrew bolt (5-730B) and remove washer (5-740B).
- (6) Remove nut (5-640) and washer (5-650).
- (7) Take out bolt (5-660) and remove washer (5-670).
- (8) Remove upper blanking plate (22D-500).
- (9) Recover spacer (22D-515) and washers (5-675) and (5-745).

D. Removal of Bay 2 Upper Blanking Plate (22B-285)

- (1) Unscrew hex. head bolts (5-410) and remove plain washers (5-420).
- (2) Remove stiffener (5-430).
- (3) Unscrew bolt (22B-290), and remove washer (22B-295).
- (4) Unscrew bolt (22B-300), and remove washer (22B-305).
- (5) Unscrew bolt (22B-310), and remove washer (22B-315).
- (6) Unscrew bolt (22B-320), and remove washer (22B-325).
- (7) Unscrew bolt (22B-330), and remove washer (22B-335).
- (8) Remove washer (22B-340).
- (9) Remove shim(s) (22B-345).

78-13-01

Page 140

Apr 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



NOTE : Reference-mark the adjusting shims.

- (10) Unscrew bolt (5-730B), and remove washer (5-740B).
- (11) Remove nut (5-640) and washer (5-650).
- (12) Take out bolt (5-660), and remove washer (5-670).
- (13) Remove upper blanking plate (22B-285).
- (14) Recover washers (5-745) and (5-675).

E. Removal of Bay 1 Lower Blanking Plate (22A-165).

- (1) Unscrew bolt (22A-170), and remove washer (22A-175)..
- (2) Unscrew hex. head bolts (6-40), and remove plain washers (6-50).
- (3) Remove stiffener (6-60).
- (4) Unscrew bolt (22A-180).
- (5) Unscrew bolt (22A-185) and remove washer (22A-190).
- (6) Remove shim(s) (22A-195).

NOTE : Reference-mark the adjusting shims.

- (7) Unscrew bolt (6-360B), and remove washer (6-370B).
- (8) Remove nut (6-270), and washer (6-280).
- (9) Take out bolt (6-290), and remove washer (6-300).
- (10) Take off lower blanking plate (22A-165).
- (11) Recover washers (6-305) and (6-375).

F. Removal of Bay 1 Lower Blanking Plate (22C-400).

- (1) Unscrew bolt (22C-405), and remove washer (22C-410)
- (2) Unscrew hex. head bolts (6-10), and remove washers (6-20).



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (3) Remove stiffener (6-30).
- (4) Unscrew bolts (22C-420), and remove washers (22C-425).
- (5) Unscrew bolt (6-360B), and remove washer (6-370B).
- (6) Remove nut (6-270), and remove washer (6-280).
- (7) Take out bolt (6-290), and remove washer (6-300).
- (8) Remove lower blanking plate (22C-400).
- (9) Recover plain washers (6-305) and (6-375), and spacer (22C-415).

G. Removal of Bay 2 Lower Blanking Plate (22D-460).

- (1) Unscrew bolt (22D-465) and remove washer (22D-470).
- (2) Unscrew hex. head bolts (6-410), and remove plain washers (6-420).
- (3) Take down stiffener (6-430).
- (4) Unscrew bolts (22D-480), and remove washers (22D-485).
- (5) Unscrew bolt (6-730B) and remove washer (6-740B).
- (6) Remove nut (6-640) and washer (6-650).
- (7) Take out bolt (6-660) and remove washer (6-670).
- (8) Take down lower blanking plate (22D-460).
- (9) Recover plain washers (6-675) and (6-745), and spacer (22D-475).

H. Removal of Bay 2 Lower Blanking Plate (22B-230)

- (1) Unscrew bolt (22B-235), and remove washer (22B-240).
- (2) Unscrew bolt (6-380), and remove washers (6-390).
- (3) Take down stiffener (6-400).

78-13-01

Page 142  
Aug 31/79





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Unscrew bolts (22B-245).
- (5) Unscrew bolt (22B-250), and remove washer (22B-255).
- (6) Remove shim(s) (22B-260).

NOTE : Reference-mark the adjusting shims.

- (7) Remove bolt (6-730B) and washer (6-740B).
- (8) Remove nut (6-640) and washer (6-650).
- (9) Take out bolt (6-660), and remove washer (6-670).
- (10) Remove lower blanking plate (22B-230).
- (11) Recover washers (6-675) and (6-745).

I. Removal of Bay 4 Upper Blanking Plates

- (1) Take down upper blanking plate (22A-86) as instructed under 20.A.
- (2) Take down upper blanking plate (22C-361) as instructed under 20.B.

J. Removal of Bay 4 Lower Blanking Plates.

- (1) Take down lower blanking plate (22A-166) as instructed under 20.E.
- (2) Take down lower blanking plate (22C-401) as instructed under 20.F.

K. Removal of Bay 3 Upper Blanking Plates.

- (1) Take down upper blanking plate (22D-501) as instructed under 20.C.
- (2) Take down upper blanking plate (22B-286) as instructed under 20.D.

L. Removal of Bay 3 Lower Blanking plates

- (1) Take down lower blanking plate (22D-461) as instructed under 20.G.
- (2) Take down lower blanking plate (22B-231) as instructed under 20.H.

78-13-01

Page 143  
Aug 31/79



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## 21. Removal of Rear End Framework Heat Shield Assemblies.

NOTE : During removal, place the assembly elements on the template - tool SC 266 - in order not to mix them.

### A. Removal of the Bay 1 Upper Heat Shield Assembly.

- (1) Unscrew nuts (5-70) ; withdraw screws (5-80) and remove the clip (5-90).
- (2) Unscrew nuts (5-100) ; withdraw screw (5-110) and remove clip (5-120).
- (3) Unscrew nuts (5-140) and remove the seal assembly (5-130).
- (4) Unscrew nuts (5-160) and remove the seal assembly (5-150).
- (5) Unscrew nuts (5-180) and remove the seal assembly (5-170). Remove the lower seal plate (5-190). Attach this seal plate to the seal (5-170), using lockwire.
- (6) Unscrew nuts (5-210) and remove the seal assembly (5-200).
- (7) Unscrew nuts (5-230) and remove the seal assembly (5-220).
- (8) Unscrew nuts (5-250) and remove the seal assembly (5-240).
- (9) Remove screws (5-310) and washers (5-320).
- (10) Remove screws (5-340) and washers (5-350).
- (11) Remove screws (5-360A) and washers (5-370A).
- (12) Remove the heat shield assembly (5-260).
- (13) Collect the spacer washers (5-330).

### B. Removal of the Bay 2 Upper Heat Shield Assembly.

- (1) Unscrew nuts (5-440) ; withdraw screws (5-450) and remove clip (5-460).
- (2) Unscrew nuts (5-470) ; withdraw screws (5-480) and remove clip (5-490).

PRINTED IN FRANCE

PRINTED IN FRANCE

**78-13-01**

Page 144  
Aug 31/79



OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN FRANCE

- (3) Unscrew nuts (5-510) and remove the seal assembly (5-500).
  - (4) Unscrew nuts (5-530) and remove the seal assembly (5-520).
  - (5) Unscrew nuts (5-550) and remove the seal assembly (5-540). Remove the lower seal plate (5-560). Attach this seal plate to the seal (5-540), using lockwire.
  - (6) Unscrew nuts (5-580) and remove the seal assembly (5-570).
  - (7) Unscrew nuts (5-600) and remove the seal assembly (5-580).
  - (8) Unscrew nuts (5-620) and remove the seal assembly (5-610).
  - (9) Remove screws (5-680) and washers (5-690).
  - (10) Remove screws (5-710) and washers (5-720).
  - (11) Remove screws (5-730A) and washers (5-740A).
  - (12) Remove the heat shield assembly (5-630).
  - (13) Collect the spacer washers (5-700).
- C. Removal of the Bay 3 Upper Heat Shield Assembly.
- (1) Remove the heat shield assembly (5-631) as per instructions in paragraph 20.B.
- D. Removal of the Bay 4 Upper Heat Shield Assembly
- (1) Remove the heat shield assembly (5-261) as per instructions of paragraph 20.A.
- E. Removal of the Bay 1 Lower Heat Shield Assembly.
- (1) Unscrew nuts (6-70) ; withdraw screws (6-80) and remove clip (6-90).
  - (2) Unscrew nuts (6-100) ; withdraw screws (6-110) and remove clip (6-120).
  - (3) Unscrew nuts (6-140) and remove the seal assembly (6-130).

78-13-01

Page 145  
Apr 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (4) Unscrew nuts (6-160) and remove the seal assembly (6-150).
- (5) Unscrew nuts (6-180) and remove the seal assembly (6-170). Remove the lower seal plate (6-190). Attach this seal plate to the seal (6-170), using lockwire.
- (6) Unscrew nuts (6-210) and remove the seal assembly (6-200).
- (7) Unscrew nuts (6-230) and remove the seal assembly (6-220).
- (8) Unscrew nuts (6-250) and remove the seal assembly (6-240).
- (9) Remove screws (6-310) and washers (6-320).
- (10) Remove screws (6-340) and washers (6-350).
- (11) Remove screws (6-360A) and washers (6-370A).
- (12) Remove the heat shield assembly (6-260).
- (13) Collect the spacer washers (6-330).

F. Removal of the Bay 2 Lower Heat Shield Assembly.

- (1) Unscrew nuts (6-440) ; withdraw screws (6-450) and remove clip (6-460).
- (2) Unscrew nuts (6-470) ; withdraw screws (6-480) and remove clip (6-490).
- (3) Unscrew nuts (6-510) and remove the seal assembly (6-500).
- (4) Unscrew nuts (6-530) and remove the seal assembly (6-520).
- (5) Unscrew nuts (6-550) and remove the seal assembly (6-540). Remove the lower seal plate (6-560). Attach this seal plate to the seal (6-540), using lockwire.
- (6) Unscrew nuts (6-580) and remove the seal assembly (6-570).
- (7) Unscrew nuts (6-600) and remove the seal assembly (6-590).



OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN FRANCE

(8) Unscrew nuts (6-620) and remove the seal assembly (6-610).

(9) Remove screws (6-680) and washers (6-690).

(10) Remove screws (6-710) and washers (6-720).

(11) Remove screws (6-730A) and washers (6-740A).

(12) Remove the heat shield assembly (6-630).

(13) Recover the spacer assembly (6-700).

G. Removal of the Bay 3 Lower Heat Shield Assembly.

(1) Remove heat shield assembly (6-631) as per instructions in paragraph 20.F.

H. Removal of the Bay 4 Lower Heat Shield Assembly.

(1) Remove heat shield assembly (6-261) as per instructions in paragraph 20.E.

22. Removal of Support Assemblies from the Rear Framework.

A. Removal of Support Assemblies (7-10).

Carry out the following operations for each support assembly :

(1) Unscrew self-locking nuts (7-20) ; remove plain washers (7-40) ; withdraw bolts (7-30) and remove washers (7-35).

(2) Unscrew self-locking nuts (7-80) and (7-120) ; remove plain washers (7-90) and (7-130) ; withdraw bolts (7-100) and (7-140). Recover plain washers (7-110) and (7-150).

(3) Unscrew self-locking nuts (7-50) and remove washers (7-55).

(4) Remove bolts (7-60) and washers (7-65).

(5) Remove the support assembly (7-10) and spacer(7-70).

78-13-01

Page 147  
Aug 31/79



OLYMPUS 593

MK.610-14-28  
OVERHAUL



B. Removal of Support Assemblies (7-160).

Carry out the following operations for each support assembly :

- (1) Unscrew self-locking nuts (7-170) ; remove plain washers (7-190), withdraw bolts (7-180) and remove washers (7-185).
- (2) Unscrew self-locking nuts (7-230) and (7-270) ; remove plain washers (7-240) and (7-280) ; withdraw bolts (7-250) and (7-290). Recover plain washers (7-260) and (7-300).
- (3) Unscrew self-locking nuts (7-200) and remove washers (7-205).
- (4) Remove bolts (7-210) and washers (7-215).
- (5) Remove support assembly (6-160) and spacer (7-220).

23. Removal of Heat Shields.

A. Removing Heat Shield (9A-530).

- (1) Remove hex. head bolts (9A-540) and save plain washers (9A-550).
- (2) Remove countersunk head screws (9A-560) and shim (9A-570).
- (3) Take down the heat shield.

B. Removing Heat Shield (9A-580)

- (1) Remove hex. head bolts (9A-590) and save plain washers (9A-600).
- (2) Remove countersunk head screws (9A-610) and shim (9A-600).
- (3) Take down the heat shield.

C. Removing Heat Shield (9A-630)

- (1) Remove hex. head bolts (9A-640) and save plain washers (9A-650).

78-13-01

Page 148  
Apr 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



(2) Remove countersunk head screws (9A-660) and shim (9A-670).

(3) Take down the heat shield.

D. Removing Heat Shield (9A-680)

(1) Remove hex. head bolts (9A-690) and save plain washers (9A-700).

(2) Remove countersunk head screws (9A-710) and shim (9A-720).

(3) Take down the heat shield.

E. Removing Heat shield (9B-730).

(1) Remove hex. head bolts (9B-740) and save plain washers (9B-750).

(2) Remove hex. head bolts (9B-760) and save plain washers (9B-770).

(3) Remove hex. head bolts (9B-780) and save plain washers (9B-790).

F. Removing Heat Shield (9B-800).

(1) Remove hex. head bolts (9B-810) and save plain washers (9B-820).

(2) Remove hex. head bolts (9B-830) and save plain washers (9B-840).

(3) Remove hex. head bolts (9B-850) and save plain washers (9B-860).

G. Removing Heat Shield (9B-870).

(1) Remove hex. head bolts (9B-880) and save plain washers (9B-890).

(2) Remove hex. head bolts (9B-900) and save plain washers (9B-910).

(3) Remove hex. head bolts (9B-920) and save plain washers (9B-930).

78-13-01

Page 149

Aug 31/79



OLYMPUS 593

MK.610-14-28  
OVERHAUL



H. Removing Heat Shield (9B-940).

- (1) Remove hex. head bolts (9B-950) and save plain washers (9B-960).
- (2) Remove hex. head bolts (9B-970) and save plain washers (9B-980).
- (3) Remove hex. head bolts (9B-990) and save plain washers (9B-995).

24. Removal of the Nozzle Side Fairing Assemblies.

NOTE : During removal of the fairing assemblies, arrange the removed parts in the templates - tool SC 199 - to prevent them getting mixed up.

A. Removing Fairing Assembly (9-10).

- (1) Unscrew self-locking nuts (9-260) and withdraw special countersunk head screws (9-250).
- (2) Unscrew self-locking nuts (9-240) and withdraw special countersunk head screws (9-230).
- (3) Unscrew self-locking nuts (9-210) ; remove plain washer (9-220) and withdraw countersunk head screws (9-200).
- (4) Unscrew self-locking nuts (9-180) ; remove plain washers (9-190) and withdraw countersunk head screws (9-170).
- (5) Unscrew self-locking nuts (9-150) ; remove plain washers (9-160) and withdraw countersunk head screws (9-140).
- (6) Unscrew self-locking nuts (9-120) ; remove plain washers (9-130) and withdraw countersunk head screws (9-110).
- (7) Unscrew self-locking nuts (9-80) ; remove plain washers (9-90), spacers (9-100) and countersunk head screws (9-70).
- (8) Unscrew self-locking nuts (9-50) ; remove plain washers (9-60) withdraw countersunk head screws (9-40) and recover angle brackets (9-577) and (9-727).

78-13-01

Page 150  
Aug 31/79





OLYMPUS 593

MK.610-14-28

OVERHAUL



- (9) Unscrew self-locking nuts (9-30) and withdraw countersunk head screws (9-20).
- (10) Remove fairing assembly (9-10) and, if applicable, recover the spacers fitted between fairing and structure or brackets.
- (11) Carry out the same operations to remove fairing assembly (9-11) from the RH twin secondary nozzle assembly.

B. Removal of Fairing Assembly (9-270)

- (1) Unscrew self-locking nuts (9-520) and withdraw special countersunk head screws (9-510).
- (2) Unscrew self-locking nuts (9-500) and withdraw special countersunk head screws (9-490).
- (3) Unscrew self-locking nuts (9-470) ; remove plain washers (9-480) and withdraw countersunk head screws (9-460).
- (4) Unscrew self-locking nuts (9-440) ; remove plain washers (9-450) and withdraw countersunk head screws (9-430).
- (5) Unscrew self-locking nuts (9-410) ; remove plain washers (9-420) and withdraw countersunk head screws (9-400).
- (6) Unscrew self-locking nuts (9-380) ; remove plain washers (9-390) and withdraw countersunk head screws (9-370).
- (7) Unscrew self-locking nuts (9-340) ; remove plain washers (9-350), spacers (9-360) and countersunk head screws (9-330).
- (8) Unscrew self-locking nuts (9-310) ; remove plain washers (9-320), withdraw countersunk head screws (9-300), and recover angle brackets (9-627) and (9-677).
- (9) Unscrew self-locking nuts (9-290) and withdraw countersunk head screws (9-280).
- (10) Remove fairing assembly (9-270) and, if applicable, recover the spacers fitted between fairing and structure or brackets.

78-13-01

Page 151  
Aug 31/79



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (11) Carry out the same operations to remove fairing assembly (9-271) from the RH twin secondary nozzle assembly.

## 25. Removal of Convergent Panels.

A. Removal of Convergent Panels. Carry out the following operations for each bay :

- (1) Remove countersunk head screw (11-20) and (11-30) and remove panel assembly (11-10).
- (2) Remove countersunk head screws (11-50) and (11-60) and remove panel assembly (11-40) and the joint plate (11-130).
- (3) Unscrew countersunk head screws (11-80) and (11-90) ; remove panel assembly (11-100) and the joint plate (11-140).
- (4) Unscrew countersunk head screws (11-110) and (11-120); remove panel assembly (11-70) and the joint plate (11-150).
- (5) Repeat operations (1), (2), (3) and (4) to remove the other half of the convergent section.

## 26. Removal of the Divergent Section Panels.

A. Removal of the Vertical Divergent Panels (12-10).

Carry out the following operations for each panel :

- (1) Remove countersunk head screws (12-60) and special washers (12-70).
- (2) Remove countersunk head screws (12-40) and special washers (12-50).
- (3) Remove countersunk head screws (12-20) and special washers (12-30).
- (4) Remove the vertical divergent panel (12-10).

NOTE : During disassembly, place the parts removed in the templates - tool SC 198 - to avoid mixing them.

B. Removal of the Divergent Panels at 45 deg Position (13-10)  
Carry out the following operations for each panel :

- (1) Remove countersunk head screws (13-60) and special washers (13-70).

**78-13-01**

Page 152

Aug 31/79



- (2) Remove countersunk head screws (13-40) and (13-100) and special washers (13-50) and (13-110).
  - \* (3) Remove countersunk head screws (13-20) and special washers (13-30).
  - \*\* (3) Remove countersunk head screws (13-20)
  - (4) Remove countersunk head screws (13-80) and special washers (13-90).
  - \* (5) Remove the divergent panel (13-10A).
  - \*\* (5) Remove the divergent panel (13-10B).
- NOTE : During disassembly, place the parts removed in the template - tool SC 197 - to avoid mixing them.

C. Removal of the Divergent Panels at 45 deg Position (13-120).

Carry out the following operations for each panel :

- (1) Remove countersunk head screws (13-170) and special washers (13-180).
  - (2) Remove countersunk head screws (13-150) and (13-210) and special washers (13-160) and (13-220).
  - \* (3) Remove countersunk head screws (13-130) and special washers (13-140).
  - \*\* (3) Remove countersunk head screws (13-130).
  - (4) Remove countersunk head screws (13-190) and special washers (13-200).
  - \* (5) Remove the divergent panel (13-120A).
  - \*\* (5) Remove the divergent panel (13-120B).
- NOTE : During disassembly, place the parts removed in the template - tool SC 197 - to avoid mixing them.

D. Removal of Lateral Divergent Panels (14-10).

Carry out the following operations for each panel :

- \* (1) Remove countersunk head screws (14-20) and special washers (14-30).
- \*\* (1) Remove countersunk head screws (14-20).

- \* 301-203-501-0 and 301-201-601-0
- \*\* 301-203-502-0 and subsequent
- 301-203-602-0 and subsequent

**78-13-01**

Page 153  
Aug 31/79



- \* (2) Remove countersunk head screws (14-40) and special washers (14-50).
- \*\* (2) Remove countersunk head screws (14-40).
- \* (3) Remove countersunk head screws (14-60) and special washers (14-70).
- \*\* (3) Remove countersunk head screws (14-60).
- \* (4) Remove countersunk head screws (14-80) and special washers (14-90).
- \*\* (4) Remove countersunk head screws (14-80).
- \* (5) Remove countersunk head screws (14-100) and special washers (14-110).
- \*\* (5) Remove countersunk head screws (14-100).
- \* (6) Remove countersunk head screws (14-120) and special washers (14-130).
- \*\* (6) Unscrew countersunk head screws (14-120).
- \* (7) Remove the lateral divergent panel (14-10A).
- \*\* (7) Remove the lateral divergent panel (14-10B).
- \* (8) Recover washers (14-140).

NOTE : During disassembly, place the parts removed in the template - tool SC 196 - to avoid mixing them.

## 27. Removal of the Fire Detection Support Bracket Assembly.

### A. Removal of LH Support Bracket Assembly (23-10).

- (1) Unscrew tubular nut (23-20) and withdraw hi-lock screw (23-30).
- (2) Unscrew self-locking nuts (23-40) and remove plain washers (23-50).
- (3) Remove hi-lock bolts (23-60) and spacer washers (23-80) and plain washers (23-70).
- (4) Remove the support bracket assembly (23-10) from the structure.

- \* 301-203-501-0 and 301-203-601-0
- \*\* 301-201-502-0 and subsequent.
- 301-203-602-0 and subsequent.

# 78-13-01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (5) Carry out the same operations to remove RH support bracket assembly (23-11) from the RH twin secondary assembly.

B. Removal of LH Support Bracket Assembly (23-90).

- (1) Unscrew tubular nut (23-100) and withdraw hi-lock screw (23-110).
- (2) Unscrew self-locking nuts (23-120) and remove plain washers (23-130).
- (3) Remove hi-lock bolts (23-140) and spacer washers (23-160) and (23-150).
- (4) Remove the support bracket assembly (23-90) from the structure.
- (5) Carry out the same operations to remove RH support bracket assembly (23-91) from the RH twin secondary assembly.

C. Removal of LH Support Bracket Assembly (23-170).

- (1) Unscrew tubular nut (23-180) and withdraw hi-lock screw (23-190).
- (2) Unscrew self-locking nuts (23-200) and remove plain washers (23-210).
- (3) Remove hi-lock bolts (23-220) and spacer washers (23-240) and (23-230).
- (4) Remove the support bracket assembly (23-170) from the structure.
- (5) Carry out the same operations to remove RH support bracket assembly (23-171) from the RH twin secondary assembly.

D. Removal of LH Support Bracket Assembly (23-250).

- (1) Unscrew tubular nut (23-260) and withdraw hi-lock screw (23-270).
- (2) Unscrew self-locking nuts (23-280) and remove plain washers (23-290).
- (3) Remove hi-lock bolts (23-300) and spacer washers (23-320) and (23-310).
- (4) Remove the support bracket assembly (23-250) from the structure.

78-13-01

Page 155  
Aug 31/79

- (5) Carry out the same operations to remove RH support bracket assembly (23-251) from the RH twin secondary assembly.

## 28. Removal of Cover Assemblies.

### A. Removal of Cover Assemblies (20-10).

Carry out the following operations for each cover assembly :

- (1) Slacken the cover screws.
- (2) Remove the cover assembly (20-10) from the structure.

### B. Removal of Cover Assemblies (20-20).

Carry out the following operations for each cover assembly :

- (1) Slacken the cover screws.
- (2) Remove the cover assembly (20-20) from the structure.

### \* C. Removal of Cover Assemblies (20-180A).

Carry out the following operations for each cover assembly :

- (1) Slacken the cover screws.
- (2) Remove the cover assembly (20-180A) from the structure.

### \*\*\* C. Removal of Cover Assemblies (20-180B).

Carry out the following operations for each cover assembly :

- (1) Slacken the cover screws.
- (2) Remove the cover assembly (20-180B) from the structure.

### D. Removal of Cover Assemblies (20-190).

Carry out the following operations for each cover assembly :

- (1) Slacken the cover screws.
- (2) Remove the cover assembly (20-190) from the structure.

## 29. Fitting the Twin Secondary Nozzle Assembly to the Transport Trolley.

- A. Using a hoist, position the hoisting "T" beam - tool SC 195 - to the secondary nozzle assembly, which is fixed to the rotating stand.

- \* 301-203-501-0, 301-203-502-0, 301-203-503-0  
 301-203-504-0, 301-203-505-0, 301-203-601-0  
 301-203-602-0, 301-203-603-0, 301-203-604-0  
 \*\*\* 301-203-506-0 and on.  
 301-203-605-0 and on.

**78-13-01**

Page 156  
Aug 31/79



OLYMPUS 593

MK.610-14-28

OVERHAUL



- B. Secure the three slings of the hoisting beam to the fixing points on the upper and side sections.
  - C. Operate the hoists to take up any slack in the slings, and adjust the centre of gravity to balance the load.
  - D. Detach the secondary nozzle assembly from the rotating stand - tool SC 117 - and remove it.
  - E. Position the secondary nozzle assembly on the transport trolley - tool SC 36 - and secure it by the side fixing points at the rear, and the side primary nozzle mounting pin housing.
  - F. Remove the hoisting "T" beam - tool SC 195 -
30. Removal of the Spherical Bearing Housing from the Front Framework.

A. Removal of Bearing Housings (29-110).

Carry out the following operations for each bearing housing :

- (1) Withdraw pin (29-40) and remove the spherical bearing bushing (29-50).
- (2) Withdraw the split pin (29-60). Withdraw the locking ring (29-70) and remove the bearing (29-100).
- (3) Withdraw the split pin (29-80). Withdraw the locking ring (29-90) and remove the bearing housing (29-110).

B. Removal of Bearing Housings (29-180)

- (1) Remove the spherical bearing bush (29-120).
- (2) Withdraw the split pin (29-130). Withdraw the locking ring (29-140) and remove the bearing (29-170).
- (3) Withdraw the split pin (29-150). Withdraw the locking ring (29-160) and remove the bearing housing (29-180).

C. Removal of the Bodge Bolt Trunnion (29-30).

Carry out the following operations on each trunnion :

- (1) Unscrew hex nuts (29-10), withdraw pivot bolts (29-20).
- (2) Remove the bodge bolt trunnion (29-30).



OLYMPUS 593

MK.610-14-28

OVERHAUL



CLEANING

1. General

- A. After disassembly, clean all the parts of the twin secondary nozzle thoroughly in order to remove all the surface contamination such as oils, greases, carbon deposits, corrosion and oxidation marks.
- B. The purpose of cleaning is to :
- (1) Allow thorough visual inspection of parts.
  - (2) Disclose cracks due to system operation through use of fluorescent penetrant inspection methods.
  - (3) Prepare the surfaces in view of future repair work.

2. Specific recommendations.

- A. Any cleaning method selected by an operator shall comply with the following requirements to avoid penalization on the service life of parts.
- (1) Do not degrease titanium parts, welded or not, using halogen products such as chlorinated solvents, trichlorethylene etc...
  - (2) Do not clean in acid baths parts having complex shapes or featuring blind holes i.e. parts on which rinsing or neutralization are difficult to carry out properly.
  - (3) Do not use cleaning agents the action of which may induce generalized or intergranular corrosion of materials, particularly on those materials showing aging due to operation on engine.
- B. Limitations related to electro-platings, chemical surface treatments, paints, varnishes and hardface metal coatings.
- (1) The cleaning methods recommended in this chapter are not harmful to the surface treatments applied on the twin secondary nozzle constitutive parts.
  - (2) To avoid deterioration to surface treatments of parts or to allow their future reconditioning, a list of the coated parts and their location (identification in regards of the illustrated Parts List) is given here - under.

78-13-01

Page 201

May 31/76





OLYMPUS 593

MK.610-14-28

OVERHAUL



## (a) Silver coated parts nomenclature

<u>Description</u>	<u>IPL Fig.item</u>	<u>Coated part base metal</u>
Deflector, assy	1-10	Austenitic alloy
Bolt, attach ballscrew gearbox	2-420	Austenitic alloy
Door, access LH	3-330	Austenitic ferrous alloy Martensitic alloy
Door, access RH	3-331	Austenitic alloy Austenitic ferrous alloy Martensitic alloy
Door, access	3-390	Austenitic alloy Austenitic alloy + Titanium
Nut plate, assy of	3-420,470	Austenitic ferrous alloy
Plate, cover	3-440	Austenitic alloy Austenitic alloy Titanium
Support, assy	7-10,160	Austenitic alloy
Pin assy, mounting	8-10,140,270,400	Austenitic alloy
Stop, spherical	8-90,350,480,590	Austenitic alloy
Washer, cup	8-100,360,490,600	Austenitic alloy
Pin assy, mounting	8-530	Austenitic alloy
Bolt, attach ballscrew gearbox	16-50	Austenitic alloy
Link assy, mounting attaching parts	18-10	Austenitic alloy
Nut, pipe end	19-40,140	Austenitic alloy
Rod assy, LH only attaching parts	19-210	Austenitic alloy
Rod assy, RH only attaching parts	19-290	Austenitic alloy
Rod assy, attaching parts	19-410	Austenitic alloy
Cover, assy	20-20	Titanium alloy
Cover, assy	20-180	Austenitic alloy
Cover, assy	20-190	Austenitic alloy
Bracket assy	23-10-,11	Austenitic alloy
Bracket assy	23-250,251	Austenitic alloy
Link, assy	24-10	Austenitic alloy Martensitic alloy Titanium alloy
Nut plate, assy	25-40,200	Austenitic alloy
Nut plate, assy	25-120,280	Austenitic alloy

PRINTED IN FRANCE

78-13-01

Page 202

May 31/76

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

## (b) Chromium plated parts nomenclature

<u>Description</u>	<u>IPL Fig.item</u>	<u>Coated part base metal</u>
Elbow assy of, pipe	17-110,170	Austenitic alloy
Trunnion, assy	20-155	Martensitic alloy
Trunnion, assy	20-170	Martensitic alloy
Support, fitting,		
Ball screw gearbox,		
attaching parts	25-10,90,170,	Martensitic alloy
	25-250,330,390	Martensitic alloy

(c) Metallized parts nomenclature  
- Cobalt/tungsten carbide

<u>Description</u>	<u>IPL Fig.item</u>	<u>Coated part base metal</u>
Door, access LH	3-330	Austenitic ferrous alloy Martensitic alloy
Door, access RH	3-331	Austenitic alloy Austenitic ferrous alloy Martensitic alloy
Door, access LH	3-350	Austenitic alloy Austenitic ferrous alloy Martensitic alloy
Door, access RH	3-351	Austenitic ferrous alloy Martensitic alloy
Door, access LH	3-370	Austenitic ferrous alloy Martensitic alloy
Door, access	3-371	Austenitic ferrous alloy Martensitic alloy
Door, access	4-10	Austenitic ferrous alloy
Door, access LH	4-30	Austenitic ferrous alloy Martensitic alloy
Door, access RH	4-31	Austenitic ferrous alloy Martensitic alloy

**78-13-01**Page 203  
May 31/76

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

<u>Description</u>	<u>IPL Fig.item</u>	<u>Coated part base metal</u>
Door, access LH	4-50	Austenitic ferrous alloy
Door, access RH	4-51	Martensitic alloy Austenitic ferrous alloy. Martensitic alloy

(d) Varnished parts nomenclature  
(Anti-seizing compound C 200) (P 209)

Housing, spherical bearing	16-130,180	Martensitic alloy
Bracket, assy	18-270,290	Austenitic alloy
Pipe, assy	19-100,200	Austenitic alloy

(e) Blue anodizing surface treated parts nomenclature

Spacer, cruciform	25-380,440	Titanium alloy
-------------------	------------	----------------

### 3. Cleaning processes

A. The following table gives the cleaning processes specified in chapter 70-15-20 of the "Standard Practices" manual and applicable to the parts described and itemized in relation to the I.P.L.

<u>Description</u>	<u>IPL Fig.item</u>	<u>Process</u>	<u>Remarks</u>
Deflector, assy attaching parts	1-10	M 100 C	
Cover, strip	-100	M 100 C	
Deflector, assy attaching parts	-200	M 100 C	
Cover, strip	-290	M 100 C	
Bucket, assy reverser complete	2-10		See 78-31-01

**78-13-01**Page 204  
Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL

Description	IPL Fig.item	Process	Remarks
Sleeve, anti-rotation	2-30,220,310	M 101 A	
Pad, locking	-120	M 101 A	
Pin,safety	-130	M 101 A	
Bearing, trunnion bucket	-160,170,260,350	M 101 A	
Door, access	3-10,150	M 116	
Plate, sleeve support	-60,120,240,300	M 101 A	
Sleeve assy	-70,130,250,310	M 101 A	
Support, sleeve	-80,140,260,320	M 101 A	
Door, access	-170,190	M 116	
Door, access	-330,331	M 116	
Door, access	-350,351	M 116	
Door, access	-370,371	M 116	
Door, access	3-390	M 116	
Plate, cover	-430,480	KERDANE paraffin (P 163)	
Door, access	4-10	M 116	
Door, access	-30,31,50,51	M 116	
Door, access*	-70,71,100,101	M 116	:: Remove the remaining Rhodor-sil sealing material by saturating with white spirit (P129) and using a sharpened plexi-glass blade (figure 517).
Stiffener	5-30,60,400,430	M 100 A	
Seal, assy	-130,240,500,610	M 100 C	
Seal, assy	-150,220,520,590	M 100 C	
Seal, assy	-170,540	M 100 C	
Seal, assy	-200,570	M 100 C	
Heat-shield	-260,261	M 100 C	
Heat-shield	-630,631	M 100 C	

78-13-01



OLYMPUS 593

MK.610-14-28  
OVERHAUL

<u>Description</u>	<u>IPL Fig.item</u>	<u>Process</u>	<u>Remarks</u>
Stiffener	6-30,60,400,430	M 100 A	
Seal, assy	-130,240,500, 610	M 100 C	
Seal, assy	-150,220,520, 590	M 100 C	
Seal, assy	-170,540	M 100 C	
Seal, assy	-200,570	M 100 C	
Heat-shield assy	-260,261,630, 631	M 100 C	
Support assy	7-10,160	M 100 A	
Cover	8-30,31,160,161 290,291,420, 421,550.	KERDANE paraffin (P 163)	
Spacer	-50,51,180,181 310, 311,440, 441.	M 101 A	
Plate, lock	-70,200,330,460, 570	M 101 A	
Washer, dogged	-80,210,340, 470,580	M 101 A	
Stop, spherical	-90,220,350, 480,590.	M 100 A	
Washer, cup	-100,230,360, 490,600.	M 100 A	
Pin, mounting	-10, 140, 270, 400,530	M 100 A	
Fairing, assy	9-10,11,270,271	M 116	
Seal, plate	10-20,21,40,41, 60,61,80,81, 100,101,120, 121,140,141, 160,161,180, 181,200,201, 220,221,240, 260,261,280, 281,300,301, 320,321,340, 341,360,361, 380,381,400, 401,420,421, 440,441,460, 461,480.	M 100 A	

PRINTED IN FRANCE

78-13-01

Page 206  
Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL

PRINTED IN FRANCE

Description	IPL Fig.item	Process	Remarks
Pin, threaded	10-490	M 100 A	
Washer, throat	-510,550, 590,630.	M 100 A	
Strip, anti-fret	-520,530,560, 570,600,610, 640,650,690, 700.	M 100 A	
Panel, assy, convergent attaching parts	11-10,40,70,100	M 116	
Plate, joint	-130,140,150	M 116	
Panel, divergent vertical	12-10	M 100 C	
Panel, divergent 45 DEG position	13-10,120	M 100 C	
Panel, divergent lateral	14-10	M 100 C	
Shaft, flexible	15-10,20,30,40 50,150,160,170		See 78-34-01
Ball screw gearbox	16-10		See 78-32-19
Indicator, position bucket	-70		See 78-35-01
Bearing, spherical	-120,170	M 100 A	
Housing, spherical bearing	-130,180	M 100 A	
Bracket, assy, welded	-220,250,	M 100 A	
Tube, telescopic	17-10		See 78-31-12
Plate retaining	-50	M 101 A or M 100 A	
Ring keep, telescopic	-90	M 101 A or M 100 A	
Clamp, collar	-100,160	KERDANE paraffin (P 163)	
Elbow assy of, pipe	-110,170	M 101 A or M 100 A	

78-13-01

Page 207

May 31/76



OLYMPUS 593

MK. 610-14-28

OVERHAUL



<u>Description</u>	<u>IPL Fig.item</u>	<u>Process</u>	<u>Remarks</u>
Elbow assy, exhaust	17-150,210,	M 101 A or	See 78-33-06
Actuator, pneumatic	-230	M 100 A	
Bushing	-320,370,380, 390,400	M 101 A or M 100 A	
Rod, end	18-80	M 101 A or M 100 A	See 78-37-01
Clevis, rod end	-100	M 101 A or M 100 A	
Elbow assy of, tube	-110	M 101 A or M 100 A	
Clamp, collar	-160,240	KERDANE paraffin (P 163)	
Bearing spherical	-180	M 101 A or M 100 A	
Elbow assy of, tube	-190	M 101 A or M 100 A	
Bracket, support isolation valve	-270,290	M 101 A or M 100 A	
Bearing spherical	-280,300	M 101 A or M 100 A	
Valve, crossfeed	-310		
Half-clamp, assy	-330	M 101 A or M 100 A	
Tube, assy	-340	M 101 A or M 100 A	
"p"clip	-420,510	M 101 A or M 100 A	
Tube, assy	-430	M 101 A or M 100 A	
Bracket, angle	-550	M 101 A or M 100 A	
Yoke, mounting	-620	M 101 A or M 100 A	
Pivot	-660	M 101 A or M 100 A	
Bracket	-670	M 101 A or M 100 A	
Cover, plate	19-20	M 101 A	
Cover, plate	-30	M 101 A	
Bearing, spherical	-90,190	M 101 A	
Pipe, assy	-100	M 101 A or M 100 A	
Cover, plate	-120	M 101 A	

PRINTED IN FRANCE

78-13-01

Page 208

May 31/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



<u>Description</u>	<u>IPL Fig. Item</u>	<u>Process</u>	<u>Remarks</u>
Cover, plate	19-130	M 101 A	
Pipe, assy	-200	M 101 A or	
		M 100 A	
Rod, end,	-260,340,460	M 101 A	
Fork, end	-280	M 101 A	
Fork, end	-360	M 101 A	
Bushing	-370,380,390,	M 101 A	
	400,490,500,		
	510,520		
Fork, end	-480	M 101 A	
Cover, assy	20-10A	KERDANE paraffin (P163)	
Cover, assy	-20A	KERDANE paraffin (P163)	
Support	-150	M 101 A	
Trunnion	-170	M 101 A	
Cover, assy	-180	KERDANE paraffin (P163)	
Cover, assy	-190	KERDANE paraffin (P163)	
Support	21-10	M 101 A or	
		M 100 A	
Support	-170	M 101 A or	
		M 100 A	
Plate, assy, slotted	22-20	M 101 A or	
		M 100 A	
Housing assy	-30	M 101 A or	
		M 100 A	
Plate, blanking assy	22A-85	M 101 A or	
		M 100 A	
Plate, blanking assy	-165	M 101 A or	
		M 100 A	
Plate, blanking assy	22B-230	M 101 A or	
		M 100 A	
Plate, blanking assy	-285	M 101 A or	
		M 100 A	
Plate, blanking assy	22C-360	M 101 A or	
		M 100 A	
Plate, blanking assy	-400	M 101 A or	
		M 100 A	
Plate, blanking assy	22D-460	M 101 A or	
		M 100 A	

78-13-01

Page 209

Aug 31/79





OLYMPUS 593

MK.610-14-28

OVERHAUL



Description	IPL Fig. Item	Process	Remarks
Plate, blanking assy	-500	M 101 A or M 100 A	
Bracket, assy	23-10,11	M 101 A	
Bracket, assy	-90,91	M 101 A	
Bracket, assy	-170,171	M 101 A	
Bracket, assy	-250,251	M 101 A	
Fitting assy	24-120	M 101 A	
Fork, end	-140	M 102 A	
Bushing	-150,160,170 180	M 101 A	
Support, fitting ball- screw gearbox	25-10,90	M 101 A or M 100 A	
Support, fitting ball- screw gearbox	-170,250	M 101 A or M 100 A	
Support, fitting ball- screw gearbox	-330,390	M 101 A or M 100 A	
Spacer, cruciform	-380,440	KERDANE paraffin (P163)	
Wiring, electrical bays	26-10		See 78-13-10
Wiring, electrical bays	27-60		See 78-13-10
Spacer, square	28-30	M 101 A	
Clamp, half	-90	M 101 A	
Gutter, welded assy	-278	M 101 A	
Plate, square	-300	M 101 A	
Bolt,pivot	29-20	M 101 A	
Trunnion, bodge bolt	-30	M 101 A	
Bush, spherical bearing	-50	M 101 A	
Locking, ring	-701,140	M 101 A	
Locking, ring	-90,160	M 101 A	
Bearing,	-100,170	M 101 A	
Housing, bearing	-110,180	M 101 A	
Bush, spherical bearing	29-120A	M 101 A	
Twin according nozzle	29-190	M 116	
Harness, transducer area primary nozzle	30	White Spirit P 129	Do not immerse

78-13-01

Page 210

Apr 30/93

**ATP  
TEMPORARY  
REVISION**

**BRITISH AIRWAYS**  
OLYMPUS 593 OVERHAUL MANUAL  
EXHAUST SYSTEM TWIN SECONDARY NOZZLE

This Temporary Revision complies with BCAR's Chapter A6-2 and TSS No. 0-2.

*W. Chubb*

for Chief Engineer (Technical & Quality Services) CAA Design Approval No.  
DA1/8566/78

**TEMPORARY REVISION 78-525**

Insert in 78-13-01 facing page 301

**REASON FOR ISSUE**

To introduce a Refurbishment Specification to the Twin Secondary Nozzle Overhaul (MCR.EPO.450/MD).

**ACTION**

Concorde Exhaust System Refurbishment

Introduction

The exhaust system consists of four main components:-

- (a) The Reheat Jet Pipe
- (b) The Primary Nozzle
- (c) The Twin Secondary Nozzle
- (d) The Thrust Reverser Bucket

Their Refurbishment Specifications are as follows:-

Reheat Jet Pipe	CON 78.11.01.100 Issue 1
Primary Nozzle	CON 78.12.01.100 Issue 1
Twin Secondary Nozzle	CON 78.13.01.100 Issue 1
Thrust Reverser Bucket	CON 78.31.01.100 Issue 1

These refurbishment schedules fulfil the life development requirements of the Approved Maintenance Schedule (A.M.S.).

The work listed in the Refurbishment Schedule is to allow the unit to be considered as a "Condition Monitored" (C.M.) unit.

This means that such units are currently considered to have no known hidden "wear out" features that require planned time interval specific inspections. However, such units may be required to be stripped and inspected purely to gain experience of their condition, i.e. life samples when it is considered that opportunity arisings of strip and inspection are inadequate. Such life sampling requirements will be indicated by an A.M.S. revision.

Notes

Where the term "visual inspection" is used, it implies a visual inspection of all parts exposed arising either as a result of the minimum work content of the Refurbishment Schedule or to a greater depth of strip dictated by other reasons, i.e. repair of damage embodiment of modifications, etc.

When in the course of visual inspection evidence exists, e.g. wear witness, distortion, etc. that requires further stripping, it must be referred to Propulsion Engineering for a review of acceptance standards and agreement to further strip.

# BRITISH AIRWAYS

## OLYMPUS 593 OVERHAUL MANUAL EXHAUST SYSTEM TWIN SECONDARY NOZZLE

TEMPORARY REVISION No. 78-525 (Cont'd.)

### Concorde Exhaust System Refurbishment Twin Secondary Nozzle

Specification No. CON 78.13.01.100 Issue 1

1. The Secondary Nozzle is to be disassembled IAW OHM 78-13-01 P/B 100.
2. At the completion of disassembly clean thoroughly all the parts of the secondary nozzle so as to remove all surface contamination such as oils, greases, carbon deposits, corrosion and oxidisation marks IAW OHM 78-13-01 P/B 200.
3. Crack detect parts listed in OHM 78-13-01 Page 305 to 309 using processes specified. Parts failing to meet the required standard must be held for possible repair development.
4. Visually inspect all parts IAW OHM 78-13-01 P/B 300 and repair as required. Any part that is damaged beyond the repair limits must be held for possible repair development. Any part that is damaged and has no cleared repair scheme must be held for possible repair development.
5. Embody Modifications IAW the BA Modification call up list.
6. Inform Propulsion Engineering of any defects found during refurbishment.
7. Re-assemble the Secondary Nozzle IAW OHM 78-13-01 P/B 500.
8. The Secondary Nozzle inspection and release documentation is to state the specification number to which the unit has been refurbished.



OLYMPUS 593

MK.610-14-28

OVERHAUL



INSPECTION

1. Breakdown of the Inspection Section

The "Estimate" inspection of the Twin Secondary Nozzle assembly includes the following chapters :

- General
- Twin Secondary Nozzle assembly - Removable parts
- Basic Twin Secondary Nozzle

The latter chapter is itself divided in paragraphs as follows:

- Introduction
- Identification
- Restricted areas
- Inspection methods
- Permissible damage

This breakdown of the Inspection section results in a different pagination for each chapter and paragraph, of the following type :

Chapter "Removable parts"

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 301

Jan 15/76

Chapter "Basic Twin Secondary Nozzle"  
Paragraph "Identification"

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 301

Jan 15/76

2. General

A. Inspection - General

- (1) The Estimate Inspection, prepared during overhaul on the modules or separate disassembled components, has the object of :

Eliminating worn or deteriorated components which are impossible or too costly to be repaired. However, these components can be kept because certain sound portions of them may be usable for the repair of an identical component.

Indicating the modifications to be applied to bring up to a new Standard.

78-13-01

GENERAL

Page 301

Jan 15/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



Indicating the repairs to be carried out. If this repair has not been envisaged in the Repair Section of the Manual, make a request to SNECMA - Après-Vente Civile Site de MELUN MONTEREAU Aérodrome de VILLAROCHE BP 1936 - 77019 MELUN CEDEX (FRANCE).

Eliminating components that have reached their life limitation.

B. Preparation to the "Estimate" Inspection

- (1) Following disassembly, suitable cleaning for each component is given in the "Cleaning" section of the Overhaul Manual.

NOTE : Take care that any assembly "awaiting inspection" be stored in the "bins" or containers for this purpose.

This inspection must be carried out on thoroughly clean parts.

Place all the parts, making up the sub-assemblies, on the inspection tables covered with anti-shock material (lino or similar material).

- (2) Make a list of the modifications to be applied for each sub-assembly.
- (3) Inspect the parts.

C. "Estimate" Inspection

CAUTION : THE COMPONENTS MUST BE HANDLED WITH THE GREATEST CARE DURING THE INSPECTION OPERATIONS SO AS TO AVOID SHOCKS, SCRATCHES, ETC ...

- (1) Personnel in charge of this inspection must have a thorough knowledge of the instructions given in the Inspection and Repair sections of this manual and in the corresponding chapter 70.

They must be conscious of the importance of their decisions and of their consequences. A good technical and functional knowledge of the accessory will enable this personnel to carry out an efficient and intelligent inspection, particularly in vital zones.

PRINTED IN FRANCE

78-13-01

GENERAL

Page 302

Apr 30/93



- (2) The inspection methods to be used are as follows:

Visual inspection

Inspection for soundness

Dimensional inspection

NOTE: It is recommended that these inspection methods be followed as per the indicated order so that faulty, not repairable components detected during visual or soundness inspections can be scrapped prior to dimensional inspection.

If new types of defects are disclosed, the repairer shall request SNECMA to design a repair scheme.

- (3) Measuring instruments for dimensional inspection

Choice of the measuring instrument must be made in relation to the precision desired.

(a) Instrument classification

Two kinds of measuring instruments are to be distinguished:

Standard and universal inspection tools such as: slide gages, micrometers, depth gages, miscellaneous dial gages, etc.

This equipment is part of the provisioning items commercially available and requires no particular comment provided that it is available in the required quantity and precision, and satisfies to the requirements for the work to be undertaken.

Special inspection equipment such as: bases, supports, rigs, jigs, etc.

These tools are identified by a type number in the manual text at the exact place where they are used.

(b) Calibration

Measuring instruments used in overhaul are to be checked periodically according to a procedure defined in relation to master instruments (SNECMA to be informed of procedure), themselves checked



OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

in relation to the official master instruments of the country concerned.

The Official Control Authorities of the countries where repairs are carried out will have to take steps to ensure that the repairer has set up suitable facilities and equipment.

In the absence of a procedure in the countries concerned, the repairer will request from SNECMA the procedure applied in their own workshop.

- (4) During the inspection, each component must be labelled (see chapter 70-10-00) so as to indicate:

If it is suitable to be put back into service.

If a repair is necessary.

If it must be renewed.

Labelling of components may also be used to note the value of certain measured dimensions which can affect a clearance or a tolerance. This makes it possible for the Inspection Dpt. to check the clearance or tolerance during final assembly.

#### D. Protection against corrosion after inspection

- (1) After inspection, when 3 months elapses before rebuild, apply a temporary protection to carbon steel, alloy steel and martensitic alloy parts using a dessicant oil such as Ensis Fluid 254 (P309) or ARDROX 396/1E8 (P373) or RUSTILO DW377 (P373).

**78-13-01**

GENERAL

Page 304

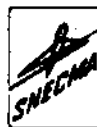
Dec 31/01



OLYMPUS 593

MK.610-14-28

OVERHAUL



## INSPECTION

### TWIN SECONDARY NOZZLE ASSEMBLY - REMOVABLE PARTS

#### 1. Introduction

This chapter gives all the data needed for the visual, soundness and dimensional inspections to be carried out on the removable parts of the Twin Secondary Nozzle assembly.

#### 2. Visual inspection

A. Visual inspection is an operation which starts on reception of the accessory (inventory), continues during disassembly, on table inspection, re-assembly, testing and dispatching.

- (1) Visual inspection generally concerns the following points :

Each part is inspected to ascertain its general condition and make sure that it is fit for service. Refer to chapter 70-21-00.

Threads and tapped holes must not be deteriorated.

Rivets used to attach the various components on riveted assemblies must not be shaken loose, rotating or missing, otherwise change them.

Self-locking nuts must have a satisfactory locking torque. See chapter 70-21-30, otherwise change them.

Crimped self-locking nuts must be satisfactorily crimped. See chapter 70-21-30, otherwise change them.

Hinge parts (such as pins/bores of bushes; ball joint inner ring/outer ring of rods ...) must not show seizing marks or scratches, otherwise remove them by emery cloth.

Components made up of sheet metal elements and/or "Stresskin" material must not show nicks, tears, heavy distortions and/or, burns.

Parts featuring plated areas (metallization) must not show flaking conditions, otherwise renew the metallization as indicated in the "Repair" section of the Manual

**78-13-01**

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 301

Jan 15/76





OLYMPUS 593

MK.610-14-28

OVERHAUL



Parts featuring a protective surface coating must not show bare or flaked areas, otherwise recondition coating as indicated in "Repair" section of the Manual.

- (2) Measures to be taken in relation to the damage affecting the parts are given in paragraph 5 "Parts Inspection".

### 3. Inspection for soundness

- A. The object of the inspection for soundness is to ensure that the components are not cracked.

The inspection methods used are as follows :

Visual inspection :

This inspection can be carried out using a binocular magnifying glass (magnification X 10) or a borescope.

Aural inspection :

This method is used to check Stressskin panels and described in paragraph 5 "Parts Inspection".

Dye penetrant inspection : see chapter 70-20-10.

M 502 - Water-washable fluorescent penetrant inspection.

M 504 - Post-emulsification fluorescent penetrant inspection.

NOTE : M 502 A or M 504 A : for titanium made parts  
M 502 B or M 504 B : for all parts except titanium parts.

Radiographic inspection : see chapter 70-20-30.

using X-rays  
using gamma-rays

- B. The following table gives the list of parts and their appropriate methods.

**78-13-01**

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 302

Jan 15/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL

PARTS TO BE CHECKED		INSPECTION METHODS	REMARKS and Zones requiring careful examination
IPL	DESCRIPTION		
1-10/200	Deflector assy	M 504 B	
1-100/290	Strip cover	M 504 B	
Sheet 1	Hardware	M 504 B	(1)
2-30/220/310	Anti-rotation sleeve	M 504 B	(1)
2-60/250/340	Attach trunnion bolt	M 504 B	(1)
2-120	Locking pad	M 504 B	(1)
2-130	Safety pin	M 504 B	(1)
2-160/170 260/350	Bucket bearing trunnion	M 504 B	(1)
2-200/290/ 380	Trunnion locking pin	M 504 B	(1)
Sheet 2	Miscellaneous : Ring Bolt Nut	M 504 B	(1)
3-10/150/170 190/330/331 350/351/370 371	Access door assy	Visual + Aural	Penetrant inspection (M 502 B) and X-Ray inspection can be used to find out de- terioration accurately
3-60/120	Sleeve support plate	Visual	(1)
3-65/125	Shim	Visual	(1)
3-70/130	Sleeve assy	M 502 B	(1)
3-80/140	Sleeve support assy	M 502 B	(1)
3-420/470	Cover plate assy	Visual	(1)
3-430/480	Cover plate	M 502 B	(1)

(1) If any crack is found, scrap the part.

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 303

Aug 31/79

PRINTED IN FRANCE

PRINTED IN FRANCE

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

PARTS TO BE CHECKED		INSPECTION METHODS	REMARKS and Zones requiring careful examination
I P L	DESCRIPTION		
4-10/30/31 50/51/70 71/100/101	Access door assy	Aural + Visual	Penetrant inspection (M 502 B) and X-Ray inspection can be used to find out deterior- ation accurately
5-30/60/400 430	Stiffener	M 502 B	(1)
5-90/120/460 490	Plate, retaining	M 502 B	(1)
5-130/150/190 170/200/220 240/500/520 560/540/570 590/610	Seal, assy	M 502 B	
5-260/630 261/631	Heat shield, assy	M 502 B	
6-30/60/400 430	Stiffener	M 502 B	(1)
6-90/120/460 490	Plate, retaining	M 502 B	(1)
6-130/150/170 190/200/220 240/500/520 560/540/570 590/610	Seal, assy	M 502 B	
6-260/630 261/631	Heat shield, assy	M 502 B	
7-10/160	Support assy	M 502 B	(1)
8-30/31/160 161/290/291 420/421/550	Cover	M 502 A	(1)

(1) If any crack is found, scrap the part.

**78-13-01**

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 304

Aug 31/79

PRINTED IN FRANCE

PRINTED IN FRANCE



OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN FRANCE

PARTS TO BE CHECKED		INSPECTION METHODS	REMARKS and Zones requiring careful examination
I P L	DESCRIPTION		
8-50/51/180 181/310/311 440/441	Spacer	M 502 B	(1)
8-70/200/330 460/570	Lock plate	M 502 B	(1)
8-80/210/340 470/580	Dogged washer	M 504 B	(1)
8-90/220/350 480/590	Spherical stop	M 504 B	(1)
8-100/230/360 490/600	Cut washer assy	M 504 B	(1)
8-110/240/360 500/610	Bushing retaining bolt	M 504 B	(1)
8-10/140/270 400/530	Mounting pin	M 504 B	(1)
9-10/11 270/271	Fairing assy	Radiogra- phic + M 502 B	Inspection method defined in par. 5
9-530/531/580 581/630/631 680/681/730 731/800/801 870/871/940 941	Heatshield	M 502 B	(1)
9-570/620/670 720	Shim	M 502 B	(1)
9-574/575/624 625/674/675 724/725	Plate, blanking	M 502 B	(1)
9- 577/578/627 628/677/678 727/728	Bracket	M 502 B	(1)

(1) If any crack is found, scrap the part.

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 305

Apr 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



PARTS TO BE CHECKED		INSPECTION METHODS	REMARKS and Zones requiring careful examination
I P L	DESCRIPTION		
10-490	Threaded pin	M 504 B	(1)
Sheet 10	Miscellaneous :		
	Seal	{ Visual	
	Anti-fret strip		(1)
	Plate		
11-10/40 70/100	Convergent panel assy	Visual + Aural	Penetrant inspection (M 502 B) and X-Ray inspection can be used to find out deterioration accurately.
11-130/140 150	Joint plate	M 502 B	(1)
12-10	{ Divergent panel assy	M 502 B	
13-10/120			
14-10			
16-50	Attaching bolt	M 504 B	(1)
16-120/170	Spherical bearing	M 504 B	(1)
16-130/180	Spherical bearing housing	M 504 B	(1)
16-100/190	Shim	Visual	(1)
16-220/250	Welded bracket assy	M 502 B	
17-50	Retaining plate	M 502 B	(1)
17-90	Telescopic keep ring	M 502 B	(1)
17-100/160	Collar clamp	M 502 B	(1)
17-110/170	Elbow assy	M 502 B	
17-150/210	Exhaust elbow assy	M 502 B	
Sheet 17	Miscellaneous :		
	Stud	{ M 502 B	(1)
	Bolt		
	Ring		

(1) If any crack is found, scrap the part.

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 306

Aug 31/79

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

PARTS TO BE CHECKED		INSPECTION METHODS	REMARKS and Zones requiring careful examination
I P L	DESCRIPTION		
18-10	Mounting link assy	M 502 B	(1)
18-110/190	Elbow assy	M 502 B	
18-160/240	Collar clamp	M 502 B	(1)
18-270/290	Isolation valve bracket assy	M 502 B	(1)
18-330	Half-clamp assy	M 502 A	(1)
18-340/430	Tube assy	M 502 B	
18-187/189/420 510/597/655	P-clip	Visual	(1)
18-550	Angle bracket	M 502 A	(1)
18-560	Yoke assy	M 502 B	(1)
18-660	Pivot	M 502 B	(1)
18-670	Angle bracket	M 502 B	(1)
19-20/30 120/130	Plate	Visual	(1)
19-40/140	Pipe end nut	M 502 B	(1)
19-90/190	Spherical bearing	M 502 B	(1)
19-100/200	Pipe assy	M 502 B	
19-210/290 410	Rod assy	M 502 B	(1)
19-250/450	Pin	M 502 B	(1)
20-10/20/180 190	Cover assy	Visual	(1)
20-150	Support	M 502 B	(1)

(1) If any crack is found, scrap the part.

**78-13-01**

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 307  
Aug 31/79

PRINTED IN FRANCE

PRINTED IN FRANCE

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

PARTS TO BE CHECKED		INSPECTION METHODS	REMARKS and Zones requiring careful examination
I P L	DESCRIPTION		
20-170	Trunnion	M 502 B	(1)
21-10/170	Bracket	M 502 B	(1)
22-20	Slotted plate assy	M 502 B	
22-30	Welded housing assy	M 502 B	
22-80/81/160	Bracing, assy	M 502 B	(1)
161/225/226			
280/281/355			
356/395/396			
455/456/495			
496			
22-85/86/165	Plate, blanking assy	M 502 B	
166/230/231			
285/286/360			
361/400/401			
460/461/500			
501			
22-130/195/260	Shim	M 502 B	(1)
345			
23-10/11/90	Bracket assy	M 502 B	(1)
91/170/171			
250/251			
24-10	Link assy	M 502 A	
24-50/100	Bolt	M 502 B	(1)
25-10/90/170	Ball screw gearbox	M 502 B	(1)
250/330/390	fitting support		
25-40A/120A	Nut plate, assy	M 502 B	(1)
200A/280A			
25-380/440	Spacer, cruciform	M 502 A	(1)
26-240	Clip	Visual	(1)
27-180	P-clip	Visual	(1)
27-210	Support	M 502 B	(1)
28-90	Clamp, half	M 502 B	(1)
28-278	Gutter, weldment	M 502 B	(1)
30-1	Wiring	Visual	

(1) If any crack is found, scrap the part.

**78-13-01**

TWIN SEC. NOZZLE ASSY - REMOVABLE PARTS

Page 308

Aug 31/79

PRINTED IN FRANCE

PRINTED IN FRANCE



OLYMPUS 593

MK.610-14-28  
OVERHAUL



#### 4. Dimensional Inspection of Parts

Details concerning the dimensional inspection and the acceptance criteria are given in paragraph 5 "Parts Inspection".

#### 5. Parts Inspection

##### A. Deflector Assy (1-10/200)

###### (1) Visual inspection

- (a) Check that deflector blade or cover plate are not out of shape.

Otherwise, re-shape them.

###### (2) Inspection for soundness

- (a) Renew cover plate if showing cracks, per REP 1-10-1.
- (b) Repair cracked deflector assemblies LH and RH in accordance with BOR 15.

1 A crack of less than 20 mm (0.787 in.) in length on the leading edge of a blade to be repaired per REP 1-10-2.

##### B. Strip Cover (1-100/290)

###### (1) Visual inspection

- (a) Check that strip cover is not out of shape.  
If cover strip is out of shape, withdraw from service pending the establishment of a repair procedure.

###### (2) Inspection for soundness

- (a) The presence of cracks in the cover strip is not acceptable. A cracked cover strip must be withdrawn from service pending the establishment of a repair procedure.

**78-13-01**





OLYMPUS 593

MK.610-14-28

OVERHAUL



C. Safety Pin (2-130)

(1) Visual inspection

- (a) Check that safety pin centering diameter is free from any seizing indent or scratch.

Otherwise, eliminate them using an emery cloth.

(2) Dimensional inspection

- (a) Should there be a reworking of safety pin centering diameter, check that its value remains greater than 12,18 mm (0.4796 in.).

If not, scrap the pin.

D. Bucket Bearing Trunnion (2-160/170/260/350)

(1) Visual inspection

- (a) Seizing indents or scratches on centering diameter must be eliminated using an emery cloth.

- (b) Check that thread for trunnion extraction is in good condition.

If thread shows sign of damage, withdraw from service pending the establishment of a repair procedure.

(2) Dimensional inspection

- (a) Check that centering diameter is greater than 47,57 mm (1.8728 in.).

If this is not so, withdraw trunnion from service pending establishment of repair procedure.

E. Trunnion Locking Pin (2-200/290/380)

(1) Visual inspection

- (a) Check that pin centering diameter is free from seizing indents or scratches.

Otherwise, eliminate them using emery cloth.

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 310

Jun 15/82



OLYMPUS 593

MK.610-14-28

OVERHAUL



(2) Dimensional inspection

- (a) If it is necessary to rework pin centering diameter, check that its value remains greater than 9,48 mm (0.3735 in.).

Otherwise, scrap the pin.

F. Access Door Assy (3-10/150/170/190/330/331/350/351/370/371)  
and (4-10/30/31/50/51/70/71/100/101)

(1) Visual inspection

- (a) Check that inserts are correctly crimped.

Otherwise, renew those found to be defective according to instructions in REP 3-10-3.

- (b) Check the condition of stiffeners on doors (3-330) and (4-10) together with securing parts.

In case of damage or failure, replace defective part per REP 3-10-2.

- (c) Check that the "Stressskin" panel is free from indents or nicks.

Otherwise, rework the door per REP 3-10-4.

- (d) Check that tungsten carbide protection of areas in contact with secondary nozzle is not flaked or worn out.

Otherwise, rework it per REP 3-10-1.

(2) Inspection for soundness

- (a) Cracks developing in "Stressskin" panel skins together with delamination of internal ribbon are unacceptable and require door repair.

G. Sleeve Assembly (3-70/130)

(1) Visual inspection

- (a) Check that pin is not damaged or shaken.

Otherwise, renew it.

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 311

Jun 15/82



OLYMPUS 593

MK.610-14-28

OVERHAUL



H. Seal Assy (5-130/150/170/200/220/240/500/520/540/570/590/610) and (6-130/150/170/200/220/240/500/520/540/570/590/610)

(1) Visual inspection

(a) Check condition of seal blades and stiffeners.

In case of crack, tearing, deformation or important wear, replace the damaged item as instructed in REP 5-130-1.

I. Heat Shield Assy (5-260/261/630/631) and (6-260/261/630/631)

(1) Visual inspection

(a) Check condition of reinforcements and relevant riveting.

If damaged, renew them as per REP 5-260-1.

(b) Check contact zone of seal assemblies.

If there are signs of an unacceptable level of wear, recondition zone per REP 5-260-3.

(2) Inspection for soundness

(a) Cracks developing in heat shields are unacceptable.

If cracks are present, repair by welding per REP 5-260-2.

J. Support Assembly (7-10/160)

(1) Visual inspection

(a) Check condition of floating nut.

Nut in poor condition (silver plating removed, inefficient spring mechanism...) is unacceptable and must be renewed per REP 7-10-1.

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 312

Jun 15/82



OLYMPUS 593

MK.610-14-28  
OVERHAUL



K. Spacer (8-50/51/180/181/310/311/440/441)

(1) Visual inspection

- (a) If riveted nuts are damaged, renew them per  
REP 8-50-1

L. Spherical Stop (8-90/220/350/480/590)

(1) Visual inspection

- (a) Check that the spherical part is free from  
seizing marks or flats.  
Otherwise, scrap it.
- (b) Check that thread and spherical part silver plating  
is in good condition.  
Otherwise, rework silver plating per REP 8-90-1.

M. Cup Washer Assembly (8-100/230/360/490/600)

(1) Visual inspection

- (a) Check nut condition (crimping and torque).  
If damaged, renew it per REP 8-100-1.
- (b) Check that the mating face of cup to pin, together  
with the spherical stop thrust face are free from  
deterioration.  
Otherwise, eliminate surface defects by lapping.

N. Bushing (8-120/250/380/510/620)

(1) Visual inspection

Deleted

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 313

Apr 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



(2) Dimensional inspection

Deleted.

O. Mounting Pin (8-130/260/390/520/630)

(1) Visual inspection

- (a) Check that there is no scratch, or other surface deterioration on centering diameters, on outer diameter of bushing and mating face.

Otherwise, eliminate them by lapping within the following dimensional specifications.

(2) Dimension inspection

- (a) Check systematically pin centering diameters (see Figure 301).

They must be :

dia. A = 64,44 mm min. (2.5369 in.)

dia. C = 58,36 mm min. (2.2977 in.).

Below these values, store the part pending repair.

dia. B = 31,97 mm min. (1.2586 in.)

Below this value, replace the bushing following repair REP 8-10-1.

P. Rear Fairing Assembly (9-10/11/270/271)

(1) Visual inspection

- (a) Loosened or missing reinforcement sheet attachment rivets are unacceptable, they must be replaced per REP 9-10-1.
- (b) Damages due to contact with the elevon junction are acceptable if there is no crack.

Otherwise, store the part pending repair.

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 314

Apr 30/93



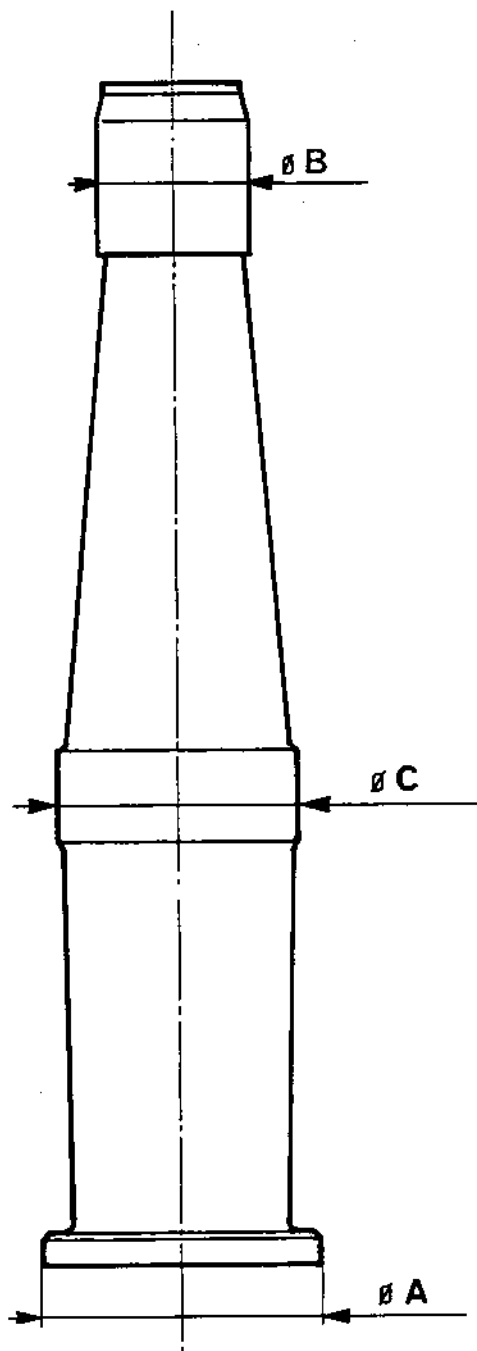
OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN FRANCE



Mounting Pin Dimensional Inspection  
Figure 301

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

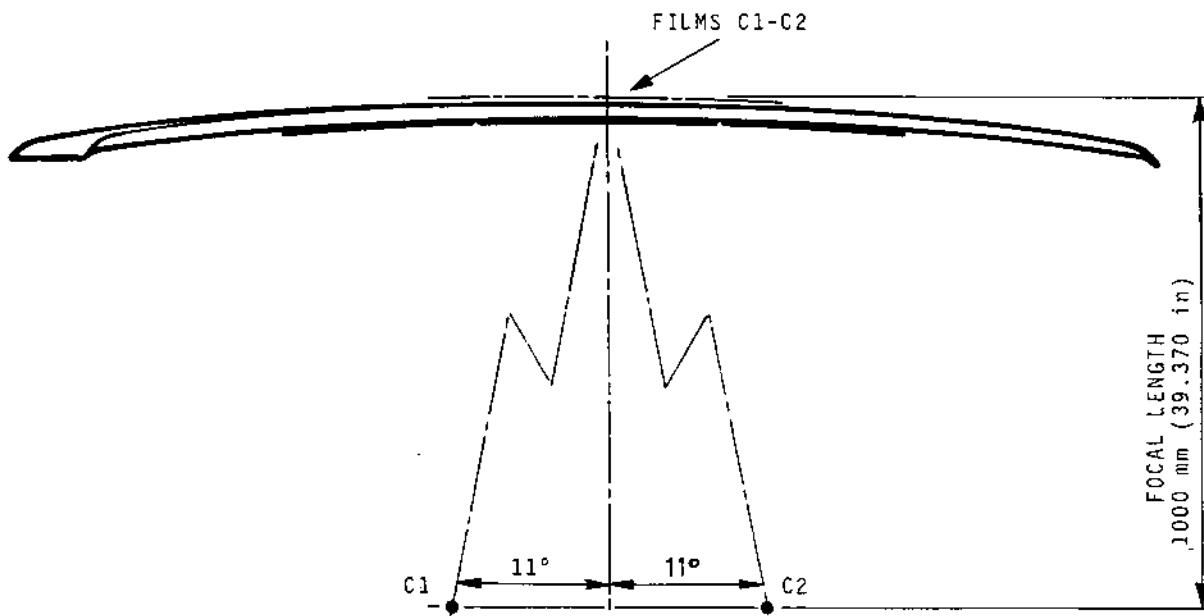
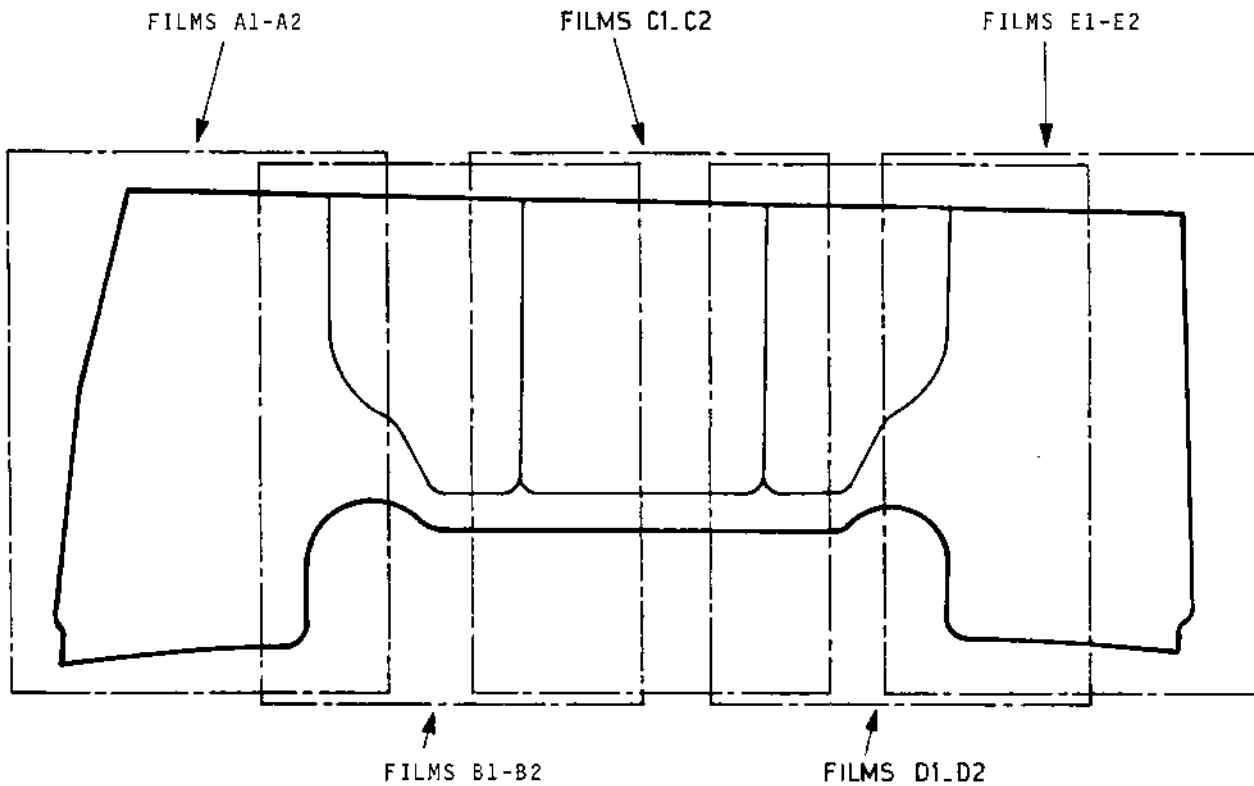
Page 315

Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



X-Ray Radiographic Inspection of LH Fairing Assy  
Figure 302 - Sheet 1 of 2

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 316

Aug 31/79

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

SOURCE LOCATION		COMPONENTS CHECKED	FILMS *	PHOTOGRAPHIC DENSITY	IMAGE QUALITY INDICATOR (I.Q.I)
A1	A2	Stressskin panel in non-reinforced areas	2 films	2.2	wire 0,15 mm dia. (0.006 in)
E1	E2	(Inner and outer skins + junction to ribbon)	2 films		
B1	B2	Stressskin panel in reinforced areas	2 films	2.2	wire 0,15 mm dia. (0.006 in)
C1	C2	(Inner and outer skins + junction to ribbon)	2 films		
D1	D2		2 films		

\* Type "M" kodak film without screen or similar  
Film dimensions 300 x 400 mm  
(11.811 x 15.748 in)

X-ray Radiographic Inspection of L/H Fairing Assembly  
Figure 302 - Sheet 2 of 2

**78-13-01**

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 317

Aug 31/79





OLYMPUS 593

MK.610-14-28  
OVERHAUL



(2) Inspection for soundness

(a) Inspection methods

The 2 inspection methods described below are complementary :

. Dye penetrant inspection :

Water washable fluorescent penetrant inspection is to be carried out according to method M 502 B of chapter 70-20-10.

The purpose of these inspection is to find out cracks likely to develop :  
from attaching points,  
in panel crushing or shape evolution areas,  
from possible damages.

. Radiographic inspection :

This inspection is carried out using an X-ray set fitted with a long anode, as shown in figure 302.

The purpose of this inspection is to point out peeling-off or deterioration of "Stressskin" panel ribbon or cracks developing under reinforcement sheets.

(b) Acceptance criteria

If cracks of any type are found, they are to be eliminated per REP 9-10-2.

Peeling-off or internal deterioration of ribbon is not acceptable. Repair this damage per REP 9-10-2.

Q. Heat Shield (9-530/531/580/581/630/631/680/681/730/731/800/801/870/871/940/941)

(1) Visual inspection

(a) Check condition of floating anchor nuts.

. Any deterioration on silver plating or locking torque is inadmissible and requires replacement of these nuts according to REP 9-530-1.

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 318

Jun 15/82



OLYMPUS 593

MK.610-14-28  
OVERHAUL



R. Plate Seal (10-20/40/60/80/100/120/140/160/180/200/220/240/  
260/280/300/320/340/360/380/400/420/440/460/480)  
(10-21/41/61/81/101/121/141/161/181/201/221/241/261/281/  
301/321/341/361/381/401/421/441/461/481)

(1) Visual inspection

(a) Wear marks are acceptable after surface smoothing  
if not associated with crack or penetration.  
Otherwise, scrap the seal.

S. Threaded Pin (10-490)

(1) Visual inspection

(a) Check that there are no wear marks or other sur-  
face deteriorations over pin centering diameter.  
If any, eliminate them by using an emery cloth  
within dimensional limits.

(2) Dimensional inspection

(a) Check that pin diameter is not less than 12,62 mm  
(0.4970 in.).  
Otherwise, store the pin pending repair.

T. Convergent Panel (11-10/40/70/100)

(1) Visual inspection

(a) Check that insert crimping is correct.  
Otherwise, renew defective inserts according  
to REP 11-10-1.

(b) Check that the plasma plating in panel mating  
areas is neither flaked nor worn out.  
Otherwise, rework it according to REP 11-10-2.

(c) Check that the "Stressskin" panel is free from  
indent or nick.  
Otherwise, recondition according to REP 11-10-3.

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 319

Apr 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



(2) Inspection for soundness

(a) Inspection method

Carry out an aural inspection by lightly tapping the "Stresskin" panel with a metal part such as a coin.

The purpose of this inspection is to show up a peeling-off or a deterioration of the internal ribbon.

A panel in good condition gives a clear sound.

A panel with a damaged ribbon gives a dead sound.

(b) Acceptance criteria

Peeling-off or internal deterioration of ribbon is unacceptable.

Recondition panel according to REP 11-10-3.

U. Joint Plate (11-130/140/150)

(1) Visual inspection

- (a) Check condition of self-aligning nuts. Deterioration of silver plating, locking torque or travel is unacceptable and requires their renewal according to REP 11-130-1.

V. Divergent Panel (12-10, 13-10/120, 14-10)

(1) Visual inspection

- (a) Wear marks on reinforcing part are acceptable if no crack is detected.

Otherwise, store the part pending repair.

- (b) It is acceptable for the panel to be worn out by less than 0,5 mm (0.020 in.) at attaching point locations, i.e. a min sheet thickness equal to 1 mm (0.039 in.).

Beyond these values, store the part pending repair.

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 320

Apr 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (c) Ensure that crimping of special washer is correct.  
Otherwise, renew the defective crimped washers  
according to REP 12-10B-1.

(2) Inspection for soundness

- (a) Cracks of any types are unacceptable.  
If any, store the part pending repair.

W. Attaching Bolt (16-50)

(1) Visual inspection

- (a) Check that bolt surface is free from scratches or  
other damages.  
Otherwise, eliminate them using an emery cloth  
within dimensional limits.

(2) Dimensional inspection

- (a) Check that bolt diameter is not less than  
12,66 mm (0.4984 in.).  
Otherwise, store the part pending repair.

X. Spherical Bearing (16-120/170)

(1) Visual inspection

- (a) Check that the outer spherical diameter of bea-  
ring, together with bore, are free from scratches  
or other surface deterioration.  
Otherwise, eliminate them using an emery cloth  
and remaining within dimensional limits.

(2) Dimensional inspection

- (a) Check that spherical diameter is not less than  
14,26 mm (0.5614 in.) and that the bore is not  
greater than 7,94 mm (0.3125 in.).  
Beyond these values, scrap the part.

78-13-01

TWIN SEC..NOZZLE ASSY. - REMOVABLE PARTS

Page 321

Jun 15/82



OLYMPUS 593

MK.610-14-28

OVERHAUL



Y. Spherical Bearing Housings (16-130/180)

(1) Visual inspection

- (a) Check that the spherical bore is free from scratches or other surface damages.

Otherwise, eliminate them using an emery cloth within dimensional limits.

(2) Dimensional inspection

- (a) Check that the spherical bore is not greater than 14,31 mm (0.5634 in.).

Otherwise, scrap the part.

Z. Welded Bracket (16-220/250)

(1) Visual inspection

- (a) Check that self-locking nuts are in good condition.

Otherwise, renew them according to REP 16-220-1.

(2) Inspection for soundness

- (a) Cracks are unacceptable and must be eliminated by filler welding.

AA. Elbow Assembly (17-110/170)

(1) Visual inspection

- (a) Check that the flange tapered surface is free from scratches or other surface deteriorations, and that chrome plating is in good condition.

Otherwise, rework tapered surface chrome plating according to REP 17-110-1.

(2) Inspection for soundness

- (a) Cracks developing in weld beads are unacceptable and must be eliminated by welding according to REP 17-110-2.

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 322

Jun 15/82



OLYMPUS 593

MK.610-14-28  
OVERHAUL



AB. Exhaust Elbow Assembly (17-150/210)

(1) Visual inspection

- (a) Make sure that the valve operates properly.  
If not, renew it.

(2) Inspection for soundness

- (a) Cracks developing in weld beads are unacceptable and must be eliminated by filler welding according to REP 17-150-1.

AC. Pin Assy (17-270B)

(1) Visual inspection

- (a) Check that the pin external diameter is free from scratches and other surface damages.  
Otherwise, eliminate them using emery cloth.
- (b) Check that the bushing tight fitted on the pin does not rotate freely.  
Otherwise, discard the assembly.

(2) Dimensional inspection

- (a) Check that the external diameter of the bushing is greater than 12,68 mm (0.4992 in.).  
Otherwise, scrap the part.

AD. Pin Assy (17-310B)

(1) Visual inspection

- (a) Check that the pin external diameter is free from scratches and other surface damages.  
Otherwise, eliminate them using emery cloth.
- (b) Check that the bushing, tight fitted on the pin, does not rotate freely.  
Otherwise, discard the assembly.

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 323

Jun 15/82



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(2) Dimensional inspection

- (a) Check that the external diameter of the bushing is greater than 9,49 mm (0.3736 in.).

Otherwise, scrap the part.

AE. Bushing (17-320)

(1) Visual inspection

- (a) Check that the external diameter together with bushing bore are free from scratches and other surface damage.

Otherwise, eliminate them using an emery cloth.

(2) Dimensional inspection

- (a) Check that the external diameter is greater than 9,49 mm (0.3736 in.) and bore is less than 6,37 mm (0.2508 in.).

If not, scrap the part.

AF. Bushings (17-370/380/390/400)

(1) Visual inspection

- (a) Check that the external diameter and the internal diameter are free from scratches and other surface damage.

Otherwise, eliminate them using emery cloth.

(2) Dimensional inspection

- (a) Check that the external diameter is greater than 12,68 mm (0.4992 in.) and that the internal diameter is less than 9,56 mm (0.3764 in.).

Otherwise, scrap the part.

AG. Link Assembly (18-10)

(1) Visual inspection

- (a) Manually make sure that ball joint is free in rotation.

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 324

Jun 15/82



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Otherwise, renew the ball joint end-piece.

(2) Dimensional inspection

- (a) Check that link bores are meeting the following dimensions.

Ball joint bore 6,35 mm dia. (0.2500 in.) max.

Bushing housing 9,45 mm (0.3756 in.) max.

Beyond these tolerances scrap the damaged part.

AH. Bushing (18-60/70)

(1) Visual inspection

- (a) Check that the internal and external diameters of bushing are free from scratches and other surface damage.

Otherwise, eliminate these defects using emery cloth.

(2) Dimensional inspection

- (a) Check that the diameters of bushings comply with following dimensions :

internal diameter 6,37 mm (0.2508 in.) max.

upper diameter 9,516 mm (0.3746) min.

- (b) Otherwise, scrap the bushing.

AI. Elbow Assembly (18-110/190)

(1) Visual inspection

- (a) On elbow (18-110) manually make sure that the ball joint is free in rotation.

Otherwise, renew ball joint.

- (b) Make sure the heat resistant varnish on the conical flange seating is in good condition. Otherwise, recondition the varnish in accordance with the instructions of REP 18-110-1 (silver plating) or of REP 18-110-4 (varnishing).

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 325

Apr 30/93





OLYMPUS 593

MK.610-14-28

OVERHAUL



## (2) Inspection for soundness

- (a) Cracks developing in weld beads are unacceptable and must be eliminated by filler welding.

## (3) Dimensional inspection

- (a) Check that ball joint bore is not greater than 6,35 mm dia. (0.2500 in.).  
Otherwise, renew the ball joint.

## AJ. Isolation Valve Bracket (18-270/290)

CAUTION : VALVE BRACKET MUST SYSTEMATICALLY BE SENT TO REPAIR TO REWORK ANTI-SEIZING VARNISH ON BALL JOINT AND BALL JOINT HOUSING ACCORDING TO REP 18-270-1.

## (1) Visual inspection

- (a) Manually make sure that the ball joint is free in rotation.  
Otherwise, renew ball joint.

## (2) Dimensional inspection

- (a) Check that ball joint bore is not greater than 12,02 mm (0.4732 in.).  
If not, scrap the part.
- (b) Check that the clearance between ball joint and its housing is not greater than 0,1 mm (0.0039 in.) with respect to the diameter.  
Otherwise, renew ball joint/housing assembly.

## AK. Tube Assembly (18-340/430)

## (1) Visual inspection

- (a) Make sure the heat resistant varnish on the conical flange seating is in good condition.  
Otherwise, recondition the varnish in accordance with the instructions of REP 18-340-1 (silver plating) or of REP 18-340-4 (varnishing).

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 326

-Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Check that spherical end-piece chrome plating is in good condition.

If not, rework chrome plating according to REP 18-340-2.

(2) Inspection for soundness

- (a) Cracks developing in weld beads are acceptable and must be eliminated by filler welding according to REP 18-340-3.

AL. Yoke Assembly (18-560)

(1) Dimensional inspection

- (a) Check that bushing bores are not greater than 6,37 mm (0.2508 in.).

Otherwise, renew bushings.

AM. Pivot (18-660)

(1) Visual inspection

- (a) Check that pivot is free from scratches or other surface damages.

Otherwise, smooth down by using an emery cloth within dimensional limits.

(2) Dimensional inspection

- (a) Check that pivot diameter is not less than 11,97 mm (0.4715 in.).

Otherwise, scrap the part.

AN. Nut (19-40/140)

(1) Visual inspection

- (a) Check that nut silver plating is correct.

Otherwise, rework silver plating according to REP 19-40-1.

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 327  
Jun 15/82



OLYMPUS 593

MK.610-14-28

OVERHAUL



AO. Spherical Bearing (19-90/190)

(1) Dimensional inspection

- (a) Check that spherical bearing dimensions comply with the following :

spherical dia. : 12,68 mm (0.4992 in.) min.

bore : 6,35 mm (0.2500 in.) max.

If these values are not respected, scrap the part.

AP. Pipe Assembly (19-100/200)

CAUTION : THE PIPE ASSEMBLY MUST SYSTEMATICALLY BE SENT TO REPAIR TO REWORK SPHERICAL BEARING HOUSING ANTI-SEIZING VARNISH ACCORDING TO REP 19-100-1.

(1) Visual inspection

- (a) Make sure the heat resistant varnish on the conical flange seating is in good condition. Otherwise, recondition the varnish in accordance with the instructions of REP 19-100-2 (silver plating) or of REP 19-100-4 (varnishing).

(2) Inspection for soundness

- (a) Cracks developing in weld beads are unacceptable and must be eliminated by filler welding according to REP 19-100-3.

(3) Dimensional inspection

- (a) Check that flange spherical bore is not greater than 12,72 mm (0.5008 in.).

Otherwise, store the pipe pending repair.

AQ. Rod Assembly (19-210/290/410)

(1) Visual inspection

- (a) Manually, make sure that ball joint is free in rotation.

Otherwise, renew swivel end-piece.

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

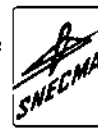
Page 328

Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(2) Dimensional inspection

- (a) Check that rod bores are within the following values :

balljoint bore : 6,35 mm (0.2500 in.) max.

bushing housing : 12,72 mm (0.5008 in.) max.

Beyond these values, renew damaged component.

AR. Pin Assy (19-250B/450B)

(1) Visual inspection

- (a) Check that the pin external diameter is free from scratches and other surface damages.

Otherwise, eliminate them using emery cloth.

- (b) Check that the bushing tight fitted on the pin does not rotate freely.

Otherwise, discard the assembly.

(2) Dimensional inspection

- (a) Check that the external diameter of the bushing is greater than 9,492 mm (0.3737 in.).

Otherwise, scrap the part.

AS. Bushings (19-370/380/490/500)

(1) Visual inspection

- (a) Check that the external diameter of the bushing is free from scratches or other surface defects.

Otherwise, eliminate these defects using emery cloth.

(2) Dimensional inspection

- (a) Check that external diameter is greater than 12,68 mm (0.4992 in.) and that internal diameter is less than 9,45 mm (0.3756 in.).

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 329

Jun 15/82



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Otherwise, scrap the part.

AT. Bushing (19-390/400/510/520)

(1) Visual inspection

- (a) Check that the external diameter of the bushing is free from scratches or other surface defects. Otherwise, eliminate these defects using emery cloth.

(2) Dimensional inspection

- (a) Check that the external diameter is greater than 9,51 mm (0.3744 in.) and that the internal diameter is less than 6,38 mm (0.2512 in.). Otherwise, replace the part.

AU. Support (20-150)

(1) Visual inspection

- (a) Check that the bore accommodating trunnion (20-170) is free from scratches or other surface deterioration. Otherwise, smooth down surface deteriorations within dimensional limits.

(2) Dimensional inspection

- (a) Check that the bore accommodating trunnion is not greater than 25,80 mm (1.0157 in.). Otherwise, recondition bore according to REP 20-150-1.

AV. Trunnion (20-170)

(1) Visual inspection

- (a) Check that chrome plating on spherical diameter and in trunnion bore is in good condition.

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 330

Jun 15/82



OLYMPUS 593

MK.610-14-28

OVERHAUL



If damaged, rework it according to REP 20-170-1.

(2) Dimensional inspection

- (a) Check that spherical diameter is not less than 25,65 mm (1.0098 in.).

Otherwise, rework trunnion chromium plating according to REP 20-170-1.

AW. Slotted Plate (22-20)

(1) Visual inspection

- (a) Make sure that spacer end threads are in good condition.

If not, scrap the part.

(2) Inspection for soundness

- (a) Cracks developing in weld beads are unacceptable and must be eliminated by filler welding.

AX. Welded Housing Assembly (22-30)

(1) Visual inspection

- (a) Check that riveted nuts are in good condition. Should locking torque or nut protection be damaged, renew them.

(2) Inspection for soundness

- (a) Cracks developing in weld beads are unacceptable and must be eliminated by filler welding.

AY. Bracing Assy (22-80/81/160/161/225/226/280/281/355/356/395/396/455/456/495/496)

(1) Visual inspection

- (a) Check condition of floating anchor nuts.

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 331

Jun 15/82



OLYMPUS 593

MK.610-14-28

OVERHAUL



Any deterioration on silver plating, locking torque or spring flexibility is inadmissible and require replacement of these nuts.

AZ. Plate, Blanking Assy (22-85/86/165/166/230/231/285/286/360/361/400/401/460/461/500/501)

(1) Visual inspection

- (a) Check the state of blanking plate around the attachment points at the intersection between rear frame and vertical panel of twin secondary assembly.

If there is deterioration or tearing away of metal, repair according to REP 22-85-2.

(2) Inspection for soundness

- (a) Cracks developing in weld beads or in bending areas are inadmissible and must be fill-up welded according to REP 22-85-1.

BA. Bracket (23-10/90/170/250 and 23-11/91/171/251)

(1) Visual inspection

- (a) Check that brackets are not distorted.  
Otherwise, scrap them.

- (b) Check that nuts are in good condition.

If locking torque or nut protection are damaged, renew them according to REP 23-10-1.

BB. Link Assembly (24-10)

(1) Visual inspection

- (a) Manually, check that ball joint is free in rotation.

Otherwise, renew ball joint.

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 332

Jun 15/82



OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN FRANCE

(2) Dimensional inspection

- (a) Check that link bores are within the following dimensions :

bushing bores : 7,96 mm dia. (0.3134 in.) max.

ball joint bore : 7,94 mm dia. (0.3125 in.) max.

Beyond these values, renew bushings or ball joint end-piece.

BC. Bushing (24-170/180)

(1) Visual inspection

- (a) Check that external diameter of bushing is free from scratches or other surface defects.

Otherwise, eliminate defects using emery cloth.

(2) Dimensional inspection

- (a) Check that external diameter is greater than 7,96 mm (0.3134 in.).

Otherwise, scrap the part.

BD. Hex Head Bolt (24-50/100)

(1) Visual inspection

- (a) Check that bolt is free from scratches and other surface damages.

Otherwise, eliminate them using an emery cloth within dimensional limits.

(2) Dimensional inspection

- (a) Check that bolt diameter is not less than 7,91 mm (0.3115 in.).

If not, scrap bolt.

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 333

Jun 15/82





OLYMPUS 593

MK.610-14-28  
OVERHAUL



BE. Ballscrew Gearbox Fitting Support (25-10/90/170/250/330/390)

(1) Visual inspection

- (a) Check that ball joint is in good condition. It must be freely operable by hand. Chrome plating must be in good condition.

If not, renew ball joint.

(2) Dimensional inspection

- (a) Check that ball joint bore is not greater than 12,7 mm (0.5000 in.).

Otherwise, renew ball joint according to REP 25-10-1.

BF. Nut Plate Assembly (25-40/120/200/280)

(1) Visual inspection

- (a) Deleted.

BG. Pivot (29-20)

(1) Visual inspection

- (a) Check that the bearing surfaces of the pivot are free from scratches or other surface defects.

If not eliminate these defects using emery cloth and within dimensional limits.

(2) Dimensional inspection

- (a) Check that pivot dimensions comply with the following :

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 334

Apr 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



- 1 Centering diameter of trunnion 29-30 :  
11,096 mm min. (0.4368 in.).
- 2 Centering diameter of pivot in twin secondary  
assembly : 7,91 mm min. (0.3114 in.).

- (b) If dimensions do not comply with these tolerances,  
withdraw part from service pending repair.

BH. Trunnion (29-30)

(1) Visual inspection

- (a) Check that trunnion bores are free from scratches  
or other surface defects.
- (b) If not, smooth using emery cloth and within  
dimensional limits.

(2) Dimension inspection

- (a) Check that the bores are less than 11,15 mm in  
diameter (0.4390 in. dia.).
- (b) If not, withdraw the part from service pending  
the establishment of a repair procedure.

BI. Harness, Primary Nozzle Area Transducer (30-1)

(1) Visual inspection

- (a) Visually inspect all the parts providing for  
electrical connections.

Scrap systematically the components showing the  
following defects :

- components showing overheating marks,
- ripped (torn) sheathes,
- wires with defective insulating material,
- wires with strands severed at the crimped, end  
of pins/sockets,

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 335

Jun 15/82



OLYMPUS 598

MK.610-14-28  
OVERHAUL



- connector nuts distorted due to successive tightenings,
- pins/sockets showing carbon deposits.

78-13-01

TWIN SEC. NOZZLE ASSY. - REMOVABLE PARTS

Page 336

Jun 15/82



OLYMPUS 593

MK.610-14-28

OVERHAUL



INSPECTION

## BASIC TWIN SECONDARY NOZZLE

### 1. Introduction

This chapter gives all the pertinent information to carry out the visual, soundness and dimensional inspections of the basic twin secondary nozzle.

These information are arranged in the following order :

#### Paragraph 2 - Identification

This paragraph provides for identification of the secondary nozzle basic components and gives the material constituting each component as well as the thickness of parts manufactured from sheet metal material.

#### Paragraph 3 - Restricted areas

This paragraph defines the structural areas for which the mechanical strength is the essential criterion and to which any damage and repair might affect the useful life of the twin secondary nozzle.

#### Paragraph 4 - Inspection methods

This paragraph defines the visual, aural and radiographic methods used for inspection of the twin secondary nozzle.

#### Paragraph 5 - Permissible damage

This paragraph specifies the damage extents beyond which it is necessary to comply with a specific repair scheme.

PRINTED IN FRANCE

**78-13-01**

BASIC TWIN SEC. NOZZLE - INTRODUCTION

Pages 301/302

Jan 15/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## 2. Identification

This paragraph defines the secondary nozzle basic components.

These are classed in two categories :

- Secondary nozzle structure
- Secondary nozzle inner and outer stressskin panels.

### A. Secondary nozzle structure

The structural components are defined on figures 301 through 306.

For each component is given :

- the material identification (P xxxx type, refer to the SNECMA's Products File, or AFNOR type for forged and/or cast parts)
- the material thickness for the parts manufactured from sheet metal.

### B. Secondary nozzle inner and outer stressskin panels

These components are defined on figures 307 through 309.

For each component is given :

- the material identification (P xxxx type, refer to the SNECMA's Products File).
- the panel thickness

NOTE : In the case of a chemically milled panel, it is illustrated separately so that to outline on a diagram the thickness variations on both its internal and external face sheets. These information are necessary in order to ensure correct assessment of damage.

### C. Twin secondary nozzle effectivity

This paragraph "Identification" includes all the variants of twin secondary nozzles; as a result, the effectivity is indicated on all the pages wherein differences between secondary nozzles appear.

**78-13-01**

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

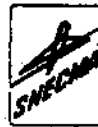
Page 301

Jan 15/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Effectivity is expressed as follows :

(1) Summary of all the secondary nozzle variants.

This information is given by Table I and is stated as follows :

Example : 

A	Secondary nozzles	}	IPL Codification
B	Secondary nozzles		
C	All secondary nozzles but those indicated in <span style="border: 1px solid black; padding: 0 5px;">A</span> and <span style="border: 1px solid black; padding: 0 5px;">B</span> .		

(2) On the illustrations :

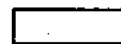
- (a) In the case where any one page "Identification" is applicable to all the secondary nozzles, the effectivity is not indicated..
- (b) In the case where any one page "Identification" includes pieces of information relative to different variants of secondary nozzles, the following cases are to be taken into account :

1st case - The concerned zone keeps the same graphic representation, but certain parts are manufactured from an other material or incorporate minor changes thus requiring complementary data in the identification table.

In this case, effectivity is indicated by :

- placing the framed letter near the part's identification index
- adding, below the previously existing index, a new index followed by the framed letter corresponding to the variant

Example :



20

A

Part's old configuration corresponding to nozzles variant A

100

C

Part's new configuration corresponding to all nozzles except variant A

**78-13-01**

BASIC TWIN SEC. NOZZLE- IDENTIFICATION

Page 302

Jan 15/76



OLYMPUS 593

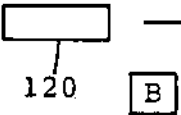


MK.610-14-28

OVERHAUL



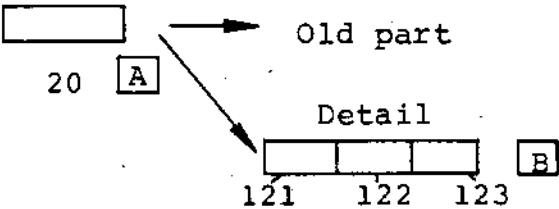


2nd case - In the concerned zone, a new component, specific to one nozzle or a batch of nozzles, is incorporated.

In this case, the effectivity is indicated by placing the framed letter after the new part's index.

Example :  New part.  
120  New index applicable to the nozzle variant 


3rd case - In the concerned zone, one part changes in graphic representation and may embody new components.

In this case, a detail specific to the appropriate effectivity will be placed next to the modified part.

Example :  Old part  
20  Detail  
121 122 123 

4th case - A major change in configuration which cannot be contained within a detailed view.

In this case, a complete sheet is provided for each variant, the effectivity being placed next to the illustration title.

Example : "Inboard Side Wall" 

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 303

Jan 15/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Table I - Twin Secondary Nozzles Variants

SYMBOLS	TWIN SECONDARY NOZZLES
A	FROM SECONDARY NOZZLE N°309 TO 314
B	_____ N°315 TO 334
C	_____ N°309 TO 318,320,321 AND 324 TO 326
D	_____ N°317 TO 334
E	_____ N°309 TO 321 AND 324 TO 326

PRINTED IN FRANCE

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 304

Nov 30/77



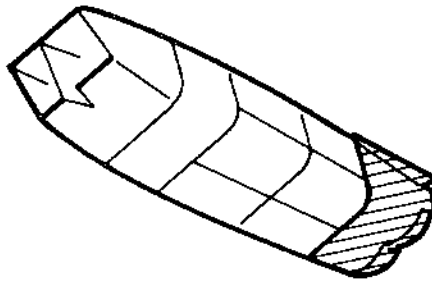


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE



NOTE : LH SECONDARY NOZZLE SHOWN  
RH SECONDARY NOZZLE, OPPOSITE HAND

INBOARD SIDE WALL  
(SEE FIG. 302)

UPPER SECTION  
(SEE FIG. 304)

THROAT SECTION  
(SEE FIG. 306)

FORWARD

LOWER SECTION  
(SEE FIG. 305)

CENTRAL WALL  
(SEE FIG. 303)

OUTBOARD SIDE WALL  
(SEE FIG. 302)

Twin Secondary Nozzle Structure - Identification  
Figure 301

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 305  
Nov 30/77



OLYMPUS 593

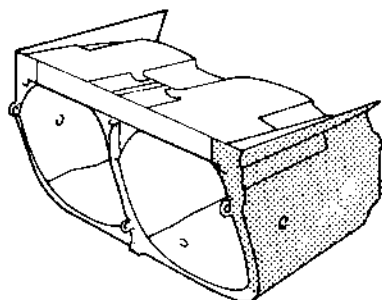
MK.610-14-28

OVERHAUL



NOTE : LH SECONDARY NOZZLE OUTBOARD  
SIDE WALL, SHOWN

RH SECONDARY NOZZLE OUTBOARD  
SIDE WALL, OPPOSITE HAND.



ZONE "A"  
(SEE SHEET 2)

XMB  
1732.500

XMB  
1763.500

XMB  
1790.000

ZMB  
19.042

ZMB  
38.726

ZMB  
- 18.413

ZMB  
- 28.884

ZONE "B"  
(SEE SHEET 3)

FORWARD



XMB  
1750.818

XMB  
1775.610

XMB  
1801.250

ZONE "C"  
(SEE SHEET 4)

Twin Secondary Nozzle - Identification  
Figure 302 (Sheet 1 of 25)

PRINTED IN FRANCE

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 306

Nov 30/77

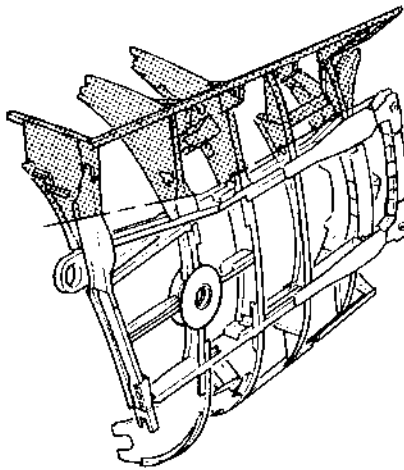


OLYMPUS 593

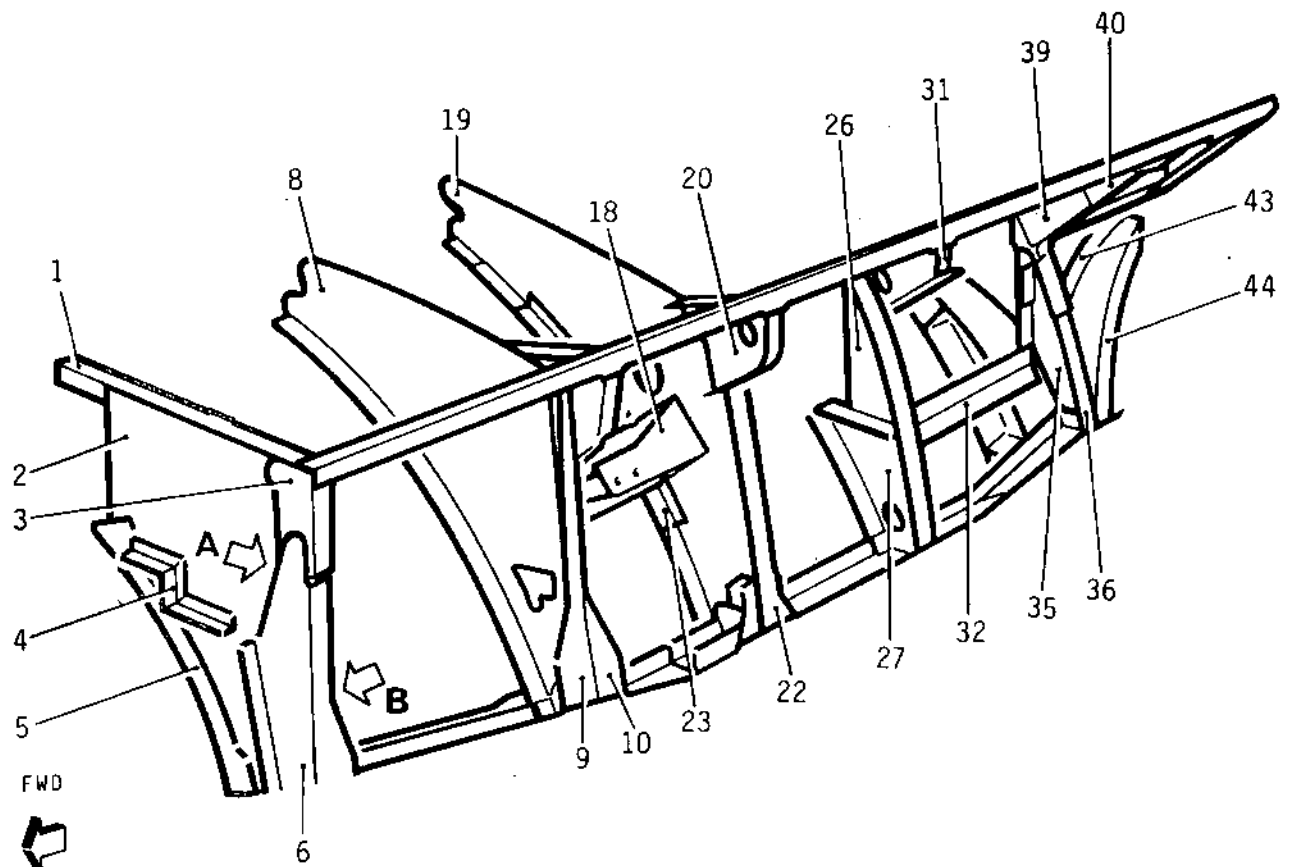
MK.610-14-28  
OVERHAUL



OUTBOARD SIDE WALL  
ZONE "A"



PRINTED IN FRANCE



Twin Secondary Nozzle - Identification  
Figure 302 (Sheet 2 of 25)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 307

Nov 30/77



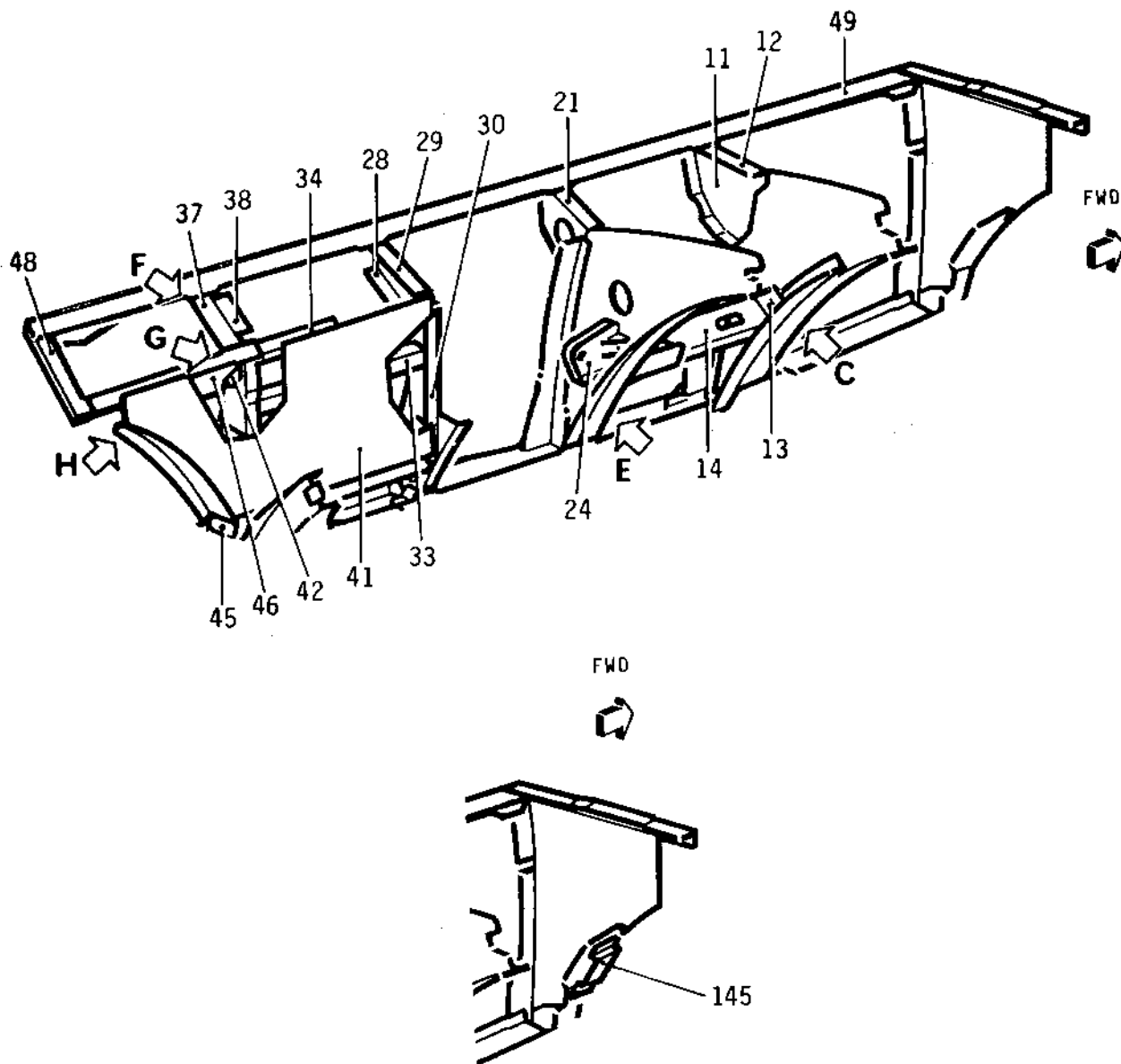
OLYMPUS 593

MK.610-14-28

OVERHAUL



OUTBOARD SIDE WALL  
ZONE "A"



PRINTED IN FRANCE

Twin Secondary Nozzle - Identification  
Figure 302 (Sheet 3 of 25)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

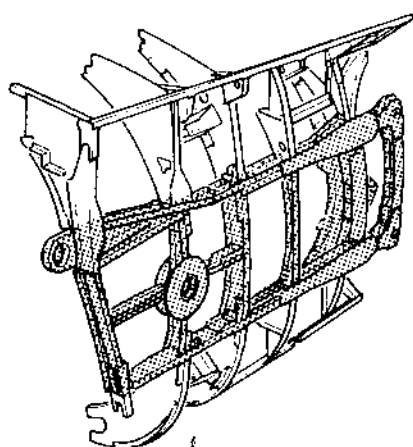
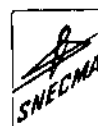
Page 308

Nov 30/77

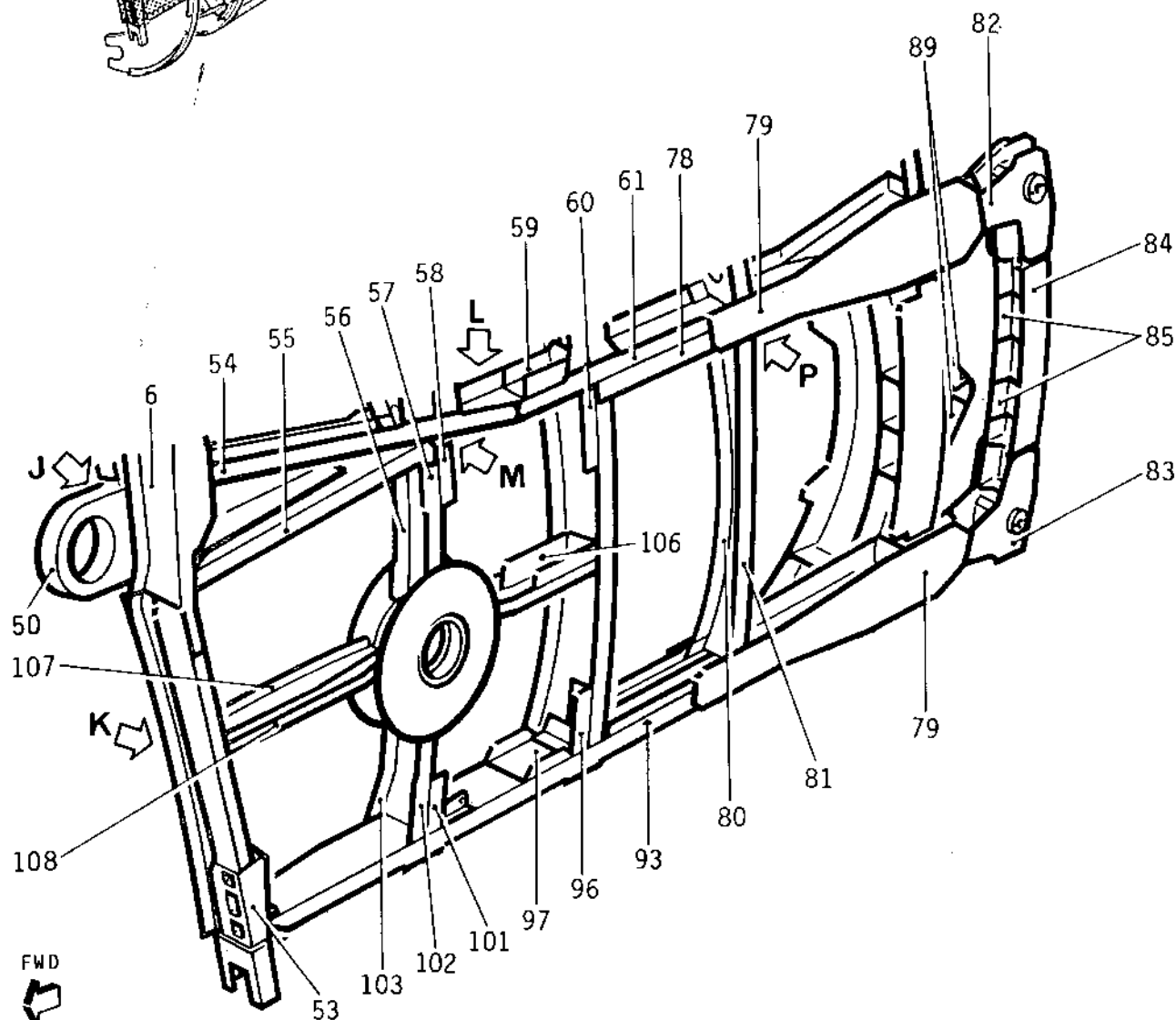


OLYMPUS 593

MK.610-14-28  
OVERHAUL



OUTBOARD SIDE WALL  
ZONE "B"



Twin Secondary Nozzle - Identification  
Figure 302 (Sheet 4 of 25)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 309

Nov 30/77

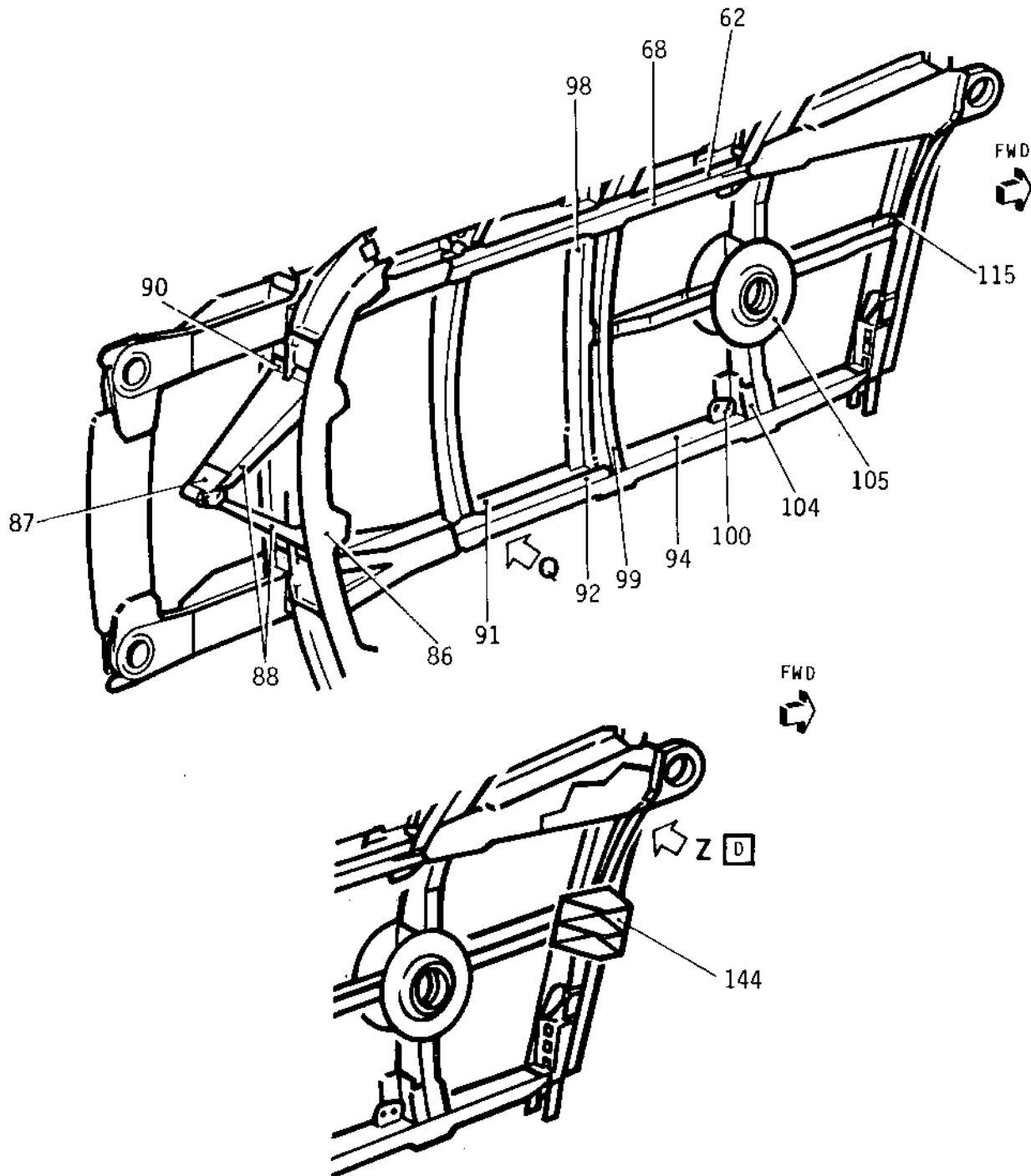


OLYMPUS 593

MK.610-14-28  
OVERHAUL



OUTBOARD SIDE WALL  
ZONE "B"



Twin Secondary Nozzle - Identification  
Figure 302 (Sheet 5 of 25)

PRINTED IN FRANCE

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

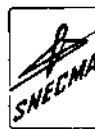
Page 310

Nov 30/77

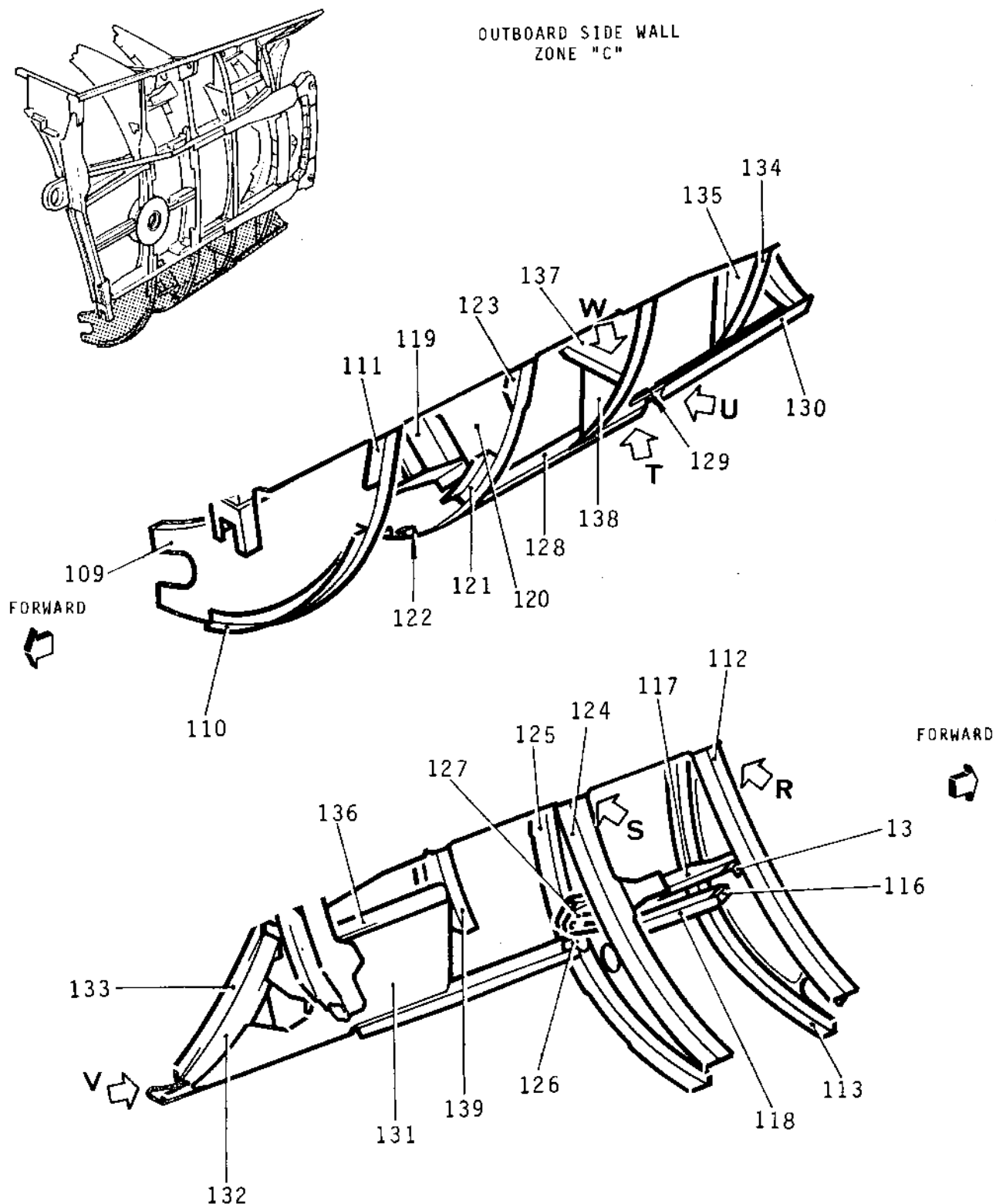


OLYMPUS 593

MK.610-14-28  
OVERHAUL



OUTBOARD SIDE WALL  
ZONE "C"



Twin Secondary Nozzle - Identification  
Figure 302 (Sheet 6 of 25)

78-13-01

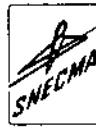
BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 311

Nov 30/77



OLYMPUS 593

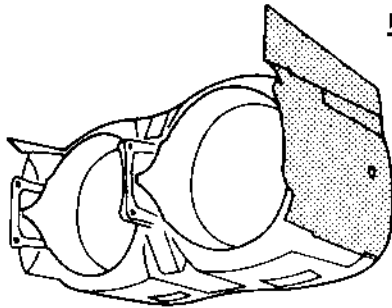


MK.610-14-28

OVERHAUL

NOTE : LH SECONDARY NOZZLE INBOARD  
SIDE WALL, SHOWN

RH SECONDARY NOZZLE INBOARD  
SIDE WALL, OPPOSITE HAND.



ZONE "D"  
(SEE SHEET 6)

XMB  
1790.000

XMB  
1763.500

XMB  
1732.500

FORWARD



ZMB  
- 18.413

ZMB  
- 28.884

ZONE "E"  
(SEE SHEET 7)

ZONE "F"  
(SEE SHEET 8)

ZMB  
- 19.042

ZMB  
- 38.726

XMB  
1801.250

XMB  
1775.610

XMB  
1750.818

Twin Secondary Nozzle - Identification  
Figure 302 (Sheet 7 of 25)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 312

Nov 30/77

PRINTED IN FRANCE



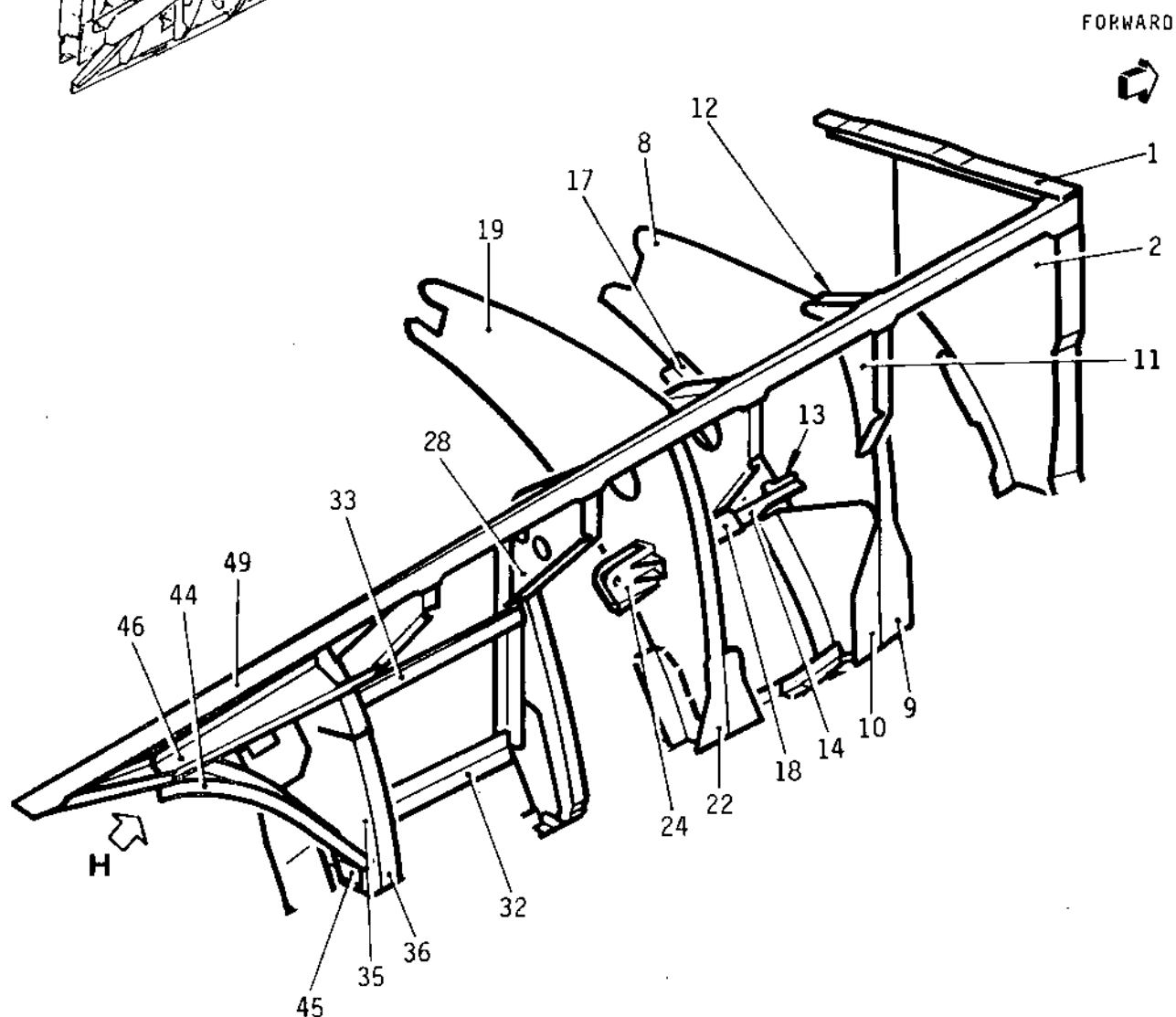
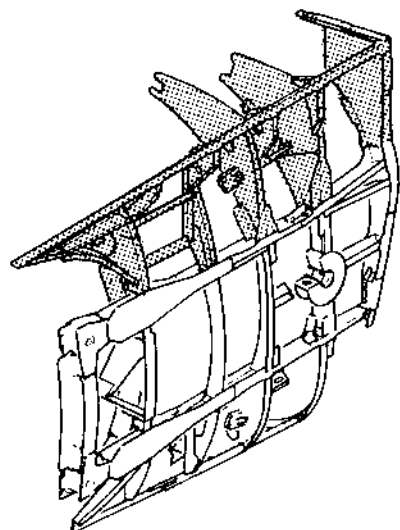


OLYMPUS 593

MK.610-14-28  
OVERHAUL



INBOARD SIDE WALL  
ZONE "D"



Twin Secondary Nozzle - Identification  
Figure 302 (Sheet 8 of 25)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 313

Nov 30/77

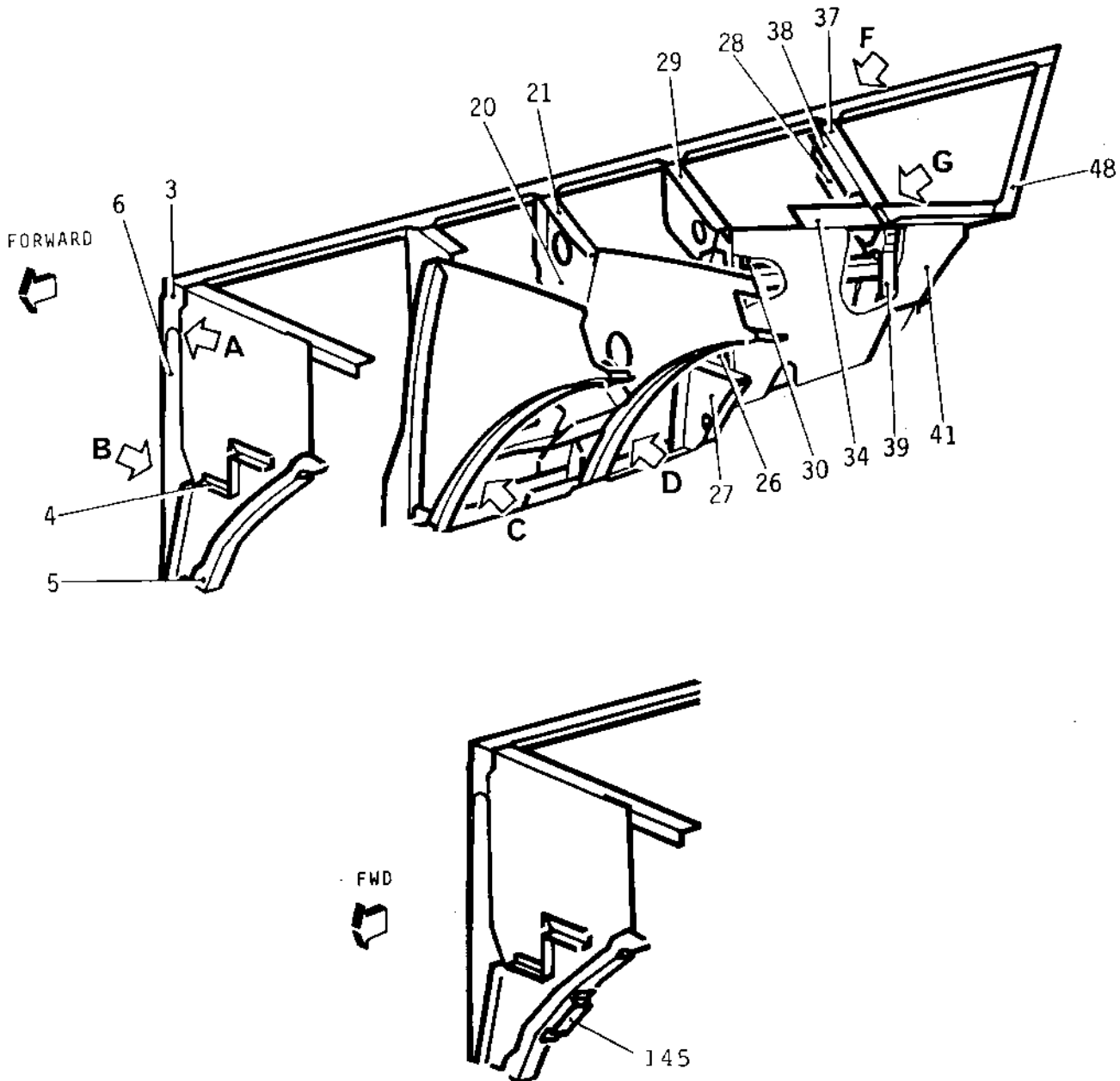


OLYMPUS 593

MK.610-14-28  
OVERHAUL



INBOARD SIDE WALL  
ZONE "D"



PRINTED IN FRANCE

Twin Secondary Nozzle - Identification  
Figure 302 (Sheet 9 of 25)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 314

Nov 30/77



OLYMPUS 593

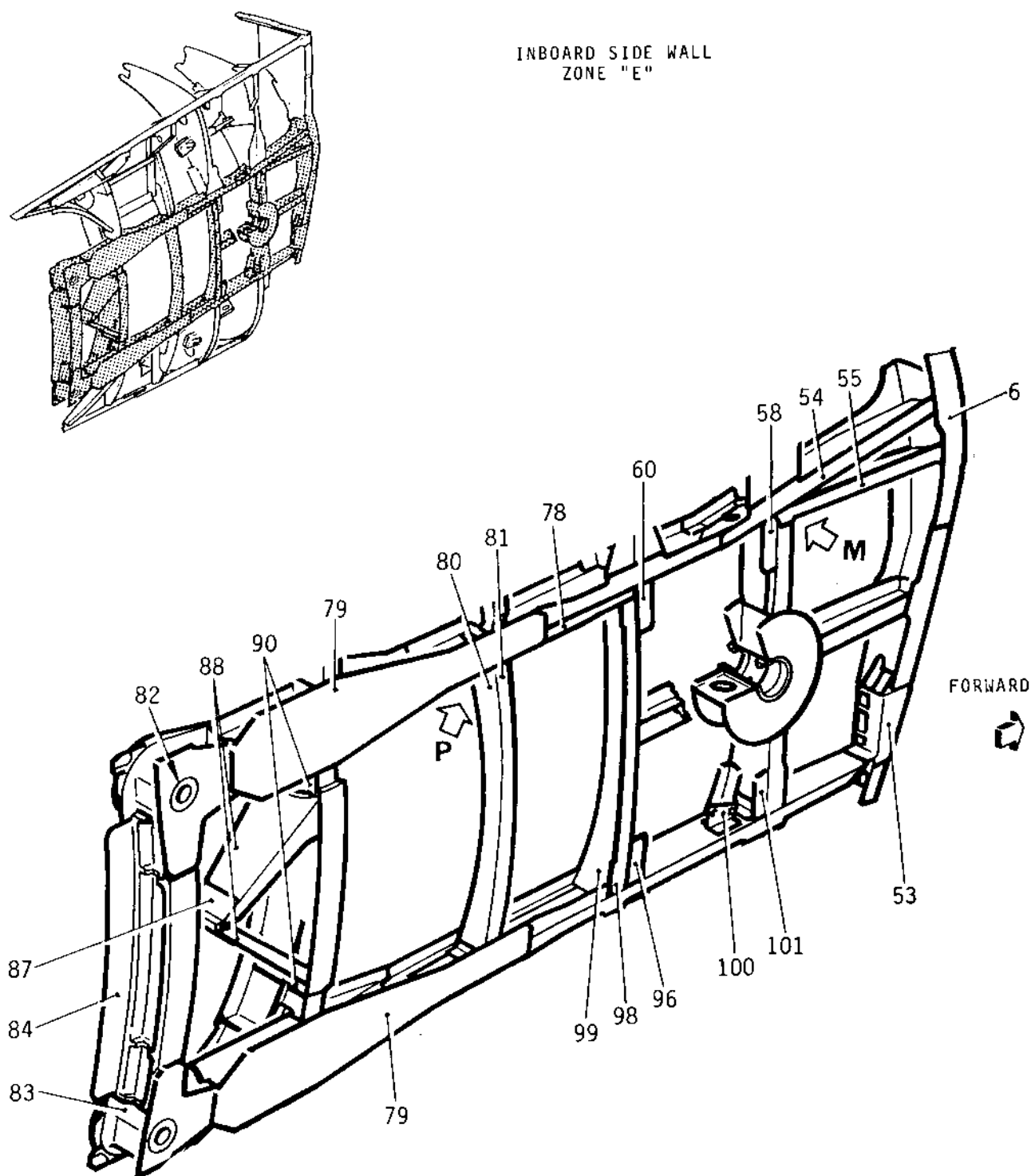
MK.610-14-28

OVERHAUL



INBOARD SIDE WALL  
ZONE "E"

PRINTED IN FRANCE



Twin Secondary Nozzle - Identification  
Figure 302 (Sheet 10 of 25)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 315

Nov 30/77

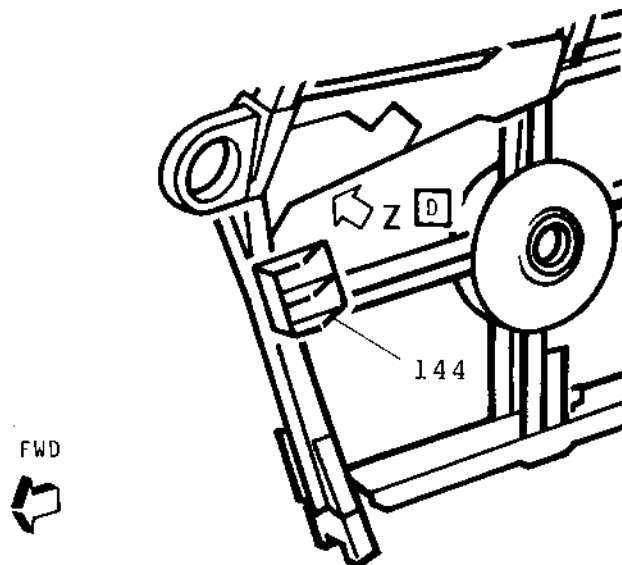
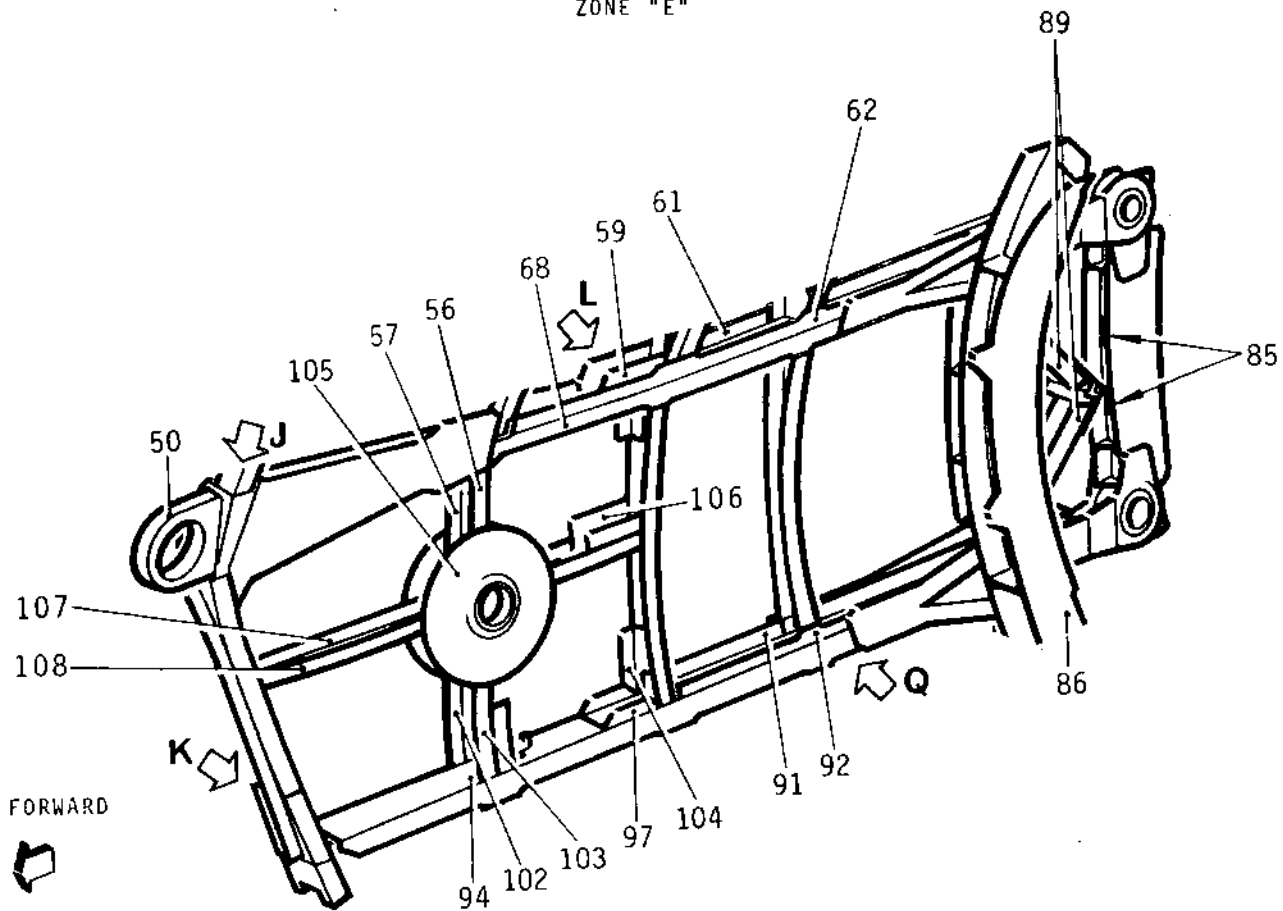


OLYMPUS 593

MK.610-14-28  
OVERHAUL



INBOARD SIDE WALL  
ZONE "E"



Twin Secondary Nozzle - Identification  
Figure 302 (Sheet 11 of 25)

PRINTED IN FRANCE

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 316

Nov 30/77

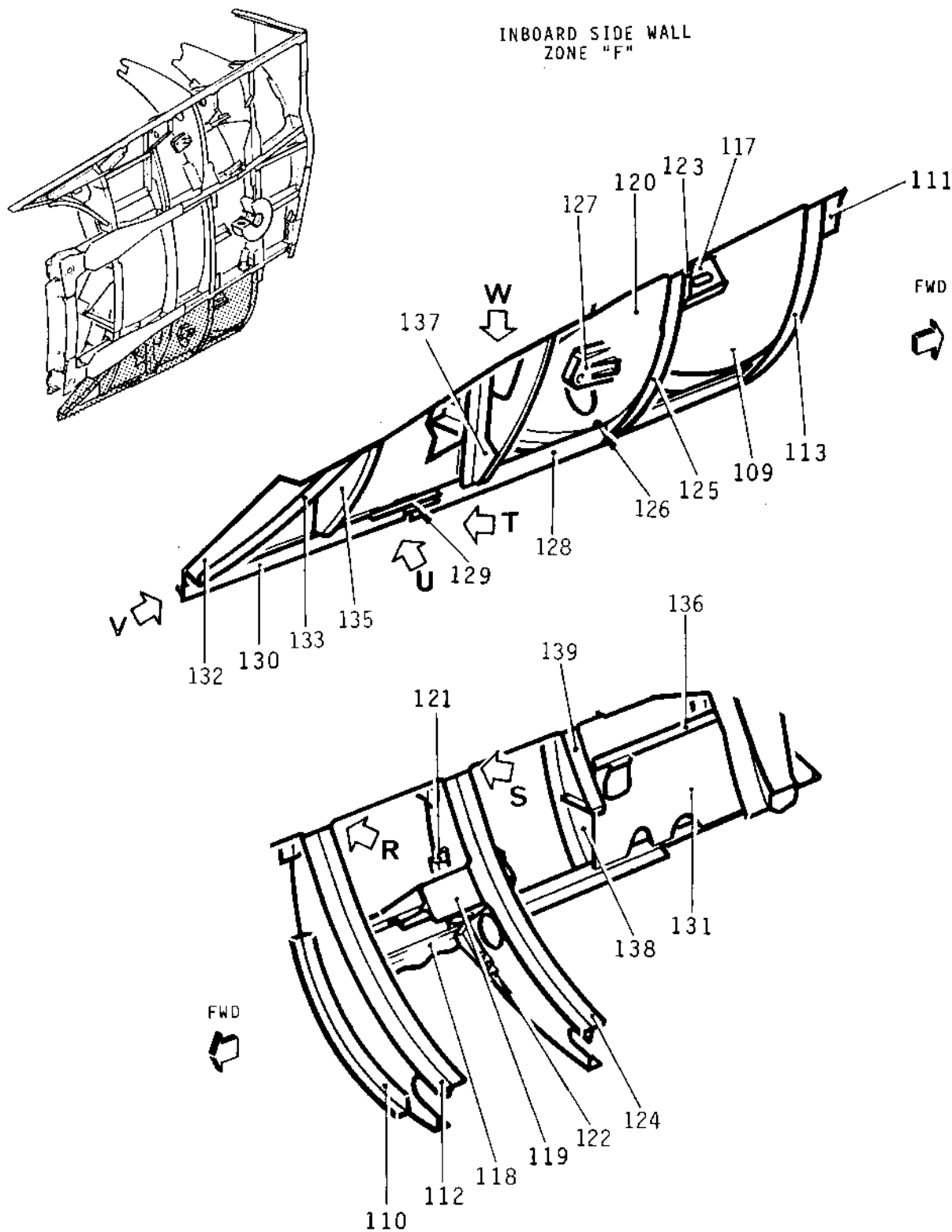


OLYMPUS 593

MK.610-14-28  
OVERHAUL



INBOARD SIDE WALL  
ZONE "F"



Twin Secondary Nozzle - Identification  
Figure 302 (Sheet 12 of 25)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 317

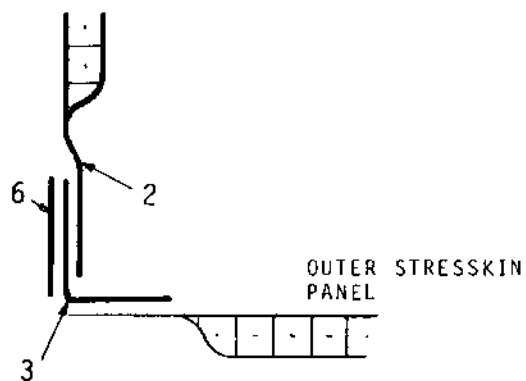
Nov 30/77



OLYMPUS 593

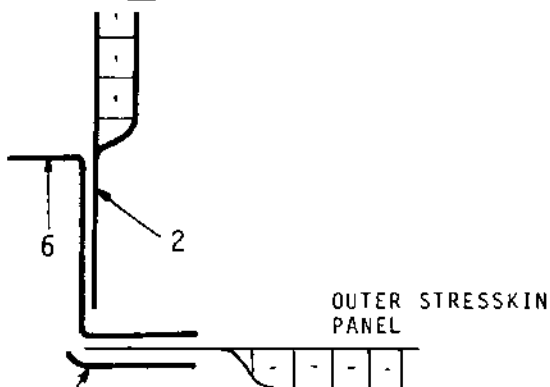
MK.610-14-28

OVERHAUL



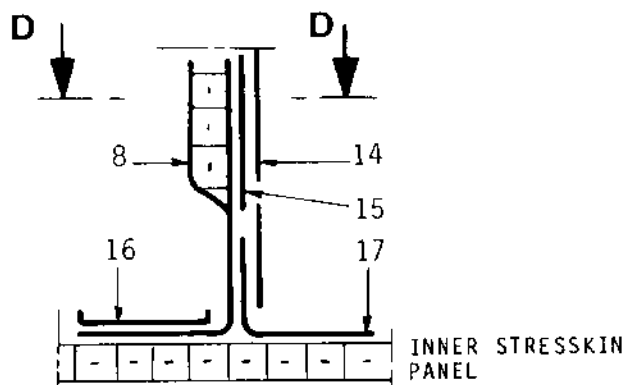
FWD

DETAIL A



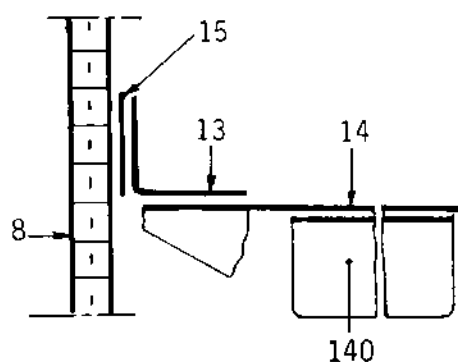
FWD

DETAIL B

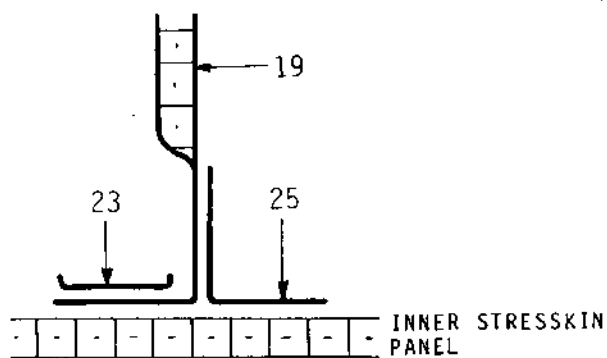


FWD

DETAIL C

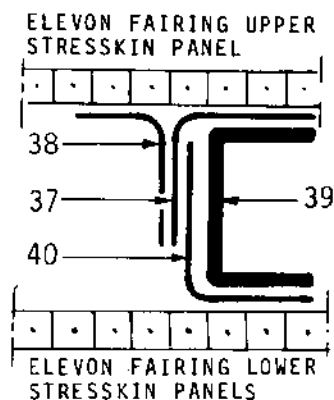


SECTION D



FWD

DETAIL E



FWD

DETAIL F

Twin Secondary Nozzle - Identification  
Figure 302 (Sheet 13 of 25)

PRINTED IN FRANCE

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 318

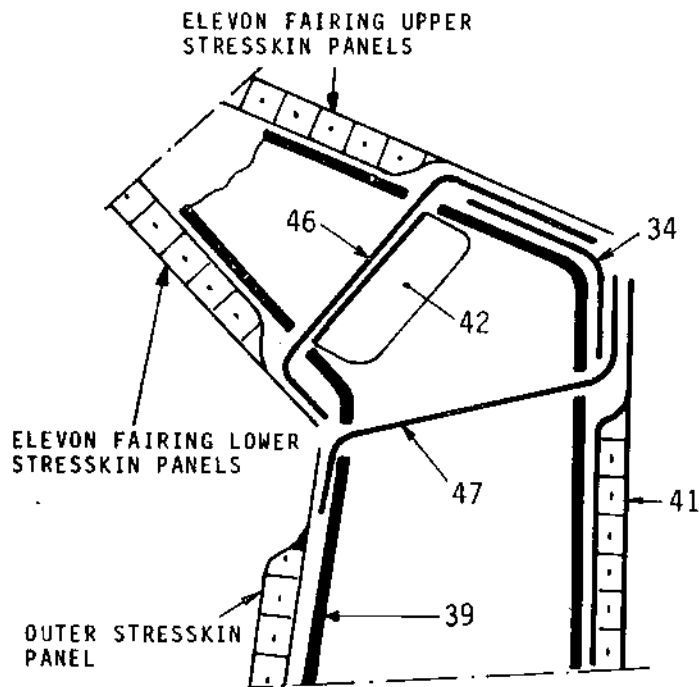
Nov 30/77



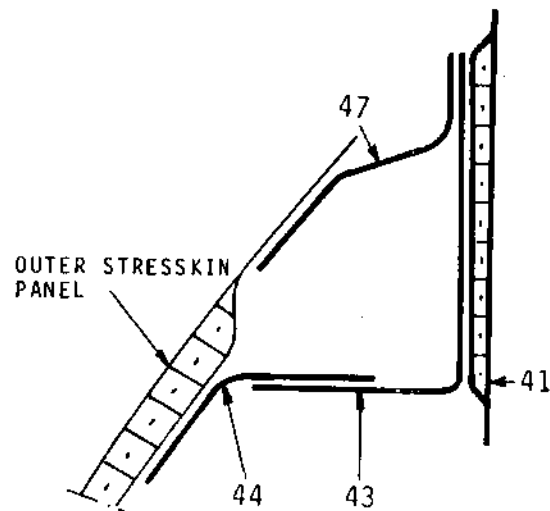
OLYMPUS 593

MK.610-14-28

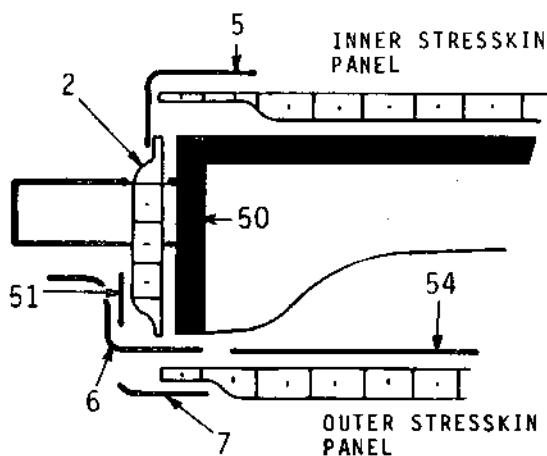
OVERHAUL



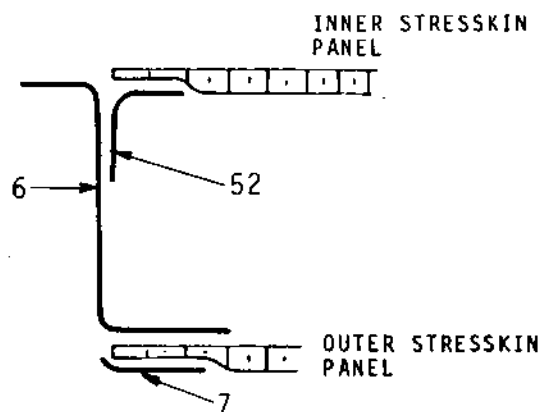
DETAIL G



DETAIL H



DETAIL J



DETAIL K

Twin Secondary Nozzle - Identification  
Figure 302 (Sheet 14 of 25)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 319

Nov 30/77



OLYMPUS 593

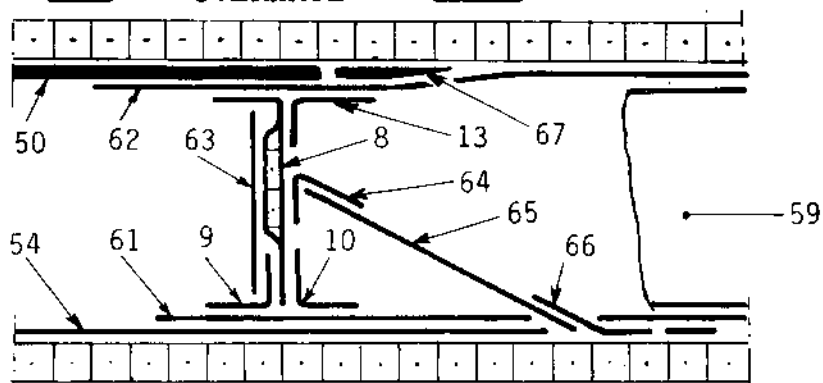
MK.610-14-28

OVERHAUL



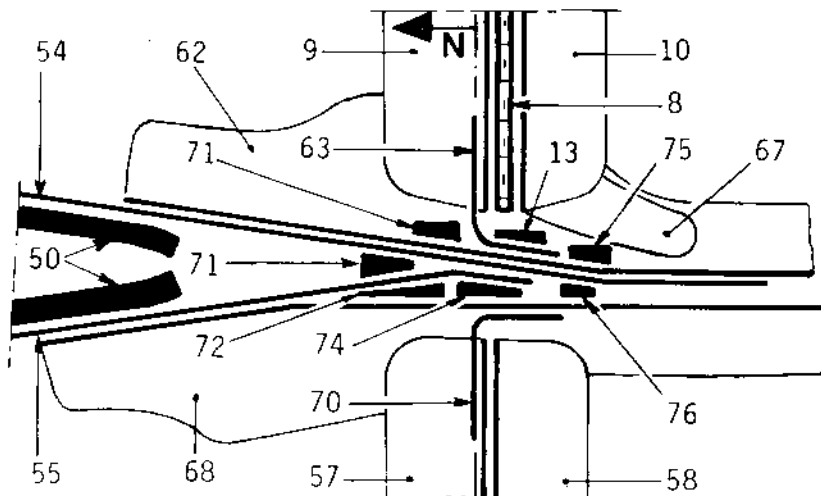
INNER STRESSKIN  
PANEL

OUTER STRESSKIN  
PANEL



← FWD

DETAIL L

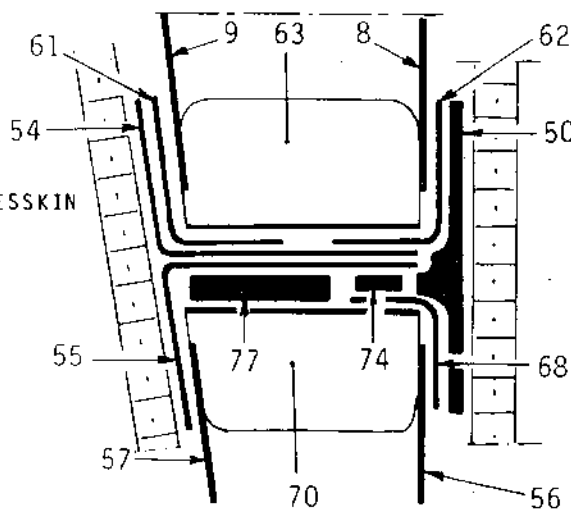


← FWD

DETAIL M

OUTER STRESSKIN  
PANEL

INNER STRESSKIN  
PANEL



↑ UP

DETAIL N

Twin Secondary Nozzle - Identification  
Figure 302 (Sheet 15 of 25)

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

78-13-01

Page 320

Nov 30/77

PRINTED IN FRANCE

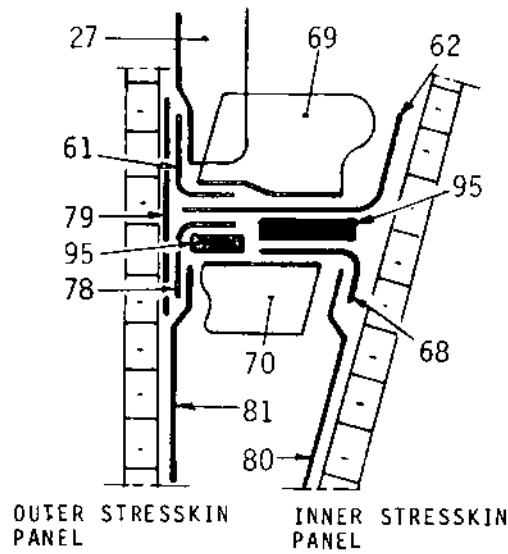


PRINTED IN FRANCE

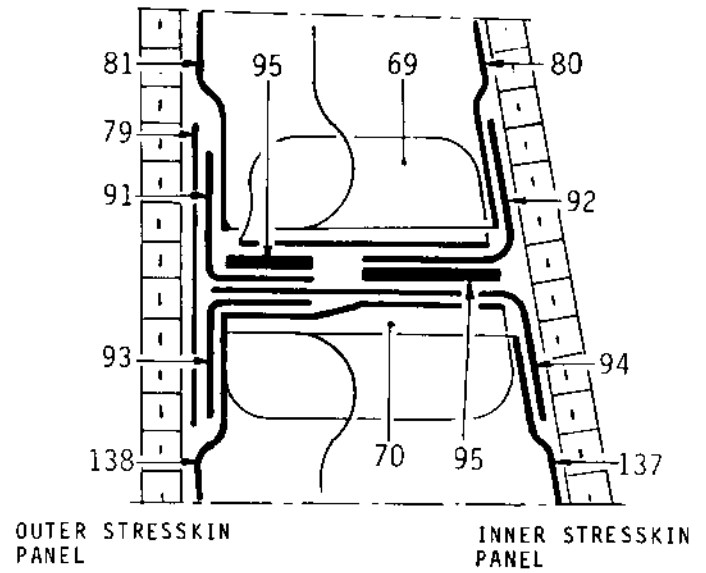


OLYMPUS 593

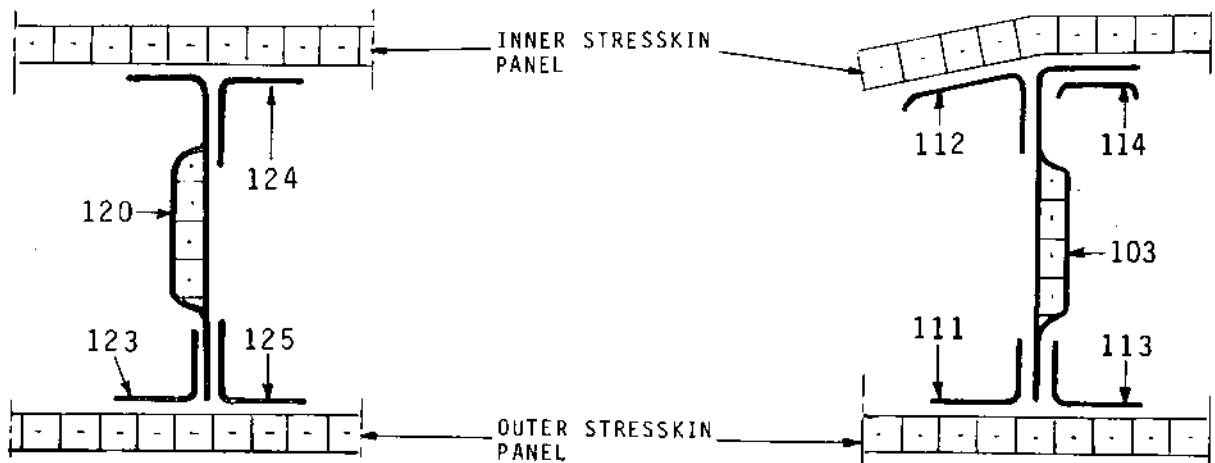
MK.610-14-28  
OVERHAUL



↑ UP  
DETAIL P



↑ UP  
DETAIL Q



← FWD  
DETAIL R

← FWD  
DETAIL S

Twin Secondary Nozzle - Identification  
Figure 302 (Sheet 16 of 25)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 321

Nov 30/77

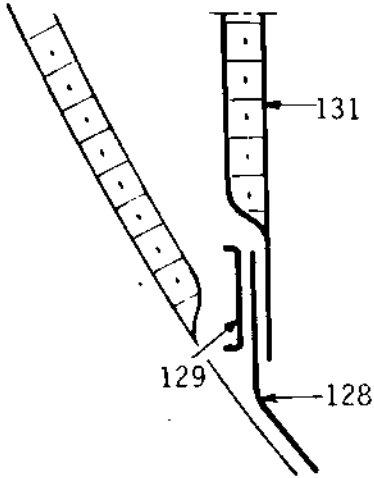


OLYMPUS 593

MK.610-14-28  
OVERHAUL

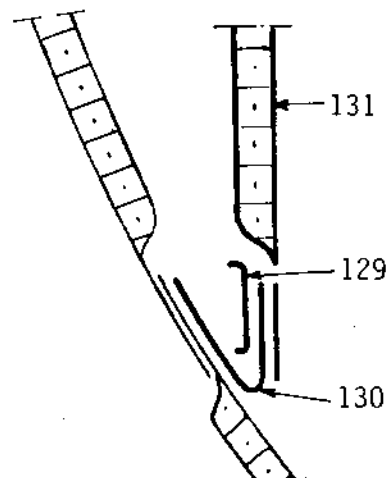


OUTER STRESSKIN  
PANEL



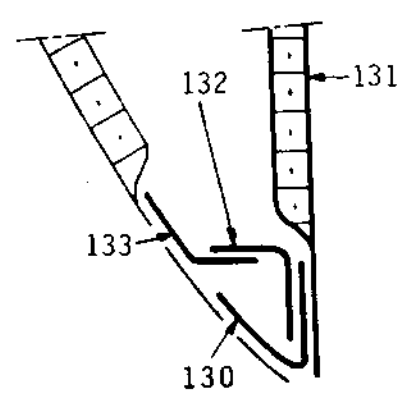
↑ UP  
DETAIL T

OUTER STRESSKIN  
PANEL

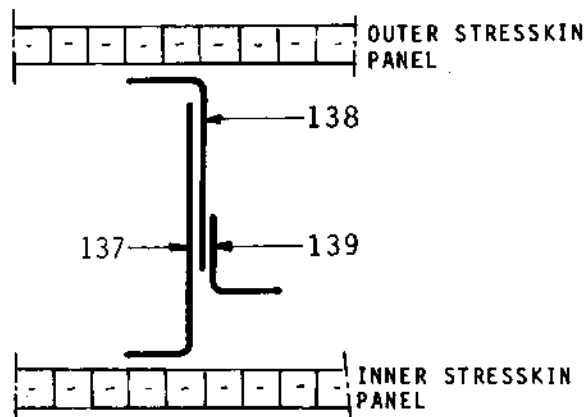


↑ UP  
DETAIL U

OUTER STRESSKIN  
PANEL



↑ UP  
DETAIL V



← FWD  
DETAIL W

PRINTED IN FRANCE

Twin Secondary Nozzle - Identification  
Figure 302 (Sheet 17 of 25)

**78-13-01**

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

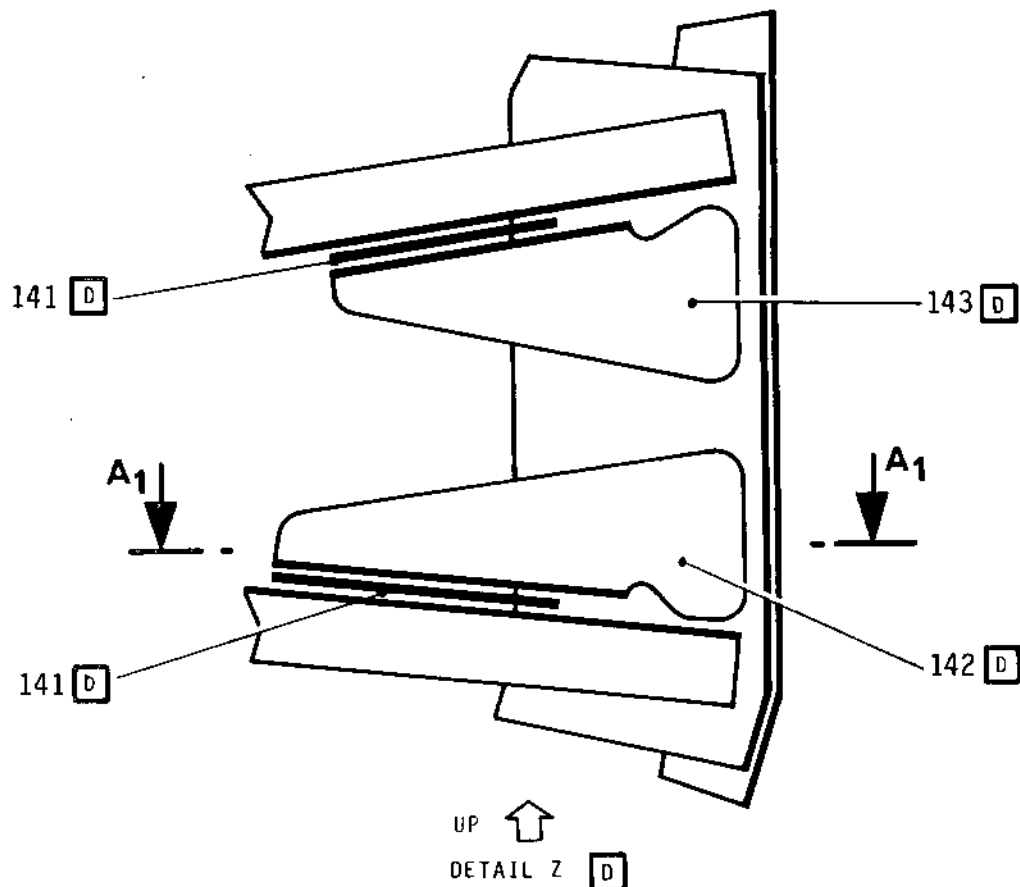
Page 322

Nov 30/77



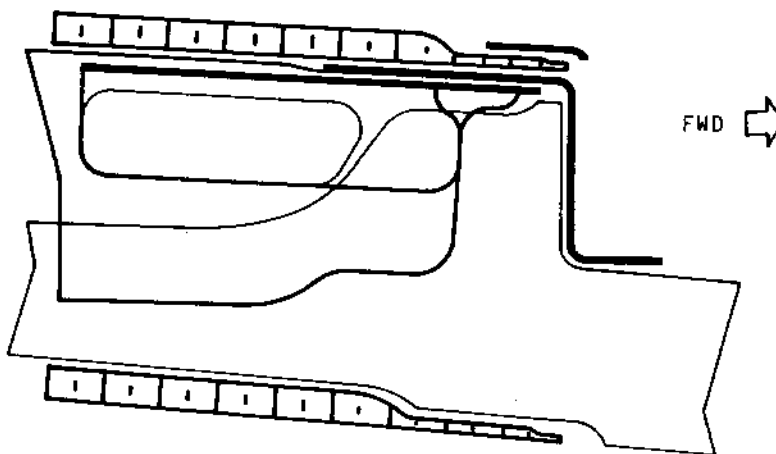
OLYMPUS 593

MK.610-14-28  
OVERHAUL



OUTER STRESSKIN  
PANEL

INNER STRESSKIN  
PANEL



SECTION A1 D

Twin Secondary Nozzle - Identification  
Figure 302 (sheet 18 of 25)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 323

Nov 30/77

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

ITEM NO.	DESCRIPTION	MATERIAL		
		MADE FROM	THICKNESS IN	MM
1	Angle	P3305	0.040	1,0
2	Stresskin Panel (welded)	P3701	0.018	0,5
3	Bracket	P3305	0.050	1,3
4	Angle	P3343	0.050	1,3
5	Angle	P3305	0.050	1,3
6	Seal	P3305	0.050	1,3
7	Rub strip	P3305	0.050	1,3
8	Stresskin panel (welded)	P3701	0.018	0,5
9	Angle	P3305	0.040	1,0
10	Angle	P3305	0.040	1,0
11	Web	P3343	0.040	1,0
12	Angle	P3343	0.040	1,0
13	Clip	P3305	0.050	1,3
14	Beam	P3305	0.070	1,8
15	Shim	P3342	0.063	1,6
16	Channel	P3305	0.063	1,6
17	Channel	P3305	0.063	1,6
18	Fitting	TA6V		
19	Stresskin panel (welded)	P3701	0.018	0,5
20	Web	P3343	0.040	1,0
21	Angle	P3343	0.040	1,0

PRINTED IN FRANCE

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

PRINTED IN FRANCE

ITEM NO.	DESCRIPTION	MATERIAL		
		MADE FROM	THICKNESS IN	MM
22	Angle	P3305	0.040	1,0
23	Channel	P3305	0.040	1,0
24	Fitting	TA6V		
25	Angle	P3305	0.040	1,0
26	Angle	P3305	0.040	1,0
27	Support	P3305	0.040	1,0
28	Angle	P3343	0.040	1,0
29	Angle	P3343	0.040	1,0
30	Angle	P3305	0.040	1,0
31	Angle	P3305	0.040	1,0
32	Intercostal	P3305	0.040	1,0
33	Intercostal	P3305	0.040	1,0
34	Support	P3305	0.040	1,0
35	Web	P3305	0.040	1,0
36	Angle	P3305	0.040	1,0
37	Angle	P3305	0.040	1,0
38	Angle	P3305	0.040	1,0
39	Fitting	Z5CNU17		
40	Angle	P3305	0.040	1,0
41	Stressskin panel (welded)	P3706	0.012	0,3
42	Clip	P3305	0.040	1,0
43	Angle	P3305	0.040	1,0
44	Web	P3322	0.040	1,0

Twin Secondary Nozzle - Identification  
Figure 302 (Sheet 20 of 25)

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 325

Nov 30/77

**78-13-01**



OLYMPUS 593

MK.610-14-28  
OVERHAUL

ITEM NO.	DESCRIPTION	MATERIAL		
		MADE FROM	THICKNESS IN	MM
45	Clip	P3305	0.040	1,0
46	Channel	P3305	0.040	1,0
47	Intercostal	P3305	0.090	2,3
48	Channel	P3305	0.040	1,0
49	Angle	P3340	0.040	1,0
50	Fitting	TA6V		
51	Filler	P3343	0.050	1,3
52	Angle	P3305	0.050	1,3
53	Fitting	TA6V		
54	Angle	P3305	0.050	1,3
55	Angle	P3305	0.050	1,3
56	Angle	P3305	0.040	1,0
57	Angle	P3305	0.040	1,0
58	Clip	P3305	0.040	1,0
59	Fitting	TA6V		
60	Angle	P3305	0.040	1,0
61	Angle	P3305	0.040	1,0
62	Web	P3305	0.040	1,0
63	Clip	P3305	0.040	1,0
64	Clip	P3305	0.063	1,6
65	Fitting	TA6V		
66	Clip	P3305	0.063	1,6
67	Shim	P3343	0.156	4,0

Twin Secondary Nozzle - Identification  
Figure 302 (Sheet 21 of 25)

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

78-13-01

Page 326

. Apr 30/93

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

PRINTED IN FRANCE

ITEM NO.	DESCRIPTION	MATERIAL		
		MADE FROM	THICKNESS IN	MM
68	Angle	P3305	0.050	1,0
69	Clip	P3305	0.040	1,0
70	Clip	P3305	0.040	1,0
71	Shim	P3343	0.250	6,4
72	Shim	P3343	0.125	3,2
73	Shim	P3343	0.160	4,1
74	Shim	P3343	0.180	4,6
75	Shim	P3343	0.160	4,1
76	Shim	P3343	0.150	3,8
77	Shim	P3343	0.230	5,8
78	Angle	P3305	0.040	1,0
79	Strap	P3305	0.100	2,5
80	Angle	P3305	0.040	1,0
81	Angle	P3305	0.040	1,0
82	Fitting	NCK20TA		
83	Fitting	NCK20TA		
84	Fitting	NC19FeNb		
85	Angle	P3305	0.040	1,0
86	Fitting	NC19FeNb		
87	Fitting attach	Z5CNU17		
88	Angle	P3323	0.040	1,0
89	Angle	P3323	0.040	1,0
90	Angle	P3323	0.040	1,0

Twin Secondary Nozzle - Identification  
Figure 302 (Sheet 22 of 25)

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 327

Nov 30/77

**78-13-01**

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

ITEM NO.	DESCRIPTION	MATERIAL		
		MADE FROM	THICKNESS IN	MM
91	Angle	P3305	0.040	1,0
92	Angle	P3305	0.040	1,0
93	Angle	P3305	0.040	1,0
94	Angle	P3305	0.040	1,0
95	Shim taper	P3301	0.090	2,3
96	Angle	P3305	0.040	1,0
97	Doubler	P3305	0.070	1,8
98	Angle	P3305	0.040	1,0
99	Angle	P3305	0.040	1,0
100	Bracket	P3305	0.040	1,0
101	Clip	P3305	0.040	1,0
102	Angle	P3305	0.040	1,0
103	Angle	P3305	0.040	1,0
104	Angle	P3305	0.040	1,0
105	Fitting	Z5CNU17		
106	Fitting	TA6V		
107	Angle	P3305	0.050	1,3
108	Angle	P3305	0.050	1,3
109	Stressskin panel (welded)	P3700	0.012	0,3
110	Angle	P3305	0.040	1,0
111	Clip	P3305	0.040	1,0
112	Angle	P3305	0.040	1,0
113	Angle	P3305	0.040	1,0

Twin Secondary Nozzle - Identification  
Figure 302 (Sheet 23 of 25)**78-13-01**

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 328  
Nov 30/77



**OLYMPUS 593**MK.610-14-28  
OVERHAUL

PRINTED IN FRANCE

ITEM NO.	DESCRIPTION	MATERIAL		
		MADE FROM	THICKNESS IN	MM
114	Channel	P3305	0.040	1,0
115	Clip	P3305	0.040	1,0
116	Clip	P3305	0.040	1,0
117	Beam	P3305	0.070	1,8
118	Zee	P3305	0.040	1,8
119	Fitting	TA6V		
120	Stressskin panel (welded)	P3700	0.012	0,3
121	Angle	P3305	0.040	1,0
122	Bracket	P3305	0.050	1,3
123	Clip	P3305	0.040	1,0
124	Channel	P3305	0.040	1,0
125	Angle	P3305	0.040	1,0
126	Clip	P3305	0.040	1,0
127	Fitting	TA6V		
128	Angle	P3305	0.040	1,0
129	Splice	P3305	0.040	1,0
130	Angle	P3305	0.090	2,3
131	Stressskin panel (welded)	P3706	0.012	0,3
132	Web	P3305	0.040	1,0
133	Angle	P3322	0.040	1,0
134	Angle	P3305	0.040	1,0
135	Web	P3305	0.040	1,0

Twin Secondary Nozzle - Identification  
Figure 302 (Sheet 24 of 25)

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 329

Nov 30/77

**78-13-01**

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

ITEM NO.	DESCRIPTION	MATERIAL		
		MADE FROM	THICKNESS IN	MM
136	Angle	P3305	0.040	1,0
137	Support	P3305	0.040	1,0
138	Angle	P3305	0.040	1,0
139	Angle	P3305	0.040	1,0
140	Angle	P3305	0.040	1,0
141	Shim	P3343	1.000	2,5
142	Angle	P3305	0.050	1,3
143	Angle	P3305	0.050	1,3
144	Bracket	P3302	0.050	1,3
145	Bracket	P3302	0.050	1,3

PRINTED IN FRANCE

Twin Secondary Nozzle - Identification  
Figure 302 (Sheet 25 of 25)**78-13-01**

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 330  
Nov 30/77



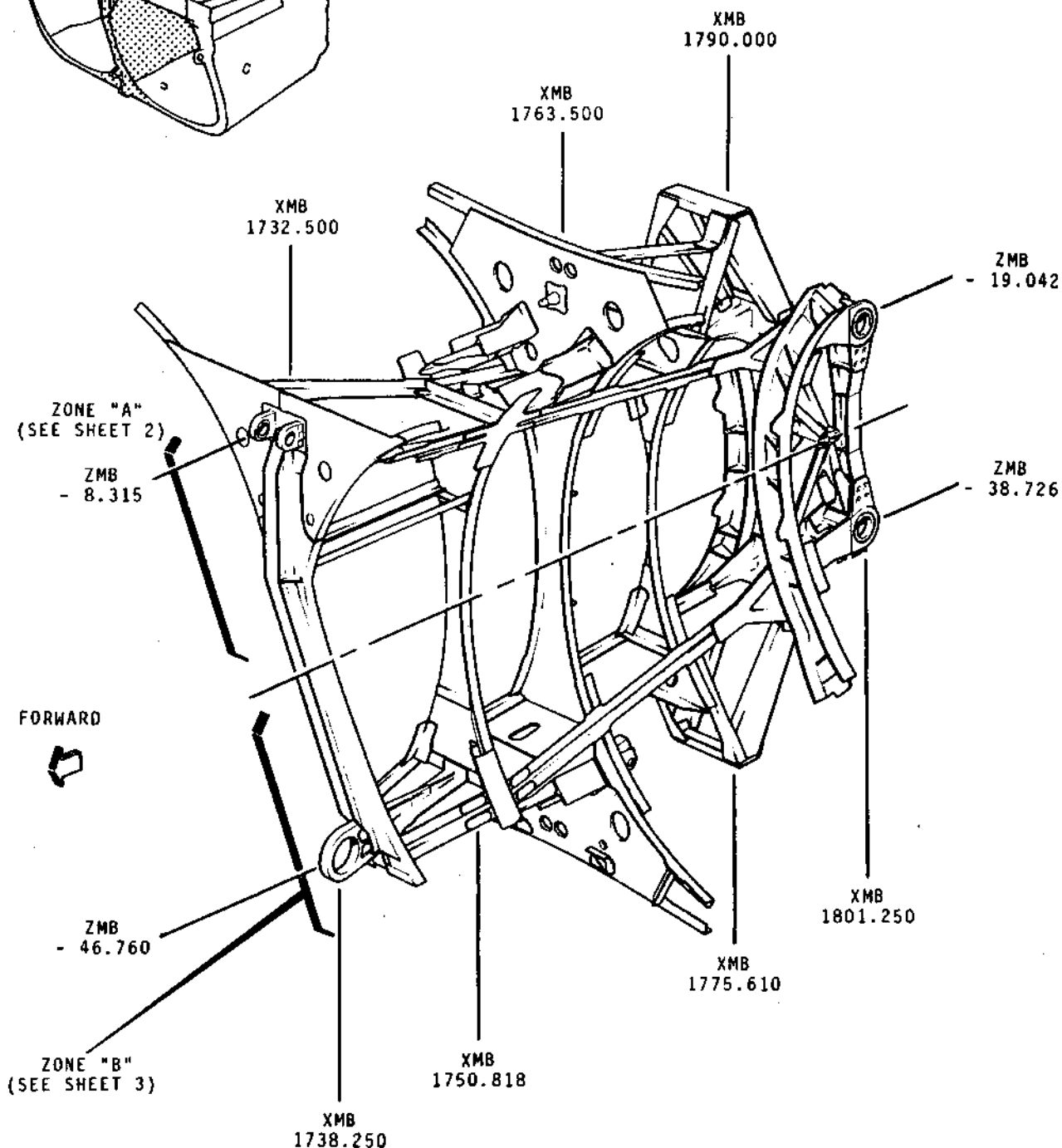
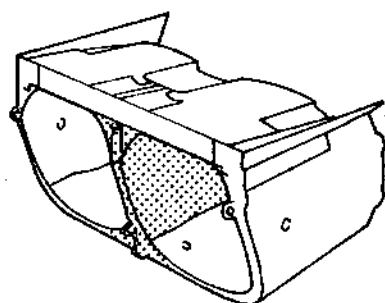
# OLYMPUS 593

MK.610-14-28

OVERHAUL



NOTE : LH SECONDARY NOZZLE CENTRAL  
WALL, SHOWN  
RH SECONDARY NOZZLE CENTRAL  
WALL, OPPOSITE HAND.



Twin Secondary Nozzle - Identification  
Figure 303 (Sheet 1 of 12)

## 78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 331

Nov 30/77

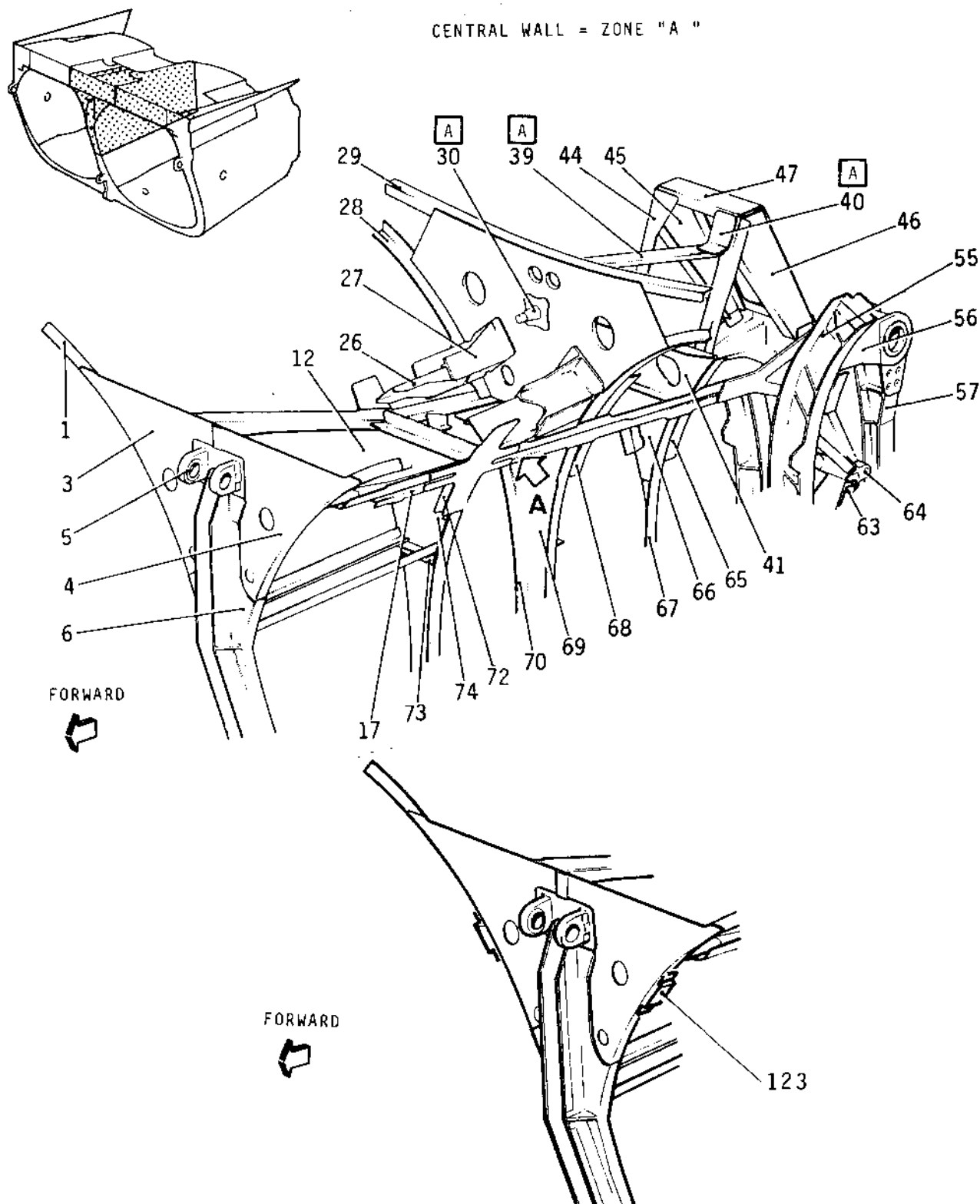


OLYMPUS 593

MK.610-14-28  
OVERHAUL



CENTRAL WALL = ZONE "A "



Twin Secondary Nozzle - Identification  
Figure 303 (Sheet 2 of 12)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 332

Nov 30/77

PRINTED IN FRANCE



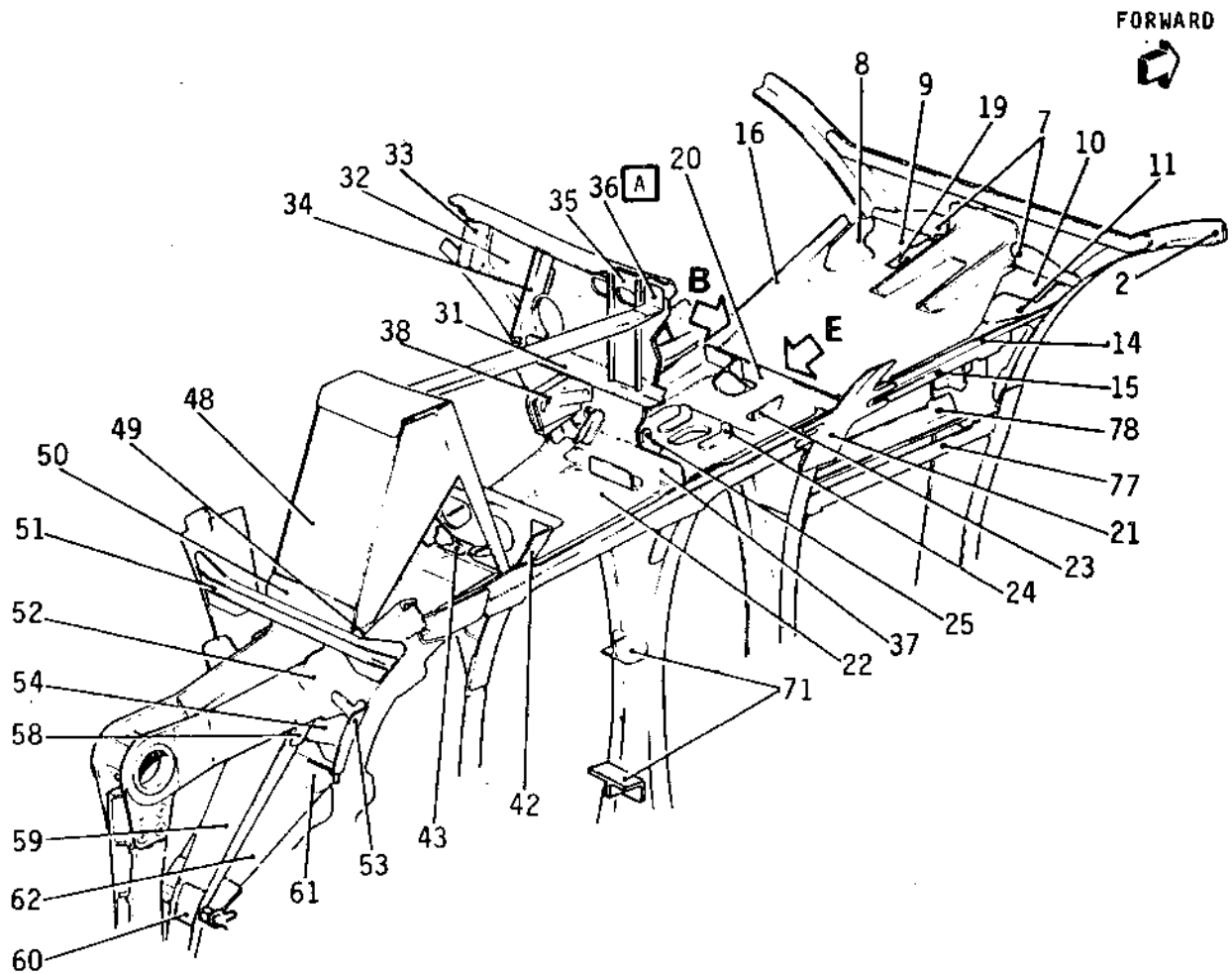
OLYMPUS 593

MK.610-14-28  
OVERHAUL



CENTRAL WALL = ZONE "A "

PRINTED IN FRANCE



Twin Secondary Nozzle - Identification  
Figure 303 (Sheet 3 of 12)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 333

Nov 30/77



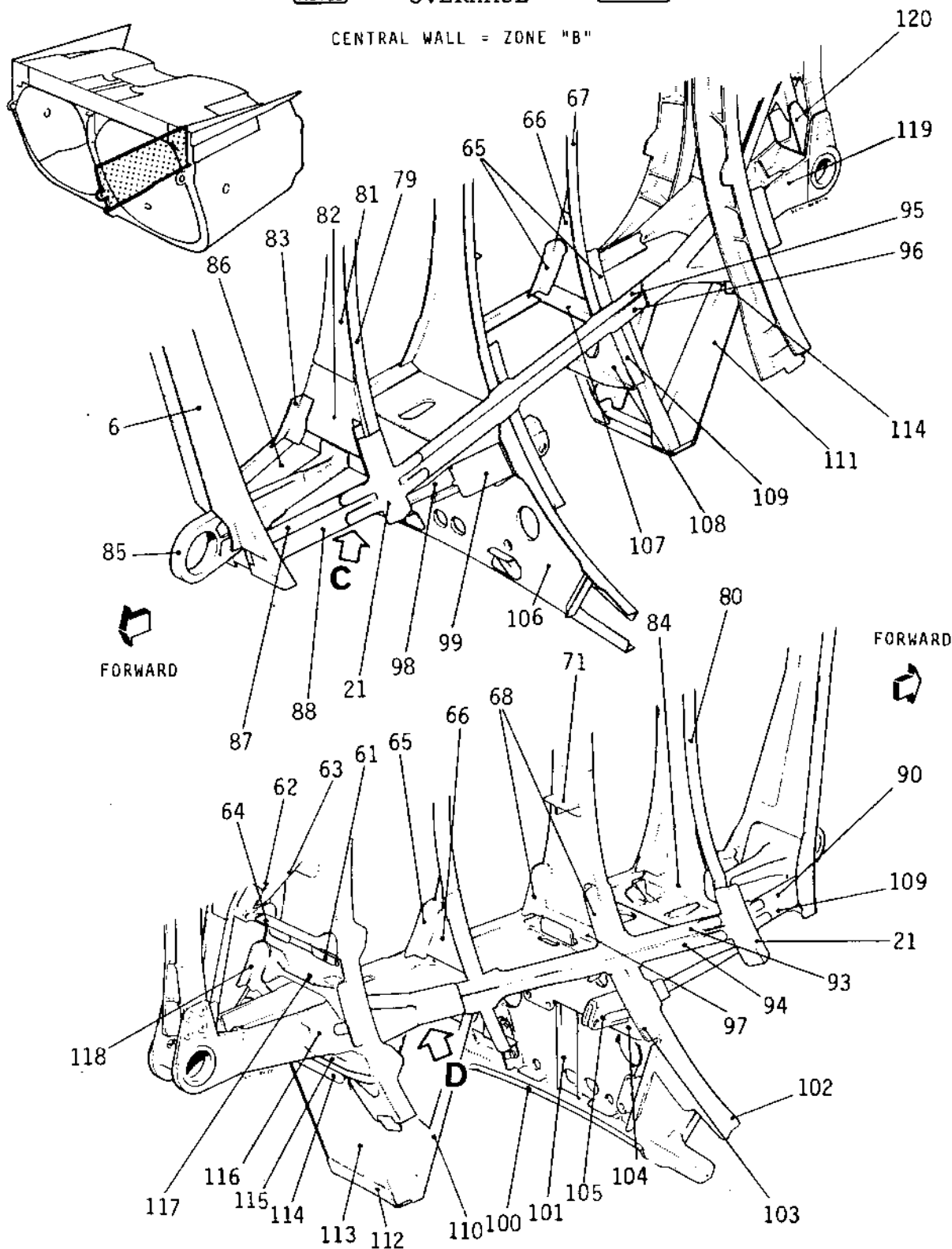
OLYMPUS 593

MK.610-14-28

OVERHAUL



CENTRAL WALL = ZONE "B"



Twin Secondary Nozzle - Identification  
Figure 303 (Sheet 4 of 12)

PRINTED IN FRANCE

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

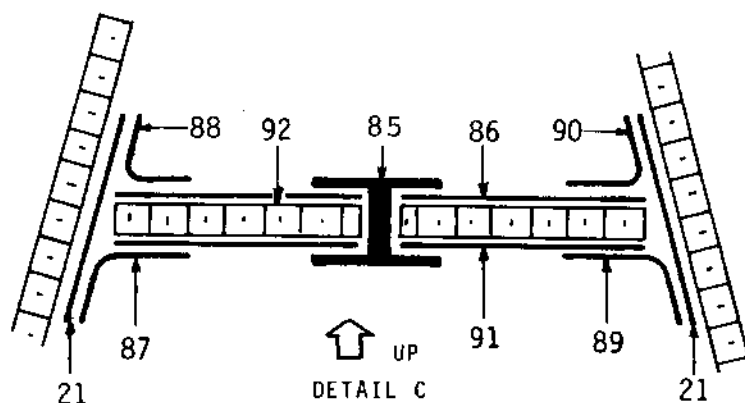
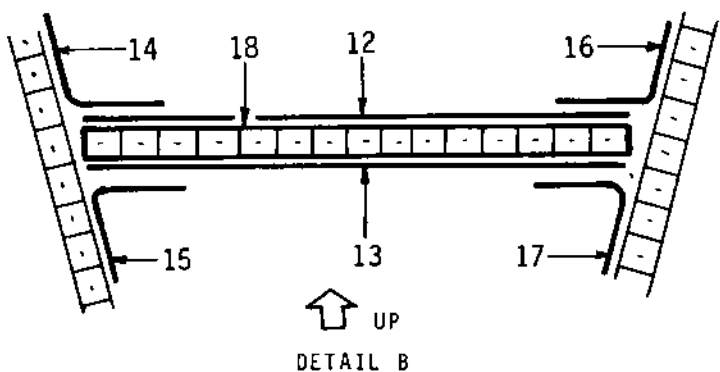
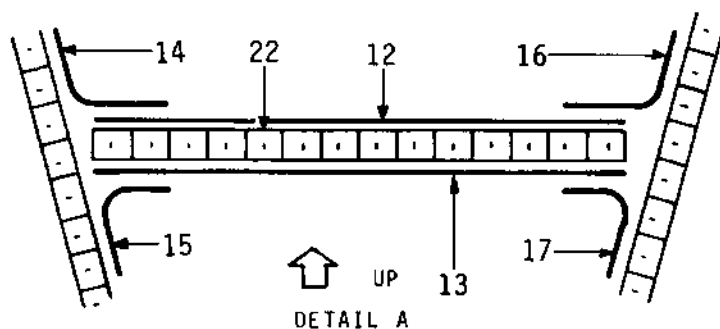
Page 334

Nov 30/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Twin Secondary Nozzle - Identification  
Figure 303 (Sheet 5 of 12)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

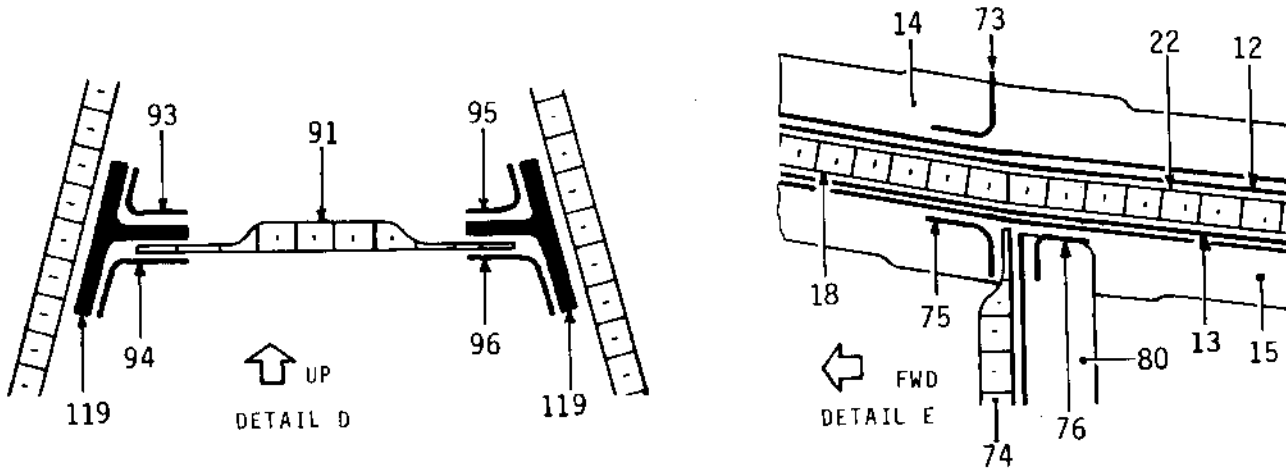
Page 335

Nov 30/77

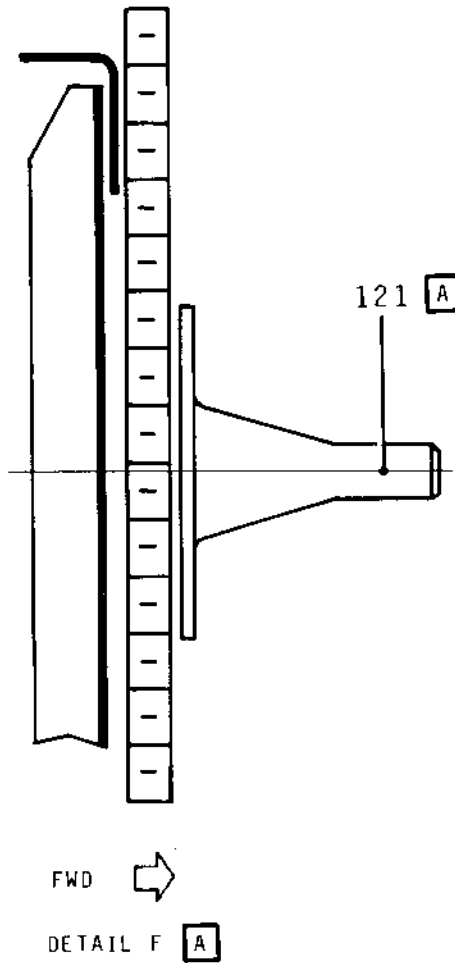


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE



Twin Secondary Nozzle - Identification  
Figure 303 (Sheet 6 of 12)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 336

Nov 30/77



**OLYMPUS 593**MK. 610-14-28  
OVERHAUL

PRINTED IN FRANCE

ITEM NO.	DESCRIPTION	MATERIAL		
		MADE FROM	THICKNESS IN	MM
1	Angle	P3305	0.040	1,0
2	Angle	P3305	0.040	1,0
3	Panel	P3305	0.040	1,0
4	Panel	P3305	0.040	1,0
5	Fitting	TA6V		
6	Fitting	TA6V		
7	Tee	TA6V		
8	Cover	P3305	0.020	0,5
9	Cover	P3305	0.020	0,5
10	Cover	P3305	0.020	0,5
11	Cover	P3305	0.020	0,5
12	Doubler	P3305	0.024	0,6
13	Doubler	P3305	0.024	0,6
14	Angle	P3305	0.050	1,3
15	Angle	P3305	0.050	1,3
16	Angle	P3305	0.050	1,3
17	Angle	P3305	0.050	1,3
18	Stressskin panel (welded)	P3702	0.024	0,6
19	Bracket	P3305	0.040	1,0
20	Angle	P3305	0.040	1,0
21	Doubler	P3306	0.130	3,3
22	Stressskin panel (welded)	P3702	0.024	0,6

Twin Secondary Nozzle - Identification  
Figure 303 (Sheet 7 of 12)

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

**78-13-01**Page 337  
Nov 30/77

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

ITEM NO.	DESCRIPTION	MATERIAL		
		MADE FROM	THICKNESS IN	MM
23	Bracket	P3305	0.040	1,0
24	Angle	P3305	0.040	1,0
25	Angle	P3305	0.040	1,0
26	Beam	P3305	0.070	1,8
27	Fitting	TA6V		
28	Angle	P3305	0.040	1,0
29	Channel	P3305	0.040	1,0
30	Fitting	Z5CNU17		
31	Angle	P3305	0.040	1,0
32	Stresskin panel (welded)	P3702	0.024	0,6
33	Angle	P3305	0.040	1,0
34	Angle	P3305	0.040	1,0
35	Channel	P3305	0.040	1,0
36	Angle	P3305	0.063	1,6
37	Angle	P3305	0.040	1,0
38	Fitting	TA6V		
39	Channel	P3305	0.040	1,0
40	Bracket	P3305	0.050	1,3
41	Channel	P3305	0.040	1,0
42	Angle	P3305	0.040	1,0
43	Angle	P3305	0.050	1,3
44	Angle	P3305	0.040	1,0
45	Support	P3305	0.040	1,0

Twin Secondary Nozzle - Identification  
Figure 303 (Sheet 8 of 12)

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

**78-13-01**

Page 338

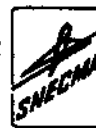
Nov 30/77

PRINTED IN FRANCE

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



PRINTED IN FRANCE

ITEM NO.	DESCRIPTION	MATERIAL		
		MADE FROM	THICKNESS IN	MM
46	Support	P3305	0.040	1,0
47	Bracket	P3305	0.050	1,3
48	Stressskin panel (welded)	P3706	0.012	0,3
49	Angle	P3305	0.100	2,5
50	Angle	P3305	0.063	1,6
51	Tee	NC19FeNb		
52	Web	P3323	0.063	1,6
53	Angle	P3323	0.063	1,6
54	Fitting	NC19FeNb		
55	Fitting	NC19FeNb		
56	Fitting	NCK20TA		
57	Fitting	NCK20TA		
58	Plate	P3323	0.090	2,3
59	Brace	P3323	0.070	1,8
60	Block	P3323	0.125	3,2
61	Angle	P3323	0.040	1,0
62	Bracket	P3323	0.040	1,0
63	Angle	P3323	0.040	1,0
64	Fitting	Z5CNU17		
65	Angle	P3305	0.050	1,3
66	Web	P3305	0.040	1,0
67	Web	P3305	0.040	1,0
68	Bracket	P3305	0.040	1,0

Twin Secondary Nozzle - Identification  
Figure 303 (Sheet 9 of 12)**78-13-01**

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 339

Nov 30/77

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

ITEM NO.	DESCRIPTION	MATERIAL		
		MADE FROM	THICKNESS IN	MM
69	Web	P3305	0.040	1,0
70	Angle	P3305	0.040	1,0
71	Bracket	P3305	0.040	1,0
72	Clip	P3305	0.040	1,0
73	Clip	P3305	0.040	1,0
74	Stressskin panel (welded)	P3700	0.012	0,3
75	Angle	P3640	0.130	3,3
76	Angle	TA6V		
77	Angle	P3305	0.050	1,3
78	Angle	P3305	0.050	1,3
79	Cap	P3305	0.040	1,0
80	Cap	P3305	0.040	1,0
81	Web	P3305	0.040	1,0
82	Stressskin panel (welded)	P3700	0.012	0,3
83	Clip	P3305	0.063	1,6
84	Angle	P3305	0.040	1,0
85	Fitting	TA6V		
86	Doubler	P3305	0.024	0,6
87	Angle	P3305	0.090	2,3
88	Angle	P3305	0.090	2,3
89	Angle	P3305	0.090	2,3
90	Angle	P3305	0.090	2,3

Twin Secondary Nozzle - Identification  
Figure 303 (Sheet 10 of 12)

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

**78-13-01**Page 340  
Nov 30/77

PRINTED IN FRANCE

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



PRINTED IN FRANCE

ITEM NO.	DESCRIPTION	MATERIAL		
		MADE FROM	THICKNESS IN	MM
91	Doubler	P3305	0.024	0,6
92	Stressskin panel (welded)	P3702	0.024	0,6
93	Angle	P3305	0.071	1,8
94	Angle	P3305	0.071	1,8
95	Angle	P3305	0.071	1,8
96	Angle	P3305	0.071	1,8
97	Angle	P3305	0.040	1,0
98	Beam	P3305	0.070	1,8
99	Fitting	TA6V		
100	Angle	P3305	0.080	2,0
101	Channel	P3305	0.040	1,0
102	Angle	P3305	0.040	1,0
103	Angle	P3305	0.040	1,0
104	Angle	P3305	0.040	1,0
105	Fitting	TA6V		
106	Stressskin panel (welded)	P3702	0.024	0,6
107	Angle	P3305	0.040	1,0
108	Channel	P3305	0.040	1,0
109	Angle	P3305	0.040	1,0
110	Angle	P3305	0.040	1,0
111	Support	P3305	0.040	1,0
112	Bracket	P3305	0.050	1,3

Twin Secondary Nozzle - Identification  
Figure 303 (Sheet 11 of 12)**78-13-01**

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 341

Nov 30/77

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



ITEM NO.	DESCRIPTION	MATERIAL		
		MADE FROM	THICKNESS IN	MM
113	Stressskin panel (welded)	P3706	0.012	0,3
114	Angle	P3305	0.063	1,6
115	Tee	NC19FeNb		
116	Web	P3323	0.063	1,6
117	Fitting	NC19FeNb		
118	Angle	P3323	0.063	1,6
119	Fitting	NCK20TA		
120	Plate	P3323	0.125	3,2
121	Fitting	Z5CNU17		
122	Channel	P3305	0.040	1,0
123	Bracket	P3301	0.050	1,3

PRINTED IN FRANCE

Twin Secondary Nozzle - Identification  
Figure 303 (Sheet 12 of 12)

**78-13-01**

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

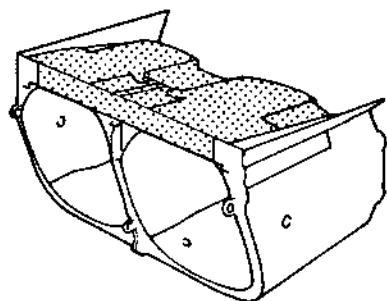
Page 342  
Nov 30/77



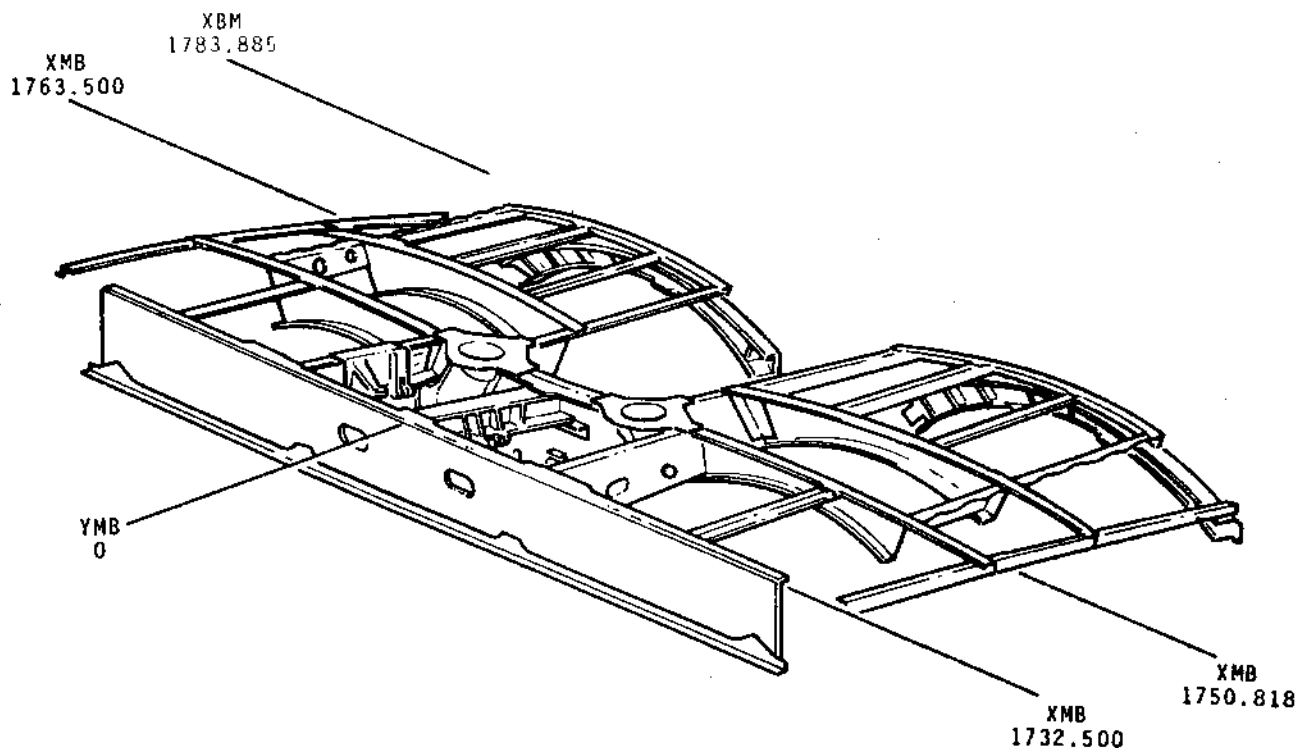
OLYMPUS 593

MK.610-14-28

OVERHAUL



NOTE : LH SECONDARY NOZZLE UPPER  
SECTION, SHOWN  
RH SECONDARY NOZZLE UPPER  
SECTION, OPPOSITE HAND.



FORWARD



Twin Secondary Nozzle - Identification  
Figure 304 (Sheet 1 of 12)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

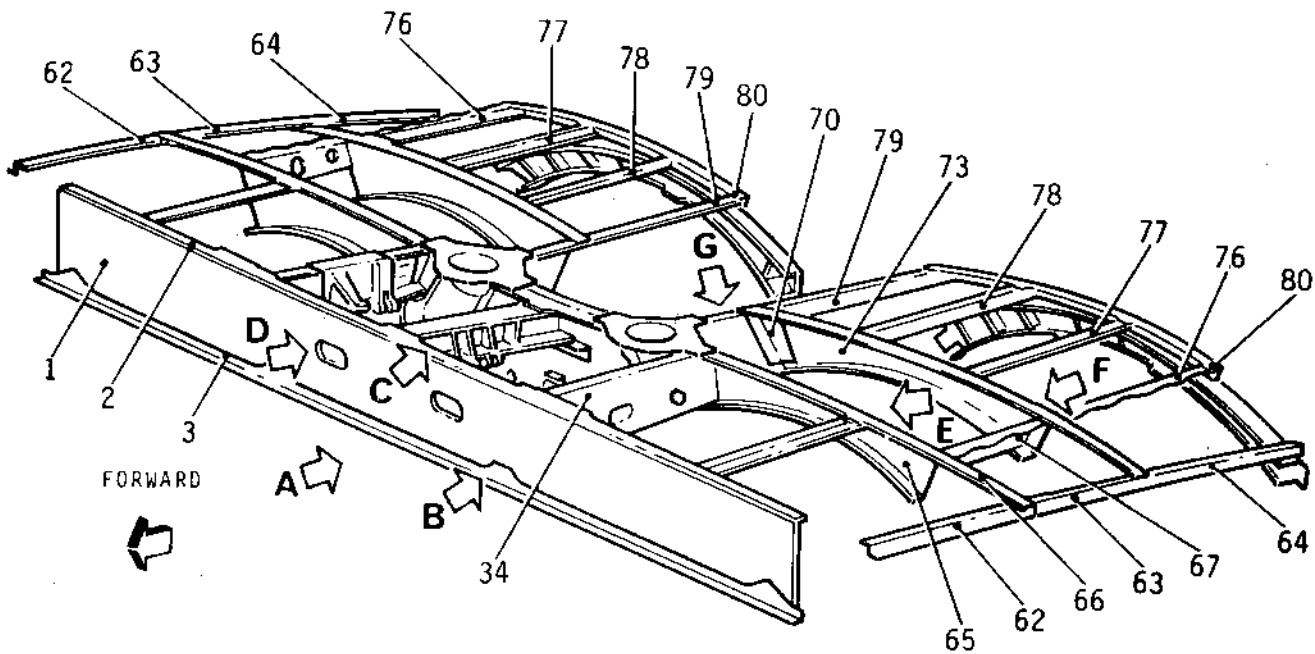
Page 343

Nov 30/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE

Twin Secondary Nozzle - Identification  
Figure 304 (Sheet 2 of 12)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 344

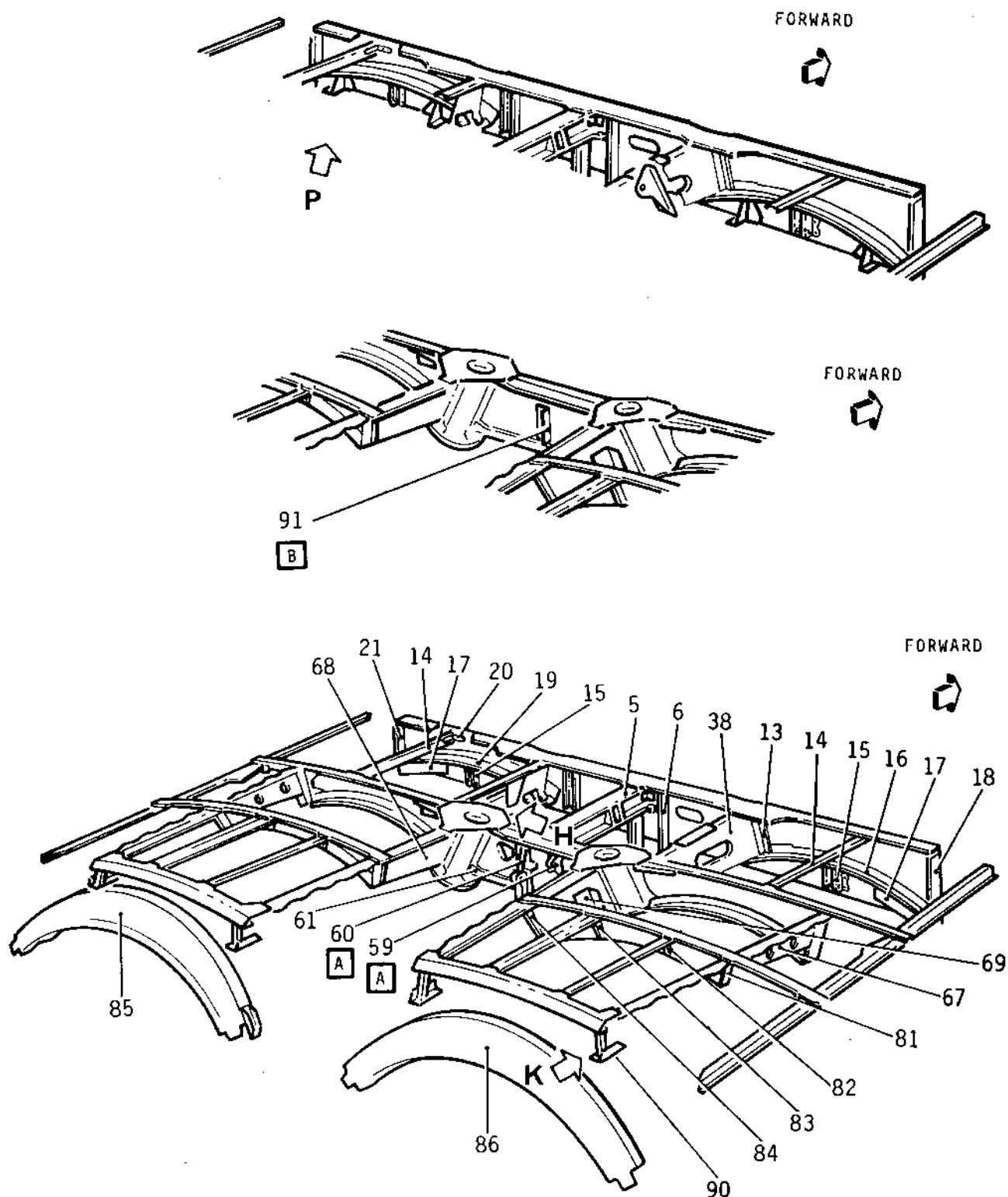
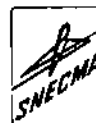
Nov 30/77





OLYMPUS 593

MK.610-14-28  
OVERHAUL



Twin Secondary Nozzle - Identification  
Figure 304 (Sheet 3 of 12)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

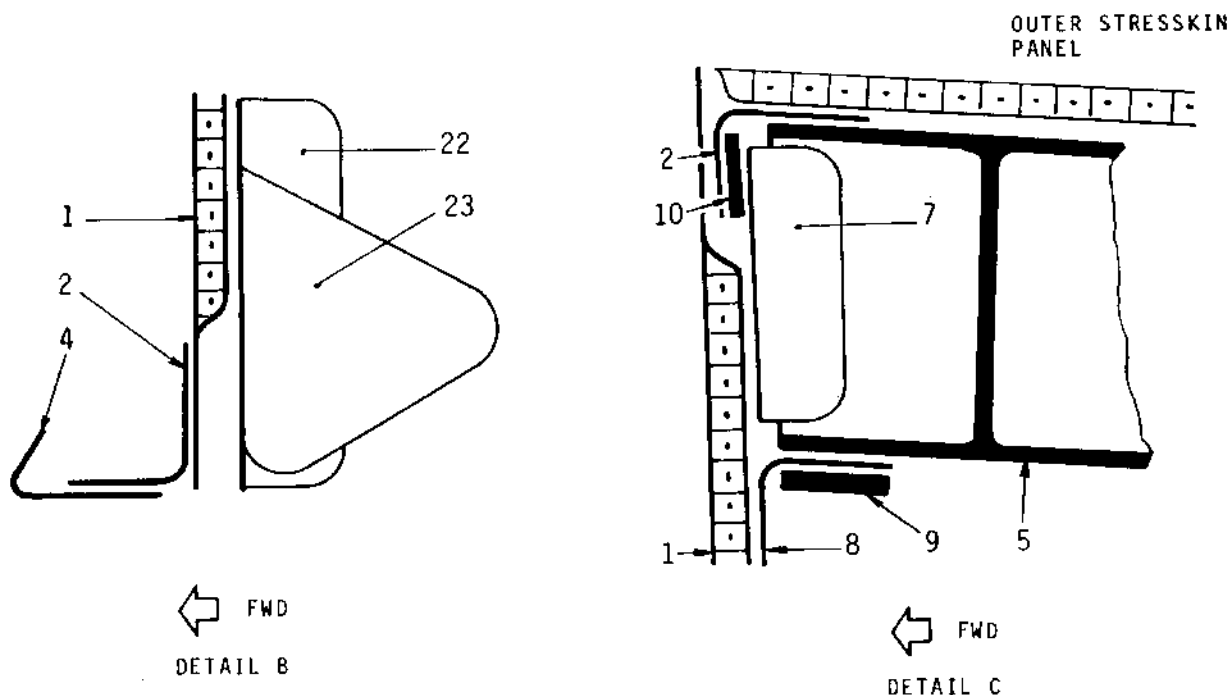
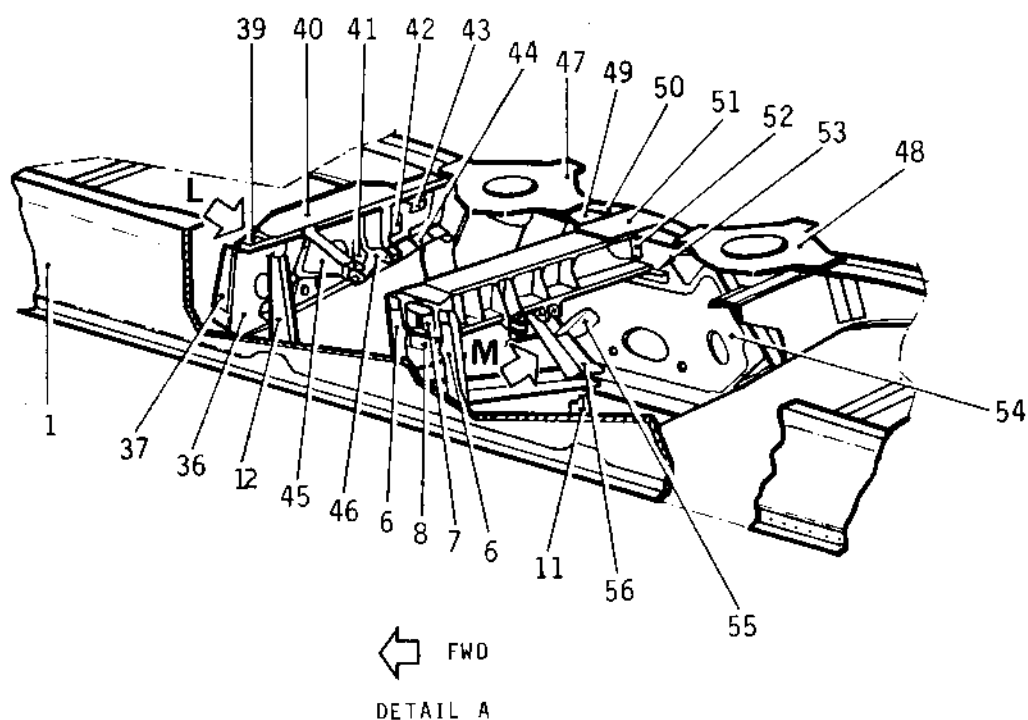
Page 345

Nov 30/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Twin Secondary Nozzle - Identification  
Figure 304 (Sheet 4 of 12)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 346

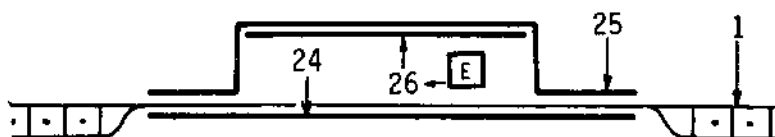
Nov 30/77



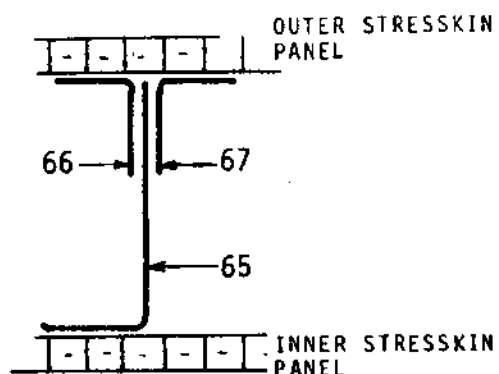
OLYMPUS 593

MK.610-14-28

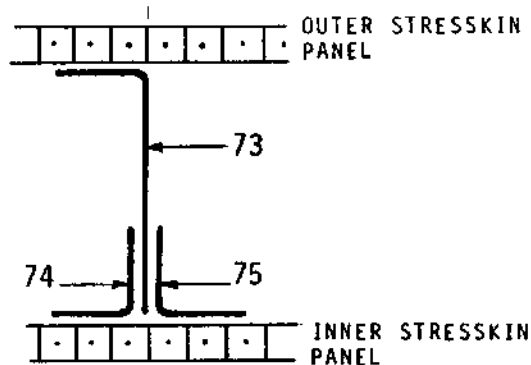
OVERHAUL



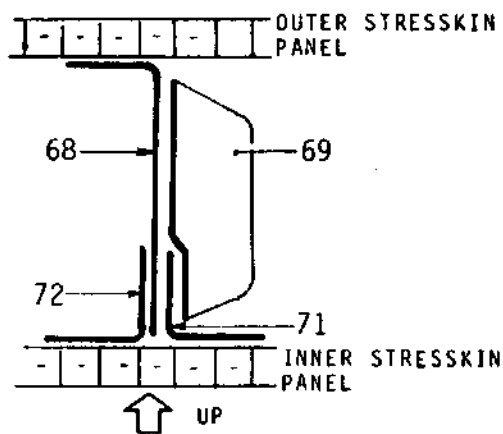
DETAIL D



DETAIL E



DETAIL F



DETAIL G

Twin Secondary Nozzle - Identification  
Figure 304 (Sheet 5 of 12)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

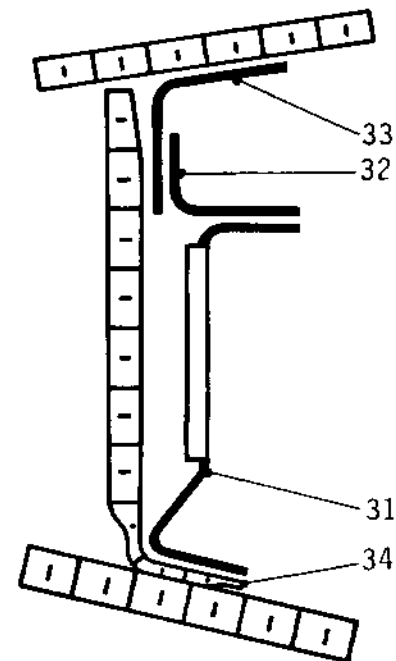
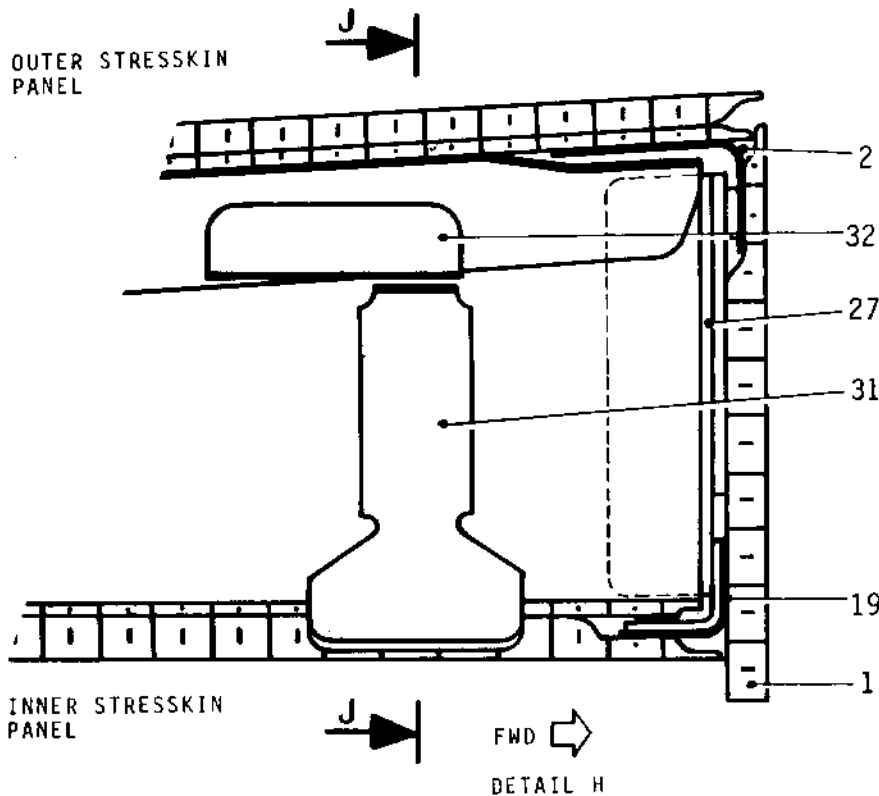
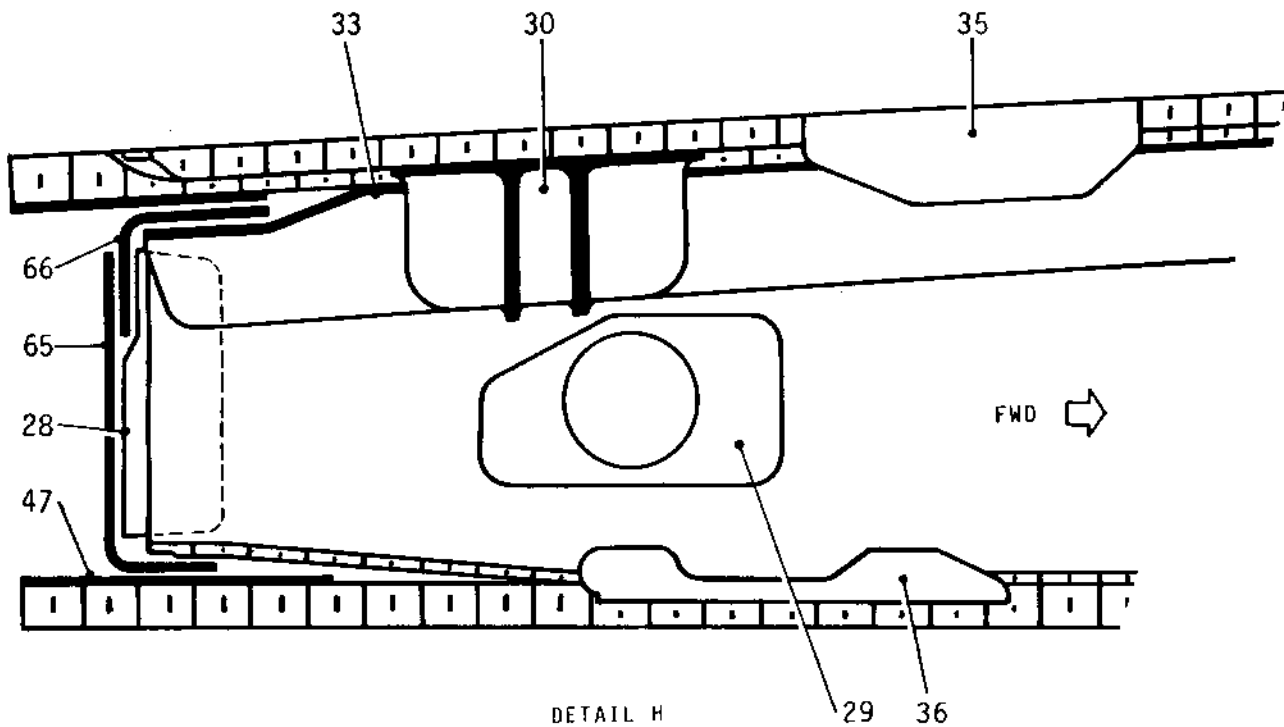
Page 347

Nov 30/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Twin Secondary Nozzle - Identification  
Figure 304 (Sheet 6 of 12)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 348

Nov 30/77

PRINTED IN FRANCE

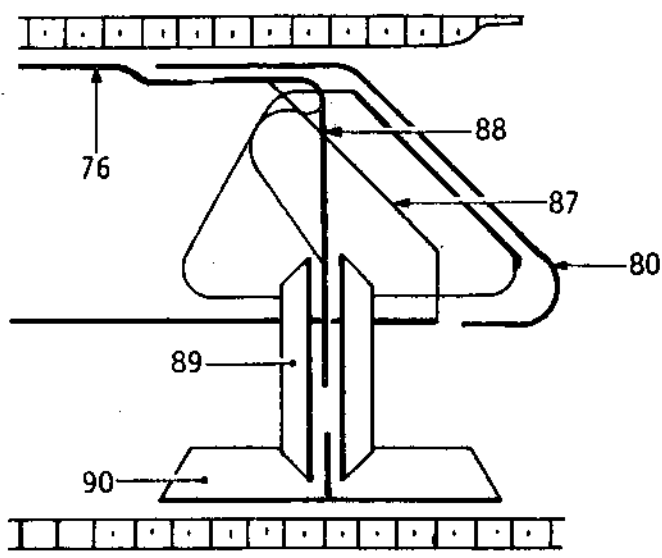


OLYMPUS 593

MK.610-14-28  
OVERHAUL

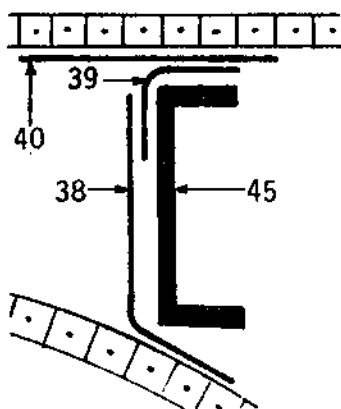


OUTER STRESSKIN  
PANEL



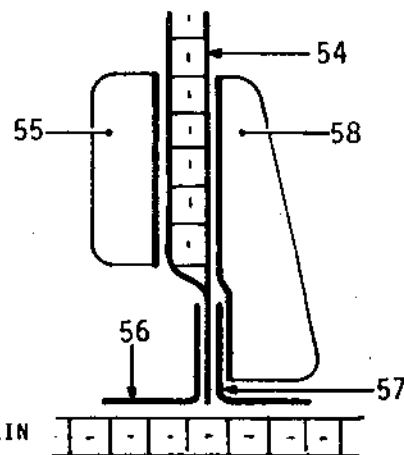
INNER STRESSKIN  
PANEL

← FWD  
DETAIL K



INNER STRESSKIN  
PANEL

↑ UP  
DETAIL L



INNER STRESSKIN  
PANEL

← FWD  
DETAIL M

Twin Secondary Nozzle - Identification  
Figure 304 (Sheet 7 of 12)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

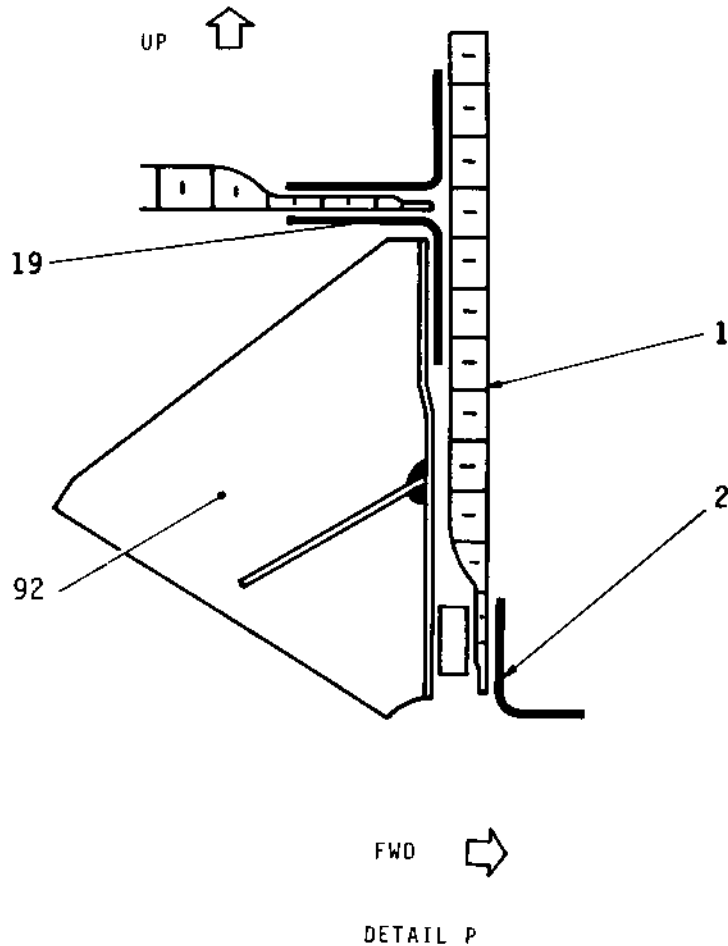
Page 349

Nov 30/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE

Twin Secondary Nozzle-Identification  
Figure 304 (Sheet 8 of 12)

**78-13-01**

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 350

Nov 30/77

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



ITEM NO.	DESCRIPTION	MATERIAL		
		MADE FROM	THICKNESS IN	MM
1	Stressskin panel (welded)	P3700	0.012	0,3
2	Angle	P3305	0.050	1,3
3	Seal angle	P3305	0.050	1,3
4	Angle	P3305	0.050	1,3
5	Fitting	Z5CNU17		
6	Fitting	TA6V		
7	Clip	P3305	0.050	1,3
8	Angle	P3305	0.050	1,3
9	Radius block	P3305	0.125	3,2
10	Spacer	P3305	0.100	2,5
11	Channel	P3305	0.050	1,3
12	Channel	P3305	0.050	1,3
13	Plate	P3305	0.100	2,5
14	Stiffener	P3305	0.040	1,0
15	Angle	P3305	0.080	2,0
16	Angle	P3305	0.050	1,3
17	Angle	P3305	0.050	1,3
18	Channel	P3305	0.050	1,3
19	Angle	P3305	0.050	1,3
20	Clip	P3305	0.050	1,3
21	Channel	P3305	0.050	1,3
22	Angle	P3305	0.080	2,0
23	Angle	P3305	0.080	2,0

Twin Secondary Nozzle - Identification  
Figure 304 (Sheet 9 of 12)

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

**78-13-01**

Page 351  
Nov 30/77

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

ITEM NO.	DESCRIPTION	MATERIAL		
		MADE FROM	THICKNESS IN	MM
24	Plate	P3305	0.060	1,5
25	Weld assy	P3305	0.040	1,0
26	Plate	P3305	0.040	1,0
27	Angle	P3305	0.040	1,0
28	Angle	P3305	0.040	1,0
29	Conduit assembly	Z10CNT18		
30	Fitting	TA6V		
31	Bracket	P3305	0.050	1,3
32	Bracket	P3305	0.050	1,3
33	Angle	P3305	0.050	1,3
34	Stressskin panel (welded)	P3700	0.012	0,3
35	Bracket	P3305	0.050	1,3
36	Bracket	P3305	0.050	1,3
37	Angle	P3305	0.040	1,0
38	Web	P3305	0.050	1,3
39	Cap angle	P3305	0.050	1,3
40	Doubler	P3305	0.030	0,7
41	Bracket	P3305	0.050	1,3
42	Conduit assy	Z10CNT18	0.050	1,3
43	Bracket	P3305	0.050	1,3
44	Bracket	P3305	0.050	1,3
45	Fitting	TA6V		
46	Fitting	TA6V		

Twin Secondary Nozzle - Identification  
Figure 304 (Sheet 10 of 12)

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

**78-13-01**

Page 352

Nov 30/77



**OLYMPUS 593**

MK.610-14-28

OVERHAUL



ITEM NO.	DESCRIPTION	MATERIAL		
		MADE FROM	THICKNESS IN	MM
47	Fitting	Z5CNU17		
48	Fitting	Z5CNU17		
49	Angle	P3305	0.040	1,0
50	Angle	P3305	0.040	1,0
51	Shim	P3305	0.040	1,0
52	Angle	P3305	0.050	1,3
53	Angle	P3305	0.090	2,7
54	Stressskin panel (welded)	P3700	0.012	0,3
55	Angle	P3305	0.040	1,0
56	Angle	P3305	0.063	1,6
57	Angle	P3305	0.040	1,0
58	Angle	P3305	0.040	1,0
59	Fitting	TA6V		
60	Fitting	TA6V		
61	Angle	P3305	0.050	1,3
62	Stiffener	P3305	0.040	1,0
63	Stiffener	P3305	0.040	1,0
64	Stiffener	P3305	0.040	1,0
65	Panel	P3305	0.050	1,3
66	Angle	P3305	0.050	1,3
67	Angle	P3305	0.050	1,3
68	Web	P3305	0.080	2,0
69	Support	P3305	0.063	1,6

Twin Secondary Nozzle - Identification  
Figure 304 (Sheet 11 of 12)

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

**78-13-01**

Page 353

Nov 30/77

**OLYMPUS 593**MK. 610-14-28  
OVERHAUL

ITEM NO.	DESCRIPTION	MATERIAL		
		MADE FROM	THICKNESS IN	MM
70	Angle	P3305	0.050	1,3
71	Angle	P3305	0.050	1,3
72	Angle	P3305	0.050	1,3
73	Web	P3305	0.080	2,0
74	Angle	P3305	0.040	1,0
75	Angle	P3305	0.040	1,0
76	Stiffener	P3305	0.040	1,0
77	Stiffener	P3305	0.040	1,0
78	Stiffener	P3305	0.040	1,0
79	Stiffener	P3305	0.040	1,0
80	Channel	P3305	0.063	1,6
81	Angle	P3305	0.040	1,0
82	Angle	P3305	0.040	1,0
83	Angle	P3305	0.040	1,0
84	Angle	P3305	0.040	1,0
85	Fitting	NC19FeNb		
86	Fitting	NC19FeNb		
87	Bracket	P3305	0.063	1,6
88	Angle	P3305	0.040	1,0
89	Angle	P3305	0.032	0,8
90	Support assy	P3305	0.063	1,6
91	Angle	P3305	0.040	1,0
92	Angle	P3305	0.060	1,5

Twin Secondary Nozzle - Identification  
Figure 304 (Sheet 12 of 12)

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

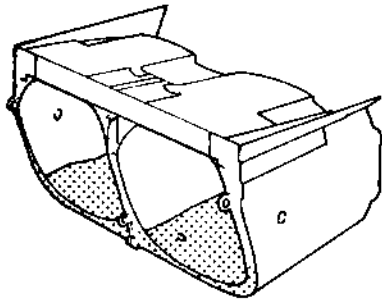
**78-13-01**Page 354  
Nov 30/77

PRINTED IN FRANCE



OLYMPUS 593

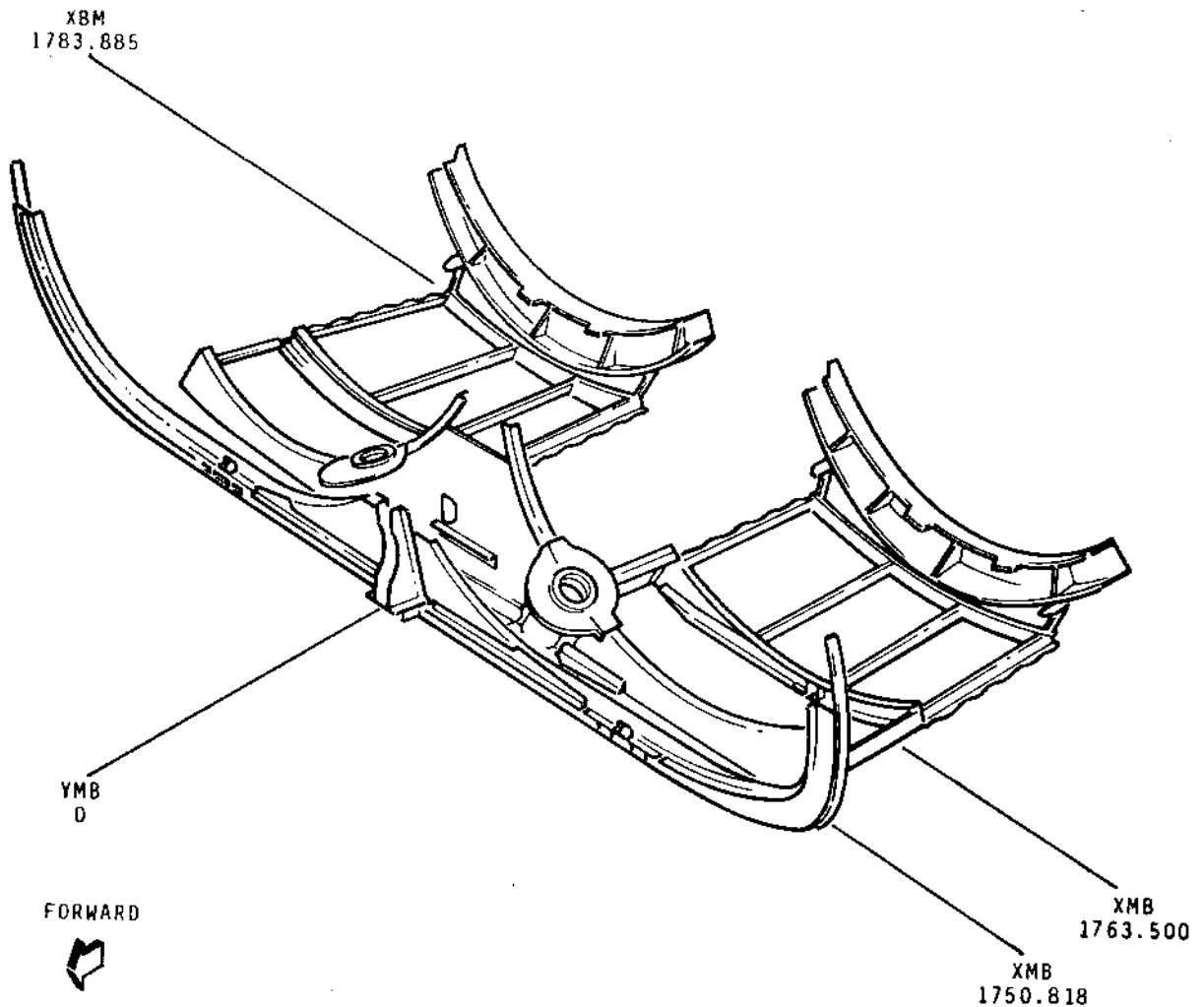
MK.610-14-28  
OVERHAUL



NOTE : LH SECONDARY NOZZLE LOWER  
SECTION, SHOWN

RH SECONDARY NOZZLE LOWER  
SECTION, OPPOSITE HAND.

PRINTED IN FRANCE



Twin Secondary Nozzle - Identification  
Figure 305 (Sheet 1 of 10)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 355

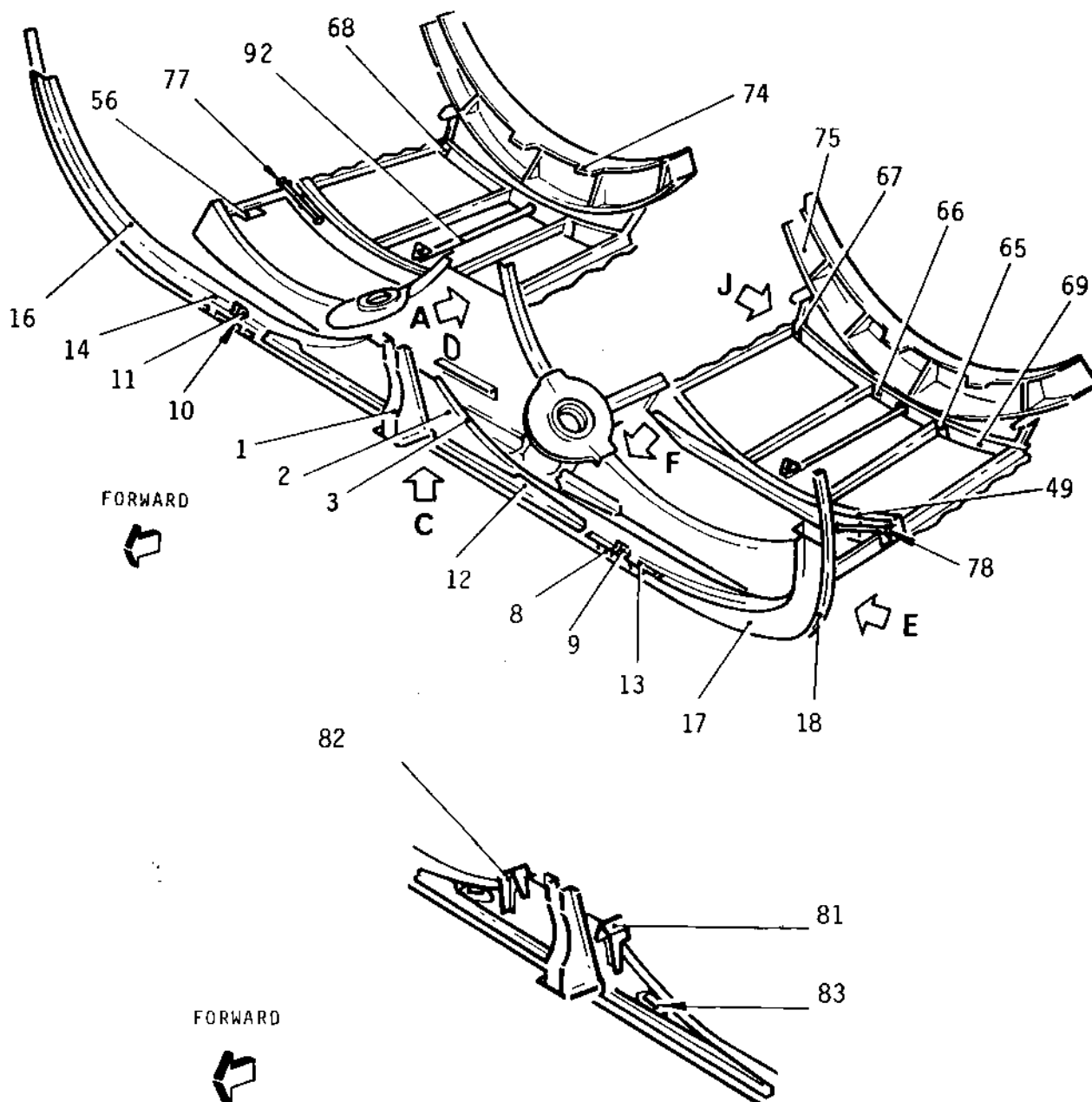
Nov 30/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN FRANCE

Twin Secondary Nozzle - Identification  
Figure 305 (Sheet 2 of 10)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

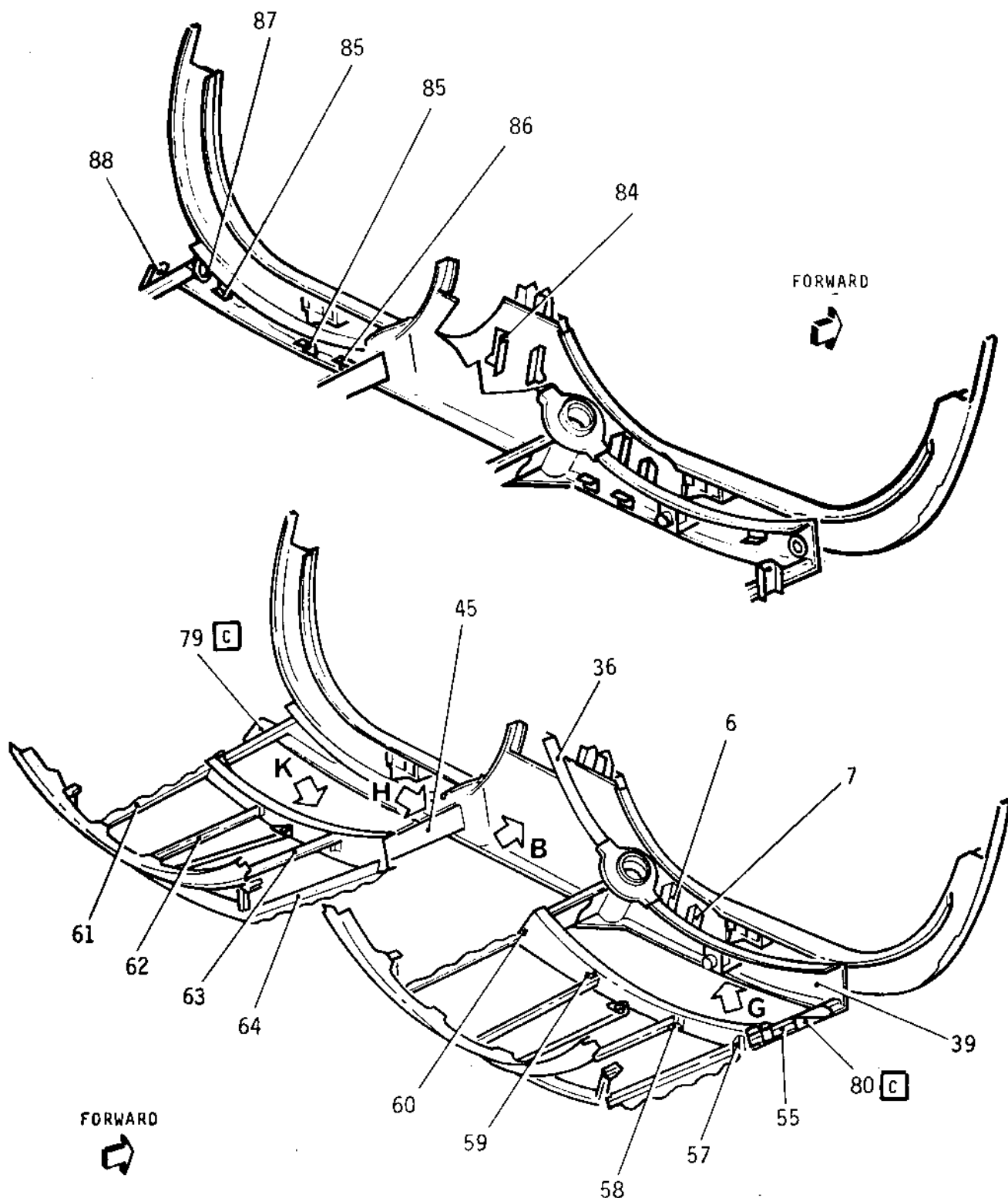
Page 356

Nov 30/77



OLYMPUS 593

MK. 610-14-28  
OVERHAUL



Twin Secondary Nozzle - Identification  
Figure 305 (Sheet 3 of 10)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

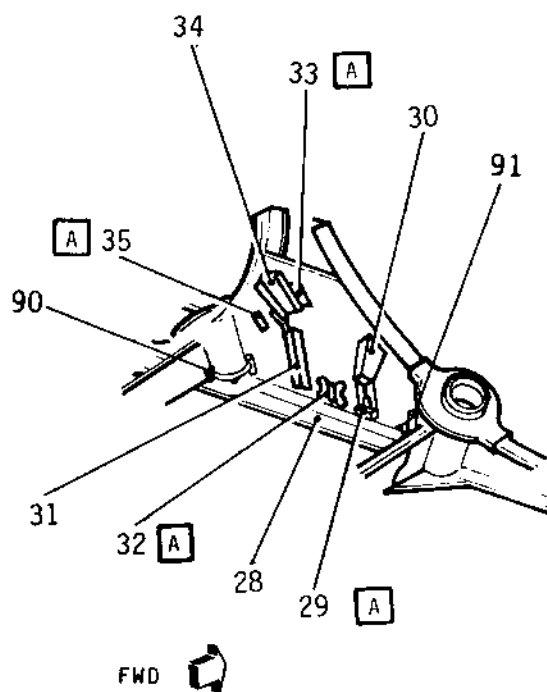
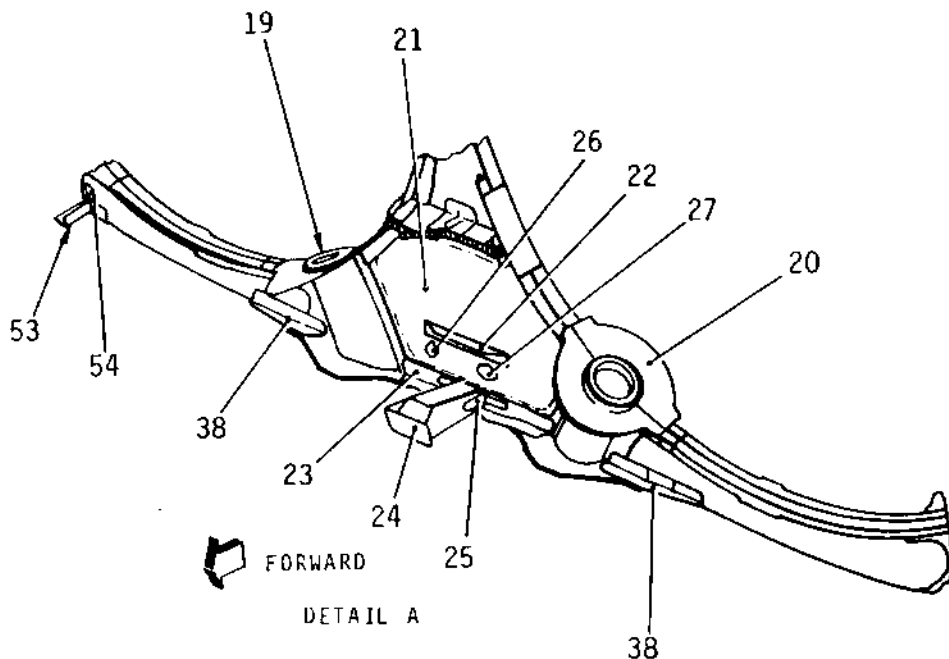
Page 357

Nov 30/77

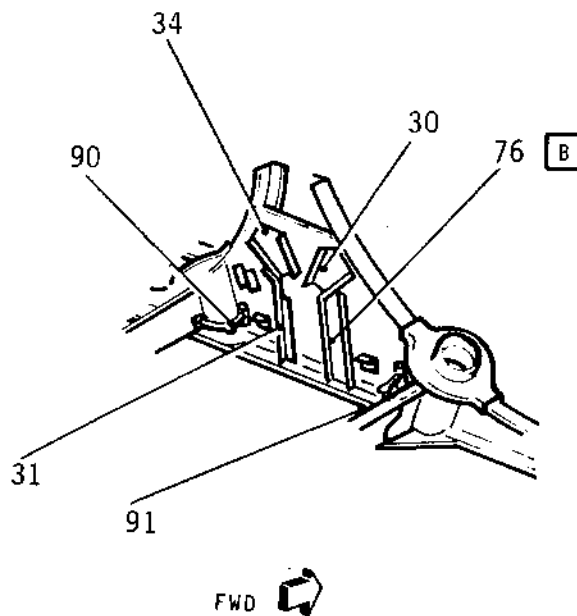


OLYMPUS 593

MK.610-14-28  
OVERHAUL



DETAIL B [A]



DETAIL B [B]

Twin Secondary Nozzle - Identification  
Figure 305 (Sheet 4 of 10)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 358

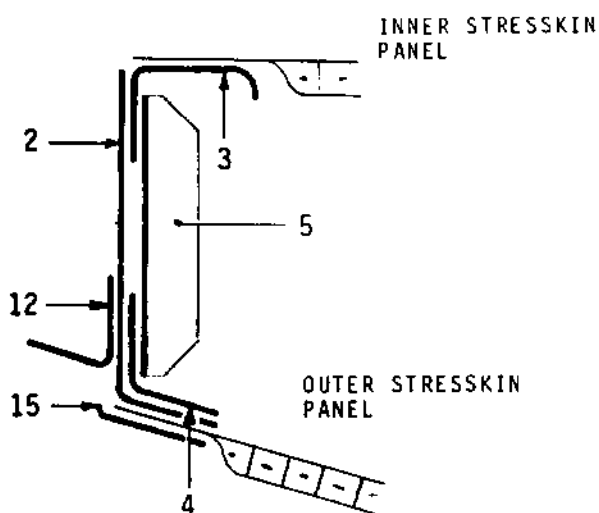
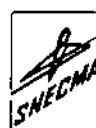
Nov 30/77

PRINTED IN FRANCE

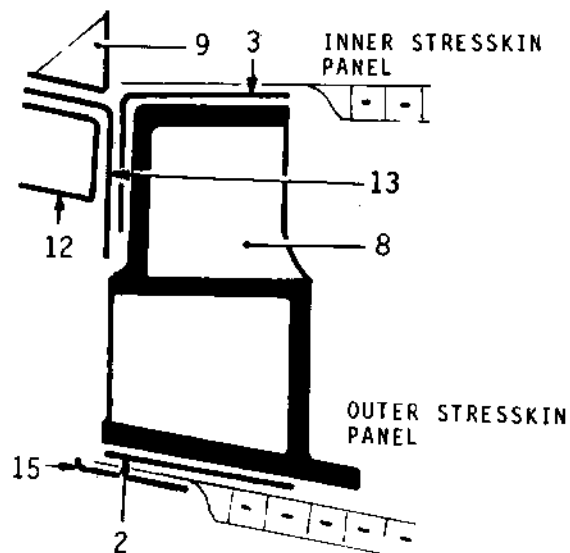


OLYMPUS 593

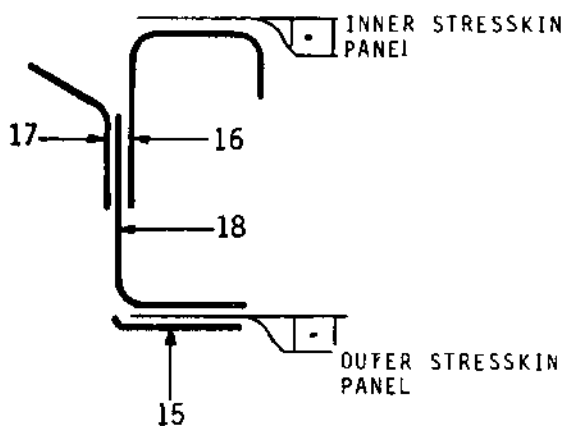
MK.610-14-28  
OVERHAUL



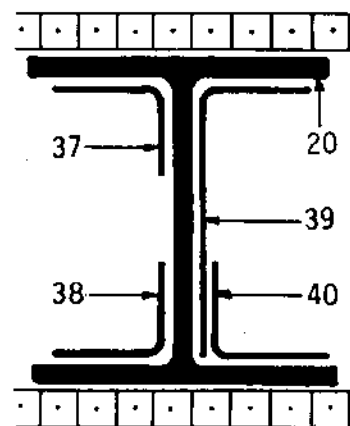
← FWD  
DETAIL C



← FWD  
DETAIL D



← FWD  
DETAIL E



← FWD  
DETAIL F

Twin Secondary Nozzle - Identification  
Figure 305 (Sheet 5 of 10)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

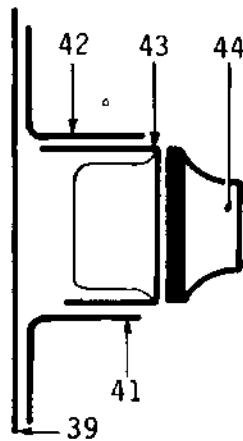
Page 359

Nov 30/77

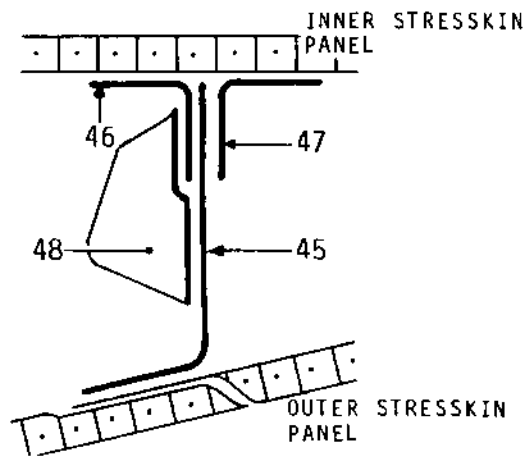


OLYMPUS 593

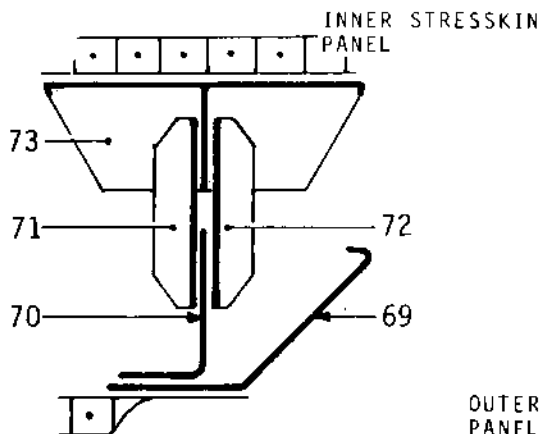
MK.610-14-28  
OVERHAUL



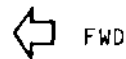
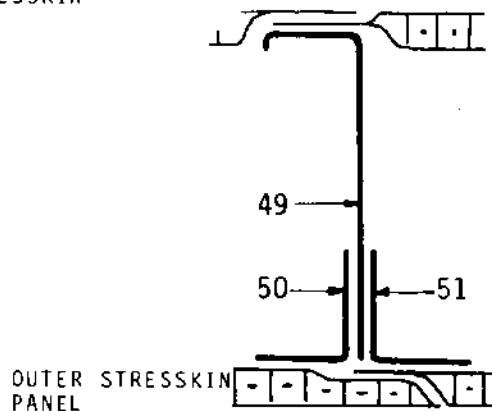
DETAIL G



DETAIL H



DETAIL J



DETAIL K

Twin Secondary Nozzle - Identification  
Figure 305 (Sheet 6 of 10)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 360

Nov 30/77

PRINTED IN FRANCE



**OLYMPUS 593**

MK.610-14-28

OVERHAUL



PRINTED IN FRANCE

ITEM NO.	DESCRIPTION	MATERIAL		
		MADE FROM	THICKNESS IN	MM
1	Fitting	TA6V		
2	Panel	P3305	0.050	1,3
3	Angle	P3305	0.050	1,3
4	Angle	P3305	0.050	1,3
5	Angle	P3305	0.050	1,3
6	Angle	P3305	0.050	1,3
7	Angle	P3305	0.050	1,3
8	Fitting	TA6V		
9	Fitting	TA6V		
10	Fitting	TA6V		
11	Fitting	TA6V		
12	Angle	P3305	0.050	1,3
13	Angle	P3305	0.050	1,3
14	Angle	P3305	0.050	1,3
15	Rub strip	P3305	0.050	1,3
16	Angle	P3305	0.050	1,3
17	Angle	P3305	0.050	1,3
18	Angle	P3305	0.050	1,3
19	Fitting	Z5CNU17		
20	Fitting	Z5CNU17		
21	Stresskin panel (welded)	P3702	0.024	0,6
22	Angle	P3305	0.063	1,6
23	Angle	P3305	0.050	1,3

Twin Secondary Nozzle - Identification  
Figure 305 (Sheet 7 of 10)

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 361

Nov 30/77

**78-13-01**

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

ITEM NO.	DESCRIPTION	MATERIAL		
		MADE FROM	THICKNESS IN	MM
24	Fitting	TA6V		
25	Clip	P3305	0.063	1,6
26	Plate	P3305	0.050	1,3
27	Plate	P3305	0.050	1,3
28	Angle	P3305	0.040	1,0
29	Fitting	TA6V		
30	Channel	P3305	0.040	1,0
31	Angle	P3305	0.040	1,0
32	Fitting	TA6V		
33	Clip	P3305	0.050	1,3
34	Channel	P3305	0.040	1,0
35	Clip	P3305	0.050	1,3
36	Angle	P3305	0.063	1,6
37	Angle	P3305	0.050	1,3
38	Angle	P3305	0.040	1,0
39	Web	P3305	0.040	1,0
40	Angle	P3305	0.040	1,0
41	Angle	P3305	0.060	1,5
42	Angle	P3305	0.060	1,5
43	Bracket	P3305	0.060	1,5
44	Fitting	Z5CNU17		
45	Beam	P3305	0.063	1,6
46	Angle	P3305	0.050	1,3

Twin Secondary Nozzle - Identification  
Figure 305 (Sheet 8 of 10)

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

**78-13-01**

Page 362

Nov 30/77

PRINTED IN FRANCE

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

PRINTED IN FRANCE

ITEM NO.	DESCRIPTION	MATERIAL		
		MADE FROM	THICKNESS IN	MM
47	Angle	P3305	0.050	1,3
48	Clip	P3305	0.063	1,6
49	Web	P3305	0.040	1,0
50	Angle	P3305	0.040	1,0
51	Angle	P3305	0.040	1,0
52	Fitting	TA6V		
53	Angle	P3305	0.040	1,0
54	Clip	P3305	0.040	1,0
55	Angle	P3305	0.040	1,0
56	Angle assy	P3305	0.040	1,0
57	Clip	P3305	0.040	1,0
58	Clip	P3305	0.040	1,0
59	Clip	P3305	0.040	1,0
60	Clip	P3305	0.040	1,0
61	Angle	P3305	0.040	1,0
62	Zee	P3305	0.040	1,0
63	Zee	P3305	0.040	1,0
64	Beam	P3305	0.040	1,0
65	Clip	P3305	0.040	1,0
66	Clip	P3305	0.040	1,0
67	Clip	P3305	0.040	1,0
68	Clip	P3305	0.040	1,0
69	Angle	P3305	0.063	1,6

Twin Secondary Nozzle - Identification  
Figure 305 (Sheet 9 of 10)

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

**78-13-01**Page 363  
Nov 30/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL

ITEM NO	DESCRIPTION	MATERIAL		
		MADE FROM	THICKNESS IN	MM
70	Clip	P3305	0.063	1,6
71	Angle	P3305	0.032	0,8
72	Angle	P3305	0.032	0,8
73	Bracket assy	P3305	0.063	1,6
74	Fitting	NC19FeNb		
75	Fitting	NC19FeNb		
76	Support	P3305	0.040	1,0
77	Welded support	Z10CNT18		
78	Welded support	Z10CNT18		
79	Welded support	P3305	0.040	1,0
80	Welded support	P3305	0.040	1,0
81	Welded bracket	P3301	0.060	1,5
82	Welded bracket	P3301	0.060	1,5
83	Angle	P3305	0.080	2,0
84	Angle	P3305	0.040	1,0
85	Angle	P3301	0.060	1,5
86	Angle	P3301	0.060	1,5
87	Doubler	P3305	0.060	1,5
88	Support	P3301	0.060	1,5
89	Angle	P3301	0.060	1,5
90	Welded support	Z10CNT18		
91	Welded support	Z10CNT18		

Twin Secondary Nozzle - Identification  
Figure 305 (Sheet 10 of 10)

**78-13-01**

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 364

Nov 30/77

PRINTED IN FRANCE



OLYMPUS 593

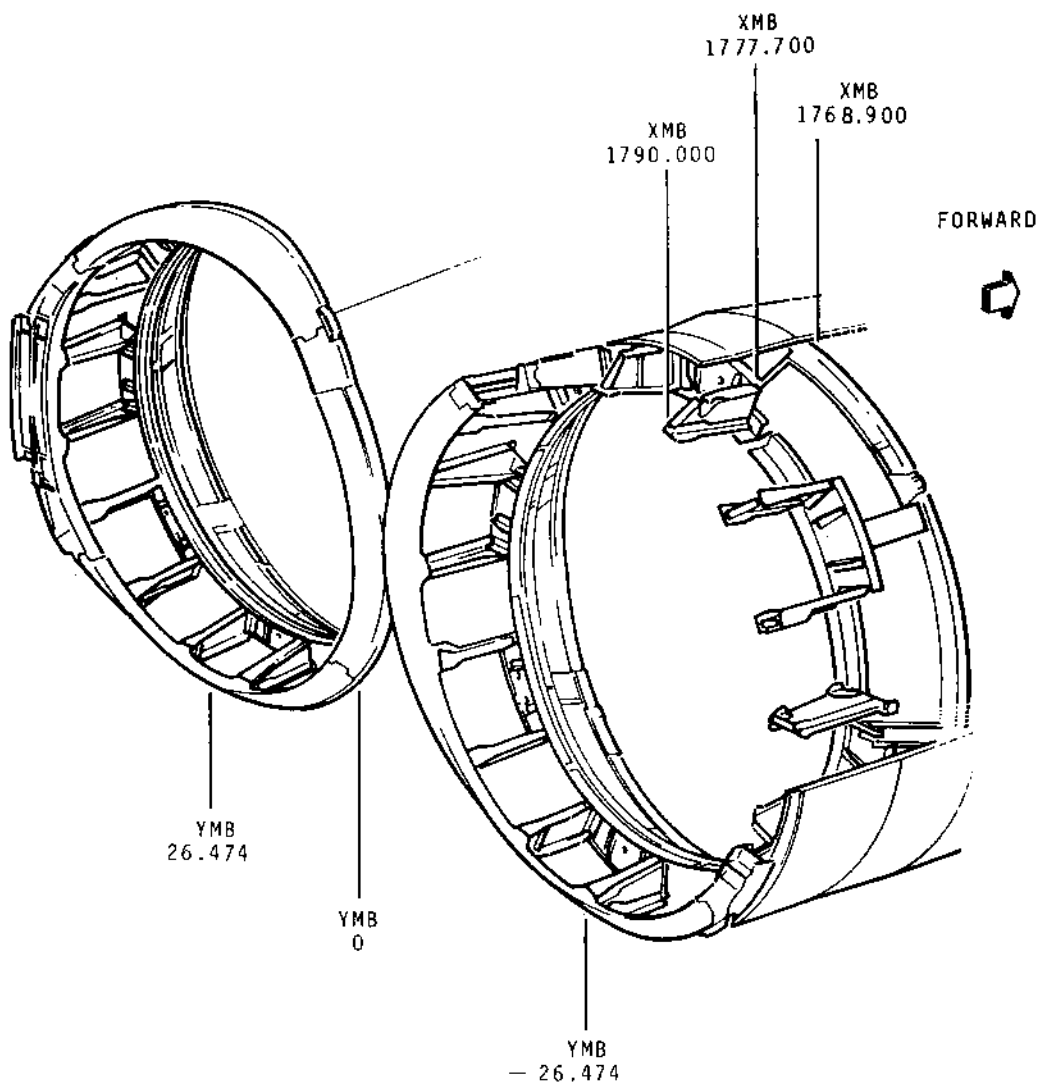
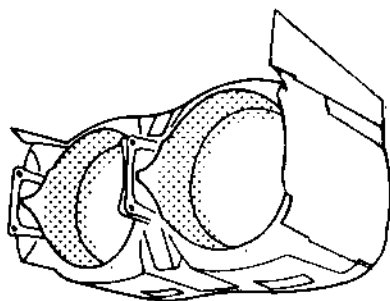
MK.610-14-28

OVERHAUL



NOTE : L.H. TWIN SECONDARY NOZZLE  
THROAT SECTIONS SHOWN.

R.H. TWIN SECONDARY NOZZLE  
THROAT SECTION, OPPOSITE HAND.



Twin Secondary Nozzle - Identification  
Figure 306 (Sheet 1 of 7)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

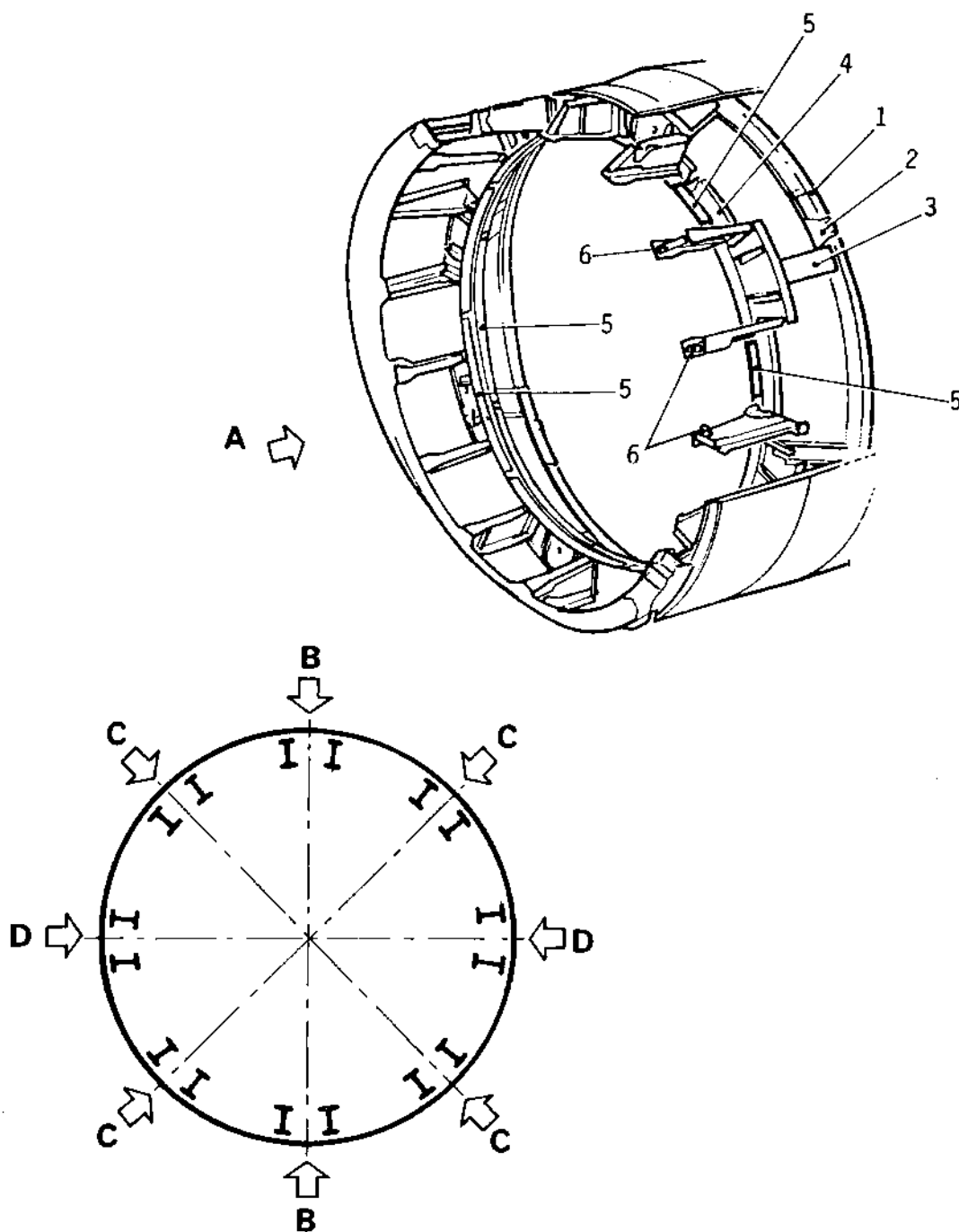
Page 365

Nov 30/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE

Twin Secondary Nozzle - Identification  
Figure 306 (Sheet 2 of 7)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 366

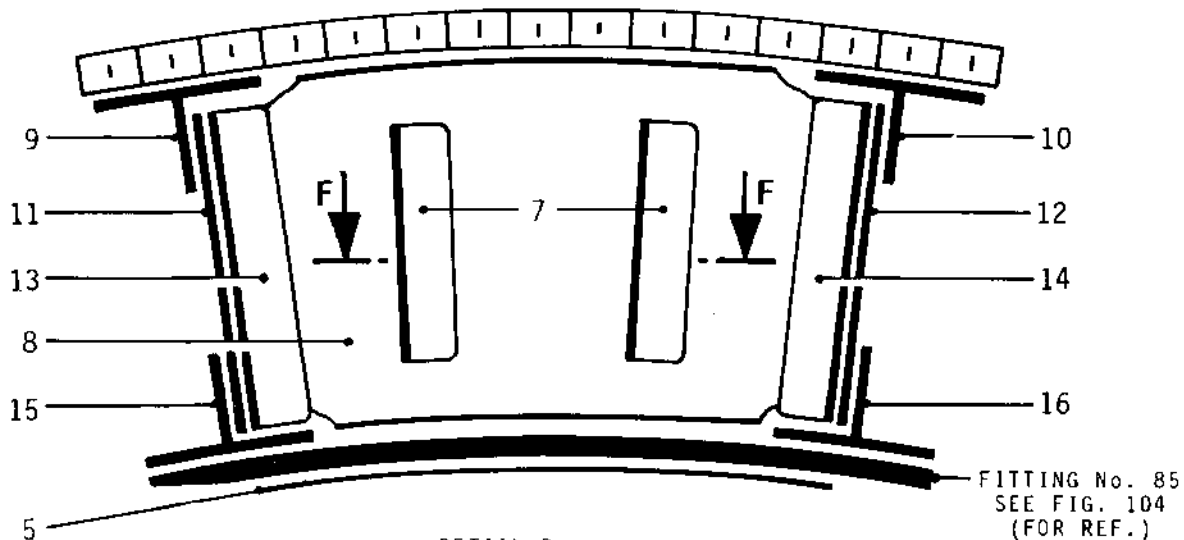
Nov 30/77



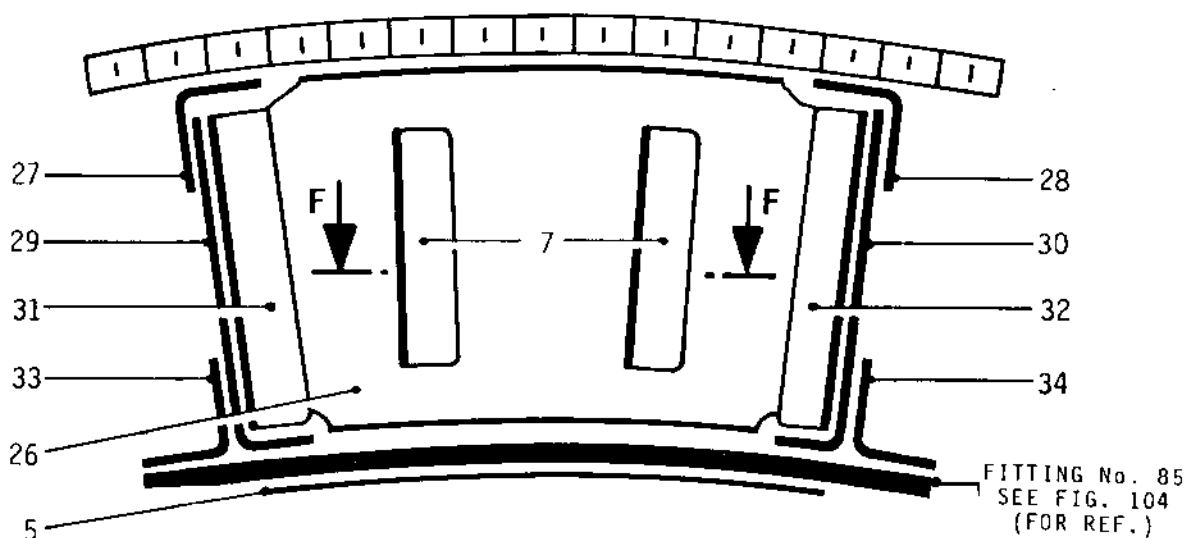
OLYMPUS 593

MK. 610-14-28

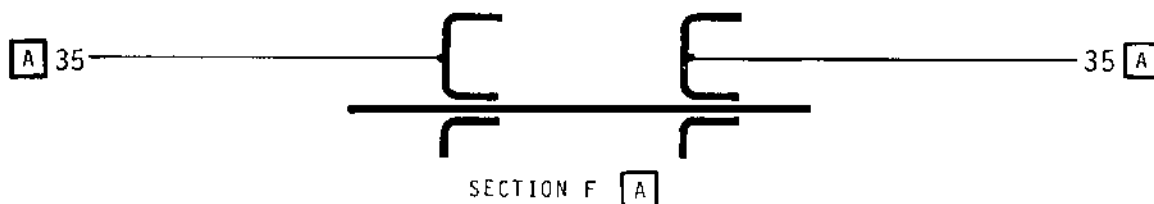
OVERHAUL



DETAIL B



DETAIL D



Twin Secondary Nozzle - Identification  
Figure 306 (Sheet 3 of 7)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

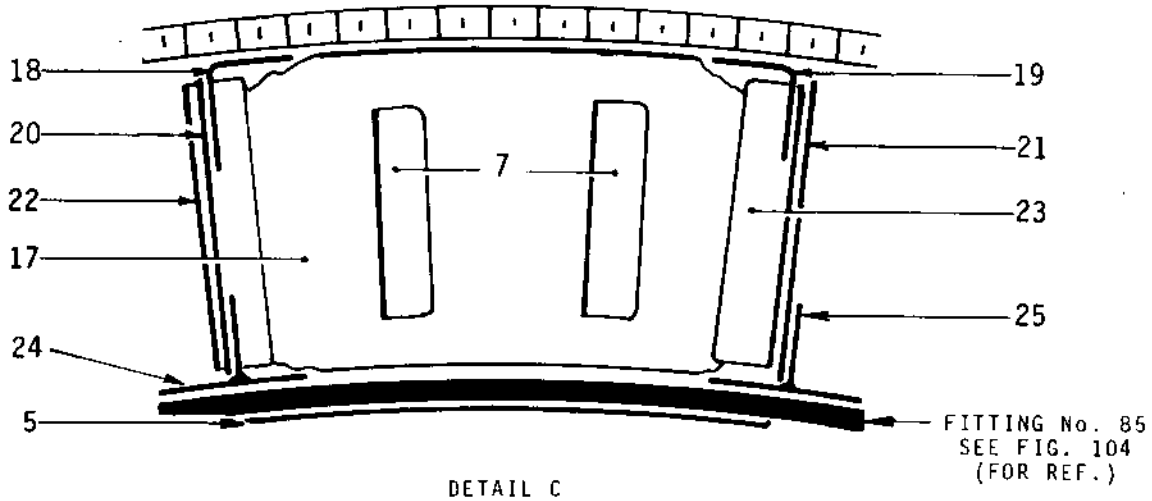
Page 367

Nov 30/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE

Twin Secondary Nozzle-Identification  
Figure 306 (Sheet 4 of 7)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 368

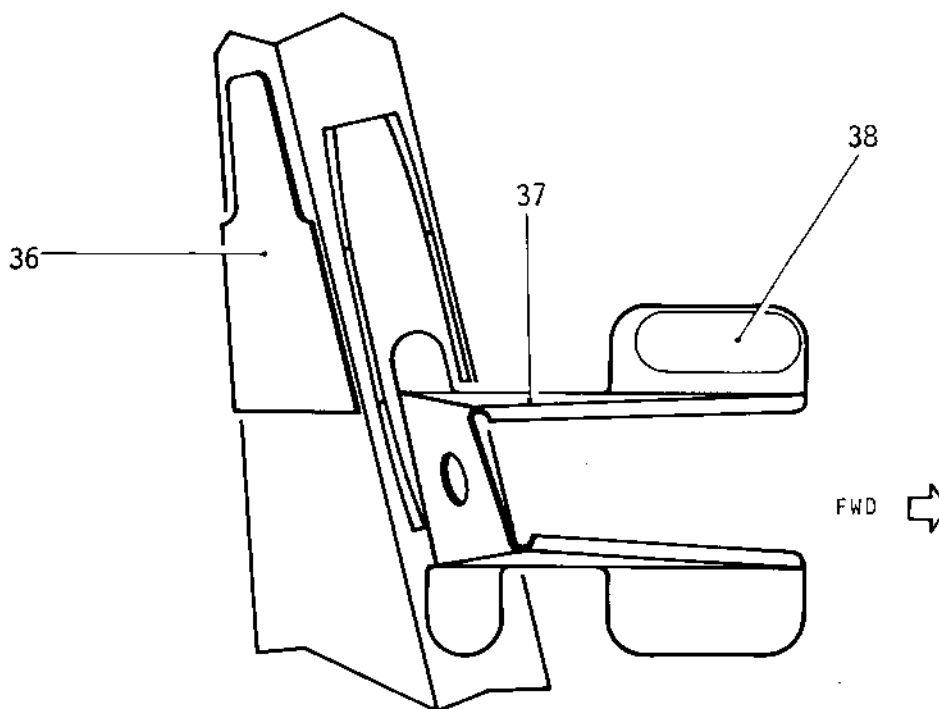
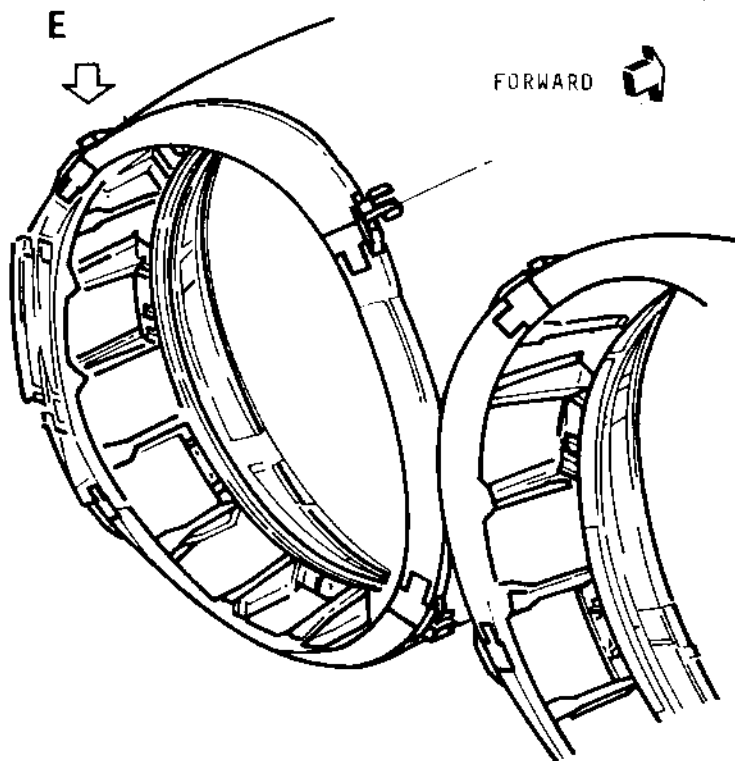
Nov 30/77





OLYMPUS 593

MK. 610-14-28  
OVERHAUL



DETAIL E

Twin Secondary Nozzle - Identification  
Figure 306 (Sheet 5 of 7)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 369

Nov 30/77

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

ITEM NO.	DESCRIPTION	MATERIAL		
		MADE FROM	THICKNESS IN	MM
1	Angle	P3305	0.050	1,3
2	Angle	P3305	0.050	1,3
3	Angle	P3305	0.050	1,3
4	Ring	NC19FeNb		
5	Rub strip	P3323	0.040	1,0
6	Clip	P 3305	0,050	1,3
7	Angle	P3305	0,040	1,0
8	Web	P3305	0,040	1,0
9	Tee	Z5CNU17		
10	Tee	Z5CNU17		
11	Web	P3305	0,063	1,6
12	Web	P3305	0,063	1,6
13	Clip	P3305	0,063	1,6
14	Clip	P3305	0,063	1,6
15	Support	Z5CNU17		
16	Support	Z5CNU17		
17	Web	P3305	0.040	1,0
18	Support	Z5CNU17		
19	Support	Z5CNU17		
20	Web	P3305	0,050	1,3
21	Web	P3305	0.050	1,3
22	Clip	P3305	0.050	1,3

PRINTED IN FRANCE

Twin Secondary Nozzle - Identification  
Figure 306 (Sheet 6 of 7)

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

**78-13-01**

Page 370

Nov 30/77

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



PRINTED IN FRANCE

ITEM NO	DESCRIPTION	MATERIAL		
		MADE FROM	THICKNESS IN	MM
23	Clip	P3305	0.050	1,3
24	Support	Z5CNU17		
25	Support	Z5CNTI7		
26	Web	P3305	0.040	1,0
27	Angle	P3305	0.050	1,3
28	Angle	P3305	0.050	1,3
29	Web	P3305	0.040	1,0
30	Web	P3305	0.040	1,0
31	Clip	P3305	0.050	1,3
32	Clip	P3305	0.050	1,3
33	Clip	P3305	0.050	1,3
34	Clip	P3305	0.050	1,3
35	Clip	P3305	0.050	1,3
36	Seal	P3301	0.050	1,3
37	Support	P3326	0.063	1,6
38	Shim	P3301	0.040	1,0

Twin Secondary Nozzle - Identification  
Figure 306 (Sheet 7 of 7)

**78-13-01**

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

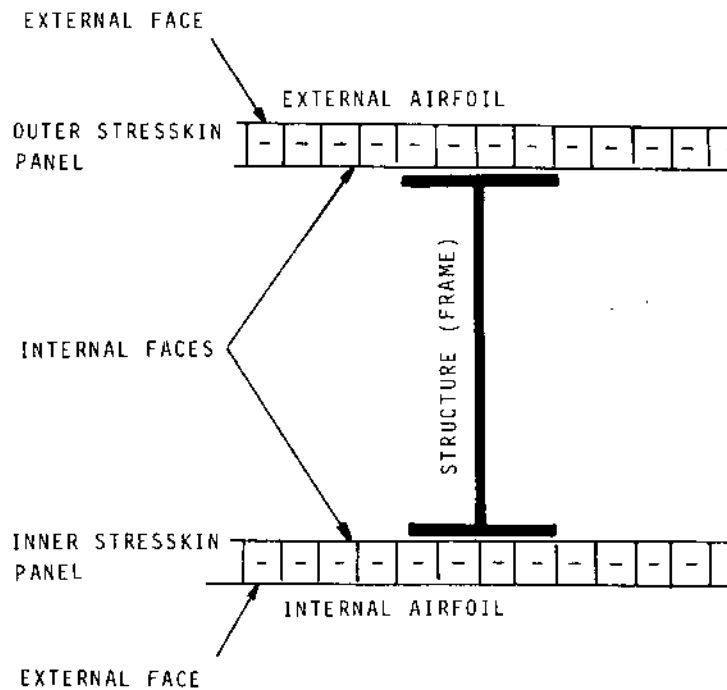
Page 371

Nov 30/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE

DEFINITION OF THE TERMS USED TO IDENTIFY THE STRESSKIN PANELS.

Twin Secondary Nozzle - Identification  
Figure 307

**78-13-01**

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 372  
Nov 30/77



# OLYMPUS 593

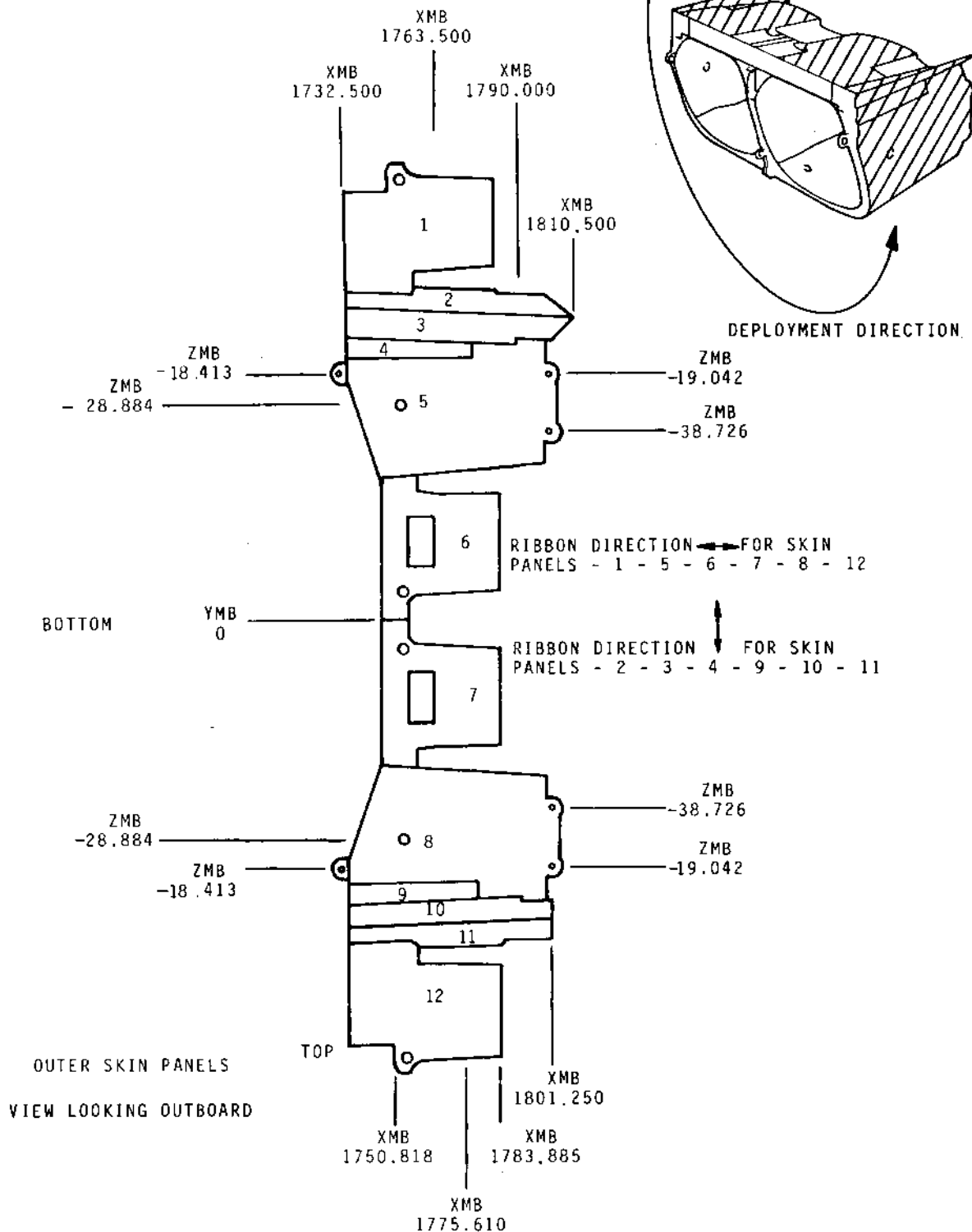
MK.610-14-28

OVERHAUL



NOTE : L.H. SECONDARY NOZZLE SHOWN  
R.H. SECONDARY NOZZLE, OPPOSITE HAND

PRINTED IN FRANCE



Twin Secondary Nozzle - Identification  
Figure 308 (Sheet 1 of 9)

## 78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

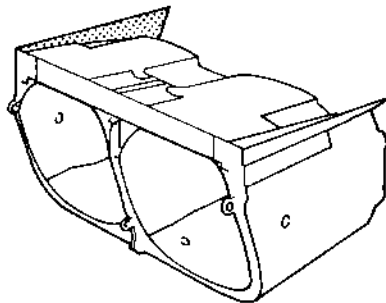
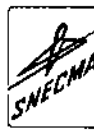
Page 373

Nov 30/77

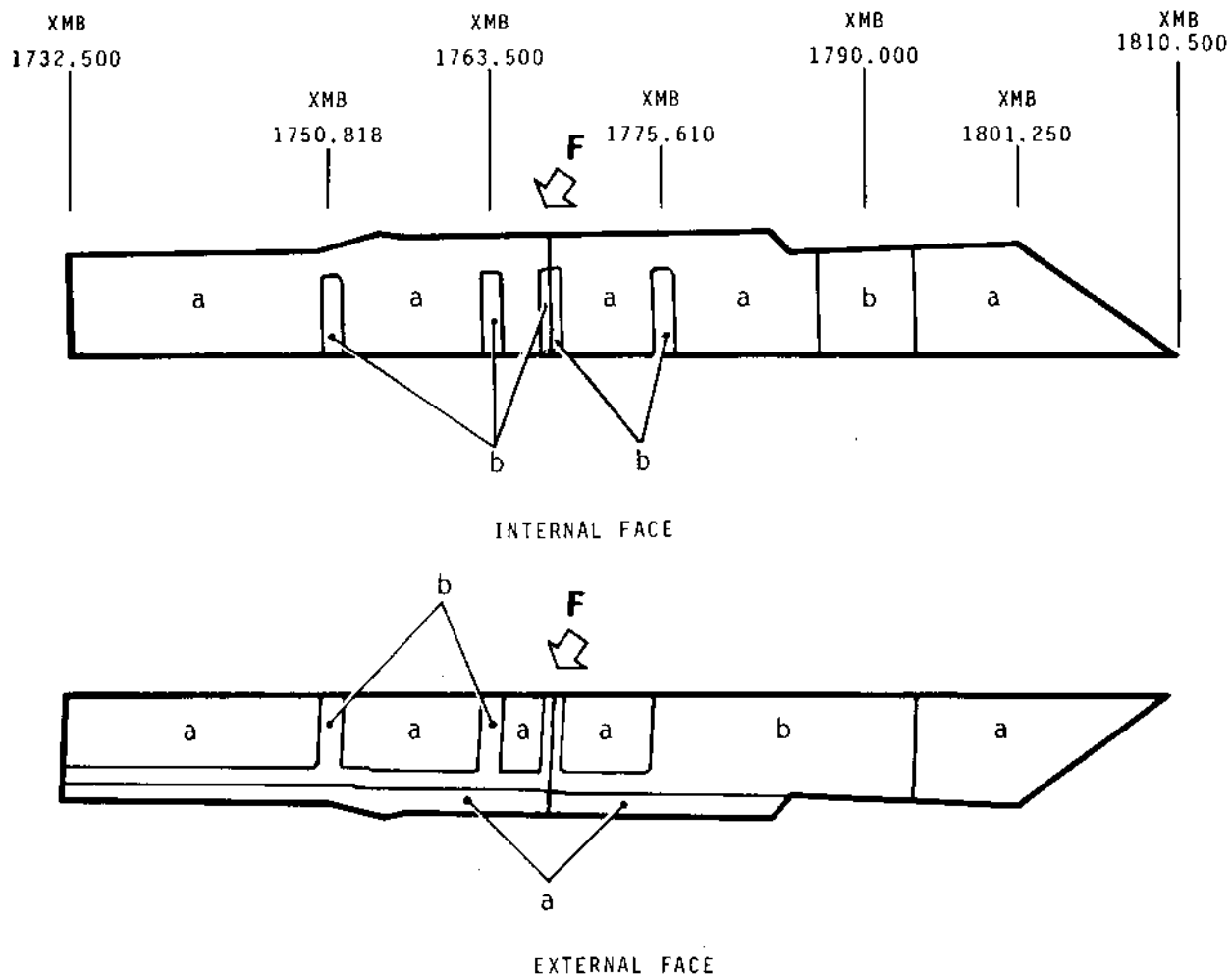


# OLYMPUS 593

MK.610-14-28  
OVERHAUL



IDENT	THICKNESS	
	in	mm
a	0.012	0,30
b	0.018	0,46



PANEL 2 BAY 2 (DRG.301-025-801-0)  
VALID FOR NOZZLES SERIAL NO. 309 ONWARD  
BAY 3 (DRG.301-025-851-0)  
VALID FOR NOZZLES SERIAL NO. 310 ONWARD

Twin Secondary Nozzle - Identification  
Figure 308 (Sheet 2 of 9)

## 78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 374

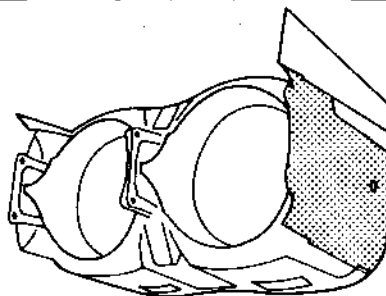
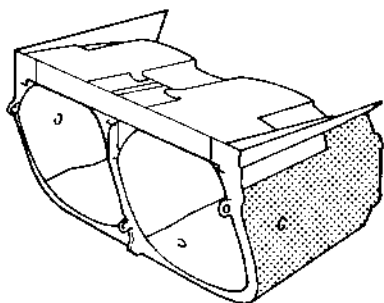
Nov 30/77



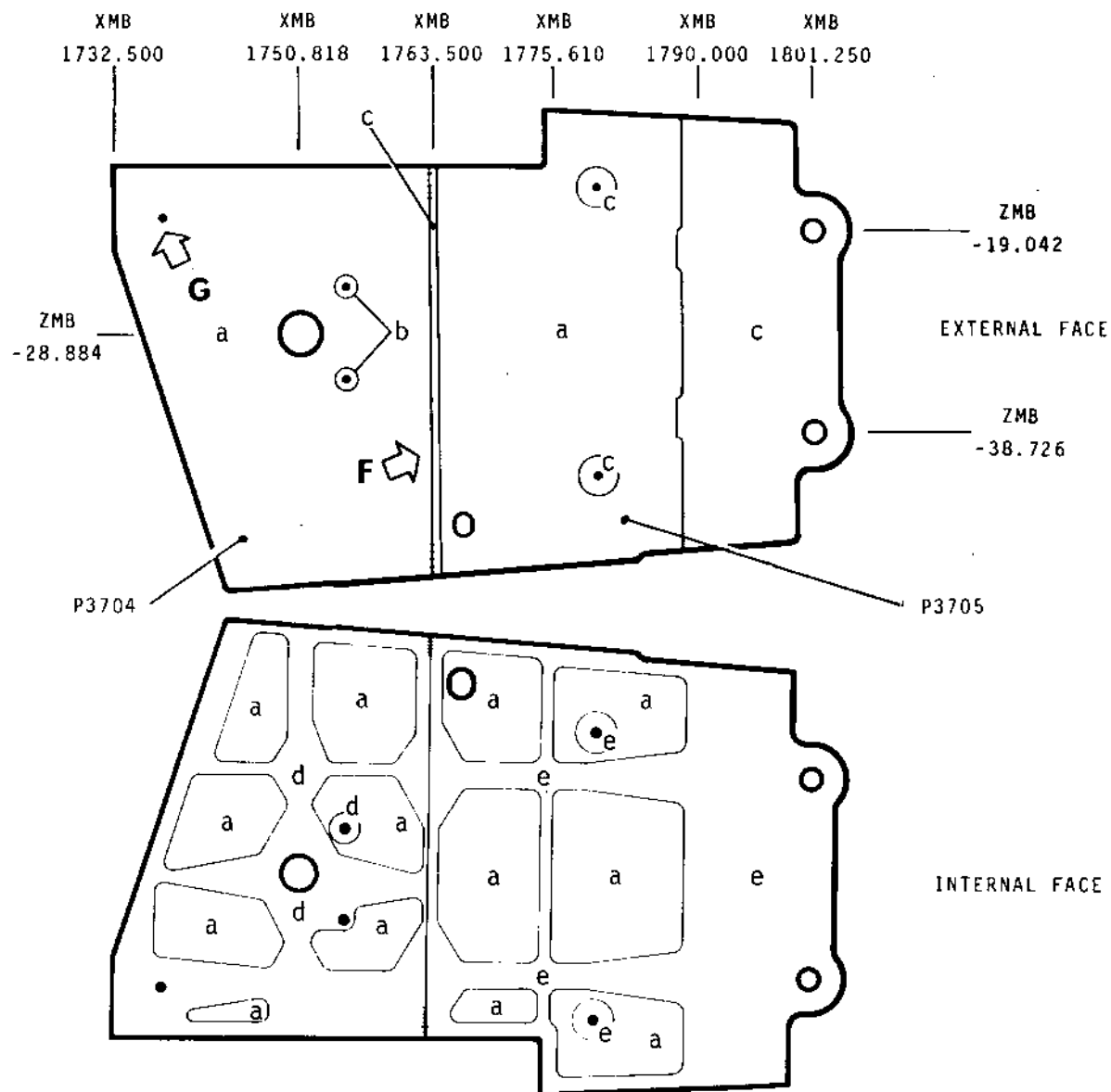
OLYMPUS 593

MK.610-14-28

OVERHAUL



IDENT	THICKNESS	
	in	mm
a.	0.012	0,30
b.	0.014	0,36
c.	0.016	0,41
d.	0.018	0,46
e.	0.024	0,61



PANEL 5 (DRG.300-860-002-0)

BAY 1 - BAY 3

VALID FOR NOZZLES SERIAL NO. 309 TO 326 AND 328

PANEL 8 (DRG.300-860-052-0)

BAY 2 - BAY 4

VALID FOR NOZZLES SERIAL NO. 309 TO 330

Twin Secondary Nozzle - Identification  
Figure 308 (Sheet 3 of 9)

78-13-01

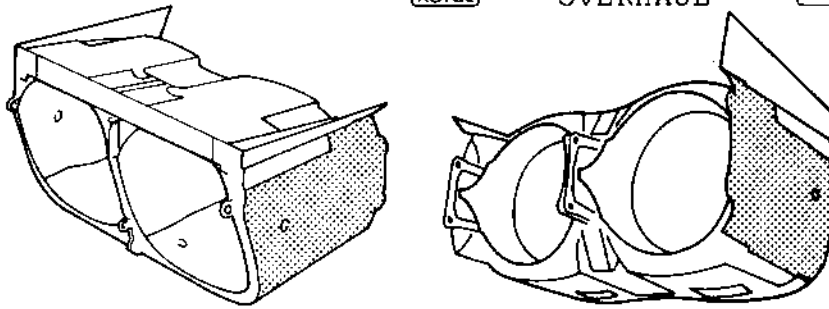
BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 375  
Nov 30/77



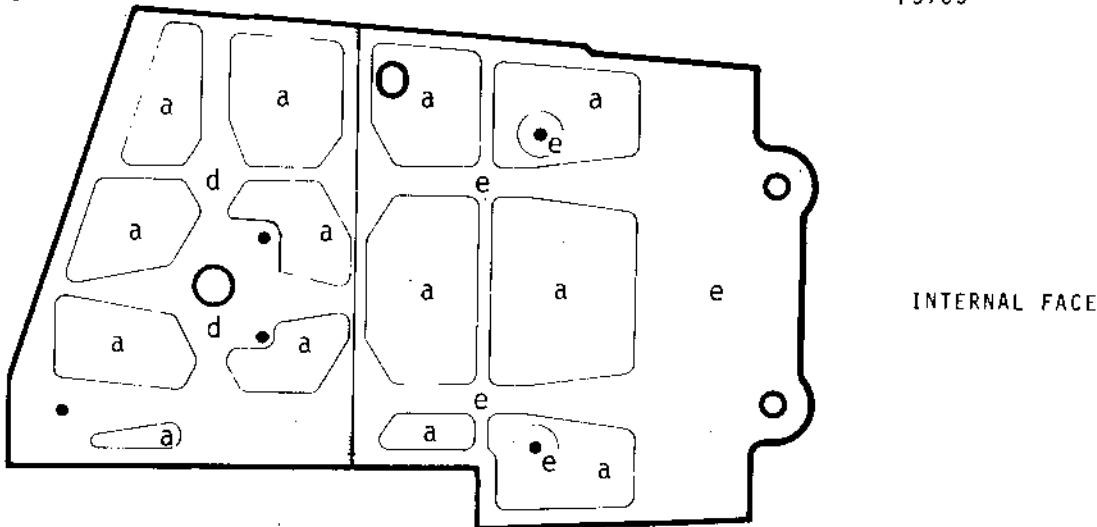
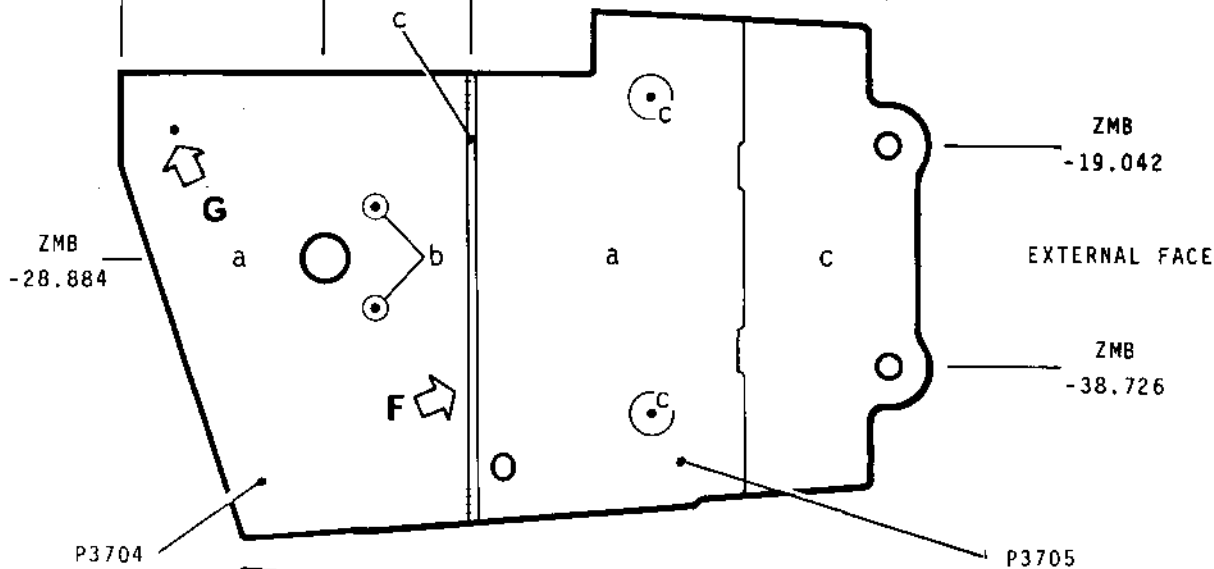
OLYMPUS 593

MK.610-14-28  
OVERHAUL



IDENT	THICKNESS	
	in	mm
a	0.012	0,30
b	0.014	0,36
c	0.016	0,41
d	0.018	0,46
e	0.024	0,61

XMB 1732.500 XMB 1750.818 XMB 1763.500 XMB 1775.610 XMB 1790.000 XMB 1801.250



PANEL 5 (DRG.300-860-003-0)  
BAY 1 - BAY 3

PANEL 8 (DRG.300-860-053-0)  
BAY 2 - BAY 4

VALID FOR NOZZLES SERIAL NO. 327,329,330 ONWARD VALID FOR NOZZLES SERIAL NO. 331, 332 ONWARD

Twin Secondary Nozzle - Identification  
Figure 308 (Sheet 4 of 9)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 376

Nov 30/77

PRINTED IN FRANCE



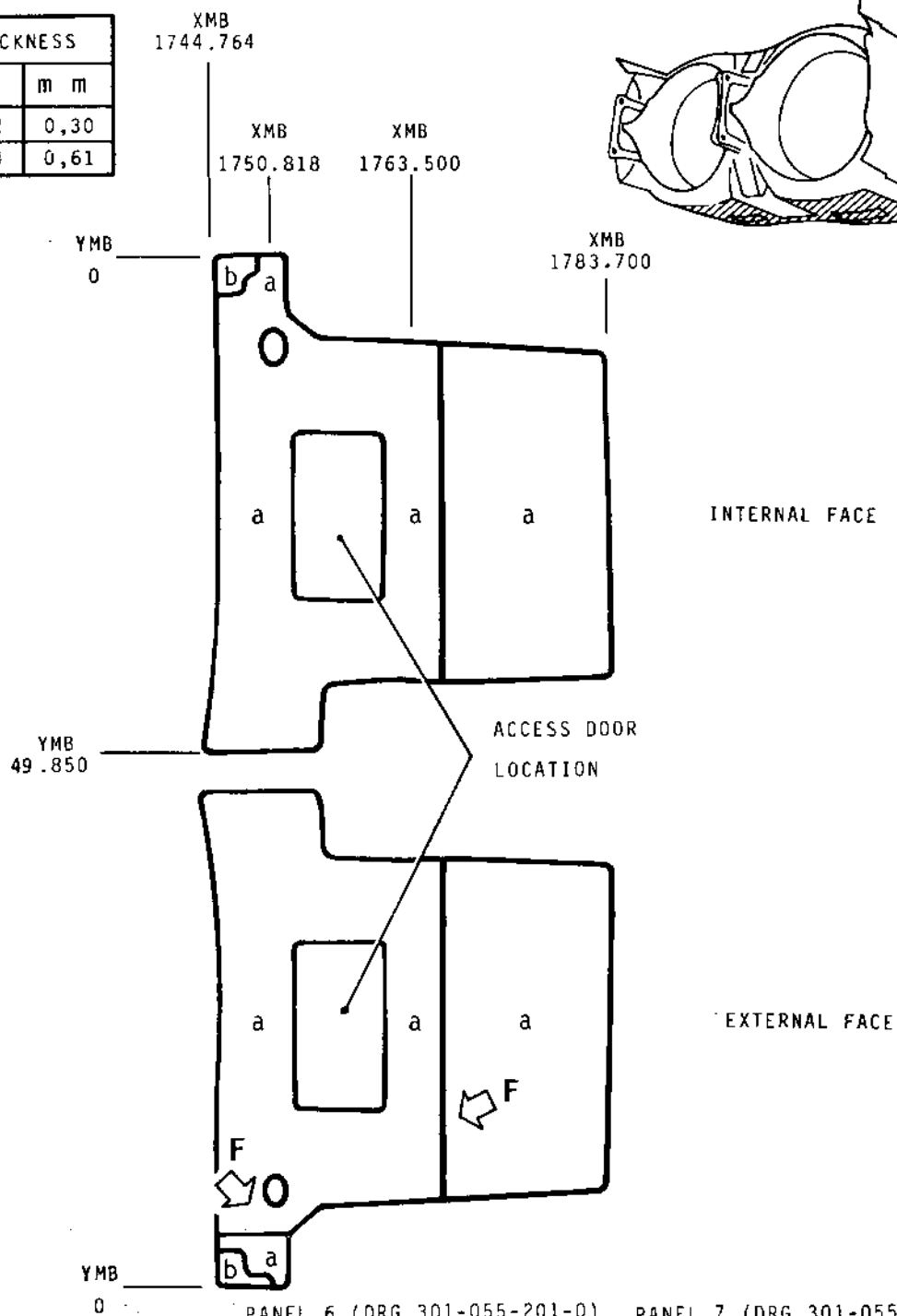
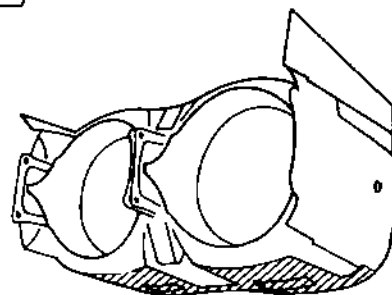


OLYMPUS 593

MK.610-14-28  
OVERHAUL



IDENT	THICKNESS	
	in	mm
a	0.012	0,30
b	0.024	0,61



PANEL 6 (DRG.301-055-201-0)  
BAY 1 - BAY 3

PANEL 7 (DRG.301-055-251-0)  
BAY 2 - BAY 4

VALID FOR NOZZLES SERIAL NO. 309, 310 ONWARD

Twin Secondary Nozzle - Identification  
Figure 308 (Sheet 5 of 9)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

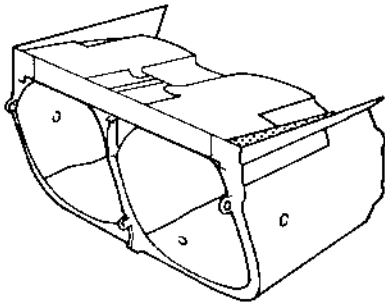
Page 377

Nov 30/77

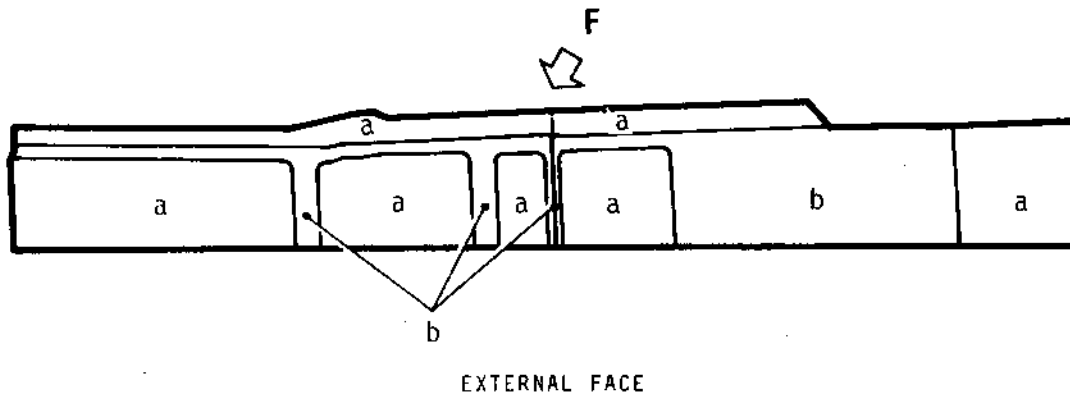
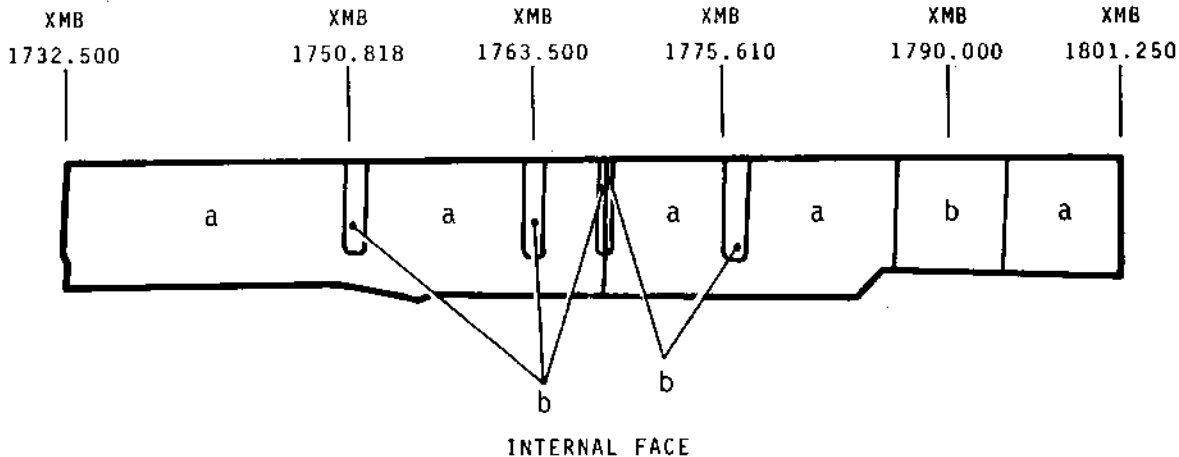


OLYMPUS 593

MK.610-14-28  
OVERHAUL



IDENT	THICKNESS	
	in	mm
a	0.012	0,30
b	0.018	0,46



PANEL 11 BAY 1 (DRG.301-018-101-0)  
VALID FOR NOZZLES SERIAL NO. 309 ONWARD

BAY 4 (DRG.301-018-151-0)  
VALID FOR NOZZLES SERIAL NO. 310 ONWARD

Twin Secondary Nozzle - Identification  
Figure 308 (Sheet 6 of 9)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 378

Nov 30/77

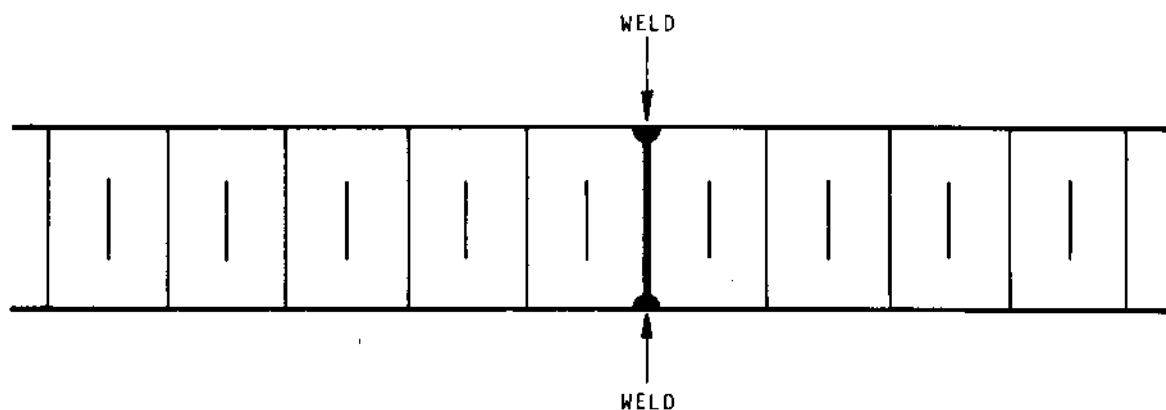
PRINTED IN FRANCE

PRINTED IN FRANCE

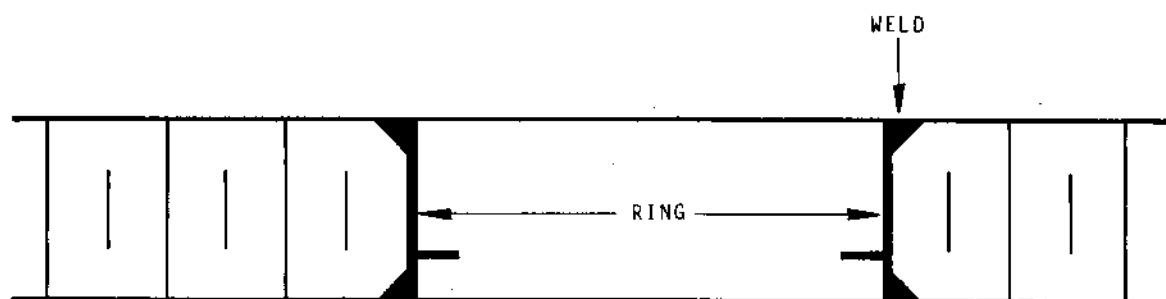


OLYMPUS 593

MK.610-14-28  
OVERHAUL



DETAIL F



BORESCOPE ORIFICE

DETAIL G

Twin Secondary Nozzle - Identification  
Figure 308 (Sheet 7 of 9)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 379  
Nov 30/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL

ITEM NO	DESCRIPTION	MATERIAL		
		MADE FROM	THICKNESS	
			IN.	MM
1	Stresskin Panel (Welded)	P3700	0.012	0,30
2	Stresskin Panel (Welded)	P3707		
3	Stresskin Panel (Welded)	P3710	0.012	0,30
4	Stresskin Panel (Welded)	P3700	0.012	0,30
5	Stresskin Panel (Welded)	P3704 P3705		
6	Stresskin Panel (Welded)	P3700 P3702		
7	Stresskin Panel (Welded)	P3700 P3702		
8	Stresskin Panel (Welded)	P3704 P3705		
9	Stresskin Panel (Welded)	P3700	0.012	0,30
10	Stresskin Panel (Welded)	P3710	0.012	0,30
11	Stresskin Panel (Welded)	P3707		
12	Stresskin Panel (Welded)	P3700	0.012	0,30
13	Access door L.H. Nozzle 418 AT R.H. Nozzle 438 AT	P3700	0.012	0,30

Twin Secondary Nozzle - Identification  
Figure 308 (Sheet 8 of 9)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 380

Nov 30/77

PRINTED IN FRANCE



OLYMPUS 593

MK. 610-14-28  
OVERHAUL

PRINTED IN FRANCE

ITEM NO	DESCRIPTION	MATERIAL		
		MADE FROM	THICKNESS IN.	MM
14	Access door L.H.Nozzle 417 AT R.H.Nozzle 437 AT	P3700	0.012	0,30
15	Access door L.H.Nozzle 417 BB R.H.Nozzle 437 BB	P3700	0.012	0,30
16	Access door L.H.Nozzle 417 AB R.H.Nozzle 437 AB	P3700	0.012	0,30
17	Access door L.H.Nozzle 418 AB R.H.Nozzle 438 AB	P3700	0.012	0,30
18	Access door L.H.Nozzle 427 AB R.H.Nozzle 447 AB	P3700	0.012	0,30
19	Access door L.H.Nozzle 428 AB R.H.Nozzle 448 AB	P3700	0.012	0,30
20	Access door L.H.Nozzle 428 AT R.H.Nozzle 448 AT	P3700	0.012	0,30
21	Access door L.H.Nozzle 427 AT R.H.Nozzle 447 AT	P3700	0.012	0,30
22	Access door L.H.Nozzle 418 CT R.H.Nozzle 438 CT	P3700	0.012	0,30

Twin Secondary Nozzle - Identification  
Figure 308 (Sheet 9 of 9)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 381

Nov 30/77

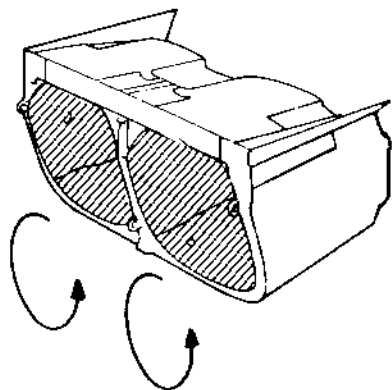


OLYMPUS 593

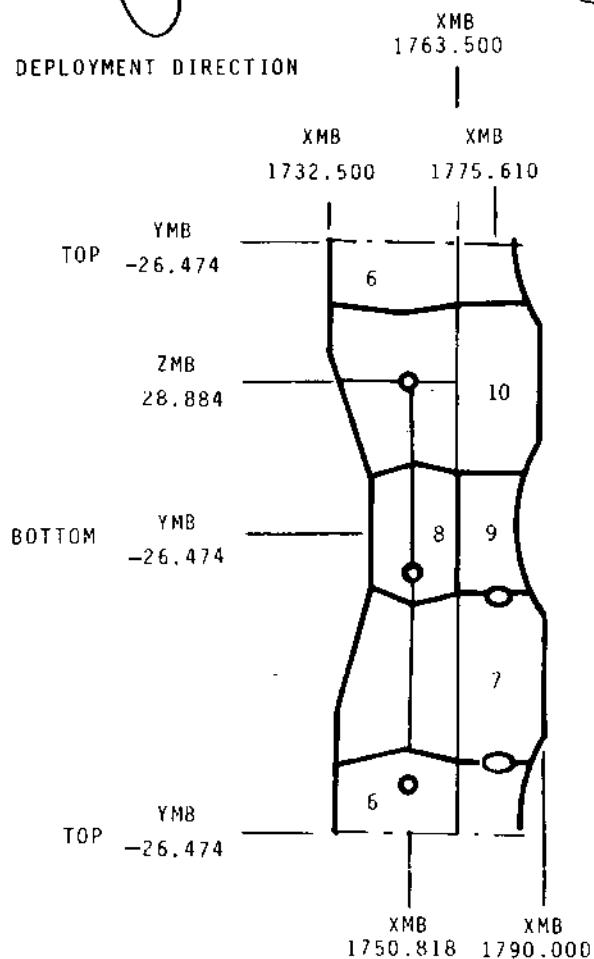
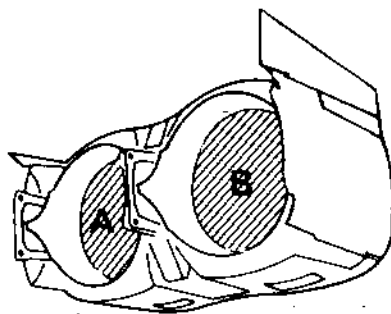
MK.610-14-28  
OVERHAUL



NOTE : L.H. SECONDARY NOZZLE SHOWN  
R.H. SECONDARY NOZZLE, OPPOSITE HAND

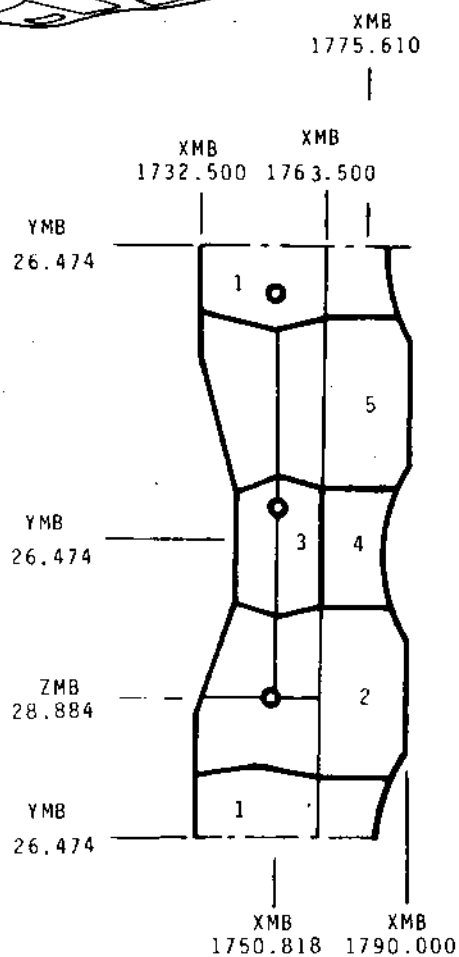


DEPLOYMENT DIRECTION



ZONE B

INNER SKIN PANELS



ZONE A

Twin Secondary Nozzle - Identification  
Figure 309 (Sheet 1 of 16)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

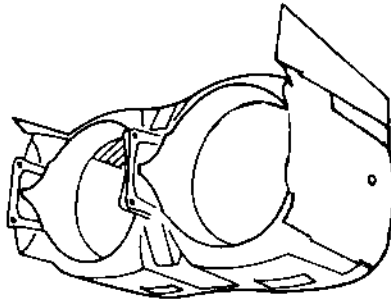
Page 382

Nov 30/77

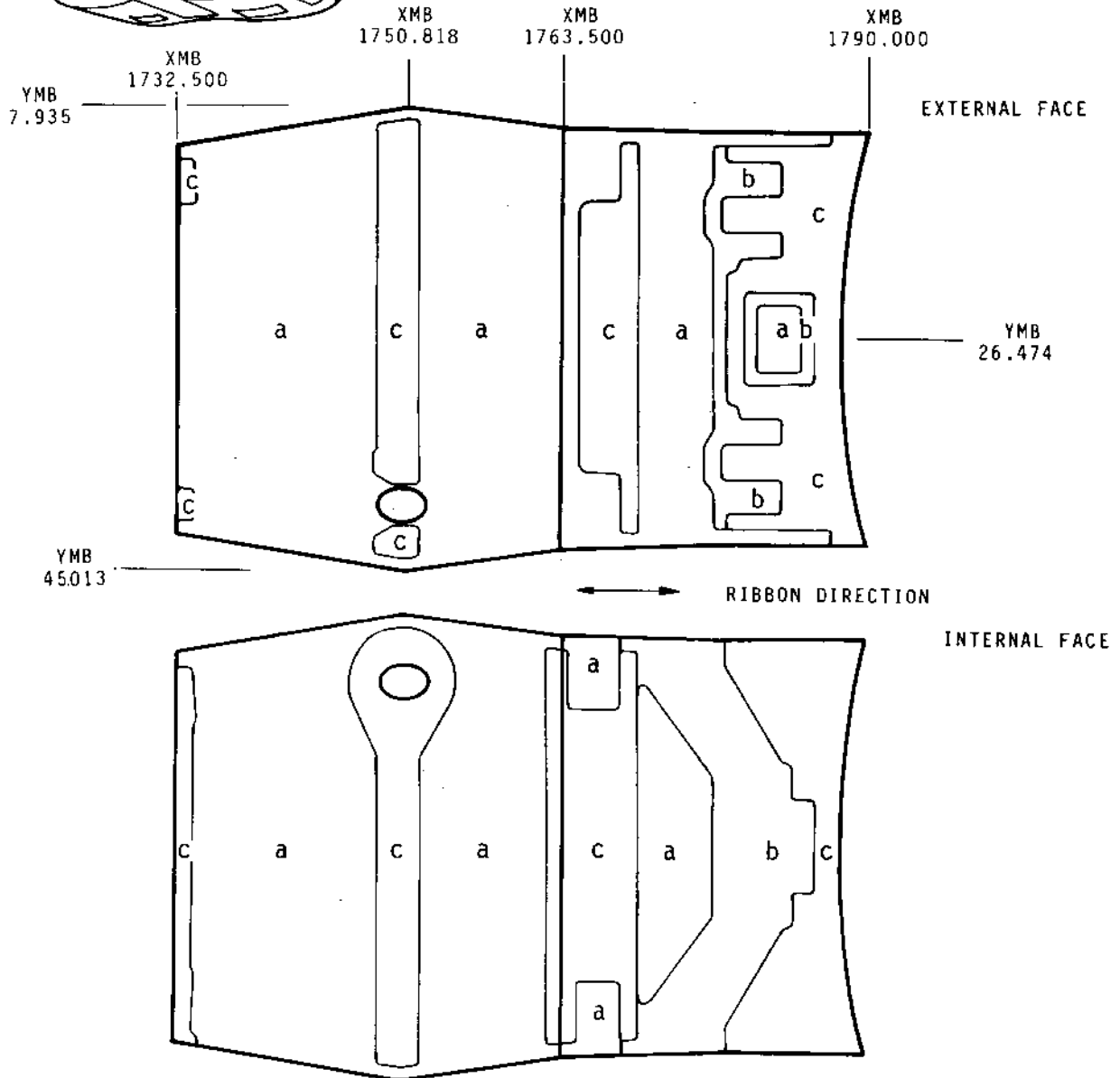


OLYMPUS 593

MK.610-14-28  
OVERHAUL



IDENT	THICKNESS	
	in	mm
a	0.012	0,30
b	0.018	0,46
c	0.024	0,61



PANEL 1 (DRG.302-000-700-0)  
BAY 1 - BAY 3  
VALID FOR NOZZLES SERIAL NO. 309 TO 316

Twin Secondary Nozzle - Identification  
Figure 309 (Sheet 2 of 16)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

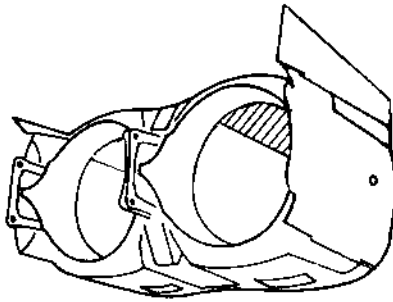
Page 383

Nov 30/77

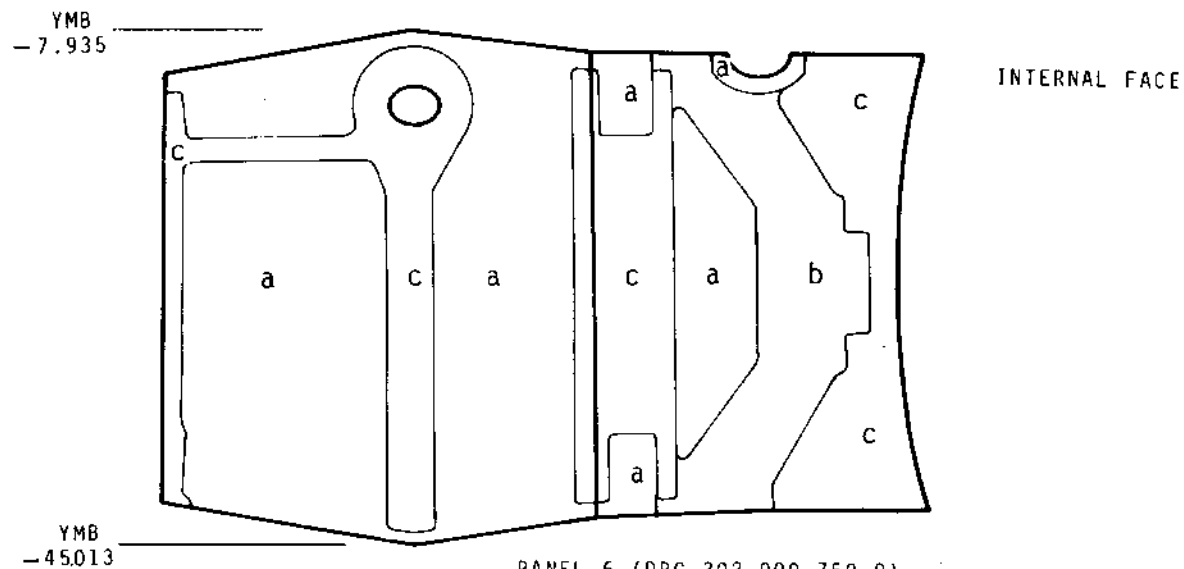
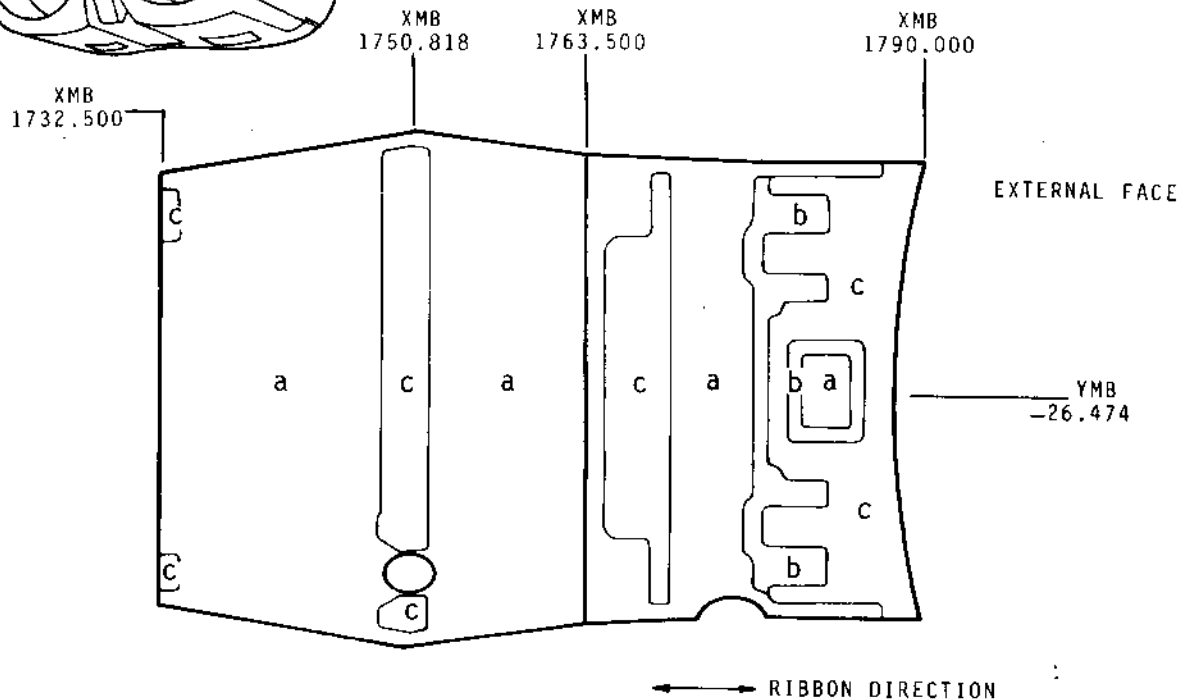


OLYMPUS 593

MK.610-14-28  
OVERHAUL



IDENT	THICKNESS	
	in	mm
a	0.012	0,30
b	0.018	0,46
c	0.024	0,61



PANEL 6 (DRG.302-000-750-0)  
BAY 2 - BAY 4  
VALID FOR NOZZLES SERIAL NO. 309 TO 316

Twin Secondary Nozzle - Identification  
Figure 309 (Sheet 3 of 16)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 384  
Nov 30/77

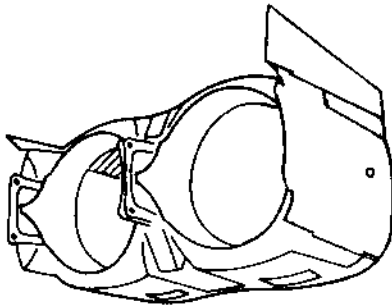
PRINTED IN FRANCE



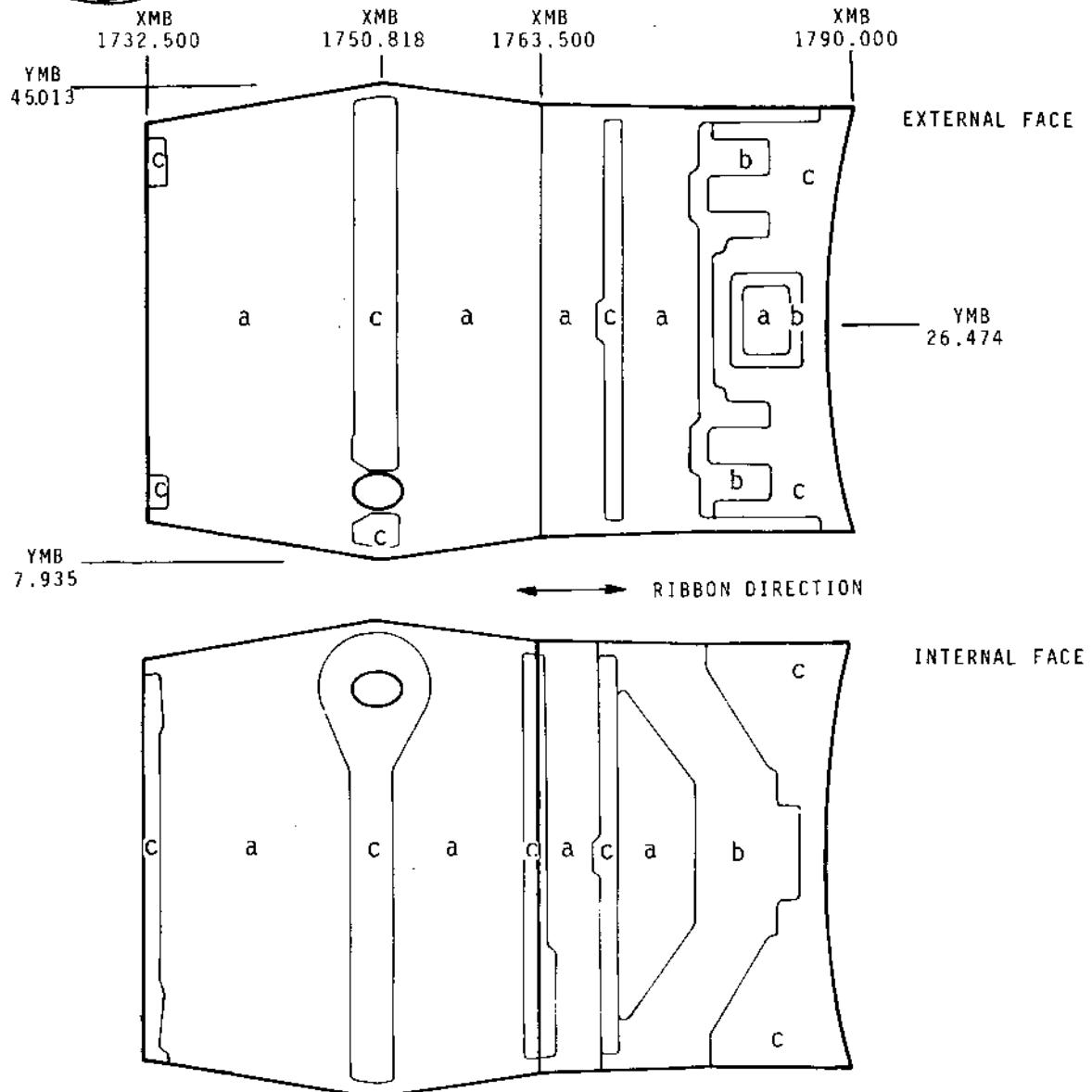


OLYMPUS 593

MK.610-14-28  
OVERHAUL



IDENT	THICKNESS	
	in	mm
a	0.012	0,30
b	0.018	0,46
c	0.024	0,61



PANEL 1 (DRG.302-000-701-0)  
BAY 1 - BAY 3  
VALID FOR NOZZLES SERIAL NO. 317 TO 322

Twin Secondary Nozzle - Identification  
Figure 309 (Sheet 4 of 16)

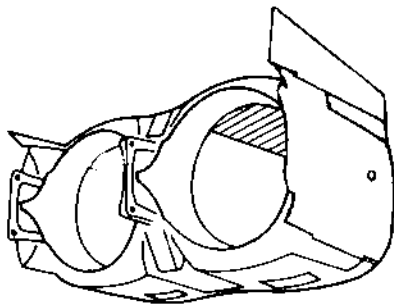
78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION



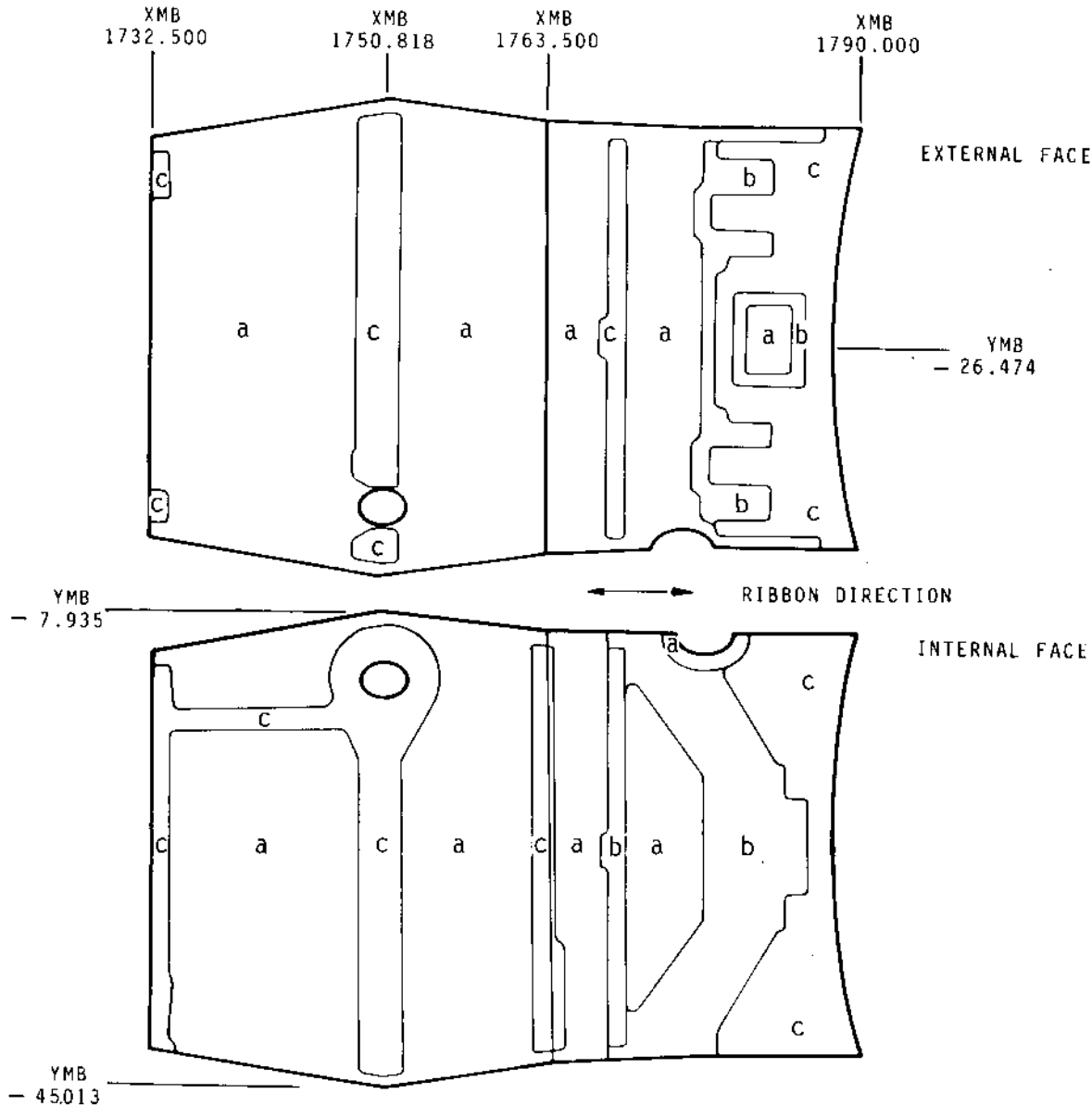
OLYMPUS 593

MK.610-14-28  
OVERHAUL



IDENT	THICKNESS	
	in	mm
a	0.012	0,30
b	0.018	0,46
c	0.024	0,61

PRINTED IN FRANCE



PANEL 6(DRG.302-000-751-0)  
BAY 2 - BAY 4  
VALID FOR NOZZLES SERIAL NO. 317 TO 322

Twin Secondary Nozzle - Identification  
Figure 309 (Sheet 5 of 16)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

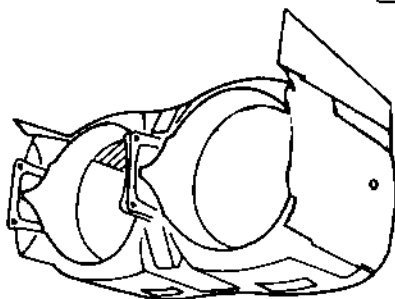
Page 386

Nov 30/77

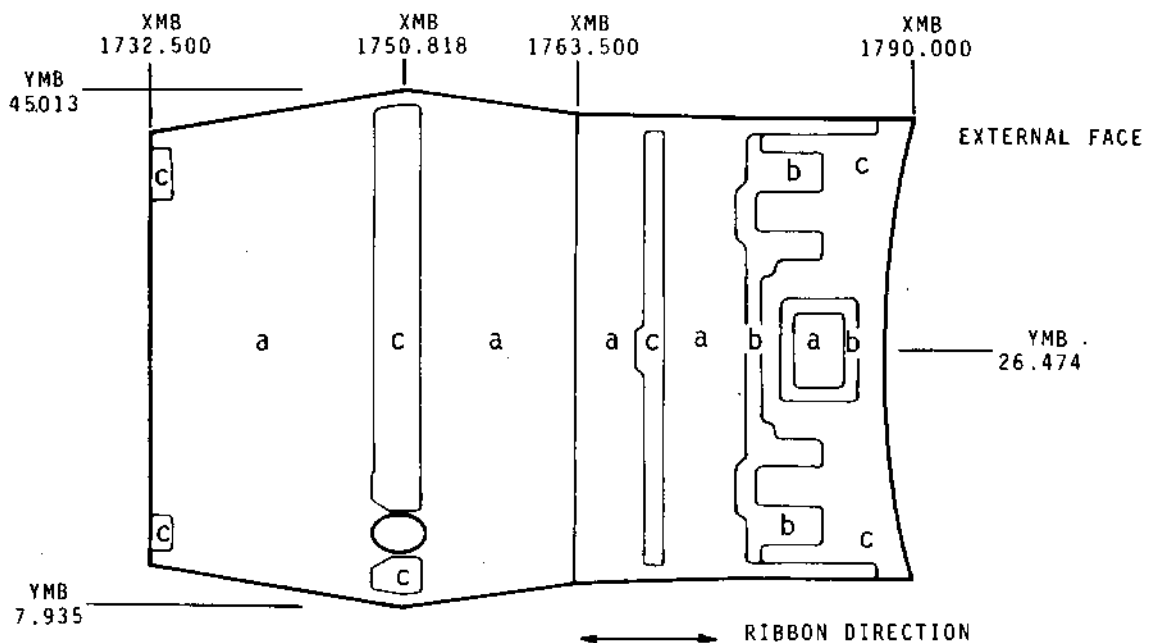


OLYMPUS 593

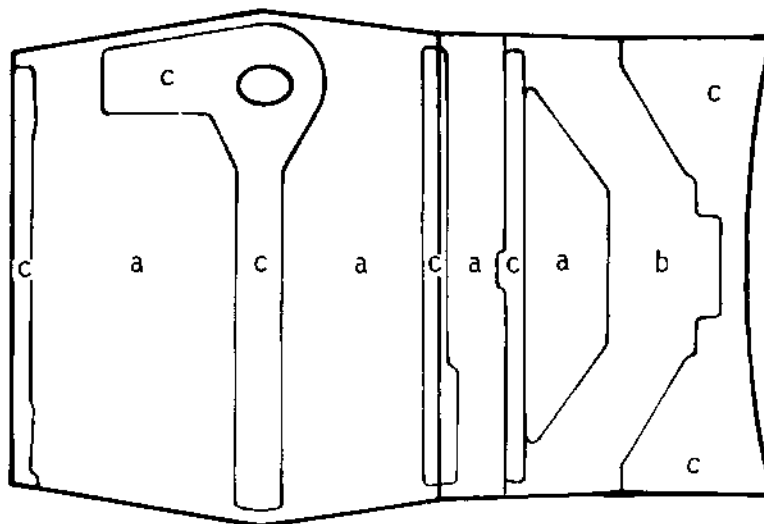
MK.610-14-28  
OVERHAUL



IDENT	THICKNESS	
	in	mm
a	0.012	0,30
b	0.018	0,46
c	0.024	0,61



YMB  
7.935



PANEL 1 (DRG.302-000-702-0)  
BAY 1 - BAY 3  
VALID FOR NOZZLES SERIAL NO. 323,324 ONWARD

Twin Secondary Nozzle - Identification  
Figure 309 (Sheet 6 of 16)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

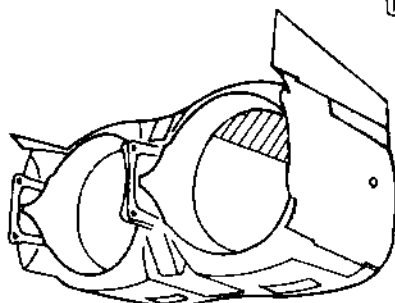
Page 387

Nov 30/77

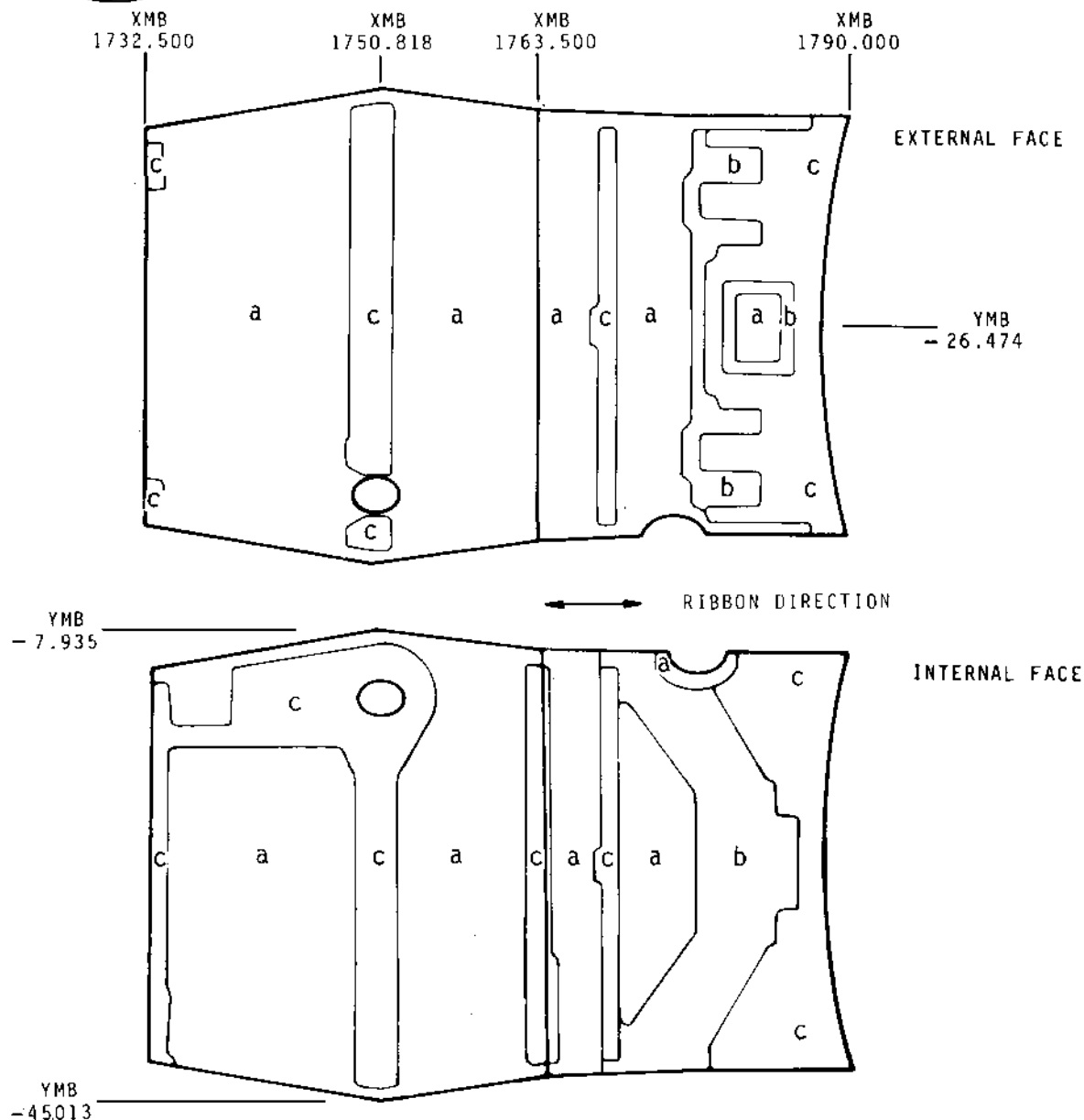


OLYMPUS 593

MK.610-14-28  
OVERHAUL



IDENT	THICKNESS	
	in	mm
a	0.012	0,30
b	0.018	0,46
c	0.024	0,61



PANEL 6 (DRG.302-000-752-0)

BAY 2 - BAY 4

VALID FOR NOZZLES SERIAL NO. 323,324 ONWARD

Twin Secondary Nozzle - Identification  
Figure 309 (Sheet 7 of 16)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 388

Nov 30/77

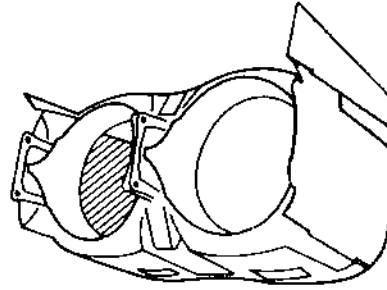
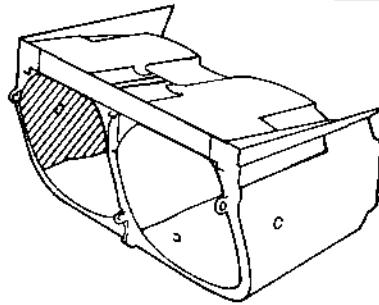
PRINTED IN FRANCE

PRINTED IN FRANCE



OLYMPUS 593

MK.610-14-28  
OVERHAUL



IDENT	THICKNESS	
	in	mm
a	0.012	0,30
b	0.018	0,46
c	0.024	0,61

XMB  
1732.500

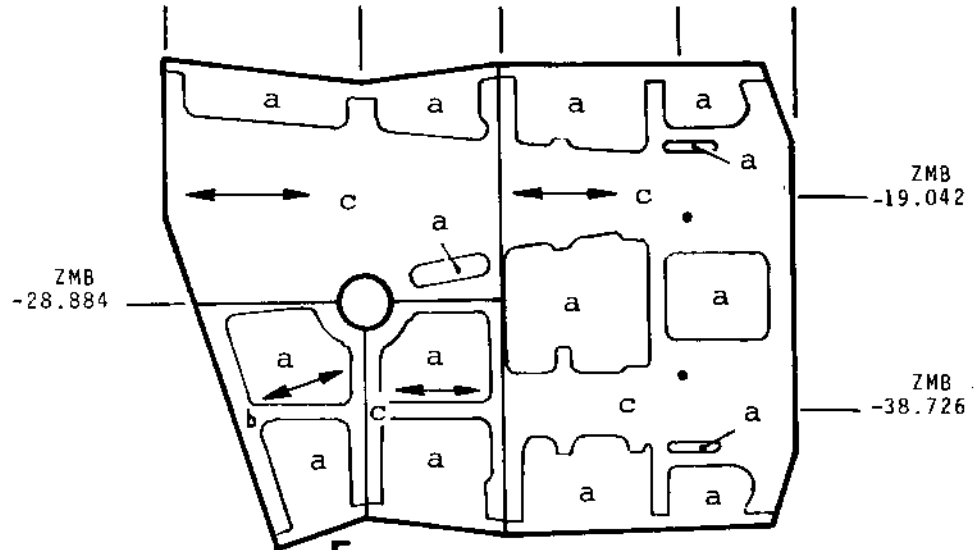
XMB  
1750.818

XMB  
1763.500

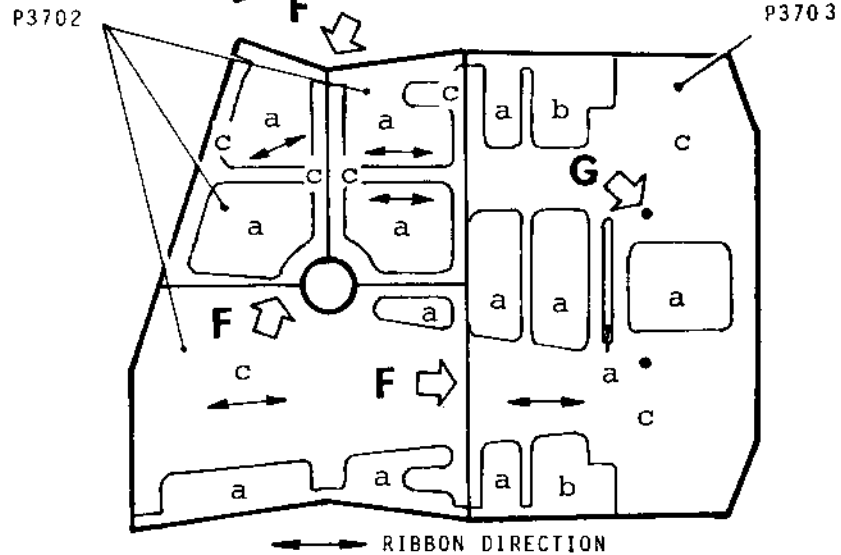
XMB  
1775.610

XMB  
1790.000

EXTERNAL FACE



INTERNAL FACE



← RIBBON DIRECTION →

PANEL 2 (DRG.300-856-903-0)

BAY 1 - BAY 3

VALID FOR NOZZLES SERIAL NO. 309 TO 326

PANEL 10 (DRG.300-856-953-0)

BAY 2 - BAY 4

VALID FOR NOZZLES SERIAL NO. 309 TO 330

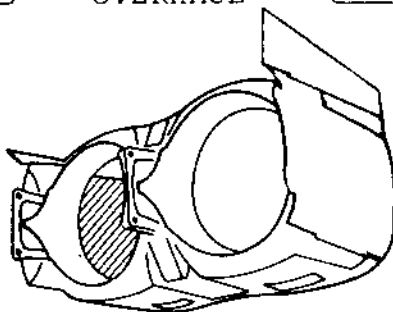
Twin Secondary Nozzle - Identification  
Figure 309 (Sheet 8 of 16)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 389

Nov 30/77



IDENT	THICKNESS	
	in	mm
a	0.012	0,30
b	0.018	0,46
c	0.024	0,61

**PRINTED IN FRANCE**

XMB  
90.000

ZMB  
-38.726

INTERNAL FACE

P3703



RIBBON DIRECTION

VALID FOR NOZZLES SERIAL NO. 327,328 ONWARD VALID FOR NOZZLES SERIAL NO. 331,332 ONWARD

Twin Secondary Nozzle - Identification  
Figure 309 (Sheet 9 of 16)

**78-13-01**

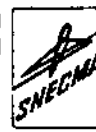
BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 390  
Nov 30/77

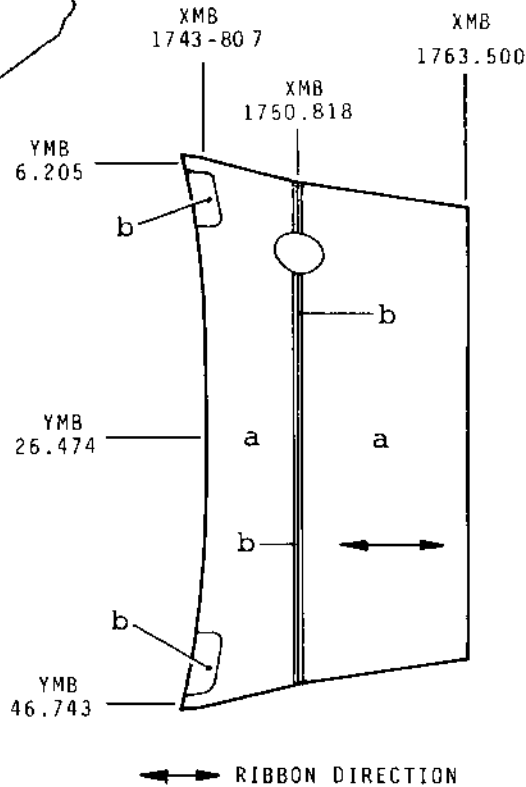
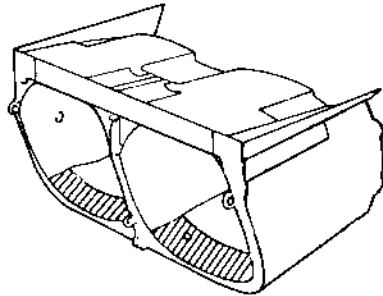


OLYMPUS 593

MK.610-14-28  
OVERHAUL



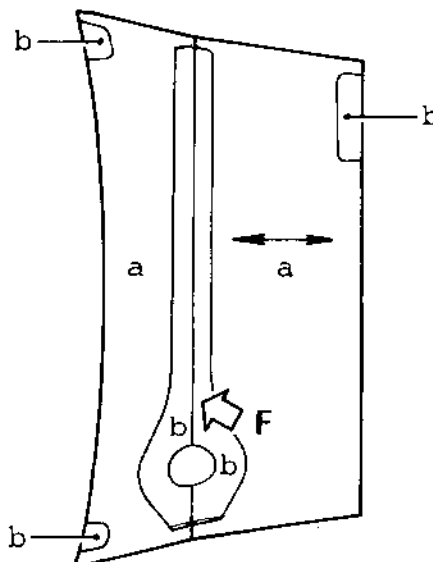
IDENT	THICKNESS	
	in	mm
a	0.012	0,30
b	0.024	0,61



EXTERNAL FACE

PANEL 3 (DRG.301-058-100-0)  
BAY 1 - BAY 3  
PANEL 8 (DRG.301-058-150-0)  
BAY 2 - BAY 4  
VALID FOR NOZZLES SERIAL  
NO. 309 TO 318 AND 321

(DRG.301-058-101-0)  
(DRG.301-058-151-0)  
VALID FOR NOZZLES SERIAL  
NO. 319,323 L.H. ONWARD  
320,322 R.H. ONWARD



INTERNAL FACE

Twin Secondary Nozzle - Identification  
Figure 309 (Sheet 10 of 16)

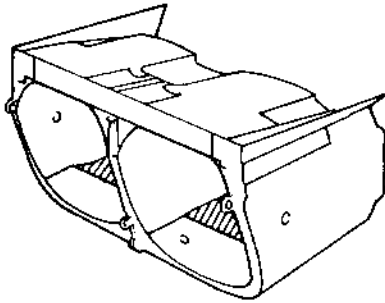
78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION



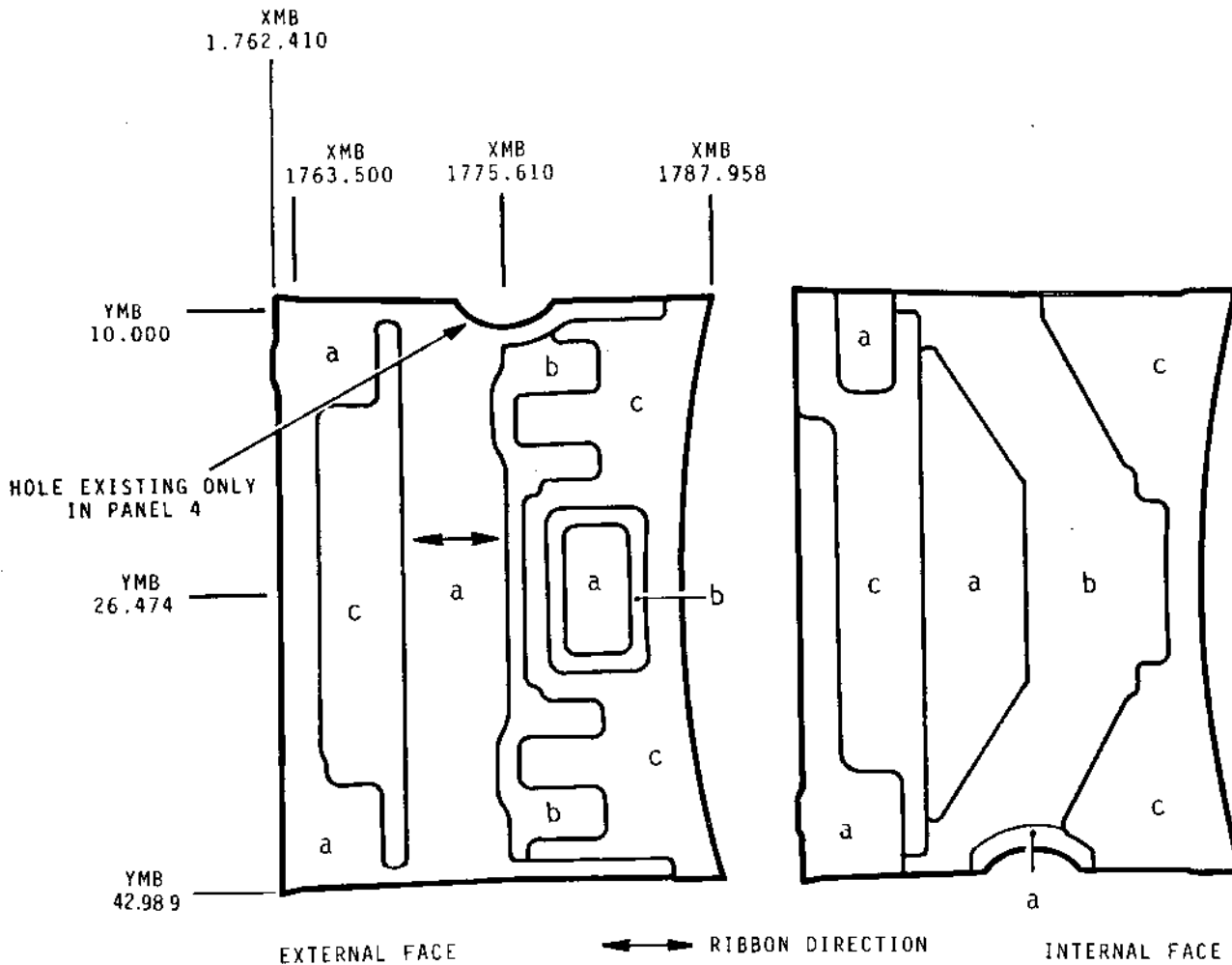
OLYMPUS 593

MK.610-14-28  
OVERHAUL



IDENT	THICKNESS	
	in	mm
a	0.012	0,30
b	0.018	0,46
c	0.024	0,61

PRINTED IN FRANCE



PANEL 4 (DRG.301-059-201-0)  
BAY 1 - BAY 3  
VALID FOR NOZZLES SERIAL NO. 309 TO 316

PANEL 9 (DRG.301-059-251-0)  
BAY 2 - BAY 4  
VALID FOR NOZZLES SERIAL NO. 309 TO 316

Twin Secondary Nozzle - Identification  
Figure 309 (Sheet 11 of 16)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 392

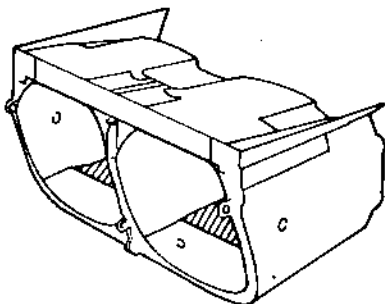
Nov 30/77



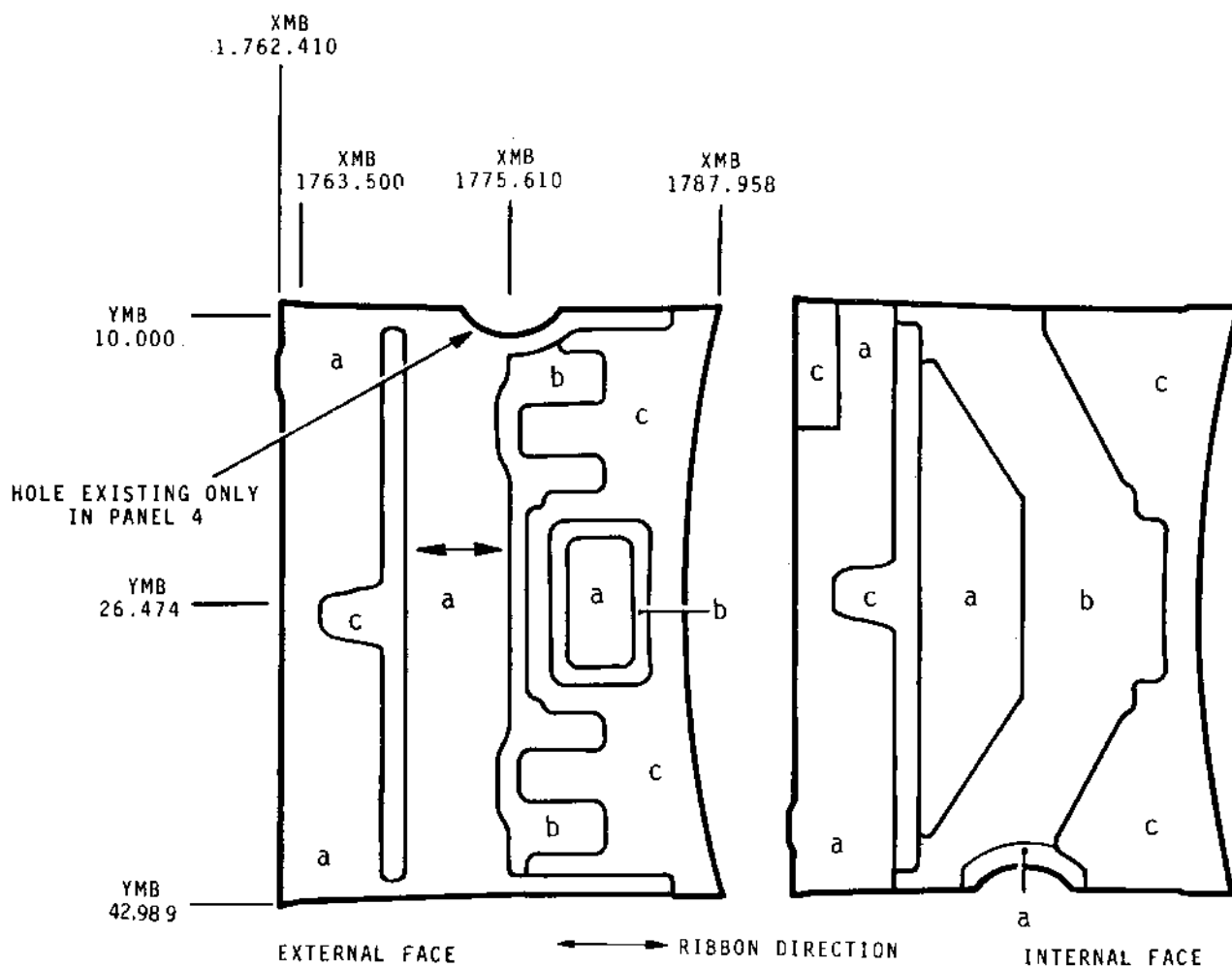


OLYMPUS 593

MK.610-14-28  
OVERHAUL



IDENT	THICKNESS	
	in	mm
a	0.012	0,30
b	0.018	0,46
c	0.024	0,61



PANEL 4 (DRG.301-059-202-0)

BAY 1 - BAY 3

VALID FOR NOZZLES SERIAL NO. 317-318 ONWARD

PANEL 9 (DRG.301-059-252-0)

BAY 2 - BAY 4

VALID FOR NOZZLES SERIAL NO. 317,318 ONWARD

Twin Secondary Nozzle - Identification  
Figure 309 (Sheet 12 of 16)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

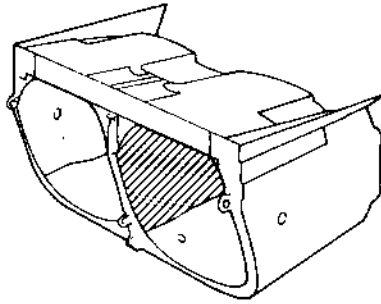
Page 393

Nov 30/77

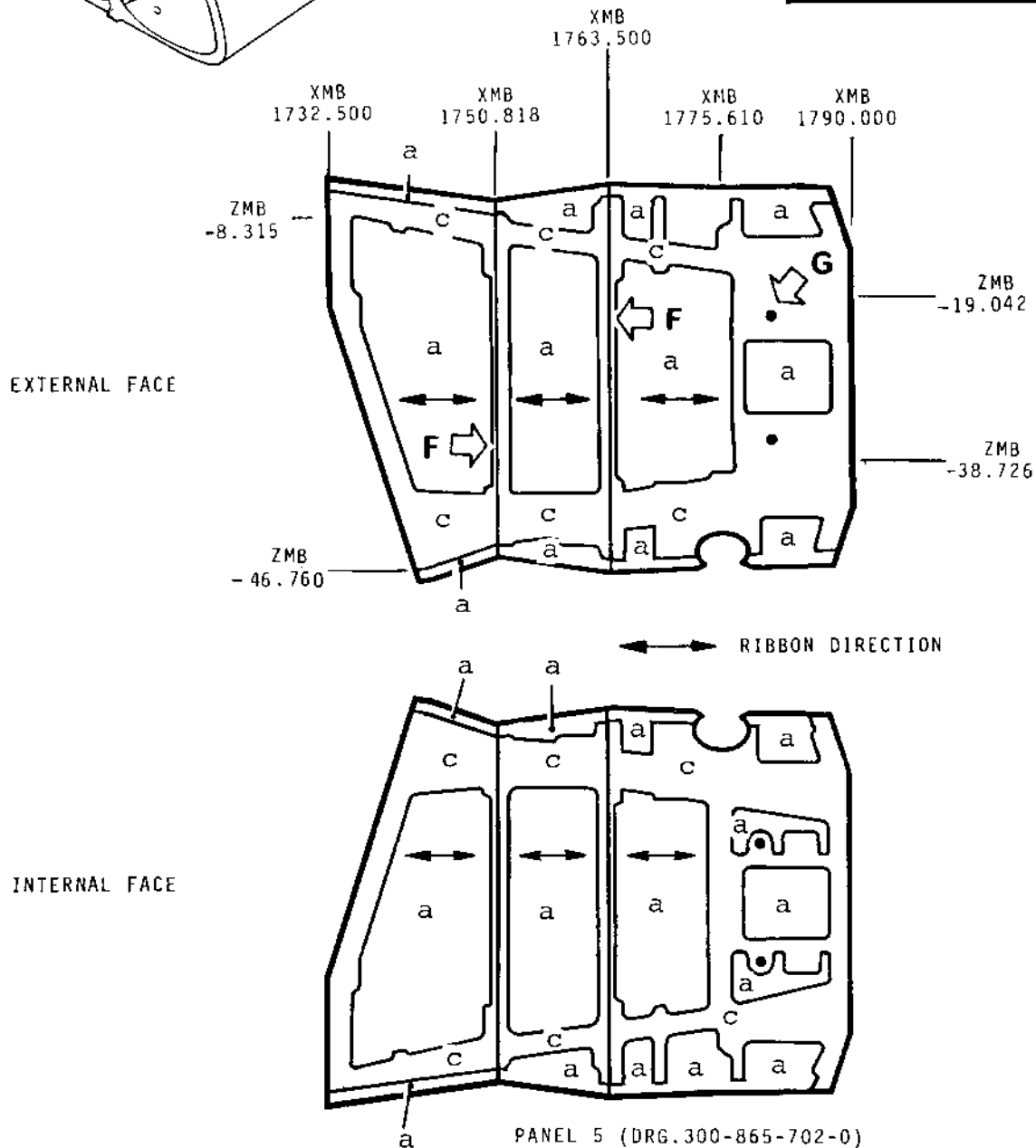


OLYMPUS 593

MK.610-14-28  
OVERHAUL



IDENT	THICKNESS	
	in	mm
a	0.012	0,30
b	0.018	0,46
c	0.024	0,61



Twin Secondary Nozzle - Identification  
Figure 309 (Sheet 13 of 16)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Page 394

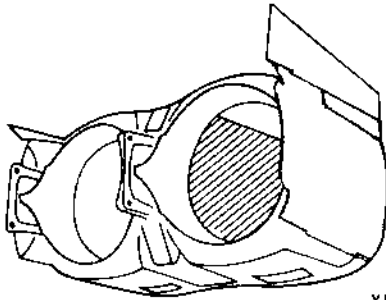
Nov 30/77

PRINTED IN FRANCE

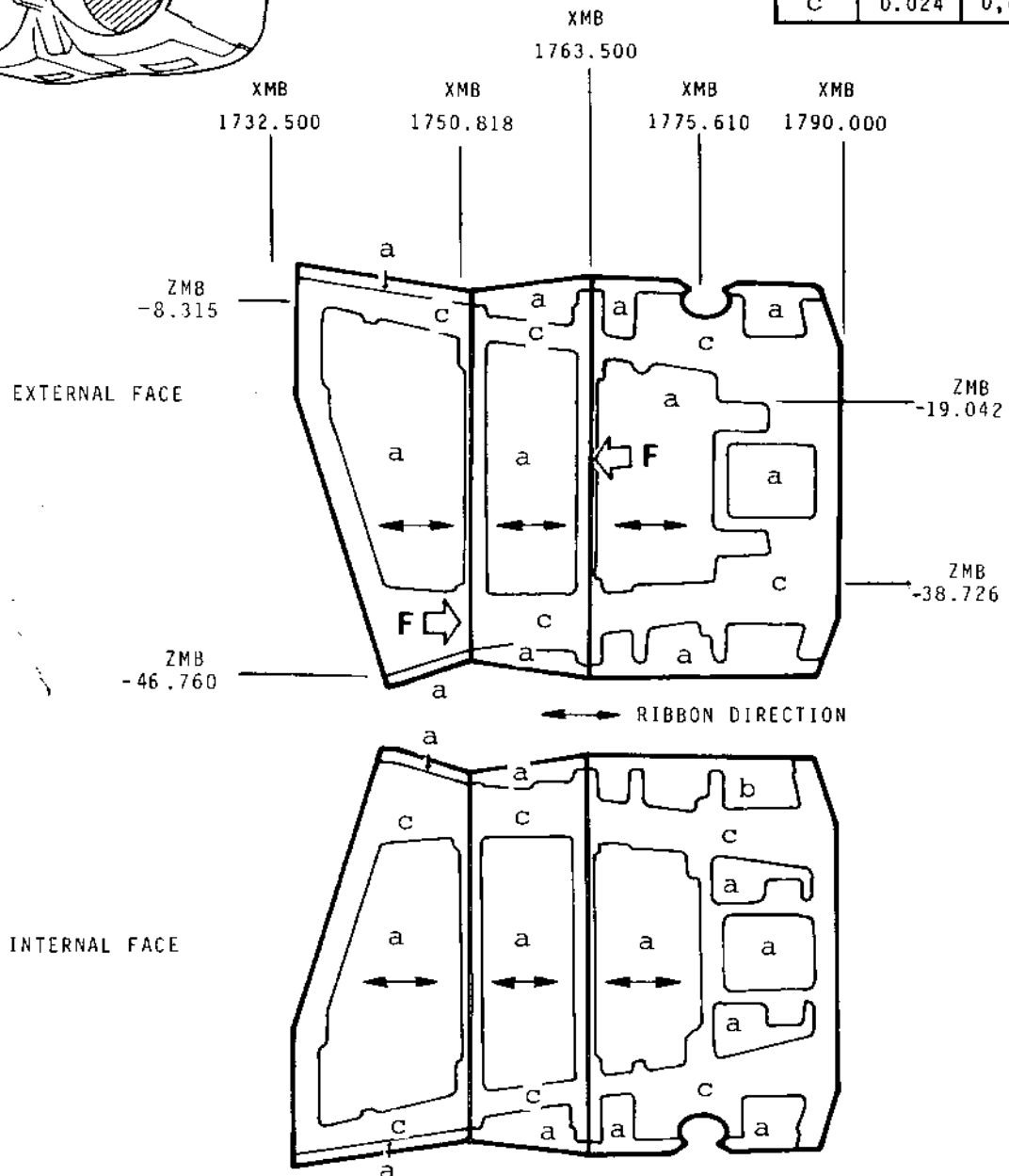


OLYMPUS 593

MK.610-14-28  
OVERHAUL



IDENT	THICKNESS	
	in	mm
a	0.012	0,30
b	0.018	0,46
c	0.024	0,61



PANEL 7 (DRG.300-865-752-0)

BAY 2 - BAY 4

VALID FOR NOZZLES SERIAL NO. 309,310 ONWARD

Twin Secondary Nozzle - Identification  
Figure 309 (Sheet 14 of 16)

78-13-01

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

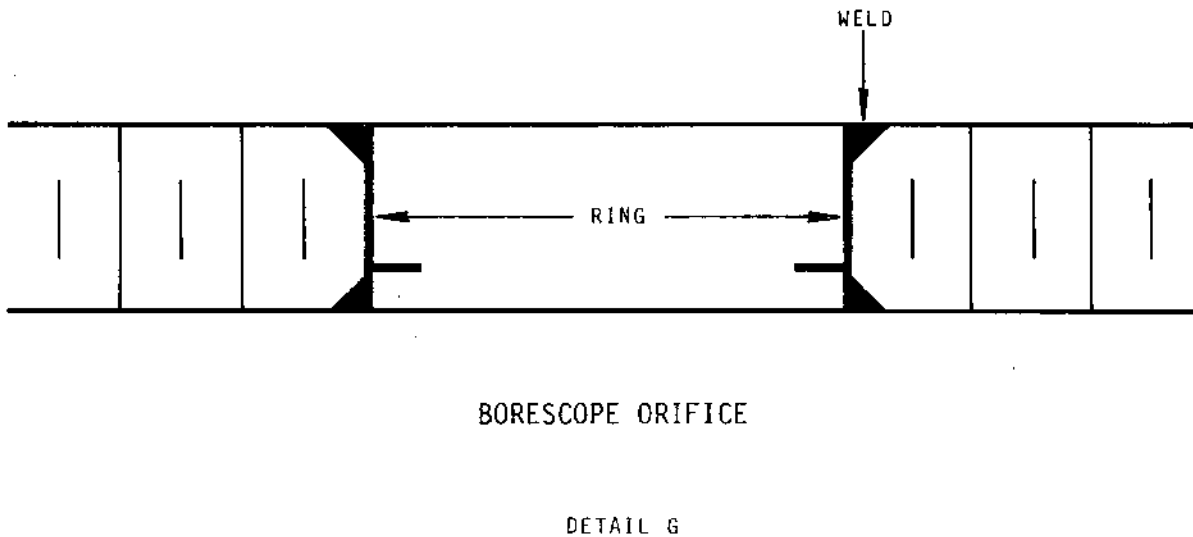
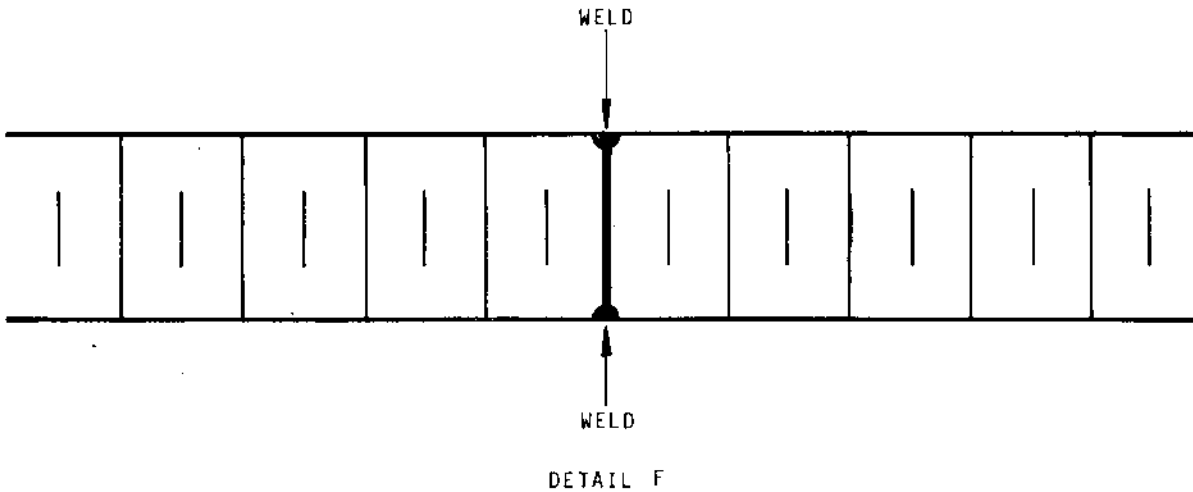
Page 395

Nov 30/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE

Twin Secondary Nozzle - Identification  
Figure 309 (Sheet 15 of 16)

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

**78-13-01**

Page 396  
Nov 30/77

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

PRINTED IN FRANCE

ITEM NO.	DESCRIPTION	MATERIAL		
		MADE FROM	THICKNESS IN	MM
1	Stresskin Panel (Welded)	P3702		
2	Stresskin Panel (Welded)	P3702 P3703		
3	Stresskin Panel (Welded)	P3702		
4	Stresskin Panel (Welded)	P3702		
5	Stresskin Panel (Welded)	P3702		
6	Stresskin Panel (Welded)	P3702		
7	Stresskin Panel (Welded)	P3702		
8	Stresskin Panel (Welded)	P3702		
9	Stresskin Panel (Welded)	P3702		
10	Stresskin Panel (Welded)	P3702 P3703		

Twin Secondary Nozzle - Identification  
Figure 309 (Sheet 16 of 16)**78-13-01**

BASIC TWIN SEC. NOZZLE - IDENTIFICATION

Pages 397/398

Nov 30/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



### 3. Restricted Areas

This paragraph defines the structural areas for which the mechanical strength is the essential criterion and to which any damage and repair might affect the useful life of the twin secondary nozzle.

The breakdown of this paragraph is as follows :

Restricted areas of the Twin Secondary Nozzle structure -  
Figures 301 through 305.

Restricted areas in the Secondary Nozzle inner and outer  
stressskin panels - Figures 306 and 307.

PRINTED IN FRANCE

**78-13-01**

BASIC TWIN SEC. NOZZLE - RESTRICTED AREAS

Page 301

Jan 15/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



NOTE : LH SECONDARY NOZZLE SHOWN  
RH SECONDARY NOZZLE, OPPOSITE HAND

INBOARD SIDE WALL  
(SEE FIG. 302)

UPPER SECTION  
(SEE FIG. 304)

THROAT SECTION  
(SEE FIG. 306)

FORWARD

LOWER SECTION  
(SEE FIG. 305)

OUTBOARD SIDE WALL  
(SEE FIG. 302)

CENTRAL WALL  
(SEE FIG. 303)

PRINTED IN FRANCE

Twin Secondary Nozzle - Restricted Areas  
Figure 301

78-13-01

BASIC TWIN SEC. NOZZLE - RESTRICTED AREAS

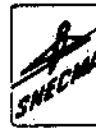
Page 302

Jan 15/76

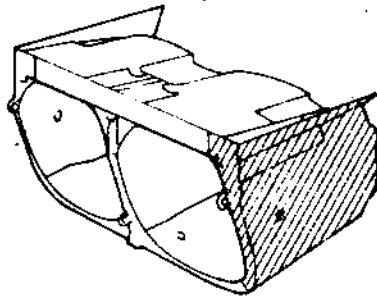


OLYMPUS 593

MK.610-14-28  
OVERHAUL



OUTBOARD SIDE WALL



XMB  
1732.500

XMB  
1763.500

XMB  
1790.000

ZMB  
19.042

ZMB  
38.726

ZMB  
- 18.413

ZMB  
- 28.884

XMB  
1801.250

XMB  
1775.610

XMB  
1750.818

FORWARD



Twin Secondary Nozzle - Restricted Areas  
Figure 302 (Sheet 1 of 2)

78-13-01

BASIC TWIN SEC. NOZZLE - RESTRICTED AREAS

Page 303

Jan 15/76





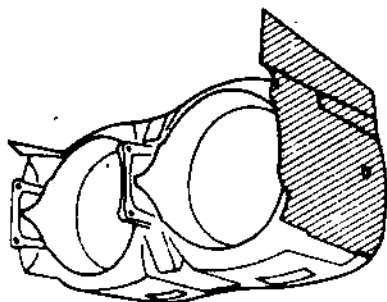
OLYMPUS 593

MK.610-14-28  
OVERHAUL



INBOARD SIDE WALL

XMB  
1732.500



XMB  
1763.500

XMB  
1790.000

ZMB  
- 18.413

ZMB  
- 28.884

FORWARD



ZMB  
- 19.042

ZMB  
- 38.726

XMB  
1801.250

XMB  
1775.610

XMB  
1750.818

Twin Secondary Nozzle - Restricted Areas  
Figure 302 (Sheet 2 of 2)

78-13-01

BASIC TWIN SEC. NOZZLE - RESTRICTED AREAS

Page 304

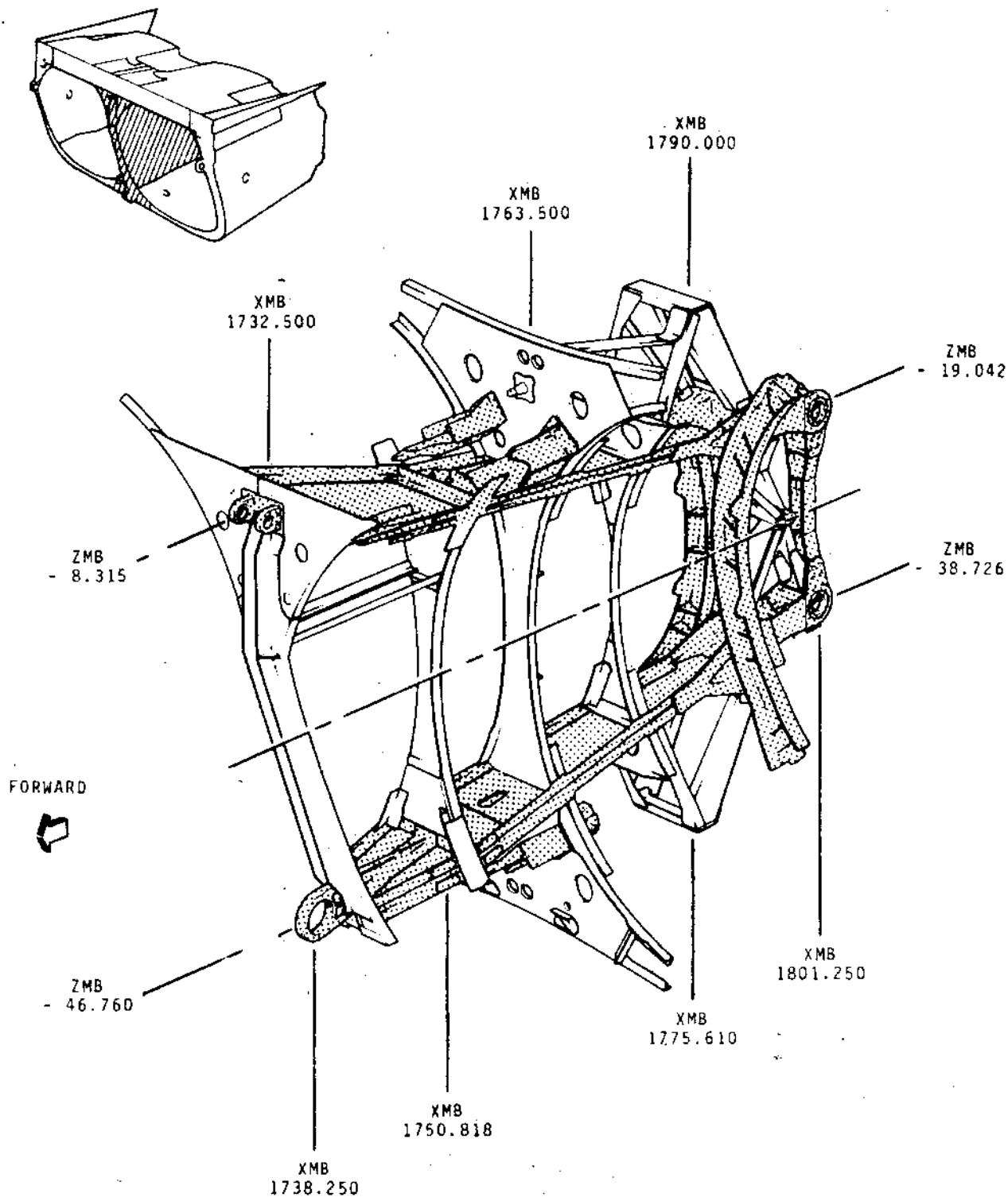
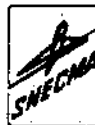
Jan 15/76

PRINTED IN FRANCE



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Twin Secondary Nozzle - Restricted Areas  
Figure 303 (Sheet 1 of 2)

78-13-01

BASIC TWIN SEC. NOZZLE - RESTRICTED AREAS

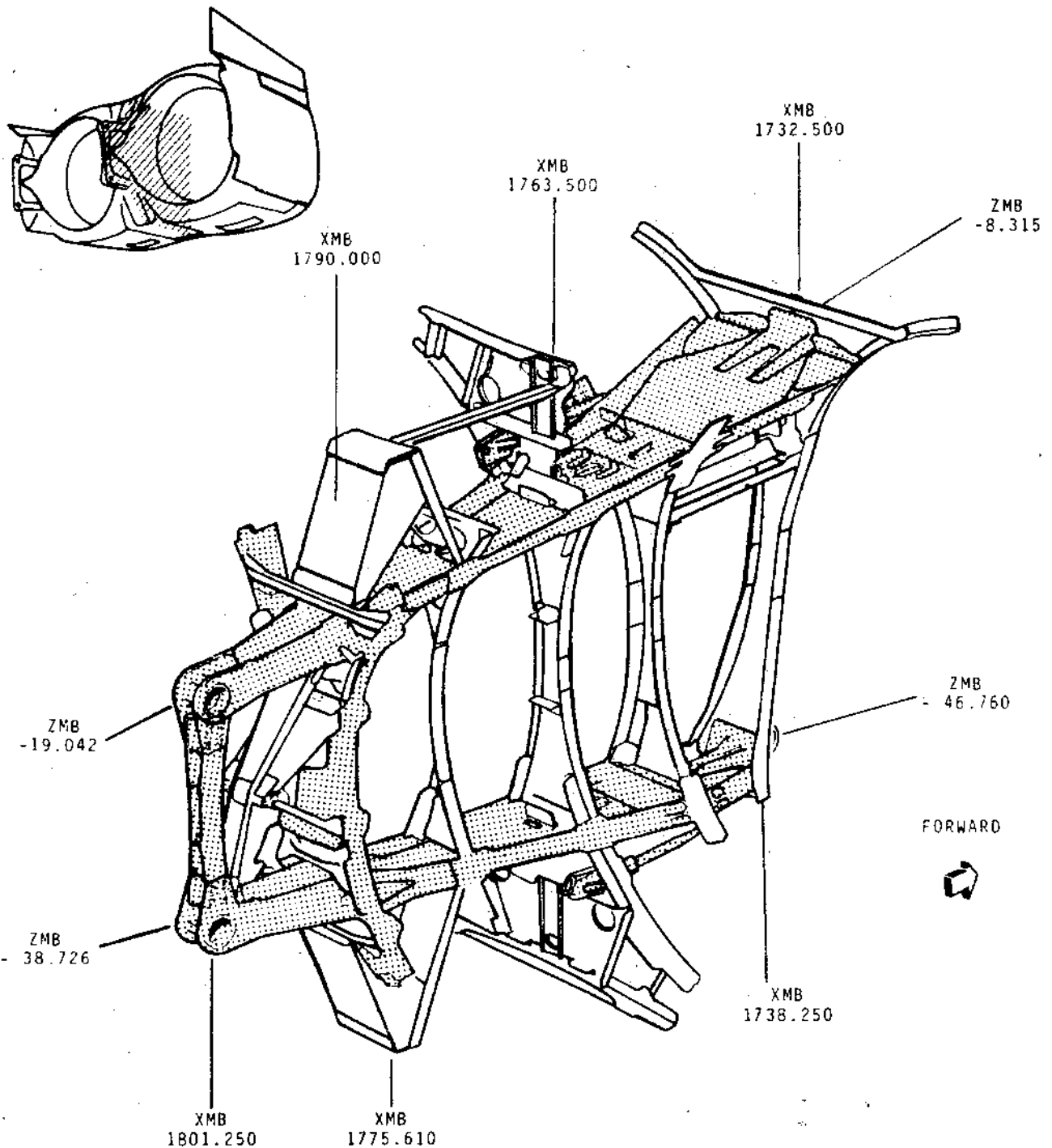
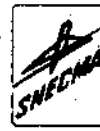
Page 305

Jan 15/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Twin Secondary Nozzle - Restricted Areas  
Figure 303 (Sheet 2 of 2)

78-13-01

BASIC TWIN SEC. NOZZLE - RESTRICTED AREAS

Page 306

Jan 15/76

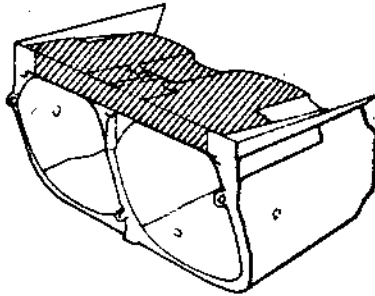


OLYMPUS 593

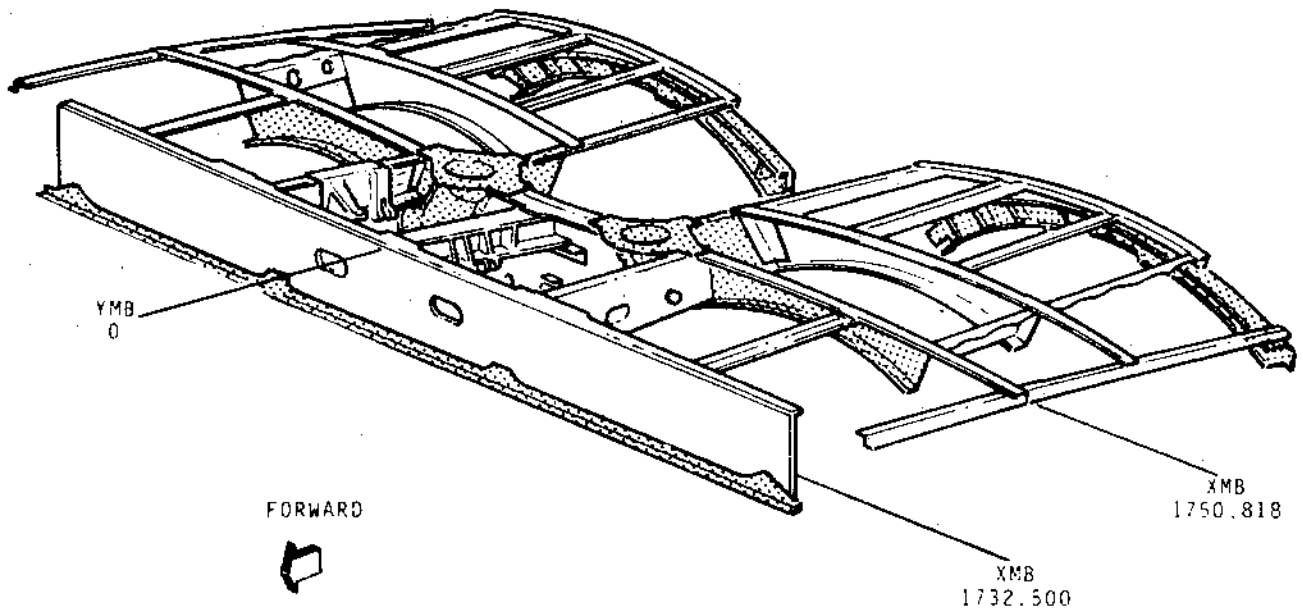
MK.610-14-28  
OVERHAUL



UPPER SECTION



XMB  
1783.885  
XMB  
1763.500



FORWARD

XMB  
1750.818

XMB  
1732.500

Twin Secondary Nozzle - Restricted Areas  
Figure 303

78-13-01

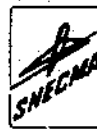
BASIC TWIN SEC. NOZZLE - RESTRICTED AREAS

Page 307  
Jan 15/76

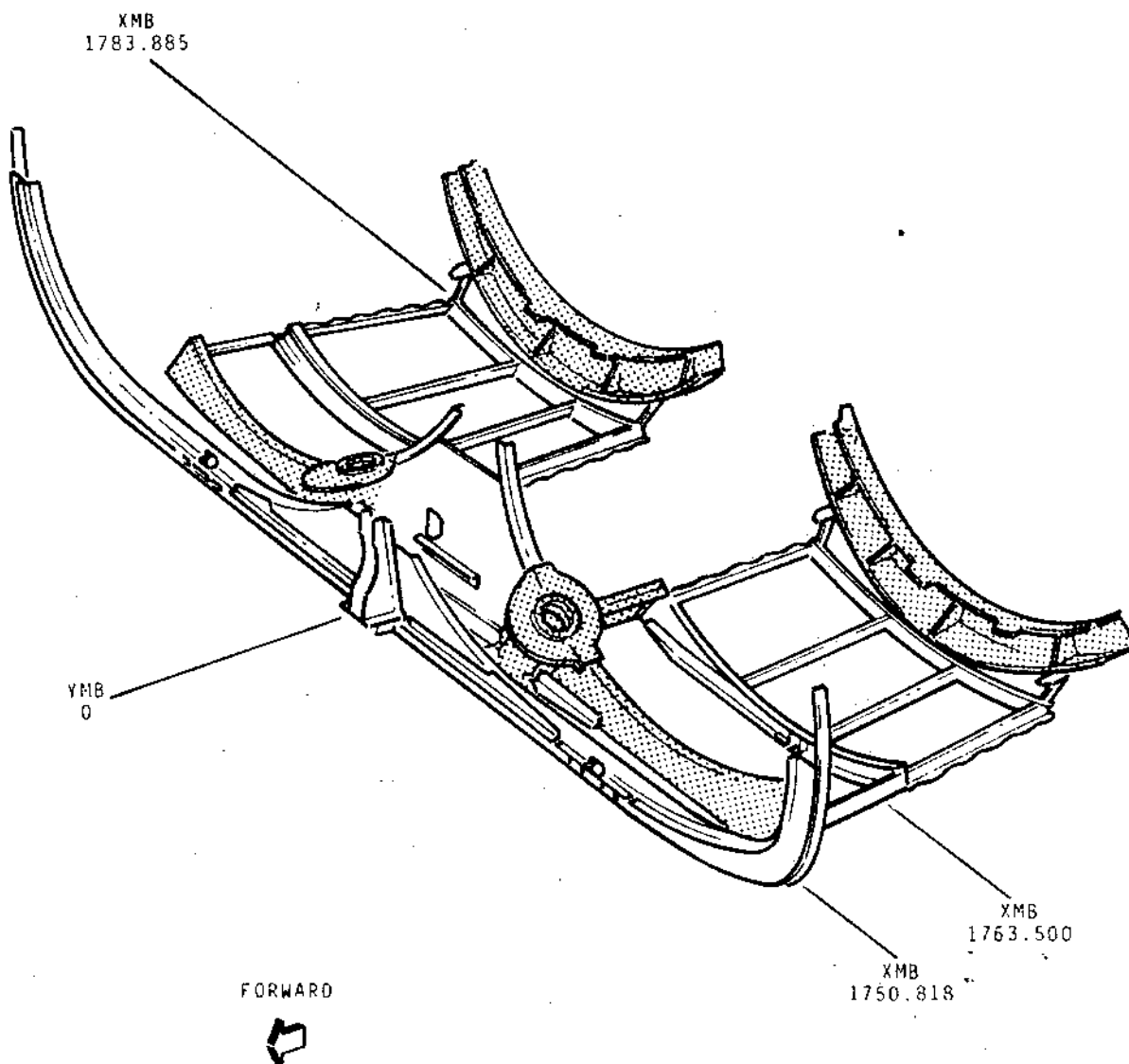
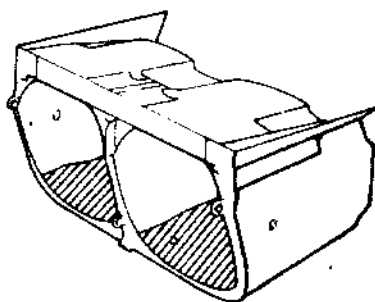


OLYMPUS 593

MK.610-14-28  
OVERHAUL



LOWER SECTION



Twin Secondary Nozzle - Restricted Areas  
Figure 304

78-13-01

BASIC TWIN SEC. NOZZLE - RESTRICTED AREAS

Page 308

Jan 15/76

PRINTED IN FRANCE

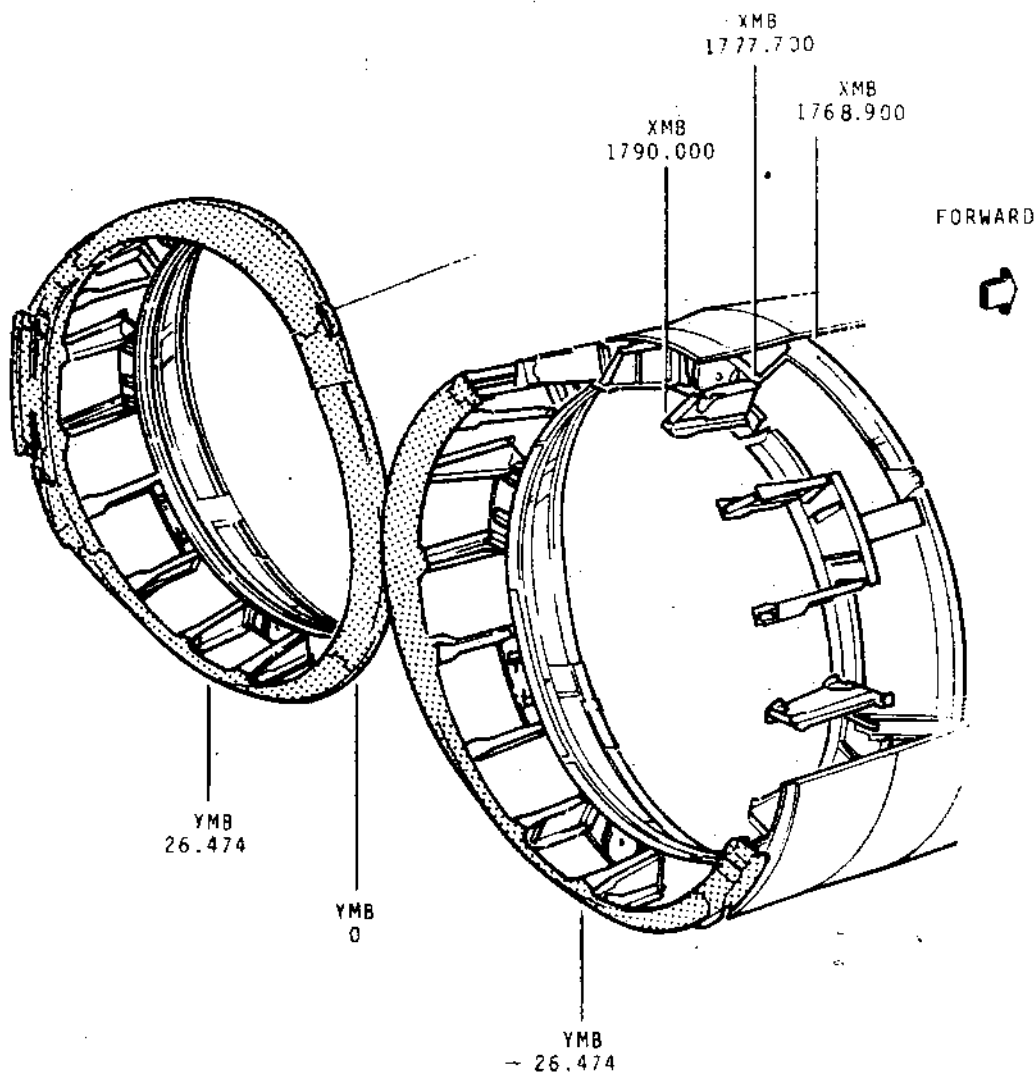
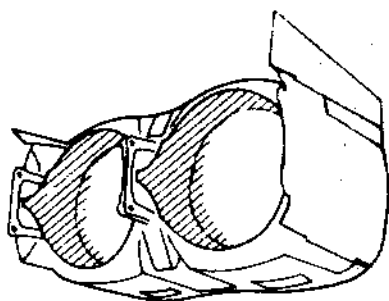


OLYMPUS 593

MK.610-14-28  
OVERHAUL



THROAT SECTION



Twin Secondary Nozzle - Restricted Areas  
Figure 305

78-13-01

BASIC TWIN SEC. NOZZLE - RESTRICTED AREAS

Page 309

Jan 15/76

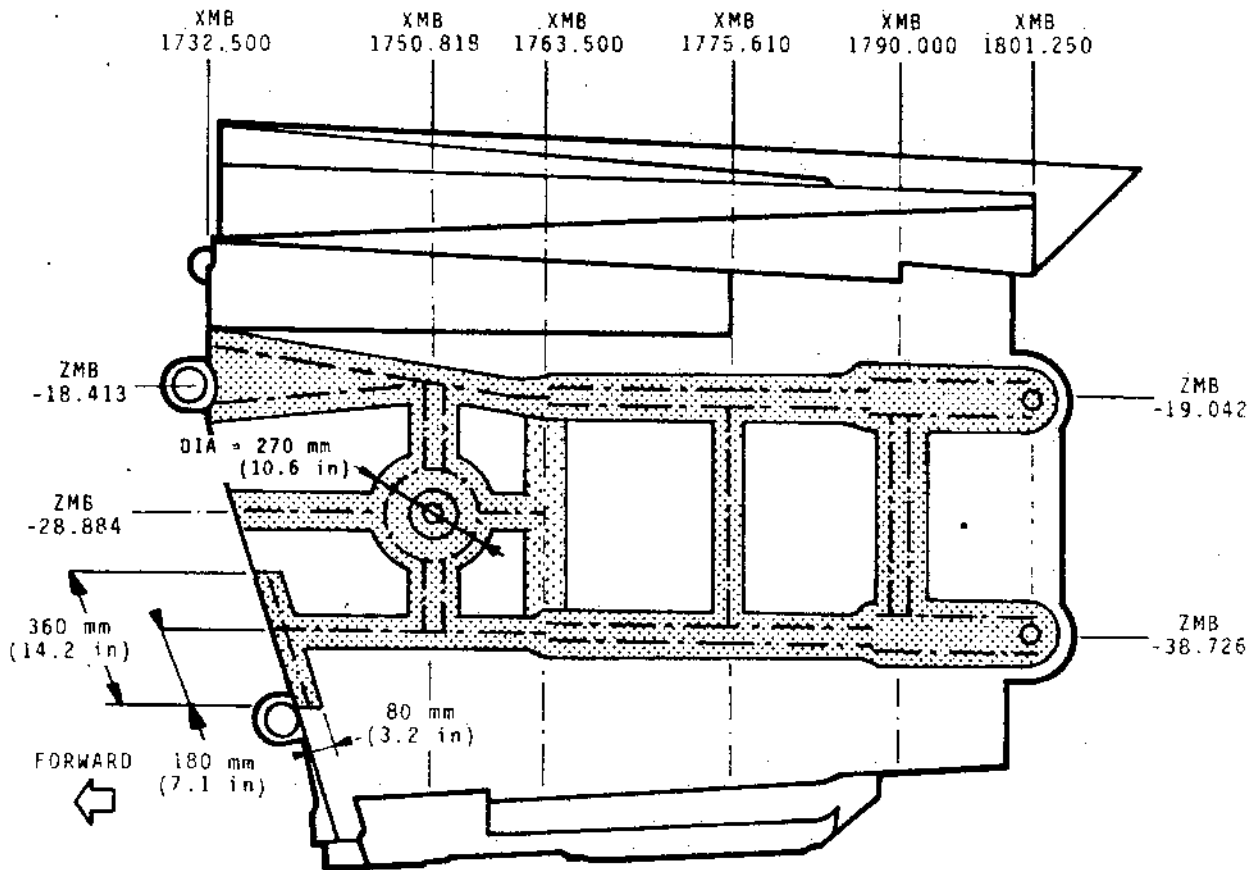


OLYMPUS 593

MK.610-14-28  
OVERHAUL

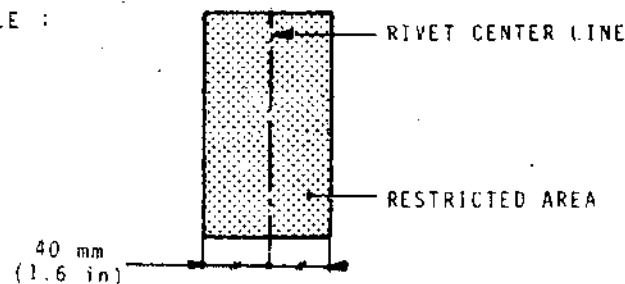


OUTBOARD AND INBOARD SIDE WALLS



NOTE : THE NON-DIMENSIONED AREAS ARE  
LOCATED WITHIN 40 mm (1.6 in.)  
EACH SIDE OF THE RIVETS CENTER-  
LINES

EXAMPLE :



Twin Secondary Nozzle Outer Panels -  
Restricted Areas  
Figure 306 (Sheet 1 of 3)

78-13-01

BASIC TWIN SEC. NOZZLE - RESTRICTED AREAS

Page 310  
Jan 15/76



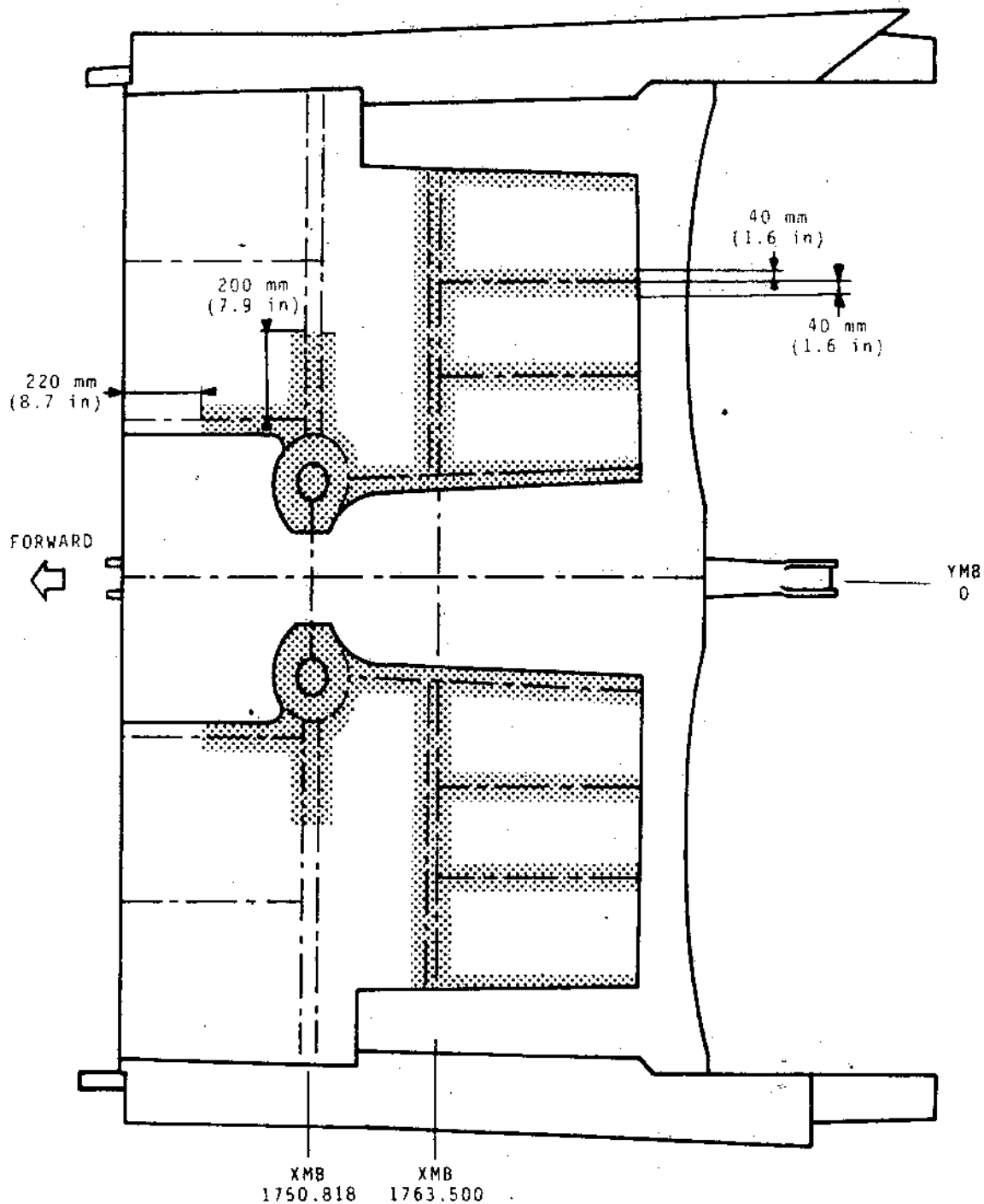
OLYMPUS 593

MK.610-14-28

OVERHAUL



UPPER SECTION



Twin Secondary Nozzle Outer Panels -  
Restricted Areas  
Figure 306 (Sheet 2 of 3)

78-13-01

BASIC TWIN SEC. NOZZLE - RESTRICTED AREAS

Page 311

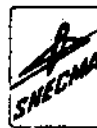
Jan 15/76



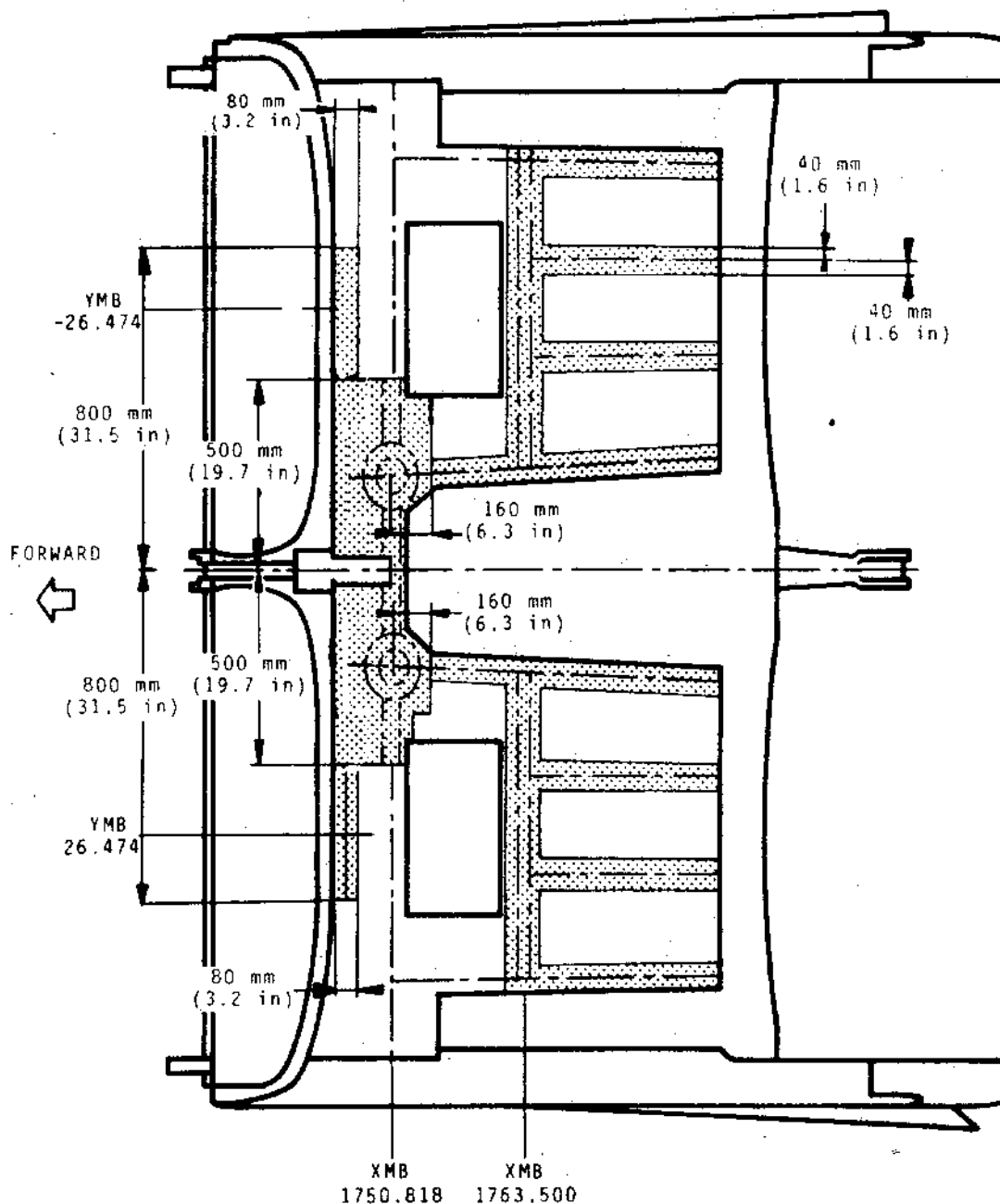


OLYMPUS 593

MK.610-14-28  
OVERHAUL



LOWER SECTION



Twin Secondary Nozzle Outer Panels -  
Restricted Areas  
Figure 306 (Sheet 3 of 3)

78-13-01

BASIC TWIN SEC. NOZZLE - RESTRICTED AREAS

Page 312

Jan 15/76

PRINTED IN FRANCE



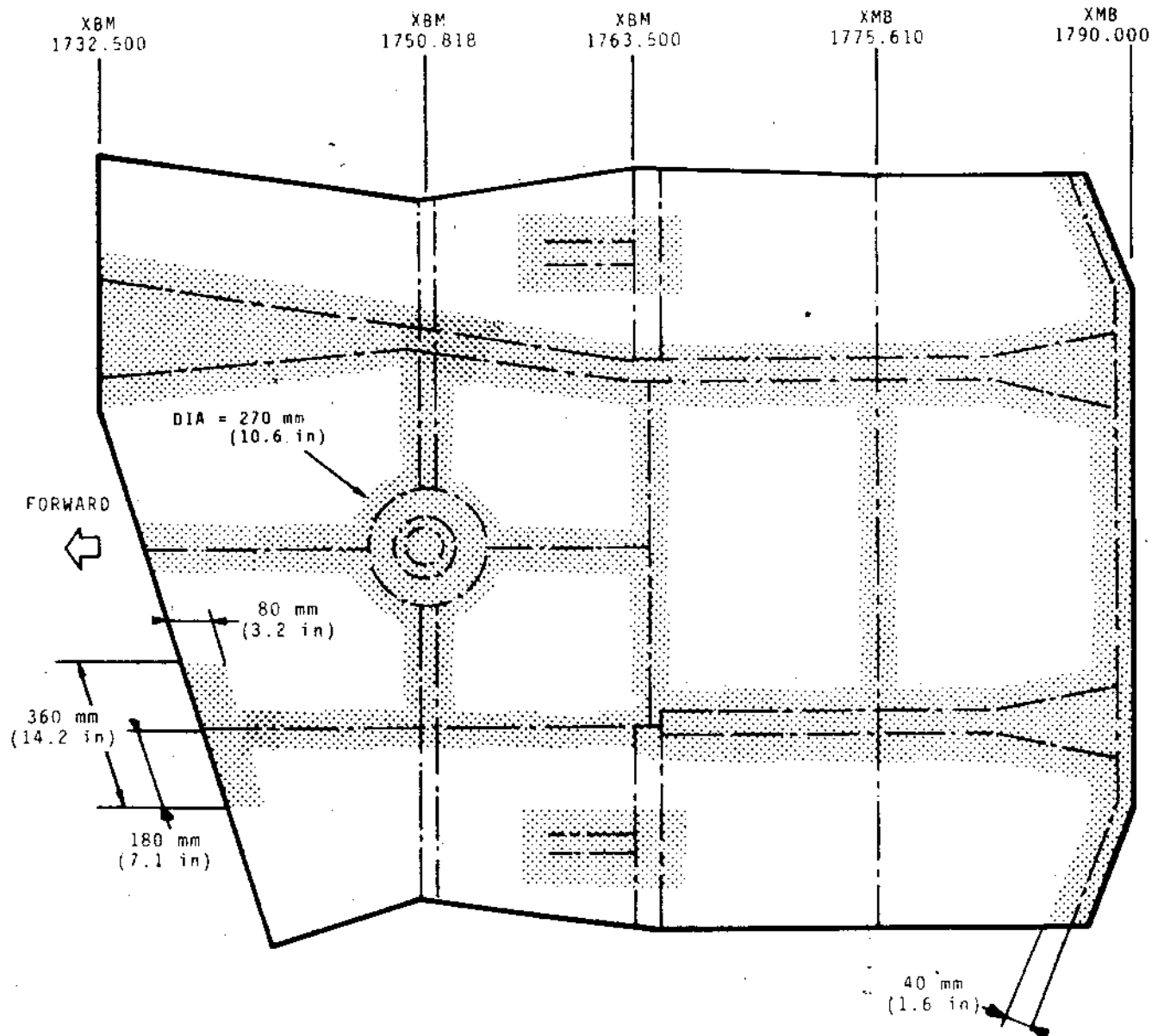
OLYMPUS 593

MK.610-14-28

OVERHAUL



OUTBOARD AND INBOARD SIDE WALLS



Twin Secondary Nozzle Inner Panels -  
Restricted Areas

Figure 307 (Sheet 1 of 4)

78-13-01

BASIC TWIN SEC. NOZZLE - RESTRICTED AREAS

Page 313

Jan 15/76

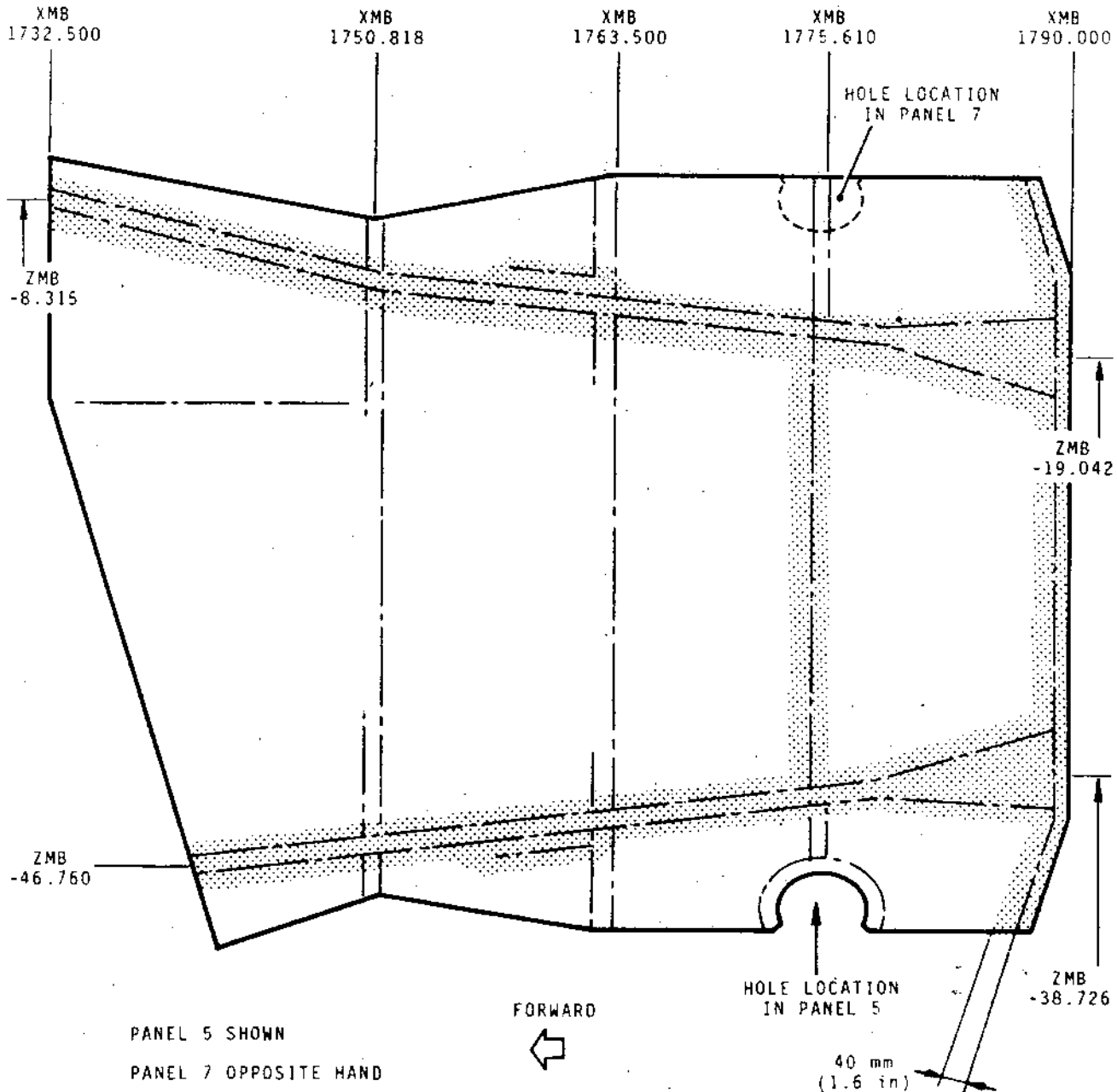


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



CENTRAL WALLS



PRINTED IN FRANCE

Twin Secondary Nozzle Inner Panels -  
Restricted Areas  
Figure 307 (Sheet 2 of 4)

78-13-01

BASIC TWIN SEC. NOZZLE- RESTRICTED AREAS

Page 314

Jan 15/76

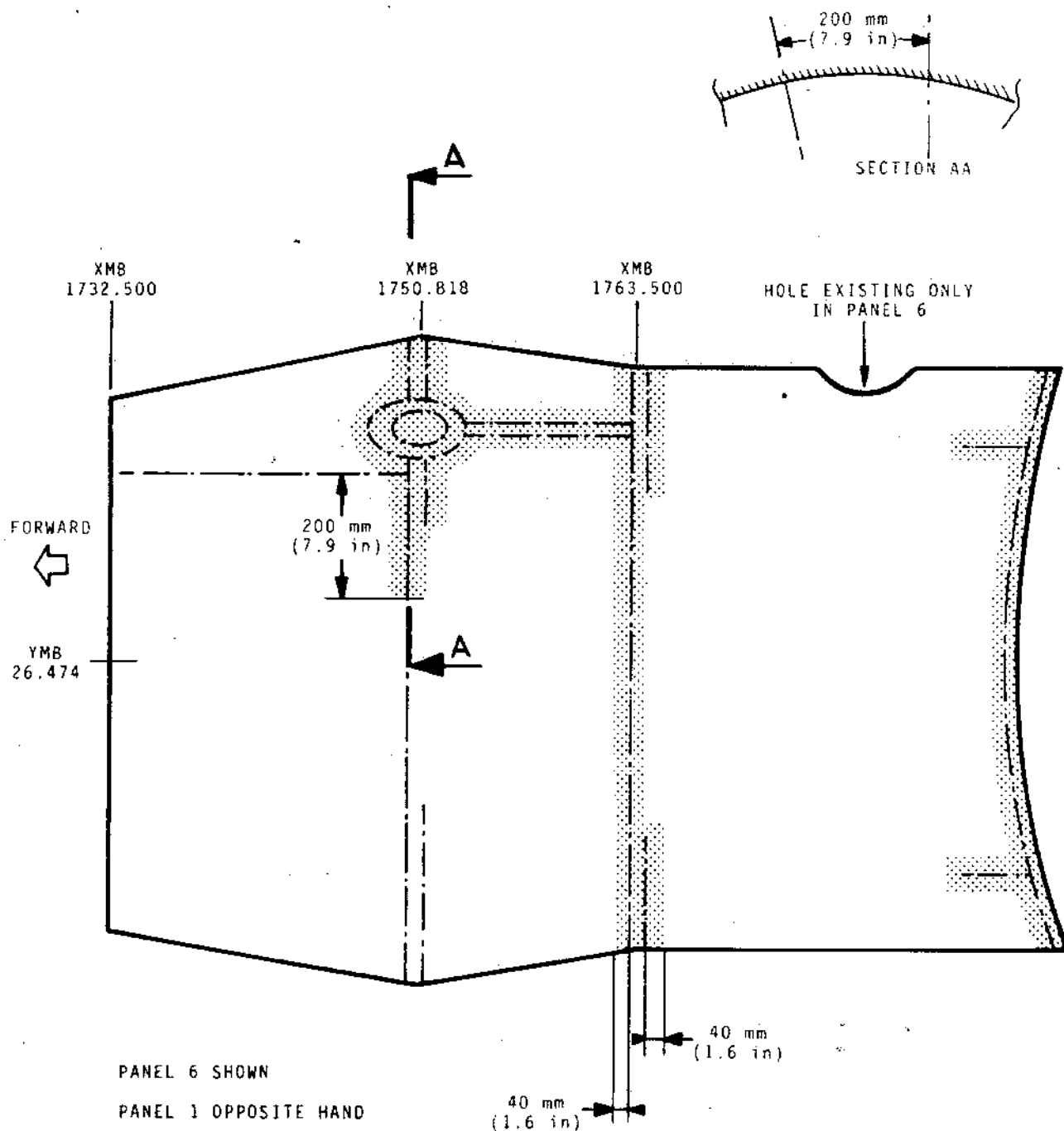


OLYMPUS 593

MK.610-14-28  
OVERHAUL



UPPER SECTION



Twin Secondary Nozzle Inner Panels -  
Restricted Areas  
Figure 307 (Sheet 3 of 4)

78-13-01

BASIC TWIN SEC. NOZZLE - RESTRICTED AREAS

Page 315

Jan 15/76

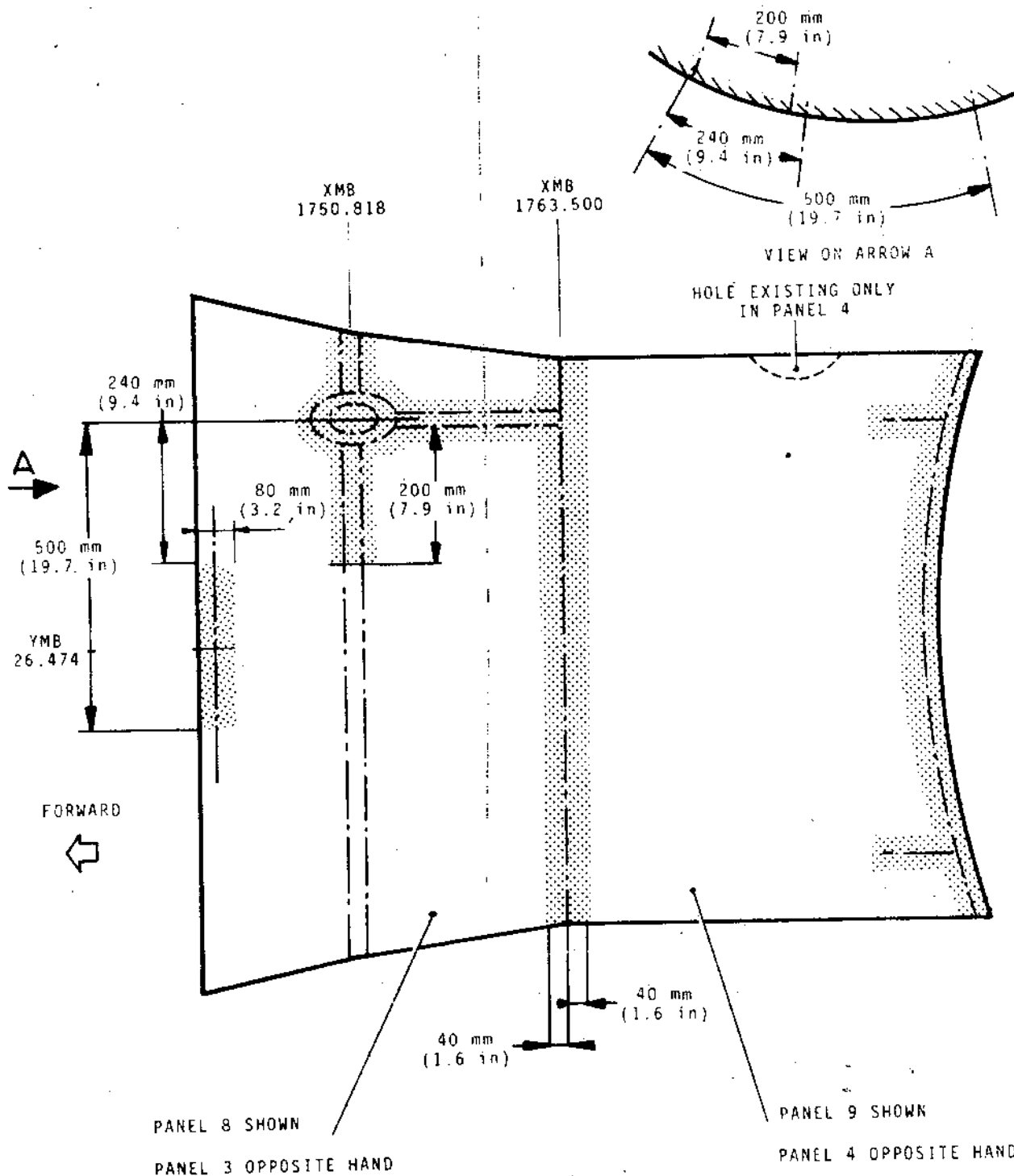


OLYMPUS 593

MK.610-14-28  
OVERHAUL



LOWER SECTION



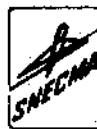
Twin Secondary Nozzle Inner Panels  
Restricted Areas  
Figure 307 (Sheet 4 of 4)

78-13-01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



#### 4. Inspection Methods

The inspection methods used to assess the condition of the twin secondary nozzle are :

- visual check
- aural check
- radiographic inspection
- dimensional inspection

##### A. Visual check

This check consists in :

visually checking zones with straight-through access using, if required, a binocular (magnifying power : x 10).

visually checking box-type zones through the orifices (ports) provided, using a borescope (see fig. 301).

NOTE : The borescopes currently used at SNECMA for examination of the twin secondary nozzle are :

Rigid borescopes "FORT" with the following characteristics :

- 15 mm (0.590 in.) dia. Direct view
- 15 mm (0.590 in.) dia. 90° Side view
- 15 mm (0.590 in.) dia. 60° Backward view
- 10 mm (0.394 in.) dia. 60° Backward view

Flexible borescopes "OLYMPUS", 11 mm (0.433 in.) dia. Direct view.

This visual check is intended for :

- (1) Ascertaining the condition of the self-locking nuts providing for attachment of the :

- access doors
- convergent panels
- divergent panels
- rear frame heat shield assemblies
- seal plate assemblies
- thermal protections of side walls

- (2) Ascertaining the condition of the various attachment parts such as rivets, bolts, etc... used for assembling the secondary nozzle.

78-13-01

BASIC TWIN SEC. NOZZLE - INSPECTION METHODS

Page 301

Jan 15/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (3) Ascertaining the condition of components made from stresskin material and more particularly the presence of damage such as : cracks, impacts, tears, wrinkles, wear marks, ...

B. Aural check

This check is carried out by tapping slightly on the stresskin panel, using a small piece of metal, such as a coin.

The purpose of this check is to evidence a core-to-face sheet separation or a deterioration of the internal ribbon.

A panel in good condition emits a clear sound whereas a panel with a deteriorated internal ribbon emits a dull sound

NOTE : This checking method is less efficient in the areas where the stresskin panel contacts a fitting or a structural element and also in the crushed-edge areas of panels.

The aural check is to be applied to all the stresskin panels constituting the inner and outer skins of the secondary nozzle by coin-tapping evenly every 3 or 4 cells.

C. Radiographic inspection using gamma-rays

This inspection is performed using an Iridium 192 radiation source and in accordance with the instructions of chapter 70-20-30, "RADIOGRAPHIC INSPECTION", and as indicated on figure 302.

The purpose of this check is to evidence :

- core-to-face sheet separation or internal ribbon deterioration
- cracks within the stresskin panels or the structural components.

D. Dimensional inspection

Dimensional inspection of the Twin Secondary Nozzle is performed using standard inspection tooling and instrumentation.

78-13-01

BASIC TWIN SEC. NOZZLE - INSPECTION METHODS

Page 302

Jan 15/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Items to be checked are the following :

- Distance between centres of rear fittings providing for bucket hinge points.
- I.D. of bushings accommodating the bucket trunnion bearings.
- I.D. of housings accommodating the primary nozzle mounting pins.
- I.D. of bushings of the secondary nozzle's attachment links "J", "N", "T" and "R" to nacelle.
- Bores of engine access door lock
- I.D. of bushings provided for upper access door support bracket.
- I.D. of bushings provided for attachment of the bucket pneumatic drive actuator.
- Bores and pins of links provided for barrel support.

**78-13-01**

BASIC TWIN SEC. NOZZLE - INSPECTION METHODS

Page 303

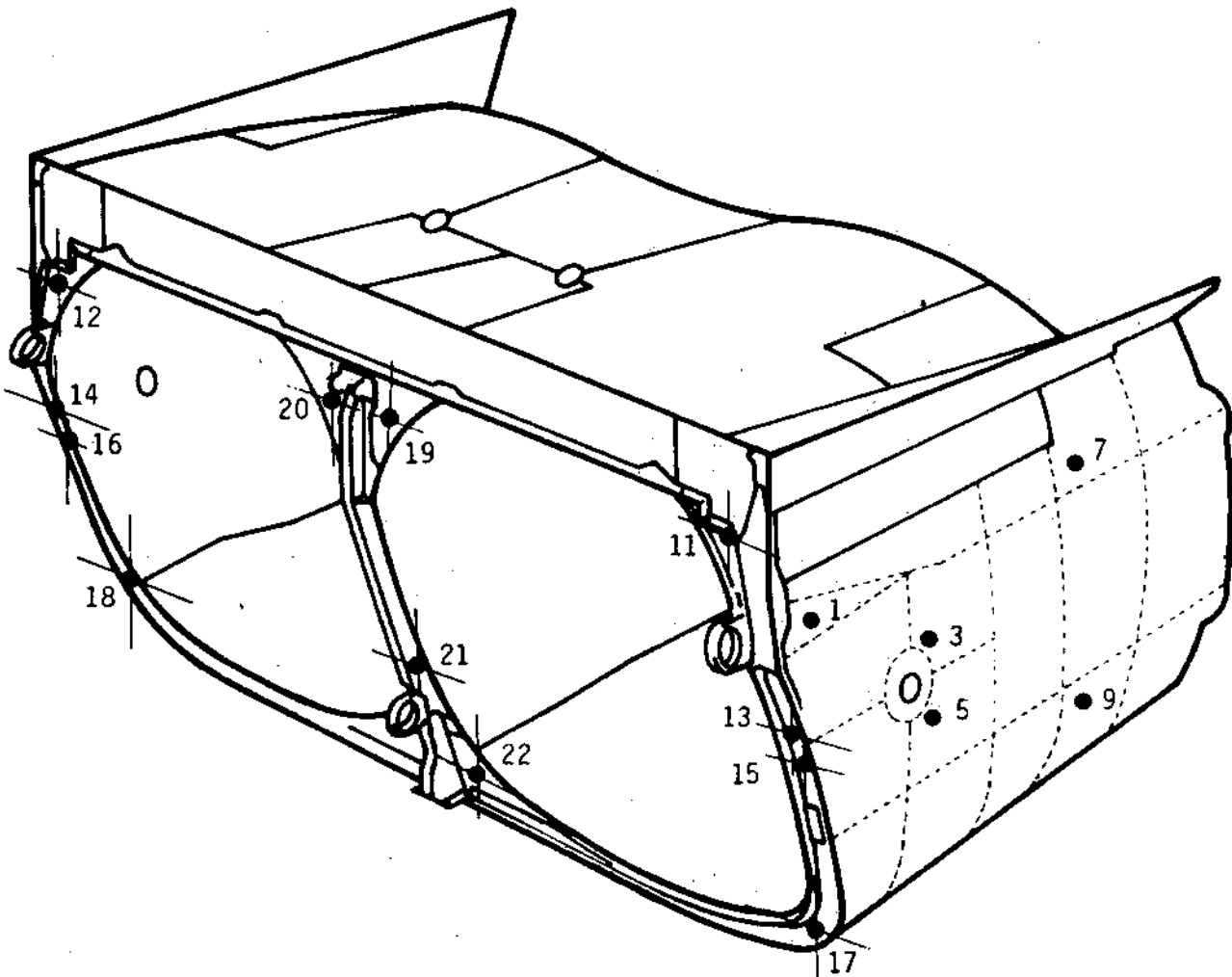
Jan 15/76





OLYMPUS 593

MK.610-14-28  
OVERHAUL



Twin Secondary Nozzle - Provisions for Borescopic Inspection  
Figure 301 (Sheet 1 of 2)

78-13-01

BASIC TWIN SEC. NOZZLE - INSPECTION METHODS

Page 304

Jan 15/76

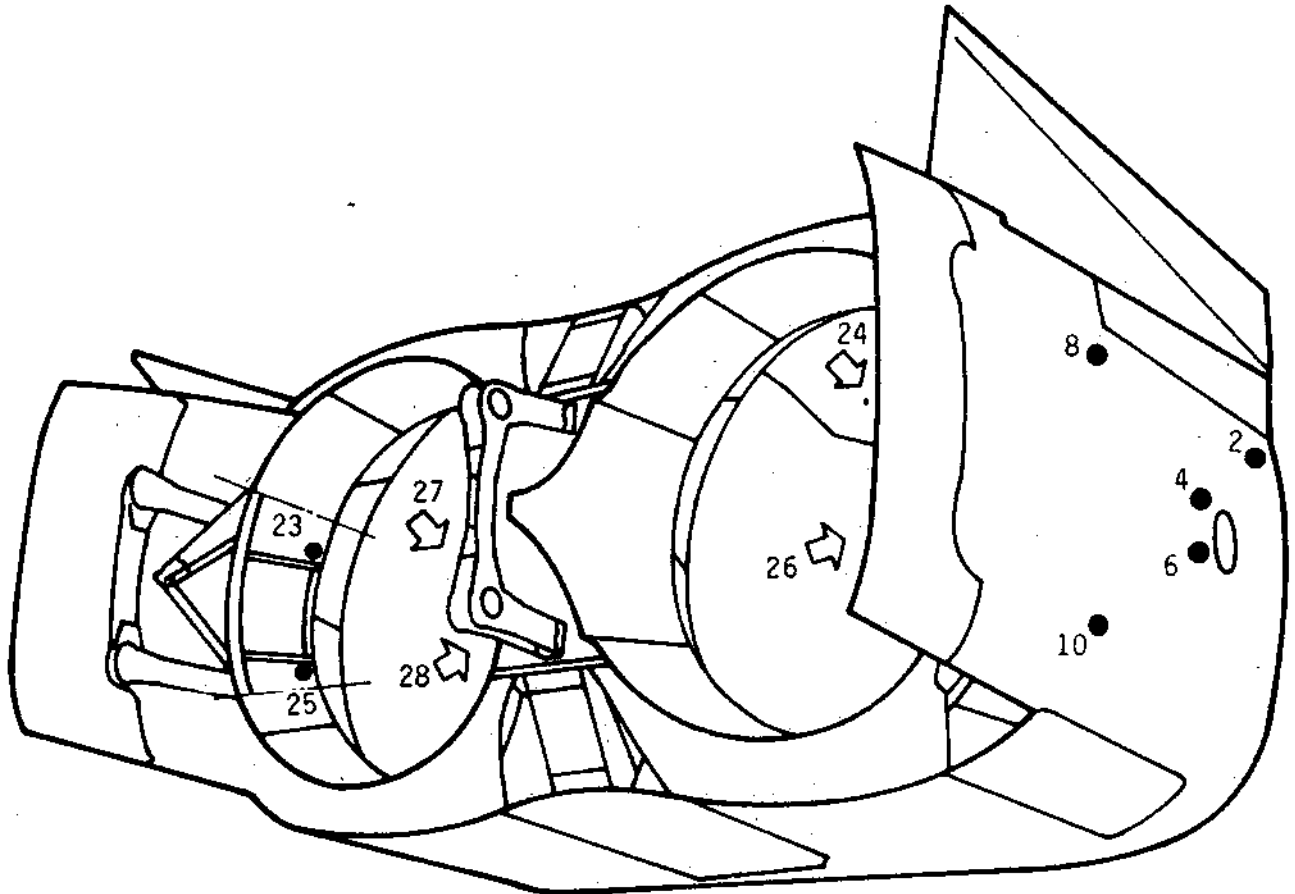


OLYMPUS 593

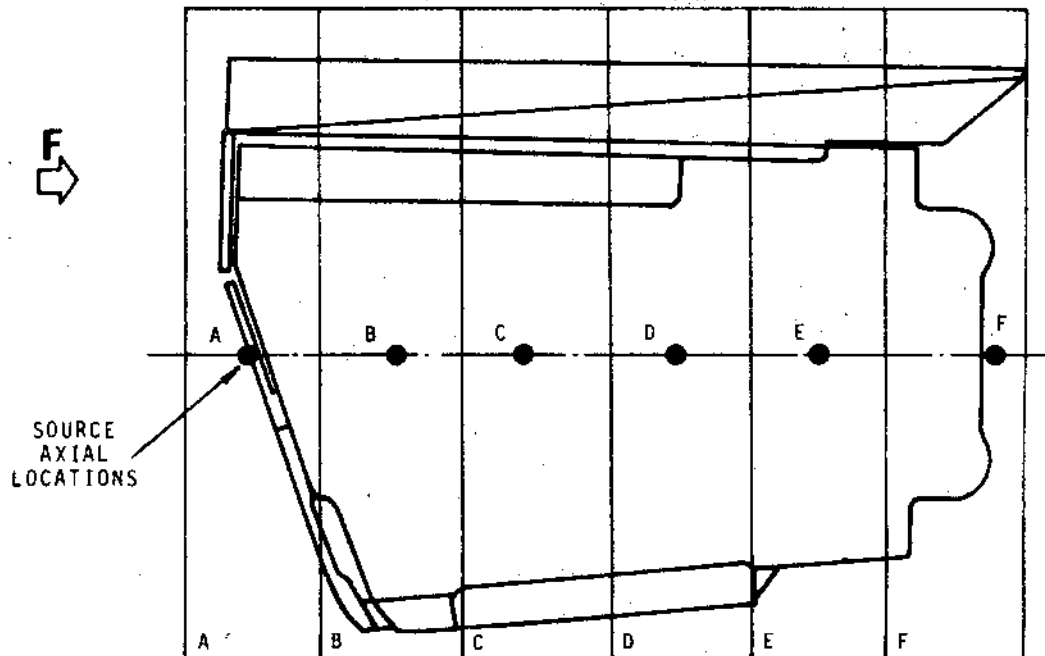
MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE



Twin Secondary Nozzle - Provisions for Borescopic Inspection  
Figure 301 (Sheet 2 of 2)

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

SOURCE LOCATION	FILMS *	PHOTOGRAPHIC DENSITY	IMAGE QUALITY INDICATOR (I.Q.I.)
A	1 to 8 + 13 and 14	2,2	Wire 0,15 mm dia. (0.006 in.)
B and C	1 to 14		
D	1 to 12		
E and F	1 to 4		

\* Type "M" KODAK film - between lead screens 0,15 to 0,25 mm (0.0060 to 0.0098 in.) thick.

Films dimensions are shown on sheets 3 and 4.

Twin Secondary Nozzle - Radiographic Inspection  
Figure 302 (Sheet 1 of 4)

**78-13-01**

BASIC TWIN SEC. NOZZLE - INSPECTION METHODS

Page 306

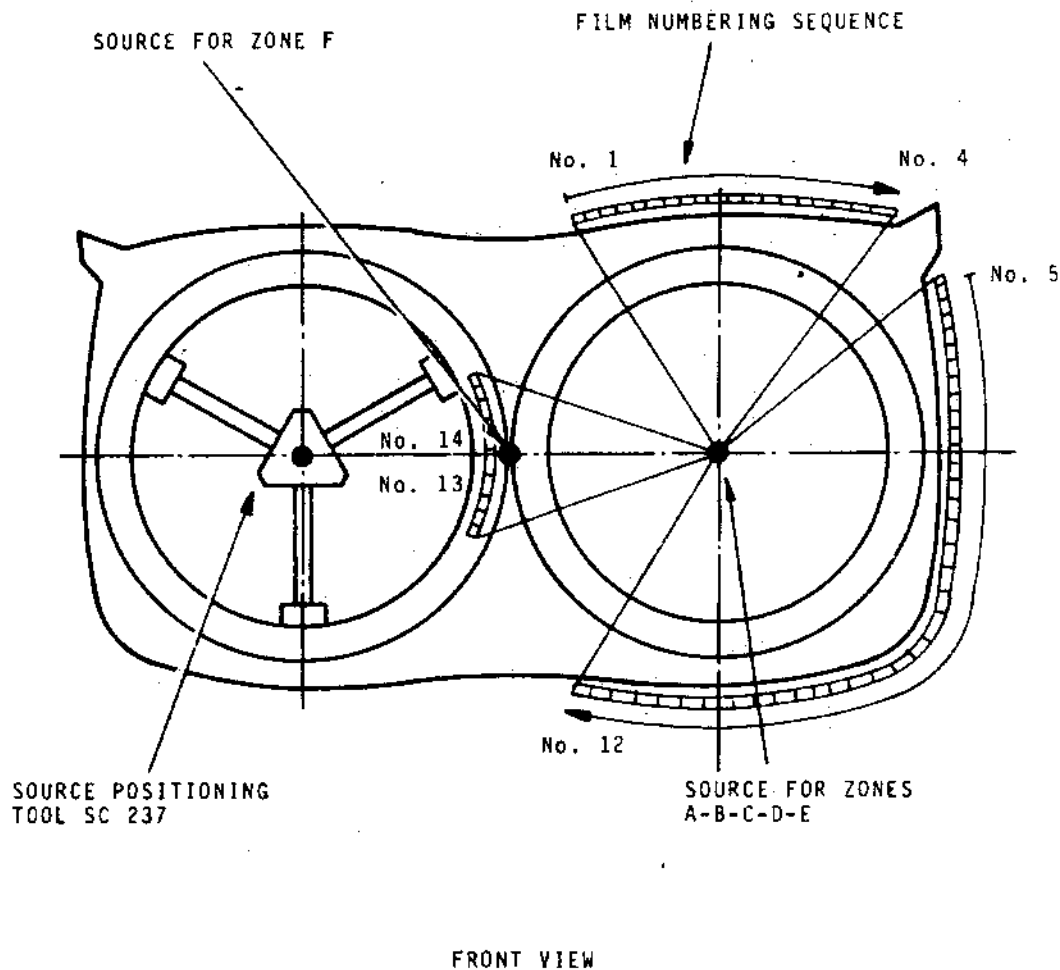
Jan 15/76



OLYMPUS 593  
MK.610-14-28  
OVERHAUL



**F**



Twin Secondary Nozzle - Radiographic Inspection  
Figure 302 (Sheet 2 of 4)

**78-13-01**

BASIC TWIN SEC. NOZZLE - INSPECTION METHODS

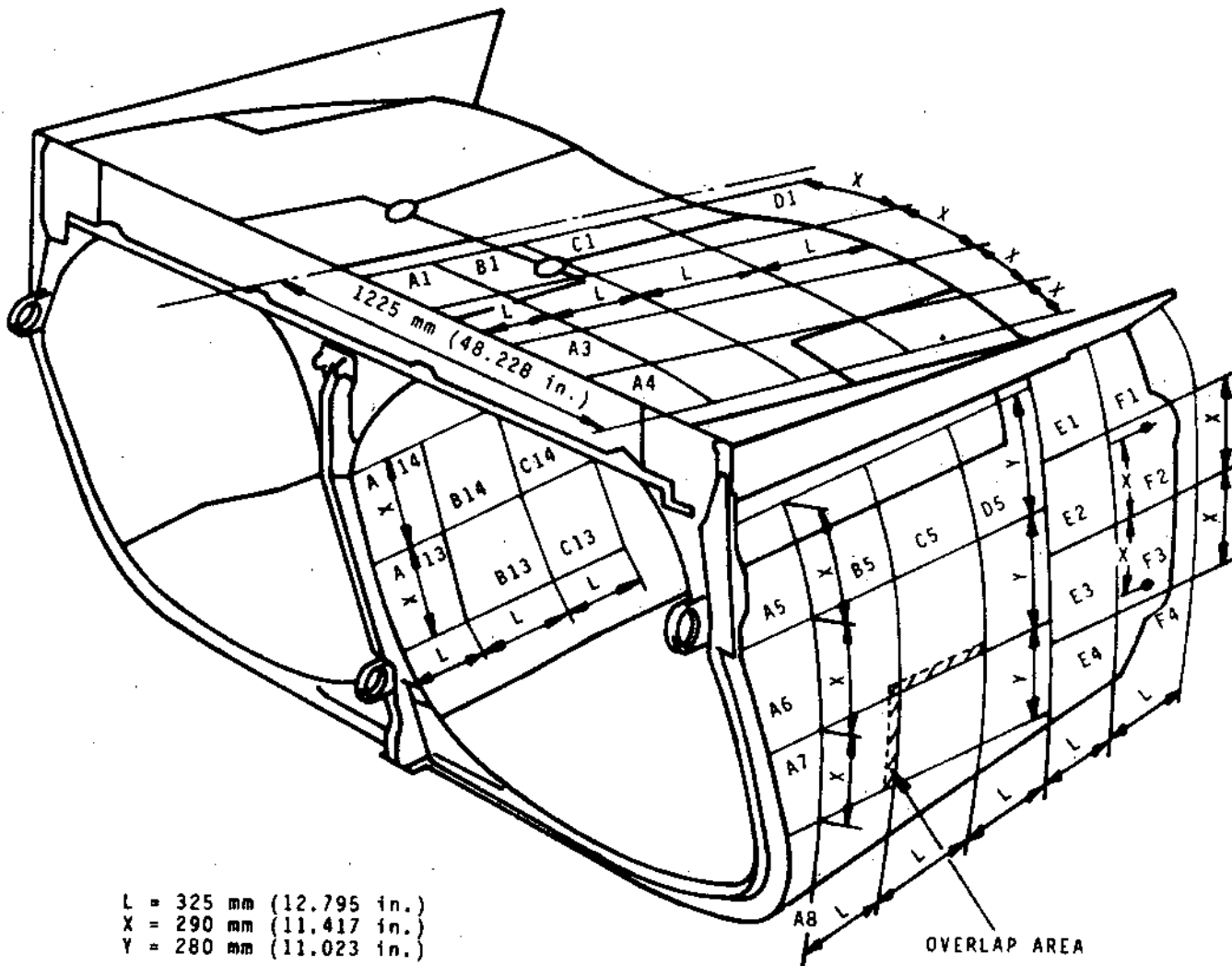
Page 307

Jan 15/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



L = 325 mm (12.795 in.)  
X = 290 mm (11.417 in.)  
Y = 280 mm (11.023 in.)

Twin Secondary Nozzle - Radiographic Inspection  
Figure 302 (Sheet 3 of 4)

78-13-01

BASIC TWIN SEC. NOZZLE - INSPECTION METHODS

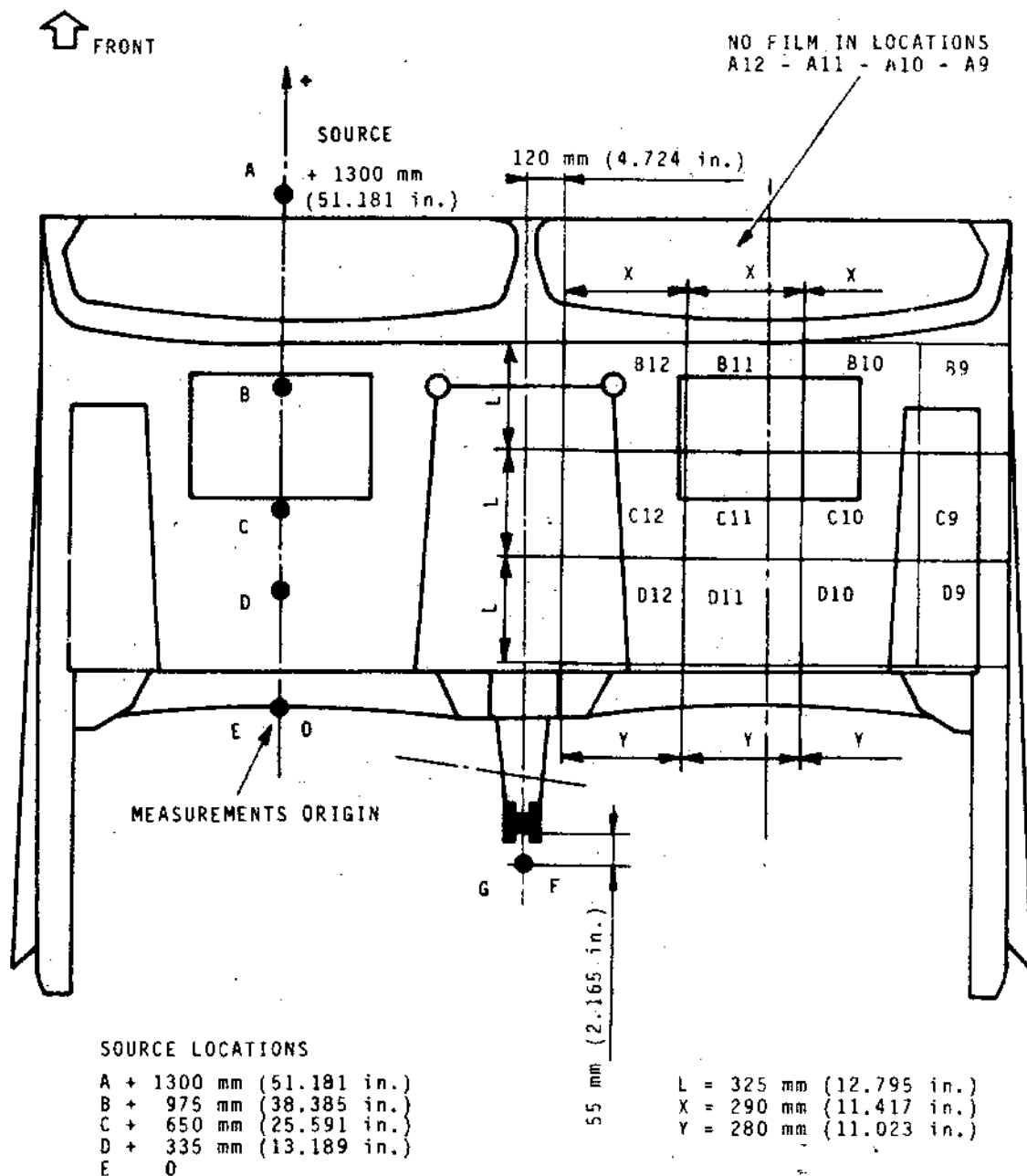
Page 308

Jan 15/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Twin Secondary Nozzle - Radiographic Inspection  
Figure 302 (Sheet 4 of 4)

78-13-01

BASIC TWIN SEC. NOZZLE - INSPECTION METHODS

Pages 309/310

Jan 15/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



## 5. Permissible damage

This paragraph defines the maximum extent of the defects beyond which it is necessary to apply a repair scheme.

The permissible damage are categorized as follows :

- Acceptable damage on the inner and outer skin panels
- Acceptable damage on the main (basic) structure
- Acceptable damage affecting the dimensional characteristics (distortion, wear ...)

### A. Acceptable damage on the inner and outer skin panels

#### (1) Introduction

- (a) Within the damage acceptance limits for the skin panels, two cases are to be considered :

- General case

Zones where the panel provides only for streamlining (covering) or carries minor loads.

- Cases of restricted areas

Zones where the panel transmits heavy loads. and/or wherein the mechanical strength is essential.

NOTE : Restricted areas are defined in paragraph 3.

- (b) Cumulative damage are permissible so long as within an area designated "mesh" and delimited by the frames and stringers (See fig. 301), the unaffected area which separates two successive defects is at least, equal to the most stringent criterion established for the said defects.

- (c) The damage may be adjacent to one or more attachment points provided that acceptance limits for the ineffective attachment points are not exceeded.

NOTE : Restricted areas are defined in paragraph 3.

78-13-01

BASIC TWIN SEC. NOZZLE - PERMISSIBLE DAMAGE

Page 301

Jan 31/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(2) Permissible damage

(a) Dents (See figure 302)

CAUTION : IF DENT HAS RESULTED IN A CRACK OR A HOLE, REFER TO ACCEPTANCE LIMITS FOR THESE DEFECTS.

Acceptance limits for the 3 types of dent damage considered are the following :

Case I - Rounded bottom dent, contained within one cell with no collapsing of the panel core ribbon :

- . Max. depth and width of dent to be, respectively, 1 mm (0.04 in.) and equal to 5 times the depth at least.
- . Unaffected area around such defect :  
General case : 45 mm (1.77 in.)  
Restricted areas : 75 mm (2.95 in.)
- . Max. number of this type of dent affecting one (1) "mesh" : 5

Case II - Rounded bottom dent, contained within 3 or 4 cells at maximum, with collapsing of the panel core ribbon.

- . Max. depth and width of dent to be, respectively, 1,5 mm (0.06 in.) and equal to 10 times the depth at least.
- . Unaffected area around such defect :  
General case : 100 mm (3.94 in.)  
Restricted areas : 200 mm (7.87 in.)
- . Max. number of this type of dent affecting one (1) "mesh" : 3

Case III - Large surface dent

These defects are unacceptable. Dents beyond acceptable limits necessitate the repair of panel. The type of repair is determined by the damage extent and location. See chapter REPAIR in the Overhaul Manual.

78-13-01

BASIC TWIN SEC. NOZZLE - PERMISSIBLE DAMAGE

Page 302

Jan 31/77





OLYMPUS 593

MK.610-14-28  
OVERHAUL



NOTE : Dents affecting the outer skin panels and remaining within the acceptance limits, must be masked using an elastomer to reconstitute the panel contour. See REP 29-190-5

- (b) Round bottomed longitudinal crushing (crease)

CAUTION : IF THIS DEFECT SHOWS SHARP EDGES OR HAS INDUCED A CRACK, REFER TO THE ACCEPTANCE LIMITS FOR CRACKS.

This damage is unacceptable.

The type of repair is determined by the damage extent and location. Refer to chapter "REPAIR" of the Overhaul Manual.

- (c) Wrinkles on skin panel face-sheets

CAUTION : IF THIS DEFECT HAS RESULTED IN CRACKING, REFER TO THE ACCEPTANCE LIMITS FOR CRACKS

This damage is unacceptable.

The type of repair is conditioned by the damage extent and location. Refer to chapter "REPAIR" in the Overhaul Manual.

- (d) Delamination (core-to-face sheet separation) or deterioration of core ribbon.

NOTE : Such defects may possibly cause the buckling or bubbling out of plane of the panel face-sheet.

This damage is unacceptable.

The type of repair is conditioned by the damage extent and location. Refer to chapter "REPAIR" in the Overhaul Manual.

- (e) Missing piece of panel face-sheet

This damage is unacceptable.

78-13-01



OLYMPUS 593

MK.610-14-28  
OVERHAUL



The type of repair is conditioned by damage extent and location. Refer to chapter "REPAIR" in the Overhaul Manual.

(e) Missing piece of panel face-sheet

This damage is unacceptable.

The type of repair is conditioned by damage extent and location. Refer to chapter "REPAIR" in the Overhaul Manual.

(f) Cracking

This damage is unacceptable.

The type of repair is determined by the damage extent and location. See chapter "REPAIR" in the Overhaul Manual.

(g) Loss of positive retention at the attachment points (Ref. Figure 303)

This condition may be caused by :

- a missing fastener (rivet, bolt, etc...)
- a loose fastener
- a deteriorated panel in the area of attachment point.

In the case of a missing or loose fastener, re-install a new fastener.

In the case of panel deterioration next to the attachment point, the latter becomes ineffective and the following limits shall apply :

General case (Ref. Figure 303 - Sheet 1)

- Of the two first attachment points located at each end of a row of fasteners, at least one(1) must remain effective.
- In same row, two ineffective attachment points must be separated by two effective ones at least.

Particular case :

The particular cases are defined on Figure 303 (Sheets 2 thru 11)

78-13-01

BASIC TWIN SEC. NOZZLE - PERMISSIBLE DAMAGE

Page 304

Jan 31/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



FRAMES

STRINGERS

"MESH"

OUTBOARD SIDE WALL

Mesh Delineation  
Figure 301

N

BASIC TWIN SEC. NOZZLE - PERMISSIBLE DAMAGE

78-13-01

Page 305

Jan 31/77



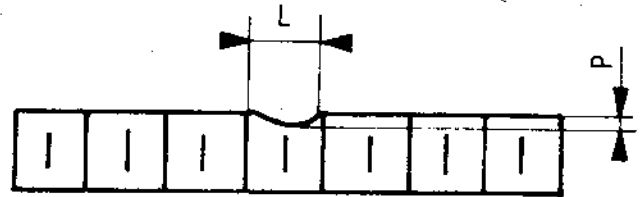
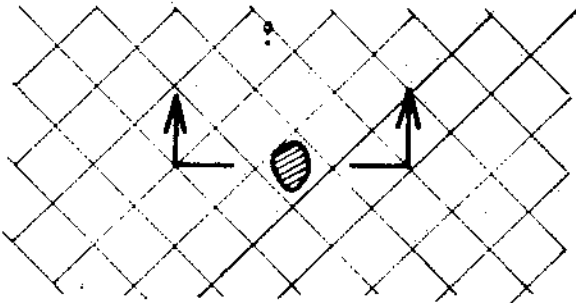
OLYMPUS 593

MK.610-14-28  
OVERHAUL

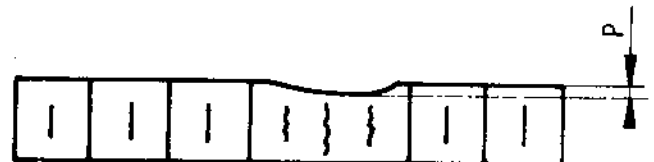
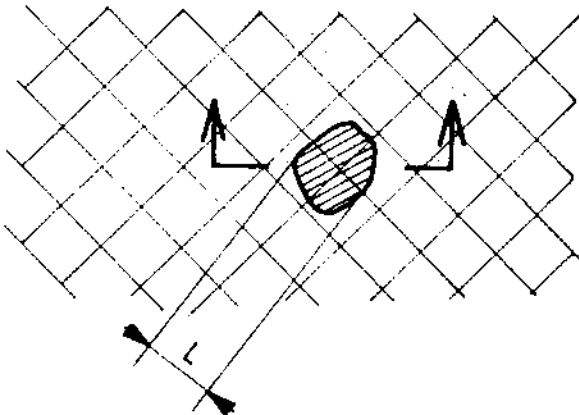


DENT

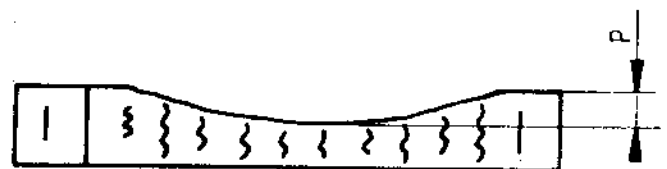
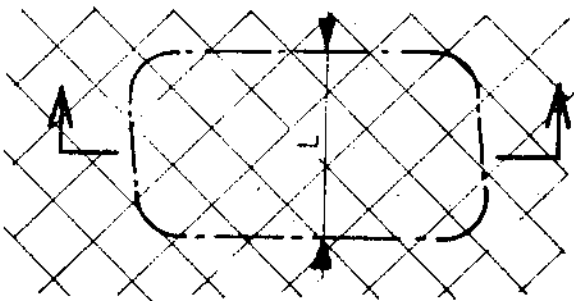
CASE I



CASE II



CASE III



Depiction of Damage Affecting the Skin Panels  
Figure 302 (Sheet 1 of 3)

78-13-01

BASIC TWIN SEC. NOZZLE - PERMISSIBLE DAMAGE

Page 306

Jan 31/77

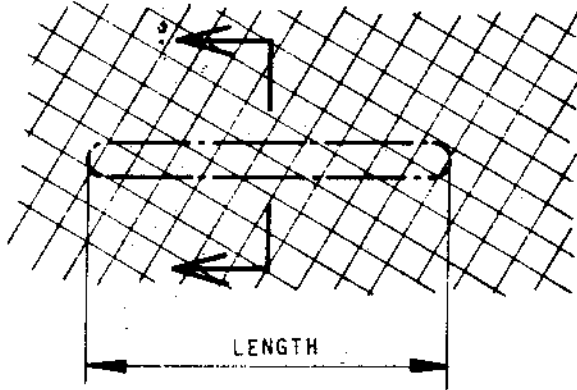


OLYMPUS 593

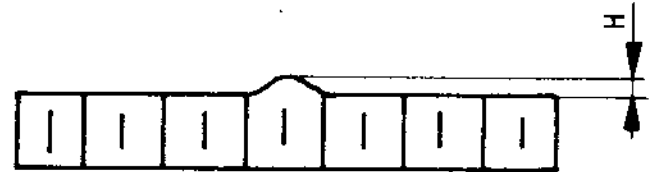
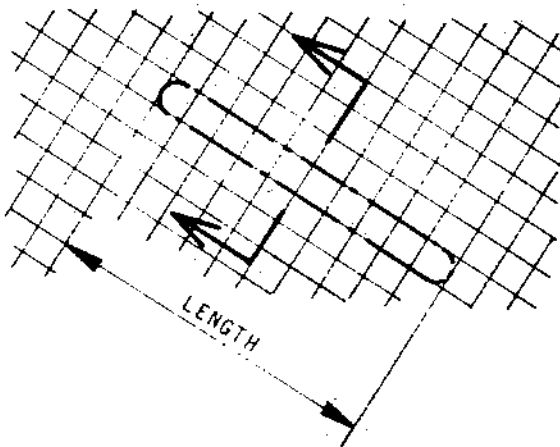
MK.610-14-28  
OVERHAUL



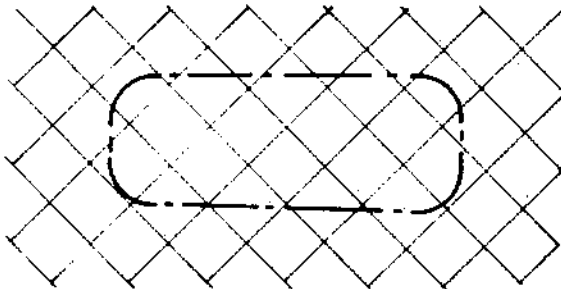
### CREASE OR WRINKLE



### BUCKLES



### DELAMINATION (CORE-TO-FACE SHEET SEPARATION)



SEPARATION OF FACE SHEET  
FROM CORE RIBBON MAY NOT  
BE VISIBLE



Depiction of Damage Affecting the Skin Panels  
Figure 302 (Sheet 2 of 3)

78-13-01

BASIC TWIN SEC. NOZZLE - PERMISSIBLE DAMAGE

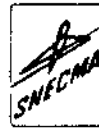
Page 307

Jan 31/77

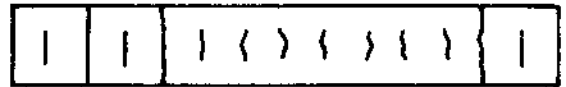
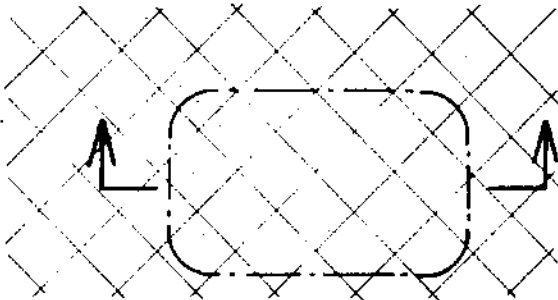


OLYMPUS 593

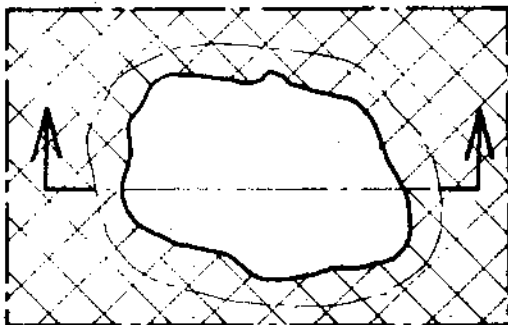
MK.610-14-28  
OVERHAUL



### CORE RIBBON DETERIORATION



### HOLE THROUGH PANEL



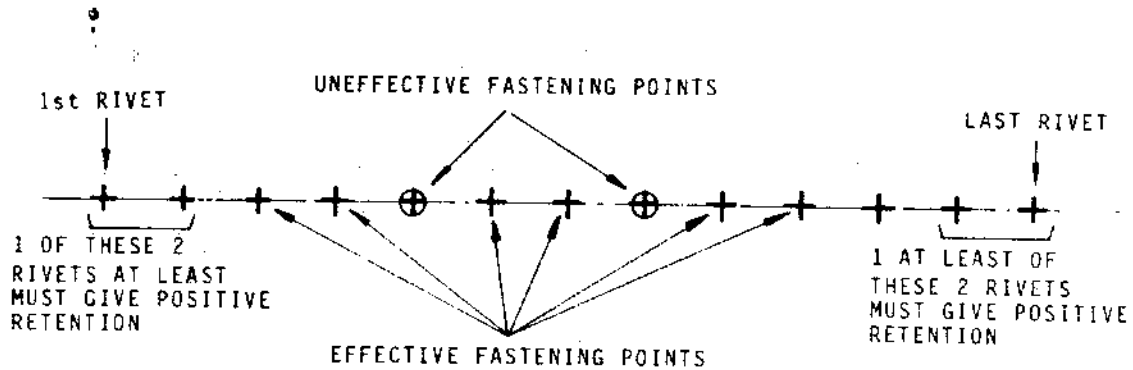
Depiction of Damage Affecting the Skin Panels  
Figure 302 (Sheet 3 of 3)

78-13-01

BASIC TWIN SEC. NOZZLE - PERMISSIBLE DAMAGE

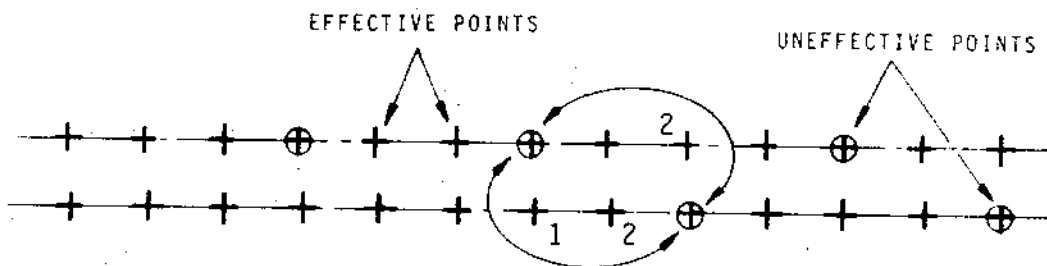
Page 308  
Jan 31/77

# GENERAL ACCEPTANCE CRITERIA



2 UNEFFECTIVE POINTS TO BE SEPARATED BY 2 EFFECTIVE ONES AT LEAST

TYPICAL FOR ONE ROW OF FASTENERS



2 UNEFFECTIVE POINTS TO BE SEPARATED BY 2 EFFECTIVE ONES AT LEAST

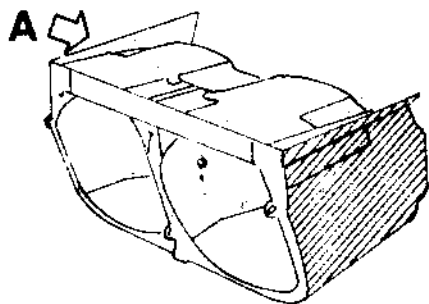
TYPICAL FOR 2 ROWS OF FASTENERS

Loose or Missing Fasteners Resulting in Ineffective Attachment Points on the Inner and Outer Skin Panels  
 Figure 303 (Sheet 1 of 11)



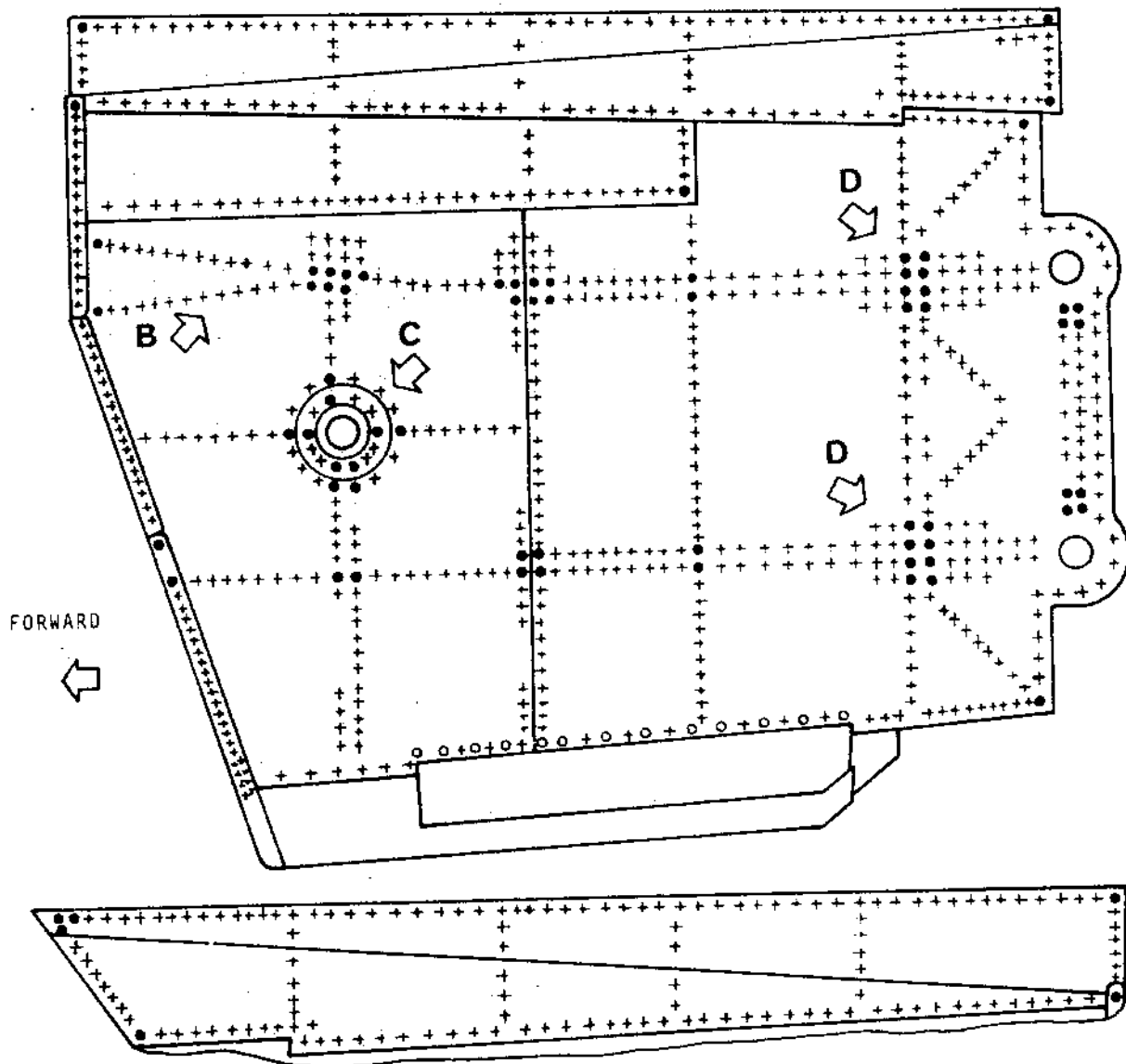
OLYMPUS 593

MK.610-14-28  
OVERHAUL



NOTE : L.H. SECONDARY NOZZLE SHOWN  
R.H. SECONDARY NOZZLE, OPPOSITE HAND

VALID FOR L.H. AND R.H. SIDE WALLS EXCEPT FOR  
DETAIL A



GENERAL CASE : SEE SHEET 1

• INEFFECTIVE FASTENING POINT, UNACCEPTABLE

DETAIL A



Loose or Missing Fasteners Resulting in Ineffective  
Attachment Points on the Inner and Outer Skin Panels  
Figure 303 (Sheet 2 of 11)

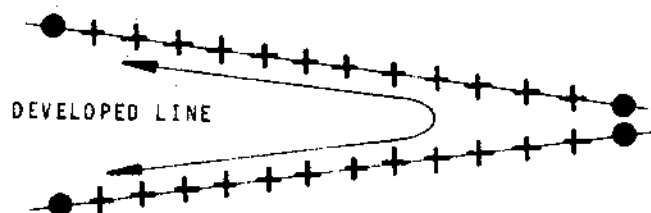
78-13-01

BASIC TWIN SEC. NOZZLE - PERMISSIBLE DAMAGE

Page 310

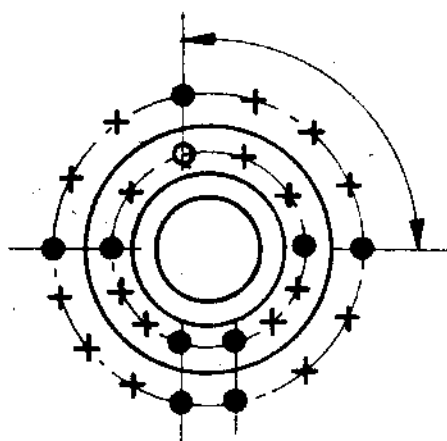
Jan 31/77





2 INEFFECTIVE FASTENING POINTS TO BE SEPARATED BY 5 EFFECTIVE ONES

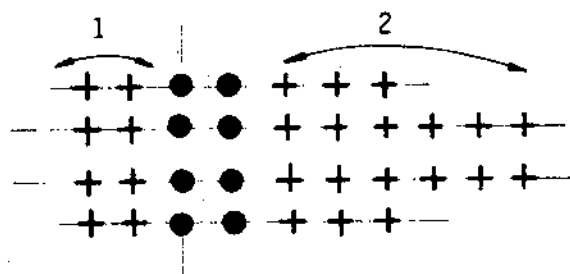
DETAIL B



2 INEFFECTIVE FASTENING POINTS MAX. PER PRIMARY NOZZLE MOUNTING PIN HOUSING

1 INEFFECTIVE FASTENING POINT MAX. PER QUADRANT

DETAIL C



ZONE 1 : 1 INEFFECTIVE FASTENING POINT MAX.

ZONE 2 : 2 INEFFECTIVE FASTENING POINTS MAX. NO ADJACENT

DETAIL D

Loose or Missing Fasteners Resulting in Ineffective Attachment Points on the Inner and Outer Skin Panels  
Figure 303 (Sheet 3 of 11)

78-13-01

BASIC TWIN SEC. NOZZLE - PERMISSIBLE DAMAGE

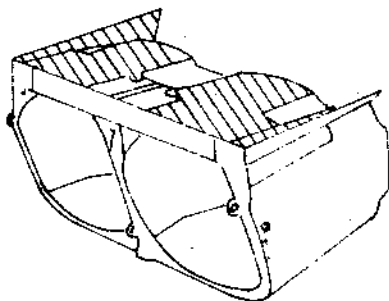
Page 311

Jan 31/77

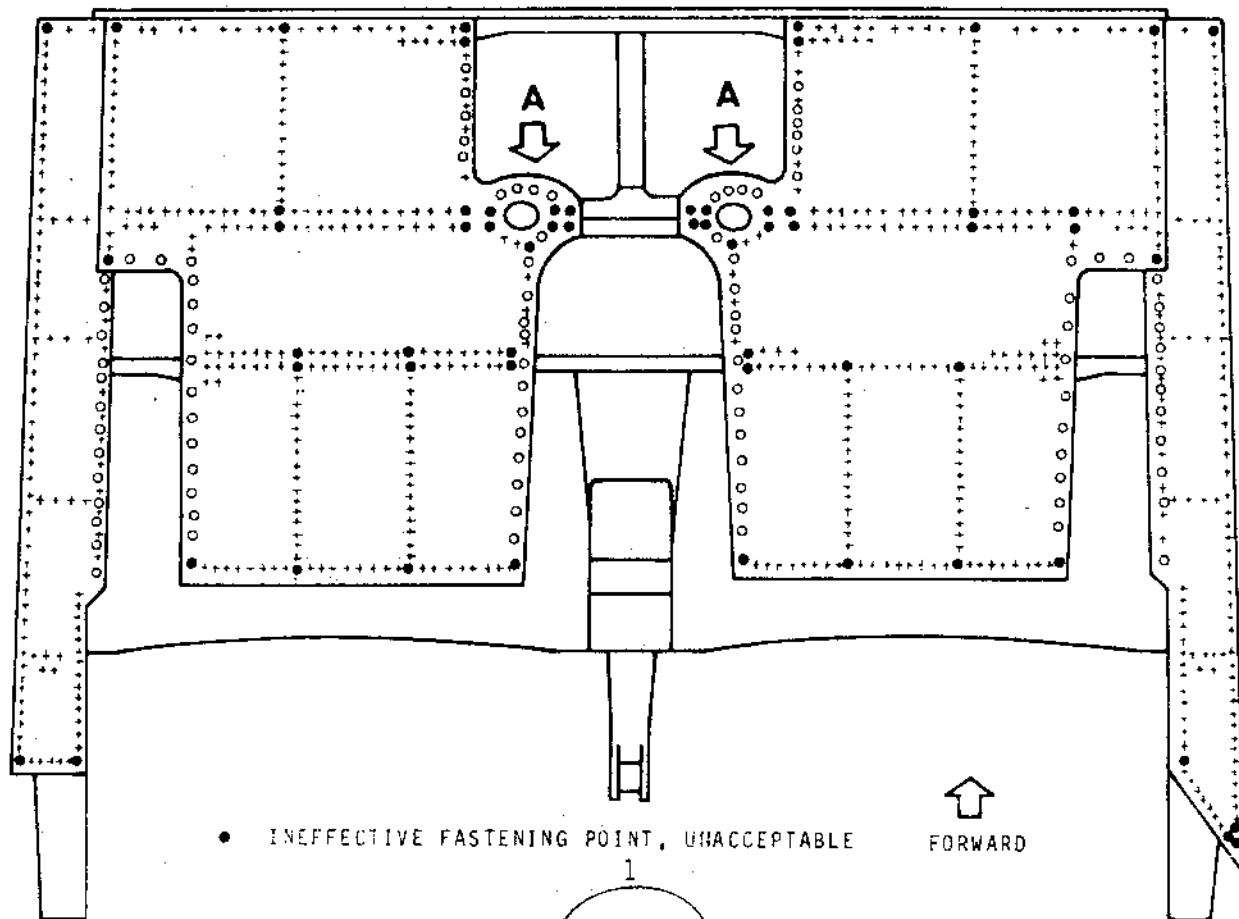


OLYMPUS 595

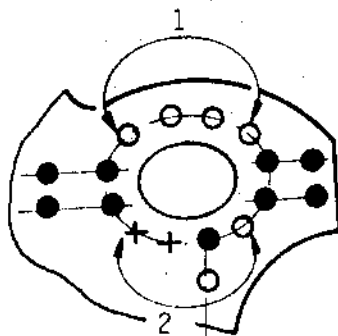
MK.610-14-28  
OVERHAUL



NOTE : L.H. SECONDARY NOZZLE SHOWN  
R.H. SECONDARY NOZZLE, OPPOSITE HAND



GENERAL CASE : SEE SHEET 1  
PARTICULAR CASE



ZONE 1 - ZONE 2 : 1 INEFFECTIVE FASTENING POINT MAX.

DETAIL A

Loose or Missing Fasteners Resulting in Ineffective  
Attachment Points on the Inner and Outer Skin Panels  
Figure 303 (Sheet 4 of 11)

78-13-01

BASIC TWIN SEC. NOZZLE - PERMISSIBLE DAMAGE

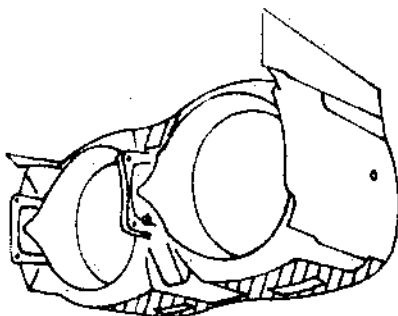
Page 312  
Jan 31/77



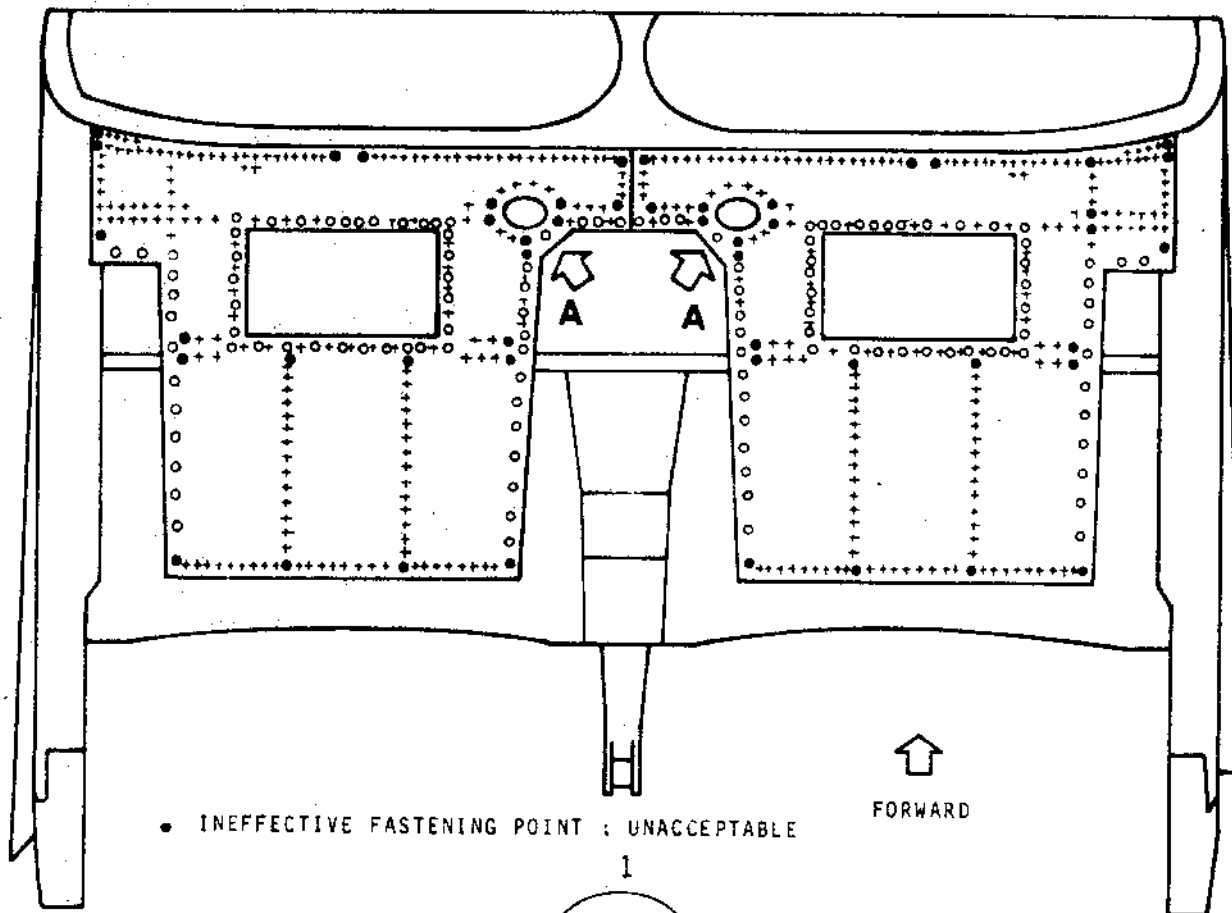
OLYMPUS 593

MK. 610-14-28

OVERHAUL

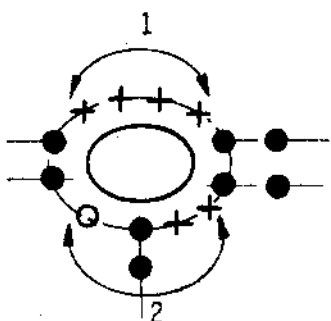


NOTE : L.H. SECONDARY NOZZLE SHOWN  
R.H. SECONDARY NOZZLE, OPPOSITE HAND



GENERAL CASE : SEE SHEET 1

PARTICULAR CASE



ZONE 1 - ZONE 2 1 INEFFECTIVE FASTENING POINT MAX.

DETAIL A

Loose or Missing Fasteners Resulting in Ineffective Attachment Points on the Inner and Outer Skin Panels  
Figure 303 (Sheet 5 of 11)

78-13-01

BASIC TWIN SEC. NOZZLE - PERMISSIBLE DAMAGE

Page 313

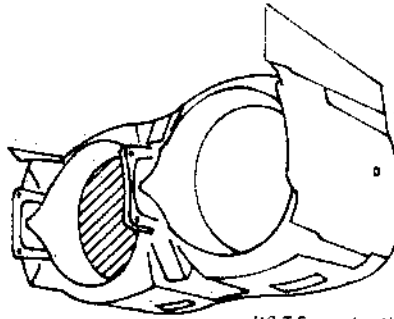
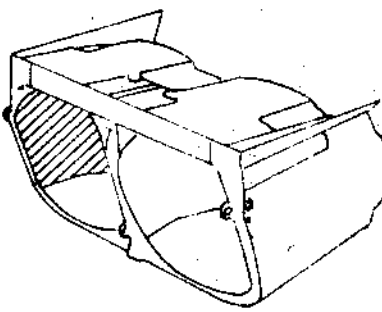
Jan 31/77



OLYMPUS 593

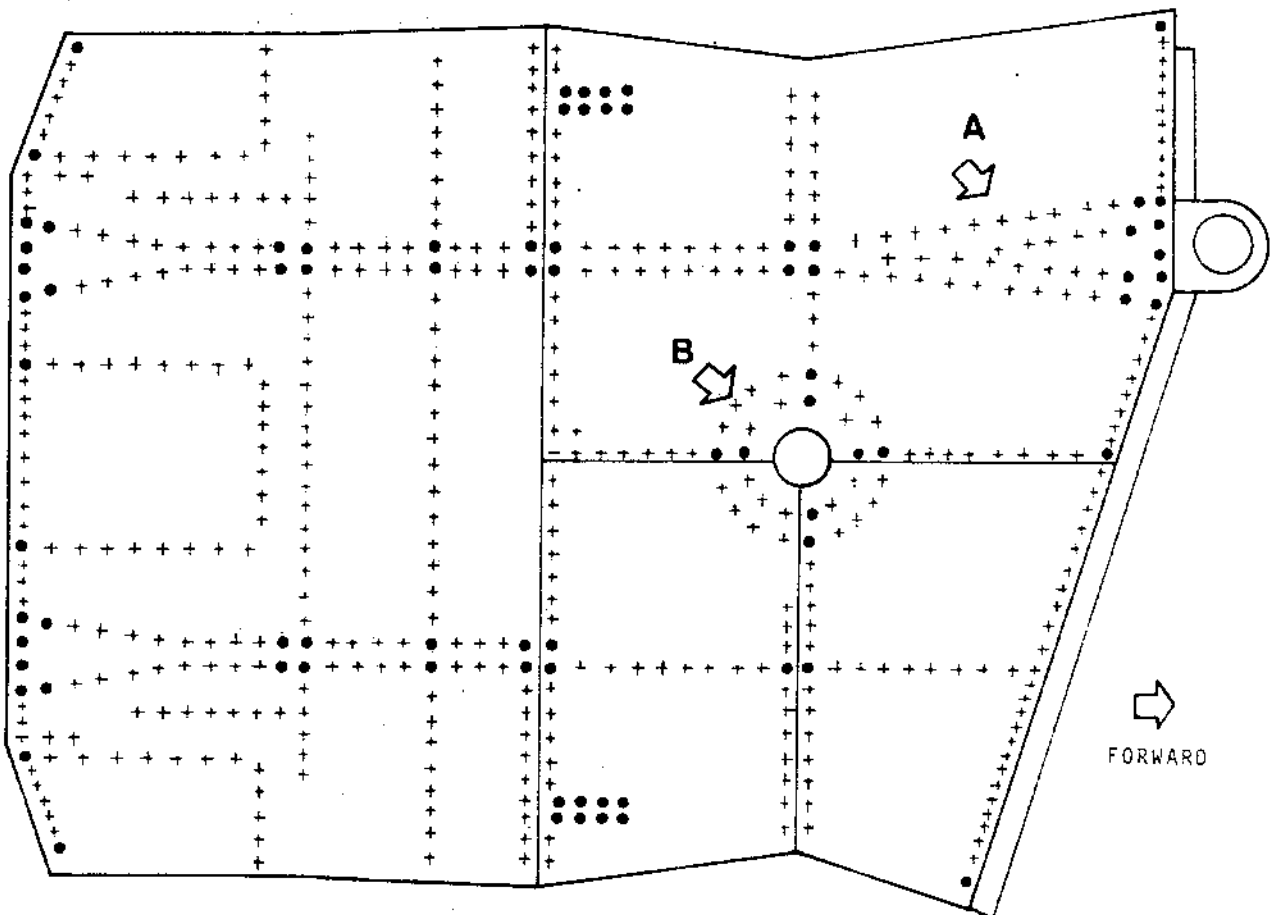
MK.610-14-28

OVERHAUL



NOTE : L.H. SECONDARY NOZZLE SHOWN  
R.H. SECONDARY NOZZLE, OPPOSITE HAND

VALID FOR L.H. AND R.H. SIDE WALLS



• INEFFECTIVE FASTENING POINT, UNACCEPTABLE

GENERAL CASE : SEE SHEET 1

Loose or Missing Fasteners Resulting in Ineffective  
Attachment Points on the Inner and Outer Skin Panels  
Figure 303 (Sheet 6 of 11)

78-13-01

BASIC TWIN SEC. NOZZLE - PERMISSIBLE DAMAGE

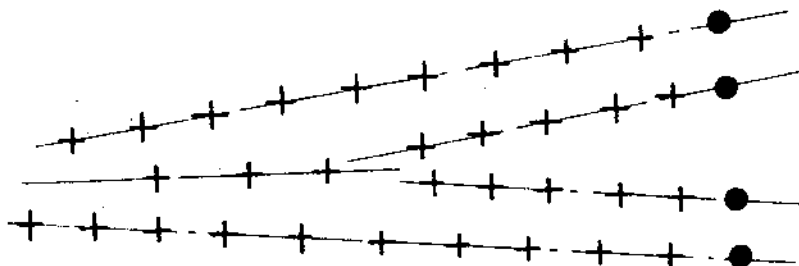
Page 314

Jan 31/77



OLYMPUS 593

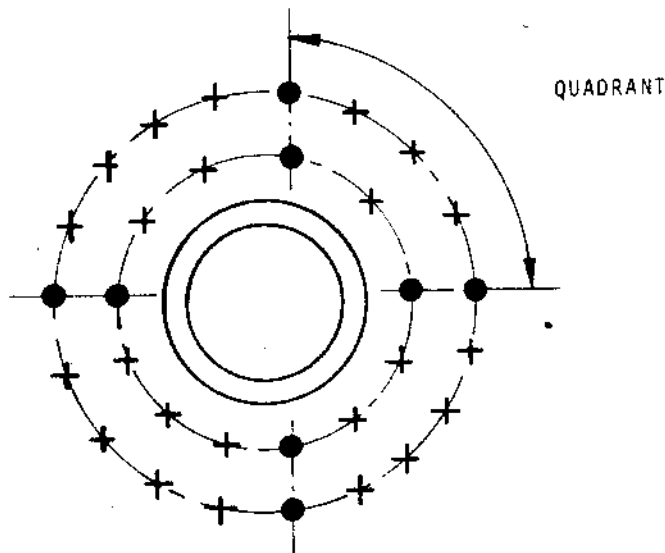
MK.610-14-28  
OVERHAUL



4 INEFFECTIVE FASTENING POINTS MAX. NOT ADJACENT

2 INEFFECTIVE FASTENING POINTS MAX. PER ROW

DETAIL A



2 INEFFECTIVE FASTENING POINTS MAX. PER PRIMARY NOZZLE MOUNTING PIN HOUSING

1 INEFFECTIVE FASTENING POINT MAX. PER QUADRANT

DETAIL B

Loose or Missing Fasteners Resulting in Ineffective  
Attachment Points on the Inner and Outer Skin Panels  
Figure 303 (Sheet 7 of 11)

78-13-01

BASIC TWIN SEC. NOZZLE - PERMISSIBLE DAMAGE

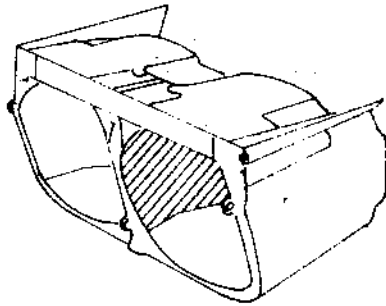
Page 315

Jan 31/77



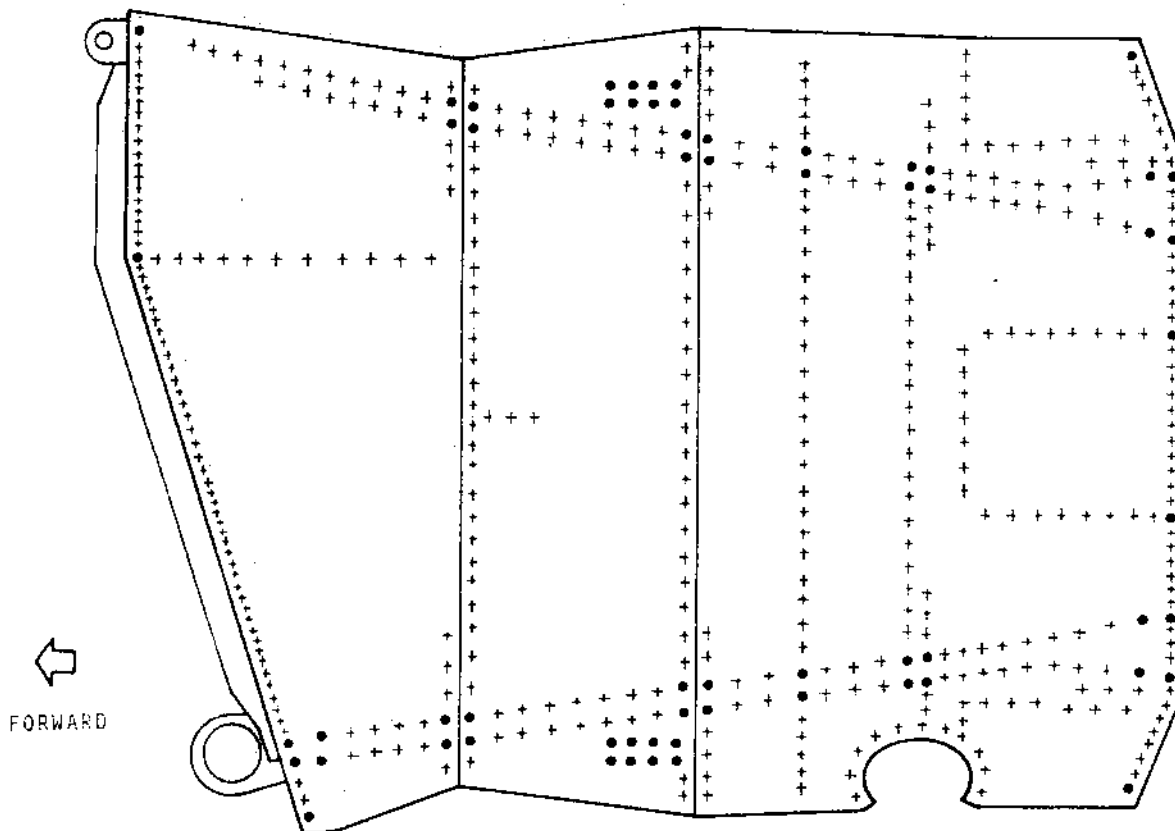
OLYMPUS 593

MK.610-14-28  
OVERHAUL



NOTE : L.H. SECONDARY NOZZLE SHOWN  
R.H. SECONDARY NOZZLE, OPPOSITE HAND

VALID FOR L.H. AND R.H. CENTRAL WALLS.



- INEFFECTIVE FASTENING POINT, UNACCEPTABLE

GENERAL CASE : SEE SHEET 1

Loose or Missing Fasteners Resulting in Ineffective  
Attachment Points on the Inner and Outer Skin Panels  
Figure 303 (Sheet 8 of 11)

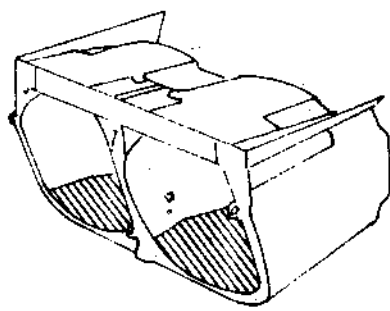
78-13-01

BASIC TWIN SEC. NOZZLE - PERMISSIBLE DAMAGE

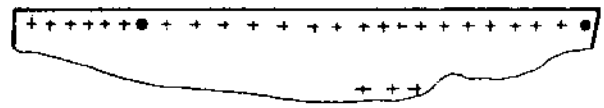
Page 316

Jan 31/77

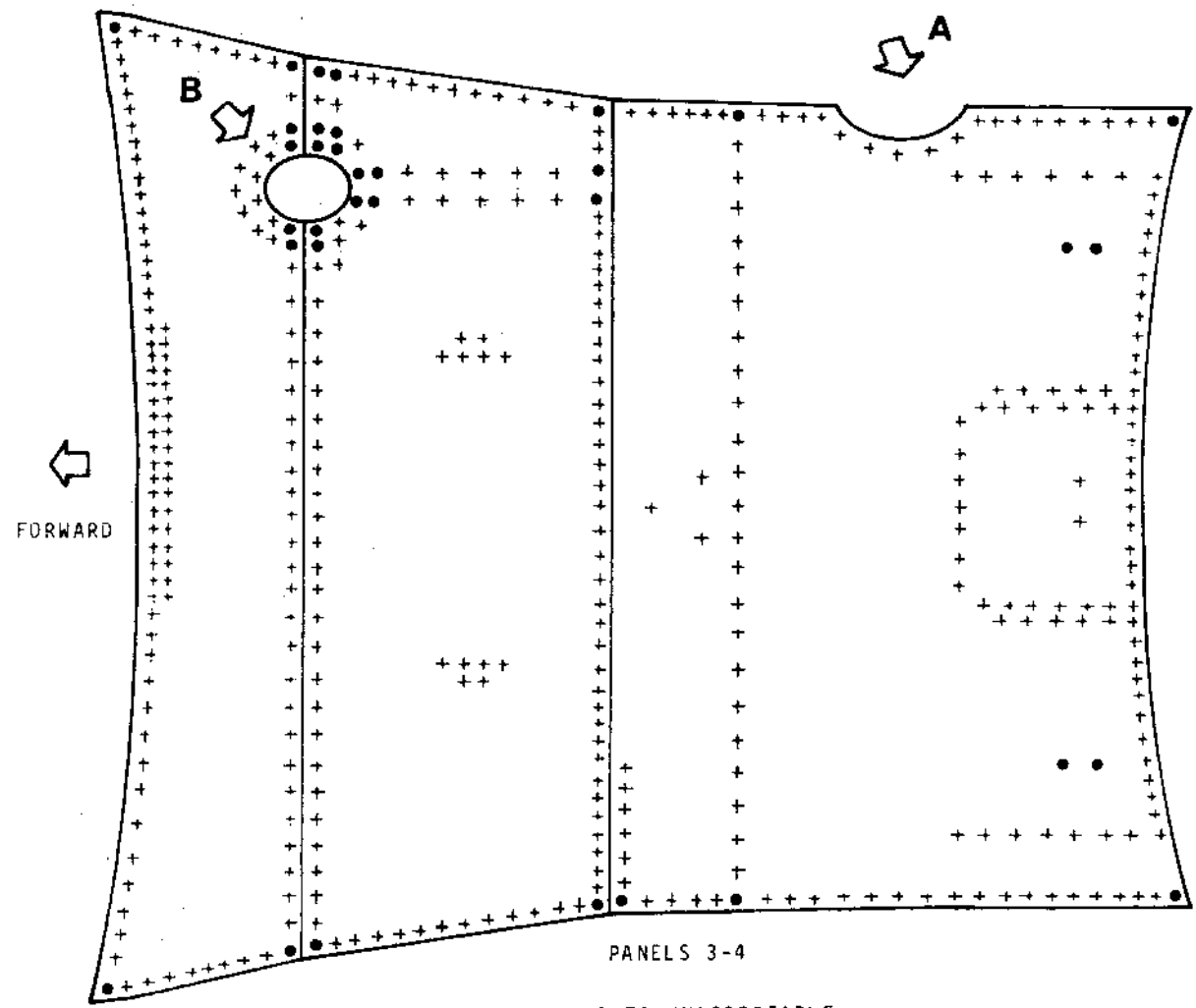
PRINTED IN FRANCE



NOTE : L.H. SECONDARY NOZZLE SHOWN  
R.H. SECONDARY NOZZLE, OPPOSITE HAND



DETAIL A (PANELS 8-9)



• INEFFECTIVE FASTENING POINTS-UNACCEPTABLE  
GENERAL CASE : SEE SHEET 1  
Loose or Missing Fasteners Resulting in Ineffective  
Attachment Points on the Inner and Outer Skin Panels  
Figure 303 (Sheet 9 of 11)

N

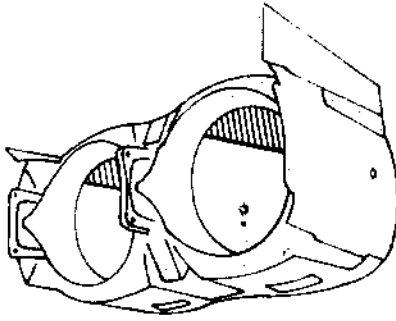


OLYMPUS 593

MK.610-14-28  
OVERHAUL



NOTE : L.H. SECONDARY NOZZLE SHOWN  
R.H. SECONDARY NOZZLE, OPPOSITE HAND



A →

FWD  
↓

→ C

DETAIL A (PANEL 1)

PANEL 6

● INEFFECTIVE FASTENING POINT, UNACCEPTABLE

GENERAL CASE : SEE SHEET 1

Loose or Missing Fasteners Resulting in Ineffective  
Attachment Points on the Inner and Outer Skin Panels  
Figure 303 (Sheet 10 of 11)

78-13-01

BASIC TWIN SEC. NOZZLE - PERMISSIBLE DAMAGE

Page 318

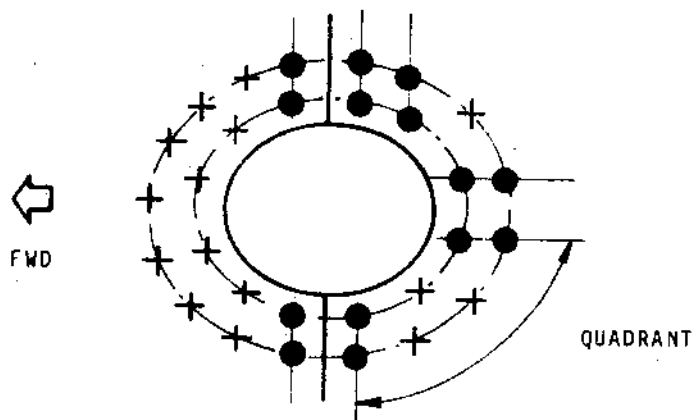
Jan 31/77





OLYMPUS 593

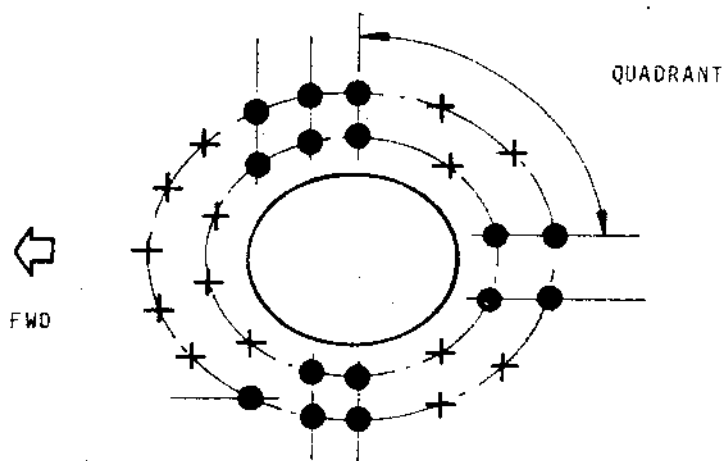
MK.610-14-28  
OVERHAUL



2 INNEFFECTIVE FASTENING POINTS MAX. PER PRIMARY NOZZLE MOUNTING PIN HOUSING

1 INNEFFECTIVE FASTENING POINT MAX. PER QUADRANT

DETAIL B (PAGE 315)



2 INNEFFECTIVE FASTENING POINTS MAX. PER PRIMARY NOZZLE MOUNTING PIN HOUSING

1 INNEFFECTIVE FASTENING POINT MAX. PER QUADRANT

DETAIL C (PAGE 316)

Loose or Missing Fasteners Resulting in Ineffective  
Attachment Points on the Inner and Outer Skin Panels  
Figure 303 (Sheet 11 of 11)

78-13-01

N

BASIC TWIN SEC. NOZZLE - PERMISSIBLE DAMAGE

Page 319

Jan 31/77



OLYMPUS 590  
MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE

B. Acceptable damage affecting the nozzle structure (framework)

(1) Introduction

Acceptable damage on the basic structure are categorized per type of parts and as follows :

- Acceptable damage on structural fittings and members (forged, cast or machined-from-solid parts)
- Acceptable damage on sheet metal items
- Acceptable damage on items made from Stressskin panels.
- Acceptable damage on attaching hardware (or fasteners).

Within the acceptance limits for damage affecting the bucket structure, two cases are to be considered :

General case

Zones where the structure carries minor loads

Restricted areas

Zones where the structure carries heavy loads and/or wherein the mechanical strength is essential.

NOTE : The restricted areas are defined in paragraph 3.

(2) Acceptable damage on structural fittings and members

(a) Cracking

Cracks are unacceptable

The type of repair is determined by the crack extent and location. See chapter "REPAIR" in the Overhaul Manual.

(3) Acceptable damage on sheet metal components

(a) Cracking

Cracks are unacceptable

78-13-01

BASIC TWIN SEC. NOZZLE - PERMISSIBLE DAMAGE

Page 320

Jan 31/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



The type of repair is determined by the crack extent and location. Refer to chapter "REPAIR" of the Overhaul Manual.

(4) Acceptable damage on items from Stressskin panels.

(a) Dents

CAUTION : IF DENT HAS RESULTED IN A CRACK OR A HOLE, REFER TO ACCEPTANCE LIMITS FOR THESE DEFECTS.

Acceptance limits for dents are the following :

Case I : Rounded bottom dent, contained in one cell, with no collapsing of core ribbon.

. Max. depth and width of dent to be respectively, 1 mm (0.04 in.) and equal to 5 times the depth at least.

. Unaffected area around such defects :  
75 mm (2.95 in.)

Case II : Rounded bottom dent, contained in 3 or 4 cells maximum, with collapsing of panel core ribbon.

. Max. depth and width of dent to be respectively, 1,5 mm (0.06 in.) and equal to 10 times the depth at least.

. Unaffected area around this defect :  
200 mm (7.87 in.)

Case III : Large surface dent.

This condition is unacceptable

Dents beyond acceptable limits necessitate the repair of the panel.

The type of repair is determined by the damage extent and location. See chapter "REPAIR" in the Overhaul Manual.

(b) Other types of defects

The following defects are unacceptable :

- longitudinal creasing or wrinkling :
- buckling of panel face-sheet
- delamination or deterioration of panel core ribbon.



OLYMPUS 593

MK.610-14-28

OVERHAUL



- missing piece in panel face-sheet,
- crack evidence.

The type of repair is determined by the damage extent and location. See chapter "REPAIR" in the Overhaul Manual.

- (5) Acceptable damage on the attaching hardware (fasteners).

The fasteners are classified into two categories :

- fasteners retaining panels or removable parts,
- fasteners providing for structural assembly purposes.

- (a) Fasteners for retaining panels of removable parts.

The deterioration of these items is unacceptable. Renew them by applying the following repair schemes :

REP 29-190-1 : Renewal of floating anchor nuts retaining the convergent panels.

REP 29-190-2 : Renewal of floating anchor nuts retaining the divergent panels.

REP 29-190-3 : Renewal of floating anchor nuts retaining the access doors.

REP 29-190-4 : Renewal of floating anchor nuts retaining the rear frame heat shields.

REP 29-190-6 : Renewal of floating anchor nuts retaining the BAC seal.

REP 29-190-7 : Renewal of floating anchor nuts retaining the side wall heat shields.

REP 29-190-10: Replacement of bushings at the bucket pneumatic drive actuator mounting points.

78-13-01

BASIC TWIN SEC. NOZZLE - PERMISSIBLE DAMAGE

Page 322

Jun 15/82



OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

- (b) Fasteners for structural assembly purposes.  
For these items, two cases are to be considered:

- 1 Case of the accessible fastening items.  
The deterioration of these items is unacceptable. Renew them as instructed in the following repair chapters:

REP 29-190-8 : Repair of barrel suspension links.

REP 29-190-9 : Replacement of defective fasteners on inner and outer shim panels.

REP 29-190-14 : Replacing drain tube.

- 2 Case of the inaccessible fastening items.  
The acceptance limits concerning the loss of such items will be issued later.

- C. Acceptable damage affecting the nozzle dimensional characteristics.

The twin secondary nozzle dimensional characteristics must comply with the following requirements:

- (1) Distance between centres of rear fittings providing for bucket hinge/attachment (See Figure 304 - Sheet 2).
- (a) This check aims at ensuring that the installation of the buckets will be performed under acceptable loads conditions. It is carried out using a micrometer.
- (b) The values "X" measured at each (bucked) hinge arrangement must be included between 1258,6 and 1263,10 mm (49.551 and 49.728 in.).  
Beyond these limits, report to the SNECMA Commercial Product Support.
- (2) Inner diameter of bushes accommodating the bucket trunnion bearings (See Figure 304, Sheet 3).
- (a) The I.D. values must be lower than 47,69 mm (1.8776 in.).

Beyond these values, renew the bushes.

78-13-01

BASIC TWIN SEC.NOZZLE - PERMISSIBLE DAMAGE

Page 323

Jun 30/97



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Inner diameter of bushes for the attachment points to nacelle "J", "N", "T", "R" of the twin secondary nozzle (See Figure 304, Sheet 4).
- (a) I.D. values must be less than :
- |                      |                         |
|----------------------|-------------------------|
| Points "J" and "N" : | 71,445 mm (2.2128 in.). |
| Point "T" :          | 71,445 mm (2.2128 in.). |
| Point "R" :          | 28,628 mm (1.1271 in.). |
- (b) Beyond these values, renew the bushes.
- (4) Inner diameter of bushes accommodating the primary nozzle mounting pins (See Figure 304, Sheet 5).
- (a) The I.D. values must be less than :
- |          |                        |
|----------|------------------------|
| Dia. A : | 64,54 mm (2.5408 in.). |
| Dia. B : | 58,46 mm (2.3016 in.). |
- (b) Beyond these values, renew the bushes.
- (5) Bores providing for lock attachment (See Figure 304, Sheet 5).
- (a) The bores accommodating the pins for lock retention must be less than :
- 7,96 mm (0.3134 in.).
- (b) Beyond this value, report the Direction Après-Vente of SNECMA.
- (6) I.D. of bushes providing for upper access door mounting (See Figure 304, Sheet 5).
- (a) I.D. value shall be less than :
- 7,96 mm (0.3134 in.).
- (b) Beyond this value, renew the bushes.
- (7) Bores providing for mounting of bucket pneumatic drive actuator (See Figure 304, Sheet 6).
- (a) Bore values shall be less than :
- |              |                       |
|--------------|-----------------------|
| location A : | 9,56 mm (0.3764 in.), |
| location B : | 9,56 mm (0.3764 in.), |
| location C : | 6,38 mm (0.2512 in.). |

78-13-01

BASIC TWIN SEC. NOZZLE - PERMISSIBLE DAMAGE

Page 324

Apr 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Beyond these values, renew the bushes.
- (8) Bores and pins of links providing for barrel support  
(See Figure 304, Sheet 7).
  - (a) Value of link bores shall be less than 6,5 mm  
(0.256 in.).  
Pin diameter value shall be higher than 6,3 mm  
(0.248 in.).
  - (b) Beyond these limits, renew deteriorated parts  
according to REP 29-190-8.

78-13-01

BASIC TWIN SEC. NOZZLE - PERMISSILE DAMAGE

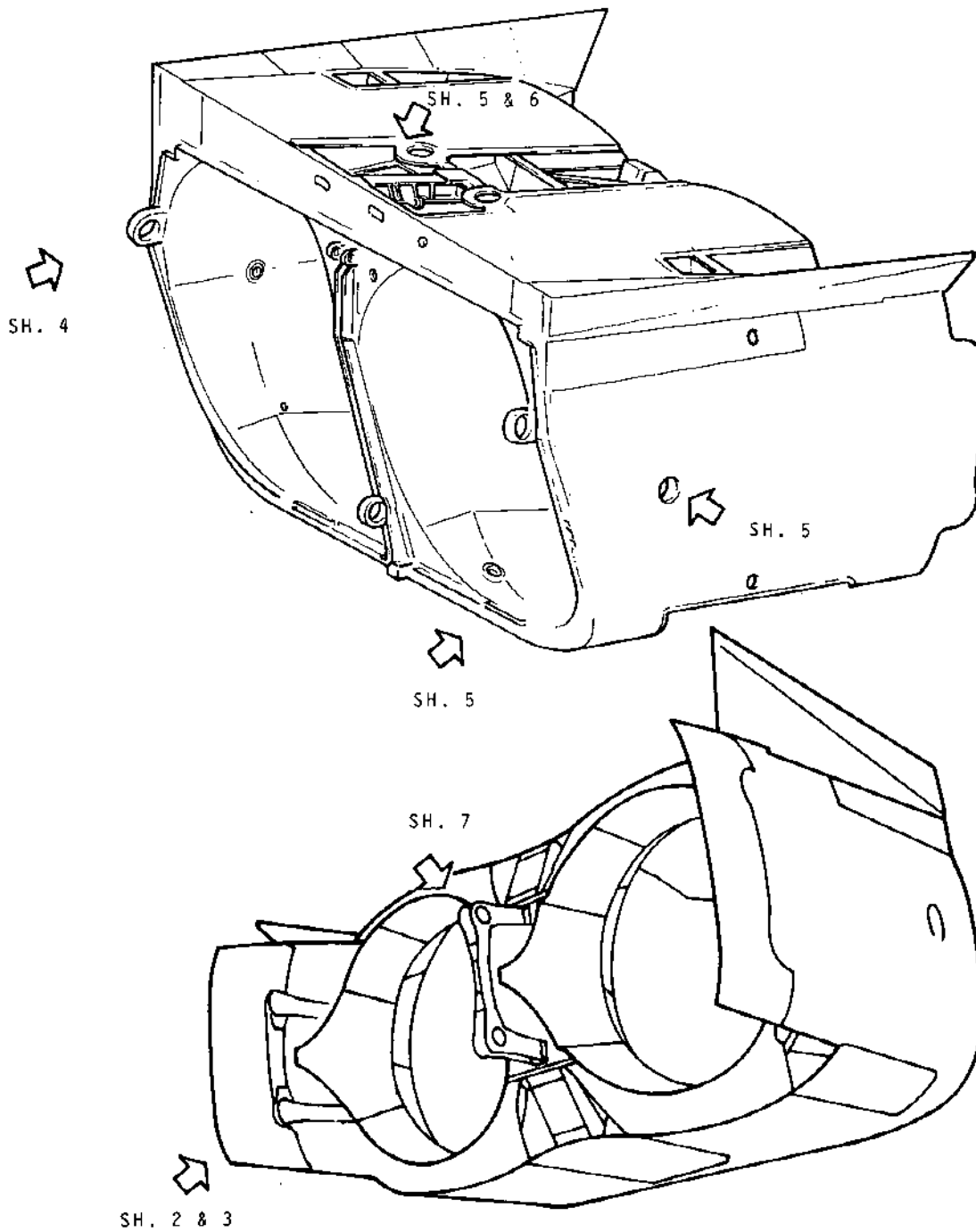
Page 325

Jun 15/82



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Twin Secondary Nozzle Dimensional Inspection  
Figure 304 (Sheet 1 of 7)

78-13-01

BASIC TWIN SEC. NOZZLE - PERMISSIBLE DAMAGE

Page 326  
Jun 15/82



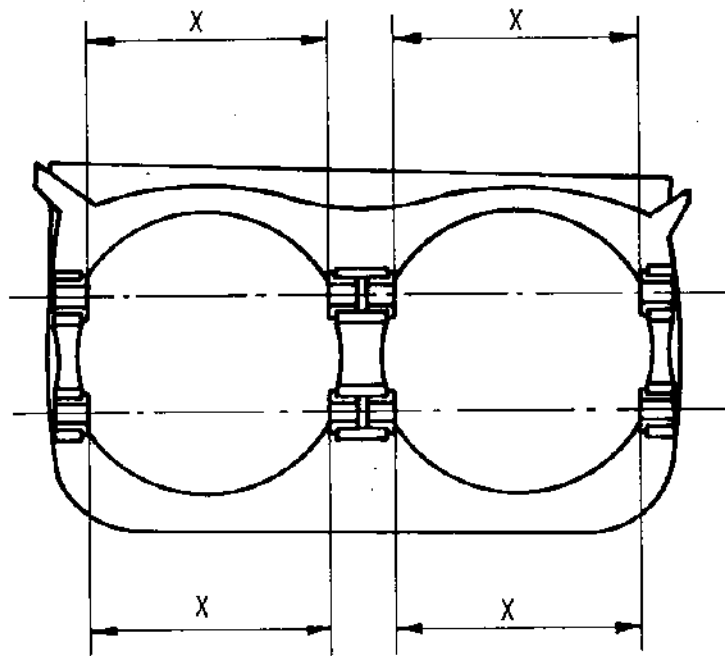


OLYMPUS 593

MK.610-14-28  
OVERHAUL



DISTANCE BETWEEN CENTRES OF REAR FITTINGS



Twin Secondary Nozzle Dimensional Inspection  
Figure 304 (Sheet 2 of 7)

78-13-01

BASIC TWIN SEC. NOZZLE - PERMISSIBLE DAMAGE

Page 327

Jun 15/82

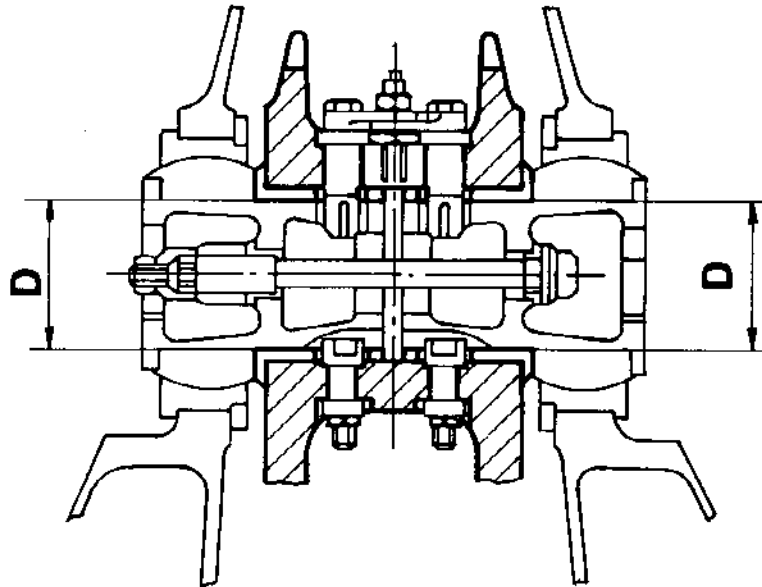


OLYMPUS 593

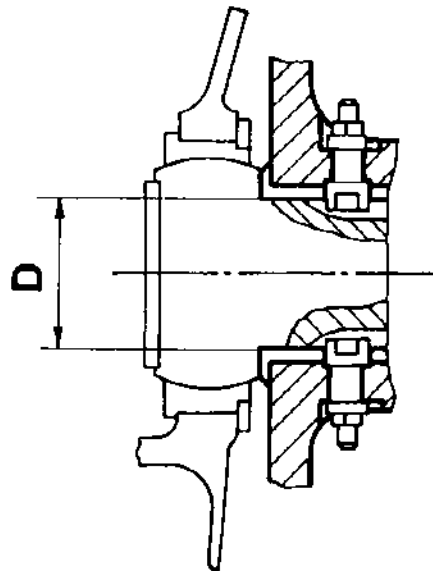
MK.610-14-28  
OVERHAUL



BUCKET HINGE ARRANGEMENT - CENTRAL WALL



BUCKET HINGE ARRANGEMENT - SIDES WALLS



Twin Secondary Nozzle Dimensional Inspection  
Figure 304 (Sheet 3 of 7)

78-13-01

BASIC TWIN SEC. NOZZLE - PERMISSIBLE DAMAGE

Page 328

Jun 15/82



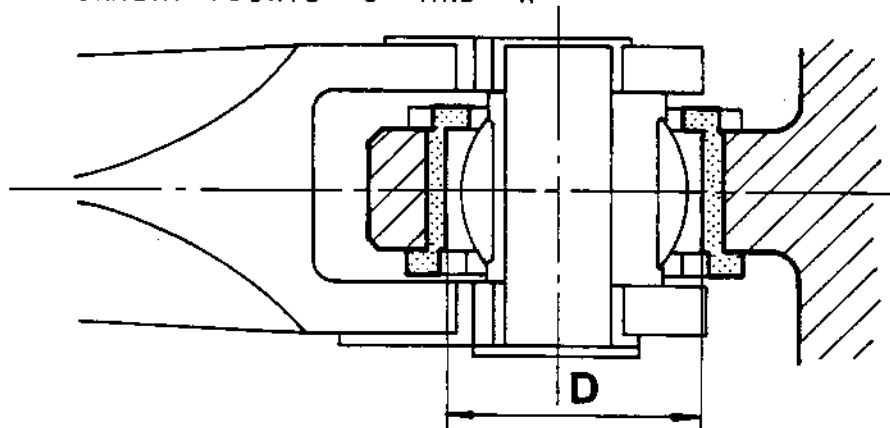
OLYMPUS 593

MK.610-14-28  
OVERHAUL

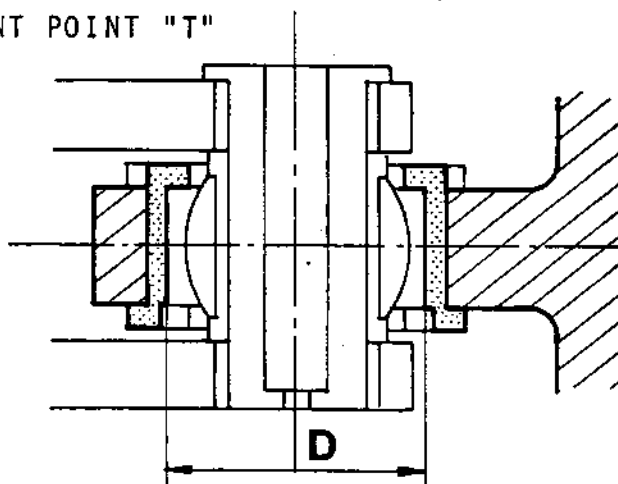


PRINTED IN FRANCE

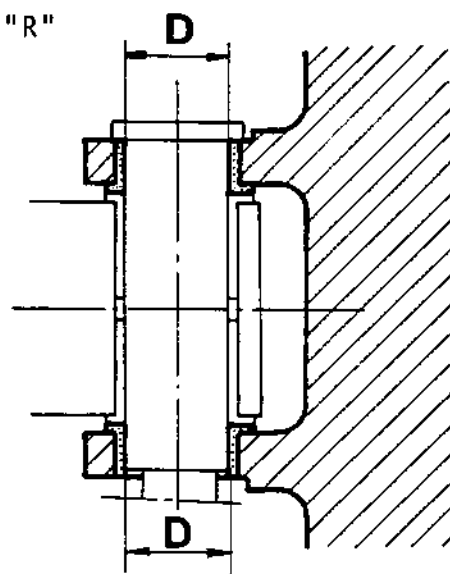
ATTACHMENT POINTS "J" AND "N"



ATTACHMENT POINT "T"



ATTACHMENT POINT "R"



Twin Secondary Nozzle Dimensional Inspection  
Figure 304 (Sheet 4 of 7)

78-13-01

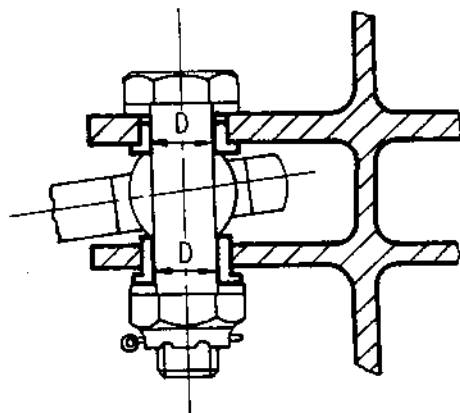
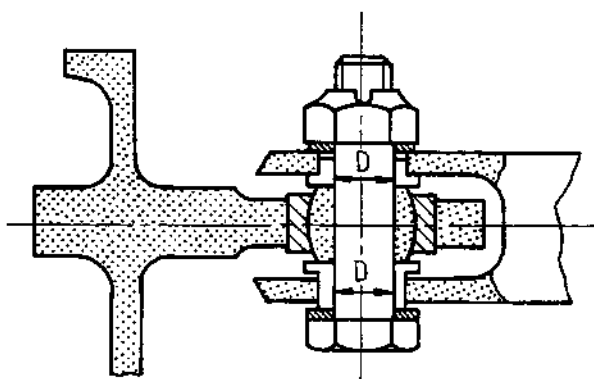
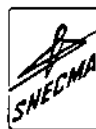
BASIC TWIN SEC. NOZZLE - PERMISSIBLE DAMAGE

Page 329  
Jun 15/82



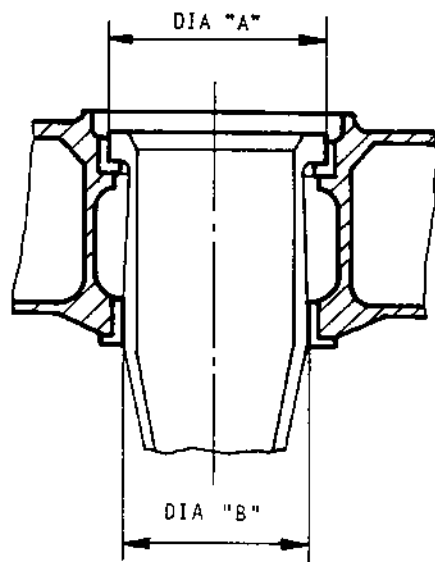
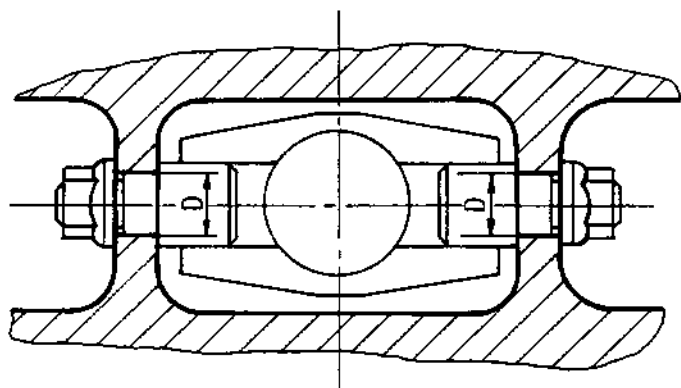
OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRIMARY NOZZLE MOUNTING PINS

LOCK ATTACHMENT



Twin Secondary Nozzle Dimensional Inspection  
Figure 304 (Sheet 5 of 7)

78-13-01  
BASIC TWIN SEC. NOZZLE - PERMISSIBLE DAMAGE

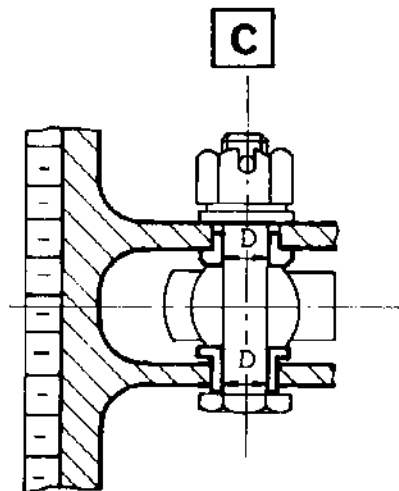
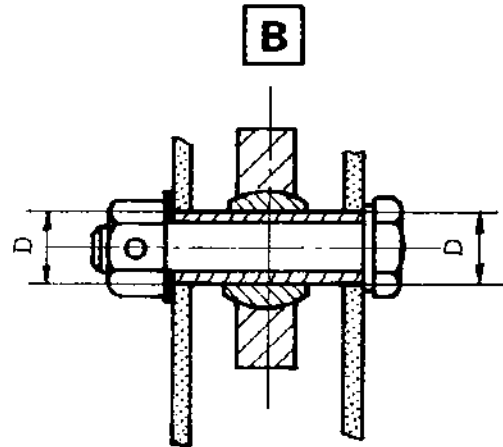
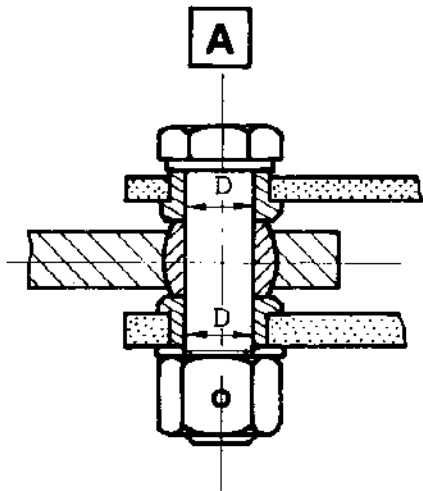
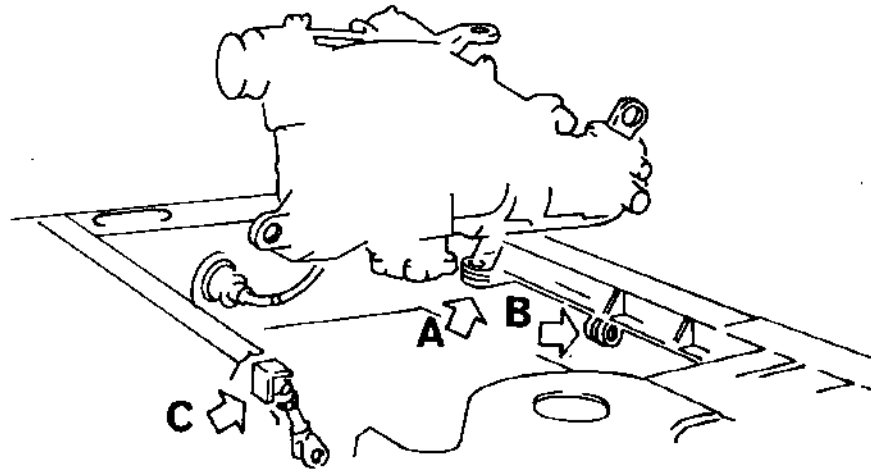


OLYMPUS 593

MK.610-14-28  
OVERHAUL



BUCKET PNEUMATIC DRIVE ACTUATOR MOUNTING ARRANGEMENT



Twin Secondary Nozzle Dimensional Inspection  
Figure 304 (Sheet 6 of 7)

78-13-01

BASIC TWIN SEC. NOZZLE - PERMISSIBLE DAMAGE

Page 331  
Jun 15/82

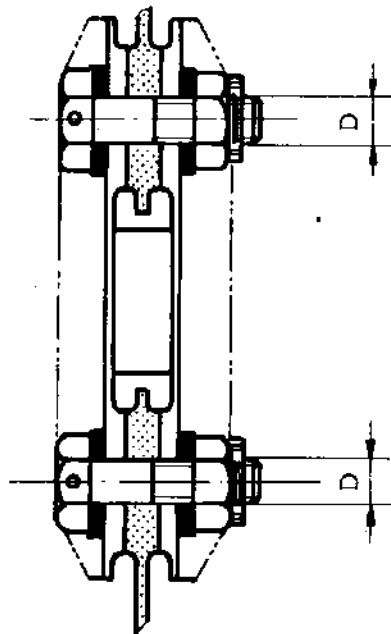


OLYMPUS 593

MK.610-14-28  
OVERHAUL



## LINKS BETWEEN BARREL AND UPPER/LOWER SKIN PANELS



Twin Secondary Nozzle Dimensional Inspection  
Figure 304 (Sheet 7 of 7)

**78-13-01**

BASIC TWIN SEC. NOZZLE - PERMISSIBLE DAMAGE

Page 332

Jun 15/82



OLYMPUS 593

MK.610-14-28

OVERHAUL



## REPAIR

### 1. Format of the repair schemes

Each repair scheme (REP) describes only one operation to be carried out on a single part.

#### A. Repair scheme identification and classification

Any one part is identified by :

- its nomenclature
- its classification in the Illustrated Parts List (Figure-Item)

A repair scheme is identified by :

- the part to which it relates
- the purpose of this repair

These various criteria have been used for identification and classification purposes.

##### (1) Identification

The identification of a repair scheme is given by :

- the nomenclature of the part with its IPL reference No. (Figure-Item)
- the purpose of the repair preceded by its numerical order

##### (2) Classification

The classification of a repair scheme is given by :

- the A.T.A. breakdown system
- the number of the repair scheme which is given by :
  - (a) The part IPL classification (Figure-Item) and the repair numerical order.
- the page number, proper to any repair scheme (re-starts from page 401 for each repair scheme)
- the date

##### (3) Sample of identification and classification

**78-13-01**

FOREWORD

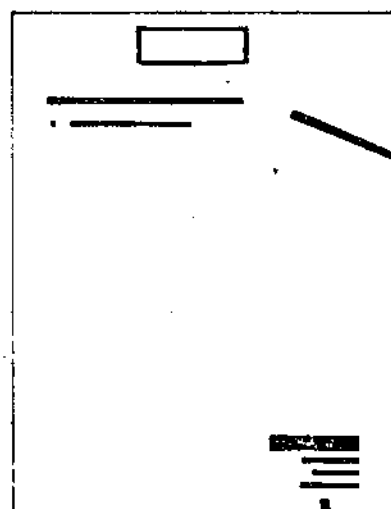
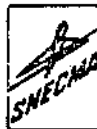
Page 401

May 31/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



NOMENCLATURE OF THE PART

IPL PART CLASSIFICATION

- 11 : FIGURE No.
- 320 : ITEM

MOBILE ASSEMBLY (11-320)

1. Renewal of the crimped nuts

PURPOSE OF THE REPAIR

REPAIR SCHEME No.

REP No. :

- REP = IPL FIGURE No. WHERE  
THE PART IS SHOWN
- 320 = PART ITEM No. ON FIGURE
- 1 = REPAIR SCHEME No.

ATA BREAKDOWN SYSTEM

78-10-01

REP 11-320-1

Page 401

May 30/73

PAGE NUMBERING

DATE

78-13-01

FOREWORD

Page 402

May 31/76





OLYMPUS 593

MK.610-14-28

OVERHAUL



NOTE : The REP numbering system uses the repair scheme identification criteria in order to establish the direct identification/classification relationship.

(4) Particular case

(a) Identical parts

When n identical parts are installed on a same assembly, the numbering of the REP will be made by using the IPL classification of the first part.

Example :

Identification of the

thrust reverser cascades : CASCADE (2-10, 11, 30, 31, 50, 51, 70, 90, 110, 111, 130, 150, 170, 190)

REP No. : REP. 2-10-1

(b) Optional parts

In the case of the I.P.L. making mention of optional parts (OPT TO ...) and should these parts require a special repair scheme, the said scheme shall be identified as follows :

- the nomenclature of the part with its IPL reference No. (Figure - Item) of the basic part (and, if required, the manufacturer's part number),
- the purpose of the repair preceded by its numerical order number,  
and classified as follows :
- A.T.A. breakdown system,
- the number of the repair scheme which is given by the IPL classification of the basic part (Figure - Item) and the repair scheme numerical order number followed by an alphabetical variant,
- page numbered 401 and onward,
- the date.

78-13-01

FOREWORD  
Page 403  
May 31/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



## 2. Updating

A. The revisions, entailed by the technical evolution of the repair scheme, will affect its classification only as far as the date is concerned.

B. Modification of the alternate part.

An alpha variant is introduced in the IPL and modifies the figure-item No.

(1) This modification has no effect on the repair scheme :

- the REP remains unchanged

(2) This modification introduces a new REP :

Elaboration of a new repair scheme in which appears the alpha variant issue letter introducing this new REP.

Example : The modification introduces a REP with issue letter C, the previous REP is valid for the parts A and B.

REP 4-20-3 : valid for alpha variant A and B

REP 4-20C-3: valid from alpha variant C.

78-13-01

FOREWORD

Page 404

May 31/76

PRINTED IN FRANCE

PRINTED IN FRANCE

**OLYMPUS 593**MK. 610-14-28  
OVERHAUL

PART NUMBER	DESCRIPTION	REPAIR NUMBER
A11471-10-4	FLOATING NUT	REP 29-190 - 4
A11471-11-4	FLOATING NUT	REP 29-190 - 4
A11471-12-4	FLOATING NUT	REP 29-190 - 1
A11471-12-4	FLOATING NUT	REP 29-190 - 2
A11471-13-4	FLOATING NUT	REP 29-190 - 1
A11471-13-4	FLOATING NUT	REP 29-190 - 2
A11471-13-4	FLOATING NUT	REP 29-190 - 4
A11471-14-4	FLOATING NUT	REP 29-190 - 1
A11471-14-4	FLOATING NUT	REP 29-190 - 2
A11471-14-4	FLOATING NUT	REP 29-190 - 3
A11471-14-4	FLOATING NUT	REP 29-190 - 4
A11471-15-4	FLOATING NUT	REP 29-190 - 4
A11471-17-4	FLOATING NUT	REP 29-190 - 3
A11471-18-4	FLOATING NUT	REP 11-130 - 1
A11471-18-4	FLOATING NUT	REP 29-190 - 3
A11471-18-4	FLOATING NUT	REP 29-190 - 4
A11471-19-4	FLOATING NUT	REP 29-190 - 3
A11471-19-4	FLOATING NUT	REP 29-190 - 4
A11471-20-4	FLOATING NUT	REP 29-190 - 2
A11471-20-4	FLOATING NUT	REP 29-190 - 3
A11471-20-4	FLOATING NUT	REP 29-190 - 4
A11471-21-4	FLOATING NUT	REP 29-190 - 2
A11471-21-4	FLOATING NUT	REP 29-190 - 3
A11471-22-4	FLOATING NUT	REP 29-190 - 2
A11471-22-4	FLOATING NUT	REP 29-190 - 3
A11471-5-4	FLOATING NUT	REP 29-190 - 4
A11471-6-4	FLOATING NUT	REP 7- 10 - 1
A11471-6-4	FLOATING NUT	REP 29-190 - 4
A11471-7-4	FLOATING NUT	REP 29-190 - 3
A11471-7-4	FLOATING NUT	REP 29-190 - 4
A11471-8-4	FLOATING NUT	REP 29-190 - 3
A11471-9-4	FLOATING NUT	REP 29-190 - 4
AN960C10	WASHER	REP 29-190 -17
AN960C10	WASHER	REP 29-190 -24
AN960C10L	WASHER	REP 29-190 - 2
AN960C416	WASHER	REP 29-190 - 8
AN960C8	WASHER	REP 29-190 -12
AN960C8	WASHER	REP 29-190 -17
AN960C8	WASHER	REP 29-190 -18
BAS7641-04	BEARING	REP 18-110 - 3
CR2540-5-2	BLIND RIVET	REP 29-190 - 9
CR2540-5-3	BLIND RIVET	REP 29-190 - 9
CR2540-5-4	BLIND RIVET	REP 29-190 - 9
CR2540-5-5	BLIND RIVET	REP 29-190 - 9

**78-13-01**

REPAIR PARTS LIST

Page 401

Apr 30/93

**OLYMPUS 593**

MK.610-14-28

OVERHAUL



PART NUMBER	DESCRIPTION	REPAIR NUMBER
CR2540-5-6	BLIND RIVET	REP 29-190 - 9
CR2540-5-7	BLIND RIVET	REP 29-190 - 9
CR2540-5-8	BLIND RIVET	REP 29-190 - 9
CR2540-6-2	BLIND RIVET	REP 29-190 - 9
CR2540-6-3	BLIND RIVET	REP 29-190 - 9
CR2540-6-4	BLIND RIVET	REP 29-190 - 9
CR2540-6-5	BLIND RIVET	REP 29-190 - 9
CR2540-6-6	BLIND RIVET	REP 29-190 - 9
CR2540-6-7	BLIND RIVET	REP 29-190 - 9
CR2540-6-8	BLIND RIVET	REP 29-190 - 9
CR2644-6-6	BLIND RIVET	REP 9- 10 - 1
CR2644-6-7	BLIND RIVET	REP 9- 10 - 1
CR2662-3-2	BLIND RIVET	REP 8- 50 - 1
CR2662-3-2	BLIND RIVET	REP 29-190 - 2
CR2662-3-3	BLIND RIVET	REP 29-190 - 2
CR2662-3-4	BLIND RIVET	REP 29-190 - 2
CR2662-3-4	BLIND RIVET	REP 29-190 -24
CR2662-3-5	BLIND RIVET	REP 29-190 -24
CR2662-4-3	BLIND RIVET	REP 29-190 - 1
CR2662-4-3	BLIND RIVET	REP 29-190 - 2
CR2662-4-4	BLIND RIVET	REP 29-190 - 2
CR2662-4-4	BLIND RIVET	REP 29-190 - 3
CR2662-4-5	BLIND RIVET	REP 29-190 - 3
CR2743-6-2	BLIND RIVET	REP 29-190 - 9
CR2743-6-3	BLIND RIVET	REP 29-190 - 9
CR2743-6-4	BLIND RIVET	REP 29-190 - 9
CR2743-6-5	BLIND RIVET	REP 29-190 - 9
CR2743-6-6	BLIND RIVET	REP 29-190 - 9
CR2743-8-1	BLIND RIVET	REP 29-190 - 9
CR2743-8-2	BLIND RIVET	REP 29-190 - 9
CR2743-8-4	BLIND RIVET	REP 29-190 - 9
CR2743-8-5	BLIND RIVET	REP 29-190 - 9
CR2743-8-5	BLIND RIVET	REP 29-190 - 9
CR2743-8-6	BLIND RIVET	REP 29-190 - 9
CR2744-6-2	BLIND RIVET	REP 29-190 - 9
CR2744-6-3	BLIND RIVET	REP 29-190 - 9
CR2744-6-4	BLIND RIVET	REP 29-190 - 9
CR2744-6-5	BLIND RIVET	REP 29-190 - 9
CR2744-6-6	BLIND RIVET	REP 9- 10 - 1
CR2744-6-6	BLIND RIVET	REP 29-190 - 9
CR2744-6-7	BLIND RIVET	REP 9- 10 - 1
CR2744-8-6	BLIND RIVET	REP 29-190 - 9
CR2838-4-2	BLIND RIVET	REP 29-190 -14
CR2838-4-4	BLIND RIVET	REP 29-190 -14

**78-13-01**

REPAIR PARTS LIST

Page 402

Apr 30/93

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

PART NUMBER	DESCRIPTION	REPAIR NUMBER
CR2838-4-6	BLIND RIVET	REP 29-190 -13
CR2838-5-2	BLIND RIVET	REP 29-190 - 9
CR2838-5-3	BLIND RIVET	REP 29-190 - 9
CR2838-5-4	BLIND RIVET	REP 29-190 - 9
CR2838-5-4	BLIND RIVET	REP 29-190 -24
CR2838-5-5	BLIND RIVET	REP 29-190 - 9
CR2838-5-5	BLIND RIVET	REP 29-190 - 9
CR2838-5-6	BLIND RIVET	REP 9- 10 - 1
CR2838-5-6	BLIND RIVET	REP 29-190 - 9
CR2838-5-6	BLIND RIVET	REP 29-190 -14
CR2838-5-6	BLIND RIVET	REP 29-190 -19
CR2838-5-7	BLIND RIVET	REP 9- 10 - 1
CR2838-5-8	BLIND RIVET	REP 29-190 -24
CR2838-6-3	BLIND RIVET	REP 29-190 - 9
CR2838-6-4	BLIND RIVET	REP 29-190 - 9
CR2838-6-5	BLIND RIVET	REP 29-190 - 9
CR2838-6-6	BLIND RIVET	REP 29-190 - 9
CR2838-6-8	BLIND RIVET	REP 29-190 -24
CR2839-4-2	BLIND RIVET	REP 29-190 -24
CR2839-5-2	BLIND RIVET	REP 29-190 - 9
CR2839-5-3	BLIND RIVET	REP 29-190 - 9
CR2839-5-3	BLIND RIVET	REP 29-190 -16
CR2839-5-4	BLIND RIVET	REP 29-190 - 8
CR2839-5-4	BLIND RIVET	REP 29-190 - 9
CR2839-5-4	BLIND RIVET	REP 29-190 -16
CR2839-5-4	BLIND RIVET	REP 29-190 -17
CR2839-5-6	BLIND RIVET	REP 29-190 -16
CR2839-5-6	BLIND RIVET	REP 29-190 -19
CR2839-5-8	BLIND RIVET	REP 29-190 -16
CR2839-6-1	BLIND RIVET	REP 29-190 - 9
CR2839-6-2	BLIND RIVET	REP 29-190 - 9
CR2839-6-2	BLIND RIVET	REP 29-190 -14
CR2839-6-2	BLIND RIVET	REP 29-190 -19
CR2839-6-3	BLIND RIVET	REP 29-190 - 8
CR2839-6-3	BLIND RIVET	REP 29-190 - 9
CR2839-6-3	BLIND RIVET	REP 29-190 -14
CR2839-6-3	BLIND RIVET	REP 29-190 -17
CR2839-6-3	BLIND RIVET	REP 29-190 -19
CR2839-6-4	BLIND RIVET	REP 29-190 - 9
CR2839-6-4	BLIND RIVET	REP 29-190 -24
CR2839-6-5	BLIND RIVET	REP 29-190 - 9
CR2839-6-6	BLIND RIVET	REP 29-190 - 9
CR2839-6-6	BLIND RIVET	REP 29-190 -12
CR2839-6-6	BLIND RIVET	REP 29-190 -16

**78-13-01**

REPAIR PARTS LIST

Page 403

Apr 30/93

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

PART NUMBER	DESCRIPTION	REPAIR NUMBER
CR2839-6-7	BLIND RIVET	REP 29-190 -12
CR2839-6-7	BLIND RIVET	REP 29-190 -19
CR2839-6-8	BLIND RIVET	REP 29-190 -19
CR2840-4-2	BLIND RIVET	REP 29-190 - 9
CR2840-4-3	BLIND RIVET	REP 29-190 - 9
CR2840-4-4	BLIND RIVET	REP 29-190 - 9
CR2840-5-2	BLIND RIVET	REP 29-190 - 9
CR2840-5-3	BLIND RIVET	REP 29-190 - 9
CR2840-5-4	BLIND RIVET	REP 29-190 - 9
CR2840-5-5	BLIND RIVET	REP 29-190 - 9
CR2840-5-6	BLIND RIVET	REP 29-190 - 9
CR2840-5-6	BLIND RIVET	REP 29-190 -12
CR2840-5-7	BLIND RIVET	REP 29-190 - 9
CR2840-5-8	BLIND RIVET	REP 29-190 - 9
CR2840-5-9	BLIND RIVET	REP 29-190 - 9
CR2840-6-3	BLIND RIVET	REP 29-190 - 9
CR2840-6-4	BLIND RIVET	REP 29-190 - 9
CR2840-6-5	BLIND RIVET	REP 29-190 - 9
CR2840-6-6	BLIND RIVET	REP 29-190 - 9
CR2840-6-7	BLIND RIVET	REP 29-190 - 9
CR2840-6-8	BLIND RIVET	REP 29-190 - 9
CR2840-6-8	BLIND RIVET	REP 29-190 - 9
HL144-5-11	SCREW	REP 3- 10 - 4
HL144-5-11	SCREW	REP 11- 10 - 3
HL144-5-12	SCREW	REP 29-190 -12
HL144-5-12	SCREW	REP 29-190 -18
HL144-5-37	SCREW	REP 9- 10 - 2
HL144-5-38	SCREW	REP 9- 10 - 2
HL144-5-39	SCREW	REP 9- 10 - 2
HL144-5-40	SCREW	REP 9- 10 - 2
HL144-5-41	SCREW	REP 9- 10 - 2
HL144-5-42	SCREW	REP 9- 10 - 2
HL144-5-43	SCREW	REP 9- 10 - 2
HL144-5-44	SCREW	REP 9- 10 - 2
HL144-5-45	SCREW	REP 9- 10 - 2
HL144-5-46	SCREW	REP 9- 10 - 2
HL144-5-47	SCREW	REP 9- 10 - 2
HL144-5-48	SCREW	REP 9- 10 - 2
HL144-5-49	SCREW	REP 9- 10 - 2
HL167-5-10	SCREW	REP 29-190 - 9
HL167-5-11	SCREW	REP 29-190 - 9
HL167-5-14	SCREW	REP 29-190 - 9
HL167-5-4	SCREW	REP 29-190 - 9
HL167-5-5	SCREW	REP 29-190 - 9

**78-13-01**

REPAIR PARTS LIST

Page 404

Apr 30/93

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

PART NUMBER	DESCRIPTION	REPAIR NUMBER
HL167-5-6	SCREW	REP 29-190 ~ 9
HL167-5-7	SCREW	REP 29-190 - 9
HL167-5-9	SCREW	REP 29-190 - 9
HL169-5-10	SCREW	REP 29-190 - 9
HL169-5-13	SCREW	REP 29-190 ~ 8
HL169-5-13	SCREW	REP 29-190 - 9
HL169-5-13	SCREW	REP 29-190 -17
HL169-6-10	SCREW	REP 29-190 - 9
HL169-6-13	SCREW	REP 29-190 - 8
HL169-6-13	SCREW	REP 29-190 - 9
HL169-6-13	SCREW	REP 29-190 -17
HL40-5-10	SCREW	REP 29-190 -17
HL40-5-2	SCREW	REP 5-260 - 1
HL40-5-2	SCREW	REP 29-190 -17
HL40-5-3	SCREW	REP 29-190 -17
HL40-5-4	SCREW	REP 29-190 -17
HL40-5-5	SCREW	REP 29-190 -17
HL40-5-6	SCREW	REP 29-190 -17
HL40-5-6	SCREW	REP 29-190 -18
HL40-5-6	SCREW	REP 29-190 -20
HL40-5-7	SCREW	REP 29-190 -18
HL40-5-7	SCREW	REP 29-190 -21
HL40-5-8	SCREW	REP 29-190 -17
HL40-5-8	SCREW	REP 29-190 -18
HL40-5-8	SCREW	REP 29-190 -21
HL40-5-9	SCREW	REP 29-190 -17
HL40-6-10	SCREW	REP 29-190 -17
HL40-6-3	SCREW	REP 29-190 -21
HL40-6-4	SCREW	REP 29-190 -17
HL40-6-4	SCREW	REP 29-190 -21
HL40-6-5	SCREW	REP 29-190 -17
HL40-6-5	SCREW	REP 29-190 -20
HL40-6-5	SCREW	REP 29-190 -21
HL40-6-6	SCREW	REP 29-190 -17
HL40-6-6	SCREW	REP 29-190 -18
HL40-6-6	SCREW	REP 29-190 -20
HL40-6-6	SCREW	REP 29-190 -21
HL40-6-7	SCREW	REP 29-190 -18
HL40-6-7	SCREW	REP 29-190 -20
HL40-6-7	SCREW	REP 29-190 -21
HL40-6-8	SCREW	REP 29-190 -17
HL40-6-8	SCREW	REP 29-190 -18
HL40-6-8	SCREW	REP 29-190 -20
HL40-6-8	SCREW	REP 29-190 -21

**78-13-01**

REPAIR PARTS LIST

Page 405

Apr 30/93

**OLYMPUS 593**MK.610-14-28  
OVERHAUL

PART NUMBER	DESCRIPTION	REPAIR NUMBER
HL40-6-9	SCREW	REP 29-190 -20
HL40-8-7	SCREW	REP 29-190 -18
HL40-8-8	SCREW	REP 29-190 -18
HL40-8-8	SCREW	REP 29-190 -20
HL40-8-9	SCREW	REP 29-190 -18
HL40-8-9	SCREW	REP 29-190 -20
HL667-6-5	SCREW	REP 29-190 - 9
HL667-6-6	SCREW	REP 29-190 - 9
HL667-6-7	SCREW	REP 29-190 - 9
HL667-6-8	SCREW	REP 29-190 - 9
HL667-6-9	SCREW	REP 29-190 - 9
HL667-8-8	SCREW	REP 29-190 - 9
HL668-10-10	SCREW	REP 29-190 - 9
HL668-10-8	SCREW	REP 29-190 - 9
HL668-10-9	SCREW	REP 29-190 - 9
HL668-6-10	SCREW	REP 29-190 - 9
HL668-6-2	SCREW	REP 29-190 - 9
HL668-6-3	SCREW	REP 29-190 - 9
HL668-6-4	SCREW	REP 29-190 - 9
HL668-6-5	SCREW	REP 29-190 - 2
HL668-6-5	SCREW	REP 29-190 - 9
HL668-6-6	SCREW	REP 29-190 - 9
HL668-6-7	SCREW	REP 29-190 - 9
HL668-6-8	SCREW	REP 29-190 - 9
HL668-6-9	SCREW	REP 29-190 - 9
HL668-8-10	SCREW	REP 29-190 - 9
HL668-8-12	SCREW	REP 29-190 - 9
HL668-8-7	SCREW	REP 29-190 - 9
HL668-8-9	SCREW	REP 29-190 - 9
HL688-8-8	SCREW	REP 29-190 - 9
HL868-5-10	SCREW	REP 29-190 - 9
HL868-6-2	SCREW	REP 29-190 - 9
HL868-6-3	SCREW	REP 29-190 - 9
HL868-6-4	SCREW	REP 29-190 - 9
HL868-6-5	SCREW	REP 29-190 - 9
HL868-6-6	SCREW	REP 29-190 - 9
HL868-6-7	SCREW	REP 29-190 - 9
HL868-6-8	SCREW	REP 29-190 - 9
HL868-6-9	SCREW	REP 29-190 - 9
HL868-8-10	SCREW	REP 29-190 - 9
HL868-8-12	SCREW	REP 29-190 - 9
HL868-8-7	SCREW	REP 29-190 - 9
HL868-8-8	SCREW	REP 29-190 - 9
HL868-8-9	SCREW	REP 29-190 - 9

**78-13-01**

REPAIR PARTS LIST

Page 406

Apr 30/93



**OLYMPUS 593**

MK.610-14-28

OVERHAUL



PART NUMBER	DESCRIPTION	REPAIR NUMBER
HL869-5-10	SCREW	REP 29-190 - 9
HL869-5-11	SCREW	REP 29-190 - 9
HL869-5-12	SCREW	REP 3- 10 - 2
HL869-5-12	SCREW	REP 3- 10 - 4
HL869-5-12	SCREW	REP 29-190 - 9
HL869-5-13	SCREW	REP 29-190 - 9
HL869-5-14	SCREW	REP 29-190 - 9
HL869-5-15	SCREW	REP 29-190 - 9
HL869-5-9	SCREW	REP 29-190 - 9
HL869-6-10	SCREW	REP 29-190 - 9
HL869-6-10	SCREW	REP 29-190 -14
HL869-6-11	SCREW	REP 29-190 - 9
HL869-6-12	SCREW	REP 29-190 - 9
HL869-6-13	SCREW	REP 29-190 - 9
HL869-6-14	SCREW	REP 29-190 - 9
HL869-6-15	SCREW	REP 29-190 - 9
HL869-6-16	SCREW	REP 29-190 - 9
HL869-6-17	SCREW	REP 29-190 - 9
HL869-6-18	SCREW	REP 29-190 - 9
HL869-6-20	SCREW	REP 29-190 - 9
HL869-8-11	SCREW	REP 29-190 - 9
HL869-8-12	SCREW	REP 29-190 - 9
HL869-8-13	SCREW	REP 29-190 - 9
HL869-8-14	SCREW	REP 29-190 - 9
HL869-8-15	SCREW	REP 29-190 - 9
HL869-8-16	SCREW	REP 29-190 - 9
HL869-8-17	SCREW	REP 29-190 - 9
HL869-8-18	SCREW	REP 29-190 - 9
HL959-6-10	SCREW	REP 29-190 - 9
HL959-6-11	SCREW	REP 29-190 - 9
HL959-6-12	SCREW	REP 29-190 - 9
HL959-6-13	SCREW	REP 29-190 - 9
HL959-6-14	SCREW	REP 29-190 - 9
HL959-6-15	SCREW	REP 29-190 - 9
HL959-6-16	SCREW	REP 29-190 - 9
HL959-6-17	SCREW	REP 29-190 - 9
HL959-6-18	SCREW	REP 29-190 - 9
HL959-8-11	SCREW	REP 29-190 - 9
HL959-8-12	SCREW	REP 29-190 - 9
HL959-8-13	SCREW	REP 29-190 - 9
HL959-8-14	SCREW	REP 29-190 - 9
HL959-8-15	SCREW	REP 29-190 - 9
HL959-8-16	SCREW	REP 29-190 - 9
HL959-8-17	SCREW	REP 29-190 - 9

**78-13-01**

REPAIR PARTS LIST

Page 407

Apr 30/93

**OLYMPUS 593****MK. 610-14-28****OVERHAUL****sneema**

PART NUMBER	DESCRIPTION	REPAIR NUMBER
HL959-8-18	SCREW	REP 29-190 - 9
HL97-5	NUT	REP 29-190 -17
HL97-5	NUT	REP 29-190 -18
HL97-5	NUT	REP 29-190 -20
HL97-5	NUT	REP 29-190 -21
HL97-6	NUT	REP 29-190 -17
HL97-6	NUT	REP 29-190 -18
HL97-6	NUT	REP 29-190 -20
HL97-6	NUT	REP 29-190 -21
HL97-8	NUT	REP 29-190 -18
HL97-8	NUT	REP 29-190 -20
HLN1G5	NUT	REP 3- 10 - 2
HLN1G5	NUT	REP 3- 10 - 4
HLN1G5	NUT	REP 9- 10 - 2
HLN1G5	NUT	REP 11- 10 - 3
HLN1G5	NUT	REP 29-190 - 8
HLN1G5	NUT	REP 29-190 -12
HLN1G5	NUT	REP 29-190 -17
HLN1G5	NUT	REP 29-190 -18
HLN1G6	NUT	REP 29-190 - 8
HLN1G6	NUT	REP 29-190 -14
HLN1G6	NUT	REP 29-190 -17
HLN1G8	NUT	REP 29-190 -18
LA579-3	FLOATING NUT	REP 29-190 - 7
LHA3280B2-048	FLOATING NUT	REP 22- 30 - 1
LHA3280B2-048	FLOATING NUT	REP 29-190 - 2
LHA3280B2-048	FLOATING NUT	REP 29-190 - 3
LHA3280B3-048	FLOATING NUT	REP 29-190 - 2
LHA3280B3-048	FLOATING NUT	REP 29-190 - 3
LHA3280B4-048	FLOATING NUT	REP 29-190 - 2
LHA3280B5-048	FLOATING NUT	REP 11-130 - 1
LHA3280B5-048	FLOATING NUT	REP 29-190 - 3
LHA3280B5-048	FLOATING NUT	REP 29-190 - 4
LHA3280B6-048	FLOATING NUT	REP 29-190 - 2
LHA6932-3-048	FLOATING NUT	REP 29-190 - 2
LHA6932-5-048	FLOATING NUT	REP 29-190 - 2
LHA6932-6-048	FLOATING NUT	REP 29-190 - 2
MS20615-3M5	RIVET	REP 29-190 - 2
MS21070-4	NUT	REP 12-220 - 1
MS24665-153	SPLIT PIN	REP 29-190 - 8
MS9364-10	NUT	REP 29-190 - 8
NAS1068C4	FLOATING NUT	REP 29-190 - 2
NAS11002E3-16	SCREW	REP 29-190 -16
NAS1199-5-6	RIVET	REP 29-190 - 4

**78-13-01**

REPAIR PARTS LIST

Page 408

Jun 30/97

**OLYMPUS 593****MK. 610-14-28****OVERHAUL****sneema**

PART NUMBER	DESCRIPTION	REPAIR NUMBER
NAS1200-3-4	RIVET	REP 29-190 -24
NAS1200-3-5	RIVET	REP 29-190 -24
NAS1200-4-5	RIVET	REP 29-190 - 3
NAS1200-4-6	RIVET	REP 29-190 - 3
NAS1200-4-7	RIVET	REP 29-190 - 3
NAS1288C3	NUT	REP 29-190 -20
NAS1288C3W	WASHER	REP 29-190 -20
NAS1288C4	NUT	REP 29-190 -20
NAS1288C4W	WASHER	REP 29-190 -20
NAS1578C4T10	SCREW	REP 29-190 -18
NAS1578C4T7	SCREW	REP 29-190 -18
NAS1587-8	WASHER	REP 29-190 - 2
NAS1671-3L1	BLIND BOLT	REP 29-190 - 9
NAS1671-3L2	BLIND BOLT	REP 29-190 - 9
NAS1671-3L3	BLIND BOLT	REP 29-190 - 9
NAS1671-3L4	BLIND BOLT	REP 29-190 - 9
NAS1671-3L5	BLIND BOLT	REP 29-190 - 9
NAS1671-3L6	BLIND BOLT	REP 29-190 - 9
NAS1671-3L7	BLIND BOLT	REP 29-190 - 9
NAS1671-3L8	BLIND BOLT	REP 29-190 - 9
NAS1671-3L9	BLIND BOLT	REP 29-190 - 9
NAS1671-4L10	BLIND BOLT	REP 29-190 - 9
NAS1671-4L11	BLIND BOLT	REP 29-190 - 9
NAS1671-4L12	BLIND BOLT	REP 29-190 - 9
NAS1671-4L4	BLIND BOLT	REP 29-190 - 9
NAS1671-4L5	BLIND BOLT	REP 29-190 - 9
NAS1671-4L6	BLIND BOLT	REP 29-190 - 9
NAS1671-4L7	BLIND BOTL	REP 29-190 - 9
NAS1671-4L8	BLIND BOLT	REP 29-190 - 9
NAS1671-4L9	BLIND BOLT	REP 29-190 - 9
NAS1753-3L2	BLIND BOLT	REP 29-190 - 9
NAS1753-3L3	BLIND BOLT	REP 29-190 - 9
NAS1753-3L4	BLIND BOLT	REP 29-190 - 9
NAS1753-3L5	BLIND BOLT	REP 29-190 - 9
NAS1753-3L6	BLIND BOLT	REP 29-190 - 9
NAS1753-3L7	BLIND BOLT	REP 29-190 - 9
NAS1753-3L8	BLIND BOLT	REP 29-190 - 9
NAS1753-3L9	BLIND BOLT	REP 29-190 - 9
NAS1753-4L10	BLIND BOLT	REP 29-190 - 9
NAS1753-4L11	BLIND BOLT	REP 29-190 - 9
NAS1753-4L12	BLIND BOLT	REP 29-190 - 9
NAS1753-4L6	BLIND BOLT	REP 29-190 - 9
NAS1753-4L7	BLIND BOLT	REP 29-190 - 9
NAS1753-4L8	BLIND BOLT	REP 29-190 - 9

**78-13-01**

REPAIR PARTS LIST

Page 409

Jun 30/97

**OLYMPUS 593****MK. 610-14-28****OVERHAUL****sneema**

PART NUMBER	DESCRIPTION	REPAIR NUMBER
NAS1753-4L9	BLIND BOLT	REP 29-190 - 9
NAS463XC416	SHIM	REP 29-190 - 3
NAS6704DU14	BOLT	REP 29-190 -10
NAS6704DU16	BOLT	REP 29-190 -10
NAS680C3	FLOATING NUT	REP 29-190 - 7
NAS686C3	FLOATING NUT	REP 8- 50 - 1
NAS686C3	FLOATING NUT	REP 11-130 - 1
NAS686C3	FLOATING NUT	REP 22- 30 - 1
NAS686C3	FLOATING NUT	REP 22- 30 - 1
NAS686C4	FLOATING NUT	REP 29-190 - 2
NAS686C4	FLOATING NUT	REP 29-190 - 3
NAS686C4	FLOATING NUT	REP 29-190 -24
NAS687C3	FLOATING NUT	REP 29-190 -17
NAS687C4	FLOATING NUT	REP 23- 10 - 1
NAS687C4	FLOATING NUT	REP 29-190 - 4
NAS686C4	FLOATING NUT	REP 29-190 -24
NAS697C3	NUT	REP 29-190 -24
NAS697C4	NUT	REP 29-190 -24
PLT1001-5-4	BLIND BOLT	REP 29-190 - 9
PLT1001-5-5	BLIND BOLT	REP 29-190 - 9
PLT1004-5-4	BLIND BOLT	REP 29-190 - 9
PLT1004-5-5	BLIND BOLT	REP 29-190 - 9
PLT1004-5-6	BLIND BOLT	REP 29-190 - 9
PLT1004-5-7	BLIND BOLT	REP 29-190 - 9
PLT1004-5-8	BLIND BOTL	REP 29-190 - 9
PLT1004-6-10	BLIND BOLT	REP 29-190 - 9
PLT1004-6-2	BLIND BOLT	REP 29-190 - 9
PLT1004-6-3	BLIND BOLT	REP 29-190 - 9
PLT1004-6-4	BLIND BOLT	REP 29-190 - 6
PLT1004-6-4	BLIND BOLT	REP 29-190 - 9
PLT1004-6-5	BLIND BOLT	REP 29-190 - 6
PLT1004-6-5	BLIND BOLT	REP 29-190 - 9
PLT1004-6-6	BLIND BOLT	REP 29-190 - 6
PLT1004-6-6	BLIND BOLT	REP 29-190 - 9
PLT1004-6-7	BLIND BOLT	REP 29-190 - 9
PLT1004-6-7-5	BLIND BOLT	REP 29-190 - 9
PLT1004-6-8	BLIND BOLT	REP 29-190 - 9
PLT1004-6-9	BLIND BOLT	REP 29-190 - 9
PLT1004-8-5	BLIND BOLT	REP 29-190 - 9
PLT1004-8-6	BLIND BOLT	REP 29-190 - 9
PLT1004-8-7	BLIND BOLT	REP 29-190 - 9
PLT1004-8-8	BLIND BOLT	REP 29-190 - 9
PLT1011-5-6	BLIND BOTL	REP 29-190 - 9
PLT1011-5-7	BLIND BOLT	REP 29-190 - 9

**78-13-01**

REPAIR PARTS LIST

Page 410

Jun 30/97



OLYMPUS 593

MK. 610-14-28

OVERHAUL



sneema

PART NUMBER	DESCRIPTION	REPAIR NUMBER
PLT1011-5-8	BLIND BOLT	REP 29-190 - 9
PLT1011-6-10	BLIND BOLT	REP 29-190 - 9
PLT1011-6-2	BLIND BOLT	REP 29-190 - 9
PLT1011-6-3	BLIND BOLT	REP 29-190 - 9
PLT1011-6-4	BLIND BOLT	REP 29-190 - 9
PLT1011-6-5	BLIND BOLT	REP 29-190 - 9
PLT1011-6-5-5	BLIND BOLT	REP 29-190 - 9
PLT1011-6-6	BLIND BOLT	REP 29-190 - 9
PLT1011-6-6-5	BLIND BOLT	REP 29-190 - 9
PLT1011-6-7	BLIND BOLT	REP 29-190 - 9
PLT1011-6-7-5	BLIND BOLT	REP 29-190 - 9
PLT1011-6-8	BLIND BOLT	REP 29-190 - 9
PLT1011-6-9	BLIND BOLT	REP 29-190 - 9
PLT120-5-5	BLIND BOLT	REP 29-190 - 9
PLT121-5-5	BLIND BOLT	REP 29-190 - 9
PLT121-5-8	BLIND BOLT	REP 29-190 -24
PLT220-5-2	BLIND BOLT	REP 29-190 - 8
PLT220-6-2	BLIND BOLT	REP 29-190 - 8
PLT220-6-2	BLIND BOLT	REP 29-190 -17
PLT220-6-4	BLIND BOLT	REP 29-190 -21
PLT220-6-5	BLIND BOLT	REP 29-190 -21
PLT220-6-6	BLIND BOLT	REP 29-190 -17
PLT220-6-6	BLIND BOLT	REP 29-190 -21
PLT220-6-7	BLIND BOLT	REP 29-190 -17
PLT220-6-7	BLIND BOLT	REP 29-190 -21
PLT220-6-8	BLIND BOLT	REP 29-190 -21
SPC9407S6W	WASHER	REP 29-190 -14
SPC9000-3-3	SCREW	REP 29-190 - 9
SPC9000-3-4	SCREW	REP 29-190 - 9
SPC9000-3-5	SCREW	REP 29-190 - 9
SPC9000-3-6	SCREW	REP 29-190 - 6
SPC9000-4-10	SCREW	REP 29-190 - 9
SPC9000-4-11	SCREW	REP 29-190 -18
SPC9000-4-14	SCREW	REP 29-190 - 9
SPC9000-4-4	SCREW	REP 29-190 - 9
SPC9000-4-5	SCREW	REP 29-190 - 9
SPC9000-4-6	SCREW	REP 29-190 - 9
SPC9000-4-7	SCREW	REP 29-190 - 9
SPC9000-4-8	SCREW	REP 29-190 - 9
SPC9000-4-8	SCREW	REP 29-190 -18
SPC9000-4-9	SCREW	REP 29-190 - 9
SPC9005-31	HOLLOW BOLT	REP 29-190 - 2
SPC9005-41	HOLLOW BOLT	REP 29-190 - 2
SPC9101C8B174	INSERT	REP 11- 10 - 1

78-13-01

REPAIR PARTS LIST

Page 411

Jun 30/97



OLYMPUS 593

MK. 610-14-28

OVERHAUL



SNECMA

PART NUMBER	DESCRIPTION	REPAIR NUMBER
SPC9101C8CB174	INSERT	REP 3- 10 - 3
SPC9102C6HB-GF	RING CRIMPING	REP 3- 10 - 3
SPC9102C6HB-SFC274	INSERT	REP 3- 10 - 3
SPC9102C8CB-GF	RING CRIMPING	REP 3- 10 - 3
SPC9102C8CB-GF	RING CRIMPING	REP 3- 10 -26
SPC9102C8CB-SFC174	INSERT	REP 3- 10 - 3
SPC9102C8CB-SFC274	INSERT	REP 3- 10 -26
SPC9103-10	THREADED BUSH	REP 29-190 - 3
SPC9103-10	THREADED BUSH	REP 29-190 - 9
SPC9103-11	THREADED BUSH	REP 29-190 - 3
SPC9103-11	THREADED BUSH	REP 29-190 - 9
SPC9103-12	THREADED BUSH	REP 29-190 - 3
SPC9103-12	THREADED BUSH	REP 29-190 - 9
SPC9103-13	THREADED BUSH	REP 29-190 - 3
SPC9103-13	THREADED BUSH	REP 29-190 - 9
SPC9103-5	THREADED BUSH	REP 29-190 - 3
SPC9103-5	THREADED BUSH	REP 29-190 - 9
SPC9103-6	THREADED BUSH	REP 29-190 - 3
SPC9103-6	THREADED BUSH	REP 29-190 - 9
SPC9103-7	THREADED BUSH	REP 29-190 - 3
SPC9103-7	THREADED BUSH	REP 29-190 - 9
SPC9103-8	THREADED BUSH	REP 29-190 - 3
SPC9103-8	THREADED BUSH	REP 29-190 - 9
SPC9103-9	THREADED BUSH	REP 29-190 - 3
SPC9103-9	THREADED BUSH	REP 29-190 - 9
SPC9104C6B174	INSERT	REP 11- 10 - 1
SPC9107S3-110	INSERT	REP 29-190 - 9
SPC9107S3-130	INSERT	REP 29-190 - 9
SPC9107S3-170	INSERT	REP 29-190 - 9
SPC9107S3-190	INSERT	REP 29-190 - 9
SPC9107S5-110	INSERT	REP 29-190 - 9
SPC9107S5-170	INSERT	REP 29-190 - 9
SPC9107S5-173	INSERT	REP 29-190 - 9
SPC9107S3-110	INSERT	REP 29-190 - 9
SPC9401I6	WASHER	REP 29-190 - 2
SPC9401S5-040	WASHER	REP 29-190 -20
SPC9407S5W	WASHER	REP 3- 10 - 4
SPC9407S5W	WASHER	REP 9- 10 - 2
SPC9407S5W	WASHER	REP 11- 10 - 3
SPC9500-11	NUT CAGE	REP 29-190 - 3
SPC9501-1	NUT	REP 29-190 - 3
SPC9501-2	NUT	REP 29-190 - 3
SPC9501-3	NUT	REP 29-190 - 3
SPC9501-4	NUT	REP 29-190 - 3

78-13-01

REPAIR PARTS LIST

Page 412

Jun 30/97

**OLYMPUS 593**

MK. 610-14-28

OVERHAUL



sheema

PART NUMBER	DESCRIPTION	REPAIR NUMBER
SPC9501-5	NUT	REP 29-190 - 3
SPC9501-6	NUT	REP 29-190 - 3
TLN1000C8	NUT	REP 29-190 - 2
Z1855-02	NUT	REP 29-190 - 2
002-003-604-0	SUPPORT PLATE ASSY	REP 29-190 - 6
002-003-605-0	SUPPORT PLATE ASSY	REP 29-190 - 6
002-003-606-0	SUPPORT PLATE ASSY	REP 29-190 - 6
002-003-607-0	SUPPORT PLATE ASSY	REP 29-190 - 6
002-003-608-0	SUPPORT PLATE ASSY	REP 29-190 - 6
002-003-609-0	SUPPORT PLATE ASSY	REP 29-190 - 6
002-003-610-0	SUPPORT PLATE ASSY	REP 29-190 - 6
002-003-809-0	SUPPORT PLATE ASSY	REP 3- 10 - 4
002-003-810-0	SUPPORT PLATE ASSY	REP 11- 10 - 3
002-003-811-0	SUPPORT PLATE ASSY	REP 29-190 - 6
002-003-812-0	SUPPORT PLATE ASSY	REP 29-190 - 6
002-003-813-0	SUPPORT PLATE ASSY	REP 29-190 - 6
002-003-814-0	SUPPORT PLATE ASSY	REP 29-190 - 6
002-003-815-0	SUPPORT PLATE ASSY	REP 29-190 - 6
002-003-816-0	SUPPORT PLATE ASSY	REP 29-190 - 6
002-003-817-0	SUPPORT PLATE ASSY	REP 29-190 - 6
002-003-992-1	SPACER	REP 3- 10 - 4
002-003-992-1	SPACER	REP 11- 10 - 3
002-003-992-1	SPACER	REP 29-190 -12
002-003-992-1	SPACER	REP 29-190 -20
002-003-992-1	SPACER	REP 29-190 -21
002-003-992-2	SPACER	REP 29-190 -12
002-003-992-2	SPACER	REP 29-190 -21
002-003-992-3	SPACER	REP 29-190 -12
002-003-992-3	SPACER	REP 29-190 -17
002-003-992-3	SPACER	REP 29-190 -18
002-003-992-3	SPACER	REP 29-190 -20
002-003-992-3	SPACER	REP 29-190 -21
002-003-992-4	SPACER	REP 29-190 -12
002-003-992-5	SPACER	REP 29-190 -12
002-003-995-0	THRUST WASHER	REP 29-190 -17
002-003-995-0	WASHER	REP 29-190 -18
002-003-995-0	THRUST WASHER	REP 29-190 -21
002-004-003-0	REINFORCING PLATE	REP 29-190 - 6
002-004-005-0	COVER	REP 29-190 - 6
002-004-008-0	WASHER	REP 29-190 -18
002-004-009-0	ANGLE SECTION ASSY	REP 29-190 -16
002-004-010-0	SPACING WASHER	REP 29-190 -16
002-004-048-0	SPACING WASHER	REP 29-190 -16
002-004-073-1	SPACER	REP 29-190 -19

**78-13-01**

REPAIR PARTS LIST

Page 413

Jun 30/97

**OLYMPUS 593****MK. 610-14-28****OVERHAUL****sneema**

PART NUMBER	DESCRIPTION	REPAIR NUMBER
002-004-076-0	SPACER	REP 9- 10 - 2
002-004-077-0	THRUST WASHER	REP 9- 10 - 2
002-004-113-1	SPACER	REP 29-190 -19
002-004-114-0	COVER	REP 1- 10 - 1
002-004-115-0	COVER	REP 1- 10 - 1
21215CM4015	RIVET	REP 29-190 - 8
21215TC2407	RIVET	REP 5-260 - 1
21215TC2407	RIVET	REP 5-260 - 2
21215TC3207	RIVET	REP 5-130 - 1
21215TC3208	RIVET	REP 5-260 - 1
21215TC3208	RIVET	REP 5-260 - 2
21215TC3208	RIVET	REP 5-260 - 3
21215TC4008	RIVET	REP 5-130 - 1
21217CM4812	RIVET	REP 1- 10 - 1
21217CM4812	RIVET	REP 1- 10 - 2
21217TB2405	RIVET	REP 29-190 - 2
21217TB2405	RIVET	REP 29-190 -24
21217TB2406	RIVET	REP 11-130 - 1
21217TB2406	RIVET	REP 16-220 - 1
21217TB2406	RIVET	REP 22- 30 - 1
21217TB2406	RIVET	REP 23- 10 - 1
21217TB2406	RIVET	REP 29-190 - 1
21217TB2406	RIVET	REP 29-190 - 2
21217TB2406	RIVET	REP 29-190 - 3
21217TB2406	RIVET	REP 29-190 -17
21217TB2408	RIVET	REP 29-190 - 3
21217TB2408	RIVET	REP 29-190 - 9
21217TB2410	RIVET	REP 29-190 - 2
21217TB2410	RIVET	REP 29-190 - 3
21217TB2410	RIVET	REP 29-190 - 9
21217TB2410	RIVET	REP 29-190 -24
21217TB2411	RIVET	REP 29-190 - 2
21217TB2411	RIVET	REP 29-190 - 3
21217TB2413	RIVET	REP 29-190 - 3
21217TB3207	RIVET	REP 16-220 - 1
21217TB3207	RIVET	REP 23- 10 - 1
21217TB3208	RIVET	REP 11-130 - 1
21217TB3208	RIVET	REP 22- 30 - 1
21217TB3210	RIVET	REP 29-190 - 4
21217TB3211	RIVET	REP 29-190 - 4
21217TB3211	RIVET	REP 29-190 - 4
21217TB3211	RIVET	REP 29-190 - 4
21217TB3211	RIVET	REP 29-190 - 4
21217TB3211	RIVET	REP 29-190 - 4

**78-13-01**

REPAIR PARTS LIST

Page 414

Jun 30/97



**OLYMPUS 593**

MK. 610-14-28

OVERHAUL



SNECMA

PART NUMBER	DESCRIPTION	REPAIR NUMBER
21217TC2405	RIVET	REP 5-260 - 1
21217TC2405	RIVET	REP 5-260 - 2
21217TC2406	RIVET	REP 29-190 - 7
21217TC2407	RIVET	REP 29-190 - 7
21217TC3206	RIVET	REP 29-190 - 7
21217TC3206	RIVET	REP 5-260 - 1
21217TC3207	RIVET	REP 5-260 - 2
21217TC3207	RIVET	REP 7- 10 - 1
21217TC3207	RIVET	REP 29-190 - 3
21217TC3207	RIVET	REP 29-190 - 4
21217TC3208	RIVET	REP 29-190 - 7
21217TC3210	RIVET	REP 29-190 - 7
21217TC3210	RIVET	REP 5-260 - 1
21217TC3210	RIVET	REP 5-260 - 2
21217TC4812	RIVET	REP 1- 10 - 1
21217TC4812	RIVET	REP 1- 10 - 2
2LPYEU6-10	RIVET	REP 29-190 - 9
2LPYEU6-3	RIVET	REP 29-190 - 9
2LPYEU6-4	RIVET	REP 29-190 - 9
2LPYEU6-5	RIVET	REP 29-190 - 9
2LPYEU6-6	RIVET	REP 29-190 - 9
2LPYEU6-7	RIVET	REP 29-190 - 9
2LPYEU6-8	RIVET	REP 29-190 - 9
2LPYEU6-9	RIVET	REP 29-190 - 9
2LPYEU6-10	RIVET	REP 29-190 - 9
2LPYEU6-3	RIVET	REP 29-190 - 9
2LPYEU6-4	RIVET	REP 29-190 - 9
2LPYEU6-5	RIVET	REP 29-190 - 9
2LPYEU6-6	RIVET	REP 29-190 - 9
2LPYEU6-7	RIVET	REP 29-190 - 9
2LPYEU6-8	RIVET	REP 29-190 - 9
2LPYEU6-9	RIVET	REP 29-190 - 9
300-855-800-6	BUSHING	REP 8 10 - 1
300-856-905-6	PANEL	REP 29-190 -23
300-856-955-6	PANEL	REP 29-190 -23
300-860-003-6	PANEL	REP 29-190 -23
300-860-053-6	PANEL	REP 29-190 -23
300-860-300-0	CLAMP	REP 29-190 -14
300-860-500-0	CLAMP	REP 29-190 -14
300-865-702-6	PANEL	REP 29-190 -23
300-865-752-6	PANEL	REP 29-190 -23
300-892-600-6	PANEL	REP 29-190 -23
300-892-650-6	PANEL	REP 29-190 -23
300-894-300-0	SHIM	REP 29-190 - 2

**78-13-01**

REPAIR PARTS LIST

Page 415

Jun 30/97

**OLYMPUS 593****MK. 610-14-28****OVERHAUL****sneema**

PART NUMBER	DESCRIPTION	REPAIR NUMBER
300-896-500-6	PANEL	REP 29-190 -23
300-896-550-6	PANEL	REP 29-190 -23
301-004-002-6	ACCESS DOOR	REP 29-190 -26
301-004-052-6	ACCESS DOOR	REP 29-190 -26
301-011-100-0	SHIM	REP 5-260 - 1
301-012-101-6	PANEL	REP 29-190 -23
301-012-151-6	PANEL	REP 29-190 -23
301-017-700-6	PANEL	REP 29-190 -23
301-017-750-6	PANEL	REP 29-190 -23
301-018-101-6	PANEL	REP 29-190 -23
301-018-151-6	PANEL	REP 29-190 -23
301-018-800-6	PANEL	REP 29-190 -23
301-018-850-6	PANEL	REP 29-190 -23
301-025-400-6	PANEL	REP 29-190 -23
301-025-450-6	PANEL	REP 29-190 -23
301-025-801-6	PANEL	REP 29-190 -23
301-025-851-6	PANEL	REP 29-190 -23
301-030-703-6	PANEL	REP 29-190 -23
301-030-753-6	PANEL	REP 29-190 -23
301-030-803-6	PANEL	REP 29-190 -23
301-030-853-6	PANEL	REP 29-190 -23
301-031-901-6	PANEL	REP 29-190 -23
301-031-951-6	PANEL	REP 29-190 -23
301-041-904-6	PANEL	REP 29-190 -23
301-041-954-6	PANEL	REP 29-190 -23
301-045-301-0	SPACER	REP 29-190 - 8
301-045-401-	SPACER	REP 29-190 - 8
301-045-800-0	END FITTING	REP 29-190 -14
301-046-600-0	WASHER	REP 29-190 - 8
301-055-202-6	PANEL	REP 29-190 -23
301-055-252-6	PANEL	REP 29-190 -23
301-058-101-6	PANEL	REP 29-190 -23
301-058-151-6	PANEL	REP 29-190 -23
301-058-451-6	ACCESS DOOR	REP 29-190 -26
301-058-401-6	ACCESS DOOR	REP 29-190 -26
301-058-702-6	ACCESS DOOR	REP 29-190 -26
301-058-752-6	ACCESS DOOR	REP 29-190 -26
301-059-202-6	PANEL	REP 29-190 -23
301-059-252-6	PANEL	REP 29-190 -23
301-059-700-0	SHIM	REP 29-190 - 2
301-060-402-6	ACCESS DOOR	REP 29-190 -26
301-060-403-6	ACCESS DOOR	REP 29-190 -26
301-060-602-6	ACCESS DOOR	REP 29-190 -26
301-060-603-6	ACCESS DOOR	REP 29-190 -26
301-060-700-0	STIFFENER	REP 3- 10 - 2

**78-13-01**

REPAIR PARTS LIST

Page 416

Jun 30/97

**OLYMPUS 593****MK. 610-14-28****OVERHAUL****sneema**

PART NUMBER	DESCRIPTION	REPAIR NUMBER
301-066-100-0	STIFFENER	REP 3- 10 - 2
301-072-702-0	SPACER	REP 29-190 - 8
301-072-800-0	SUPPORTING YOKE	REP 29-190 - 8
301-072-850-0	SUPPORTING YOKE	REP 29-190 - 8
301-073-100-0	LINK ASSY	REP 29-190 - 8
301-073-150-0	LINK ASSY	REP 29-190 - 8
301-073-200-0	SUPPORTING YOKE	REP 29-190 - 8
301-073-250-0	SUPPORTING YOKE	REP 29-190 - 8
301-073-400-0	LINK ASSY	REP 29-190 - 8
301-073-450-0	LINK ASSY	REP 29-190 - 8
301-073-500-0	SUPPORTING YOKE	REP 29-190 - 8
301-073-500-0	SUPPORTING YOKE	REP 29-190 -17
301-073-550-0	SUPPORTING YOKE	REP 29-190 - 8
301-073-550-0	SUPPORTING YOKE	REP 29-190 -17
301-073-600-0	SUPPORTING YOKE	REP 29-190 - 8
301-073-600-0	SUPPORTING YOKE	REP 29-190 -17
301-073-802-0	SPACER	REP 29-190 - 8
301-073-900-0	SUPPORTING YOKE	REP 29-190 - 8
301-073-950-0	SUPPORTING YOKE	REP 29-190 - 8
301-074-000-0	SUPPORTING YOKE	REP 29-190 - 8
301-074-050-0	SUPPORTING YOKE	REP 29-190 - 8
301-074-200-0	LINK ASSY	REP 29-190 - 8
301-074-250-0	LINK ASSY	REP 29-190 - 8
301-074-400-0	LINK ASSY	REP 29-190 - 8
301-074-450-0	LINK ASSY	REP 29-190 - 8
301-093-811-0	UPPER SEAL ELEMENT	REP 5-130 - 1
301-093-911-0	LOWER SEAL ELEMENT	REP 5-130 - 1
301-094-700-0	SUPPORTING YOKE	REP 29-190 -17
301-094-700-0	SUPPORTING YOKE	REP 29-190 - 8
301-094-750-0	SUPPORTING YOKE	REP 29-190 -17
301-094-750-0	SUPPORTING YOKE	REP 29-190 - 8
301-094-900-0	LINK ASSY	REP 29-190 - 8
301-094-950-0	LINK ASSY	REP 29-190 - 8
301-095-000-0	LINK ASSY	REP 29-190 - 8
301-095-050-0	LINK ASSY	REP 29-190 - 8
301-095-100-0	SUPPORTING YOKE	REP 29-190 - 8
301-095-150-0	SUPPORTING YOKE	REP 29-190 - 8
301-095-200-0	SUPPORTING YOKE	REP 29-190 - 8
301-095-250-0	SUPPORTING YOKE	REP 29-190 - 8
301-113-700-0	GUTTER	REP 29-190 -14
301-114-900-0	PIN	REP 9- 10 - 1
301-115-701-0	REINFORCING PLATE	REP 9- 10 - 1
301-115-751-0	REINFORCING PLATE	REP 9- 10 - 1
301-115-801-0	REINFORCING PLATE	REP 9- 10 -18

**78-13-01**

REPAIR PARTS LIST

Page 417

Jun 30/97

**OLYMPUS 593****MK. 610-14-28****OVERHAUL****sneema**

PART NUMBER	DESCRIPTION	REPAIR NUMBER
301-115-851-0	REINFORCING PLATE	REP 9- 10 - 1
301-115-901-0	REINFORCING PLATE	REP 9- 10 - 1
301-115-951-0	REINFORCING PLATE	REP 9- 10 - 1
301-116-001-0	REINFORCING PLATE	REP 9- 10 - 1
301-116-051-0	REINFORCING PLATE	REP 9- 10 - 1
301-116-100-0	DOUBLER	REP 9- 10 - 1
301-116-150-0	DOUBLER	REP 9- 10 - 1
301-116-200-0	WASHER	REP 9- 10 - 1
301-125-200-0	BEARING	REP 25- 10 - 1
301-125-500-0	SHIM	REP 29-190 -14
301-146-300-0	WASHER	REP 29-190 -14
301-146-400-0	WASHER	REP 29-190 -14
301-148-412-0	EDGE REINFORCING STRIP	REP 5-260 - 1
301-148-513-0	WASHER	REP 5-260 - 1
301-148-612-0	BOLT SUPPORT	REP 5-260 - 1
301-148-712-0	WASHER	REP 5-260 - 1
301-149-013-0	STIFFENER	REP 5-260 - 1
301-149-063-0	STIFFENER	REP 5-260 - 1
301-153-702-6	ACCESS DOOR	REP 29-190 -26
301-155-600-0	DOUBLER	REP 9- 10 - 1
302-007-500-0	BUSHING	REP 18-110 - 3
302-007-900-0	INSERT	REP 3- 10 - 3
302-008-800-0	BOLT SUPPORT	REP 5-260 - 1
302-011-000-0	SHIM	REP 5-260 - 1
302-017-501-0	CRIMPING WASHER	REP 12- 10B- 1
302-019-200-0	WASHER	REP 12- 10B- 1
302-020-700-0	CRIMPING WASHER	REP 12- 10B- 1
302-057-200-0	DOUBLE RETAINING PLATE	REP 5-130 - 1
302-057-250-0	DOUBLE RETAINING PLATE	REP 5-130 - 1
302-057-300-0	WASHER	REP 5-260 - 1
302-063-500-0	INSERT	REP 3- 10 - 3
302-063-600-0	INSERT	REP 3- 10 - 3
302-063-600-0	INSERT	REP 29-190 -26
302-063-700-0	NUT CAGE	REP 29-190 - 3
302-063-900-0	INSERT	REP 3- 10 - 3
302-063-900-0	CRIMPING RING	REP 29-190 -26
3591-4TNV0500	SCREW THREAD INSERT	REP 29-190 - 2
525-003-905-0	ELBOW	REP 29-190 -14
649-784-031-0	NUT	REP 8-100 - 1

**78-13-01**

REPAIR PARTS LIST

Page 418

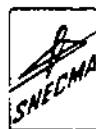
Jun 30/97



OLYMPUS 593

MK.610-14-28

OVERHAUL



### REPAIR

#### DEFLECTOR ASSY (1-10/200)

##### 1. Replacing the Cover

---

#### PARTS REQUIRED FOR REPAIR

---

Cover No. 002-004-114-0

Cover No. 002-004-115-0

Rivet T F100° BNAE 21217 CM 4812 (650-024-135-0)

or BNAE 21217 TC 4812 (650-025-135-0)

---

##### A. Disassembly

- (1) Remove the rivets by grinding out their heads.

##### B. Assembly

- (1) Put the cover in position on the deflector and clip it fast (see Fig. 401, Sheet 2).
- (2) Counterdrill, and fit the retaining rivets as instructed in chapter 70-50-10 and shown in Fig. 401.

##### C. Inspection

- (1) Check the riveting as described in chapter 70-50-81.

PRINTED IN FRANCE

**78-13-01**

REP 1-10-1

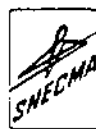
Page 401

Apr 30/93

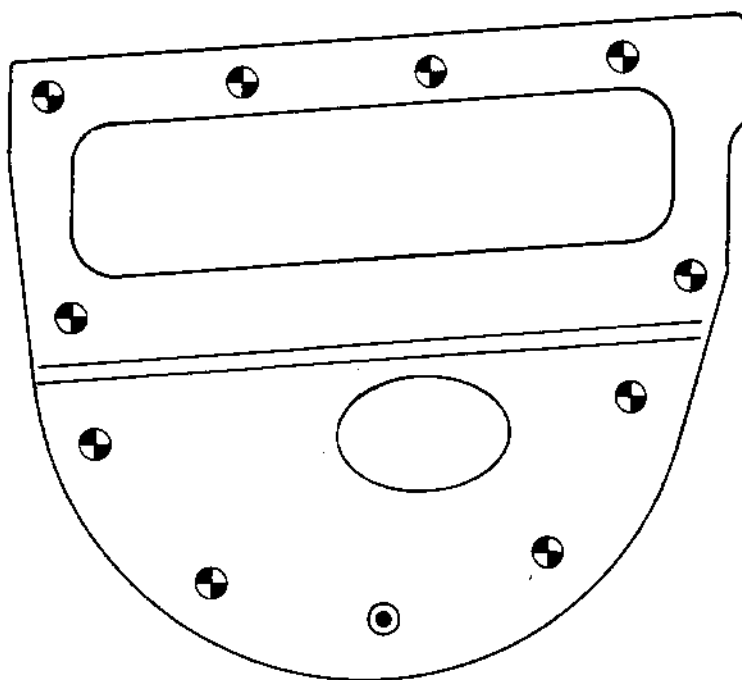


OLYMPUS 593

MK.610-14-28  
OVERHAUL



COVER No. 002-004-114-0 FROM PART No. E301-138-900-0  
COVER No. 002-004-114-0 FROM PART No. E301-138-950-0



SYMBOL	DETAILS
	10 HOLES D = 7,925 $\pm$ 0,125 (0.312 $\pm$ 0.005)
	1 HOLE D = 6,35 $\pm$ 0,125 (0.250 $\pm$ 0.005)

DIMENSIONS ARE IN MILLIMETRES WITH INCH  
CONVERSIONS IN PARENTHESES.

Replacing the Cover  
Figure 401 (Sheet 1 of 2)

78-13-01

REP 1-10-1

Page 402

Jan 31/81



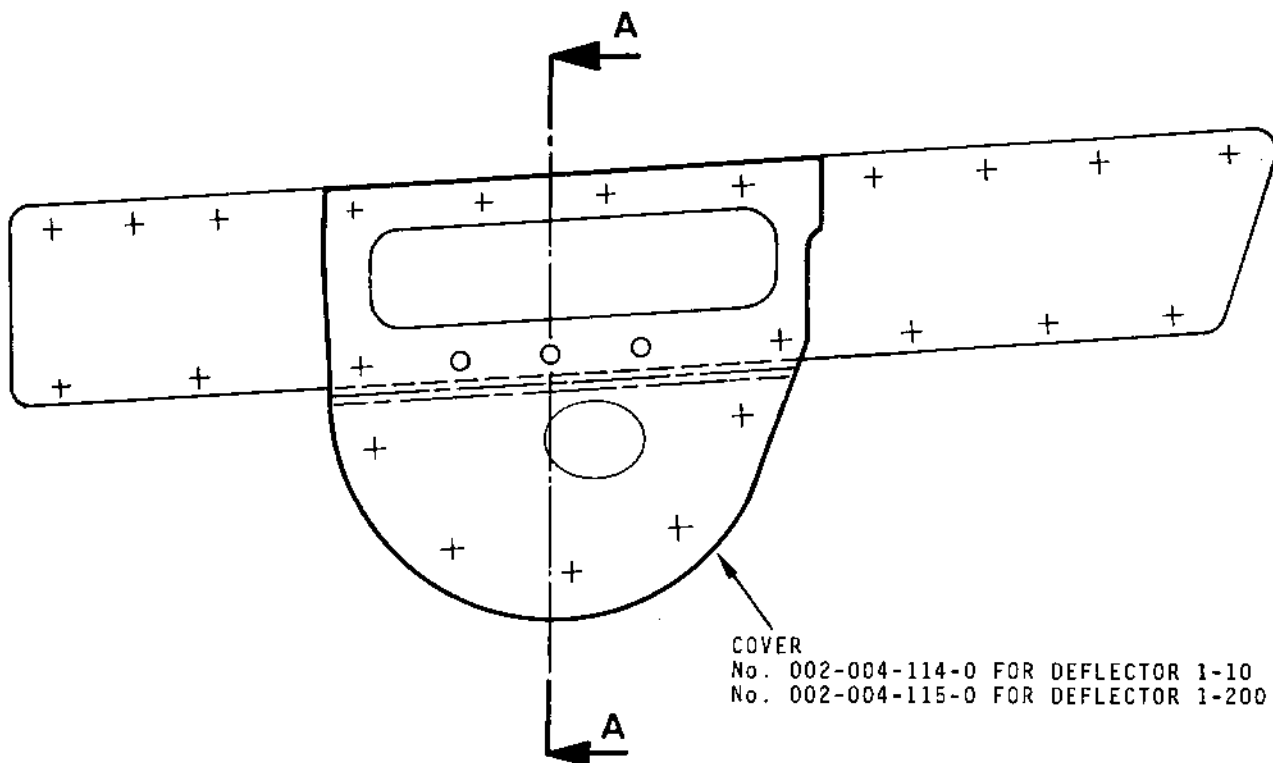
OLYMPUS 593

MK.610-14-28

OVERHAUL

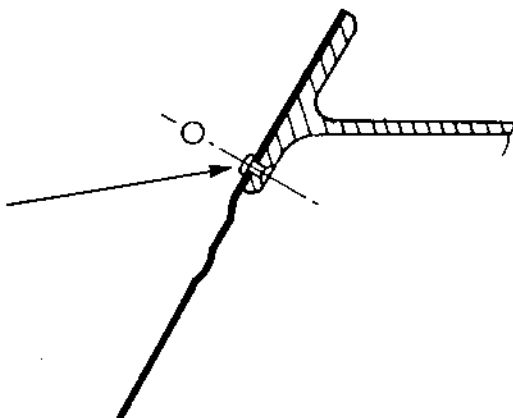


DEFLECTOR 1-10 AS SHOWN  
DEFLECTOR 1-200 COUNTER SIDE



SECTION AA

3 RIVETS  
BNAE 21217 CM 4812  
OR  
BNAE 21217 TC 4812



Replacing the Cover  
Figure 401 (Sheet 2 of 2)

78-13-01

REP 1-10-1  
Pages 403/404  
Jan 31/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



## REPAIR

ACCESS DOORS (3-10/150/170/190/330/331/350/351/370/371 and  
4-10/30/31/50/51/70/71/100/101).

### 1 Reconditioning the plasma coating

#### PARTS REQUIRED FOR REPAIR

Metallizing powder material P3200

CAUTION : THIS REPAIR SCHEME DOES NOT APPLY TO ACCESS DOORS  
3-10/150/170/190 and 4-70/71/100/101.

#### A. Removing the deteriorated coating

- (1) Strip-off the existing coating using abrasive blasting according to the method M103A of chapter 70-15-20 "CLEANING".

NOTE - 1 - The insert holes must be masked prior to carrying out the abrasive blasting.

2 - Abrasive material to be used is dry corin-  
don 40 (P135).

#### B. Restoring the coating

- (1) Spray the coating in the delineated areas shown on figure 401, as instructed in chapter 70-65-20, "SPRAYING OF COATINGS USING A PLASMA TORCH" and as follows :

The sample test-piece is to be produced from a Stres-  
skin panel material P3700.

Power material sprayed P3200.

Coating thickness 0,1 to 0,15 mm (0.004-0.006 in).

- (2) Carry out a light buffing operation to obtain the sur-  
face finish specified in figure 401.

#### C. Checking the coating

- (1) Check the coating as instructed in chapter 70-65-80  
"INSPECTION OF COATINGS".

NOTE - On the coated areas, the tolerances are  
- 0, + 13 mm (0, + 0.5 in).

78-13-01

REP 3-10-1

Page 401

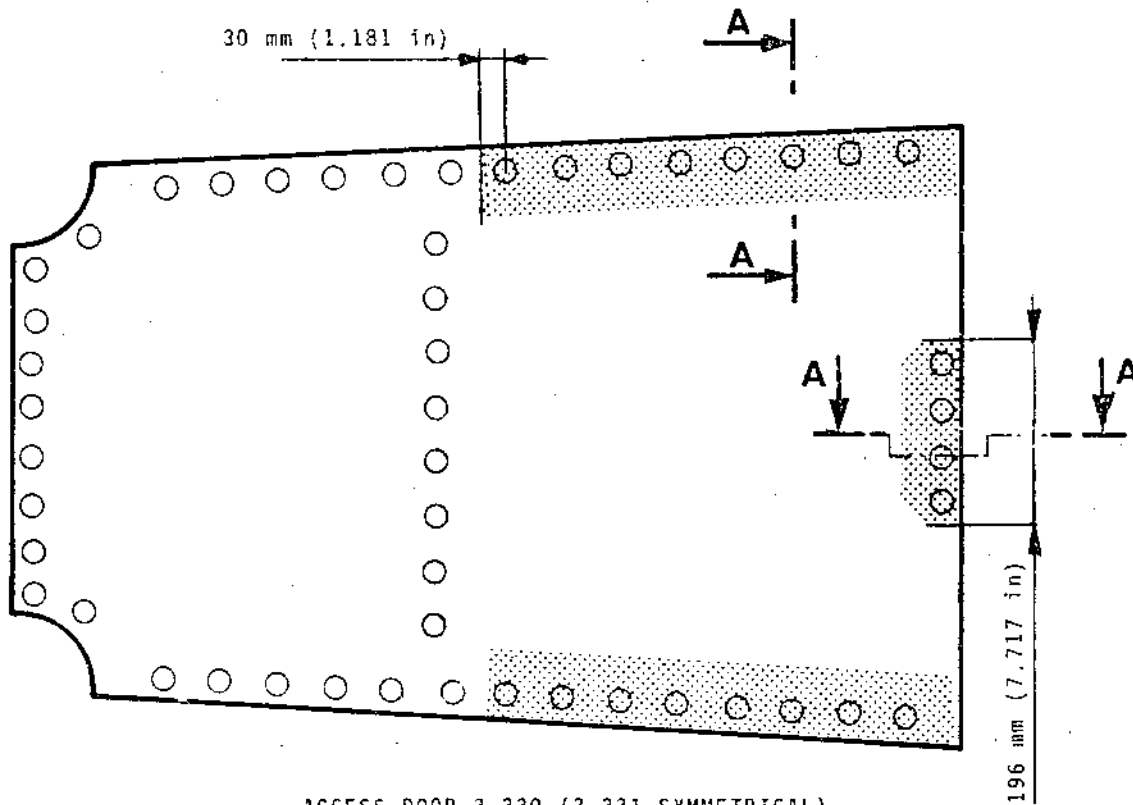
May 31/76





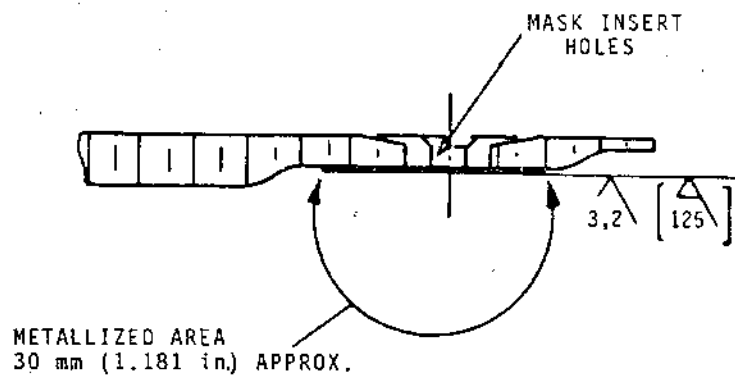
OLYMPUS 593

MK.610-14-28  
OVERHAUL



ACCESS DOOR 3-330 (3-331 SYMMETRICAL)

SECTION A-A



Reconditioning the Plasma-Sprayed Coating on Access Doors  
Figure 401 (Sheet 1 of 3)

78-13-01

REP 3-10-1

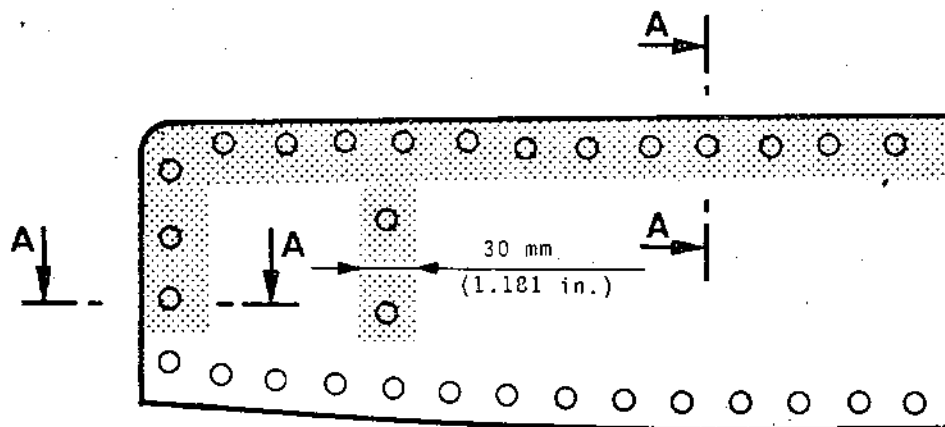
Page 402

May 31/76

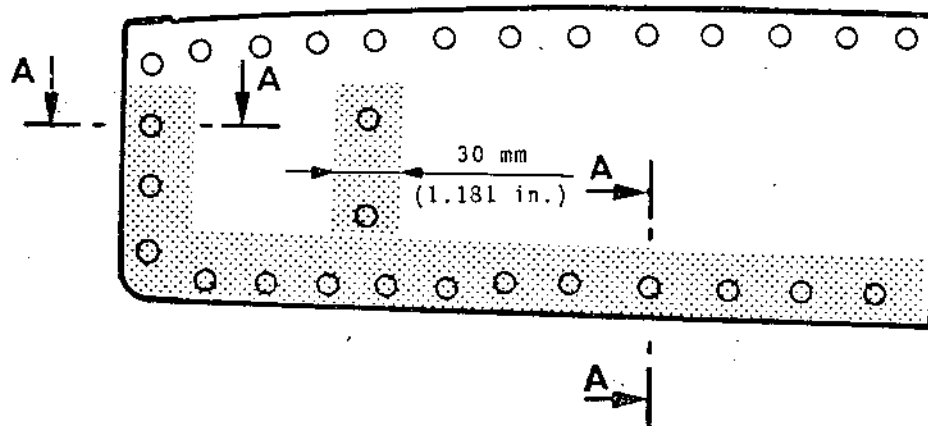


OLYMPUS 593

MK.610-14-28  
OVERHAUL



ACCESS DOOR 3-350 (3-351 SYMMETRICAL)



ACCESS DOOR 3-370 (3-371 SYMMETRICAL)

Reconditioning the Plasma-Sprayed Coating on Access Doors  
Figure 401 (Sheet 2 of 3)

78-13-01

REP 3-10-1

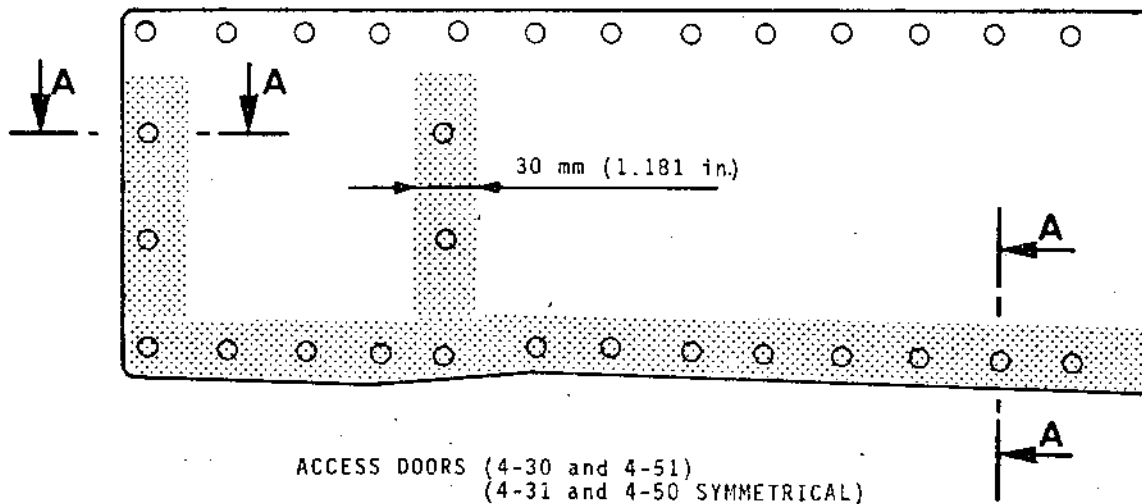
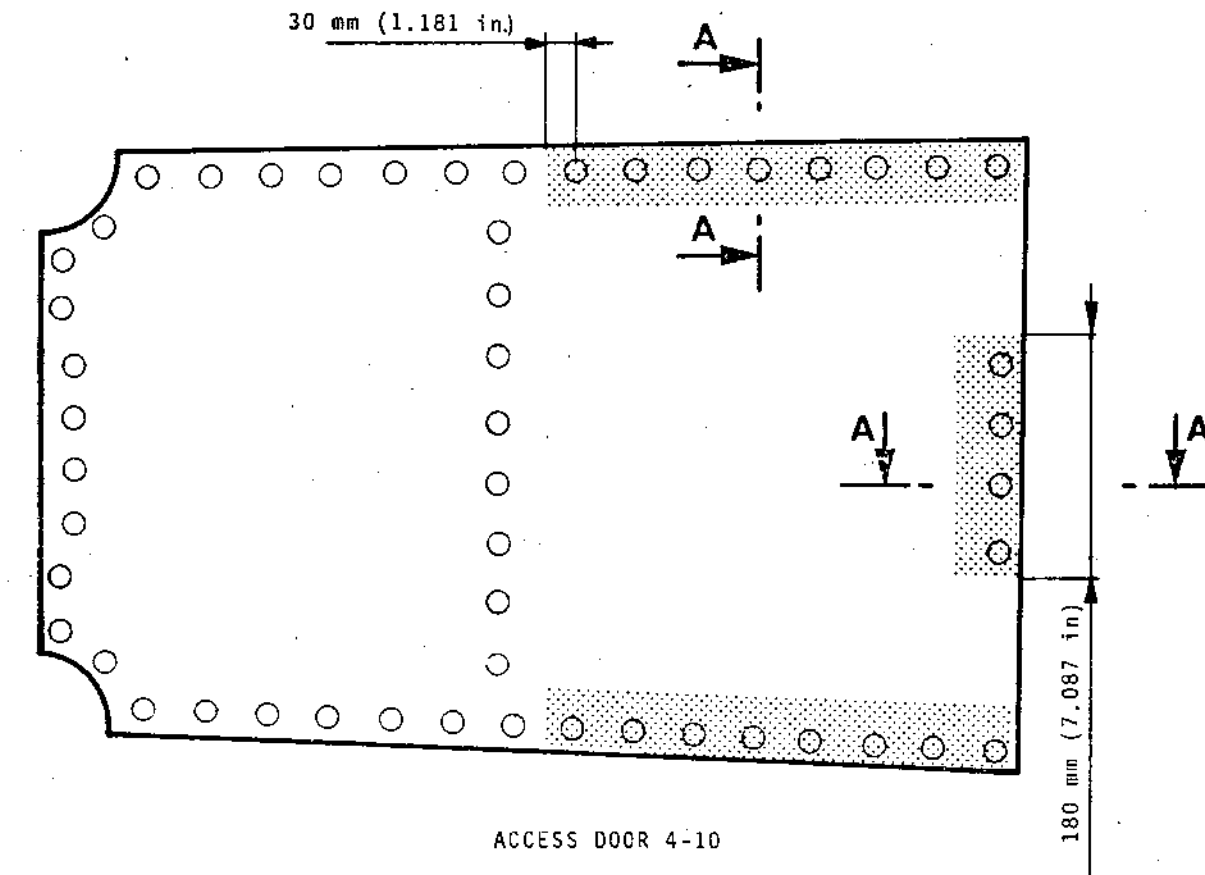
Page 403

May 31/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Reconditioning the Plasma-Sprayed Coating on Access Doors  
Figure 401 (Sheet 3 of 3)

78-13-01

REP 3-10-1

Page 404

May 31/76



OLYMPUS 593

MK.610-14-28

OVERHAUL

REPAIR



## DEFLECTOR ASSEMBLY (1-10)

### 2. Repair of leading edge by means of a welded insert.

---

#### PARTS NECESSARY FOR REPAIR

---

Sheet metal P3325 (NC 20 K 14 x). Thickness : 5 mm (0.197 in.).

Rivet head F100 No. 650-024-135-0

or No. 650-025-135-0.

Filler wire : P 3024.

---

#### A. Removal.

- (1) Remove the deflector cover according to instructions in REP 1-10-1 of this chapter.

#### B. Heat treatment.

- (1) Apply a solution heat treatment to the deflector as specified in method M 832 of chapter 70-45-10.
- (2) Check the treatment in the opening in the foot of the deflector, as specified in chapter 70-45-80.

NOTE : HV  $\leq$  277.

#### C. Preparation of elements to be welded.

- (1) Cut away the damaged area of the blade by electro-discharge machining as indicated in figure 401 and as follows :
  - (a) Cut away at least 5 mm (0.197 in.) around the damaged zone.
  - (b) Grind away the area affected by electric discharge machining to a depth of 0,5 mm (0.020 in.).

**78-13-01**

REP 1-10-2

Page 401

Jun 15/82



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) From sheet metal P 3325, thickness 5 mm (0.197 in.), make the repair strip as indicated in figure 402 and by the following remarks :

- (a) Machining of sheet metal to follow outline of blade.
- (b) Cutting of strip to shape of area cut away on deflector blade.
- (c) Reworking of edge to be welded into area cut out of deflector blade.

D. Welding of repair strip.

- (1) Chamfer the edges of the parts to be welded as shown in figure 403.
- (2) Position insert strip on deflector blade and argon arc tack weld without filler metal.
- (3) Tack and then weld the run-off tabs in position as shown in figure 403.
  - (a) Welding by argon arc.
  - (b) Class of weld : B 1.
  - (c) Filler metal : P 3024.
- (4) Weld insert strip according to chapter 70-35-10 and the following instructions.

NOTE : Build up weld to allow for later reworking of inserted strip and of weld bead.

- (a) Argon arc welding, successive runs.

NOTE : Alternate welding runs between one part of the deflector blade and another in order reduce deformations.

- (b) Class of weld : B 2.
- (c) Filler metal : P 3024.

78-13-01

REP 1-10-2

Page 402

Jun 15/82



OLYMPUS 593

MK.610-14-28

OVERHAUL



(5) Carry out a class B 2 type weld, check as specified in chapter 70-35-80 and as follows :

- (a) Visual check, binocular magnifier, x 9 magnification.
- (b) Check for crack detection by post emulsification fluorescent penetrant according to method M 504 B of chapter 70-20-10.
- (c) Radiographic check of weld bead according to chapter 70-20-30.

(6) Remove run-off tabs by grinding and deburr.

E. Heat treatment.

(1) Apply heat treatment to the deflector in this state as indicated in chapter 70-45-00 and by the following operations :

- (a) Tempering according to method M 807.
- (b) Tempering according to method M 808.

(2) Check heat treatment in the opening of the foot and around the insert strip mentioned in figure 403 and as specified in chapter 70-45-80.

Hardness should be : BHN from 300 to 385 after heat treatments.

F. Reforming

- (1) Check flatness of deflector blade, as indicated in figure 404.
- (2) Reform if necessary.

G. Machining of blade.

- (1) Remove the build up of material from the insert strip as shown in figure 404.
  - (a) Level the weld seam to the level of the sides of the deflector blade.
  - (b) Level off the build up from insert strip.



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (2) Machine the leading edge of the blade as indicated in figure 404 and according to chapter 70-55-00.

- (a) Radiusing of blade angles.
- (b) Chamfering of leading edges.
  - 1 Rough machine by milling.
  - 2 Finish by grinding.

- (c) Radiusing of corners of leading edge.

#### H. Heat treatment.

- (1) Apply a stress relieving treatment to the deflector as specified in method M 808, chapter 70-45-10.

NOTE : Soak time : 4 hours.

- (2) Check heat treatment in the opening in the foot in accordance with chapter 70-45-80.

Hardness should be : BHN from 300 to 385.

#### I. Dimensional check of parts.

- (1) Mount the part on the test apparatus SC 318 as shown in figure 405 and indicated in the following instructions :

- (a) Rest the surface "B" of the blade on the studs.
- (b) Rest surface "A" of footing against the two feelers.

NOTE : The two feelers represent the generating line produced by the intersection of planes "A" and "B".

- (c) Rest the part against the stop.
  - (d) Immobilise the deflector in this position by means of the three clamps.
- (2) Check the dimensions of the deflector as shown in figure 405 and indicated in the following instructions :

78-13-01

REP 1-10-2

Page 404

Jun 15/82



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (a) Check outline of the blade as shown in figure 405 sheet 1 using standard 3 mm (0.118 in.) shims at the points marked \*.
- (b) Check the footing by checking surface "A" using the templates and standard 3 mm (0.118 in.) shims according to figure 405 sheet 2.

1 When the 3 mm (0.118 in.) shim is in position between the template and the lug, the clearance between the template and the footing must be between 0,15 and 0,60 mm (0.0060 to 0.024 in.).

- (c) Check blade positioning with a micrometric comparator as shown in figure 405 sheet 2 and according to the following procedure :

1 Zero comparator at standard.

2 Check position of the blade on the whole length by moving comparator along the slide.

NOTE : Thickness of the blade in the area checked : 5,33 mm (0.2100 in.).

#### J. Reworking.

- (1) If necessary, reform the deflector footing in a press, taking into account the flatness of surface "B" of the blade.

- (2) Check the reshaping as indicated in I.

#### K. Polishing.

- (1) Polish the 2 sides of the blade along the full length of the post as shown in figure 406 and according to the following conditions :

(a) Rough with emery cloth P 547, grade 80, and then grade 180.

(b) Finish with paste P 266.

NOTE : Roughness : 1,6 Ra (0.063).





OLYMPUS 593

MK.610-14-28

OVERHAUL



L. Peening.

- (1) Apply a steel ball peening operation to all sides of the deflector, except for surface "A" of the footing and the opening, according to method M 312 C of chapter 70-15-30 and the following information :

(a) Steel ball peening, steel shot 315 (S 62).

(b) Intensity : F 15A à F 23A.

M. Installation.

- (1) Replace the cover on the deflector as specified in REP 1-10-1 of this chapter.

N. Marking.

- (1) Following the part number mark "REP 2", according to method M 28 of chapter 70-10-20.

NOTE : Neutralise electrolyte action as quickly as possible.

78-13-01

REP 1-10-2

Page 406

Jun 15/82



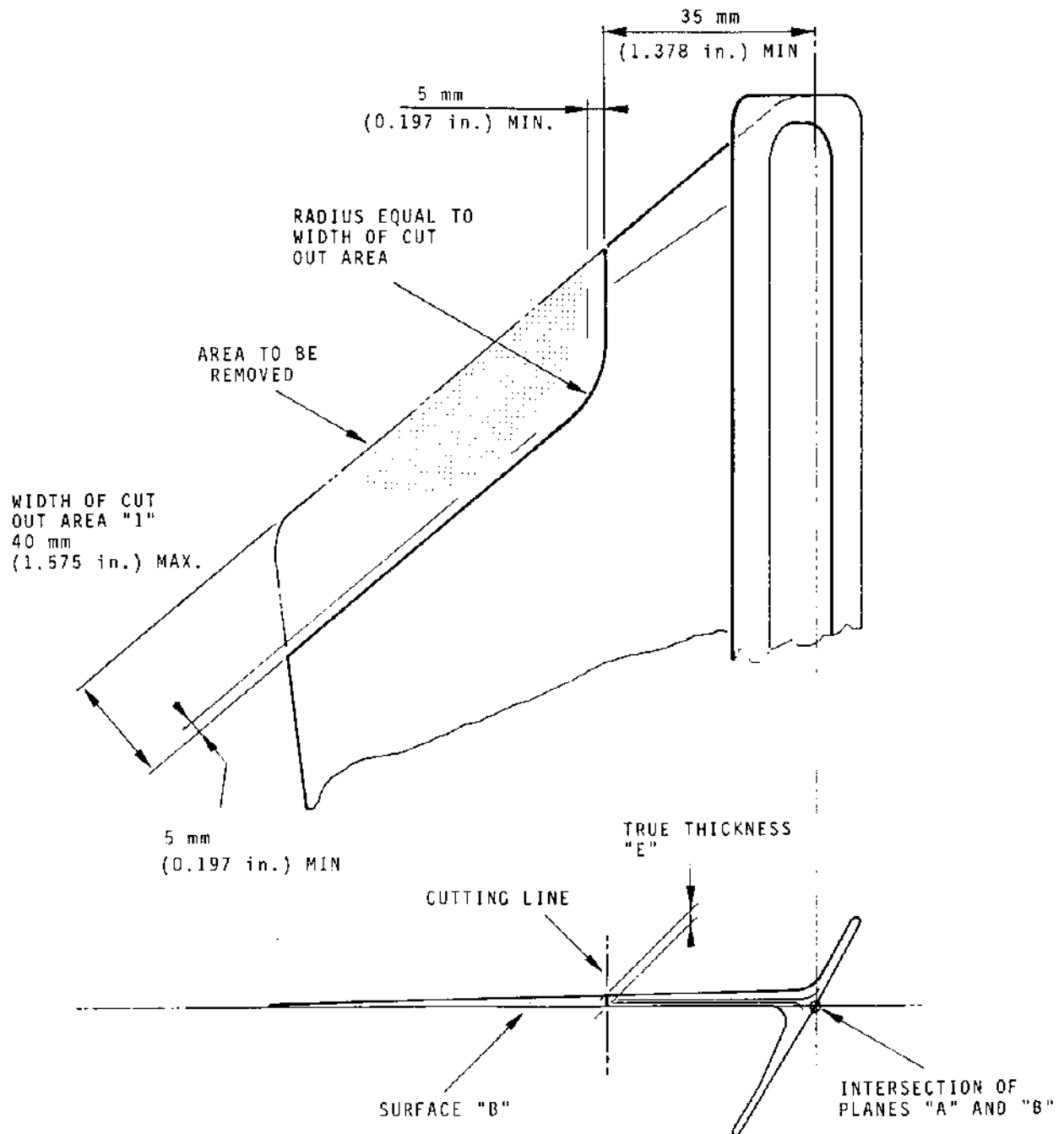
OLYMPUS 593

MK.610-14-28

OVERHAUL



BASIC DEFLECTOR 1-10 SHOWN  
BASIC DEFLECTOR 1-200 SHOWN



Cutting Away Zone to be Repaired  
Figure 401

78-13-01

REP 1-10-2

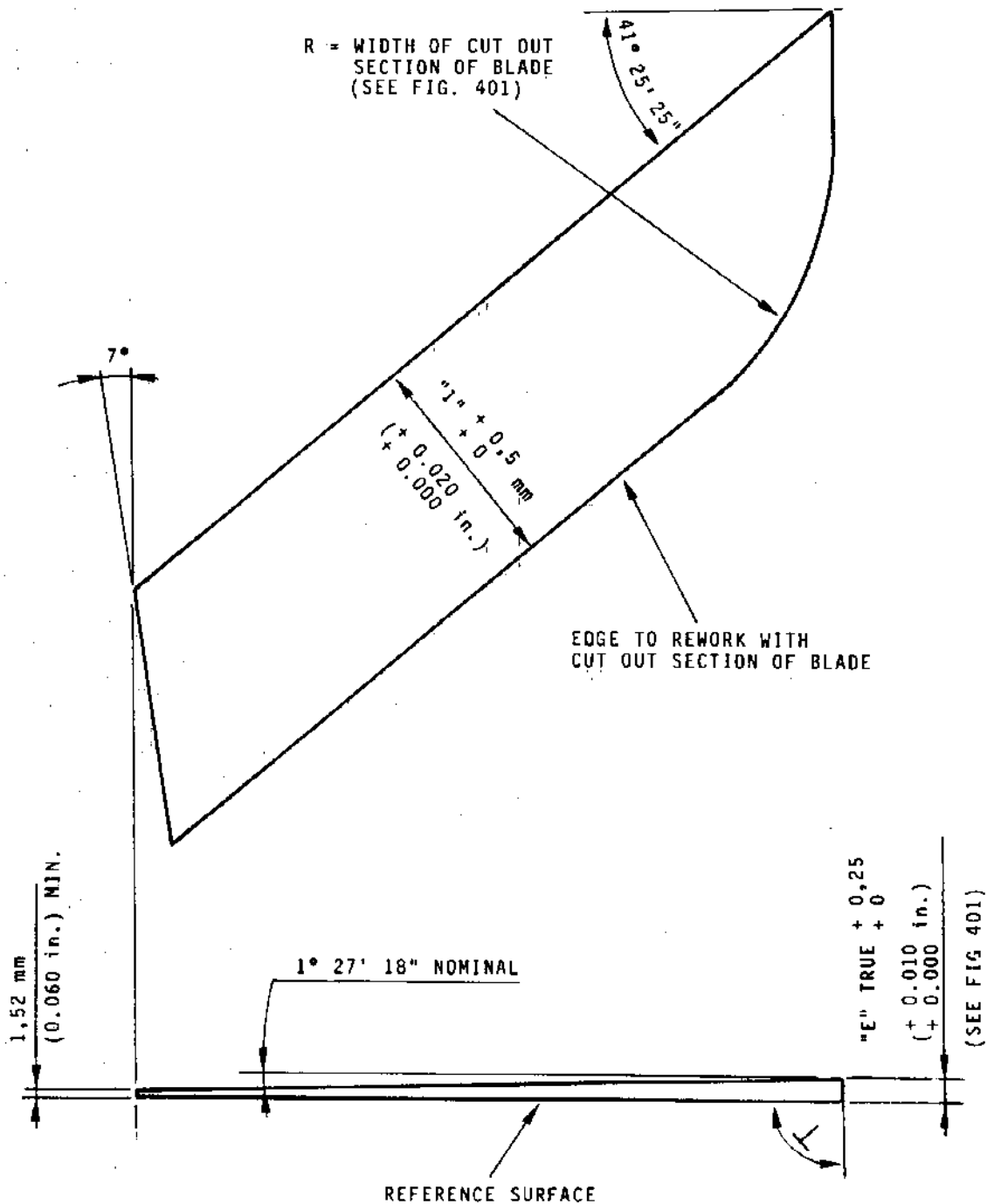
Page 407

Jun 15/82



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Making of the Insert Strip  
Figure 402

78-13-01

REP 1-10-2

Page 408

Jun 15/82



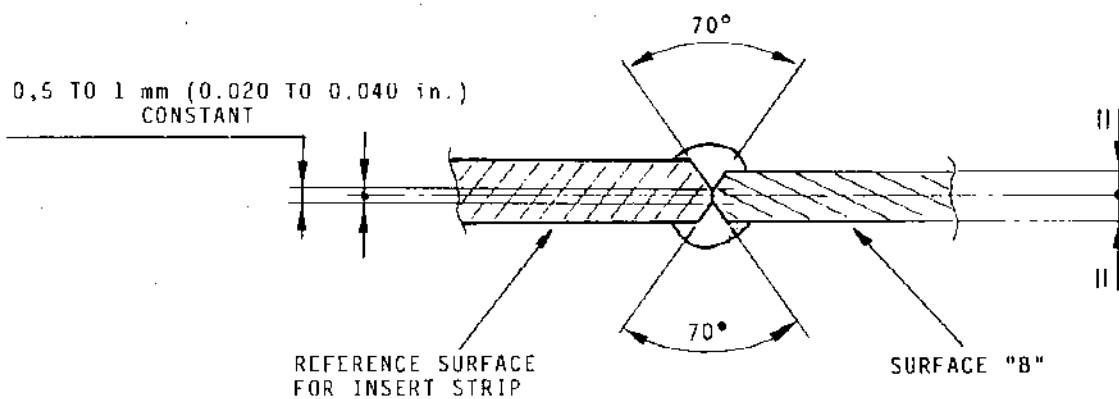
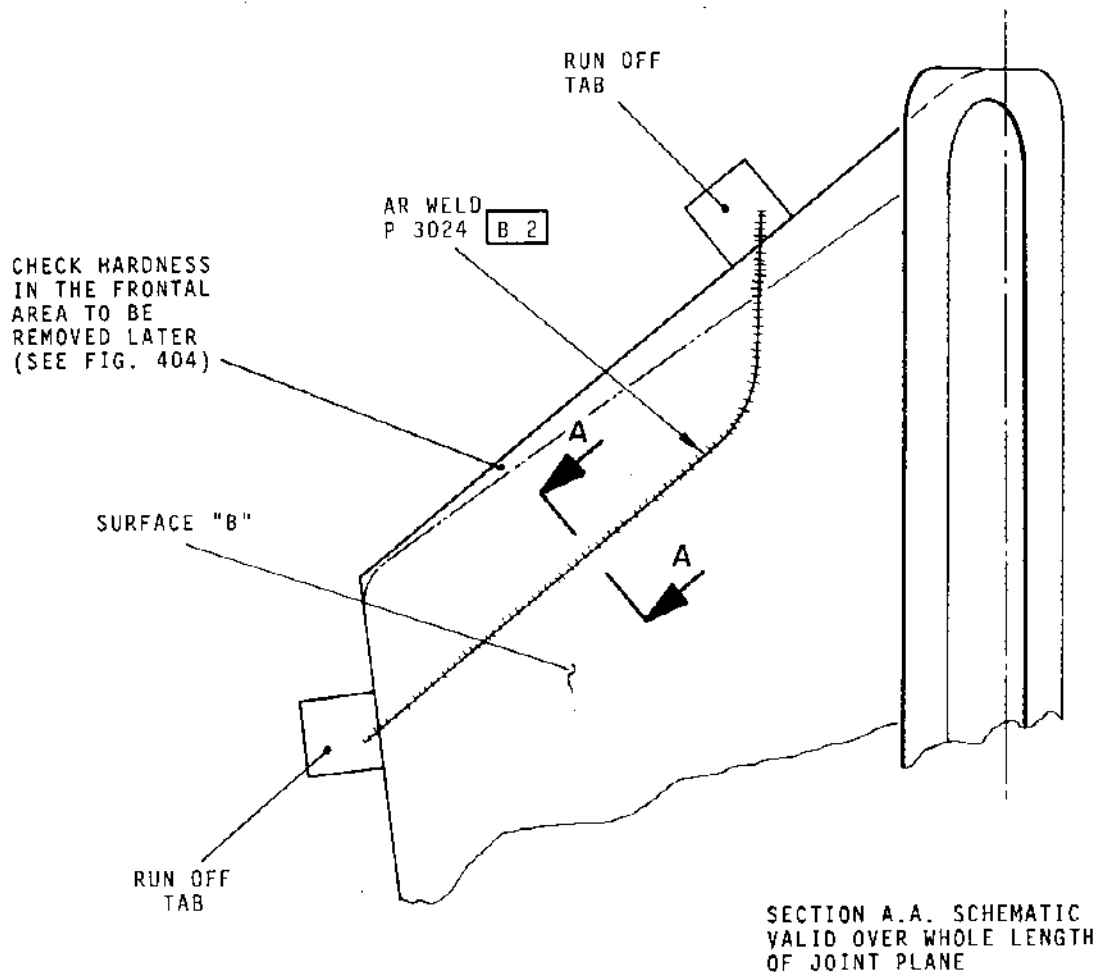
OLYMPUS 593

MK.610-14-28

OVERHAUL



AREA TO CHECK FOR  
HARDNESS IN THE OPENING  
IN THE FOOTING



Installation of Insert Strip  
Figure 403

78-13-01

REP 1-10-2

Page 409

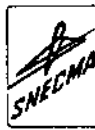
Jun 15/82



OLYMPUS 593

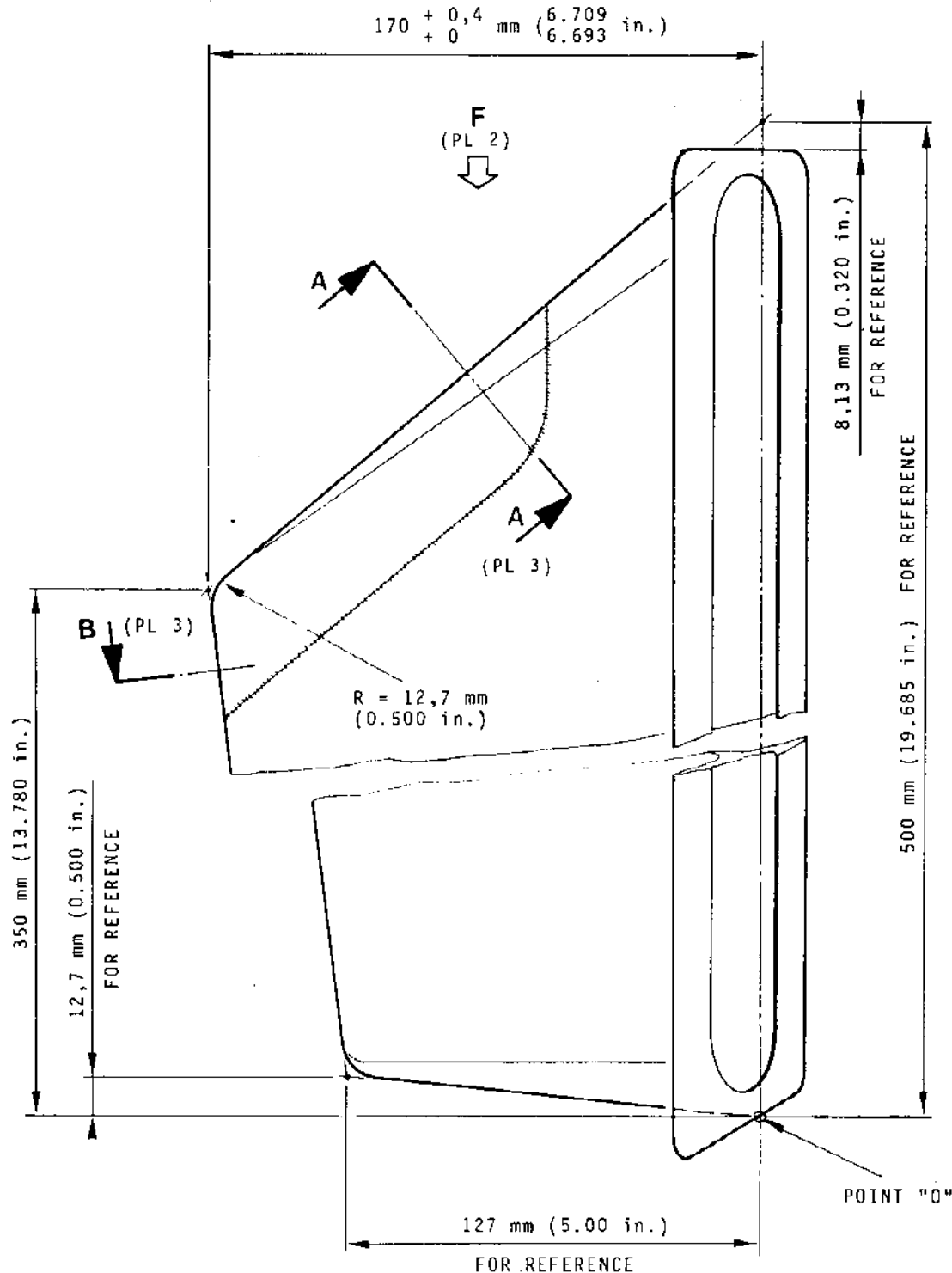
MK.610-14-28

OVERHAUL



DEFLECTOR 1-10 SHOWN  
DEFLECTOR 1-200 SYMMETRICAL

ROUGHNESS : 3,2 [0.126]



Machining of Deflector Blade  
Figure 404 (Sheet 1 of 3)

78-13-01

REP 1-10-2

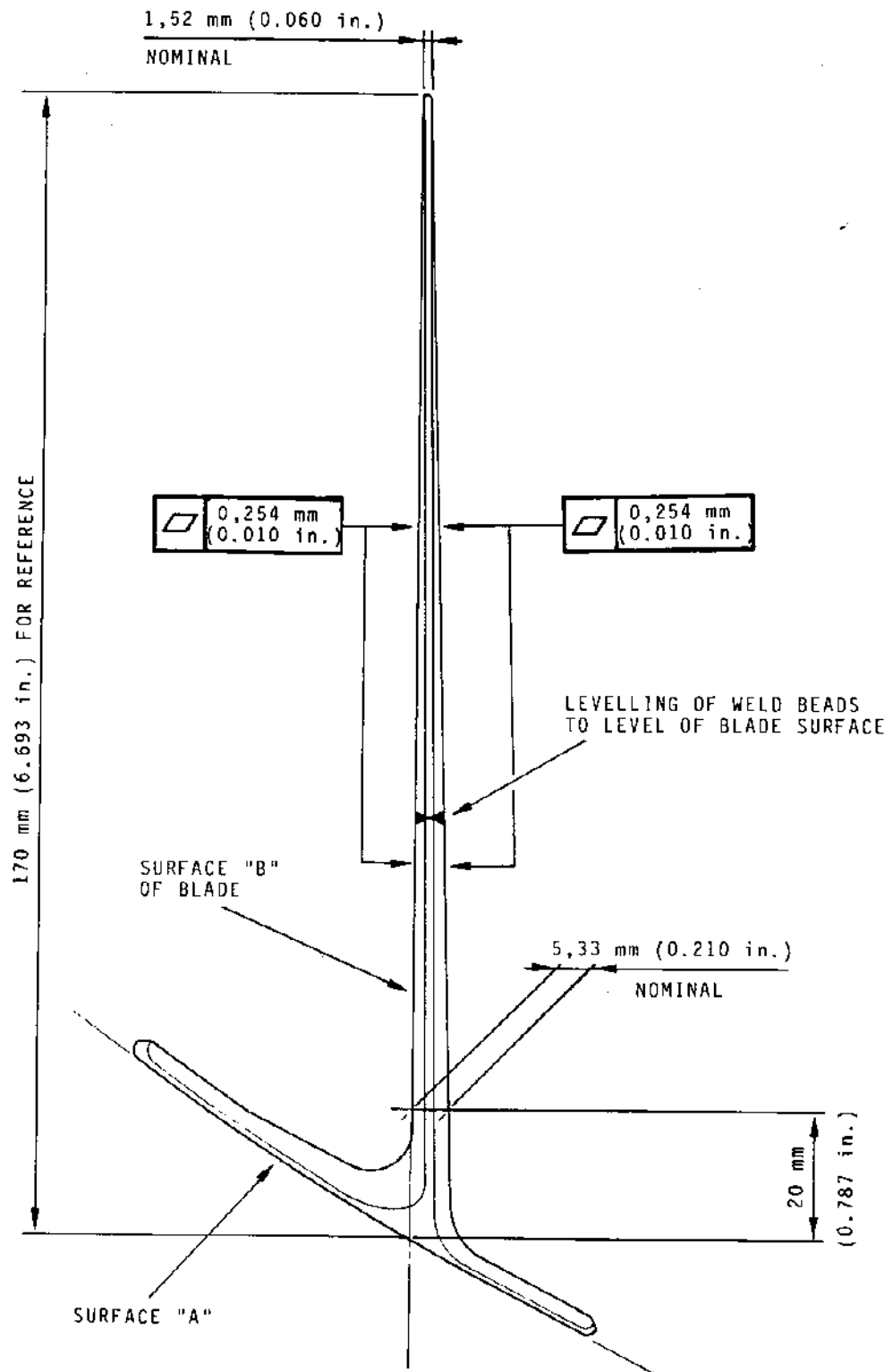
Page 410

Jun 15/82



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Machining of Deflector Blade  
Figure 404 (Sheet 2 of 3)

78-13-01

REP 1-10-2

Page 411

Jun 15/82



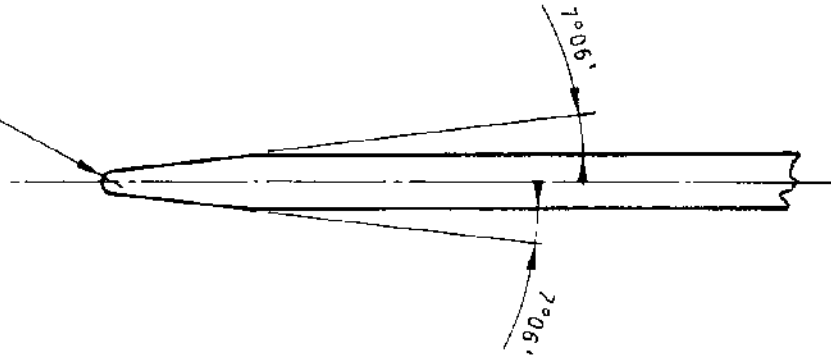
OLYMPUS 593

MK.610-14-28  
OVERHAUL



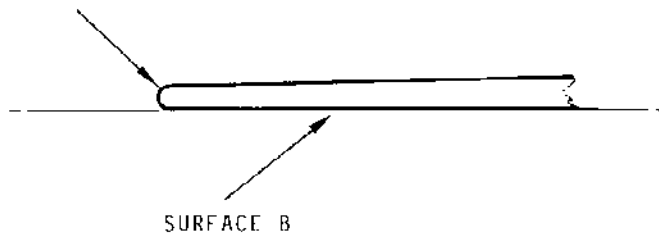
SECTION A.A

R = 0,76 mm  
(0.030 in.)  
CONSTANT ON  
LEADING EDGE



SECTION B.B

ROUND CORNERS A  
R = 0,76 mm (0.030 in.)  
BY DRAW FILING



Machining of Deflector Blade  
Figure 404 (Sheet 3 of 3)

78-13-01

REP 1-10-2

Page 412

Jun 15/82

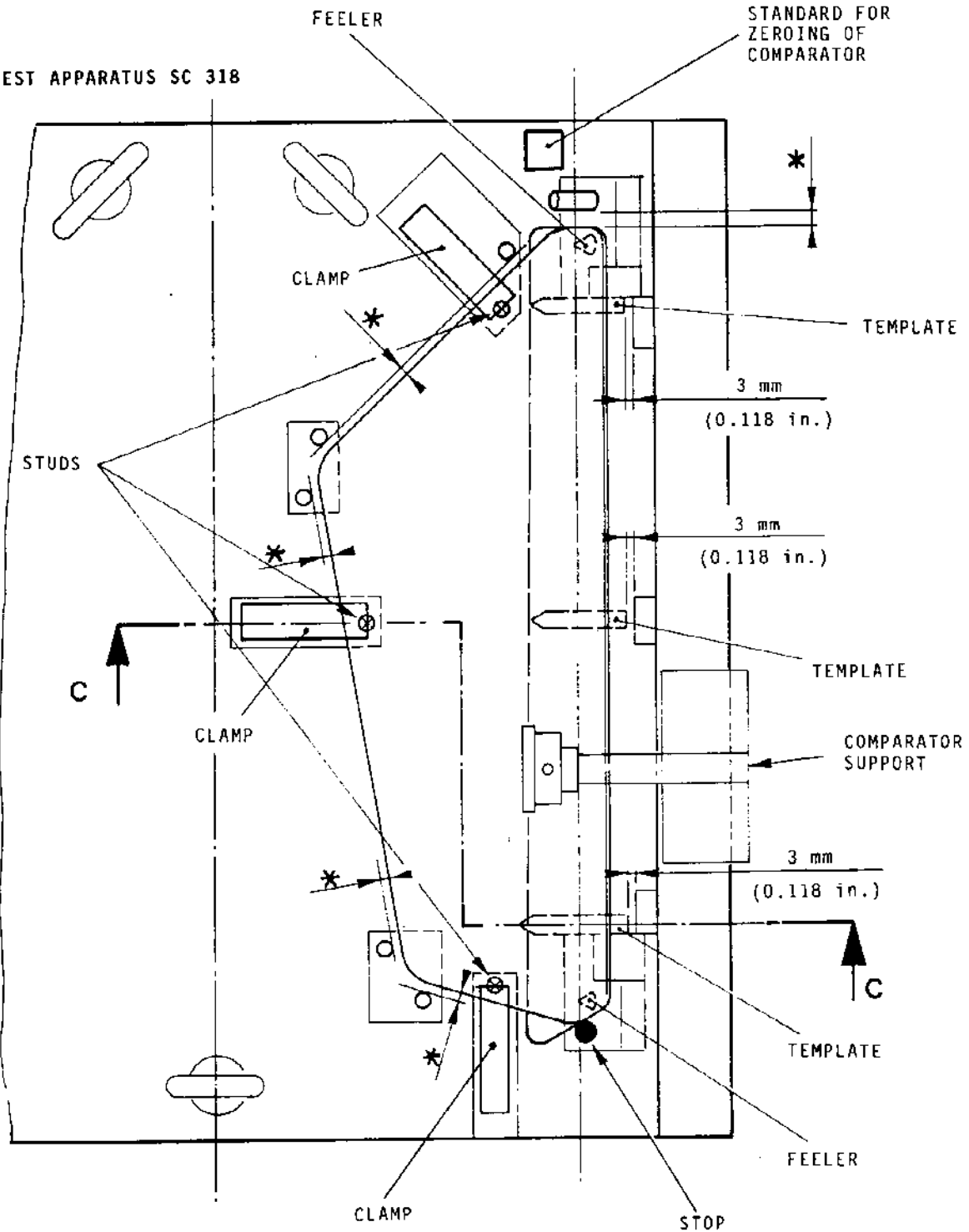


OLYMPUS 593

MK.610-14-28  
OVERHAUL



TEST APPARATUS SC 318



NOTE : DIMENSIONS MARKED \* : 3 mm (0.118 in.) NOMINAL

Dimensional Check of Deflector  
Figure 405 (Sheet 1 of 2)

78-13-01

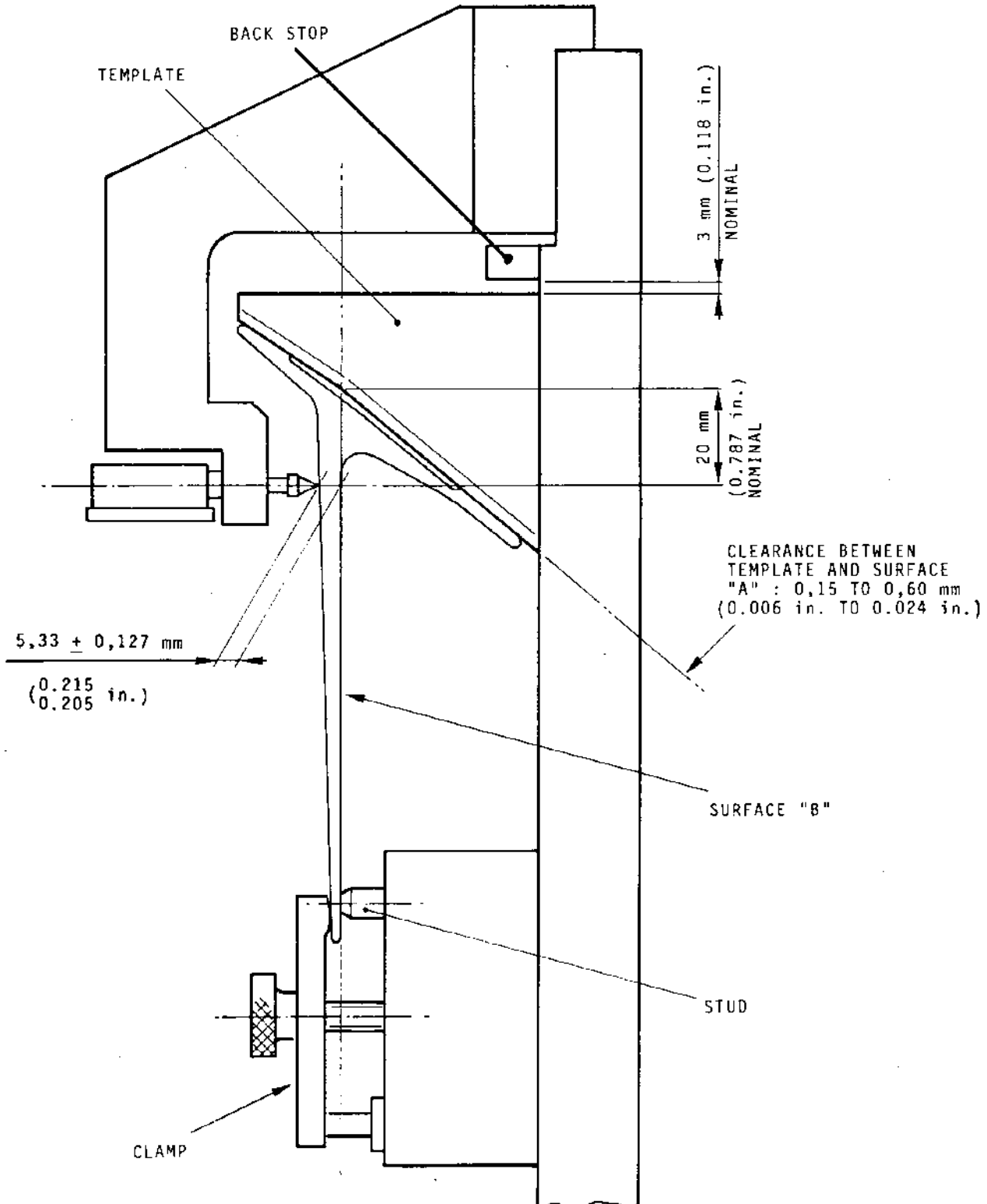
REP 1-10-2  
Page 413  
Jun 15/82





OLYMPUS 593

MK.610-14-28  
OVERHAUL



Dimensional Check of Deflector  
Figure 405 (Sheet 2 of 2)

78-13-01

REP 1-10-2

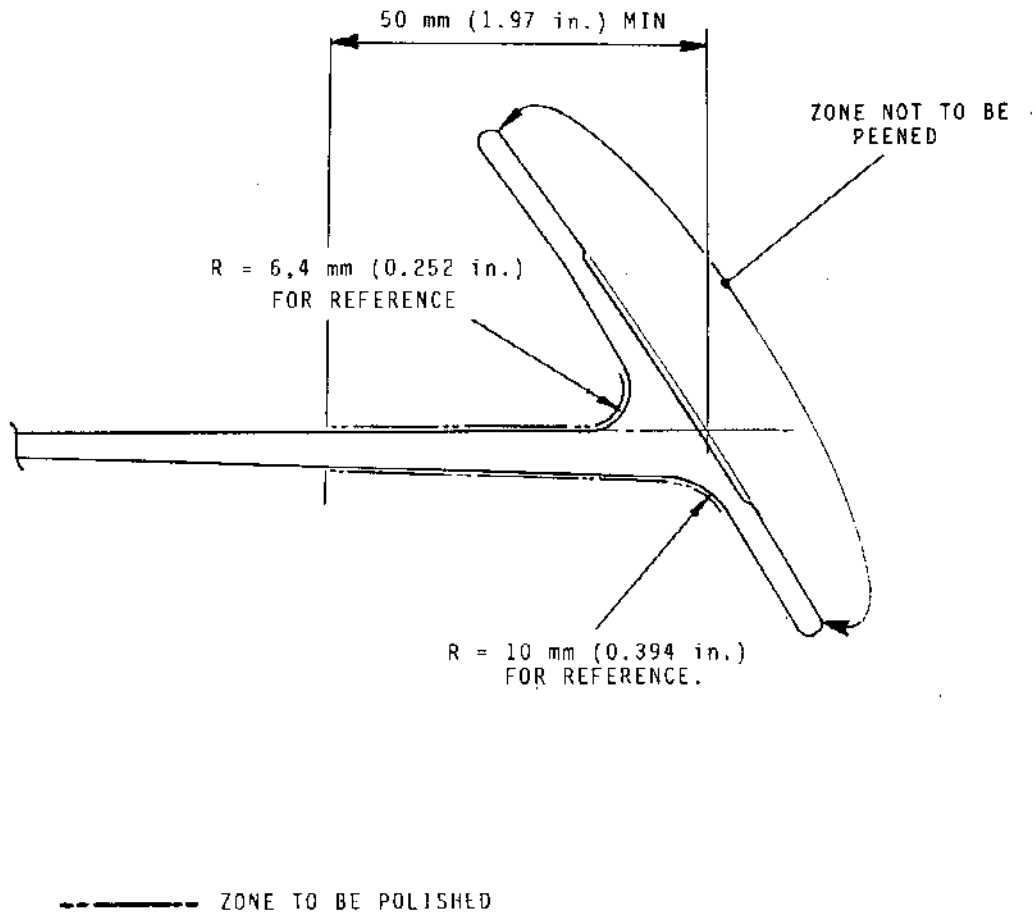
Page 414

Jun 15/82



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Polishing and Peening of Deflector Blade  
Figure 406

78-13-01

REP 1-10-2  
Pages 415/416  
Jun 15/82



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

ACCESS DOORS (3-10/150/170/190/330/331/350/351/370/371 and  
4-10/30/31/50/51/70/71/100/101).

2. Renewing the stiffener

---

PARTS REQUIRED FOR REPAIR

---

Stiffener 301-060-700-0 and 301-066-100-0

Screw HL 869-5-12 (649-781-035-0)

Self-locking nut HLN 1-G-5 (649-785-047-0)

CAUTION : THIS REPAIR SCHEME IS APPLICABLE TO THE ACCESS DOORS  
3-330/331 and 4-10 ONLY.

- A. Remove the damaged stiffener and install a new one as indicated on figure 401.

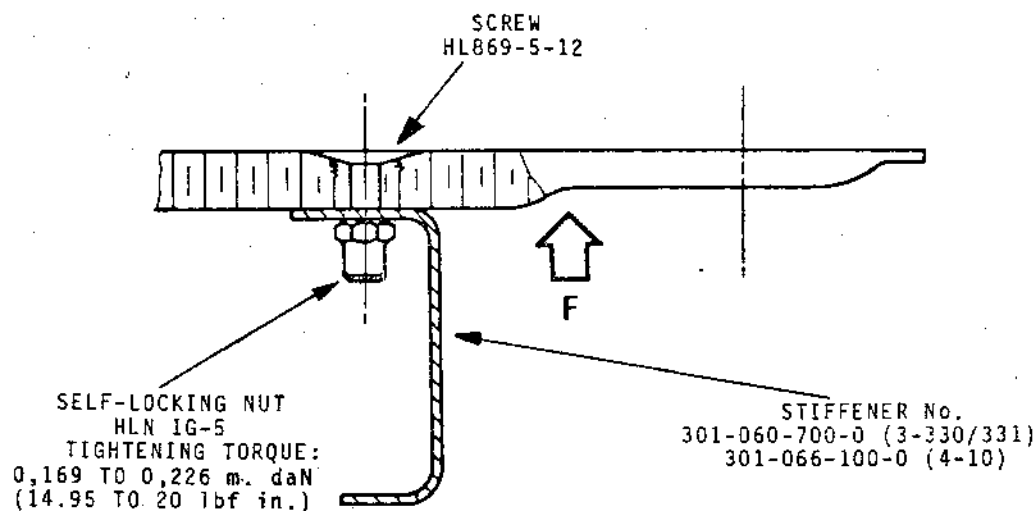


OLYMPUS 593

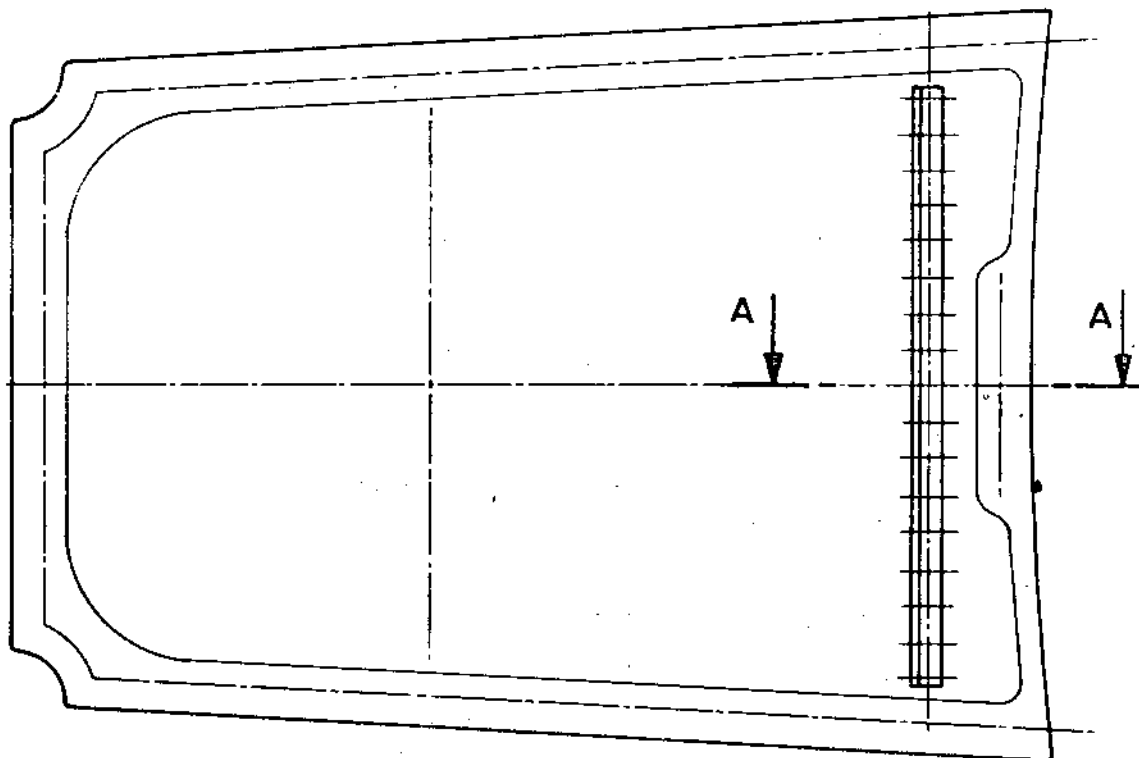
MK.610-14-28  
OVERHAUL



SECTION A-A



F



Renewing the Stiffener  
Figure 401

78-13-01

REP 3-10-2

Page 402

May 31/76

PRINTED IN FRANCE



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

ACCESS DOORS (3-10B/150B/170B/190B/330C/331C/350C/351C/370C/371C  
and 4-10C/30B/31B/50B/51B/70D/71D/100D/101D.

3. Renewing the Inserts

---

PARTS REQUIRED FOR REPAIR

---

Insert	No. 302-007-900-0
Insert	No. 302-063-500-0
Insert	No. 302-063-600-0
Insert	No. 649-773-190-0
Insert	No. 649-773-249-0
Insert	No. 649-773-256-0
Ring, crimping	No. 302-063-900-0
Ring, crimping	No. 649-773-248-0
Ring, crimping	No. 649-773-257-0
Filler welding wire	P 3008 (Z8 CND 15)
Hollow rod material	P3621 (NC22FeD) for bushes

---

A. Removing the Damaged Insert

- (1) Remove the insert by grinding out or drilling the crimping as shown on Figure 401.

CAUTION : TAKE CARE TO PROTECT THE STRESSKIN PANEL  
TO AVOID ANY DETERIORATION OR BURNING AS  
A RESULT OF THE GRINDING OPERATION.

**78-13-01**

REP 3-10-3

Page 401

Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL

## B. Preparing the Components

- (1) Depending on the type of insert to be renewed, produce a bush as indicated on figure 402.
- (2) Rework the inserts and the crimping rings as indicated on figure 403.

## C. Fitting the Bushes

- (1) Perpendicular to the tangent plane of the door, ream the hole which accommodate the bush as indicated in figure 404.
  - (a) The hole location is determined using a drilling template as specified on figure 407.
  - (b) The drilling operation is carried out by means of a pilot-end milling cutter as instructed in the Standard Practices, chapter 70-30-10 and on figure 404.
- (2) After machining, visually check for cracks perpendicular to the hole, using a binocular with a tenfold magnifying power.

No crack is permissible. If any crack is found, set the part aside pending a repair scheme to come.

- (3) Fit the bush as follows :
  - (a) Locate the bush, making sure that it is perpendicular to the access door outer contour.
  - (b) Tackweld in position then, argon arc weld the bush to the access door as instructed in the Standard Practices Manual, chapters 70-30-10 and 70-35-10 and in figure 404.

1 Filler welding wire P3008

2 Class of weld B1

**78-13-01**

REP 3-10-3

Page 402

Jan 31/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



NOTE : The panel shall be argon-purged for one (1) hour prior to the welding operation. When welding, protect the panel all around the bush by means of copper heat-sink (heat removing) blocks.

(c) Test the weld, class B1, for soundness as instructed in the Standard Practices Manual, chapter 70-35-80.

1 Inspect locally, using the water-washable dye penetrant process M 501 B in chapter 70-20-10.

(d) Grind the welds flush with the adjacent contour and machine the bushes as indicated in figure 404, sheet 2.

(e) Chamfer and deburr the bushes.

#### D. Fitting the Inserts

(1) Install the inserts as shown in figures 405 and 406.

(2) Crimp the inserts using the tool SC 253 and as shown in figure 405, sheet 2.

#### E. Inspection

(1) Ensure that the insert does not work around in its recess.

(2) Check that the inserts fully contact the panel and inspect the crimping as indicated in figure 408.



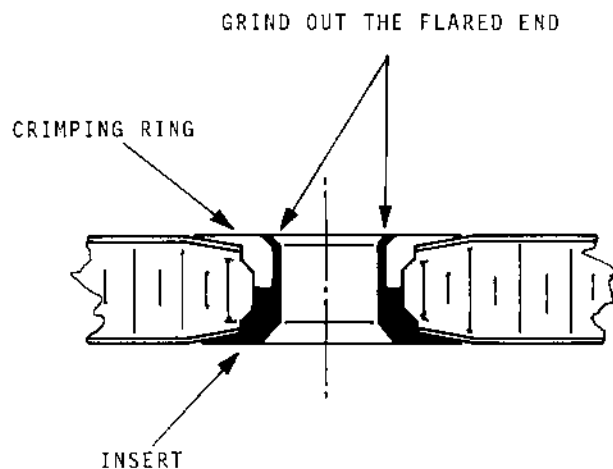
OLYMPUS 593

MK.610-14-28

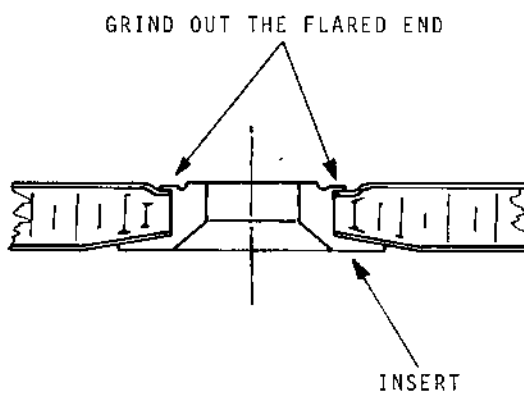
OVERHAUL



INSERT ATTACHMENT TYPE ● AND ⊕ AND ⊙



INSERT ATTACHMENT TYPE ○ AND ⊖ AND ⊗



Renewing the Inserts - Typical  
Figure 401

78-13-01

REP 3-10-3

Page 404

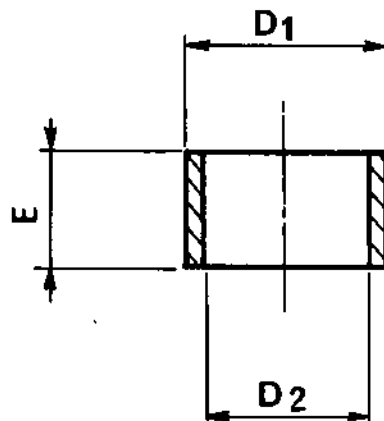
Jan 31/81





OLYMPUS 593

MK.610-14-28  
OVERHAUL



MATERIAL : P3621

SURFACE FINISH :  $6,3/\sqrt{250}$

SYMBOLS	D1 $\begin{matrix} + 0 \\ - 0,1 \end{matrix}$ $\begin{matrix} (+ 0.000) \\ (- 0.004) \end{matrix}$	D2 $\begin{matrix} + 0,05 \\ - 0 \end{matrix}$ $\begin{matrix} (+ 0.002) \\ (- 0.000) \end{matrix}$	E $\begin{matrix} + 0 \\ - 0,1 \end{matrix}$ $\begin{matrix} (+0.000) \\ (-0.004) \end{matrix}$
●	15 mm (0.591 in.)	13 mm (0.512 in.)	5,5 mm (0.217 in.)
⊕	13 mm (0.512 in.)	11,05 mm (0.435 in.)	5,5 mm (0.217 in.)
⊗	13 mm (0.512 in.)	10,26 mm (0.404 in.)	3,2 mm (0.126 in.)
◐	25 mm (0.984 in.)	23,10 mm (0.909 in.)	3,2 mm (0.126 in.)
○	15 mm (0.591 in.)	13 mm (0.512 in.)	3,2 mm (0.126 in.)
◑	13 mm (0.512 in.)	11,05 mm (0.435 in.)	5,5 mm (0.217 in.)

Machining the Bushes  
Figure 402

78-31-01

REP 3-10-3

Page 405

Jan 31/81



# OLYMPUS 593

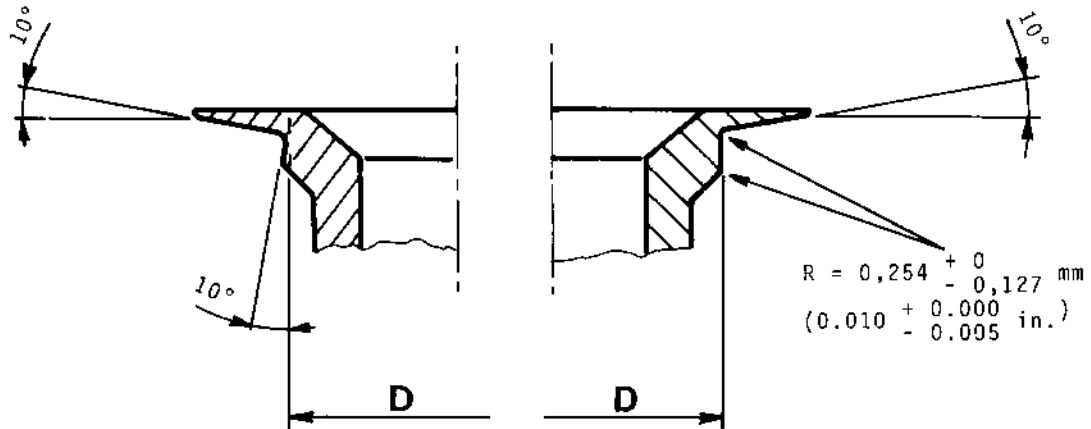
MK. 610-14-28

OVERHAUL



BEFORE REWORK

AFTER REWORK



INSERT CRIMPING RING	SYMBOLS	$D + 0$ $- 0,05$	$\left( D = + 0.000 \right.$ $\left. - 0.002 \text{ in.} \right)$
No. 649-773-256-0	⊕	11,05 mm	(0.435 in.)
No. 649-773-257-0			
No. 649-773-249-0	●	11,05 mm	(0.435 in.)
No. 649-773-248-0			

Reworking the Inserts and the Crimping Rings  
Figure 403

## 78-13-01

REP 3-10-3

Page 406

Jan 31/81

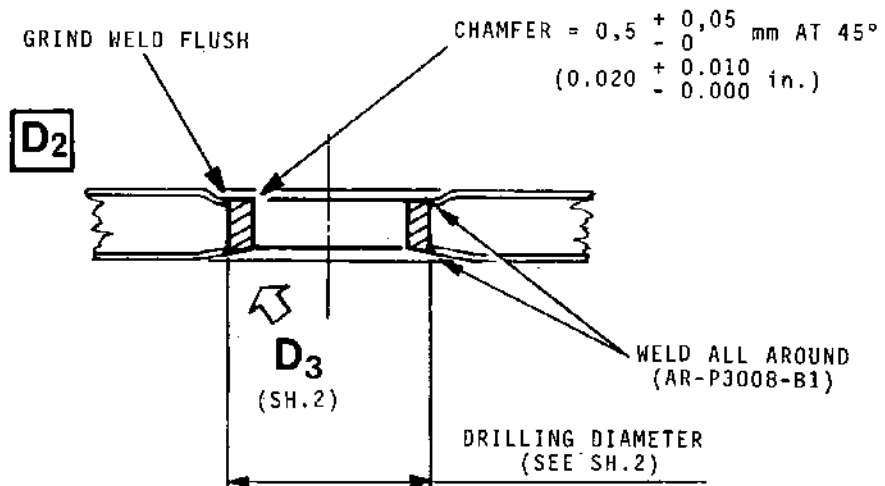
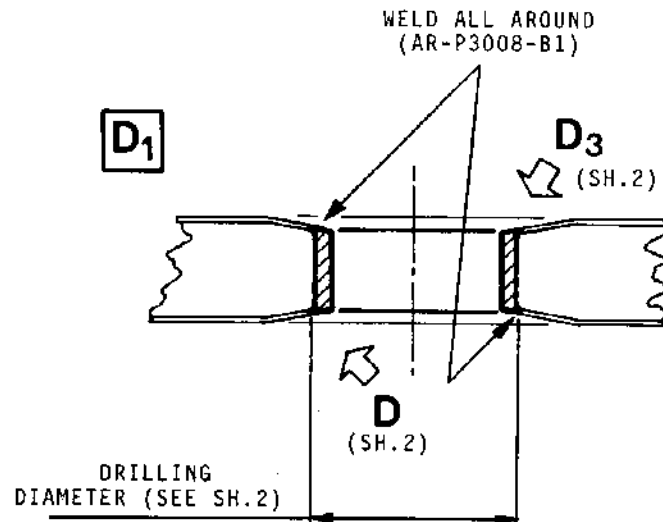
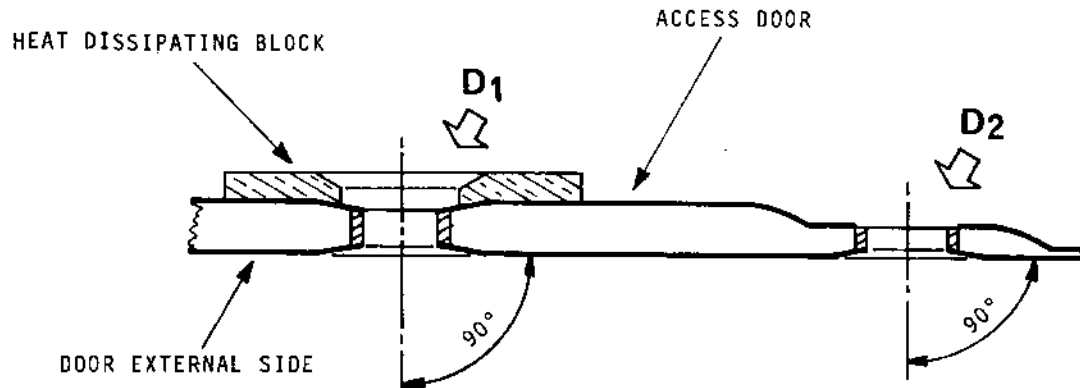


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE



Fitting the Bushes  
Figure 404 (Sheet 1 of 2)

78-13-01

REP 3-10-3

Page 407

Jan 31/81



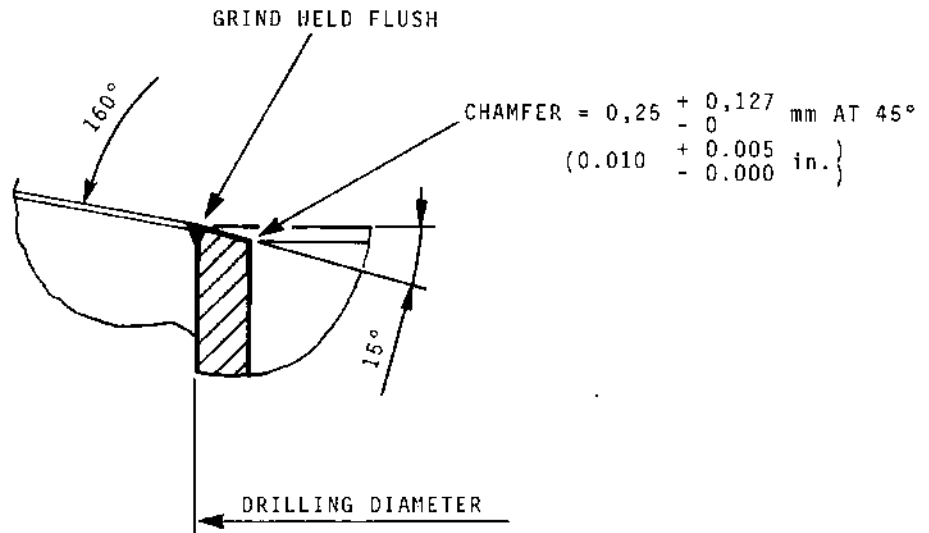
OLYMPUS 593

MK.610-14-28  
OVERHAUL



**D<sub>3</sub>**

FOR THE DIMPLINGS ONLY



SYMBOLS	DRILLING DIAMETER	
	D = + 0,1 (D = + 0.004) - 0 (D = - 0.000)	
●	15 mm	( 0.591 in.)
⊕	13 mm	( 0.512 in.)
◐	13 mm	( 0.512 in.)
◑	25 mm	( 0.984 in.)
○	15 mm	( 0.591 in.)
◒	13 mm	( 0.512 in.)

Fitting the Bushes  
Figure 404 (Sheet 2 of 2)

**78-13-01**

REF 3-10-3  
Page 400  
Jan 31/81

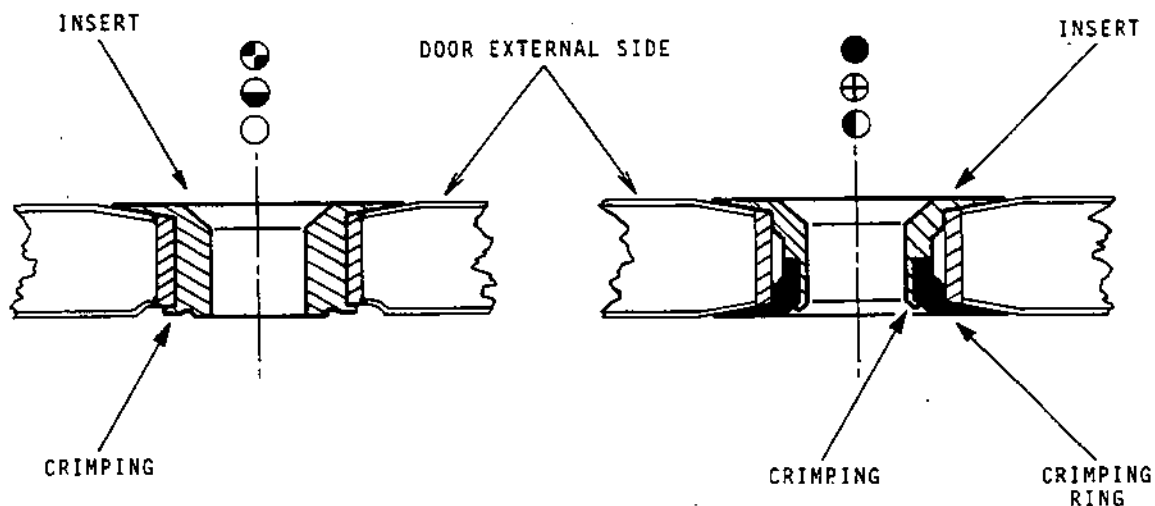


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE



SYMBOLS	ITEMS	
●	INSERT	No. 302-063-600-0
	CRIMPING RING	No. 302-063-900-0
⊕	INSERT	No. 649-773-256-0
	CRIMPING RING	No. 649-773-257-0
◐	INSERT	No. 649-773-190-0
◑	INSERT	No. 302-007-900-0
○	INSERT	No. 302-063-500-0
◒	INSERT	No. 649-773-249-0
	CRIMPING RING	No. 649-773-248-0

Fitting the Inserts  
Figure 405 (Sheet 1 of 2)

78-13-01

REP 3-10-3

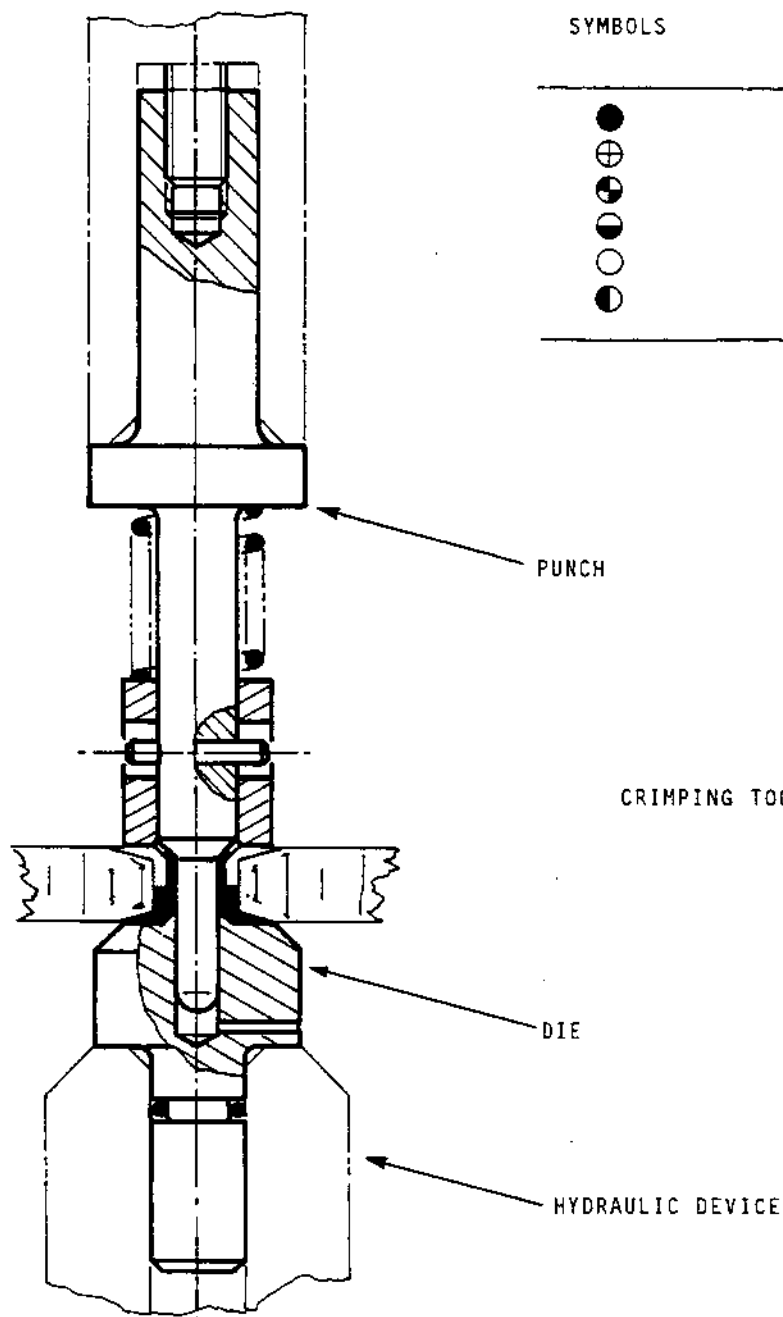
Page 409

Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



SYMBOLS	TOOL DETAILS	
	PUNCH	DIE
●	18	21
⊕	7	15
◐	2	2
◑	16	19
○	17	21
◒	15	2

Fitting the Inserts  
Figure 405 (Sheet 2 of 2)

78-13-01

REP 3-10-3

Page 410

Apr 30/93



OLYMPUS 593

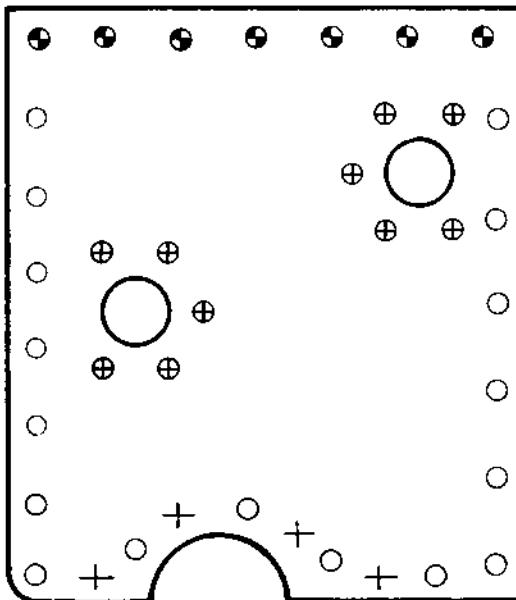
MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE

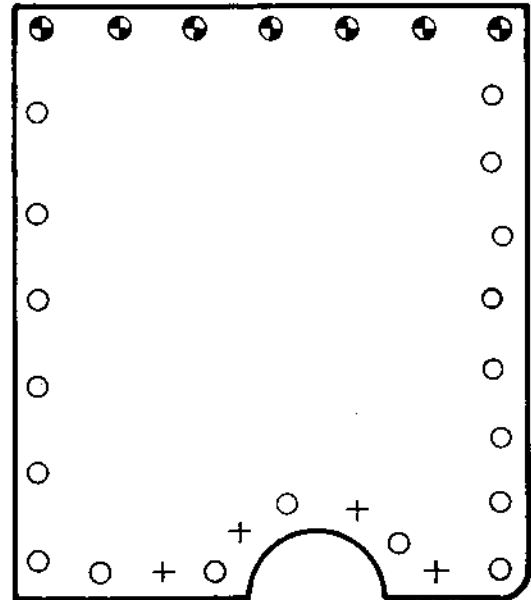
ACCESS DOORS

3-10 VARIANT B AS SHOWN  
3-190 VARIANT B SYMMETRICAL



ACCESS DOORS

3-170 VARIANT B AS SHOWN  
3-150 VARIANT B SYMMETRICAL



+ : INSERTS PLUGGED AS PER S.B.593-78-28220-16

Renewing the Inserts  
Figure 406 (Sheet 1 of 5)

**78-13-01**

REF 3-10-3

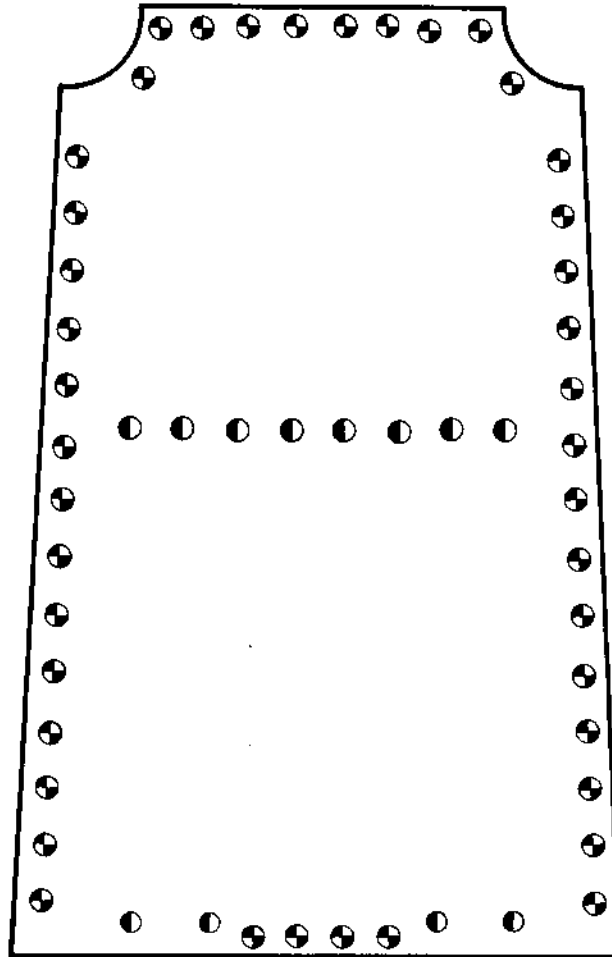
Page 411

Jan 31/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



ACCESS DOOR

3-330 VARIANT C AS SHOWN  
3-331 VARIANT C SYMMETRICAL

Renewing the Inserts  
Figure 406 (Sheet 2 of 5)

**78-13-01**

REP 3-10-3

Page 412

Jan 31/81



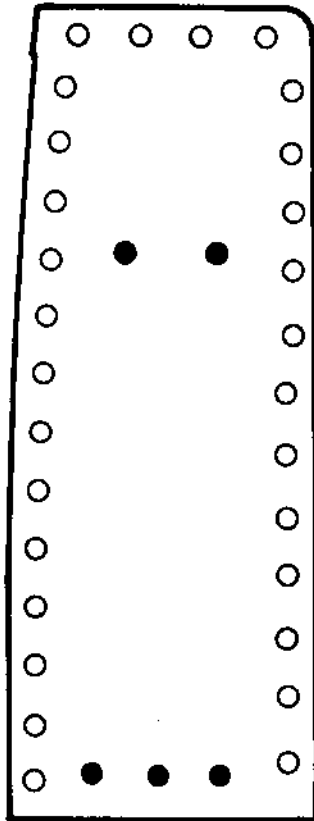


OLYMPUS 593

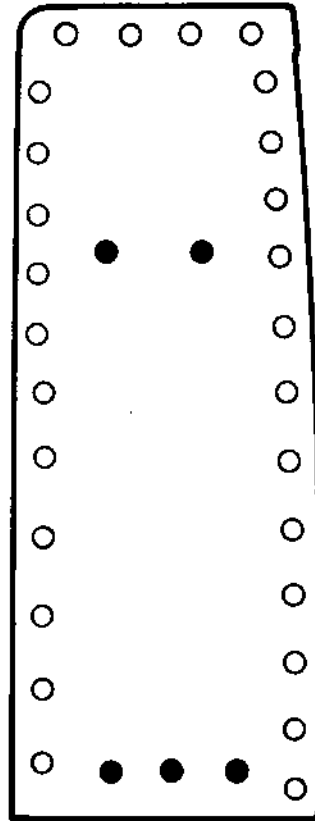
MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE



ACCESS DOOR  
3-350 VARIANT C AS SHOWN  
3-351 VARIANT C SYMMETRICAL



ACCESS DOOR  
3-370 VARIANT C AS SHOWN  
3-371 VARIANT C SYMMETRICAL

Renewing the Inserts  
Figure 406 (Sheet 3 of 5)

**78-13-01**

REP 3-10-3

Page 413

Jan 31/81

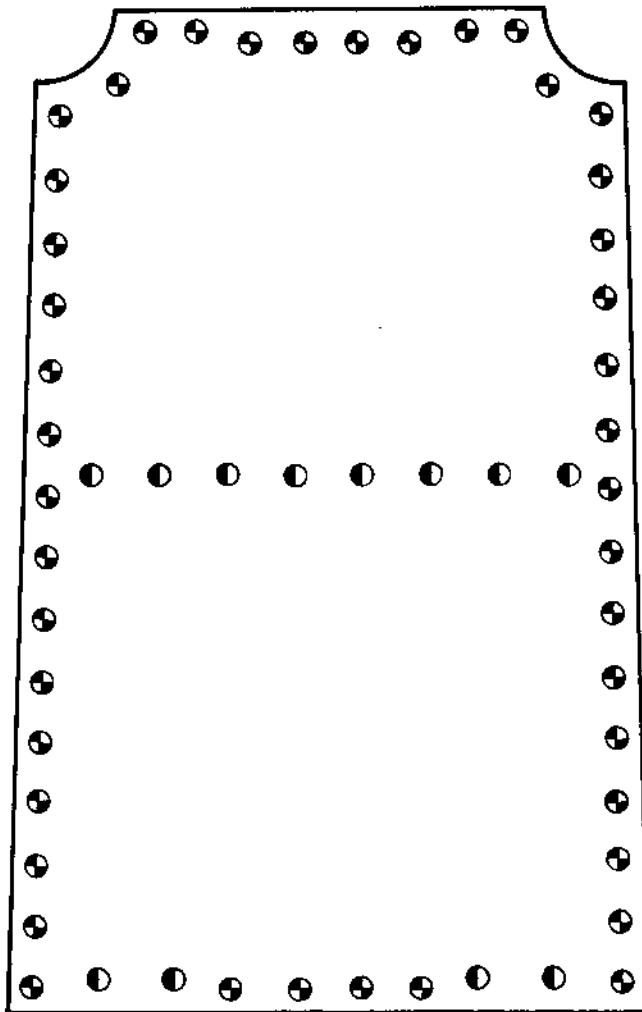


OLYMPUS 593

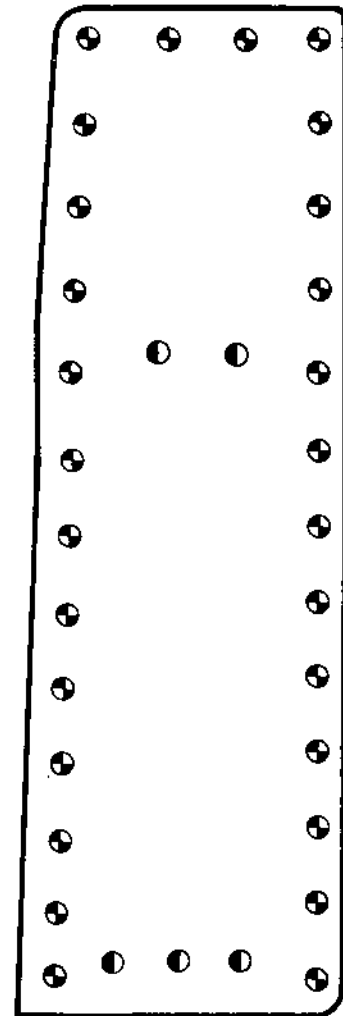
MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE



ACCESS DOOR 4-10  
VARIANT C



ACCESS DOOR  
4-30 VARIANT B AS SHOWN  
4-31 VARIANT B SYMMETRICAL  
4-50 VARIANT B AS SHOWN  
4-41 VARIANT B SYMMETRICAL

Renewing the Inserts  
Figure 406 (Sheet 4 of 5)

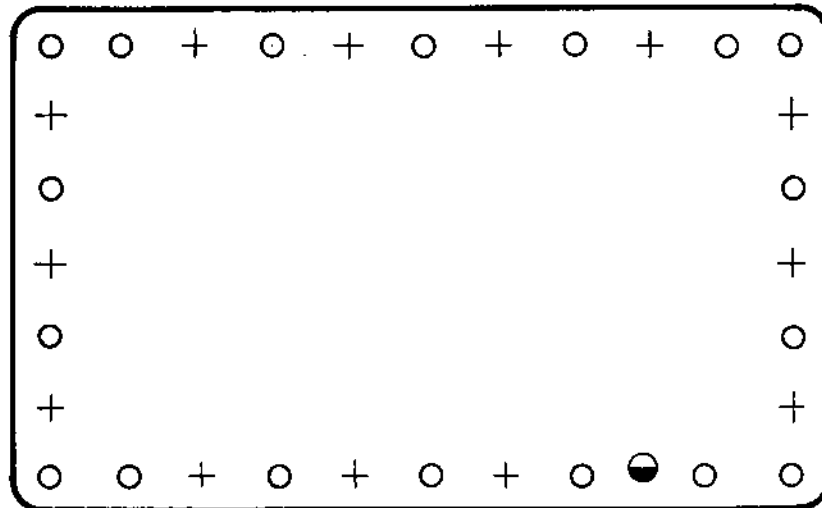
78-13-01

REF 3-10-3

Page 414

Jan 31/81

: INSERTS PLUGGED AS PER S.B.593-78-32



ACCESS DOORS:

4-70 VARIANT D AS SHOWN  
4-71 VARIANT D SYMMETRICAL  
4-101 VARIANT D AS SHOWN  
4-100 VARIANT D SYMMETRICAL

Renewing the Inserts  
Figure 406 (Sheet 5 of 5)

**78-13-01**

REP 3-10-3

Page 415

Jan 31/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN FRANCE

ACCESS DOORS	TEMPLATES	ACCESS DOORS	TEMPLATES
3-10	SC 219	4-10	SC 229
3-150	SC 220	4-30/51	SC 230
3-170	SC 221	4-31/50	SC 231
3-190	SC 222	4-70/101	SC 232
3-330	SC 223	4-71/100	SC 233
3-331	SC 224		
3-350	SC 225		
3-351	SC 226		
3-370	SC 227		
3-371	SC 228		

Identification of the Drilling Templates  
Figure 407

78-13-01

REP 3-10-3

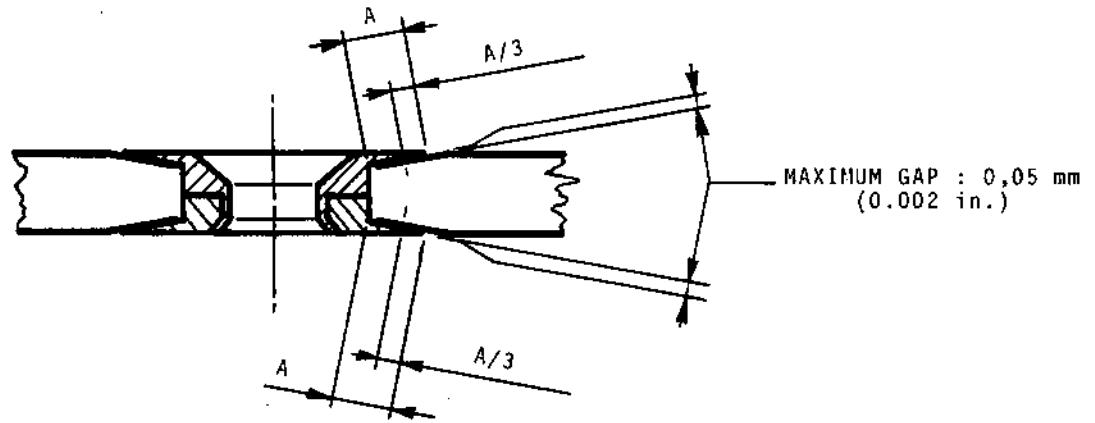
Page 416

Jan 31/81

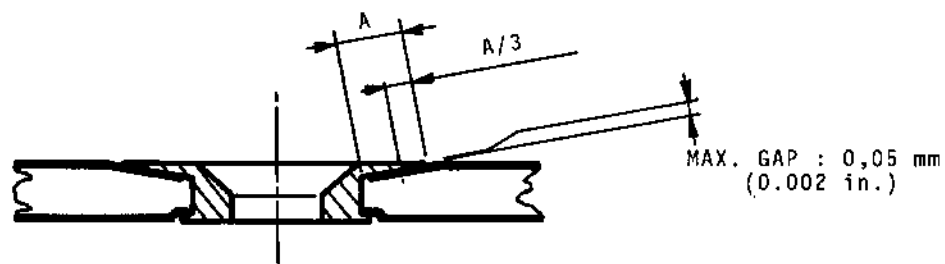


OLYMPUS 593

MK.610-14-28  
OVERHAUL



MAXIMUM GAP ALL AROUND INSERT AND  
CRIMPING RING OVER A LENGTH OF A/3



Inspecting the Installed Inserts  
Figure 408 (Sheet 1 of 2)

78-13-01

REF 3-10-3

Page 417

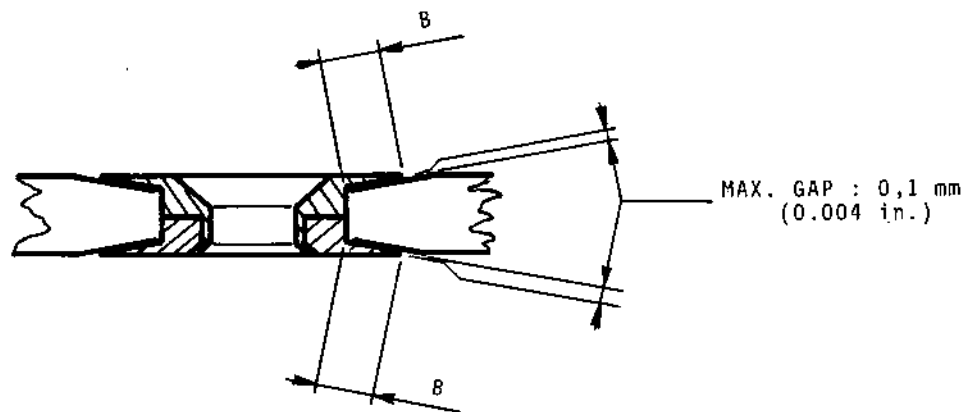
Jan 31/81



OLYMPUS 593

MK.610-14-28

OVERHAUL

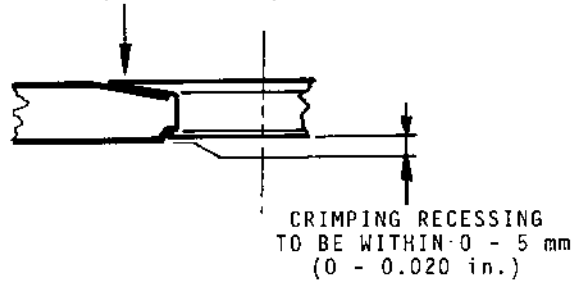


0,10 mm (0.004 in.) MAX. GAP OVER THE FULL LENGTH B

- OVER 30 % MAX. OF INSERT PERIPHERY
- FOR 10 % MAX. OF INSERTS COMPRISING ONE ATTACHMENT ROW
- UNACCEPTABLE IF MAX. GAP IS FOUND ON TWO ADJACENT INSERTS.

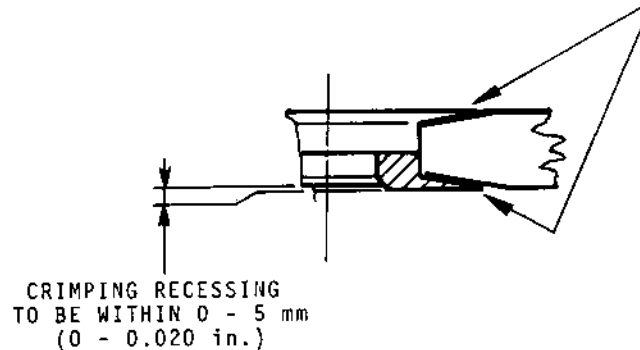
OUT-OF FLUSH TOLERANCES

+ 0,10 mm (+ 0.004 in.)  
- 0,25 mm (- 0.010 in.)



OUT-OF-FLUSH TOLERANCES

+ 0,10 mm (+ 0.004 in.)  
- 0,25 mm (- 0.010 in.)



Inspecting the Installed Inserts  
Figure 408 (Sheet 2 of 2)

78-13-01

REF 3-10-3

Page 418

Jan 31/81

## REPAIR

ACCESS DOORS (3-10/170/330/350/370)  
(4-10/30/50/70/100)

#### 4. Reconditioning the Access Doors Consecutively to Various Damage

## PARTS REQUIRED FOR REPAIR

CAF 4 Silicone elastomer (P 474)  
Bar material P 3601 (Z6 NCT 25 sv)  
Filler welding wire P 3008 (Z8 CND 15)  
or P 3030 (ND 24 FeC)  
Screw HI-LOCK HL 144-5-11 (649-781-443-0)  
HL 869-5-12 (649-781-035-0)  
Self-locking nut HI-LOCK HLN1G5 (649-785-047-0)  
Spacer No. 002-003-992-1  
Washer No. 649-786-229-0

## A. Introduction

In this repair scheme, three cases are considered :

- (1) Crack repair in accordance with para. B.
- (2) Repair of impacts (nicks/dents) in accordance with para. C.
- (3) Repair of delaminations in accordance with para. D.

### B. Crack repair

- (1) Restrictions on repair.
  - (a) The crack must not lie in a delaminated zone. Perform an aural check (tap coin test) to ensure there is no delamination.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(2) Repair instructions

- (a) Using a X 20 power binocular eye-piece, accurately demarcate the crack then, stop-drill both ends of crack by a 2,5 mm (0.098 in.) dia. hole.
- (b) Argon arc weld fill the crack as prescribed in chapter 70-30-10 "PRINCIPLES FOR REPAIRING COMPONENTS MANUFACTURED FROM WELDED HONEYCOMB MATERIAL" and 70-35-10 "WELDING BY FUSION" (Ref. Fig. 401).

Filler welding wire P 3008 or P 3030  
Weld class B1

NOTE : During the welding operation, it is essential that copper heat-sink blocks (cooling blocks) be placed as close as possible the zone being welded (Fig. 401).

(3) Inspection

Inspect the weld, class B1, as prescribed in chapter 70-35-80 "INSPECTION OF WELDS".

Locally check for cracks by the water-washable dye penetrant test, method M 501 B in chapter 70-20-10.

CAUTION : THE PENETRANT IS TO BE CLEARED OUT USING A CLOTH SOAKED WITH ISOPROPYL ALCOHOL (P 442).

C. Repair of impacts (nicks/dents)

(1) Restrictions on repairs

- (a) Using a X 20 power binocular eye-piece, check that impacts are free from cracks.
- (b) Tap coin test to ascertain there is no delamination within the area to be repaired.

(2) Repair instructions

- (a) Recondition the contour of access doors using silicone elastomer CAF 4 (P 474) adhering to the instructions of method M 701 described in chapter 70-31-20 "APPLICATION OF RESINS AND ELASTOMERS" and as instructed hereafter :

78-13-01

REP 3-10-4

Page 402

Sep 30/78





OLYMPUS 593

MK.610-14-28  
OVERHAUL



- 1 Prepare the repair area by sanding with an emery cloth.
- 2 Degrease the repair area using a cloth soaked with trichloroethylene (P 76A).

- (b) After polymerization of elastomer, smooth the surface discontinuities by sanding with emery cloth if necessary.

#### D. Repair of delaminations

##### (1) Restrictions on repairs

- (a) The delamination must not be combined with a crack or an impact.  
Check for cracks using X 20 power binocular eyepiece.
- (b) The shaded zones shown on figure 402 can not accommodate delamination restraining bolts.

##### (2) Repair instructions

- (a) Using a very fine grain abrasive paper, sand lightly the panel until the cell pattern shows up in the area under repair.
- (b) Mark the locations of stiffening points as specified in figure 402.
  - 1 When a delamination is adjacent to an angle piece or a fillet, mark the stiffening points in compliance with the conditions stated in figure 402.
  - 2 Where the stiffener zone is involved, remove the stiffener per REP 3-10-2.
- (c) Drill passage holes for HI-LOCK screws as instructed in chapter 70-50-40 "JOINTS MADE BY MEANS OF HI-LOCK FIXINGS".
- (d) Drill recess holes for spacers in the delamination zone as indicated in figure 402.

78-13-01

REP 3-10-4

Page 403

Apr 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (e) Measure and record the effective value of depth "E" for spacer recess holes in accordance with figure 402.
- (f) Machine spacers from bar P 3601 to the dimensions specified in figure 402.

NOTE : The value  $L = "E" - 0,2 \text{ mm (0.008 in.)}$  for the length of spacers is required to allow for a pre-stress condition upon the installation of HI-LOCK screws.

- (g) Install the spacers and hold them fast into their recess using bonding agent LOCTITE 307 (P 502).
- (h) Install the stiffening attachments as indicated in figure 402 and as instructed in chapter "RIVETING" section 70-50-40.

NOTE : When fitting the washer, the radiused face must contact the stressskin panel.

- (j) If it has been necessary to remove the stiffener to carry out the repair, re-install it as prescribed in REP 3-10-2.

(3) Inspection

Inspect the HI-LOCK screw fixings as instructed in chapter "RIVETING", section 70-50-84.

78-13-01

REP 3-10-4

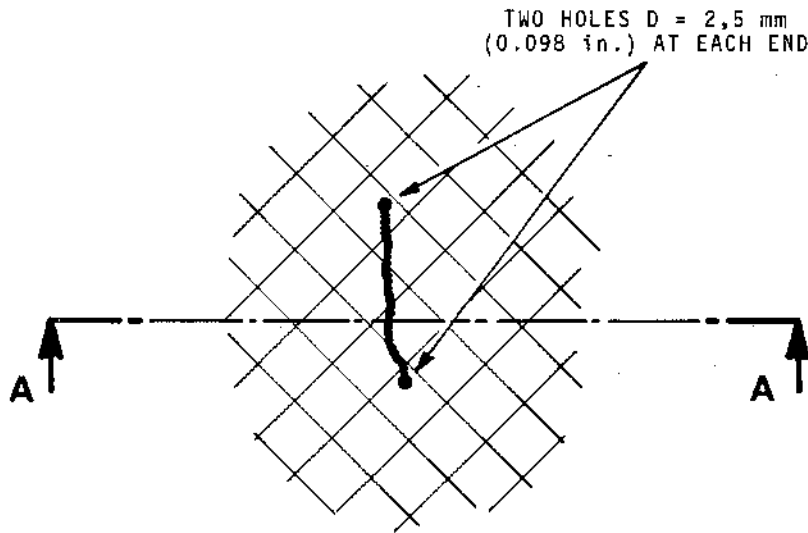
Page 404

Sep 30/78

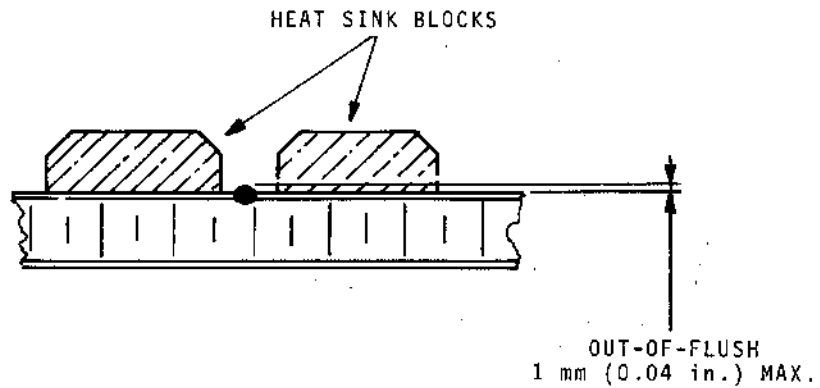


OLYMPUS 593

MK.610-14-28  
OVERHAUL



SECTION AA



Repairing the Cracks by Welding  
Figure 401 (Sheet 1 of 1)

78-13-01

REP 3-10-4

Page 405

Sep 30/78

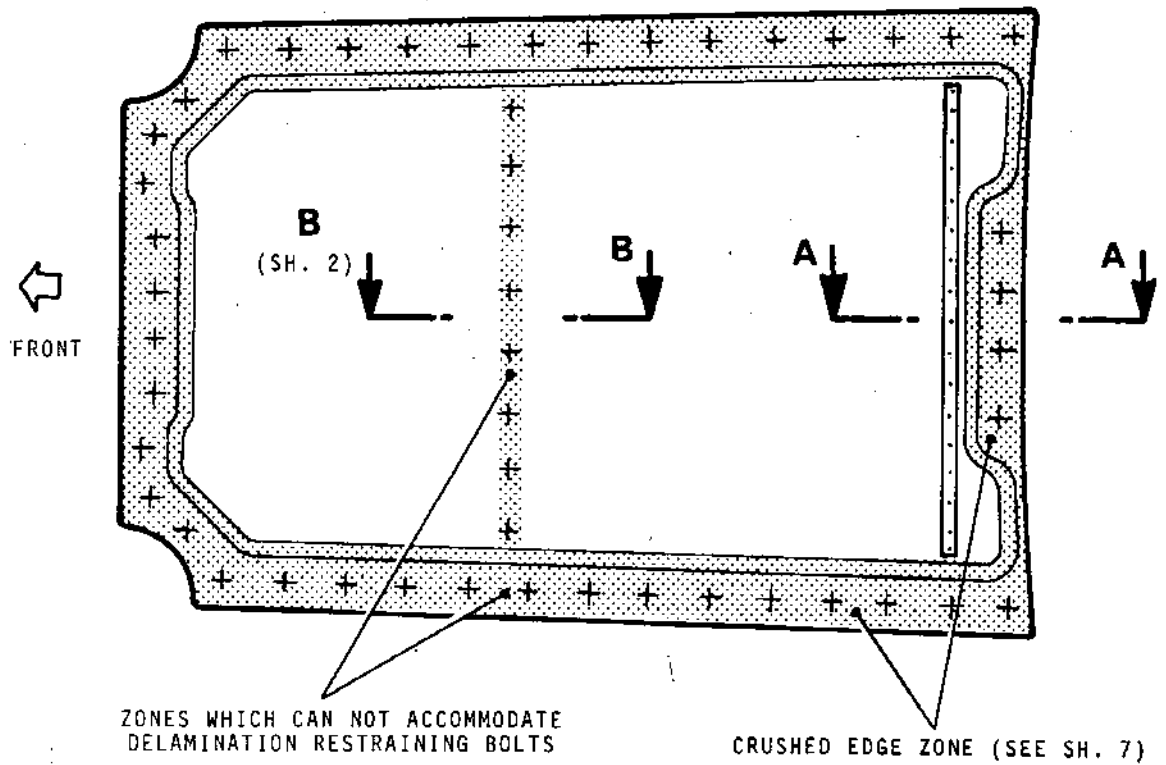


OLYMPUS 593

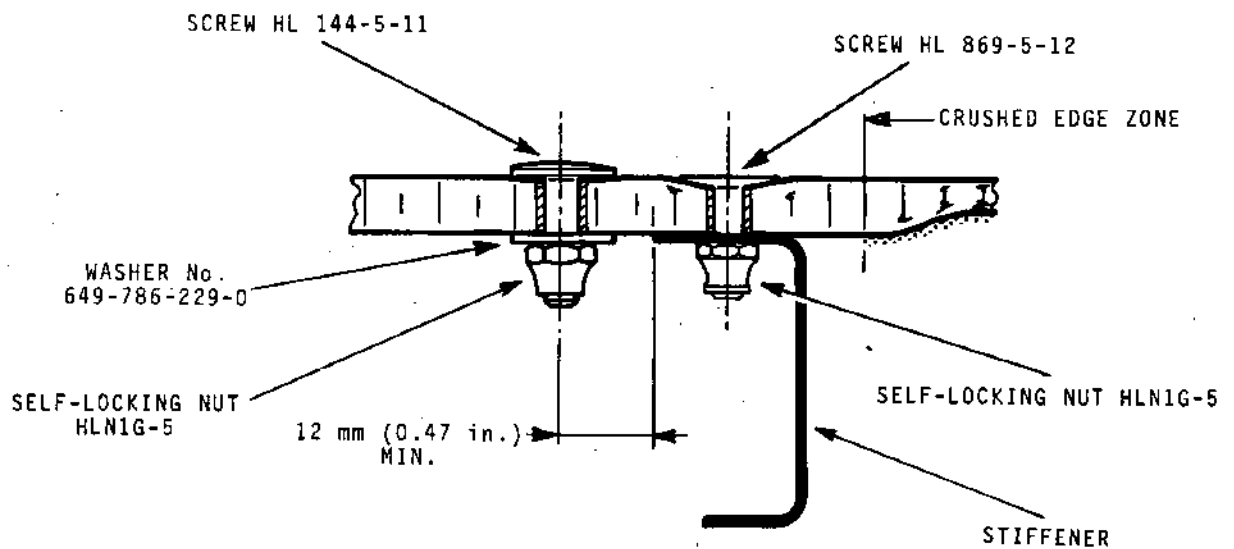
MK.610-14-28  
OVERHAUL



INNER SIDE VIEW OF CENTRAL DOOR



SECTION AA  
TYPICAL FOR DOORS  
3-330, 331 AND 4-10



Repairing the Delaminations  
Figure 402 (Sheet 1 of 7)

78-13-01

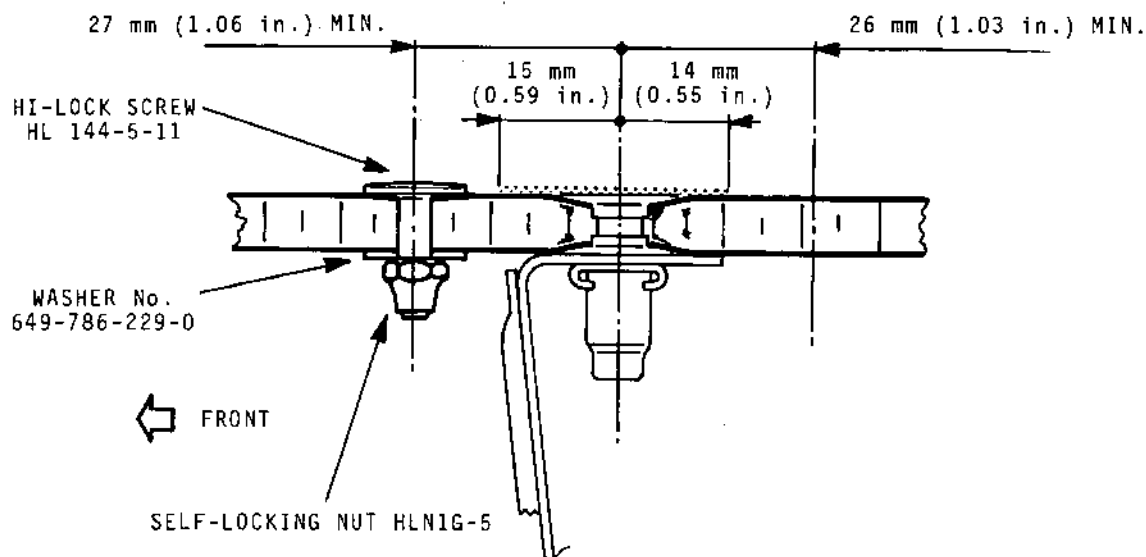
REP 3-10-4

Page 406

Sep 30/78

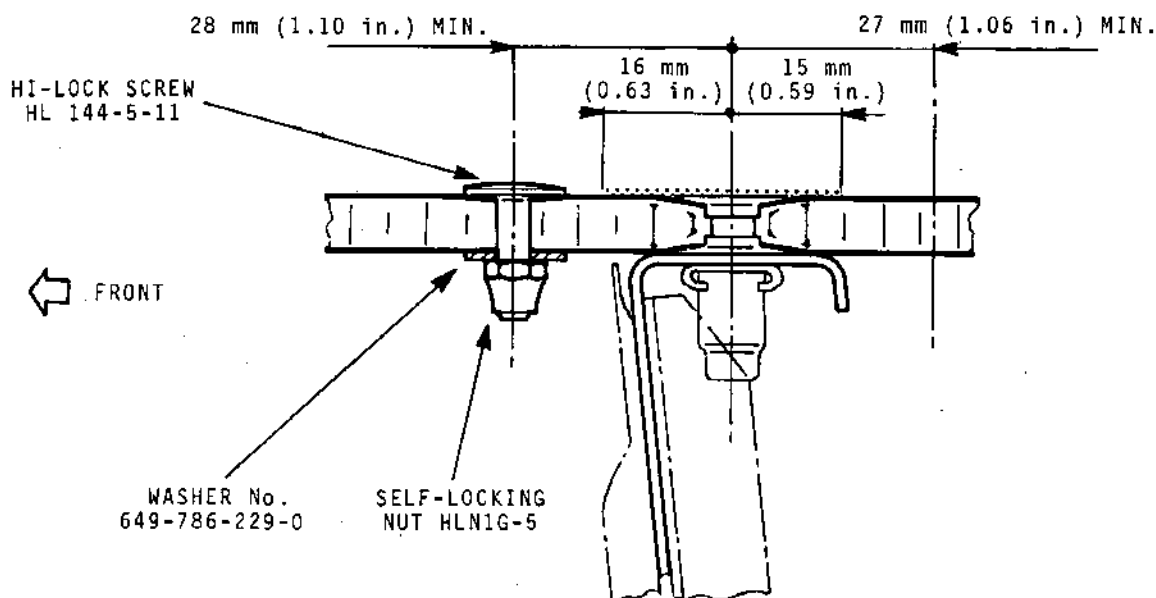


SECTION BB  
TYPICAL FOR DOORS 3-330 AND 331



ZONES WHICH CAN NOT ACCOMMODATE  
DELAMINATION RESTRAINING BOLTS

SECTION BB  
TYPICAL FOR DOORS 4-10



Repairing the Delaminations  
Figure 402 (Sheet 2 of 7)

78-13-01

REP 3-10-4  
Page 407  
Sep 30/78

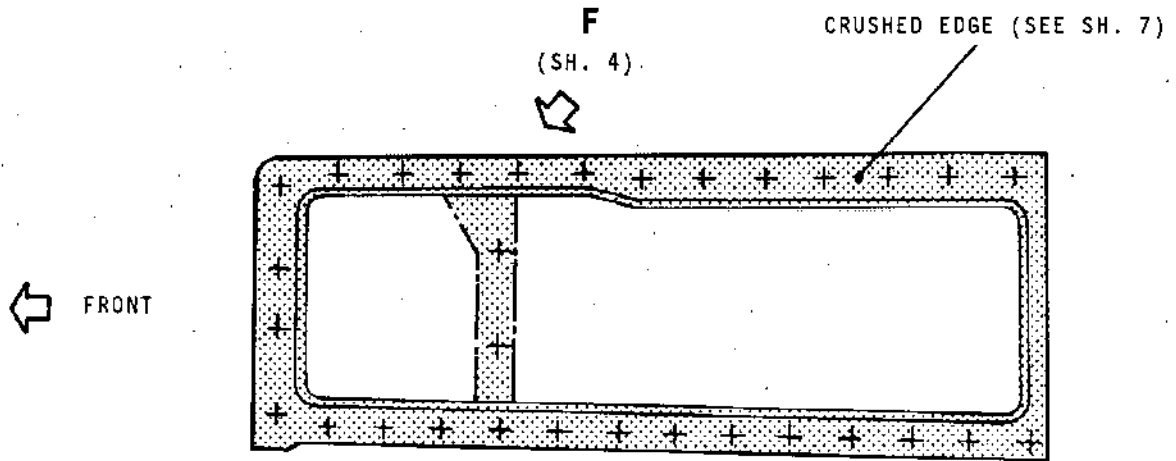



OLYMPUS 593

MK.610-14-28  
OVERHAUL

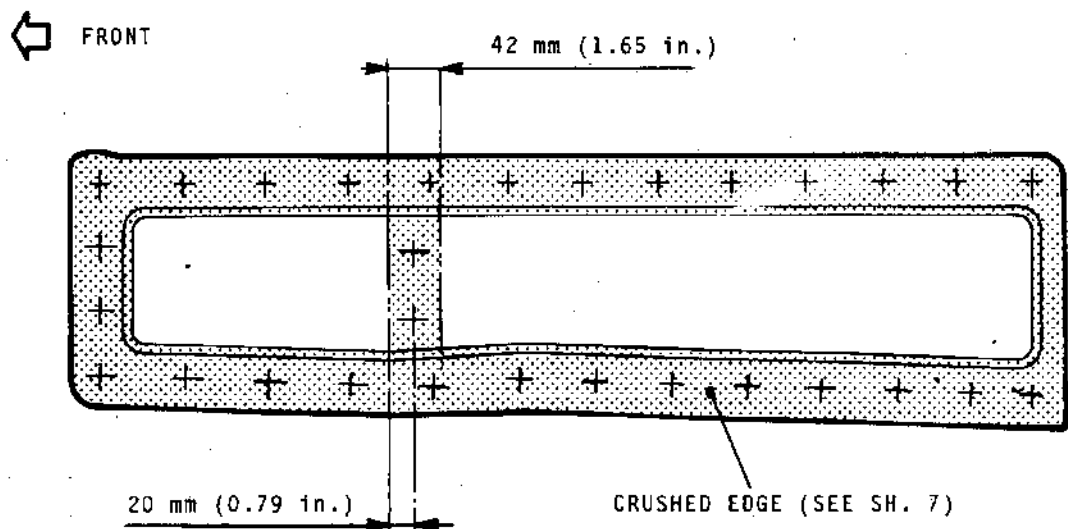


INNER SIDE VIEW OF  
UPPER LATERAL DOORS  
3-370/351 SHOWN  
3-350/371 SYMMETRICAL



 ZONES WHICH CAN NOT ACCOMMODATE  
DELAMINATION RESTRAINING BOLTS

INNER SIDE VIEW  
OF LOWER LATERAL DOORS  
4-50 SHOWN  
4-30 SYMMETRICAL



Repairing the Delaminations  
Figure 402 (Sheet 3 of 7)

78-13-01

REP 3-10-4

Page 408

Sep 30/78



OLYMPUS 593

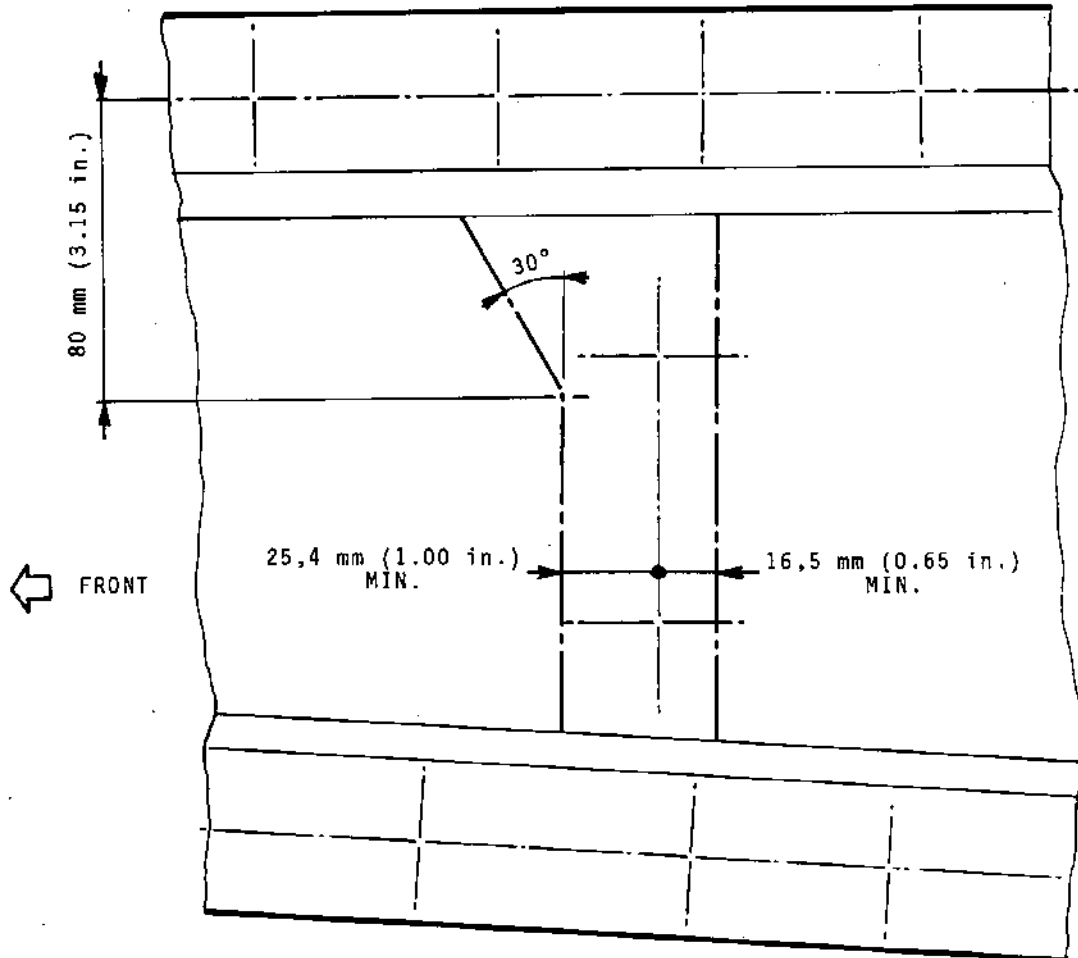
MK.610-14-28

OVERHAUL



**F**

VALID FOR LATERAL DOORS  
3-370 AND 351 SHOWN  
3-350 AND 371 SYMMETRICAL



Repairing the Delaminations  
Figure 402 (Sheet 4 of 7)

**78-13-01**

REP 3-10-4

Page 409

Sep 30/78



OLYMPUS 593

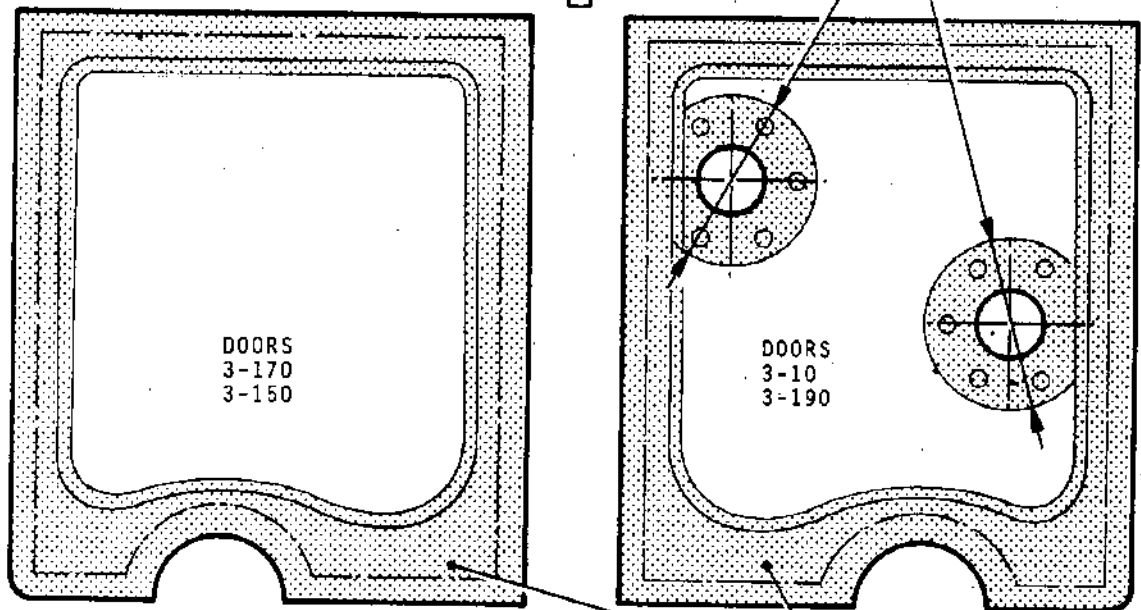
MK.610-14-28  
OVERHAUL



INNER SIDE VIEW OF UPPER FRONT DOORS

D = 130 mm (5.12 in.) MIN.

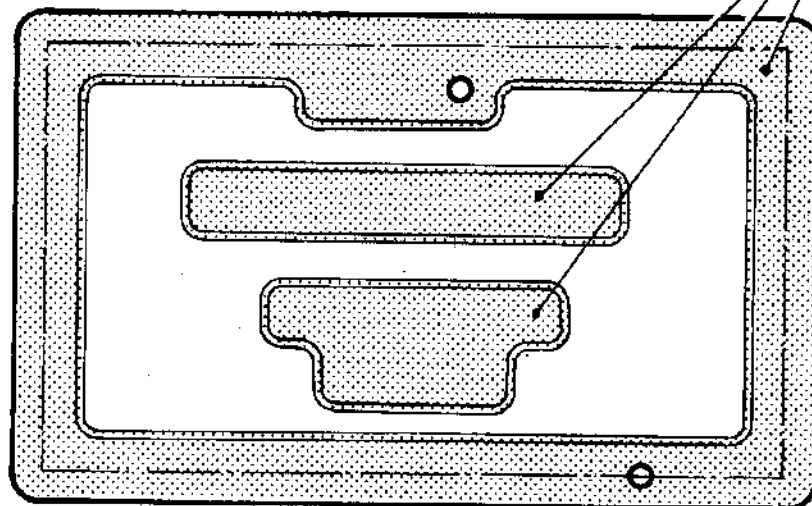
FRONT



CRUSHED EDGE (SEE SH. 7)

INNER SIDE VIEW OF LOWER REAR DOOR  
DOOR 4-70 SHOWN  
DOOR 4-100 SYMMETRICAL

FRONT



ZONES WHICH CAN NOT  
ACCOMMODATE DELAMINATION  
RESTRAINING BOLTS



Repairing the Delaminations  
Figure 402 (Sheet 5 of 7)

78-13-01

REP 3-10-4

Page 410

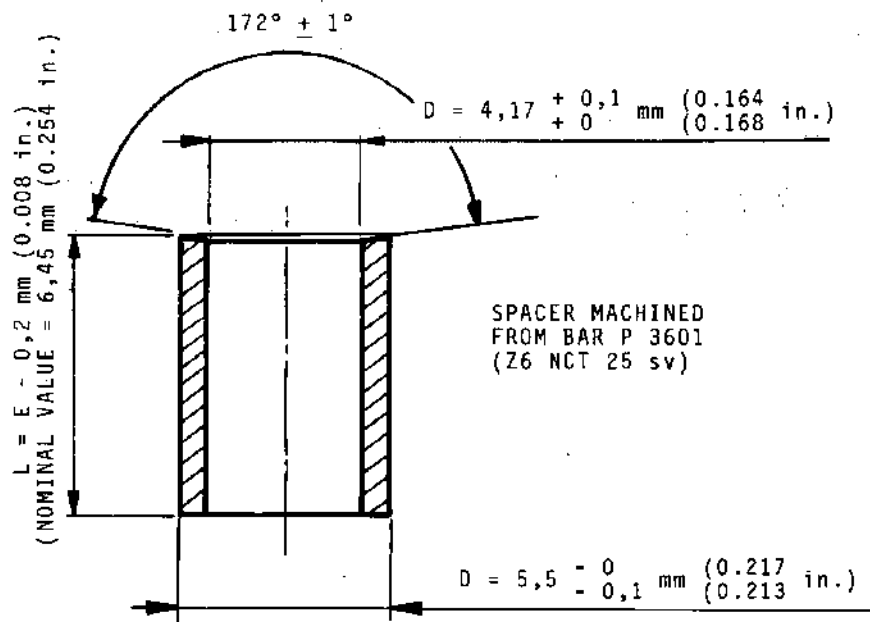
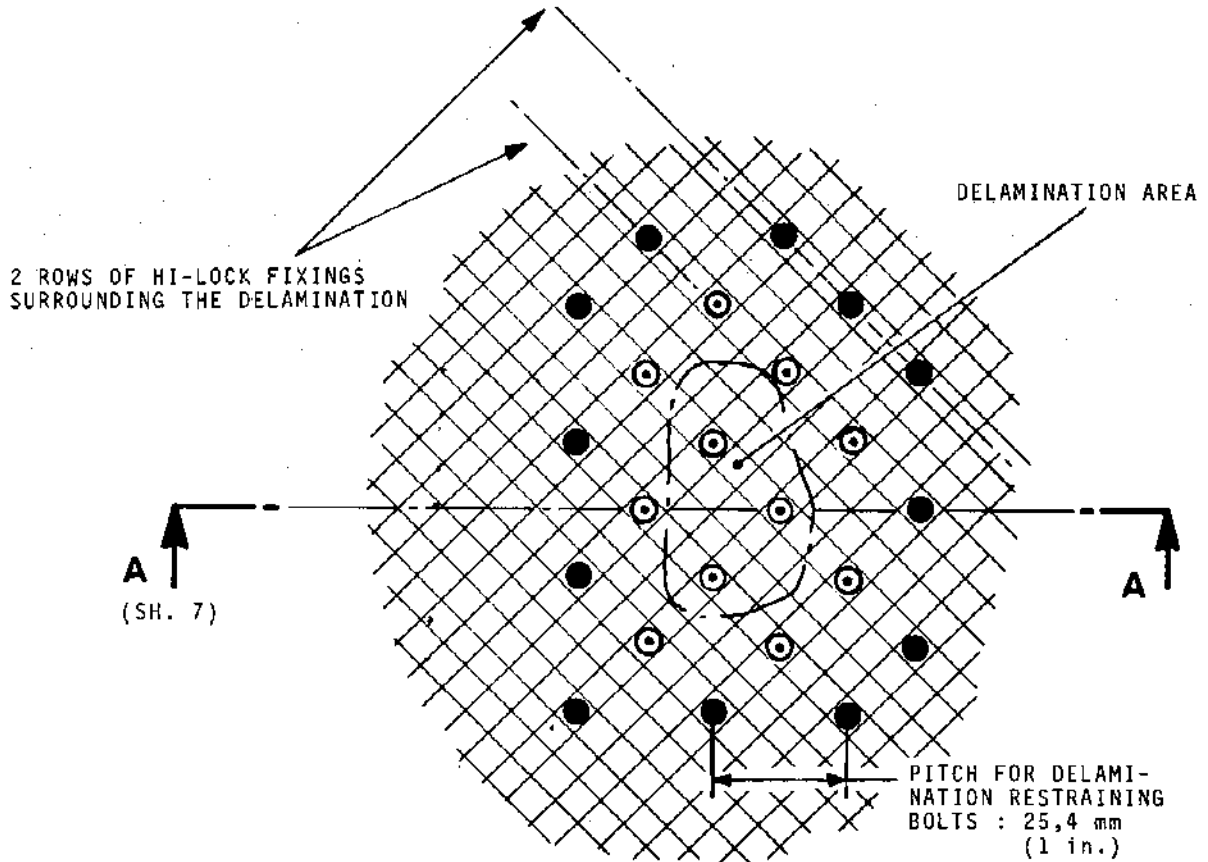
Sep 30/78





OLYMPUS 593

MK.610-14-28  
OVERHAUL



Repairing the Delaminations  
Figure 402 (Sheet 6 of 7)

78-13-01

REP 3-10-4

Page 411

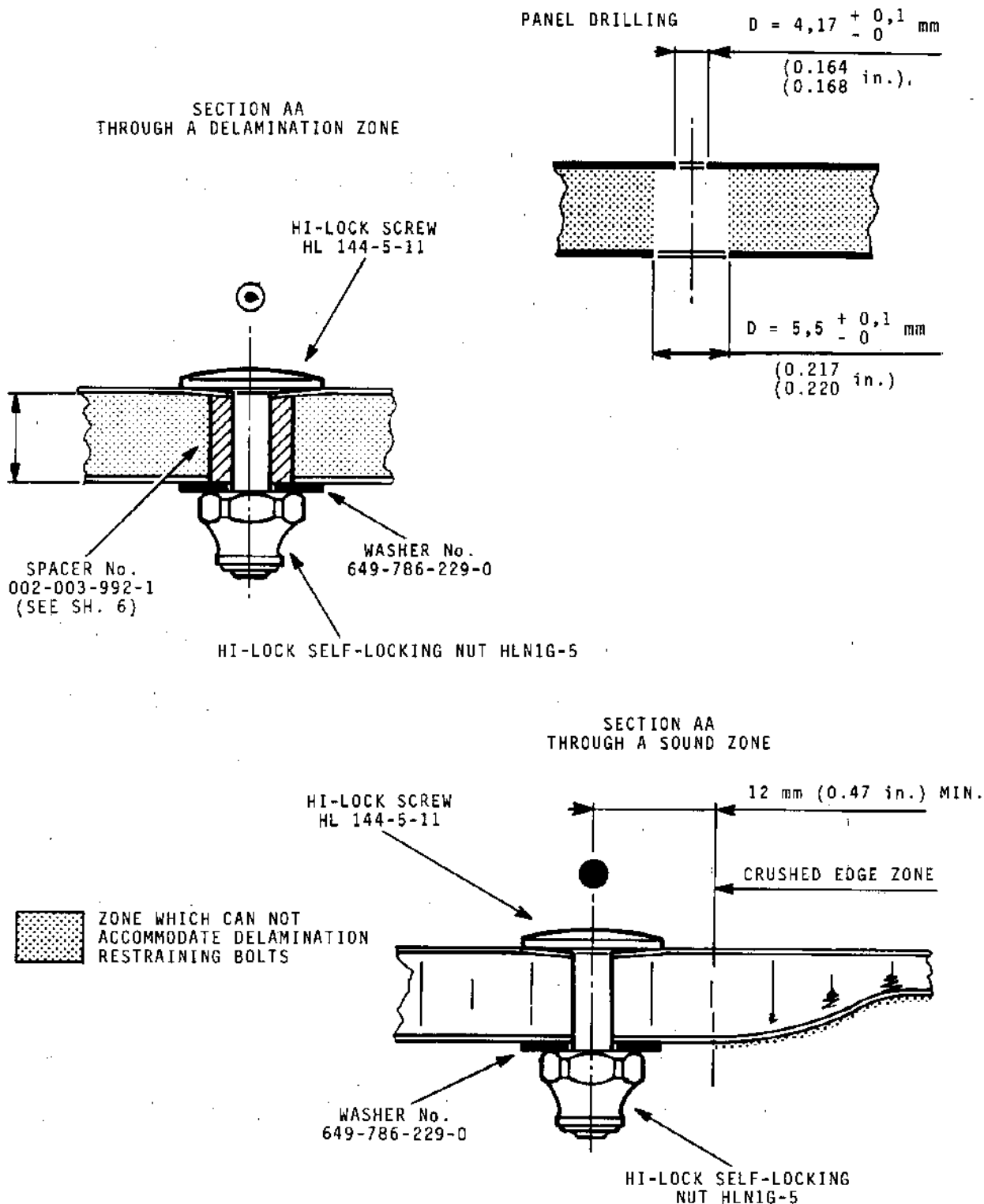
Sep 30/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



Repairing the Delaminations  
Figure 402 (Sheet 7 of 7)

78-13-01

REP 3-10-4

Page 412

Sep 30/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



### REPAIR

SEAL ASSEMBLIES 5-130/150/170/200/220/240/500/520/540/570/590/610  
6-130/150/170/200/220/240/500/520/540/570/590/610

#### 1. Renewing Seal Elements

---

##### PARTS REQUIRED FOR REPAIR

---

Double retaining plate	No. 302-057-200-0
Double retaining plate	No. 302-057-250-0
Upper seal element	No. 301-093-811-0
Lower seal element	No. 301-093-911-0
Rivet	No. BNAE 21215 TC 3207 (650-015-073-0)
or	No. BNAE 21215 TC 4008 (650-015-101-0)

---

#### A. Removing Damaged Seal Elements

- (1) Remove rivets securing damaged seal element by grinding out the heads without impairing the reinforcement plates.

#### B. Installing New Seal Elements

- (1) Check diameter of rivet holes as directed in chapter "RIVETING", section 70-50-10.
- (2) Fit new elements and rivet, as instructed in chapter "RIVETING", section 70-50-10 and in figure 401.

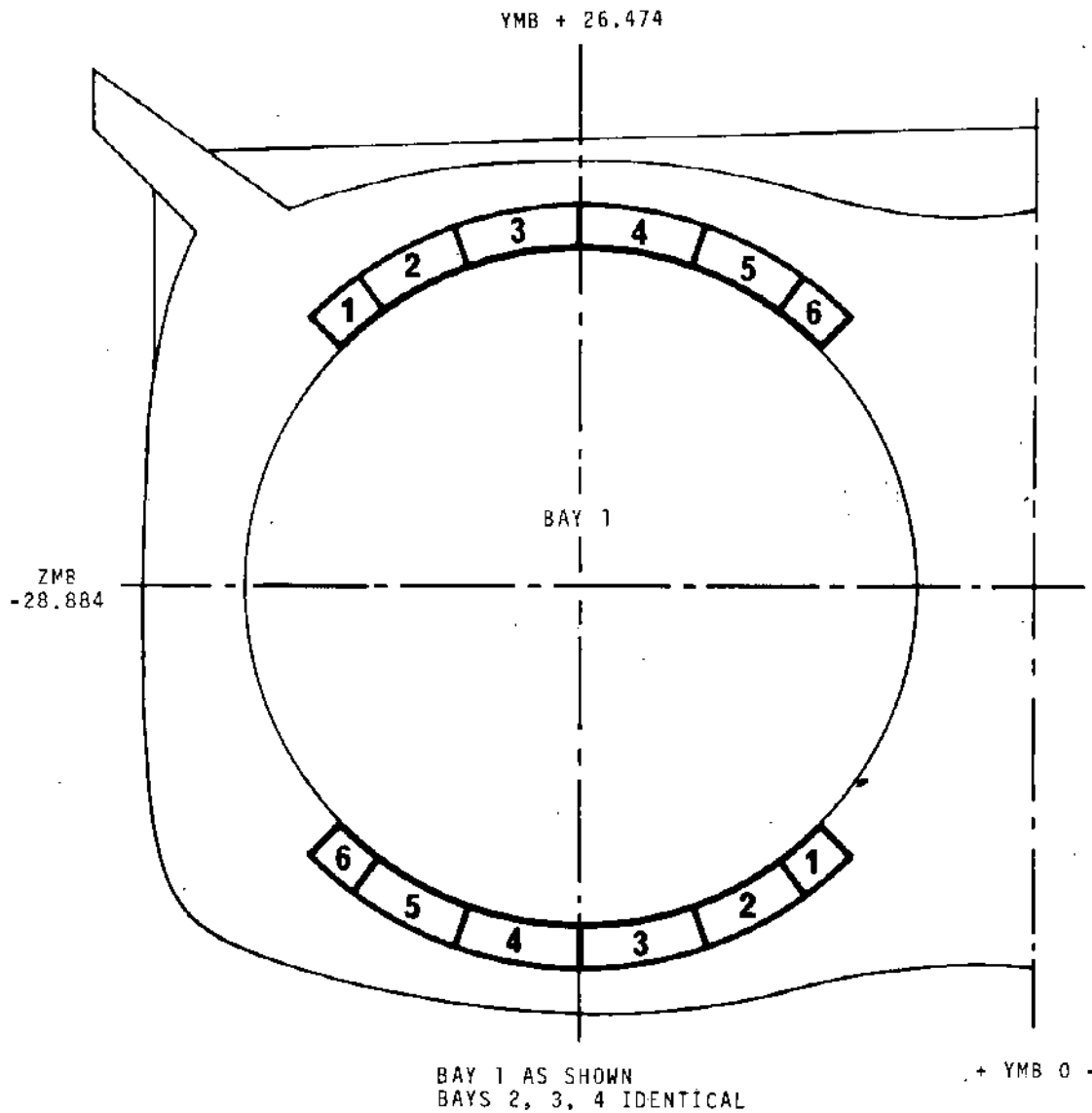
CAUTION : WHEN USING RIVETS BNAE 21215 TC 4008, THEIR HEADS ARE TO BE REWORKED AS INDICATED IN FIGURE 401.

- (3) Check riveting as directed in chapter "RIVETING", section 70-50-80.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE

Renewing Seal Elements  
Figure 401 - (Sheet 1 of 5)

N

78-13-01

REP 5-130-1

Page 402

Mar 31/77

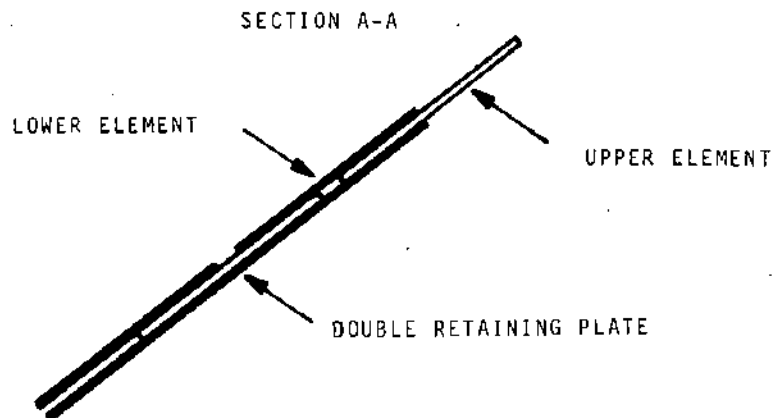
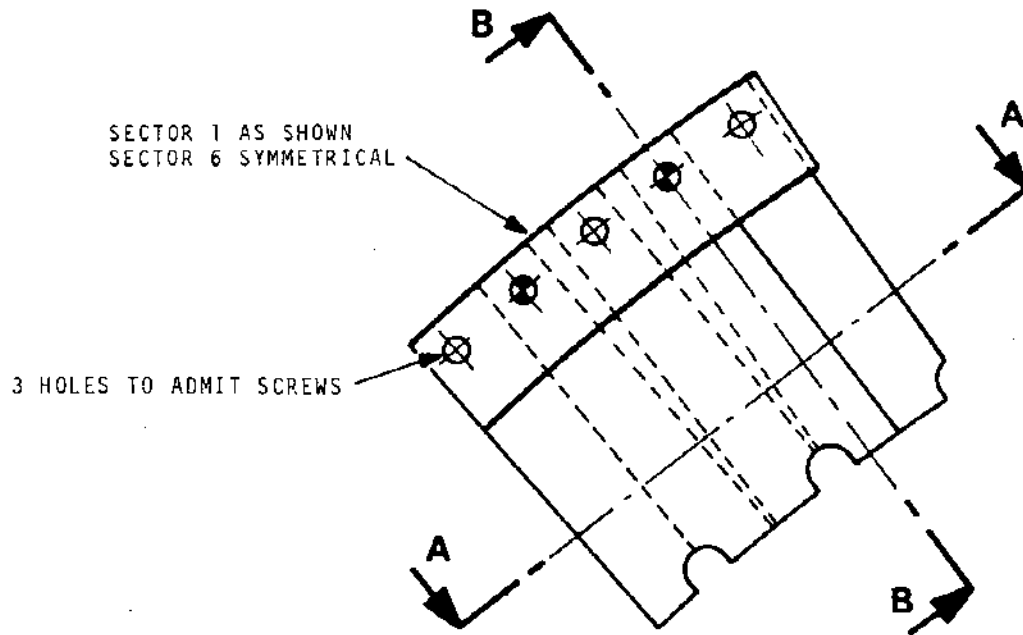


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



PRINTED IN FRANCE



Renewing Seal Elements  
Figure 401 - (Sheet 2 of 5)

N

78-13-01

REP 5-130-1

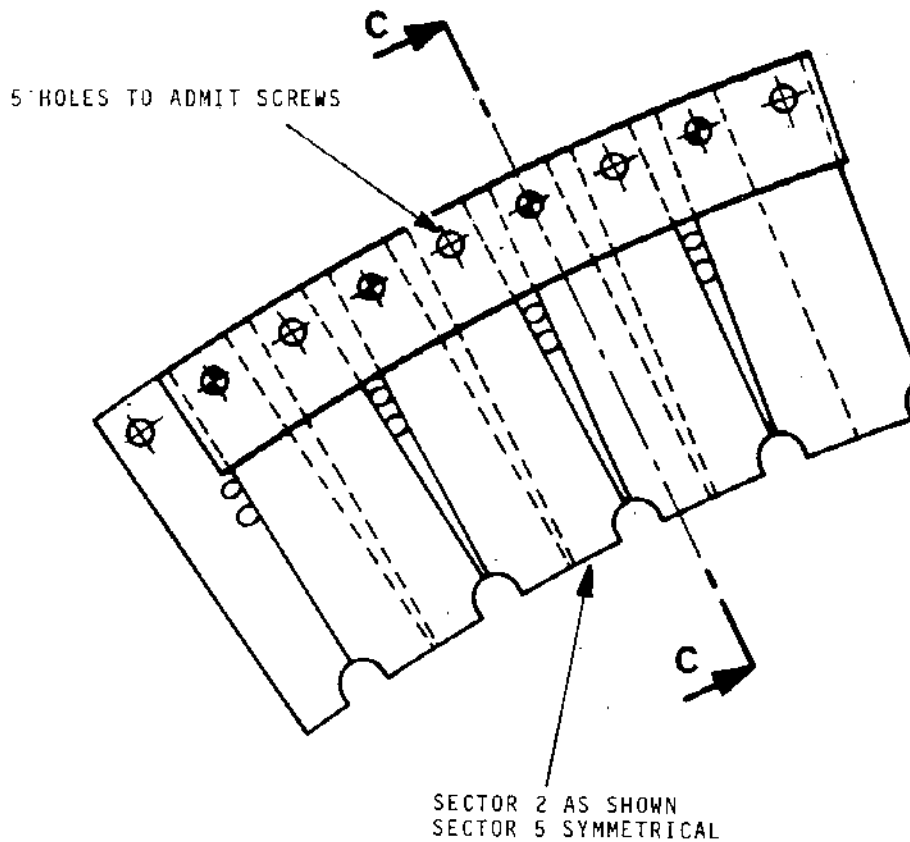
Page 403

Mar 31/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Renewing Seal Elements  
Figure 401 - (Sheet 3 of 5)

78-13-01

REP 5-130-1

Page 404

Mar 31/77



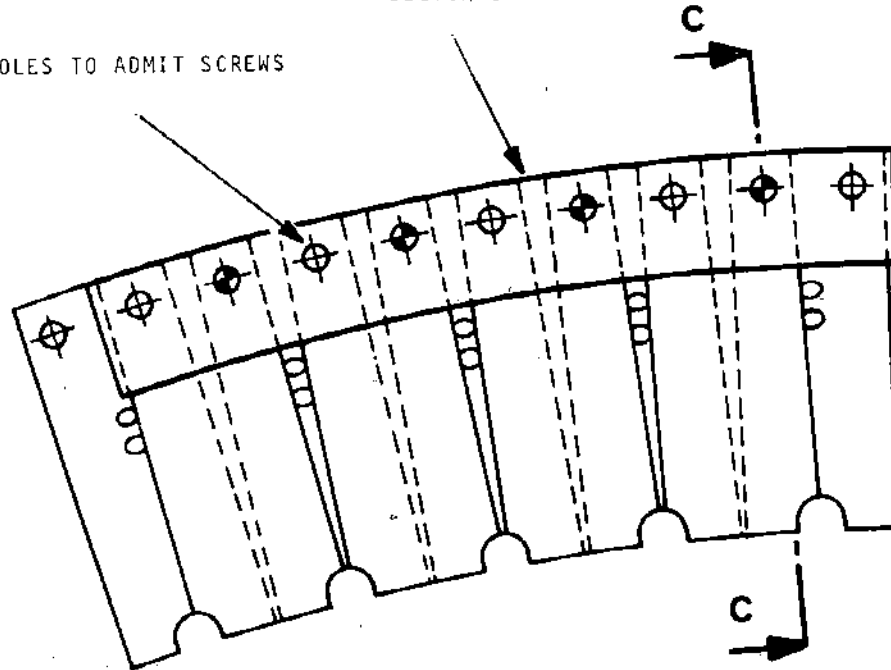
OLYMPUS 593

MK.610-14-28  
OVERHAUL



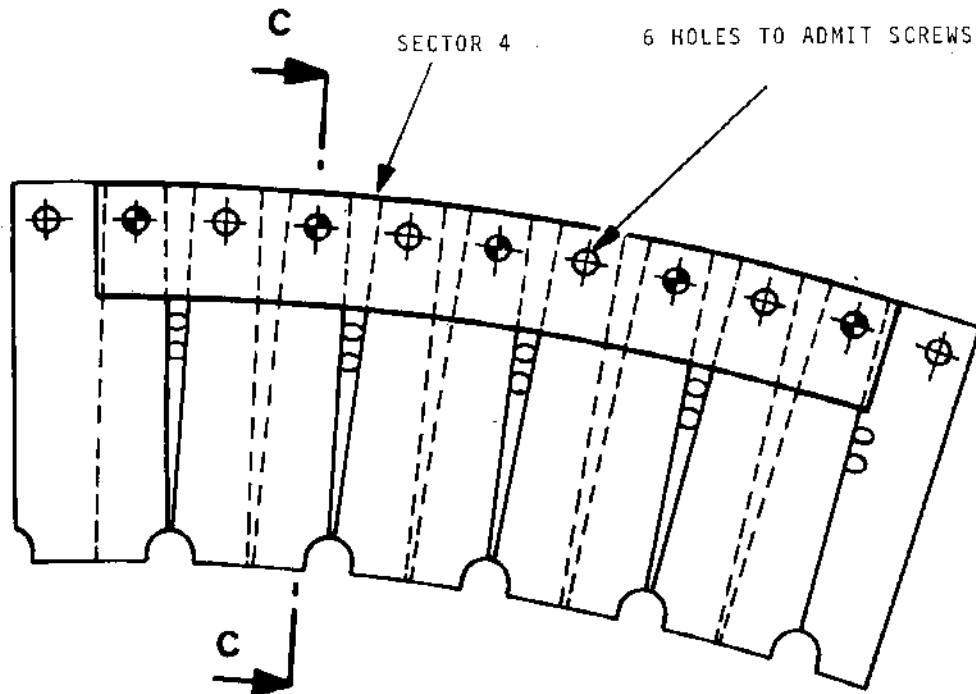
SECTOR 3

6 HOLES TO ADMIT SCREWS



SECTOR 4

6 HOLES TO ADMIT SCREWS



Renewing Seal Elements  
Figure 401 - (Sheet 4 of 5)

N

78-13-01

REP 5-130-1

Page 405

Mar 31/77



# OLYMPUS 593

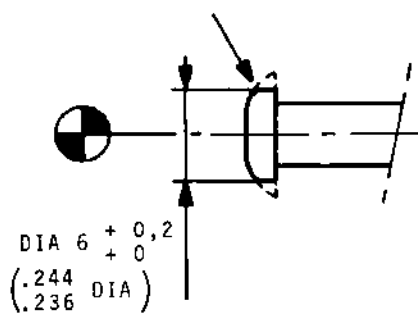
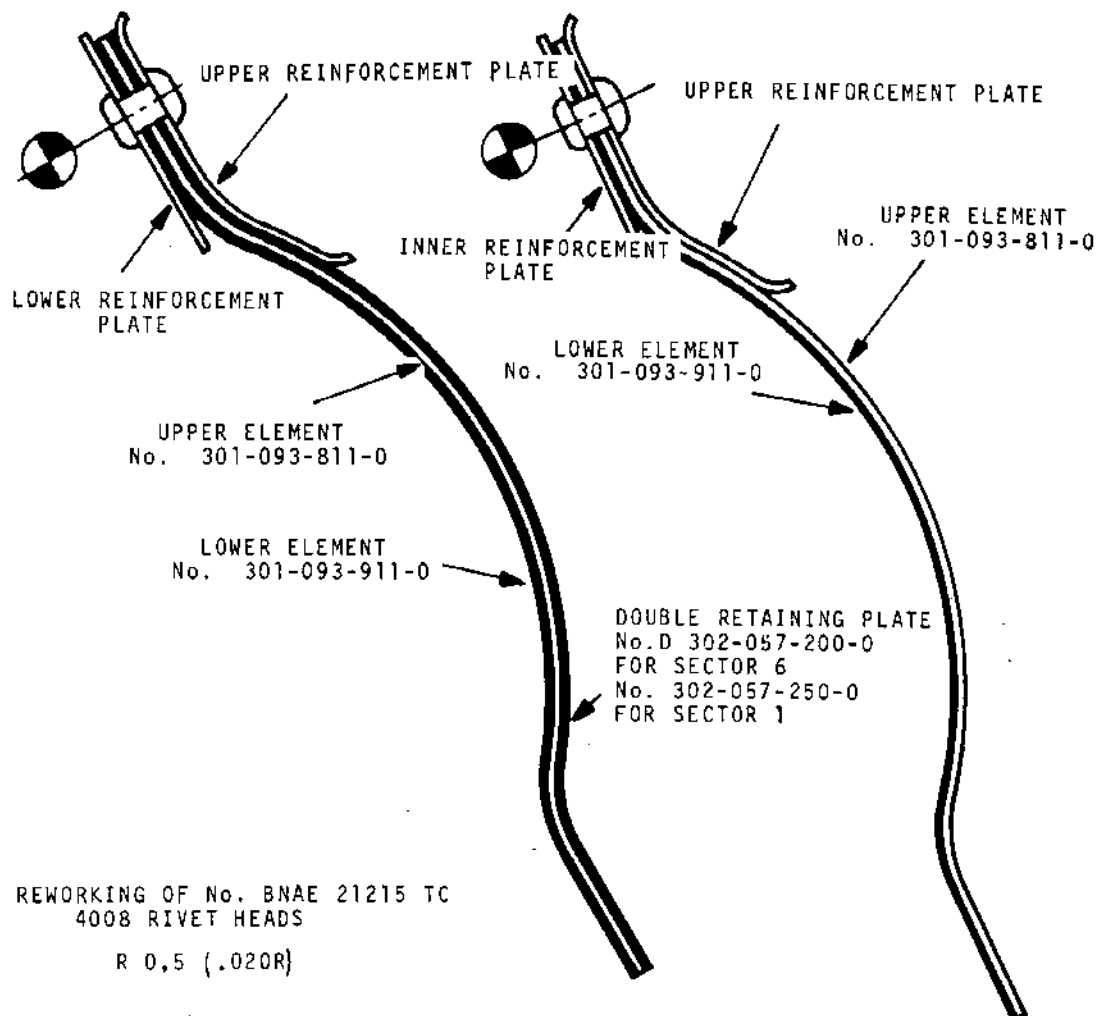
MK.610-14-28

OVERHAUL



SECTION B-B

SECTION C-C



RIVETS No.BNAE : 21215 TC 3207  
RIVETS No.BNAE : 21215 TC 4008

Renewing Seal Elements  
Figure 401 - (Sheet 5 of 5)

PRINTED IN FRANCE



**ATP  
TEMPORARY  
REVISION**

**British airways**

OLYMPUS 593 OVERHAUL MANUAL

This Temporary Revision complies with BCAR's Chapter A6-2 and TSS No. 0-2

*P. [Signature]* for Chief Engineer (Technical & Quality Services) CAA Design Approval No. DA1/8566/78

TEMPORARY REVISION 78-501

Insert in 78-13-01 facing REP 5-260-1 page 401.

REASON FOR ISSUE

BA Repair Reference added

ACTION

Reference "1. Replacement of riveted elements"

BA Repair 78-41544 refers.

14 Feb 84

TR 78-501

78-13-01

TR Page 1 of 1



OLYMPUS 593

MK.610-14-28  
OVERHAULREPAIRUPPER AND LOWER HEAT SHIELDS (5-260/261/630/631 AND 6-260/261/630/631)1. Replacement of riveted elements

---

PARTS REQUIRED FOR REPAIR

---

Stiffener	301-149-013-0	
Stiffener	301-149-063-0	
Shim	302-011-000-0	
Shim	302-011-100-0	
Edge reinforcing strip	301-148-412-0	
Bolt support	301-148-612-0	
Bolt support	302-008-800-0	
Bolt	HL 40-5-2	(649-781-290-0)
Rivet	21215 TC 2407	(650-015-043-0)
Rivet	21215 TC 3208	(650-015-074-0)
Rivet	21217 TC 3206	(650-025-072-0)
Rivet	21217 TC 3210	(650-025-076-0)
Rivet	21217 TC 2405	(650-025-041-0)
Washer	301-148-513-0	
Washer	301-148-712-0	
Washer	302-057-300-0	

---

## A. Disassembly

- (1) Remove damaged elements by grinding out the rivet heads as instructed in Chapter "RIVETING" and figure 401.

## B. Mounting new elements

This can be done in three ways :

- (1) Applying a reinforcing strip

- (a) Mark out the locations of the fasteners as shown in figure 401

78-13-01

REP 5-260-1

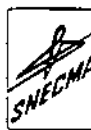
Page 401

Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (b) Drill pilot of 2 mm (0.08 in.) dia. at the fixing points.
- (c) Put the edge reinforcing strip in position and pin it on. Insert shims 1,2 mm (0.047 in.) in thickness between strip and shield.
- (d) Drill out and apply rivets as instructed in Chapter "Riveting" and figure 401.

NOTE : Remember to fit washers between reinforcing strip and heat shield.

- (2) Applying shims as per views F1 and F5.
  - (a) Locate and fasten on the shims.
  - (b) Apply the fixing rivets as instructed in Chapter "RIVETING" Section 70-50-10, and in figure 401.
  - (c) Machine-flush the rivet heads.
  - (d) Shape the shims to the shield contour as instructed in figure 401.
- (3) Applying bolt supports and stiffeners.
  - (a) Put the new elements in position on the shield, as shown in figure 401.
  - (b) Counterdrill the retaining holes.
  - (c) Apply the rivets, not omitting to fit the HI-LOK bolts, and washers underneath the rivet heads, as instructed in Chapter "RIVETING", Section 70-50-10, and in figure 401.
  - (d) Machine flush the shim rivet heads marked ● and ○ in figure 401.

#### C. Inspection

- (1) Check the riveting as instructed in Chapter "RIVETING", Section 70-50-81. "Inspection of solid rivets".



OLYMPUS 593

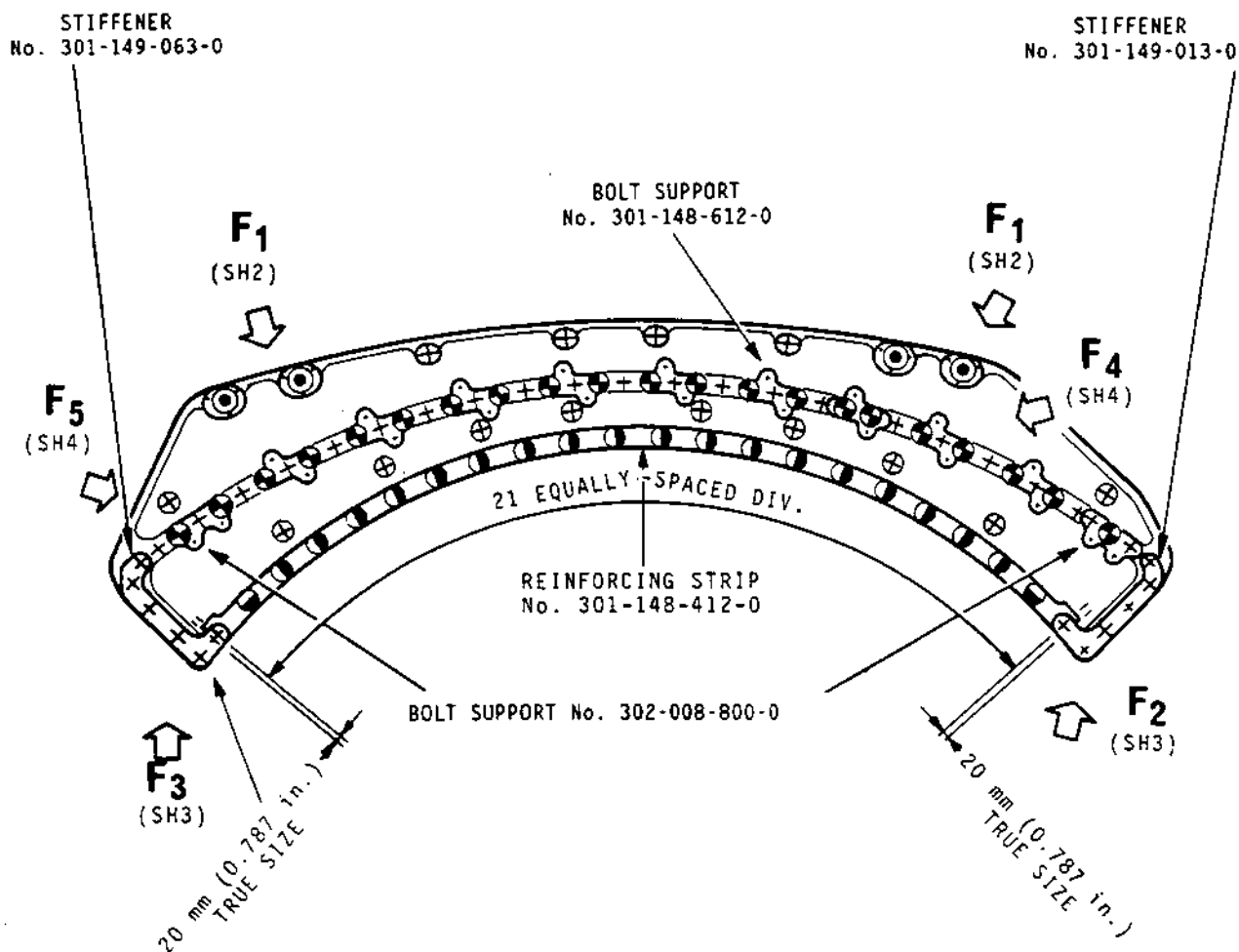
MK.610-14-28  
OVERHAUL



REARWARD VIEW

5-260 , 5-630 and 6-260 , 6-631 AS SHOWN  
5-261 , 5-631 and 6-261 , 6-630 SYMMETRICAL

PRINTED IN FRANCE



Replacement of Riveted Elements  
Figure 401 (Sheet 1 of 7)

78-13-01

REP 5-260-1

Page 403

Apr 30/93

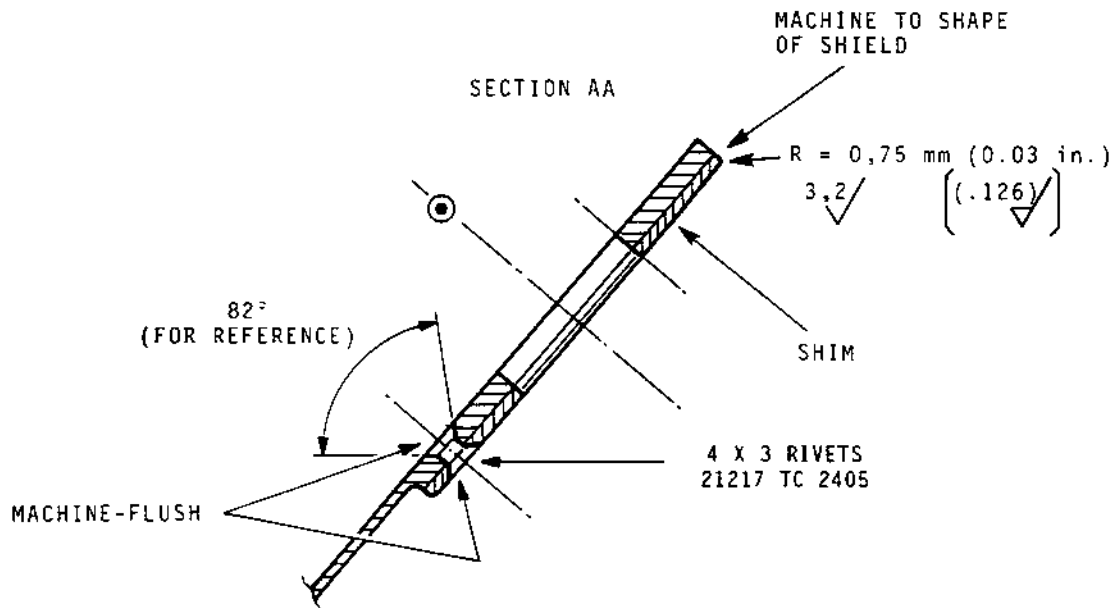
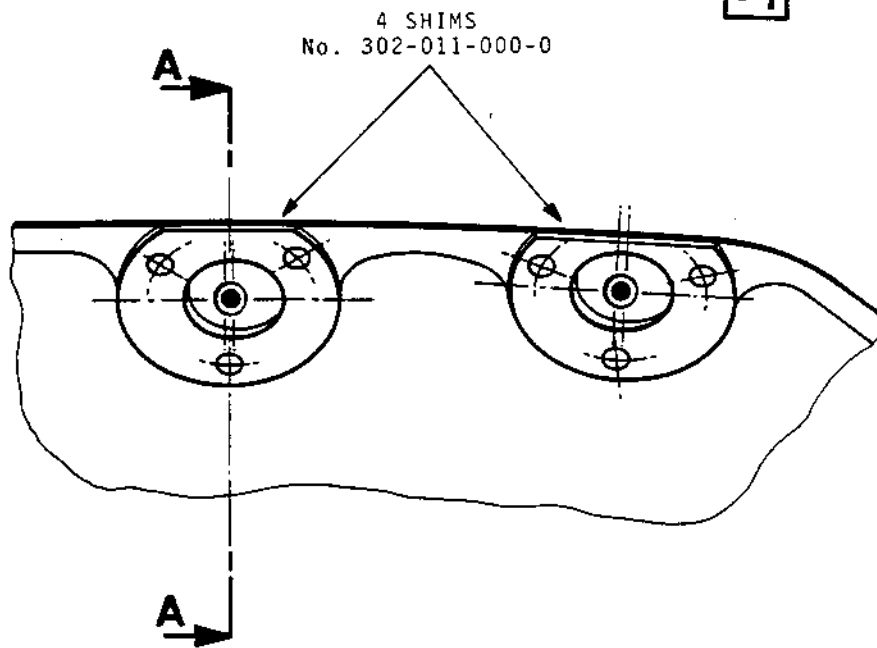


OLYMPUS 593

MK.610-14-28  
OVERHAUL



F<sub>1</sub>



Replacement of Riveted Elements  
Figure 401 (Sheet 2 of 7)

78-13-01

REP 5-260-1

Page 404

Apr 30/93

PRINTED IN FRANCE



OLYMPUS 593

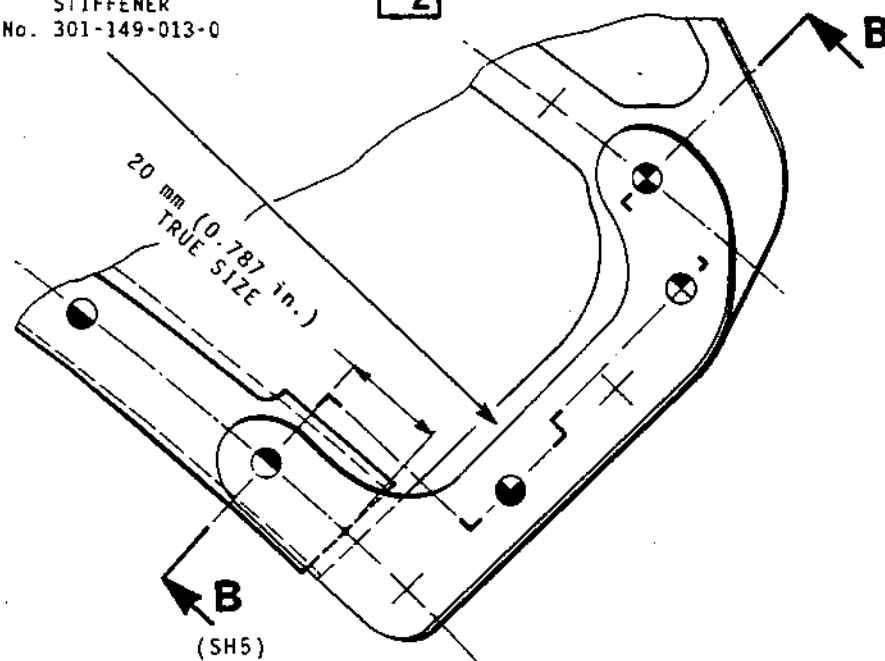
MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE

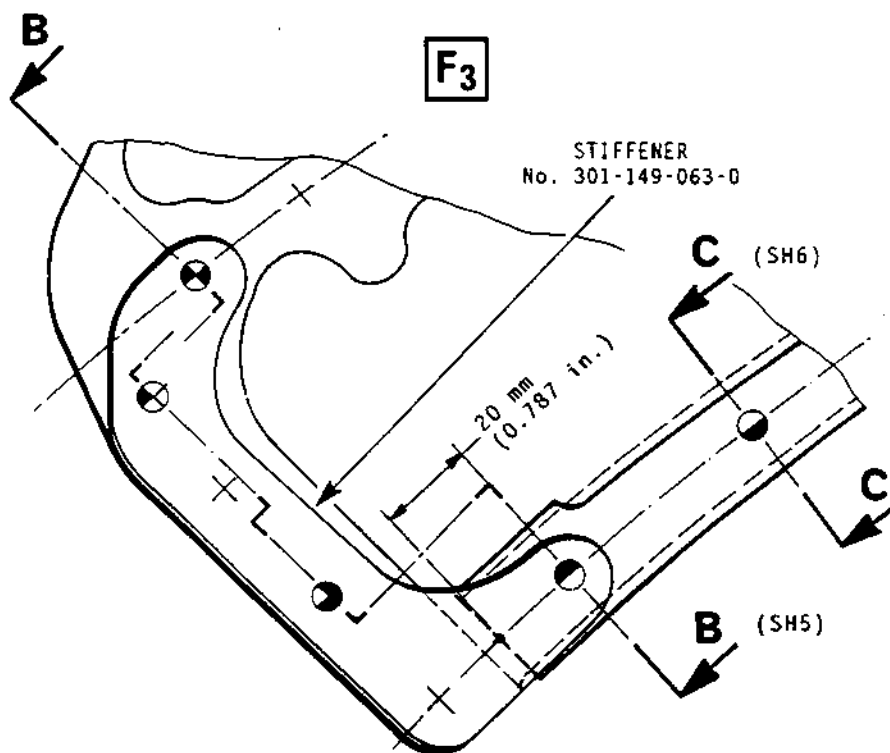
STIFFENER  
No. 301-149-013-0

F<sub>2</sub>



F<sub>3</sub>

STIFFENER  
No. 301-149-063-0



Replacement of Riveted Elements  
Figure 401 (Sheet 3 of 7)

78-13-01

REP 5-260-1

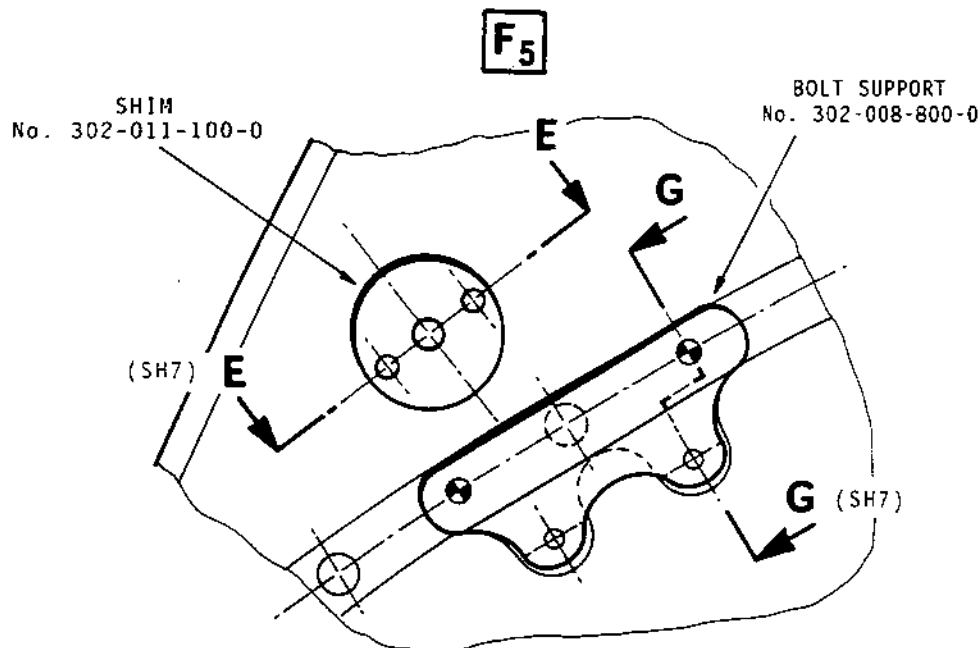
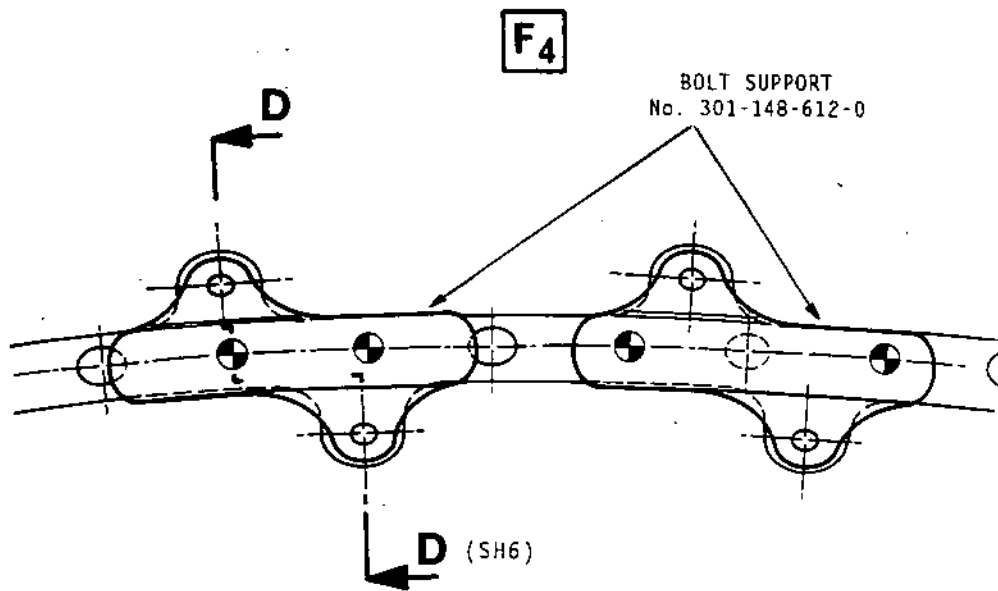
Page 405

Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Replacement of Riveted Elements  
Figure 401 (Sheet 4 of 7)

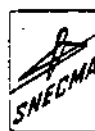
78-13-01

REP 5-260-1  
Page 406  
Apr 30/93

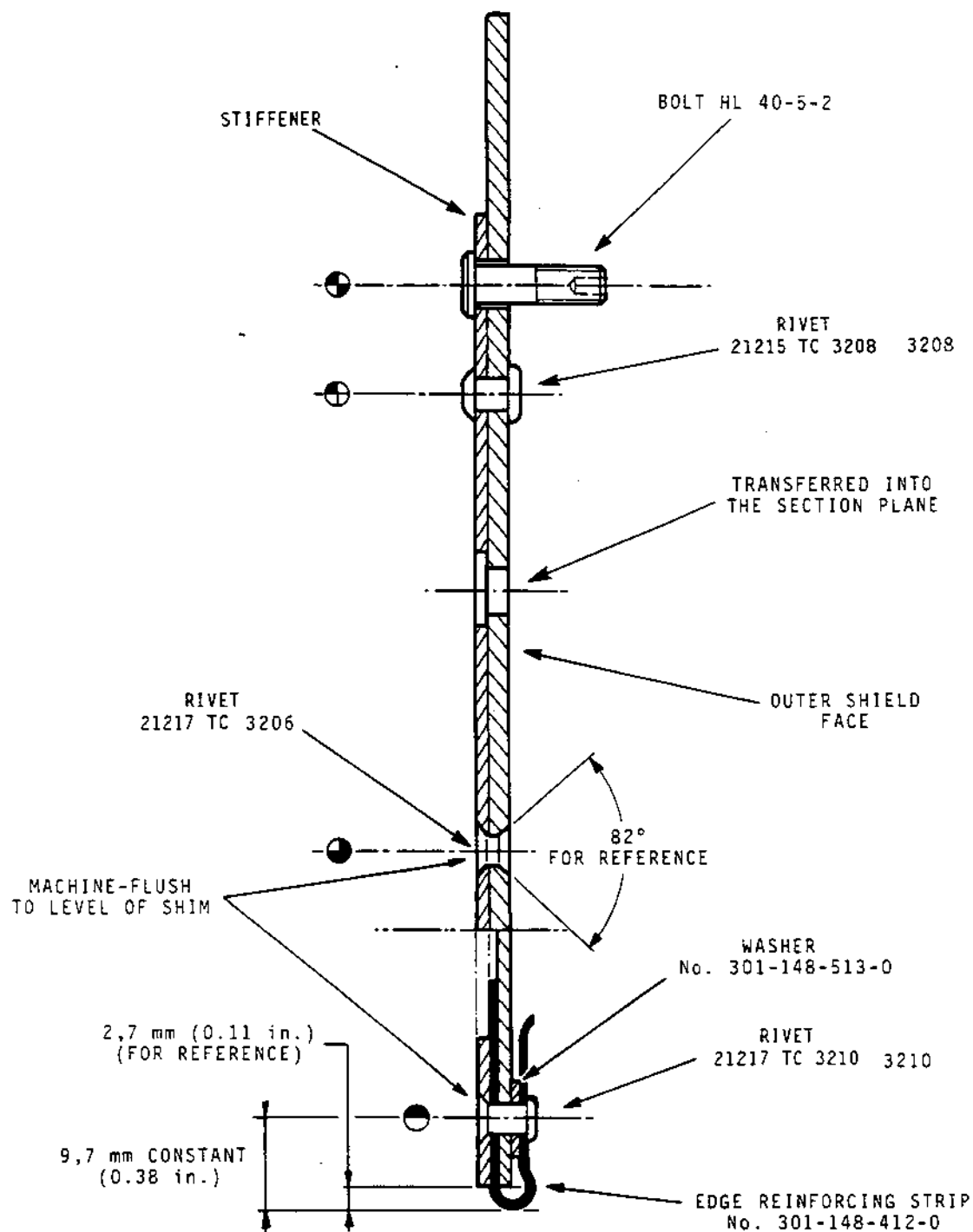


OLYMPUS 500

MK.610-14-28  
OVERHAUL



SECTION BB



Replacement of Riveted Elements  
Figure 401 (Sheet 5 of 7)

78-13-01

REP 5-260-1

Page 407

Apr 30/93



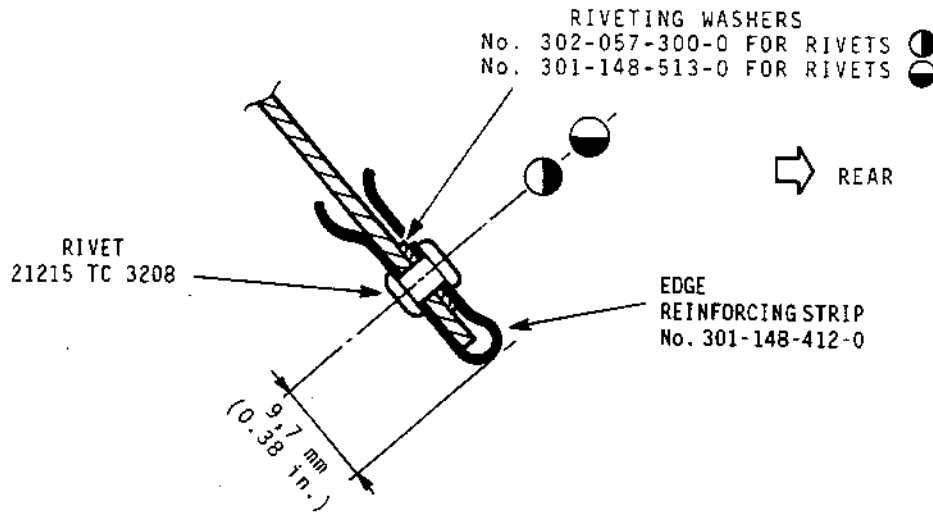


OLYMPUS 593

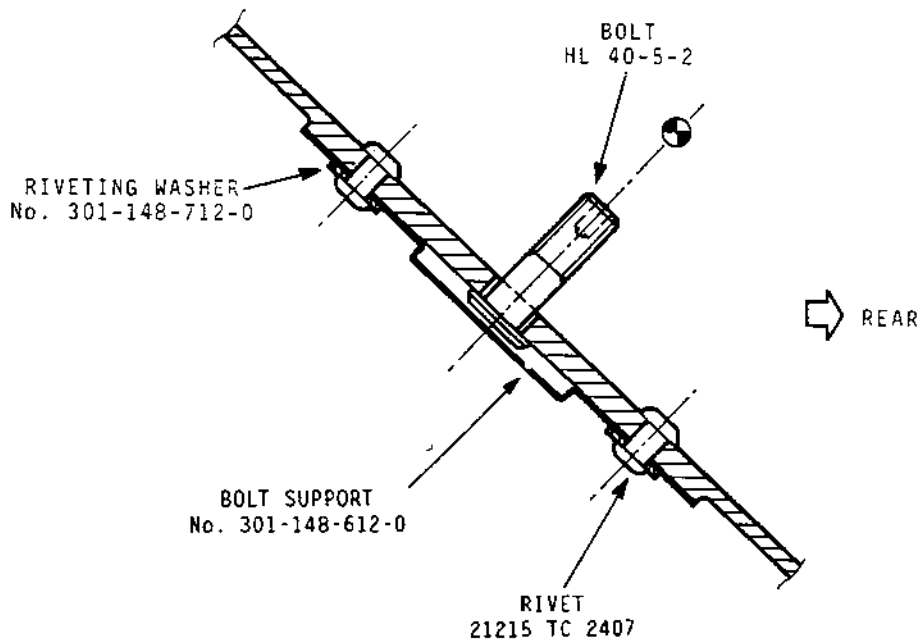
MK.610-14-28  
OVERHAUL



SECTION CC



SECTION DD



Replacement of Riveted Elements  
Figure 401 (Sheet 6 of 7)

78-13-01

REP 5-260-1

Page 408

Apr 30/93

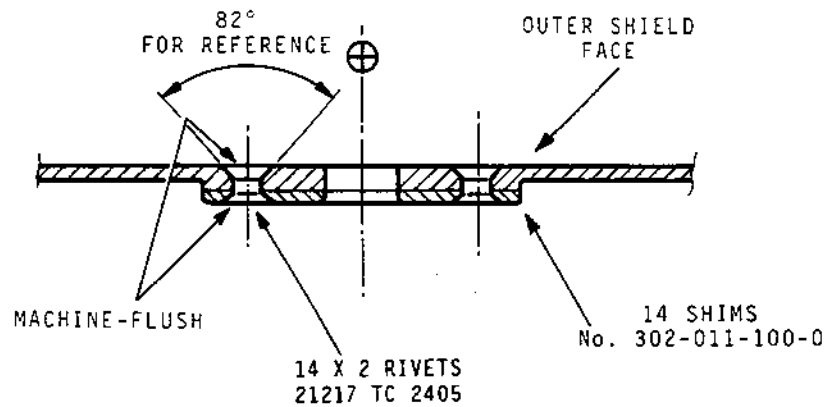


OLYMPUS 593

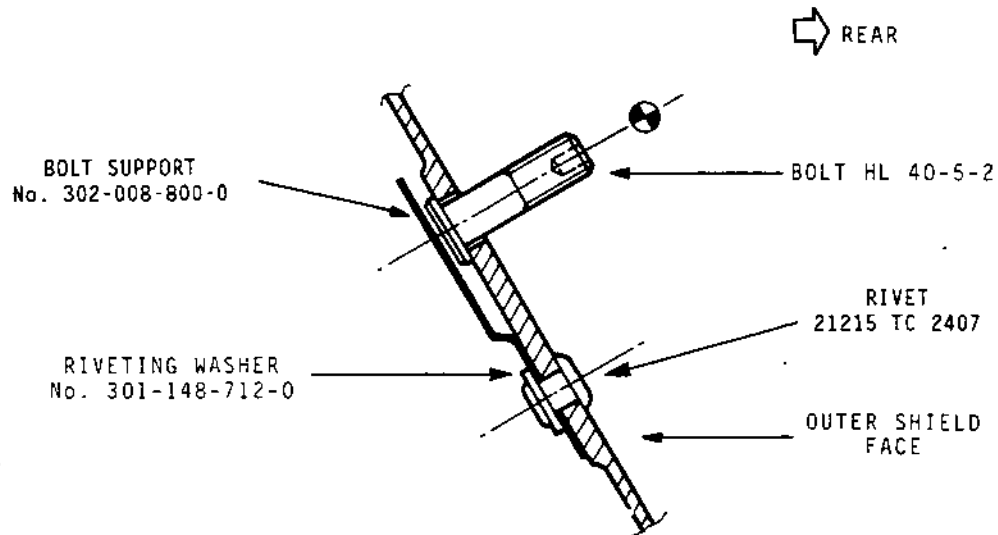
MK.610-14-28  
OVERHAUL



SECTION EE



SECTION GG



Replacement of Riveted Elements  
Figure 401 (Sheet 7 of 7)

78-13-01

REP 5-260-1  
Pages 409/410  
Apr 30/93

**OLYMPUS 593**

MK.610-14-28

OVERHAUL

**REPAIR****UPPER AND LOWER HEAT SHIELDS**

(5-260/261/630/631 AND 6-260/261/630/631)

**2. Crack filler welding**

---

**PARTS REQUIRED FOR REPAIR**

---

Rivet, round head	BNAE 21215 TC 2407 (650-015-043-0)
Rivet, round head	BNAE 21215 TC 3208 (650-015-074-0)
Rivet, head F 100	BNAE 21217 TC 2405 (650-025-041-0)
Rivet, head F 100	BNAE 21217 TC 3206 (650-025-072-0)
Rivet, head F 100	BNAE 21217 TC 3210 (650-025-076-0)

Filler weld wire P 3028 (NCK 20 D)

---

**A. Introduction**

In this repair scheme two types of action are applicable.

- (1) Filler welding as per paragraph B when crack length is smaller than or equal to 25 mm (0.098 in).
- (2) Filler welding as per paragraph C when crack length is greater than 25 m (0.098 in).

**B. Crack filler welding when crack length is smaller than 25 mm (0.098 in).**

- (1) If necessary, remove the riveted elements as instructed in REP 5-260-1.

NOTE : Retain the plain washers and HI-LOCK bolts.

- (2) Argon arc-weld the cracks as instructed in chapter 70-35-10.

(a) Filler weld wire : P 3028 (NCK 20 D).

(b) Class of weld : B1.

**78-13-01**

REP 5-260-2

Page 401

Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



(3) Inspect class B1 welds as instructed in chapter 70-35-80.

(a) Perform local dye penetrant inspection using fluorescent water-washable product as per method M 502 B, chapter 70-20-10.

(4) If applicable, machine flush the weld in the zones in contact with the riveted elements.

(5) Re-install the riveted elements and check for correct installation as per REP 5-260-1.

C. Crack filler welding when crack length is greater than 25 mm (0.098 in)

(1) Remove all the riveted items as per REP 5-260-1.

NOTE : Retain the plain washers and HI-LOCK bolts.

(2) Filler weld the cracks as per paragraph B (2), (3) and (4) of this repair scheme.

(3) Carry out a heat treatment of the shield as per method M 812 in chapter 70-45-10.

(a) Treatment at 800°C for 8 hours and cooling in still air.

(4) Re-install all the riveted elements and check for correct installation as per REP 5-260-1.

**78-13-01**

REP 5-260-2

Page 402

Oct 31/81

**OLYMPUS 593**

MK.610-14-28

OVERHAUL

REPAIRUPPER AND LOWER HEAT SHIELDS

(5-260/261/630/631 AND 6-260/261/630/631)

3. Reconditioning of worn areas by metal spraying

---

PARTS REQUIRED FOR REPAIR

---

Powder	P 3205
Rivet, round head	BNAE 21215 TC 3208 (650-015-074-0)
Rivet, head F 100	BNAE 21217 TC 3210 (650-025-076-0)

---

## A. Removal

- (1) Remove the reinforcing strip after removing the rivets as per REP 5-260-1.

## B. Metal spraying

- (1) Metal spray the worn areas of the shields as per figure 401, chapter 70-65-20 and following instructions :

- (a) Sprayed powder : P 3205

- (b) Coating thickness : as required.

NOTE 1 : Test pieces used prior to metal spraying on parts are made of sheet metal P 3328 (NC 22 FeD), test piece dimensions are given in chapter 70-65-20.

NOTE 2 : The master test-piece is made of 4 mm (0.157 in) - thick sheet metal P 3326 (NCK 20 D).

- - (2) Inspect the coating as per chapter 70-65-80.
  - (3) Slightly buff the part so as to obtain the surface condition specified in figure 401.

**78-13-01**

REP 5-260-3

Page 401

Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



C. Inspection

- (1) Inspect the metal spray coating as per chapter 70-65-80.

D. Marking

- (1) Following the part number, mark "REP 3" as per method M 28 in chapter 70-10-10.

**78-13-01**

REP 5-260-3

Page 402

Oct 31/81



OLYMPUS 593

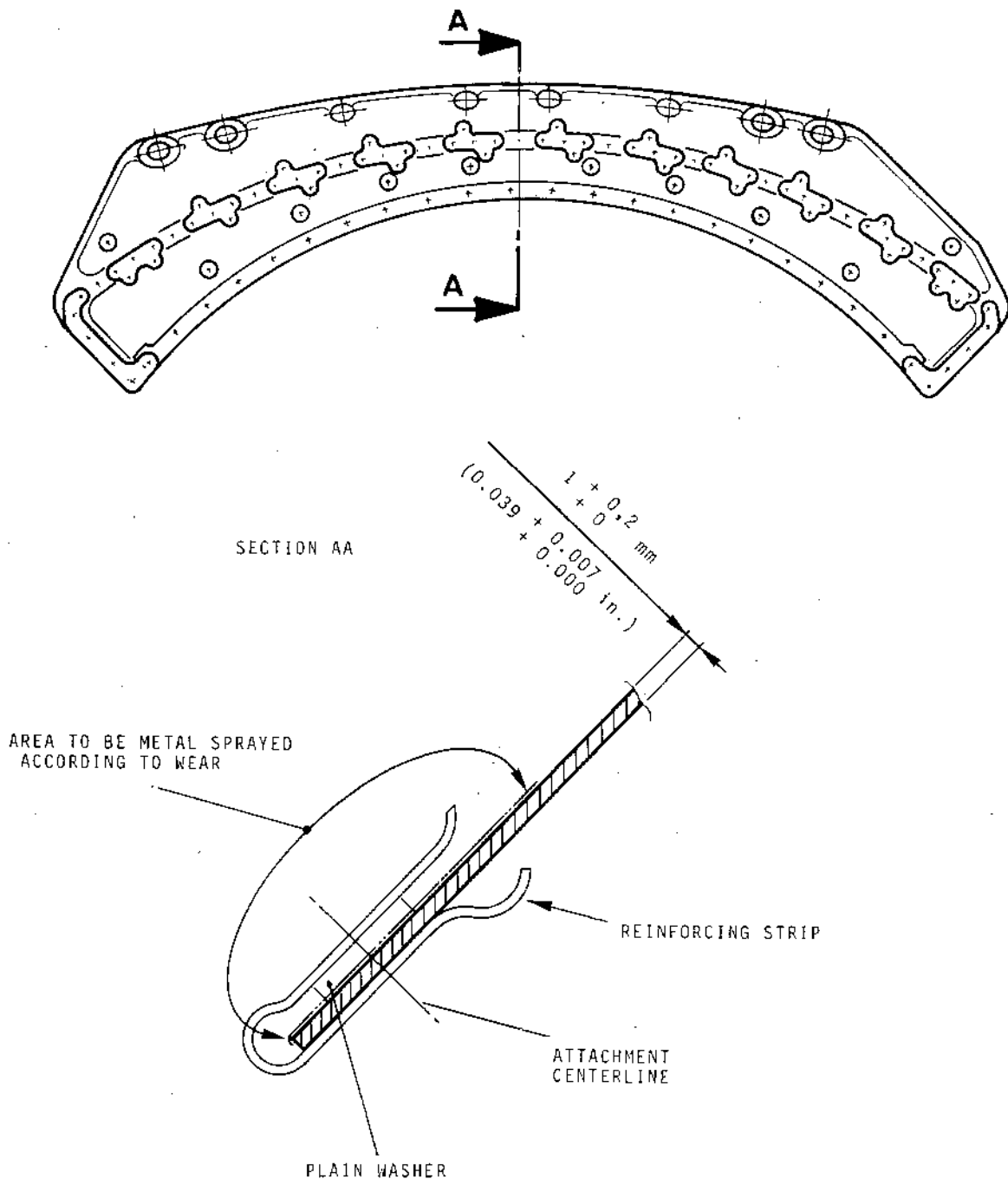
MK.610-14-28  
OVERHAUL



AFT LOOKING FORWARD

SHIELDS 5-260/630 AND 6-260/630, REPRESENTED  
SHIELDS 5-261/631 AND 6-261/631, SYMMETRICAL

PRINTED IN FRANCE



Reconditioning by metal spraying  
Figure 401

78-13-01

FEP 5-260-3  
Pages 403/404  
Oct 31/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

SUPPORT ASSEMBLY (7-10/160)

1. Replacement of the floating anchor nut

---

PARTS REQUIRED FOR REPAIR

---

Floating nut A 11471-6-4 (649-785-192-0)

Rivet head F 100 BNAE 21217 TC 3207 (650-025-073-0)

---

A. Removal

- (1) Remove the damaged nut by grinding out the fixing-rivet heads.

B. Replacement of the nut

- (1) Place a new nut on the support bracket.
- (2) Apply the rivets as instructed in chapter "RIVETING", Section 70-50-10, "Joints Made by Means of Solid Rivets" and as shown in figure 401.
- (3) Machine the rivet heads flush with the support, as instructed in chapter "RIVETING", Section 70-50-81, "Inspection of Solid Rivets".



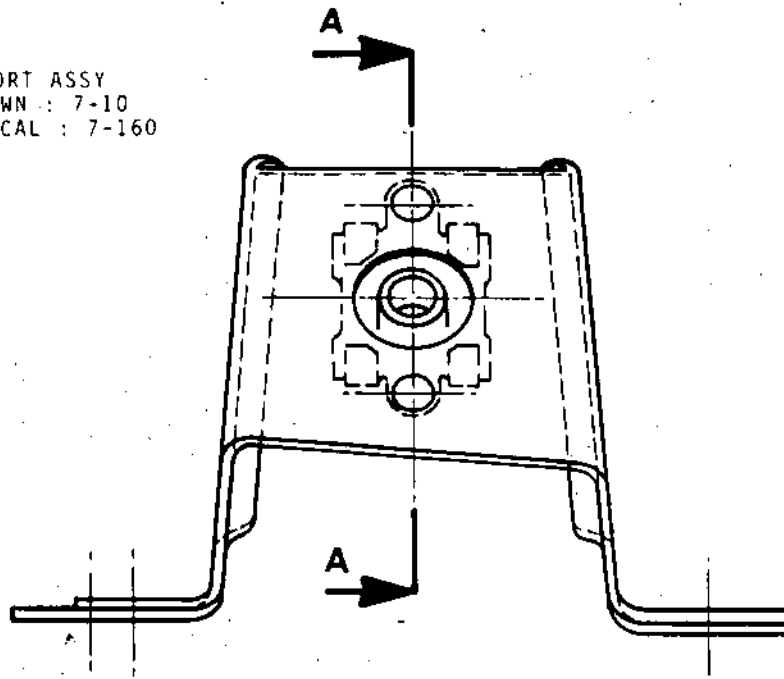


OLYMPUS 593

MK.610-14-28  
OVERHAUL



SUPPORT ASSY  
AS SHOWN : 7-10  
SYMMETRICAL : 7-160



SECTION A-A

RIVETS  
BNAE 21217 TC 3207

FLOATING NUT  
A 11471-6-4

MACHINE-FLUSH  
RIVET HEADS

Replacement of Floating Anchor Nut  
Figure 401

78-13-01

REP 7-10-1  
Page 402  
Aug 31/77



OLYMPUS 593

MK.610-14-28

OVERHAUL

REPAIR



PINS (8-10/140/270/400/530)

1. Replacement of the Sleeve.

---

PARTS REQUIRED FOR REPAIR

---

Sleeve	300-855-800-6
--------	---------------

---

A. Removal of the Damaged Sleeve. Refer to figure 401.

- (1) Remove the spherical end stop using a pin wrench.
- (2) Install the pin on a lathe as follows:
  - (a) Tighten in soft jaws on diameter A: 64,476 mm (2.5384 in.).
  - (b) Install a 90° tail stock at the end of the pin.
  - (c) Set to obtain a concentricity of diameter C relative to diameter A within 0,025 mm (0.0010 in.) maxi.
- (3) Remove the sleeve by turning per chapter 70-55-10 of Standard Practices, taking care not to damage the pin.

NOTE: Pin material: KC20WNa (HS25)

B. Visual Inspection of Parts.

- (1) Check for the good condition of silver plating on the spherical end stop thread.

If necessary, recondition per REP 8-110-1.

- (2) Check that the sleeve mating face on the pin is free of scratch and surface defects.

In case of evidence of defect, remove defect by lapping within dimensional of diameter D.

**78-13-01**

REP 8-10-1

Page 401

Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



C. Fluorescent Penetrant Inspection of Parts.

- (1) Perform a water washable fluorescent penetrant test of the spherical end stop by method M502B of chapter 70-20-10.

No crack allowed.

- (2) Perform a water washable fluorescent penetrant test of the sleeve mating face of the pin (diameter D) by method M504B of chapter 72-20-10.

No crack allowed.

D. Dimensional Inspection.

- (1) Check that diameter D is superior to 26,94 mm (1.0606 in.).

If diameter is lower than this value, store the part for a futur repair.

E. Installation of a New Sleeve on the Pin.

- (1) Make sure that the parts are clean.

If necessary clean the parts with a clean cloth moisted with solvent P325 (Acetone) or P422 (Methylethylketone).

- (2) Chill the pin in liquid nitrogen.
- (3) Position the sleeve, chamfered side first on the pin and fit until abutment.

F. Machining of Sleeve. Refer to figure 402.

- (1) Install the pin assembly on a grinding machine as follows:

- (a) Tighten in soft jaws on diameter A: 64,476 mm (2.5384 in.).
- (b) Install a 90° tail stock at the end of the pin.
- (c) Set to obtain a concentricity of diameter C relative to diameter A within 0,025 mm (0.0010 in.) maxi.

78-13-01

REP 8-10-1  
Page 402  
Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Grind the outer diameter, Dia B, of the sleeve per figure 402.

NOTE: Sleeve material: KC20WNx (HS25).

- G. Clean the Pin per Method M100A of Chapter 70-15-20.
- H. Perform a water washable fluorescent penetrant test of the sleeve by method M501B of chapter 72-20-10.
- No crack allowed.
- I. Install the Spherical End Stop as Follows.
- (1) Lightly coat the thread with oil P194 (lanoline).
- (2) Install the spherical end stop in the pin. Tighten using a pin wrench. Torque to 2,6-2,9 daN.m. (19-21 lb.ft).

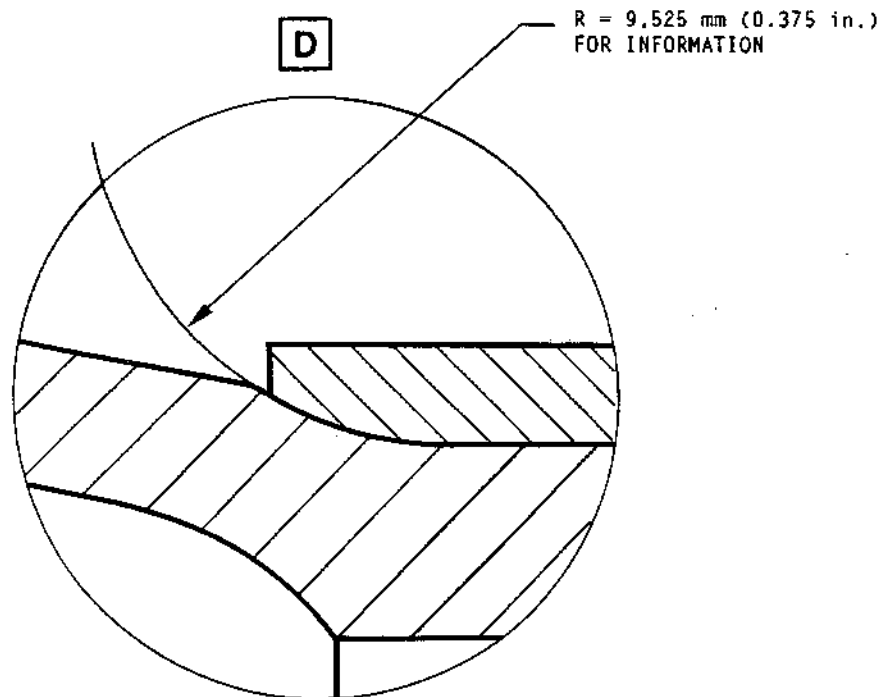
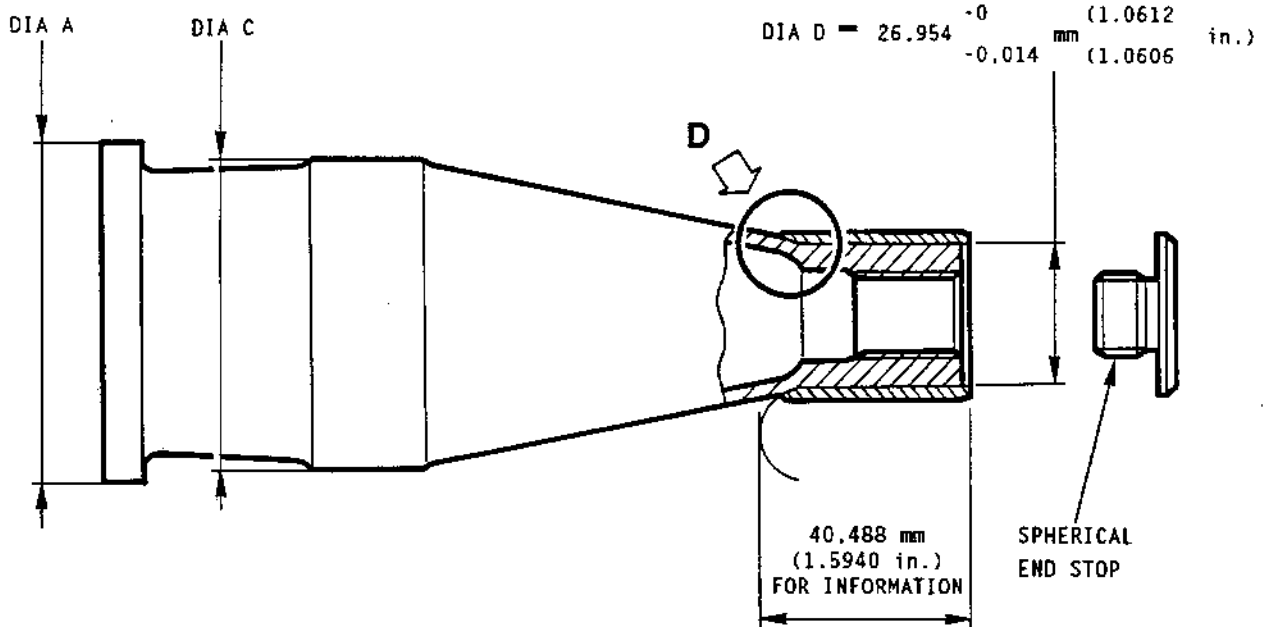
**78-13-01**

REP 8-10-1  
Page 403  
Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Removal of the Damaged Sleeve  
Figure 401

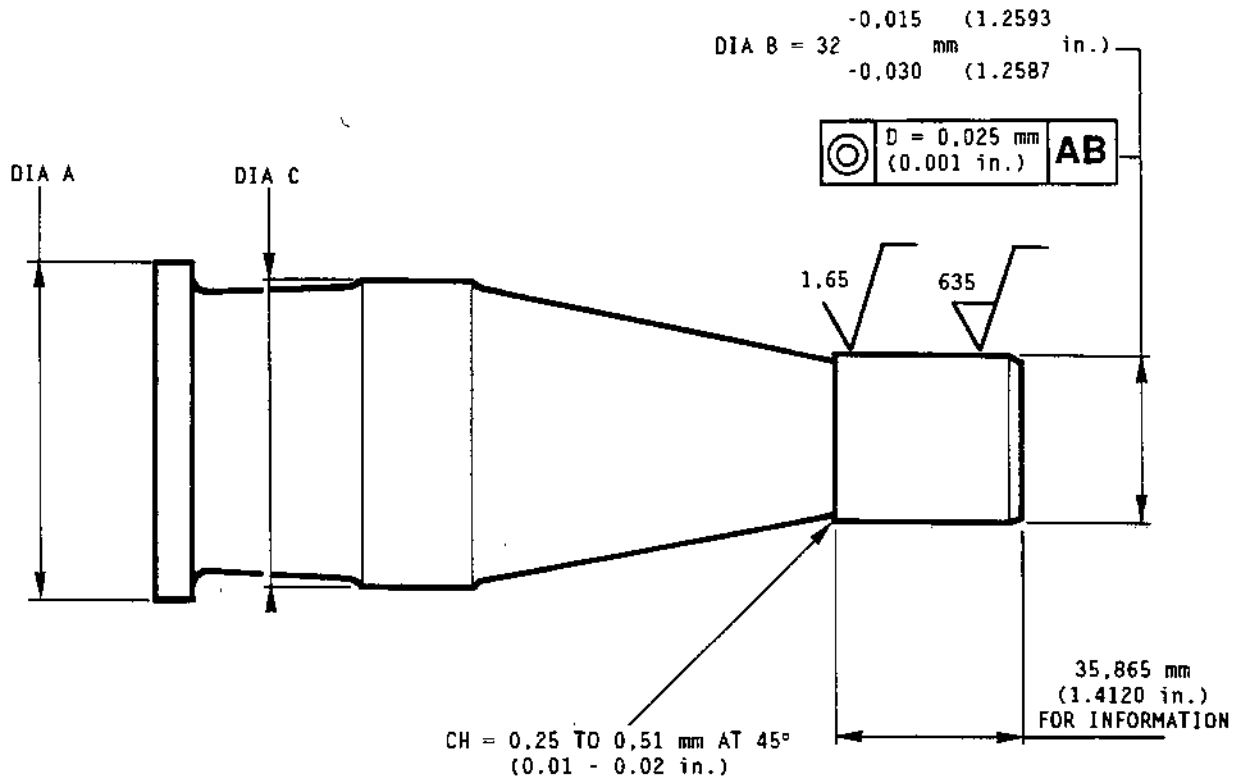
78-13-01

REP 8-10-1  
Page 404  
Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Machining of Sleeve  
Figure 402

78-13-01

REP 8-10-1  
Page 405/406  
Apr 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

SPACER (8-50/51/180/181/310/311/440/441)

1. Renewing the anchor nuts

---

PARTS REQUIRED FOR REPAIR

---

Nut No. NAS 686 C3 (649-785-086-0)

Rivet No. CR 2662-3-2 (649-772-059-0)

---

A. Removing the damaged anchor nut

- (1) Remove nut by drilling out the rivets securing it  
(Nominal rivet : Diameter 2,4 mm (0.094 in.).

B. Installing a new anchor nut

- (1) Check the rivet holes as instructed in chapter 70-50-50 "RIVETING".
- (2) Locate a new anchor nut and rivet it as instructed in chapter 70-50-50 "RIVETING" and as shown on figure 401.
- (3) Check the riveting as instructed in chapter 70-50-85 "RIVETING".

PRINTED IN FRANCE

78-13-01

REP 8-50-1

Page 401

Oct 31/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

SPHERICAL STOP (8-90/220/350/480/590)

1. Reconditioning the silver plating

---

PARTS REQUIRED FOR REPAIR

---

A. Reconditioning the silver plating

- (1) Recondition silver plating in accordance with the method M303B a) of chapter 70-15-30 "SURFACE TREATMENTS" and as indicated on figure 401.

NOTE 1 : After stripping-off the old silver plating, crack test to be carried out using the post-emulsified fluorescent penetrant process M504 B of chapter 70-20-10 "DYE PENETRANT CRACK TESTING".

2 : Plating thickness : 0,015 to 0,020 mm  
(0.0006 - 0.0008 in.)

B. Control

- (1) Using a master ring, check that the threaded zone is free from any seizing condition.

78-13-01

REP 8-90-1

Page 401

May 31/76



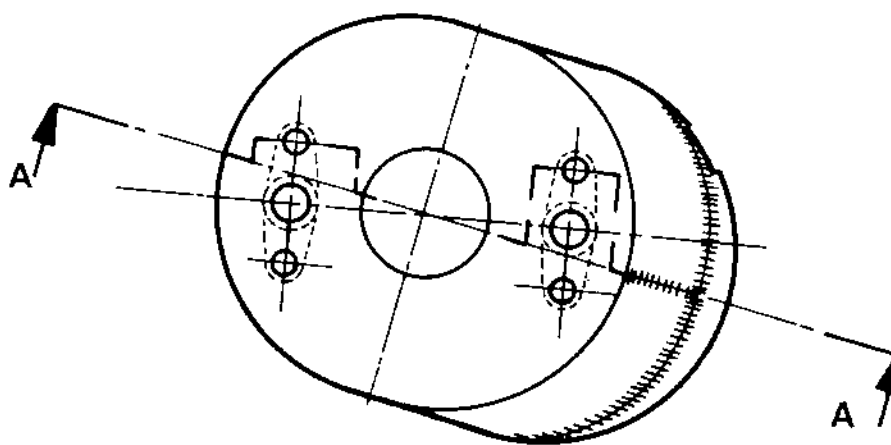
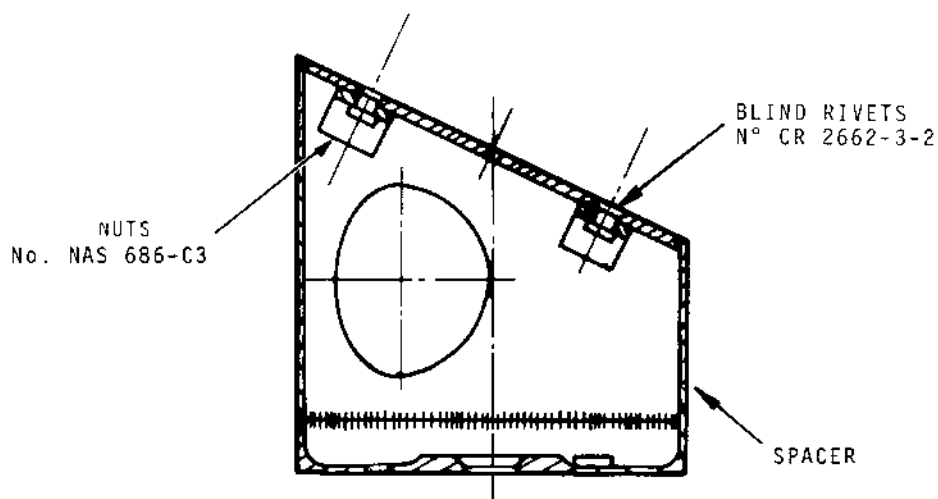


OLYMPUS 593

MK.610-14-28  
OVERHAUL



SECTION A A



Renewing the Anchor Nuts  
Figure 401

78-13-01

REP 8-50-1

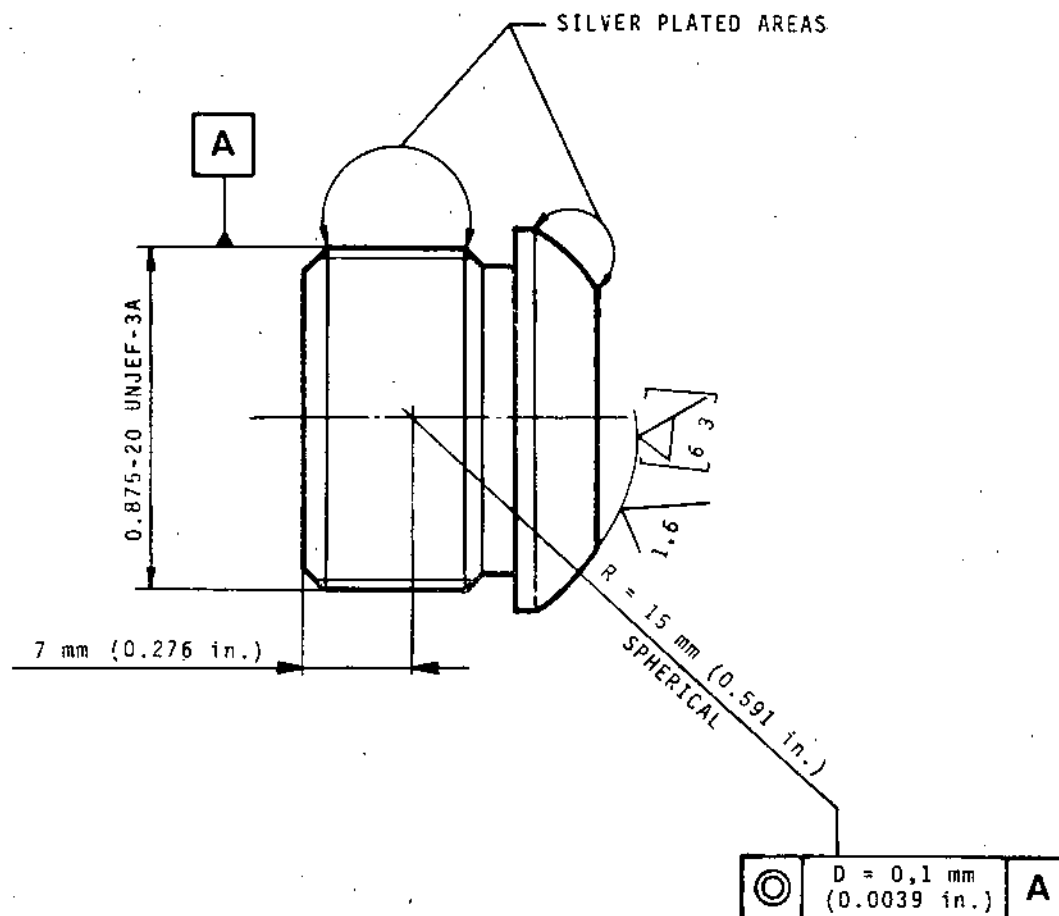
Page 402

Oct 31/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Reconditioning the Silver Plating  
Figure 401

78-13-01

REP 8-90-1

Page 402

May 31/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

CUP WASHER ASSY (8-100/230/360/490/600)

1. Renewing the crimped nut

---

PARTS REQUIRED FOR REPAIR

---

Nut No. 649-784-031-0

---

A. Removing the damaged crimped nut

- (1) Using a 60° relief angle milling cutter fitted on a hand drill, machine the crimped flange (collar) of the nut. When the flange is sufficiently thinned, the nut can be driven out.

NOTE : It is recommended not to machine the flange entirely in order to avoid damage to the crimping recess.

B. Installing the new crimped nut

- (1) Install a new nut using the crimping tool SC 234 and shown on figure 401.

C. Checking the crimping

- (1) Ensure that :

The nut skirt is recessed relative to the part abutment face.

The skirt is not cracked. Otherwise, fit a new nut.

The nut can be moved axially by a few tenths of a millimeter; refer to figure 401.

PRINTED IN FRANCE

78-13-01

REP 8-100-1

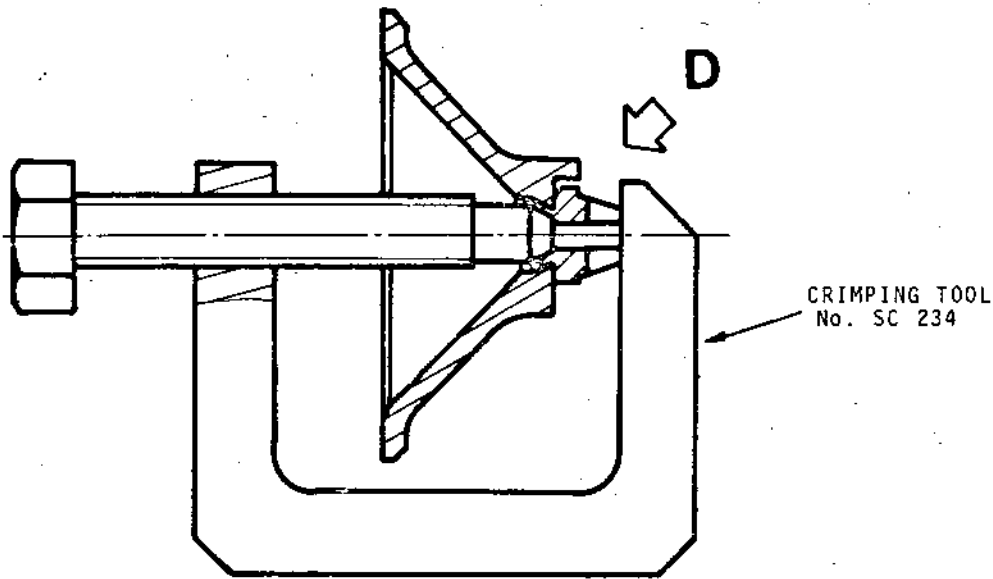
Page 401

May 31/76

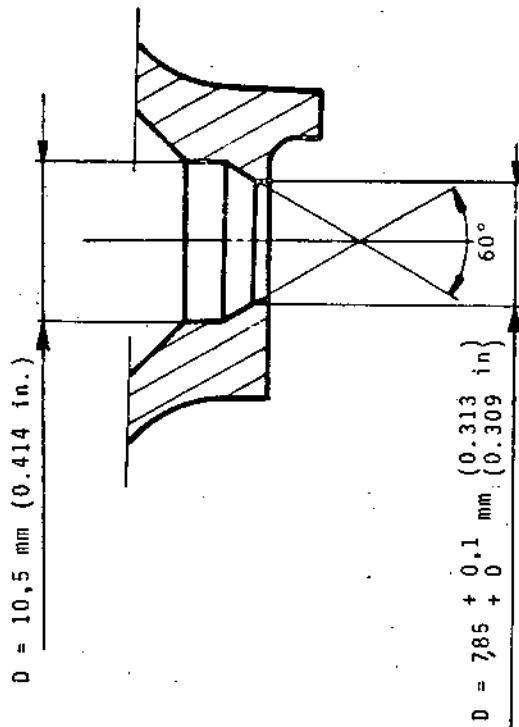


OLYMPUS 593

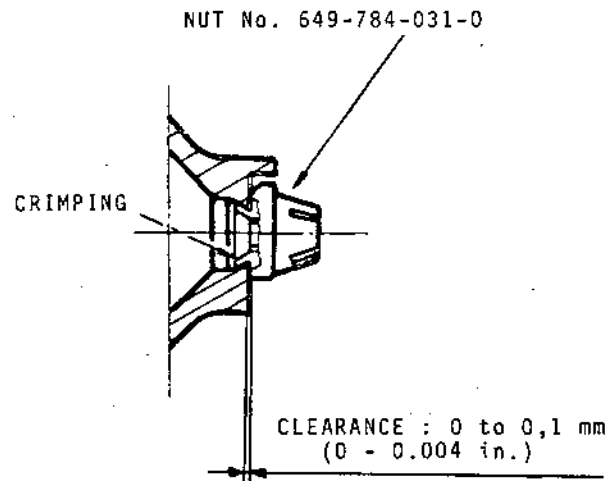
MK.610-14-28  
OVERHAUL



WITHOUT NUT



WITH CRIMPED NUT INSTALLED



Renewing the Crimped Nut  
Figure 401

78-13-01

REP 8-100-1

Page 402

May 31/76

**OLYMPUS 593**

MK. 610-14-28

OVERHAUL

REPAIRREAR SIDE FAIRING (9-10/270)1. Replacement of reinforcement plates or their fasteners

---

PARTS REQUIRED FOR REPAIR

---

Doubler	301-115-600-0	
Doubler	301-116-100-0	
Doubler	301-116-150-0	
Reinforcement plate	301-115-701-0	
Reinforcement plate	301-115-751-0	
Reinforcement plate	301-115-801-0	
Reinforcement plate	301-115-851-0	
Reinforcement plate	301-115-901-0	
Reinforcement plate	301-115-951-0	
Reinforcement plate	301-116-001-0	
Reinforcement plate	301-116-051-0	
Pin	301-114-900-0	
Washer to be welded	301-116-200-0	
Weld filler wire P 3002 (Z 3 CN 18)		
Rivet CHERRY-LOCK	CR 2838-5-6	(649-772-079-0)
or	CR 2744-6-6	(649-772-232-0)
or	CR 2644-6-6	(649-772-352-0)
Rivet CHERRY-LOCK	CR 2838-5-7	(649-772-080-0)
or	CR 2744-6-7	(649-772-304-0)
or	CR 2644-6-7	(649-772-353-0)

## A. Replacement of rivets A and B

- (1) Remove damaged blind rivets as instructed in chapter "RIVETING", Section 70-50-50.
- (2)
  - (a) Inspect the rivet holes as described in chapter "RIVETING", Section 70-50-50.
  - (b) If necessary, make holes for repair-size rivets.
- (3) Apply new blind rivets as instructed in chapter "RIVETING", Section 70-50-50, "Joints Made by the Use of CHERRY-LOCK Blind Rivets", and in figure 401.

**78-13-01**

REP 9-10-1

Page 401

Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (4) Check the riveting as described in chapter "RIVETING" Section 70-50-85.

B. Replacement of pins and welded washers.

- (1) Remove the damaged fasteners of doublers by grinding or drilling on welded washer side.
- (2) Fit new pins and washers as follows :
  - (a) Place the pin and washer in their recesses as shown in figure 401.
  - (b) Exert a force of 45 daN (100 lbs) on the washer, and argon arc-weld it onto the pin as instructed in chapter "WELDING", Section 70-35-10 "Welding by Fusion".  
  
Weld filler wire P3002 (Z 3 CN 18)  
Weld class B1
- (3) Machine down the excess pin portion flush with the washer, without damaging the weld.
- (4) Carry out inspection of the Class B1 weld as described in chapter "WELDING", Section 70-35-80.

C. Replacement of reinforcement plates and doublers

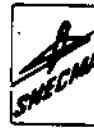
- (1) Remove the fasteners of reinforcement plates and doublers as instructed under A and B in this repair scheme description and in figure 401.
- (2) Apply identifying marks to the retaining holes by the following procedure :
  - (a) Stick strips of STABYLENE bracing paper on the side fairing.
  - (b) Mark the retaining holes.
  - (c) Position the reinforcement plates or doublers on the side fairing as indicated in figure 401.
  - (d) Stick the STABYLENE strips on the reinforcement plates, and take down.
- (3) Drill the appropriate doubler and reinforcement plate retaining holes in the side fairing.



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (a) On the doublers, marked "C" to dia.  $6 + 0,1$  mm  
 $(0.238 + 0.004$  in.)  
 $+ 0.001$
- (b) On the reinforcement plates, marked A and B as instructed in chapter "RIVETING", Section 70-50-50, "Joints Made by the Use of CHERRY-LOCK Blind Rivets", and in figure 401.
- (4) Drill the holes for the side fairing fasteners in the nacelle.
  - (a) In the region of doublers, marked "D" to dia.  
 $6,35 + 0,1$  mm ( $0.250 + 0.004$  in.)  
 $+ 0$
  - (b) In the region of reinforcement plates, marked "E" as instructed in chapter "RIVETING", Section 70-50-40, "Joints Made by Means of HI-LOCK Fixings".
- (5) Go on to secure the doublers and reinforcement plates on the side fairing, with the fasteners mounted as described under A and B in this repair scheme description, and as shown in figure 401.

78-13-01

REP 9-10-1

Page 403

Aug 31/77



OLYMPUS 593

MK.610-14-28

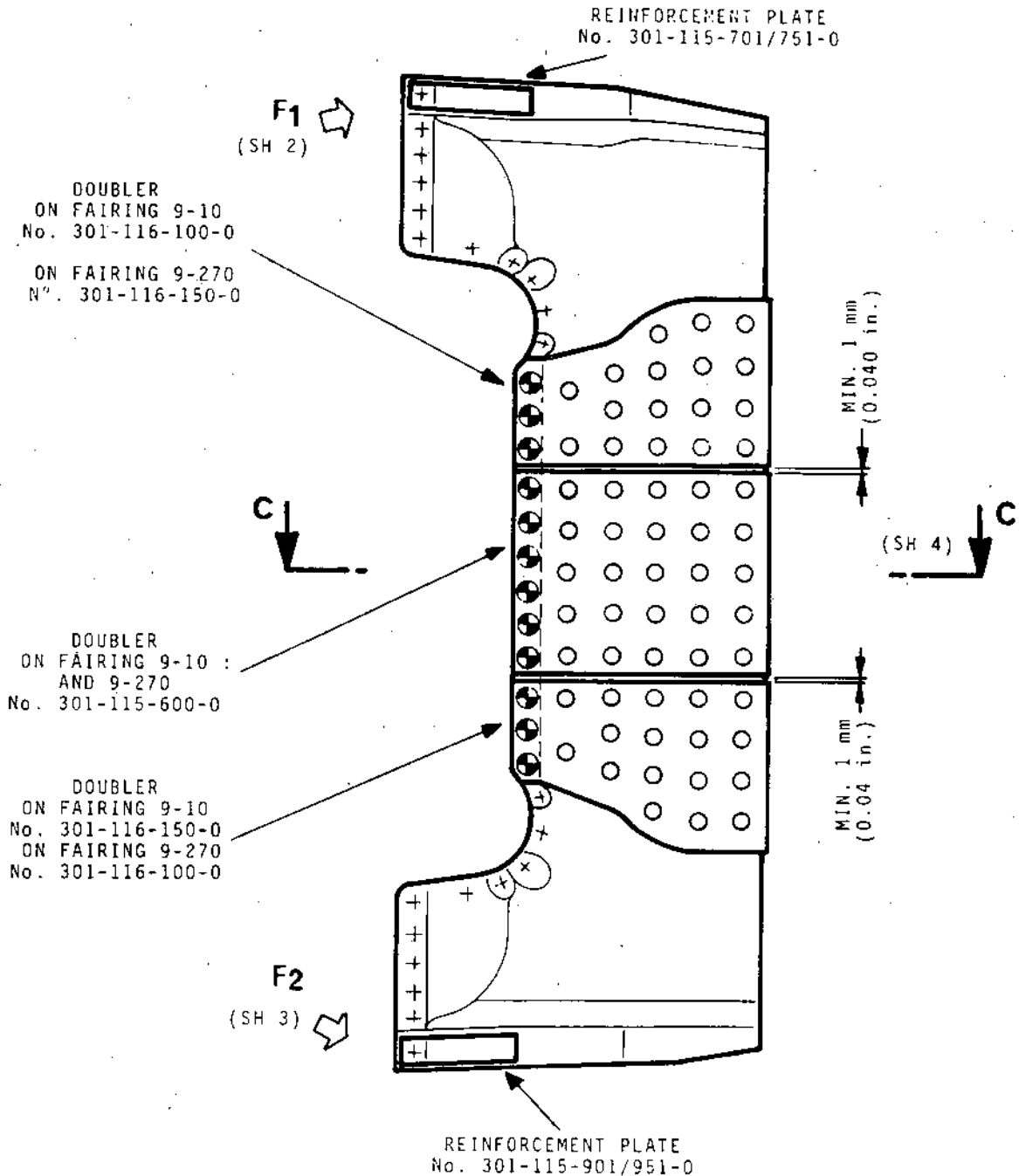
OVERHAUL



INSIDE VIEW OF SIDE FAIRING

9-170 AS SHOWN

9-10 SYMMETRICAL



Replacement of Reinforcement-plate Doublers  
or Theirs Fasteners  
Figure 401 - (Sheet 1 of 4)

78-13-01

REP 9-10-1

Page 404

Aug 31/77





OLYMPUS 593

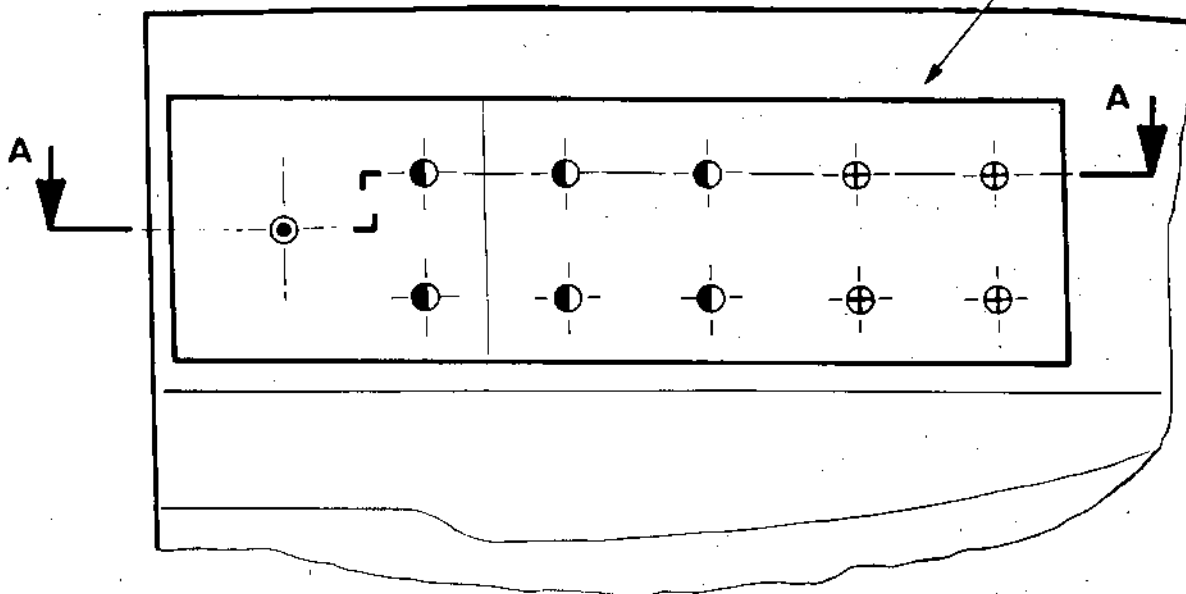
MK.610-14-28

OVERHAUL



F<sub>1</sub>

REINFORCEMENT PLATE  
No. 301-115-751-0



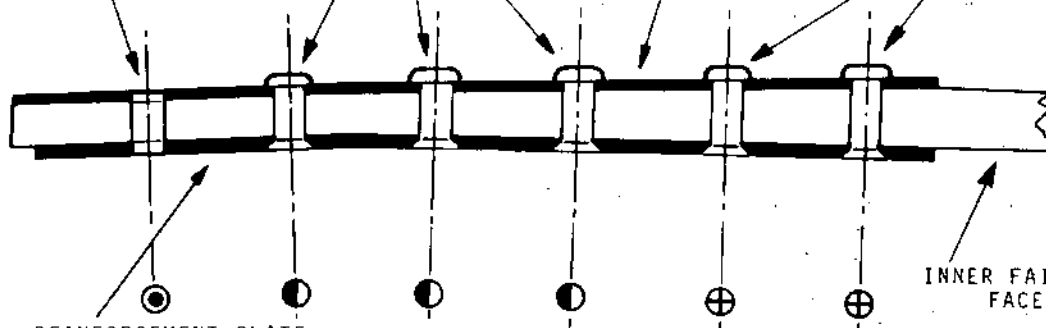
SECTION AA

REINFORCEMENT PLATE  
FOR FAIRING 9-10 : No.301-115-801-0  
FOR FAIRING 9-270 : No.301-115-851-0

HI-LOK BOLT  
HOLE  
HL 169-6-X

BLIND RIVETS  
CR 2838-5-6

BLIND RIVETS  
CR 2838-5-7



REINFORCEMENT PLATE  
FOR FAIRING 9-10 : No.301-115-701-0  
FOR FAIRING 9-270 : No.301-115-751-0

INNER FAIRING  
FACE

Replacement of Reinforcement-plate Doublers  
or Theirs Fasteners

Figure 401 - (Sheet 2 of 4)

78-13-01

REP 9-10-1

Page 405

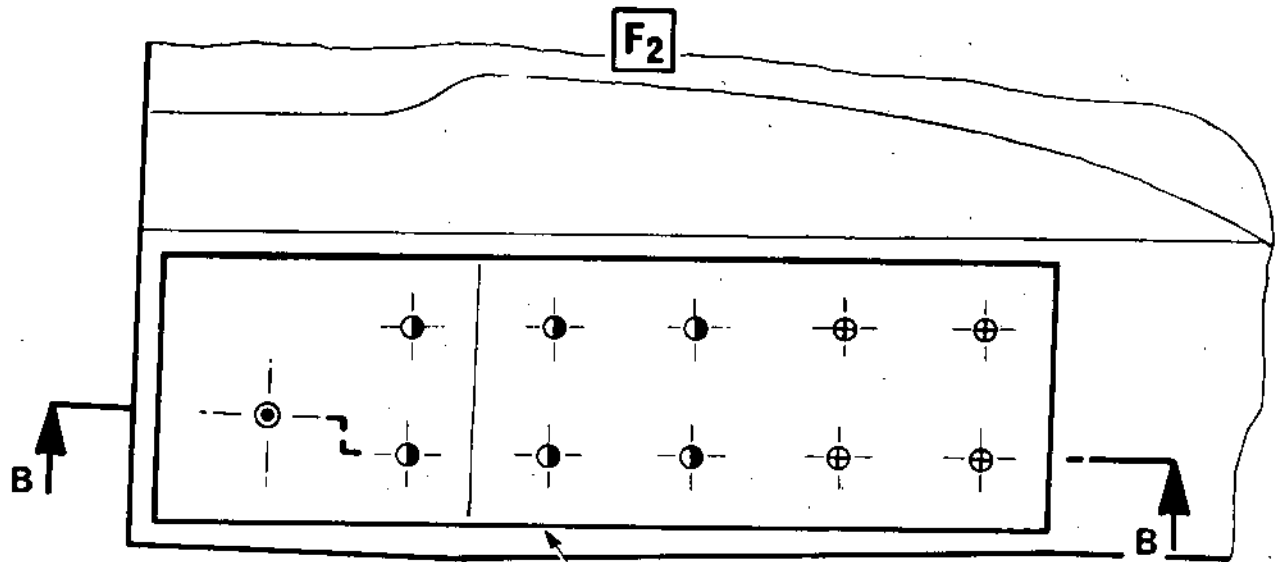
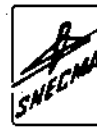
Aug 31/77



OLYMPUS 593

MK.610-14-28

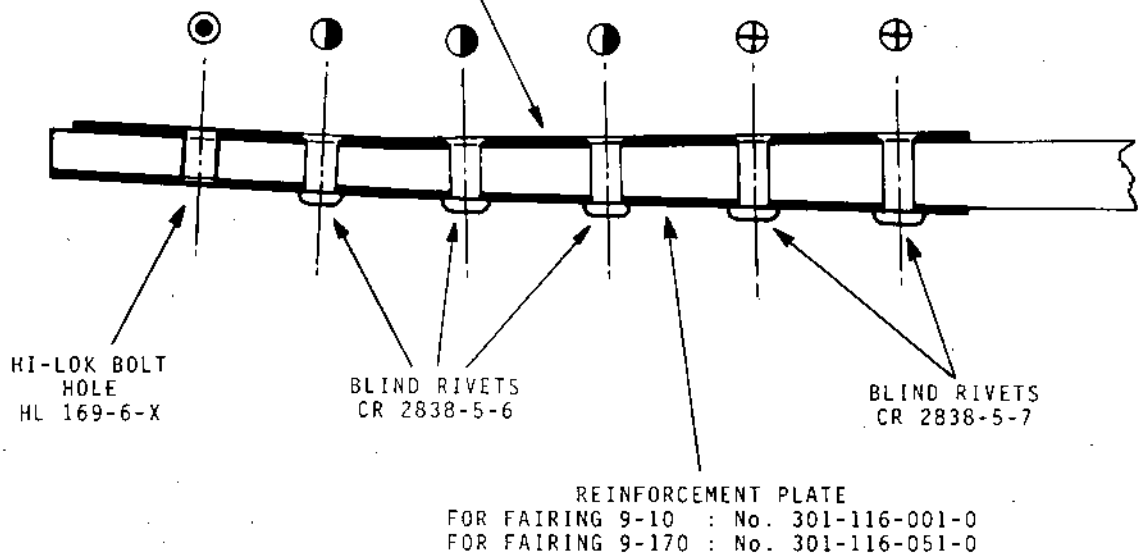
OVERHAUL



REINFORCEMENT PLATE No. 301-115-951-0

SECTION BB

REINFORCEMENT PLATE  
FOR FAIRING 9-10 : No. 301-115-901-0  
FOR FAIRING 9-270 : No. 301-115-951-0



Replacement of Reinforcement-plate Doublers  
or Their Fasteners

Figure 401 - (Sheet 3 of 4)

78-13-01

REP 9-10-1

Page 406

Aug 31/77

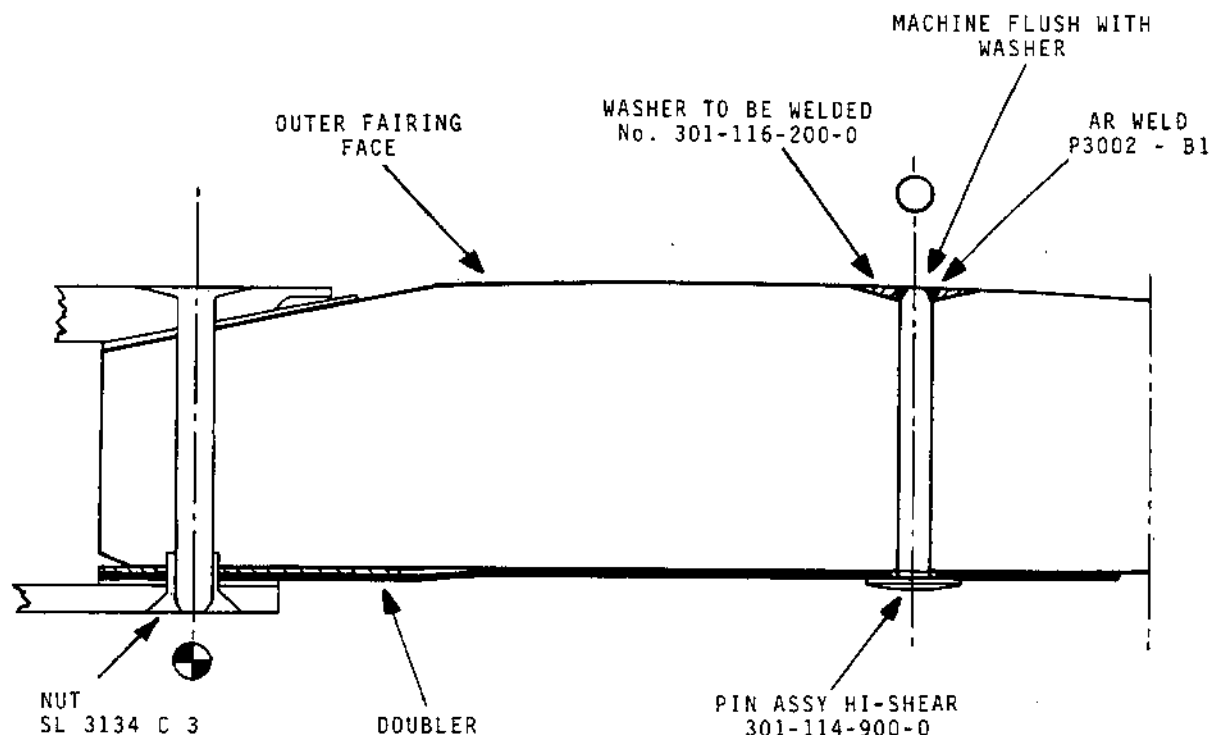


OLYMPUS 593

MK.610-14-28  
OVERHAUL



SECTION CC



REPLACEMENT OF FASTENERS

MARKING TEXT	FIGURE	TYPE	ORIGIN	REPAIR
"A"	⊙	CHERRY LOCK	CR 2838-5-6	CR 2744-6-6 or CR 2644-6-6
"B"	⊕	CHERRY LOCK	CR 2838-5-7	CR 2744-6-7 or CR 2644-6-7
"C"	○		301-114-900-0	301-114-900-0

DRILLING RETAINING HOLES

MARKING TEXT	FIGURE	DESCRIPTION
"D"	⊕	RETAINING HOLE FOR NUT SL 3134 C 3
"E"	⊙	RETAINING HOLE FOR BOLT HL 169-6-X

Replacement of Reinforcement-plate Doublers  
or Their Fasteners  
Figure 401 - (Sheet 4 of 4)

78-13-01

REP 9-10-1  
Pages 407/408  
Apr 30/93

**OLYMPUS 593**MK.610-14-28  
OVERHAULREPAIRREAR SIDE FAIRING (9-10/270)2. Reconditioning the Fairings Consecutively to Various Damage

---

**PARTS REQUIRED FOR REPAIR**

---

CAF 4 Silicone elastomer (P 474)

Bar material P 3601 (Z6 NCT 25 sv)

Filler welding wire P 3008 (Z8 CND 15)  
or P 3030 (ND 24 FeC)

HI-LOCK screw HL	144-5-37	(649-781-454-0)
	144-5-38	(649-781-455-0)
	144-5-39	(649-781-456-0)
	144-5-40	(649-781-457-0)
	144-5-41	(649-781-458-0)
	144-5-42	(649-781-459-0)
	144-5-43	(649-781-460-0)
	144-5-44	(649-781-461-0)
	144-5-45	(649-781-462-0)
	144-5-46	(649-781-463-0)
	144-5-47	(649-781-464-0)
	144-5-48	(649-781-465-0)
	144-5-49	(649-781-466-0)

HI-LOCK self-locking nut HLN1G5 (649-785-047-0)

Spacer No. 002-004-076-0

Washer No. 649-786-229-0

Thrust washer No. 002-004-077-0

---

## A. Introduction

In this repair scheme, three cases are considered :

- (1) Crack repair in accordance with para. B.
- (2) Repair of impacts (nicks/dents) in accordance with para. C.
- (3) Repair of delamination in accordance with para. D.

**78-13-01**

REP 9-10-2

Page 401

Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



## B. Crack repair

### (1) Restrictions on repair

- (a) Crack to be no longer than 100 mm (4 in.).
- (b) The sound area surrounding the repair must span 100 mm (4 in.) minimum.
- (c) The crack must not lie in a delaminated zone.  
Aurally check (tap coin test) to ensure there is no delamination.  
The non-compliance with one of these prerequisites should not permit to carry out the repair.

### (2) Repair instructions

- (a) Using a X 20 power binocular eye-piece, accurately demarcate the crack then, stop-drill either ends of crack by a 2,5 mm (0.098 in.) dia. hole.
- (b) Argon arc weld fill the crack as instructed in chapters 70-30-10 and 70-35-10.  
Filler welding wire : P 3008 or P 3030.  
Weld class : B1.

NOTE : During the welding operation, it is essential that copper heat-sink blocks (cooling blocks) be placed as close as possible the zone being welded (See fig. 401).

### (3) Inspection

Inspect the weld class B1 as instructed in chapter 70-35-80.

- Locally check for cracks by the water-washable dye penetrant test, method M 501 B in chapter 70-20-10.

CAUTION : THE PENETRANT IS TO BE CLEARED OUT USING A CLOTH SOAKED WITH ISOPROPYL ALCOHOL (P 442).

78-13-01

REP 9-10-2

Page 402

Sep 30/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



C. Repair of impacts (nicks/dents)

(1) Restrictions on repair

- (a) Using a X 20 power binocular eye-piece, check that the area to be repaired is free from cracks.
- (b) Tap coin test to ascertain there is no delamination.

Do not carry out the repair if one of the above defects is present.

(2) Repair instructions

- (a) Recondition the contour of the rear side fairing using CAF 4 Silicone Elastomer (P 474), per method M 701 in chapter 70-31-20 and as indicated below :
  - 1. Degrease the area under repair with a cloth soaked with trichloroethylene (P 76 A).
  - 2. Prepare the repair area by sanding with an emery cloth.
- (b) After polymerization of elastomer, if required, smooth the surface discontinuities by sanding with an emery cloth.

D. Repair of delaminations

(1) Restrictions on repair

- (a) Using a X 20 power binocular eye-piece, check for cracks in the area under repair.
- (b) Ensure there is no impact in same area.
- (c) Repairs can not be carried out in the shaded zones defined on figure 402.

The non-compliance with one of these criteria should not permit this kind of repair.

(2) Repair instructions

- (a) Using a very fine grain abrasive paper, lightly sand the panel until the cell pattern shows up in the area under repair.

78-13-01

REP 9-10-2

Page 403

Sep 30/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Mark the locations of the stiffening points as indicated in figure 402.

When a delamination lies next to the doublers or a fillet, mark the stiffening points per the conditions stated in figure 402.

- (c) Drill the passage holes for the HI-LOCK screws as instructed in chapter 70-50-40 and per figure 402.
- (d) In the delamination zone, drill the recess holes for the spacers to the dimensions indicated on figure 402.
- (e) Measure and record the effective value of depth "E" for the spacer recess holes in accordance with figure 402.
- (f) Machine the spacers from stock material P 3601 to the dimensions specified in figure 402.

NOTE : The value  $L = "E" - 0,2 \text{ mm (0.008 in.)}$  for the length of spacers is required to allow for a pre-stress condition upon the installation of HI-LOCK screws.

- (g) If necessary, machine thrust washers from stock material P 3601, as per figure 402 (Sheet 5 of 5).

NOTE : The alpha angle is that largest slope angle relative to the abutment face of HI-LOCK self-locking nut.

- (h) Locate the spacers in their recess and hold them in place using bonding agent LOCTITE 307 (P 502).
- (j) Install the stiffening attachments as indicated in figure 402 and instructed in chapter 70-50-40.

NOTE : When fitting the thrust washer, position it so that its radiused face contacts the stressskin panel.

### (3) Inspection

Inspect the HI-LOCK screw fixings as instructed in chapter 70-50-84.

**78-13-01**

REP 9-10-2

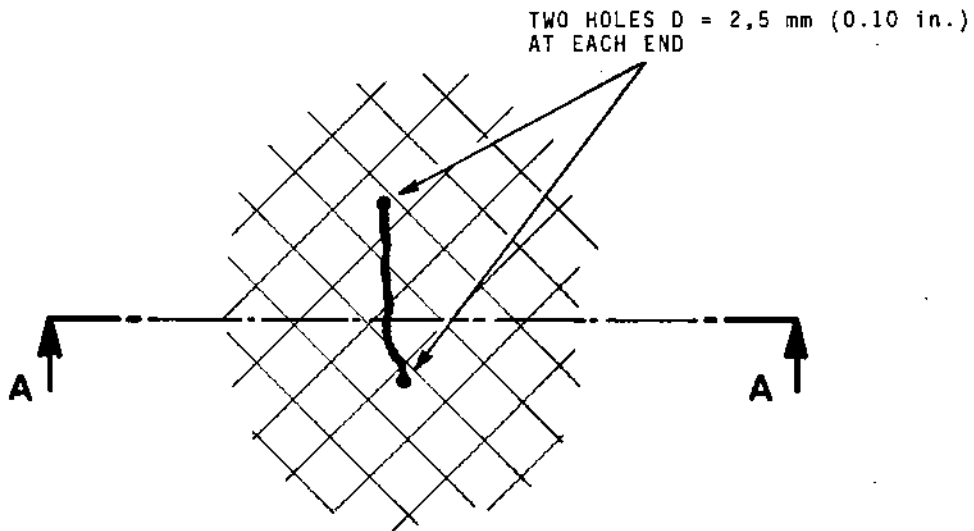
Page 404

Sep 30/78

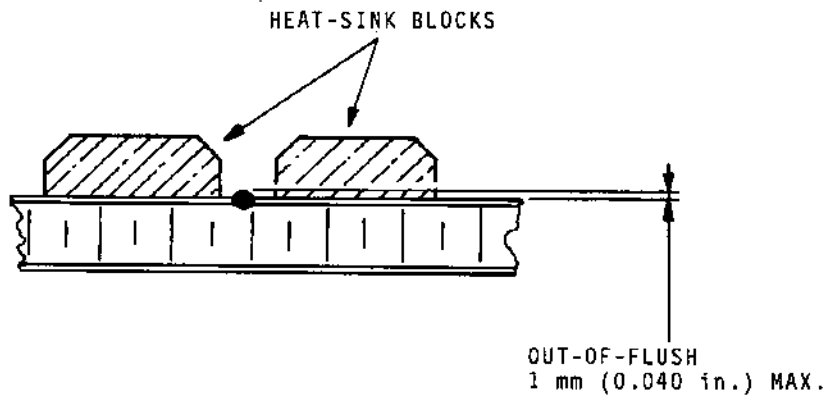


OLYMPUS 593

MK.610-14-28  
OVERHAUL



SECTION AA



Repairing the Cracks by Welding  
Figure 401

78-13-01

REP 9-10-2

Page 405

Sep 30/78





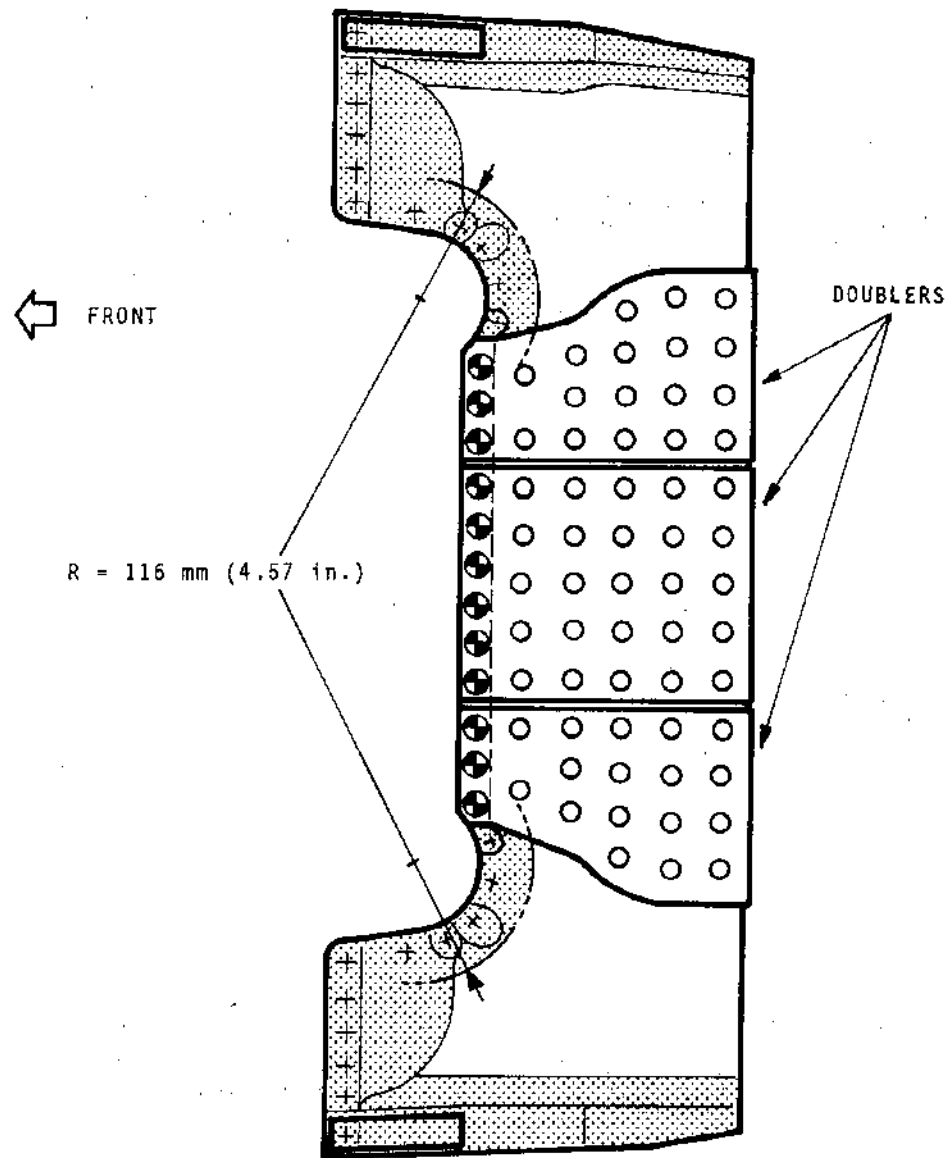
OLYMPUS 593

MK.610-14-28  
OVERHAUL



INNER SIDE VIEW OF FAIRING

FAIRING 9-170 SHOWN  
FAIRING 9-10 SYMMETRICAL



CRUSHED EDGE ZONES WHICH CAN NOT  
ACCOMMODATE STIFFENING ATTACHMENTS

Repairing the Delaminations  
Figure 402 (Sheet 1 of 5)

78-13-01

REP 9-10-2

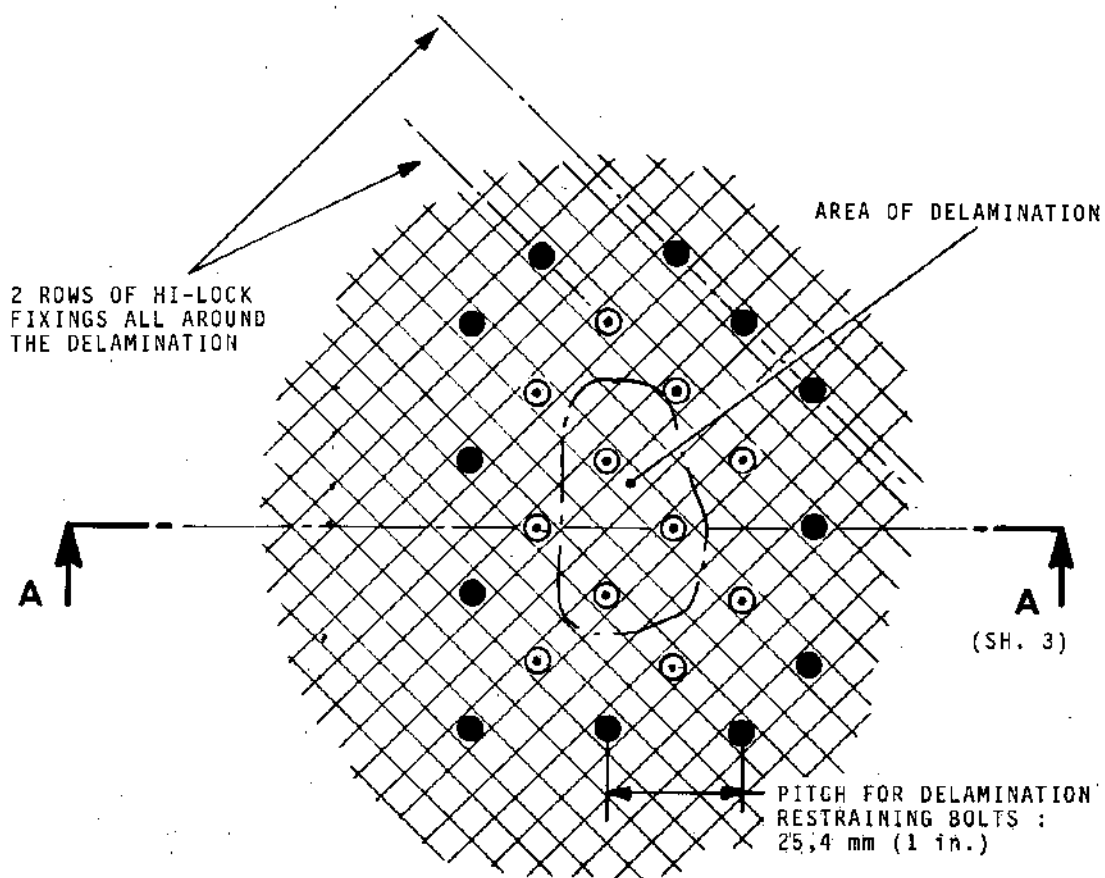
Page 406

Sep 30/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Repairing the Delaminations  
Figure 402 (Sheet 2 of 5)

78-13-01

REP 9-10-2

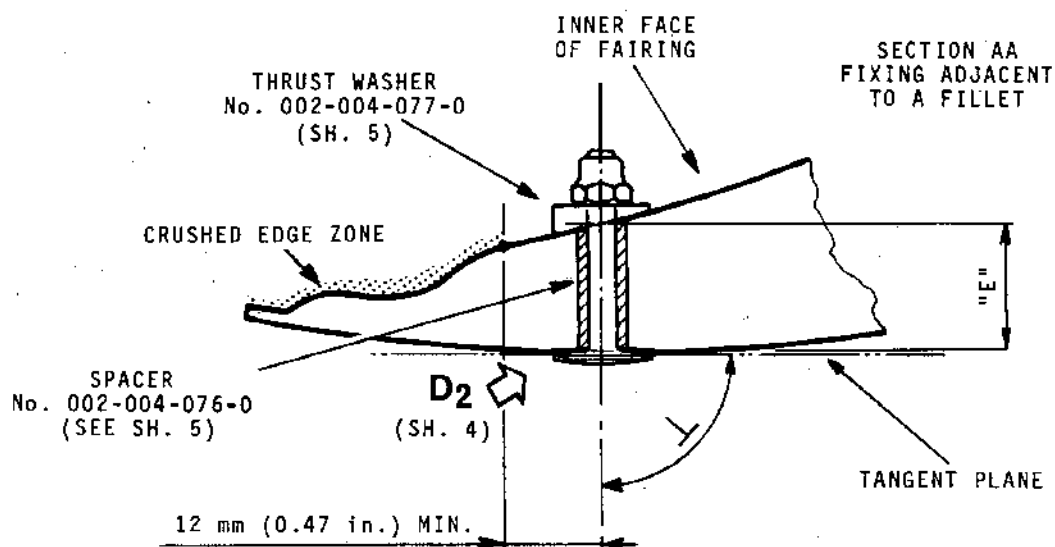
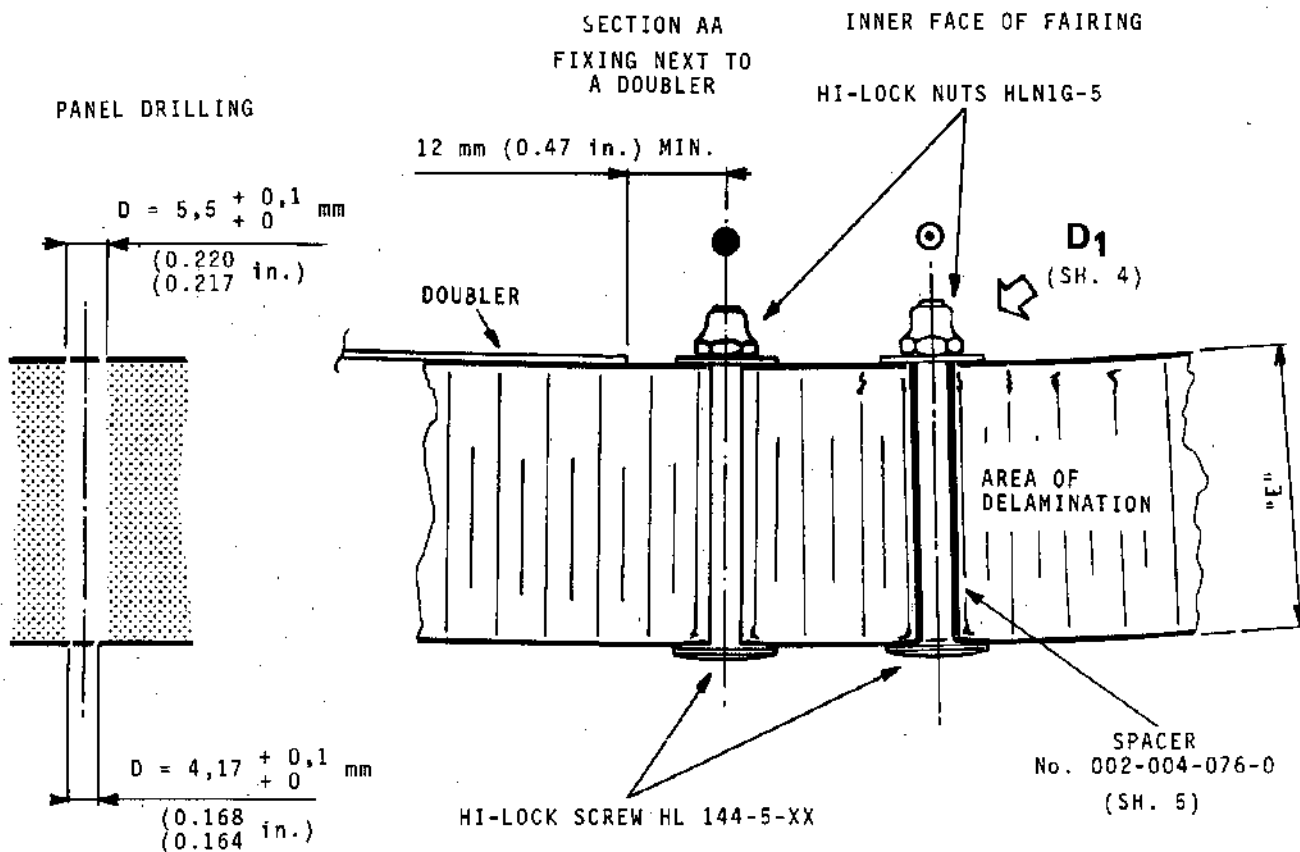
Page 407

Sep 30/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Repairing the Delaminations  
Figure 402 (Sheet 3 of 5)

78-13-01

REP 9-10-2

Page 408

Sep 30/78



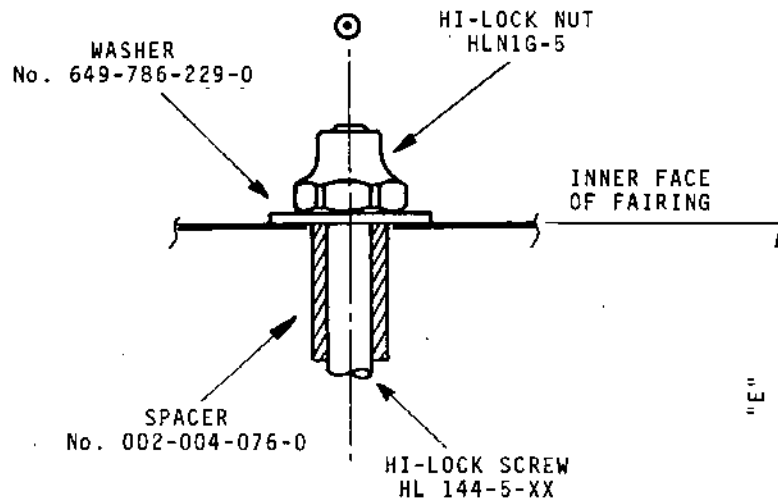
OLYMPUS 593

MK.610-14-28  
OVERHAUL

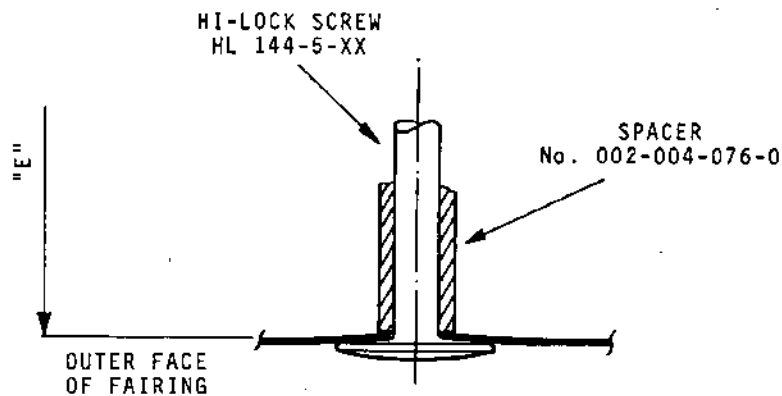


PRINTED IN FRANCE

D1



D2



Repairing the Delaminations  
Figure 402 (Sheet 4 of 5)

78-13-01

REP 9-10-2

Page 409

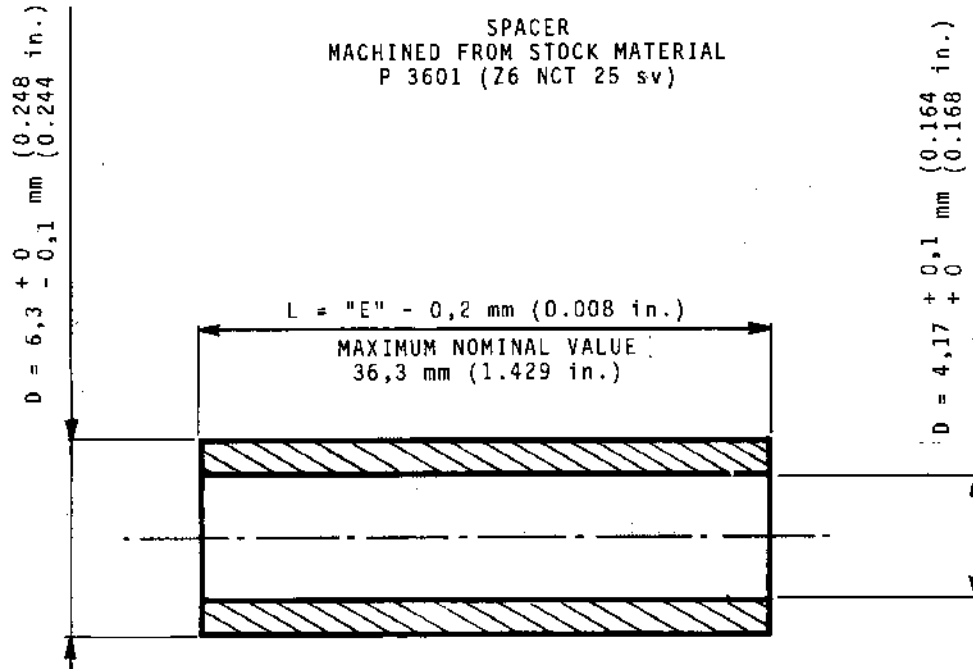
Sep 30/78



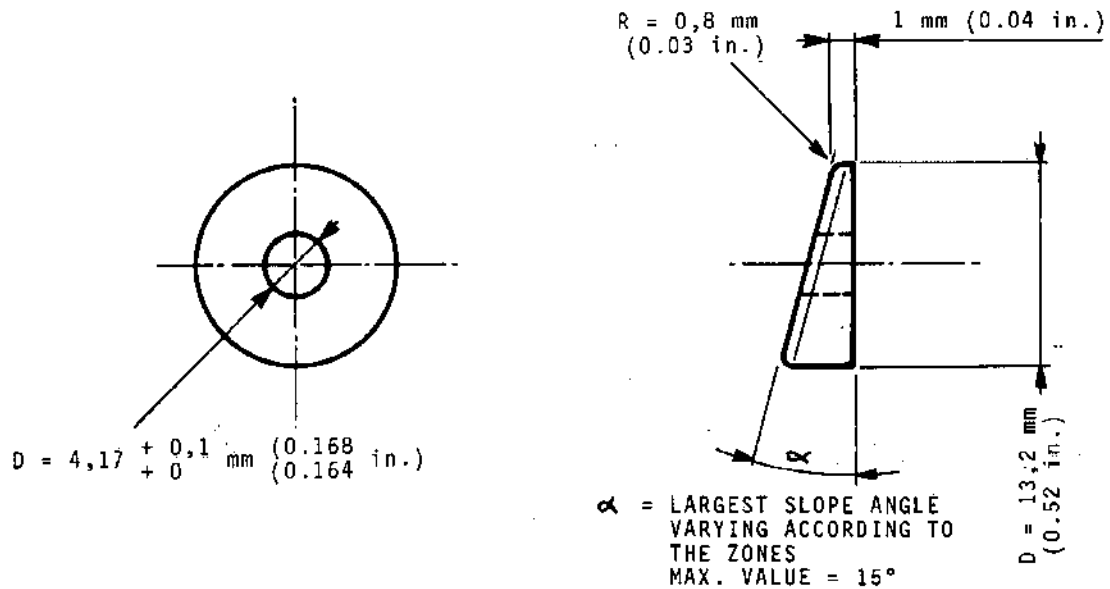
OLYMPUS 593

MK.610-14-28

OVERHAUL



THRUST WASHER  
MACHINED FROM STOCK MATERIAL  
P 3601 (Z6 NCT 25 sv)



Repairing the Delaminations  
Figure 402 (Sheet 5 of 5)

78-13-01

REP 9-10-2

Page 410

Sep 30/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

HEAT SHIELD (9-530/580/630/680)

1. Replacing the floating nuts

PARTS TO BE REPAIRED

Floating nut	SIMMONDS LA 579-3	(649-302-008-0)
Floating nut	SPS 13716-02-3	(649-785-195-0)
Rivet	BNAE 21217TC2406	(650-025-042-0)
or	BNAE 21217TC3207	(650-025-073-0)

A. Disassembly

- (1) Loosen out the defective nut by grinding out the rivet heads.
- (2) Check the rivet holes as instructed under 70-50-10, chapter "Riveting".

Where called for, rebore the rivet holes on assembly to the next larger diameter as instructed under 70-50-10, chapter "Riveting".

B. Assembly

- (1) Put a new nut in place on the heat shield, then apply to retaining rivets as instructed under 70-50-10, chapter "Riveting" and in Fig. 401.

C. Inspection

- (1) Check the riveting as instructed under 70-50-81, chapter "Riveting".

78-13-01

REP 9-530-1

Page 401

Apr 30/93

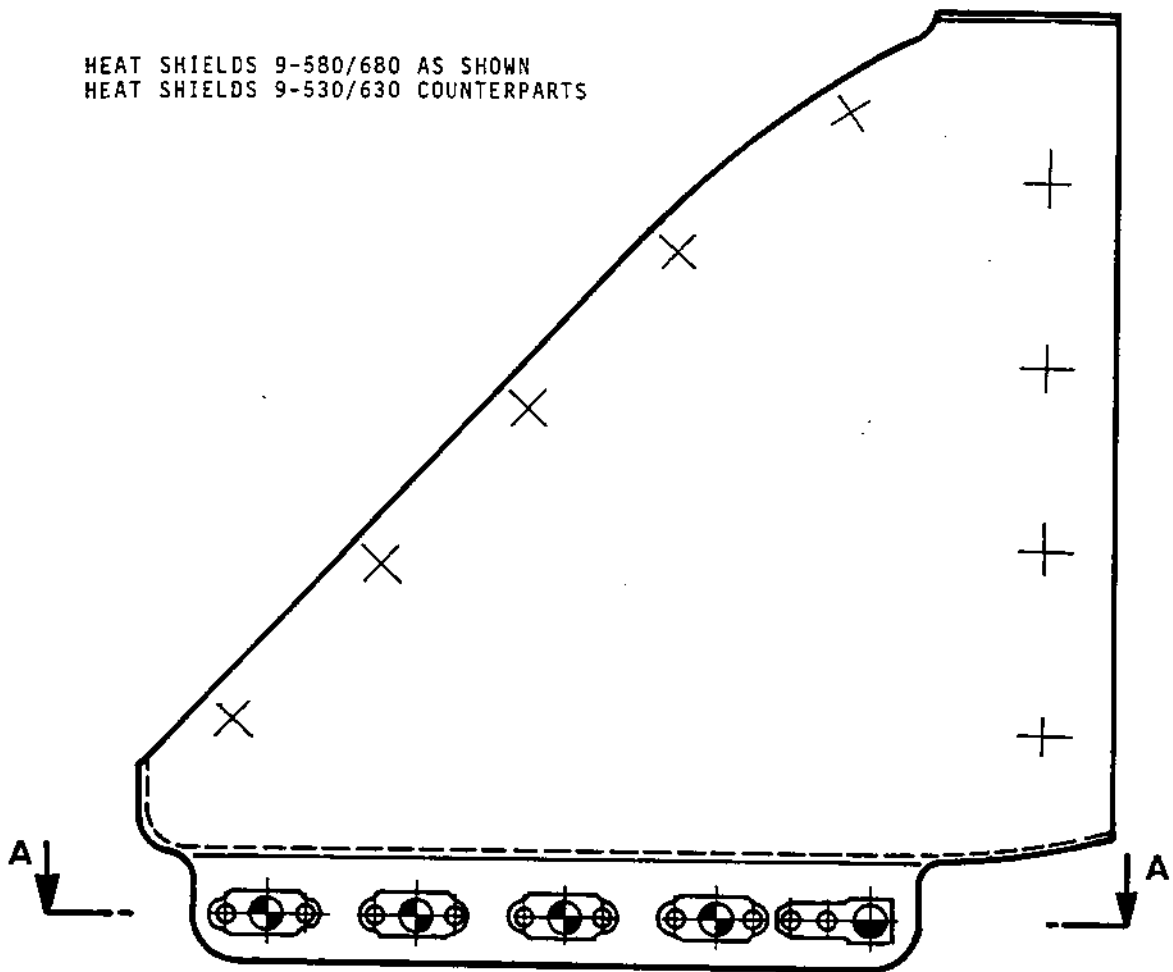


OLYMPUS 593

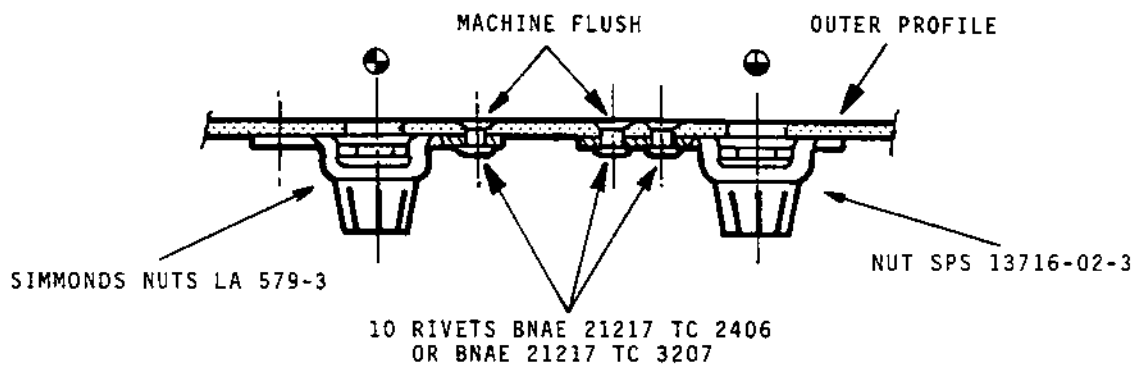
MK.610-14-28  
OVERHAUL



HEAT SHIELDS 9-580/680 AS SHOWN  
HEAT SHIELDS 9-530/630 COUNTERPARTS



SECTION AA



Replacing Floating Nuts  
Figure 401

78-13-01

REP 9-530-1

Page 402

Mar 31/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



## REPAIR

CONVERGENT PANEL ASSY (11-10/40/70/100)1. Renewing the insertsPARTS REQUIRED FOR REPAIR

Insert	649-773-095-0
Insert	649-773-140-0
Hollow rod material P 3621	
Filler welding wire P 3008	

## A. Removing the damaged insert

- (1) Remove the insert by grinding out its flared end as indicated on figure 401.

CAUTION : TAKE CARE TO PROTECT THE STRESSKIN PANEL TO AVOID ANY DETERIORATION OR BURNING AS A RESULT OF THE GRINDING OPERATION.

## B. Preparing the components

- (1) Depending on the type of insert to be renewed, produce a bush as indicated on figure 402.

## C. Installing the insert

- (1) Perpendicular to the insert to be renewed, drill a hole to accommodate the bush.  
The hole location is determined using a drilling template, the ref. No. of which is given on figure 404.

Drilling of hole is carried out using an end mill cutter as instructed in chapter 70-30-10 "PRINCIPLES FOR REPAIRING COMPONENTS MANUFACTURED FROM WELDED HONEY-COMB MATERIAL" and as shown on figure 403.

- (2) After machining, visually check for cracks using a binocular with a tenfold magnifying power.

No crack is permissible. Should one be found, put the part aside pending a repair scheme.

78-13-01

REP 11-10-1

Page 401

Apr 30/93





OLYMPUS 593

MK.610-14-28  
OVERHAUL



(3) To fit the bush, operate as follows :

- (a) Place the bush in position, making sure that it is perpendicular to the panel internal contour.
- (b) Tackweld, then argon arc weld the bush to the converging panel as instructed in chapter 70-35-10 "WELDING BY FUSION" and in chapter 70-30-10 "PRINCIPLES FOR REPAIRING COMPONENTS MANUFACTURED FROM WELDED HONEYCOMB MATERIAL".

Filler welding wire P 3008  
Class of weld B1

NOTE : The panel must be argon-purged for one (1) hour prior to carrying out the welding.  
During the welding operation, protect the panel around the bush using copper heat-sink blocks.

- (c) Inspect the weld, class B1, for soundness as instructed in chapter 70-35-80 "INSPECTION OF WELDS".
  - (d) Grind the weld seam flush with the profile of dimpling (see figure 403).
- (4) Locate the insert in position and crimp it using tool SC 253 as shown on figure 404.
- (5) Check that the insert does not rotate or otherwise move in its recess.

PRINTED IN FRANCE

78-13-01

REP 11-10-1

Page 402

May 31/76

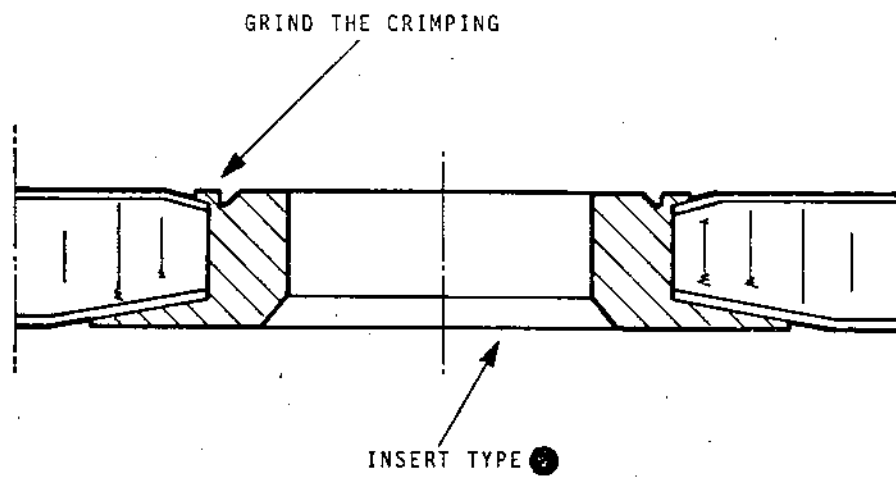
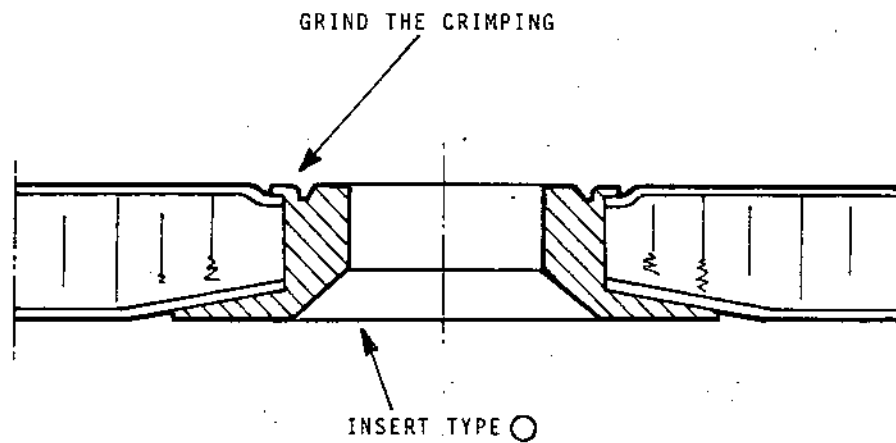


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE



Removing an Insert - Typical  
Figure 401

78-13-01

REP 11-10-1

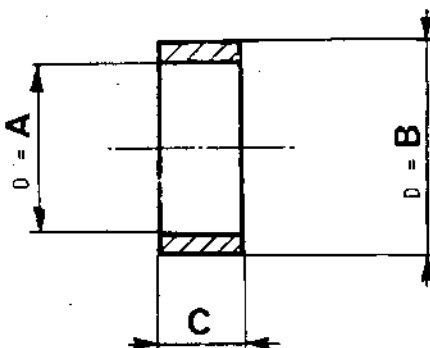
Page 403

May 31/76



# OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE

GENERAL TOLERANCES : SEE CHAPTER 70-21-10

SURFACE FINISH = 12,5  $\sqrt{\text{in}}$  [500  $\sqrt{\text{in}}$ ]

MATERIAL = P 3621

INSERT	DIA = A + 0,05 mm + 0.0020 in. + 0 + 0.0000 in.	DIA = B ± 0,05 mm (± 0.0020 in.)	C
○	10,29 mm (0.405 in.)	13 mm (0.512 in.)	3,6 mm (0.142 in.)
●	7,90 mm (0.311 in.)	10 mm (0.394 in.)	3,6 mm (0.142 in.)

Machining the Bushes  
Figure 402

## 78-13-01

REP 11-10-1

Page 404

May 31/76

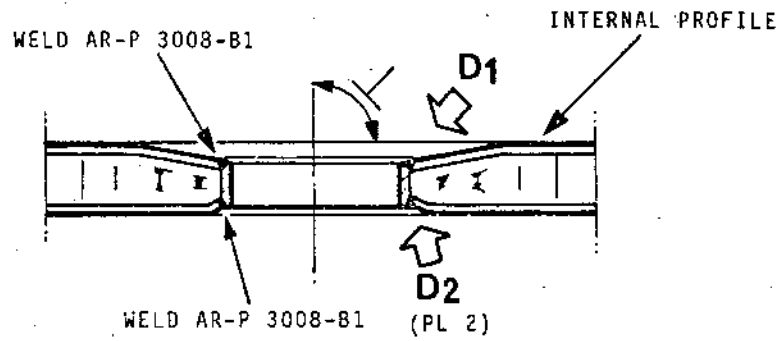


OLYMPUS 593

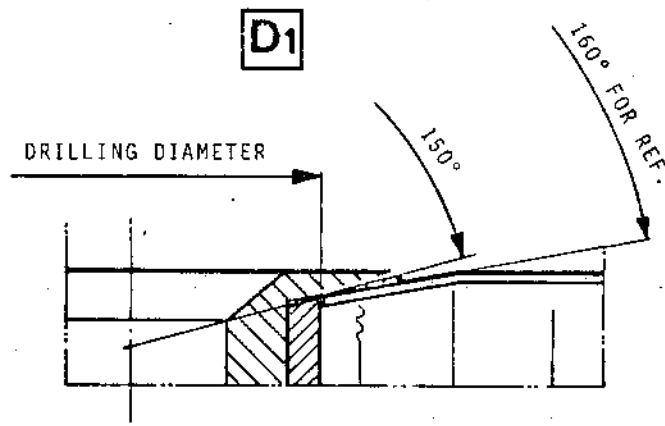
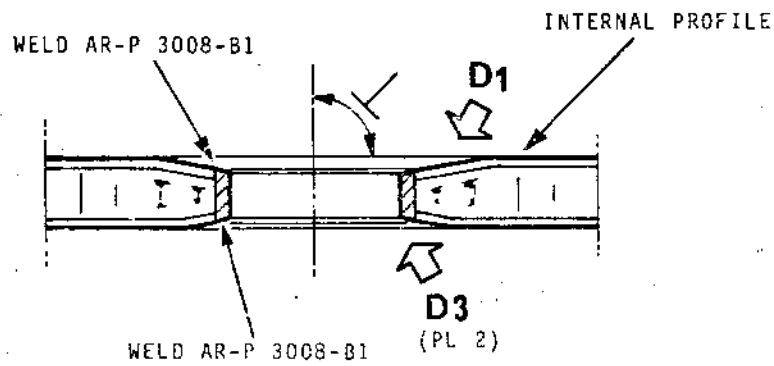
MK.610-14-28  
OVERHAUL



FOR INSERTS ○



FOR INSERTS ●



Fitting the Bushes  
Figure 403 (Sheet 1 of 2)

78-13-01

REP 11-10-1

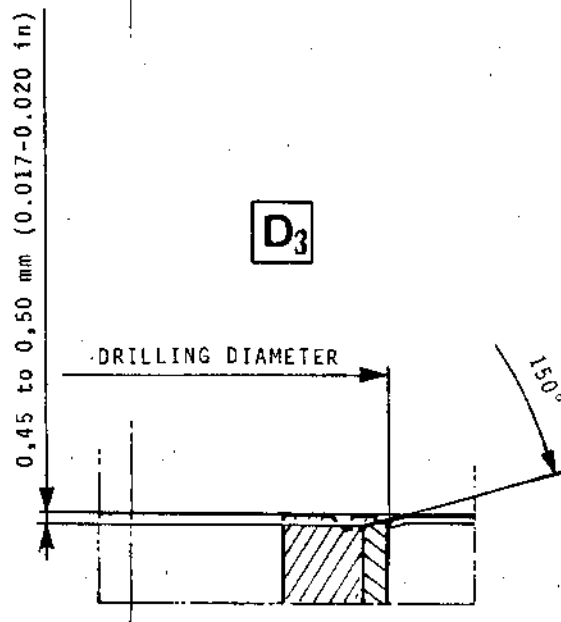
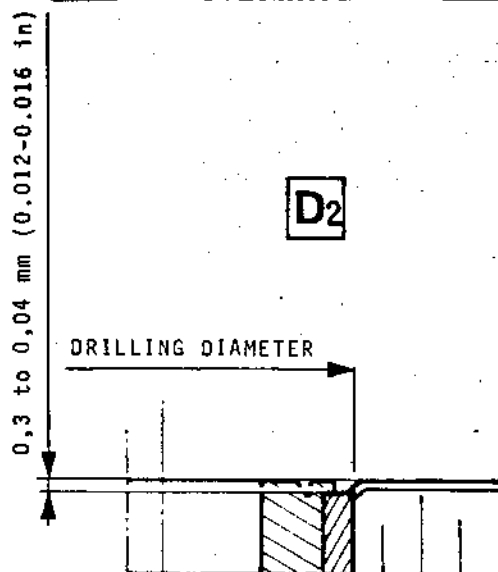
Page 405

May 31/76



OLYMPUS 593

MK.610-14-28  
OVERHAUL



INSERT	DRILLING DIAMETER
	$D \pm 0,05 \text{ mm (DIA } \pm 0.002 \text{ in.)}$
○	13 mm (0.512 in.)
●	10 mm (0.394 in.)

Fitting the Bushes  
Figure 403 (Sheet 2 of 2)

78-13-01

REP 11-10-1

Page 406

May 31/76

PRINTED IN FRANCE



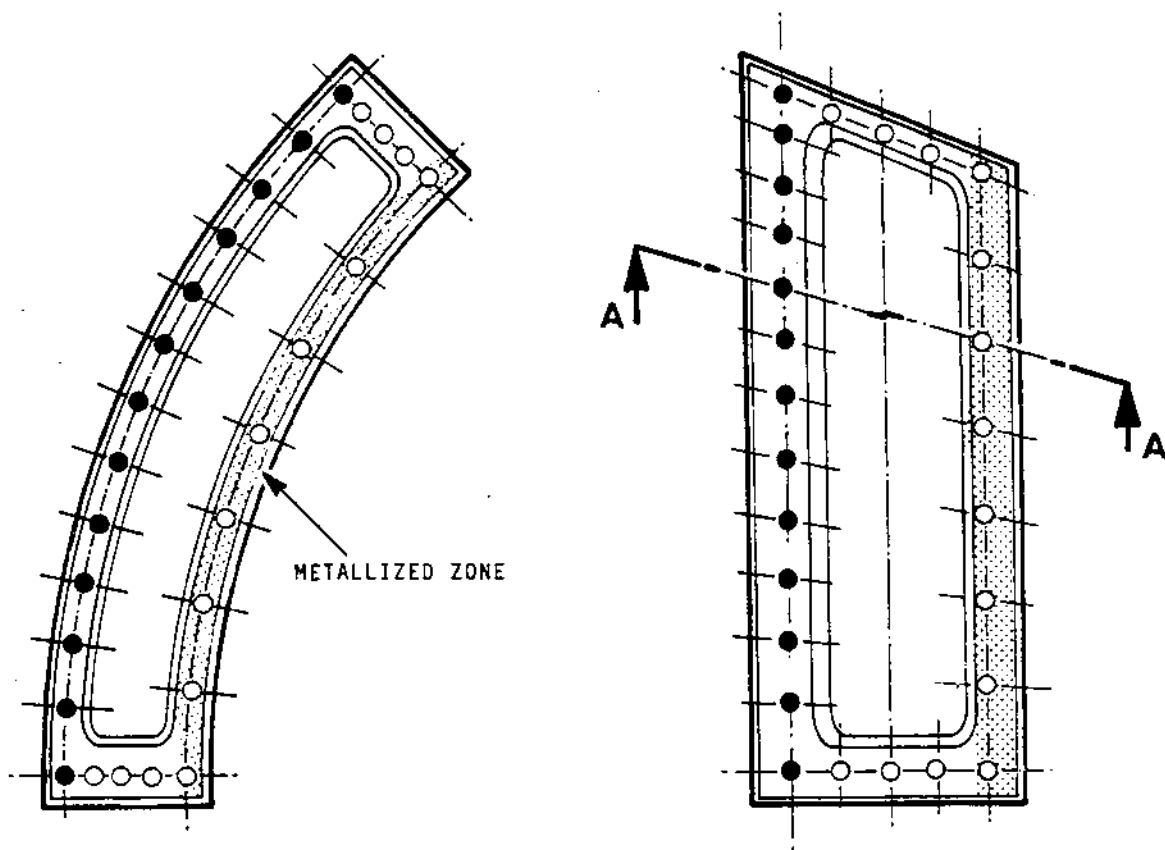
OLYMPUS 593

MK.610-14-28

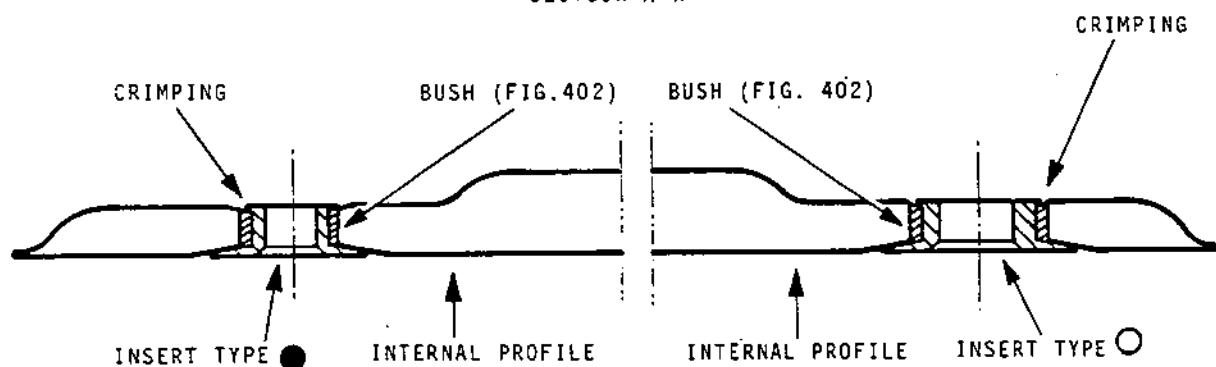
OVERHAUL



CONVERGENT PANEL SHOWN : 11-70



SECTION A-A



Installing the Inserts  
Figure 404 (Sheet 1 of 3)

78-13-01

REP 11-10-1

Page 407

May 31/76

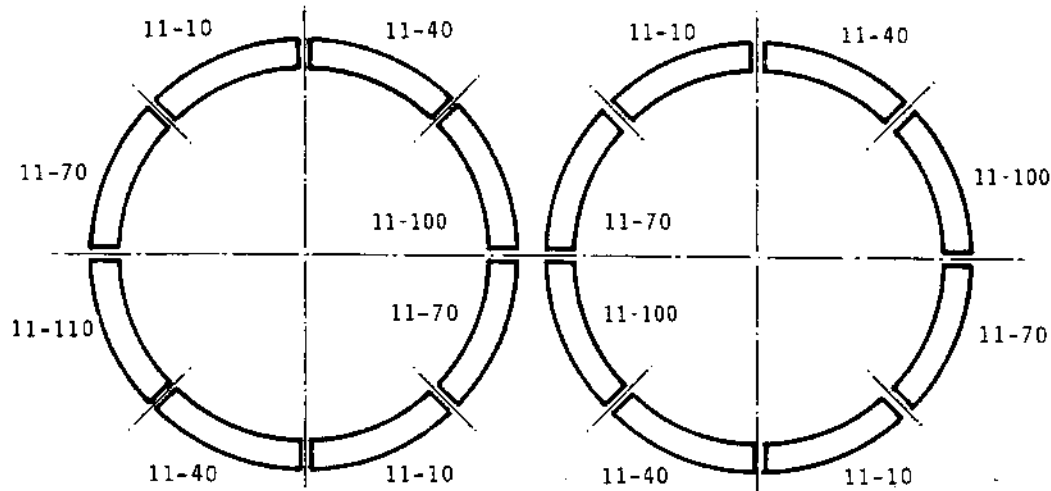


# OLYMPUS 593

MK.610-14-28  
OVERHAUL



## L.H. TWIN SECONDARY NOZZLE SCHEMATIC REAR VIEW



### DRILLING TEMPLATES

PANEL	TEMPLATES
11 - 10	SC 240
11 - 40	SC 241
11 - 70	SC 242
11 - 100	SC 243

### DESIGNATION OF INSERTS

SYMBOL	INSERT Nos
○	649-773-095-0
●	649-773-140-0

Installing the Inserts  
Figure 404 (Sheet 2 of 3)

# 78-13-01

REP 11-10-1

Page 408

Apr 30/93



OLYMPUS 593

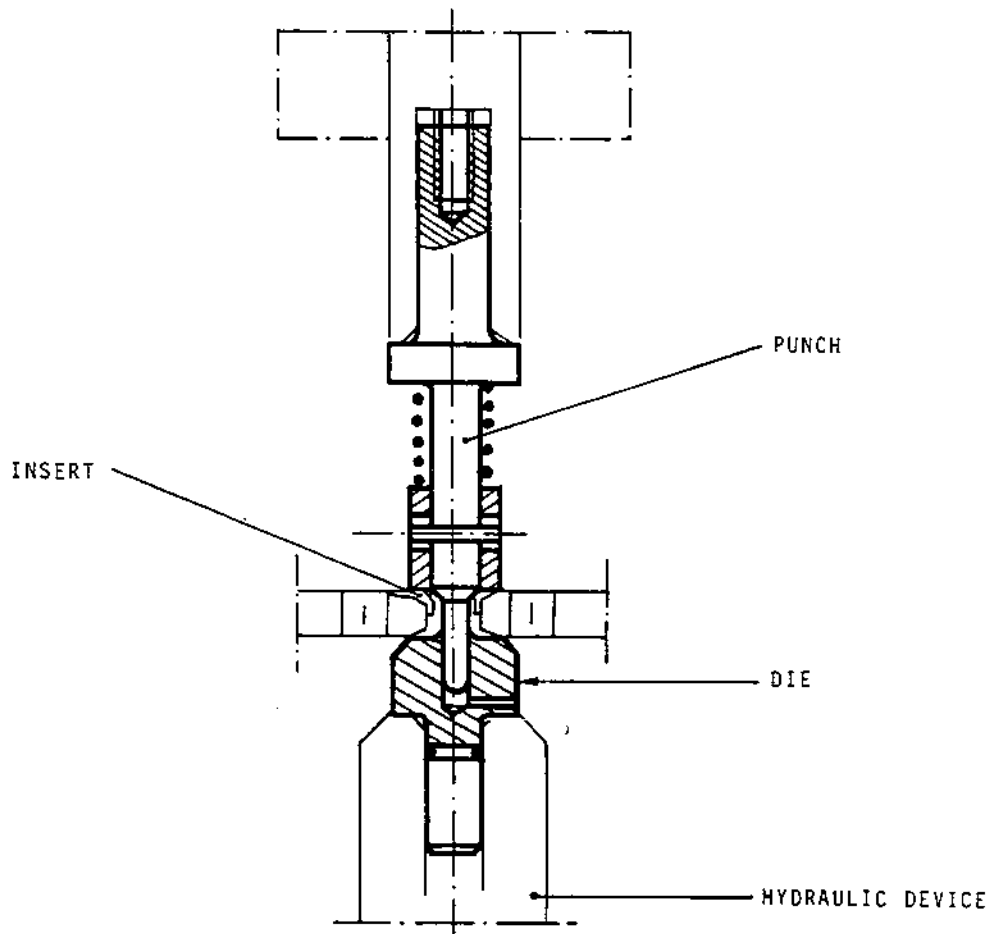
MK.610-14-28  
OVERHAUL



CRIMPING FIXTURE SC 253

INSERT	PUNCH	DIE
649-773-095-0	01	01
649-773-140-0	10	07

PRINTED IN FRANCE



Installing the Inserts  
Figure 404 (Sheet 3 of 3)

78-13-01

REP 11-10-1  
Pages 409/410  
Apr 30/93





OLYMPUS 593

MK.610-14-28

OVERHAUL



## REPAIR

### CONVERGENT PANEL ASSY (11-10/40/70/100)

#### 2. Reconditioning the plasma coating

---

##### PARTS REQUIRED FOR REPAIR

---

Metallizing powder material P 3200

---

##### A. Removing the deteriorated coating

- (1) Strip-off the existing coating using abrasive blasting according to the method M 103 A of chapter 70-15-20 "CLEANING".

NOTE 1 : The insert holes must be masked prior to carrying out the abrasive blasting.

2 : Abrasive material to be used is dry corindon 40 (P 135).

##### B. Restoring the coating

- (1) Spray the coating in the areas outlined on figure 401 as instructed in chapter 70-65-20 "SPRAYING OF COATINGS USING A PLASMA TORCH" and as follows :

The sample test-piece is to be produced from a Stress-skin panel material P 3700.

Sprayed powder material P 3200.

Coating thickness : 0,1 to 0,15 mm (0.004 - 0.006 in)

- (2) Carry out a light buffing operation to obtain the surface finish specified on figure 401.

##### C. Checking the coating

- (1) Check the coating as instructed in chapter 70-65-80 "INSPECTION OF COATINGS"

NOTE : On the coated areas, the tolerances are  
- 0 + 13 mm (0 + 0.5 in.)

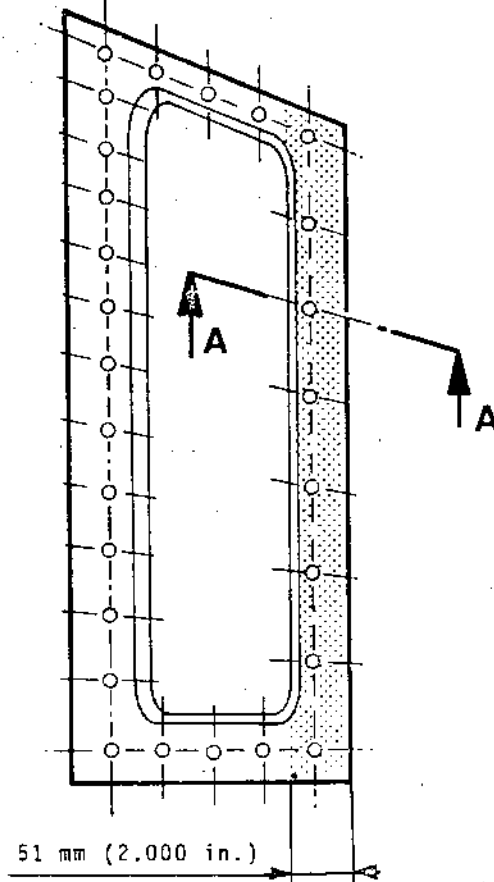
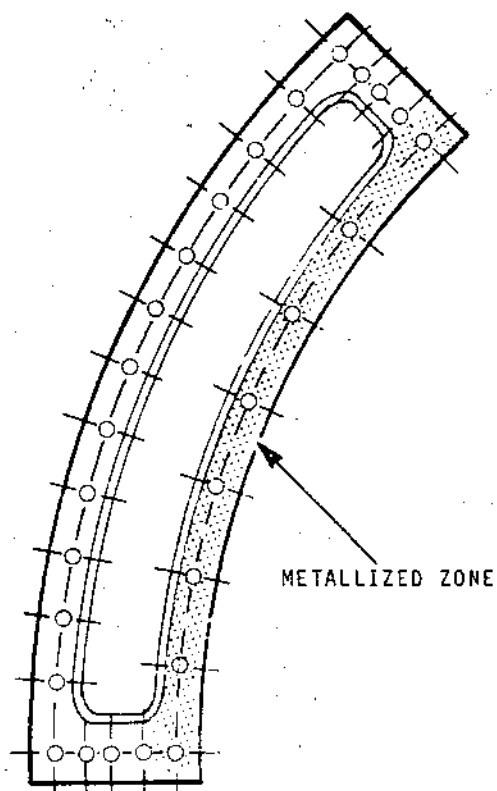


OLYMPUS 593

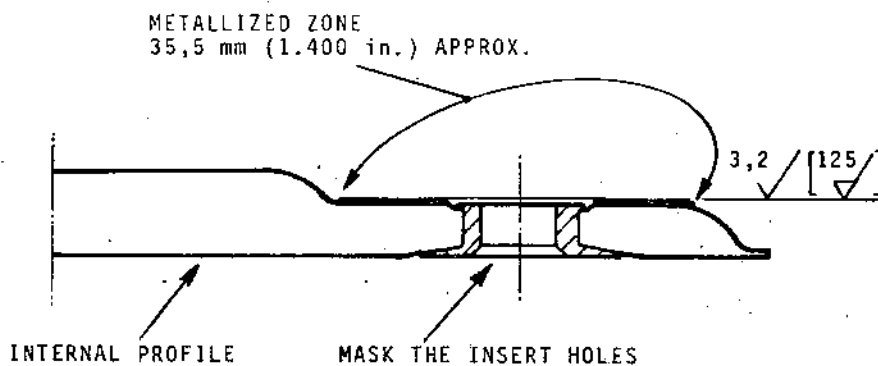
MK.610-14-28  
OVERHAUL



CONVERGENT PANEL SHOWN : 11-70



SECTION AA



Reconditioning the Plasma Coating  
Figure 401

78-13-01

REP 11-10-2

Page 402

May 31/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

CONVERGENT PANEL ASSY (11-10/40/70/100)

3. Panel Repairs for Miscellaneous Types of Damage

---

PARTS REQUIRED FOR REPAIR

---

Sheeting P3305 (Z8 CND 15), thickness according to need  
Bar P3061 (Z6 NCT 25 sv)  
Weld filler wire P3030 (ND 24 Fec)  
P3008 (Z8 CND 15)  
Screw HI-LOCK HL 144-5-11 (649-781-443-0)  
Nut HI-LOCK HLN1-G-5 (649-785-047-0)  
Thin washer 649-786-229-0  
Spacer 002-003-992-1

---

A. Introduction

This repair scheme covers three types of repair, namely :

- (1) Repair of cracks (heading B)
- (2) Repair of impact marks (heading C)
- (3) Repair of delaminations (heading D)

B. Repair of cracks

(1) Restrictions on repair

- (a) The crack must not exceed 100 mm (4 in) in length.
- (b) The sound area around the site of repair must be 100 mm (4 in).
- (c) The crack must not lie in a delaminated area. Freedom from delamination is to be ascertained by a tapping test using a metal coin.

(2) Repair instructions

- (a) Precisely demarcate the crack with the aid of a X20 twin-lens magnifier, and drill a 2,5 mm (0.10 in) dia. hole at its either end.

**78-13-01**

REP 11-10-3

Page 401

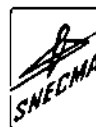
Jan 31/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (b) Argon-arc weld fill the crack, following the instructions in chapters 70-30-10 "REPAIR OF WELDED HONEYCOMB STRUCTURES" and 70-35-10 "WELDING" (see Fig. 401).

Filler metal P3008 or P3030

Weld class B1

NOTE : While welding, it is essential to use copper cooling blocks placed as near to the site of welding as possible (see Fig. 401).

(3) Inspection

Perform a class B1 weld inspection as instructed in chapter 70-35-80 "WELDING" ; next a water washable dye penetrant test by method M 501 B, chapter 70-20-10.

CAUTION : THE PENETRANT IS TO BE CLEARED OUT WITH A CLOTH STEEPED IN ISOPROPYL ALCOHOL (P442).

C. Repair of impact marks

(1) Restrictions on repair

- (a) Use a X20 twin-lens magnifier to ascertain that the impact has produced no crack.
- (b) Do a tapping test with a coin to check that the area under repair is free from delamination.
- (c) Puncture of the skin through impact is admissible if limited to a single cell.

(2) Readyng the site of repair

- (a) Rub the area under repair with a fine emery cloth.
- (b) Cleanse the surface to be welded with a pad dipped in isopropyl alcohol (P442).

If the panel is punctured, repeat several times over.

78-13-01

REP 11-10-3

Page 402

Jan 31/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



### (3) Repair instructions

NOTE : While welding, it is essential to use copper cooling blocks placed as near to the site of welding as possible.

- (a) An impact mark whose area is limited to a single cell is repaired by argon-arc weld filling, as per instructions in chapters 70-35-10 "WELDING" and 70-30-10 "REPAIR OF WELDED HONEYCOMB STRUCTURES", and Fig. 402, sheet 1.

Filler metal P3030 or P3008

Weld class B1

- (b) An impact mark not exceeding 5 sq.cm (0.78sq.in) in area is repaired as follows :

- Machine a washer out of sheeting P3305, intended to stop up the hollow made by the impact.
- Argon arc weld the washer as instructed in chapters 70-35-10 "WELDING" and 70-30-10 "REPAIR OF HONEYCOMB STRUCTURES" and shown in Fig. 402, sheet 2.

Filler metal 3008 or P3030

Weld class B1

NOTE : Weld on the washer first by its central hole then round its entire circumference (see Fig 402).

### (4) Inspection

- (a) Perform a class B1 weld inspection as instructed in chapter 70-35-10 "WELDING".

Locally applied water washable dye penetrant test by method M 501 B, chapter 70-20-10.

- (b) Check that the repaired segment is free from delamination (tapping test with a coin).

78-13-01

REP 11-10-3

Page 403

Apr 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



D. Repair of delaminations

(1) Restrictions on repair

- (a) Use a X20 twin lens magnifier to ascertain that the delaminated surface is free from cracks.
- (b) The core-to-face sheet separation must not be compounded by impact marks.

In case of either cracks or impact marks, this type of repair is ruled out.

(2) Repair instructions

- (a) Lightly sandpaper the panel with extra-fine abrasive for the cellular pattern to show up in the area under repair.
- (b) Location mark the points of reinforcement.  
  
Where a delamination is adjacent to a blending radius, mark the reinforced points in the mode of installation shown in Fig. 403.
- (c) Drill the Hi-Lock screw holes as marked out, and as described in chapter 70-50-40 "RIVETING".
- (d) Drill the spacer accommodating holes in the delaminated area to the dimensions specified in Fig. 403.
- (e) Measure the actual spacer hole depth "E" as indicated in Fig. 403.
- (f) Prepare spacers out of bar P3601 in the size specified in Fig. 403.

NOTE : Spacer length L = "E" of 0.2 mm (0.008 in) is required to ensure a prestressing margin for the mounting of the Hi-Lock screws.

78-13-01

REP 11-10-3

Page 404

Jan 31/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (g) Fit the spacers and secure them in their holes with LOCTITE 307 glue (P502).
- (h) Apply the reinforcing fasteners as shown in Fig. 403 and instructed in chapter 70-50-40 "RIVETING".

NOTE : When placing the thin washer, its rounded edged face must be in contact with the stressskin panel.

(3) Inspection

Check the HI-LOCK screws for proper fit as described in chapter 70-50-84 "RIVETING".

PRINTED IN FRANCE



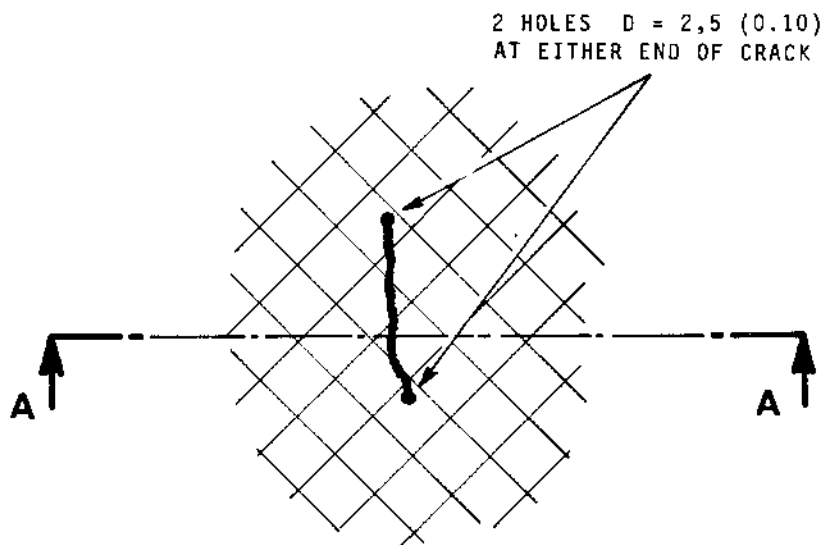
OLYMPUS 593

MK.610-14-28

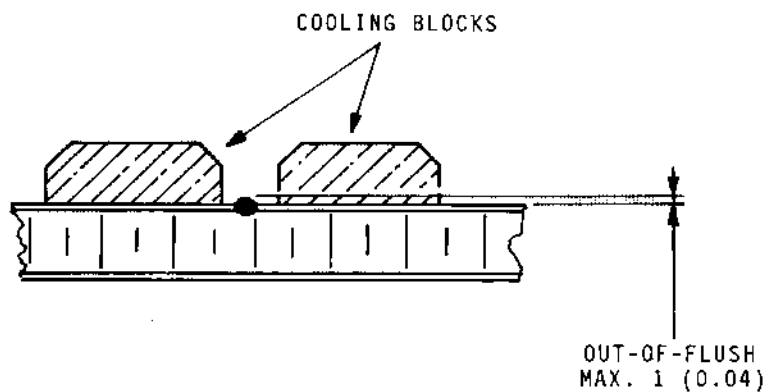
OVERHAUL



PRINTED IN FRANCE



SECTION AA



DIMENSIONS ARE IN MILLIMETRES WITH INCH  
CONVERSIONS IN PARENTHESES.

Repair of Cracks  
Figure 401

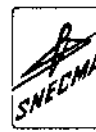




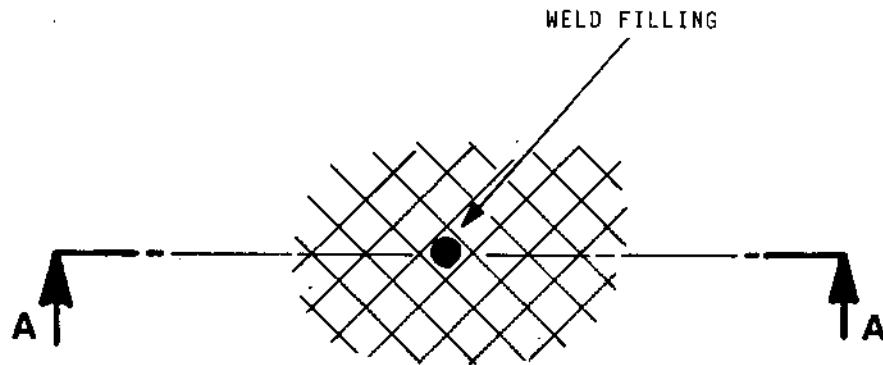
OLYMPUS 593

MK.610-14-28

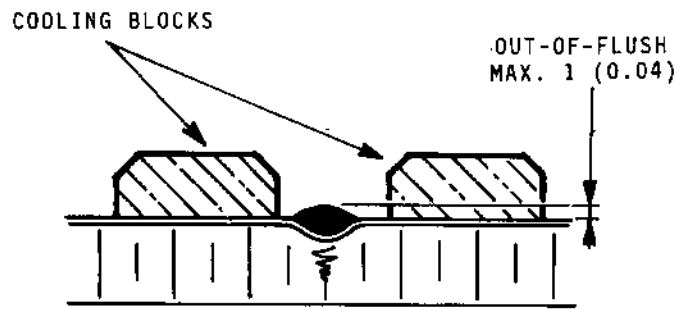
OVERHAUL



REPAIR CONFINED TO A SINGLE CELL



SECTION AA



DIMENSIONS ARE IN MILLIMETRES WITH INCH  
CONVERSIONS IN PARENTHESES.

Repair of Impact Marks  
Figure 402 (Sheet 1 of 2)

78-13-01

REP 11-10-3

Page 407

Jan 31/81

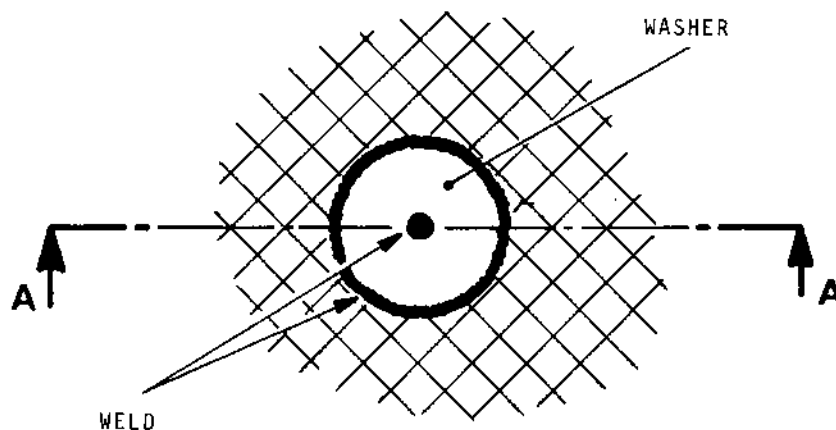


OLYMPUS 593

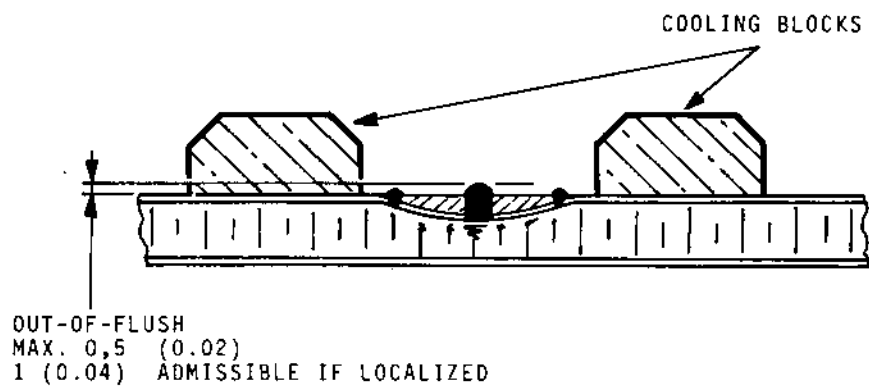
MK.610-14-28  
OVERHAUL



REPAIR CONFINED TO A 5 SQ.CM (0.78 SQ.) AREA



SECTION AA



DIMENSIONS ARE IN MILLIMETRES WITH INCH  
CONVERSIONS IN PARENTHESES.

Repair of Impacts  
Figure 402 (Sheet 2 of 2)

78-13-01

REP 11-10-3

Page 408

Jan 31/81



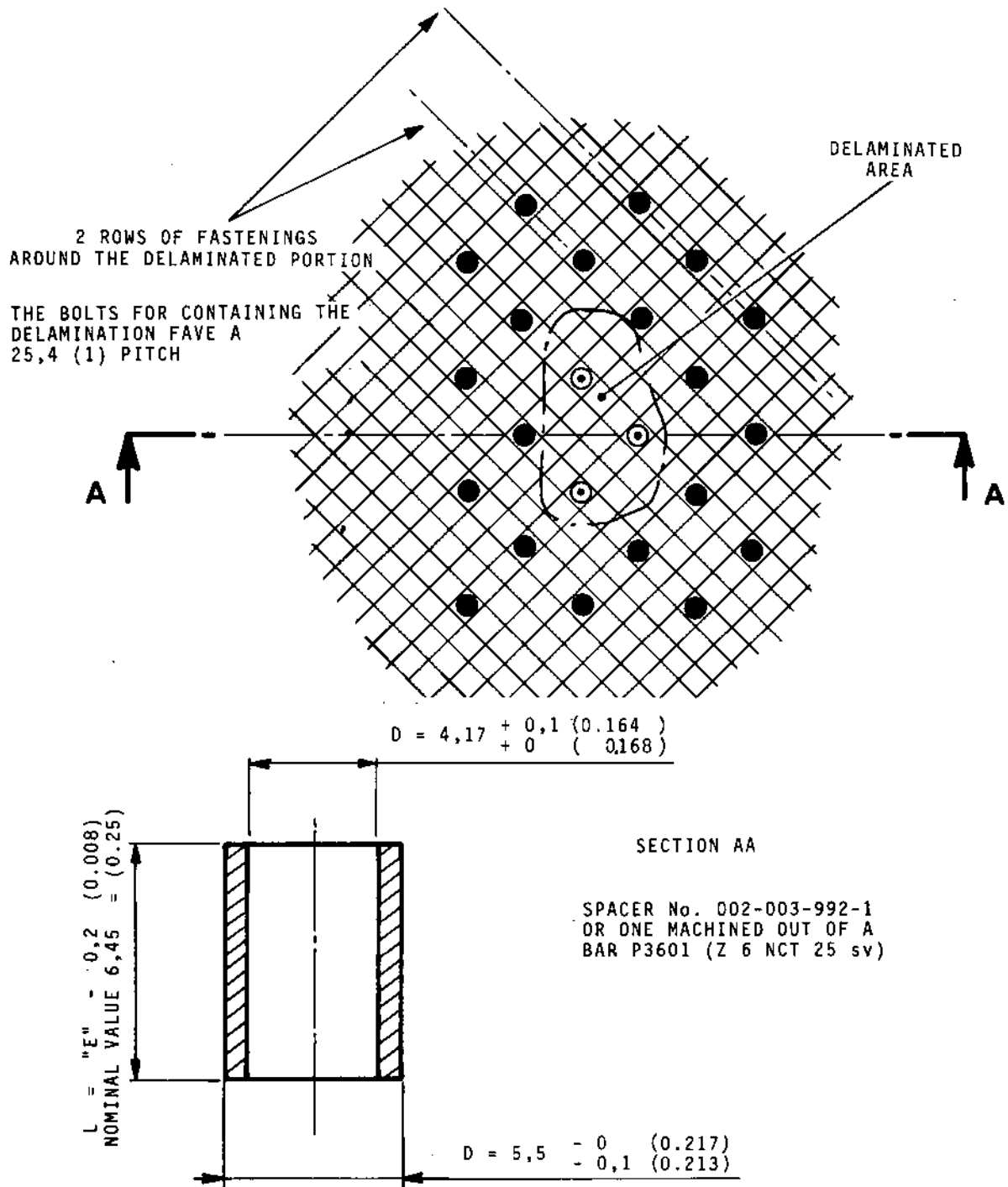
OLYMPUS 593

MK.610-14-28

OVERHAUL



PRINTED IN FRANCE



DIMENSIONS ARE IN MILLIMETRES WITH INCH  
CONVERSIONS IN PARENTHESES.

Repair of Delaminations  
Figure 403 (Sheet 1 of 2)

78-13-01

REP 11-10-3

Page 409

Jan 31/81



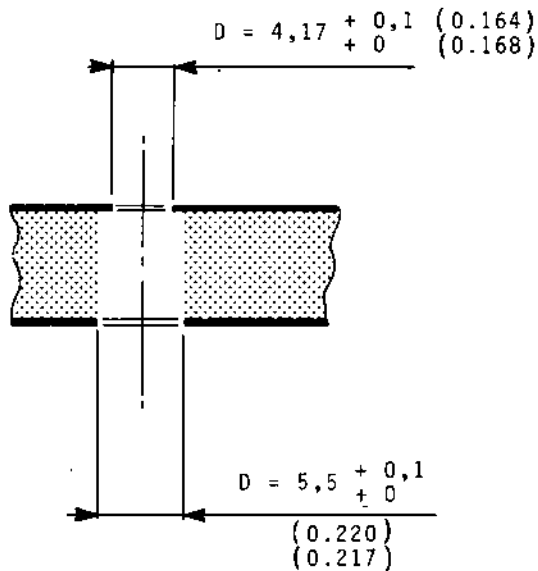
OLYMPUS 593

MK.610-14-28  
OVERHAUL

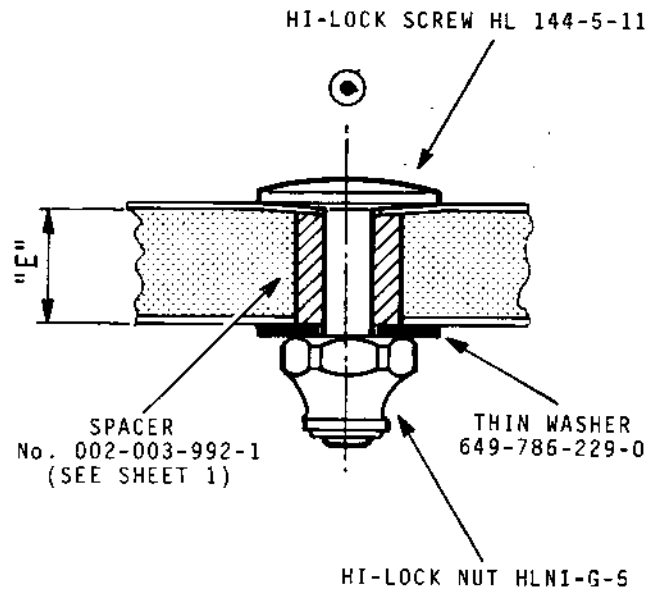


PRINTED IN FRANCE

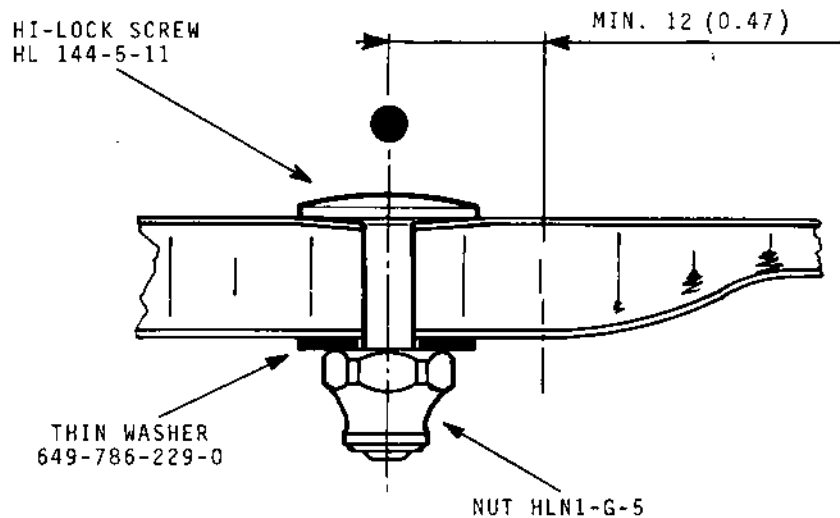
DRILLING THE PANEL



SECTION AA  
IN A DELAMINATED AREA



SECTION AA  
IN SOUND AREA



DIMENSIONS ARE IN MILLIMETRES WITH INCH  
CONVERSIONS IN PARENTHESES.

Repair of Delaminations  
Figure 403 (Sheet 2 of 2)

78-13-01

REP 11-10-3

Page 410

Jan 31/81



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

JOINT PLATE (11-130/140/150)

1. Renewing the floating nuts

---

PARTS REQUIRED FOR REPAIR

---

Floating nut No. A-11471-18-4 (649-785-107-0)  
Floating nut No. LHA 3280B-5-048 (649-785-117-0)  
Floating nut No. NAS 686C3 (649-785-086-0)

Rivet No. MS 20427-M3-4  
Rivet No. MS 20427-M4-5

---

A. Removing the deteriorated nut

- (1) Remove the damaged nut by grinding off the head of the attaching rivets.

B Installing a new nut

- (1) Inspect the rivet holes as instructed in chapter 70-50-10 "RIVETING".
- (2) Install a new nut and rivet it as instructed in chapter 70-50-10 "RIVETING" and as indicated on figure 401.

NOTE : When renewing a nut No. A-11471-18-4 and before carrying out the riveting, it is necessary to check that the out-of-flushness condition of the bush is within the limits prescribed on figure 401 in order to ensure the sliding of the bush in its cage.

- (3) Check the riveting as instructed in chapter 70-50-80 "RIVETING"

78-13-01

REP 11-130-1

Page 401

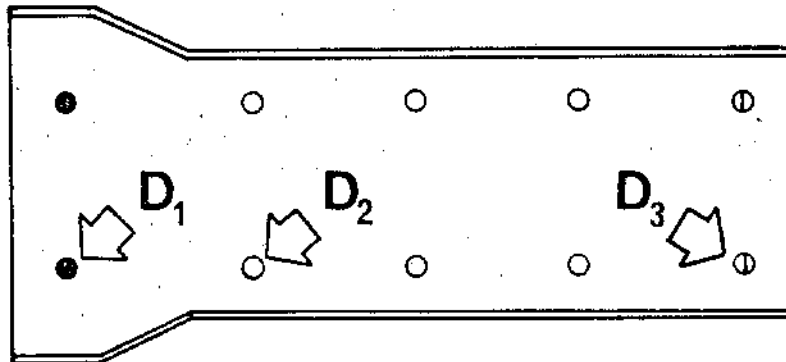
May 31/76



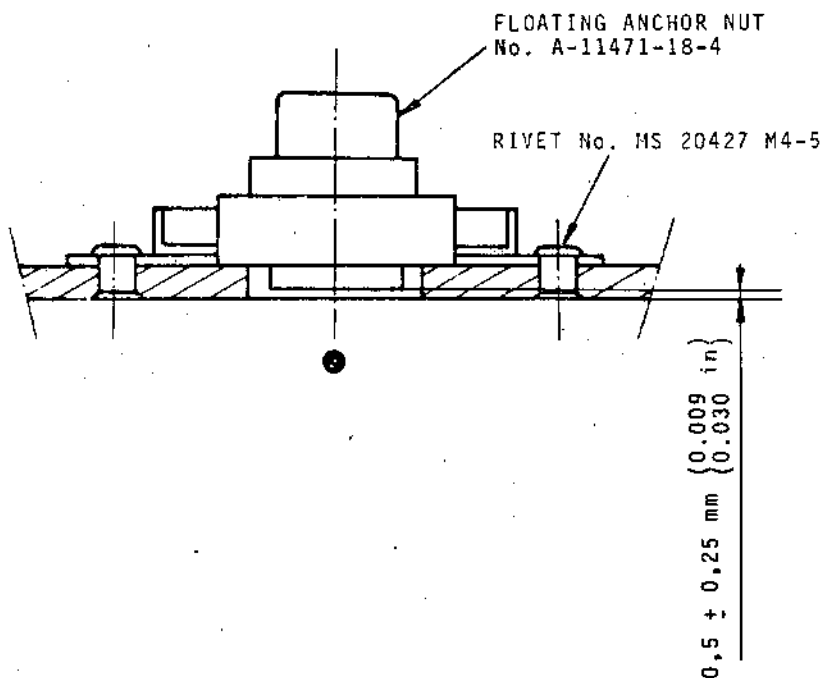
OLYMPUS 593

MK.610-14-28

OVERHAUL



D<sub>1</sub>



Renewing the Floating Anchor Nuts  
Figure 401 (Sheet 1 of 2)

78-13-01

REP 11-130-1

Page 402

May 31/76



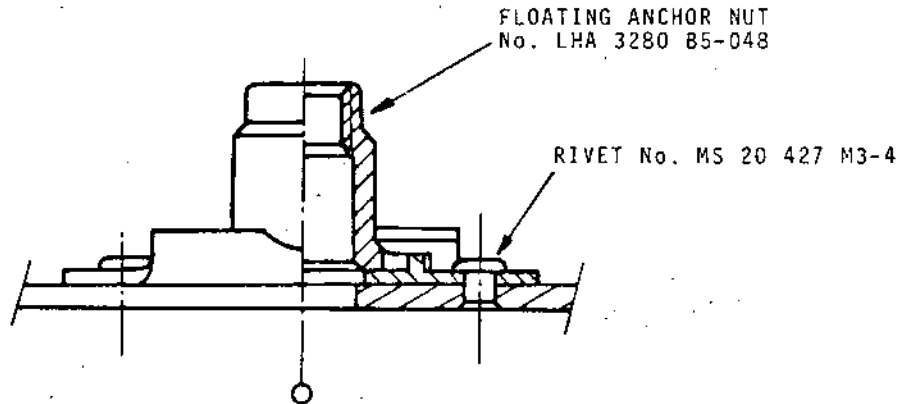
OLYMPUS 593

MK.610-14-28  
OVERHAUL

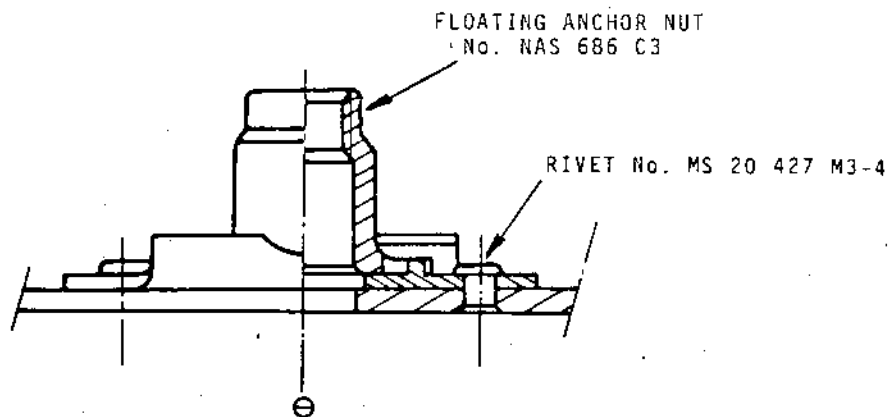


PRINTED IN FRANCE

D<sub>2</sub>



D<sub>3</sub>



Renewing the Floating Anchor Nuts  
Figure 401 (Sheet 2 of 2)

78-13-01

REP 11-130-1

Page 403

May 31/76



OLYMPUS 593

MK.610-14-28

OVERHAUL



## REPAIR

### DIVERGENT PANELS (12-10/13-10/13-120/14-10) Variant B

#### 1. Renewing Crimped Washers

---

#### PARTS REQUIRED FOR REPAIR

---

Crimping washer	No. 302-017-501-0
Crimping washer	No. 302-020-700-0
Washer	No. 302-019-200-0

---

#### A. Removal

- (1) Remove damaged crimped washers by grinding the bits of crimping come undone, as indicated in figure 401.

#### B. Inspection Checks

- (1) Make sure that the housing and bearing face of the crimping washer is thoroughly clean.
- (2) Perform a water-washable dye penetrant test at the crimped-washer locations, employing method M 501 B as described in chapter "PENETRANT INSPECTION", section 70-20-10.

Cracks are not admissible.

#### C. Installing New Washers

- (1) Fit new washers as indicated in figure 402.
- (2) Crimp the crimping washer around its periphery, in the way indicated in figure 402, using a punch with a 100° angle.

#### D. Checking the Crimping

- (1) Ascertain that :
  - (a) The crimped washers do not turn or shift in their housings.





OLYMPUS 593

MK.610-14-28  
OVERHAUL



(b) The tab is free from cracks.

Should defect (a) and/or (b) occur, renew the washers.

PRINTED IN FRANCE

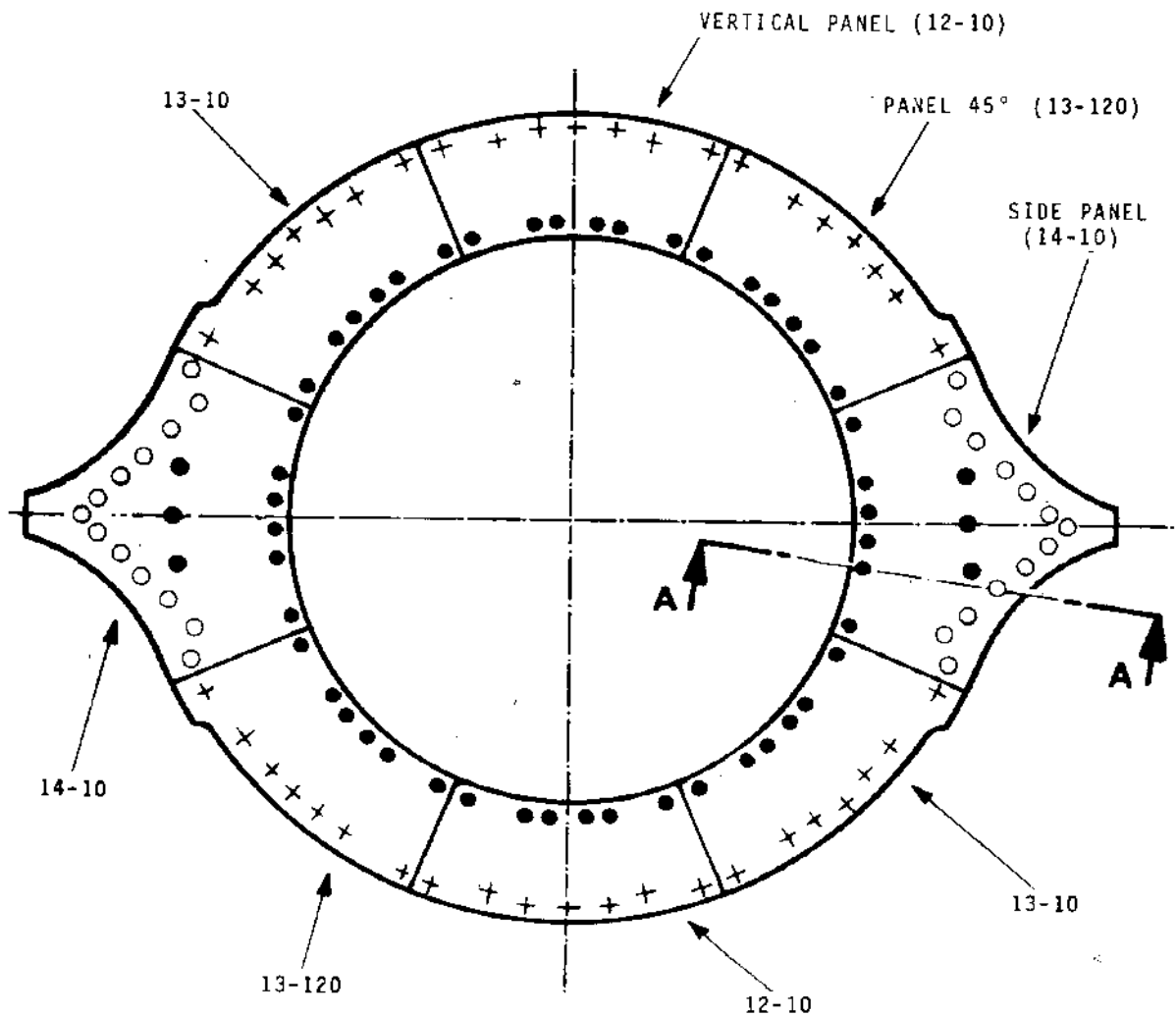


OLYMPUS 593

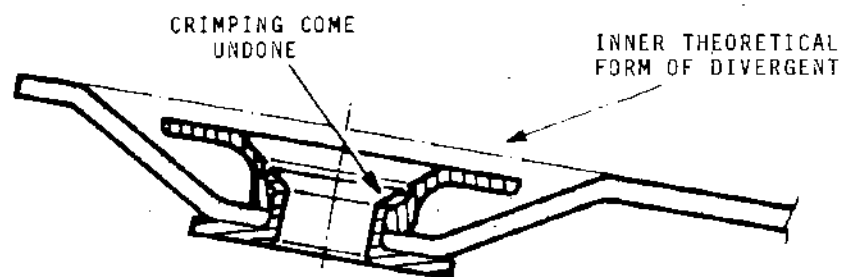
MK.610-14-28  
OVERHAUL



REAR VIEW OF NOZZLE



SECTION A-A



Removing Crimped Washer  
Figure 401

PRINTED IN FRANCE

N

78-13-01

REP 12-10B-1

Page 403

Mar 31/77

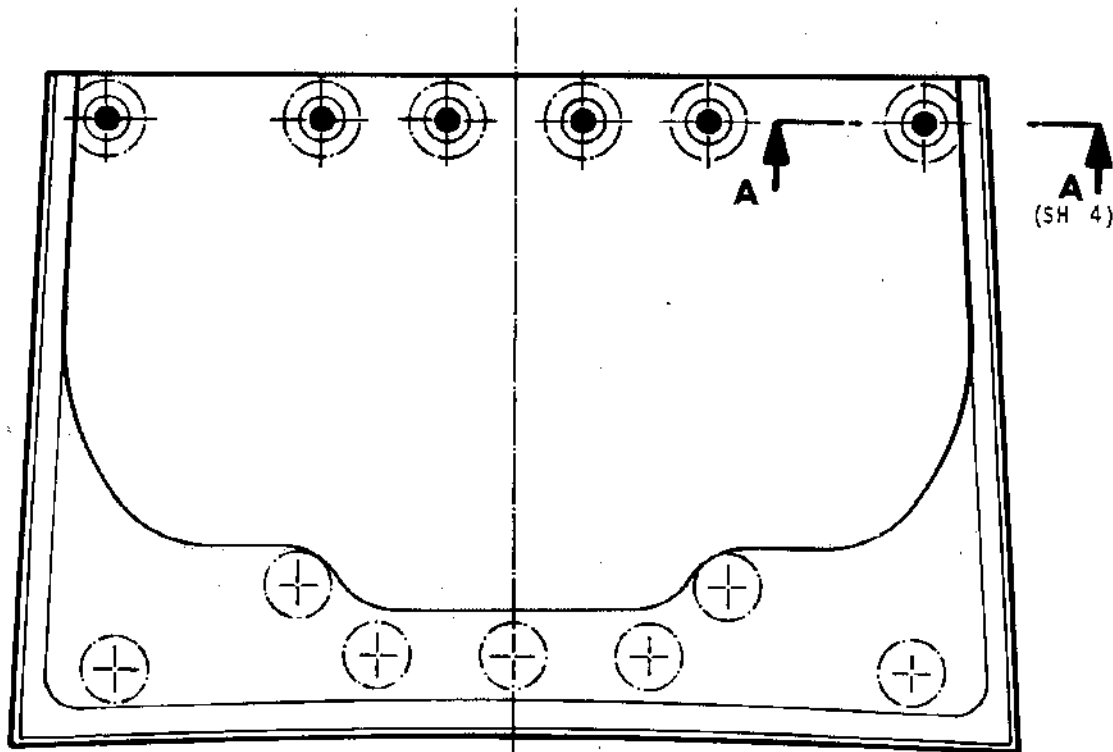


OLYMPUS 593

MK.610-14-28  
OVERHAUL



OUTSIDE VIEW OF VERTICAL  
PANEL (12-10)



Renewing Crimped Washers  
Figure 402 - (Sheet 1 of 5)

N

**78-13-01**

REP 12-10B-1

Page 404

Mar 31/77

PRINTED IN FRANCE

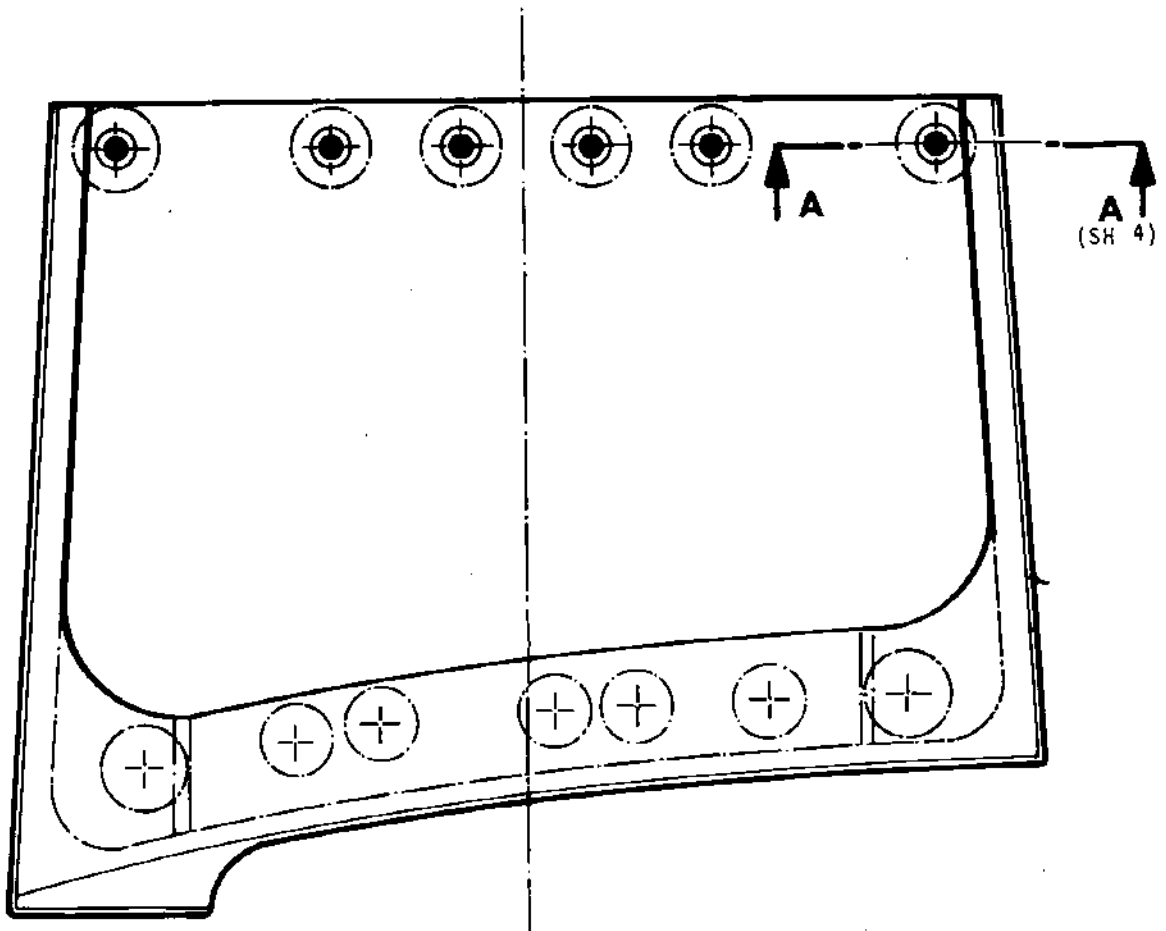


OLYMPUS 593

MK.610-14-28  
OVERHAUL



OUTSIDE VIEW OF 45° PANEL  
PANEL AS SHOWN (13-10)  
PANEL SYMMETRICAL (13-120).



Renewing Crimped Washers  
Figure 402 - (Sheet 2 of 5)

N

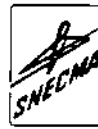
78-13-01

REP 12-10B-1  
Page 405  
Mar 31/77

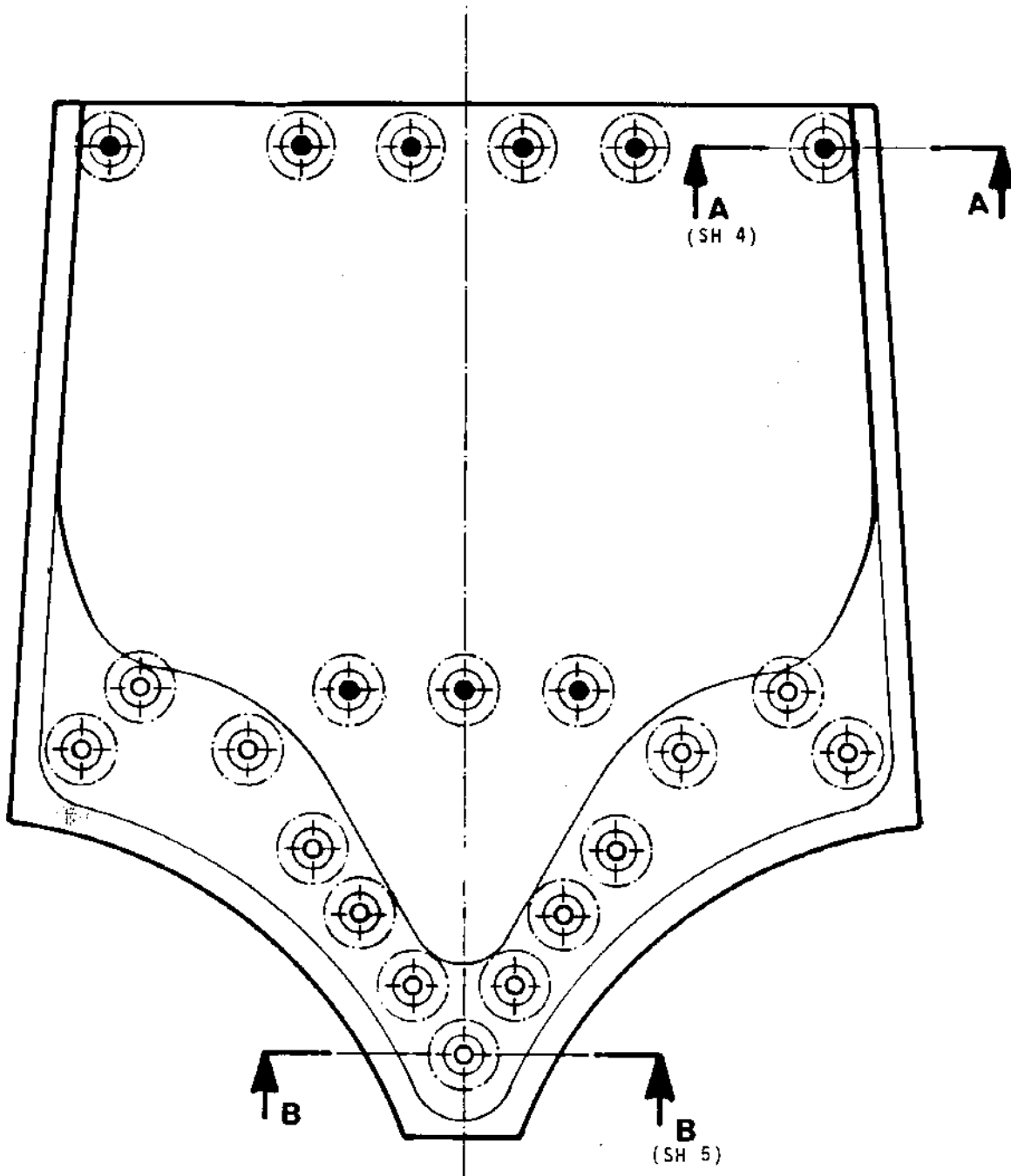


OLYMPUS 593

MK.610-14-28  
OVERHAUL



OUTSIDE VIEW OF SIDE PANEL  
(14-10)



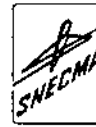
Renewing Crimped Washers  
Figure 402 - (Sheet 3 of 5)

PRINTED IN FRANCE

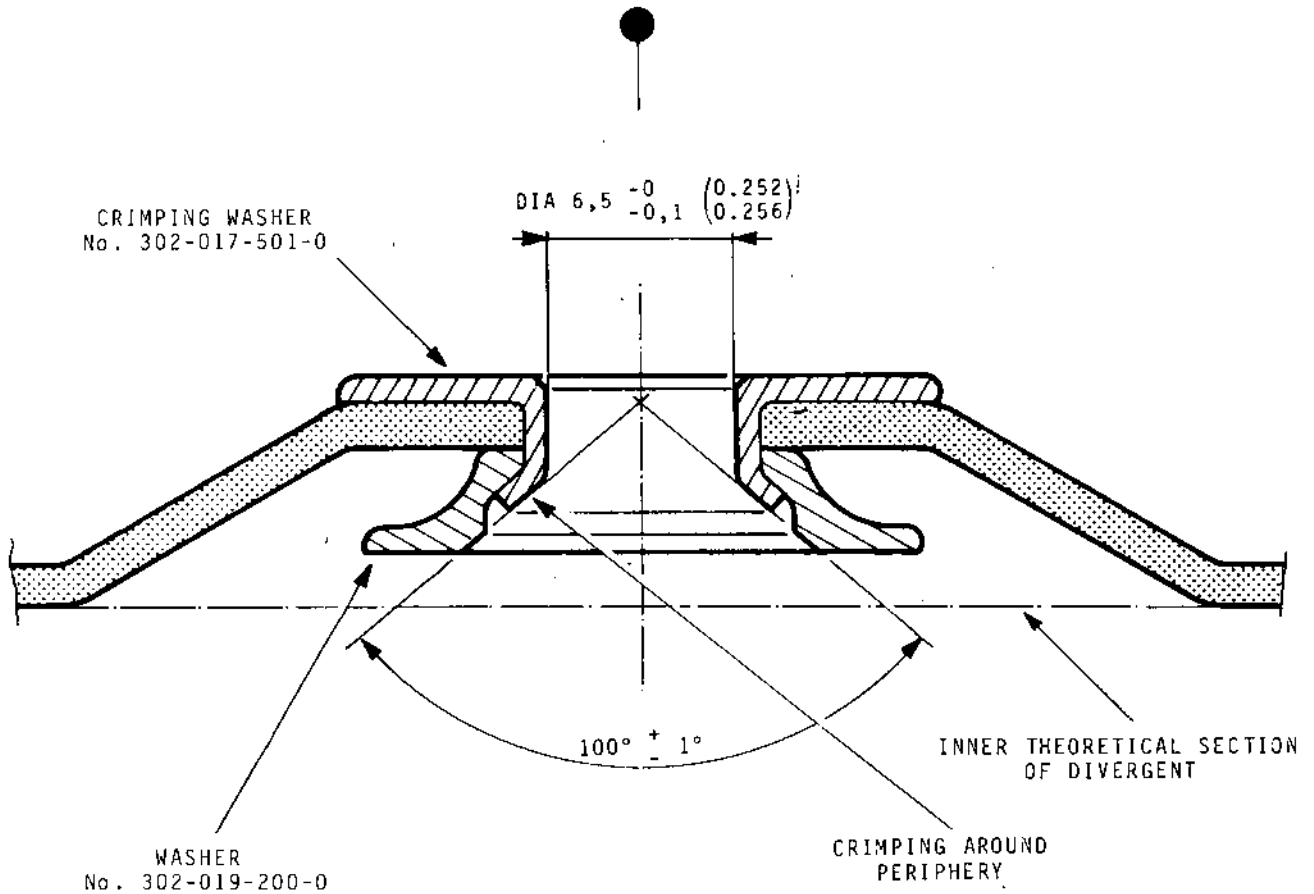


OLYMPUS 593

MK.610-14-28  
OVERHAUL



SECTION A-A



Renewing Crimped Washers  
Figure 402 - (Sheet 4 of 5)

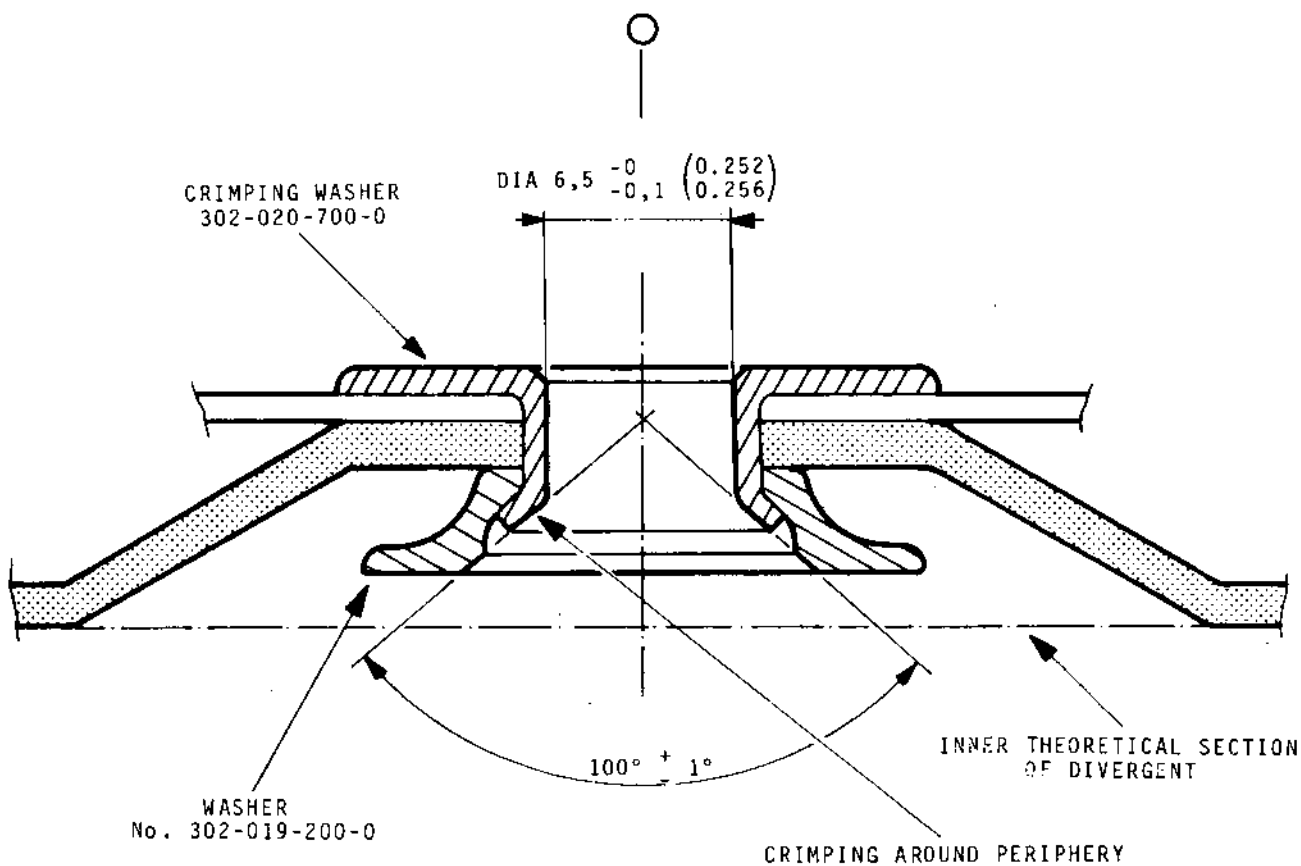


OLYMPUS 593

MK.610-14-28  
OVERHAUL



SECTION B-B



Renewing Crimped Washers  
Figure 402 - (Sheet 5 of 5)

78-13-01

REP 12-10B-1

Page 408

Oct 30/77



OLYMPUS 593

MK.610-14-28

OVERHAUL

REPAIRSUPPORT ASSY (16-220/250)1. Renewing the self-locking nuts

---

PARTS REQUIRED FOR REPAIR

---

Self-locking nut KAYLOCK MK 1031-4

(649-785-004-0)

Rivet BNAE 21217 TB 2406

(650-022-042-0)

or Rivet BNAE 21217 TB 3207

(650-022-073-0)

---

## A. Removing the damaged nut

- (1) Remove the damaged nut by grinding out the heads of the fixing rivets.

## B. Installing a new nut

- (1) Check the rivet holes as instructed in chapter 70-50-10 : "JOINTS MADE BY USE OF SOLID RIVETS".
- (2) Fit in a new nut by riveting it as instructed in chapter 70-50-10 : "JOINTS MADE BY USE OF SOLID RIVETS" and in figure 401.
- (3) Check the riveting as instructed in chapter 70-50-81 : "INSPECTION OF SOLID RIVETS".

**78-13-01**

REP 16-220-1

Page 401

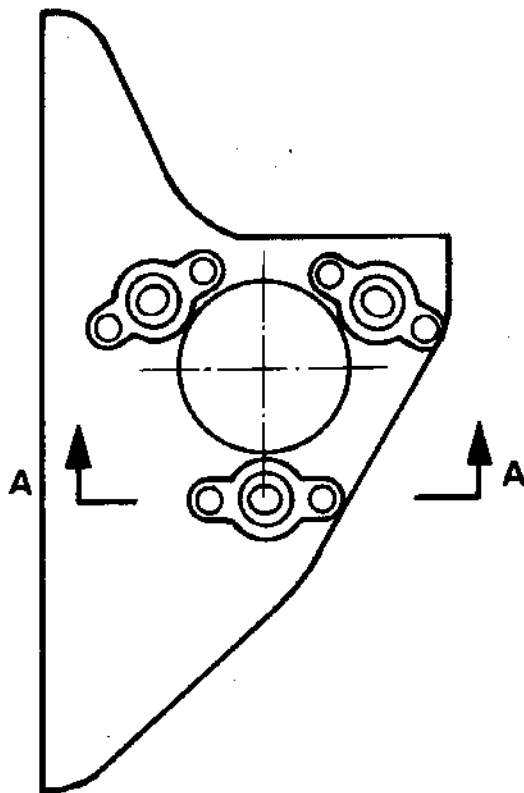
Mar 31/77





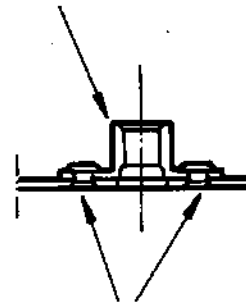
OLYMPUS 593

MK.610-14-28  
OVERHAUL



SECTION A-A

3 SELF-LOCKING NUTS  
KAYLOCK MK 1031-4



2 RIVETS BNAE 21217 TB 2406  
OR BNAE 21217 TB 3207

Renewing the Self-locking Nuts  
Figure 401

78-13-01

REP 16-220-1

Page 402

Mar 31/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

ELBOW ASSY (17-110/170)

1. Reconditioning the chrome-plating of the conical flange seating

PARTS REQUIRED FOR REPAIR

A. Recondition the chrome-plating of the conical seating face in accordance with the instructions on Method M 300 B a) in chapter 70-15-30 : "SURFACE TREATMENT METHODS", and the indications in figure 401, observing the following points :

- (1) No grinding is required previous to chrome-plating.
- (2) Check for cracks by the water-washable fluorescent penetrant process, using Method M 502 B described in chapter 70-20-10 : "PENETRANT INSPECTION".
- (3) Min. plating thickness : 0.076 mm (0.0030 in).

PRINTED IN FRANCE

**78-13-01**

REP 17-110-1

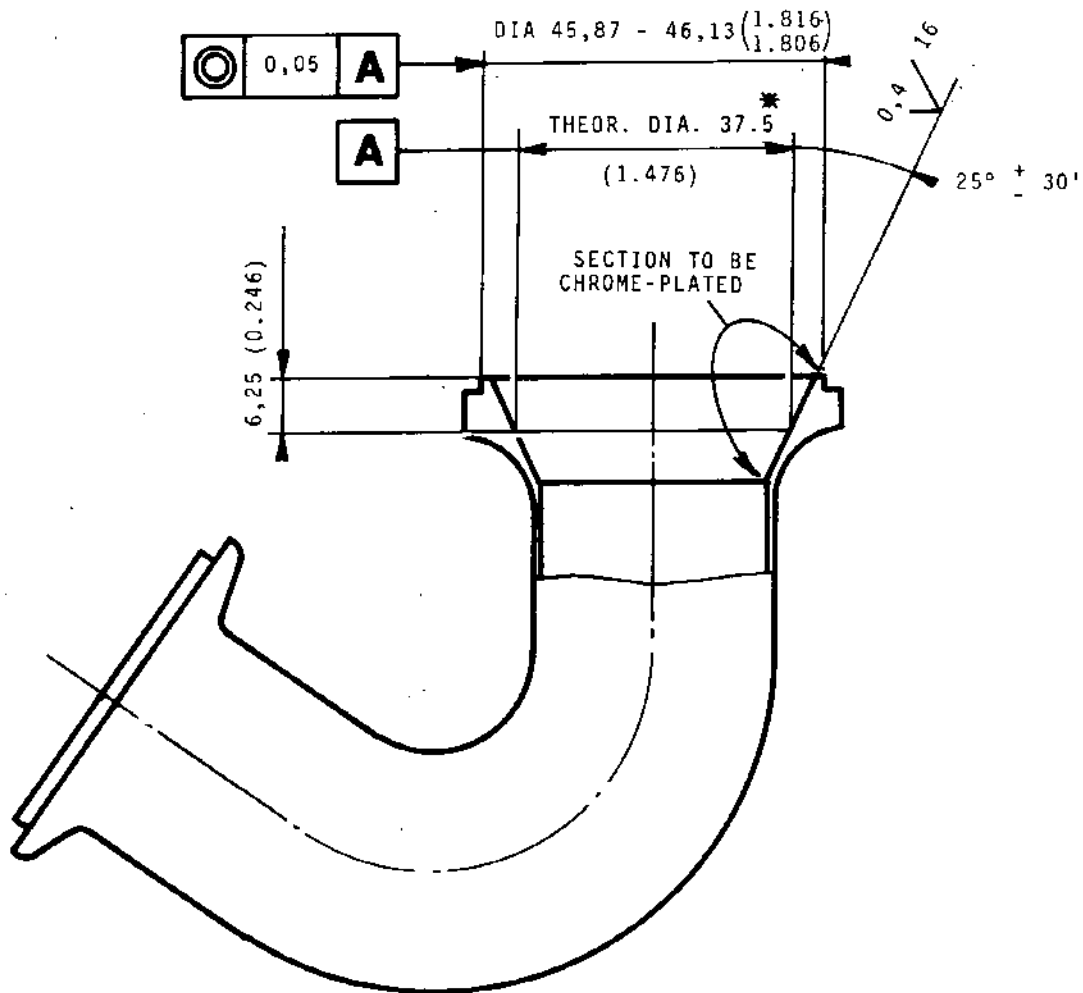
Page 401

Mar 31/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



\* DIMENSION AFTER PLATING

Reconditioning the Chrome-plating of the Conical Flange Seating  
Figure 401

78-13-01

REP 17-110-1

Page 402

Mar 31/77

PRINTED IN FRANCE



OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

ELBOW ASSY (17-110/170)

2. Weld-filling cracks

---

PARTS REQUIRED FOR REPAIR

---

Weld filler wire (P 3028) (NCK 20 D)

---

A. Weld filling cracks

- (1) Argon arc weld-fill cracks as instructed in chapter 70-35-10 "Fusion Welding".
  - Weld filler wire P 3028
  - Weld class B3

B. Checking welds

- (1) Perform a class B3 weld inspection as instructed in chapter 70-35-80 "Weld Inspection" and covering :
  - Water washable fluorescent penetrant test by method M 502 B, chapter 70-20-10 "Dye Penetrant Inspection".
  - X-ray examination as per chapter 70-20-30 "Radiographic Inspection".
- (2) Perform a pressure test at 0,344 hbar (relative pressure)

C. Treatment

- (1) Heat treat the part by method M 812, chapter 70-45-10 "Heat Treatments".

D. Chromium-plating

- (1) Renew the chrome-plating on the tapered contact surface of the flange, as instructed under REP 17-110-1.

**78-13-01**

REP 17-110-2  
Pages 401/402  
Mar 31/78



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

EXHAUST ELBOW ASSY, BUCKET PNEUMATIC DIVE ACTUATOR (17-150/210)

1. Weld filling cracks

---

PARTS REQUIRED FOR REPAIR

---

Weld filler wire (P 3009) (Z 10 CNT 18)

---

A. Weld filling cracks

- (1) Argon arc weld fill cracks as instructed in chapter 70-35-10 "Fusion Welding".
  - Filler wire P 3009
  - Weld class B1

B. Checking welds

- (1) Perform a class B1 weld inspection as directed in chapter 70-35-80 "Weld Inspection", covering :
  - Water washable fluorescent penetrant test by method M 502 B, chapter 70-20-10 "Dye Penetrant Inspection"

PRINTED IN FRANCE



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

ELBOW ASSY (18-110/190)

1. Reconditioning the silverplating of the conical flange seating

PARTS REQUIRED FOR REPAIR

- A. Recondition the silverplating of the conical flange bores in accordance with the instructions on Method M 303 B a) in chapter 70-15-30 : "SURFACE TREATMENT METHODS", and the indications in figure 401, observing the following points :
- (1) The damaged silverplating is to be stripped off by Method M 109 A described in chapter 70-15-20 : "CLEANING METHODS".
  - (2) Check for cracks by the water-washable fluorescent penetrant process using Method M 102 B described in chapter 70-20-10 : "PENETRANT INSPECTION".
  - (3) Plating thickness : 0.015 to 0.020 mm (0.0006 to 0.0008 in).

**78-13-01**

REP 18-110-1

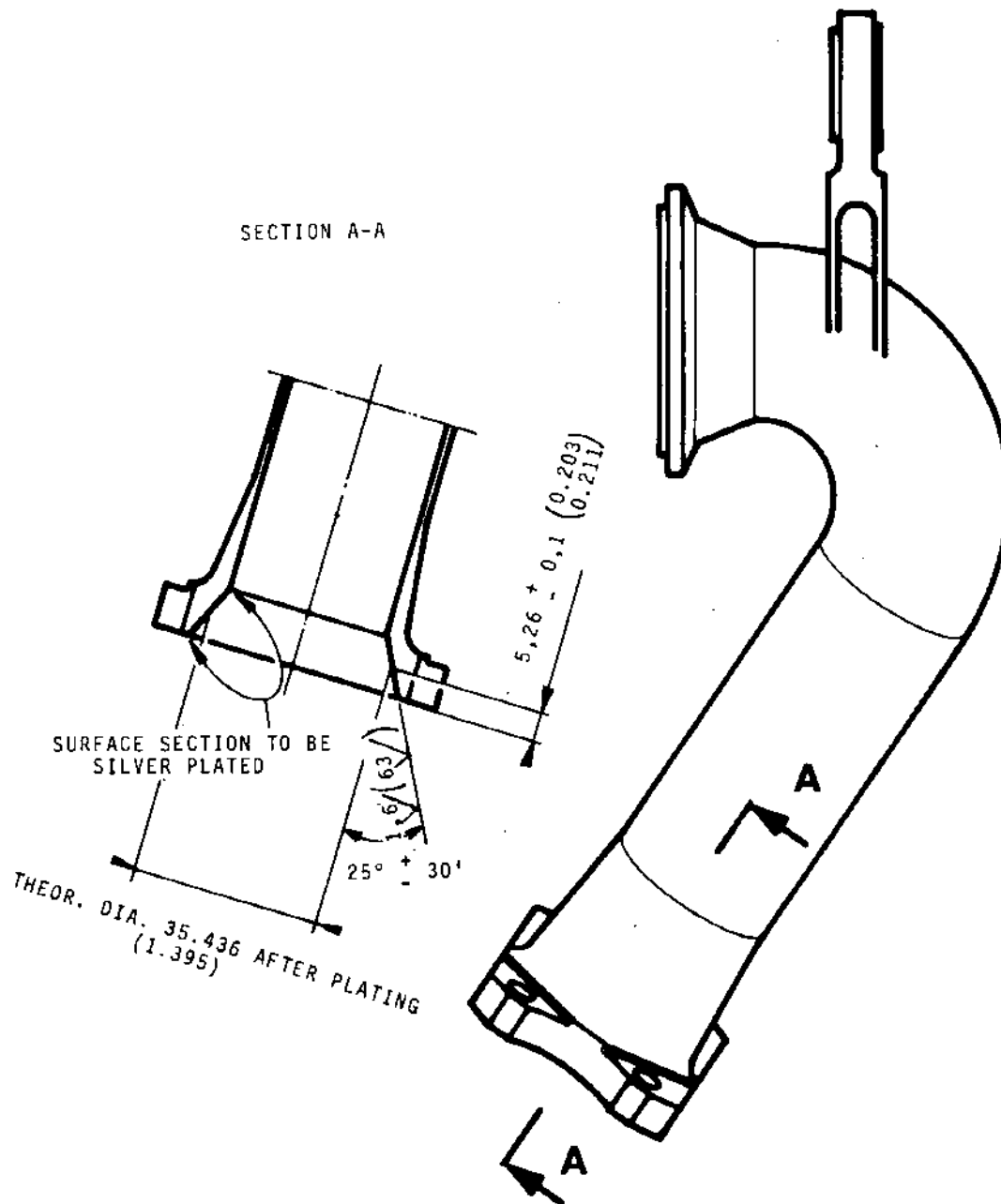
Page 401

Mar 31/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Reconditioning the Silverplating of the Conical Flange Seating  
Figure 401

78-13-01

REP 18-110-1  
Page 402  
Mar 31/77



OLYMPUS 593

MK.610-14-28

OVERHAUL

REPAIRELBOW ASSY (18-110/190)2. Weld Filling Cracks

---

PARTS REQUIRED FOR REPAIR

---

---

Weld filler wire (P3009) (Z 10 CNT 18)

---

## A. Weld filling cracks

- (1) Argon arc weld fill cracks as instructed in chapter 70-35-10 "FUSION WELDING".

- Weld filler wire P3009
- Weld class B2

## B. Checking welds

- (1) Perform a class B2 weld inspection as instructed in chapter 70-35-10 "WELD INSPECTION", and covering :

- Water washable fluorescent penetrant test by method M 502 B, chapter 70-20-10 "DYE PENETRANT INSPECTION"
- X-ray examination as per chapter 70-20-10 "RADIOGRAPHIC INSPECTION".

- (2) Perform a pressure test at 0,334 hbar (relative pressure).





OLYMPUS 593

MK.610-14-28

OVERHAUL

REPAIR



ELBOW ASSY (18-110/190)

3. Replacement of the Spherical Bearing with or without the Sleeve.

---

PARTS REQUIRED FOR REPAIR

---

Spherical Bearing	BAS 7641-04 (649-801-007-0)
Flanged Bushing	302-007-500-0

---

A. Introduction.

This repair give two spherical bearing replacement solutions.

- (1) For a first replacement of the spherical bearing in the elbow assy, apply solution B.
- (2) For a new replacement of a spherical bearing previously replaced by solution B; apply solution C.

B. Replacement of the Spherical Bearing.

- (1) Remove the 6 bearing outer race crimping points by drilling per figure 401.
- (2) Remove the spherical bearing from the flanged bushing.
- (3) Install a new spherical bearing in the flanged bushing.
- (4) Crimp the spherical bearing in the flanged bushing using a punch per figure 402.
- (5) Check that there is no axial play of the bearing outer race in the flanged bushing.
- (6) Check that the spherical bearing move freely by hand in the outer race.

**78-13-01**

REP 18-110-3

Page 401

Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



C. Replacement of the Spherical Bearing and the Flanged Bushing.

- (1) Remove the 6 bushing crimping points by drilling per figure 401.
- (2) Remove the bushing and spherical bearing assembly.
- (3) Install a new flanged bushing in the bracket housing.
- (4) Crimp the flanged bushing in the bracket using a punch per figure 402.
- (5) Check that there is no axial play of the flanged bushing in the bracket.
- (6) Install a new spherical bearing in the flanged bushing.
- (7) Crimp the spherical bearing in the flanged bushing using a punch per figure 402.
- (8) Check that there is no axial play of the bearing outer race in the flanged bushing.
- (9) Check that the spherical bearing move freely by hand in the outer race.

**78-13-01**

REP 18-110-3

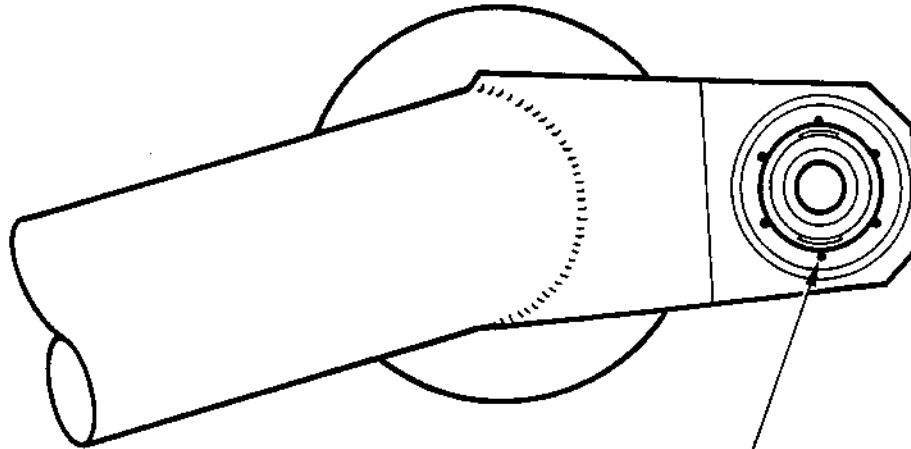
Page 402

Apr 30/93



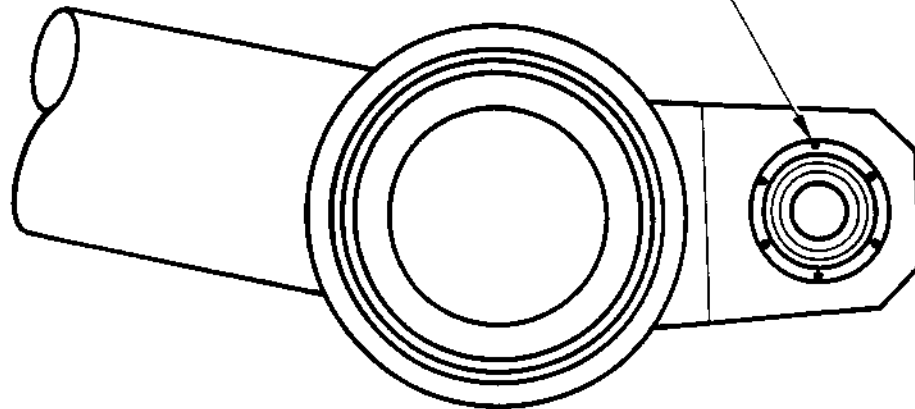
OLYMPUS 593

MK.610-14-28  
OVERHAUL



LOCKING OF THE SPHERICAL BEARING OUTER  
RACE IN THE BUSHING BY SIX CRIMPING  
POINTS IN THE FLANGED BUSHING

LOCKING OF THE BUSHING IN THE ELBOW  
BRACKET BY SIX CRIMPING POINTS IN THE  
FLANGED BUSHING



Removal of the Spherical Bearing or the Flanged Bushing  
Figure 401

**78-13-01**

REP 18-110-3

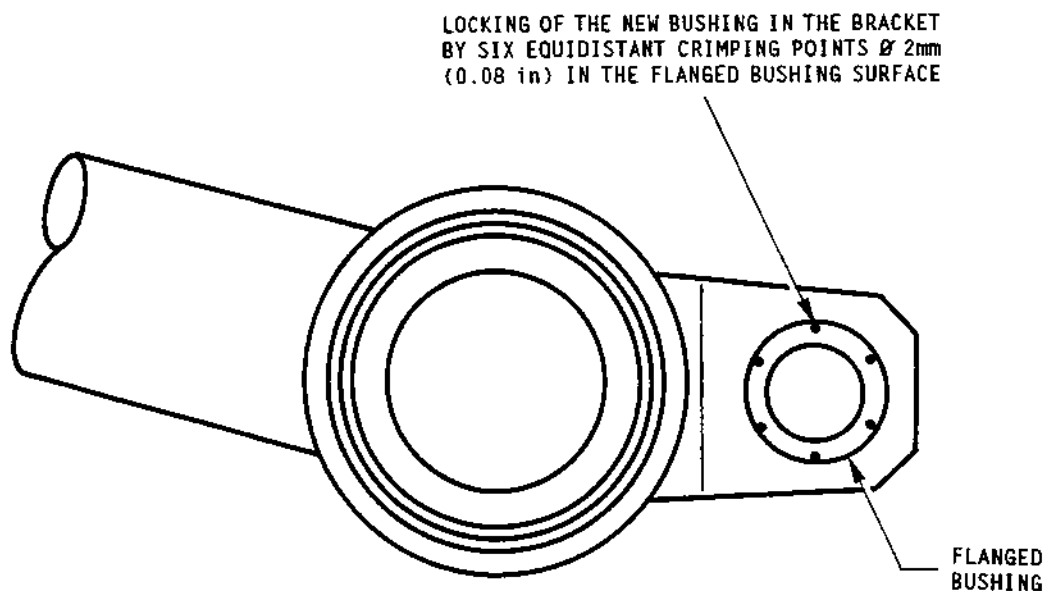
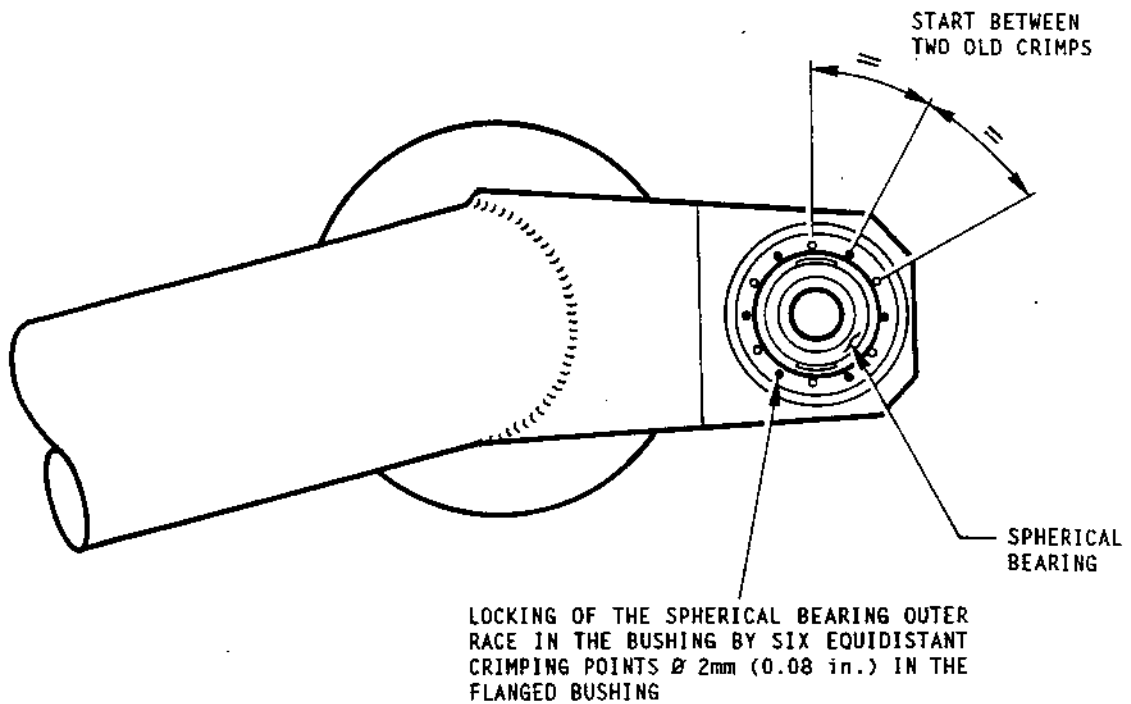
Page 403

Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Crimping of the Flanged Bushing and the Spherical Bearing  
Figure 402

78-13-01

REP 18-110-3

Page 404

Apr 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL

REPAIR



ELBOW ASSY (18-110/190)

4. Reconditioning of the Heat Resistant Varnish on the Conical Flange Seating.

---

PARTS REQUIRED FOR REPAIR

---

A. Remove the Damaged Coating as Follows:

- (1) For silver plating. Stripp of per method M109A of chapter 70-15-20 of Standard Practices.
- (2) For heat resistant varnish. Remove per method M120A of chapter 70-15-20 of Standard Practices.

B. Perform a water washable fluorescent-penetrant test of the conical flange seating by method M502B of chapter 70-20-10 of Standard Practices.

C. Apply heat resistant varnish on the conical flange seating per method M331B.a of chapter 70-15-30 of Standard Practices.

NOTE: Hold temperature at 250°C (482°F) for one hour.

**78-13-01**

REP 18-110-4

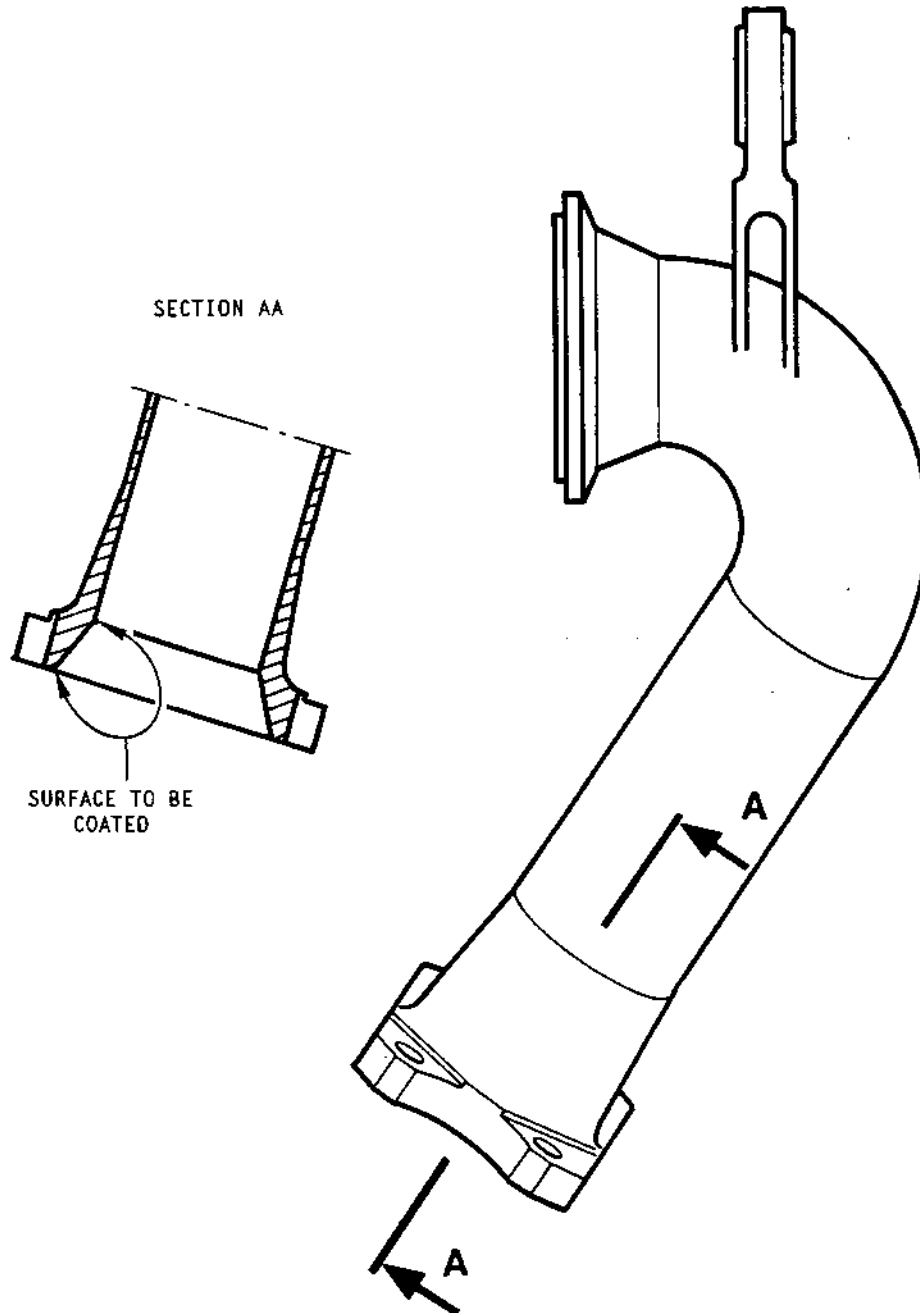
Page 401

Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Reconditioning of the Heat Resistant Varnish on the Conical  
Flange Seating  
Figure 401

78-13-01

REP 18-110-4

Page 402

Apr 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

ISOLATION VALVE SUPPORT BRACKET ASSY (18-270/290)

1. Reconditioning the anti-seizing varnish on the ball joint

---

PARTS REQUIRED FOR REPAIR

---

Anti-seizing varnish P 209

---

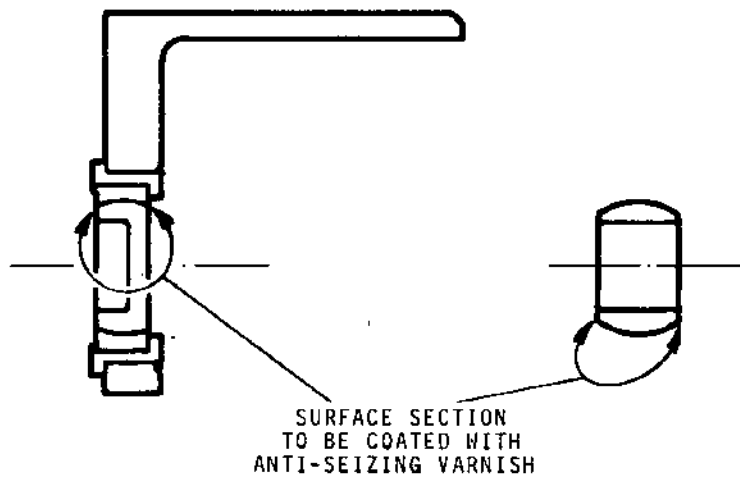
A. Recondition the anti-seizing varnish on the inner and outer rings of the ball joint in accordance with the instructions on Method M 322 B in chapter 70-15-30 : "SURFACE TREATMENT METHODS", the indications in figure 401 and the following guidance.

- (1) Check for cracks by the water-washable fluorescent penetrant process, using Method M 502 B described in chapter 70-20-10 : "PENETRANT INSPECTION".



OLYMPUS 593

MK.610-14-28  
OVERHAUL



PRINTED IN FRANCE

Reconditioning the Anti-seizing Varnish on the Ball Joint  
Figure 401

**78-13-01**

REP 18-270-1

Page 402

Mar 31/77





OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

AIR INLET P3 TUBE ASSY (18-340/430)

1. Reconditioning the silverplating of the conical flange bores

PARTS REQUIRED FOR REPAIR

A. Recondition the conical bores of the flanges in accordance with the indications in figure 401, and the instructions on Method M 303 B a) in chapter 70-15-30 : "SURFACE TREATMENT METHODS", observing the following points :

- (1) Slacken off the flanges of the ball ends and hold them in position during operations.
- (2) The old silverplating is to be stripped off by Method M 109 A described in chapter 70-15-20 : "CLEANING METHODS".

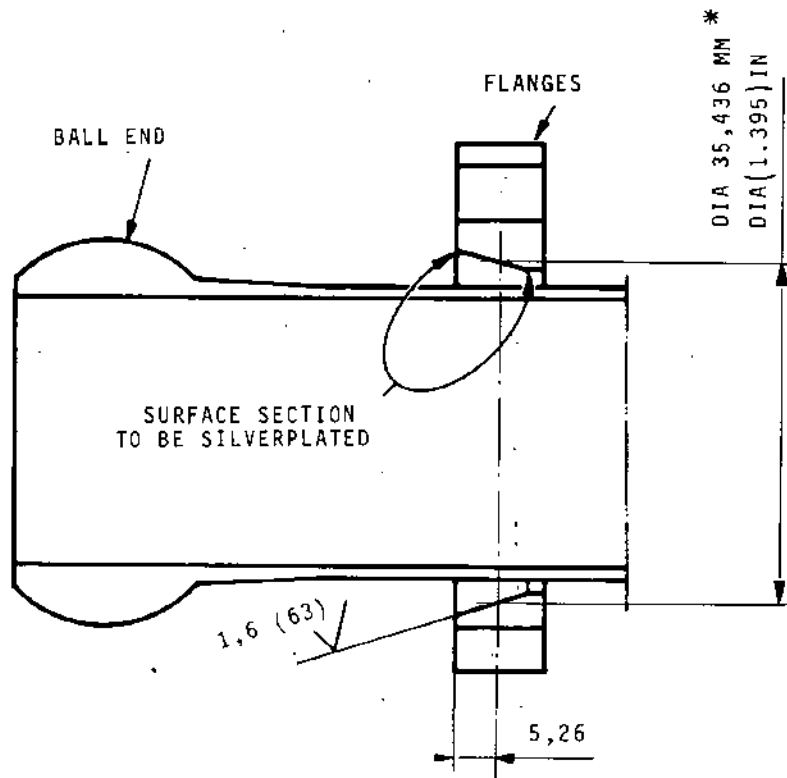
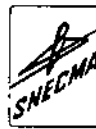
NOTE : With the silverplating off, check that the parent metal is not marked by a dent perceptible by touch ; if it is, set the part aside pending adoption of an applicable repair scheme.

- (3) Check for cracks by the water-washable fluorescent penetrant process, using Method M 502 B described in chapter 70-20-10 : "PENETRANT INSPECTION".
- (4) Plating thickness 0.015 to 0.020 mm (0.0006 to 0.0008 in).
- (5) After plating, check that the ball ends come to bear fully on the conical flange bores.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



\* THEORETICAL VALUE AFTER PLATING.  
THE CORRESPONDING BALL-END DIA.  
MUST COME TO BEAR FULLY ON THIS  
DIAMETER.

Reconditioning the Silverplating of the Conical Flange Bores  
Figure 401

78-13-01

REP 18-340-1  
Page 402

Mar 31/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

AIR INLET P3 TUBE ASSY (18-340/430)

2. Reconditioning the chrome-plating of the ball ends

---

PARTS REQUIRED FOR REPAIR

---

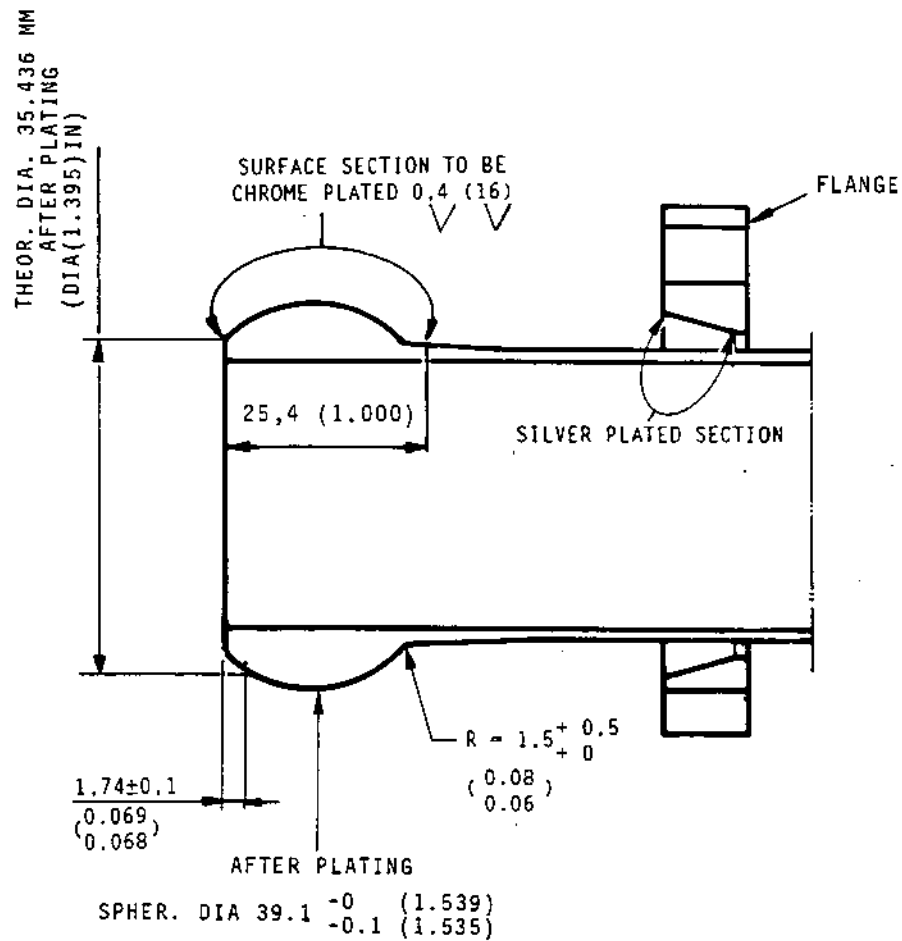
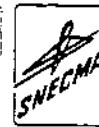
- A. Recondition the chrome-plating of the ball ends in accordance with the indications in figure 401, and the instructions on Method M 300 B a) in chapter 70-15-30 : "SURFACE TREATMENT METHODS", observing the following points.
- (1) Slacken off the ball-end flanges and hold them in position during operations. If necessary, mask the silver-plated surfaces.
  - (2) The surface sections to be chrome-plated need not be reground.
  - (3) Check for cracks by the water-washable fluorescent penetrant process, using Method M 502 B described in chapter 70-20-10 : "PENETRANT INSPECTION".
  - (4) Plating thickness : 0.025 to 0.50 mm (0.001 to 0.002 in).

FORNIED IN FRANCE



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Reconditioning the Chrome-plating of the Ball Ends  
Figure 401

78-13-01

REP 18-340-2

Page 402

Apr 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

TUBE ASSY, P3 AIR INLET (18-340/430)

3. Weld filling cracks

---

PARTS REQUIRED FOR REPAIR

---

Weld filler wire (P 3009) (Z 10 CNT 18)

---

A. Weld filling cracks

(1) Weld fill cracks as instructed in chapter 70-35-10 "Fusion Welding".

- Weld filler wire P 3009
- Weld class B2

B. Checking welds

(1) Perform a class B2 weld inspection as instructed in chapter 70-35-80 "Weld Inspection", and covering :

- Water washable fluorescent penetrant test by method M 502 B, chapter 70-20-10 "Dye Penetrant Inspection"
- X-ray examination as per chapter 70-20-30 "Radiographic Inspection".

(2) Perform a pressure test at 0,334 hbar (relative pressure).

PRINTED IN FRANCE



OLYMPUS 593

MK.610-14-28

OVERHAUL

REPAIR



AIR INLET P3 TUBE ASSY (18-340/430)

4. Reconditioning of the Heat Resistant Varnish on the Conical Flange Bores.

---

PARTS REQUIRED FOR REPAIR

---

- A. Remove the Damaged Coating as Follows:
- (1) For silver plating. Stripp of per method M109A of chapter 70-15-20 of Standard Practices.
  - (2) For heat resistant varnish. Remove per method M120A of chapter 70-15-20 of Standard Practices.
- B. Perform a water washable fluorescent-penetrant test of the conical bore of the flange by method M502B of chapter 70-20-10 of Standard Practices.
- C. Apply heat resistant varnish on the conical bore of the flange per method M331B.a of chapter 70-15-30 of Standard Practices.

NOTE: Hold temperature at 250°C (482°F) for one hour.

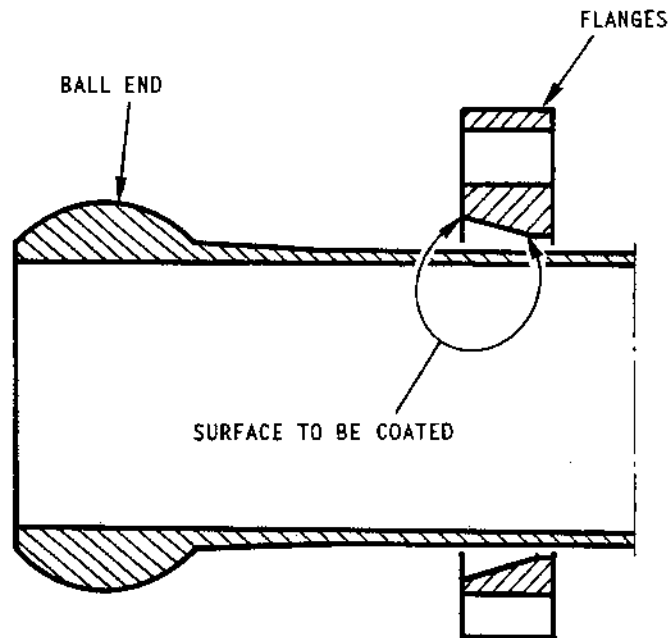


OLYMPUS 593

MK.610-14-28  
OVERHAUL



SECTION VALID IN TWO LOCATIONS



Reconditioning of the Heat Resistant Varnish on the Conical  
Flange Bores  
Figure 401

78-13-01

REP 18-340-4

Page 402

Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

HEXAGONAL NUT (19-40/140)

1. Reconditioning the silverplating

---

PARTS REQUIRED FOR REPAIR

---

A. Recondition the silverplating of the whole nut in accordance with the instructions on Method M 303 B a) in chapter 70-15-30 : "SURFACE TREATMENT METHODS", observing the following points :

- (1) The former silverplating is to be stripped off by Method M 109 A described in chapter 70-15-20 : "CLEANING METHODS".
- (2) Check for cracks by the water-washable fluorescent penetrant process using Method M 502 B described as one of the standard methods in chapter 70-20-10.
- (3) Plating thickness 0.005 to 0.012 mm (0.00020 to 0.00047 in).
- (4) Thread 1.850 - 12 UNJS - 3B (special)

Inner dia.	45.565 <sup>+</sup> <sub>0</sub> 0.254	1.7939 <sup>+</sup> <sub>0</sub> 0.0100
Pitch dia.	46.251 <sup>+</sup> <sub>0</sub> 0.147	1.8209 <sup>+</sup> <sub>0</sub> 0.0058
Min. outer dia.	47.625 (1.8750)	

78-13-01

REP 19-40-1  
Pages 401/402  
Mar 31/77





OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

AIR PIPE P3 (19-100/200)

1. Reconditioning the anti-seizing varnish on the ball joint

---

PARTS REQUIRED FOR REPAIR

---

Anti-seizing varnish P 209

- 
- A. Reconditioning the anti-seizing varnish on the ball joint in accordance with the instructions on Method M 322 B in chapter 70-15-30 : "SURFACE TREATMENT METHODS" and the indications in figure 401.

CAUTION: 1. OPERATION 30 (WET SAND-BLASTING) MUST NOT BE PERFORMED IF THE PART SHOWS A DULL SURFACE APPEARANCE WITHOUT ANY PEENING MARKS.

2. MASK THE SILVERPLATING OF THE CONICAL FLANGE BORES BY THE USE OF MASKING 112 (P 236). DO NOT IMMERSE THESE SURFACE SECTIONS IN THE STRIPPING BATHS.

78-13-01

REP 19-100-1

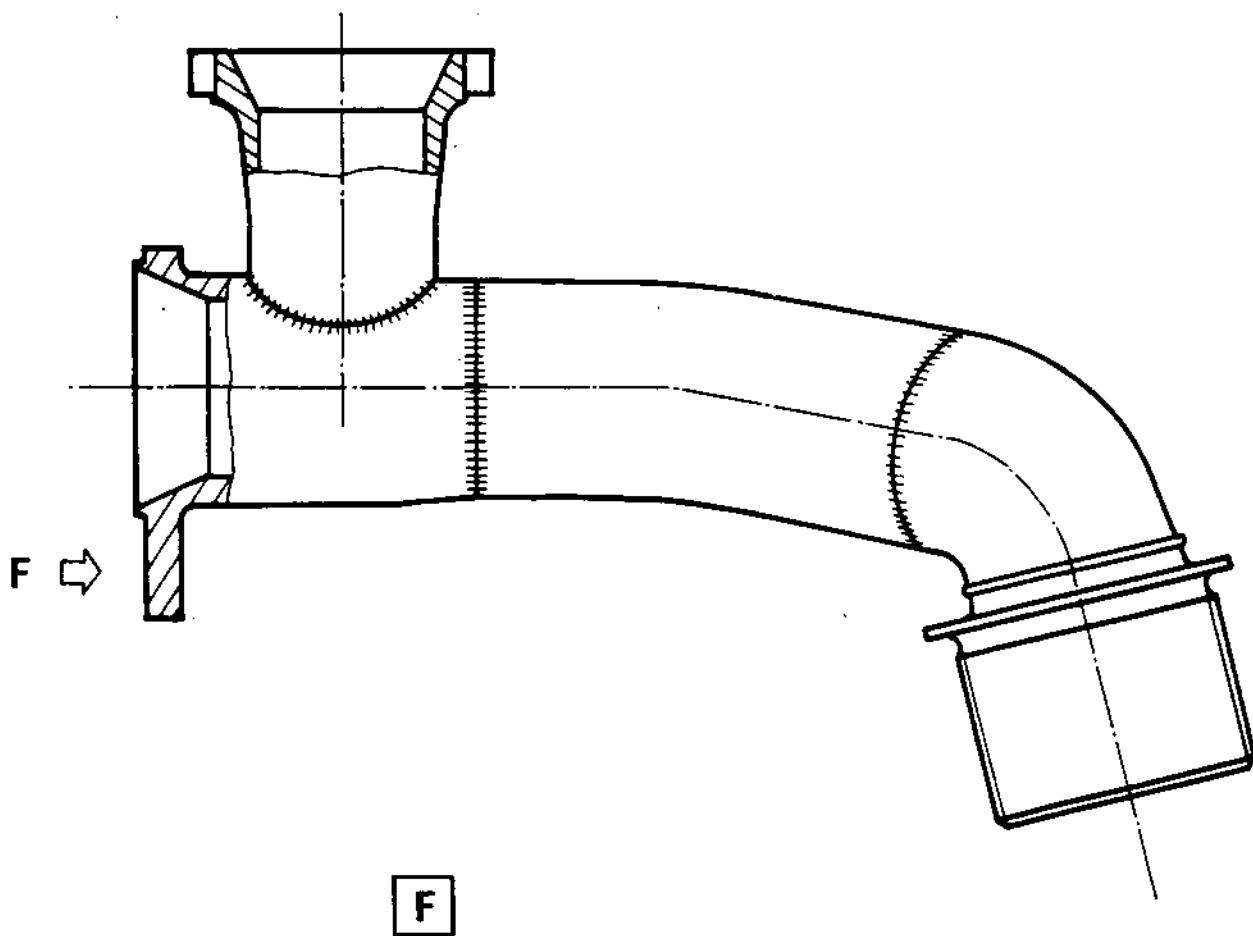
Page 401

Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



APPLY ANTI-SEIZING VARNISH  
OVER THE ENTIRE BORE SURFACE

Reconditioning the Anti-seizing Varnish on the Ball Joint  
Figure 401

78-13-01

REP 19-100-1

Page 402

Mar 31/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

AIR PIPE P3 (19-100/200)

2. Reconditioning the silverplating of the conical flange bores

PARTS REQUIRED FOR REPAIR

A. Recondition the silverplating of the conical flange bores in accordance with the instructions on Method M 303 B a) in chapter 70-15-30 : "SURFACE TREATMENT METHODS" and the indications in figure 401, observing the following points:

- (1) The damaged silverplating is to be stripped off by Method M 109 A described in chapter 70-15-20 : "CLEANING METHODS".
- (2) Check for cracks by the water-washable fluorescent penetrant process, using method M 502 B described in chapter 70-20-10 : "PENETRANT INSPECTION".
- (3) Plating thickness : 0.015 to 0.020 mm (0.0006 to 0.0008 in).

CAUTION : CAREFULLY MASK THE BALL JOINT IF THE ANTI-SEIZING VARNISH IS IN GOOD CONDITION.

PRINTED IN FRANCE

78-13-01

REP 19-100-2

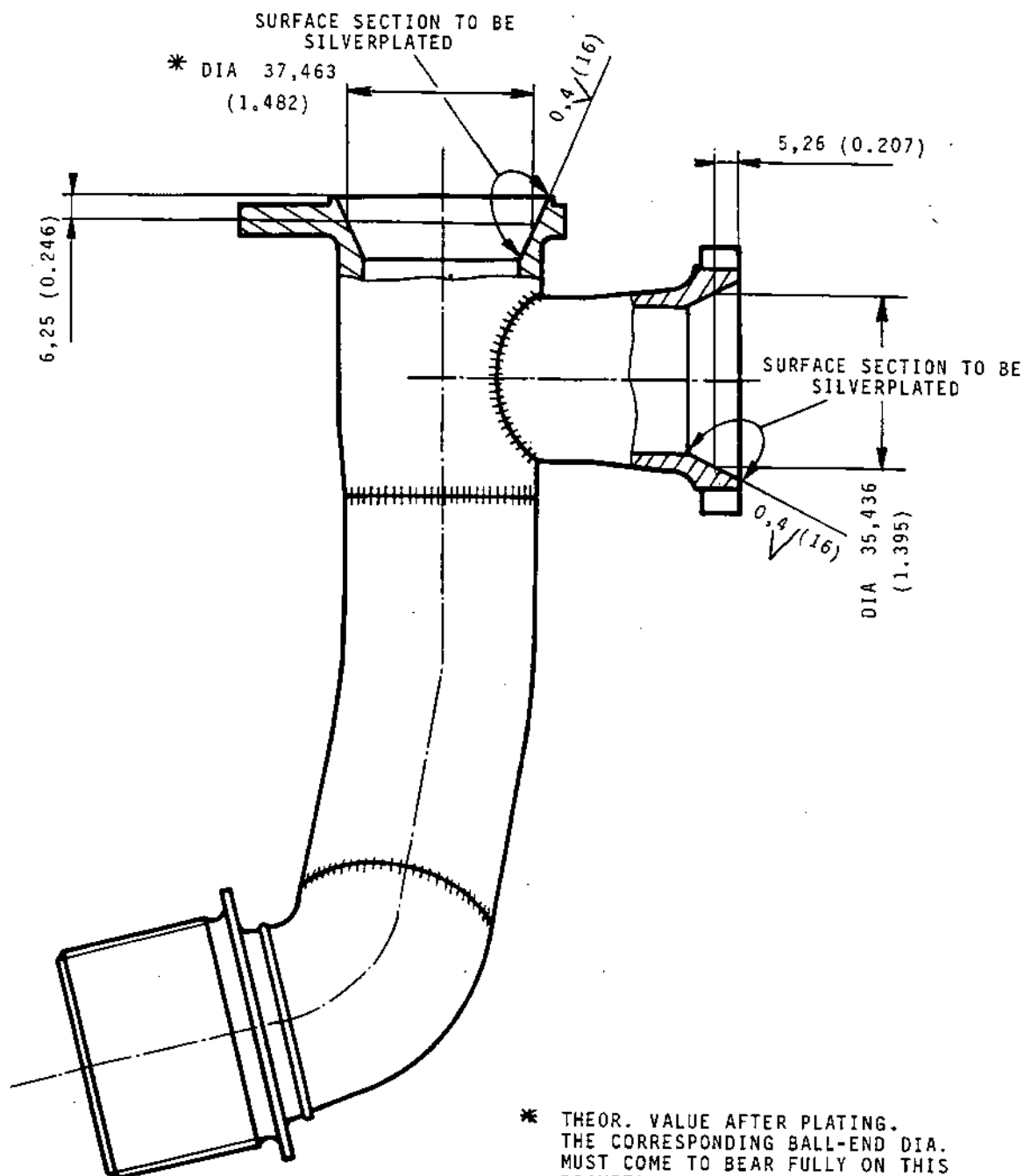
Page 401

Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Reconditioning the Silverplating of the Conical Flange Bores  
Figure 401

78-13-01

REP 19-100-2

Page 402

Mar 31/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

PIPE ASSY, P3 AIR (19-100/200)

3. Weld filling cracks

---

PARTS REQUIRED FOR REPAIR

---

Weld filler wire (P 3009) (Z 10 CNT 18)

---

A. Weld filling cracks

- (1) Argon arc weld fill cracks as instructed in chapter "Fusion Welding".
  - Weld filler wire P 3009
  - Weld class B2

B. Checking welds

- (1) Perform a class B2 weld inspection as instructed in chapter 70-35-80 "Weld Inspection", and covering :
  - Water washable fluorescent penetrant test by method M 502 B, chapter 70-20-10 "Dye Penetrant Inspection"
  - X ray examination as per chapter 70-20-30 "Radiographic Inspection".
- (2) Perform a pressure test at 0,331 hbar (relative pressure).



OLYMPUS 593

MK.610-14-28

OVERHAUL

REPAIR



AIR PIPE P3 (19-100/200)

4. Reconditioning of the Heat Resistant Varnish on the Conical Flange Bores.

---

PARTS REQUIRED FOR REPAIR

---

A. Remove the Damaged Coating as Follows:

- (1) For silver plating. Stripp of per method M109A of chapter 70-15-20 of Standard Practices.
- (2) For heat resistant varnish. Remove per method M120A of chapter 70-15-20 of Standard Practices.

B. Perform a water washable fluorescent-penetrant test of the conical bore of the flange by method M502B of chapter 70-20-10 of Standard Practices.

C. Apply heat resistant varnish on the conical bore of the flange per method M331B.a of chapter 70-15-30 of Standard Practices.

NOTE: Hold temperature at 250°C (482°F) for one hour.

**78-13-01**

REP 19-100-4

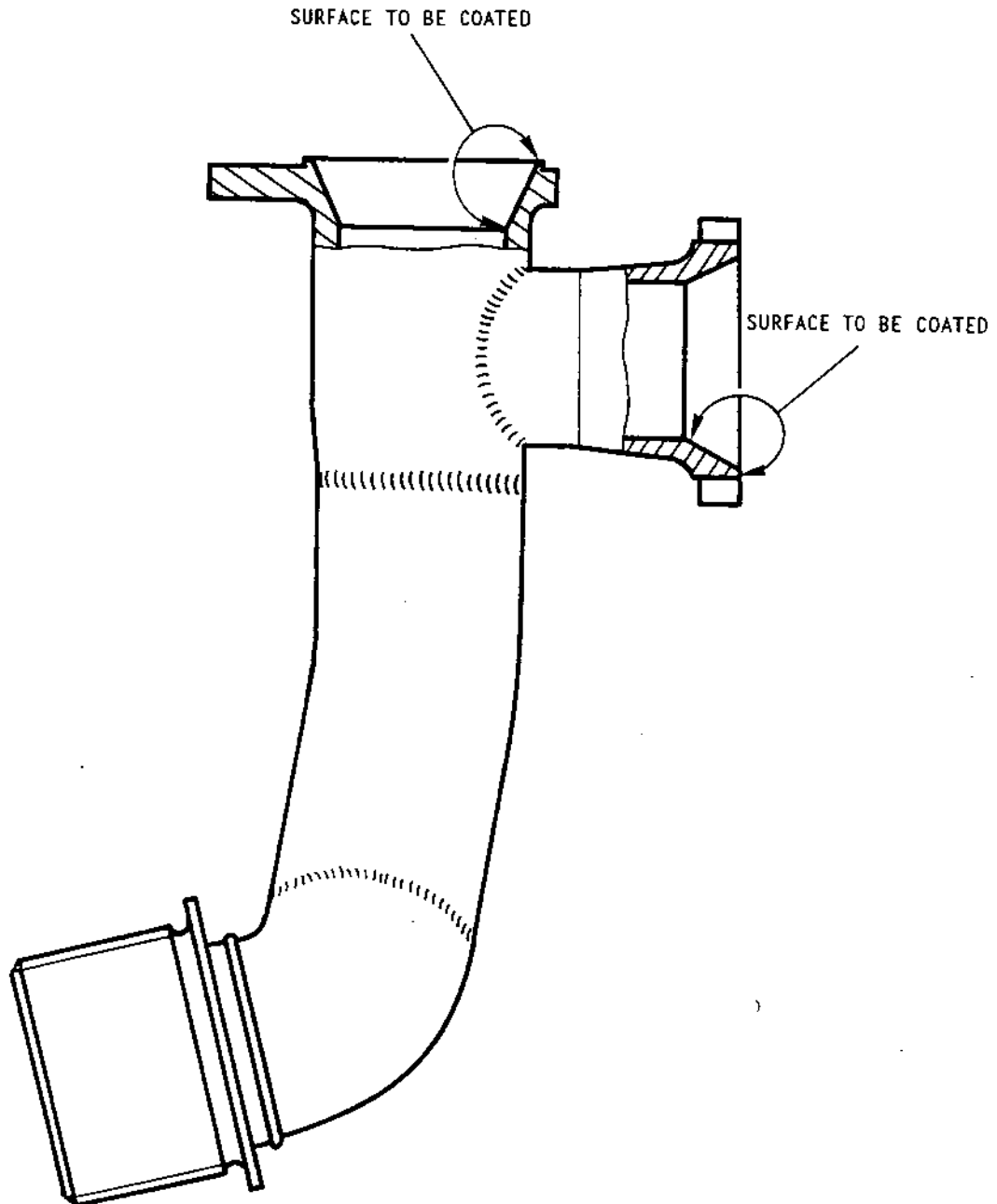
Page 401

Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Reconditioning of the Heat Resistant Varnish on the Conical  
Flange Bores  
Figure 401

**78-13-01**  
REP 19-100-4  
Page 402  
Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

AIR PIPE P3 (19-200)

1. Reconditioning the anti-seizing varnish on the ball joint

---

PARTS REQUIRED FOR REPAIR

---

Anti-seizing varnish P 209

- 
- A. Recondition the anti-seizing varnish on the ball joint in accordance with the instructions on Method M 322 B in chapter 70-15-30 : "SURFACE TREATMENT METHODS" and the indications in figure 401.

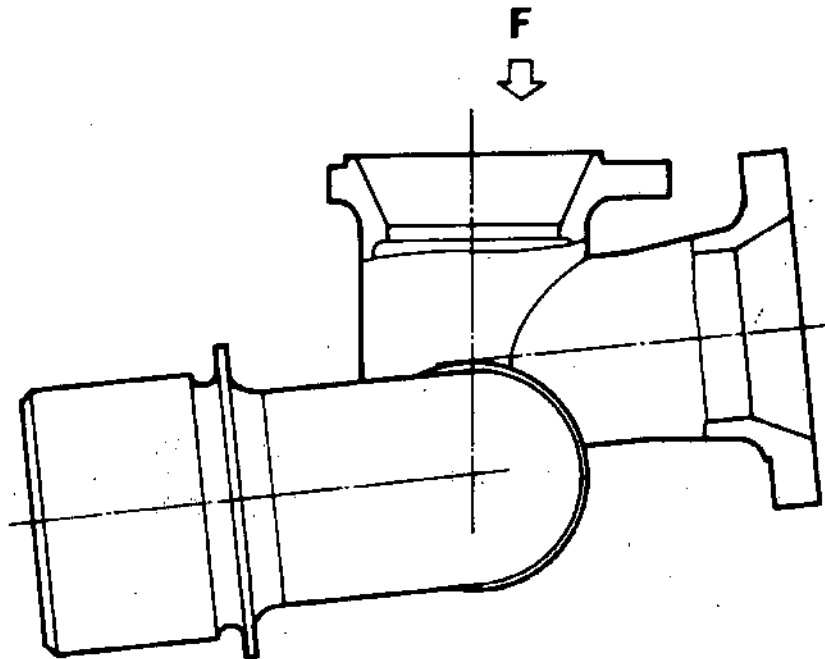
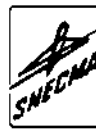
- CAUTION :
1. OPERATION 30 (WET SAND-BLASTING) MUST NOT BE PERFORMED IF THE PART SHOWS A DULL SURFACE APPEARANCE WITHOUT ANY PEENING MARKS.
  2. MASK THE SILVERPLATING OF THE CONICAL FLANGE BORES BY THE USE OF MASKING 112 (P 236). DO NOT IMMERSE THESE SURFACE SECTIONS IN THE STRIPPING BATHS.





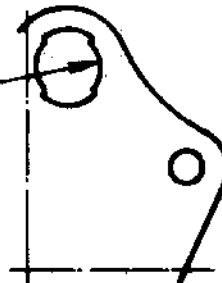
OLYMPUS 593

MK.610-14-28  
OVERHAUL



F

APPLY ANTI-SEIZING VARNISH  
OVER THE ENTIRE BORE SURFACE



Reconditioning the Anti-seizing Varnish on the Ball Joint  
Figure 401

78-13-01

REP 19-200-1  
Page 402  
Mar 31/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

AIR PIPE P3 (19-200)

2. Reconditioning the silverplating of the flange bores

---

PARTS REQUIRED FOR REPAIR

---

A. Recondition the silverplating of the conical flange bores in accordance with the instructions on Method M 303 B a) in chapter 70-15-30 : "SURFACE TREATMENT METHODS", and the indications in figure 401, observing the following points :

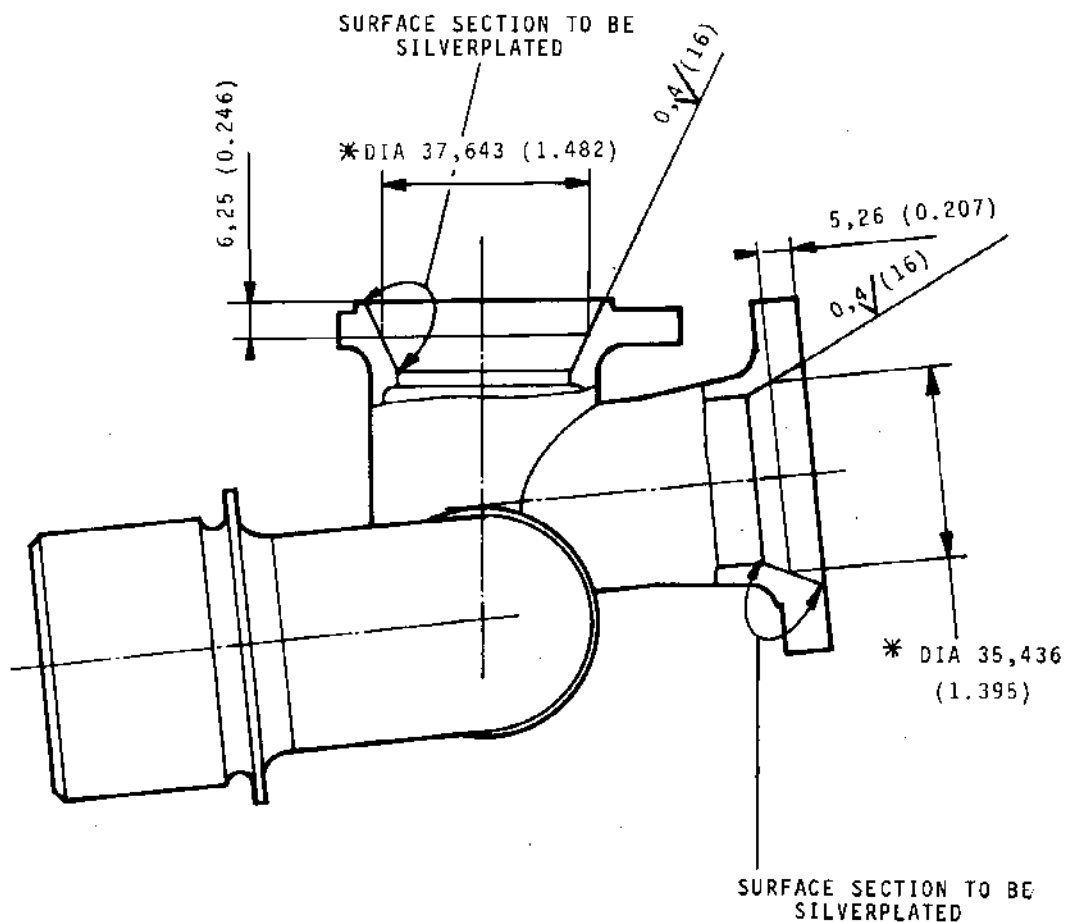
- (1) The damaged silverplating is stripped off by Method M 109 A described in chapter 70-15-20 : "CLEANING METHODS".
- (2) Check for cracks by the water-washable fluorescent penetrant process, using Method M 502 B described in chapter 70-20-10 : "PENETRANT INSPECTION".
- (3) Plating thickness : 0.015 to 0.010 mm (0.0006 to 0.0008 in).

CAUTION : CAREFULLY MASK THE BALL JOINT IF THE ANTI-SEIZING VARNISH IS IN GOOD CONDITION.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



\* THEORETICAL VALVE AFTER PLATING,  
THE CORRESPONDING BALL-END DIA.  
MUST COME TO BEAR FULLY ON THIS  
DIAMETER.

Reconditioning the Silverplating of the Conical Flange Bores  
Figure 401

78-13-01

REP 19-200-2  
Page 402  
Mar 31/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

PIPE ASSY, P3 AIR (19-200)

3. Weld filling cracks

---

PARTS REQUIRED FOR REPAIR

---

Weld filler wire (P 3009) (Z 10 CNT 18)

---

A. Weld filling cracks

(1) Argon arc weld fill cracks as instructed in chapter "Fusion Welding".

- Weld filler wire P 3009
- Weld class B2

B. Checking welds

(1) Perform a class B2 weld inspection as instructed in chapter 70-35-80 "Weld Inspection" and covering :

- Water washable fluorescent penetrant test by method M 502 B, chapter 70-20-10 "Dye Penetrant Inspection"
- X-ray examination as per chapter 70-20-30 "Radiographic Inspection".

(2) Perform a pressure test at 0,334 hbar (relative pressure).

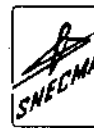
PRINTED IN FRANCE



OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

SUPPORT (20-150)

1. Repairing the internal bore by hard chromium plating

---

PARTS REQUIRED FOR REPAIR

---

- A. Repair the internal bore by the use of a hard chromium deposit, as directed in Fig. 401, under method M 300 B b) in chapter 70-15-30 "Surface Treatment Methods", and the following instructions :
- (1) Correct the machining by regrinding so as to remove defects and ensure a min. chromium plate thickness of 0,05 mm (0.0020 in), with the upper thickness limit set at 0,5 mm (0.020 in).
  - (2) Check for cracks by a water washable fluorescent penetrant test by method M 502 B, chapter 70-20-10, "Dye Penetrant Inspection".
- B. Marking
- (1) Inscribe "REP 1" next after the part No., as described under method M 28, chapter 70-10-10 "Marking".

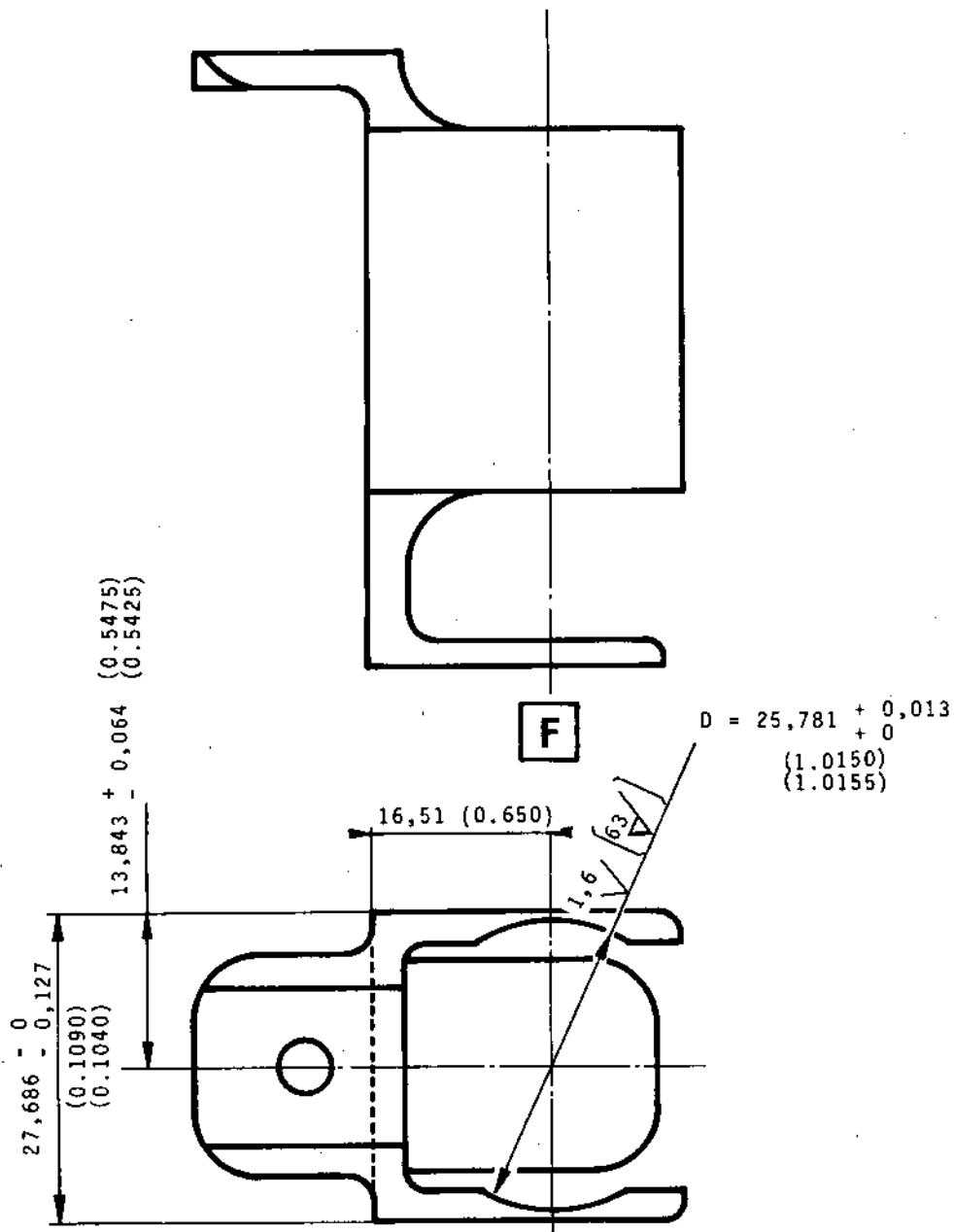
78-13-01

REP 20-150-1

Page 401

Mar 31/78

↓ **F**



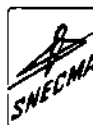
78-13-01  
REP 20-150-1  
Page 402  
Mar 31/78



OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

TRUNNION (20-170)

1. Reconditioning the hard chrome-plating

---

PARTS REQUIRED FOR REPAIR

---

A. Recondition the hard chrome-plating on all trunnion faces in accordance with the instructions on Method M 300 B b) in chapter 70-15-30 : "SURFACE TREATMENT METHODS", observing the following points :

- (1) No regrinding is required
- (2) Check for cracks by the water-washable fluorescent penetrant process, using Method M 502 B described in chapter 70-20-10 : "PENETRANT INSPECTION".
- (3) Plating thickness : 0.008 to 0.013 mm (0.0003 to 0.0005 in ).

NOTE : The plating thickness tolerance is not mandatory except for the bore and the outer diameter.

PRINTED IN FRANCE

78-13-01

REP 20-170-1

Page 401

Mar 31/77

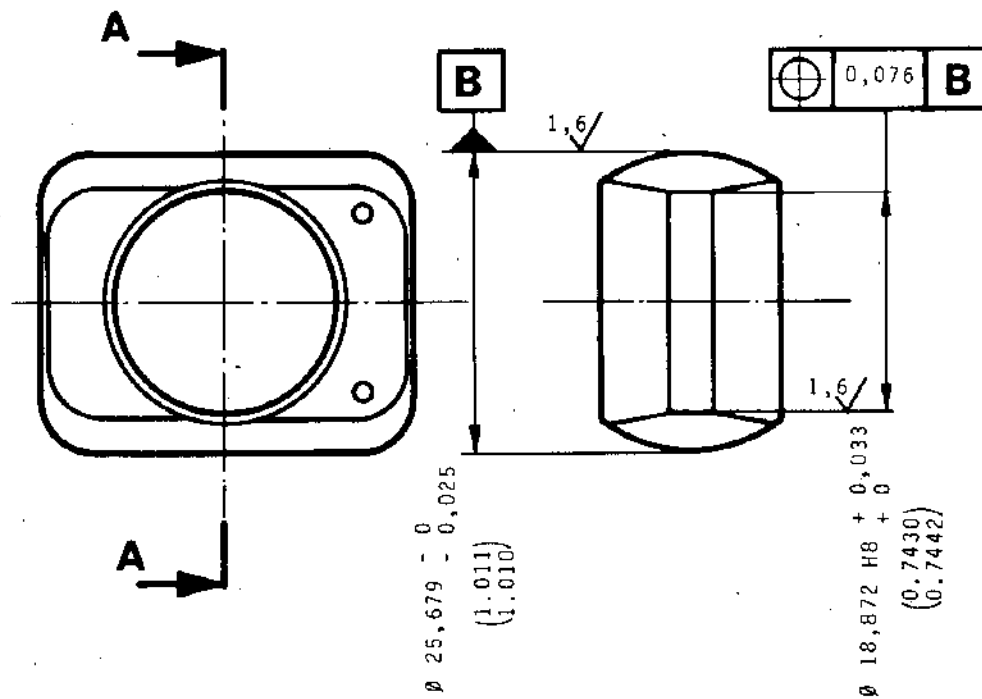


OLYMPUS 593

MK.610-14-28  
OVERHAUL



SECTION A-A



Reconditioning the Hard Chrome-plating  
Figure 401

78-13-01

REP 20-170-1

Page 402

Mar 31/77





OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

SLOTTED PLATE ASSY (22-20)

1. Weld Filling Cracks

---

PARTS REQUIRED FOR REPAIR

---

Weld filler wire (P3009) (Z 10 CNT 18)

---

A. Weld filling cracks

- (1) Argon arc weld fill cracks as instructed in chapter 70-35-10 "FUSION WELDING".

- Weld filler wire P3009
- Weld class B1

B. Checking welds

- (1) Perform a class B1 weld inspection as instructed in chapter 70-35-80 "WELD INSPECTION", and covering :

- Water washable fluorescent penetrant test by method M 502 B, chapter 70-20-10 "DYE PENETRANT INSPECTION"

PRINTED IN FRANCE



OLYMPUS 593

MK.610-14-28

OVERHAUL



## REPAIR

### WELDED HOUSING ASSY (22-30)

#### 1. Renewing the riveted nuts

---

##### PARTS REQUIRED FOR REPAIR

---

	Rivet MS 20427 M3-4	(650-022-042-0)
or	Rivet MS 20427 M4-5	(650-022-074-0)
	Floating nut LHA 3280 B2-048	(649-785-114-0)
	Floating nut NAS 686 C3	(649-785-086-0)

---

#### A. Removing the damaged nut

- (1) Remove damaged nut by grinding out the heads of the fixing rivets.

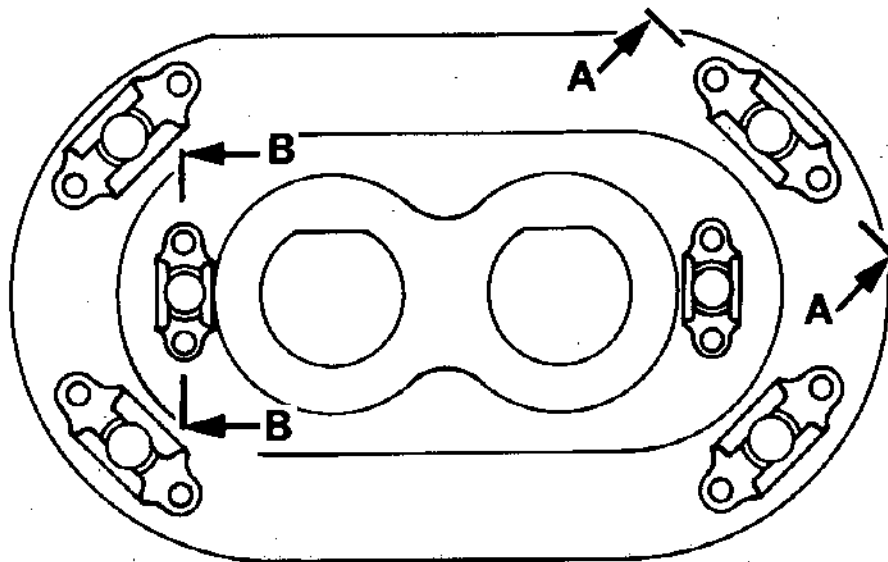
#### B. Installing the new nut

- (1) Check the rivet holes as instructed in chapter 70-50-10 "JOINTS MADE BY USE OF SOLID RIVETS".
- (2) Fit a new nut by grinding it as instructed in chapter 70-50-10 : "JOINTS MADE BY USE OF SOLID RIVETS", and as indicated in figure 401.
- (3) Check the riveting as instructed in chapter 70-50-81 : "INSPECTION OF SOLID RIVETS".



OLYMPUS 593

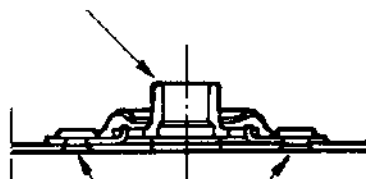
MK.610-14-28  
OVERHAUL



SECTION A-A

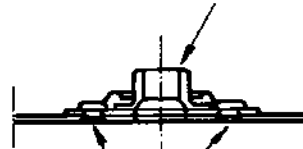
SECTION B-B

FLOATING ANCHOR NUT LHA 3280 B2-048



RIVET MS 20427 M3-4  
OR RIVET MS 20427 M4-5

FLOATING ANCHOR NUT  
NAS 686 C3



RIVET MS 20427 M3-4  
OR RIVET MS 20427 M4-5

Renewing the Riveted Floating Nuts  
Figure 401

78-13-01

REP 22-30-1

Page 402

Mar 31/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

BLANKING PART FOR ACTUATOR CAVITY (22-85/86/165/166/230/231/285/  
286/360/361/400/401/460/461/500/501)

1. Crack filler welding

---

PARTS REQUIRED FOR REPAIRS

---

Filler weld wire P 3028 (NCK 20 D)

---

A. Filler welding

(1) Argon arc-weld the cracks as per chapter 70-35-10.

(a) Filler weld wire : P 3028

(b) Class of weld : B2.

B. Inspection of weld

(1) Perform class B2 weld inspection as per chapter  
70-35-80.

(a) Perform local dye penetrant inspection using  
fluorescent water-washable product as per method  
M503B, in chapter 70-20-10.

(b) X-ray inspect as per chapter 70-20-30.

C. Heat treatment

(1) Perform annealing heat treatment on the blanking parts  
as per method M812, in chapter 70-45-10.

(2) Perform local dye penetrant inspection using fluo-  
rescent water-washable product as per method M503B in  
chapter 70-20-10.

**78-13-01**

REP 22-85-1  
Pages 401/402  
Oct 31/81



OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

ACTUATOR CAVITY BLANKING PART (22-85/86/165/166/230/231/285/286/  
360/361/400/401/460/461/500/501)

2. Repair of the attachment zone of the blanking part at the junction of the vertical panel of the actuator cavity and the rear frame fitting.

---

PARTS NECESSARY FOR THE REPAIR

---

Sheet metal P 3326. Thickness 0,9 mm	(0.035 in.)
Sheet metal P 3326. Thickness 1,2 mm	(0.047 in.)
Bar P 3620. $\varnothing$ 25 mm	(0.984 in. dia.)
Filler metal for welding	P 3028

---

A. Removal of damaged zones.

- (1) Eliminate damaged zones as shown in figure 401. Deburr.
- (2) If necessary, refill any cracks in weld beads as indicated in REP 22-85-1 of this chapter.

NOTE : Do not apply heat treatment after refilling.

B. Welding of the inserted plate.

At the point whose the blanking part is attached to the rear frame, install the plate as shown in figure 402 and as follows :

- (1) From sheet metal P 3326, thickness 0,9 mm (0.035 in.), cut out a plate dimensioned as necessary.
- (2) Form the plate and rework the edges to be welded to the cut away area. Deburr.

NOTE : Ensure continuity of shape of blanking part.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (3) Position and then weld the plate according to figure 402 and chapter 70-35-10.
  - (a) Argon arc welding. Class B 2.
  - (b) Filler metal : P 3028.
- (4) Check the class B 2 weld as indicated in chapter 70-35-80 and in the following conditions :
  - (a) Check for localised cracks using water washable fluorescent penetrant test according to method M 503 B of chapter 70-20-20.
  - (b) Radiographic, X-ray test according to chapter 70-20-30.
- (5) Smooth the weld bead in the flat zone to be situated beneath the reinforcing plate marked "3" (see figures 402 and 403).

#### C. Manufacturing of inserted parts.

- (1) From sheet metal P 3326, thickness 0,9 mm (0.035 in.), make the lugs marked "1" and "2" as shown in figure 404 sheet 1. Rework to fit cut out section.
- (2) From sheet metal P 3326, thickness 1,2 mm (0.047 in.), make the reinforcing plate marked "3" as shown in figure 404 sheet 2.
- (3) From bar P 3620, dia. 25 mm (0.984 in.), make shouldered washer marked "4" as shown in figure 404 sheet 3.

#### D. Welding of lugs and reinforcing plates.

- (1) Weld parts marked "1", "2" and "3" to the blanking part according to figure 403 and as follows :
  - (a) Position the parts and argon arc tack weld without filler metal.
  - (b) Weld the parts according to chapter 70-35-10 and following conditions :
    - 1 Argon arc welding.
    - 2 Class : B 2 weld.

78-13-01

REP 22-85-2

Page 402

Jun 15/82



OLYMPUS 593

MK.610-14-28

OVERHAUL



3 Filler metal P 3028.

(c) Reforming of welded zone if necessary.

(2) Check class B 2 weld according to chapter 70-35-80.

(a) Localised check by means of water washable fluorescent penetrant according to method M 503 B of chapter 70-20-10.

(b) Radiographic X-ray check according to chapter 70-20-30.

#### E. Welding of shouldered washer.

(1) Trace out position of housing of the washer then drill as shown in figure 403 sheets 5 and 6 and chamfer.

(2) Weld shouldered washer according to figure 403 sheets 5 and 6 and chapter 70-35-10.

(a) Position the washer and argon arc tack weld without filler metal.

(b) Weld the washer according to chapter 70-35-10 and the following conditions :

1 Argon arc welding.

2 Weld, class : B 1.

3 Filler metal : P 3028.

(3) Check class B 1 weld according to chapter 70-35-80.

(a) Localised check by means of water washable fluorescent penetrant according to method M 503 B of chapter 70-20-10.

#### F. Drilling.

(1) Trace the position of attachment holes in the reinforcement marked "1" and "2" as shown in figure 403 sheets 3 and 4.

(2) Drill to dimensions indicated in figure 403.

(3) Deburr.

78-13-01

REP 22-85-2

Page 403

Jun 15/82



OLYMPUS 593

MK.610-14-28  
OVERHAUL



G. Heat treatment.

- (1) Apply heat treatment to blanking part according to method M 812 of chapter 70-45-10.
- (2) Check for cracks by means of water washable fluorescent penetrant according to method M 503 B of chapter 70-20-10. No cracks can be accepted.

H. Marking.

- (1) After the part no. mark "REP 2" according to method M 28 of chapter 70-10-10.

78-13-01

REP 22-85-2

Page 404

Jun 15/82



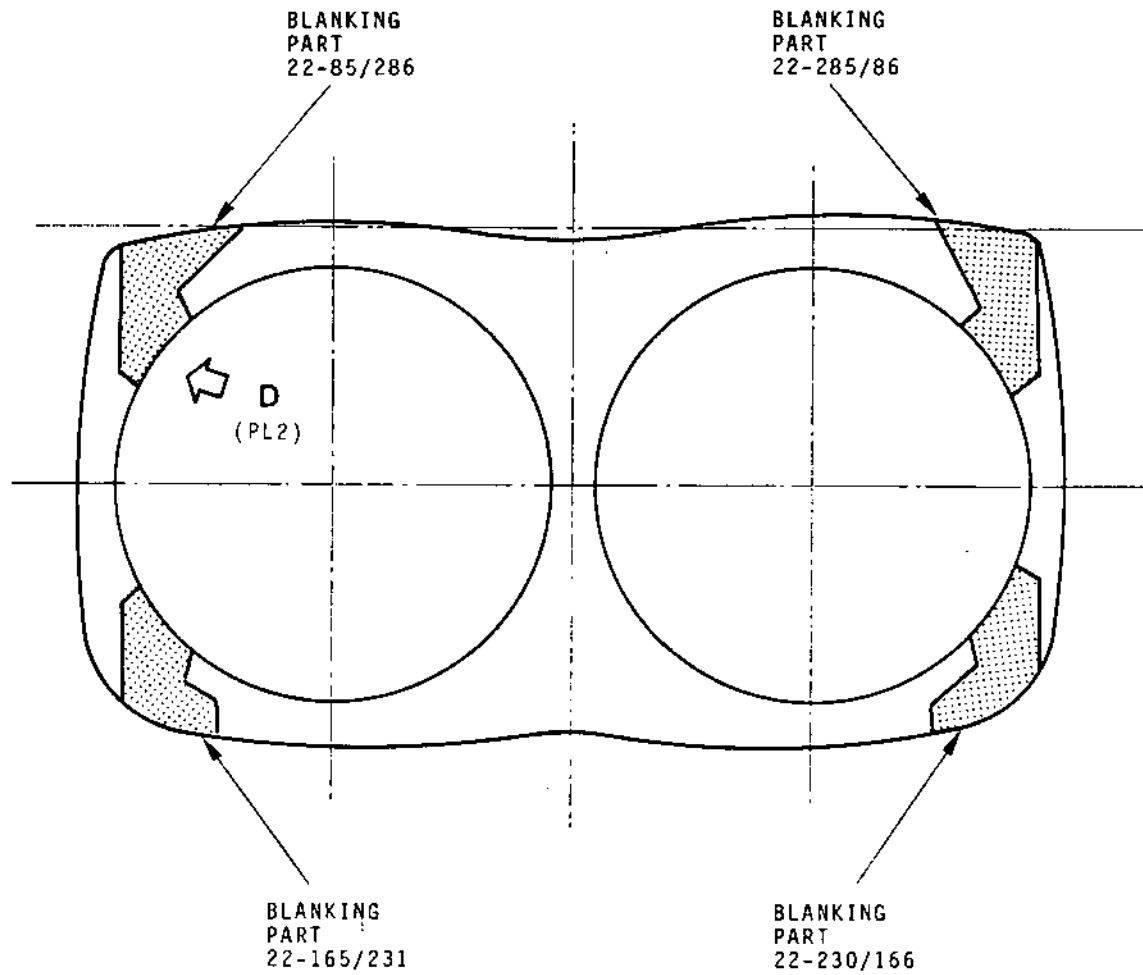


OLYMPUS 593

MK. 610-14-28  
OVERHAUL



REAR VIEW



Elimination of Damaged Zones  
Figure 401 (Sheet 1 of 2)

78-13-01

REP 22-85-2

Page 405

Jun 15/82



OLYMPUS 593

MK.610-14-28  
OVERHAUL

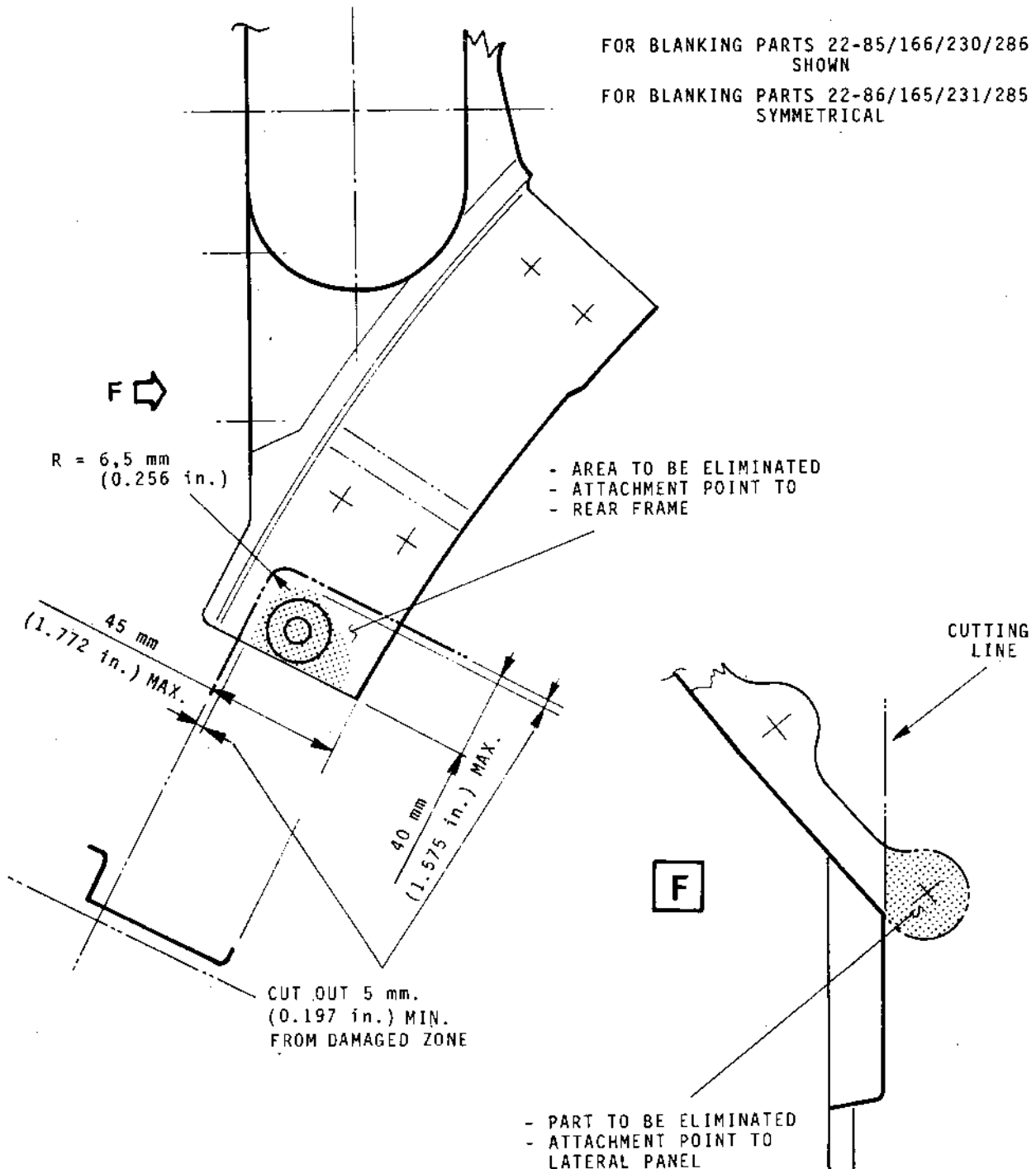


**D**

ZONE TO BE REPAIRED

FOR BLANKING PARTS 22-85/166/230/286  
SHOWN

FOR BLANKING PARTS 22-86/165/231/285  
SYMMETRICAL



Elimination of Damaged Zones  
Figure 401 (Sheet 2 of 2)

78-13-01

REP 22-85-2

Page 406

Jun 15/82



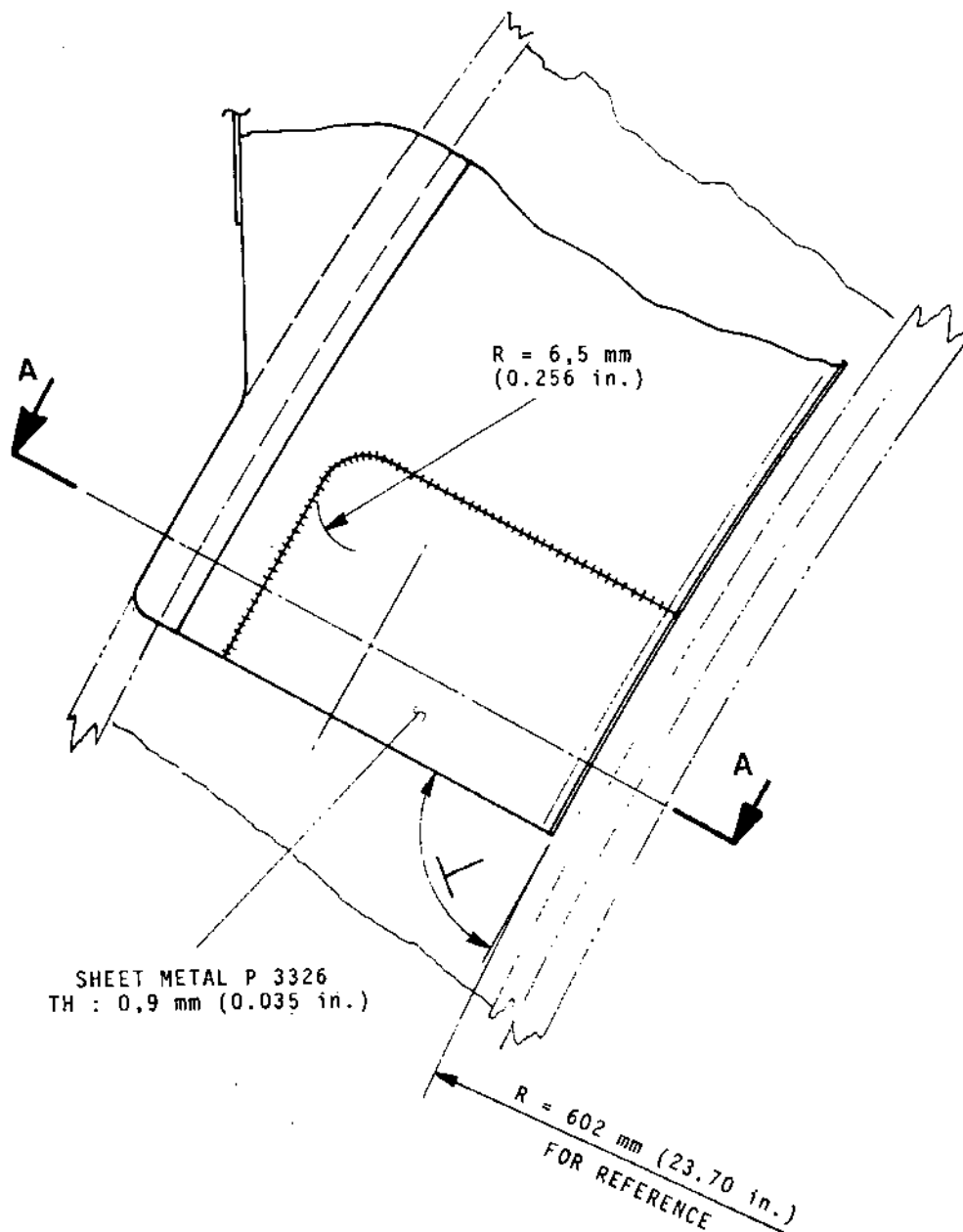
OLYMPUS 593

MK.610-14-28

OVERHAUL



ZONE OF ATTACHMENT POINT TO  
REAR FRAME



Welding of Inserted Plate  
Figure 402 (Sheet 1 of 2)

78-13-01

REP 22-85-2

Page 407

Jun 15/82

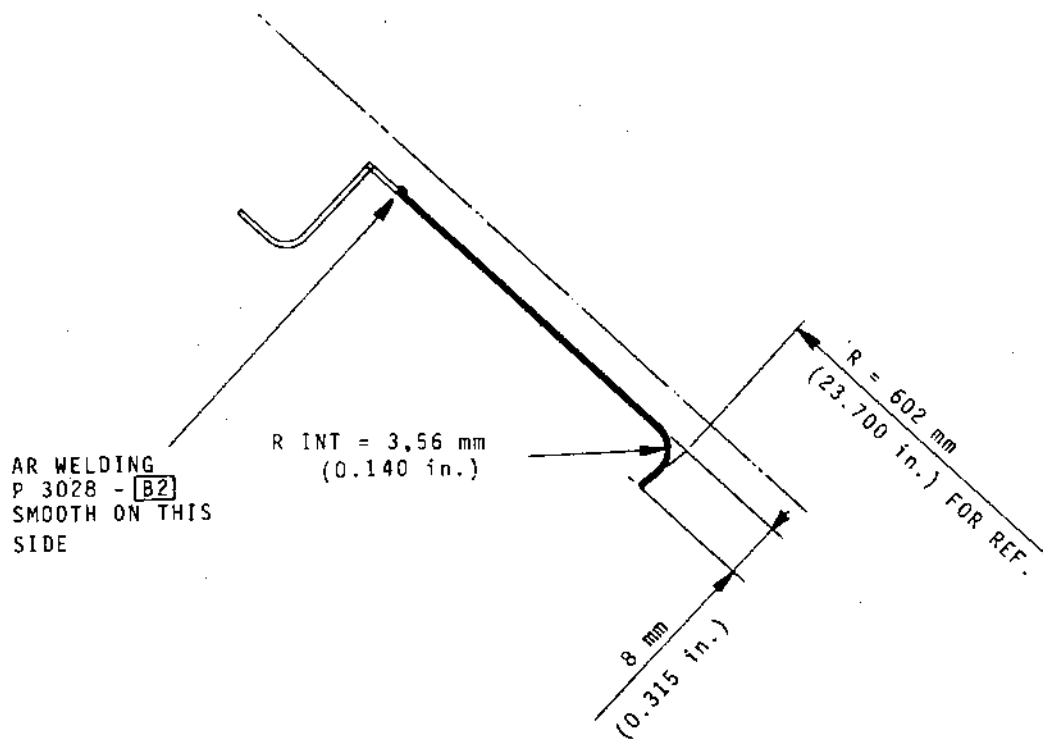


OLYMPUS 593

MK.610-14-28  
OVERHAUL



SECTION A A



ROUND SHARP CORNERS TO

CH = 0,13 TO 0,64 mm AT 45°  
(0.005 - 0.025 in.)

Welding of Inserted Plate  
Figure 402 (Sheet 2 of 2)

78-13-01

REP 22-85-2

Page 408

Jun 15/82



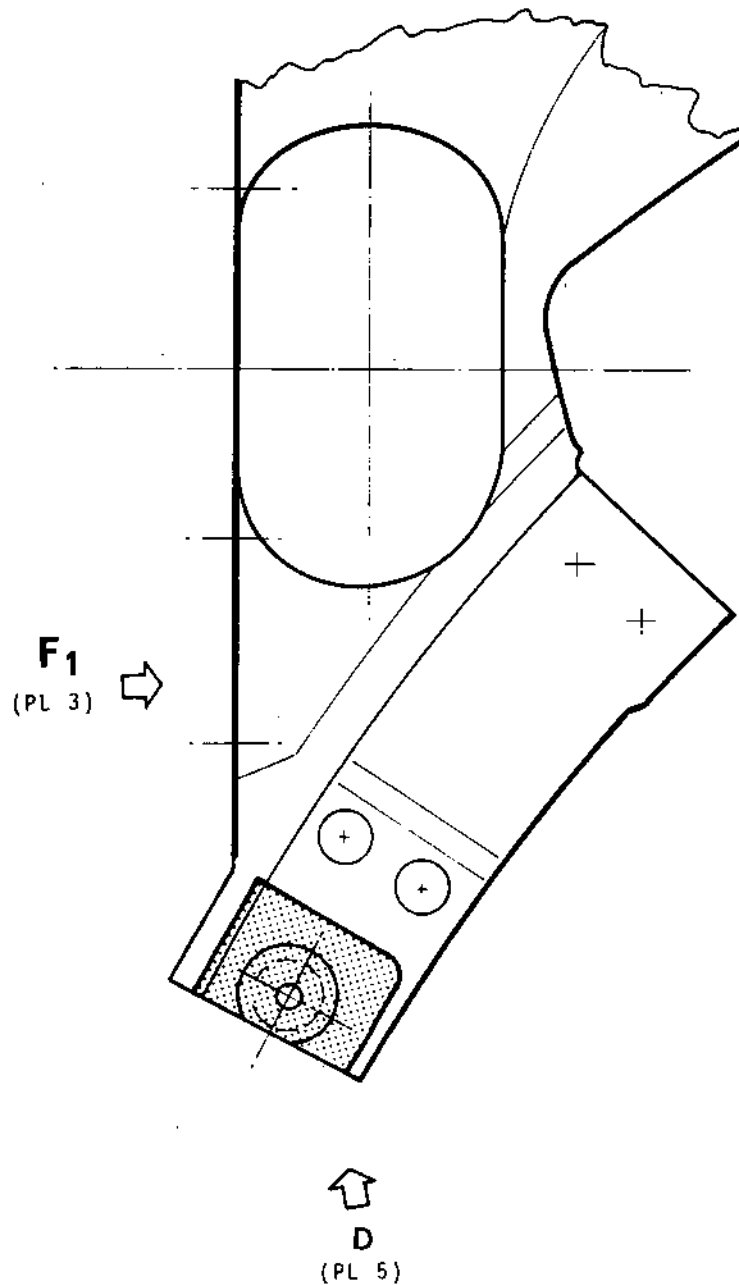
OLYMPUS 593

MK.610-14-28

OVERHAUL



ZONE OF BLANKING PART TO BE REPAIRED  
22 - 85 AND - 286 SHOWN  
22 - 86 AND - 285 SYMMETRICAL.  
(SEE FIG 401 FOR LOCATION)



Installation of Repair Parts  
Figure 403 (Sheet 1 of 6)

78-13-01

REP 22-85-2

Page 409

Jun 15/82



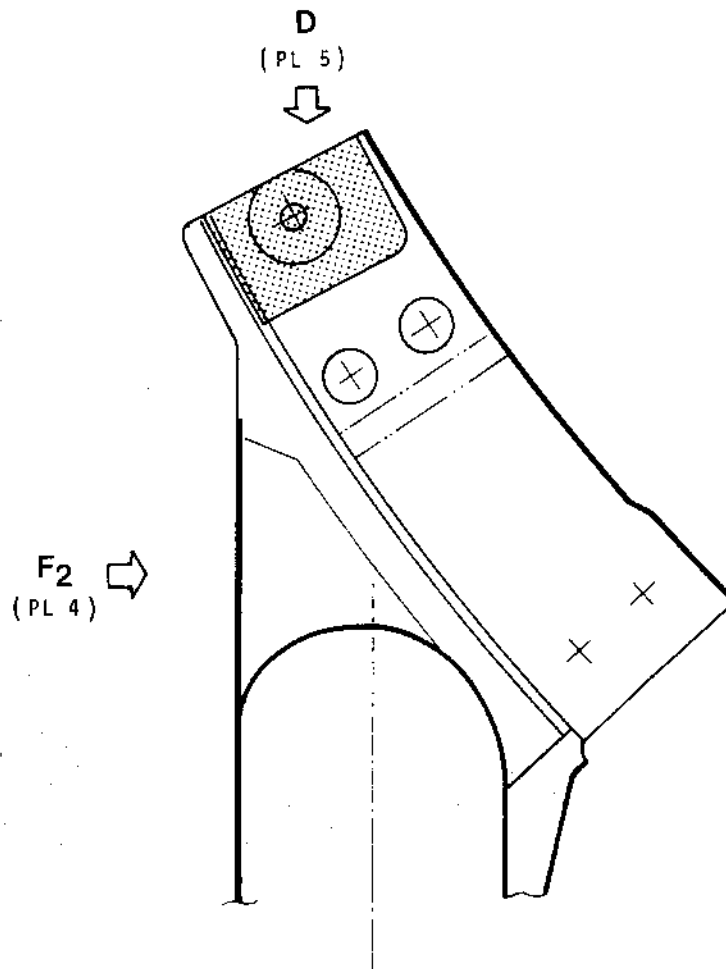
OLYMPUS 593

MK.610-14-28

OVERHAUL



ZONE OF BLANKING PART TO BE REPAIRED.  
22 - 165 AND 231 SHOWN.  
22- 166 AND 230 SYMMETRICAL  
(SEE FIGURE 401 FOR LOCATION)



Installation of Repair Parts  
Figure 403 (Sheet 2 of 6)

78-13-01

REP 22-85-2

Page 410

Jun 15/82



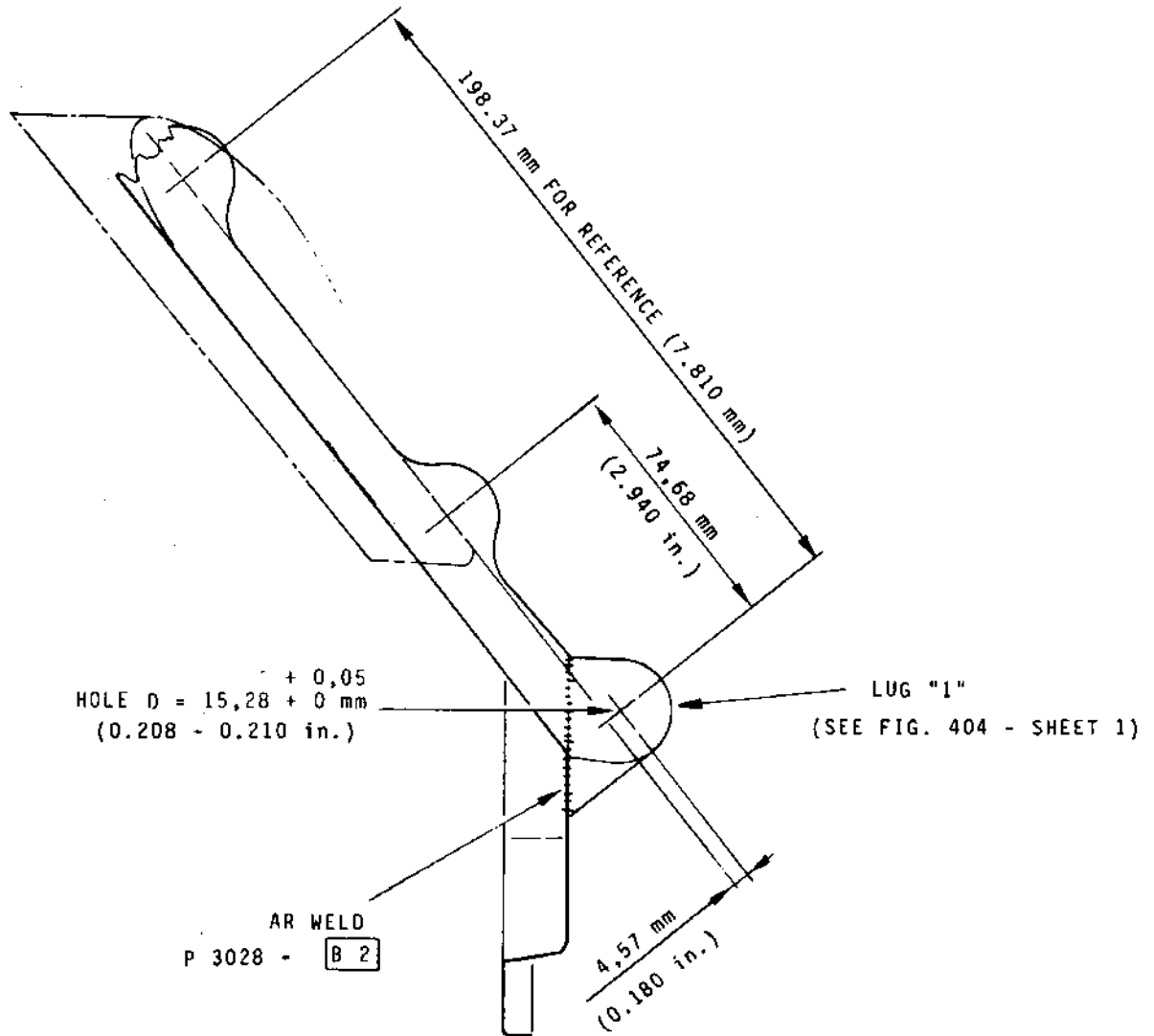
OLYMPUS 593

MK.610-14-28

OVERHAUL



F<sub>1</sub>



Installation of Repair Parts  
Figure 403 (Sheet 3 of 6)

78-13-01

REP 22-85-2

Page 411

Jun 15/82



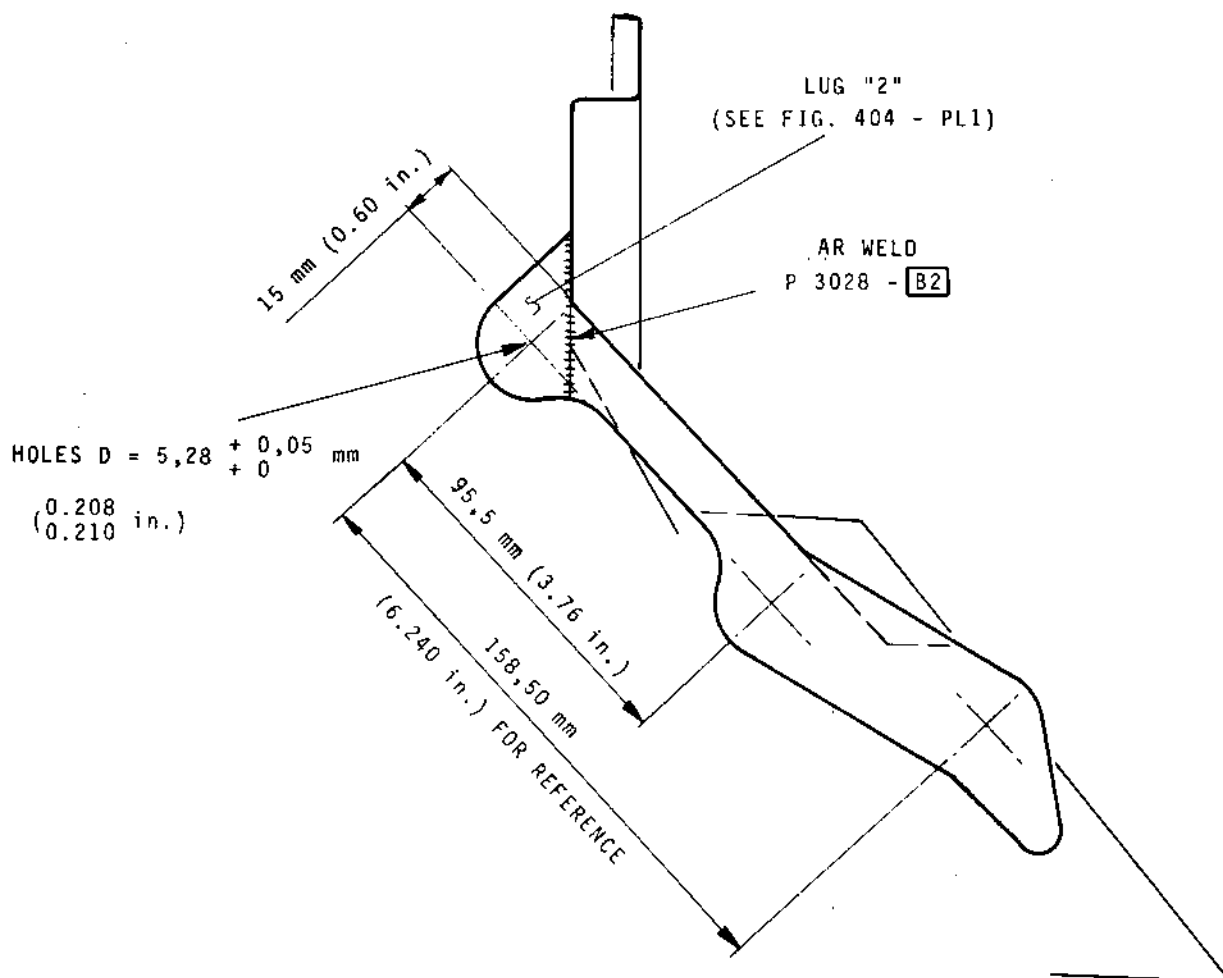
OLYMPUS 593

MK.610-14-28

OVERHAUL



F<sub>2</sub>



Installation of Repair Parts  
Figure 403 (Sheet 4 of 6)

78-13-01

REP 22-85-2

Page 412

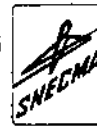
Jun 15/82



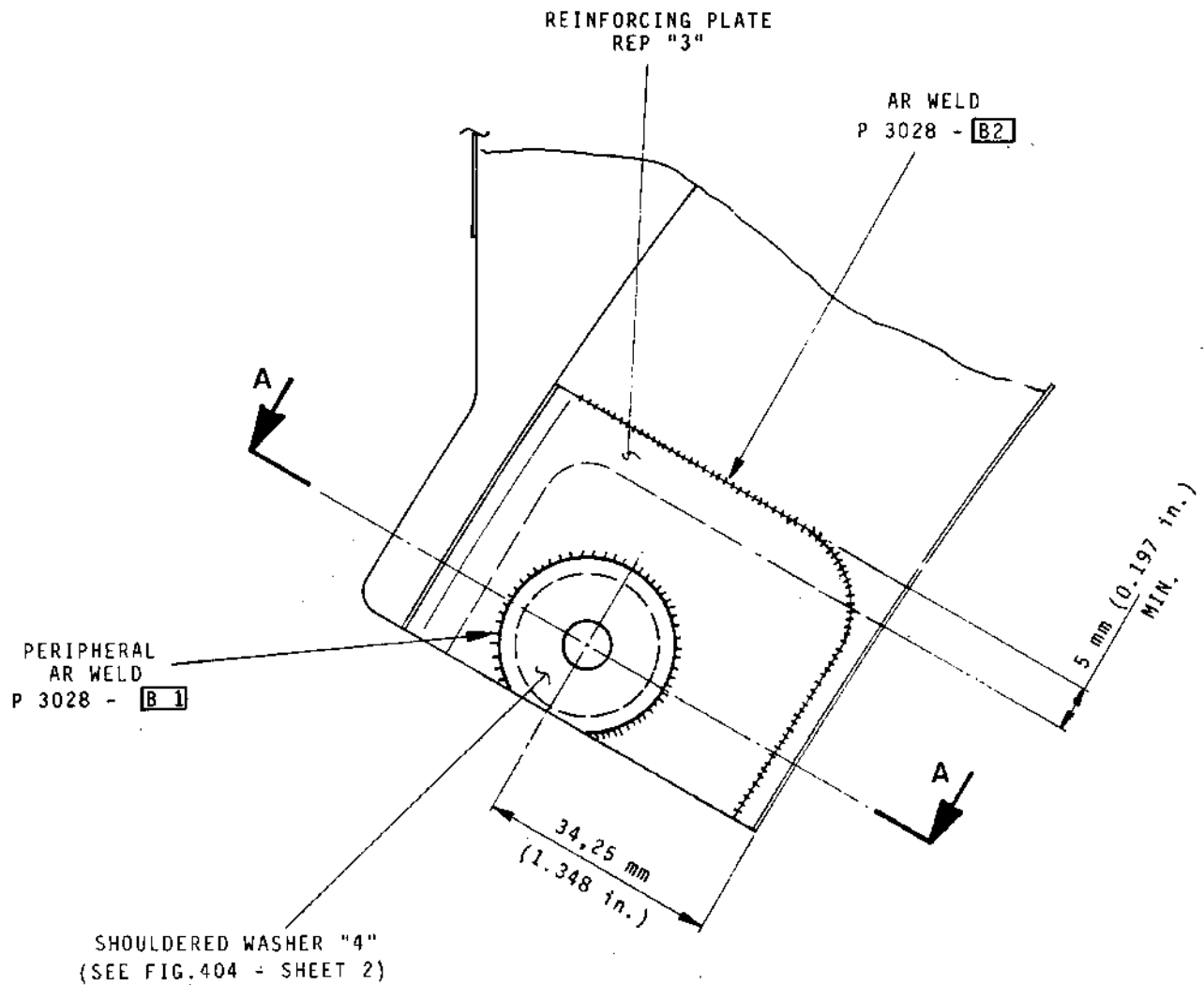


OLYMPUS 593

MK.610-14-28  
OVERHAUL



D



Installation of Repair Parts  
Figure 403 (Sheet 5 of 6)

78-13-01

REP 22-85-2

Page 413

Jun 15/82



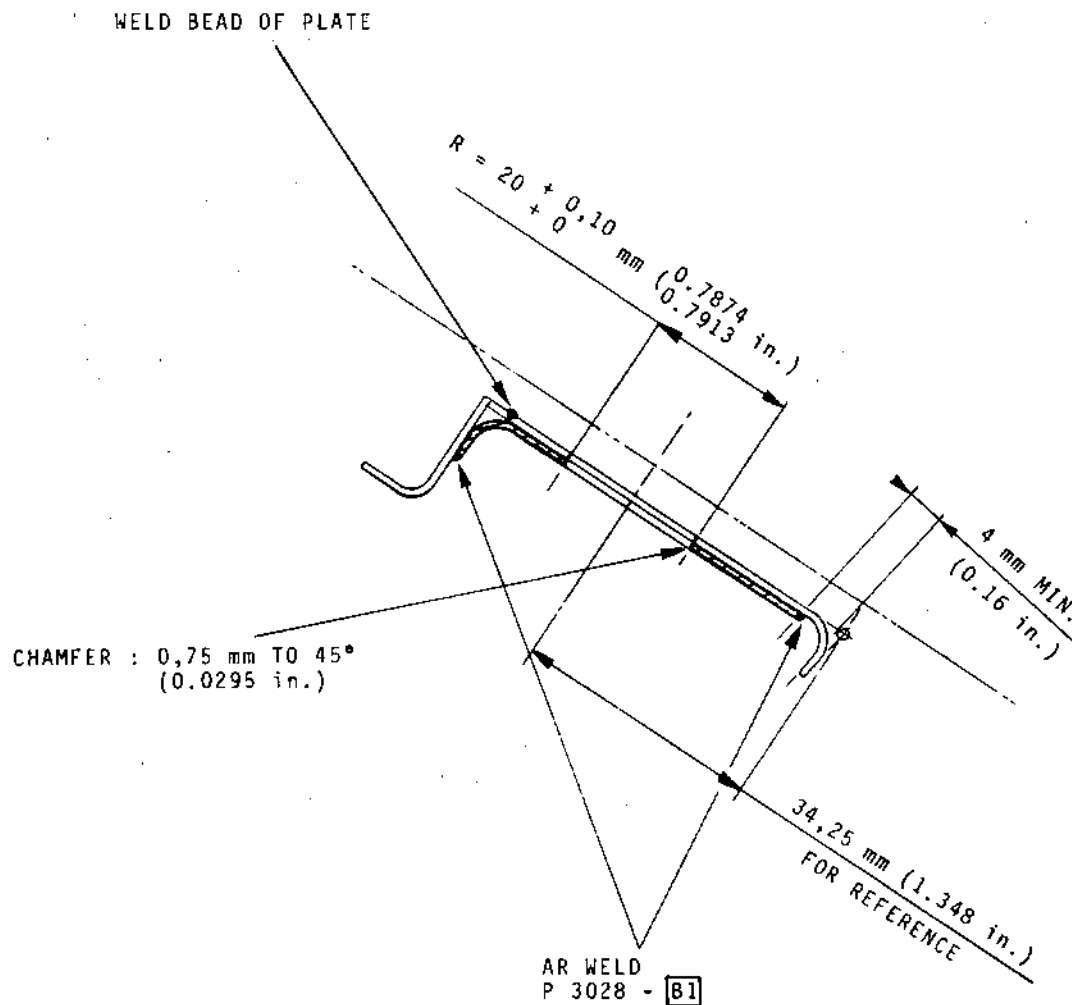
OLYMPUS 593

MK.610-14-28

OVERHAUL



SECTION A.A  
WITHOUT SHOULDERED WASHER



Installation of Repair Parts  
Figure 403 (Sheet 6 of 6)

78-13-01

REP 22-85-2

Page 414

Jun 15/82



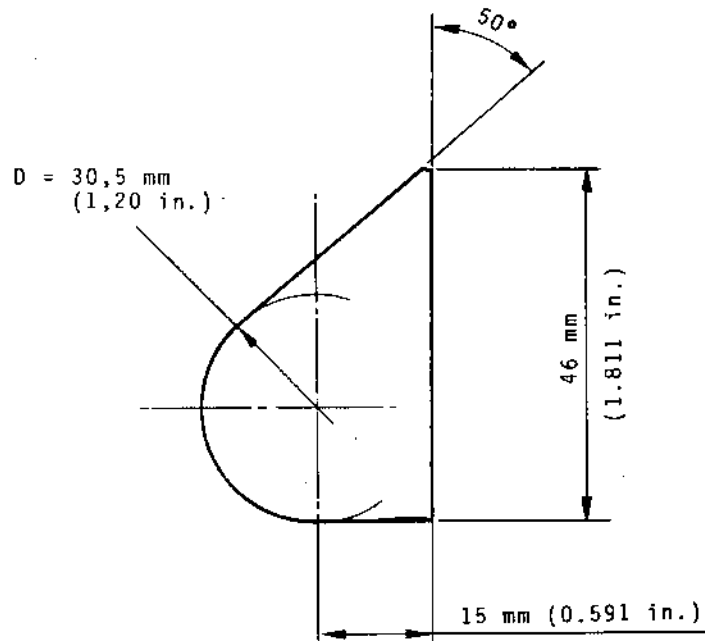
OLYMPUS 593

MK.610-14-28  
OVERHAUL



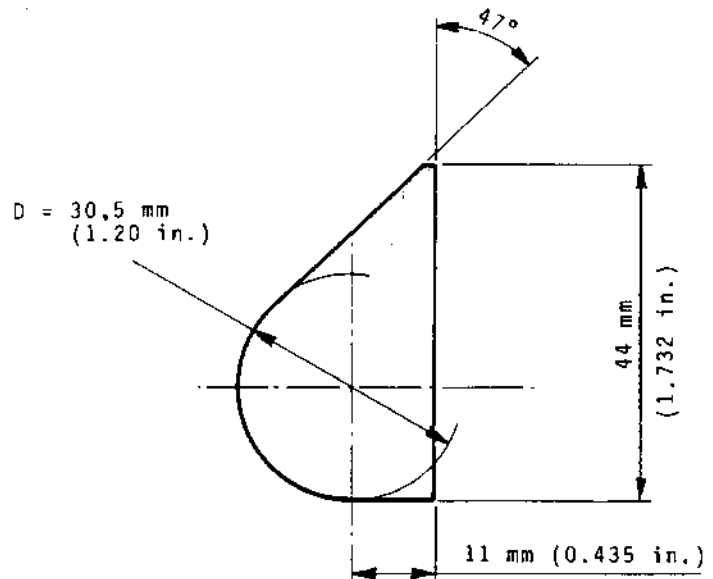
LUG "1"

- MATERIAL = P 3326
- THICKNESS OF SHEET METAL : 0,9 mm (0.035 in.)



LUG "2"

- MATERIAL : 3326
- THICKNESS OF SHEET METAL 0,9 mm (0.035 in.)



Manufacture of Repair Parts  
Figure 404 (Sheet 1 of 3)

78-13-01

REP 22-85-2

Page 415

Jun 15/82



OLYMPUS 593

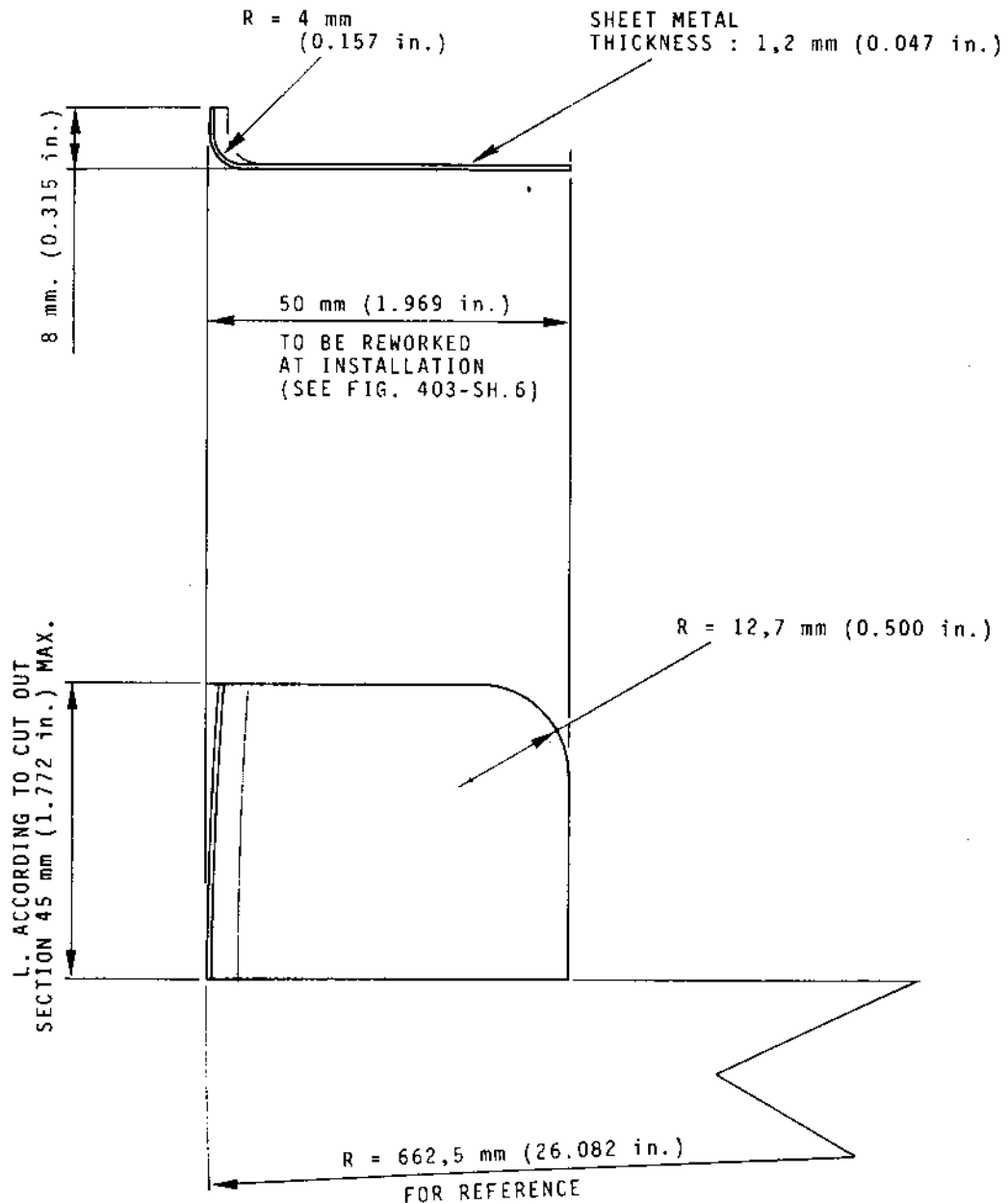
MK.610-14-28

OVERHAUL



REINFORCING PLATE "3"  
FOR BLANKING PART

22-85/166/230/286 SHOWN  
22-86/165/231/285 SYMMETRICAL



Manufacture of Repair Parts  
Figure 404 (Sheet 2 of 3)

78-13-01

REP 22-85-2

Page 416

Jun 15/82



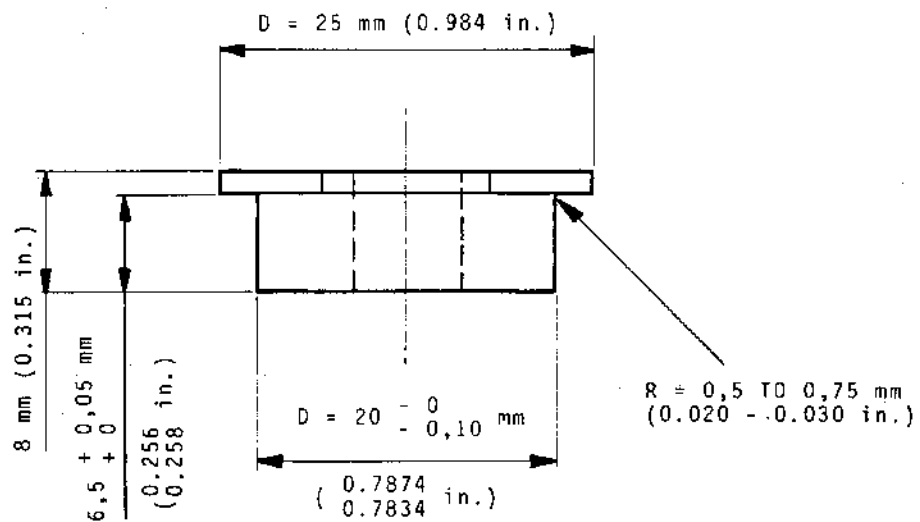
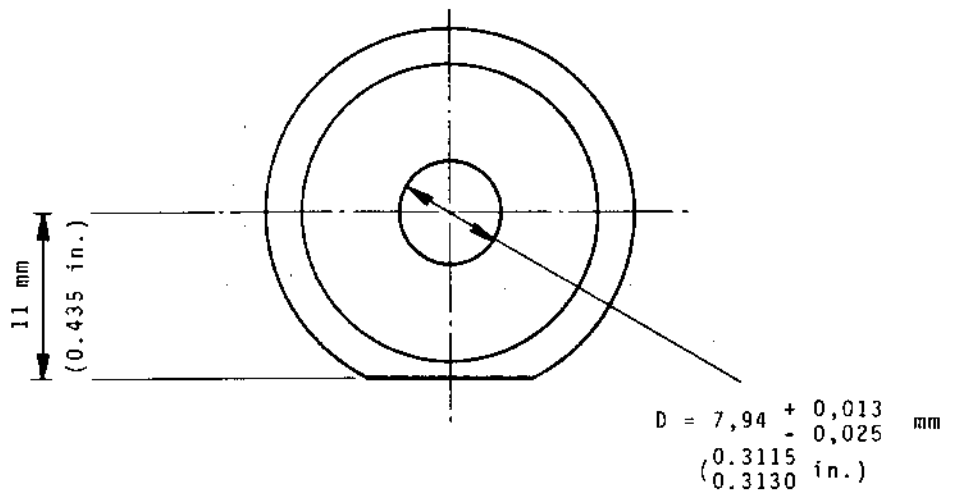
OLYMPUS 593

MK.610-14-28

OVERHAUL



SHOULDERED WASHER "4"



CHAMFER EDGES TO 0,5 mm AT 45° (0.020 in.)

MATERIAL : P 3620

ROUGHNESS :  $3,2 \sqrt{}$  [0.125  $\sqrt{}$ ]

Manufacture of Repair Parts  
Figure 404 (Sheet 3 of 3)



OLYMPUS 593

MK.610-14-28  
OVERHAUL



REPAIR

SUPPORT BRACKET ASSY (23-10/90/170/250)

1. Renewing the riveted floating nuts

---

PARTS REQUIRED FOR REPAIR

---

Nut	NAS 687-C4	(649-785-092-0)
Rivet	BNAE 21217 TB 2406	(650-022-042-0)
or Rivet	BNAE 21217 TB 3207	(650-022-073-0)

---

A. Removing the damaged nut

- (1) Remove the damaged nut by grinding out the heads of the fixing rivets.

B. Installing the new nut

- (1) Check the rivet holes as instructed in chapter 70-50-10 : "JOINTS MADE BY USE OF SOLID RIVETS".
- (2) Fit a new nut by riveting it as instructed in chapter 70-50-10 : "JOINTS MADE BY USE OF SOLID RIVETS", and as indicated in figure 401.
- (3) Check the riveting as instructed in chapter 70-50-81 : "INSPECTION OF SOLID RIVETS".

PRINTED IN FRANCE

**78-13-01**

REP 23-10-1

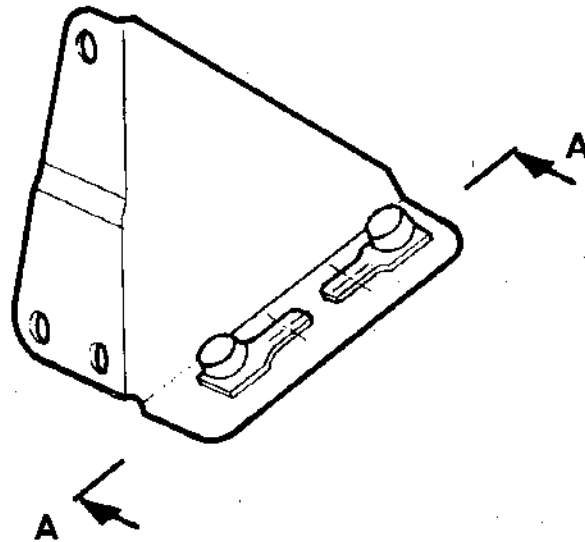
Page 401

Mar 31/77

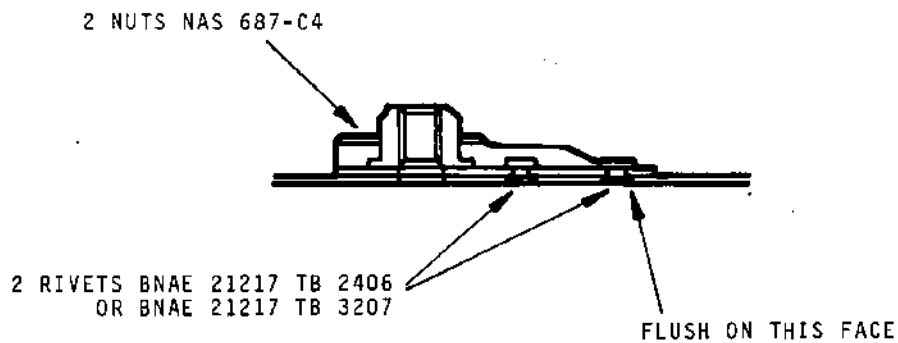


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PARTIAL A-A SECTION



Renewing the Riveted Floating Nuts  
Figure 401

**78-13-01**

REP 23-10-1

Page 402

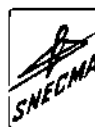
Mar 31/77



OLYMPUS 593

MK.610-14-28

OVERHAUL



REPAIR

BALLSCREW GEAR BOX SUPPORT (25-10/90/170/250/330/390)

1. Renewing the ball joint

---

PARTS REQUIRED FOR REPAIR

---

Ball joint No. 301-125-200-0

---

A. Removing the damaged ball joint

- (1) Remove the damaged ball joint by machining the crimped ring and extracting the joint with a screw press.

B. Installing the new ball joint

- (1) Press-fit the new ball joint by means of a screw press and position it as indicated in figure 401.
- (2) Crimp ball joint on both its faces (see figure 401) using a punch mounted onto a screw press (see Principle in fig. 402).

C. Checking

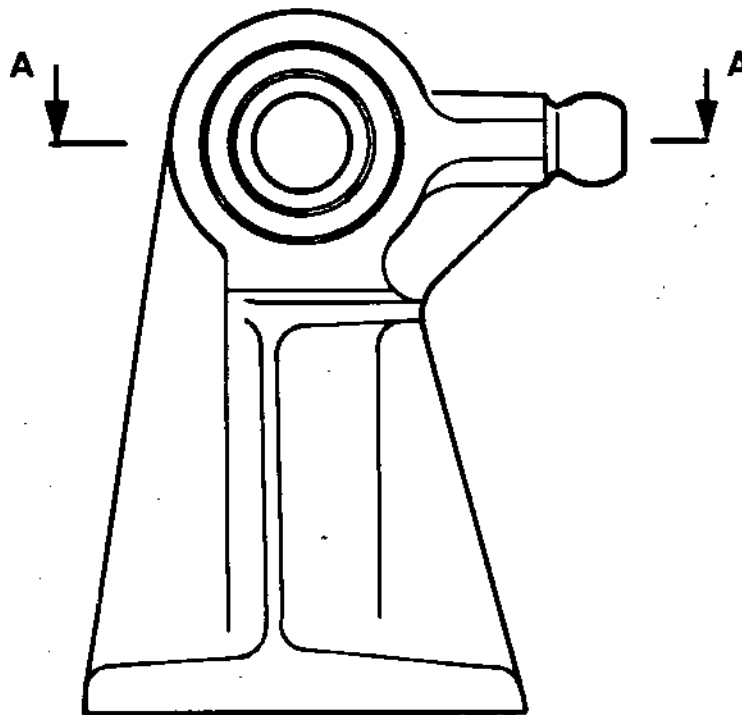
- (1) Make sure that the crimped ring shows no end play.
- (2) Check that the inner ring can be freely moved by hand.



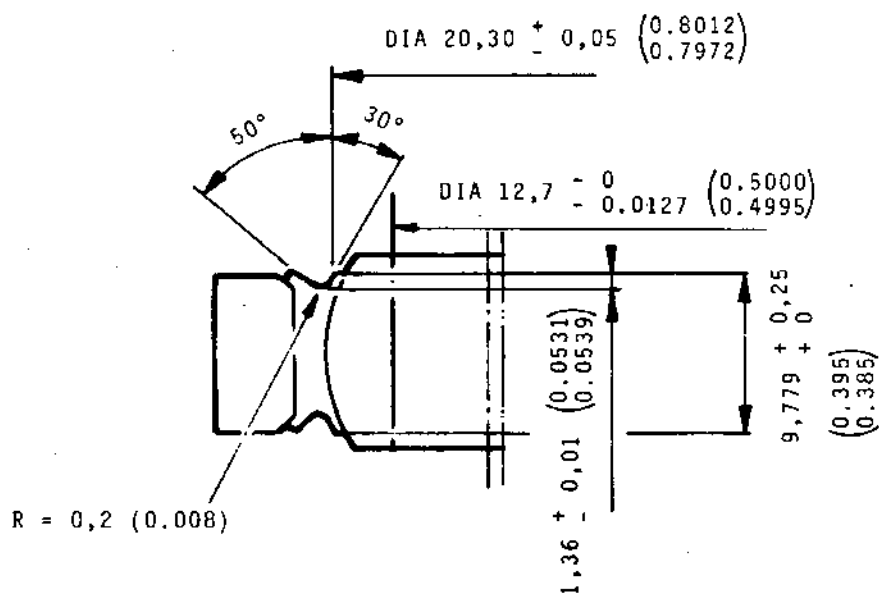


OLYMPUS 593

MK.610-14-28  
OVERHAUL



PARTIAL A-A SECTION



Renewing the Ball Joint  
Figure 401

78-13-01

REP 25-10-1

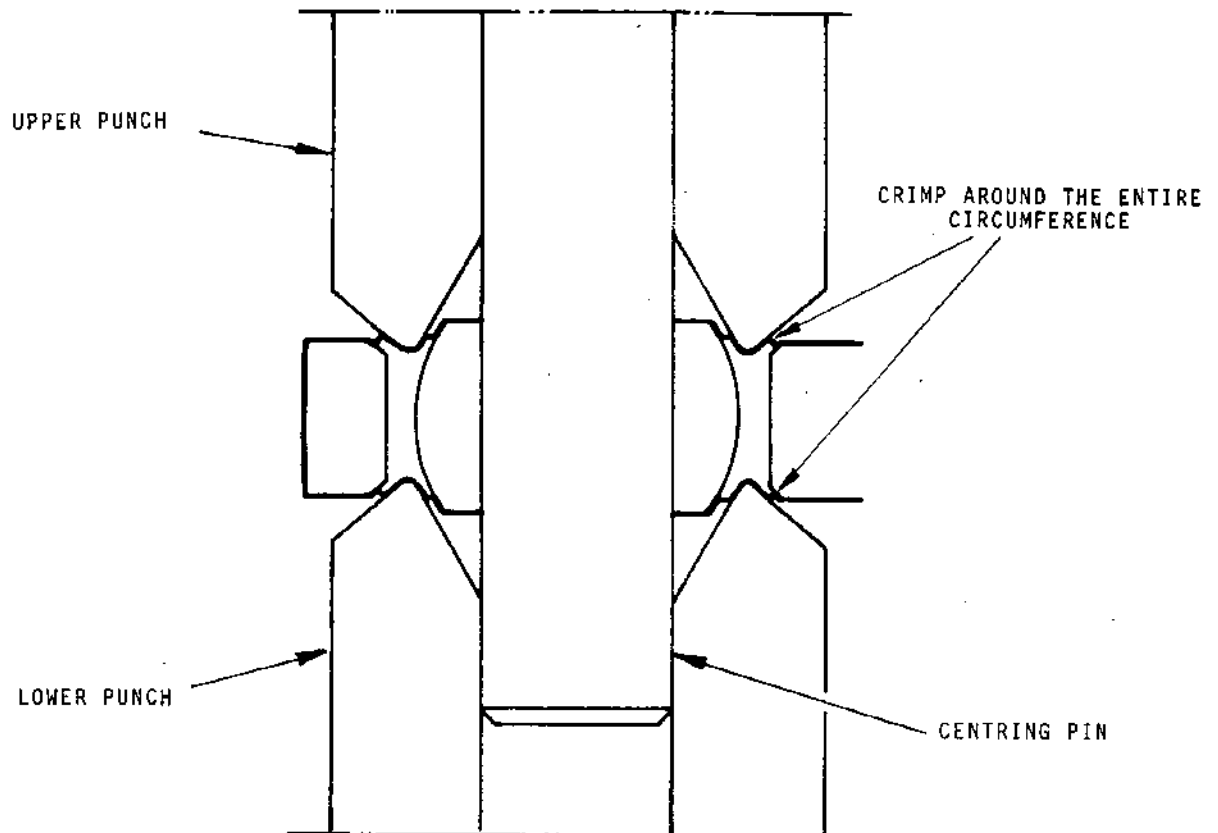
Page 402

Mar 31/77



OLYMPUS 593

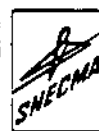
MK.610-14-28  
OVERHAUL



Principle of Crimping  
Figure 402

78-13-01

REP 25-10-1  
Pages 403/404  
Mar 31/77

**OLYMPUS 593**MK.610-14-28  
OVERHAULREPAIRTWIN SECONDARY NOZZLE (29-190/191)1. Renewing Floating Nuts Securing Convergent Panels to Throat and Angle Sections.

---

**PARTS REQUIRED FOR REPAIR**

---

Floating nut	No. A 11471-12-4	(649-785-154-0)
	or A 11471-13-4	(649-785-132-0)
	or A 11471-14-4	(649-785-105-0)
Floating nut	No. NAS 686C3	(649-785-086-0)
Rivet	No. CR 2662-4-3	(649-772-063-0)
Rivet	No. MS 20427M3-4	(650-022-042-0)

---

**A. Replacing Nuts on Throat Section**

- (1) Remove damaged nut by grinding out the retaining-rivet heads.
- (2) Fit a new nut and secure it by riveting as directed in chapter "RIVETING", section 70-50-50, in figure 401, and in the following instructions :
  - (a) Select nut suited to thickness "E" of unit fully assembled.

NOTE : - Figure 401 shows the Part No. of the nut for a theoretical thickness "E".

- (b) Mounting instructions for Nuts A 11471.

Ascertain before riveting the nut that the out-of-flush level difference of the bush lies within the tolerance limits laid down in figure 401. If it does, the free sliding of the bush in its cage is ensured after assembly of the convergent panel.

- (3) Check the riveting as instructed in chapter "RIVETING" section 70-50-85.

**B. Replacing Nuts on Angle**

- (1) Remove damaged nut by grinding out the retaining-rivet heads.

**78-13-01**

REP 29-190-1

Page 401

Apr 30/93



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (2) Fit new nut and rivet it as directed in chapter "RIVETING", section 70-50-10, and in figure 402.
- (3) Check the riveting as instructed in chapter "RIVETING" section 70-50-81.

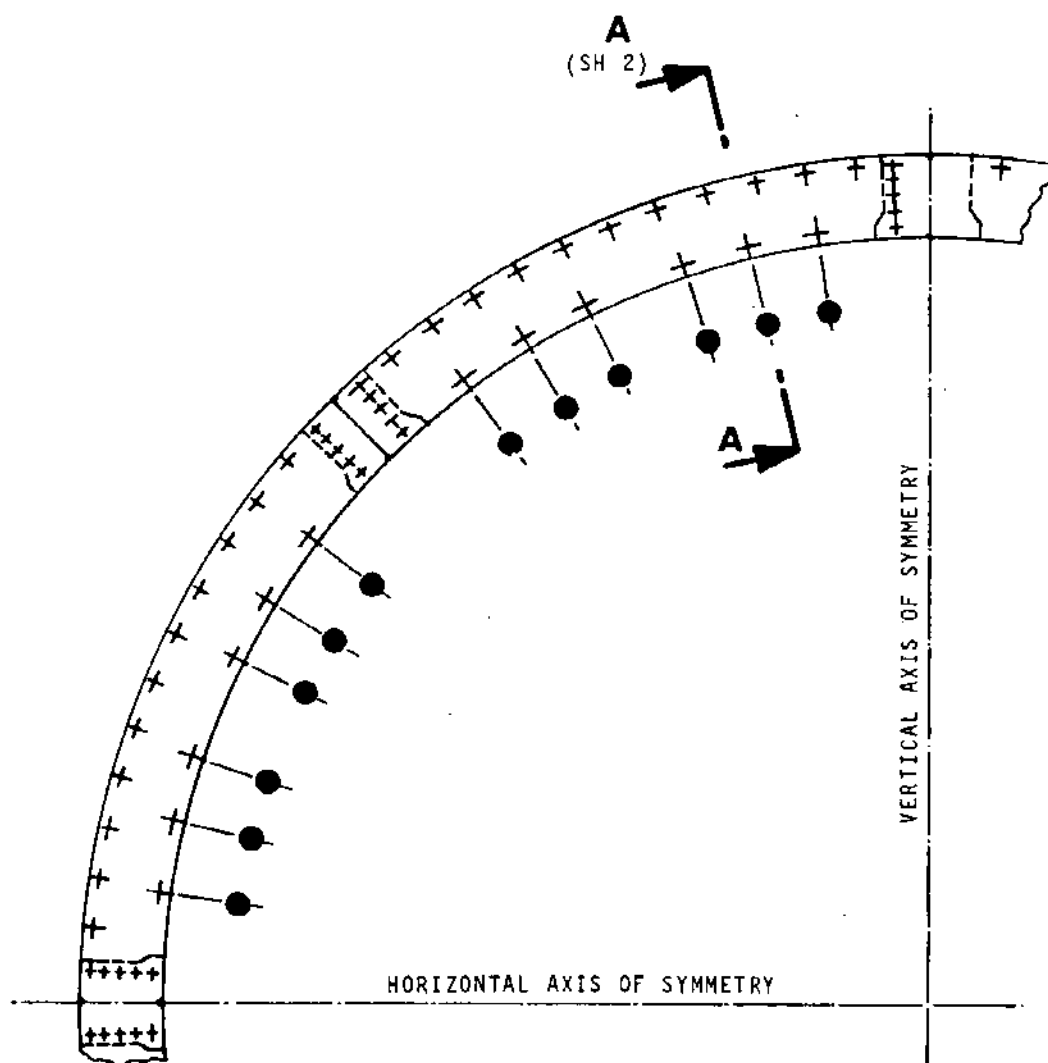


OLYMPUS 593

MK.610-14-28  
OVERHAUL



FRONT VIEW OF ENGINE AS SEEN FROM THROAT SECTION FLANGE  
APPLICABLE TO BAYS 1, 2, 3 AND 4



Renewing Attachment Items of Convergent Panels  
Next to Throat Section Flange  
Figure 401 - (Sheet 1 of 3)

N

78-13-01

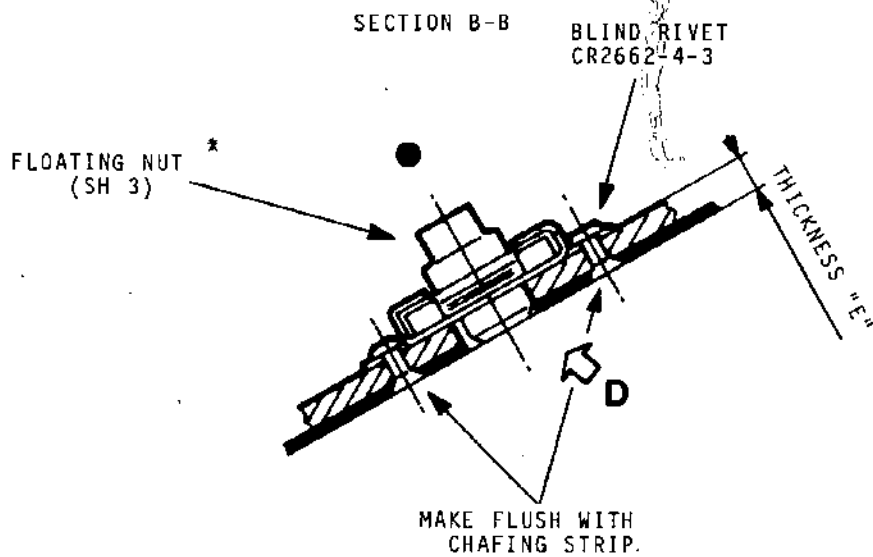
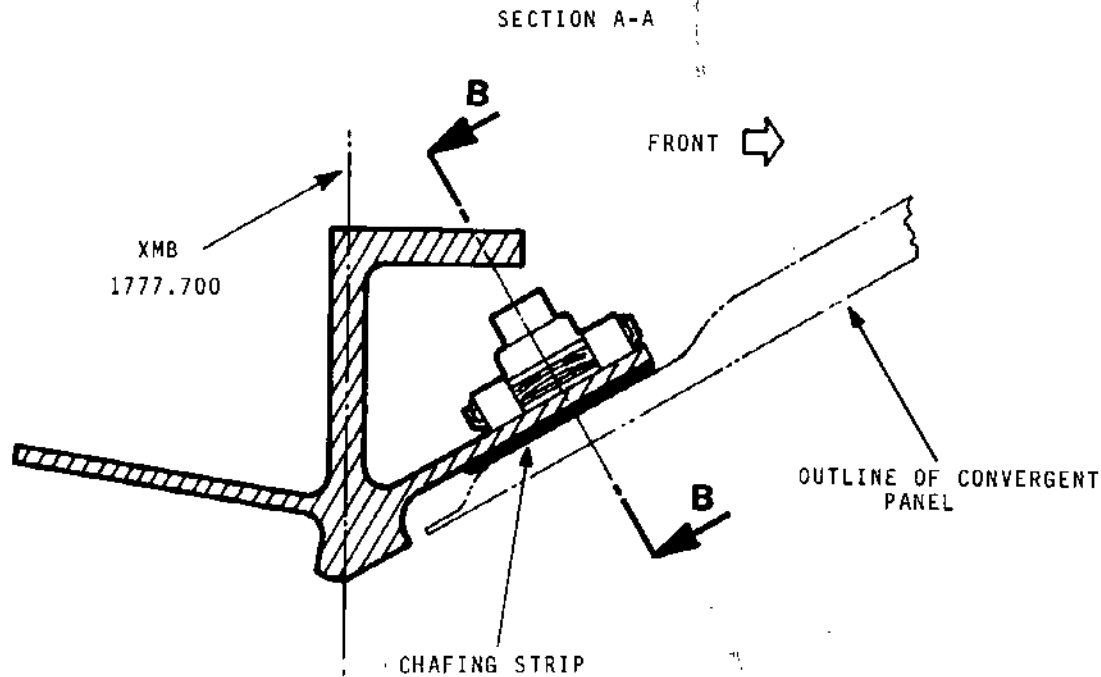
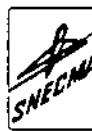
REP 29-190-1  
Page 403

Mar 31/77



OLYMPUS 593

MK.610-14-28  
OVERHAUL



Renewing Attachment Items of Convergent Panels  
Next to Throat Section Flange  
Figure 401 - (Sheet 2 of 3)

PRINTED IN FRANCE



OLYMPUS 593

MK.610-14-28  
OVERHAUL



D

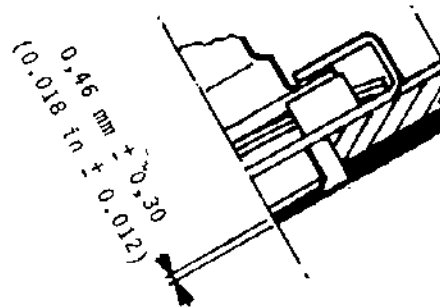


TABLE FOR CHOICE OF NUT TYPE A11471

THICKNESS "E" mm (in)	FLOATING NUT *
3,05 mm (0.120 in)	A11471-12-4
3,30 mm (0.130 in)	A11471-13-4
3,56 mm (0.140 in)	A11471-14-4

Renewing Attachment Items of Convergent Panels  
Next to Throat Section Flange  
Figure 401 - (Sheet 3 of 3)

N

78-13-01

REP 29-190-1

Page 405

Mar 31/77

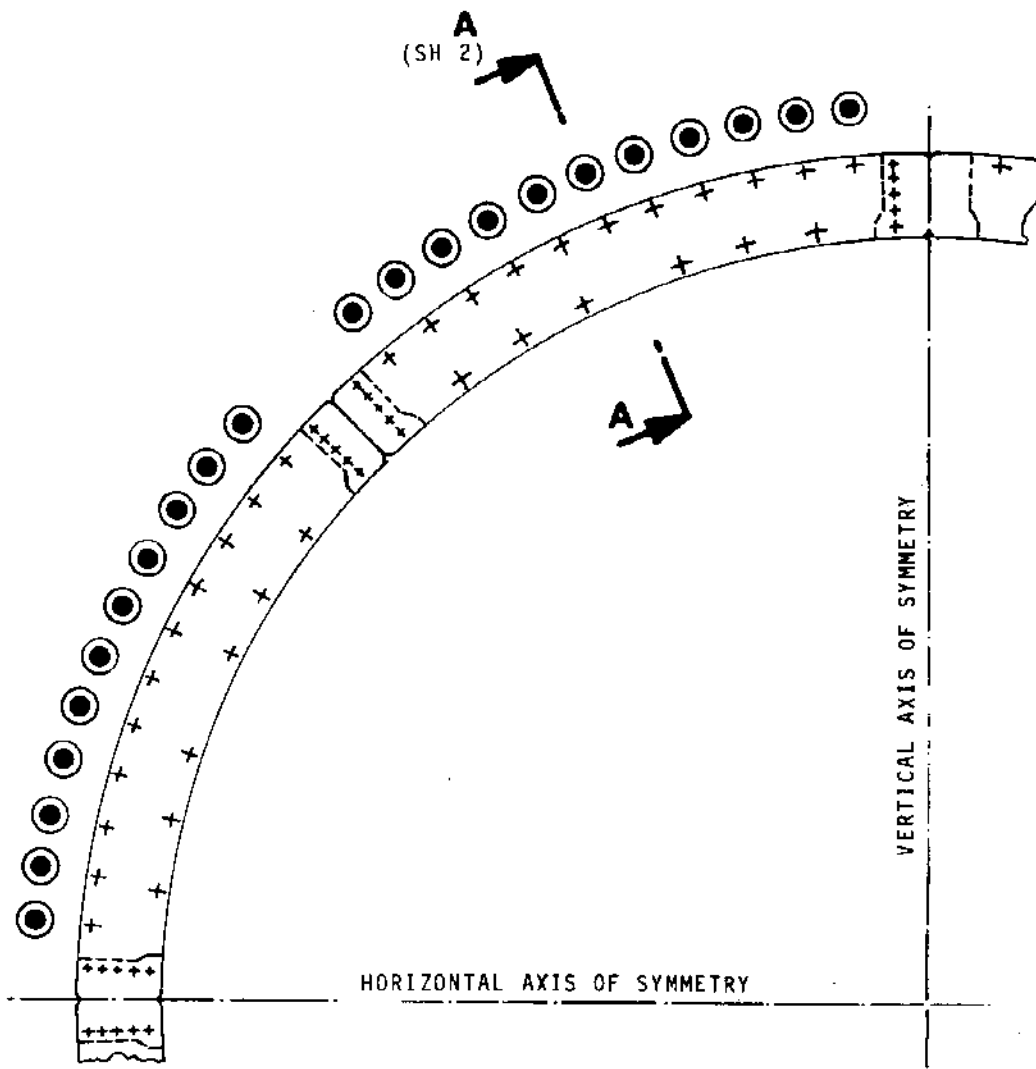


OLYMPUS 593

MK.610-14-28  
OVERHAUL



VIEW OF ENGINE FRONT  
FROM SUPPORT BRACKET  
APPLICABLE TO BAYS 1, 2, 3 AND 4



PRINTED IN FRANCE

Renewing Attachment Items of Convergent Panels  
Next to Support Bracket  
Figure 402 - (Sheet 1 of 2)



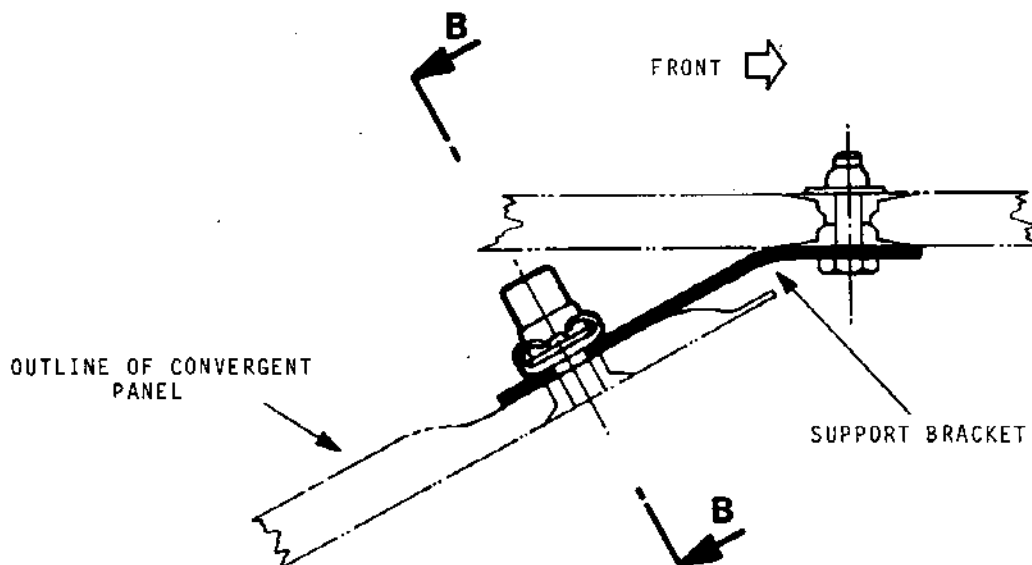


OLYMPUS 593

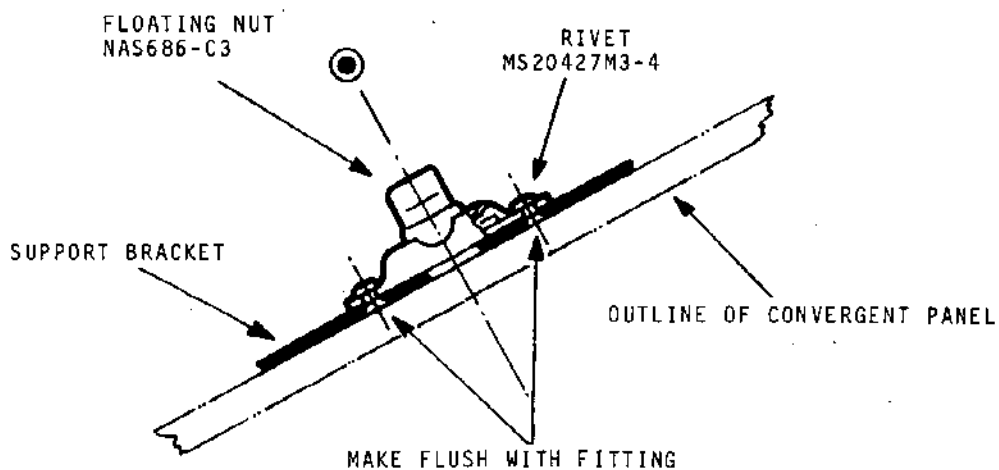
MK.610-14-28  
OVERHAUL



SECTION A-A



SECTION B-B



Renewing Attachment Items of Convergent Panels  
Next to Support bracket  
Figure 402 - (Sheet 2 of 2)

**OLYMPUS 593**

MK.610-14-28

OVERHAUL

REPAIRSECONDARY NOZZLE (29-190/191)2. Replacing the Attachment Items of Divergent Panels Next to Front Frame and Throat Section.

---

**PARTS REQUIRED FOR REPAIR**

---

Hex. nut	TLN1000C8	(649-783-077-0)
Castellated nut	Z1855-02	(649-292-010-0)
Anchor nut	NAS1068C4	(649-785-189-0)
Anchor nut	NAS686C4	(649-785-095-0)
Floating nut	LHA3280B2-048	(649-785-114-0)
Floating nut	LHA3280B3-048	(649-785-115-0)
Floating nut	LHA3280B4-048	(649-785-116-0)
Floating nut	LHA3280B6-048	(649-785-118-0)
Floating nut	LHA6932-3-048	(649-785-119-0)
Floating nut	LHA6932-5-048	(649-785-122-0)
Floating nut	LHA6932-6-048	(649-785-123-0)
Floating nut	A11471-12-4	(649-785-154-0)
	or A11471-13-4	(649-785-132-0)
	or A11471-14-4	(649-785-105-0)
Floating nut	A11471-20-4	(649-785-109-0)
Floating nut	A11471-21-4	(649-785-110-0)
Floating nut	A11471-22-4	(649-785-133-0)
Rivet F100°	MS20427M3-3	(650-022-041-0)
Rivet T.F100°	MS20427M3-4	(650-022-042-0)
Rivet T.F100°	MS20427M3-6	(650-022-046-0)
Rivet T.F100°	MS20427M3-7	(650-022-047-0)
Rivet T.round and flat head	MS20615-3M5	(649-772-202-0)
Blind rivet	CR2662-3-2	(649-772-059-0)
Blind rivet	CR2662-3-3	(649-772-060-0)
Blind rivet	CR2662-3-4	(649-772-061-0)
Blind rivet	CR2662-4-3	(649-772-063-0)
Blind rivet	CR2662-4-4	(649-772-064-0)
Hollow bolt	649-781-369-0	
Hollow bolt	649-781-370-0	
Bolt hi-lok	HL668-6-5	(649-781-312-0)
Washer	AN960C10L	(649-786-069-0)
Washer	NAS1587-8	(649-786-166-0)
Washer	649-786-167-0	
Heli-coil thread	3591-4TNV0500	
Shim	300-894-300-0	
Shim	301-059-700-0	

---

In this type of repair, there are 3 possible forms of assembly, viz:

**78-13-01**

REP 29-190-2

Page 401

Apr 30/93



OLYMPUS 593

MK.610-14-28

OVERHAUL



Form 1 : Assemblies with nut attachment items readily accessible.

Form 2 : Assemblies with nut attachment items inaccessible.  
Here the support plates must accordingly be removed  
before the damaged nut can be renewed.

Form 3 : Assemblies whose attachment items are fully-assembled  
hollow bolts. Renew the thread inserts or, where neces-  
sary, the whole attachment item assy.

A. Renewing the floating nuts in the rear frame.  
Assembly type 1

- (1) Remove the damaged nuts by grinding out the fixing ri-  
vet heads as directed in Chapter "RIVETING", sections  
70-50-10 : Standard Assembly and 70-50-50 : Assembly  
with CHERRY LOK Blind Rivets, and in figure 401.
- (2) Fit in a new nut and secure it with rivets as instruc-  
ted in Chapter "RIVETING", sections 70-50-10 : Standard  
Assembly and 70-50-50 : Assembly with CHERRY LOK Blind  
Rivets, as well as in figure 401.
- (3) Check riveting of attachment items as directed in Chap-  
ter "RIVETING", sections 70-50-81 : Standard Riveting  
and 70-50-85 : Assembly with CHERRY LOK Blind Rivets.

Assembly type 2

- (1) Take down support plates and remove attachment items as  
directed in Chapter "RIVETING", sections 70-50-10 :  
Standard Assembly and 70-50-40 : Assembly by H1 LOK  
Attachments, as well as in figure 401.
- (2) Renew damaged nuts as indicated under Assembly type 1  
(1), (2) and (3), and in figure 401.
  - (a) Riveting in accord with 70-50-10 : Standard Assem-  
bly.
  - (b) Checking in accord with 70-50-81 : Standard Assem-  
bly.



OLYMPUS 593

MK.610-14-28

OVERHAUL



- (3) Remount plate assy and secure it with rivets as directed in Chapter "RIVETING", sections 70-50-10 : Standard Assembly and 70-50-40 : Assembly by H1 LOK Attachments, as well as in figure 401.
- (4) Check attachment items of support plates as instructed in Chapter "RIVETING", sections 70-50-81 : Standard Assembly and 70-50-84 : Assembly by H1 LOK Attachments.

#### Assembly type 3

NOTE : To renew thread inserts, the hollow bolt assemblies are to be removed and the hex. nuts discarded.

- (1) Remove damaged thread with Manufacturer's extractor tool.
- (2) Check that the locating tapping of the Heli-coil thread is clean.  
If burry, rectify the tapping with the Manufacturer's "finishing" taps (Heli-coil 14-28 thread, Class 3B).
- (3) Fit a new Heli-coil thread with a Manufacturer's threaded mandrel as indicated in figure 401, Sheet 9.  
Break off the tang with a breaking tool.
- (4) Make sure that the thread insert is properly fitted on as shown in figure 401, Sheet 9.
- (5) Fit back the hollow bolt assemblies as indicated in figure 401, Sheet 13.

#### B. Replacing floating nuts at throat section.

- (1) Discard damaged floating nuts by grinding out the heads of their retaining rivets, as instructed in Chapter "RIVETING", section 70-50-50 : Assembly by CHERRY LOK Blind Rivets.
- (2) Fit a new floating nut and secure it with rivets as directed in Chapter "RIVETING", section 70-50-50 : Assembly with CHERRY LOK Blind Rivets, in figures 402 and 403, and in the following instructions for floating nuts of the type A11471.



OLYMPUS 593

MK.610-14-28  
OVERHAUL



- (a) Choose a floating nut suited to the theoretical thickness "E" of the unit fully assembled (see table in fig. 401-402).
- (b) Ascertain before riveting the nut type All471 that the out-of-flush level difference of the bush lies within the tolerance limits laid down in figures 402 and 403. If it does, the free sliding of the nut in its cage is ensured after assembly of the divergent panels.
- (3) Check the riveting as directed in Chapter "RIVETING", section 70-50-85 : Assembly with CHERRY LOK Blind Rivets.

PRINTED IN FRANCE

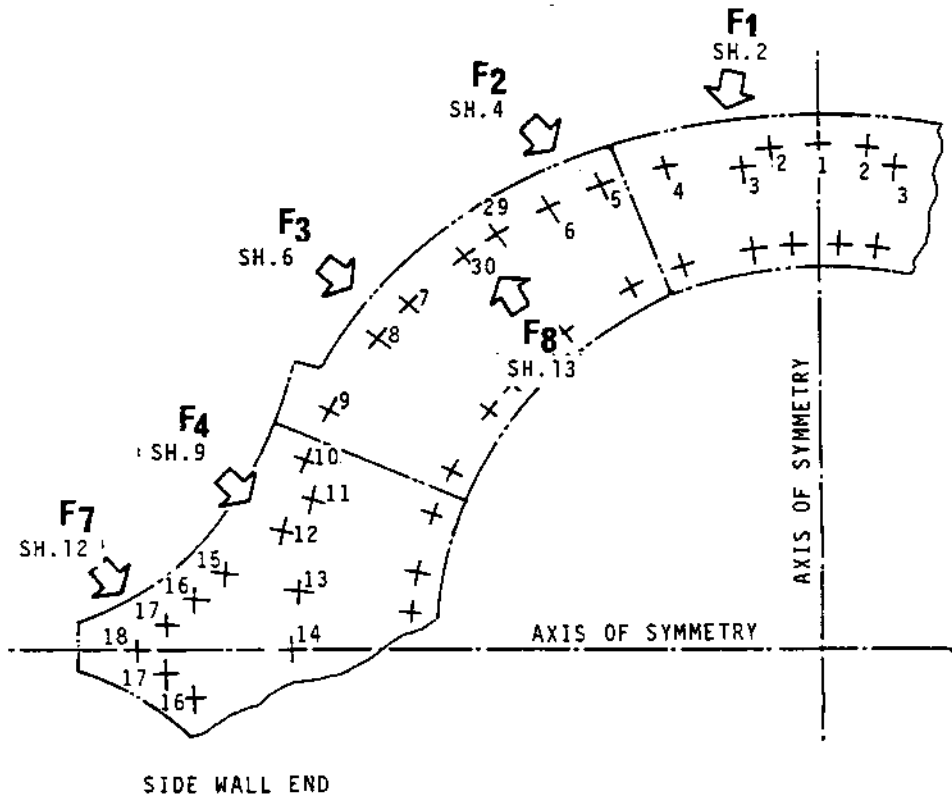


OLYMPUS 593

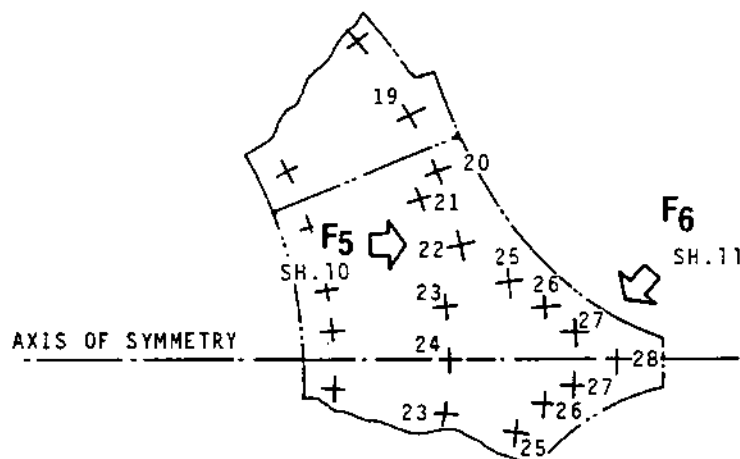
MK.610-14-28  
OVERHAUL



REAR VIEW AS SEEN FROM REAR FRAME  
BAYS 1 AND 3 AS SHOWN  
BAYS 2 AND 4 SYMMETRICAL



CENTER WALL END



Renewing Attachment Items of Divergent Panels  
Next to Rear Frame  
Figure 401 - (Sheet 1 of 16)